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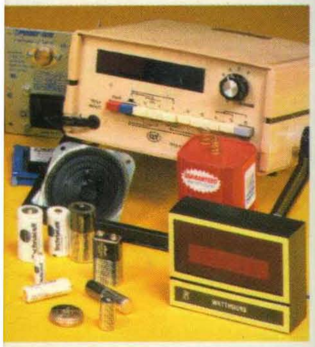

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TO D•1585

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2050	Computer Software
2200	Control Systems & Components
2325	Data Acquisition/Handling Systems & Accessories
2550	Environmental Test Equipment
2900	Instruments, Test & Measuring
2950	Panel Meters (Analog & Digital)
2975	Oscilloscopes
3000	Instruments, Graphic Recording
3400	Microwave Systems & Equipment
3475	Military Systems & Equipment
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contents

How to use EEM .... D•2
Alphabetical Index of Manufacturers' Catalog Data Pages .... D•4
Alphabetical Index of Distributors' Advertisements .... D•8
Product Index & Directory .... D•9
Manufacturers & Sales Offices Directory .... Yellow Pages 601
Trademark and Logofinder Directories .... B•901
Manufacturers' Catalog Data Pages .... D•1002

product sections

1100 Amplifier Assemblies, Instrumentation .... D•1002
1300 Audio Equipment & Accessories .... D•1023
1900 Communications & Telemetry Equipment .... D•1049
2000 Computer Peripheral Equipment .... D•1057
2025 Computers (Mini/Micro) .... D•1083
2050 Computer Software .... D•1106
2200 Control Systems & Components .... D•1109
2325 Data Acquisition/Handling Systems & Accessories .... D•1135
2550 Environmental Test Equipment .... D•1165
2900 Instruments, Test & Measuring .... D•1174
2950 Panel Meters (Analog & Digital) .... D•1328
2975 Oscilloscopes .... D•1384
3000 Instruments, Graphic Recording .... D•1400
3400 Microwave Systems & Equipment .... D•1408
3475 Military Systems & Equipment .... D•1410
3900 Batteries .... D•1412
4000 Power Supplies, DC .... D•1446
4050 Power Supplies, AC .... D•1876
4100 Production Equipment & Manufacturing Services .... D•1977
4900 Servomechanisms & Robotic Equipment .... D•1985

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<table>
<tr><td>CALEX
MFG. CO.</td><td rowspan="2">INDUSTRIAL
COMPUTER
DESIGNS</td><td>NES INC.</td><td>ASTRO MED
INC.</td><td rowspan="2">ELPOWER</td><td rowspan="2">POWER ONE</td><td rowspan="2">GLASSMAN
HIGH VOLTAGE INC.</td></tr>
<tr><td>QUAM-
NICHOLS</td><td>IET LABS</td><td>B AND K
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</table>

how to use eem

The 28th edition of EEM is arranged in four volumes, each composed of related Product Sections. For user convenience, each volume contains its own Product Index and Directory (green pages) and its own Manufacturers and Sales Offices Directory (yellow pages). Every Product Heading and every Manufacturer of electronic products is listed in each volume. Where, however, the Product Section is assigned to a volume other than that in use, a cross reference is made to the appropriate volume for further information.

To locate a specific product. Start by choosing the volume whose title describes the class of electronic product you are seeking. If you are not sure which volume is appropriate, pick up the first one at hand and find the product heading in the green pages. There you will find either a list of that product's manufacturers or you will be referred to the proper volume. All products are identified by their generic terms. Please read the detailed instructions on the first page of this section. Manufacturers with catalog data in this edition of EEM appear in bold face type and page numbers are shown. Manufacturers appearing in light face type have submitted verifying evidence that they supply the products shown. When you have located a product of interest, turn to the page(s) shown for further information. You will find these pages in each volume in the appropriate sections.

product selection guides

There are 34 Product Selection Guides included in this edition of EEM! They are located on the first pages of the Product Section to which they apply. Use these guides for basic selection parameters and then go to the EEM pages shown in the guide for more detailed information.

product selection index

Product Selection Index		**Vol. A**	**Vol. B**	**Vol. C**	**Vol. D**
1100	Amplifier Assemblies, Instrumentation				**D**•1002
1300	Audio Equipment & Accessories				**D**•1023
1400*	Cabinets, Enclosures, Racks & Chassis			**C**•1002	
1500*	Capacitors	**A**•1002			
1600	Chemical Compounds (Adhesives, Cleaners, Coatings)			**C**•1096	
1700*	Circuit Boards (Printed), Materials & Accessories			**C**•1098	
1800*	Coils, Chokes, & Inductors	**A**•1204			
1850	Cores, Magnets, & Ferrites	**A**•1298			
1900	Communications & Telemetry Equipment				**D**•1049
2000	Computer Peripheral Equipment				**D**•1057
2025	Computers (Mini/Micro)				**D**•1083
2050	Computer Software				**D**•1106
2100*	Connectors, Terminals, & Sockets			**C**•1104	
2200	Control Systems & Components				**D**•1109
2300*	Crystals, Oscillators, Crystal & Piezoelectric Filters	**A**•1308			
2325	Data Acquisition/Handling Systems & Accessories				**D**•1135
2350*	Delay Lines	**A**•1458			
2400*	Panel Hardware (Bezels, Dials, Knobs, etc.)			**C**•1588	
2440*	Military Components		**B**•1002		
2450*	Displays, Readouts, Lamps, & Lights		**B**•1014		
2475	Fiber Optic Equipment & Accessories		**B**•1118		
2500	Mechanical Components			**C**•1617	
2550	Environmental Test Equipment				**D**•1165
2600*	Fans, Blowers, Cooling Equipment, & Heat Exchangers			**C**•1622	
2700*	Filters	**A**•1582			
2800	Hardware (Electrical/Electronic)			**C**•1683	
2825	Hardware (Mechanical)			**C**•1694	
2900*	Instruments, Test & Measuring				**D**•1174
2950*	Panel Meters (Analog & Digital)				**D**•1328
2975*	Instruments, Oscilloscopes				**D**•1384
3000*	Instruments, Graphic Recording				**D**•1400
3100	Insulators & Insulating Materials			**C**•1697	
3130	Integrated Circuits, Hybrid Circuits, & Function Modules	**A**•1659			
3200*	Interconnection Systems (Backpanels, Card Holders, Packaging Systems)			**C**•1698	
3400	Microwave Systems & Subsystems				**D**•1408
3450*	Microwave Components	**A**•1684			
3475	Military Systems & Equipment				**D**•1410
3500*	Motors, Drives, & Rotating Components		**B**•1128		
3700	Electro-optical Equipment		**B**•1203		
3800	Packing, Shipping, & Storage Containers & Materials			**C**•1716	
3900*	Batteries				**D**•1412
4000*	Power Supplies, DC				**D**•1446
4050*	Power Supplies, AC				**D**•1876
4100	Production Equipment, & Manufacturing Services				**D**•1977
4200	Prototype Boards, Kits & Design Aids			**C**•1718	
4300*	Protective Components (Fuses, Circuit Breakers, etc.)		**B**•1224		
4500*	Relays		**B**•1260		
4525	Shields & Shielding			**C**•1720	
4550*	Solenoids		**B**•1462		
4600	Soldering & Desoldering Equipment			**C**•1738	
4700*	Resistors	**A**•1784			
4750*	Potentiometers, Trimmers, Controls, & Rheostats	**A**•1990			
4800*	Discrete Semiconductors	**A**•2066			
4900	Servomechanisms & Robotic Equipment				**D**•1985
5100*	Switches		**B**•1476		
5150*	Keyboards & Keypads		**B**•1704		
5300*	Thermal Components		**B**•1740		
5400	Tools (Manual & Power)			**C**•1741	
5500*	Transducers & Encoders		**B**•1776		
5600*	Transformers	**A**•2098			
5700	Electron Tubes (Including CRT)	**A**•2342			
6000*	Wire & Cable			**C**•1742	

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*Product Selection Guide

advertisers' index

To find a specific manufacturer's data pages, an alphabetical index of EEM participants appears in EEM starting on page A•4 of Volume A and on pages B•4, C•4 and D•4 of the other volumes.

trademark and logofinder directories

A comprehensive trademark directory is included at the end of the EEM green pages in Volume B. NEW in this edition, the EEM logofinder shows the symbols and graphics used by manufacturers as identifiers on their products. Use these pages to locate manufacturers of specific trademarks and logos.

manufacturers' index

In the EEM yellow pages you will find pertinent details on all manufacturers listed in EEM including local sales offices and/or distributors. Please refer to the detailed instructions on the first page of the EEM yellow pages for additional information.

to order a product found in eem

When you have located the product that suits your needs, call the manufacturer or the local sales rep or distributor as shown in the EEM yellow pages. Give the EEM data page number and specs from that page. You and the supplier will be talking on the same wave length which should simplify your ordering and buying.

to file manufacturers' catalogs and data

The EEM File System has been revised and updated. The new EEM File System contains a complete Product Index. This Index tells you where to file which catalog. It also contains a cross-reference so you'll know where catalogs are filed.

In order to use the new EEM File System all you need is a supply of standard letter size, third-cut, manila file folders which are available locally. You then use the pressure sensitive labels which are supplied with the File System to go into as much detail as you want (or need).

Each label fits the third-cut file folder exactly. There are over 300 of these labels in one System: 1 for the index, 1 each for the 62 EEM Product Sections, 24 for the alphabetical file of multiproduct catalogs, plus more than 200 additional labels for System expansion. The System also includes 62 Cross Reference Cards so you can quickly and easily find multiproduct catalogs. The EEM File System is complete and can save you countless hours of time and thousands of dollars. The price? Only $25.00. Send a check to: EEM File System, 645 Stewart Ave., Garden City, NY 11530 and we'll absorb postage and handling. Send a purchase order and add $2.00 for postage and handling. NY and CA residents, please add sales tax.

technical information: codes ... miniglossaries ... charts ...

Abbreviations/Acronyms	A•1166, B•1012, C•1028, D•1016
ASCII Code	D•1087
Batteries & Fuel Cells	D•1430
Capacitors	A•1066
Capacitor Formulas	A•1093
Conductors, Maximum Current Capacity	C•1863
Connectors	C•1129
EBCDIC Code	D•1092
Encapsulation	C•1086
Opto Semiconductors	B•1214
Power Supplies	D•1462
Relays	B•1308
Relay Contact Forms	B•1317
Resistor Color Codes	A•1828
Servo Components	D•1985
Thermal Conductivity of Dielectrics	B•1744
Thyristors & High Power Diodes	A•2076
Wire Gauges	C•1844

85
86 Alphabetical Index of Manufacturers Catalog Pages

This index provides an alphabetical listing of manufacturers pages and where to find them

A

Abacus Controls Inc. D•1880-1882
Abbott Transistor Labs., Industrial Products Div. D•1449, 1884-1885
Abbott Transistor Labs., Power Supply Div. D•1449-1461
Abbott Transistor Labs., Transformer Div. A•2102-2108
ACC Electronics A•1659
Acopian D•1463-1497
Active Control Instrmn. D•1109
ADAC Corp. D•1135
Adtech Power Inc. D•1499
Advance Conversion Devices Co. D•1886-1887
Advanced Detector Corp., Applied Solar Energy Corp. B•1203
Advanced Sys. Concepts D•1137
Ad-Vance Magnetics, Inc. C•1720
Aeroflex Labs., Magnetic Prods. Div., B•1131, 1779
Aeroflex Labs., Microelctrns. Div. A•1660
AirBorn, Inc. C•1111-1118
Airflyte Elctrns. Co. B•1128, 1132-1137
Airpax Corp. B•1226
Airpax Corp., Cheshire Div. B•1138; D•1110
Airpax Corp., Frederick Div., A North American Philips Co. B•1263, 1742
Alberox C•1617
Alco Elctrn. Prods., Inc. B•1481-1483
Alden Products Co. C•1119-1124
Allen Avionics A•1460-1463, 1584-1589, 2109
Allen-Bradley Co., Electronics Group, Rockwell Corporation A•1298-1301, 1784, 1787-1799, 1993-1995, 2068-2069
Allen-Bradley Co., Electronics Group, Div. of Rockwell Corp., Magnetic Products Div. A•1298-1301
Allen-Bradley Co., Electronics Group, Div.of Rockwell Corp., Microelectronic Products Div. A•2068-2069
Allen-Bradley Co., Electronics Group, Div. of Rockwell Corp., Resistive Products Div. A•1993-1995
Alps Electric (USA), Inc. D•1057
Amco Engrg. C•1006-1007, 1625
Amecon, Inc. A•2110-2117
AME Corp. B•1485
Amerace Corp., Elastimold Div. D•1111
American Aerospace Controls B•1780-1781
American Automation D•1179
American Insulated Wire Corp., Leviton Mfg. Co. C•1747
American Microsemiconductor, Inc. A•1661, 2070-2071
American Research & Engineering B•1486-1487
American Switch Corp. B•1488-1491
American Technical Ceramics Corporation A•1007-1009
American Zettler B•1264-1274
Amlan, Inc. C•1125-1128
AMP Incorporated A•1590; B•1118-1120, 1492-1493, 1706; C•1131-1152, 1748
AMP Distributor Marketing Div, A Division of AMP Products Corporation B•1495; C•1130, 1683, 1749
Amplifier Research D•1002-1003
Amuneal Mfg. C•1721
Analogic Corp. D•1138-1139
Analogic Corp., Data Conversion Prods. Grp. D•1138-1139
Analog Modules, Inc. D•1004
Andersen Labs. A•1591
Anderson Elctrns. A•1313
Ango Electronics Corp. C•1008
A. P. Circuit Corp. A•1592
Apex Microtechnology Corp. D•1005
Apollo Magnetics Corp. D•1058
Appleton Papers Inc. D•1059
Applied Electro Technlg., Int., STI Company B•1275
Applied Power Conversion, Technology Dynamics, Inc. D•1500-1507
Applied Research, Inc. A•1702-1703
Arcolectric Corp. B•1018-1020, 1496-1501; C•1153
Aries Elctrns. C•1155-1158
Armtec Industries, Inc., Daven Components Grp. B•1502
Arnold Magnetics D•1508-1511
Aromat Corp. B•1276-1295, 1503
Arra Inc. A•1705
Arrow Hart Div., Cooper Inds. B•1504-1509
Arstan Products Intl. Ltd. A•2118-2121
Asmann Components, Div. of ebm Industries, Inc. C•1160-1161
Assembly Specialists C•1700
Associated Research, Inc. D•1181-1182
Astec USA, Ltd., A BSR Intl. Co. D•1512-1514
Astro-Med, Inc. D•1402
Astron Corp. D•1515
Astrosystems D•1183, 1517, 1888
Atlee Inc. B•1229; C•1009, 1684, 1701, 1722
ATR Elctrns., Inc. D•1889
Augat Inc. C•1702-1703
Ault, Incorporated D•1518-1519
Austron, Inc. A•1314-1315
Automatic Coil Corp., Sub. Designatronics, Inc. A•1207-1209, 1464-1467
Automatic Timing & Controls Co. D•1112
Auto-Swage Prods. C•1685
Avex Elctrns. D•1416
Avionic Instrs. D•1890-1893
Avtel Div., Unitron Inc. D•1895-1897
AVX Corporation A•1010-1011
Axial Magnetics B•1139

B

Ballantine Labs. D•1185
B & K Precision, Industrial Electronics Product Group, Dynascan Corporation D•1186-1190, 1386-1388, 1521
Barnes Engrg. C•1010-1024
BBC-Metrawatt/Goerz D•1192-1193
Bead Electronic Connectors, Bead Chain Manufacturing Co. C•1162-1167
Bead Elctrns., Div. Bead Chain Mfg. Co. C•1686-1688
Beau Products Div., Vernitron Corp. C•1168-1170
Behlman Engineering D•1898-1905
BEI Motion Systems Co., Corporate Off. B•1782-1783
BEI Motion Sys. Co., Computer Prod. Div. B•1783
BEI Motion Sys. Co., Digital Prods. Div. B•1782
BEI Motion Sys. Co., General Control Systems Div. B•1783
BEI Motion Sys. Co., Industrial Encoder Div. B•1782
BEI Motion System Company, Kimco Division B•1783
BEI Motion Sys. Co., Position Controls Div. B•1782
Belden, Electronic Wire & Cable C•1742, 1750-1789
Bel Fuse A•1468-1486; B•1230-1232
Bell, Floyd, Assocs., Inc. D•1023
Bell, F. W., Inc. B•1784-1785; D•1113, 1194-1195, 1977
Bell Inds., J. W. Miller Div. A•1210-1217
Berkeley Nucleonics Corp. D•1196
Bertan Assocs. D•1522-1535
Best Electrics Div. B•1743
B-G Instruments D•1060
B. H. Elctrns. A•2122-2123
Bikor D•1536
Bivar, Inc. C•1025
Blatek Inds., Inc. B•1787
Bliley Elec. Co. A•1316-1323
Blue M, A Unit of General Signal D•1165
Bodine Elec. Co. B•1140
Boonton Elctrns. Corp. D•1197
Bopla Enclosures C•1026
Bosch, Robert, Corp. B•1296-1297
Boschert Inc. D•1537-1540
Bourns, Inc., Resistive Components Group A•1800-1803, 1996-2008
Bowmar/ALI, Bowmar Instr. Corp. D•1331-1333
Bowmar Instrument Corp., Aerospace Div. B•1707
Breeze-Illinois, TransTechnology Corp. C•1171, 1790-1792
Brevel Motors, Inc., Sub. Vernitron Corp. B•1141
Brim Elctrns. C•1793-1800
Buckeye Stamping Co. C•1027
Buehler Products, Inc. B•1142
Bulbtronics, Inc. B•1021
Bumper Products Corp. C•1694
Burgess Switch Co., Inc. B•1510-1512

C

Cabtron Sys., Inc. C•1029
Caddell-Burns Mfg. A•1218-1229

Caddock Electronics, Inc. A•1804-1827
Calex Mfg. Co., Inc. D•1006, 1542-1545
California Avionics Labs. D•1198
California DC D•1546
California Instruments, A Div. of Amstar Tech. Prods. Co., Inc. D•1907
Calmark Corp. C•1030-1044
Cal-R, Inc. A•1829-1831; B•1745-1747
Cambridge Aero Instruments, Inc. D•1116
C & K Components, Inc. B•1513
Canon U.S.A., Elctrn. Comps. Div. B•1143
Canyon Elctrns. B•1022
Capacitor Technology, Inc. A•1012
Capar Components Corp., Div. of Diplomat Electronics A•1013
Carlingswitch, Inc. B•1514-1515
Carol Cable Co., Inc., Columbia Elctrn. Cables Div. C•1801-1819
Catalyst Research, D•1417
Caton Connector Corp. C•1172
Celesco Transducer Prods., Inc. B•1788-1789
Centronic Inc. B•1204-1205
Ceramaseal C•1173
CES Elctrns. D•1606
Chassis-Trak, General Devices Co., Inc. C•1062-1063
Chatsworth Data Corp, Cablemaster Div. D•1199
Cherry Electrical Prods. Corp. B•1024, 1521-1533, 1708-1712
Chessell Corp. D•1403
Chesterfield Prods. A•1593
Chicago Lock Co. B•1534
Christie Elec. Corp. D•1547-1549
Chrono-log Corp. D•1061
Cincinnati Sub-Zero Prods. D•1166
Ciprico Inc. D•1062
Clairex Electronics B•1206-1209
Clare Division, General Instrument Corp. B•1260, 1302-1306
Clarke-Hess Comm. Resch. Corp. D•1200-1201
Clifton Precision, Litton Systems, Inc. B•1144
CML MACARR Div., Marine Electric RPD, Inc. D•1908-1909
Coaxial Dynamics D•1203
COBA, Inc. B•1535-1537
Colber Corp. A•1832
Cole Instr. B•1538
Colorado Crystal Corp. A•1324
Comclok, Inc. A•1325

Communications Instrs., Inc. .... B•1298-1301
Compac .... A•1594, 1706-1707; C•1046-1049
Component Research Co. Inc. .... A•1014-1063
Compower Div., Computer Prods., Inc. .... D•1446, 1552-1558, 1584-1585
Computer Components, Inc. .... B•1307
Computer Conversions Corp. .... D•1140-1141
Computer Devices Corp. .... A•1487
Computer Prods. Inc., Power Conversion Grp. .... D•1446, 1551-1585
Comstron Corp. .... A•1327-1329, 1595; D•1204-1205
Concept Industries, App-Rep, Inc. .... A•1064-1065, 1833
Concord Elctrns. .... C•1174-1175
Condor D.C. Power Supplies, Inc. ... D•1587-1599
Connector Corp. .... C•1176-1177
Connor-Winfield Corp. .... A•1331-1334
Control Concepts Corp. .... B•1233
Control Elctrns. Co., Inc. .... A•1488
Controlled Power Co. .... D•1876, 1910-1915
Control Sciences, Inc. .... D•1142-1146
Control Technology Co. .... D•1986-1987
Converter Concepts, Inc. .... D•1600-1603
Cooner Wire Co. .... C•1820-1826
Corcom, Inc. .... A•1596
Cord Electronics, Inc. ....A•2009; B•1023; C•1827; D•1024, 1605
Cornell-Dubilier Elctrns. .... A•1067, 1597; B•1309
Corning Glass Works, Corning Elctrns. .... A•1068-1069, 1835
Coto Corporation .... B•1310-1311
CPS Inc. .... D•1607
Crestronics Div., Applied Electro Technlg., Int. .... D•1609
Crosspoint, Div. of Info-Lite .... B•1539
Crouzet Controls, Inc. ... B•1145, 1315-1316, 1541
Croven Crystals .... A•1335
Crydom Division, Int'l. Rectifier ...... B•1312-1314
CSI Capacitors, CSI Technlgs. .... A•1070
C-Tek Inc. .... D•1114-1115
CTS Corporation .... A•1336-1357, 1663-1667; B•1542-1546
CTS Corporation, Berne Division .... A•1836-1844, 2011
CTS Electronics Corp., Paso Robles Div., Electromechanical Gp. .... B•1542-1546
CTS Electronics Corp.,, Knights Division .... A•1336-1357
CTS Corporation, Microelectronics Div. .... A•1662-1667
CTS Electronics Corp., Halex Division .... A•1662-1667
Curtis Inds. .... A•1599; C•1178; D•1978
Curtis Instrs., Inc. .... D•1117
CYTEC Corp. .... D•1207

D

Daburn Elctrns. & Cable .... C•1828-1837
Daico Inds., Inc. .... A•1708-1709
Dai-Ichi Shoji of Amer., Inc. .... A•1071; B•1548-1549; C•1179
Dale Electronics, Inc., Columbus Div. .... B•1025-1027
Dale Electronics, Inc., El Paso Div. ...A•1845-1863
Dale Electronics, Inc., Norfolk Div. ...B•1748-1749
Dale Electronics, Inc., Tempe Div. ... A•1358-1359
Dale Electronics, Inc., Yankton Div. .... A•1231-1237, 2125-2132; C•1180-1183
Damon/Elctrns. Div. .... A•1360
D & B Power, Inc. .... D•1610-1611
Daniels Mfg. Corp. .... C•1741
DataCon, Inc. .... C•1705
Data Delay Devices .... A•1489-1501
Data Instruments, Inc. .... B•1790
Datak Corp. .... C•1100, 1590, 1838
Datamax Electronics, Inc. .... A•1502-1507
Datametrics • Dresser Inds., Inc. .... B•1791
Data Tech, Div. of Penril Corp. .... D•1328, 1334-1345
Datawrap, Inc. .... D•1979
Datec, Inc. .... D•1049
Datel, General Electric Co. .... D•1083, 1147, 1346
Datum Inc., Timing/Aacom Divisions .... D•1050, 1148
DCI Inc. .... D•1347
Deak Technology, Inc. .... D•1208-1210
Dearborn Wire & Cable Co. .... C•1839
Del Elctrns. Corp. .... A•2133; D•1614-1615
Delevan Div., American Precision Inds. Inc. .... A•1238
Delta Electronic Ind. USA, Delta Elctrn. Ind. Co. Ltd. .... A•1600-1601; D•1616-1617
Deltrol Controls .... B•1320-1321, 1464-1465
Densitron Corp. .... B•1029-1031
Dialight Corp. .... B•1032-1038, 1550-1551
Diego Power .... D•1916
Digital Equipment Corp. .... D•1063-1065
Digitec Corp. .... D•1066, 1149, 1348
Dio-Rey, Div. of Info-Lite .... B•1040-1046
Displex, Inc. .... D•1619, 1917
Diversified Elctrns., Inc., Indl. Controls Div. .... B•1322
Dixson, Inc., Instrument Div. .... D•1349
Douglas Randall .... B•1323-1331
Dow-Key Microwave Corporation .... A•1710
Dranetz Technologies, Inc, Computer Products-Division .... D•1167
Dreefs Switch, Inc. .... B•1553-1555
Duncan Electronics, Inc. .... A•2012-2013
DVE/Caltronic Co., Ltd., A Sub. of Dee Van Entrp. Co., Ltd. .... D•1613
Dynamics Research Corp., Encoder Division .... B•1793

E

Eagle Magnetic Company, Inc. .... C•1723
EAO Switch Corp. .... B•1557
E-A-R Div., Cabot Corp. .... C•1695
Eastern Air Devices Motor Div. .... B•1146
ebm Inds., Inc. .... C•1626-1628
Eby Co. .... C•1184-1185
Ectron Corp. .... D•1007
EECO Incorporated .... B•1558-1561
EFRATOM, a division of Ball Corp. .... A•1361
EG & G Almond Instruments .... D•1620-1621
EG & G Birtcher .... C•1051-1053
EG & G Rotron, Commercial Div. ... C•1630-1636 .... B•1210
EG & G Vactec .... B•1210
Elcom Systems, Inc. .... A•1711
Electric Switches, Inc. .... B•1516-1517
Electro Comp., Inc. .... A•1864-1865
Electro-Craft .... B•1147-1149
Electrodynamics, Inc., A Talley Inds. Co. ...D•1119
Electro-Films, Inc. .... A•1866-1867
Electro Impulse .... C•1637; D•1211
Electro Industries, Div. E.I. Elctrns., Inc. .... D•1350-1351
Elec-Trol, Inc. .... B•1332-1342
Electromech, Inc. .... A•2134
Electro-Mechanisms .... B•1466-1467
Electro-Mech Comps. .... B•1562-1563
Electronic Components Groupe, Stein Industries, Inc. .... B•1566
Electronic Concepts, Inc. .... A•1072-1077
Electronic Dev. Corp. .... D•1213-1215
Electronic Enclosures, Div. Wyle Labs .... C•1056
Electronic Instr. & Specialty Corp. ... B•1344-1345
Electronic Measurements .... D•1622-1625
Elctrn. Molding Corp. .... C•1186-1188, 1698, 1706-1709
Electronic Navigation Inds, Emerson Electric Co. .... D•1008-1009
Elect. Prec. Comp. Corp. ... A•1603, 1868; D•1217
Electronic Research Co. .... A•1362
Electronic Solutions .... D•1084-1086
Electronic Specialty Div., ElecSpec Corp. .... B•1346-1347
Electro Space Fabricators .... C•1054-1055
Electro Switch .... B•1564-1565
Elfab Corp. .... C•1190-1191
Elgar Corp, An Onan McGraw Edison Co. .... D•1918-1922
Elgenco, Inc. .... D•1218-1223
Elmwood Sensors .... B•1750
Elpac Comps. .... A•1078-1079
Elpac Power Sys. .... D•1626-1631
Elpower .... D•1418-1420
EMCO High Voltage Co. .... D•1632
Emcor Products, Crenlo, Inc. .... C•1057
EMICO Inc. .... D•1352-1353
Empro Mfg. Co., Inc. .... D•1224
Endicott Coil .... A•1239, 2135
Endicott Resch. Grp., Inc. .. B•1047-1049; D•1633
Energy, Ltd. .... D•1923
Entran Devices .... B•1794-1795
Epsco .... D•1634
Equipto Elctrns. Corp. .... C•1059
ERA Transpac Div., Sub. Elctrn. Research Assocs. .... D•1635-1637
ESC Elctrns. Corp. ...... A•1508-1521, 1604-1605
E-Systems, Memcor Div. .... A•1869, 2015
ETI Systems, Polaris Indl. Entprs. ... A•2016-2017; B•1150-1152; D•1120-1121
ETM Electromatic .... D•1226-1227, 1638
ETRI, Inc. .... C•1638-1640
EVI, Inc. .... D•1639
EWC, Inc. .... A•2136-2148
Exar Corp. .... A•1668-1669
Excel Technology Intl. Corp. .... B•1050-1052

F

Fabricast .... B•1154-1159
Fairchild Weston, Data Recorders .... D•1228
Farrand Controls, Div. of Farrand Industries, Inc. .... B•1796
Fenwal Elctrns. .... B•1751
Ferrotran Elctrns. Co., Inc. .... D•1640-1641
FIC Corp. .... B•1235
Fifth Dimension, Inc. .... B•1348, 1567
Filter Concepts Inc. .... A•1606-1607
Filtron Co., Inc., Div. of Aeroflex Labs., Inc. .... A•1608
Fischer-America, Inc., Div. of Technographics, Inc. .... C•1193
Flex-Core Div., Morlan & Assocs., Inc. ..... A•2149
Flex-Key Division, Rogers Corp. .... B•1714-1715
Fox Elctrns. .... A•1363
Franek, John, Co., Inc. .... D•1924-1927
Frederick Components Intl. ....B•1717; C•1194, 1641; D•1643
Freed Transformer .... A•2150-2153; D•1229
Frequency and Time Systems, Inc., DATUM, INC. .... A•1364-1365; D•1230
Frequency Devices, Inc. .... A•1609; D•1231
Frequency Elctrns. .... A•1366-1367
Frequency Selective Networks, Inc. .... A•1369
Fujitsu America, Inc. ....B•1349-1368; C•1104, 1195-1224
Fuses Unlimited .... B•1234

G

Gamma High Voltage Resch. Inc. ... D•1644-1645
Gardiner Solder Co., Div. of Gardiner Metal Co. .... C•1738
Gemini .... C•1060-1061
General Devices .... C•1062-1065
General Digital Corp. .... D•1067
General Microwave Corp. .... A•1712; D•1232
General Power Sys. .... D•1929
General Resistance, Inc., A Prime Technology Company .... A•1870; D•1233
Genicom Corp. .... B•1370-1373
Georator Corp. .... D•1930-1932
GFC/Hammond Elctrns., Inc. .... D•1647
Gilway Technical Lamp .... B•1053-1055
Glassman High Voltage Inc. .... D•1234-1235, 1648-1651
Gordos Corporation, Gordos International Corp. .... B•1375-1379, 1568-1570
Gordos Arkansas, Gordos International Corp. .... B•1380-1383
Gould Inc., Design & Test Sys. Div. .... D•1237
Gould Inc., Recording Systems Div. .... D•1400, 1404
Gowanda Elctrns. .... A•1240
Gralex Inds. .... D•1354-1356
Graphite Metallizing Corp. .... B•1160
Grayhill Inc. .....B•1384-1385, 1571-1587, 1704, 1718-1725; C•1225
GRIM Corporation .... D•1051
GSI Corp. .... C•1840
Guardian Elec. Mfg. Co. .... B•1386-1387
G W Three Incorporated .... D•1088-1090

H

Hafstrom Technical Products, Inc. .... D•1169
Hamilton Standard Controls .... B•1447
Hamlin .... B•1389, 1588
Hammond Mfg. Co. .... C•1066-1067
H&T Components Inc., H&T Components Ltd. .... C•1226
Harrel, Inc. .... D•1122
Hasco Components, Inc. ....B•1390-1396, 1589-1591
HEI, Inc. .... B•1211
Heinemann Elec. Co. .... B•1236-1237
Hermetic Switch .... B•1592
Heurikon Corporation .... D•1091
Hewlett-Packard Co. .... D•1653-1656
Hexacon Elec. .... C•1739
Heyco Molded Products .... C•1227
Hi-G Company, A Subsidiary of Nytronics Inc. .... B•1398-1407
Hipotronics ....A•2154-2156; D•1238-1240, 1658-1659, 1934-1935
Hiram Jones Elctrns. .... C•1228-1231
Richard Hirschmann of America .... C•1232-1237
Hisonic, Inc. .... A•1610, 2157
Hi-Tech Components, Mitsubishi International Corp. .... A•2018-2019; B•1239
Hi-Tech, Inc. .... C•1642
Hitran Corp., Agex ... A•2158; D•1660, 1936-1937
Holmberg Elctrns. .... C•1239-1270
Hughes Solid State Products .... A•1370-1373
Huntington Electric Inc. .... A•1871
Hybricon Corp. .... C•1710
HyComp Inc. .... A•1670, 1872-1873
Hypertronics Corp. .... C•1271
Hytek Microsystems .... A•1522-1527, 1671

I

IDEC Systems & Controls Corp. .... B•1056. 1408-1412
IEI-ISKRA Electronics, Inc. ..A•1080-1081, 1875, 2020, 2072-2073; B•1413; C•1643
IERC .... C•1643

INDEX OF MANUFACTURER'S CATALOG PAGES

IET Labs, Inc. ... D•1242-1245
ILC Data Device Corp. ... D•1150-1151
Illinois Capacitor, Inc. ... A•1084-1085
Illinois Lock Co., The Eastern Co. ... B•1593-1595
IMC Magnetics Corp., Exec. Off. ... B•1161; C•1644-1645, 1647
IMC Magnetics Corp., Eastern Div. ... B•1161; C•1644-1645
IMC Magnetics Corp., New Hampshire Div. ... C•1647
Inductive Prods., Inc. ... A•1230
Industrial Control Co. ... D•1988
Industrial Devices, Inc. ... B•1014, 1017, 1057-1077
Industrial Elctrn. Engrs., Inc. ... B•1078-1079, 1726
Industrial Elctrn. Hardware Corp. ... C•1272
Industrial Test Equip. ... D•1247, 1938-1941
Infodex, Inc. ... B•1080-1081; D•1410
Information Transfer Indl. ... D•1152-1154, 1248-1249
Injectorall Elctrns. ... C•1101
Instrumentation & Control Sys. ... B•1318-1319; D•1933
The Instrument Mart ... D•1246, 1364, 1389
Instruments for Industry, Inc. ... D•1010
Instrument Specialties Co. ... C•1724-1725
Intech, Microcircuits Div. ... A•1672
Integrated Circuits, Inc. ... A•1673; D•1661-1665
Interconnection Technology, Inc. ... C•1711
Interelectronics Corp. ... D•1667
Interface Engrg. ... D•1156-1157
Inter-Market ... B•1082, 1597
International Comps. Corp. ... A•1086, 1876, 2074; C•1273; D•1025
International Electro Magnetics, Inc. ... D•1026
International High Voltage Elctrns., Inc. ... D•1668-1669
International Instruments, General Resistance, Inc. ... D•1357
International Microelectronic Prods. ... A•1674-1676
International Power ... D•1670-1674
International Sensor Systems, Inc. ... A•1677
Inter-Technical Grp. ... A•1087-1092
Intronics, Inc. ... D•1676-1677
Ion Physics Co. ... D•1123
ISL Products Int'l, Ltd. ... A•1094-1095, 1877, 2075, 2159
Isotemp Research, Inc ... A•1374-1375
Itek Measurement Sys., Div. Litton Inds. ... B•1797
ITT Cannon ... C•1274-1288
ITT Components Electromechanical Grp. ... B•1414-1417, 1419, 1422, 1471
ITT Components Passive Grp. ... A•1096-1101, 1377; B•1418, 1420-1421, 1423
ITT Pomona Electronics ... C•1289-1407
ITT Schadow ... B•1598-1602
IVO Inds., Inc. ... B•1603
Iwatsu Instruments, Inc. ... D•1390-1392

J

JAE ... B•1604-1607
Janco Corp. ... B•1608-1609
Jan Hardware Mfg. Co. ... C•1588, 1591-1611
JBM Electronics, Inc. ... A•1528-1529
J-B-T Instrs. ... D•1358
JDK Controls, Inc. ... A•2021
Jennings ... A•1102-1103; B•1424-1425, 1610; D•1251
Jerome Industries Corp. ... D•1678-1679
Jettron Prods. ... C•1408-1410
Jewell Electrical Instrs. ... D•1359
JMJ Technical Prods. ... C•1613
JMK, Inc. ... A•1611
JM Transformer Co., Inc. ... A•2160-2163
Jobmaster Corp. ... A•1303
Johanson Dielectrics ... A•1104
Johanson Mfg. Corp. ... A•1105
JSC Wire & Cable ... C•1841
Judco Mfg. Inc. ... B•1611
Judd Wire, High Voltage Engrg. ... C•1842-1843
Judd Wire, High Voltage Engrg. ... C•1842-1843
Julie Resch. Labs. ... A•1878; D•1252-1256

K

Kaiser Systems, Inc. ... D•1680-1683
Kalamazoo Technical Furniture ... C•1068
K & M Elctrns. ... A•1879
Kappa Networks, Inc. ... A•1530-1545
Kavlico Corp. ... B•1798
Kay Elemetrics Corp. ... A•1713
KDI Electronics, Inc., Engelmann & Pyrofilm Divisions ... A•1881
KEC Elctrns., Inc. ... D•1685-1687
Kel-Am ... C•1412-1423
Keltec Florida ... D•1688
Kelvin ... A•1882-1883
Kemet, Union Carbide Corporation, Elctrns. Div., Components Dept. ... A•1106-1107
Kepco, Inc. ... D•1689-1714
Kessler-Ellis Prods. ... D•1124-1125
Kester Solder Div. ... C•1096, 1740
Keystone Carbon, Thermistor Div. ... B•1752-1755
KGS Electronics, Inc., GAR Entprs. ... D•1715, 1942-1943
Kikusui Intl. Corp. ... D•1393, 1652
Kilovac Corp. ... B•1426-1427
KOA Speer Elctrns. ... A•1108, 1884-1886
Koep Precision Standards, Inc. ... D•1257
Kollmorgen Corp., Industrial Drives Div. ... B•1163-1165; C•1483
KR Electronics, Inc. ... A•1613
Krohn-Hite Corp. ... D•1258-1259
Krystinel Corp. ... A•1304-1306
Kulite Semiconductor Prods., Inc. ... B•1799
Kulka Smith, Inc. ... C•1424-1429
Kurz Instruments, Inc. ... B•1800

L

Lamtech Electronics ... C•1845
Lansing Research Corp. ... C•1069
LaserSonics Power Supply Operation ... D•1719
L-Com Inc. ... C•1846-1847
LDJ Incorporated ... D•1260
Leach Corp., Control Prods. Div. ... A•1378-1379, 1678-1679; B•1428-1429
Leach Corp., Relay Div. ... B•1430-1435
Lear Siegler, Inc., Elctrn. Instr. Div. ... C•1430
Ledex Inc. ... B•1462, 1468-1470, 1612-1614
Ledtronics, Inc. ... B•1083
Leecraft Mfg. ... B•1085-1087
LEMO U.S.A., Inc. ... C•1431-1439
Lenco Elctrns., Inc. ... A•2164-2165
Liberty Controls ... B•1472-1473
Liberty Mirror, Libbey-Owens-Ford Co. ... B•1212
Lincoln Instrs. ... D•1361
Lindgren RF Enclosures, Inc. ... C•1726
Linseis, Inc. ... D•1405
Littelfuse, Inc., Sub. of Tracor, Inc. ... B•1088, 1224, 1240-1246, 1616-1617
Litton Encoder Div. ... B•1801
Logitek, Inc. ... B•1436-1437
LVC Inds., Inc., CO-ORD Switch Div. ... B•1619-1621
LZR Electronics, Inc. ... D•1716-1718

M

Mabuchi Motor America Corp. ... B•1167
M/A-Com. Cable/Home Communicatios Comm/Scope Coaxial Cable, M/A-Com Inc. ... C•1849-1857
Mac Panel Co. ... C•1712-1713; D•1411
Magnecraft Elec. Co. ... B•1438
Magnetic Instrumentation ... D•1261
Magnetico Inc. ... A•2167
Magnetic Shield Div., Perfection Mica Co. ... C•1727-1729
Magnetic Technology ... B•1168-1169
Magnet Sales & Mfg. Co. Inc. ... A•1307
Magnum Elec. ... C•1440-1444
Magnum Opus Custom Elctrn. Engrg. ... D•1093
Maida Development Co. ... A•1109-1113
Malco, Div. Microdot Electronic Components Group ... C•1446-1449, 1859
Mallory Capacitor Co., Mallory Comps. Grp. ... A•1114-1115
Mallory Components Division, Emhart Elec./Elctrn. Grp. ... A•2022
Mantex Corp. ... B•1727
Marcon America Corp. ... A•1116-1117, 1887
MARCONI INSTRUMENTS ... D•1262-1264
Markel Corp. ... C•1689
Marquardt Switches Inc. ... B•1622
Marway Prods. Inc. ... D•1944-1945
Math Assocs. ... B•1124
Matrix Corp. ... D•1158
Matrix Sys. Corp. ... A•1715
Matsuo Electronics ... A•1118-1123
Maurey Instr. Corp. ... A•2023-2027; B•1170
Maxon Precision Motors, Inc. ... B•1171
McCoy Electronics Co., Sub. Oak Technology Inc. ... A•1380-1383
MCG Elctrns. ... B•1248-1253
McGill Mfg. Co., Inc., Electrical Div. ... B•1623; D•1929
MCI Transformer Corporation ... A•2168-2175, 2177-2183
MCL, Inc. ... D•1408-1409
McLean Engrg., Div. of Zero Corp. ... C•1648-1649
McLean Midwest ... C•1650-1651
3M Co., Static Control Sys. Div. ... D•1980-1981
MDF Products Inc. ... D•1265
Measurement Sys., Inc. ... D•1126
Mechanical Entprs. ... B•1624, 1728-1729
Mechanized Electronic Assembly Div., Universal Instrs. Corp. ... D•1982
Meissner Inds. ... A•1889
Melcor/Materials Elctrn. Prods. ... C•1652-1653
Memodyne ... D•1068
Mepco//Electra, Inc., North American Philips Corp., Corpo. ... A•1124-1126, 1890-1891, 2029; B•1008
Mepco//Electra, Inc., North American Philips Corp. ... A•2029; B•1008
Mepco//Electra, Inc., North American Philips Corp. ... A•1124; B•1009
Mepco//Electra, Inc., North American Philips Corp. ... A•1126, 1890-1891
Mepco//Electra, Inc., North American Philips Corp. ... A•1124-1126; B•1009
Mepco//Electra, Inc. ... A•1890
MERET, Inc. ... B•1121
Metuchen Capacitors, Inc. ... A•1128-1134, 1614-1615; C•1454-1457
MF Elctrns. Corp. ... A•1384-1385
MG Electronics ... D•1027
Mhotronics., Inc. ... C•1459-1461
Microcomputer Power ... D•1721-1723
Micro Devices Product Group, Therm-O-Disc, Inc. ... B•1775
Microelectronic Relays, Inc. ... B•1439
Micro Mo Electronics, Inc. ... B•1172-1175
Micronel U.S. ... C•1622, 1654-1673
Micro-Ohm Corp. ... A•1892-1897
Microsonics Inc. ... A•1386
Micro Switch, A Honeywell Div. ... B•1476, 1625-1670, 1732-1733, 1757, 1802-1804
Micro Technical Inds., Micro-Ohm Corp. ... D•1170-1171
Microtran Co. Inc. ... A•1241, 2098, 2184-2197
Mid-Eastern Industries ... D•1724-1726
Midland-Ross Corp., NEL Unit ... A•1387
Midwest Comps. ... B•1740, 1758-1765
Mil-Comm Distributors, Inc. ... D•1421
Millivac Instrs. ... D•1266
Mills Resistor Co. ... A•1899
Milwaukee Resistor Corp. ... A•1900-1905
Mini-Circuits Lab. ... A•1700, 1716-1779
Mini-Systems, Inc. ... A•1906
Mini-Systems, Inc., Electronic Package Div. ... A•1681
Mizar, Inc. ... D•1094-1096, 1106
Modular Devices ... D•1011, 1727
Modutec ... D•1362-1363
Molecu-Wire ... C•1860-1862
MOLEX, Inc. ... B•1671; C•1463-1467
Monitor Prods. Co., Inc. ... A•1388-1391
Motorola, Inc., Compt. Divs. Clock Oscillator Dept. ... A•1392-1393
Motorola Semiconductor Prods. Sector ... A•1682-1692, 2066, 2077-2087; D•1098-1101
Motor-Tronics, Inc. ... B•1176-1177
Moxness Products, Inc., Versa Technologies ... B•1734
MTE Corp. ... A•2199
M-Tron Inds. ... A•1395
Mueller Elec. Co. ... C•1468-1472
Multi Prods. Intl. ... A•1135, 2202-2203; D•1728
Murata Erie North America, Inc. ... A•1002, 1136-1139, 1396-1397, 1582, 1616-1617, 1907-1909, 1990, 2030-2031, 2089, 2205; D•1028, 1729
MVP Elctrns. ... D•1012
MWS Wire Inds. ... C•1864-1865

N

Nano Pulse Industries ... A•1546-1549, 2206-2207
Natel Engrg. Co., Inc. ... A•1694-1695
National Capacitor ... A•1127
National Electric Cable ... C•1866-1867
National Power Technlg. ... D•1730-1732
National Tel-Tronics ... C•1473
National Wire & Cable Corp. ... C•1868-1884
N.C.E. ... D•1428-1429
NES, Inc. (Nationwide Electronic Systems) ... B•1089; D•1069, 1127, 1159, 1365-1368
Newman, M. M., Corp., Heli-Tube Div. ... C•1885
Newport Electronics ... D•1370-1371
NIC Components Corp. ... A•1140-1141, 1910
NJE Corporation ... D•1733
NKK Switches of America, Inc. ... B•1673-1681
North American Soar Corp. ... D•1174, 1267-1281, 1394-1396
North Atlantic Inds., Instrument Div. ... D•1283, 1373
North Hills Elctrns. ... A•1243, 1780, 2208-2210; D•1734
Nova Elec., Hobart Bros. Co. ... D•1946
NRD, Mark IV Ind., Inc. ... D•1983
NTK Technical Ceramics, NGK Spark Plugs (U.S.A.), Inc. ... A•1398-1399; B•1805; D•1029
NWL Transformers ... A•2211; D•1735
NWL Transformers ... D•1735
Nytronics Components Grp., Inc. ... A•1142-1155, 1204, 1244-1263, 1550-1554, 1911

O

Oaktron Inds. .... D•1030
Ocean Marine Instrument .... D•1947
Ohio Semitronics, Inc. .... B•1776, 1806-1819; D•1284-1289
Ohmite Mfg. Co. .... A•1912-1921, 2032-2033
Ohmtek, Inc. .... A•1923-1925
Omega Engrg. .... B•1683, 1766-1767, 1820-1821; C•1887; D•1013, 1070, 1128, 1160, 1290, 1374-1375, 1407
Opamp Labs, Inc. .... D•1014
OPT Inds. Inc. .... A•1401, 2212; D•1736-1739
Opto 22 .... B•1440-1441
Oram Electronics .... D•1740
Orbit Instrument Corp. .... B•1735; D•1129
Oscillatek Corp. .... A•1402-1407
Oshino Electric Lamp Works, Ltd. .... B•1090
Oslo Controls .... B•1684-1685
Otto Engrg. .... B•1686-1687
Ovenaire, Electronic Technologies Inc. .... A•1408-1411

P

Pacific Instrs. Inc. .... D•1015
Pacific Power Source Corp. .... D•1949-1953
Pacific Resistor Co. .... A•1926-1927
PacTec Div., LaFrance Corp. .... C•1002, 1070-1071
Paine Instrs. .... B•1823
Panasonic, Ind'l. Elctrn. Comps., Panasonic, Elctrn. Comps. Div. .... D•1422-1427
Panduit Corp. .... C•1474-1476, 1888-1891
Panel Components Corp. .... B•1254-1255; C•1478-1482, 1892-1893
Pan-Magnetics Intl., Inc. .... A•1265, 2213-2220; D•1742-1743
Paraline Transformer Corp. .... A•2221-2225
PCA Elctrns. .... A•1556-1566
PCK Elastomerics, Inc., Kollmorgen Corporation .... C•1483
PC Transformer Corp. .... A•2226-2229
Pearson Elctrns. .... A•2230
Penn-Tran Corp. .... A•1266, 2231; D•1741
Performance Controls Inc. .... B•1178
Perkin-Elmer Corp., Elctrn. Prods. Dept. .... A•2232
Perma Power Elctrns. .... B•1256; C•1690-1691
Phi Technologies, Inc. .... D•1052-1054
Phoenix Contact .... C•1484-1488
Photodyne .... B•1122-1123
Pico Elctrns. .... A•1267-1271, 2233-2255; D•1744-1751
Piconics .... A•1273, 1618, 1696
Piezo Elec. Prods., Inc. .... B•1768-1769
Piezo Technology Inc. .... A•1308, 1413-1418
Pioneer Magnetics .... D•1752-1753
PITTMAN, Penn Engrg. & Mfg. Corp. .... B•1179
Polyphase Instr. .... A•1619-1622, 2257-2264
PolyPhaser Corporation .... B•1257
Portescap U.S. .... B•1181
Potter Co. .... A•1623
Power Designs, Inc. .... D•1755-1759
Power Dynamics .... A•1628; B•1258-1259, 1689; C•1489-1493, 1615
Power General, Unitrode .... D•1760-1767
Power Group International .... D•1428-1429
Powermark .... D•1955
Power-One, Inc., Power-One Linear Products .... D•1768-1773
Power Pac .... D•1774-1778
Power Products Div., Computer Products, Inc. .... D•1446, 1552-1553, 1559-1572, 1584-1585
Power-Sonic .... D•1431
Power Systems .... D•1780-1781
Powertec, Inc. .... D•1782-1799
Power Technology, Inc. .... B•1125
Power Ten, Inc. .... D•1779
POWR-UPS Corp. .... B•1182-1183
PPD, Inc. .... A•1157-1165
PPM, Inc. .... D•1291
Precicontact, Inc. .... C•1494-1495
Precision Filters .... A•1624-1627; D•1017
Precision Resistive Prods., Inc. .... A•1929
Precision Resistor Co., Inc. .... A•1930-1933; B•1770-1771
Preh Electronics Industries, Inc. .... A•2034; B•1736; C•1497
Premier Metal Prods. Co. .... C•1072-1073
Premier Microwave .... A•1781
Prem Magnetics .... A•2265-2267
Pres-Air-Trol Corp. .... B•1690
Preston Scientific .... D•1161
Prime Power, Inc., Prime Technology Co. .... D•1801
Probe Master, Inc. .... D•1397
Production Industries, Inc. .... C•1075-1077; D•1384
Programmed Test Sources .... D•1292
Prototek, Inc. .... C•1714
Pulizzi Engineering, Inc. .... D•1956-1958

Q

Q-Tech Corp. .... A•1420-1422
Qualidyne Sys., Unitech Ltd. .... D•1803-1809
Quam-Nichols Co. .... D•1032-1033
Quantum Data, Inc. .... D•1293

R

Radio Switch Corp. .... B•1691
RCD Components, Inc. .... A•1934-1935
RCL Electronics, Inc. .... A•1936-1941
Shallcross, Inc. .... A•1936-1941
RDI/Reed Devices, Inc. .... C•1498-1501
Reeves-Hoffman Div. .... A•1423-1427; C•1619-1621
Refac Elctrns. Corp. .... B•1091
Regdon Corp. .... B•1475
Rehlander Assocs. .... B•1213
RE Instruments Corp. .... D•1295
Renco .... B•1824-1825; D•1131
Renco Elctrns. .... A•1274-1276, 2268-2269
Reproduction Technologies Inc. .... D•1034
Republic Elctrns. Corp. .... A•1167
Resistors, Inc. .... A•1942
Res-Net .... A•1943
RFI Corporation .... A•1629
Rhombus Inds. .... A•1568-1573
RIFA, Inc. .... D•1810-1811
Risk, George, Inds. .... B•1737
RMF Prods., Inc. .... C•1616
RO Assocs. .... D•1812-1814
Robbins & Meyers, Inc., Motor & Control Sys. Div. .... B•1184
ROD-L Electronics, Inc. .... D•1296-1301
Rogers Corp. .... C•1715
Rose Enclosures Sys., Inc. .... C•1078-1079
Ross Engrg. Corp. .... B•1443
Rowe Industries, Inc. .... C•1502-1504, 1895
RTE Deltec Corp. .... D•1959
RTE, Power/Mate Co. .... D•1816-1827
RTS Systems, Inc., Compact Video, Inc. .... D•1055
Ryan Intl. Corp. .... D•1303

S

SAFT America, Inc., Portable Battery Division .... D•1412, 1432-1437
Samarius, Inc. .... A•2035
S & H Inds. .... D•1829, 1984
Sangano Weston-Sangamo Components Div., Fairchild Semiconductor .... A•2056-2064
SaRonix .... A•1428-1431
Sawtek Inc. .... A•1432
Saxton Wire and Cable .... C•1896-1903
Schrack North America Corp. .... B•1444-1446
Schroff Inc. .... C•1080
Secoinsa/Digi Power .... D•1830-1832
Seiko Instrs. U.S.A., Inc. .... A•1433; B•1092; D•1071
Semiconductor Packaging Matls. Co. Inc. .... C•1097
Sencore .... D•1399
Sensitive Research Instrs. .... D•1304-1306
Servo-Tek Prods. Co. .... B•1185
Setra Systems, Inc. .... B•1826
SFE Technologies .... A•1168-1171, 1277, 1434, 1630-1631
Shallco .... B•1692-1695; D•1036-1037
Shalltronix Corp. .... D•1307
Shape Magnetronics, Inc. .... D•1960-1961
Shelly Associates, Inc. .... B•1093
Shinano Kenshi Corp. (SKC) .... B•1187
Shogyo Intl. Corp. .... A•2037, 2270-2271; B•1094-1096; C•1506-1508, 1905; D•1038, 1376
Shokai Far East, Ltd. .... D•1039
SIDAC Enclosures, Div. of Triac Electronic Systems, Inc. .... C•1082
Sierracin/Magnedyne .... B•1188-1189
Sierracin/Power Systems .... D•1834-1836
Sigma Systems Corp. .... D•1172
Signal Transformer .... A•1632-1633, 2272-2287
Silonex Inc. .... B•1215
Simpson Elec. Co. .... D•1308, 1377
Skydyne Division, AAR/Brooks & Perkins .... C•1081
Slaughter Co. .... D•1309
Sloan Co. .... B•1098-1101
SL Waber .... C•1692; D•1963
Kulka Smith, Inc. .... C•1509, 1693
Sohio Engineered Materials Co., Unit of Sohio .... A•1172, 1944-1947; B•1772
Sokol Crystal Prods., Inc. .... A•1435-1437
Sola, A Unit of General Sign. .... D•1838-1839, 1964-1967
Sonnenschein Batteries Inc. .... D•1438
Sorenson Lighted Controls .... B•1102-1103
SP America Inc., Shin-Etsu Polymer .... B•1739; C•1510-1511
Spectrol Elctrns. .... A•2039-2047
Spectrum Control, Inc. .... A•1635-1637; C•1513-1517
Spectrum Technology, Inc. .... A•1438-1439
Spellman High Voltage Elctrns. Corp. .... D•1840-1842
Sprague-Goodman Elctrns., Inc. .... A•1173
Staco Transpower .... A•2288
Stancor/Hamilton Standard Controls .... A•2289-2297; B•1447
Standard Energy, Div. WBH Scientific, Inc. .... D•1844-1845
Standard Grigsby, Inc., Gordos International Corp. .... B•1568-1570
Standex Elctrns. .... A•1638-1639; B•1448
Stantron Div. .... C•1083
Star Micronics, Inc., Components Div. .... D•1040-1044, 1072
Statek Corp. .... A•1441-1445
State of the Art, Inc. .... A•1949-1951
Staver Co., Inc. .... B•1105-1107
Sterling Transformer Corp. .... A•2299-2303
Stettner Elctrns. .... A•1175
Stevens-Arnold Div., Computer Prods., Inc. .... D•1446, 1552-1553, 1573-1585
Stock Drive Prods., Div. of Designatronics, Inc. .... B•1191; C•1674
STRONGBOX .... C•1084-1085
Struthers-Dunn, Inc. .... B•1449
Sullins Elctrns. Corp. .... C•1518-1521
Summit Elctrns. .... D•1846-1847
Sunshine Sci. Instr. .... D•1302
Superior Elec. Co. .... A•2304-2305; B•1192-1193; C•1523; D•1968
Switchcraft, Inc. .... B•1696-1697; C•1524-1527
Switches Unlimited, Inc. .... B•1682
Sylvania GTE Control Devices .... B•1773
Sylvania Electronic Components, Philips ECG Inc., A North American Philips Co. .... A•2090-2091
Sylvania Miniature Lighting, GTE Corporation .... B•1109-1111
Symbex Corp. .... C•1528-1529
Syntest Corp. .... D•1073

T

TA Instr. Case Co. .... C•1087
Tape Concepts, Inc. .... D•1035
Tapeswitch Corp. of America .... B•1699
Tauber Elctrns. Inc. .... D•1439
Taurus Corp. .... D•1074
Taylor Electronics, Inc. .... D•1848
TDJ Co., Inc. .... C•1088-1089
TDK Corporation of America .... A•1176-1178, 1278, 1640-1641; D•1046-1047, 1849
TECA, ThermoElectric Cooling America Corp. .... C•1675-1677
Teccor Elctrns. .... A•2092-2093
Tech Labs., Inc. .... B•1700-1701
Techmar Corp. .... C•1090-1091
Technipower, A Penril Co. .... A•2306; D•1850
Technitrol .... A•1458, 1574-1579, 2307; B•1002, 1010
Technology Dynamics .... D•1851
Techtrol Cyclonetics, Inc. .... A•1446-1449
Tecknit (Eastern Facility) .... C•1530-1535, 1730-1737
Tecron Industrial Prods., Crown Intl., Inc. .... D•1018-1021, 1310-1311
Tedea USA .... B•1827
Telemecanique, Inc., Allied Control Products .... B•1450-1459
Tel Labs, Inc. .... A•1952-1953
Telpar, Inc. .... D•1075
Tenney Engrg. .... D•1173
Tettex Instruments, Inc. .... D•1312
Texas Instruments Optoelectronics .... B•1216-1219
Texmate, Inc. .... D•1378-1379
Textro .... C•1906-1908
Thermalloy, Inc. .... C•1679
Therm-O-Disc, Inc., Sub. Emerson Elec. Co. .... B•1775
Thordarson Meissner, Components Corp. of Amer. .... A•2308-2313
THORN EMI Gencom Inc. .... A•2342-2343
THORN EMI Technology Inc. .... D•1313
TII Electronics, Inc., Div. TII Industries .... D•1852-1853
Todd Prods. Corp. .... D•1854-1855
Todd Systems, Inc. .... A•2314-2317
Toko America, Inc. .... A•1279, 1581, 1643; D•1856, 1989
Toroid Corp. of Maryland .... A•2318-2319
Torotel Prods. Inc. .... A•1280-1295, 2320-2325
Torotron Corp. .... D•1315
Torwico Elctrns. Inc. .... A•2328-2329
Tracewell Enclosures .... C•1092-1093
TRAK Microwave Corp. .... A•1782-1783
TRAK Microwave, Western Division .... A•1782-1783
TRAK Systems, Div. TRAK Microwave Corp. .... D•1076-1081
Transducers and Systems Inc., A Prime Technology Company .... B•1828
Transformation Elctrns. Corp. .... D•1857
Transistor Devices .... D•1316-1317
Transmagnetics .... D•1162-1163

Triac Electronic Systems, Inc. .... D•1132-1133
Triad-Utrad .... A•2330-2337; D•1970-1971
Triplett Corp.-A Penril Co. .... D•1318-1321, 1380-1381
TRW Capacitor Div. .... A•1179-1185
TRW Connector Div., TRW Electronic Components Grp. .... B•1126-1127; C•1536-1565
TRW Cylindrical Connector Div., TRW Electronic Components Grp. .... C•1566
TRW Motor Division, Industrial/Commerical Products .... B•1194
TRW Motor Div. (Military) .... B•1195
TRW Optoelectronics Div. .... A•2094; B•1221-1223
TRW Resistive Products Div., TRW Electronic Components Grp. .... A•1954-1957
TS Products, Inc. .... D•1990
TTE, Inc. .... A•1644-1655
Tusonix, Inc. .... A•1187-1193, 1656-1657

U

Ultronix, Inc. .... A•1958-1965
Ulveco, Inc. .... A•2338-2339
Unicorp .... C•1696
Unimax Switch Corp. .... B•1702
Union Carbide Corporation, Battery Prods. Div. .... D•1440-1441
Union Carbide Corp., Elctrns. Div., Component Dept. .... A•1106-1107
United Chemi-Con Inc. .... A•1194-1197
UNITRACK Div., Calabro Inds., Inc. .... C•1094
Unitrode Corp. .... A•1697-1699
Unitron Inc. .... D•1895-1897
Universal Voltronics .... D•1858
UPSystems, Inc. .... D•1973
U.S. Digital .... B•1829
U.S. Instr. Rentals .... D•1322-1323
U.S. Toyo Fan Corp. .... C•1680-1681

V

Validyne Engrg. Corp. .... D•1164
Vamistor Corp. .... A•1967
Varian Canada, Inc., Microwave Div. .... D•1859-1862
Varo Semiconductor, Inc. .... A•2095
Varta Batteries, Inc. .... D•1442
Vector Electronic Co., Inc. .... C•1095, 1098, 1102-1103; D•1103-1104
Vectron Labs. .... A•1450-1454
Veetronix, Inc., Sub. Reach Electronics .... B•1703
Velonex .... D•1324-1325, 1383
Vent-Rak Div. .... C•1064-1065
Venus Scientific, Inc. .... D•1863
Vernitech ....A•2048-2049; B•1011, 1196-1197, ... 1830-1831; D•1991
Vernitron Corp., Control Comps. Div. ....B•1199-1202
Vernitron Piezoelectric Div. .... A•1455
Vibra-Metrics .... B•1832
Victoreen, Inc., Component Div. ..... A•1968-1971
Viking Labs/Honeywell, Operation of Test Instruments Div. of Honeywell, Inc. ..... B•1013; D•1327
Virginia Plastics Co. .... C•1567-1569, 1909-1911
Vishay Resistive Sys. Grp. ....A•1972-1985, 2051-2053
Visual Communications Co., Inc. .... B•1113-1115
VIZ Test Equipment, Div. VIZ Mfg. .... D•1864
VL Electronics .... B•1117
Voltage Multipliers, Inc. .... A•2097
Voltex .... D•1865
VRN International, Div. Vernitron .... A•2054-2055; D•1056

W

Wabash Relay & Elctrns. .... B•1460-1461
Wall-Able Manufacturing Corp. ..... C•1570-1571
Ward Leonard Elec. .... A•1986-1988
Wayne Transformer Co., Inc. .... A•2340-2341
WECO Electrical Connectors, Inc. ... C•1572-1578
Wells Elctrns. .... C•1580-1587
Wesco Electrical Co. .... A•1198-1203
Wes-Garde Components Group, Inc. ...... B•1698
Wilco Corp. .... A•1296-1297
Wilmore Elctrns. Co. .... D•1867-1869, 1974-1975
Wintek Corp. .... D•1105, 1107

X

Xentek, Inc. .... D•1870-1873
Xico, Inc. .... D•1082
Xsis Electronics, Inc. .... A•1457
Xylog Corp. .... D•1875, 1976

Y

Yardney Battery Div., Yardney Corp. ...... D•1443
Yuasa Battery (America), Inc. .... D•1445

Z

Zeus .... C•1697

85 86 Index To Distributors Advertisements

Alpha Distributor Corp. .... pgs. 624, 643, 702, 713, 815
Distributor Specialists .... pgs. 708, 775, 786
Electric Switches, Inc. .... B·1516, 1517, pgs. 605, 614, 616, 632, 635, 637, 638, 639, 651, 657, 669, 672, 675, 676, 688, 689, 701, 709, 711, 719, 724, 726, 731, 736, 747, 751, 753, 766, 767, 768, 781, 786, 789, 794, 801, 803, 816
Fuses Unlimited .... B·1234
Inductive Products Inc. .... A·1230
Inductor Supply .... p. 700
The Instrument Mart .... D·1246, D·1364, D·1389
Logicomp Electronics, Inc. .... pgs. 614, 635, 651, 661, 684, 702, 736, 761, 789
Metermaster .... pgs. 612, 680, 701, 781, 805, 824
Mil-Comm Distributors, Inc. .... D·1421
Mouser Electronics .... p. 742
National Capacitor .... A·1127
PoCo Sales .... pgs. 691, 705
RAG Electronics, Inc. .... pgs. 618, 622, 623, 654, 687, 690, 695, 710, 715, 723, 750, 759, 761, 764, 765, 781, 785, 819
Sunshine Sci. Instr. .... pgs. 612, 618, 622, 624, 680, 690, 695, 701, 715, 723, 760, 781, 789, 805, 824
Switches Unlimited, Inc. .... B·1682
TNR Technical, Inc. .... pgs. 686, 773
Wes-Garde Components Group, Inc. .... B·1698

85
86 Product Index and Directory

All products are listed alphabetically by their generic names and then by subclassification. For example, look for "Fiber Optic Connectors" under "Connectors, Fiber Optic" or for "Digital Panel Meters" under "Meters, Panel (Digital)."

Following each product heading is a four-digit number directing you to the Product Section where these products are usually cataloged. If that Product Section is not in the EEM volume you are using, a "See Vol. A, B, C, or D" will direct you to the proper volume for your product classification. No numbers appear with cross-reference headings.

Under each product heading whose Product Section appears in the volume you are using, the names of the manufacturers who supply the product are shown in alphabetical order with EEM catalogers shown first in boldface type with appropriate page numbers. Other manufacturers are shown in light face type. The symbol (§) indicates that these products are available from local distributors. The symbol (†) indicates that the product is available to MIL specifications.

Abrasive Belts, Compounds, Cords, Powders, etc.-5400 — *See Vol. C*

Absorbers, Microwave-3400

§ Dielectric Communications, General Signal, Tower Hill Rd., Raymond, ME 04071 .... 207-655-4555;800-341-9678

Keene Ray Proof, Keene Corp., 50 Keeler Ave., Norwalk, CT 06878 203-838-4555

M/A-Com Millimeter Products, M/A-Com, Inc., Second Avenue, Burlington, MA 01803 617-272-3000

Trans-Tech, Inc., Alpha Inds., Inc., 20 Sylvan Rd., Woburn, MA 01801 617-935-5150

Varian Associates, Inc., Microwave Tube Div., 611 Hansen Way, Palo Alto, CA 94303 415-493-4000

Accelerometers-5500 — *See Vol. B*

Acoustic CM Equipment (MIL), Airborne-3475

† General Instr., Govt. Sys., 600 W. John St., Hicksville, NY 11802-0709 ... 516-933-3000

Acoustic Systems (MIL)-3475

§† Benthos, Inc., Edgerton Dr., N. Falmouth, MA 02556 ...... 617-563-5917;617-540-5500

† EDMAN Corp., Subsidiary of Rospatch, 7500 Main St., P.O. Box 750, Fishers, NY 14453-0750 716-924-4000

Energy, Ltd., 4714 Upshur Street, Bladensburg, MD 20710 301-699-1144

† General Instr., Govt. Sys., 600 W. John St., Hicksville, NY 11802-0709 ... 516-933-3000

† Hazeltine Corp., 500 Commack Rd., Commack, NY 11725 516-462-5100

† Honeywell Inc., Aerospace & Defense Grp., Honeywell Plaza, Minneapolis, MN 55408 612-870-5186

† Raytheon Co., Submarine Signal Div., 1847 W. Main Rd., P.O. Box 360, Portsmouth, RI 02871 401-847-8000

AC Power Protection Equipment — See Line Conditioners (Vol. D)

Actuators, Satellite Antennas-1900

§ Basic Systems, 1919 S. 129 5. Ave., Tulsa, OK 74108 918-437-7066

IMC Magnetics Corp., Western Div., 12627 Hiddencreek Way, Cerritos, CA 90701 213-926-0927

† Micro Mo Electronics, Inc., 742 2nd Ave. S., St. Petersburg, FL 33701 ... 813-822-2529

Actuators, Servo, Linear-4900

Airpax Corp., Cheshire Div., Cheshire Indl. Pk., Box E, Cheshire, CT 06410, 203-272-0301 .... B•1138

† BEI Motion System Company, Kimco Division, 150 Vallecitos de Oro, San Marcos, CA 92069, 619-744-5671 .... B•1783

† Control Technology Co., 41-16 29th St., Long Island City, NY 11101, 718-361-2133 .... D•1987

Deltrol Controls, 2745 S. 19th St., Milwaukee, WI 53215, 414-671-6800 .... B•1464-1465

Electro-Mechanisms, 2745 E. Huntington Dr., Duarte, CA 91010, 818-359-2535 .... B•1466-1467

† Ledex Inc., P.O. Box 427, Vandalia, OH 45377, 513-898-3621 ...... B•1468-1470

Liberty Controls, 500 Brookforest Ave., Shorewood, IL 60435, 815-725-2241 .... B•1472-1473

Regdon Corp., 3713 Grand Blvd., Brookfield, IL 60513, 312-485-5152 .... B•1475

TS Products, Inc., 12455 Branford St., Bldg. 22, Arleta, CA 91331, 818-896-6676 .... D•1990

§† Bailey Controls Co., 29801 Euclid Ave., Wickliffe, OH 44092 216-585-5800

§ Bellofram Corp., A Rexnord Co., 30 Blanchard Rd., Burlington, MA 01803 .... 617-272-2100;800-225-1031

† Bendix Corp., Electrodynamics Div., 11600 Sherman Way, N. Hollywood, CA 91605 818-765-1010

Burleigh Instrs., Burleigh Pk., Fishers, NY 14453 716-924-9355

† Clifton Precision, Litton Systems, Inc., Marple at Broadway, Clifton Hgts., PA 19018 215-622-1000

† EEMCO Div., 4585 Electronics Pl., Los Angeles, CA 90039 213-247-7060

Eldec Corp., Monitor & Control Div., 16700 13th Ave. W., P.O. Box 100, Lynnwood, WA 98046-0100 206-743-1313

§ Hoke, 1 Tenakill Pk., Cresskill, NJ 07626 201-568-9100

† Honeywell, Process Control Div., 1100 Virginia Dr., Ft. Washington, PA 19034 .... 800-321-5111, Ext. 596

† HTL Electro Kinetics, 402 E. Gutierrez St., Santa Barbara, CA 93101 805-963-2055

IMC Magnetics Corp., Western Div., 12627 Hiddencreek Way, Cerritos, CA 90701 213-926-0927

† Industrial Control Co., 3100 Pineda Ave., Rockledge, FL 32955 305-259-7105

† Inland Motor, Kollmorgen Corp., 501 First St., Radford, VA 24141 703-639-9045

Instron Corp., 100 Royall St., Canton, MA 02021 617-828-2500

§ ITT General Controls Div., Intl. Telephone & Telegraph Corp., 801 Allen Ave., Glendale, CA 91201 213-842-6131

† Lear Siegler, Inc., 2850 Ocean Park Blvd., P.O. Box 2158, Santa Monica, CA 90406 213-452-5444

† Line Elec. Prods., G. General Electro-Components, Inc., 122 Naubuc Ave., Glastonbury, CT 06033 203-659-3573

† Lisk, G. W., Co., 2 South St., Clifton Springs, NY 14432 315-462-2611

† Lundy Elctrns. & Systems, Inc., 1 Robert La., Glen Head, NY 11545 516-671-9000

† McFadden Sys., Inc., 8953 S. Atlantic Ave., South Gate, CA 90280-9990 213-564-5958

Modular Devices, 50 Orville Dr., Bohemia, NY 11716 516-567-9620

MTS Sys., Box 24012, Minneapolis, MN 55424 612-937-4000

† Northern Precision Labs., 11 Madison Rd., Fairfield, NJ 07006 201-227-4800

NTK Technical Ceramics, NGK Spark Plugs (U.S.A.), Inc., 1701 N. Greenville Ave. #205, Richardson, TX 75081 214-235-8332

Oak Switch Sys., 100 S. Main St., Crystal Lake, IL 60014 815-459-5000

Oriel Corp., 250 Long Beach Blvd., Stratford, CT 06497-0872 203-377-8282

† Raymond Engrg. Inc., Raycorder Prods. Div., 217 Smith St., Middletown, CT 06457 203-632-1000

† Sierracin/Magnedyne, 2258 Rutherford Rd., P.O. Box 458, Carlsbad, CA 92008 619-438-3321

† Singer Co., Kearfott Div., 1150 McBride Ave., Little Falls, NJ 07424 201-785-6000

† Superior Mfg. & Instr., 19-36 38th St., Long Island City, NY 11105 212-932-1800

Synektron Corporation, 12000 S. W. Garden Place, Portland, OR 97223 503-684-3090

† TRW Motor Div. (Military), 2275 Stanley Ave., Dayton, OH 45404 513-228-3171

† Western Gear Corp., Applied Tech. Div., 14724 E. Proctor, City of Industry, CA 91744 818-968-6525

Actuators, Servo, Rotary-4900

† BEI Motion System Company, Kimco Division, 150 Vallecitos de Oro, San Marcos, CA 92069, 619-744-5671 ..... B•1783

† Control Technology Co., 41-16 29th St., Long Island City, NY 11101, 718-361-2133 ..... D•1987

† Ledex Inc., P.O. Box 427, Vandalia, OH 45377, 513-898-3621 ..... B•1468,1470

TS Products, Inc., 12455 Branford St., Bldg. 22, Arleta, CA 91331, 818-896-6676 ..... D•1990

† AMETEK, Dynamics Division, AMETEK, Inc., 5649 Peck Rd., Arcadia, CA 91006 818-442-5981

† Astrosyn America, 14349 Victory Blvd., Ste. 304, Van Nuys, CA 91401 213-785-2197

Barber-Colman Co., Indl. Instrs. Div., P.O. Box 2940, 1354 Clifford Ave., Loves Park, IL 61132 815-877-0241

§ Bellofram Corp., A Rexnord Co., 30 Blanchard Rd., Burlington, MA 01803 ..... 617-272-2100;800-225-1031

† Bendix Corp., Electrodynamics Div., 11600 Sherman Way, N. Hollywood, CA 91605 818-765-1010

† Clifton Precision, Litton Systems, Inc., Marple at Broadway, Clifton Hgts., PA 19018 215-622-1000

† EEMCO Div., 4585 Electronics Pl., Los Angeles, CA 90039 213-247-7060

Eldec Corp., Monitor & Control Div., 16700 13th Ave. W., P.O. Box 100, Lynnwood, WA 98046-0100 206-743-1313

Electro-Craft, 1600 2nd St. S., Hopkins, MN 55343 612-931-2700

† Electro Kinetics Co., Sub. HTL Inds., Inc., 402 E. Gutierrez St., Santa Barbara, CA 93102 805-963-2055

Evershed & Vignoles, Ltd., Acton Lane, Chiswick, London, ENGLAND W4 5HJ 01-994-3670

† GAP Instr., 40 Oser Ave., Hauppauge, NY 11787 516-273-0909

† Honeywell, Process Control Div., 1100 Virginia Dr., Ft. Washington, PA 19034 ..... 800-321-5111, Ext. 596

† HTL Electro Kinetics, 402 E. Gutierrez St., Santa Barbara, CA 93101 805-963-2055

Icon, 156 Sixth St., Cambridge, MA 02142 617-868-5400

IMC Magnetics Corp., Western Div., 12627 Hiddencreek Way, Cerritos, CA 90701 213-926-0927

† Industrial Control Co., 3100 Pineda Ave., Rockledge, FL 32955 305-259-7105

† Inland Motor, Kollmorgen Corp., 501 First St., Radford, VA 24141 703-639-9045

Instron Corp., 100 Royall St., Canton, MA 02021 617-828-2500

§ ITT General Controls Div., Intl. Telephone & Telegraph Corp., 801 Allen Ave., Glendale, CA 91201 213-842-6131

§ Jamesbury Corp., Div. of Combustion Engineering, Inc., 640 Lincoln St., Worcester, MA 01605 617-852-0200

Kollmorgen Corp., Industrial Drives Div., 201 Rock Rd., Radford, VA 24141 703-639-2495

† Lear Siegler, Inc., 2850 Ocean Park Blvd., P.O. Box 2158, Santa Monica, CA 90406 213-452-5444

Leeds & Northrup Instrs., A Unit of General Signal Corp., Sumneytown Pike, North Wales, PA 19454 215-643-2000

† Line Elec. Prods., G. General Electro-Components, Inc., 122 Naubuc Ave., Glastonbury, CT 06033 203-659-3573

† Lisk, G. W., Co., 2 South St., Clifton Springs, NY 14432 315-462-2611

† Lundy Elctrns. & Systems, Inc., 1 Robert La., Glen Head, NY 11545 516-671-9000

† Magnetic Technology, 21001 Kittridge St., Canoga Pk., CA 91303 818-887-7700

† McFadden Sys., Inc., 8953 S. Atlantic Ave., South Gate, CA 90280-9990 213-564-5958

Micro Mo Electronics, Inc., 742 2nd Ave. S., St. Petersburg, FL 33701 813-822-2529

Modular Devices, 50 Orville Dr., Bohemia, NY 11716 516-567-9620

MTS Sys., Box 24012, Minneapolis, MN 55424 612-937-4000

† Northern Precision Labs., 11 Madison Rd., Fairfield, NJ 07006 201-227-4800

Oak Switch Sys., 100 S. Main St., Crystal Lake, IL 60014 815-459-5000

PMI Motors, Kollmorgen Corp., 5 Aerial Way, Syosset, NY 11791 516-938-8000

Portescap U.S., 1547 Trooper Rd., P.O. Box 780, Worcester, PA 19490 215-277-0433

† Precision Mechanisms, 44 Brooklyn Ave., Westbury, NY 11590 ..... 516-ED3-5955

† Sierracin/Magnedyne, 2258 Rutherford Rd., P.O. Box 458, Carlsbad, CA 92008 619-438-3321

† Singer Co., Kearfott Div., 1150 McBride Ave., Little Falls, NJ 07424 201-785-6000

† Superior Mfg. & Instr., 19-36 38th St., Long Island City, NY 11105 212-932-1800

† Transicoil, Inc., Trooper Rd., P.O. Box 99, Worcester, PA 19490-9990 215-277-1300

† TRW Motor Div. (Military), 2275 Stanley Ave., Dayton, OH 45404 513-228-3171

† Western Gear Corp., Applied Tech. Div., 14724 E. Proctor, City of Industry, CA 91744 818-968-6525

Adapters — See Connector Adapters (Vol. C), Plug Adapters (Vol. C), Socket Adapters (Vol. C), etc.

Adapters/Connectors, T.V. to Peripheral Equipment-2100 — *See Vol. C*

Adapters, Fiber Optic-2475 — *See Vol. B*

Adapters, Meter, Current Measurement-2900

Bluffton Products, Inc., Tegam, Inc., 7230 North Ridge Road, Madison, OH 44057 216-946-3572

§ ITT Pomona Electronics, 1500 E. 9th St., P.O. Box 2767, Pomona, CA 91766 714-623-3463

Adapters, Modular Telephone-2100 — *See Vol. C*

Adapters, US to European Power-2100 — *See Vol. C*

Adapters, Wall Plug-in — See Power Supplies, Plug-in (Vol. D)

Adapters, Waveguide-3450 — *See Vol. A*

Adapters, RF (MIL)-2440 — *See Vol. B*

Adhesives, Conducting-1600 — *See Vol. C*

Adhesives, General Purpose-1600 — *See Vol. C*

Adhesives, Insulating-1600 — *See Vol. C*

Adhesives, Liquid Spray-1600 — *See Vol. C*

Adhesives, Optical-1600 — *See Vol. C*

Adhesives, UV Curing-1600 — *See Vol. C*

Adhesives, Wire Tacking-1600 — *See Vol. C*

Air Cleaners & Filters (Shielded & Unshielded)-2600 — *See Vol. C*

Air Conditioners (For Equipment)-2600 — *See Vol. C*

Alarms & Alarm Systems-2200

Bell, Floyd, Assocs., Inc., 897 Higgs Ave., Columbus, OH 43212, 614-488-3193 ..... D•1023

† GRIM Corporation, Box 67, Medford, NJ 08055, 609-267-7950 ..... D•1051

§ MG Electronics, 32 Ranick Rd., Hauppauge, NY 11788, 516-582-3400 ..... D•1027

§ Murata Erie North America, Inc., 1148 Franklin Rd., S.E., Marietta, GA 30067, 404-952-9777 ..... D•1028

Oaktron Inds., 1000 30th St., Monroe, WI 53566, 608-328-5560 ..... D•1030

§ Shokai Far East, Ltd., 280 North Central Ave., Hartsdale, NY 10530, 914-681-0700 ..... D•1039

Star Micronics, Inc., Components Div., 70-D Ethel Rd. W., Piscataway, NJ 08854, 201-572-9512 ..... D•1044

Accurate Elctrns., 169 S. Abbe Rd., P.O. Box 1287, Elyria, OH 44036 216-365-1211

† Acromag, 30765 Wixom Rd., Wixom, MI 48096 313-624-1541

§ Action Instrs., 8601 Aero Dr., San Diego, CA 92123 619-279-5726

Active Control Instrmn., P.O. Box 243-Wildwood Circle, Key Largo, FL 33037 305-451-1000

§ Acurex-Autodata, 555 Clyde, Mountain View, CA 94039 415-964-3200

§† Adapter/Charger Prdts., Box 3218, Peoria, IL 61614 309-691-0810

AES Corp., 285 Newbury St., P.O. Box 2093, Peabody, MA 01960 617-535-7310

† Alarm Controls, 19 Brandywine Dr., Deer Park, NY 11729 516-586-4220

American Elctrn. Labs., Inc., Govt. Grp. Div., P.O. Box 552, Lansdale, PA 19446

Applied Control, 1275 Bloomfield Ave., Fairfield, NJ 07006-2828 201-227-5454

Applied Sys., 26401 Harper Ave., St. Clair Shores, MI 48081 313-779-8700

§ Aqualarm Inc., 544 W. 182nd, Gardena, CA 90248 213-321-5873

§ Armiger & Assocs., Inc., Daniel Woodhead, Inc., 2525 Ridgmar Blvd., Fort Worth, TX 76116 817-737-2900

A-Systems Inc., 1500 Avon St. Extd., Charlottesville, VA 22901 804-295-7200

§ Atkins Tech., 3321 S.W. 40th Blvd., Gainesville, FL 32608 904-378-5555

Atlantic Research, 5390 Cherokee Ave., Alexandria, VA 22312 703-642-4000

§ Atlas Sound Div., 10 Pomeroy Rd., Parsippany, NJ 07054 201-887-7800

§† Audiosone, Inc., 617 Fan Hill Rd., Monroe, CT 06468 ..... 203-268-4372;203-268-6703

Barber-Colman Co., Indl. Instrs. Div., P.O. Box 2940, 1354 Clifford Ave., Loves Park, IL 61132 815-877-0241

† Barnes Engrg., 44 Commerce Rd., P.O. Box 53, Stamford, CT 06904 203-348-5381

† Base Ten Sys., One Electronics Dr., Box 3151, Trenton, NJ 08619 609-586-7010

§ Bell Audio Service Co., Magnetic Programming, Inc., 6740-G Huntley Road, Worthington, OH 43085 614-846-2766

Bird Elctrn., 30303 Aurora Rd., Cleveland, OH 44139 216-248-1200

Bristol Babcock Inc., 40 Bristol St., Waterbury, CT 06708 203-575-3000

† Brooks Instr. Div., Emerson Elec. Co., 407 W. Vine St., Hatfield, PA 19440 215-362-3500

Cambridge Aero Instruments, Inc., 6A Dunham Rd., Billerica, MA 01821 617-275-0889

Cincinnati Electrosys., 469 Wards Corner Rd., Loveland, OH 45140 513-831-4347

† CML MACARR Div., Marine Electric RPD, Inc., 666 Pacific St., Brooklyn, NY 11217 718-857-2400

Cognitronics, 25 Crescent St., Stamford, CT 06906 203-327-5307

† Columbia Resch. Labs., Macdade Blvd. & Bullens La., Woodlyn, PA 19094 215-532-9464

§ Control Prods., Devar, Inc., P.O. Box 589, Bridgeport, CT 06601 203-368-6751

§ Corby Inds. Inc., P. O. Box 2838, Allentown, PA 18001 215-433-1412

§ Cybersonic Corp., Box 38, Glenside, PA 19038 215-885-1734

Dataprobe, 110 Palisades Blvd., Palisades Park, NJ 07650 201-947-9500

Data Signal Corp., 149 California St., Newton, MA 02158 617-926-5080

Daytronic Corp., 2589 Corporate Pl., Miamisburg, OH 45342 513-866-3300

† Devco Engrg., Control Sys. Div., 36 Pier Lane West, Fairfield, NJ 07006 ..... 201-CA8-0321

§ Edwards Co., Signaling Prods. Div., P.O. Box 1188, Farmington, CT 06034 203-678-0410

Eldec Corp., Monitor & Control Div., 16700 13th Ave. W., P.O. Box 100, Lynnwood, WA 98046-0100 206-743-1313

Electronic Prods. Corp., Interstate Indl. Plaza, R. D. #5, York, PA 17402 717-767-6517

Electro-Tech Sys., Inc., 115 E. Glenside Ave., Glenside, PA 19038 215-887-2196

Eltec Instruments Inc., P.O. Box 9610, Daytona Bch., FL 32020 904-253-5328

§ ERA Poly-Planar Div., 311 E. Park St., Moonachie, NJ 07074 201-641-3650

§ Fenwal, Inc., 400 Main St., Ashland, MA 01721 617-881-2000

Forma Scientific, Div. of Mallinckrodt Inc., Box 649, Marietta, OH 45750 614-373-4763

Foundation Instruments Inc., 24 Colonnade Rd., Nepean, ON, CANADA K2E 7J6 613-226-4000

§ GC Elctrns., 400 S. Wyman St., Rockford, IL 61101 815-968-9661

Harrel, Inc., 16 Fitch St., E. Norwalk, CT 06855 203-866-2573

§ Heath Co., Benton Harbor, MI 49022 616-982-3886

Henschel, General Signal Corp., 9 Hoyt Drive, P.O. Box 30, Newburyport, MA 01950 617-462-2400
§ Hobart Engrg., 4143 Cheshire Dr., Cypress, CA 90630 714-827-2135
Honeywell Inc., Aerospace & Defense Grp., Honeywell Plaza, Minneapolis, MN 55408 612-870-5186
Honeywell Inc., Commercial Div., MN 27-7246, Honeywell Plaza, Minneapolis, MN 55408 612-870-5357
† Honeywell, Process Control Div., 1100 Virginia Dr., Ft. Washington, PA 19034 .... 800-321-5111, Ext. 596
Hy-Cal Engrg., 9650 Telstar Ave., El Monte, CA 91731 213-444-4000
§ Industrial Computer Designs, Inc., 31264 La Baya Drive, Westlake Village, CA 91362 818-889-3179
International Instruments, General Resistance, Inc., Twin Lakes Rd, P.O. Box 185, N. Branford, CT 06471 203-481-3450
Kalglo Elctrns. Co., Inc., 6584 Ruch Rd., E. Allen Twp., Bethlehem, PA 18017 215-837-0700
Kaye Instruments, 15 De Angelo Dr., Bedford, MA 01730 617-275-0300
† Keltron Corp., 225 Crescent St., Waltham, MA 02154 617-894-8700
§ WALTER KIDDE, Div. of Kidde, Inc., Fire Sys. Operations, P.O. Box 1147, Wake Forest, NC 27587 919-556-6811
KMC Systems, Inc., 140 Greenwood Ave. (Bldg. 3), Midland Pk., NJ 07432 201-447-0007
† Kolin Inds., Box 300, Pound Ridge, NY 10576 914-764-5775
Kurz Instruments, Inc., P.O. Box 849, Carmel Valley, CA 93924 800-424-7356
Litton Potentiometer Div., 750 So. Fulton Ave., Mt. Vernon, NY 10551 914-664-7733
§ Love Controls, 1475 S. Wheeling Rd., Wheeling, IL 60090 312-541-3232
Magnum Opus Custom Elctrn. Engrg., 284 Kennedy St., Iselin, NJ 08830 201-283-4925
Mallory Capacitor Co., Mallory Comps. Grp., 3029 E. Washington St., Indianapolis, IN 46201 317-636-5353
§ Markat Div., Wild Oats Corp., 3 Country Dr., Plainview, NY 11803 516-549-9272
† Megatran Electronic Power, Rising Sun Rd., Bordentown, NJ 08505 609-298-7300
§ Metrix Instrument Co., 1711 Townhurst, Houston, TX 77043 713-461-2131
§ NES, Inc. (Nationwide Electronic Systems), 3003 Wakefield, Carpentersville, IL 60110 312-426-5900
Omega Engrg., Box 4047, Stamford, CT 06907 203-359-1660
§ Poly-Scientific, Litton Inds., 1213 N. Main St., Blacksburg, VA 24060 703-552-3014
PPM, Inc., 4521 Emery Ind. Pkwy., Cleveland, OH 44128 216-292-6006
§ Projects Unltd., 3680 Wyse Rd., Dayton, OH 45414 513-890-1918
§ PSG Inds., 1225 Tunnel Road, Perkasie, PA 18944 215-257-3621
RCI/Data, 1992 Lakewood Rd., Toms River, NJ 08753 201-341-8361
Reliance Electric Co., Marketing Info Center, P.O. Box 99502, Cleveland, OH 44199 .... 800-245-4501;800-245-4497 In Ohio
§ Risk, George, Inds., GRI Plaza, Kimball, NE 69145 308-235-4645
Rochester Instr. Sys., 255 N. Union St., Rochester, NY 14605 716-263-7700
Schlage Electronics, 3260 Scott Blvd., Santa Clara, CA 95051 408-727-5170
Scientific-Atlanta, Inc., P.O. Box 105600, Atlanta, GA 30348 404-441-4000
Spectral Dynamics, Scientific-Atlanta, Inc., 4255 Ruffin Rd., San Diego, CA 92123-0575 619-268-7100
Scientific Columbus, Inc., Esterline Corp., 1900 Arlingate La., Columbus, OH 43228 614-274-7160
§ Seaboard Elctrns., 70 Church St., New Rochelle, NY 10805 914-235-8073
Shogyo Intl. Corp., 287 Northern Blvd., Great Neck, NY 11021 516-466-0911
Signatron, A Unit of Sundstrand Corp., 12 Hartwell Ave., Lexington, MA 02173 617-861-1500
§ Sinclair Radio Labs., 122 Rayette Rd., Concord, ONT, CANADA L9W2Y8 416-669-1244
Solder Absorbing Technology (SAT), South End Bridge Circle, Agawam, MA 01001 800-628-8862
§ Soundlier, American Trading & Prod. Corp., 9380 Watson Ind'l. Pk., St. Louis, MO 63126 314-962-9870
§ SPECO Div., Components Specialties, Inc., P.O. Box 624, 1172 Rte. 109, Lindenhurst, NY 11757 .... 516-957-8700;800-645-5516
Spectron Corp., 344 New Albany Rd., Moorestown, NJ 08057 609-234-5700
§ Square D Co., Executive Plaza, Palatine, IL 60067 312-397-2600
§ Struthers-Dunn, Inc., Lamb's Rd., Pitman, NJ 08071 609-589-7500
§ Tapeswitch Corp. of America, 100 Schmitt Blvd., Farmingdale, NY 11735 516-694-6312
Tegal Scientific, Inc., Box 5905, Concord, CA 94524 415-827-1054
§ Tektone Sound & Signal, 1331 S. Killian Dr., Lake Park, FL 33403 305-844-2383
§ Telco Products Co., 44 Sea Cliff, Glen Cove, NY 11542 516-759-0300
† Telectro Sys., 96-18 43rd Ave., Corona, NY 11368 212-651-8900
Teledyne/Geotech, 3401 Shiloh Rd., Garland, TX 75041 214-271-2561
§† Transamerica Delaval, Gems Sensors Div., Cowles Rd, Plainville, CT 06062-9990 203-677-1311
Trans-Met Engrg., 601 S. Palm St., La Habra, CA 90631 213-691-2266
Vibra-Metrics, 1014 Sherman Ave., Hamden, CT 06514 .... 203-288-6158; 1-800-352-2001
Wheelock, Inc., 273 Branchport Ave., Long Branch, NJ 07740 201-222-6880
Xylog Corp., 150 Tillman St., Westwood, NJ 07675 201-664-7997

Alarms, Controls, Photoelectric-3700 — *See Vol. B*

Alarms, Static — See Alarms & Alarm Systems

Alloys, Brazing-5400 — *See Vol. C*

Alloys, Metal/Ceramic-1600 — *See Vol. C*

Alphanumeric Readouts — See Tubes, Readout (Vol. A)

Alternators-4050

† Georator Corp., Box 70, Manassas, VA 22110, 703-368-2101 .... D•1932
† American Elctrns., 1600 E. Valencia Dr., Fullerton, CA 92631 714-871-3020
Bosch, Robert, Corp., 2800 S. 25th Ave., Broadview, IL 60153 312-865-5200
† Columbia Elec. Mfg., 4519 Hamilton Ave. N.W., Cleveland, OH 44114 216-361-8060
§ Diversified Elctrns., Inc., Indl. Controls Div., 119 N. Morton Ave., Evansville, IN 47711 812-426-2806
Eastern Air Devices Motor Div., 1 Progress Dr., Dover, NH 03820 603-742-3330
† Electro Kinetics Co., Sub. HTL Inds., Inc., 402 E. Gutierrez St., Santa Barbara, CA 93102 805-963-2055
Electro-Pacific, 5782 Thornwood Dr., Goleta, CA 93017 805-964-0751
§† Hertner Div., 12690 Elmwood Ave., Cleveland, OH 44111 216-252-4242
† HTL Electro Kinetics, 402 E. Gutierrez St., Santa Barbara, CA 93101 805-963-2055
† IMC Magnetics Corp., Eastern Div., 570 Main St., Westbury, NY 11590 516-334-7070
Q-S Products Co., Inc., 3605 S.W. Snoqualmie St., Seattle, WA 98126 206-937-5505
Reliance Electric Co., Marketing Info Center, P.O. Box 99502, Cleveland, OH 44199 .... 800-245-4501;800-245-4497 In Ohio
Simmonds Precision, P.O. Box 310, Norwich, NY 13815 607-335-5000
§ Square D Co., Executive Plaza, Palatine, IL 60067 312-397-2600

Altimeters-2900

§ Epic, Inc., 150 Nassau St., New York, NY 10038 212-349-2470

Aluminizers, Vacuum — See Deposition Equip. (Vol. D), Evaporation Equipment, Electronic Beam (Vol. D)

Amplifiers, AF-1300

Industrial Test Equip., 21 Yennicock Ave., Port Washington, NY 11050, 516-883-1700 .... D•1938
Krohn-Hite Corp., Avon Indl. Pk., Bodwell St., Avon, MA 02322, 617-580-1660 .... D•1259
† Millivac Instrs., Box 997, Curry Rd. Ext., Schenectady, NY 12301, 518-355-8300 .... D•1266
Modular Devices, 50 Orville Dr., Bohemia, NY 11716, 516-567-9620 .... D•1011
§ Opamp Labs, Inc., 1033 N. Sycamore Ave., Los Angeles, CA 90038, 213-934-3566 .... D•1014
Precision Filters, 240 Cherry St., Ithaca, NY 14850, 607-277-3550 .... A•1625
§ RTS Systems, Inc., Compact Video, Inc., 1100 W. Chestnut St., Burbank, CA 91506, 818-840-7119 .... D•1055
§ Shokai Far East, Ltd., 280 North Central Ave., Hartsdale, NY 10530, 914-681-0700 .... D•1039
Tecron Industrial Prods., Crown Intl., Inc., 1718 W. Mishawaka Rd., Elkhart, IN 46517, 219-294-8300 .... D•1019-1020
A E G Telefunken, Semiconductor Grp., Rte. 22, Somerville, NJ 08876 201-722-9800
† AEROCOM, 3090 S.W. 37th Ave., Miami, FL 33133 305-448-6503
Aiken Advanced Sys., Amstar Technical Products Company, Inc., 5901 Edsall Rd., Alexandria, VA 22304-4197 703-370-0900
§ Aiphone, 1700 130th St. NE, Bellevue, WA 98005 206-455-0510
§ Altec Lansing, Altec Corp., 1250 N. Red Gum St., Anaheim, CA 92806 714-632-7117
American Electronic Labs., Box 552, Lansdale, PA 19446 215-822-2929
§ Amperex Electronic Corp., Hicksville Div., Box 418 - 230 Duffy Ave., Hicksville, NY 11802 516-931-6200
Amplifier Research, 160 School House Rd., Souderton, PA 18964-9990 215-723-8181
† Analog Devices, P.O. Box 280, Norwood, MA 02062 617-329-4700
Analog Systems, P.O. Box 35879, Tucson, AZ 85740-5879 602-293-4923
† Andrich Sys., Inc., 1699 Roosevelt Ave., Bohemia, NY 11716 516-589-5656
† Apex Microtechnology Corp., 2895 W. Rudasil Road, Tucson, AZ 85741 602-746-0849
Beckman Instrs., 2500 Harbor Blvd., Fullerton, CA 92634 714-871-4848
Behlman Engineering, 1142 Mark Ave., Carpinteria, CA 93013 805-684-8311
§ Bell Audio Service Co., Magnetic Programming, Inc., 6740-G Huntley Road, Worthington, OH 43085 614-846-2766
Burr-Brown Corp., P.O. Box 11400, Tucson, AZ 85734 602-746-1111
California Instruments, A Div. of Amstar Tech. Prods. Co., Inc., 5150-Convoy St., San Diego, CA 92111 .... 619-279-8620;800-356-2244;800-821-1634
C-COR Elctrns., 60 Decibel Rd., State College, PA 16801 814-238-2461
§ Cetec Raymer, 7315 Fulton Ave., No. Hollywood, CA 91605 213-875-0423
Cherry Semiconductor Corp, 2000 S. County Trail, East Greenwich, RI 02818 401-885-3600
† CML MACARR Div., Marine Electric RPD, Inc., 666 Pacific St., Brooklyn, NY 11217 718-857-2400
† Control Technology Co., 41-16 29th St., Long Island City, NY 11101 718-361-2133
Dantel, 2991 N. Argyle Ave., Fresno, CA 93727 209-292-1111
§ The David Hafler Co., 5910 Crescent Blvd., Pennsauken, NJ 08109 609-662-6355
§ Davis, J. W., & Co., P.O. Box 26177, Dallas, TX 75226 214-651-7341
§ Delta Elctrns., 145 Fayette St., Winston-Salem, NC 27101 919-725-4122
Dexter Research Ctr., Inc., 7300 Huron River Dr., Dexter, MI 48130 313-426-3921
§† Dukane Corp., Communications Sys. Div., 2900 Dukane Dr., St. Charles, IL 60174 312-584-2300
§ Dynamics, Div. of Waugh Controls Corp., 9001 Fullbright Ave., Chatsworth, CA 91311 818-998-8281
§† Elantec, Inc., 1996 Tarob Ct., Milpitas, CA 95035 .... 408-945-1323;800-821-7429
† Electro-Optical Inds., Box 3770, Santa Barbara, CA 93130 805-964-6701
Elgar Corp, An Onan McGraw Edison Co., 9250 Brown Deer Rd., San Diego, CA 92121 619-450-0085
Exact Electronics, Div. of Dynatech Nevada Inc., Box 1925, 2000 Arrowhead Dr., Carson City, NV 89701 .... 702-883-3400;800-648-7952
§ Ferranti Elec., 87 Modula Ave., Commack, NY 11725 516-543-0200
§ Frazier, 1930 Valley View La., Dallas, TX 75234 214-241-3441
§ GC Elctrns., 400 S. Wyman St., Rockford, IL 61101 815-968-9661
† Gentex, Box 315, Carbondale, PA 18407 603-434-0311
Gra-Mar Inc., 3165 McCrory Pl., Ste. 265, Orlando, FL 32803 305-894-3351
† GRIM Corporation, Box 67, Medford, NJ 08055 609-267-7950
§ Harris Corp., Dracon Div., 809 Calle Plano, Camarillo, CA 93010 805-987-9511
§ Heath Co., Benton Harbor, MI 49022 616-982-3886
HGA Elctrns., 519 S. Fifth Ave., Mt. Vernon, NY 10550 914-664-5393
† Instruments, Inc., 7263 Engineer Rd., San Diego, CA 92111 619-571-1111
† International Sensor Systems, Inc., Aurora Industrial Pk., Box 345, Aurora, NE 68818 402-694-6111

ITHACO, Inc., Meas. & Control Instrs. Div., 735 W. Clinton St., P.O. Box 6437, Ithaca, NY 14851-6437 607-272-7640
Julie Resch. Labs., 211 West 61st St., New York, NY 10023 212-245-2727
Lear Siegler, Inc., 2850 Ocean Park Blvd., P.O. Box 2158, Santa Monica, CA 90406 213-452-5444
Linear Technlg., P.O. Box 489, Sta. "A", Burlington, ON, CANADA L7R 3Y3 416-632-2996
LogiMetrics, 121-03 Dupont St., Plainview, NY 11803 516-349-1700
Magnum Opus Custom Elctrn. Engrg., 284 Kennedy St., Iselin, NJ 08830 201-283-4925
† Mel Tec, Div. Epsco, Inc., 411 Providence Hwy., Westwood, MA 02090 .. 617-329-1508
MERET, Inc., 1815 24th St., Santa Monica, CA 90404-4998 213-828-7496
Modular Audio Prods., Modular Devices Inc., 50 Orville Dr., Bohemia, NY 11716 516-567-9620
§ NEC Elctrns. USA Inc., NEC Electron Div., 252 Humboldt Ct., Sunnyvale, CA 94086 408-745-6520
Norton Assocs., 10 Di Tomas Ct., Copiague, NY 11726 516-842-4666
† Pacific Electro Dynamics, Inc., 11465 Willows Rd. N.E., Redmond, WA 98052 206-881-1700
Peca, Inc., 592 Winks Lane, Bensalem, PA 19020 215-245-1550
§ Perma Power Elctrns., 5615 W. Howard Ave., Chicago, IL 60648 312-647-9414
† Perry Amplifier, 138 Fuller St., Brookline, MA 02146 617-734-0844
§ Philmore Mfg., 40 Inip Dr., Inwood, NY 11696 516-239-6161
§ Plessey Semiconductors, 1641 Kaiser Ave., Irvine, CA 92714 714-540-9979
§ Precision Elctrns., 9101 King Ave., Franklin Park, IL 60131 312-678-5350
§† Precision Monolithics, Inc., 1500 Space Dr., Santa Clara, CA 95054 408-727-9222
§ Ramko Resch., Inc., 11355A Folsom Blvd., Rancho Cordova, CA 95670 800-821-2545
§† RCA Solid State Div., Route 202, Somerville, NJ 08876 201-685-6000
§† RCA Solid State Div., Linear Integrated Circuits, Rte. 202, Somerville, NJ 08876 201-685-6000
RFL Inds., A Dowty Grp. Co./Comms. Div., Powerville Rd., Boonton, NJ 07005 201-334-3100
RF Power Labs, Inc., 21820 87th S. E., Woodinville, WA 98072 206-481-8833
† Roanwell, 180 Varick St., New York, NY 10014 212-989-1090
SGS Semiconductor Corporation, 1000 E. Bell Road, Phoenix, AZ 85022 602-867-6100
§ Shure Bros., 222 Hartrey Ave., Evanston, IL 60204 312-866-2200
† Solid State Elctrns. Corp., 18646 Parthenia St., Northridge, CA 91324 ... 818-993-8257
Solitron Devices, 8808 Balboa Ave., San Diego, CA 92123 619-278-8780
Southwest Tech Prods Corp., 219 W. Rhapsody, San Antonio, TX 78216 512-344-0242
§ SPECO Div., Components Specialties, Inc., P.O. Box 624, 1172 Rte. 109, Lindenhurst, NY 11757 .... 516-957-8700;800-645-5516
§ Spectra Sonics, 3750 Airport Rd., Ogden, UT 84403 801-392-7531
§† Sprague Electric Company, Distribution Division, 481 Marshall St., No. Adams, MA 01247 413-664-4481
Sylvania Electronic Components, Philips ECG Inc., A North American Philips Co., 100 First Ave., Waltham, MA 02254 617-890-6107
† Telephonics, 770 Park Ave., Huntington, NY 11743 516-549-6000
Texas Instrs., Inc., Box 225012-MS-84, Dallas, TX 75265 214-995-6611
§ Tucker Elctrns., Box 461966, Garland, TX 75046 .... 214-348-8800;800-527-4642
Unholtz-Dickie Corp., 6 Brookside Dr., Wallingford, CT 06492 203-265-3929
Varian Associates, Inc., Microwave Tube Div., 611 Hansen Way, Palo Alto, CA 94303 415-493-4000

Amplifiers, Antenna-1900

† Adams-Russell, Parisi Div., 280 Bear Hill Rd., Waltham, MA 02154 617-890-0055
Aiken Advanced Sys., Amstar Technical Products Company, Inc., 5901 Edsall Rd., Alexandria, VA 22304-4197 703-370-0900
Antennacraft, Box 1005, Burlington, IA 52601 319-754-7575
† Avantek, Inc., 3175 Bowers Ave., Santa Clara, CA 95054 408-496-6710
C-COR Elctrns., 60 Decibel Rd., State College, PA 16801 814-238-2461
† EDMAN Corp., Subsidiary of Rospatch, 7500 Main St., P.O. Box 750, Fishers, NY 14453-0750 716-924-4000
† Environmental Comm., 3150 Pullman St., Costa Mesa, CA 92627 714-557-7800
FG Engrg., Box 476, Fredonia, AZ 86022 602-643-7375
§† Harris Corp., PRD Elctrns. Div., 6801 Jericho Tpke., Syosset, NY 11791 516-364-0400
§ Kay-Townes Antenna, P.O. Box 593, Rome, GA 30161 404-291-9871
† Locus, Box 740, State College, PA 16804 814-466-6275
§ Macom Inds., 8230 Haskell Ave., Van Nuys, CA 91406
Mu-Del Electronics, Inc., 2426 Linden Lane, Silver Spring, MD 20910-1288 301-587-6087
Resdel Engrg., 300 E. Live Oak Ave., Arcadia, CA 91006 213-684-2600
Scientific-Atlanta, Inc., P.O. Box 105600, Atlanta, GA 30348 404-441-4000
† Scientific Communications, Inc., 3425 Kingsley Rd., Garland, TX 75041 214-271-3685
§ Shokai Far East, Ltd., 280 North Central Ave., Hartsdale, NY 10530 914-681-0700
§ Sitco Antennas, 10330 N.E. Marx St., Portland, OR 97220 503-253-2000
§ SPECO Div., Components Specialties, Inc., P.O. Box 624, 1172 Rte. 109, Lindenhurst, NY 11757 .... 516-957-8700;800-645-5516
† TRAK Microwave Corp., 4726 Eisenhower Blvd., Dept. E5, Tampa, FL 33614 813-884-1411
† TRW Microwave, 825 Stewart Dr., Sunnyvale, CA 94086 408-732-0880
Wide Band Engrg. Co., Inc., Box 21652, Phoenix, AZ 85036 602-254-1570

Amplifiers, Compressor-1100

§ **Opamp Labs, Inc., 1033 N. Sycamore Ave., Los Angeles, CA 90038, 213-934-3566 .... D•1014**
Linear Technlg., P.O. Box 489, Sta. "A", Burlington, ON, CANADA L7R 3Y3 416-632-2996
† Mel Tec, Div. Epsco, Inc., 411 Providence Hwy., Westwood, MA 02090 .. 617-329-1508
Modular Audio Prods., Modular Devices Inc., 50 Orville Dr., Bohemia, NY 11716 516-567-9620
Modular Devices, 50 Orville Dr., Bohemia, NY 11716 516-567-9620
§ MVP Elctrns., 1161 N. Tustin, Orange, CA 92667 714-639-9246
SGS Semiconductor Corporation, 1000 E. Bell Road, Phoenix, AZ 85022 602-867-6100
§ Shure Bros., 222 Hartrey Ave., Evanston, IL 60204 312-866-2200
§ Spectra Sonics, 3750 Airport Rd., Ogden, UT 84403 801-392-7531

Amplifiers, Current, AC-1100

† **Analog Modules, Inc., 126 Baywood Avenue, Longwood, FL 32750, 305-339-4356/4355 .... D•1004**
† **Apex Microtechnology Corp., 2895 W. Rudasil Road, Tucson, AZ 85741, 602-746-0849 .... D•1005**
Industrial Test Equip., 21 Yennicock Ave., Port Washington, NY 11050, 516-883-1700 .... D•1938
Ohio Semitronics, Inc., 1205 Chesapeake Ave., Columbus, OH 43212, 614-486-9561 .... B•1812
Tecron Industrial Prods., Crown Intl., Inc., 1718 W. Mishawaka Rd., Elkhart, IN 46517, 219-294-8300 .... D•1019-1020
† Acromag, 30765 Wixom Rd., Wixom, MI 48096 313-624-1541
† Analog Devices, P.O. Box 280, Norwood, MA 02062 617-329-4700
Behlman Div., California Instrs., Div. of Norlin Inds., 5150 Convoy St., San Diego, CA 92111 619-279-8620
California Instruments, A Div. of Amstar Tech. Prods. Co., Inc., 5150-Convoy St., San Diego, CA 92111 .... 619-279-8620;800-356-2244;800-821-1634
† Control Technology Co., 41-16 29th St., Long Island City, NY 11101 718-361-2133
§† Elantec, Inc., 1996 Tarob Ct., Milpitas, CA 95035 .... 408-945-1323;800-821-7429
Elin Div., California Instrs. Co., Div. of Norlin Ind., 5150 Convoy St., San Diego, CA 92111 619-279-8620
Frequency Control Prods., Inc., American Time Prods. Div., 61-20 Woodside Ave., Woodside, NY 11377 212-458-5811
ITHACO, Inc., Meas. & Control Instrs. Div., 735 W. Clinton St., P.O. Box 6437, Ithaca, NY 14851-6437 607-272-7640
Julie Resch. Labs., 211 West 61st St., New York, NY 10023 212-245-2727
Kollmorgen Corp., Industrial Drives Div., 201 Rock Rd., Radford, VA 24141 703-639-2495
§† Linear Technology Corp., 1630 McCarthy Blvd., Milpitas, CA 95035 408-942-0810
† Mel Tec, Div. Epsco, Inc., 411 Providence Hwy., Westwood, MA 02090 .. 617-329-1508
Modular Devices, 50 Orville Dr., Bohemia, NY 11716 516-567-9620
Norton Assocs., 10 Di Tomas Ct., Copiague, NY 11726 516-842-4666
† Optical Electronics, Inc., Box 11140, Tucson, AZ 85734 602-624-8358
† Perry Amplifier, 138 Fuller St., Brookline, MA 02146 617-734-0844
§† RCA Solid State Div., Route 202, Somerville, NJ 08876 201-685-6000
§† RCA Solid State Div., Linear Integrated Circuits, Rte. 202, Somerville, NJ 08876 201-685-6000
Rochester Instr. Sys., 255 N. Union St., Rochester, NY 14605 716-263-7700
Rotek Instr. Corp., 390 Main St., Waltham, MA 02254 617-899-4611
SGS Semiconductor Corporation, 1000 E. Bell Road, Phoenix, AZ 85022 602-867-6100
§ Shokai Far East, Ltd., 280 North Central Ave., Hartsdale, NY 10530 914-681-0700
§ THORN EMI Gencom Inc., 23 Madison Rd., Fairfield, NJ 07006 201-575-5586

Amplifiers, DC-1100

† **Analog Modules, Inc., 126 Baywood Avenue, Longwood, FL 32750, 305-339-4356/4355 .... D•1004**
† **Control Technology Co., 41-16 29th St., Long Island City, NY 11101, 718-361-2133 .... D•1986**
Ectron Corp., 8159 Engineer Rd., San Diego, CA 92111, 619-278-0600 ... D•1007
Modular Devices, 50 Orville Dr., Bohemia, NY 11716, 516-567-9620 ..... D•1011
† **NWL Transformers, Rising Sun Rd., P.O. Box 358, Bordentown, NJ 08505, 609-298-7300 .... D•1735**
NWL Transformers, Rising Sun Rd., P.O. Box 358, Bordentown, NJ 08505, 609-298-7300 .... D•1735
Opamp Labs, Inc., 1033 N. Sycamore Ave., Los Angeles, CA 90038, 213-934-3566 .... D•1014
Tecron Industrial Prods., Crown Intl., Inc., 1718 W. Mishawaka Rd., Elkhart, IN 46517, 219-294-8300 .... D•1019-1020
† Acromag, 30765 Wixom Rd., Wixom, MI 48096 313-624-1541
§ Action Instrs., 8601 Aero Dr., San Diego, CA 92123 619-279-5726
† Analog Devices, P.O. Box 280, Norwood, MA 02062 617-329-4700
† Analog Systems, P.O. Box 35879, Tucson, AZ 85740-5879 602-293-4923
† Andrich Sys., Inc., 1699 Roosevelt Ave., Bohemia, NY 11716 516-589-5656
† Apex Microtechnology Corp., 2895 W. Rudasil Road, Tucson, AZ 85741 602-746-0849
Bell & Howell/CEC Div., 360 Sierra Madre Villa, Pasadena, CA 91109 ... 213-796-9381
Bertsch U.S., Sycamore Resch. Ctr., 2142F Industrial Ct., Vista, CA 92083 619-727-7420
Burleigh Instrs., Burleigh Pk., Fishers, NY 14453 716-924-9355
† Burr-Brown Corp., P.O. Box 11400, Tucson, AZ 85734 602-746-1111
† Calex Mfg. Co., Inc., 3355 Vincent Rd., Pleasant Hill, CA 94523 415-932-3911
† CELCO, 70 Constantine Dr., Mahwah, NJ 07430 201-327-1123
Cherry Semiconductor Corp, 2000 S. County Trail, East Greenwich, RI 02818 401-885-3600
† Comlinear Corp., 2468 E. 9th St., Loveland, CO 80537 303-669-9433
Continental Resources, Inc., 175 Middlesex Tpke., Bedford, MA 01730 .. 617-275-0850
† Control Prods., Devar, Inc., P.O. Box 589, Bridgeport, CT 06601 203-368-6751
† Datel, General Electric Co., 11 Cabot Blvd., Mansfield, MA 02048 617-339-9341
† Del Elctrns. Corp., 250 E. Sandford Blvd., Mt. Vernon, NY 10550 914-699-2000
§ Dynamics, Div. of Waugh Controls Corp., 9001 Fullbright Ave., Chatsworth, CA 91311 818-998-8281
§† Elantec, Inc., 1996 Tarob Ct., Milpitas, CA 95035 .... 408-945-1323;800-821-7429
Electro-Craft, 1600 2nd St. S., Hopkins, MN 55343 612-931-2700
Fogg Sys., 15592 E. Batavia Dr., Aurora, CO 80011 303-344-1883
Frequency Control Prods., Inc., American Time Prods. Div., 61-20 Woodside Ave., Woodside, NY 11377 212-458-5811
§ General Magnetics, 211 Grove St., Bloomfield, NJ 07003 201-743-2700
Gould Inc., Recording Systems Div., 3631 Perkins Ave., Cleveland, OH 44114 216-361-3315

Gra-Mar Inc., 3165 McCrory Pl., Ste. 265, Orlando, FL 32803 ... 305-894-3351
§ Guildline Instrs., 4403 Vineland Rd, Suite B-10, Orlando, FL 32811-9998 ... 305-423-8215
† Hades Mfg. Corp., 151-A Verdi St., Farmingdale, NY 11735 ... 516-249-4244
Honeywell, Test Instrs. Div., P.O. Box 5227, Denver, CO 80217 ... 303-773-4700
§ Hottinger Baldwin Measurements, 139 Newbury St., Framingham, MA 01701 ... 617-875-8282
Hughes Aircraft Co, Aerospace Grps./Support Sys., P.O. Box 90515, Los Angeles, CA 90009 ... 213-670-1515
Hughes Aircraft Co., Microelctrn. Sys. Div., 2601 Campus Dr., Irvine, CA 92715 ... 714-752-3800
† Industrial Control Co., 3100 Pineda Ave., Rockledge, FL 32955 ... 305-259-7105
Inertial Motors, 280 N. Broad St., Doylestown, PA 18901 ... 215-345-1010
† Inland Motor, Kollmorgen Corp., 501 First St., Radford, VA 24141 ... 703-639-9045
§† Intech, Microcircuits Div., 2270 Martin Ave., Santa Clara, CA 95050 ... 408-988-4930
ITHACO, Inc., Meas. & Control Instrs. Div., 735 W. Clinton St., P.O. Box 6437, Ithaca, NY 14851-6437 ... 607-272-7640
IXYS Corp., 142 Charcot Ave., San Jose, CA 95131 ... 408-262-8800
Julie Resch. Labs., 211 West 61st St., New York, NY 10023 ... 212-245-2727
† Kollmorgen Corp., Industrial Drives Div., 201 Rock Rd., Radford, VA 24141 ... 703-639-2495
Krohn-Hite Corp., Avon Indl. Pk., Bodwell St., Avon, MA 02322 ... 617-580-1660
Larson Instr., Greenbush Rd., Orangeburg, NY 10962 ... 914-359-3800
LeCroy Resch. Sys. Corp., 700 S. Main St., Spring Vly., NY 10977 ... 914-425-2000
Leeds & Northrup Instrs., A Unit of General Signal Corp., Sumneytown Pike, North Wales, PA 19454 ... 215-643-2000
§† Linear Technology Corp., 1630 McCarthy Blvd., Milpitas, CA 95035 ... 408-942-0810
Marel Instr. Co., 907 South East 13th Pl., Cape Coral, FL 33904 ... 813-574-8788
McFadden Sys., Inc., 8953 S. Atlantic Ave., South Gate, CA 90280-9990 ... 213-564-5958
† Megatran Electronic Power, Rising Sun Rd., Bordentown, NJ 08505 ... 609-298-7300
† Mel Tec, Div. Epsco, Inc., 411 Providence Hwy., Westwood, MA 02090 ... 617-329-1508
† Micro Mo Electronics, Inc., 742 2nd Ave. S., St. Petersburg, FL 33701 ... 813-822-2529
Mini-Systems, Inc., 20 David Rd., North Attleboro, MA 02761 ... 617-695-0203
§ MVP Elctrns., 1161 N. Tustin, Orange, CA 92667 ... 714-639-9246
† Natel Engrg. Co., Inc., 4550 Runway St., Simi Valley, CA 93063 ... 805-581-3950
Neff Instr., 700 S. Myrtle Ave., Monrovia, CA 91016 ... 818-357-2281
Nuclear Resch. Corp., 125 Titus Ave., Warrington, PA 18976 ... 215-343-5900
Omega Engrg., Box 4047, Stamford, CT 06907 ... 203-359-1660
Optical Electronics, Inc., Box 11140, Tucson, AZ 85734 ... 602-624-8358
Pacific Instrs. Inc., 215 Mason Circle, Concord, CA 94518 ... 415-827-9010
Pacific Power Source Corp., 15122 Bolsa Chica St., Huntington Bch., CA 92649 ... 714-898-2691;800-854-2433
† Performance Controls Inc., 333-E Byberry Rd., Hatboro, PA 19040 ... 215-675-6500
† Perry Amplifier, 138 Fuller St., Brookline, MA 02146 ... 617-734-0844
PPM, Inc., 4521 Emery Ind. Pkwy., Cleveland, OH 44128 ... 216-292-6006
Precision Filters, 240 Cherry St., Ithaca, NY 14850 ... 607-277-3550
§† Precision Monolithics, Inc., 1500 Space Dr., Santa Clara, CA 95054 ... 408-727-9222
§ Preston Scientific, 805 E. Cerritos Ave., Anaheim, CA 92805 ... 714-776-6400
§† RCA Solid State Div., Route 202, Somerville, NJ 08876 ... 201-685-6000
§† RCA Solid State Div., Linear Integrated Circuits, Rte. 202, Somerville, NJ 08876 ... 201-685-6000
Rehlander Assocs., 118A Bridge St., Beverly, MA 01915 ... 617-922-5961
RFL Inds., A Dowty Grp. Co./Comms. Div., Powerville Rd., Boonton, NJ 07005 ... 201-334-3100
RIL Elctrns., Inc., 125 Titus Ave., P.O. Box H, Warrington, PA 18976 ... 215-EL5-1361
Rochester Instr. Sys., 255 N. Union St., Rochester, NY 14605 ... 716-263-7700
Ross Engrg. Corp., 540 Westchester Dr., Campbell, CA 95008 ... 408-377-4621
SGS Semiconductor Corporation, 1000 E. Bell Road, Phoenix, AZ 85022 ... 602-867-6100
§ Shokai Far East, Ltd., 280 North Central Ave., Hartsdale, NY 10530 ... 914-681-0700
§ Spectra Sonics, 3750 Airport Rd., Ogden, UT 84403 ... 801-392-7531
† Tegam, 7230 N. Ridge Rd., Madison, OH 44057 ... 216-428-7505
Teledyne/Geotech, 3401 Shiloh Rd., Garland, TX 75041 ... 214-271-2561
Teledyne Philbrick, Allied Dr. Rte 128, Dedham, MA 02026 ... 617-329-1600
Texmate, Inc., 348 S. Cedros Ave., P.O. Box 2000, Solana Beach, CA 92075 ... 619-481-7177
† Transmagnetics, 210 Adams Blvd., Farmingdale, NY 11735 ... 516-293-3100
§ Tucker Elctrns., Box 461966, Garland, TX 75046 ... 214-348-8800;800-527-4642
Tustin Elctrns. Co., 1431 E. Saint Andrews Pl., Santa Ana, CA 92705 ... 714-549-0391
Unholtz-Dickie Corp., 6 Brookside Dr., Wallingford, CT 06492 ... 203-265-3929
§ Westamp, 1542 15th St., Santa Monica, CA 90404 ... 213-393-0401
Yokogawa Corp. of America, 2 Dart Rd., Shenandoah, GA 30265 ... 404-253-7000

Amplifiers, Data — See Amplifiers, Instrumentation (Vol. D)

Amplifiers, Decade-1100

Amplifier Research, 160 School House Rd., Souderton, PA 18964-9990, 215-723-8181 ... D•1003
Burr-Brown Corp., P.O. Box 11400, Tucson, AZ 85734 ... 602-746-1111
ITHACO, Inc., Meas. & Control Instrs. Div., 735 W. Clinton St., P.O. Box 6437, Ithaca, NY 14851-6437 ... 607-272-7640
Marel Instr. Co., 907 South East 13th Pl., Cape Coral, FL 33904 ... 813-574-8788
§ MVP Elctrns., 1161 N. Tustin, Orange, CA 92667 ... 714-639-9246
Pacific Instrs. Inc., 215 Mason Circle, Concord, CA 94518 ... 415-827-9010
§† Plessey Semiconductors, 1641 Kaiser Ave., Irvine, CA 92714 ... 714-540-9979
Precision Filters, 240 Cherry St., Ithaca, NY 14850 ... 607-277-3550
Schaffner EMC, Inc., 825 Lehigh Ave., Union, NJ 07083 ... 201-851-0644

Amplifiers, Deflection-Also See Yokes, Deflection, Oscilloscopes, etc.-1100

† Apex Microtechnology Corp., 2895 W. Rudasil Road, Tucson, AZ 85741 ... 602-746-0849
† CELCO, 70 Constantine Dr., Mahwah, NJ 07430 ... 201-327-1123
CPS Inc., 110 Wolfe Rd., Sunnyvale, CA 94086 ... 408-738-0530
Data Ray Corp., 452 Burbank Street, Broomfield, CO 80020 ... 303-469-5173
† Infodex, Inc., 395 W. Main St., Waterbury, CT 06702 ... 203-757-9291
Intronics, Inc., 57 Chapel St., Newton, MA 02158 ... 617-964-4000
Modular Devices, 50 Orville Dr., Bohemia, NY 11716 ... 516-567-9620
SGS Semiconductor Corporation, 1000 E. Bell Road, Phoenix, AZ 85022 ... 602-867-6100

Amplifiers, Differential-1100

† Analog Modules, Inc., 126 Baywood Avenue, Longwood, FL 32750, 305-339-4356/4355 ... D•1004
Ectron Corp., 8159 Engineer Rd., San Diego, CA 92111, 619-278-0600 ... D•1007
§ RTS Systems, Inc., Compact Video, Inc., 1100 W. Chestnut St., Burbank, CA 91506, 818-840-7119 ... D•1055
† Analog Devices, P.O. Box 280, Norwood, MA 02062 ... 617-329-4700
Analogic Corp., Data Conversion Prods. Grp., Audubon Rd., Wakefield, MA 01880 ... 617-246-0300
† Andrich Sys., Inc., 1699 Roosevelt Ave., Bohemia, NY 11716 ... 516-589-5656
† Apex Microtechnology Corp., 2895 W. Rudasil Road, Tucson, AZ 85741 ... 602-746-0849
† Comlinear Corp., 2468 E. 9th St., Loveland, CO 80537 ... 303-669-9433
Dymec, 8 Lowell Ave., Winchester, MA 01890 ... 617-729-7870
Gould Inc., Recording Systems Div., 3631 Perkins Ave., Cleveland, OH 44114 ... 216-361-3315
Honeywell, Test Instrs. Div., P.O. Box 5227, Denver, CO 80217 ... 303-773-4700
§† Intech, Microcircuits Div., 2270 Martin Ave., Santa Clara, CA 95050 ... 408-988-4930
ITHACO, Inc., Meas. & Control Instrs. Div., 735 W. Clinton St., P.O. Box 6437, Ithaca, NY 14851-6437 ... 607-272-7640
§† Linear Technology Corp., 1630 McCarthy Blvd., Milpitas, CA 95035 ... 408-942-0810
† Mel Tec, Div. Epsco, Inc., 411 Providence Hwy., Westwood, MA 02090 ... 617-329-1508
MERET, Inc., 1815 24th St., Santa Monica, CA 90404-4998 ... 213-828-7496
MICRA Corp., 120 Ricefield Lane, Hauppauge, NY 11788 ... 516-231-8600
§ MVP Elctrns., 1161 N. Tustin, Orange, CA 92667 ... 714-639-9246
Omega Engrg., Box 4047, Stamford, CT 06907 ... 203-359-1660
Pacific Instrs. Inc., 215 Mason Circle, Concord, CA 94518 ... 415-827-9010
Precision Filters, 240 Cherry St., Ithaca, NY 14850 ... 607-277-3550
§† Precision Monolithics, Inc., 1500 Space Dr., Santa Clara, CA 95054 ... 408-727-9222
§ Preston Scientific, 805 E. Cerritos Ave., Anaheim, CA 92805 ... 714-776-6400
RCA Solid State Div., Linear Integrated Circuits, Rte. 202, Somerville, NJ 08876 ... 201-685-6000
§† Ross Engrg. Corp., 540 Westchester Dr., Campbell, CA 95008 ... 408-377-4621
SGS Semiconductor Corporation, 1000 E. Bell Road, Phoenix, AZ 85022 ... 602-867-6100
§ Siliconix, Inc., 2201 Laurelwood Rd., Santa Clara, CA 95054 ... 408-988-8000
Tustin Elctrns. Co., 1431 E. Saint Andrews Pl., Santa Ana, CA 92705 ... 714-549-0391

Amplifiers, Distribution-1100

Austron, Inc., P.O. Box 14766, Exit 248 N. IH 35, Austin, TX 78761, 512-251-2341 ... A•1315
† Frequency and Time Systems, Inc., DATUM, INC., 34 Tozer Rd., Beverly, MA 01915, 617-927-8220 ... D•1148
† Frequency Elctrns., 55 Charles Lindbergh Blvd., Mitchel Field, NY 11553, 516-794-4500 ... A•1366
Opamp Labs, Inc., 1033 N. Sycamore Ave., Los Angeles, CA 90038, 213-934-3566 ... D•1014
§ RTS Systems, Inc., Compact Video, Inc., 1100 W. Chestnut St., Burbank, CA 91506, 818-840-7119 ... D•1055
Antennacraft, Box 1005, Burlington, IA 52601 ... 319-754-7575
† Apex Microtechnology Corp., 2895 W. Rudasil Road, Tucson, AZ 85741 ... 602-746-0849
Avantek, Inc., 3175 Bowers Ave., Santa Clara, CA 95054 ... 408-496-6710
† CATEL Telecommunications, United Scientific Corp., 4800 Patrick Henry Dr., Santa Clara, CA 95054 ... 408-988-7722
C-COR Elctrns., 60 Decibel Rd., State College, PA 16801 ... 814-238-2461
† Comlinear Corp., 2468 E. 9th St., Loveland, CO 80537 ... 303-669-9433
Data Ray Corp., 452 Burbank Street, Broomfield, CO 80020 ... 303-469-5173
Datum Inc., Timing/Aacom Divisions, 1363 S. State College Blvd., Anaheim, CA 92806 ... 714-533-6333
§ Dyma Engrg., Box 1535, Los Lunas, NM 87031 ... 505-865-6700
§ Electronic Navigation Inds, Emerson Electric Co., 100 Highpower Road, Rochester, NY 14623 ... 716-427-8300
† Environmental Comm., 3150 Pullman St., Costa Mesa, CA 92627 ... 714-557-7800
§ ESE, 142 Sierra St., El Segundo, CA 90245 ... 213-322-2136
FG Engrg., Box 476, Fredonia, AZ 86022 ... 602-643-7375
Foundation Instruments Inc., 24 Colonnade Rd., Nepean, ON, CANADA K2E 7J6 ... 613-226-4000
§ Heath Co., Benton Harbor, MI 49022 ... 616-982-3886
International Crystal Mfg., 10 N. Lee, P.O. Box 26330, Oklahoma City, OK 73126 ... 405-236-3741
§† Lenco Elctrns., Inc., 300 N. Maryland St., Jackson, MO 63755 ... 314-243-3147
§ Macom Inds., 8230 Haskell Ave., Van Nuys, CA 91406
† M/A-COM Microwave Power Dvcs., 330 Oser Ave., Hauppauge, NY 11788 ... 516-231-1400
Modular Audio Prods., Modular Devices Inc., 50 Orville Dr., Bohemia, NY 11716 ... 516-567-9620
Modular Devices, 50 Orville Dr., Bohemia, NY 11716 ... 516-567-9620
§ MVP Elctrns., 1161 N. Tustin, Orange, CA 92667 ... 714-639-9246
Nuclear Resch. Corp., 125 Titus Ave., Warrington, PA 18976 ... 215-343-5900
§† Ramko Resch., Inc., 11355A Folsom Blvd., Rancho Cordova, CA 95670 ... 800-821-2545
RCI/Data, 1992 Lakewood Rd., Toms River, NJ 08753 ... 201-341-8361
RF Power Labs, Inc., 21820 87th S. E., Woodinville, WA 98072 ... 206-481-8833
† RHG Electronics Lab., Inc., 161 E. Industry Ct., Deer Park, NY 11729 ... 516-242-1100
RIL Elctrns., Inc., 125 Titus Ave., P.O. Box H, Warrington, PA 18976 ... 215-EL5-1361
§ RMS Electronics Inc., 50 Antin Pl., Bronx, NY 10462 ... 212-892-6700
Spectracom, 101 Despatch Drive, East Rochester, NY 14445 ... 716-381-4827
§ Spectra Sonics, 3750 Airport Rd., Ogden, UT 84403 ... 801-392-7531

§ Sylvania Electronic Components, Philips ECG Inc., A North American Philips Co., 100 First Ave., Waltham, MA 02254 ... 617-890-6107
Tecron Industrial Prods., Crown Intl., Inc., 1718 W. Mishawaka Rd., Elkhart, IN 46517 ... 219-294-8300
Telemet, 185 Dixon Ave., Amityville, NY 11701 ... 516-842-2300
§ Television Equip. Assocs., Box 393, So. Salem, NY 10590-0393 ... 914-763-8893
Western Multiplex Corp., 1320 Bayport Avenue, San Carlos, CA 94070 .. 415-592-8832

Amplifiers, Equalization-1300

§ Opamp Labs, Inc., 1033 N. Sycamore Ave., Los Angeles, CA 90038, 213-934-3566 ... D•1014
C-COR Elctrns., 60 Decibel Rd., State College, PA 16801 ... 814-238-2461
Convex Corp., P.O. Box 17225, Dulles Intl. Airport, Washington, DC 20041 ... 703-661-8900
† Mel Tec, Div. Epsco, Inc., 411 Providence Hwy., Westwood, MA 02090 .. 617-329-1508
Modular Audio Prods., Modular Devices Inc., 50 Orville Dr., Bohemia, NY 11716 ... 516-567-9620
Modular Devices, 50 Orville Dr., Bohemia, NY 11716 ... 516-567-9620
Precision Filters, 240 Cherry St., Ithaca, NY 14850 ... 607-277-3550
Reliance Electric Co., Marketing Info Center, P.O. Box 99502, Cleveland, OH 44199 ... 800-245-4501;800-245-4497 In Ohio
SGS Semiconductor Corporation, 1000 E. Bell Road, Phoenix, AZ 85022 ... 602-867-6100
Telemet, 185 Dixon Ave., Amityville, NY 11701 ... 516-842-2300
§ Television Equip. Assocs., Box 393, So. Salem, NY 10590-0393 ... 914-763-8893

Amplifiers, Fiber Optic-1100

MERET, Inc., 1815 24th St., Santa Monica, CA 90404-4998, 213-828-7496 ... B•1121
Augat Fiberoptics, 710 Narragansett Park Dr., Pawtucket, RI 02861 ... 401-724-4400
Dymec, 8 Lowell Ave., Winchester, MA 01890 ... 617-729-7870
† Foundation Instruments Inc., 24 Colonnade Rd., Nepean, ON, CANADA K2E 7J6 ... 613-226-4000
NEC Electronics, Inc., 401 Ellis Street, Mtn. View, CA 94039 ... 415-960-6000
Opto Technology, Inc., 1674 S. Wolf Rd., Wheeling, IL 60090 ... 312-537-4277
† Ross Engrg. Corp., 540 Westchester Dr., Campbell, CA 95008 ... 408-377-4621
Telemet, 185 Dixon Ave., Amityville, NY 11701 ... 516-842-2300

Amplifiers, IF-1100

CTS Corporation, Microelectronics Div., 1201 Cumberland Ave., W. Lafayette, IN 47906, 317-463-2565 ... A•1662-1664
CTS Electronics Corp., Halex Division, 1202 McGaw Ave., Irvine, CA 92714, 714-261-6381 ... A•1662-1664
Motorola Semiconductor Prods. Sector, Adv. 72, Box 20912, Phoenix, AZ 85036, 602-244-6900 ... A•2077
† Adams-Russell, Anzac Div., 80 Cambridge St., Burlington, MA 01803 ... 671-273-3333
§ A E G Telefunken, Semiconductor Grp., Rte. 22, Somerville, NJ 08876 .. 201-722-9800
AERCOM, 405 Tasman Dr., Sunnyvale, CA 94086 ... 408-744-1320
† Alpha Inds., Inc.-Microelectronic Div., 2800 Crystal Drive, Hatfield, PA 19440 ... 215-822-1311
Alpha Inds., Inc.-MSD Div., 20 Sylvan Rd., Woburn, MA 01801 ... 617-935-5150
American Electronic Labs., Box 552, Lansdale, PA 19446 ... 215-822-2929
Amplifier Research, 160 School House Rd., Souderton, PA 18964-9990 ... 215-723-8181
† Amplifonix Inc., 220 Rte. 13, Bristol, PA 19007 ... 215-788-2350
† Andrich Sys., Inc., 1699 Roosevelt Ave., Bohemia, NY 11716 ... 516-589-5656
§† Avantek, Inc., 3175 Bowers Ave., Santa Clara, CA 95054 ... 408-496-6710
† Aydin Vector Div., Box 328, Newtown, PA 18940 ... 215-968-4271
C-COR Elctrns., 60 Decibel Rd., State College, PA 16801 ... 814-238-2461
Cherry Semiconductor Corp, 2000 S. County Trail, East Greenwich, RI 02818 ... 401-885-3600
† Comlinear Corp., 2468 E. 9th St., Loveland, CO 80537 ... 303-669-9433
§ Eaton Corp., Elctrn. Instrmn. Div., 5340 Alla Rd., Los Angeles, CA 90066
† Environmental Comm., 3150 Pullman St., Costa Mesa, CA 92627 ... 714-557-7800
FG Engrg., Box 476, Fredonia, AZ 86022 ... 602-643-7375
Gra-Mar Inc., 3165 McCrory Pl., Ste. 265, Orlando, FL 32803 ... 305-894-3351
Instruments for Industry, Inc., 151 Toledo St., Farmingdale, NY 11735 ... 516-694-1414
† Lorch Elctrns., 105 Cedar La., Englewood, NJ 07631 ... 201-569-8282
† M/A-COM Microwave Power Dvcs., 330 Oser Ave., Hauppauge, NY 11788 ... 516-231-1400
† M/A-COM OSW, Inc., 2626 S. Hardy Dr., Tempe, AZ 85282 ... 602-966-1471
MERET, Inc., 1815 24th St., Santa Monica, CA 90404-4998 ... 213-828-7496
† Merrimac Inds., 41 Fairfield Pl., West Caldwell, NJ 07006 ... 201-575-1300
Microphase, 587 Connecticut Ave., Norwalk, CT 06856 ... 203-866-8000
§† MITEQ Inc., 125 Ricefield Lane, Hauppauge, NY 11788 ... 516-543-8873
† Narda Microwave Corp., 435 Moreland Rd., Hauppauge, NY 11788 ... 516-231-1700
§ New-Tone Electronics, Inc., 44 Farrand St., Bloomfield, NJ 07003 ... 201-748-5089
† Perry Amplifier, 138 Fuller St., Brookline, MA 02146 ... 617-734-0844
§† Plessey Semiconductors, 1641 Kaiser Ave., Irvine, CA 92714 ... 714-540-9979
§† RCA Solid State Div., Route 202, Somerville, NJ 08876 ... 201-685-6000
§† RCA Solid State Div., Linear Integrated Circuits, Rte. 202, Somerville, NJ 08876 ... 201-685-6000
† RFD, Inc., 5024 Nassau St., Tampa, FL 33607 ... 813-872-1502
† RHG Electronics Lab., Inc., 161 E. Industry Ct., Deer Park, NY 11729 ... 516-242-1100
§ Rodelco Elctrns. Corp., 356A Comac Rd., Deer Park, NY 11729 ... 516-643-5110
† Scientific Communications, Inc., 3425 Kingsley Rd., Garland, TX 75041 ... 214-271-3685
SGS Semiconductor Corporation, 1000 E. Bell Road, Phoenix, AZ 85022 ... 602-867-6100
§ Shokai Far East, Ltd., 280 North Central Ave., Hartsdale, NY 10530 ... 914-681-0700
† Technical Research & Mfg., Inc., R.F.D. # 10, Manchester, NH 03103 ... 603-627-6000
† Techtrol Cyclonetics, Inc., 815 Market St., New Cumberland, PA 17070 .. 717-774-2746
† TRAK Microwave Corp., 4726 Eisenhower Blvd., Dept. E5, Tampa, FL 33614 ... 813-884-1411
† TRW Microwave, 825 Stewart Dr., Sunnyvale, CA 94086 ... 408-732-0880
§ Tucker Elctrns., Box 461966, Garland, TX 75046 ... 214-348-8800;800-527-4642
Varian Associates, Inc., Microwave Tube Div., 611 Hansen Way, Palo Alto, CA 94303 ... 415-493-4000
† Watkins-Johnson Co., 3333 Hillview Ave., Palo Alto, CA 94304 ... 415-493-4141
† Zeta Labs., 3265 Scott Blvd., Santa Clara, CA 95054 ... 408-727-6001

Amplifiers, Instrumentation-1100

Amplifier Research, 160 School House Rd., Souderton, PA 18964-9990, 215-723-8181 ... D•1002-1003
† Calex Mfg. Co., Inc., 3355 Vincent Rd., Pleasant Hill, CA 94523, 415-932-3911 ... D•1006
† Datel, General Electric Co., 11 Cabot Blvd., Mansfield, MA 02048, 617-339-9341 ... D•1147
Ectron Corp., 8159 Engineer Rd., San Diego, CA 92111, 619-278-0600 ... D•1007
Electro-Craft, 1600 2nd St. S., Hopkins, MN 55343, 612-931-2700 ... B•1148
§† Intech, Microcircuits Div., 2270 Martin Ave., Santa Clara, CA 95050, 408-988-4930 ... A•1672
Julie Resch. Labs., 211 West 61st St., New York, NY 10023, 212-245-2727 ... D•1255
† Millivac Instrs., Box 997, Curry Rd. Ext., Schenectady, NY 12301, 518-355-8300 ... D•1266
Modular Devices, 50 Orville Dr., Bohemia, NY 11716, 516-567-9620 ... D•1011
MVP Elctrns., 1161 N. Tustin, Orange, CA 92667, 714-639-9246 ... D•1012
§ Opamp Labs, Inc., 1033 N. Sycamore Ave., Los Angeles, CA 90038, 213-934-3566 ... D•1014
Pacific Instrs. Inc., 215 Mason Circle, Concord, CA 94518, 415-827-9010 ... D•1015
PPM, Inc., 4521 Emery Ind. Pkwy., Cleveland, OH 44128, 216-292-6006 .. D•1291
Precision Filters, 240 Cherry St., Ithaca, NY 14850, 607-277-3550 ... A•1625, D•1017
† Acromag, 30765 Wixom Rd., Wixom, MI 48096 ... 313-624-1541
† Amptek, Inc., 6 De Angelo Dr., Bedford, MA 01730 ... 617-275-2242
† Analog Devices, P.O. Box 280, Norwood, MA 02062 ... 617-329-4700
Analogic Corp., Data Conversion Prods. Grp., Audubon Rd., Wakefield, MA 01880 ... 617-246-0300
† Andrich Sys., Inc., 1699 Roosevelt Ave., Bohemia, NY 11716 ... 516-589-5656
† Aydin Vector Div., Box 328, Newtown, PA 18940 ... 215-968-4271
Bell & Howell/CEC Div., 360 Sierra Madre Villa, Pasadena, CA 91109 ... 213-796-9381
Bruel & Kjaer Instrs. Inc., 185 Forest St., Marlboro, MA 01752 ... 617-481-7000
† Burr-Brown Corp., P.O. Box 11400, Tucson, AZ 85734 ... 602-746-1111
C-COR Elctrns., 60 Decibel Rd., State College, PA 16801 ... 814-238-2461
Cherry Semiconductor Corp, 2000 S. County Trail, East Greenwich, RI 02818 ... 401-885-3600
CML MACARR Div., Marine Electric RPD, Inc., 666 Pacific St., Brooklyn, NY 11217 ... 718-857-2400
† Comlinear Corp., 2468 E. 9th St., Loveland, CO 80537 ... 303-669-9433
Continental Resources, Inc., 175 Middlesex Tpke., Bedford, MA 01730 .. 617-275-0850
§ Control Prods., Devar, Inc., P.O. Box 589, Bridgeport, CT 06601 ... 203-368-6751
Data, Inc., 7702 Emerald Ave., Box 2071, Ft. Collins, CO 80525 ... 303-493-1222
Data Translation, 100 Locke Dr., Marlboro, MA 01752 ... 617-481-3700
† Dymec, 8 Lowell Ave., Winchester, MA 01890 ... 617-729-7870
§ Dynamics, Div. of Waugh Controls Corp., 9001 Fullbright Ave., Chatsworth, CA 91311 ... 818-998-8281
† Electronic Dev. Corp., 11 Hamlin St., Boston, MA 02127-4198 ... 617-268-9696
§ Electronic Navigation Inds, Emerson Electric Co., 100 Highpower Road, Rochester, NY 14623 ... 716-427-8300
§ Endevco, 30700 Rancho Viejo Rd., San Juan Capistrano, CA 92675 ... 714-493-8181
Entran Devices, 10 Washington Ave., Fairfield, NJ 07006 ... 201-227-1002
Esterline Angus Instr. Corp., Box 24000, Indianapolis, IN 46224 ... 317-244-7611
Fogg Sys., 15592 E. Batavia Dr., Aurora, CO 80011 ... 303-344-1883
† Genisco Technlg. Corp., Transducers Prods. Div., 650 Easy St., Simi Valley, CA 93065 ... 805-581-3985
Gould Inc., Recording Systems Div., 3631 Perkins Ave., Cleveland, OH 44114 ... 216-361-3315
† Hades Mfg. Corp., 151-A Verdi St., Farmingdale, NY 11735 ... 516-249-4244
§† Harris Corp., PRD Elctrns. Div., 6801 Jericho Tpke., Syosset, NY 11791 ... 516-364-0400
§ Helm Instr. Co., Inc., 1387 Dussel Drive, Maumee, OH 43537 ... 419-893-4356
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
Honeywell, Test Instrs. Div., P.O. Box 5227, Denver, CO 80217 ... 303-773-4700
§ Hottinger Baldwin Measurements, 139 Newbury St., Framingham, MA 01701 ... 617-875-8282
Hughes Aircraft Co., Electron Dynamics Div., 3100 W. Lomita Blvd., P.O. Box 2999, Torrance, CA 90509-2999 ... 213-517-6000
† Hytek Microsystems, 980 University Ave., Los Gatos, CA 95030 ... 408-395-2300
Intronics, Inc., 57 Chapel St., Newton, MA 02158 ... 617-964-4000
ITHACO, Inc., Meas. & Control Instrs. Div., 735 W. Clinton St., P.O. Box 6437, Ithaca, NY 14851-6437 ... 607-272-7640
LeCroy Resch. Sys. Corp., 700 S. Main St., Spring Vly., NY 10977 ... 914-425-2000
LeCroy Resch. Sys. Corp. (Cal.), 1806 Embarcadero Rd., Palo Alto, CA 94303 ... 415-856-1800
Leeds & Northrup Instrs., A Unit of General Signal Corp., Sumneytown Pike, North Wales, PA 19454 ... 215-643-2000
§† Linear Technology Corp., 1630 McCarthy Blvd., Milpitas, CA 95035 ... 408-942-0810
Marel Instr. Co., 907 South East 13th Pl., Cape Coral, FL 33904 ... 813-574-8788
† MCL, Inc., 10 North Beach Ave., La Grange, IL 60525-2092 ... 312-354-4350
† Mel Tec, Div. Epsco, Inc., 411 Providence Hwy., Westwood, MA 02090 .. 617-329-1508
MICRA Corp., 120 Ricefield Lane, Hauppauge, NY 11788 ... 516-231-8600
Mini-Systems, Inc., 20 David Rd., North Attleboro, MA 02761 ... 617-695-0203
† Natel Engrg. Co., Inc., 4550 Runway St., Simi Valley, CA 93063 ... 805-581-3950
Neff Instr., 700 S. Myrtle Ave., Monrovia, CA 91016 ... 818-357-2281
Omega Engrg., Box 4047, Stamford, CT 06907 ... 203-359-1660
† Paine Instrs., 2401 S. Bayview St., Seattle, WA 98144 ... 800-426-0366
† PCB Piezotronics, 3425 Walden Ave., Depew, NY 14043-2495 ... 716-684-0001
Phoenix Data, Inc., 3384 W. Osborn Rd., Phoenix, AZ 85017 ... 602-278-8528
§† Precision Monolithics, Inc., 1500 Space Dr., Santa Clara, CA 95054 ... 408-727-9222
§ Preston Scientific, 805 E. Cerritos Ave., Anaheim, CA 92805 ... 714-776-6400

§† RCA Solid State Div., Route 202, Somerville, NJ 08876 201-685-6000
§† RCA Solid State Div., Linear Integrated Circuits, Rte. 202, Somerville, NJ 08876 201-685-6000
RCI/Data, 1992 Lakewood Rd., Toms River, NJ 08753 201-341-8361
RF Power Labs, Inc., 21820 87th S. E., Woodinville, WA 98072 206-481-8833
Rochester Instr. Sys., 255 N. Union St., Rochester, NY 14605 716-263-7700
§† Ross Engrg. Corp., 540 Westchester Dr., Campbell, CA 95008 408-377-4621
Sensor Corp., Box 140, Scottdale, PA 15683 412-887-4080
Sensotec, Inc., 1200 Chesapeake Ave., Columbus, OH 43212 614-486-7723
Seven Mountains Sci. Inc., P.O. Box 650, Boalsburg, PA 16827 814-466-6559
Tektronix, Inc., P. O. Box 500, Y3-314, Beaverton, OR 97077 ..... 800-547-1512;Oregon only 800-452-1877
Teledyne/Geotech, 3401 Shiloh Rd., Garland, TX 75041 214-271-2561
† Transmagnetics, 210 Adams Blvd., Farmingdale, NY 11735 516-293-3100
Tri-Com, Inc., 7304 Grove Rd., Frederick, MD 21701 301-694-6666
† TRW Microwave, 825 Stewart Dr., Sunnyvale, CA 94086 408-732-0880
Tustin Elctrns. Co., 1431 E. Saint Andrews Pl., Santa Ana, CA 92705 714-549-0391
Unholtz-Dickie Corp., 6 Brookside Dr., Wallingford, CT 06492 203-265-3929
Universal Ad-Yu Elctrns., Inc., 2517 E. Norwich St., Milwaukee, WI 53207 414-482-4100
Wide Band Engrg. Co., Inc., Box 21652, Phoenix, AZ 85036 602-254-1570
Yokogawa Corp. of America, 2 Dart Rd., Shenandoah, GA 30265 404-253-7000

Amplifiers, Integrating-Also See Amplifiers, Operational; Integrators, Electronic-1100

† Analog Devices, P.O. Box 280, Norwood, MA 02062 617-329-4700
† Andrich Sys., Inc., 1699 Roosevelt Ave., Bohemia, NY 11716 516-589-5656
Burr-Brown Corp., P.O. Box 11400, Tucson, AZ 85734 602-746-1111
§ Control Prods., Devar, Inc., P.O. Box 589, Bridgeport, CT 06601 203-368-6751
† Control Technology Co., 41-16 29th St., Long Island City, NY 11101 718-361-2133
Gould Inc., Recording Systems Div., 3631 Perkins Ave., Cleveland, OH 44114 216-361-3315
† Mel Tec, Div. Epsco, Inc., 411 Providence Hwy., Westwood, MA 02090 .. 617-329-1508
MICRA Corp., 120 Ricefield Lane, Hauppauge, NY 11788 516-231-8600
Modular Devices, 50 Orville Dr., Bohemia, NY 11716 516-567-9620
Optical Electronics, Inc., Box 11140, Tucson, AZ 85734 602-624-8358
Sprague Electric Company, Distribution Division, 481 Marshall St., No. Adams, MA 01247 413-664-4481
§ Tennelec, 601 Turnpike, Oak Ridge, TN 37830 615-483-8405
Unholtz-Dickie Corp., 6 Brookside Dr., Wallingford, CT 06492 203-265-3929

Amplifiers, Isolation-1100

Julie Resch. Labs., 211 West 61st St., New York, NY 10023, 212-245-2727 .... D•1255
§ **Opamp Labs, Inc., 1033 N. Sycamore Ave., Los Angeles, CA 90038, 213-934-3566 .... D•1014**
† Acromag, 30765 Wixom Rd., Wixom, MI 48096 313-624-1541
† Adams-Russell, Anzac Div., 80 Cambridge St., Burlington, MA 01803 671-273-3333
† Amplifonix Inc., 220 Rte. 13, Bristol, PA 19007 215-788-2350
† Analog Devices, P.O. Box 280, Norwood, MA 02062 617-329-4700
† Aydin Vector Div., Box 328, Newtown, PA 18940 215-968-4271
§ Brelonix, 106 No. 36th St., Seattle, WA 98103 206-633-1964
Burr-Brown Corp., P.O. Box 11400, Tucson, AZ 85734 602-746-1111
† Control Technology Co., 41-16 29th St., Long Island City, NY 11101 718-361-2133
Cross Elctrns., 100 Commonwealth Dr., Warrendale, PA 15086 412-776-1591
Data Translation, 100 Locke Dr., Marlboro, MA 01752 617-481-3700
Datel, General Electric Co., 11 Cabot Blvd., Mansfield, MA 02048 617-339-9341
Ectron Corp., 8159 Engineer Rd., San Diego, CA 92111 619-278-0600
Fogg Sys., 15592 E. Batavia Dr., Aurora, CO 80011 303-344-1883
§ General Magnetics, 211 Grove St., Bloomfield, NJ 07003 201-743-2700
§ Hobart Engrg., 4143 Cheshire Dr., Cypress, CA 90630 714-827-2135
§ Intech, Microcircuits Div., 2270 Martin Ave., Santa Clara, CA 95050 408-988-4930
IPAC Grp., 3047 Indl. Blvd., Bethel Pk., PA 15102 412-831-9200
† Locus, Box 740, State College, PA 16804 814-466-6275
Marel Instr. Co., 907 South East 13th Pl., Cape Coral, FL 33904 813-574-8788
† Mel Tec, Div. Epsco, Inc., 411 Providence Hwy., Westwood, MA 02090 .. 617-329-1508
MICRA Corp., 120 Ricefield Lane, Hauppauge, NY 11788 516-231-8600
§† MITEQ Inc., 125 Ricefield Lane, Hauppauge, NY 11788 516-543-8873
Modular Devices, 50 Orville Dr., Bohemia, NY 11716 516-567-9620
Neff Instr., 700 S. Myrtle Ave., Monrovia, CA 91016 818-357-2281
North Hills Elctrns., 1 Alexander Pl., Glen Cove, NY 11542 516-671-5700
Pacific Instrs. Inc., 215 Mason Circle, Concord, CA 94518 415-827-9010
† Perry Amplifier, 138 Fuller St., Brookline, MA 02146 617-734-0844
§ Preston Scientific, 805 E. Cerritos Ave., Anaheim, CA 92805 714-776-6400
Rochester Instr. Sys., 255 N. Union St., Rochester, NY 14605 716-263-7700
Ross Engrg. Corp., 540 Westchester Dr., Campbell, CA 95008 408-377-4621
Scientific Columbus, Inc., Esterline Corp., 1900 Arlingate La., Columbus, OH 43228 614-274-7160
Singer Co., Kearfott Div., 1150 McBride Ave., Little Falls, NJ 07424 201-785-6000
§ Spectra Sonics, 3750 Airport Rd., Ogden, UT 84403 801-392-7531
† TRW Microwave, 825 Stewart Dr., Sunnyvale, CA 94086 408-732-0880
§ Tucker Elctrns., Box 461966, Garland, TX 75046 .... 214-348-8800;800-527-4642
† Watkins-Johnson Co., 3333 Hillview Ave., Palo Alto, CA 94304 415-493-4141

Amplifiers, Klystron-3400

† **MCL, Inc., 10 North Beach Ave., La Grange, IL 60525-2092, 312-354-4350 .... D•1408**
Alpha Inds., Inc.-MSD Div., 20 Sylvan Rd., Woburn, MA 01801 617-935-5150
Aydin Corp., 700 Dresher Rd., Horsham, PA 19044 215-657-7510
† Aydin Microwave, 75 East Trimble Rd., San Jose, CA 95131 408-946-5600
Continental Electronics Mfg. Co., P.O. Box 270879, Dallas, TX 75227 214-381-7161
ETM Electromatic, 470 San Antonio Ave., Palo Alto, CA 94306 415-494-1505
§† ITT Electron Tube, ITT Corp., Box 100, Easton, PA 18042 215-252-7331
† Litton Systems, Inc., Electron Dvcs. Div., 960 Industrial Rd., San Carlos, CA 94070 415-591-8411

Varian Associates, Inc., Microwave Tube Div., 611 Hansen Way, Palo Alto, CA 94303 415-493-4000

Amplifiers, Limiting-1100

† **Analog Modules, Inc., 126 Baywood Avenue, Longwood, FL 32750, 305-339-4356/4355 .... D•1004**
§ **Opamp Labs, Inc., 1033 N. Sycamore Ave., Los Angeles, CA 90038, 213-934-3566 .... D•1014**
AERCOM, 405 Tasman Dr., Sunnyvale, CA 94086 408-744-1320
† Airtron, Litton Industries, Inc., 200 E. Hanover Ave., Morris Plains, NJ 07950 201-539-5500
Alpha Inds., Inc., Microwave Comp. Div., 90 Glenn St., Lawrence, MA 01843 617-681-8520
† Avantek, Inc., 3175 Bowers Ave., Santa Clara, CA 95054 408-496-6710
§ Aydin Microwave, 75 East Trimble Rd., San Jose, CA 95131 408-946-5600
† Control Technology Co., 41-16 29th St., Long Island City, NY 11101 718-361-2133
† Environmental Comm., 3150 Pullman St., Costa Mesa, CA 92627 714-557-7800
FG Engrg., Box 476, Fredonia, AZ 86022 602-643-7375
Linear Technlg., P.O. Box 489, Sta. "A", Burlington, ON, CANADA L7R 3Y3 416-632-2996
† Locus, Box 740, State College, PA 16804 814-466-6275
† M/A-COM OSW, Inc., 2626 S. Hardy Dr., Tempe, AZ 85282 602-966-1471
MICRA Corp., 120 Ricefield Lane, Hauppauge, NY 11788 516-231-8600
§† MITEQ Inc., 125 Ricefield Lane, Hauppauge, NY 11788 516-543-8873
Modular Audio Prods., Modular Devices Inc., 50 Orville Dr., Bohemia, NY 11716 516-567-9620
§† Plessey Semiconductors, 1641 Kaiser Ave., Irvine, CA 92714 714-540-9979
§ Precision Elctrns., 9101 King Ave., Franklin Park, IL 60131 312-678-5350
RFL Inds., A Dowty Grp. Co./Comms. Div., Powerville Rd., Boonton, NJ 07005 201-334-3100
† RHG Electronics Lab., Inc., 161 E. Industry Ct., Deer Park, NY 11729 516-242-1100
§ Shure Bros., 222 Hartrey Ave., Evanston, IL 60204 312-866-2200
§ Spectra Sonics, 3750 Airport Rd., Ogden, UT 84403 801-392-7531
† TRAK Microwave Corp., 4726 Eisenhower Blvd., Dept. E5, Tampa, FL 33614 813-884-1411
† TRW Microwave, 825 Stewart Dr., Sunnyvale, CA 94086 408-732-0880
Universal Ad-Yu Elctrns., Inc., 2517 E. Norwich St., Milwaukee, WI 53207 414-482-4100
Varian Associates, Inc., Microwave Tube Div., 611 Hansen Way, Palo Alto, CA 94303 415-493-4000
† Watkins-Johnson Co., 3333 Hillview Ave., Palo Alto, CA 94304 415-493-4141
† Zeta Labs., 3265 Scott Blvd., Santa Clara, CA 95054 408-727-6001

Amplifiers, Line-1100

§ **Opamp Labs, Inc., 1033 N. Sycamore Ave., Los Angeles, CA 90038, 213-934-3566 .... D•1014**
Amplifier Research, 160 School House Rd., Souderton, PA 18964-9990 215-723-8181
Burr-Brown Corp., P.O. Box 11400, Tucson, AZ 85734 602-746-1111
† Control Technology Co., 41-16 29th St., Long Island City, NY 11101 718-361-2133
§ Delta Elctrns., 145 Fayette St., Winston-Salem, NC 27101 919-725-4122
§ Dyma Engrg., Box 1535, Los Lunas, NM 87031 505-865-6700
§ Dynamics, Div. of Waugh Controls Corp., 9001 Fullbright Ave., Chatsworth, CA 91311 818-998-8281
GRIM Corporation, Box 67, Medford, NJ 08055 609-267-7950
Neff Instr., 700 S. Myrtle Ave., Monrovia, CA 91016 818-357-2281
§ Paso Sound Prods., 14 First St., Pelham, NY 10803 914-738-4800
† Perry Amplifier, 138 Fuller St., Brookline, MA 02146 617-734-0844
§ Precision Elctrns., 9101 King Ave., Franklin Park, IL 60131 312-678-5350
§ Ramko Resch., Inc., 11355A Folsom Blvd., Rancho Cordova, CA 95670 800-821-2545
RCI/Data, 1992 Lakewood Rd., Toms River, NJ 08753 201-341-8361
Reliance Electric Co., Marketing Info Center, P.O. Box 99502, Cleveland, OH 44199 .... 800-245-4501;800-245-4497 In Ohio
RFL Inds., A Dowty Grp. Co./Comms. Div., Powerville Rd., Boonton, NJ 07005 201-334-3100
SGS Semiconductor Corporation, 1000 E. Bell Road, Phoenix, AZ 85022 602-867-6100
§ Shure Bros., 222 Hartrey Ave., Evanston, IL 60204 312-866-2200
§ Spectra Sonics, 3750 Airport Rd., Ogden, UT 84403 801-392-7531
Tri-Com, Inc., 7304 Grove Rd., Frederick, MD 21701 301-694-6666
† TRW Microwave, 825 Stewart Dr., Sunnyvale, CA 94086 408-732-0880

Amplifiers, Lock-in-1100

† Control Technology Co., 41-16 29th St., Long Island City, NY 11101 718-361-2133
Evans Electronics, Box 5055, Berkeley, CA 94705 415-653-3083
ITHACO, Inc., Meas. & Control Instrs. Div., 735 W. Clinton St., P.O. Box 6437, Ithaca, NY 14851-6437 607-272-7640
Krohn-Hite Corp., Avon Indl. Pk., Bodwell St., Avon, MA 02322 617-580-1660
Pacific Instrs. Inc., 215 Mason Circle, Concord, CA 94518 415-827-9010

Amplifiers, Logarithmic-1100

† **Analog Modules, Inc., 126 Baywood Avenue, Longwood, FL 32750, 305-339-4356/4355 .... D•1004**
CTS Corporation, Microelectronics Div., 1201 Cumberland Ave., W. Lafayette, IN 47906, 317-463-2565 .... A•1662-1664
CTS Electronics Corp., Halex Division, 1202 McGaw Ave., Irvine, CA 92714, 714-261-6381 .... A•1662-1664
§ **MVP Elctrns., 1161 N. Tustin, Orange, CA 92667, 714-639-9246 .... D•1012**
† Adams-Russell, Anzac Div., 80 Cambridge St., Burlington, MA 01803 671-273-3333
American Elctrn. Labs., Inc., Govt. Grp. Div., P.O. Box 552, Lansdale, PA 19446
† Analog Devices, P.O. Box 280, Norwood, MA 02062 617-329-4700
† Andrich Sys., Inc., 1699 Roosevelt Ave., Bohemia, NY 11716 516-589-5656
† Avantek, Inc., 3175 Bowers Ave., Santa Clara, CA 95054 408-496-6710
Burr-Brown Corp., P.O. Box 11400, Tucson, AZ 85734 602-746-1111
† Control Technology Co., 41-16 29th St., Long Island City, NY 11101 718-361-2133

† Environmental Comm., 3150 Pullman St., Costa Mesa, CA 92627 714-557-7800
Gould Inc., Recording Systems Div., 3631 Perkins Ave., Cleveland, OH 44114 216-361-3315
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
Image Technology Methods Corp., 103 Moody St., Waltham, MA 02154 617-894-1720
§† Intech, Microcircuits Div., 2270 Martin Ave., Santa Clara, CA 95050 408-988-4930
Intronics, Inc., 57 Chapel St., Newton, MA 02158 617-964-4000
Marel Instr. Co., 907 South East 13th Pl., Cape Coral, FL 33904 813-574-8788
† Mel Tec, Div. Epsco, Inc., 411 Providence Hwy., Westwood, MA 02090 .. 617-329-1508
MICRA Corp., 120 Ricefield Lane, Hauppauge, NY 11788 516-231-8600
Microphase, 587 Connecticut Ave., Norwalk, CT 06856 203-866-8000
§† MITEQ Inc., 125 Ricefield Lane, Hauppauge, NY 11788 516-543-8873
Modular Devices, 50 Orville Dr., Bohemia, NY 11716 516-567-9620
North Hills Elctrns., 1 Alexander Pl., Glen Cove, NY 11542 516-671-5700
Pacific Instrs. Inc., 215 Mason Circle, Concord, CA 94518 415-827-9010
† Perry Amplifier, 138 Fuller St., Brookline, MA 02146 617-734-0844
§† Plessey Semiconductors, 1641 Kaiser Ave., Irvine, CA 92714 714-540-9979
† RHG Electronics Lab., Inc., 161 E. Industry Ct., Deer Park, NY 11729 516-242-1100
Teledyne Philbrick, Allied Dr. Rte 128, Dedham, MA 02026 617-329-1600
† TRW Microwave, 825 Stewart Dr., Sunnyvale, CA 94086 408-732-0880
§ Tucker Elctrns., Box 461966, Garland, TX 75046 .... 214-348-8800;800-527-4642
Varian Associates, Inc., Microwave Tube Div., 611 Hansen Way, Palo Alto, CA 94303 415-493-4000
Venable Industries, Inc., 3555 Lomita Blvd., Torrance, CA 90505 213-539-2522
§ Wiltron, 805 E. Middlefield Rd., P.O. Box 7290, Mountain View, CA 94042-7290 415-969-6500

Amplifiers, Magnetic-1100

† Technitrol, 1952 E. Allegheny, Philadelphia, PA 19134; 215-426-9105 .... B•1010
Adams-Russell, Parisi Div., 280 Bear Hill Rd., Waltham, MA 02154 617-890-0055
Atlas Engrg. Corp., 10 Cheney St., Dorchester, MA 02121 617-445-7100
Basler Elec., Rte. 143, Highland, IL 62249 618-654-2341
Berkshire Transformer Corp., Route 341, P.O. Box 129, Kent, CT 06757 203-927-3541
† Bicron Elctrns., Box 807, Barlow St., Canaan, CT 06018 203-824-5125
Cross Elctrns., 100 Commonwealth Dr., Warrendale, PA 15086 412-776-1591
Electrocom Inds., 1105 N. Ironwood Dr., S. Bend, IN 46615 219-232-2743
Electro-Pacific, 5782 Thornwood Dr., Goleta, CA 93017 805-964-0751
EWC, Inc., 725 Federal Ave., Kenilworth, NJ 07033 .... 201-245-3200;800-526-4048
† Freed Transformer, 1718 Weirfield St., Ridgewood, NY 11385 212-386-1300
§ General Magnetics, 211 Grove St., Bloomfield, NJ 07003 201-743-2700
Genisco Technlg. Corp., Filters Div., 18435 Susana Rd., Rancho Dominguez, CA 90221 213-537-4750
† Harrel, Inc., 16 Fitch St., E. Norwalk, CT 06855 203-866-2573
HGA Elctrns., 519 S. Fifth Ave., Mt. Vernon, NY 10550 914-664-5393
Hitran Corp., Agex, Rte. 31, RD 5-65, Flemington, NJ 08822 201-782-5525
Hughes Aircraft Co, Aerospace Grps./Support Sys., P.O. Box 90515, Los Angeles, CA 90009 213-670-1515
Hughes Aircraft Co., Microelctrn. Sys. Div., 2601 Campus Dr., Irvine, CA 92715 714-752-3800
† Industrial Control Co., 3100 Pineda Ave., Rockledge, FL 32955 305-259-7105
KGS Electronics, Inc., GAR Entprs., 2029 N. Lincoln Ave., Pasadena, CA 91103 818-798-0786
† Magnetico Inc., 182 Morris Ave., Holtsville, NY 11742 516-654-1166
Magnetic Specs., 10 Albemarle Ave., Trenton, NJ 08638 609-883-3150
Modular Devices, 50 Orville Dr., Bohemia, NY 11716 516-567-9620
Oeco Corp., 712 S.E. Hawthorne Blvd., Portland, OR 97214 503-238-2440
† OPT Inds. Inc., 300 Red School La., Phillipsburg, NJ 08865 201-454-2600
† Rayco Elctrn. Mfg., 1625 12th St., Santa Monica, CA 90404 213-450-0777
Reliance Electric Co., Marketing Info Center, P.O. Box 99502, Cleveland, OH 44199 .... 800-245-4501;800-245-4497 In Ohio
SGS Semiconductor Corporation, 1000 E. Bell Road, Phoenix, AZ 85022 602-867-6100
Sigma Instrs., 170 Pearl St., Braintree, MA 02184 617-843-5000
† Telectro Sys., 96-18 43rd Ave., Corona, NY 11368 212-651-8900
† Torotel Prods. Inc., 13402 S. 71 Hwy., Grandview, MO 64030 816-761-6314
† Torwico Elctrns. Inc., 410 Oberlin Ave. South, Lakewood, NJ 08701 201-364-1800
† Transformer & Coil Products, TRW Electronic Assemblies Division, 150 Varick St., New York, NY 10013 212-255-3500
† Transmagnetics, 210 Adams Blvd., Farmingdale, NY 11735 516-293-3100
§† Zambre Co., Inc., 2134 Old Middlefield Way, Mountain View, CA 94043 .. 415-968-9176

Amplifiers, Master Antenna — See Amplifiers, Distribution (Vol. D)

Amplifiers, Microphone — See Amplifiers, AF (Vol. D)

Amplifiers, Microwave-3400

Amplifier Research, 160 School House Rd., Souderton, PA 18964-9990, 215-723-8181 .... D•1003
ETM Electromatic, 470 San Antonio Ave., Palo Alto, CA 94306, 415-494-1505 .... D•1226
Hughes Solid State Products, 500 Superior Ave., Dept. E8, Newport Bch., CA 92658-8903, 714-759-2411 .... A•1372
† MCL, Inc., 10 North Beach Ave., La Grange, IL 60525-2092, 312-354-4350 .... D•1408
Mini-Circuits Lab., 2625 E. 14th St., P.O. Box 166, Brooklyn, NY 11235, 718-934-4500 .... A•1719-1720,1729,1762-1767,1778-1779
North Hills Elctrns., 1 Alexander Pl., Glen Cove, NY 11542, 516-671-5700 .... A•1780
† Adams-Russell, Anzac Div., 80 Cambridge St., Burlington, MA 01803 671-273-3333
§ A E G Telefunken, Semiconductor Grp., Rte. 22, Somerville, NJ 08876 .. 201-722-9800
AERCOM, 405 Tasman Dr., Sunnyvale, CA 94086 408-744-1320
† Airtron, Litton Industries, Inc., 200 E. Hanover Ave., Morris Plains, NJ 07950 201-539-5500
† Alpha Inds., Inc.-Microelectronic Div., 2800 Crystal Drive, Hatfield, PA 19440 215-822-1311
Alpha Inds., Inc., Microwave Comp. Div., 90 Glenn St., Lawrence, MA 01843 617-681-8520
Alpha Inds., Inc.-MSD Div., 20 Sylvan Rd., Woburn, MA 01801 617-935-5150
Alpha Inds., Inc., 20 Sylvan Rd., Woburn, MA 01801 617-935-5150
American Electronic Labs., Box 552, Lansdale, PA 19446 215-822-2929
† Amplifonix Inc., 220 Rte. 13, Bristol, PA 19007 215-788-2350
† Applied Research, Inc., 160 Dupont St., Plainview, NY 11803 516-349-9200
† Avantek, Inc., 3175 Bowers Ave., Santa Clara, CA 95054 408-496-6710
Aydin Corp., 700 Dresher Rd., Horsham, PA 19044 215-657-7510
Aydin Microwave, 75 East Trimble Rd., San Jose, CA 95131 408-946-5600
California Microwave, 990 Almanor Ave., Sunnyvale, CA 94086 408-732-4000
† Central Microwave Co., Alpha Inds., Inc., 12180 Prichard Farm Rd., Maryland Heights, MO 63043 314-291-5270
† Comtech Microwave Corp., Comtech Corp., 63 Oser Ave., Hauppauge, NY 11788 516-435-4646
Continental Resources, Inc., 175 Middlesex Tpke., Bedford, MA 01730 .. 617-275-0850
† Dexcel, Div. of Gould, 2285C Martin Ave., Santa Clara, CA 95050 408-727-9833
Drake, R. L., Co., 540 Richard St., Miamisburg, OH 45342 513-866-2421
§ Electronic Navigation Inds, Emerson Electric Co., 100 Highpower Road, Rochester, NY 14623 716-427-8300
† EPSCO Microwave, 411 Providence Hwy., Westwood, MA 02090 617-329-1500
FG Engrg., Box 476, Fredonia, AZ 86022 602-643-7375
† Frequency West, Inc., 3140 Alfred St., Santa Clara, CA 95054 408-727-8500
Harris Microwave Semiconductor, 1530 McCarthy Blvd., Milpitas, CA 95035 408-262-2222
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
Hughes Aircraft Co., Electron Dynamics Div., 3100 W. Lomita Blvd., P.O. Box 2999, Torrance, CA 90509-2999 213-517-6000
Instruments for Industry, Inc., 151 Toledo St., Farmingdale, NY 11735 ... 516-694-1414
† Keltec Florida, P.O. Box 2917, Ft. Walton Bch., FL 32549 904-651-9749
† Litton Systems, Inc., Electron Dvcs. Div., 960 Industrial Rd., San Carlos, CA 94070 415-591-8411
† LNR Communications, Inc., 180 Marcus Blvd., Hauppauge, NY 11788 ... 516-273-7111
† Locus, Box 740, State College, PA 16804 814-466-6275
† LogiMetrics, 121-03 Dupont St., Plainview, NY 11803 516-349-1700
† M/A-COM Microwave Power Dvcs., 330 Oser Ave., Hauppauge, NY 11788 516-231-1400
† M/A-COM OSW, Inc., 2626 S. Hardy Dr., Tempe, AZ 85282 602-966-1471
M/A-Com PHI, Inc., M/A-Com, 1742 Crenshaw Blvd., Torrance, CA 90501 213-320-6160
† Microlab/FXR, 10 Microlab Rd., Livingston, NJ 07039 201-992-7700
Microphase, 587 Connecticut Ave., Norwalk, CT 06856 203-866-8000
† Microwave Assocs. Ltd., Humphrey Rd., Dunstable, Bedfordshire, ENGLAND LU5 4SX, England .... 44-(582) 60-14-41
† Microwave Semiconductor Corp., 100 School House Rd., Somerset, NJ 08873 201-469-3311
§† MITEQ Inc., 125 Ricefield Lane, Hauppauge, NY 11788 516-543-8873
Mu-Del Electronics, Inc., 2426 Linden Lane, Silver Spring, MD 20910-1288 301-587-6087
† Narda Microwave Corp., 435 Moreland Rd., Hauppauge, NY 11788 516-231-1700
† NSD, 10936 Portal Dr., Los Alamitos, CA 90720 714-527-4896
† Nurad, Inc., 2165 Druid Pk. Dr., Baltimore, MD 21211 301-462-1700
Resdel Engrg., 300 E. Live Oak Ave., Arcadia, CA 91006 213-684-2600
† RFD, Inc., 5024 Nassau St., Tampa, FL 33607 813-872-1502
† RHG Electronics Lab., Inc., 161 E. Industry Ct., Deer Park, NY 11729 516-242-1100
† Rodale Elctrns. Corp., 603 Chestnut St., Garden City, NY 11530 516-222-0050
Scientific-Atlanta, Inc., P.O. Box 105600, Atlanta, GA 30348 404-441-4000
† Scientific Communications, Inc., 3425 Kingsley Rd., Garland, TX 75041 214-271-3685
§ Siemens Components, Inc., 186 Wood Ave., S., Iselin, NJ 08830 201-321-3400
§† Systron-Donner Microwave Div., 14844 Oxnard St., Van Nuys, CA 91409 818-786-1760
† Technical Research & Mfg., Inc., R.F.D. #10, Manchester, NH 03103 ... 603-627-6000
† Teledyne Microelectronics, 12964 Panama St., Los Angeles, CA 90066 .... 213-822-8229;213-870-9831
† TRAK Microwave Corp., 4726 Eisenhower Blvd., Dept. E5, Tampa, FL 33614 813-884-1411
† TRW Microwave, 825 Stewart Dr., Sunnyvale, CA 94086 408-732-0880
§ Tucker Elctrns., Box 461966, Garland, TX 75046 .... 214-348-8800;800-527-4642
Varian Associates, Inc., Microwave Tube Div., 611 Hansen Way, Palo Alto, CA 94303 415-493-4000
† Watkins-Johnson Co., 3333 Hillview Ave., Palo Alto, CA 94304 415-493-4141
† Zeta Labs., 3265 Scott Blvd., Santa Clara, CA 95054 408-727-6001

Amplifiers, Mixing-1300

§ Opamp Labs, Inc., 1033 N. Sycamore Ave., Los Angeles, CA 90038, 213-934-3566 .... D•1014
Alpha Inds., Inc.-MSD Div., 20 Sylvan Rd., Woburn, MA 01801 617-935-5150
† Analog Devices, P.O. Box 280, Norwood, MA 02062 617-329-4700
† Aydin Vector Div., Box 328, Newtown, PA 18940 215-968-4271
§† Data-Control Sys., Commerce Dr., Box 860, Danbury, CT 06810 203-743-9241
§ Dyma Engrg., Box 1535, Los Lunas, NM 87031 505-865-6700
GRIM Corporation, Box 67, Medford, NJ 08055 609-267-7950
HGA Elctrns., 519 S. Fifth Ave., Mt. Vernon, NY 10550 914-664-5393
§ Lear Siegler, Inc., 2850 Ocean Park Blvd., P.O. Box 2158, Santa Monica, CA 90406 213-452-5444
Mini-Circuits Lab., 2625 E. 14th St., P.O. Box 166, Brooklyn, NY 11235 .. 718-934-4500
Modular Audio Prods., Modular Devices Inc., 50 Orville Dr., Bohemia, NY 11716 516-567-9620
Modular Devices, 50 Orville Dr., Bohemia, NY 11716 516-567-9620
§ Paso Sound Prods., 14 First St, Pelham, NY 10803 914-738-4800
§ Precision Elctrns., 9101 King Ave., Franklin Park, IL 60131 312-678-5350
§ Ramko Resch., Inc., 11355A Folsom Blvd., Rancho Cordova, CA 95670 800-821-2545

RCI/Data, 1992 Lakewood Rd., Toms River, NJ 08753 201-341-8361
§ Shure Bros., 222 Hartrey Ave., Evanston, IL 60204 312-866-2200
† Solid State Elctrns. Corp., 18646 Parthenia St., Northridge, CA 91324 818-993-8257
§ Spectra Sonics, 3750 Airport Rd., Ogden, UT 84403 801-392-7531
Tri-Com, Inc., 7304 Grove Rd., Frederick, MD 21701 301-694-6666
Varian Associates, Inc., Microwave Tube Div., 611 Hansen Way, Palo Alto, CA 94303 415-493-4000

Amplifiers, Multichannel-1100

† Analog Modules, Inc., 126 Baywood Avenue, Longwood, FL 32750, 305-339-4356/4355 .... D•1004
§ MVP Elctrns., 1161 N. Tustin, Orange, CA 92667, 714-639-9246 .... D•1012
Precision Filters, 240 Cherry St., Ithaca, NY 14850, 607-277-3550 .... A•1625, D•1017
Alpha Inds., Inc.-MSD Div., 20 Sylvan Rd., Woburn, MA 01801 617-935-5150
Antennacraft, Box 1005, Burlington, IA 52601 319-754-7575
† Argent Elctrns., 3245 S. County Rd., 25A, Troy, OH 45373 513-335-0031
Burr-Brown Corp., P.O. Box 11400, Tucson, AZ 85734 602-746-1111
Honeywell, Test Instrs. Div., P.O. Box 5227, Denver, CO 80217 303-773-4700
ITHACO, Inc., Meas. & Control Instrs. Div., 735 W. Clinton St., P.O. Box 6437, Ithaca, NY 14851-6437 607-272-7640
LeCroy Resch. Sys. Corp., 700 S. Main St., Spring Vly., NY 10977 914-425-2000
LeCroy Resch. Sys. Corp. (Cal.), 1806 Embarcadero Rd., Palo Alto, CA 94303 415-856-1800
† MCL, Inc., 10 North Beach Ave., La Grange, IL 60525-2092 312-354-4350
Pacific Instrs. Inc., 215 Mason Circle, Concord, CA 94518 415-827-9010
Reliance Electric Co., Marketing Info Center, P.O. Box 99502, Cleveland, OH 44199 .... 800-245-4501;800-245-4497 In Ohio
RHG Electronics Lab., Inc., 161 E. Industry Ct., Deer Park, NY 11729 516-242-1100
Sensotec, Inc., 1200 Chesapeake Ave., Columbus, OH 43212 614-486-7723
Tecron Industrial Prods., Crown Intl., Inc., 1718 W. Mishawaka Rd., Elkhart, IN 46517 219-294-8300
§ Tennelec, 601 Turnpike, Oak Ridge, TN 37830 615-483-8405
† TRAK Microwave Corp., 4726 Eisenhower Blvd., Dept. E5, Tampa, FL 33614 813-884-1411
Varian Associates, Inc., Microwave Tube Div., 611 Hansen Way, Palo Alto, CA 94303 415-493-4000

Amplifiers, Narrow Band-1100

Ectron Corp., 8159 Engineer Rd., San Diego, CA 92111, 619-278-0600 .... D•1007
AERCOM, 405 Tasman Dr., Sunnyvale, CA 94086 408-744-1320
Alpha Inds., Inc., Microwave Comp. Div., 90 Glenn St., Lawrence, MA 01843 617-681-8520
Alpha Inds., Inc.-MSD Div., 20 Sylvan Rd., Woburn, MA 01801 617-935-5150
Amplifier Research, 160 School House Rd., Souderton, PA 18964-9990 215-723-8181
C-COR Elctrns., 60 Decibel Rd., State College, PA 16801 814-238-2461
CML MACARR Div., Marine Electric RPD, Inc., 666 Pacific St., Brooklyn, NY 11217 718-857-2400
§ Dynamics, Div. of Waugh Controls Corp., 9001 Fullbright Ave., Chatsworth, CA 91311 818-998-8281
§ Ehrhorn Technological Opers., Inc., P.O. Box 888, Canon City, CO 81212 303-275-1613
FG Engrg., Box 476, Fredonia, AZ 86022 602-643-7375
Hughes Aircraft Co., Electron Dynamics Div., 3100 W. Lomita Blvd., P.O. Box 2999, Torrance, CA 90509-2999 213-517-6000
Instruments for Industry, Inc., 151 Toledo St., Farmingdale, NY 11735 516-694-1414
ITHACO, Inc., Meas. & Control Instrs. Div., 735 W. Clinton St., P.O. Box 6437, Ithaca, NY 14851-6437 607-272-7640
§ Laboratory Products, Inc., 57 Cornwall St., P. O. Box 1750, Jamaica Plain, MA 02130 617-522-7800
† Locus, Box 740, State College, PA 16804 814-466-6275
† Lorch Elctrns., 105 Cedar La., Englewood, NJ 07631 201-569-8282
† M/A-COM Microwave Power Dvcs., 330 Oser Ave., Hauppauge, NY 11788 516-231-1400
† MCL, Inc., 10 North Beach Ave., La Grange, IL 60525-2092 312-354-4350
† Microwave Semiconductor Corp., 100 School House Rd., Somerset, NJ 08873 201-469-3311
§† MITEQ Inc., 125 Ricefield Lane, Hauppauge, NY 11788 516-543-8873
† Natel Engrg. Co., Inc., 4550 Runway St., Simi Valley, CA 93063 805-581-3950
Neff Instr., 700 S. Myrtle Ave., Monrovia, CA 91016 818-357-2281
† NSD, 10936 Portal Dr., Los Alamitos, CA 90720 714-527-4896
Pacific Instrs. Inc., 215 Mason Circle, Concord, CA 94518 415-827-9010
† Perry Amplifier, 138 Fuller St., Brookline, MA 02146 617-734-0844
Resdel Engrg., 300 E. Live Oak Ave., Arcadia, CA 91006 213-684-2600
RF Power Labs, Inc., 21820 87th S. E., Woodinville, WA 98072 206-481-8833
† Scientific Communications, Inc., 3425 Kingsley Rd., Garland, TX 75041 214-271-3685
§† Systron-Donner Microwave Div., 14844 Oxnard St., Van Nuys, CA 91409 818-786-1760
† Technical Research & Mfg., Inc., R.F.D. #10, Manchester, NH 03103 603-627-6000
Tektronix, Inc., P. O. Box 500, Y3-314, Beaverton, OR 97077 .... 800-547-1512;Oregon only 800-452-1877
§ Telco Products Co., 44 Sea Cliff, Glen Cove, NY 11542 516-759-0300
† TRAK Microwave Corp., 4726 Eisenhower Blvd., Dept. E5, Tampa, FL 33614 813-884-1411
† TRW Microwave, 825 Stewart Dr., Sunnyvale, CA 94086 408-732-0880
Varian Associates, Inc., Microwave Tube Div., 611 Hansen Way, Palo Alto, CA 94303 415-493-4000

Amplifiers, Null-1100

CTS Corporation, Microelectronics Div., 1201 Cumberland Ave., W. Lafayette, IN 47906, 317-463-2565 .... A•1662
CTS Electronics Corp., Halex Division, 1202 McGaw Ave., Irvine, CA 92714, 714-261-6381 .... A•1662
† Control Technology Co., 41-16 29th St., Long Island City, NY 11101 718-361-2133
Leeds & Northrup Instrs., A Unit of General Signal Corp., Sumneytown Pike, North Wales, PA 19454 215-643-2000
Tettex Instruments, Inc., P.O. Box 281, Fairview Village, PA 19409-0281 215-539-6050
§ Tucker Elctrns., Box 461966, Garland, TX 75046 .... 214-348-8800;800-527-4642

Amplifiers, Operational-1100

† Apex Microtechnology Corp., 2895 W. Rudasil Road, Tucson, AZ 85741, 602-746-0849 .... D•1005
CTS Corporation, Microelectronics Div., 1201 Cumberland Ave., W. Lafayette, IN 47906, 317-463-2565 .... A•1662-1663,1665-1666
CTS Electronics Corp., Halex Division, 1202 McGaw Ave., Irvine, CA 92714, 714-261-6381 .... A•1662-1663,1665-1666
§† Exar Corp., P. O. Box 62229, 750 Palomar Ave., Sunnyvale, CA 94086, 408-732-7970 .... A•1668-1669
International Microelectronic Prods., 2830 North First Street, San Jose, CA 95134, 408-262-9100 .... A•1676
Modular Devices, 50 Orville Dr., Bohemia, NY 11716, 516-567-9620 .... D•1011
§ Motorola Semiconductor Prods. Sector, Adv. 72, Box 20912, Phoenix, AZ 85036, 602-244-6900 .... A•1688,2077
§ Opamp Labs, Inc., 1033 N. Sycamore Ave., Los Angeles, CA 90038, 213-934-3566 .... D•1014
A E G Telefunken, Semiconductor Grp., Rte. 22, Somerville, NJ 08876 201-722-9800
† Analog Devices, P.O. Box 280, Norwood, MA 02062 617-329-4700
Analogic Corp., Data Conversion Prods. Grp., Audubon Rd., Wakefield, MA 01880 617-246-0300
† Analog Systems, P.O. Box 35879, Tucson, AZ 85740-5879 602-293-4923
† Andrich Sys., Inc., 1699 Roosevelt Ave., Bohemia, NY 11716 516-589-5656
Beckman Industrial Corp., Electronic Technologies Div., 2500 Harbor Blvd., Fullerton, CA 92634 714-871-4848
Behlman Engineering, 1142 Mark Ave., Carpinteria, CA 93013 805-684-8311
Burleigh Instrs., Burleigh Pk., Fishers, NY 14453 716-924-9355
† Burr-Brown Corp., P.O. Box 11400, Tucson, AZ 85734 602-746-1111
Calex Mfg. Co., Inc., 3355 Vincent Rd., Pleasant Hill, CA 94523 415-932-3911
Cherry Semiconductor Corp, 2000 S. County Trail, East Greenwich, RI 02818 401-885-3600
† Comlinear Corp., 2468 E. 9th St., Loveland, CO 80537 303-669-9433
† Control Prods., Devar, Inc., P.O. Box 589, Bridgeport, CT 06601 203-368-6751
† Datel, General Electric Co., 11 Cabot Blvd., Mansfield, MA 02048 617-339-9341
§ Dymec, 8 Lowell Ave., Winchester, MA 01890 617-729-7870
§ Dynamics, Div. of Waugh Controls Corp., 9001 Fullbright Ave., Chatsworth, CA 91311 818-998-8281
§† Elantec, Inc., 1996 Tarob Ct., Milpitas, CA 95035 .... 408-945-1323;800-821-7429
§† Fairchild Camera & Instr. Corp., Linear Div., 313 Fairchild Dr., Mountain View, CA 94139 415-962-4011
Hybrid Systems Corp., 22 Linnell Circle, Billerica, MA 01821 617-667-8700
† Hytek Microsystems, 980 University Ave., Los Gatos, CA 95030 408-395-2300
Industrial Test Equip., 21 Yennicock Ave., Port Washington, NY 11050 516-883-1700
§† Intech, Microcircuits Div., 2270 Martin Ave., Santa Clara, CA 95050 408-988-4930
§† Intersil, 10710 N. Tantau Ave., Cupertino, CA 95014 408-996-5000
Intronics, Inc., 57 Chapel St., Newton, MA 02158 617-964-4000
Keithley Instrs., 28775 Aurora Rd., Cleveland, OH 44139 216-248-0400
† M.S. Kennedy Corp., Sub of Hybrilonics, Inc., 8170 Thompson Rd., Clay, NY 13041 315-699-9201
§ Kepco, Inc., 131-38 Sanford Ave., Flushing, NY 11352 718-461-7000
Leeds & Northrup Instrs., A Unit of General Signal Corp., Sumneytown Pike, North Wales, PA 19454 215-643-2000
§† Linear Technology Corp., 1630 McCarthy Blvd., Milpitas, CA 95035 408-942-0810
Linear Technlg., P.O. Box 489, Sta. "A", Burlington, ON, CANADA L7R 3Y3 416-632-2996
† Mel Tec, Div. Epsco, Inc., 411 Providence Hwy., Westwood, MA 02090 617-329-1508
MICRA Corp., 120 Ricefield Lane, Hauppauge, NY 11788 516-231-8600
§† Micro Power Sys. Inc., 3100 Alfred St., Santa Clara, CA 95050 408-727-5350
Mini-Systems, Inc., 20 David Rd., North Attleboro, MA 02761 617-695-0203
Modular Audio Prods., Modular Devices Inc., 50 Orville Dr., Bohemia, NY 11716 516-567-9620
§ NEC Elctrns. USA Inc., NEC Electron Div., 252 Humboldt Ct., Sunnyvale, CA 94086 408-745-6520
Neff Instr., 700 S. Myrtle Ave., Monrovia, CA 91016 818-357-2281
§ New-Tone Electronics, Inc., 44 Farrand St., Bloomfield, NJ 07003 201-748-5089
Omega Engrg., Box 4047, Stamford, CT 06907 203-359-1660
§† Precision Monolithics, Inc., 1500 Space Dr., Santa Clara, CA 95054 408-727-9222
§† Raytheon Semiconductor, 350 Ellis St., Mountain View, CA 94043 415-968-9211
RCA Solid State Div., Route 202, Somerville, NJ 08876 201-685-6000
§ RCA Solid State Div., Linear Integrated Circuits, Rte. 202, Somerville, NJ 08876 201-685-6000
§ Sanken Elec. Co., 1-22-8 Nishi-Ikebukuro, Toshima-Ku, Tokyo, JAPAN 03-986-6151
SGS Semiconductor Corporation, 1000 E. Bell Road, Phoenix, AZ 85022 602-867-6100
§† Signetics, U.S. Philips Corp., 811 E. Arques Ave, P.O. Box 3409, Sunnyvale, CA 94088-3409 408-739-7700
§† Silicon General, 11861 Western Ave., Garden Grove, CA 92641 714-898-8121
† Singer Co., Kearfott Div., 1150 McBride Ave., Little Falls, NJ 07424 201-785-6000
§† Sprague Electric Company, Distribution Division, 481 Marshall St., No. Adams, MA 01247 413-664-4481
Sylvania Electronic Components, Philips ECG Inc., A North American Philips Co., 100 First Ave., Waltham, MA 02254 617-890-6107
Teledyne/Geotech, 3401 Shiloh Rd., Garland, TX 75041 214-271-2561
Teledyne Philbrick, Allied Dr. Rte 128, Dedham, MA 02026 617-329-1600
§† Teledyne Semiconductor, 1300 Terra Bella Ave., PO Box 7267, Mountain View, CA 94039-7267 415-968-9241

Amplifiers, Parametric-3400

† Comtech Microwave Corp., Comtech Corp., 63 Oser Ave., Hauppauge, NY 11788 516-435-4646
† Eaton Corp., A.I.L. Div., Comac Rd., Deer Park, NY 11729 516-595-3094

† LNR Communications, Inc., 180 Marcus Blvd., Hauppauge, NY 11788 516-273-7111
MICRA Corp., 120 Ricefield Lane, Hauppauge, NY 11788 516-231-8600
† Scientific Communications, Inc., 3425 Kingsley Rd., Garland, TX 75041 214-271-3685
Teledyne Philbrick, Allied Dr. Rte 128, Dedham, MA 02026 617-329-1600

Amplifiers, Peak Limiting-1100

§ RTS Systems, Inc., Compact Video, Inc., 1100 W. Chestnut St., Burbank, CA 91506, 818-840-7119 .... D•1055
† Helionetics, Inc., DECC Div., 17312 Eastman St., Irvine, CA 92714 .... 714-546-4731; 800-421-7915
Linear Technlg., P.O. Box 489, Sta. "A", Burlington, ON, CANADA L7R 3Y3 416-632-2996
§ Ramko Resch., Inc., 11355A Folsom Blvd., Rancho Cordova, CA 95670 800-821-2545
† Scientific Communications, Inc., 3425 Kingsley Rd., Garland, TX 75041 214-271-3685

Amplifiers, Peak Sense & Hold-1100

† Analog Modules, Inc., 126 Baywood Avenue, Longwood, FL 32750, 305-339-4356/4355 .... D•1004
† Acromag, 30765 Wixom Rd., Wixom, MI 48096 313-624-1541
† Optical Electronics, Inc., Box 11140, Tucson, AZ 85734 602-624-8358

Amplifiers, Phase-Lock Loop-1100

Alpha Inds., Inc.-MSD Div., 20 Sylvan Rd., Woburn, MA 01801 617-935-5150
† A.R.F. Prods., 2559 75th St., Boulder, CO 80301 303-443-4844
Cherry Semiconductor Corp, 2000 S. County Trail, East Greenwich, RI 02818 401-885-3600
Contraves Goerz Corp., 610 Epsilon Dr., Pittsburgh, PA 15238 412-967-7700
§† Exar Corp., P. O. Box 62229, 750 Palomar Ave., Sunnyvale, CA 94086 .. 408-732-7970
§ Heath Co., Benton Harbor, MI 49022 616-982-3886
ITHACO, Inc., Meas. & Control Instrs. Div., 735 W. Clinton St., P.O. Box 6437, Ithaca, NY 14851-6437 607-272-7640
† LogiMetrics, 121-03 Dupont St., Plainview, NY 11803 516-349-1700
† Microwave Assocs. Ltd., Humphrey Rd., Dunstable, Bedfordshire, ENGLAND LU5 4SX, England .... 44-(582) 60-14-41
§† Plessey Semiconductors, 1641 Kaiser Ave., Irvine, CA 92714 714-540-9979
Varian Associates, Inc., Microwave Tube Div., 611 Hansen Way, Palo Alto, CA 94303 415-493-4000
† Vibration Instrs. Co., 1614 Orangethorpe Way, Anaheim, CA 92801 714-879-6085

Amplifiers, Photocell — See Amplifiers, Transducer (Vol. D)

Amplifiers, Power-1100

Amplifier Research, 160 School House Rd., Souderton, PA 18964-9990, 215-723-8181 .... D•1002
† Apex Microtechnology Corp., 2895 W. Rudasil Road, Tucson, AZ 85741, 602-746-0849 .... D•1005
Applied Research, Inc., 160 Dupont St., Plainview, NY 11803, 516-349-9200 .... A•1702
Clarke-Hess Comm. Resch. Corp., 17 West 17th St., New York, NY 10011, 212-255-2940 .... D•1200
† Control Technology Co., 41-16 29th St., Long Island City, NY 11101, 718-361-2133 .... D•1986
CTS Corporation, Microelectronics Div., 1201 Cumberland Ave., W. Lafayette, IN 47906, 317-463-2565 .... A•1662,1665
CTS Electronics Corp., Halex Division, 1202 McGaw Ave., Irvine, CA 92714, 714-261-6381 .... A•1662,1665
§ Electronic Navigation Inds, Emerson Electric Co., 100 Highpower Road, Rochester, NY 14623, 716-427-8300 .... D•1008-1009
Elgar Corp, An Onan McGraw Edison Co., 9250 Brown Deer Rd., San Diego, CA 92121, 619-450-0085 .... D•1921
Industrial Test Equip., 21 Yennicock Ave., Port Washington, NY 11050, 516-883-1700 .... D•1938
Instruments for Industry, Inc., 151 Toledo St., Farmingdale, NY 11735, 516-694-1414 .... D•1010
Julie Resch. Labs., 211 West 61st St., New York, NY 10023, 212-245-2727 .... D•1256
† MCL, Inc., 10 North Beach Ave., La Grange, IL 60525-2092, 312-354-4350 .... D•1408-1409
Mini-Circuits Lab., 2625 E. 14th St., P.O. Box 166, Brooklyn, NY 11235, 718-934-4500 .... A•1719-1720,1762-1767
§ Opamp Labs, Inc., 1033 N. Sycamore Ave., Los Angeles, CA 90038, 213-934-3566 .... D•1014
Pacific Power Source Corp., 15122 Bolsa Chica St., Huntington Bch., CA 92649, 714-898-2691;800-854-2433 .... D•1949
§ RTS Systems, Inc., Compact Video, Inc., 1100 W. Chestnut St., Burbank, CA 91506, 818-840-7119 .... D•1055
Tecron Industrial Prods., Crown Intl., Inc., 1718 W. Mishawaka Rd., Elkhart, IN 46517, 219-294-8300 .... D•1018-1020
§ A E G Telefunken, Semiconductor Grp., Rte. 22, Somerville, NJ 08876 .. 201-722-9800
† AEROCOM, 3090 S.W. 37th Ave., Miami, FL 33133 305-448-6503
† Alpha Inds., Inc.-Microelectronic Div., 2800 Crystal Drive, Hatfield, PA 19440 215-822-1311
Alpha Inds., Inc., Microwave Comp. Div., 90 Glenn St., Lawrence, MA 01843 617-681-8520
Alpha Inds., Inc.-MSD Div., 20 Sylvan Rd., Woburn, MA 01801 617-935-5150
Alpha-M Corp., 3009 Wildflower Dr., Dallas, TX 75229 214-620-0021
American Electronic Labs., Box 552, Lansdale, PA 19446 215-822-2929
American Elctrn. Labs., Inc., Govt. Grp. Div., P.O. Box 552, Lansdale, PA 19446
† Analog Systems, P.O. Box 35879, Tucson, AZ 85740-5879 602-293-4923
Applied Control, 1275 Bloomfield Ave., Fairfield, NJ 07006-2828 201-227-5454
† Avantek, Inc., 3175 Bowers Ave., Santa Clara, CA 95054 408-496-6710
§ Aydin Microwave, 75 East Trimble Rd., San Jose, CA 95131 408-946-5600
† Beckman Industrial Corp., Electronic Technologies Div., 2500 Harbor Blvd., Fullerton, CA 92634 714-871-4848
Behlman Div., California Instrs., Div. of Norlin Inds., 5150 Convoy St., San Diego, CA 92111 619-279-8620
Behlman Engineering, 1142 Mark Ave., Carpinteria, CA 93013 805-684-8311
§ Bell Audio Service Co., Magnetic Programming, Inc., 6740-G Huntley Road, Worthington, OH 43085 614-846-2766
Bertsch U.S., Sycamore Resch. Ctr., 2142F Industrial Ct., Vista, CA 92083 619-727-7420
Brady Co., 574A Somerset St., N. Plainfield, NJ 07060 201-753-7988
Bruel & Kjaer Instrs. Inc., 185 Forest St., Marlboro, MA 01752 617-481-7000
† Burr-Brown Corp., P.O. Box 11400, Tucson, AZ 85734 602-746-1111
† California Instruments, A Div. of Amstar Tech. Prods. Co., Inc., 5150-Convoy St., San Diego, CA 92111 .... 619-279-8620;800-356-2244;800-821-1634
† Central Microwave Co., Alpha Inds., Inc., 12180 Prichard Farm Rd., Maryland Heights, MO 63043 314-291-5270
§ Cetec Raymer, 7315 Fulton Ave., No. Hollywood, CA 91605 213-875-0423
† Cincinnati Elctrns., 2630 Glendale Milford Rd., Cincinnati, OH 45241 513-733-6100
† CML MACARR Div., Marine Electric RPD, Inc., 666 Pacific St., Brooklyn, NY 11217 718-857-2400
Continental Electronics Mfg. Co., P.O. Box 270879, Dallas, TX 75227 214-381-7161
Continental Resources, Inc., 175 Middlesex Tpke., Bedford, MA 01730 .. 617-275-0850
Contraves Goerz Corp., 610 Epsilon Dr., Pittsburgh, PA 15238 412-967-7700
Datron Systems, Inc., 200 West Los Angeles Ave., Simi Valley, CA 93065-1650 805-584-1717
Design Automation, Inc., 809 Massachusetts Ave., Lexington, MA 02173-3992 617-862-8998
† Dukane Corp., Communications Sys. Div., 2900 Dukane Dr., St. Charles, IL 60174 312-584-2300
§ Dyma Engrg., Box 1535, Los Lunas, NM 87031 505-865-6700
§ Eaton Corp., Elctrn. Instrmn. Div., 5340 Alla Rd., Los Angeles, CA 90066
§ Edwards Co., Signaling Prods. Div., P.O. Box 1188, Farmington, CT 06034 203-678-0410
§ Ehrhorn Technological Opers., Inc., P.O. Box 888, Canon City, CO 81212 303-275-1613
§† Elantec, Inc., 1996 Tarob Ct., Milpitas, CA 95035 .... 408-945-1323;800-821-7429
Elin Div., California Instrs. Co., Div. of Norlin Ind., 5150 Convoy St., San Diego, CA 92111 619-279-8620
Fluke, John, Mfg. Co., Box C9090, MS 250C, Everett, WA 98206 206-356-5400
§ Frazier, 1930 Valley View La., Dallas, TX 75234 214-241-3441
† Frequency West, Inc., 3140 Alfred St., Santa Clara, CA 95054 408-727-8500
§ GC Elctrns., 400 S. Wyman St., Rockford, IL 61101 815-968-9661
§ Harris Corp., Dracon Div., 809 Calle Plano, Camarillo, CA 93010 805-987-9511
§† Harris Corp., PRD Elctrns. Div., 6801 Jericho Tpke., Syosset, NY 11791 516-364-0400
Harris Microwave Semiconductor, 1530 McCarthy Blvd., Milpitas, CA 95035 408-262-2222
§ Heath Co., Benton Harbor, MI 49022 616-982-3886
† Helionetics, Inc., DECC Div., 17312 Eastman St., Irvine, CA 92714 .... 714-546-4731; 800-421-7915
Hughes Aircraft Co., Electron Dynamics Div., 3100 W. Lomita Blvd., P.O. Box 2999, Torrance, CA 90509-2999 213-517-6000
† Industrial Control Co., 3100 Pineda Ave., Rockledge, FL 32955 305-259-7105
† Instruments, Inc., 7263 Engineer Rd., San Diego, CA 92111 619-571-1111
§ Intech, Microcircuits Div., 2270 Martin Ave., Santa Clara, CA 95050 408-988-4930
IXYS Corp., 142 Charcot Ave., San Jose, CA 95131 408-262-8800
† Keltec Florida, P.O. Box 2917, Ft. Walton Bch., FL 32549 904-651-9749
Krohn-Hite Corp., Avon Indl. Pk., Bodwell St., Avon, MA 02322 617-580-1660
§ Lenco Elctrns., Inc., 300 N. Maryland St., Jackson, MO 63755 314-243-3147
† LogiMetrics, 121-03 Dupont St., Plainview, NY 11803 516-349-1700
† Lorch Elctrns., 105 Cedar La., Englewood, NJ 07631 201-569-8282
† M/A-COM Microwave Power Dvcs., 330 Oser Ave., Hauppauge, NY 11788 516-231-1400
M/A-COM OSW, Inc., 2626 S. Hardy Dr., Tempe, AZ 85282 602-966-1471
Magnum Opus Custom Elctrn. Engrg., 284 Kennedy St., Iselin, NJ 08830 201-283-4925
McFadden Sys., Inc., 8953 S. Atlantic Ave., South Gate, CA 90280-9990 213-564-5958
† Mel Tec, Div. Epsco, Inc., 411 Providence Hwy., Westwood, MA 02090 .. 617-329-1508
MICRA Corp., 120 Ricefield Lane, Hauppauge, NY 11788 516-231-8600
† Microwave Semiconductor Corp., 100 School House Rd., Somerset, NJ 08873 201-469-3311
§† MITEQ Inc., 125 Ricefield Lane, Hauppauge, NY 11788 516-543-8873
Modular Audio Prods., Modular Devices Inc., 50 Orville Dr., Bohemia, NY 11716 516-567-9620
Modular Devices, 50 Orville Dr., Bohemia, NY 11716 516-567-9620
† Natel Engrg. Co., Inc., 4550 Runway St., Simi Valley, CA 93063 805-581-3950
§ NEC Elctrns. USA Inc., NEC Electron Div., 252 Humboldt Ct., Sunnyvale, CA 94086 408-745-6520
§ New-Tone Electronics, Inc., 44 Farrand St., Bloomfield, NJ 07003 201-748-5089
† NSD, 10936 Portal Dr., Los Alamitos, CA 90720 714-527-4896
§ Paso Sound Prods., 14 First St., Pelham, NY 10803 914-738-4800
† Perry Amplifier, 138 Fuller St., Brookline, MA 02146 617-734-0844
Power Functions Engrg., 3831 Cavalier Dr., Garland, TX 75042 214-278-0996
§ Precision Elctrns., 9101 King Ave., Franklin Park, IL 60131 312-678-5350
§ Pyle Industries, Inc., 501 Center St., P.O. Box 620, Huntington, IN 46750 219-356-1200
§ Ramko Resch., Inc., 11355A Folsom Blvd., Rancho Cordova, CA 95670 800-821-2545
RCA Solid State Div., Linear Integrated Circuits, Rte. 202, Somerville, NJ 08876 201-685-6000
RCI/Data, 1992 Lakewood Rd., Toms River, NJ 08753 201-341-8361
Resdel Engrg., 300 E. Live Oak Ave., Arcadia, CA 91006 213-684-2600
† RFD, Inc., 5024 Nassau St., Tampa, FL 33607 813-872-1502
RFL Inds., A Dowty Grp. Co./Comms. Div., Powerville Rd., Boonton, NJ 07005 201-334-3100
RF Power Labs, Inc., 21820 87th S. E., Woodinville, WA 98072 206-481-8833
§ Sanken Elec. Co., 1-22-8 Nishi-Ikebukuro, Toshima-Ku, Tokyo, JAPAN 03-986-6151

Sanken Elec. U.S.A. Corp., 3848 Carson St., Ste. 105, Torrance, CA 90503 213-540-2209
•SGS Semiconductor Corporation, 1000 E. Bell Road, Phoenix, AZ 85022 602-867-6100
§ Shokai Far East, Ltd., 280 North Central Ave., Hartsdale, NY 10530 914-681-0700
Solar Elctrns. Co., 901 N. Highland, Hollywood, CA 90038 213-462-0806
Solitron Devices, 8808 Balboa Ave., San Diego, CA 92123 619-278-8780
§ Spectra Sonics, 3750 Airport Rd., Ogden, UT 84403 801-392-7531
Sylvania Electronic Components, Philips ECG Inc., A North American Philips Co., 100 First Ave., Waltham, MA 02254 617-890-6107
† Technical Research & Mfg., Inc., R.F.D. #10, Manchester, NH 03103 603-627-6000
§ Telco Products Co., 44 Sea Cliff, Glen Cove, NY 11542 516-759-0300
† Teledyne Microelectronics, 12964 Panama St., Los Angeles, CA 90066 ..... 213-822-8229;213-870-9831
§ Ten-Tec, Inc., Industrial Park, Sevierville, TN 37862 615-453-7172
Texas Instrs., Inc., Box 225012-MS-84, Dallas, TX 75265 214-995-6611
† TRAK Microwave Corp., 4726 Eisenhower Blvd., Dept. E5, Tampa, FL 33614 813-884-1411
† Transmagnetics, 210 Adams Blvd., Farmingdale, NY 11735 516-293-3100
§ Tucker Elctrns., Box 461966, Garland, TX 75046 ..... 214-348-8800;800-527-4642
Unholtz-Dickie Corp., 6 Brookside Dr., Wallingford, CT 06492 203-265-3929
Varian Associates, Inc., Microwave Tube Div., 611 Hansen Way, Palo Alto, CA 94303 415-493-4000
Vectrol, Division of Westinghouse Elec. Corp., 110 Douglas Rd, Oldsmar, FL 33557 813-855-4621
§ Wilson, H. M., Co., 11501 Chimney Rock Rd., Houston, TX 77035 713-729-1183

Amplifiers, Programmable Gain-1100

† Analog Modules, Inc., 126 Baywood Avenue, Longwood, FL 32750, 305-339-4356/4355 ..... D•1004
† Datel, General Electric Co., 11 Cabot Blvd., Mansfield, MA 02048, 617-339-9341 ..... D•1147
Ectron Corp., 8159 Engineer Rd., San Diego, CA 92111, 619-278-0600 ..... D•1007
§ MVP Elctrns., 1161 N. Tustin, Orange, CA 92667, 714-639-9246 ..... D•1012
Pacific Instrs. Inc., 215 Mason Circle, Concord, CA 94518, 415-827-9010 ..... D•1015
Precision Filters, 240 Cherry St., Ithaca, NY 14850, 607-277-3550 ..... A•1625, D•1017
Behlman Div., California Instrs., Div. of Norlin Inds., 5150 Convoy St., San Diego, CA 92111 619-279-8620
Behlman Engineering, 1142 Mark Ave., Carpinteria, CA 93013 805-684-8311
Burleigh Instrs., Burleigh Pk., Fishers, NY 14453 716-924-9355
Burr-Brown Corp., P.O. Box 11400, Tucson, AZ 85734 602-746-1111
California Instruments, A Div. of Amstar Tech. Prods. Co., Inc., 5150-Convoy St., San Diego, CA 92111 ..... 619-279-8620;800-356-2244;800-821-1634
Cyber Sys., Inc., 2031 E. Cerritos Ave., Anaheim, CA 92806 714-722-2051
Electronic Dev. Corp., 11 Hamlin St., Boston, MA 02127-4198 617-268-9696
Elin Div., California Instrs. Co., Div. of Norlin Ind., 5150 Convoy St., San Diego, CA 92111 619-279-8620
† Helionetics, Inc., DECC Div., 17312 Eastman St., Irvine, CA 92714 ..... 714-546-4731; 800-421-7915
† Hytek Microsystems, 980 University Ave., Los Gatos, CA 95030 408-395-2300
Instruments for Industry, Inc., 151 Toledo St., Farmingdale, NY 11735 516-694-1414
§ Intech, Microcircuits Div., 2270 Martin Ave., Santa Clara, CA 95050 408-988-4930
ITHACO, Inc., Meas. & Control Instrs. Div., 735 W. Clinton St., P.O. Box 6437, Ithaca, NY 14851-6437 607-272-7640
LeCroy Resch. Sys. Corp., 700 S. Main St., Spring Vly., NY 10977 914-425-2000
LeCroy Resch. Sys. Corp. (Cal.), 1806 Embarcadero Rd., Palo Alto, CA 94303 415-856-1800
Marel Instr. Co., 907 South East 13th Pl., Cape Coral, FL 33904 813-574-8788
† Mel Tec, Div. Epsco, Inc., 411 Providence Hwy., Westwood, MA 02090 617-329-1508
MICRA Corp., 120 Ricefield Lane, Hauppauge, NY 11788 516-231-8600
§ Preston Scientific, 805 E. Cerritos Ave., Anaheim, CA 92805 714-776-6400
Pulse Instrs. Co., 1234 Francisco, Torrance, CA 90502 213-515-5330
SGS Semiconductor Corporation, 1000 E. Bell Road, Phoenix, AZ 85022 602-867-6100
Tegam, 7230 N. Ridge Rd., Madison, OH 44057 216-428-7505
Tustin Elctrns. Co., 1431 E. Saint Andrews Pl., Santa Ana, CA 92705 714-549-0391

Amplifiers, Public Address — See Amplifiers, AF (Vol. D)

Amplifiers, Pulse-1100

Amplifier Research, 160 School House Rd., Souderton, PA 18964-9990, 215-723-8181 ..... D•1003
† Analog Modules, Inc., 126 Baywood Avenue, Longwood, FL 32750, 305-339-4356/4355 ..... D•1004
CTS Corporation, Microelectronics Div., 1201 Cumberland Ave., W. Lafayette, IN 47906, 317-463-2565 ..... A•1662,1664
CTS Electronics Corp., Halex Division, 1202 McGaw Ave., Irvine, CA 92714, 714-261-6381 ..... A•1662,1664
Advanced Kinetics, 1231 Victoria St., Costa Mesa, CA 92627 714-646-7165
AERCOM, 405 Tasman Dr., Sunnyvale, CA 94086 408-744-1320
American Electronic Labs., Box 552, Lansdale, PA 19446 215-822-2929
† Amptek, Inc., 6 De Angelo Dr., Bedford, MA 01730 617-275-2242
† Avantek, Inc., 3175 Bowers Ave., Santa Clara, CA 95054 408-496-6710
Berkeley Nucleonics Corp., 1198 Tenth St., Berkeley, CA 94710 415-527-1121
Burr-Brown Corp., P.O. Box 11400, Tucson, AZ 85734 602-746-1111
Canberra Ind., One State St., Meriden, CT 06450 203-238-2351
C-COR Elctrns., 60 Decibel Rd., State College, PA 16801 814-238-2461
Cherry Semiconductor Corp, 2000 S. County Trail, East Greenwich, RI 02818 401-885-3600
CML MACARR Div., Marine Electric RPD, Inc., 666 Pacific St., Brooklyn, NY 11217 718-857-2400
† Comlinear Corp., 2468 E. 9th St., Loveland, CO 80537 303-669-9433
Continental Electronics Mfg. Co., P.O. Box 270879, Dallas, TX 75227 214-381-7161
§ Electronic Navigation Inds, Emerson Electric Co., 100 Highpower Road, Rochester, NY 14623 716-427-8300
† Environmental Comm., 3150 Pullman St., Costa Mesa, CA 92627 714-557-7800
† EPSCO Microwave, 411 Providence Hwy., Westwood, MA 02090 617-329-1500
Instrument Research Co., Box 40207, Santa Barbara, CA 93103 805-962-8336
Instruments for Industry, Inc., 151 Toledo St., Farmingdale, NY 11735 516-694-1414
§ Laboratory Products, Inc., 57 Cornwall St., P. O. Box 1750, Jamaica Plain, MA 02130 617-522-7800
§ Lenco Elctrns., Inc., 300 N. Maryland St., Jackson, MO 63755 314-243-3147
† LogiMetrics, 121-03 Dupont St., Plainview, NY 11803 516-349-1700
† M/A-COM Microwave Power Dvcs., 330 Oser Ave., Hauppauge, NY 11788 516-231-1400
M/A-Com PHI, Inc., M/A-Com, 1742 Crenshaw Blvd., Torrance, CA 90501 213-320-6160
Maxwell Labs., 8835 Balboa Ave., San Diego, CA 92123 619-279-5100
† MCL, Inc., 10 North Beach Ave., La Grange, IL 60525-2092 312-354-4350
† Mel Tec, Div. Epsco, Inc., 411 Providence Hwy., Westwood, MA 02090 617-329-1508
MICRA Corp., 120 Ricefield Lane, Hauppauge, NY 11788 516-231-8600
† Microwave Assocs. Ltd., Humphrey Rd., Dunstable, Bedfordshire, ENGLAND LU5 4SX, England ..... 44-(582) 60-14-41
† Microwave Semiconductor Corp., 100 School House Rd., Somerset, NJ 08873 201-469-3311
§ MVP Elctrns., 1161 N. Tustin, Orange, CA 92667 714-639-9246
North Hills Elctrns., 1 Alexander Pl., Glen Cove, NY 11542 516-671-5700
Nuclear Resch. Corp., 125 Titus Ave., Warrington, PA 18976 215-343-5900
Optical Electronics, Inc., Box 11140, Tucson, AZ 85734 602-624-8358
Pacific Instrs. Inc., 215 Mason Circle, Concord, CA 94518 415-827-9010
† Perry Amplifier, 138 Fuller St., Brookline, MA 02146 617-734-0844
Power Functions Engrg., 3831 Cavalier Dr., Garland, TX 75042 214-278-0996
Products for Resch., 88 Holten St., Danvers, MA 01923 617-774-3250
Pulse Instrs. Co., 1234 Francisco, Torrance, CA 90502 213-515-5330
RF Power Labs, Inc., 21820 87th S. E., Woodinville, WA 98072 206-481-8833
† RHG Electronics Lab., Inc., 161 E. Industry Ct., Deer Park, NY 11729 516-242-1100
RIL Elctrns., Inc., 125 Titus Ave., P.O. Box H, Warrington, PA 18976 ..... 215-EL5-1361
Ross Engrg. Corp., 540 Westchester Dr., Campbell, CA 95008 408-377-4621
Sensor Corp., Box 140, Scottdale, PA 15683 412-887-4080
§ Shokai Far East, Ltd., 280 North Central Ave., Hartsdale, NY 10530 914-681-0700
Teledyne Philbrick, Allied Dr. Rte 128, Dedham, MA 02026 617-329-1600
§ Television Equip. Assocs., Box 393, So. Salem, NY 10590-0393 914-763-8893
§ Tennelec, 601 Turnpike, Oak Ridge, TN 37830 615-483-8405
† TRAK Microwave Corp., 4726 Eisenhower Blvd., Dept. E5, Tampa, FL 33614 813-884-1411
† TRW Microwave, 825 Stewart Dr., Sunnyvale, CA 94086 408-732-0880
§ Tucker Elctrns., Box 461966, Garland, TX 75046 ..... 214-348-8800;800-527-4642
United Detector Tech., 12525 Chadron Ave., Hawthorne, CA 90250 213-978-0516
Varian Associates, Inc., Microwave Tube Div., 611 Hansen Way, Palo Alto, CA 94303 415-493-4000
† Velonex, 560 Robert Ave., Santa Clara, CA 95050 408-727-7370
† Watkins-Johnson Co., 3333 Hillview Ave., Palo Alto, CA 94304 415-493-4141
Westamp, 1542 15th St., Santa Monica, CA 90404 213-393-0401

Amplifiers, Pulse Limiting-1100

† Analog Modules, Inc., 126 Baywood Avenue, Longwood, FL 32750, 305-339-4356/4355 ..... D•1004
AERCOM, 405 Tasman Dr., Sunnyvale, CA 94086 408-744-1320
CML MACARR Div., Marine Electric RPD, Inc., 666 Pacific St., Brooklyn, NY 11217 718-857-2400
Environmental Comm., 3150 Pullman St., Costa Mesa, CA 92627 714-557-7800
Pacific Power Source Corp., 15122 Bolsa Chica St., Huntington Bch., CA 92649 ..... 714-898-2691;800-854-2433
† TRAK Microwave Corp., 4726 Eisenhower Blvd., Dept. E5, Tampa, FL 33614 813-884-1411
† Watkins-Johnson Co., 3333 Hillview Ave., Palo Alto, CA 94304 415-493-4141

Amplifiers, Recording — See Amplifiers, AF (Vol. D)

Amplifiers, Resolver — See Amplifiers, Servo (Vol. D)

Amplifiers, RF-1100

Amplifier Research, 160 School House Rd., Souderton, PA 18964-9990, 215-723-8181 ..... D•1002-1003
† Analog Modules, Inc., 126 Baywood Avenue, Longwood, FL 32750, 305-339-4356/4355 ..... D•1004
§ Electronic Navigation Inds, Emerson Electric Co., 100 Highpower Road, Rochester, NY 14623, 716-427-8300 ..... D•1008
Hughes Solid State Products, 500 Superior Ave., Dept. E8, Newport Bch., CA 92658-8903, 714-759-2411 ..... A•1372
Instruments for Industry, Inc., 151 Toledo St., Farmingdale, NY 11735, 516-694-1414 ..... D•1010
Krohn-Hite Corp., Avon Indl. Pk., Bodwell St., Avon, MA 02322, 617-580-1660 ..... D•1259
† MCL, Inc., 10 North Beach Ave., La Grange, IL 60525-2092, 312-354-4350 ..... D•1408-1409
† Mini-Circuits Lab., 2625 E. 14th St., P.O. Box 166, Brooklyn, NY 11235, 718-934-4500 ..... A•1719-1720,1729,1762-1767
North Hills Elctrns., 1 Alexander Pl., Glen Cove, NY 11542, 516-671-5700 ..... A•1780
† Adams-Russell, Anzac Div., 80 Cambridge St., Burlington, MA 01803 671-273-3333
AERCOM, 405 Tasman Dr., Sunnyvale, CA 94086 408-744-1320
† AEROCOM, 3090 S.W. 37th Ave., Miami, FL 33133 305-448-6503
† Aiken Advanced Sys., Amstar Technical Products Company, Inc., 5901 Edsall Rd., Alexandria, VA 22304-4197 703-370-0900
† Alpha Inds., Inc.-Microelectronic Div., 2800 Crystal Drive, Hatfield, PA 19440 215-822-1311
Alpha Inds., Inc., Microwave Comp. Div., 90 Glenn St., Lawrence, MA 01843 617-681-8520

Alpha Inds., Inc.-MSD Div., 20 Sylvan Rd., Woburn, MA 01801 617-935-5150
American Electronic Labs., Box 552, Lansdale, PA 19446 215-822-2929
† Amplifonix Inc., 220 Rte. 13, Bristol, PA 19007 215-788-2350
† AN/COM Industries, P.O. Box 530, 5521 Cleon Ave., N. Hollywood, CA 91603 818-769-5518
† Andrich Sys., Inc., 1699 Roosevelt Ave., Bohemia, NY 11716 516-589-5656
Antennacraft, Box 1005, Burlington, IA 52601 319-754-7575
† Applied Research, Inc., 160 Dupont St., Plainview, NY 11803 516-349-9200
† A.R.F. Prods., 2559 75th St., Boulder, CO 80301 303-443-4844
† Argent Elctrns., 3245 S. County Rd., 25A, Troy, OH 45373 513-335-0031
† Avantek, Inc., 3175 Bowers Ave., Santa Clara, CA 95054 408-496-6710
Aydin Corp., 700 Dresher Rd., Horsham, PA 19044 215-657-7510
Aydin Microwave, 75 East Trimble Rd., San Jose, CA 95131 408-946-5600
† Aydin Vector Div., Box 328, Newtown, PA 18940 215-968-4271
C-COR Elctrns., 60 Decibel Rd., State College, PA 16801 814-238-2461
† Comlinear Corp., 2468 E. 9th St., Loveland, CO 80537 303-669-9433
Communication Assocs., 200 McKay Rd., Huntington Sta., NY 11746 516-271-0800
Compliance Design Inc., 593 Massachusetts Ave., Boxboro, MA 01719 .. 617-264-4668
Continental Electronics Mfg. Co., P.O. Box 270879, Dallas, TX 75227 214-381-7161
Continental Resources, Inc., 175 Middlesex Tpke., Bedford, MA 01730 .. 617-275-0850
Design Automation, Inc., 809 Massachusetts Ave., Lexington, MA 02173-3992 617-862-8998
§ Eaton Corp., Elctrn. Instrmn. Div., 5340 Alla Rd., Los Angeles, CA 90066
§ Ehrhorn Technological Opers., Inc., P.O. Box 888, Canon City, CO 81212 303-275-1613
† Environmental Comm., 3150 Pullman St., Costa Mesa, CA 92627 714-557-7800
Erbtec Engineering, Inc., 5680 Valmont Rd., Boulder, CO 80301 303-447-8750
FG Engrg., Box 476, Fredonia, AZ 86022 602-643-7375
Gra-Mar Inc., 3165 McCrory Pl., Ste. 265, Orlando, FL 32803 305-894-3351
§† Harris Corp., PRD Elctrns. Div., 6801 Jericho Tpke., Syosset, NY 11791 516-364-0400
Hughes Aircraft Co., Electron Dynamics Div., 3100 W. Lomita Blvd., P.O. Box 2999, Torrance, CA 90509-2999 213-517-6000
§ Kay-Townes Antenna, P.O. Box 593, Rome, GA 30161 404-291-9871
† Keltec Florida, P.O. Box 2917, Ft. Walton Bch., FL 32549 904-651-9749
§ KLM Electronics, 16890 Church St., P.O. Box 816, Morgan Hill, CA 95037 408-779-7363
§ Laboratory Products, Inc., 57 Cornwall St., P. O. Box 1750, Jamaica Plain, MA 02130 617-522-7800
† LNR Communications, Inc., 180 Marcus Blvd., Hauppauge, NY 11788 ... 516-273-7111
† Locus, Box 740, State College, PA 16804 814-466-6275
LogiMetrics, 121-03 Dupont St., Plainview, NY 11803 516-349-1700
† Lorch Elctrns., 105 Cedar La., Englewood, NJ 07631 201-569-8282
§ Macom Inds., 8230 Haskell Ave., Van Nuys, CA 91406
† M/A-COM Microwave Power Dvcs., 330 Oser Ave., Hauppauge, NY 11788 516-231-1400
M/A-COM OSW, Inc., 2626 S. Hardy Dr., Tempe, AZ 85282 602-966-1471
M/A-Com PHI, Inc., M/A-Com, 1742 Crenshaw Blvd., Torrance, CA 90501 213-320-6160
Matec Instruments, Inc., 60 Metebello Rd., Warwick, RI 02886 401-739-9030
† Mel Tec, Div. Epsco, Inc., 411 Providence Hwy., Westwood, MA 02090 .. 617-329-1508
MERET, Inc., 1815 24th St., Santa Monica, CA 90404-4998 213-828-7496
Microphase, 587 Connecticut Ave., Norwalk, CT 06856 203-866-8000
† Microwave Assocs. Ltd., Humphrey Rd., Dunstable, Bedfordshire, ENGLAND LU5 4SX, England .... 44-(582) 60-14-41
† Microwave Semiconductor Corp., 100 School House Rd., Somerset, NJ 08873 201-469-3311
§† MITEQ Inc., 125 Ricefield Lane, Hauppauge, NY 11788 516-543-8873
Mu-Del Electronics, Inc., 2426 Linden Lane, Silver Spring, MD 20910-1288 301-587-6087
† Narda Microwave Corp., 435 Moreland Rd., Hauppauge, NY 11788 516-231-1700
§ NEC Elctrns. USA Inc., NEC Electron Div., 252 Humboldt Ct., Sunnyvale, CA 94086 408-745-6520
§ New-Tone Electronics, Inc., 44 Farrand St., Bloomfield, NJ 07003 201-748-5089
† NSD, 10936 Portal Dr., Los Alamitos, CA 90720 714-527-4896
§† Omni Spectra, Inc., Microwave Subsystems Div., 2626 So. Hardy Dr., Tempe, AZ 85282 602-966-1471
§ Pathcom, Inc., Pace Two-Way Radio Prods., 24105 S. Frampton Ave., Harbor City, CA 90710 213-325-1290
† Perry Amplifier, 138 Fuller St., Brookline, MA 02146 617-734-0844
§† Plessey Semiconductors, 1641 Kaiser Ave., Irvine, CA 92714 714-540-9979
§† RCA Solid State Div., Route 202, Somerville, NJ 08876 201-685-6000
§† RCA Solid State Div., Linear Integrated Circuits, Rte. 202, Somerville, NJ 08876 201-685-6000
Resdel Engrg., 300 E. Live Oak Ave., Arcadia, CA 91006 213-684-2600
RF Power Labs, Inc., 21820 87th S. E., Woodinville, WA 98072 206-481-8833
RHG Electronics Lab., Inc., 161 E. Industry Ct., Deer Park, NY 11729 516-242-1100
§ Rodelco Elctrns. Corp., 356A Comac Rd., Deer Park, NY 11729 516-643-5110
§ Shokai Far East, Ltd., 280 North Central Ave., Hartsdale, NY 10530 914-681-0700
Signetics, U.S. Philips Corp., 811 E. Arques Ave, P.O. Box 3409, Sunnyvale, CA 94088-3409 408-739-7700
§ Sinclair Radio Labs., 122 Rayette Rd., Concord, ONT, CANADA L9W2Y8 416-669-1244
Sparkomatic, Rte. 6 & 209, Milford, PA 18337 717-296-6444
§ Sylvania Electronic Components, Philips ECG Inc., A North American Philips Co., 100 First Ave., Waltham, MA 02254 617-890-6107
§† Systron-Donner Microwave Div., 14844 Oxnard St., Van Nuys, CA 91409 818-786-1760
Technical Research & Mfg., Inc., R.F.D. # 10, Manchester, NH 03103 ... 603-627-6000
† Techtrol Cyclonetics, Inc., 815 Market St., New Cumberland, PA 17070 .. 717-774-2746
§ Telco Products Co., 44 Sea Cliff, Glen Cove, NY 11542 516-759-0300
† Teledyne Microelectronics, 12964 Panama St., Los Angeles, CA 90066 .... 213-822-8229;213-870-9831
§ Ten-Tec, Inc., Industrial Park, Sevierville, TN 37862 615-453-7172
† TRAK Microwave Corp., 4726 Eisenhower Blvd., Dept. E5, Tampa, FL 33614 813-884-1411
† TRW Microwave, 825 Stewart Dr., Sunnyvale, CA 94086 408-732-0880
§† TRW, RF Devices Div., 14520 Aviation Blvd., Lawndale, CA 90260 213-536-0888
§ Tucker Elctrns., Box 461966, Garland, TX 75046 .... 214-348-8800;800-527-4642
Varian Associates, Inc., Microwave Tube Div., 611 Hansen Way, Palo Alto, CA 94303 415-493-4000
† Watkins-Johnson Co., 3333 Hillview Ave., Palo Alto, CA 94304 415-493-4141
Wide Band Engrg. Co., Inc., Box 21652, Phoenix, AZ 85036 602-254-1570
† Zeta Labs., 3265 Scott Blvd., Santa Clara, CA 95054 408-727-6001

Amplifiers, Sample & Hold-1100

Analogic Corp., Data Conversion Prods. Grp., Audubon Rd., Wakefield, MA 01880, 617-246-0300 .... D•1139
CTS Corporation, Microelectronics Div., 1201 Cumberland Ave., W. Lafayette, IN 47906, 317-463-2565 .... A•1662-1664
CTS Electronics Corp., Halex Division, 1202 McGaw Ave., Irvine, CA 92714, 714-261-6381 .... A•1662-1664
† Datel, General Electric Co., 11 Cabot Blvd., Mansfield, MA 02048, 617-339-9341 .... D•1147
† ILC Data Device Corp., 105 Wilbur Pl., Bohemia, NY 11716, 516-567-5600 .... D•1151
§† Intech, Microcircuits Div., 2270 Martin Ave., Santa Clara, CA 95050, 408-988-4930 .... A•1672
† Acromag, 30765 Wixom Rd., Wixom, MI 48096 313-624-1541
§ Action Instrs., 8601 Aero Dr., San Diego, CA 92123 619-279-5726
† Analog Devices, P.O. Box 280, Norwood, MA 02062 617-329-4700
† Andrich Sys., Inc., 1699 Roosevelt Ave., Bohemia, NY 11716 516-589-5656
† Burr-Brown Corp., P.O. Box 11400, Tucson, AZ 85734 602-746-1111
§ Control Prods., Devar, Inc., P.O. Box 589, Bridgeport, CT 06601 203-368-6751
Data Translation, 100 Locke Dr., Marlboro, MA 01752 617-481-3700
Datawest, 7333 E. Helm Dr., Scottsdale, AZ 85260 602-948-3280
† Dymec, 8 Lowell Ave., Winchester, MA 01890 617-729-7870
Hybrid Systems Corp., 22 Linnell Circle, Billerica, MA 01821 617-667-8700
§† Linear Technology Corp., 1630 McCarthy Blvd., Milpitas, CA 95035 408-942-0810
† Mel Tec, Div. Epsco, Inc., 411 Providence Hwy., Westwood, MA 02090 .. 617-329-1508
MICRA Corp., 120 Ricefield Lane, Hauppauge, NY 11788 516-231-8600
† Micro Networks, 324 Clark St., Worcester, MA 01606 617-852-5400
Neff Instr., 700 S. Myrtle Ave., Monrovia, CA 91016 818-357-2281
† Optical Electronics, Inc., Box 11140, Tucson, AZ 85734 602-624-8358
§† Phoenix Data, Inc., 3384 W. Osborn Rd., Phoenix, AZ 85017 602-278-8528
§† Precision Monolithics, Inc., 1500 Space Dr., Santa Clara, CA 95054 408-727-9222
§ Preston Scientific, 805 E. Cerritos Ave., Anaheim, CA 92805 714-776-6400
Rochester Instr. Sys., 255 N. Union St., Rochester, NY 14605 716-263-7700
SGS Semiconductor Corporation, 1000 E. Bell Road, Phoenix, AZ 85022 602-867-6100
§ Signetics, U.S. Philips Corp., 811 E. Arques Ave, P.O. Box 3409, Sunnyvale, CA 94088-3409 408-739-7700
Teledyne Philbrick, Allied Dr. Rte 128, Dedham, MA 02026 617-329-1600
Tustin Elctrns. Co., 1431 E. Saint Andrews Pl., Santa Ana, CA 92705 714-549-0391

Amplifiers, Servo-4900

Control Technology Co., 41-16 29th St., Long Island City, NY 11101, 718-361-2133 .... D•1986
§ Electro-Craft, 1600 2nd St. S., Hopkins, MN 55343, 612-931-2700 ... B•1147-1148
† Industrial Control Co., 3100 Pineda Ave., Rockledge, FL 32955, 305-259-7105 .... D•1988
Kollmorgen Corp., Industrial Drives Div., 201 Rock Rd., Radford, VA 24141, 703-639-2495 .... B•1163-1165
Modular Devices, 50 Orville Dr., Bohemia, NY 11716, 516-567-9620 ..... D•1011
§ Opamp Labs, Inc., 1033 N. Sycamore Ave., Los Angeles, CA 90038, 213-934-3566 .... D•1014
† Performance Controls Inc., 333-E Byberry Rd., Hatboro, PA 19040, 215-675-6500 .... B•1178
† ABA Electromechanical Sys. Inc., Box 500, Pinellas Pk., FL 34290-0500 813-541-6681
Adams-Russell, Parisi Div., 280 Bear Hill Rd., Waltham, MA 02154 617-890-0055
§ Aerotech, Inc., 101 Zeta Dr., Pittsburgh, PA 15238 412-963-7470
§ Analog Devices, P.O. Box 280, Norwood, MA 02062 617-329-4700
† Apex Microtechnology Corp., 2895 W. Rudasil Road, Tucson, AZ 85741 602-746-0849
† Applied Control, 1275 Bloomfield Ave., Fairfield, NJ 07006-2828 201-227-5454
§ A. S. R. Servotron, Inc., (Sub. Baldor Elec. Co.), 7945 Deering Ave., Canoga Park, CA 91304 818-999-6193
Bertsch U.S., Sycamore Resch. Ctr., 2142F Industrial Ct., Vista, CA 92083 619-727-7420
Burr-Brown Corp., P.O. Box 11400, Tucson, AZ 85734 602-746-1111
Contraves Goerz Corp., 610 Epsilon Dr., Pittsburgh, PA 15238 412-967-7700
Cross Elctrns., 100 Commonwealth Dr., Warrendale, PA 15086 412-776-1591
Data Technology, Inc., 4 Gill St., Woburn, MA 01811 617-935-8820
Datatran Labs, P.O. Box 384, Sussex, NJ 07461 914-856-4313
Datron Systems, Inc., 200 West Los Angeles Ave., Simi Valley, CA 93065-1650 805-584-1717
EG & G Torque Systems, 36 Arlington St., Watertown, MA 02172 617-924-6000
§† Elantec, Inc., 1996 Tarob Ct., Milpitas, CA 95035 .... 408-945-1323;800-821-7429
Eldec Corp., Monitor & Control Div., 16700 13th Ave. W., P.O. Box 100, Lynnwood, WA 98046-0100 206-743-1313
† Evershed & Vignoles, Ltd., Acton Lane, Chiswick, London, ENGLAND W4 5HJ 01-994-3670
§ Exar Corp., P. O. Box 62229, 750 Palomar Ave., Sunnyvale, CA 94086 .. 408-732-7970
Frequency Control Prods., Inc., American Time Prods. Div., 61-20 Woodside Ave., Woodside, NY 11377 212-458-5811
† General Magnetics, 211 Grove St., Bloomfield, NJ 07003 201-743-2700
† Honeywell, Process Control Div., 1100 Virginia Dr., Ft. Washington, PA 19034 .... 800-321-5111, Ext. 596
† Inland Motor Division, Kollmorgen Corp., 4020 E. Inland Rd., Sierra Vista, AZ 85635 602-459-1150
† Inland Motor, Kollmorgen Corp., 501 First St., Radford, VA 24141 703-639-9045

† Innovatek Microsystems, Inc., Smithfield Rd., R1 Box 104, Millerton, NY 12546-9720	914-373-9003
Interface Engrg., 386 Lindelof Ave., Stoughton, MA 02072	617-344-7383
. IXYS Corp., 142 Charcot Ave., San Jose, CA 95131	408-262-8800
Leeds & Northrup Instrs., A Unit of General Signal Corp., Sumneytown Pike, North Wales, PA 19454	215-643-2000
† Magnetico Inc., 182 Morris Ave., Holtsville, NY 11742	516-654-1166
McFadden Sys., Inc., 8953 S. Atlantic Ave., South Gate, CA 90280-9990	213-564-5958
† Mel Tec, Div. Epsco, Inc., 411 Providence Hwy., Westwood, MA 02090	617-329-1508
MICRA Corp., 120 Ricefield Lane, Hauppauge, NY 11788	516-231-8600
† Micro Mo Electronics, Inc., 742 2nd Ave. S., St. Petersburg, FL 33701	813-822-2529
Mini-Systems, Inc., 20 David Rd., North Attleboro, MA 02761	617-695-0203
Muirhead, 1101 Briston Rd., Mountainside, NJ 07092	201-233-6010
Pacific Power Source Corp., 15122 Bolsa Chica St., Huntington Bch., CA 92649	714-898-2691;800-854-2433
† Perry Amplifier, 138 Fuller St., Brookline, MA 02146	617-734-0844
PKS - Digiplan Ltd., 1859 Charter Lane, Lancaster, PA 17601	717-299-2706
PMI Motors, Kollmorgen Corp., 5 Aerial Way, Syosset, NY 11791	516-938-8000
§ Ragen Data Systems, Inc., 3 Oval Dr., Central Islip, NY 11722	516-234-3800
§ Sanken Elec. Co., 1-22-8 Nishi-Ikebukuro, Toshima-Ku, Tokyo, JAPAN	03-986-6151
Sanken Elec. U.S.A. Corp., 3848 Carson St., Ste. 105, Torrance, CA 90503	213-540-2209
SGS Semiconductor Corporation, 1000 E. Bell Road, Phoenix, AZ 85022	602-867-6100
§† Signetics, U.S. Philips Corp., 811 E. Arques Ave, P.O. Box 3409, Sunnyvale, CA 94088-3409	408-739-7700
Singer Co., Kearfott Div., 1150 McBride Ave., Little Falls, NJ 07424	201-785-6000
† Superior Mfg. & Instr., 19-36 38th St., Long Island City, NY 11105	212-932-1800
Tecron Industrial Prods., Crown Intl., Inc., 1718 W. Mishawaka Rd., Elkhart, IN 46517	219-294-8300
Texas Instrs., Inc., Box 225012-MS-84, Dallas, TX 75265	214-995-6611
† Transicoil, Inc., Trooper Rd., P.O. Box 99, Worcester, PA 19490-9990	215-277-1300
† Transmagnetics, 210 Adams Blvd., Farmingdale, NY 11735	516-293-3100
§† Westamp, 1542 15th St., Santa Monica, CA 90404	213-393-0401
§ Wilson, H. M., Co., 11501 Chimney Rock Rd., Houston, TX 77035	713-729-1183

Amplifiers, Single Sideband-1900

† AEROCOM, 3090 S.W. 37th Ave., Miami, FL 33133	305-448-6503
† Cincinnati Elctrns., 2630 Glendale Milford Rd., Cincinnati, OH 45241	513-733-6100
† Collins Avionics Divisions, Rockwell Intl., 400 Collins Rd. NE, Cedar Rapids, IA 52498	319-395-1000
Continental Electronics Mfg. Co., P.O. Box 270879, Dallas, TX 75227	214-381-7161
§ Ehrhorn Technological Opers., Inc., P.O. Box 888, Canon City, CO 81212	303-275-1613
§ Electronic Navigation Inds, Emerson Electric Co., 100 Highpower Road, Rochester, NY 14623	716-427-8300
Instruments for Industry, Inc., 151 Toledo St., Farmingdale, NY 11735	516-694-1414
§ KLM Electronics, 16890 Church St., P.O. Box 816, Morgan Hill, CA 95037	408-779-7363
† M/A-COM Microwave Power Dvcs., 330 Oser Ave., Hauppauge, NY 11788	516-231-1400
† MCL, Inc., 10 North Beach Ave., La Grange, IL 60525-2092	312-354-4350
† NSD, 10936 Portal Dr., Los Alamitos, CA 90720	714-527-4896
Pathcom, Inc., Pace Two-Way Radio Prods., 24105 S. Frampton Ave., Harbor City, CA 90710	213-325-1290
§† Plessey Semiconductors, 1641 Kaiser Ave., Irvine, CA 92714	714-540-9979
Resdel Engrg., 300 E. Live Oak Ave., Arcadia, CA 91006	213-684-2600
RF Power Labs, Inc., 21820 87th S. E., Woodinville, WA 98072	206-481-8833
§ Telco Products Co., 44 Sea Cliff, Glen Cove, NY 11542	516-759-0300
§ Ten-Tec, Inc., Industrial Park, Sevierville, TN 37862	615-453-7172
Varian Associates, Inc., Microwave Tube Div., 611 Hansen Way, Palo Alto, CA 94303	415-493-4000

Amplifiers, Strain Gauge — See Amplifiers, Transducer (Vol. D)

Amplifiers, Sweep-1100

Alpha Inds., Inc.-MSD Div., 20 Sylvan Rd., Woburn, MA 01801	617-935-5150
Amplifier Research, 160 School House Rd., Souderton, PA 18964-9990	215-723-8181
§ Electronic Navigation Inds, Emerson Electric Co., 100 Highpower Road, Rochester, NY 14623	716-427-8300
§† Harris Corp., PRD Elctrns. Div., 6801 Jericho Tpke., Syosset, NY 11791	516-364-0400
Hughes Aircraft Co., Electron Dynamics Div., 3100 W. Lomita Blvd., P.O. Box 2999, Torrance, CA 90509-2999	213-517-6000
† M/A-COM Microwave Power Dvcs., 330 Oser Ave., Hauppauge, NY 11788	516-231-1400
† NSD, 10936 Portal Dr., Los Alamitos, CA 90720	714-527-4896
RF Power Labs, Inc., 21820 87th S. E., Woodinville, WA 98072	206-481-8833
Wide Band Engrg. Co., Inc., Box 21652, Phoenix, AZ 85036	602-254-1570

Amplifiers, Synchro-4900

Control Technology Co., 41-16 29th St., Long Island City, NY 11101, 718-361-2133	**D•1986**
† **Industrial Control Co., 3100 Pineda Ave., Rockledge, FL 32955, 305-259-7105**	**D•1988**
† Analog Devices, P.O. Box 280, Norwood, MA 02062	617-329-4700
Astrosystems, 6 Nevada Dr., Lake Success, NY 11042	516-328-1600
Bertsch U.S., Sycamore Resch. Ctr., 2142F Industrial Ct., Vista, CA 92083	619-727-7420
† Computer Conversions Corp., 6 Dunton Ct., E. Northport, NY 11731	516-261-3300
† Henschel, General Signal Corp., 9 Hoyt Drive, P.O. Box 30, Newburyport, MA 01950	617-462-2400
† Interface Engrg., 386 Lindelof Ave., Stoughton, MA 02072	617-344-7383
† Magnetico Inc., 182 Morris Ave., Holtsville, NY 11742	516-654-1166
Modular Devices, 50 Orville Dr., Bohemia, NY 11716	516-567-9620
Muirhead, 1101 Briston Rd., Mountainside, NJ 07092	201-233-6010
† Natel Engrg. Co., Inc., 4550 Runway St., Simi Valley, CA 93063	805-581-3950
† Northern Precision Labs., 11 Madison Rd., Fairfield, NJ 07006	201-227-4800
Oeco Corp., 712 S.E. Hawthorne Blvd., Portland, OR 97214	503-238-2440
† Singer Co., Kearfott Div., 1150 McBride Ave., Little Falls, NJ 07424	201-785-6000
† Transmagnetics, 210 Adams Blvd., Farmingdale, NY 11735	516-293-3100

Amplifiers, Telemetering-1900

Mini-Circuits Lab., 2625 E. 14th St., P.O. Box 166, Brooklyn, NY 11235, 718-934-4500	**A•1719-1720,1729,1762-1767**
† Aydin Vector Div., Box 328, Newtown, PA 18940	215-968-4271
Crompton Instrs., Hawker Siddley, 2763 Old Higgins Rd., Elk Grove Village, IL 60007	312-593-1107
§† Data-Control Sys., Commerce Dr., Box 860, Danbury, CT 06810	203-743-9241
§ EDL, Inc., 385 Oser Ave., Hauppauge, NY 11788	516-435-2808;1-800-DIAL EDL
§ Electronic Navigation Inds, Emerson Electric Co., 100 Highpower Road, Rochester, NY 14623	716-427-8300
EMR Data Systems, Div. Sangamo- Weston, Box 3041, Sarasota, FL 33578	813-371-0811
Gould Inc., Recording Systems Div., 3631 Perkins Ave., Cleveland, OH 44114	216-361-3315
† Hades Mfg. Corp., 151-A Verdi St., Farmingdale, NY 11735	516-249-4244
† LNR Communications, Inc., 180 Marcus Blvd., Hauppauge, NY 11788	516-273-7111
† Lorch Elctrns., 105 Cedar La., Englewood, NJ 07631	201-569-8282
† M/A-COM Microwave Power Dvcs., 330 Oser Ave., Hauppauge, NY 11788	516-231-1400
† Mel Tec, Div. Epsco, Inc., 411 Providence Hwy., Westwood, MA 02090	617-329-1508
Microphase, 587 Connecticut Ave., Norwalk, CT 06856	203-866-8000
† Microwave Semiconductor Corp., 100 School House Rd., Somerset, NJ 08873	201-469-3311
§ NES, Inc. (Nationwide Electronic Systems), 3003 Wakefield, Carpentersville, IL 60110	312-426-5900
† Omnitek, Inc., P.O. Box 102, 820 Pennsylvania Blvd., Feasterville, PA 19047	215-355-4443
Pacific Instrs. Inc., 215 Mason Circle, Concord, CA 94518	415-827-9010
Resdel Engrg., 300 E. Live Oak Ave., Arcadia, CA 91006	213-684-2600
† RHG Electronics Lab., Inc., 161 E. Industry Ct., Deer Park, NY 11729	516-242-1100
Rochester Instr. Sys., 255 N. Union St., Rochester, NY 14605	716-263-7700
† Solid State Elctrns. Corp., 18646 Parthenia St., Northridge, CA 91324	818-993-8257
Teledyne/Geotech, 3401 Shiloh Rd., Garland, TX 75041	214-271-2561
Tri-Com, Inc., 7304 Grove Rd., Frederick, MD 21701	301-694-6666
† TRW Microwave, 825 Stewart Dr., Sunnyvale, CA 94086	408-732-0880
† Watkins-Johnson Co., 3333 Hillview Ave., Palo Alto, CA 94304	415-493-4141

Amplifiers, Thermocouple — See Amplifiers, Transducer (Vol. D)

Amplifiers, Track & Hold-1100

Optical Electronics, Inc., Box 11140, Tucson, AZ 85734	602-624-8358

Amplifiers, Transducer-Also See Signal Conditioners-1100

Analogic Corp., Data Conversion Prods. Grp., Audubon Rd., Wakefield, MA 01880, 617-246-0300	**D•1138**
† **Analog Modules, Inc., 126 Baywood Avenue, Longwood, FL 32750, 305-339-4356/4355**	**D•1004**
† **Calex Mfg. Co., Inc., 3355 Vincent Rd., Pleasant Hill, CA 94523, 415-932-3911**	**D•1006**
Data Instruments, Inc., 4 Hartwell Pl., Lexington, MA 02173, 617-861-7450	**B•1790**
Data Tech, Div. of Penril Corp., 3110 W. Segerstrom, Santa Ana, CA 92704, 714-546-7160	**D•1341**
Ectron Corp., 8159 Engineer Rd., San Diego, CA 92111, 619-278-0600	**D•1007**
§ **Newport Electronics, 630 E. Young St., Santa Ana, CA 92705, 714-540-4914**	**D•1370**
Ohio Semitronics, Inc., 1205 Chesapeake Ave., Columbus, OH 43212, 614-486-9561	**B•1812**
Omega Engrg., Box 4047, Stamford, CT 06907, 203-359-1660	**D•1013,1070,1128,1374-1375**
§ **Opamp Labs, Inc., 1033 N. Sycamore Ave., Los Angeles, CA 90038, 213-934-3566**	**D•1014**
Pacific Instrs. Inc., 215 Mason Circle, Concord, CA 94518, 415-827-9010	**D•1015**
PPM, Inc., 4521 Emery Ind. Pkwy., Cleveland, OH 44128, 216-292-6006	**D•1291**
Precision Filters, 240 Cherry St., Ithaca, NY 14850, 607-277-3550	**D•1017**
Transducers and Systems Inc., A Prime Technology Company, Twin Lakes Rd., P.O. Box 185, N. Branford, CT 06471, 203-481-5721	**B•1828**
Validyne Engrg. Corp., 8626 Wilbur Ave., Northridge, CA 91324, 818-886-2057	**D•1164**
† Acromag, 30765 Wixom Rd., Wixom, MI 48096	313-624-1541
§ Action Instrs., 8601 Aero Dr., San Diego, CA 92123	619-279-5726
Active Control Instrmn., P.O. Box 243-Wildwood Circle, Key Largo, FL 33037	305-451-1000
† Analog Devices, P.O. Box 280, Norwood, MA 02062	617-329-4700
Applied Control, 1275 Bloomfield Ave., Fairfield, NJ 07006-2828	201-227-5454
Astrosystems, 6 Nevada Dr., Lake Success, NY 11042	516-328-1600
Barber-Colman Co., Indl. Instrs. Div., P.O. Box 2940, 1354 Clifford Ave., Loves Park, IL 61132	815-877-0241
Bell, Floyd, Assocs., Inc., 897 Higgs Ave., Columbus, OH 43212	614-488-3193
Bell & Howell/CEC Div., 360 Sierra Madre Villa, Pasadena, CA 91109	213-796-9381
Bently Nevada Corp., P.O. Box 157, Minden, NV 89423	702-782-3611
BLH Elctrns., 75 Shawmut Road, Canton, MA 02021	617-821-2000
Bruel & Kjaer Instrs. Inc., 185 Forest St., Marlboro, MA 01752	617-481-7000
Burr-Brown Corp., P.O. Box 11400, Tucson, AZ 85734	602-746-1111

Amplifiers, Transducer-1100 (Cont'd)

† Centronic Inc., 1101 Bristol Rd., Mountainside, NJ 07092 201-233-7200
CML MACARR Div., Marine Electric RPD, Inc., 666 Pacific St., Brooklyn, NY 11217 718-857-2400
† Columbia Resch. Labs., Macdade Blvd. & Bullens La., Woodlyn, PA 19094 215-532-9464
Control Prods., Devar, Inc., P.O. Box 589, Bridgeport, CT 06601 203-368-6751
Crompton Instrs., Hawker Siddley, 2763 Old Higgins Rd., Elk Grove Village, IL 60007 312-593-1107
Cross Elctrns., 100 Commonwealth Dr., Warrendale, PA 15086 412-776-1591
Data Translation, 100 Locke Dr., Marlboro, MA 01752 617-481-3700
Datel, General Electric Co., 11 Cabot Blvd., Mansfield, MA 02048 617-339-9341
Dexter Research Ctr., Inc., 7300 Huron River Dr., Dexter, MI 48130 313-426-3921
Dunegan Corporation, P.O. Box 3238, Mission Viejo, CA 92690 714-831-9131
§ Dynamics, Div. of Waugh Controls Corp., 9001 Fullbright Ave., Chatsworth, CA 91311 818-998-8281
§ EDL, Inc., 385 Oser Ave., Hauppauge, NY 11788 .... 516-435-2808;1-800-DIAL EDL
EG&G, Inc., Electro-Optics Div., 35 Congress St., Salem, MA 01970 617-745-3200
§ Electronic Navigation Inds, Emerson Electric Co., 100 Highpower Road, Rochester, NY 14623 716-427-8300
EMR Data Systems, Div. Sangamo- Weston, Box 3041, Sarasota, FL 33578 813-371-0811
§ Endevco, 30700 Rancho Viejo Rd., San Juan Capistrano, CA 92675 714-493-8181
ENI Power Sys., 3000 Winton Rd. S., Rochester, NY 14623 716-473-7330
Entran Devices, 10 Washington Ave., Fairfield, NJ 07006 201-227-1002
Farrand Controls, Div. of Farrand Industries, Inc., 99 Wall St., Valhalla, NY 10595 .... 914-RO1-2600
Fogg Sys., 15592 E. Batavia Dr., Aurora, CO 80011 303-344-1883
General Magnetics, 211 Grove St., Bloomfield, NJ 07003 201-743-2700
§† Gould Inc., Meas. Sys. Div., 2230 Statham Blvd., Oxnard, CA 93030 805-487-8511
Gould Inc., Recording Systems Div., 3631 Perkins Ave., Cleveland, OH 44114 216-361-3315
§ GSE, 23640 Research Dr., Farmington Hills, MI 48024 313-476-7875
Gulton Inds., Inc., Graphic Instruments Div., Gulton Ind'l. Pk., E. Greenwich, RI 02818 401-884-6800
† Hades Mfg. Corp., 151-A Verdi St., Farmingdale, NY 11735 516-249-4244
Harrel, Inc., 16 Fitch St., E. Norwalk, CT 06855 203-866-2573
† Helionetics, Inc., DECC Div., 17312 Eastman St., Irvine, CA 92714 .... 714-546-4731; 800-421-7915
§ Hobart Engrg., 4143 Cheshire Dr., Cypress, CA 90630 714-827-2135
Honeywell, Test Instrs. Div., P.O. Box 5227, Denver, CO 80217 303-773-4700
§ Hottinger Baldwin Measurements, 139 Newbury St., Framingham, MA 01701 617-875-8282
Hybrid Systems Corp., 22 Linnell Circle, Billerica, MA 01821 617-667-8700
Hy-Cal Engrg., 9650 Telstar Ave., El Monte, CA 91731 213-444-4000
§† Intech, Microcircuits Div., 2270 Martin Ave., Santa Clara, CA 95050 408-988-4930
ITHACO, Inc., Meas. & Control Instrs. Div., 735 W. Clinton St., P.O. Box 6437, Ithaca, NY 14851-6437 607-272-7640
† Kulite Semiconductor Prods., Inc., 1039 Hoyt Ave., Ridgefield, NJ 07657 201-945-3000
Larson Instr., Greenbush Rd., Orangeburg, NY 10962 914-359-3800
§† Linear Technology Corp., 1630 McCarthy Blvd., Milpitas, CA 95035 408-942-0810
§ Lion Precision, 60 Bridge St., Newton, MA 02195 617-969-4710
Marel Instr. Co., 907 South East 13th Pl., Cape Coral, FL 33904 813-574-8788
Measurements Group, Inc., Box 27777, Raleigh, NC 27611 919-365-3800
† Mel Tec, Div. Epsco, Inc., 411 Providence Hwy., Westwood, MA 02090 617-329-1508
§ Metrix Instrument Co., 1711 Townhurst, Houston, TX 77043 713-461-2131
Mini-Systems, Inc., 20 David Rd., North Attleboro, MA 02761 617-695-0203
Modular Devices, 50 Orville Dr., Bohemia, NY 11716 516-567-9620
† Natel Engrg. Co., Inc., 4550 Runway St., Simi Valley, CA 93063 805-581-3950
Neff Instr., 700 S. Myrtle Ave., Monrovia, CA 91016 818-357-2281
Norton Assocs., 10 Di Tomas Ct., Copiague, NY 11726 516-842-4666
† Omnitek, Inc., P.O. Box 102, 820 Pennsylvania Blvd., Feasterville, PA 19047 215-355-4443
Optoelectronics, Inc., 1309 Dynamic St., Petaluma, CA 94952 707-763-4181
Opto Technology, Inc., 1674 S. Wolf Rd., Wheeling, IL 60090 312-537-4277
Pacific Power Source Corp., 15122 Bolsa Chica St., Huntington Bch., CA 92649 .... 714-898-2691;800-854-2433
† Paine Instrs., 2401 S. Bayview St., Seattle, WA 98144 800-426-0366
Panametrics, 221 Cresent St., Waltham, MA 02254 617-899-2740
† PCB Piezotronics, 3425 Walden Ave., Depew, NY 14043-2495 716-684-0001
† Perry Amplifier, 138 Fuller St., Brookline, MA 02146 617-734-0844
Rochester Instr. Sys., 255 N. Union St., Rochester, NY 14605 716-263-7700
Schaevitz Engrg., U.S. 130, Union Ave., Pennsauken, NJ 08110 609-662-8000
Scientific Columbus, Inc., Esterline Corp., 1900 Arlingate La., Columbus, OH 43228 614-274-7160
Sensor Corp., Box 140, Scottdale, PA 15683 412-887-4080
Sensor Techn., 21012 Lassen St., Chatsworth, CA 91311 213-882-4100
Sensotec, Inc., 1200 Chesapeake Ave., Columbus, OH 43212 614-486-7723
Skan-A-Matic, Box S, Elbridge, NY 13060 315-689-3961
§ Spectra Sonics, 3750 Airport Rd., Ogden, UT 84403 801-392-7531
Stow Labs., Inc., Kane Ind'l. Dr., Hudson, MA 01749 617-562-9347
† Sundstrand Data Control, Overlake Ind'l. Pk., Redmond, WA 98052 206-885-3711
Tegam, 7230 N. Ridge Rd., Madison, OH 44057 216-428-7505
Tektronix, Inc., P. O. Box 500, Y3-314, Beaverton, OR 97077 .... 800-547-1512; Oregon only 800-452-1877
Teledyne/Geotech, 3401 Shiloh Rd., Garland, TX 75041 214-271-2561
§ Tennelec, 601 Turnpike, Oak Ridge, TN 37830 615-483-8405
Trans-Tek, P.O. Box 338, Rte. 83, Ellington, CT 06029 203-872-8351
Tri-Com, Inc., 7304 Grove Rd., Frederick, MD 21701 301-694-6666
Tri-Tronics Co. Inc., 13420 Wright Cir., Tampa, FL 33624 813-855-4453
Tustin Elctrns. Co., 1431 E. Saint Andrews Pl., Santa Ana, CA 92705 714-549-0391
Unholtz-Dickie Corp., 6 Brookside Dr., Wallingford, CT 06492 203-265-3929
United Detector Tech., 12525 Chadron Ave., Hawthorne, CA 90250 213-978-0516
United States Testing Co., Inc., 1415 Park Ave., Hoboken, NJ 07030 .... 800-631-3096; 201-792-2400
§ Vibra-Metrics, 1014 Sherman Ave., Hamden, CT 06514 .... 203-288-6158; 1-800-352-2001
Wilcoxon Resch., P.O. Box 5798, Bethesda, MD 20814 301-770-3790
§ Wilson, H. M., Co., 11501 Chimney Rock Rd., Houston, TX 77035 713-729-1183

Amplifiers, Travelling Wave Tube-1100

† MCL, Inc., 10 North Beach Ave., La Grange, IL 60525-2092, 312-354-4350 .... D•1408-1409
Aydin Corp., 700 Dresher Rd., Horsham, PA 19044 215-657-7510
ETM Electromatic, 470 San Antonio Ave., Palo Alto, CA 94306 415-494-1505
§† ITT Electron Tube, ITT Corp., Box 100, Easton, PA 18042 215-252-7331
† LogiMetrics, 121-03 Dupont St., Plainview, NY 11803 516-349-1700

Amplifiers, Ultrasonic-1100

† Analog Modules, Inc., 126 Baywood Avenue, Longwood, FL 32750, 305-339-4356/4355 .... D•1004
Tecron Industrial Prods., Crown Intl., Inc., 1718 W. Mishawaka Rd., Elkhart, IN 46517, 219-294-8300 .... D•1019-1020
Amplifier Research, 160 School House Rd., Souderton, PA 18964-9990 215-723-8181
CML MACARR Div., Marine Electric RPD, Inc., 666 Pacific St., Brooklyn, NY 11217 718-857-2400
† Control Elctrns. Co., Inc., 107-B Allen Blvd., Farmingdale, NY 11735 516-694-0125
§ Electronic Navigation Inds, Emerson Electric Co., 100 Highpower Road, Rochester, NY 14623 716-427-8300
ENI Power Sys., 3000 Winton Rd. S., Rochester, NY 14623 716-473-7330
Exact Electronics, Div. of Dynatech Nevada Inc., Box 1925, 2000 Arrowhead Dr., Carson City, NV 89701 .... 702-883-3400;800-648-7952
† Instruments, Inc., 7263 Engineer Rd., San Diego, CA 92111 619-571-1111
Instruments for Industry, Inc., 151 Toledo St., Farmingdale, NY 11735 516-694-1414
Krohn-Hite Corp., Avon Indl. Pk., Bodwell St., Avon, MA 02322 617-580-1660
§ Laboratory Products, Inc., 57 Cornwall St., P. O. Box 1750, Jamaica Plain, MA 02130 617-522-7800
Matec Instruments, Inc., 60 Metebello Rd., Warwick, RI 02886 401-739-9030
§ MVP Elctrns., 1161 N. Tustin, Orange, CA 92667 714-639-9246
Panametrics, 221 Cresent St., Waltham, MA 02254 617-899-2740
† Perry Amplifier, 138 Fuller St., Brookline, MA 02146 617-734-0844
Precision Filters, 240 Cherry St., Ithaca, NY 14850 607-277-3550
RF Power Labs, Inc., 21820 87th S. E., Woodinville, WA 98072 206-481-8833

Amplifiers, Video-1100

† Analog Modules, Inc., 126 Baywood Avenue, Longwood, FL 32750, 305-339-4356/4355 .... D•1004
§ MVP Elctrns., 1161 N. Tustin, Orange, CA 92667, 714-639-9246 .... D•1012
§ Opamp Labs, Inc., 1033 N. Sycamore Ave., Los Angeles, CA 90038, 213-934-3566 .... D•1014
Advanced Kinetics, 1231 Victoria St., Costa Mesa, CA 92627 714-646-7165
A E G Telefunken, Semiconductor Grp., Rte. 22, Somerville, NJ 08876 201-722-9800
† Aiken Advanced Sys., Amstar Technical Products Company, Inc., 5901 Edsall Rd., Alexandria, VA 22304-4197 703-370-0900
American Electronic Labs., Box 552, Lansdale, PA 19446 215-822-2929
American Elctrn. Labs., Inc., Govt. Grp. Div., P.O. Box 552, Lansdale, PA 19446
Amplifier Research, 160 School House Rd., Souderton, PA 18964-9990 215-723-8181
† Analog Systems, P.O. Box 35879, Tucson, AZ 85740-5879 602-293-4923
† Apex Microtechnology Corp., 2895 W. Rudasil Road, Tucson, AZ 85741 602-746-0849
Astro-Geo-Marine, Inc., 202 E. Cota St., Santa Barbara, CA 93101 805-965-7005
ATV Research, Inc., 1301 Broadway, Dakota City, NE 68731 402-987-3771
† Avantek, Inc., 3175 Bowers Ave., Santa Clara, CA 95054 408-496-6710
† Aydin Vector Div., Box 328, Newtown, PA 18940 215-968-4271
Ballantine Labs., 90 Fanny Rd., Boonton, NJ 07005 201-335-0900
Burr-Brown Corp., P.O. Box 11400, Tucson, AZ 85734 602-746-1111
C-COR Elctrns., 60 Decibel Rd., State College, PA 16801 814-238-2461
† CELCO, 70 Constantine Dr., Mahwah, NJ 07430 201-327-1123
† Comlinear Corp., 2468 E. 9th St., Loveland, CO 80537 303-669-9433
Dantel, 2991 N. Argyle Ave., Fresno, CA 93727 209-292-1111
Data Ray Corp., 452 Burbank Street, Broomfield, CO 80020 303-469-5173
Datel, General Electric Co., 11 Cabot Blvd., Mansfield, MA 02048 617-339-9341
Dymec, 8 Lowell Ave., Winchester, MA 01890 617-729-7870
§† Elantec, Inc., 1996 Tarob Ct., Milpitas, CA 95035 .... 408-945-1323;800-821-7429
§ Electronic Navigation Inds, Emerson Electric Co., 100 Highpower Road, Rochester, NY 14623 716-427-8300
† Environmental Comm., 3150 Pullman St., Costa Mesa, CA 92627 714-557-7800
§† Fairchild Camera & Instr. Corp., Linear Div., 313 Fairchild Dr., Mountain View, CA 94139 415-962-4011
† Foundation Instruments Inc., 24 Colonnade Rd., Nepean, ON, CANADA K2E 7J6 613-226-4000
Frequency Elctrns., 55 Charles Lindbergh Blvd., Mitchel Field, NY 11553 516-794-4500
HDS Inc., 12310 Pinecrest Rd., Reston, VA 22091 703-620-6200
Image Technology Methods Corp., 103 Moody St., Waltham, MA 02154 617-894-1720
Infodex, Inc., 395 W. Main St., Waterbury, CT 06702 203-757-9291
Instruments for Industry, Inc., 151 Toledo St., Farmingdale, NY 11735 516-694-1414
International Crystal Mfg., 10 N. Lee, P.O. Box 26330, Oklahoma City, OK 73126 405-236-3741
† M.S. Kennedy Corp., Sub of Hybrilonics, Inc., 8170 Thompson Rd., Clay, NY 13041 315-699-9201
§ Laboratory Products, Inc., 57 Cornwall St., P. O. Box 1750, Jamaica Plain, MA 02130 617-522-7800
§ Lenco Elctrns., Inc., 300 N. Maryland St., Jackson, MO 63755 314-243-3147
† Lorch Elctrns., 105 Cedar La., Englewood, NJ 07631 201-569-8282
Magnum Opus Custom Elctrn. Engrg., 284 Kennedy St., Iselin, NJ 08830 201-283-4925
† Mel Tec, Div. Epsco, Inc., 411 Providence Hwy., Westwood, MA 02090 617-329-1508

† MERET, Inc., 1815 24th St., Santa Monica, CA 90404-4998 213-828-7496
MICRA Corp., 120 Ricefield Lane, Hauppauge, NY 11788 516-231-8600
Microphase, 587 Connecticut Ave., Norwalk, CT 06856 203-866-8000
Modular Audio Prods., Modular Devices Inc., 50 Orville Dr., Bohemia, NY 11716 516-567-9620
§ New-Tone Electronics, Inc., 44 Farrand St., Bloomfield, NJ 07003 201-748-5089
Nuclear Resch. Corp., 125 Titus Ave., Warrington, PA 18976 215-343-5900
Optical Electronics, Inc., Box 11140, Tucson, AZ 85734 602-624-8358
Pacific Instrs. Inc., 215 Mason Circle, Concord, CA 94518 415-827-9010
† Perry Amplifier, 138 Fuller St., Brookline, MA 02146 617-734-0844
§ Philmore Mfg., 40 Inip Dr., Inwood, NY 11696 516-239-6161
§† Plessey Semiconductors, 1641 Kaiser Ave., Irvine, CA 92714 714-540-9979
§† RCA Solid State Div., Route 202, Somerville, NJ 08876 201-685-6000
§† RCA Solid State Div., Linear Integrated Circuits, Rte. 202, Somerville, NJ 08876 201-685-6000
RF Power Labs, Inc., 21820 87th S. E., Woodinville, WA 98072 206-481-8833
RHG Electronics Lab., Inc., 161 E. Industry Ct., Deer Park, NY 11729 516-242-1100
RIL Elctrns., Inc., 125 Titus Ave., P.O. Box H, Warrington, PA 18976 .... 215-EL5-1361
† Scientific Communications, Inc., 3425 Kingsley Rd., Garland, TX 75041 214-271-3685
SGS Semiconductor Corporation, 1000 E. Bell Road, Phoenix, AZ 85022 602-867-6100
§ Shokai Far East, Ltd., 280 North Central Ave., Hartsdale, NY 10530 914-681-0700
§† Silicon General, 11861 Western Ave., Garden Grove, CA 92641 714-898-8121
§† Sprague Electric Company, Distribution Division, 481 Marshall St., No. Adams, MA 01247 413-664-4481
Telemet, 185 Dixon Ave., Amityville, NY 11701 516-842-2300
§ Television Equip. Assocs., Box 393, So. Salem, NY 10590-0393 914-763-8893
§ Television Microtime, Inc., 1280 Blue Hills Ave., Bloomfield, CT 06002 203-242-4242
† Third Domain, P.O. Box 35400, Tucson, AZ 85740-5400 602-293-6310
† TRAK Microwave Corp., 4726 Eisenhower Blvd., Dept. E5, Tampa, FL 33614 813-884-1411
Vicon Industries, Inc., 525 Broad Hollow Rd., Melville, NY 11747 516-293-2200
Video Automation Systems, Upper Shad Rd., Pound Ridge, NY 10576 914-764-4613
† Watkins-Johnson Co., 3333 Hillview Ave., Palo Alto, CA 94304 415-493-4141

Amplifiers, Voltage Reference-1100

† Analog Devices, P.O. Box 280, Norwood, MA 02062 617-329-4700
Analogic Corp., Data Conversion Prods. Grp., Audubon Rd., Wakefield, MA 01880 617-246-0300
Behlman Div., California Instrs., Div. of Norlin Inds., 5150 Convoy St., San Diego, CA 92111 619-279-8620
Burr-Brown Corp., P.O. Box 11400, Tucson, AZ 85734 602-746-1111
§ Control Prods., Devar, Inc., P.O. Box 589, Bridgeport, CT 06601 203-368-6751
Dymec, 8 Lowell Ave., Winchester, MA 01890 617-729-7870
§ Dynamics, Div. of Waugh Controls Corp., 9001 Fullbright Ave., Chatsworth, CA 91311 818-998-8281
Electronic Dev. Corp., 11 Hamlin St., Boston, MA 02127-4198 617-268-9696
Elin Div., California Instrs. Co., Div. of Norlin Ind., 5150 Convoy St., San Diego, CA 92111 619-279-8620
General Magnetics, 211 Grove St., Bloomfield, NJ 07003 201-743-2700
Industrial Test Equip., 21 Yennicock Ave., Port Washington, NY 11050 516-883-1700
IXYS Corp., 142 Charcot Ave., San Jose, CA 95131 408-262-8800
Julie Resch. Labs., 211 West 61st St., New York, NY 10023 212-245-2727
Koep Precision Standards, Inc., P. O. Box 191, So. Plainfield, NJ 07080 201-549-9280
§† Linear Technology Corp., 1630 McCarthy Blvd., Milpitas, CA 95035 408-942-0810
† Mel Tec, Div. Epsco, Inc., 411 Providence Hwy., Westwood, MA 02090 617-329-1508
MICRA Corp., 120 Ricefield Lane, Hauppauge, NY 11788 516-231-8600
† Micro Networks, 324 Clark St., Worcester, MA 01606 617-852-5400
Mini-Systems, Inc., 20 David Rd., North Attleboro, MA 02761 617-695-0203
Neff Instr., 700 S. Myrtle Ave., Monrovia, CA 91016 818-357-2281
§† Precision Monolithics, Inc., 1500 Space Dr., Santa Clara, CA 95054 408-727-9222
Rochester Instr. Sys., 255 N. Union St., Rochester, NY 14605 716-263-7700
SGS Semiconductor Corporation, 1000 E. Bell Road, Phoenix, AZ 85022 602-867-6100
§ THORN EMI Gencom Inc., 23 Madison Rd., Fairfield, NJ 07006 201-575-5586

Amplifiers, Wideband-1100

Amplifier Research, 160 School House Rd., Souderton, PA 18964-9990, 215-723-8181 .... D◦1002-1003
† Analog Modules, Inc., 126 Baywood Avenue, Longwood, FL 32750, 305-339-4356/4355 .... D◦1004
Ectron Corp., 8159 Engineer Rd., San Diego, CA 92111, 619-278-0600 .... D◦1007
Instruments for Industry, Inc., 151 Toledo St., Farmingdale, NY 11735, 516-694-1414 .... D◦1010
Intech, Microcircuits Div., 2270 Martin Ave., Santa Clara, CA 95050, 408-988-4930 .... A◦1672
Krohn-Hite Corp., Avon Indl. Pk., Bodwell St., Avon, MA 02322, 617-580-1660 .... D◦1259
† Mini-Circuits Lab., 2625 E. 14th St., P.O. Box 166, Brooklyn, NY 11235, 718-934-4500 .... A◦1719-1720,1762-1767
§ MVP Elctrns., 1161 N. Tustin, Orange, CA 92667, 714-639-9246 .... D◦1012
North Hills Elctrns., 1 Alexander Pl., Glen Cove, NY 11542, 516-671-5700 .... A◦1780
§† Ross Engrg. Corp., 540 Westchester Dr., Campbell, CA 95008, 408-377-4621 .... B◦1443
† Adams-Russell, Anzac Div., 80 Cambridge St., Burlington, MA 01803 671-273-3333
Advanced Kinetics, 1231 Victoria St., Costa Mesa, CA 92627 714-646-7165
AERCOM, 405 Tasman Dr., Sunnyvale, CA 94086 408-744-1320
† Aiken Advanced Sys., Amstar Technical Products Company, Inc., 5901 Edsall Rd., Alexandria, VA 22304-4197 703-370-0900
† Alpha Inds., Inc.-Microelectronic Div., 2800 Crystal Drive, Hatfield, PA 19440 215-822-1311
Alpha Inds., Inc.-MSD Div., 20 Sylvan Rd., Woburn, MA 01801 617-935-5150
American Electronic Labs., Box 552, Lansdale, PA 19446 215-822-2929
† Amplifonix Inc., 220 Rte. 13, Bristol, PA 19007 215-788-2350
† Analog Devices, P.O. Box 280, Norwood, MA 02062 617-329-4700
† Analog Systems, P.O. Box 35879, Tucson, AZ 85740-5879 602-293-4923
† Andrich Sys., Inc., 1699 Roosevelt Ave., Bohemia, NY 11716 516-589-5656
† Apex Microtechnology Corp., 2895 W. Rudasil Road, Tucson, AZ 85741 602-746-0849
§ ATV Research, Inc., 1301 Broadway, Dakota City, NE 68731 402-987-3771
† Avantek, Inc., 3175 Bowers Ave., Santa Clara, CA 95054 408-496-6710
§ Aydin Microwave, 75 East Trimble Rd., San Jose, CA 95131 408-946-5600
† Aydin Vector Div., Box 328, Newtown, PA 18940 215-968-4271
Ballantine Labs., 90 Fanny Rd., Boonton, NJ 07005 201-335-0900
Burr-Brown Corp., P.O. Box 11400, Tucson, AZ 85734 602-746-1111
§ C-COR Elctrns., 60 Decibel Rd., State College, PA 16801 814-238-2461
† CELCO, 70 Constantine Dr., Mahwah, NJ 07430 201-327-1123
† CML MACARR Div., Marine Electric RPD, Inc., 666 Pacific St., Brooklyn, NY 11217 718-857-2400
† Comlinear Corp., 2468 E. 9th St., Loveland, CO 80537 303-669-9433
Compliance Design Inc., 593 Massachusetts Ave., Boxboro, MA 01719 617-264-4668
Continental Electronics Mfg. Co., P.O. Box 270879, Dallas, TX 75227 214-381-7161
Dantel, 2991 N. Argyle Ave., Fresno, CA 93727 209-292-1111
§ Data-Design Labs., P.O. Box 711, 7925 Center Ave., Cucamonga, CA 91730 714-987-2511
† Datel, General Electric Co., 11 Cabot Blvd., Mansfield, MA 02048 617-339-9341
† Dexcel, Div. of Gould, 2285C Martin Ave., Santa Clara, CA 95050 408-727-9833
Dymec, 8 Lowell Ave., Winchester, MA 01890 617-729-7870
§ Dynamics, Div. of Waugh Controls Corp., 9001 Fullbright Ave., Chatsworth, CA 91311 818-998-8281
§ Electronic Navigation Inds, Emerson Electric Co., 100 Highpower Road, Rochester, NY 14623 716-427-8300
† Environmental Comm., 3150 Pullman St., Costa Mesa, CA 92627 714-557-7800
Erbtec Engineering, Inc., 5680 Valmont Rd., Boulder, CO 80301 303-447-8750
Evans Electronics, Box 5055, Berkeley, CA 94705 415-653-3083
Granger Assocs., 3101 Scott Blvd., Santa Clara, CA 95051 408-727-3101
§† Harris Corp., PRD Elctrns. Div., 6801 Jericho Tpke., Syosset, NY 11791 516-364-0400
Hughes Aircraft Co., Electron Dynamics Div., 3100 W. Lomita Blvd., P.O. Box 2999, Torrance, CA 90509-2999 213-517-6000
† Instruments, Inc., 7263 Engineer Rd., San Diego, CA 92111 619-571-1111
Intronics, Inc., 57 Chapel St., Newton, MA 02158 617-964-4000
† Keltec Florida, P.O. Box 2917, Ft. Walton Bch., FL 32549 904-651-9749
† M.S. Kennedy Corp., Sub of Hybrilonics, Inc., 8170 Thompson Rd., Clay, NY 13041 315-699-9201
§ Laboratory Products, Inc., 57 Cornwall St., P. O. Box 1750, Jamaica Plain, MA 02130 617-522-7800
LeCroy Resch. Sys. Corp., 700 S. Main St., Spring Vly., NY 10977 914-425-2000
LeCroy Resch. Sys. Corp. (Cal.), 1806 Embarcadero Rd., Palo Alto, CA 94303 415-856-1800
† Locus, Box 740, State College, PA 16804 814-466-6275
† LogiMetrics, 121-03 Dupont St., Plainview, NY 11803 516-349-1700
† Lorch Elctrns., 105 Cedar La., Englewood, NJ 07631 201-569-8282
† M/A-COM Microwave Power Dvcs., 330 Oser Ave., Hauppauge, NY 11788 516-231-1400
Matec Instruments, Inc., 60 Metebello Rd., Warwick, RI 02886 401-739-9030
MCL, Inc., 10 North Beach Ave., La Grange, IL 60525-2092 312-354-4350
† Mel Tec, Div. Epsco, Inc., 411 Providence Hwy., Westwood, MA 02090 617-329-1508
MICRA Corp., 120 Ricefield Lane, Hauppauge, NY 11788 516-231-8600
§ Microwave Semiconductor Corp., 100 School House Rd., Somerset, NJ 08873 201-469-3311
§† MITEQ Inc., 125 Ricefield Lane, Hauppauge, NY 11788 516-543-8873
Mu-Del Electronics, Inc., 2426 Linden Lane, Silver Spring, MD 20910-1288 301-587-6087
Neff Instr., 700 S. Myrtle Ave., Monrovia, CA 91016 818-357-2281
† NSD, 10936 Portal Dr., Los Alamitos, CA 90720 714-527-4896
Optical Electronics, Inc., Box 11140, Tucson, AZ 85734 602-624-8358
Pacific Instrs. Inc., 215 Mason Circle, Concord, CA 94518 415-827-9010
Peca, Inc., 592 Winks Lane, Bensalem, PA 19020 215-245-1550
† Perry Amplifier, 138 Fuller St., Brookline, MA 02146 617-734-0844
§† Plessey Semiconductors, 1641 Kaiser Ave., Irvine, CA 92714 714-540-9979
Precision Filters, 240 Cherry St., Ithaca, NY 14850 607-277-3550
§ Preston Scientific, 805 E. Cerritos Ave., Anaheim, CA 92805 714-776-6400
RCA Solid State Div., Route 202, Somerville, NJ 08876 201-685-6000
RCA Solid State Div., Linear Integrated Circuits, Rte. 202, Somerville, NJ 08876 201-685-6000
Resdel Engrg., 300 E. Live Oak Ave., Arcadia, CA 91006 213-684-2600
RF Power Labs, Inc., 21820 87th S. E., Woodinville, WA 98072 206-481-8833
† RHG Electronics Lab., Inc., 161 E. Industry Ct., Deer Park, NY 11729 516-242-1100
§† Silicon General, 11861 Western Ave., Garden Grove, CA 92641 714-898-8121
§ Spectra Sonics, 3750 Airport Rd., Ogden, UT 84403 801-392-7531
Sylvania Electronic Components, Philips ECG Inc., A North American Philips Co., 100 First Ave., Waltham, MA 02254 617-890-6107
Tecron Industrial Prods., Crown Intl., Inc., 1718 W. Mishawaka Rd., Elkhart, IN 46517 219-294-8300
Tegam, 7230 N. Ridge Rd., Madison, OH 44057 216-428-7505
§ Ten-Tec, Inc., Industrial Park, Sevierville, TN 37862 615-453-7172
† TRAK Microwave Corp., 4726 Eisenhower Blvd., Dept. E5, Tampa, FL 33614 813-884-1411
† TRW Microwave, 825 Stewart Dr., Sunnyvale, CA 94086 408-732-0880
† Watkins-Johnson Co., 3333 Hillview Ave., Palo Alto, CA 94304 415-493-4141
Western Multiplex Corp., 1320 Bayport Avenue, San Carlos, CA 94070 415-592-8832
Wide Band Engrg. Co., Inc., Box 21652, Phoenix, AZ 85036 602-254-1570

Analyzers, AF-2900

Krohn-Hite Corp., Avon Indl. Pk., Bodwell St., Avon, MA 02322, 617-580-1660 .... D◦1258
RE Instruments Corp., 31029 Center Ridge Rd., Westlake, OH 44145, 216-871-7617 .... D◦1295

Amber Electro Design Inc., 4810 Jean Talon Blvd. W Ste 321, Montreal, Quebec, CANADA H4P2N5 514-735-4105
Antenna Specialists, 12435 Euclid Ave., Cleveland, OH 44106 216-791-7878
A. P. Circuit Corp., 513 East 86th St., P.O. Box 1350, New York, NY 10028 212-737-1348
Continental Resources, Inc., 175 Middlesex Tpke., Bedford, MA 01730 .. 617-275-0850
Electro-Dynamics Dev. Co., 475 Mt. Hood Dr. S.W., Issaquah, WA 98027 206-392-2493
§† Electro-Metrics, Penril Corp., 100 Church St., Amsterdam, NY 12010 518-843-2600
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
Kay Elemetrics Corp., 12 Maple Ave., Pine Brook, NJ 07058-9797 201-227-2000
§ Leader Instrs. Corp., 380 Oser Ave., Hauppauge, NY 11788-3694 516-231-6900
MARCONI INSTRUMENTS, 3 Pearl Court, Allendale, NJ 07401 201-934-9050
Metrosonics, Inc., Box 23075, Rochester, NY 14692-3075 716-334-7300
§ REI Sls., 19525 Business Centre Dr., Northridge, CA 91324 617-938-0900
RF Power Labs, Inc., 21820 87th S. E., Woodinville, WA 98072 206-481-8833
Spectral Dynamics Div., Scientific-Atlanta, Box 671, San Diego, CA 92112 619-268-7100
† Vibration Instrs. Co., 1614 Orangethorpe Way, Anaheim, CA 92801 714-879-6085
Voice Identification, Box 714, Somerville, NJ 08876 201-526-3408
Wavetek Rockland Sci., 245 Livingston St., Northvale, NJ 07647 201-767-7100
† Wavetek Rockland Scientific, Inc., 10 Volvo Dr., Rockleigh Indl. Pk., Rockleigh, NJ 07647 201-767-7900

Analyzers, Air Pollution-2550

Monitor Labs, Inc., 10180 Scripps Ranch Blvd., San Diego, CA 92131 ... 619-578-5060

Analyzers, Antenna Pattern-2900

† Gorman-Redlich Mfg. Co., 6 Curtis St., Athens, OH 45701 614-593-3150
Interface Engrg., 386 Lindelof Ave., Stoughton, MA 02072 617-344-7383
† Microwave/Sys., 1 Adler Dr., E. Syracuse, NY 13057 315-437-9951
† Polarad Elctrns., Inc., 5 Delaware Dr., Lake Success, NY 11042 516-328-1100
Scientific-Atlanta, Inc., P.O. Box 105600, Atlanta, GA 30348 404-441-4000

Analyzers, Dielectric Constant-2900

Forte Technology, Inc., 201 Carnegie Row, Norwood, MA 02062 617-769-9150

Analyzers, Differential – See Analyzers, Phase & Voltage (Vol. D)

Analyzers, Digital Signal-2900

§ AQ Sys., 1736 Front St., Yorktown Hgts., NY 10598 800-431-2104
Atlantic Research, 5390 Cherokee Ave., Alexandria, VA 22312 703-642-4000
§† Digitech Industries, Inc., 66 Grove St., Ridgefield, CT 06877 203-438-3731
Digitus Corporation, 22 West 25th Street, Baltimore, MD 21218 301-467-3223
Epicom, Inc., 411 Josiane Court, Altamonte Springs, FL 32701 305-331-1640
Extech International Corp., 150 Bear Hill Rd., Waltham, MA 02154 617-890-7440
Genstar Rental Elctrns., 2445 Faber Pl., Palo Alto, CA 94303 415-856-7600
§ GMR Co., 8801 Sepulveda Blvd., Los Angeles, CA 90045 213-216-9516
INTERFACE TECH. DYNATECH, 150 East Arrow Highway, San Dimas, CA 91773 714-592-2971
† Litton Applied Technology, 645 Almanor Ave., P.O. Box 3478, Sunnyvale, CA 94088-3478 408-773-0777
MARCONI INSTRUMENTS, 3 Pearl Court, Allendale, NJ 07401 201-934-9050
Mathematical Systems Design, Inc., 2850 Ocean Park Blvd., Ste. 300, Santa Monica, CA 90405 213-450-9851
Practical Technology, 12 Village Ctr., Box 449, Carmel Valley, CA 93924 408-659-3128
† Racal-Dana Instrs. Inc., 4 Goodyear St., Irvine, CA 92715 714-859-8999
Scientific-Atlanta, Inc., P.O. Box 105600, Atlanta, GA 30348 404-441-4000
Spectral Dynamics, Scientific-Atlanta, Inc., 4255 Ruffin Rd., San Diego, CA 92123-0575 619-268-7100
Solartron Instruments, Sangamo Weston, Inc., 2 Westchester Plaza, Elmsford, NY 10523 914-592-9168
Spectral Dynamics Div., Scientific-Atlanta, Box 671, San Diego, CA 92112 619-268-7100
Tau-Tron, Inc., A Unit of General Signal, 10 Lyberty Way, Westford, MA 01886 617-692-5100
Wavetek Rockland Sci., 245 Livingston St., Northvale, NJ 07647 201-767-7100

Analyzers, Distortion – See Analyzers, AF (Vol. D)

Analyzers, Disturbance (Power, Volt, Humidity, Temperature)-2900

Bermar Corp., P.O. Box 12844, Research Triangle Park, NC 27709 919-489-4316
§ Pacer Industries, Inc., 1450 First Ave., Chippewa Falls, WI 54729 715-723-1141
§ Power-Science, 7667 Vickers St., San Diego, CA 92111 619-292-4322

Analyzers, Frequency – See Analyzers, Spectrum (Vol. D)

Analyzers, Frequency Stability – See Meters, Frequency Deviation (Vol. D)

Analyzers, Harmonic-2900

Amber Electro Design Inc., 4810 Jean Talon Blvd. W Ste 321, Montreal, Quebec, CANADA H4P2N5 514-735-4105
A. P. Circuit Corp., 513 East 86th St., P.O. Box 1350, New York, NY 10028 212-737-1348
Applied Sys., 26401 Harper Ave., St. Clair Shores, MI 48081 313-779-8700
Bruel & Kjaer Instrs. Inc., 185 Forest St., Marlboro, MA 01752 617-481-7000
† Cushman Elctrns., 2450 N. 1st St., San Jose, CA 95131 408-263-8100
Data Check Corp., 10070 Willow Creek Rd., San Diego, CA 92131 619-578-0101
† Dranetz Technologies, Inc, Computer Products Division, 1000 New Durham Rd., P.O. Box 4019, Edison, NJ 08818-4019 201-287-3680
Dranetz Technologies, Inc., General Instrument Division, 1000 New Durham Rd., P.O. Box 4019, Edison, NJ 08818-4019 201-287-3680
§ Electro-Metrics, Penril Corp., 100 Church St., Amsterdam, NY 12010 518-843-2600
§ Heath Co., Benton Harbor, MI 49022 616-982-3886
Krohn-Hite Corp., Avon Indl. Pk., Bodwell St., Avon, MA 02322 617-580-1660
§ Leader Instrs. Corp., 380 Oser Ave., Hauppauge, NY 11788-3694 516-231-6900
MARCONI INSTRUMENTS, 3 Pearl Court, Allendale, NJ 07401 201-934-9050
† Microwave/Sys., 1 Adler Dr., E. Syracuse, NY 13057 315-437-9951
§ Pacer Industries, Inc., 1450 First Ave., Chippewa Falls, WI 54729 715-723-1141
† Polarad Elctrns., Inc., 5 Delaware Dr., Lake Success, NY 11042 516-328-1100
RE Instruments Corp., 31029 Center Ridge Rd., Westlake, OH 44145 ... 216-871-7617
Spectral Dynamics Div., Scientific-Atlanta, Box 671, San Diego, CA 92112 619-268-7100
§ Tucker Elctrns., Box 461966, Garland, TX 75046 .... 214-348-8800;800-527-4642
† Vibration Instrs. Co., 1614 Orangethorpe Way, Anaheim, CA 92801 714-879-6085
† Wavetek Rockland Scientific, Inc., 10 Volvo Dr., Rockleigh Indl. Pk., Rockleigh, NJ 07647 201-767-7900

Analyzers, Impedance-2900

Bruel & Kjaer Instrs. Inc., 185 Forest St., Marlboro, MA 01752 617-481-7000
Electro-Dynamics Dev. Co., 475 Mt. Hood Dr. S.W., Issaquah, WA 98027 206-392-2493
Electro Scientific Inds., 13900 N.W. Science Pk. Dr., Portland, OR 97229 503-641-4141
† Narda Microwave Corp., 435 Moreland Rd., Hauppauge, NY 11788 516-231-1700
Solartron Instruments, Sangamo Weston, Inc., 2 Westchester Plaza, Elmsford, NY 10523 914-592-9168
Venable Industries, Inc., 3555 Lomita Blvd., Torrance, CA 90505 213-539-2522

Analyzers, Interference-2900

† Brady Co., 574A Somerset St., N. Plainfield, NJ 07060 201-753-7988
† Electro-Mechanics Co., Box 1546, Austin, TX 78767 512-835-4684
§† Electro-Metrics, Penril Corp., 100 Church St., Amsterdam, NY 12010 518-843-2600
Instruments for Industry, Inc., 151 Toledo St., Farmingdale, NY 11735 ... 516-694-1414
† Polarad Elctrns., Inc., 5 Delaware Dr., Lake Success, NY 11042 516-328-1100
Schaffner EMC, Inc., Instr. Div., 825 Lehigh Avenue, Union, NJ 07083 201-851-0644
Sprague Elec. Co., 481 Marshall St., No. Adams, MA 01247 413-664-4411
§ Tucker Elctrns., Box 461966, Garland, TX 75046 .... 214-348-8800;800-527-4642

Analyzers, Intermodulation-2900

Amber Electro Design Inc., 4810 Jean Talon Blvd. W Ste 321, Montreal, Quebec, CANADA H4P2N5 514-735-4105
Antenna Specialists, 12435 Euclid Ave., Cleveland, OH 44106 216-791-7878
Bruel & Kjaer Instrs. Inc., 185 Forest St., Marlboro, MA 01752 617-481-7000
† Cushman Elctrns., 2450 N. 1st St., San Jose, CA 95131 408-263-8100
§ Heath Co., Benton Harbor, MI 49022 616-982-3886
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
MARCONI INSTRUMENTS, 3 Pearl Court, Allendale, NJ 07401 201-934-9050
† Polarad Elctrns., Inc., 5 Delaware Dr., Lake Success, NY 11042 516-328-1100

Analyzers, Logic-2900

§ Gould Inc., Design & Test Sys. Div., 4650 Old Ironsides Dr., Santa Clara, CA 95054-1279, 408-988-6800 .... D•1237
§ North American Soar Corp., 11126 Cornell Ave., Cherry Hill, NJ 08002, 609-488-1060 .... D•1267
§ Advanced Digital Tech, 13400 Northrup Wy Ste 27, Bellevue, WA 98005 206-643-2382
§ AQ Sys., 1736 Front St., Yorktown Hgts., NY 10598 800-431-2104
§ CmC Instr. Div., Connecticut microComputer Inc., 568 Danbury Road, New Milford, CT 06776 203-354-9395
§ Computer System Assocs., 7564 Trade St., San Diego, CA 92121 619-566-3911
Dolch Logic Instrs., 2029 O'Toole Avenue, San Jose, CA 95131 408-945-1881
§ E & L Instruments, Inc., 61 First St., Derby, CT 06418 203-735-8774
Genstar Rental Elctrns., 2445 Faber Pl., Palo Alto, CA 94303 415-856-7600
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
Hilevel Tech., Inc., 18902 Bardeen Way, Irvine, CA 92715 714-752-5215
Information Technolgoy A.D.S.C., P.O. Box 470, College Park, MD 20740 301-779-5110
§† Intech, Instruments Div., 282 Brokaw Rd., Santa Clara, CA 95050 408-727-0500
† Iwatsu Instruments, Inc., 430 Commerce Blvd., Carlstadt, NJ 07072 201-935-5220
§ Kontron Elctrns., 1230 Charleston Rd., Mountain View, CA 94039-7230 415-965-7020
† Metier Management Sys., Inc., 5884 Point West Dr., Houston, TX 77036 713-988-9100
Montek Microsystems, P.O. Box 1845, Huntsville, AL 35807 205-723-2927
§† Nicolet Paratronics, 201 Fourier Ave., Fremont, CA 94539 415-490-8300
Philips Test & Measuring Instrs., 85 McKee Dr., Mahwah, NJ 07430 201-529-3800
Practical Technology, 12 Village Ctr., Box 449, Carmel Valley, CA 93924 408-659-3128
§ PrimeLine-Soltec Distbn., Soltec Corp., P.O. Box 818, Sun Valley, CA 91353-0818 .... 800-525-5554;818-764-5400
Pro-Log, 2411 Garden Rd., Monterey, CA 93940 408-372-4593
† Racal-Dana Instrs. Inc., 4 Goodyear St., Irvine, CA 92715 714-859-8999
† Sensor Electronics, Inc., 105 Fairway Terrace, Mt. Laurel, NJ 08054 609-778-0850
Step Engineering, P.O. Box 61166, Sunnyvale, CA 94088 408-733-7837
§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 215-673-5600
Tektronix, Inc., P. O. Box 500, Y3-314, Beaverton, OR 97077 ..... 800-547-1512;Oregon only 800-452-1877
§ Tucker Elctrns., Box 461966, Garland, TX 75046 .... 214-348-8800;800-527-4642
Ziatech, 3433 Roberto Ct., San Luis Obispo, CA 93401 805-541-0488

Analyzers, Magnetic-2900

§ Bell, F. W., Inc., 6120 Hanging Moss Rd., Orlando, FL 32807, 305-678-6900 .... D•1977
LDJ Incorporated, 2200 Stephenson Hwy., P.O. Box 219, Troy, MI 48099-0219, 313-528-2202 .... D•1260
Elma Engrg., 1066 E. Meadow Circle, Palo Alto, CA 94303 415-494-7303
High Voltage Engrg. Corp., S. Bedford St., Burlington, MA 01803 617-272-1313
† Industrial Control Co., 3100 Pineda Ave., Rockledge, FL 32955 305-259-7105

RFL Inds., A Dowty Grp. Co./Instr. Div., Powerville Rd., Boonton, NJ 07005 ... 201-334-3100
Sensor Corp., Box 140, Scottdale, PA 15683 ... 412-887-4080
Varian Assocs., Indl. Equip. Grp., 611 Hansen Way, Palo Alto, CA 94303 ... 415-493-4000
Walker Scientific, Rockdale St., Worcester, MA 01606 ... 617-852-3674

Analyzers, Microwave-3400

MARCONI INSTRUMENTS, 3 Pearl Court, Allendale, NJ 07401, 201-934-9050 ... D•1263
Continental Resources, Inc., 175 Middlesex Tpke., Bedford, MA 01730 .. 617-275-0850
§ Eaton Corp., Elctrn. Instrmn. Div., 5340 Alla Rd., Los Angeles, CA 90066
§† Electro-Metrics, Penril Corp., 100 Church St., Amsterdam, NY 12010 518-843-2600
† General Microwave Corp., 155 Marine St., Farmingdale, NY 11735 ... 516-694-3600
Genstar Rental Elctrns., 2445 Faber Pl., Palo Alto, CA 94303 ... 415-856-7600
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
Narda Microwave Corp., 435 Moreland Rd., Hauppauge, NY 11788 ... 516-231-1700
§ Pacific Meas., Inc., 488 Tasman Drive, Sunnyvale, CA 94086 ... 408-734-5780
† Polarad Elctrns., Inc., 5 Delaware Dr., Lake Success, NY 11042 ... 516-328-1100
Power Sys. Grp., Rantec Div., Emerson Elec., 9401 Oso Ave., Chatsworth, CA 91311 ... 818-885-8223
† Raytheon Co., Microwave & Power Tube Div., 190 Willow St., Waltham, MA 02154 ... 617-899-8400
Rockwell Intl., Commercial Elctrns. Opers., 1200 N. Alma Rd., Richardson, TX 75081 ... 214-996-5000
Texscan Instruments, 3169 N. Shadeland, Indianapolis, IN 46226 ... 317-545-4196
§ Tucker Elctrns., Box 461966, Garland, TX 75046 ... 214-348-8800;800-527-4642
Wavetek Corporation, 9191 Towne Centre Drive, San Diego, CA 92122 ... 619-450-9971

Analyzers, Modulation-2900

Polarad Elctrns., Inc., 5 Delaware Dr., Lake Success, NY 11042 ... 516-328-1100

Analyzers, Network-2900

Atlantic Research, 5390 Cherokee Ave., Alexandria, VA 22312 ... 703-642-4000
Continental Resources, Inc., 175 Middlesex Tpke., Bedford, MA 01730 .. 617-275-0850
§† Digitech Industries, Inc., 66 Grove St., Ridgefield, CT 06877 ... 203-438-3731
† Dranetz Technologies, Inc, Computer Products Division, 1000 New Durham Rd., P.O. Box 4019, Edison, NJ 08818-4019 ... 201-287-3680
Dranetz Technologies, Inc., General Instrument Division, 1000 New Durham Rd., P.O. Box 4019, Edison, NJ 08818-4019 ... 201-287-3680
§ Electro Standards Lab., Inc., P.O. Box 9144, Providence, RI 02940 ... 401-943-1164
Genstar Rental Elctrns., 2445 Faber Pl., Palo Alto, CA 94303 ... 415-856-7600
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
§ International Data Sciences, 7 Wellington Rd., Lincoln, RI 02865 ... 401-333-6200
† Metier Management Sys., Inc., 5884 Point West Dr., Houston, TX 77036 ... 713-988-9100
Narda Microwave Corp., 435 Moreland Rd., Hauppauge, NY 11788 ... 516-231-1700
OK Industries, Inc., 3455 Conner St., Bronx, NY 10475 ... 212-994-6600
§ Pacific Meas., Inc., 488 Tasman Drive, Sunnyvale, CA 94086 ... 408-734-5780
† Polarad Elctrns., Inc., 5 Delaware Dr., Lake Success, NY 11042 ... 516-328-1100
§ REI Sls., 19525 Business Centre Dr., Northridge, CA 91324 ... 617-938-0900
Solartron Instruments, Sangamo Weston, Inc., 2 Westchester Plaza, Elmsford, NY 10523 ... 914-592-9168
Spectron Corp., 344 New Albany Rd., Moorestown, NJ 08057 ... 609-234-5700
§ Telebyte Technology, Inc., Remark Datacom Div., 270 East Pulaski Road, Greenlawn, NY 11740 ... 516-423-3232
Teradyne, Inc., 183 Essex St., Boston, MA 02111 ... 617-482-2700
§ Tucker Elctrns., Box 461966, Garland, TX 75046 ... 214-348-8800;800-527-4642
Wavetek Corporation, 9191 Towne Centre Drive, San Diego, CA 92122 ... 619-450-9971
§ Wiltron, 805 E. Middlefield Rd., P.O. Box 7290, Mountain View, CA 94042-7290 ... 415-969-6500

Analyzers, Noise-2900

A. P. Circuit Corp., 513 East 86th St., P.O. Box 1350, New York, NY 10028 ... 212-737-1348
Bearing Inspection, 10041 Shoemaker Ave., Santa Fe Springs, CA 90670 ... 213-944-6251
Bruel & Kjaer Instrs. Inc., 185 Forest St., Marlboro, MA 01752 ... 617-481-7000
† California Microwave, 990 Almanor Ave., Sunnyvale, CA 94086 ... 408-732-4000
Chesterfield Prods., 37 Midland Ave., Elmwood Park, NJ 07407 ... 201-797-9655
§† Columbia Resch. Labs., Macdade Blvd. & Bullens La., Woodlyn, PA 19094 ... 215-532-9464
Continental Resources, Inc., 175 Middlesex Tpke., Bedford, MA 01730 .. 617-275-0850
Convex Corp., P.O. Box 17225, Dulles Intl. Airport, Washington, DC 20041 ... 703-661-8900
† DuPont de Nemours, E. I., & Co., 1007 Market St., Wilmington, DE 19898 ... 302-773-3218
§ Eaton Corp., Elctrn. Instrmn. Div., 5340 Alla Rd., Los Angeles, CA 90066
Eitel Mfg., 2835 Laguna Canyon Rd., Laguna Beach, CA 92652 ... 714-494-2012
§ Electro-Metrics, Penril Corp., 100 Church St., Amsterdam, NY 12010 518-843-2600
Elgenco, Inc., Box 460, Hurricane, UT 84737 ... 801-635-4954
§ Epoch Enterprises, Ltd., 3541 N. Olive Rd., Tucson, AZ 85719 ... 602-887-1970; 888-5167
GenRad, Inc., 300 Baker Ave., Concord, MA 01742 ... 617-369-4400
Genstar Rental Elctrns., 2445 Faber Pl., Palo Alto, CA 94303 ... 415-856-7600
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
MARCONI INSTRUMENTS, 3 Pearl Court, Allendale, NJ 07401 ... 201-934-9050
§ Metrosonics, Inc., Box 23075, Rochester, NY 14692-3075 ... 716-334-7300
† Microwave/Sys., 1 Adler Dr., E. Syracuse, NY 13057 ... 315-437-9951
† Polarad Elctrns., Inc., 5 Delaware Dr., Lake Success, NY 11042 ... 516-328-1100
† Raytheon Co., Microwave & Power Tube Div., 190 Willow St., Waltham, MA 02154 ... 617-899-8400
RE Instruments Corp., 31029 Center Ridge Rd., Westlake, OH 44145 ... 216-871-7617
Schaffner EMC, Inc., Instr. Div., 825 Lehigh Avenue, Union, NJ 07083 201-851-0644
Spectral Dynamics Div., Scientific-Atlanta, Box 671, San Diego, CA 92112 ... 619-268-7100
§ Tucker Elctrns., Box 461966, Garland, TX 75046 ... 214-348-8800;800-527-4642
† Vibration Instrs. Co., 1614 Orangethorpe Way, Anaheim, CA 92801 ... 714-879-6085
Wavetek Rockland Sci., 245 Livingston St., Northvale, NJ 07647 ... 201-767-7100
† Wavetek Rockland Scientific, Inc., 10 Volvo Dr., Rockleigh Indl. Pk., Rockleigh, NJ 07647 ... 201-767-7900

Analyzers, Phase & Voltage-2900

† Dranetz Technologies, Inc, Computer Products Division, 1000 New Durham Rd., P.O. Box 4019, Edison, NJ 08818-4019, 201-287-3680 ... D•1167
† North Atlantic Inds., Instrument Div., 60 Plant Ave., Hauppauge, NY 11788, 516-582-6500 ... D•1283
Astrosystems, 6 Nevada Dr., Lake Success, NY 11042 ... 516-328-1600
Basic Measuring Insts., 402 Lincoln Centre Dr., Foster City, CA 94404 ... 415-570-5355
CML MACARR Div., Marine Electric RPD, Inc., 666 Pacific St., Brooklyn, NY 11217 ... 718-857-2400
Dranetz Technologies, Inc., General Instrument Division, 1000 New Durham Rd., P.O. Box 4019, Edison, NJ 08818-4019 ... 201-287-3680
§ Feedback, 620 Springfield Ave., Berkeley Hghts., NJ 07922 ... 201-464-5181
Genstar Rental Elctrns., 2445 Faber Pl., Palo Alto, CA 94303 ... 415-856-7600
† Gorman-Redlich Mfg. Co., 6 Curtis St., Athens, OH 45701 ... 614-593-3150
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
ITHACO, Inc., Meas. & Control Instrs. Div., 735 W. Clinton St., P.O. Box 6437, Ithaca, NY 14851-6437 ... 607-272-7640
§ Liebert Corp., Programmed Power Div., 995 Benicia Ave., Sunnyvale, CA 94086 ... 408-245-8900
MARCONI INSTRUMENTS, 3 Pearl Court, Allendale, NJ 07401 ... 201-934-9050
Polarad Elctrns., Inc., 5 Delaware Dr., Lake Success, NY 11042 ... 516-328-1100
§ Power-Science, 7667 Vickers St., San Diego, CA 92111 ... 619-292-4322
RFL Inds., A Dowty Grp. Co./Instr. Div., Powerville Rd., Boonton, NJ 07005 ... 201-334-3100
† Sigma Electronics Inc., 10830 Kinghurst Dr., Houston, TX 77099 ... 713-933-4700
Solartron Instruments, Sangamo Weston, Inc., 2 Westchester Plaza, Elmsford, NY 10523 ... 914-592-9168
§ Tucker Elctrns., Box 461966, Garland, TX 75046 ... 214-348-8800;800-527-4642
Venable Industries, Inc., 3555 Lomita Blvd., Torrance, CA 90505 ... 213-539-2522
† Vibration Instrs. Co., 1614 Orangethorpe Way, Anaheim, CA 92801 ... 714-879-6085
† Wavetek Rockland Scientific, Inc., 10 Volvo Dr., Rockleigh Indl. Pk., Rockleigh, NJ 07647 ... 201-767-7900
§ Western Electro. Mech. Co. Inc., 300 Broadway, Oakland, CA 94607 ... 415-452-1936
§ Wiltron, 805 E. Middlefield Rd., P.O. Box 7290, Mountain View, CA 94042-7290 ... 415-969-6500

Analyzers, Protocol-2900

§† Digitech Industries, Inc., 66 Grove St., Ridgefield, CT 06877 ... 203-438-3731
§ Electrodata, Inc., 23020 Miles Rd., Bedford Heights, OH 44128 ... 216-663-3333
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.

Analyzers, Pulse-2900

American Electronic Labs., Box 552, Lansdale, PA 19446 ... 215-822-2929
American Elctrn. Labs., Inc., Govt. Grp. Div., P.O. Box 552, Lansdale, PA 19446
Canberra Ind., One State St., Meriden, CT 06450 ... 203-238-2351
† Dranetz Technologies, Inc, Computer Products Division, 1000 New Durham Rd., P.O. Box 4019, Edison, NJ 08818-4019 ... 201-287-3680
Dranetz Technologies, Inc., General Instrument Division, 1000 New Durham Rd., P.O. Box 4019, Edison, NJ 08818-4019 ... 201-287-3680
§ EH Electronics, Inc., Sub. EH Intl., Inc., 48507 Milmont Drive, Fremont, CA 94538 ... 415-651-2340
† General Microwave Corp., 155 Marine St., Farmingdale, NY 11735 ... 516-694-3600
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LeCroy Resch. Sys. Corp. (Cal.), 1806 Embarcadero Rd., Palo Alto, CA 94303 ... 415-856-1800
† Polarad Elctrns., Inc., 5 Delaware Dr., Lake Success, NY 11042 ... 516-328-1100
§ Tennelec, 601 Turnpike, Oak Ridge, TN 37830 ... 615-483-8405
§ Tucker Elctrns., Box 461966, Garland, TX 75046 ... 214-348-8800;800-527-4642

Analyzers, Servo-4900

Astrosystems, 6 Nevada Dr., Lake Success, NY 11042 ... 516-328-1600
† Control Technology Co., 41-16 29th St., Long Island City, NY 11101 718-361-2133
§ Feedback, 620 Springfield Ave., Berkeley Hghts., NJ 07922 ... 201-464-5181
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
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† North Atlantic Inds., Instrument Div., 60 Plant Ave., Hauppauge, NY 11788 ... 516-582-6500
† Northern Precision Labs., 11 Madison Rd., Fairfield, NJ 07006 ... 201-227-4800
Singer Co., Kearfott Div., 1150 McBride Ave., Little Falls, NJ 07424 ... 201-785-6000
Solartron Instruments, Sangamo Weston, Inc., 2 Westchester Plaza, Elmsford, NY 10523 ... 914-592-9168
Transistor Devices, 274 S. Salem St., Randolph, NJ 07869 ... 201-361-6622
Venable Industries, Inc., 3555 Lomita Blvd., Torrance, CA 90505 ... 213-539-2522

Analyzers, Signature-2900

§ Bugtrap Instrumentation, 1209 Alderwood Avenue, Sunnyvale, CA 94089 ... 408-734-1118
† Data Precision Corp., Electronics Ave., Danvers, MA 01923 ... 617-246-1600
Image Technology Methods Corp., 103 Moody St., Waltham, MA 02154 ... 617-894-1720
§† Nicolet Paratronics, 201 Fourier Ave., Fremont, CA 94539 ... 415-490-8300
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Solartron Instruments, Sangamo Weston, Inc., 2 Westchester Plaza, Elmsford, NY 10523 ... 914-592-9168
Spectral Dynamics Div., Scientific-Atlanta, Box 671, San Diego, CA 92112 ... 619-268-7100
§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 ... 215-673-5600

† Systems Resch. Labs., Inc., 2800 Indian Ripple Rd., Dayton, OH 45440 .. 513-426-6000

Analyzers, Sonic & Subsonic-2900

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Metrosonics, Inc., Box 23075, Rochester, NY 14692-3075 716-334-7300
Precision Filters, 240 Cherry St., Ithaca, NY 14850 607-277-3550
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§ Spanta, Inc., Box 193, Franklin Lakes, NJ 07417 201-337-0044
Spectral Dynamics Div., Scientific-Atlanta, Box 671, San Diego, CA 92112 619-268-7100
Voice Identification, Box 714, Somerville, NJ 08876 201-526-3408
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† Wavetek Rockland Scientific, Inc., 10 Volvo Dr., Rockleigh Indl. Pk., Rockleigh, NJ 07647 201-767-7900

Analyzers, Spectrum-2900

MARCONI INSTRUMENTS, 3 Pearl Court, Allendale, NJ 07401, 201-934-9050 .... D•1264
Tecron Industrial Prods., Crown Intl., Inc., 1718 W. Mishawaka Rd., Elkhart, IN 46517, 219-294-8300 .... D•1021,1310-1311
Analogic Corp., 8 Centennial Dr., Peabody, MA 01961 ..... 617-532-5660;617-777-4500; 617-246-0300;800-451-1
A. P. Circuit Corp., 513 East 86th St., P.O. Box 1350, New York, NY 10028 212-737-1348
Applied Research Labs, 9545 Wentworth, P.O. Box 129, Sunland, CA 91040 818-352-6011
Beckman Instrs., 2500 Harbor Blvd., Fullerton, CA 92634 714-871-4848
Bently Nevada Corp., P.O. Box 157, Minden, NV 89423 702-782-3611
Brady Co., 574A Somerset St., N. Plainfield, NJ 07060 201-753-7988
Bruel & Kjaer Instrs. Inc., 185 Forest St., Marlboro, MA 01752 617-481-7000
Burleigh Instrs., Burleigh Pk., Fishers, NY 14453 716-924-9355
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† Colorado Video, Inc., Box 928, Boulder, CO 80306 303-444-3972
Computer Design & Applications Inc., 411 Waverly Oaks Rd., Waltham, MA 02154 617-647-1900
† Comstron Corp., 200 E. Sunrise Hwy., Freeport, NY 11520 516-546-9700
Continental Resources, Inc., 175 Middlesex Tpke., Bedford, MA 01730 .. 617-275-0850
§ Eaton Corp., Elctrn. Instrmn. Div., 5340 Alla Rd., Los Angeles, CA 90066
EG&G Gamma Scientific, Div. of EG&G Inc., 3777 Ruffin Rd., San Diego, CA 92123 619-279-8034
§† Electro-Metrics, Penril Corp., 100 Church St., Amsterdam, NY 12010 518-843-2600
§ EMR Data Systems, Div. Sangamo- Weston, Box 3041, Sarasota, FL 33578 813-371-0811
Eventide, Inc., One Alsan Way, Little Ferry, NJ 07643 201-641-1200
GenRad, Inc., 300 Baker Ave., Concord, MA 01742 617-369-4400
Genstar Rental Elctrns., 2445 Faber Pl., Palo Alto, CA 94303 415-856-7600
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§ Integra, Inc., 2368 Walsh Ave., Santa Clara, CA 95051 408-727-9601
† Kay Elemetrics Corp., 12 Maple Ave., Pine Brook, NJ 07058-9797 201-227-2000
† Litton Applied Technology, 645 Almanor Ave., P.O. Box 3478, Sunnyvale, CA 94088-3478 408-773-0777
Mathematical Systems Design, Inc., 2850 Ocean Park Blvd., Ste. 300, Santa Monica, CA 90405 213-450-9851
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† Polarad Elctrns., Inc., 5 Delaware Dr., Lake Success, NY 11042 516-328-1100
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† R. C. Elctrns. Inc., 5386 Hollister Ave., Santa Barbara, CA 93111 805-964-6708
§ REI Sls., 19525 Business Centre Dr., Northridge, CA 91324 617-938-0900
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Spectral Dynamics Div., Scientific-Atlanta, Box 671, San Diego, CA 92112 619-268-7100
§† Takeda Riken Co., Ltd., NS Bldg. 14th,4-1,Nishi-Shinjuku 2-Chome,Shinjuku-ku, Tokyo 160, Tokyo 176, JAPAN 03-342-7500
Tektronix, Inc., P. O. Box 500, Y3-314, Beaverton, OR 97077 ..... 800-547-1512;Oregon only 800-452-1877
Telemet, 185 Dixon Ave., Amityville, NY 11701 516-842-2300
Texscan Instruments, 3169 N. Shadeland, Indianapolis, IN 46226 317-545-4196
§ Tucker Elctrns., Box 461966, Garland, TX 75046 .... 214-348-8800;800-527-4642
Varian Assocs., Indl. Equip. Grp., 611 Hansen Way, Palo Alto, CA 94303 415-493-4000
Vistar Corp., 13740 McCormick Dr., Tampa, FL 33625 813-855-6611
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Wavetek Indiana, Inc., 5808 Churchman, Beech Grove, IN 46107 317-787-3332
† Wavetek Rockland Scientific, Inc., 10 Volvo Dr., Rockleigh Indl. Pk., Rockleigh, NJ 07647 201-767-7900
Wavetek Corporation, 9191 Towne Centre Drive, San Diego, CA 92122 619-450-9971

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CELCO, 70 Constantine Dr., Mahwah, NJ 07430 201-327-1123
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Dranetz Technologies, Inc., General Instrument Division, 1000 New Durham Rd., P.O. Box 4019, Edison, NJ 08818-4019 201-287-3680
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Spectral Dynamics Div., Scientific-Atlanta, Box 671, San Diego, CA 92112 619-268-7100
Telemet, 185 Dixon Ave., Amityville, NY 11701 516-842-2300
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† Vibration Instrs. Co., 1614 Orangethorpe Way, Anaheim, CA 92801 714-879-6085
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† Wavetek Rockland Scientific, Inc., 10 Volvo Dr., Rockleigh Indl. Pk., Rockleigh, NJ 07647 201-767-7900

Analyzers, Transient-2900

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CDS - Colorado Data Sys., 3301 W. Hampden, Unit C, Englewood, CO 80110 303-762-1640
Image Technology Methods Corp., 103 Moody St., Waltham, MA 02154 617-894-1720
LeCroy Resch. Sys. Corp., 700 S. Main St., Spring Vly., NY 10977 914-425-2000
Micro Instr., 2250 Micro Pl., Escondido, CA 92025 619-746-2010
§† Nicolet Paratronics, 201 Fourier Ave., Fremont, CA 94539 415-490-8300
† Norland Corp., Norland Dr., Ft. Atkinson, WI 53538 414-563-8456
§ Power-Science, 7667 Vickers St., San Diego, CA 92111 619-292-4322
† R. C. Elctrns. Inc., 5386 Hollister Ave., Santa Barbara, CA 93111 805-964-6708
Spectral Dynamics, Scientific-Atlanta, Inc., 4255 Ruffin Rd., San Diego, CA 92123-0575 619-268-7100
§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 215-673-5600
Test & Measurement Systems, Inc., 349 Cobalt Way, Ste. 301, Sunnyvale, CA 94086 408-720-8877

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§† Ansonics, Inc., P.O. Box 910, Halfway, OR 97834 503-742-7475
Matec Instruments, Inc., 60 Metebello Rd., Warwick, RI 02886 401-739-9030
§ Metrix Instrument Co., 1711 Townhurst, Houston, TX 77043 713-461-2131
Panametrics, 221 Cresent St., Waltham, MA 02254 617-899-2740
† R. C. Elctrns. Inc., 5386 Hollister Ave., Santa Barbara, CA 93111 805-964-6708
† Wavetek Rockland Scientific, Inc., 10 Volvo Dr., Rockleigh Indl. Pk., Rockleigh, NJ 07647 201-767-7900

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† Vibra-Metrics, 1014 Sherman Ave., Hamden, CT 06514, 203-288-6158;1-800-352-2001 .... B•1832
† Alpha-M Corp., 3009 Wildflower Dr., Dallas, TX 75229 214-620-0021
Applied Sys., 26401 Harper Ave., St. Clair Shores, MI 48081 313-779-8700
Atec, Inc., Box 19426, 8219 Kempwood Dr., Houston, TX 77055 713-468-7971
Bearing Inspection, 10041 Shoemaker Ave., Santa Fe Springs, CA 90670 213-944-6251
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Bruel & Kjaer Instrs. Inc., 185 Forest St., Marlboro, MA 01752 617-481-7000
Computer Design & Applications Inc., 411 Waverly Oaks Rd., Waltham, MA 02154 617-647-1900
Continental Resources, Inc., 175 Middlesex Tpke., Bedford, MA 01730 .. 617-275-0850
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§ Endevco, 30700 Rancho Viejo Rd., San Juan Capistrano, CA 92675 714-493-8181
Entran Devices, 10 Washington Ave., Fairfield, NJ 07006 201-227-1002
§ Epoch Enterprises, Ltd., 3541 N. Olive Rd., Tucson, AZ 85719 .... 602-887-1970; 888-5167
GenRad, Inc., 300 Baker Ave., Concord, MA 01742 617-369-4400
§ Helm Instr. Co., Inc., 1387 Dussel Drive, Maumee, OH 43537 419-893-4356
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
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§ Spanta, Inc., Box 193, Franklin Lakes, NJ 07417 201-337-0044
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§ Tucker Elctrns., Box 461966, Garland, TX 75046 .... 214-348-8800;800-527-4642
Unholtz-Dickie Corp., 6 Brookside Dr., Wallingford, CT 06492 203-265-3929
† Vibration Instrs. Co., 1614 Orangethorpe Way, Anaheim, CA 92801 714-879-6085
§ Vibro-Meter Corp., 1 Progress Rd., Billerica, MA 01822-5058 617-663-7600
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† Wavetek Rockland Scientific, Inc., 10 Volvo Dr., Rockleigh Indl. Pk., Rockleigh, NJ 07647 201-767-7900

Analyzers, Video — See Analyzers, Spectrum (Vol. D)

Analyzers, Waveform-2900

Photodyne, 1175 Tourmaline Dr., Newbury Park, CA 91320, 818-889-8770 .... B•1122
Sencore, 3200 Sencore Dr., Sioux Falls, SD 57107, 605-339-0100 .... D•1399

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Micro Instr., 2250 Micro Pl., Escondido, CA 92025 619-746-2010
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Wavetek Corporation, 9191 Towne Centre Drive, San Diego, CA 92122 619-450-9971

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§ Leader Instrs. Corp., 380 Oser Ave., Hauppauge, NY 11788-3694 516-231-6900
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† R. C. Elctrns. Inc., 5386 Hollister Ave., Santa Barbara, CA 93111 805-964-6708
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Analyzers (MIL), Antenna Pattern-3475

† Systems Resch. Labs., Inc., 2800 Indian Ripple Rd., Dayton, OH 45440 .. 513-426-6000

Analyzers (MIL), Pulse-3475

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† Data Precision Corp., Electronics Ave., Danvers, MA 01923 617-246-1600

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§† Electro-Metrics, Penril Corp., 100 Church St., Amsterdam, NY 12010 518-843-2600
Mathematical Systems Design, Inc., 2850 Ocean Park Blvd., Ste. 300, Santa Monica, CA 90405 213-450-9851
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Scientific-Atlanta, Inc., P.O. Box 105600, Atlanta, GA 30348 404-441-4000
† Tektronix, Inc., P. O. Box 500, Y3-314, Beaverton, OR 97077 ..... 800-547-1512;Oregon only 800-452-1877
§† UTI Instruments Co., 325 N. Mathilda Ave., Sunnyvale, CA 94086 408-738-3301
Wavetek Corporation, 9191 Towne Centre Drive, San Diego, CA 92122 619-450-9971

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§ Pacer Industries, Inc., 1450 First Ave., Chippewa Falls, WI 54729 715-723-1141
§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 215-673-5600

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Dio-Rey, Div. of Info-Lite, 422 Cliff St., Fairview, NJ 07022, 201-941-4455 .... B∘1044,1046
§ **Micro Switch, A Honeywell Div., 11 W. Spring St., Freeport, IL 61032, 815-235-6600 .... B∘1656**
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Automation Displays Inc., 3833 N. White Ave., Eau Claire, WI 54703 715-834-9595
§ Cincinnati Electrosys., 469 Wards Corner Rd., Loveland, OH 45140 513-831-4347
Cognitronics, 25 Crescent St., Stamford, CT 06906 203-327-5307
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§ Datatron, Inc., 2942 Dow Ave., Tustin, CA 92680 714-544-9970
† Devco Engrg., Control Sys. Div., 36 Pier Lane West, Fairfield, NJ 07006 .... 201-CA8-0321
§ Edwards Co., Signaling Prods. Div., P.O. Box 1188, Farmington, CT 06034 203-678-0410
Electrospace Sys., Inc., P. O. Box 831359, Richardson, TX 75083-1359 214-783-2004
Henschel, General Signal Corp., 9 Hoyt Drive, P.O. Box 30, Newburyport, MA 01950 617-462-2400
† Instruments and Controls Div., Technology Inc., P.O. Box 3036, Overlook Branch, Dayton, OH 45431 513-426-2405
KMC Systems, Inc., 140 Greenwood Ave. (Bldg. 3), Midland Pk., NJ 07432 201-447-0007
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MSC Prods./Eaton Corp., 1640 Monrovia St., Costa Mesa, CA 92627 ... 714-642-2427
§ Newport Electronics, 630 E. Young St., Santa Ana, CA 92705 714-540-4914
RCI/Data, 1992 Lakewood Rd., Toms River, NJ 08753 201-341-8361
Rochester Instr. Sys., 255 N. Union St., Rochester, NY 14605 716-263-7700
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† Transicoil, Inc., Trooper Rd., P.O. Box 99, Worcester, PA 19490-9990 215-277-1300
Trans-Met Engrg., 601 S. Palm St., La Habra, CA 90631 213-691-2266
§ TRW, Dynalco Controls Div., 5200 NW 37th, P.O. Box 8187, Ft. Lauderdale, FL 33310 305-739-4300

Antenna Dummy Loads — See Dummy Loads (Vol. D)

Antenna Feed Systems-3450 — See *Vol. A*

Antenna Groups (MIL)-3475

Compliance Design Inc., 593 Massachusetts Ave., Boxboro, MA 01719 .. 617-264-4668
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† Electrospace Sys., Inc., P. O. Box 831359, Richardson, TX 75083-1359 214-783-2004
† Hazeltine Corp., 500 Commack Rd., Commack, NY 11725 516-462-5100
† Nurad, Inc., 2165 Druid Pk. Dr., Baltimore, MD 21211 301-462-1700
† Radio Resch. Instr. Co., Inc., Two Lake Ave. Extension, Danbury, CT 06811-5295 203-792-6666
† Sabre Comms. Corp., 117 Main St., Soiux City, IA 51102 712-258-6690
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† Tecom Inds., 9324 Topanga Canyon Blvd., Chatsworth, CA 91311 818-341-4010
† Teledyne Micronetics, 7155 Mission Gorge Rd., San Diego, CA 92120 .. 619-583-3525

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† Sabre Comms. Corp., 117 Main St., Soiux City, IA 51102 712-258-6690
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† Tecom Inds., 9324 Topanga Canyon Blvd., Chatsworth, CA 91311 818-341-4010
† Transco Products, Inc., 4241 Glencoe Ave., Marina del Rey, CA 90295 .. 213-822-0800

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† ABA Electromechanical Sys. Inc., Box 500, Pinellas Pk., FL 34290-0500 813-541-6681
Adams Rite Prods., Inc., 540 W. Chevy Chase Dr., Glendale, CA 91204 .. 818-241-5121
† Aeroflex Labs., Magnetic Prods. Div.,, 35 South Service Road, Plainview, NY 11803 516-694-6700
§ Alpha Products, Inc., 5740 Corsa Ave. # 104, Westlake Village, CA 91362 818-889-9304
Antenna Resch. Assocs., 11317 Frederick Ave., Beltsville, MD 20705 301-937-8888
Datron Systems, Inc., 200 West Los Angeles Ave., Simi Valley, CA 93065-1650 805-584-1717
† Electro-Magnetic Processes, Inc., 9616 Owensmouth Ave., Chatsworth, CA 91311 818-882-6333
† Electrospace Sys., Inc., P. O. Box 831359, Richardson, TX 75083-1359 214-783-2004
§ Heath Co., Benton Harbor, MI 49022 616-982-3886
§ Lance Inds., P.O. Box 4156, Sylmar, CA 91342-0156 818-367-1811
Maury Microwave, 8610 Helms Ave., Cucamonga, CA 91730 714-987-4715
Philips ECG, Inc., 100 First Ave., Waltham, MA 02254 617-890-6107
† Radio Resch. Instr. Co., Inc., Two Lake Ave. Extension, Danbury, CT 06811-5295 203-792-6666
† Sabre Comms. Corp., 117 Main St., Soiux City, IA 51102 712-258-6690
† Sage Laboratories, Inc., 3 Huron Dr., Natick, MA 01778 617-653-0844
Tasker Systems, 20131 Sunburst St., Chatsworth, CA 91311 213-341-3010
† Tecom Inds., 9324 Topanga Canyon Blvd., Chatsworth, CA 91311 818-341-4010
§ Vicon Industries, Inc., 525 Broad Hollow Rd., Melville, NY 11747 516-293-2200
§ Wilson Electronics, PO Box 19000, Las Vegas, NV 89119 702-739-1931

Antenna Sets (MIL), DF-3475

American Elctrn. Labs., Inc., Antenna Div., P.O. Box 552, Lansdale, PA 19446
† AN/COM Industries, P.O. Box 530, 5521 Cleon Ave., N. Hollywood, CA 91603 818-769-5518
† Condor Systems, Inc., 2605 S. Winchester Blvd., Campbell, CA 95008 ... 408-866-5900
† Electro-Magnetic Processes, Inc., 9616 Owensmouth Ave., Chatsworth, CA 91311 818-882-6333
† Electrospace Sys., Inc., P. O. Box 831359, Richardson, TX 75083-1359 214-783-2004
† Nurad, Inc., 2165 Druid Pk. Dr., Baltimore, MD 21211 301-462-1700
Schaffner EMC, Inc., Instr. Div., 825 Lehigh Avenue, Union, NJ 07083 201-851-0644
† Tecom Inds., 9324 Topanga Canyon Blvd., Chatsworth, CA 91311 818-341-4010
† Transco Products, Inc., 4241 Glencoe Ave., Marina del Rey, CA 90295 .. 213-822-0800

Antenna Switching Matrices-1900

CYTEC Corp., 107 N. Washington St., E. Rochester, NY 14445, 716-381-4740 .... D∘1207
† **Daico Inds., Inc., Box 5225, Compton, CA 90224, 213-631-1143 .... A∘1708-1709**
† Adams-Russell, Anzac Div., 80 Cambridge St., Burlington, MA 01803 671-273-3333
A.D. Data Sys., Techtran Industries, 200 Commerce Dr., Rochester, NY 14623 716-334-9649
† Aiken Advanced Sys., Amstar Technical Products Company, Inc., 5901 Edsall Rd., Alexandria, VA 22304-4197 703-370-0900
Alpha Inds., Inc.-MSD Div., 20 Sylvan Rd., Woburn, MA 01801 617-935-5150
American Electronic Labs., Box 552, Lansdale, PA 19446 215-822-2929

† Dielectric Communications, General Signal, Tower Hill Rd., Raymond, ME 04071 ... 207-655-4555;800-341-9678
† Dow-Key Microwave Corporation, 1110 Mark Ave., Carpenteria, CA 93013-2918 ... 805-684-4560
† Electrospace Sys., Inc., P. O. Box 831359, Richardson, TX 75083-1359 ... 214-783-2004
§ Heath Co., Benton Harbor, MI 49022 ... 616-982-3886
† Microwave Assocs. Ltd., Humphrey Rd., Dunstable, Bedfordshire, ENGLAND LU5 4SX, England ... 44-(582) 60-14-41
North Hills Elctrns., 1 Alexander Pl., Glen Cove, NY 11542 ... 516-671-5700
† Ross Engrg. Corp., 540 Westchester Dr., Campbell, CA 95008 ... 408-377-4621
Sanders Assocs., Flexprint Prods. Div., Grenier Fld., Manchester, NH 03103 ... 603-669-4615
† G.T.E. Gov't Sys. Corp., Comm. Sys. Div., 77 A St., Needham Hgts., MA 02194 ... 617-449-2000
† Transco Products, Inc., 4241 Glencoe Ave., Marina del Rey, CA 90295 ... 213-822-0800

Antenna Towers-1900

Aluma Tower Co., 1639 Old Dixie Hwy., Box 2806, Vero Beach, FL 32960 ... 305-567-3423
Andrew Corp., 10500 W. 153rd St., Orland Pk., IL 60462 ... 312-349-3300
Brady Co., 574A Somerset St., N. Plainfield, NJ 07060 ... 201-753-7988
§ CGTI, 2 Windward Ave., White Plains, NY 10605 ... 914-949-3719
Compliance Design Inc., 593 Massachusetts Ave., Boxboro, MA 01719 ... 617-264-4668
† Electrospace Sys., Inc., P. O. Box 831359, Richardson, TX 75083-1359 ... 214-783-2004
Microflect, 3575 25th S.E., Salem, OR 97302-0985 ... 503-363-9267
Milliflect, 7752 Enterprise Dr., Newark, CA 94560 ... 415-791-5188
† Radio Resch. Instr. Co., Inc., Two Lake Ave. Extension, Danbury, CT 06811-5295 ... 203-792-6666
† Sabre Comms. Corp., 117 Main St., Soiux City, IA 51102 ... 712-258-6690
Schaffner EMC, Inc., Instr. Div., 825 Lehigh Avenue, Union, NJ 07083 ... 201-851-0644
Stainless, Inc., 3rd St., N. Wales, PA 19454 ... 215-699-4871
† G.T.E. Gov't Sys. Corp., Comm. Sys. Div., 77 A St., Needham Hgts., MA 02194 ... 617-449-2000
Tasker Systems, 20131 Sunburst St., Chatsworth, CA 91311 ... 213-341-3010

Antennas, Airborne-1900

† Adams-Russell, Antenna & Microwave Div., Haverhill Rd., Amesbury, MA 01913 ... 617-388-5210
† Aeroflex Labs., Magnetic Prods. Div.,, 35 South Service Road, Plainview, NY 11803 ... 516-694-6700
§ Alpha Products, Inc., 5740 Corsa Ave. #104, Westlake Village, CA 91362 ... 818-889-9304
American Electronic Labs., Box 552, Lansdale, PA 19446 ... 215-822-2929
American Elctrn. Labs., Inc., Antenna Div., P.O. Box 552, Lansdale, PA 19446
† AN/COM Industries, P.O. Box 530, 5521 Cleon Ave., N. Hollywood, CA 91603 ... 818-769-5518
Andrew Corp., 10500 W. 153rd St., Orland Pk., IL 60462 ... 312-349-3300
§ Brelonix, 106 No. 36th St., Seattle, WA 98103 ... 206-633-1964
§† Cal Count, 5407 Port Royal Rd., Springfield, VA 22151 ... 703-321-9625
† Eastern Microwave, 4 Gill St., Woburn, MA 01801 ... 617-935-8600
† Electro-Magnetic Processes, Inc., 9616 Owensmouth Ave., Chatsworth, CA 91311 ... 818-882-6333
Electronic Space Sys. Corp., Old Powder Mill Rd., Concord, MA 01742 ... 617-369-7200
Electrospace Sys., Inc., P. O. Box 831359, Richardson, TX 75083-1359 ... 214-783-2004
§ Emergency Beacon Corp., 15 River St., New Rochelle, NY 10801 ... 914-235-9400
§† E-Systems, Garland Div., Box 226118, Dallas, TX 75266 ... 214-272-0515
† Milliflect, 7752 Enterprise Dr., Newark, CA 94560 ... 415-791-5188
† Nurad, Inc., 2165 Druid Pk. Dr., Baltimore, MD 21211 ... 301-462-1700
† Power Sys. Grp., Rantec Div., Emerson Elec., 9401 Oso Ave., Chatsworth, CA 91311 ... 818-885-8223
† Premier Microwave, 35 New Broad St., Port Chester, NY 10573 ... 914-939-8900
† Radio Resch. Instr. Co., Inc., Two Lake Ave. Extension, Danbury, CT 06811-5295 ... 203-792-6666
Rockwell Intl., Commercial Elctrns. Opers., 1200 N. Alma Rd., Richardson, TX 75081 ... 214-996-5000
§ Russell Inds., 3000 Lawson Blvd., Oceanside, NY 11572 ... 516-536-5000
† Sabre Comms. Corp., 117 Main St., Soiux City, IA 51102 ... 712-258-6690
Sanders Assocs., Flexprint Prods. Div., Grenier Fld., Manchester, NH 03103 ... 603-669-4615
Sensor Systems, Inc., 8929 Fullbright Ave., Chatsworth, CA 91311 ... 818-341-5366
§† Systron-Donner Microwave Div., 14844 Oxnard St., Van Nuys, CA 91409 ... 818-786-1760
† Tecom Inds., 9324 Topanga Canyon Blvd., Chatsworth, CA 91311 ... 818-341-4010
† Teledyne Micronetics, 7155 Mission Gorge Rd., San Diego, CA 92120 ... 619-583-3525
† Titchener, E. H., & Co., 1 Titchener Pl., Binghamton, NY 13902 ... 607-772-1161
† Transco Products, Inc., 4241 Glencoe Ave., Marina del Rey, CA 90295 ... 213-822-0800
† Vega Precision Labs., 800 Follin La., Vienna, VA 22180 ... 703-938-6300

Antennas, Citizens Band — See Antennas, Whip & Accessories (Incl. Marine & Mobile Types) (Vol. D)

Antennas, Direction Finding-1900

† Adams-Russell, Antenna & Microwave Div., Haverhill Rd., Amesbury, MA 01913 ... 617-388-5210
† Adams-Russell, Parisi Div., 280 Bear Hill Rd., Waltham, MA 02154 ... 617-890-0055
† Aeroflex Labs., Magnetic Prods. Div.,, 35 South Service Road, Plainview, NY 11803 ... 516-694-6700
American Electronic Labs., Box 552, Lansdale, PA 19446 ... 215-822-2929
American Elctrn. Labs., Inc., Antenna Div., P.O. Box 552, Lansdale, PA 19446
† Collins Avionics Divisions, Rockwell Intl., 400 Collins Rd. NE, Cedar Rapids, IA 52498 ... 319-395-1000
† Condor Systems, Inc., 2605 S. Winchester Blvd., Campbell, CA 95008 ... 408-866-5900
† Electro-Magnetic Processes, Inc., 9616 Owensmouth Ave., Chatsworth, CA 91311 ... 818-882-6333
† Electrospace Sys., Inc., P. O. Box 831359, Richardson, TX 75083-1359 ... 214-783-2004
§ Emergency Beacon Corp., 15 River St., New Rochelle, NY 10801 ... 914-235-9400
§† E-Systems, Garland Div., Box 226118, Dallas, TX 75266 ... 214-272-0515
General Instr., Govt. Sys., 600 W. John St., Hicksville, NY 11802-0709 ... 516-933-3000
Glatzer Industry Corp., 15 River St., New Rochelle, NY 10801 ... 914-576-2700
GTE Sys.-Sylvania Sys. Grp., Western Div., P.O. Box 7188, Mountain View, CA 94039 ... 415-966-2000
Hughes Aircraft Co, Aerospace Grps./Support Sys., P.O. Box 90515, Los Angeles, CA 90009 ... 213-670-1515
Hughes Aircraft Co., Microelctrn. Sys. Div., 2601 Campus Dr., Irvine, CA 92715 ... 714-752-3800
M/A-Com MDM, Inc., M/A-Com, 9000 Fullbright Ave., Chatsworth, CA 91311 ... 818-700-8400
† Milliflect, 7752 Enterprise Dr., Newark, CA 94560 ... 415-791-5188
† Nurad, Inc., 2165 Druid Pk. Dr., Baltimore, MD 21211 ... 301-462-1700
OAR Corp., A CompuDyne Co., 10447 Roselle St., San Diego, CA 92121 ... 619-453-4013
Power Sys. Grp., Rantec Div., Emerson Elec., 9401 Oso Ave., Chatsworth, CA 91311 ... 818-885-8223
† Premier Microwave, 35 New Broad St., Port Chester, NY 10573 ... 914-939-8900
Sanders Assocs., Flexprint Prods. Div., Grenier Fld., Manchester, NH 03103 ... 603-669-4615
Schaffner EMC, Inc., Instr. Div., 825 Lehigh Avenue, Union, NJ 07083 ... 201-851-0644
Sensor Systems, Inc., 8929 Fullbright Ave., Chatsworth, CA 91311 ... 818-341-5366
Synergetics Intl., Inc., 6565 Odell Pl., P.O. Box E, Boulder, CO 80306-1236 ... 303-530-2020
† Tecom Inds., 9324 Topanga Canyon Blvd., Chatsworth, CA 91311 ... 818-341-4010
† Titchener, E. H., & Co., 1 Titchener Pl., Binghamton, NY 13902 ... 607-772-1161
† Transco Products, Inc., 4241 Glencoe Ave., Marina del Rey, CA 90295 ... 213-822-0800
† Vega Precision Labs., 800 Follin La., Vienna, VA 22180 ... 703-938-6300

Antennas, Ground Plane-1900

† Adams-Russell, Antenna & Microwave Div., Haverhill Rd., Amesbury, MA 01913 ... 617-388-5210
American Electronic Labs., Box 552, Lansdale, PA 19446 ... 215-822-2929
Amplifier Research, 160 School House Rd., Souderton, PA 18964-9990 ... 215-723-8181
† Eastern Microwave, 4 Gill St., Woburn, MA 01801 ... 617-935-8600
† Electro-Magnetic Processes, Inc., 9616 Owensmouth Ave., Chatsworth, CA 91311 ... 818-882-6333
† Electrospace Sys., Inc., P. O. Box 831359, Richardson, TX 75083-1359 ... 214-783-2004
GTE Sys.-Sylvania Sys. Grp., Western Div., P.O. Box 7188, Mountain View, CA 94039 ... 415-966-2000
§ Kreckman, Herb, Co., Cresco, PA 18326 ... 717-595-2212
† Nurad, Inc., 2165 Druid Pk. Dr., Baltimore, MD 21211 ... 301-462-1700
Power Sys. Grp., Rantec Div., Emerson Elec., 9401 Oso Ave., Chatsworth, CA 91311 ... 818-885-8223
§ Premax Prods. Div., Highland & College Aves., Niagara Falls, NY 14305 ... 716-285-9186
† Premier Microwave, 35 New Broad St., Port Chester, NY 10573 ... 914-939-8900
† Sabre Comms. Corp., 117 Main St., Soiux City, IA 51102 ... 712-258-6690
§ Shokai Far East, Ltd., 280 North Central Ave., Hartsdale, NY 10530 ... 914-681-0700
§ Sinclair Radio Labs., 122 Rayette Rd., Concord, ONT, CANADA L9W2Y8 ... 416-669-1244
Sparkomatic, Rte. 6 & 209, Milford, PA 18337 ... 717-296-6444
† G.T.E. Gov't Sys. Corp., Comm. Sys. Div., 77 A St., Needham Hgts., MA 02194 ... 617-449-2000
§† Systron-Donner Microwave Div., 14844 Oxnard St., Van Nuys, CA 91409 ... 818-786-1760
† Tecom Inds., 9324 Topanga Canyon Blvd., Chatsworth, CA 91311 ... 818-341-4010
† Vega Precision Labs., 800 Follin La., Vienna, VA 22180 ... 703-938-6300
§ Wilson Electronics, PO Box 19000, Las Vegas, NV 89119 ... 702-739-1931

Antennas, Helical-1900

† Adams-Russell, Antenna & Microwave Div., Haverhill Rd., Amesbury, MA 01913 ... 617-388-5210
American Electronic Labs., Box 552, Lansdale, PA 19446 ... 215-822-2929
American Elctrn. Labs., Inc., Antenna Div., P.O. Box 552, Lansdale, PA 19446
Andrew Corp., 10500 W. 153rd St., Orland Pk., IL 60462 ... 312-349-3300
Antenna Resch. Assocs., 11317 Frederick Ave., Beltsville, MD 20705 ... 301-937-8888
Datron Systems, Inc., 200 West Los Angeles Ave., Simi Valley, CA 93065-1650 ... 805-584-1717
† Eastern Microwave, 4 Gill St., Woburn, MA 01801 ... 617-935-8600
Eaton Corp., Elctrn. Instrmn. Div., 5340 Alla Rd., Los Angeles, CA 90066
† Electro-Magnetic Processes, Inc., 9616 Owensmouth Ave., Chatsworth, CA 91311 ... 818-882-6333
† Electrospace Sys., Inc., P. O. Box 831359, Richardson, TX 75083-1359 ... 214-783-2004
§† E-Systems, Garland Div., Box 226118, Dallas, TX 75266 ... 214-272-0515
GTE Sys.-Sylvania Sys. Grp., Western Div., P.O. Box 7188, Mountain View, CA 94039 ... 415-966-2000
† Nurad, Inc., 2165 Druid Pk. Dr., Baltimore, MD 21211 ... 301-462-1700
† Premier Microwave, 35 New Broad St., Port Chester, NY 10573 ... 914-939-8900
§ Russell Inds., 3000 Lawson Blvd., Oceanside, NY 11572 ... 516-536-5000
Schaffner EMC, Inc., Instr. Div., 825 Lehigh Avenue, Union, NJ 07083 ... 201-851-0644
§ Sinclair Radio Labs., 122 Rayette Rd., Concord, ONT, CANADA L9W2Y8 ... 416-669-1244
Tasker Systems, 20131 Sunburst St., Chatsworth, CA 91311 ... 213-341-3010
† Tecom Inds., 9324 Topanga Canyon Blvd., Chatsworth, CA 91311 ... 818-341-4010
† Teledyne Micronetics, 7155 Mission Gorge Rd., San Diego, CA 92120 ... 619-583-3525
† Transco Products, Inc., 4241 Glencoe Ave., Marina del Rey, CA 90295 ... 213-822-0800

Antennas, Log Periodic-1900

Amplifier Research, 160 School House Rd., Souderton, PA 18964-9990, 215-723-8181 .... D∘1003
American Electronic Labs., Box 552, Lansdale, PA 19446 215-822-2929
American Elctrn. Labs., Inc., Antenna Div., P.O. Box 552, Lansdale, PA 19446
Andrew Corp., 10500 W. 153rd St., Orland Pk., IL 60462 312-349-3300
Antennacraft, Box 1005, Burlington, IA 52601 319-754-7575
Antenna Resch. Assocs., 11317 Frederick Ave., Beltsville, MD 20705 301-937-8888
Brady Co., 574A Somerset St., N. Plainfield, NJ 07060 201-753-7988
† CATEL Telecommunications, United Scientific Corp., 4800 Patrick Henry Dr., Santa Clara, CA 95054 408-988-7722
† Cincinnati Elctrns., 2630 Glendale Milford Rd., Cincinnati, OH 45241 513-733-6100
Condor Systems, Inc., 2605 S. Winchester Blvd., Campbell, CA 95008 408-866-5900
† Eastern Microwave, 4 Gill St., Woburn, MA 01801 617-935-8600
Electro-Mechanics Co., Box 1546, Austin, TX 78767 512-835-4684
§† Electro-Metrics, Penril Corp., 100 Church St., Amsterdam, NY 12010 518-843-2600
† Electrospace Sys., Inc., P. O. Box 831359, Richardson, TX 75083-1359 214-783-2004
§† E-Systems, Garland Div., Box 226118, Dallas, TX 75266 214-272-0515
† Granger Assocs., 3101 Scott Blvd., Santa Clara, CA 95051 408-727-3101
GTE Sys.-Sylvania Sys. Grp., Western Div., P.O. Box 7188, Mountain View, CA 94039 415-966-2000
§ Kay-Townes Antenna, P.O. Box 593, Rome, GA 30161 404-291-9871
§ KLM Electronics, 16890 Church St., P.O. Box 816, Morgan Hill, CA 95037 408-779-7363
§ Lance Inds., P.O. Box 4156, Sylmar, CA 91342-0156 818-367-1811
† Nurad, Inc., 2165 Druid Pk. Dr., Baltimore, MD 21211 301-462-1700
† Sabre Comms. Corp., 117 Main St., Soiux City, IA 51102 712-258-6690
Sanders Assocs., Flexprint Prods. Div., Grenier Fld., Manchester, NH 03103 603-669-4615
Schaffner EMC, Inc., Instr. Div., 825 Lehigh Avenue, Union, NJ 07083 201-851-0644
§ Sinclair Radio Labs., 122 Rayette Rd., Concord, ONT, CANADA L9W2Y8 416-669-1244
§ Sitco Antennas, 10330 N.E. Marx St., Portland, OR 97220 503-253-2000
† Tecom Inds., 9324 Topanga Canyon Blvd., Chatsworth, CA 91311 818-341-4010
† Teledyne Micronetics, 7155 Mission Gorge Rd., San Diego, CA 92120 .. 619-583-3525
† Tensor, Box 14843, Austin, TX 78761 512-251-4131

Antennas, Loop-1900

Connector Corp., 6025 N. Keystone Ave., Chicago, IL 60646, 312-539-3108 .... C∘1176
Antenna Resch. Assocs., 11317 Frederick Ave., Beltsville, MD 20705 301-937-8888
† Collins Avionics Divisions, Rockwell Intl., 400 Collins Rd. NE, Cedar Rapids, IA 52498 319-395-1000
Eaton Corp., Elctrn. Instrmn. Div., 5340 Alla Rd., Los Angeles, CA 90066
† Electro-Mechanics Co., Box 1546, Austin, TX 78767 512-835-4684
† Electrospace Sys., Inc., P. O. Box 831359, Richardson, TX 75083-1359 214-783-2004
GTE Sys.-Sylvania Sys. Grp., Western Div., P.O. Box 7188, Mountain View, CA 94039 415-966-2000
§ MG Electronics, 32 Ranick Rd., Hauppauge, NY 11788 516-582-3400
§ Palomar Engrs., Box 455, Escondido, CA 92025 619-747-3343
§ Russell Inds., 3000 Lawson Blvd., Oceanside, NY 11572 516-536-5000
Schaffner EMC, Inc., Instr. Div., 825 Lehigh Avenue, Union, NJ 07083 201-851-0644
Sensor Systems, Inc., 8929 Fullbright Ave., Chatsworth, CA 91311 818-341-5366
§ Shokai Far East, Ltd., 280 North Central Ave., Hartsdale, NY 10530 914-681-0700
Solar Elctrns. Co., 901 N. Highland, Hollywood, CA 90038 213-462-0806
Spectracom, 101 Despatch Drive, East Rochester, NY 14445 716-381-4827
† Tecom Inds., 9324 Topanga Canyon Blvd., Chatsworth, CA 91311 818-341-4010
† Tensor, Box 14843, Austin, TX 78761 512-251-4131
§ Vidaire Electronics Mfg. Corp., P. O. Box 788, Freeport, NY 11520 516-623-6696
§† Workman Elctrn. Prods., Box 3828, Sarasota, FL 33578 813-371-4242

Antennas, Microwave-1900

North Hills Elctrns., 1 Alexander Pl., Glen Cove, NY 11542, 516-671-5700 .... A∘1780
† **Premier Microwave, 35 New Broad St., Port Chester, NY 10573, 914-939-8900 .... A∘1781**
† Adams-Russell, Antenna & Microwave Div., Haverhill Rd., Amesbury, MA 01913 617-388-5210
† Airtron, Litton Industries, Inc., 200 E. Hanover Ave., Morris Plains, NJ 07950 201-539-5500
Alpha Inds., Inc.-MSD Div., 20 Sylvan Rd., Woburn, MA 01801 617-935-5150
Alpha Inds., Inc. - TRG Millimeter Comp., 20 Sylvan Rd., Woburn, MA 01801 617-935-5150
American Elctrn. Labs., Inc., Antenna Div., P.O. Box 552, Lansdale, PA 19446
Amplifier Research, 160 School House Rd., Souderton, PA 18964-9990 215-723-8181
Andrew Corp., 10500 W. 153rd St., Orland Pk., IL 60462 312-349-3300
Antennacraft, Box 1005, Burlington, IA 52601 319-754-7575
† Cablewave Sys., 60 Dodge Ave., North Haven, CT 06473 203-239-3311
§ CGTI, 2 Windward Ave., White Plains, NY 10605 914-949-3719
† Condor Systems, Inc., 2605 S. Winchester Blvd., Campbell, CA 95008 408-866-5900
† Electro-Magnetic Processes, Inc., 9616 Owensmouth Ave., Chatsworth, CA 91311 818-882-6333
§† Electro-Metrics, Penril Corp., 100 Church St., Amsterdam, NY 12010 518-843-2600
Electronic Space Sys. Corp., Old Powder Mill Rd., Concord, MA 01742 .. 617-369-7200
Epsilon-Lambda Elctrns. Corp., 427 Stevens St., Geneva, IL 60134 312-232-9611
† Gabriel Elctrns., Box 70, Scarborough Indl. Pk., Scarborough, ME 04074 207-883-5161
† Granger Assocs., 3101 Scott Blvd., Santa Clara, CA 95051 408-727-3101
GTE Sys.-Sylvania Sys. Grp., Western Div., P.O. Box 7188, Mountain View, CA 94039 415-966-2000
† Hazeltine Corp., 500 Commack Rd., Commack, NY 11725 516-462-5100
HDS Inc., 12310 Pinecrest Rd., Reston, VA 22091 703-620-6200
† Interconics, BMC Industries, Inc., 245 E. 6th St., 3rd Flr., St. Paul, MN 55101 612-228-6512
Lance Inds., P.O. Box 4156, Sylmar, CA 91342-0156 818-367-1811
LogiMetrics, 121-03 Dupont St., Plainview, NY 11803 516-349-1700
M/A-Com MDM, Inc., M/A-Com, 9000 Fullbright Ave., Chatsworth, CA 91311 818-700-8400
† Mitec Elctrns., 15 Commerce St., Williston, VT 05495 802-864-0064
† Narda Microwave Corp., 435 Moreland Rd., Hauppauge, NY 11788 516-231-1700
† Nurad, Inc., 2165 Druid Pk. Dr., Baltimore, MD 21211 301-462-1700
† Polarad Elctrns., Inc., 5 Delaware Dr., Lake Success, NY 11042 516-328-1100
† Radio Resch. Instr. Co., Inc., Two Lake Ave. Extension, Danbury, CT 06811-5295 203-792-6666
Schaffner EMC, Inc., Instr. Div., 825 Lehigh Avenue, Union, NJ 07083 201-851-0644
Stainless, Inc., 3rd St., N. Wales, PA 19454 215-699-4871
Tasker Systems, 20131 Sunburst St., Chatsworth, CA 91311 213-341-3010
† Tecom Inds., 9324 Topanga Canyon Blvd., Chatsworth, CA 91311 818-341-4010
† Teledyne Micronetics, 7155 Mission Gorge Rd., San Diego, CA 92120 .. 619-583-3525
† Watkins-Johnson Co., 3333 Hillview Ave., Palo Alto, CA 94304 415-493-4141

Antennas, Multiband, UHF/VHF-1900

† Adams-Russell, Antenna & Microwave Div., Haverhill Rd., Amesbury, MA 01913 617-388-5210
AN/COM Industries, P.O. Box 530, 5521 Cleon Ave., N. Hollywood, CA 91603 818-769-5518
Antennacraft, Box 1005, Burlington, IA 52601 319-754-7575
† CATEL Telecommunications, United Scientific Corp., 4800 Patrick Henry Dr., Santa Clara, CA 95054 408-988-7722
Compliance Design Inc., 593 Massachusetts Ave., Boxboro, MA 01719 .. 617-264-4668
Electrospace Sys., Inc., P. O. Box 831359, Richardson, TX 75083-1359 214-783-2004
Lattin Radio Labs., 1431 Sweeney, P.O. Box 44, Owensboro, KY 42302 502-683-2868
† Sabre Comms. Corp., 117 Main St., Soiux City, IA 51102 712-258-6690
Schaffner EMC, Inc., Instr. Div., 825 Lehigh Avenue, Union, NJ 07083 201-851-0644
Sensor Systems, Inc., 8929 Fullbright Ave., Chatsworth, CA 91311 818-341-5366
§ Sitco Antennas, 10330 N.E. Marx St., Portland, OR 97220 503-253-2000
† Tecom Inds., 9324 Topanga Canyon Blvd., Chatsworth, CA 91311 818-341-4010

Antennas, Phased Array-1900

† Adams-Russell, Antenna & Microwave Div., Haverhill Rd., Amesbury, MA 01913 617-388-5210
† Airtron, Litton Industries, Inc., 200 E. Hanover Ave., Morris Plains, NJ 07950 201-539-5500
Alpha Inds., Inc.-MSD Div., 20 Sylvan Rd., Woburn, MA 01801 617-935-5150
American Electronic Labs., Box 552, Lansdale, PA 19446 215-822-2929
American Elctrn. Labs., Inc., Antenna Div., P.O. Box 552, Lansdale, PA 19446
Antenna Resch. Assocs., 11317 Frederick Ave., Beltsville, MD 20705 301-937-8888
† Datron Systems, Inc., 200 West Los Angeles Ave., Simi Valley, CA 93065-1650 805-584-1717
† Eastern Microwave, 4 Gill St., Woburn, MA 01801 617-935-8600
† Electro-Magnetic Processes, Inc., 9616 Owensmouth Ave., Chatsworth, CA 91311 818-882-6333
† Electrospace Sys., Inc., P. O. Box 831359, Richardson, TX 75083-1359 214-783-2004
§† E-Systems, Garland Div., Box 226118, Dallas, TX 75266 214-272-0515
GTE Sys.-Sylvania Sys. Grp., Western Div., P.O. Box 7188, Mountain View, CA 94039 415-966-2000
† Hazeltine Corp., 500 Commack Rd., Commack, NY 11725 516-462-5100
§ KLM Electronics, 16890 Church St., P.O. Box 816, Morgan Hill, CA 95037 408-779-7363
M/A-Com MDM, Inc., M/A-Com, 9000 Fullbright Ave., Chatsworth, CA 91311 818-700-8400
† Nurad, Inc., 2165 Druid Pk. Dr., Baltimore, MD 21211 301-462-1700
† Power Sys. Grp., Rantec Div., Emerson Elec., 9401 Oso Ave., Chatsworth, CA 91311 818-885-8223
† Premier Microwave, 35 New Broad St., Port Chester, NY 10573 914-939-8900
† Sabre Comms. Corp., 117 Main St., Soiux City, IA 51102 712-258-6690
Sanders Assocs., Flexprint Prods. Div., Grenier Fld., Manchester, NH 03103 603-669-4615
§ Sinclair Radio Labs., 122 Rayette Rd., Concord, ONT, CANADA L9W2Y8 416-669-1244
§† Sitco Antennas, 10330 N.E. Marx St., Portland, OR 97220 503-253-2000
† Tecom Inds., 9324 Topanga Canyon Blvd., Chatsworth, CA 91311 818-341-4010
† Teledyne Micronetics, 7155 Mission Gorge Rd., San Diego, CA 92120 .. 619-583-3525
† Transco Products, Inc., 4241 Glencoe Ave., Marina del Rey, CA 90295 .. 213-822-0800

Antennas, Rhombic-1900

† Sabre Comms. Corp., 117 Main St., Soiux City, IA 51102 712-258-6690
Sanders Assocs., Flexprint Prods. Div., Grenier Fld., Manchester, NH 03103 603-669-4615
§ Sinclair Radio Labs., 122 Rayette Rd., Concord, ONT, CANADA L9W2Y8 416-669-1244

Antennas, Satellite-1900

† Airtron, Litton Industries, Inc., 200 E. Hanover Ave., Morris Plains, NJ 07950 201-539-5500
Datron Systems, Inc., 200 West Los Angeles Ave., Simi Valley, CA 93065-1650 805-584-1717
† Nurad, Inc., 2165 Druid Pk. Dr., Baltimore, MD 21211 301-462-1700

Antennas, Spiral-1900

† Adams-Russell, Antenna & Microwave Div., Haverhill Rd., Amesbury, MA 01913 617-388-5210
American Electronic Labs., Box 552, Lansdale, PA 19446 215-822-2929
American Elctrn. Labs., Inc., Antenna Div., P.O. Box 552, Lansdale, PA 19446
Antenna Resch. Assocs., 11317 Frederick Ave., Beltsville, MD 20705 301-937-8888
Brady Co., 574A Somerset St., N. Plainfield, NJ 07060 201-753-7988

Condor Systems, Inc., 2605 S. Winchester Blvd., Campbell, CA 95008 ... 408-866-5900
Continental Resources, Inc., 175 Middlesex Tpke., Bedford, MA 01730 .. 617-275-0850
† Eastern Microwave, 4 Gill St., Woburn, MA 01801 ... 617-935-8600
Eaton Corp., Elctrn. Instrmn. Div., 5340 Alla Rd., Los Angeles, CA 90066
† Electro-Mechanics Co., Box 1546, Austin, TX 78767 ... 512-835-4684
§† E-Systems, Garland Div., Box 226118, Dallas, TX 75266 ... 214-272-0515
† Granger Assocs., 3101 Scott Blvd., Santa Clara, CA 95051 ... 408-727-3101
GTE Sys.-Sylvania Sys. Grp., Western Div., P.O. Box 7188, Mountain View, CA 94039 ... 415-966-2000
† Premier Microwave, 35 New Broad St., Port Chester, NY 10573 ... 914-939-8900
Sanders Assocs., Flexprint Prods. Div., Grenier Fld., Manchester, NH 03103 ... 603-669-4615
† Tecom Inds., 9324 Topanga Canyon Blvd., Chatsworth, CA 91311 ... 818-341-4010
† Teledyne Micronetics, 7155 Mission Gorge Rd., San Diego, CA 92120 .. 619-583-3525
† Tensor, Box 14843, Austin, TX 78761 ... 512-251-4131
† Transco Products, Inc., 4241 Glencoe Ave., Marina del Rey, CA 90295 .. 213-822-0800

Antennas, Telescopic-1900

American Elctrn. Labs., Inc., Antenna Div., P.O. Box 552, Lansdale, PA 19446
Cord Electronics, Inc., 177 Cantiague Rock Rd., Westbury, NY 11590 ... 516-935-3640
† Electrospace Sys., Inc., P. O. Box 831359, Richardson, TX 75083-1359 ... 214-783-2004
§ GC Elctrns., 400 S. Wyman St., Rockford, IL 61101 ... 815-968-9661
§ MG Electronics, 32 Ranick Rd., Hauppauge, NY 11788 ... 516-582-3400
§ Premax Prods. Div., Highland & College Aves., Niagara Falls, NY 14305 ... 716-285-9186
§ Russell Inds., 3000 Lawson Blvd., Oceanside, NY 11572 ... 516-536-5000
§ Shokai Far East, Ltd., 280 North Central Ave., Hartsdale, NY 10530 ... 914-681-0700
§† Workman Elctrn. Prods., Box 3828, Sarasota, FL 33578 ... 813-371-4242

Antennas, Whip & Accessories (Incl. Marine & Mobile Types-1900

Accurate Elctrns., 169 S. Abbe Rd., P.O. Box 1287, Elyria, OH 44036 ... 216-365-1211
† AN/COM Industries, P.O. Box 530, 5521 Cleon Ave., N. Hollywood, CA 91603 ... 818-769-5518
§† Cal Count, 5407 Port Royal Rd., Springfield, VA 22151 ... 703-321-9625
† Cincinnati Elctrns., 2630 Glendale Milford Rd., Cincinnati, OH 45241 ... 513-733-6100
Communication Assocs., 200 McKay Rd., Huntington Sta., NY 11746 ... 516-271-0800
§ GC Elctrns., 400 S. Wyman St., Rockford, IL 61101 ... 815-968-9661
§ Heath Co., Benton Harbor, MI 49022 ... 616-982-3886
§ KLM Electronics, 16890 Church St., P.O. Box 816, Morgan Hill, CA 95037 ... 408-779-7363
La Pointe Industries, Inc., Electronics Products Div., 155 W. Main St, Rockville, CT 06066 ... 203-872-8581
§ MG Electronics, 32 Ranick Rd., Hauppauge, NY 11788 ... 516-582-3400
Pathcom, Inc., Pace Two-Way Radio Prods., 24105 S. Frampton Ave., Harbor City, CA 90710 ... 213-325-1290
§ Premax Prods. Div., Highland & College Aves., Niagara Falls, NY 14305 ... 716-285-9186
§ Russell Inds., 3000 Lawson Blvd., Oceanside, NY 11572 ... 516-536-5000
† Shogyo Intl. Corp., 287 Northern Blvd., Great Neck, NY 11021 ... 516-466-0911
§ Sinclair Radio Labs., 122 Rayette Rd., Concord, ONT, CANADA L9W2Y8 ... 416-669-1244
Sparkomatic, Rte. 6 & 209, Milford, PA 18337 ... 717-296-6444
§ SPECO Div., Components Specialties, Inc., P.O. Box 624, 1172 Rte. 109, Lindenhurst, NY 11757 ... 516-957-8700;800-645-5516
§ Sylvania Electronic Components, Philips ECG Inc., A North American Philips Co., 100 First Ave., Waltham, MA 02254 ... 617-890-6107
§ Telco Products Co., 44 Sea Cliff, Glen Cove, NY 11542 ... 516-759-0300
Ten-Tec, Inc., Industrial Park, Sevierville, TN 37862 ... 615-453-7172
§ Wilson Electronics, PO Box 19000, Las Vegas, NV 89119 ... 702-739-1931
§† Workman Elctrn. Prods., Box 3828, Sarasota, FL 33578 ... 813-371-4242

Antennas (MIL)-2440 – *See Vol. B*

Antennas (MIL), DF-3475

American Elctrn. Labs., Inc., Antenna Div., P.O. Box 552, Lansdale, PA 19446
† Condor Systems, Inc., 2605 S. Winchester Blvd., Campbell, CA 95008 ... 408-866-5900
† Electro-Magnetic Processes, Inc., 9616 Owensmouth Ave., Chatsworth, CA 91311 ... 818-882-6333
† Electrospace Sys., Inc., P. O. Box 831359, Richardson, TX 75083-1359 ... 214-783-2004
† Nurad, Inc., 2165 Druid Pk. Dr., Baltimore, MD 21211 ... 301-462-1700
† Tecom Inds., 9324 Topanga Canyon Blvd., Chatsworth, CA 91311 ... 818-341-4010
† Transco Products, Inc., 4241 Glencoe Ave., Marina del Rey, CA 90295 .. 213-822-0800
† Watkins-Johnson Co., 3333 Hillview Ave., Palo Alto, CA 94304 ... 415-493-4141

Antennas (MIL), ECM-3475

† Adams-Russell, Antenna & Microwave Div., Haverhill Rd., Amesbury, MA 01913 ... 617-388-5210
American Elctrn. Labs., Inc., Antenna Div., P.O. Box 552, Lansdale, PA 19446
† Electro-Magnetic Processes, Inc., 9616 Owensmouth Ave., Chatsworth, CA 91311 ... 818-882-6333
† Electrospace Sys., Inc., P. O. Box 831359, Richardson, TX 75083-1359 ... 214-783-2004
† Nurad, Inc., 2165 Druid Pk. Dr., Baltimore, MD 21211 ... 301-462-1700
† Tecom Inds., 9324 Topanga Canyon Blvd., Chatsworth, CA 91311 ... 818-341-4010
† Teledyne Micronetics, 7155 Mission Gorge Rd., San Diego, CA 92120 .. 619-583-3525
† Transco Products, Inc., 4241 Glencoe Ave., Marina del Rey, CA 90295 .. 213-822-0800
† Watkins-Johnson Co., 3333 Hillview Ave., Palo Alto, CA 94304 ... 415-493-4141

Antennas (MIL), EW-3475

† Adams-Russell, Antenna & Microwave Div., Haverhill Rd., Amesbury, MA 01913 ... 617-388-5210
American Elctrn. Labs., Inc., Antenna Div., P.O. Box 552, Lansdale, PA 19446
† Electro-Magnetic Processes, Inc., 9616 Owensmouth Ave., Chatsworth, CA 91311 ... 818-882-6333
† Electrospace Sys., Inc., P. O. Box 831359, Richardson, TX 75083-1359 ... 214-783-2004
† General Instr., Govt. Sys., 600 W. John St., Hicksville, NY 11802-0709 ... 516-933-3000
† Hazeltine Corp., 500 Commack Rd., Commack, NY 11725 ... 516-462-5100
† Nurad, Inc., 2165 Druid Pk. Dr., Baltimore, MD 21211 ... 301-462-1700
† Radio Resch. Instr. Co., Inc., Two Lake Ave. Extension, Danbury, CT 06811-5295 ... 203-792-6666
† Tecom Inds., 9324 Topanga Canyon Blvd., Chatsworth, CA 91311 ... 818-341-4010
† Teledyne Micronetics, 7155 Mission Gorge Rd., San Diego, CA 92120 .. 619-583-3525
† Transco Products, Inc., 4241 Glencoe Ave., Marina del Rey, CA 90295 .. 213-822-0800
† Watkins-Johnson Co., 3333 Hillview Ave., Palo Alto, CA 94304 ... 415-493-4141

Antennas (MIL), Multibeam-3475

† Electro-Magnetic Processes, Inc., 9616 Owensmouth Ave., Chatsworth, CA 91311 ... 818-882-6333
† Electrospace Sys., Inc., P. O. Box 831359, Richardson, TX 75083-1359 ... 214-783-2004
† Microwave Applications Grp., 3030 Industrial Pkwy., Santa Maria, CA 93455 ... 805-928-5711
† Nurad, Inc., 2165 Druid Pk. Dr., Baltimore, MD 21211 ... 301-462-1700
† Sabre Comms. Corp., 117 Main St., Soiux City, IA 51102 ... 712-258-6690
† Tecom Inds., 9324 Topanga Canyon Blvd., Chatsworth, CA 91311 ... 818-341-4010
† Teledyne Micronetics, 7155 Mission Gorge Rd., San Diego, CA 92120 ... 619-583-3525

Antennas (MIL), Phased Array-3475

† Adams-Russell, Antenna & Microwave Div., Haverhill Rd., Amesbury, MA 01913 ... 617-388-5210
American Elctrn. Labs., Inc., Antenna Div., P.O. Box 552, Lansdale, PA 19446
† Electro-Magnetic Processes, Inc., 9616 Owensmouth Ave., Chatsworth, CA 91311 ... 818-882-6333
† Electrospace Sys., Inc., P. O. Box 831359, Richardson, TX 75083-1359 ... 214-783-2004
† Microwave Applications Grp., 3030 Industrial Pkwy., Santa Maria, CA 93455 ... 805-928-5711
† Nurad, Inc., 2165 Druid Pk. Dr., Baltimore, MD 21211 ... 301-462-1700
† Sabre Comms. Corp., 117 Main St., Soiux City, IA 51102 ... 712-258-6690
† Tecom Inds., 9324 Topanga Canyon Blvd., Chatsworth, CA 91311 ... 818-341-4010
† Teledyne Micronetics, 7155 Mission Gorge Rd., San Diego, CA 92120 .. 619-583-3525

Antenna Systems (MIL)-3475

† ABA Electromechanical Sys. Inc., Box 500, Pinellas Pk., FL 34290-0500 ... 813-541-6681
American Elctrn. Labs., Inc., Antenna Div., P.O. Box 552, Lansdale, PA 19446
Compliance Design Inc., 593 Massachusetts Ave., Boxboro, MA 01719 .. 617-264-4668
† Electro-Magnetic Processes, Inc., 9616 Owensmouth Ave., Chatsworth, CA 91311 ... 818-882-6333
† Electrospace Sys., Inc., P. O. Box 831359, Richardson, TX 75083-1359 ... 214-783-2004
GTE Sys.-Sylvania Sys. Grp., Western Div., P.O. Box 7188, Mountain View, CA 94039 ... 415-966-2000
M/A-Com Cable/Home Communication Prodelin Satellite Antenna Systems, M/A-Com, Inc., P.O. Box 468, Newton, NC 28658 ... 800-222-1195;704-464-4141
† Microwave Applications Grp., 3030 Industrial Pkwy., Santa Maria, CA 93455 ... 805-928-5711
† Nurad, Inc., 2165 Druid Pk. Dr., Baltimore, MD 21211 ... 301-462-1700
† Radio Resch. Instr. Co., Inc., Two Lake Ave. Extension, Danbury, CT 06811-5295 ... 203-792-6666
† Sabre Comms. Corp., 117 Main St., Soiux City, IA 51102 ... 712-258-6690
Scientific-Atlanta, Inc., P.O. Box 105600, Atlanta, GA 30348 ... 404-441-4000
† Tecom Inds., 9324 Topanga Canyon Blvd., Chatsworth, CA 91311 ... 818-341-4010
† Teledyne Micronetics, 7155 Mission Gorge Rd., San Diego, CA 92120 .. 619-583-3525
† Transco Products, Inc., 4241 Glencoe Ave., Marina del Rey, CA 90295 .. 213-822-0800
† Watkins-Johnson Co., 3333 Hillview Ave., Palo Alto, CA 94304 ... 415-493-4141

Antenna Systems (MIL), DF-3475

† ABA Electromechanical Sys. Inc., Box 500, Pinellas Pk., FL 34290-0500 ... 813-541-6681
American Elctrn. Labs., Inc., Antenna Div., P.O. Box 552, Lansdale, PA 19446
† Condor Systems, Inc., 2605 S. Winchester Blvd., Campbell, CA 95008 ... 408-866-5900
† Electro-Magnetic Processes, Inc., 9616 Owensmouth Ave., Chatsworth, CA 91311 ... 818-882-6333
† Electrospace Sys., Inc., P. O. Box 831359, Richardson, TX 75083-1359 ... 214-783-2004
† Eyring Research Inst., Inc., 1455 W. 820 N., Provo, UT 84601 ... 801-375-2434
† Nurad, Inc., 2165 Druid Pk. Dr., Baltimore, MD 21211 ... 301-462-1700
† Tecom Inds., 9324 Topanga Canyon Blvd., Chatsworth, CA 91311 ... 818-341-4010
† Transco Products, Inc., 4241 Glencoe Ave., Marina del Rey, CA 90295 .. 213-822-0800

Antistatic Devices, Blowers, Guns, etc.-4100

§† NRD, Mark IV Ind., Inc., 2937 Alt Blvd. N., Grand Island, NY 14072, 716-773-7634 ... D•1983
§† ACL Inc., 1960 E. Devon Ave., Elk Grove, IL 60007 ... 312-981-9212
Brady Co., 574A Somerset St., N. Plainfield, NJ 07060 ... 201-753-7988
Caypin Industries, Inc., P. O. Box 9737, Ft. Wayne, IN 46899 ... 219-432-1515; 1-800-348-1771
§ Clean Room Prods., 56 W. Penataquit Ave., Bay Shore, NY 11706 ... 516-968-8282
§ RCA Distr. & Special Prods. Div., RCA Corp., 2000 Clements Bridge Rd., Deptford, NJ 08096 ... 609-541-3636
Republic Packaging Corp., 9160 S. Green St., Chicago, IL 60620 ... 312-233-6530
Screen Data Corp., 80 S. Jefferson Rd., Whippany, NJ 07981 ... 201-887-7713; 800-248-1212
§ Simco Co., 2257 North Penn Rd., Hatfield, PA 19440 ... 215-822-2171
Static, Inc., Rte. 113 & Mensch Rd., P.O. Box 80, Skippack, PA 19474 ... 215-584-9600
§† Tech Spray, Inc., Box 949, Amarillo, TX 79105 ... 806-372-8523

§ Wescorp Antistatic Prods., 144 S. Whisman Rd., Mountain View, CA 94041 415-969-7717

Antistatic Packaging Materials — See Packaging Materials, Antistatic (Vol. C)

Antitheft Devices — See Alarms & Alarm Systems (Vol. D)

Armatures — See Motor & Generator Armatures, Rotors, Stators (Vol. B)

Arms & Manipulators, Robotic-4900

† ABA Electromechanical Sys. Inc., Box 500, Pinellas Pk., FL 34290-0500 813-541-6681
† Adams Rite Prods., Inc., 540 W. Chevy Chase Dr., Glendale, CA 91204 .. 818-241-5121
Adaptive Intelligence, 1401 McCarthy Blvd., Milpitas, CA 95035 408-262-7222
Astrosystems, 6 Nevada Dr., Lake Success, NY 11042 516-328-1600
† Black & Webster, 219 Bear Hill Rd., Waltham, MA 02254 617-890-9100
Muirhead, 1101 Briston Rd., Mountainside, NJ 07092 201-233-6010
† Poly-Scientific, Litton Inds., 1213 N. Main St., Blacksburg, VA 24060 703-552-3014
Seiko Instruments U.S.A., Inc., Robotics/Automation Div., 2990 W. Lomita Blvd., Torrance, CA 90505 213-530-8777

Array Processors-2025

Motorola Semiconductor Prods. Sector, Adv. 72, Box 20912, Phoenix, AZ 85036, 602-244-6900 .... A•1686
§ Advanced Micro Devices, P.O. Box 3453, 901 Thompson Pl., Sunnyvale, CA 94088 408-732-2400
Analogic Corp., 8 Centennial Dr., Peabody, MA 01961 ..... 617-532-5660;617-777-4500; 617-246-0300;800-451-1
CPSI, 40 Linnell Circle, Billerica, MA 01821 .... 617-272-6020;800-325-3110
§ Floating Point Systems, Inc., P.O. Box 23489, Portland, OR 97223 503-641-3151
Mathematical Systems Design, Inc., 2850 Ocean Park Blvd., Ste. 300, Santa Monica, CA 90405 213-450-9851
Numerix Corp., 20 Ossipee Rd., Newton, MA 02164 617-964-2500

Array Sockets — See Sockets, Array

Arresters, Electrical Surge — See Suppressors, Transient Voltage (Vol. B)

Arresters, Electrical Surge/Lightning (MIL)-2440 — See *Vol. B*

Artificial Loads — See Dummy Loads (Vol. D)

Assembly & Fabrication Services (Incl. R & D) — See Services, Assembly & Fabrication (Vol. D)

Attenuators, Audio-1300

Bourns, Inc., Resistive Components Group, 1200 Columbia Ave., Riverside, CA 92507, 714-781-5050 .... A•2006
§ ITT Pomona Electronics, 1500 E. 9th St., P.O. Box 2767, Pomona, CA 91766, 714-623-3463 .... C•1330
§ Shallco, Box 1089, Smithfield, NC 27577, 919-934-3135 .... D•1036-1037
† Tech Labs., Inc., Bergen & Edsall Blvds., Palisades Pk., NJ 07650, 201-944-2221 .... B•1701
VRN International, Div. Vernitron, 2801 72nd St. N., Box 44000, St. Petersburg, FL 33743, 813-347-2181 .... D•1056
Allen Avionics, 224 E. 2nd St., Mineola, NY 11501 516-248-8080
§ Allen-Bradley Co., Electronics Group, Rockwell Corporation, 1201 S. Second St., Milwaukee, WI 53204 414-671-2000
Allen-Bradley Co., Electronics Group, Div. of Rockwell Corp., Resistive Products Div., 1414 Allen-Bradley Dr., El Paso, TX 79935 915-592-4888
† Analog Devices, P.O. Box 280, Norwood, MA 02062 617-329-4700
† Applied Research, Inc., 160 Dupont St., Plainview, NY 11803 516-349-9200
† Arra Inc., 15 Harold Ct., Bay Shore, NY 11706 516-231-8400
Centralab, Inc., A North American Philips Co., Hwy. 20 W., P.O. Box 858, Ft. Dodge, IA 50501 515-573-1300
Dantel, 2991 N. Argyle Ave., Fresno, CA 93727 209-292-1111
§ Davis, J. W., & Co., P.O. Box 26177, Dallas, TX 75226 214-651-7341
§ Dukane Corp., Communications Sys. Div., 2900 Dukane Dr., St. Charles, IL 60174 312-584-2300
§ Duncan Electronics, Inc., 2865 Fairview Rd., Costa Mesa, CA 92626 714-545-8261
Elcom Systems, Inc., 932 Clint Moore Rd., Boca Raton, FL 33431 305-994-1774
† GRIM Corporation, Box 67, Medford, NJ 08055 609-267-7950
§ Hi-Tech Components, Mitsubishi International Corp., 520 Madison Ave., New York, NY 10022 212-605-2607
§ JFW Inds., Inc., 2719 E. Troy Ave., Indianapolis, IN 46203 317-783-9875
Kay Elemetrics Corp., 12 Maple Ave., Pine Brook, NJ 07058-9797 201-227-2000
§ Leader Instrs. Corp., 380 Oser Ave., Hauppauge, NY 11788-3694 516-231-6900
Mallory Components Division, Emhart Elec./Elctrn. Grp., 3029 E. Washington St., Indianapolis, IN 46201 317-261-1361
§ MARCONI INSTRUMENTS, 3 Pearl Court, Allendale, NJ 07401 201-934-9050
Marel Instr. Co., 907 South East 13th Pl., Cape Coral, FL 33904 813-574-8788
Matrix Sys. Corp., 5177 N. Douglas Fir Rd., Calabasas, CA 91302 818-992-6776
† Noble U.S.A., Inc., 151 Stanley St., Elk Grove Village, IL 60007 312-364-6038
§ Ohmite Mfg. Co., 3601 W. Howard St., Skokie, IL 60076 312-675-2600
Piher Int'l. Corp., 903 Feehanville Dr., Mt. Prospect, IL 60056 .... 312-640-8300; 800-323-6693
§ Pyle Industries, Inc., 501 Center St., P.O. Box 620, Huntington, IN 46750 219-356-1200
RCI/Data, 1992 Lakewood Rd., Toms River, NJ 08753 201-341-8361
SGS Semiconductor Corporation, 1000 E. Bell Road, Phoenix, AZ 85022 602-867-6100
§ Shure Bros., 222 Hartrey Ave., Evanston, IL 60204 312-866-2200
§ Soundlier, American Trading & Prod. Corp., 9380 Watson Ind'l. Pk., St. Louis, MO 63126 314-962-9870
§ Spectra Sonics, 3750 Airport Rd., Ogden, UT 84403 801-392-7531
§ Switchcraft, Inc., 5555 N. Elston, Chicago, IL 60630 312-792-2700
§ Trimm, Inc., Div. of Newton Instr. Co., 400 W. Lake St., Box 489, Libertyville, IL 60048 312-362-3700
§ Tucker Elctrns., Box 461966, Garland, TX 75046 .... 214-348-8800;800-527-4642
Vishay Resistive Sys. Grp., 63 Lincoln Hwy., Malvern, PA 19355 215-644-1300
Waters Mfg., Longfellow Ctr., Wayland, MA 01778 617-358-2777
§† Workman Elctrn. Prods., Box 3828, Sarasota, FL 33578 813-371-4242

Attenuators, Audio (T, L, LL Pads)-4750 — See *Vol. A*

Attenuators, Coaxial-3450 — See *Vol. A*

Attenuators, Decade-3450 — See *Vol. A*

Attenuators, Fiber Optic-2475 — See *Vol. B*

Attenuators, Fixed-3450 — See *Vol. A*

Attenuators, IF-1900

† Daico Inds., Inc., Box 5225, Compton, CA 90224, 213-631-1143 .... A•1708-1709
§ ITT Pomona Electronics, 1500 E. 9th St., P.O. Box 2767, Pomona, CA 91766, 714-623-3463 .... C•1330
† Tech Labs., Inc., Bergen & Edsall Blvds., Palisades Pk., NJ 07650, 201-944-2221 .... B•1701
† Alan Inds., P.O. Box 1203, Columbus, IN 47201 812-372-8869
† Amplifonix Inc., 220 Rte. 13, Bristol, PA 19007 215-788-2350
† Applied Research, Inc., 160 Dupont St., Plainview, NY 11803 516-349-9200
† Arra Inc., 15 Harold Ct., Bay Shore, NY 11706 516-231-8400
§† Avantek, Inc., 3175 Bowers Ave., Santa Clara, CA 95054 408-496-6710
§ Eaton Corp., Elctrn. Instrmn. Div., 5340 Alla Rd., Los Angeles, CA 90066
† Elcom Systems, Inc., 932 Clint Moore Rd., Boca Raton, FL 33431 305-994-1774
FG Engrg., Box 476, Fredonia, AZ 86022 602-643-7375
† General Microwave Corp., 155 Marine St., Farmingdale, NY 11735 516-694-3600
§† Harris Corp., PRD Elctrns. Div., 6801 Jericho Tpke., Syosset, NY 11791 516-364-0400
Hyletronics, Newtown Rd., Littleton, MA 01460 617-486-8911
§ JFW Inds., Inc., 2719 E. Troy Ave., Indianapolis, IN 46203 317-783-9875
Kay Elemetrics Corp., 12 Maple Ave., Pine Brook, NJ 07058-9797 201-227-2000
† Lorch Elctrns., 105 Cedar La., Englewood, NJ 07631 201-569-8282
MARCONI INSTRUMENTS, 3 Pearl Court, Allendale, NJ 07401 201-934-9050
† Merrimac Inds., 41 Fairfield Pl., West Caldwell, NJ 07006 201-575-1300
† Mini-Circuits Lab., 2625 E. 14th St., P.O. Box 166, Brooklyn, NY 11235 .. 718-934-4500
Mu-Del Electronics, Inc., 2426 Linden Lane, Silver Spring, MD 20910-1288 301-587-6087
† RHG Electronics Lab., Inc., 161 E. Industry Ct., Deer Park, NY 11729 516-242-1100
Shallco, Box 1089, Smithfield, NC 27577 919-934-3135
§ Solitron/Microwave, Box 278, Port Salerno, FL 33492 305-287-5000
† Telonic/Berkeley, 2825 Laguna Canyon Rd., Laguna Beach, CA 92652 714-494-9401
§ Tucker Elctrns., Box 461966, Garland, TX 75046 .... 214-348-8800;800-527-4642
Vermont Precision Resistor, Codeco Corp. of Vermont, Box 1170, Stowe, VT 05672 802-253-8567
Watkins-Johnson Co., 3333 Hillview Ave., Palo Alto, CA 94304 415-493-4141
Wavetek Indiana, Inc., 5808 Churchman, Beech Grove, IN 46107 317-787-3332
Weinschel Engrg., One Weinschel La., Gaithersburg, MD 20877 .... 301-948-3434; 800-638-2048

Attenuators, Impedance Matching-3450 — See *Vol. A*

Attenuators, Logarithmic-3450 — See *Vol. A*

Attenuators, Microwave-3450 — See *Vol. A*

Attenuators, Programmable-3450 — See *Vol. A*

Attenuators, RF-1900

† Applied Research, Inc., 160 Dupont St., Plainview, NY 11803, 516-349-9200 .... A•1703
Compac, 279 Skidmore Rd., Deer Park, NY 11729, 516-667-3933 .... A•1706
† Daico Inds., Inc., Box 5225, Compton, CA 90224, 213-631-1143 .... A•1708-1709
† Elcom Systems, Inc., 932 Clint Moore Rd., Boca Raton, FL 33431, 305-994-1774 .... A•1711
† Electro Impulse, Box 870, Red Bank, NJ 07701-0870, 201-741-0404 ..... D•1211
§ ITT Pomona Electronics, 1500 E. 9th St., P.O. Box 2767, Pomona, CA 91766, 714-623-3463 .... C•1330
† Kay Elemetrics Corp., 12 Maple Ave., Pine Brook, NJ 07058-9797, 201-227-2000 .... A•1713
Mini-Circuits Lab., 2625 E. 14th St., P.O. Box 166, Brooklyn, NY 11235, 718-934-4500 .... A•1719-1720,1768,1770-1771
† Tech Labs., Inc., Bergen & Edsall Blvds., Palisades Pk., NJ 07650, 201-944-2221 .... B•1701
VRN International, Div. Vernitron, 2801 72nd St. N., Box 44000, St. Petersburg, FL 33743, 813-347-2181 .... D•1056
† Alan Inds., P.O. Box 1203, Columbus, IN 47201 812-372-8869
§ Allen-Bradley Co., Electronics Group, Rockwell Corporation, 1201 S. Second St., Milwaukee, WI 53204 414-671-2000
Allen-Bradley Co., Electronics Group, Div. of Rockwell Corp., Resistive Products Div., 1414 Allen-Bradley Dr., El Paso, TX 79935 915-592-4888
Alpha Inds., Inc., Microwave Comp. Div., 90 Glenn St., Lawrence, MA 01843 617-681-8520
Alpha Inds., Inc.-MSD Div., 20 Sylvan Rd., Woburn, MA 01801 617-935-5150
§† Anaren Microwave, P.O. Box 178, 6635 Kirkville Rd., E. Syracuse, NY 13057 315-432-8909

† Armtec Industries, Inc., Daven Components Grp., Manchester Airport, Manchester, NH 03103 603-669-0940
† Arra Inc., 15 Harold Ct., Bay Shore, NY 11706 516-231-8400
† Artech Corp., 2901 Telestar Ct., Falls Church, VA 22042 703-560-3292
§ Astrolab Inc., 4 Powder Horn Drive, Warren, NJ 07060 1-201-560-3800
Automatic Connector, Inc., 400 Moreland Rd., Commack, NY 11725 516-543-5000
§† Avantek, Inc., 3175 Bowers Ave., Santa Clara, CA 95054 408-496-6710
§ Bird Elctrn., 30303 Aurora Rd., Cleveland, OH 44139 216-248-1200
Continental Resources, Inc., 175 Middlesex Tpke., Bedford, MA 01730 617-275-0850
Elect. Prec. Comp. Corp., 11 W. Sandford Blvd., Mt. Vernon, NY 10550 914-664-2333
Engelmann Microwave Co., KDI Pyrofilm, 60 S. Jefferson Rd., Whippany, NJ 07981 201-887-5700
FG Engrg., Box 476, Fredonia, AZ 86022 602-643-7375
† General Microwave Corp., 155 Marine St., Farmingdale, NY 11735 516-694-3600
§† Harris Corp., PRD Elctrns. Div., 6801 Jericho Tpke., Syosset, NY 11791 516-364-0400
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
§ JFW Inds., Inc., 2719 E. Troy Ave., Indianapolis, IN 46203 317-783-9875
§ KDI Electronics, Inc., Engelmann & Pyrofilm Divisions, 60 S. Jefferson Rd., Whippany, NJ 07981 201-887-8100
§† Kings Elctrns., 40 Marbledale Rd., Tuckahoe, NY 10707 914-793-5000
§ Laboratory Products, Inc., 57 Cornwall St., P. O. Box 1750, Jamaica Plain, MA 02130 617-522-7800
§ Macom Inds., 8230 Haskell Ave., Van Nuys, CA 91406
M/A-COM Microwave Circuits, Inc., South Ave., Burlington, MA 01803 617-272-3000
M/A-Com Microwave Components, Inc., M/A-Com, South Avenue, Burlington, MA 01803 617-272-3000
§† M/A-COM Omni Spectra, Inc., 21 Continental Blvd., Merrimack, NH 03054 603-424-4111
MARCONI INSTRUMENTS, 3 Pearl Court, Allendale, NJ 07401 201-934-9050
MarLee Switch Co., 933-D N. Central Ave., Upland, CA 91786 714-982-8988
Matrix Sys. Corp., 5177 N. Douglas Fir Rd., Calabasas, CA 91302 818-992-6776
† Merrimac Inds., 41 Fairfield Pl., West Caldwell, NJ 07006 201-575-1300
† Metropole Products Inc., P.O. Box 10275, Alexandria, VA 22310 .... 703-971-8606; 703-971-7082
Micro-Coax Components, Inc., a UTI Company, Box E, Collegeville, PA 19426 215-489-3700
§† Micronetics, 36 Oak St., Norwood, NJ 07648 201-767-1320
Mu-Del Electronics, Inc., 2426 Linden Lane, Silver Spring, MD 20910-1288 301-587-6087
Noble U.S.A., Inc., 151 Stanley St., Elk Grove Village, IL 60007 312-364-6038
§† Omni Spectra, 21 Continental Blvd., Merrimack, NH 03054 603-424-4111
† RFI Corporation, 100 E. Pine Aire Dr., Bay Shore, NY 11706 516-231-6400
RHG Electronics Lab., Inc., 161 E. Industry Ct., Deer Park, NY 11729 516-242-1100
RLC Elctrns., Inc., 83 Radio Cir., Mt. Kisco, NY 10549 914-241-1334
† Sage Laboratories, Inc., 3 Huron Dr., Natick, MA 01778 617-653-0844
§ Sealectro, 225 Hoyt St., Mamaroneck, NY 10543 914-698-5600
§ Solitron/Microwave, Box 278, Port Salerno, FL 33492 305-287-5000
§† Systron-Donner Microwave Div., 14844 Oxnard St., Van Nuys, CA 91409 818-786-1760
† Telonic/Berkeley, 2825 Laguna Canyon Rd., Laguna Beach, CA 92652 714-494-9401
Texscan Instruments, 3169 N. Shadeland, Indianapolis, IN 46226 317-545-4196
§ Tucker Elctrns., Box 461966, Garland, TX 75046 .... 214-348-8800;800-527-4642
Varian Associates, Inc., Microwave Tube Div., 611 Hansen Way, Palo Alto, CA 94303 415-493-4000
Vermont Precision Resistor, Codeco Corp. of Vermont, Box 1170, Stowe, VT 05672 802-253-8567
§† Waveline, Box 718, W. Caldwell, NJ 07006 201-226-9100
† Wavetek Indiana, Inc., 5808 Churchman, Beech Grove, IN 46107 317-787-3332
Wavetek Corporation, 9191 Towne Centre Drive, San Diego, CA 92122 619-450-9971
† Weinschel Engrg., One Weinschel La., Gaithersburg, MD 20877 .... 301-948-3434; 800-638-2048
§ Wiltron, 805 E. Middlefield Rd., P.O. Box 7290, Mountain View, CA 94042-7290 415-969-6500

Attenuators, Step-3450 — *See Vol. A*

Attenuators, Switch Operated-3450 — *See Vol. A*

Attenuators, Switchable-3450 — *See Vol. A*

Attenuators, Turret-3450 — *See Vol. A*

Attenuators, Variable-3450 — *See Vol. A*

Attenuators, Voltage Controlled-3450 — *See Vol. A*

Attenuators (MIL)-2440 — *See Vol. B*

Attenuators (MIL), Inductive-2440 — *See Vol. B*

Audible Alarms & Transducers-Also see Piezoelectric Ceramics; Transducers, Audio-1300

Murata Erie North America, Inc., 1148 Franklin Rd., S.E., Marietta, GA 30067, 404-952-9777 .... D•1028
§ Star Micronics, Inc., Components Div., 70-D Ethel Rd. W., Piscataway, NJ 08854, 201-572-9512 .... D•1040-1044
Atlas Sound Div., 10 Pomeroy Rd., Parsippany, NJ 07054 201-887-7800
§† Audiosone, Inc., 617 Fan Hill Rd., Monroe, CT 06468 .... 203-268-4372;203-268-6703
† Briggs, C. A., Co., P.O. Box 151, Glenside, PA 19038 215-885-2244
Cord Electronics, Inc., 177 Cantiague Rock Rd., Westbury, NY 11590 516-935-3640
Datavoice Corp., 180 N. La Salle St. Ste 700, Chicago, IL 60601 312-831-4488
§ Edwards Co., Signaling Prods. Div., P.O. Box 1188, Farmington, CT 06034 203-678-0410
§ Mallory Capacitor Co., Mallory Comps. Grp., 3029 E. Washington St., Indianapolis, IN 46201 317-636-5353
NTK Technical Ceramics, NGK Spark Plugs (U.S.A.), Inc., 1701 N. Greenville Ave. #205, Richardson, TX 75081 214-235-8332
Piezo Elec. Prods., Inc., 212 Durham Ave., CN-15, Metuchen, NJ 08840 201-548-2800
§ Projects Unltd., 3680 Wyse Rd., Dayton, OH 45414 513-890-1918
Relay Service Co., 1310 N. Pulaski Rd., Chicago, IL 60651 .... 312-AL2-2700
§ Rye Inds., Inc., 125 Spencer Pl., P.O. Box M, Mamaroneck, NY 10543 914-698-0080
Spectral Dynamics, Scientific-Atlanta, Inc., 4255 Ruffin Rd., San Diego, CA 92123-0575 619-268-7100
Shogyo Intl. Corp., 287 Northern Blvd., Great Neck, NY 11021 516-466-0911
§ Soundlier, American Trading & Prod. Corp., 9380 Watson Ind'l. Pk., St. Louis, MO 63126 314-962-9870
§ TDK Corporation of America, 4711 Golf Rd., Skokie, IL 60076 312-679-8200
§ Wheelock, Inc., 273 Branchport Ave., Long Branch, NJ 07740 201-222-6880

Audio Equipment — See Amplifiers (Vol. D), Microphones (Vol. D), Speakers (Vol. D), etc.

Autoclaves-2550

Express Test Corp., 239 Commercial Street, Sunnyvale, CA 94086 408-732-9999

Awls-5400 — *See Vol. C*

Backpanel Interconnect Systems-3200 — *See Vol. C*

Backplane Wiring Services — See Services, Backplane Wiring (Vol. D)

Baffles, Speaker-1300

§ Quam-Nichols Co., 234 E. Marquette Rd., Chicago, IL 60637, 312-488-5800 .... D•1033
§† Abalon Precision Mfg., 1040 Home Street, Bronx, NY 10459 212-589-5682
§ Argos Prods., 600 S. Sycamore St., Genoa, IL 60135 815-784-5118
§ Dukane Corp., Communications Sys. Div., 2900 Dukane Dr., St. Charles, IL 60174 312-584-2300
§ Fourjay Industries, Box 14617 Northridge Br., Dayton, OH 45414 513-278-9416
§ Frazier, 1930 Valley View La., Dallas, TX 75234 214-241-3441
§ GC Elctrns., 400 S. Wyman St., Rockford, IL 61101 815-968-9661
GTE SUPPLY, GTE Communications Systems, 5225 Wiley Post Way, Salt Lake City, UT 84116 801-537-5237
§ Hammond Mfg. Co., 1690 Walden Ave., Buffalo, NY 14225 716-894-5710
§ Harris Corp., Dracon Div., 809 Calle Plano, Camarillo, CA 93010 805-987-9511
§ Hartley Prods., 620 Island Rd., Ramsey, NJ 07446 201-327-4443
§ Martin Sound Prods., 28 Alpha Park, Cleveland, OH 44143-2297 216-442-2286
§ Oaktron Inds., 1000 30th St., Monroe, WI 53566 608-328-5560
§ Paso Sound Prods., 14 First St, Pelham, NY 10803 914-738-4800
† Permaluster, Inc., 1844 N. Keystone St., Burbank, CA 91504 213-849-4543
§ Pyle Industries, Inc., 501 Center St., P.O. Box 620, Huntington, IN 46750 219-356-1200
§ Soundlier, American Trading & Prod. Corp., 9380 Watson Ind'l. Pk., St. Louis, MO 63126 314-962-9870
Sparkomatic, Rte. 6 & 209, Milford, PA 18337 717-296-6444
§ SPECO Div., Components Specialties, Inc., P.O. Box 624, 1172 Rte. 109, Lindenhurst, NY 11757 .... 516-957-8700;800-645-5516

Ballasts — See Resistors, Ballast (Vol. A)

Baluns — See Transformers, Matching (Vol. A)

Barrier Blocks & Strips — See Terminal Blocks (Vol. C), Terminal Strips (Vol. C)

Bargraphs — See Meters, Bargraph (Vol. D)

Bars, Shorting-3200 — *See Vol. C*

Baths, Controlled Temperature (Air & Liquid)-4100

† Cincinnati Sub-Zero Prods., 12011 Mosteller Rd., Cincinnati, OH 45241, 513-772-8810 .... D•1166
Electro Impulse, Box 870, Red Bank, NJ 07701-0870, 201-741-0404 .... C•1637
† Tenney Engrg., 109 Springfield Rd., Union, NJ 07083, 201-686-7870 .... D•1173
Beckman Instrs., 2500 Harbor Blvd., Fullerton, CA 92634 714-871-4848
† Blue M, A Unit of General Signal, 138th & Chatham Sts., Blue Island, IL 60406 312-385-9000
Corning Glass Works, Corning Elctrns., Houghton Pk., Bldg. A-2, Corning, NY 14830 607-974-8725
Electrovert USA Corp., 10969 Shady Trail, #101, Dallas, TX 75220 214-353-9950
† FTS Sys., POB 158, Stone Ridge, NY 12484 800-824-0400
§ Guildline Instrs., 4403 Vineland Rd, Suite B-10, Orlando, FL 32811-9998 305-423-8215
Kaye Instruments, 15 De Angelo Dr., Bedford, MA 01730 617-275-0300
Koep Precision Standards, Inc., P. O. Box 191, So. Plainfield, NJ 07080 201-549-9280
Lab-Line Instrs., 15th & Bloomingdale, Melrose Park, IL 60160 312-450-2600
Marlow Inds., 10451 Vista Park Rd., Dallas, TX 75238 214-340-4900
Omega Engrg., Box 4047, Stamford, CT 06907 203-359-1660
Products for Resch., 88 Holten St., Danvers, MA 01923 617-774-3250
† Ransco Inds., Inc., Sub. Despatch Ind., Inc., 2201 Statham Blvd., Oxnard, CA 93033 805-487-7777
Science/Elctrns., 1224-26 McCook Ave., Dayton, OH 45404 513-228-6011
† Standard Environmental Systems, Inc., 383 Minnisink Rd., Totowa, NJ 07512 201-256-2200
§ Temptronic, 55 Chapel St., Newton, MA 02158 617-969-2501

United States Testing Co., Inc., 1415 Park Ave., Hoboken, NJ 07030 ..... 800-631-3096; 201-792-2400

Baths, Ultrasonic – See Cleaners, Ultrasonic (Vol. D)

Batteries, Alkaline Manganese-3900

§† **Tauber Elctrns. Inc., 4901 Morena Blvd., Bldg. 314, San Diego, CA 92117, 619-274-7242 ..... D•1439**
§† **Union Carbide Corporation, Battery Prods. Div., 39 Old Ridgebury Road, Danbury, CT 06817-0001, 203-794-7548 ..... D•1440**
§ **Varta Batteries, Inc., 300 Executive Blvd., Elmsford, NY 10523, 914-592-2500 ..... D•1442**
† Activair, Duracell, Inc., 2777 Eagandale Blvd., Eagan, MN 55121 612-681-4200
† Bren-Tronics, Inc., 10 Brayton Ct., Commack, NY 11725 516-499-5155
§† Duracell Intl., S. Broadway, Tarrytown, NY 10591 914-591-7000
Energy Concepts, PO Box 128, Carlsbad, CA 92008 619-942-3144
† N.C.E., Mail Station 331, 9925 Lyndale Ave. S., Bloomington, MN 55420 612-890-1360
† Power Group International, Dept. 227, 2200 West 66th Street, Richfield, MN 55423 612-890-1360
Power-Pak, Inc., 6216 Oakton St., Morton Grove, IL 60053 312-966-6000
§ Rayovac Corporation, 101 E. Washington Ave., Madison, WI 53703 608-252-7400
§ Techni-Tool, 5 Apollo Rd., Box 368, Plymouth Meeting, PA 19462 215-825-4990
§† Telecommunications Devices, 2320 Wisconsin Ave., Downers Grove, IL 60515 312-971-3460
§ TNR Technical, Inc., Saft & Gates Batteries, 45 Jefryn Blvd. West, Deer Park, NY 11735 516-242-4800

Batteries, Carbon Zinc-3900

Tauber Elctrns. Inc., 4901 Morena Blvd., Bldg. 314, San Diego, CA 92117, 619-274-7242 ..... D•1439
§† **Union Carbide Corporation, Battery Prods. Div., 39 Old Ridgebury Road, Danbury, CT 06817-0001, 203-794-7548 ..... D•1440**
§† **Varta Batteries, Inc., 300 Executive Blvd., Elmsford, NY 10523, 914-592-2500 ..... D•1442**
§ Altus Corp., 1610 Crane, San Jose, CA 95112
Avex Elctrns., 1683 Winchester Rd., P.O. Box 1026, Bensalem, PA 19020 215-638-1515
† Bren-Tronics, Inc., 10 Brayton Ct., Commack, NY 11725 516-499-5155
C&D Power Systems, Allied Corp., 3043 Walton Rd., Plymouth Meeting, PA 19462 215-828-9000
§ Marathon Battery Co., 8301 Imperial Dr., Waco, TX 76714 817-776-0650
† N.C.E., Mail Station 331, 9925 Lyndale Ave. S., Bloomington, MN 55420 612-890-1360
Panasonic, Ind'l. Elctrn. Comps., Panasonic, Elctrn. Comps. Div., Box 1503, Secaucus, NJ 07094 201-348-7000
Polaroid Corp., 119 Windsor St., Cambridge, MA 02139 617-577-2237
† Power Group International, Dept. 227, 2200 West 66th Street, Richfield, MN 55423 612-890-1360
§ Rayovac Corporation, 101 E. Washington Ave., Madison, WI 53703 608-252-7400
§ Shokai Far East, Ltd., 280 North Central Ave., Hartsdale, NY 10530 914-681-0700
§ Techni-Tool, 5 Apollo Rd., Box 368, Plymouth Meeting, PA 19462 215-825-4990
§ Telecommunications Devices, 2320 Wisconsin Ave., Downers Grove, IL 60515 312-971-3460
§ TNR Technical, Inc., Saft & Gates Batteries, 45 Jefryn Blvd. West, Deer Park, NY 11735 516-242-4800
§ Wonder Corp of America, 22 Elizabeth St., South Norwalk, CT 06856 203-866-3033

Batteries, Gelled Electrolyte-3900

Avex Elctrns., 1683 Winchester Rd., P.O. Box 1026, Bensalem, PA 19020, 215-638-1515 ..... D•1416
§ **Power-Sonic, Box 5242, 3106 Spring St., Redwood City, CA 94063, 415-364-5001 ..... D•1431**
§ **SAFT America, Inc., Portable Battery Division, 711 Industrial Blvd., Valdosta, GA 31601, 912-247-2331 ..... D•1412**
Sonnenschein Batteries Inc., 300 E. Johnson Ave., P.O. Box 339, Cheshire, CT 06410, 203-271-0091 ..... D•1438
§† **Tauber Elctrns. Inc., 4901 Morena Blvd., Bldg. 314, San Diego, CA 92117, 619-274-7242 ..... D•1439**
Yuasa Battery (America), Inc., 9728 Alburtis Ave., Santa Fe Springs, CA 90670, 213-949-4266 ..... D•1445
C&D Power Systems, Allied Corp., 3043 Walton Rd., Plymouth Meeting, PA 19462 215-828-9000
§† Eagle-Picher Inds., Inc., Elctrns. Div., Box 47, Joplin, MO 64801 417-623-8000
§ Elpower, 2117 S. Anne St., Santa Ana, CA 92704 714-540-6155
Energy Concepts, PO Box 128, Carlsbad, CA 92008 619-942-3144
§† Gates Energy Prods., 1050 S. Broadway, Denver, CO 80217 303-744-4806
§ Johnson Controls, Battery Div., 5757 N. Green Bay Ave., Milwaukee, WI 53201 414-228-2581
† N.C.E., Mail Station 331, 9925 Lyndale Ave. S., Bloomington, MN 55420 612-890-1360
† Power Group International, Dept. 227, 2200 West 66th Street, Richfield, MN 55423 612-890-1360
Power-Pak, Inc., 6216 Oakton St., Morton Grove, IL 60053 312-966-6000
§ RMS Electronics Inc., 50 Antin Pl., Bronx, NY 10462 212-892-6700
§ Shokai Far East, Ltd., 280 North Central Ave., Hartsdale, NY 10530 914-681-0700
§ Telecommunications Devices, 2320 Wisconsin Ave., Downers Grove, IL 60515 312-971-3460
† TNR Technical, Inc., Saft & Gates Batteries, 45 Jefryn Blvd. West, Deer Park, NY 11735 516-242-4800

Batteries, Lead Acid-3900

§ **Elpower, 2117 S. Anne St., Santa Ana, CA 92704, 714-540-6155 ..... D•1418**
† **N.C.E., Mail Station 331, 9925 Lyndale Ave. S., Bloomington, MN 55420, 612-890-1360 ..... D•1429**
Panasonic, Ind'l. Elctrn. Comps., Panasonic, Elctrn. Comps. Div., Box 1503, Secaucus, NJ 07094, 201-348-7000 ..... D•1422-1423
† **Power Group International, Dept. 227, 2200 West 66th Street, Richfield, MN 55423, 612-890-1360 ..... D•1429**
§ **Power-Sonic, Box 5242, 3106 Spring St., Redwood City, CA 94063, 415-364-5001 ..... D•1431**
§ **SAFT America, Inc., Portable Battery Division, 711 Industrial Blvd., Valdosta, GA 31601, 912-247-2331 ..... D•1412**
Sonnenschein Batteries Inc., 300 E. Johnson Ave., P.O. Box 339, Cheshire, CT 06410, 203-271-0091 ..... D•1438
Tauber Elctrns. Inc., 4901 Morena Blvd., Bldg. 314, San Diego, CA 92117, 619-274-7242 ..... D•1439
Yuasa Battery (America), Inc., 9728 Alburtis Ave., Santa Fe Springs, CA 90670, 213-949-4266 ..... D•1445
† Accudyne Corp., P.O. Box 1429, Janesville, WI 53547 608-752-9081
§ Alarm Controls, 19 Brandywine Dr., Deer Park, NY 11729 516-586-4220
Avex Elctrns., 1683 Winchester Rd., P.O. Box 1026, Bensalem, PA 19020 215-638-1515
§ Computer Power, 124E W. Main St., High Bridge, NJ 08829 201-735-8000
§† Eagle-Picher Inds., Inc., Elctrns. Div., Box 47, Joplin, MO 64801 417-623-8000
East Penn. Mfg. Co., Inc., Main Office, Lyon Station, PA 19536 215-682-6361
Exide Corp., 101 Gibraltar Rd., Horsham, PA 19044 215-674-9500
§† Gates Energy Prods., 1050 S. Broadway, Denver, CO 80217 303-744-4806
General Electric Co., Battery Business Dept., P.O. Box 992, Gainesville, FL 32602 904-462-4480
§ GNB Batteries Inc., Ind'l. Battery Div., 2010 Cabot Blvd. W., Langhorne, PA 19047 215-752-0555
Hydrocap Corp., 975 N.W. 95 St., Miami, FL 33150 305-696-2504
§ Johnson Controls, Battery Div., 5757 N. Green Bay Ave., Milwaukee, WI 53201 414-228-2581
Power-Pak, Inc., 6216 Oakton St., Morton Grove, IL 60053 312-966-6000
§ Shokai Far East, Ltd., 280 North Central Ave., Hartsdale, NY 10530 914-681-0700
Telecommunications Devices, 2320 Wisconsin Ave., Downers Grove, IL 60515 312-971-3460
§ TNR Technical, Inc., Saft & Gates Batteries, 45 Jefryn Blvd. West, Deer Park, NY 11735 516-242-4800
§† Tungstone Batteries, Inc., 18 Billings St., Sharon, MA 02067 617-784-2000

Batteries, Lead Dioxide-3900

† Accudyne Corp., P.O. Box 1429, Janesville, WI 53547 608-752-9081
Avex Elctrns., 1683 Winchester Rd., P.O. Box 1026, Bensalem, PA 19020 215-638-1515
† Eagle-Picher Inds., Inc., Elctrns. Div., Box 47, Joplin, MO 64801 417-623-8000
§ Johnson Controls, Battery Div., 5757 N. Green Bay Ave., Milwaukee, WI 53201 414-228-2581
† N.C.E., Mail Station 331, 9925 Lyndale Ave. S., Bloomington, MN 55420 612-890-1360
† Power Group International, Dept. 227, 2200 West 66th Street, Richfield, MN 55423 612-890-1360
§ SAFT America, Inc., Portable Battery Division, 711 Industrial Blvd., Valdosta, GA 31601 912-247-2331

Batteries, Lithium-3900

§† **Catalyst Research, Mine Safety Appliances Co., 1421 Clarkview Rd., Baltimore, MD 21209, 301-296-7000, Ext. 304 ..... D•1417**
Elpower, 2117 S. Anne St., Santa Ana, CA 92704, 714-540-6155 ..... D•1420
† **N.C.E., Mail Station 331, 9925 Lyndale Ave. S., Bloomington, MN 55420, 612-890-1360 ..... D•1429**
Panasonic, Ind'l. Elctrn. Comps., Panasonic, Elctrn. Comps. Div., Box 1503, Secaucus, NJ 07094, 201-348-7000 ..... D•1426-1427
† **Power Group International, Dept. 227, 2200 West 66th Street, Richfield, MN 55423, 612-890-1360 ..... D•1429**
§ **SAFT America, Inc., Portable Battery Division, 711 Industrial Blvd., Valdosta, GA 31601, 912-247-2331 ..... D•1412**
§† **Tauber Elctrns. Inc., 4901 Morena Blvd., Bldg. 314, San Diego, CA 92117, 619-274-7242 ..... D•1439**
§† **Union Carbide Corporation, Battery Prods. Div., 39 Old Ridgebury Road, Danbury, CT 06817-0001, 203-794-7548 ..... D•1441**
§† **Varta Batteries, Inc., 300 Executive Blvd., Elmsford, NY 10523, 914-592-2500 ..... D•1442**
Avex Elctrns., 1683 Winchester Rd., P.O. Box 1026, Bensalem, PA 19020 215-638-1515
† Bren-Tronics, Inc., 10 Brayton Ct., Commack, NY 11725 516-499-5155
§† Duracell Intl., S. Broadway, Tarrytown, NY 10591 914-591-7000
† Eagle-Picher Inds., Inc., Elctrns. Div., Box 47, Joplin, MO 64801 417-623-8000
§† ElectroChem Inds., Wilson Greatbatch Ltd., 10000 Wehrle, Clarence, NY 14031 716-759-6901
General Electric Co., Battery Business Dept., P.O. Box 992, Gainesville, FL 32602 904-462-4480
† Hellesens Battery Engrg., Inc., A/S Hellesens, 1636 Hyde Park Ave., Hyde Park, MA 02136 617-361-7555
† Honeywell Inc., Aerospace & Defense Grp., Honeywell Plaza, Minneapolis, MN 55408 612-870-5186
Power-Pak, Inc., 6216 Oakton St., Morton Grove, IL 60053 312-966-6000
§ Rayovac Corporation, 101 E. Washington Ave., Madison, WI 53703 608-252-7400
SAFT America Inc., Advanced Battery Sys. Div., 107 Beaver Ct., Cockeysville, MD 21030 301-666-3200
Sanyo Elec. Inc., 200 Riser Rd., Little Ferry, NJ 07643 201-641-2333
§ Strategic Sys. Div. Power Sys. Operations, GTE Prods. Corp. Sylvania Sys. Grp., 520 Winter St., Waltham, MA 02254 617-466-3000
§† Telecommunications Devices, 2320 Wisconsin Ave., Downers Grove, IL 60515 312-971-3460
† TNR Technical, Inc., Saft & Gates Batteries, 45 Jefryn Blvd. West, Deer Park, NY 11735 516-242-4800

Batteries, Lithium Manganese Dioxide-3900

§ **Elpower, 2117 S. Anne St., Santa Ana, CA 92704, 714-540-6155 ..... D•1420**
§† Altus Corp., 1610 Crane, San Jose, CA 95112

Batteries, Lithium Manganese Dioxide-3900 (Cont'd)

Avex Elctrns., 1683 Winchester Rd., P.O. Box 1026, Bensalem, PA 19020 ... 215-638-1515
† Bren-Tronics, Inc., 10 Brayton Ct., Commack, NY 11725 ... 516-499-5155
† N.C.E., Mail Station 331, 9925 Lyndale Ave. S., Bloomington, MN 55420 ... 612-890-1360
Polaroid Corp., 119 Windsor St., Cambridge, MA 02139 ... 617-577-2237
† Power Group International, Dept. 227, 2200 West 66th Street, Richfield, MN 55423 ... 612-890-1360
§ Rayovac Corporation, 101 E. Washington Ave., Madison, WI 53703 ... 608-252-7400
SAFT America Inc., Advanced Battery Sys. Div., 107 Beaver Ct., Cockeysville, MD 21030 ... 301-666-3200
Seiko Instrs. U.S.A., Inc., 2990 W. Lomita Blvd., Torrance, CA 90505 ... 213-530-8777
† TNR Technical, Inc., Saft & Gates Batteries, 45 Jefryn Blvd. West, Deer Park, NY 11735 ... 516-242-4800

Batteries, Lithium Thionyl Chloride-3900

Elpower, 2117 S. Anne St., Santa Ana, CA 92704, 714-540-6155 ... D•1420
§ Altus Corp., 1610 Crane, San Jose, CA 95112
Hellesens Battery Engrg., Inc., A/S Hellesens, 1636 Hyde Park Ave., Hyde Park, MA 02136 ... 617-361-7555
§ TNR Technical, Inc., Saft & Gates Batteries, 45 Jefryn Blvd. West, Deer Park, NY 11735 ... 516-242-4800

Batteries, Mercury-3900

Tauber Elctrns. Inc., 4901 Morena Blvd., Bldg. 314, San Diego, CA 92117, 619-274-7242 ... D•1439
§† Union Carbide Corporation, Battery Prods. Div., 39 Old Ridgebury Road, Danbury, CT 06817-0001, 203-794-7548 ... D•1441
† Activair, Duracell, Inc., 2777 Eagandale Blvd., Eagan, MN 55121 ... 612-681-4200
Avex Elctrns., 1683 Winchester Rd., P.O. Box 1026, Bensalem, PA 19020 ... 215-638-1515
† Bren-Tronics, Inc., 10 Brayton Ct., Commack, NY 11725 ... 516-499-5155
§† Duracell Intl., S. Broadway, Tarrytown, NY 10591 ... 914-591-7000
Energy Concepts, PO Box 128, Carlsbad, CA 92008 ... 619-942-3144
† N.C.E., Mail Station 331, 9925 Lyndale Ave. S., Bloomington, MN 55420 ... 612-890-1360
Panasonic, Ind'l. Elctrn. Comps., Panasonic, Elctrn. Comps. Div., Box 1503, Secaucus, NJ 07094 ... 201-348-7000
† Power Group International, Dept. 227, 2200 West 66th Street, Richfield, MN 55423 ... 612-890-1360
Power-Pak, Inc., 6216 Oakton St., Morton Grove, IL 60053 ... 312-966-6000
§ Rayovac Corporation, 101 E. Washington Ave., Madison, WI 53703 ... 608-252-7400
§ Shokai Far East, Ltd., 280 North Central Ave., Hartsdale, NY 10530 ... 914-681-0700
§† Telecommunications Devices, 2320 Wisconsin Ave., Downers Grove, IL 60515 ... 312-971-3460
TNR Technical, Inc., Saft & Gates Batteries, 45 Jefryn Blvd. West, Deer Park, NY 11735 ... 516-242-4800
§† Varta Batteries, Inc., 300 Executive Blvd., Elmsford, NY 10523 ... 914-592-2500

Batteries, Mercury Oxide-3900

§† Union Carbide Corporation, Battery Prods. Div., 39 Old Ridgebury Road, Danbury, CT 06817-0001, 203-794-7548 ... D•1441
Varta Batteries, Inc., 300 Executive Blvd., Elmsford, NY 10523, 914-592-2500 ... D•1442
§† Activair, Duracell, Inc., 2777 Eagandale Blvd., Eagan, MN 55121 ... 612-681-4200
Avex Elctrns., 1683 Winchester Rd., P.O. Box 1026, Bensalem, PA 19020 ... 215-638-1515
† N.C.E., Mail Station 331, 9925 Lyndale Ave. S., Bloomington, MN 55420 ... 612-890-1360
† Power Group International, Dept. 227, 2200 West 66th Street, Richfield, MN 55423 ... 612-890-1360
§ Rayovac Corporation, 101 E. Washington Ave., Madison, WI 53703 ... 608-252-7400

Batteries, Nickel Cadmium-3900

Avex Elctrns., 1683 Winchester Rd., P.O. Box 1026, Bensalem, PA 19020, 215-638-1515 ... D•1416
Christie Elec. Corp., 20665 Manhattan Pl., Torrance, CA 90501, 213-320-0808 ... D•1547
§ Elpower, 2117 S. Anne St., Santa Ana, CA 92704, 714-540-6155 ... D•1419
† N.C.E., Mail Station 331, 9925 Lyndale Ave. S., Bloomington, MN 55420, 612-890-1360 ... D•1428
Panasonic, Ind'l. Elctrn. Comps., Panasonic, Elctrn. Comps. Div., Box 1503, Secaucus, NJ 07094, 201-348-7000 ... D•1424-1426
† Power Group International, Dept. 227, 2200 West 66th Street, Richfield, MN 55423, 612-890-1360 ... D•1428
§ Power-Sonic, Box 5242, 3106 Spring St., Redwood City, CA 94063, 415-364-5001 ... D•1431
§ SAFT America, Inc., Portable Battery Division, 711 Industrial Blvd., Valdosta, GA 31601, 912-247-2331 ... D•1412,1432-1437
§† Tauber Elctrns. Inc., 4901 Morena Blvd., Bldg. 314, San Diego, CA 92117, 619-274-7242 ... D•1439
§† Union Carbide Corporation, Battery Prods. Div., 39 Old Ridgebury Road, Danbury, CT 06817-0001, 203-794-7548 ... D•1441
§† Varta Batteries, Inc., 300 Executive Blvd., Elmsford, NY 10523, 914-592-2500 ... D•1442
† Yardney Battery Div., Yardney Corp., 82 Mechanic St., Pawcatuck, CT 02891, 203-599-1100 ... D•1443
§ Alan Gordon Entprs., Inc., P.O. Box 3914, 5362 Cahuenga Blvd., N. Hollywood, CA 91605 ... 818-985-5500
§ Altus Corp., 1610 Crane, San Jose, CA 95112
† Bren-Tronics, Inc., 10 Brayton Ct., Commack, NY 11725 ... 516-499-5155
† Eagle-Picher Inds., Inc., Elctrns. Div., Box 47, Joplin, MO 64801 ... 417-623-8000
† EDMAN Corp., Subsidiary of Rospatch, 7500 Main St., P.O. Box 750, Fishers, NY 14453-0750 ... 716-924-4000
Energy Concepts, PO Box 128, Carlsbad, CA 92008 ... 619-942-3144
§† Gates Energy Prods., 1050 S. Broadway, Denver, CO 80217 ... 303-744-4806
General Electric Co., Battery Business Dept., P.O. Box 992, Gainesville, FL 32602 ... 904-462-4480
Hydrocap Corp., 975 N.W. 95 St., Miami, FL 33150 ... 305-696-2504
§† Marathon Battery Co., 8301 Imperial Dr., Waco, TX 76714 ... 817-776-0650
§ Motorola, Inc., Compt. Divs. Clock Oscillator Dept., 2553 N. Edgington, Franklin Park, IL 60131 ... 312-451-1000
Power-Pak, Inc., 6216 Oakton St., Morton Grove, IL 60053 ... 312-966-6000
§ Rayovac Corporation, 101 E. Washington Ave., Madison, WI 53703 ... 608-252-7400
§† SAFT America Inc., Box 1886, Valdosta, GA 31601 ... 912-247-2331
Sanyo Elec. Inc., 200 Riser Rd., Little Ferry, NJ 07643 ... 201-641-2333
§ Shokai Far East, Ltd., 280 North Central Ave., Hartsdale, NY 10530 ... 914-681-0700
§† Telecommunications Devices, 2320 Wisconsin Ave., Downers Grove, IL 60515 ... 312-971-3460
§† TNR Technical, Inc., Saft & Gates Batteries, 45 Jefryn Blvd. West, Deer Park, NY 11735 ... 516-242-4800
§† Tungstone Batteries, Inc., 18 Billings St., Sharon, MA 02067 ... 617-784-2000
† Whittaker Corp., 10880 Wilshire Blvd., Los Angeles, CA 90024 ... 213-475-9411

Batteries, Rechargeable-3900

Avex Elctrns., 1683 Winchester Rd., P.O. Box 1026, Bensalem, PA 19020, 215-638-1515 ... D•1416
Christie Elec. Corp., 20665 Manhattan Pl., Torrance, CA 90501, 213-320-0808 ... D•1547
§ Elpower, 2117 S. Anne St., Santa Ana, CA 92704, 714-540-6155 ... D•1418-1419
† N.C.E., Mail Station 331, 9925 Lyndale Ave. S., Bloomington, MN 55420, 612-890-1360 ... D•1428
Panasonic, Ind'l. Elctrn. Comps., Panasonic, Elctrn. Comps. Div., Box 1503, Secaucus, NJ 07094, 201-348-7000 ... D•1422-1426
† Power Group International, Dept. 227, 2200 West 66th Street, Richfield, MN 55423, 612-890-1360 ... D•1428
§ Power-Sonic, Box 5242, 3106 Spring St., Redwood City, CA 94063, 415-364-5001 ... D•1431
§ SAFT America, Inc., Portable Battery Division, 711 Industrial Blvd., Valdosta, GA 31601, 912-247-2331 ... D•1412,1432-1437
Tauber Elctrns. Inc., 4901 Morena Blvd., Bldg. 314, San Diego, CA 92117, 619-274-7242 ... D•1439
§† Union Carbide Corporation, Battery Prods. Div., 39 Old Ridgebury Road, Danbury, CT 06817-0001, 203-794-7548 ... D•1441
§ Varta Batteries, Inc., 300 Executive Blvd., Elmsford, NY 10523, 914-592-2500 ... D•1442
† Yardney Battery Div., Yardney Corp., 82 Mechanic St., Pawcatuck, CT 02891, 203-599-1100 ... D•1443
Yuasa Battery (America), Inc., 9728 Alburtis Ave., Santa Fe Springs, CA 90670, 213-949-4266 ... D•1445
§ Activair, Duracell, Inc., 2777 Eagandale Blvd., Eagan, MN 55121 ... 612-681-4200
† Alarm Controls, 19 Brandywine Dr., Deer Park, NY 11729 ... 516-586-4220
§ Altus Corp., 1610 Crane, San Jose, CA 95112
† Bren-Tronics, Inc., 10 Brayton Ct., Commack, NY 11725 ... 516-499-5155
Digital Pathways, Inc., 1060 E. Meadow Cir., Palo Alto, CA 94303 ... 415-493-5544
† Eagle-Picher Inds., Inc., Elctrns. Div., Box 47, Joplin, MO 64801 ... 417-623-8000
East Penn. Mfg. Co., Inc., Main Office, Lyon Station, PA 19536 ... 215-682-6361
Energy Concepts, PO Box 128, Carlsbad, CA 92008 ... 619-942-3144
Exide Corp., 101 Gibraltar Rd., Horsham, PA 19044 ... 215-674-9500
§† Gates Energy Prods., 1050 S. Broadway, Denver, CO 80217 ... 303-744-4806
§ GNB Batteries Inc., Ind'l. Battery Div., 2010 Cabot Blvd. W., Langhorne, PA 19047 ... 215-752-0555
§† Marathon Battery Co., 8301 Imperial Dr., Waco, TX 76714 ... 817-776-0650
Motorola, Inc., Compt. Divs. Clock Oscillator Dept., 2553 N. Edgington, Franklin Park, IL 60131 ... 312-451-1000
Power-Pak, Inc., 6216 Oakton St., Morton Grove, IL 60053 ... 312-966-6000
Rayovac Corporation, 101 E. Washington Ave., Madison, WI 53703 ... 608-252-7400
Sanyo Elec. Inc., 200 Riser Rd., Little Ferry, NJ 07643 ... 201-641-2333
§ Shokai Far East, Ltd., 280 North Central Ave., Hartsdale, NY 10530 ... 914-681-0700
§ Sonnenschein Batteries Inc., 300 E. Johnson Ave., P.O. Box 339, Cheshire, CT 06410 ... 203-271-0091
§† Telecommunications Devices, 2320 Wisconsin Ave., Downers Grove, IL 60515 ... 312-971-3460
§† TNR Technical, Inc., Saft & Gates Batteries, 45 Jefryn Blvd. West, Deer Park, NY 11735 ... 516-242-4800
§† Tungstone Batteries, Inc., 18 Billings St., Sharon, MA 02067 ... 617-784-2000

Batteries, Silver Cadmium-3900

† Yardney Battery Div., Yardney Corp., 82 Mechanic St., Pawcatuck, CT 02891, 203-599-1100 ... D•1443
Avex Elctrns., 1683 Winchester Rd., P.O. Box 1026, Bensalem, PA 19020 ... 215-638-1515
† N.C.E., Mail Station 331, 9925 Lyndale Ave. S., Bloomington, MN 55420 ... 612-890-1360
† Power Group International, Dept. 227, 2200 West 66th Street, Richfield, MN 55423 ... 612-890-1360
Power-Pak, Inc., 6216 Oakton St., Morton Grove, IL 60053 ... 312-966-6000
† Whittaker Corp., 10880 Wilshire Blvd., Los Angeles, CA 90024 ... 213-475-9411

Batteries, Silver Oxide-3900

§† Tauber Elctrns. Inc., 4901 Morena Blvd., Bldg. 314, San Diego, CA 92117, 619-274-7242 ... D•1439
§† Union Carbide Corporation, Battery Prods. Div., 39 Old Ridgebury Road, Danbury, CT 06817-0001, 203-794-7548 ... D•1441
§† Varta Batteries, Inc., 300 Executive Blvd., Elmsford, NY 10523, 914-592-2500 ... D•1442
† Yardney Battery Div., Yardney Corp., 82 Mechanic St., Pawcatuck, CT 02891, 203-599-1100 ... D•1443
§† Activair, Duracell, Inc., 2777 Eagandale Blvd., Eagan, MN 55121 ... 612-681-4200
† Bren-Tronics, Inc., 10 Brayton Ct., Commack, NY 11725 ... 516-499-5155
§† Duracell Intl., S. Broadway, Tarrytown, NY 10591 ... 914-591-7000
† Eagle-Picher Inds., Inc., Elctrns. Div., Box 47, Joplin, MO 64801 ... 417-623-8000

† N.C.E., Mail Station 331, 9925 Lyndale Ave. S., Bloomington, MN 55420 612-890-1360
Panasonic, Ind'l. Elctrn. Comps., Panasonic, Elctrn. Comps. Div., Box 1503, Secaucus, NJ 07094 201-348-7000
Plainview Elctrns., 28 Cain Dr., Plainview, NY 11803 516-249-6677
† Power Group International, Dept. 227, 2200 West 66th Street, Richfield, MN 55423 612-890-1360
Power-Pak, Inc., 6216 Oakton St., Morton Grove, IL 60053 312-966-6000
§ Rayovac Corporation, 101 E. Washington Ave., Madison, WI 53703 608-252-7400
§ Seiko Instrs. U.S.A., Inc., 2990 W. Lomita Blvd., Torrance, CA 90505 213-530-8777
Telecommunications Devices, 2320 Wisconsin Ave., Downers Grove, IL 60515 312-971-3460

Batteries, Silver Zinc-3900

§† Tauber Elctrns. Inc., 4901 Morena Blvd., Bldg. 314, San Diego, CA 92117, 619-274-7242 ..... D•1439
† Yardney Battery Div., Yardney Corp., 82 Mechanic St., Pawcatuck, CT 02891, 203-599-1100 ..... D•1443
† Eagle-Picher Inds., Inc., Elctrns. Div., Box 47, Joplin, MO 64801 417-623-8000
† N.C.E., Mail Station 331, 9925 Lyndale Ave. S., Bloomington, MN 55420 612-890-1360
† Power Group International, Dept. 227, 2200 West 66th Street, Richfield, MN 55423 612-890-1360
Power-Pak, Inc., 6216 Oakton St., Morton Grove, IL 60053 312-966-6000
† SAFT America, Inc., Portable Battery Division, 711 Industrial Blvd., Valdosta, GA 31601 912-247-2331
§ Seiko Instrs. U.S.A., Inc., 2990 W. Lomita Blvd., Torrance, CA 90505 213-530-8777
† Tungstone Batteries, Inc., 18 Billings St., Sharon, MA 02067 617-784-2000
† Whittaker Corp., 10880 Wilshire Blvd., Los Angeles, CA 90024 213-475-9411

Batteries, Solar — See Cells, Photovoltaic (Vol. B)

Batteries, Standard Cell-3900

§ SAFT America, Inc., Portable Battery Division, 711 Industrial Blvd., Valdosta, GA 31601, 912-247-2331 ..... D•1412
Sonnenschein Batteries Inc., 300 E. Johnson Ave., P.O. Box 339, Cheshire, CT 06410, 203-271-0091 ..... D•1438
† Yardney Battery Div., Yardney Corp., 82 Mechanic St., Pawcatuck, CT 02891, 203-599-1100 ..... D•1443
Avex Elctrns., 1683 Winchester Rd., P.O. Box 1026, Bensalem, PA 19020 215-638-1515
† Eagle-Picher Inds., Inc., Elctrns. Div., Box 47, Joplin, MO 64801 417-623-8000
Electrical Instr. Svc., 25 Dock St., Mt. Vernon, NY 10550 914-699-9717
§ Guildline Instrs., 4403 Vineland Rd, Suite B-10, Orlando, FL 32811-9998 305-423-8215
Power-Pak, Inc., 6216 Oakton St., Morton Grove, IL 60053 312-966-6000
§ Shokai Far East, Ltd., 280 North Central Ave., Hartsdale, NY 10530 914-681-0700
§† Tauber Elctrns. Inc., 4901 Morena Blvd., Bldg. 314, San Diego, CA 92117 619-274-7242
§ Techni-Tool, 5 Apollo Rd., Box 368, Plymouth Meeting, PA 19462 215-825-4990
TNR Technical, Inc., Saft & Gates Batteries, 45 Jefryn Blvd. West, Deer Park, NY 11735 516-242-4800

Batteries, Thermal-3900

Avex Elctrns., 1683 Winchester Rd., P.O. Box 1026, Bensalem, PA 19020 215-638-1515
Power-Pak, Inc., 6216 Oakton St., Morton Grove, IL 60053 312-966-6000

Batteries, Zinc Air-3900

Union Carbide Corporation, Battery Prods. Div., 39 Old Ridgebury Road, Danbury, CT 06817-0001, 203-794-7548 ..... D•1440
† Yardney Battery Div., Yardney Corp., 82 Mechanic St., Pawcatuck, CT 02891, 203-599-1100 ..... D•1443
§† Activair, Duracell, Inc., 2777 Eagandale Blvd., Eagan, MN 55121 612-681-4200
Avex Elctrns., 1683 Winchester Rd., P.O. Box 1026, Bensalem, PA 19020 215-638-1515
† N.C.E., Mail Station 331, 9925 Lyndale Ave. S., Bloomington, MN 55420 612-890-1360
Plainview Elctrns., 28 Cain Dr., Plainview, NY 11803 516-249-6677
† Power Group International, Dept. 227, 2200 West 66th Street, Richfield, MN 55423 612-890-1360
Power-Pak, Inc., 6216 Oakton St., Morton Grove, IL 60053 312-966-6000
§ Rayovac Corporation, 101 E. Washington Ave., Madison, WI 53703 608-252-7400
Telecommunications Devices, 2320 Wisconsin Ave., Downers Grove, IL 60515 312-971-3460

Batteries, Zinc Carbon-3900

Union Carbide Corporation, Battery Prods. Div., 39 Old Ridgebury Road, Danbury, CT 06817-0001, 203-794-7548 ..... D•1440
Avex Elctrns., 1683 Winchester Rd., P.O. Box 1026, Bensalem, PA 19020 215-638-1515
† Bren-Tronics, Inc., 10 Brayton Ct., Commack, NY 11725 516-499-5155
Plainview Elctrns., 28 Cain Dr., Plainview, NY 11803 516-249-6677
Power-Pak, Inc., 6216 Oakton St., Morton Grove, IL 60053 312-966-6000
§ Rayovac Corporation, 101 E. Washington Ave., Madison, WI 53703 608-252-7400
§† Telecommunications Devices, 2320 Wisconsin Ave., Downers Grove, IL 60515 312-971-3460

Batteries, Zinc Chloride-3900

Tauber Elctrns. Inc., 4901 Morena Blvd., Bldg. 314, San Diego, CA 92117, 619-274-7242 ..... D•1439
Union Carbide Corporation, Battery Prods. Div., 39 Old Ridgebury Road, Danbury, CT 06817-0001, 203-794-7548 ..... D•1440
Varta Batteries, Inc., 300 Executive Blvd., Elmsford, NY 10523, 914-592-2500 ..... D•1442
† N.C.E., Mail Station 331, 9925 Lyndale Ave. S., Bloomington, MN 55420 612-890-1360
Plainview Elctrns., 28 Cain Dr., Plainview, NY 11803 516-249-6677
† Power Group International, Dept. 227, 2200 West 66th Street, Richfield, MN 55423 612-890-1360
Power-Pak, Inc., 6216 Oakton St., Morton Grove, IL 60053 312-966-6000
§ Rayovac Corporation, 101 E. Washington Ave., Madison, WI 53703 608-252-7400

Batteries (MIL)-2440 — *See Vol. B*

Battery Chargers — See Chargers, Battery (Vol. D), Power Supplies, Plug-in (Vol. D)

Battery Holders — See Connectors, Battery (Vol. C), Retainers, Battery (Vol. C)

Battery Plugs — See Connectors, Battery (Vol. C)

Bearings-2500 — *See Vol. C*

Beepers — See Bells, Buzzers, Gongs, Sirens & Aural Warning Devices (Vol. D)

Bells, Buzzers, Gongs, Sirens & Aural Warning Devices-2200

§ Bell, Floyd, Assocs., Inc., 897 Higgs Ave., Columbus, OH 43212, 614-488-3193 ..... D•1023
§ International Comps. Corp., 105 Maxess Rd., Melville, NY 11747, 516-293-1500 ..... D•1025
Star Micronics, Inc., Components Div., 70-D Ethel Rd. W., Piscataway, NJ 08854, 201-572-9512 ..... D•1040-1044
§ TDK Corporation of America, 4711 Golf Rd., Skokie, IL 60076, 312-679-8200 ..... D•1046-1047
§ Alarm Controls, 19 Brandywine Dr., Deer Park, NY 11729 516-586-4220
§ Aqualarm Inc., 544 W. 182nd, Gardena, CA 90248 213-321-5873
§ Atlas Sound Div., 10 Pomeroy Rd., Parsippany, NJ 07054 201-887-7800
§† Audiosone, Inc., 617 Fan Hill Rd., Monroe, CT 06468 ..... 203-268-4372;203-268-6703
§ Cole-Hersee Co., 20 Old Colony Ave., Boston, MA 02127-2467 617-268-2100
Cord Electronics, Inc., 177 Cantiague Rock Rd., Westbury, NY 11590 516-935-3640
§ EAO Switch Corp., 198 Pepe's Farm Rd., P.O. Box 552 MO, Milford, CT 06460 203-877-4577
§ Edwards Co., Signaling Prods. Div., P.O. Box 1188, Farmington, CT 06034 203-678-0410
Endicott Coil, 22 E. Charlotte St., Binghamton, NY 13905 607-797-1263
§ GC Elctrns., 400 S. Wyman St., Rockford, IL 61101 815-968-9661
Golden Pacific Elctrns., Inc., 1020 N. Batavia St., Ste. Q, Orange, CA 92667 ..... 714-538-9752/9753
Harrel, Inc., 16 Fitch St., E. Norwalk, CT 06855 203-866-2573
§ Heath Co., Benton Harbor, MI 49022 616-982-3886
† Henschel, General Signal Corp., 9 Hoyt Drive, P.O. Box 30, Newburyport, MA 01950 617-462-2400
§ Inductive Prods., Inc., 11733 Markon Dr., Garden Grove, CA 92641 714-891-2572
§† Line Elec. Prods., G. General Electro-Components, Inc., 122 Naubuc Ave., Glastonbury, CT 06033 203-659-3573
§ Mallory Capacitor Co., Mallory Comps. Grp., 3029 E. Washington St., Indianapolis, IN 46201 317-636-5353
§ MG Electronics, 32 Ranick Rd., Hauppauge, NY 11788 516-582-3400
§ Murata Erie North America, Inc., 1148 Franklin Rd., S.E., Marietta, GA 30067 404-952-9777
NTK Technical Ceramics, NGK Spark Plugs (U.S.A.), Inc., 1701 N. Greenville Ave. #205, Richardson, TX 75081 214-235-8332
§ Potter & Brumfield, AMF Incorporated, 200 S. Richland Creek Dr., Princeton, IN 47671-0001 812-386-1000
§ Projects Unltd., 3680 Wyse Rd., Dayton, OH 45414 513-890-1918
Relay Service Co., 1310 N. Pulaski Rd., Chicago, IL 60651 ..... 312-AL2-2700
§ Relay Specialties, 1300 Plaza Rd., Fair Lawn, NJ 07410 ..... 201-797-3313;800-526-5376
§ Seiko Instrs. U.S.A., Inc., 2990 W. Lomita Blvd., Torrance, CA 90505 213-530-8777
Shogyo Intl. Corp., 287 Northern Blvd., Great Neck, NY 11021 516-466-0911
§ Shokai Far East, Ltd., 280 North Central Ave., Hartsdale, NY 10530 914-681-0700
§ Soundlier, American Trading & Prod. Corp., 9380 Watson Ind'l. Pk., St. Louis, MO 63126 314-962-9870
§ SPECO Div., Components Specialties, Inc., P.O. Box 624, 1172 Rte. 109, Lindenhurst, NY 11757 ..... 516-957-8700;800-645-5516
Trinetics Inc., 55807 Currant Rd., Mishawaka, IN 46545-4899 219-259-8535
§ Wheelock, Inc., 273 Branchport Ave., Long Branch, NJ 07740 201-222-6880

Belts, Dial Drive — See Cords & Cable, Dial Drive (Vol. C)

Belts, Drive-2500 — *See Vol. C*

Benches, Consoles, Tables (Work Stations, Lab & Shop)-Also See Enclosures, Equipment and Panel Mounting-1400 — *See Vol. C*

Bends & Twists, Microwave-3450 — *See Vol. A*

Bezels, Shielded & Unshielded-2400 — *See Vol. C*

Bimetals, Thermostatic-5300 — *See Vol. B*

Bins, Part Storage-3800 — *See Vol. C*

Blackbody Radiation Sources-2900

EG&G Gamma Scientific, Div. of EG&G Inc., 3777 Ruffin Rd., San Diego, CA 92123 619-279-8034
† Electro-Optical Inds., Box 3770, Santa Barbara, CA 93130 805-964-6701
Mikron Instr., Box 211, Ridgewood, NJ 07451 201-891-7330
Omega Engrg., Box 4047, Stamford, CT 06907 203-359-1660

Blowers, Centrifugal-2600 — *See Vol. C*

Blowers, Scroll (Squirrel Cage)-2600 — *See Vol. C*

Blowers, Tangential-2600 — *See Vol. C*

Board Computers & Subassemblies, Multibus Compatible-2025

Heurikon Corporation, 3201 Latham Dr., Madison, WI 53713, 800-356-9602;608-271-8700 .... D•1091
† Hybricon Corp., 410 Great Rd., Littleton, MA 01460, 617-486-0311 .... C•1710
Advanced Interconnections Corp., 5 Division St., Warwick, RI 02818 401-885-0485
§† Analog Devices, P.O. Box 280, Norwood, MA 02062 617-329-4700
Burr-Brown Corp., P.O. Box 11400, Tucson, AZ 85734 602-746-1111
Cambridge Digital Sys., Compumart, P.O. Box 568, 65 Bent St., Cambridge, MA 02139 617-491-2700
§ CmC Instr. Div., Connecticut microComputer Inc., 568 Danbury Road, New Milford, CT 06776 203-354-9395
Comark Corp., 93 W St., P. O. Box 474, Medfield, MA 02052 617-359-8161
Dexter Research Ctr., Inc., 7300 Huron River Dr., Dexter, MI 48130 313-426-3921
Diversified Technlg., P.O. Box 748, Ridgeland, MS 39157 601-856-4121
Elctrn. Molding Corp., 96 Mill St., Woonsocket, RI 02895 401-769-3800
§† Fairchild Microcontroller Div., Fairchild Camera & Instr. Corp., 450 National Ave., Mountain View, CA 94042 415-962-3838
GIC Systems, 2324 A Ridgepoint Dr., Austin, TX 78754 512-926-8840
ILC Data Device Corp., 105 Wilbur Pl., Bohemia, NY 11716 516-567-5600
§ Infosphere, Inc., 4730 S.W. Macadam Ave., Portland, OR 97201 503-226-3515
Mathematical Systems Design, Inc., 2850 Ocean Park Blvd., Ste. 300, Santa Monica, CA 90405 213-450-9851
§ Micro Digital Assocs., Inc., 12791 Western Ave., Unit C, Garden Grove, CA 92641 714-891-2363
§ National Instruments, 12109 Technology Blvd., Austin, TX 78759 512-250-9119
§ Pacific Microcomputers, Inc., 160 Chesterfield Dr., Cardiff, CA 92007 619-436-8649
† PTL Elctrns., 10211 Vinemont St., Dallas, TX 75218 214-327-3180
Relational Memory Sys., 1650 Berryessa Rd., Ste. B, San Jose, CA 95133-1082 .... 408-729-3011;800-448-4880
SGS Semiconductor Corporation, 1000 E. Bell Road, Phoenix, AZ 85022 602-867-6100
SYMBICON, 89 Route 101A, Amherst, NH 03031 603-673-8898
† Systek, 1023 N. Kellogg St., Kennewick, WA 99336 509-735-1200
Zendex Corp., 6700 Sierra La., Dublin, CA 94566 415-828-3000

Board Computers & Subassemblies, PC Bus Compatible-2025

Faraday Electronics, 743 Pastoria, Sunnyvale, CA 94086 408-749-1900

Board Computers & Subassemblies, Q Bus/Unibus Compatible-2025

† Hybricon Corp., 410 Great Rd., Littleton, MA 01460, 617-486-0311 .... C•1710
Burr-Brown Corp., P.O. Box 11400, Tucson, AZ 85734 602-746-1111
Cambridge Digital Sys., Compumart, P.O. Box 568, 65 Bent St., Cambridge, MA 02139 617-491-2700
§ CmC Instr. Div., Connecticut microComputer Inc., 568 Danbury Road, New Milford, CT 06776 203-354-9395
§ Codar Technology, Inc., 1428 Florida Avenue, Longmont, CO 80501 303-776-0472
§† Davidge Corp., 1951 Colony St., Mountain View, CA 94043 805-688-7707
Diversified Technlg., P.O. Box 748, Ridgeland, MS 39157 601-856-4121
Elctrn. Molding Corp., 96 Mill St., Woonsocket, RI 02895 401-769-3800
GEN/COMP Inc., 6 Algonquin Rd., Canton, MA 02021 617-828-2008
§ General Robotics Corp., 57 N. Main St., Hartford, WI 53027 414-673-6800
ILC Data Device Corp., 105 Wilbur Pl., Bohemia, NY 11716 516-567-5600
§ Infosphere, Inc., 4730 S.W. Macadam Ave., Portland, OR 97201 503-226-3515
† Interconnection Technology, Inc., 5542 Buckingham Drive, Huntington Beach, CA 92649 714-891-5305
Kinetic Sys., 11 Maryknoll Dr., Lockport, IL 60441 815-838-0005
Minntronics Corporation, 2599 White Bear Ave., St. Paul, MN 55109 612-770-5247
§ National Instruments, 12109 Technology Blvd., Austin, TX 78759 512-250-9119

Board Computers & Subassemblies, S100 Bus Compatible-2025

§ California Computer Systems, 740 S. Milpitas Blvd., Milpitas, CA 95035 408-945-0500
Cambridge Digital Sys., Compumart, P.O. Box 568, 65 Bent St., Cambridge, MA 02139 617-491-2700
§ CompuPro, 3506 Breakwater Ct., Hayward, CA 94545 415-786-0909
§ Cromemco, 280 Bernardo Ave., Mountain View, CA 94043 415-964-7400
Elctrn. Molding Corp., 96 Mill St., Woonsocket, RI 02895 401-769-3800
§ Industrial Computer Designs, Inc., 31264 La Baya Drive, Westlake Village, CA 91362 818-889-3179
† Interconnection Technology, Inc., 5542 Buckingham Drive, Huntington Beach, CA 92649 714-891-5305
§ National Instruments, 12109 Technology Blvd., Austin, TX 78759 512-250-9119
Pickles & Trout, P.O. Box 1206, Goleta, CA 93116 685-4641
§ Quam Corporation, 900 W. 128th St. Ste 208, Burnsville, MN 55337 612-894-2360
Seattle Computer Products, Inc., 1114 Ind. Dr., Seattle, WA 98188 .... 206-575-1830; 800-426-8936
§ Standard Microsystems, 35 Marcus Blvd., Hauppauge, NY 11788 516-273-3100

Board Computers & Subassemblies, STD Bus Compatible-2025

G W Three Incorporated, 7623 Fullerton Rd., 2nd Floor, Springfield, VA 22153, 703-451-2043 .... D•1088-1089
Stock Drive Prods., Div. of Designatronics, Inc., 2101 Jericho Turnpike, New Hyde Pk., NY 11040, 516-328-0200;328-3300 .... B•1191
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Applied Micro Technlg., A Burr Brown Co., 3669 E. 44th Street, Tucson, AZ 85713 602-622-8605
Atec, Inc., Box 19426, 8219 Kempwood Dr., Houston, TX 77055 713-468-7971
Beal Communications, Beneficial Properties, 11020 Audelia Rd. Ste. C 101, Dallas, TX 75243 .... 214-340-2044;214-340-2045
Burr-Brown Corp., P.O. Box 11400, Tucson, AZ 85734 602-746-1111
§ CompuPro, 3506 Breakwater Ct., Hayward, CA 94545 415-786-0909
Computer Dynamics, 105 S. Main St., Greer, SC 29651 803-877-7471
CYTEC Corp., 107 N. Washington St., E. Rochester, NY 14445 716-381-4740
§ Davidge Corp., 1951 Colony St., Mountain View, CA 94043 805-688-7707
§ DY-4 Systems Inc., 888 Lady Ellen Pl., Ottawa, ON, CANADA K1Z 5M1 613-728-3711
Electrologic, Inc., 1359 28th St., Signal Hill, CA 90806 213-595-0551
Elctrn. Molding Corp., 96 Mill St., Woonsocket, RI 02895 401-769-3800
GIC Systems, 2324 A Ridgepoint Dr., Austin, TX 78754 512-926-8840
Global Specialties, Interplex Electronics, Inc., 70 Fulton Terrace, P.O. Box 1942, New Haven, CT 06509 203-624-3103
§ Gordos Arkansas, Gordos International Corp., 1000 N. Second St., Rogers, AR 72756 501-636-5000
§ Infosphere, Inc., 4730 S.W. Macadam Ave., Portland, OR 97201 503-226-3515
† Interconnection Technology, Inc., 5542 Buckingham Drive, Huntington Beach, CA 92649 714-891-5305
JF Microsystems, 3641 Frontier Road, Pasco, WA 99301 .... 509-297-4294; 800-JF-CARDS
§ National Instruments, 12109 Technology Blvd., Austin, TX 78759 512-250-9119
Solarcon Technology, Inc., P.O. Box 4715, Hayward, CA 94544 415-489-3141
† Systek, 1023 N. Kellogg St., Kennewick, WA 99336 509-735-1200
TL Industries, Inc., 2541 Tracy Road, Toledo, OH 43619 1-419-666-8144
Validyne Engrg. Corp., 8626 Wilbur Ave., Northridge, CA 91324 818-886-2057
VersaLogic, 87070 Dukhobar Rd., Eugene, OR 97402 503-485-8575
Vesta Technology, Inc., 7100 W. 44th Ave. Ste. 101, Wheat Ridge, CO 80033 303-759-4988
§ Win Systems, Inc., P.O. Box 121361, Arlington, TX 76012 817-274-7553

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† Acromag, 30765 Wixom Rd., Wixom, MI 48096 313-624-1541
Advanced Interconnections Corp., 5 Division St., Warwick, RI 02818 401-885-0485
§† Analog Devices, P.O. Box 280, Norwood, MA 02062 617-329-4700
Beal Communications, Beneficial Properties, 11020 Audelia Rd. Ste. C 101, Dallas, TX 75243 .... 214-340-2044;214-340-2045
Burr-Brown Corp., P.O. Box 11400, Tucson, AZ 85734 602-746-1111
Charles River Data Systems, Inc., 983 Concord St., Framingham, MA 01701 617-626-1000
§ Colex, Incorporated, 15028 Beltway Dr., Dallas, TX 75234 214-458-2779
§ Computer System Assocs., 7564 Trade St., San Diego, CA 92121 619-566-3911
§ DY-4 Systems Inc., 888 Lady Ellen Pl., Ottawa, ON, CANADA K1Z 5M1 613-728-3711
Logical Design Group, Inc., 541 Pylon Dr., Raleigh, NC 27606 919-834-8827
Motorola Semiconductor Prods. Sector, Adv. 72, Box 20912, Phoenix, AZ 85036 602-244-6900
§ Pacific Microcomputers, Inc., 160 Chesterfield Dr., Cardiff, CA 92007 619-436-8649
§ Serial Lab Prods., Inc., 162 Cook Lane, P.O. Box 766, Marlboro, MA 01752 617-481-1684
TL Industries, Inc., 2541 Tracy Road, Toledo, OH 43619 1-419-666-8144

Boards, Circuit, Clad-1700 — *See Vol. C*

Boards, Circuit, Unclad-1700 — *See Vol. C*

Boards, Display, Graphic-2450 — *See Vol. B*

Boards, Integrated Circuit — See Boards, Plug-in (Vol. C)

Boards, Plug-in-3200 — *See Vol. C*

Boards, Plug-in, Extender-3200 — *See Vol. C*

Boards, Plug-in, Interface-3200 — *See Vol. C*

Boards, Plug-in, Memory-3200 — *See Vol. C*

Boards, Plug-in Processor-1900 — *See Vol. C*

Boards, Plug-in, Prototype-4200 — *See Vol. C*

Boards, Prewired, High Density-3200 — *See Vol. C*

Boards, Printed Circuit — See Circuits, Printed, Rigid (Vol. C)

Boards, Programming-3200 — *See Vol. C*

Bobbins, Winding, Coil & Transformer-Also See Coil Assemblies & Forms-2500 — *See Vol. C*

Bolometers, Infrared-2900

Advanced Kinetics, 1231 Victoria St., Costa Mesa, CA 92627 714-646-7165
† Barnes Engrg., 44 Commerce Rd., P.O. Box 53, Stamford, CT 06904 203-348-5381
Mikron Instr., Box 211, Ridgewood, NJ 07451 201-891-7330
Optoelectronics, Inc., 1309 Dynamic St., Petaluma, CA 94952 707-763-4181
† Thermometrics, Inc., 808 U.S. Hwy. #1, Edison, NJ 08817-4695 201-287-2870
§ Victory Engrg. Corp., Victory Rd., Springfield, NJ 07081 201-379-5900
Yellow Springs Instr., Box 279, Yellow Springs, OH 45387 513-767-7241

Bolometers, Microwave-2900
Alpha Inds., Inc.-MSD Div., 20 Sylvan Rd., Woburn, MA 01801 617-935-5150
Alpha Inds., Inc. - TRG Millimeter Comp., 20 Sylvan Rd., Woburn, MA 01801 617-935-5150
† General Microwave Corp., 155 Marine St., Farmingdale, NY 11735 516-694-3600
§† Harris Corp., PRD Elctrns. Div., 6801 Jericho Tpke., Syosset, NY 11791 516-364-0400
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
M/A-Com Millimeter Products, M/A-Com, Inc., Second Avenue, Burlington, MA 01803 617-272-3000
† Microlab/FXR, 10 Microlab Rd., Livingston, NJ 07039 201-992-7700
§† Micronetics, 36 Oak St., Norwood, NJ 07648 201-767-1320
MSI Electronics, Inc., 34-32 57th St., Woodside, NY 11377 212-672-6500
Weinschel Engrg., One Weinschel La., Gaithersburg, MD 20877 .... 301-948-3434; 800-638-2048

Bolts-2325 — See *Vol. C*

Books — See Technical Books (Vol. D)

Boosters, Low Line Voltage, Automatic — See Regulators & Stabilizers, Voltage (Vol. D)

Boxes, Decade — See Decade Boxes (Vol. D)

Boxes, Junction, Outlets & Wall Plates-1400 — *See Vol. C*

Boxes, Metal & Plastic — See Enclosures (Various types) (Vol. C)

Boxes, Power Outlet — See Boxes, Junction, Outlets & Wall Plates (Vol. C)

Boxes, Shipping (Reusable) — See Enclosures, Shipping (Vol. C)

Brackets, Antenna — See Mounts, Antenna (Vol. D)

Braid, Cable-Also See Wire Shielding-6000 — *See Vol. C*

Brakes, Magnetic-3500 — *See Vol. B*

Brakes, Mechanical-3500 — *See Vol. B*

Breadboard Assemblies-4200 — *See Vol. C*

Breadboards & Breadboard Kits — See Kits, Breadboarding (Vol. C)

Bridge Rectifiers, Silicon-Also See Rectifiers, Bridges & Assemblies-4800 — *See Vol. A*

Bridges, Admittance-2900
Electro Scientific Inds., 13900 N.W. Science Pk. Dr., Portland, OR 97229 503-641-4141
§ Tucker Elctrns., Box 461966, Garland, TX 75046 .... 214-348-8800;800-527-4642
§ Wiltron, 805 E. Middlefield Rd., P.O. Box 7290, Mountain View, CA 94042-7290 415-969-6500

Bridges, Antenna — See Bridges, RF (Vol. D)

Bridges, Audio-2900
Dantel, 2991 N. Argyle Ave., Fresno, CA 93727 209-292-1111
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Electro-Dynamics Dev. Co., 475 Mt. Hood Dr. S.W., Issaquah, WA 98027 206-392-2493
§ MARCONI INSTRUMENTS, 3 Pearl Court, Allendale, NJ 07401 201-934-9050
§ Tucker Elctrns., Box 461966, Garland, TX 75046 .... 214-348-8800;800-527-4642

Bridges, Calorimeter-2900
† Electro Impulse, Box 870, Red Bank, NJ 07701-0870 201-741-0404
† General Microwave Corp., 155 Marine St., Farmingdale, NY 11735 516-694-3600
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Tettex Instruments, Inc., P.O. Box 281, Fairview Village, PA 19409-0281, 215-539-6050 .... D•1312
§ AEMC, 99 Chauncy, Boston, MA 02111 .... 617-451-0227;800-343-1391
§ American HV Test Systems Inc., Central Garrett Ind'l. Pk., Accident, MD 21520 301-826-8651
Andeen-Hagerling, Inc., 31899 Miles Road, Chagrin Falls, OH 44022 216-349-0370
Blanck, A. R., Co., Box 249, Rutherford, NJ 07070 201-933-2091
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Cambridge Technology, Inc., 2464 Massachusetts Ave., Cambridge, MA 02140 617-876-0891
Clarke-Hess Comm. Resch. Corp., 17 West 17th St., New York, NY 10011 212-255-2940
Continental Resources, Inc., 175 Middlesex Tpke., Bedford, MA 01730 .. 617-275-0850
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§ Epic, Inc., 150 Nassau St., New York, NY 10038 212-349-2470
GenRad, Inc., 300 Baker Ave., Concord, MA 01742 617-369-4400
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IET Labs, Inc., 534 Main St., Westbury, NY 11590 516-334-5959
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Bridges, Impedance-2900
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Alford Mfg. Co., P.O. Box 2116, 32 Sixth Rd., Woburn, MA 01888 617-935-8610
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§ Heath Co., Benton Harbor, MI 49022 616-982-3886
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§ Wiltron, 805 E. Middlefield Rd., P.O. Box 7290, Mountain View, CA 94042-7290 415-969-6500

Bridges, Inductance-2900
† Freed Transformer, 1718 Weirfield St., Ridgewood, NY 11385, 212-386-1300 .... D•1229
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Bridges, Kelvin-2900

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Tettex Instruments, Inc., P.O. Box 281, Fairview Village, PA 19409-0281, 215-539-6050 ... D•1312
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Biddle Instruments, A Thorn EMI Co., 510 Township Line Rd., Blue Bell, PA 19422 ... 215-646-9200
Electro Scientific Inds., 13900 N.W. Science Pk. Dr., Portland, OR 97229 ... 503-641-4141
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Fluke, John, Mfg. Co., Box C9090, MS 250C, Everett, WA 98206 ... 206-356-5400
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§ Guildline Instrs., 4403 Vineland Rd, Suite B-10, Orlando, FL 32811-9998 ... 305-423-8215
IET Labs, Inc., 534 Main St., Westbury, NY 11590 ... 516-334-5959
Julie Resch. Labs., 211 West 61st St., New York, NY 10023 ... 212-245-2727
Leeds & Northrup Instrs., A Unit of General Signal Corp., Sumneytown Pike, North Wales, PA 19454 ... 215-643-2000
Meissner Inds., 551 Rte. 10, Dover, NJ 07801 ... 201-366-1700
Penn Airborne Prods., Industrial Hwy., Southampton, PA 18966 ... 215-355-3400
§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 ... 215-673-5600
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§ Yokogawa Corp. of America, 2 Dart Rd., Shenandoah, GA 30265 ... 404-253-7000

Bridges, LCR-2900

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Electro Scientific Inds., 13900 N.W. Science Pk. Dr., Portland, OR 97229 ... 503-641-4141
§ Leader Instrs. Corp., 380 Oser Ave., Hauppauge, NY 11788-3694 ... 516-231-6900
Mann, Henry, Inc., 3983 Mann Road, Huntingdon Valley, PA 19006 ... 215-355-7200
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§ Mechanical Techn., 968 Albany Shaker Rd., Latham, NY 12110 ... 518-785-2353
§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 ... 215-673-5600
Wayne Kerr, Inc., W.K.R. Ltd., 400 West Cummings Pk., Woburn, MA 01801 ... 617-938-8390

Bridges, Limit — See Bridges (Specific Types) (Vol. D)

Bridges, Megohm — See Bridges, Resistance (Vol. D)

Bridges, Power, RF-2900

Bird Elctrn., 30303 Aurora Rd., Cleveland, OH 44139 ... 216-248-1200
† Electro Impulse, Box 870, Red Bank, NJ 07701-0870 ... 201-741-0404
† General Microwave Corp., 155 Marine St., Farmingdale, NY 11735 ... 516-694-3600
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
§ International Rectifier Corp., Semiconductor Div., 233 Kansas St., El Segundo, CA 90245 ... 213-772-2000
§† Mechanical Techn., 968 Albany Shaker Rd., Latham, NY 12110 ... 518-785-2353
§ Pathcom, Inc., Pace Two-Way Radio Prods., 24105 S. Frampton Ave., Harbor City, CA 90710 ... 213-325-1290
† Racal-Dana Instrs. Inc., 4 Goodyear St., Irvine, CA 92715 ... 714-859-8999
§† Semtech, 652 Mitchell Rd., Newbury Park, CA 91320 ... 213-628-5392
Texscan Instruments, 3169 N. Shadeland, Indianapolis, IN 46226 ... 317-545-4196

Bridges, Programmable — See Bridges (Specific Types) (Vol. D)

Bridges, Q-2900

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IET Labs, Inc., 534 Main St., Westbury, NY 11590 ... 516-334-5959
§† Mechanical Techn., 968 Albany Shaker Rd., Latham, NY 12110 ... 518-785-2353
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Tettex Instruments, Inc., P.O. Box 281, Fairview Village, PA 19409-0281 ... 215-539-6050
§ Tucker Elctrns., Box 461966, Garland, TX 75046 ... 214-348-8800;800-527-4642
Wayne Kerr, Inc., W.K.R. Ltd., 400 West Cummings Pk., Woburn, MA 01801 ... 617-938-8390

Bridges, Ratio — See Meters, Ratio (Vol. D)

Bridges, Resistance-2900

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Julie Resch. Labs., 211 West 61st St., New York, NY 10023, 212-245-2727 ... D•1255
Tettex Instruments, Inc., P.O. Box 281, Fairview Village, PA 19409-0281, 215-539-6050 ... D•1312
§ AEMC, 99 Chauncy, Boston, MA 02111 ... 617-451-0227;800-343-1391
§ Allen-Bradley Co., Electronics Group, Rockwell Corporation, 1201 S. Second St., Milwaukee, WI 53204 ... 414-671-2000
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GenRad, Inc., 300 Baker Ave., Concord, MA 01742 ... 617-369-4400
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MARCONI INSTRUMENTS, 3 Pearl Court, Allendale, NJ 07401 ... 201-934-9050
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§ Tucker Elctrns., Box 461966, Garland, TX 75046 ... 214-348-8800;800-527-4642
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§ Wiltron, 805 E. Middlefield Rd., P.O. Box 7290, Mountain View, CA 94042-7290 ... 415-969-6500

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Bridges, Strain Gauge-2900

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Biddle Instruments, A Thorn EMI Co., 510 Township Line Rd., Blue Bell, PA 19422 ... 215-646-9200
BLH Elctrns., 75 Shawmut Road, Canton, MA 02021 ... 617-821-2000
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† North Atlantic Inds., Instrument Div., 60 Plant Ave., Hauppauge, NY 11788, 516-582-6500 ... D•1283
Astrosystems, 6 Nevada Dr., Lake Success, NY 11042 ... 516-328-1600
† Control Technology Co., 41-16 29th St., Long Island City, NY 11101 ... 718-361-2133
† Interface Engrg., 386 Lindelof Ave., Stoughton, MA 02072 ... 617-344-7383
† Transmagnetics, 210 Adams Blvd., Farmingdale, NY 11735 ... 516-293-3100

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§ dek, inc., 3480 Swenson Ave., St. Charles, IL 60174 ... 312-377-2575
§ Electrodata, Inc., 23020 Miles Rd., Bedford Heights, OH 44128 ... 216-663-3333
National Telephone & Elctrns. Inc., 2350 N.W. 96 Avenue, Miami, FL 33172 ... 305-592-0551
SGS Semiconductor Corporation, 1000 E. Bell Road, Phoenix, AZ 85022 ... 602-867-6100

Trimm, Inc., Div. of Newton Instr. Co., 400 W. Lake St., Box 489, Libertyville, IL 60048 312-362-3700

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§ Guildline Instrs., 4403 Vineland Rd, Suite B-10, Orlando, FL 32811-9998 305-423-8215
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United States Testing Co., Inc., 1415 Park Ave., Hoboken, NJ 07030 .... 800-631-3096; 201-792-2400
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Buffers, Data — See Spoolers, Printer Buffers (Vol. D)

Bulbs — See Lamps, Miniature & Subminiature (Vol. B)

Bumpers-2825 — *See Vol. C*

Burnishers, Contact-5400 — *See Vol. C*

Bus Bars & Systems-3200 — *See Vol. C*

Bus Compatible Instruments — See Instruments, Test and Measuring, GPIB Compatible (Vol. D)

Bushings, Glass, Plastic, Metal, Rubber, etc.-2500 — *See Vol. C*

Busses, Multibus, Q Bus, S100 Bus, STD Bus — See Board Computers & Subassemblies (Vol. D)

Buzzers, Electronic — See Bells, Buzzers, Gongs, Sirens & Aural Warning Devices (Vol. D)

Cabinets, Plastic — See Enclosures, Nonmetallic (Vol. C)

Cabinets & Accessories, Metal — See Enclosures, Equipment & Panel Mounting (Vol. C)

Cable, Audio-6000 — *See Vol. C*

Cable, Battery Booster-6000 — *See Vol. C*

Cable, Coaxial-6000 — *See Vol. C*

Cable, Communication-6000 — *See Vol. C*

Cable, Computer-6000 — *See Vol. C*

Cable, Data Transmission-6000 — *See Vol. C*

Cable, Dial — See Cords & Cable, Dial Drive (Vol. C)

Cable, FEP Insulated-6000 — *See Vol. C*

Cable, Fiber Optic-2475 — *See Vol. B*

Cable, Flame Retardant-6000 — *See Vol. C*

Cable, Flat-6000 — *See Vol. C*

Cable, Heater-6000 — *See Vol. C*

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Cable, Microphone-6000 — *See Vol. C*

Cable, Multiconductor-6000 — *See Vol. C*

Cable, Plenum-6000 — *See Vol. C*

Cable, Power-6000 — *See Vol. C*

Cable, Retractile — See Cords, Retractile (Vol. C)

Cable, Ribbon — See Cable, Flat (Vol. C)

Cable, Rotator Antenna — See Cable, Multiconductor (Vol. C)

Cable, Satellite-6000 — *See Vol. C*

Cable, Security-6000 — *See Vol. C*

Cable, Shielded-6000 — *See Vol. C*

Cable, Speaker-6000 — *See Vol. C*

Cable, Telephone-6000 — *See Vol. C*

Cable, TFE Insulated-6000 — *See Vol. C*

Cable, Thermocouple-6000 — *See Vol. C*

Cable, Transmission Line, Power-6000 — *See Vol. C*

Transmission Line, Data — See Cable, Data Transmission

Cable, Triaxial-6000 — *See Vol. C*

Cable, TV (Incl. Camera)-6000 — *See Vol. C*

Cable, Twisted Pair-6000 — *See Vol. C*

Cable, Woven Conductor-6000 — *See Vol. C*

Cable & Assemblies (MIL)-2440 — *See Vol. B*

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M/A-Com. Cable/Home Communicatios Comm/Scope Coaxial Cable, M/A-Com Inc., P.O. Box 1729, Hickory, NC 28603, 704-324-2200;800-438-3331 .... C◦1849-1851
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Cable (MIL), Flat-2440 — *See Vol. B*

Cable (MIL), RF-2440 — *See Vol. B*

Cable Retractors-1400 — *See Vol. C*

Cages, Card — See Enclosures, Circuit Board, Module, & Relay Mounting (Vol. C)

Calculators, Electronic, Desk Top-4200 — *See Vol. C*

Calculators, Electronic, Hand Held-4200 — *See Vol. C*

Calibration & Instrument Repair Services — See Services, Calibration & Instrument Repair (Vol. D)

Calibrators, Accelerometer-2900

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Bently Nevada Corp., P.O. Box 157, Minden, NV 89423 702-782-3611
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Compliance Design Inc., 593 Massachusetts Ave., Boxboro, MA 01719 .. 617-264-4668
§ EMR Data Systems, Div. Sangamo- Weston, Box 3041, Sarasota, FL 33578 813-371-0811
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† FSI/Fork Standards Inc., 666 Western Ave., Lombard, IL 60148 .... 312-231-3511; 312-932-9380
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PPM, Inc., 4521 Emery Ind. Pkwy., Cleveland, OH 44128 216-292-6006
Rochester Instr. Sys., 255 N. Union St., Rochester, NY 14605 716-263-7700
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Spectracom, 101 Despatch Drive, East Rochester, NY 14445 716-381-4827
Teledyne/Geotech, 3401 Shiloh Rd., Garland, TX 75041 214-271-2561
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§ TRW, Dynalco Controls Div., 5200 NW 37th, P.O. Box 8187, Ft. Lauderdale, FL 33310 305-739-4300
Weinschel Engrg., One Weinschel La., Gaithersburg, MD 20877 .... 301-948-3434; 800-638-2048

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§ Lion Precision, 60 Bridge St., Newton, MA 02195 617-969-4710
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Magnetic Instrumentation, 8350 E. 48TH ST., Indianapolis, IN 46226 317-545-2102
§ Magnos, Old School House Rd., Harvard, MA 01451 617-456-8880
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Walker Scientific, Rockdale St., Worcester, MA 01606 617-852-3674
Yokogawa Corp. of America, 2 Dart Rd., Shenandoah, GA 30265 404-253-7000

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Calibrators, Oscilloscope-2900

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Information Technolgoy A.D.S.C., P.O. Box 470, College Park, MD 20740 301-779-5110
Iwatsu Instruments, Inc., 430 Commerce Blvd., Carlstadt, NJ 07072 201-935-5220
ZI-TECH Instr. Corp., 2151 Park Blvd., Box 60490, Palo Alto, CA 94306 415-326-2151

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§ Simpson Elec. Co., 853 Dundee Ave., Elgin, IL 60120 312-697-2260
§ Spanta, Inc., Box 193, Franklin Lakes, NJ 07417 201-337-0044
§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 215-673-5600
§ Tucker Elctrns., Box 461966, Garland, TX 75046 .... 214-348-8800;800-527-4642

Calibrators, Sweep — See Generators, Sweep (Vol. D)

Calibrators, Synchro-2900

Astrosystems, 6 Nevada Dr., Lake Success, NY 11042, 516-328-1600 ... D•1183
† North Atlantic Inds., Instrument Div., 60 Plant Ave., Hauppauge, NY 11788, 516-582-6500 .... D•1283
† Computer Conversions Corp., 6 Dunton Ct., E. Northport, NY 11731 516-261-3300
† Fork Standards, Inc., 666 Western Ave., Lombard, IL 60148 312-932-9380
† ILC Data Device Corp., 105 Wilbur Pl., Bohemia, NY 11716 516-567-5600
Jonard Industries Corp., 134 Marbledale Rd., Tuckahoe, NY 10707 914-793-0700
† Transmagnetics, 210 Adams Blvd., Farmingdale, NY 11735 516-293-3100

Calibrators, Time Base-2900

§† Ballantine Labs., 90 Fanny Rd., Boonton, NJ 07005, 201-335-0900 ...... D•1185
§† EFRATOM, a division of Ball Corp., 18851 Bardeen Ave, Irvine, CA 92715, 714-752-2891 .... A•1361
Julie Resch. Labs., 211 West 61st St., New York, NY 10023, 212-245-2727 .... D•1252
California Avionics Labs., Box 701, Palo Alto, CA 94302 415-328-7999
Cincinnati Electrosys., 469 Wards Corner Rd., Loveland, OH 45140 513-831-4347
† Fork Standards, Inc., 666 Western Ave., Lombard, IL 60148 312-932-9380

Frequency Control Prods., Inc., American Time Prods. Div., 61-20 Woodside Ave., Woodside, NY 11377 212-458-5811
Hameg, Inc., 88-90 Harbor Rd., Port Washington, NY 11050 516-883-3837
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
† Iwatsu Instruments, Inc., 430 Commerce Blvd., Carlstadt, NJ 07072 201-935-5220

Calibrators, Transducer-2900

Ectron Corp., 8159 Engineer Rd., San Diego, CA 92111, 619-278-0600 ... D•1007
† Acromag, 30765 Wixom Rd., Wixom, MI 48096 313-624-1541
Bruel & Kjaer Instrs. Inc., 185 Forest St., Marlboro, MA 01752 617-481-7000
Kurz Instruments, Inc., P.O. Box 849, Carmel Valley, CA 93924 800-424-7356
Omega Engrg., Box 4047, Stamford, CT 06907 203-359-1660
Scientific Columbus, Inc., Esterline Corp., 1900 Arlingate La., Columbus, OH 43228 614-274-7160

Calibrators, Voltage-2900

Ballantine Labs., 90 Fanny Rd., Boonton, NJ 07005, 201-335-0900 ...... D•1185
Datel, General Electric Co., 11 Cabot Blvd., Mansfield, MA 02048, 617-339-9341 .... D•1346
Digitec Corp., 918 Woodley Rd., P.O. Box 459, Dayton, OH 45401, 513-254-6251 .... D•1348
Ectron Corp., 8159 Engineer Rd., San Diego, CA 92111, 619-278-0600 ... D•1007
† Electronic Dev. Corp., 11 Hamlin St., Boston, MA 02127-4198, 617-268-9696 .... D•1215
General Resistance, Inc., A Prime Technology Company, Twin Lakes Rd., P.O. Box 185, N. Branford, CT 06471, 203-481-5721 .... D•1233
IET Labs, Inc., 534 Main St., Westbury, NY 11590, 516-334-5959 ... D•1242,1244
Industrial Test Equip., 21 Yennicock Ave., Port Washington, NY 11050, 516-883-1700 .... D•1247,1938
Julie Resch. Labs., 211 West 61st St., New York, NY 10023, 212-245-2727 .... D•1252-1253,1256
† Keep Precision Standards, Inc., P. O. Box 191, So. Plainfield, NJ 07080, 201-549-9280 .... D•1257
North Hills Elctrns., 1 Alexander Pl., Glen Cove, NY 11542, 516-671-5700 .... D•1734
† Acromag, 30765 Wixom Rd., Wixom, MI 48096 313-624-1541
§ Analogic Corp., 8 Centennial Dr., Peabody, MA 01961 ..... 617-532-5660;617-777-4500; 617-246-0300;800-451-1
Cincinnati Electrosys., 469 Wards Corner Rd., Loveland, OH 45140 513-831-4347
Continental Resources, Inc., 175 Middlesex Tpke., Bedford, MA 01730 .. 617-275-0850
Data Precision Corp., Electronics Ave., Danvers, MA 01923 617-246-1600
Datron Instrs., Inc., 3401 SW 42nd Ave., Stuart, FL 33497 305-283-0935
§ EDL, Inc., 385 Oser Ave., Hauppauge, NY 11788 .... 516-435-2808;1-800-DIAL EDL
Electrical Instr. Svc., 25 Dock St., Mt. Vernon, NY 10550 914-699-9717
† Electro-Optical Inds., Box 3770, Santa Barbara, CA 93130 805-964-6701
Electro Scientific Inds., 13900 N.W. Science Pk. Dr., Portland, OR 97229 503-641-4141
§ EMR Data Systems, Div. Sangamo- Weston, Box 3041, Sarasota, FL 33578 813-371-0811
Fluke, John, Mfg. Co., Box C9090, MS 250C, Everett, WA 98206 206-356-5400
Fogg Sys., 15592 E. Batavia Dr., Aurora, CO 80011 303-344-1883
§ Guildline Instrs., 4403 Vineland Rd, Suite B-10, Orlando, FL 32811-9998 305-423-8215
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
§ International Microtronics Corp., 4016 E. Tennessee St., Tucson, AZ 85714 602-748-7900
† Iwatsu Instruments, Inc., 430 Commerce Blvd., Carlstadt, NJ 07072 201-935-5220
Leeds & Northrup Instrs., A Unit of General Signal Corp., Sumneytown Pike, North Wales, PA 19454 215-643-2000
§ Linear Instrs., 500 Edison Way, Reno, NV 89502 702-786-3636
Omega Engrg., Box 4047, Stamford, CT 06907 203-359-1660
Power Designs, Inc., 1700 Shames Dr., Westbury, NY 11590 516-333-6200
§ PrimeLine-Soltec Distbn., Soltec Corp., P.O. Box 818, Sun Valley, CA 91353-0818 .... 800-525-5554;818-764-5400
RFL Inds., A Dowty Grp. Co./Instr. Div., Powerville Rd., Boonton, NJ 07005 201-334-3100
Rochester Instr. Sys., 255 N. Union St., Rochester, NY 14605 716-263-7700
Ross Engrg. Corp., 540 Westchester Dr., Campbell, CA 95008 408-377-4621
Rotek Instr. Corp., 390 Main St., Waltham, MA 02254 617-899-4611
Scientific Columbus, Inc., Esterline Corp., 1900 Arlingate La., Columbus, OH 43228 614-274-7160
Sensitive Research Instrs., 25 Dock St., Mt. Vernon, NY 10550 914-699-9717
† Stoelting Co., 1350 S. Kostner Ave., Chicago, IL 60623 312-522-4500
§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 215-673-5600
Tempo Instrument, Inc., 87 Modular Ave., Commack, NY 11725 516-864-3700
Tri-Com, Inc., 7304 Grove Rd., Frederick, MD 21701 301-694-6666
§ Tucker Elctrns., Box 461966, Garland, TX 75046 .... 214-348-8800;800-527-4642
Tustin Elctrns. Co., 1431 E. Saint Andrews Pl., Santa Ana, CA 92705 714-549-0391
Valhalla Scientific, 9955 Mesa Rim Rd., San Diego, CA 92126 619-457-5576
Yokogawa Corp. of America, 2 Dart Rd., Shenandoah, GA 30265 404-253-7000
ZI-TECH Instr. Corp., 2151 Park Blvd., Box 60490, Palo Alto, CA 94306 415-326-2151

Calibrators, VSWR-2900

Alford Mfg. Co., P.O. Box 2116, 32 Sixth Rd., Woburn, MA 01888 617-935-8610
§† Harris Corp., PRD Elctrns. Div., 6801 Jericho Tpke., Syosset, NY 11791 516-364-0400
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
Narda Microwave Corp., 435 Moreland Rd., Hauppauge, NY 11788 516-231-1700
Weinschel Engrg., One Weinschel La., Gaithersburg, MD 20877 .... 301-948-3434; 800-638-2048

Calorimeters, Microwave-2900

† Electro Impulse, Box 870, Red Bank, NJ 07701-0870, 201-741-0404 ..... D•1211
Alpha Inds., Inc. - TRG Millimeter Comp., 20 Sylvan Rd., Woburn, MA 01801 617-935-5150

Bird Elctrn., 30303 Aurora Rd., Cleveland, OH 44139 216-248-1200
† General Microwave Corp., 155 Marine St., Farmingdale, NY 11735 516-694-3600
§† Harris Corp., PRD Elctrns. Div., 6801 Jericho Tpke., Syosset, NY 11791 516-364-0400
† Microlab/FXR, 10 Microlab Rd., Livingston, NJ 07039 201-992-7700
† Raytheon Co., Microwave & Power Tube Div., 190 Willow St., Waltham, MA 02154 617-899-8400
† Reeve Electronics, Mellish E. Murray, 1720 W. Fulton St., Chicago, IL 60612 312-670-0150
§ Tucker Elctrns., Box 461966, Garland, TX 75046 .... 214-348-8800;800-527-4642
Varian Assocs., Indl. Equip. Grp., 611 Hansen Way, Palo Alto, CA 94303 415-493-4000

Cameras, Data Recording-2325

† Alan Gordon Entprs., Inc., P.O. Box 3914, 5362 Cahuenga Blvd., N. Hollywood, CA 91605 818-985-5500
Applied Sys., 26401 Harper Ave., St. Clair Shores, MI 48081 313-779-8700
§† Benthos, Inc., Edgerton Dr., N. Falmouth, MA 02556 ...... 617-563-5917;617-540-5500
§† CAI, 550 W. Northwest Hwy., Barrington, IL 60010 312-381-2400
† CELCO, 70 Constantine Dr., Mahwah, NJ 07430 201-327-1123
Heitz, Karl, Inc., P.O. Box 427, Woodside, NY 11377 718-565-0004
§ Teledyne Camera Sys., 131 N. Fifth Ave., Arcadia, CA 91006 818-359-6691
Video Logic Corp., 597 No. Mathilda Ave., Sunnyvale, CA 94086 408-245-8622
§ Carl Zeiss, Inc., One Zeiss Drive, Thornwood, NY 10594 914-681-7670

Cameras, Digital Image Acquisition-2325

§ CCD Imaging, Fairchild Camera & Instr. Corp., 450 National Ave., Mountain View, CA 94043 415-493-8001
CELCO, 70 Constantine Dr., Mahwah, NJ 07430 201-327-1123
Penn Video Inc., 929 Sweitzer Ave., Akron, OH 44311 216-762-4840
Test & Measurement Systems, Inc., 349 Cobalt Way, Ste. 301, Sunnyvale, CA 94086 408-720-8877
Video Logic Corp., 597 No. Mathilda Ave., Sunnyvale, CA 94086 408-245-8622

Cameras, Image Converter-1900

Applied Sys., 26401 Harper Ave., St. Clair Shores, MI 48081 313-779-8700
§† CAI, 550 W. Northwest Hwy., Barrington, IL 60010 312-381-2400
† Cardion Elctrns., Div. of Gen. Sig. Conts., Inc. Unit of Gen. Sig. Corp., Long Island Expwy., Woodbury, NY 11797 516-921-7300
§ Chorus Data Systems, P.O. Box 810, 27 Proctor Hill Rd., Hollis, NH 03049 603-465-7100
ElectroPhysics Corp., 48 Spruce St., Nutley, NJ 07110 201-667-2262
Hamamatsu Photonics K.K., 325-6 Sunayama-Cho, Hamamatsu City, Shizuoka Pref, JAPAN 0534-52-2141
Innovatek Microsystems, Inc., Smithfield Rd., R1 Box 104, Millerton, NY 12546-9720 914-373-9003
§ IR Scientific, Box 110, Carlisle, MA 01741 617-369-7118
Princeton Elctrn. Prods., Box 101, North Brunswick, NJ 08902 201-297-4448
Spiricon, Inc., 2600 North Main, Logan, UT 84321 801-753-3729

Cameras, Infrared-2325

† Barnes Engrg., 44 Commerce Rd., P.O. Box 53, Stamford, CT 06904 203-348-5381
† Cardion Elctrns., Div. of Gen. Sig. Conts., Inc. Unit of Gen. Sig. Corp., Long Island Expwy., Woodbury, NY 11797 516-921-7300
† EEV Inc., 7 Westchester Plaza, Elmsford, NY 10523 914-592-6050
ElectroPhysics Corp., 48 Spruce St., Nutley, NJ 07110 201-667-2262
Hamamatsu Photonics K.K., 325-6 Sunayama-Cho, Hamamatsu City, Shizuoka Pref, JAPAN 0534-52-2141
§ IR Scientific, Box 110, Carlisle, MA 01741 617-369-7118
Mikron Instr., Box 211, Ridgewood, NJ 07451 201-891-7330
Spiricon, Inc., 2600 North Main, Logan, UT 84321 801-753-3729

Cameras, Oscilloscope-2975

§ Alan Gordon Entprs., Inc., P.O. Box 3914, 5362 Cahuenga Blvd., N. Hollywood, CA 91605 818-985-5500
§† CAI, 550 W. Northwest Hwy., Barrington, IL 60010 312-381-2400
Continental Resources, Inc., 175 Middlesex Tpke., Bedford, MA 01730 .. 617-275-0850
Dumont Oscilloscope Labs., 40 Fairfield Pl., W. Caldwell, NJ 07006 201-575-8666
Heitz, Karl, Inc., P.O. Box 427, Woodside, NY 11377 718-565-0004
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
Philips Test & Measuring Instrs., 85 McKee Dr., Mahwah, NJ 07430 201-529-3800
§ PrimeLine-Soltec Distbn., Soltec Corp., P.O. Box 818, Sun Valley, CA 91353-0818 .... 800-525-5554;818-764-5400
† Stoelting Co., 1350 S. Kostner Ave., Chicago, IL 60623 312-522-4500
§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 215-673-5600
Tektronix, Inc., P. O. Box 500, Y3-314, Beaverton, OR 97077 ..... 800-547-1512;Oregon only 800-452-1877

Cameras, Television-1900

† Ampex Corp., 401 Broadway, Redwood City, CA 94063 415-367-2011
† Cardion Elctrns., Div. of Gen. Sig. Conts., Inc. Unit of Gen. Sig. Corp., Long Island Expwy., Woodbury, NY 11797 516-921-7300
§ CCD Imaging, Fairchild Camera & Instr. Corp., 450 National Ave., Mountain View, CA 94043 415-493-8001
§ Colorado Video, Inc., Box 928, Boulder, CO 80306 303-444-3972
ElectroPhysics Corp., 48 Spruce St., Nutley, NJ 07110 201-667-2262
Hamamatsu Photonics K.K., 325-6 Sunayama-Cho, Hamamatsu City, Shizuoka Pref, JAPAN 0534-52-2141
† Lear Siegler, Inc., 2850 Ocean Park Blvd., P.O. Box 2158, Santa Monica, CA 90406 213-452-5444
Penn Video Inc., 929 Sweitzer Ave., Akron, OH 44311 216-762-4840
Philips Television Sys., Inc., P.O. Box 618, 900 Corporate Dr., Mahway, NJ 07430 201-529-1550
§ PULNiX America, Inc., 770-A Lucerne Drive, Sunnyvale, CA 94086 408-733-1560
† SEKAI Elctrns. of Amer., Inc., 14700 E. Firestone Blvd., Suite 122, La Mirada, CA 90638 714-670-1854
† Teledyne Camera Sys., 131 N. Fifth Ave., Arcadia, CA 91006 818-359-6691

Video Automation Systems, Upper Shad Rd., Pound Ridge, NY 10576 .. 914-764-4613
Video Logic Corp., 597 No. Mathilda Ave., Sunnyvale, CA 94086 408-245-8622

Cameras, Television, Fiber Optic-1900

§ CCD Imaging, Fairchild Camera & Instr. Corp., 450 National Ave., Mountain View, CA 94043 415-493-8001

Cans & Flat Packs, Integrated Circuit – See Packages, Integrated Circuit (Vol. A)

Cans, Capacitor, Relay, Semiconductor, Transformer, etc-2500 – *See Vol. C*

Capacitance Comparators – See Bridges, Capacitance (Vol. D)

Capacitor Arrays-1500 – *See Vol. A*

Capacitor, Folded Flag Tabs-1500 – *See Vol. A*

Capacitor Hardware-2800 – *See Vol. C*

Capacitor Leakage Indicators – See Testers, Capacitor (Vol. D)

Capacitor, Tap Rolls-1500 – *See Vol. A*

Capacitor Wafers-1500 – *See Vol. A*

Capacitors, Energy Storage-1500 – *See Vol. A*

Capacitors, Chip (For Microcircuits)-1500 – *See Vol. A*

Capacitors, Fixed, AC (Incl. Motor Start)-1500 – *See Vol. A*

Capacitors, Fixed, Air-1500 – *See Vol. A*

Capacitors, Fixed, Aluminum Electrolytic-1500 – *See Vol. A*

Capacitors, Fixed, Ceramic, Disc & Tubular-1500 – *See Vol. A*

Capacitors, Fixed, Ceramic, Monolithic-1500 – *See Vol. A*

Capacitors, Fixed, Feedthru-1500 – *See Vol. A*

Capacitors, Fixed, Film, Metallized & Nonmetallized-1500 – *See Vol. A*

Capacitors, Fixed, Foil-1500 – *See Vol. A*

Capacitors, Fixed, Glass-1500 – *See Vol. A*

Capacitors, Fixed, Laboratory Standard-1500 – *See Vol. A*

Capacitors, Fixed, Mica-1500 – *See Vol. A*

Capacitors, Fixed, Monolithic-1500 – *See Vol. A*

Capacitors, Fixed, Mylar – See Capacitors, Fixed, Film (Vol. A)

Capacitors, Fixed, Oil Filled-1500 – *See Vol. A*

Capacitors, Fixed, Paper, Metallized & Nonmetallized-1500 – *See Vol. A*

Capacitors, Fixed, Plastic – See Capacitors, Fixed, Film (Vol. A)

Capacitors, Fixed, Polycarbonate – See Capacitors, Fixed, Film (Vol. A)

Capacitors, Fixed, Polyester – See Capacitors, Fixed, Film (Vol. A)

Capacitors, Fixed, Polypropylene – See Capacitors, Fixed, Film (Vol. A)

Capacitors, Fixed, Polysulfone – See Capacitors, Fixed, Film (Vol. A)

Capacitors, Fixed, Polystyrene – See Capacitors, Fixed, Film (Vol. A)

Capacitors, Fixed, Porcelain-1500 – *See Vol. A*

Capacitors, Fixed, Tantalum Electrolytic-1500 – *See Vol. A*

Capacitors, Fixed, Vacuum-1500 – *See Vol. A*

Capacitors, Variable, Air-1500 – *See Vol. A*

Capacitors, Variable, Ceramic-1500 – *See Vol. A*

Capacitors, Variable, Film-1500 – *See Vol. A*

Capacitors, Variable, Gas Filled-1500 – *See Vol. A*

Capacitors, Variable, Glass-1500 – *See Vol. A*

Capacitors, Variable, HV (Lab Type)-Also See Decade Boxes, Capacitance-1500 – *See Vol. A*

Capacitors, Variable, Mica-1500 – *See Vol. A*

Capacitors, Variable, Padders & Trimmers-1500 – *See Vol. A*

Capacitors, Variable, Vacuum-1500 – *See Vol. A*

Capacitors (MIL), Fixed-2440 – *See Vol. B*

Capacitors (MIL), Variable-2440 – *See Vol. B*

Caps, Connector-2100 – *See Vol. C*

Caps, Forms & Tapes, Heat Shrinkable-Also See Tubing, Heat Shrinkable-3100 – *See Vol. C*

Caps, Lenses, Indicator Light-2450 – *See Vol. B*

Caps, Wire Splicing – See Splicers, Wire (Vol. C)

Caps (MIL)-2440 – *See Vol. B*

Card Equipment, Mark Sense-2000

HEI, Inc., 1495 Steiger Lake La., Victoria, MN 55386, 612-443-2500 ...... B•1211
BMS Data Handling, Inc., 12155 Magnolia, Riverside, CA 92503 714-359-8824

Card Equip., Punch-2000

HEI, Inc., 1495 Steiger Lake La., Victoria, MN 55386, 612-443-2500 ...... B•1211
† Astronautics Corporation of America, P.O. Box 523, Milwaukee, WI 53201-0523 414-447-8200
Gra-Mar Inc., 3165 McCrory Pl., Ste. 265, Orlando, FL 32803 305-894-3351

Card Equip., Reader-2000

† Taurus Corp., Academy Hill, P.O. Box 278, Lambertville, NJ 08530, 609-397-2390 .... D•1074
Xico, Inc., 120 Ocean Way, Santa Monica, CA 90402, 213-454-0302 ..... D•1082
† Astronautics Corporation of America, P.O. Box 523, Milwaukee, WI 53201-0523 414-447-8200
BMS Data Handling, Inc., 12155 Magnolia, Riverside, CA 92503 714-359-8824
Elcom Industries, Inc., 10268 Bach Blvd., St. Louis, MO 63132 314-429-3100
Sperry Univac, Mini-Computer Operations, Box C-19504, Irvine, CA 92713 714-754-6900
XCP, Inc., 8 W. Main St., Dryden, NY 13053 607-844-9143

Card Equip., Reader/Punch-2000

† Astronautics Corporation of America, P.O. Box 523, Milwaukee, WI 53201-0523 414-447-8200
Opto Technology, Inc., 1674 S. Wolf Rd., Wheeling, IL 60090 312-537-4277
† Plessey Electro-Products, 3860 Centinela Ave., Los Angeles, CA 90066 213-390-3585

Card Holders, Circuit Board – See Enclosures, Circuit Board, Module, & Relay Mounting (Vol. C)

Cards, Data Communication/Interfaces-2000

Renco, 26 Coromar Dr., Goleta, CA 93017-3094, 805-968-1525 .... D•1131
† Acromag, 30765 Wixom Rd., Wixom, MI 48096 313-624-1541
Applied Micro Technlg., A Burr Brown Co., 3669 E. 44th Street, Tucson, AZ 85713 602-622-8605
Artel Communications Corp., 93 Grand St., Worcester, MA 01602 617-752-5690
Charles River Data Systems, Inc., 983 Concord St., Framingham, MA 01701 617-626-1000
Digital Communications Assocs., Inc., 303 Technology Pk., Norcross, GA 30092 404-448-1400
§ Gateway Communications Inc., 16782 Redhill Ave., Irvine, CA 92714 714-261-0762
GIC Systems, 2324 A Ridgepoint Dr., Austin, TX 78754 512-926-8840
§ Grant Technology Sys. Corp., Computer Products, 11 Summer St., Chelmsford, MA 01824 617-256-8881
Hybrilonics, Inc., P.O. Box 217, Lasalle Sta., Niagara Falls, NY 14304 716-731-9080
Innovatek Microsystems, Inc., Smithfield Rd., R1 Box 104, Millerton, NY 12546-9720 914-373-9003
§ Intelligent Technology, Logica PLC, 151 University Avenue, Palo Alto, CA 94301 415-328-2411
Interface Electronics Inc., 21134 Bridge St., Southfield, MI 48034 313-352-8820
JF Microsystems, 3641 Frontier Road, Pasco, WA 99301 .... 509-297-4294; 800-JF-CARDS
M/A-COM Laser Diode, Inc., M/A-COM, Inc., 1130 Somerset St., New Brunswick, NJ 08901 201-249-7000
§ Micom Systems, Inc., 4100 Los Angeles Ave, P.O. Box 8100, Simi Valley, CA 93062-8100 805-583-8600
Minntronics Corporation, 2599 White Bear Ave., St. Paul, MN 55109 612-770-5247
Peritek Corp., 5550 Redwood Rd., Oakland, CA 94619 415-531-6500

Proteon, Inc., 4 Tech Circle, Natick, MA 01760 617-655-3340
† Signatron, A Unit of Sundstrand Corp., 12 Hartwell Ave., Lexington, MA 02173 617-861-1500
§ Via West Inc., 534 N. Stone Ave., Tucson, AZ 85705 602-623-5716
† Western DataCom, 5083 Market St., Youngstown, OH 44512 216-788-6583

Cards, Linear Function-2000

ADAC Corp., 70 Tower Office Pk., Woburn, MA 01801, 617-935-6668 .... D•1135
Electronic Solutions, 9255 Chesapeake Drive, San Diego, CA 92123, 619-292-0242;800-854-7086 .... D•1085
Modular Devices, 50 Orville Dr., Bohemia, NY 11716, 516-567-9620 .... D•1011
Renco, 26 Coromar Dr., Goleta, CA 93017-3094, 805-968-1525 .... D•1131
† Acromag, 30765 Wixom Rd., Wixom, MI 48096 313-624-1541
Analog Devices, P.O. Box 280, Norwood, MA 02062 617-329-4700
Applied Micro Technlg., A Burr Brown Co., 3669 E. 44th Street, Tucson, AZ 85713 602-622-8605
† CELCO, 70 Constantine Dr., Mahwah, NJ 07430 201-327-1123
Data Translation, 100 Locke Dr., Marlboro, MA 01752 617-481-3700
Datel, General Electric Co., 11 Cabot Blvd., Mansfield, MA 02048 617-339-9341
† Eastern Elctrns. Mfg. Corp., 180 Roberts St., East Hartford, CT 06108 203-528-9821
Elgenco, Inc., Box 460, Hurricane, UT 84737 801-635-4954
§ GIC Systems, 2324 A Ridgepoint Dr., Austin, TX 78754 512-926-8840
§ Gordos Corporation, Gordos International Corp., 250 Glenwood Ave., Bloomfield, NJ 07003 201-743-6800
§ Gunther, W., GmbH, Virnsberger Strasse 51, D 8500 Nurnberg 82, WEST GERMANY .... (0)911/65521 or 65520
Inconix Corp., 10 Tech Circle, Natick, MA 01760 617-655-1170
Industrial Computer Designs, Inc., 31264 La Baya Drive, Westlake Village, CA 91362 818-889-3179
§ Intech, Microcircuits Div., 2270 Martin Ave., Santa Clara, CA 95050 408-988-4930
† Lehighton Elctrns., Inc., Box 328, Dept M, Lehighton, PA 18235 .... 717-386-4156; 215-377-5990
† Metric Sys., 645 Anchors St., Ft. Walton Beach, FL 32548 904-244-9600
† Milton Ross Co., 511 Second St. Pike, Southampton, PA 18966 215-355-0200
Modular Audio Prods., Modular Devices Inc., 50 Orville Dr., Bohemia, NY 11716 516-567-9620
Motorola Semiconductor Prods. Sector, Adv. 72, Box 20912, Phoenix, AZ 85036 602-244-6900
Multi Prods. Intl., 218 Little Falls Rd., P.O. Box 238, Cedar Grove, NJ 07009 201-239-8183
† Natel Engrg. Co., Inc., 4550 Runway St., Simi Valley, CA 93063 805-581-3950
Peritek Corp., 5550 Redwood Rd., Oakland, CA 94619 415-531-6500
RCI/Data, 1992 Lakewood Rd., Toms River, NJ 08753 201-341-8361
§ Standard Grigsby, Inc., Gordos International Corp., 920 Rathbone Ave., Aurora, IL 60507 312-844-4300
Sylvania Electronic, Box 360, Muncy, PA 17756 717-546-3191
Sylvania Electronic Components, Philips ECG Inc., A North American Philips Co., 100 First Ave., Waltham, MA 02254 617-890-6107

Cards, Memory — See Memory Devices (Vol. D), Memory Systems (Vol. D)

Cards, Logic-2000

ADAC Corp., 70 Tower Office Pk., Woburn, MA 01801, 617-935-6668 .... D•1135
Motorola Semiconductor Prods. Sector, Adv. 72, Box 20912, Phoenix, AZ 85036, 602-244-6900 .... D•1100
† Acromag, 30765 Wixom Rd., Wixom, MI 48096 313-624-1541
§ Advanced Microcomputers, 3340 Scott Blvd., Santa Clara, CA 95051 408-732-2400
§ Anaheim Automation, 910 E. Orangefair La., Anaheim, CA 92801 714-992-6990
† Antona Corp., 2100 S. Sawtelle Blvd., Suite 205, Los Angeles, CA 90025 213-473-8995
Applied Micro Technlg., A Burr Brown Co., 3669 E. 44th Street, Tucson, AZ 85713 602-622-8605
Assembly Specialists, 914 Main St., Box 965, Acton, MA 01720 617-263-9100
CDS - Colorado Data Sys., 3301 W. Hampden, Unit C, Englewood, CO 80110 303-762-1640
§ Data General, 4400 Computer Dr., Westboro, MA 01581 617-366-8911
† Data Tech, Div. of Penril Corp., 3110 W. Segerstrom, Santa Ana, CA 92704 714-546-7160
Datatran Labs, P.O. Box 384, Sussex, NJ 07461 914-856-4313
Data Translation, 100 Locke Dr., Marlboro, MA 01752 617-481-3700
Datel, General Electric Co., 11 Cabot Blvd., Mansfield, MA 02048 617-339-9341
Digital Radio Corp., 8901 La Cienega Blvd., Inglewood, CA 90301 213-670-8611
§ Distributed Logic Corp. (DILOG), 12800-G Garden Grove Blvd., Garden Grove, CA 92643 714-534-8950
Douglas Elctrns., 718 Marina Blvd., San Leandro, CA 94577 415-483-8770
Dynage/Controls, Inc., 2 Willowbrook Rd., Cromwell, CT 06416 203-635-6257
† Eastern Elctrns. Mfg. Corp., 180 Roberts St., East Hartford, CT 06108 203-528-9821
Elctrn. Molding Corp., 96 Mill St., Woonsocket, RI 02895 401-769-3800
§ Electronic Solutions, 9255 Chesapeake Drive, San Diego, CA 92123 .... 619-292-0242; 800-854-7086
Elgenco, Inc., Box 460, Hurricane, UT 84737 801-635-4954
Enterprise Sys. Corp., P.O. Box 698, Dover, NH 03820 603-742-7363
§† Excel Prods., 401 Joyce Kilmer Ave., New Brunswick, NJ 08903 201-249-6600
Inconix Corp., 10 Tech Circle, Natick, MA 01760 617-655-1170
Industrial Computer Designs, Inc., 31264 La Baya Drive, Westlake Village, CA 91362 818-889-3179
Information Control Corp., Abacus Div. Dept EM7, 9610 Bellanca Ave., Los Angeles, CA 90045 213-641-8520
Innovatek Microsystems, Inc., Smithfield Rd., R1 Box 104, Millerton, NY 12546-9720 914-373-9003
Interface Electronics Inc., 21134 Bridge St., Southfield, MI 48034 313-352-8820
§ Intra-computer, 101 W. 31st St., New York, NY 10001 212-947-5533
Kontron Elctrns., 1230 Charleston Rd., Mountain View, CA 94039-7230 415-965-7020
† Lehighton Elctrns., Inc., Box 328, Dept M, Lehighton, PA 18235 .... 717-386-4156; 215-377-5990
Logic Technology, Inc., 2452 Charleston Rd., Mtn. View, CA 94043 415-967-1007
§ Macrolink, 1500 N. Kellogg Drive, Anaheim, CA 92807 714-777-8800
Matrix Corp., 1639 Green St., Raleigh, NC 27603 919-833-2837
† Metric Sys., 645 Anchors St., Ft. Walton Beach, FL 32548 904-244-9600
Micro/sys, 1011 Grand Central Ave., Glendale, CA 91201-3010 818-244-4600
† Milton Ross Co., 511 Second St. Pike, Southampton, PA 18966 215-355-0200
Onset Computer Corp., 199 Main St., PO Box 1030, N. Falmouth, MA 02556 617-563-2267
Peritek Corp., 5550 Redwood Rd., Oakland, CA 94619 415-531-6500
RCI/Data, 1992 Lakewood Rd., Toms River, NJ 08753 201-341-8361
† Stanford Applied Engrg. Inc., 3520 De La Cruz Blvd., Santa Clara, CA 95050 400-988-0700
Struthers-Dunn, Inc., Lamb's Rd., Pitman, NJ 08071 609-589-7500
§† Superior Elec. Co., 383 Middle St., Bristol, CT 06010 203-582-9561
Sylvania Electronic, Box 360, Muncy, PA 17756 717-546-3191
Tenor, 17020 W. Rogers Dr., New Berlin, WI 53151 414-782-3800
Zero Corp., 777 Front St., Burbank, CA 91503 213-846-4191

Carriers — See Holders & Carriers, Chip (Vol. C)

Carts & Dollies, Instrument & Equipment-3800 — *See Vol. C*

Cases, Equipment, Instrument, Meter (Portable) — See Enclosures, Portable, Metallic & Nonmetallic (Vol. C)

Cases, Equipment, Instrument, Meter (Stationary) — See Enclosures, Equipment & Panel Mounting (Vol. C)

Cases, Shielded — See Enclosures, Shielded (Vol. C)

Cases, Transit — See Enclosures, Shipping (Vol. C)

Casters-1400 — *See Vol. C*

Cathode-Ray Readout Tubes — See Tubes, Readout (Vol. A)

CATV Systems & Equipment-1900

§ American Laser Sys., Inc., 106 Fowler Rd., Goleta, CA 93117 805-967-0423
† Ampex Corp., 401 Broadway, Redwood City, CA 94063 415-367-2011
Atlantic Research, 5390 Cherokee Ave., Alexandria, VA 22312 703-642-4000
§ ATV Research, Inc., 1301 Broadway, Dakota City, NE 68731 402-987-3771
§ C-COR Elctrns., 60 Decibel Rd., State College, PA 16801 814-238-2461
Communications Technology Corp., 2237 Colby Ave., Los Angeles, CA 90064 213-478-5061
§ Daburn Elctrns. & Cable, 70 Oak St., Norwood, NJ 07648 201-768-5400
§ Data-Design Labs., P.O. Box 711, 7925 Center Ave., Cucamonga, CA 91730 714-987-2511
Dotronix, 160 First St. SE, New Brighton, MN 55112 612-633-1742
§† Electrovert Inc., 399 Executive Blvd., Elmsford, NY 10523 914-592-7322
§ Johnson Controls, Battery Div., 5757 N. Green Bay Ave., Milwaukee, WI 53201 414-228-2581
† Kalart Victor Corp., Hultenius St., Plainville, CT 06062 203-747-1663
§ Kay-Townes Antenna, P.O. Box 593, Rome, GA 30161 404-291-9871
§† Lenco Elctrns., Inc., 300 N. Maryland St., Jackson, MO 63755 314-243-3147
§ Macom Inds., 8230 Haskell Ave., Van Nuys, CA 91406
§† Manhattan Elec. Cable Corp., 1 Station Plaza, Rye, NY 10580 914-967-8000
§† Microwave Filter Inc., 6743 Kinne St., East Syracuse, NY 13057-0486 .... 315-437-3953; 800-448-1666
§ Multi Prods. Intl., 218 Little Falls Rd., P.O. Box 238, Cedar Grove, NJ 07009 201-239-8183
† Nurad, Inc., 2165 Druid Pk. Dr., Baltimore, MD 21211 301-462-1700
Peca, Inc., 592 Winks Lane, Bensalem, PA 19020 215-245-1550
Power Designs, Inc., 1700 Shames Dr., Westbury, NY 11590 516-333-6200
RLC Elctrns., Inc., 83 Radio Cir., Mt. Kisco, NY 10549 914-241-1334
§ RMS Electronics Inc., 50 Antin Pl., Bronx, NY 10462 212-892-6700
§ Shokai Far East, Ltd., 280 North Central Ave., Hartsdale, NY 10530 914-681-0700
§ Sitco Antennas, 10330 N.E. Marx St., Portland, OR 97220 503-253-2000
Stainless, Inc., 3rd St., N. Wales, PA 19454 215-699-4871
Telemet, 185 Dixon Ave., Amityville, NY 11701 516-842-2300
§ Television Microtime, Inc., 1280 Blue Hills Ave., Bloomfield, CT 06002 203-242-4242
Telpar, Inc., 4137 Billy Mitchell Rd., P.O. Box 796, Addison, TX 75001 214-233-6631
Texscan Instruments, 3169 N. Shadeland, Indianapolis, IN 46226 317-545-4196
Video Automation Systems, Upper Shad Rd., Pound Ridge, NY 10576 914-764-4613
§ Waveline, Box 718, W. Caldwell, NJ 07006 201-226-9100
† Wavetek Indiana, Inc., 5808 Churchman, Beech Grove, IN 46107 317-787-3332
Westinghouse Electric Corp., Indl. Govt. Tube Div., Westinghouse Circle, Horseheads, NY 14845 607-796-3211
Wide Band Engrg. Co., Inc., Box 21652, Phoenix, AZ 85036 602-254-1570

Cavities, Microwave-3450 — *See Vol. A*

Cells, Electrolytic (Timing) — See Timers, Electrolytic Cell (Vol. D)

Cells, Load-5500 — *See Vol. B*

Cells, Photoconductive-3700 — *See Vol. B*

Cells, Photoemissive-3700 — *See Vol. B*

Cells, Photovoltaic-3700 — *See Vol. B*

Cells, Solar — See Cells, Photovoltaic (Vol. B)

Cements — See Adhesives, (All Types) (Vol. C)

Chaff Systems (MIL)-3475

† Lundy Elctrns. & Systems, Inc., 1 Robert La., Glen Head, NY 11545 516-671-9000
Transmet Corp., 4290 Perimeter Dr., Columbus, OH 43228 .... 614-276-5522; 800-245-5253

Chambers, Altitude-2550

† Tenney Engrg., 109 Springfield Rd., Union, NJ 07083, 201-686-7870 ..... D•1173
† Associated Environmental Systems, 10 Industrial Way, Amesbury, MA 01913-4848 617-388-5662
† Bemco, 9908 San Fernando Rd., Pacoima, CA 91331 818-899-5296
§† Cincinnati Sub-Zero Prods., 12011 Mosteller Rd., Cincinnati, OH 45241 513-772-8810
§ CVC Prods., 525 Lee Rd., Rochester, NY 14603 716-458-2550
§† Despatch Inds., P.O. Box 1320, Minneapolis, MN 55440 612-331-1873
§ Hull Corp., Davisville Rd., Hatboro, PA 19040 215-672-7800
Ransco Inds., Inc., Sub. Despatch Ind., Inc., 2201 Statham Blvd., Oxnard, CA 93033 805-487-7777
† Standard Environmental Systems, Inc., 383 Minnisink Rd., Totowa, NJ 07512 201-256-2200
Vactronic Lab. Equip., 65 Brightside Ave., E. Northport, NY 11731 .... 516-AN1-2660
Varian Assocs., Indl. Equip. Grp., 611 Hansen Way, Palo Alto, CA 94303 415-493-4000

Chambers, Anechoic-2550

† Ark Elctrns. Corp., 1325 Industrial Hwy., Southampton, PA 18966 215-322-6510
Lectro Magnetics, Inc., 6056 W. Jefferson Blvd., Los Angeles, CA 90016 .... 800-325-9814;213-870-9383
Soundcoat Co., Inc., 1 Burt Dr., Deer Park, NY 11729 516-242-2200

Chambers, Environmental-2550

† Blue M, A Unit of General Signal, 138th & Chatham Sts., Blue Island, IL 60406, 312-385-9000 .... D•1165
† Cincinnati Sub-Zero Prods., 12011 Mosteller Rd., Cincinnati, OH 45241, 513-772-8810 .... D•1166
† Hafstrom Technical Products, Inc., P.O. Box 9829, San Diego, CA 92109, 619-274-8822 .... D•1169
Sigma Systems Corp., 3163 Adams Ave., San Diego, CA 92116, 619-283-3193 .... D•1172
† Tenney Engrg., 109 Springfield Rd., Union, NJ 07083, 201-686-7870 ..... D•1173
Alpha-M Corp., 3009 Wildflower Dr., Dallas, TX 75229 214-620-0021
† Artronics Corporation, 3 Electronic Avenue, Danvers, MA 01923 617-777-2880
† Associated Environmental Systems, 10 Industrial Way, Amesbury, MA 01913-4848 617-388-5662
§† Bemco, 9908 San Fernando Rd., Pacoima, CA 91331 818-899-5296
Continental Resources, Inc., 175 Middlesex Tpke., Bedford, MA 01730 .. 617-275-0850
§ Delta Design, 5775 Kearny Villa Rd., San Diego, CA 92123 619-292-5000
§† Despatch Inds., P.O. Box 1320, Minneapolis, MN 55440 612-331-1873
Electro-Tech Sys., Inc., 115 E. Glenside Ave., Glenside, PA 19038 215-887-2196
† Emerson & Cuming, W. R. Grace & Co., 59 Walpole St., Canton, MA 02021 617-828-3300
Forma Scientific, Div. of Mallinckrodt Inc., Box 649, Marietta, OH 45750 614-373-4763
† Formulated Resins Inc., Box 508, Greenville, RI 02828 401-949-2060
† FTS Sys., POB 158, Stone Ridge, NY 12484 800-824-0400
Genstar Rental Elctrns., 2445 Faber Pl., Palo Alto, CA 94303 415-856-7600
Gruenberg Oven Co., Inc., P.O. Box 3246, 2121 Reach Rd., Williamsport, PA 17701 717-326-1755
Hotpack Corp., Heinicke Instrs., 10940 Dutton Rd., Philadelphia, PA 19154 .... 215-824-1700;800-523-3608
International Instrumentation, 31131-602 Via Colinas, Westlake Vlg., CA 91362 213-991-9614
Lab-Line Instrs., 15th & Bloomingdale, Melrose Park, IL 60160 312-450-2600
OAL Assocs., P.O. Box J, Escondido, CA 92025 619-743-7143
Ransco Inds., Inc., Sub. Despatch Ind., Inc., 2201 Statham Blvd., Oxnard, CA 93033 805-487-7777
† Standard Environmental Systems, Inc., 383 Minnisink Rd., Totowa, NJ 07512 201-256-2200
Sun Electronic Systems, Inc., 1601 NW 38th Ave., Ft. Lauderdale, FL 33311 305-587-5577
§ Techni-Tool, 5 Apollo Rd., Box 368, Plymouth Meeting, PA 19462 215-825-4990
§ Temptronic, 55 Chapel St., Newton, MA 02158 617-969-2501

Chambers, Explosion-2550

† Blue M, A Unit of General Signal, 138th & Chatham Sts., Blue Island, IL 60406, 312-385-9000 .... D•1165
† Bemco, 9908 San Fernando Rd., Pacoima, CA 91331 818-899-5296
† Standard Environmental Systems, Inc., 383 Minnisink Rd., Totowa, NJ 07512 201-256-2200
† Tenney Engrg., 109 Springfield Rd., Union, NJ 07083 201-686-7870

Chambers, Fluid Conditioner-2550

Cincinnati Sub-Zero Prods., 12011 Mosteller Rd., Cincinnati, OH 45241, 513-772-8810 .... D•1166
Bemco, 9908 San Fernando Rd., Pacoima, CA 91331 818-899-5296
Ransco Inds., Inc., Sub. Despatch Ind., Inc., 2201 Statham Blvd., Oxnard, CA 93033 805-487-7777
† Tenney Engrg., 109 Springfield Rd., Union, NJ 07083 201-686-7870

Chambers, Humidity-2550

† Blue M, A Unit of General Signal, 138th & Chatham Sts., Blue Island, IL 60406, 312-385-9000 .... D•1165
† Cincinnati Sub-Zero Prods., 12011 Mosteller Rd., Cincinnati, OH 45241, 513-772-8810 .... D•1166
Sigma Systems Corp., 3163 Adams Ave., San Diego, CA 92116, 619-283-3193 .... D•1172
† Tenney Engrg., 109 Springfield Rd., Union, NJ 07083, 201-686-7870 ..... D•1173
† Associated Environmental Systems, 10 Industrial Way, Amesbury, MA 01913-4848 617-388-5662
§† Despatch Inds., P.O. Box 1320, Minneapolis, MN 55440 612-331-1873
Electro-Tech Sys., Inc., 115 E. Glenside Ave., Glenside, PA 19038 215-887-2196
Forma Scientific, Div. of Mallinckrodt Inc., Box 649, Marietta, OH 45750 614-373-4763
Gruenberg Oven Co., Inc., P.O. Box 3246, 2121 Reach Rd., Williamsport, PA 17701 717-326-1755
Hotpack Corp., Heinicke Instrs., 10940 Dutton Rd., Philadelphia, PA 19154 .... 215-824-1700;800-523-3608
Lab-Line Instrs., 15th & Bloomingdale, Melrose Park, IL 60160 312-450-2600
† Ransco Inds., Inc., Sub. Despatch Ind., Inc., 2201 Statham Blvd., Oxnard, CA 93033 805-487-7777
Science/Elctrns., 1224-26 McCook Ave., Dayton, OH 45404 513-228-6011
† Standard Environmental Systems, Inc., 383 Minnisink Rd., Totowa, NJ 07512 201-256-2200
† Thunder Sci. Corp., 623 Wyoming S.E., Albuquerque, NM 87123 505-265-8701

Chambers, Magnetic, Degaussing Coil-4525

Lindgren RF Enclosures, Inc., 1228 Capitol Drive, Addison, IL 60101, 312-628-9100 .... C•1726
† Magnetic Shield Div., Perfection Mica Co., 750 North Thomas Dr., Bensenville, IL 60106, 312-766-7800 .... C•1729
† Ad-Vance Magnetics, Inc., 625 Monroe St., Rochester, IN 46975 219-223-3158
High Voltage Engrg. Corp., S. Bedford St., Burlington, MA 01803 617-272-1313
Jan Hardware Mfg. Co., 47-27 36th St., Long Island City, NY 11101 212-361-0800
† MuShield Co., Div. Bomco, Inc., 121 Madison St., P.O. Box W, Malden, MA 02148 617-321-4410
† Power Sys. Grp., Rantec Div., Emerson Elec., 9401 Oso Ave., Chatsworth, CA 91311 818-885-8223

Chambers, Pressure-2550

† Tenney Engrg., 109 Springfield Rd., Union, NJ 07083, 201-686-7870 ..... D•1173
† Bemco, 9908 San Fernando Rd., Pacoima, CA 91331 818-899-5296
§ Benthos, Inc., Edgerton Dr., N. Falmouth, MA 02556 ...... 617-563-5917;617-540-5500
† Cincinnati Sub-Zero Prods., 12011 Mosteller Rd., Cincinnati, OH 45241 513-772-8810
Data-Design Labs., P.O. Box 711, 7925 Center Ave., Cucamonga, CA 91730 714-987-2511
§† Despatch Inds., P.O. Box 1320, Minneapolis, MN 55440 612-331-1873
Standard Environmental Systems, Inc., 383 Minnisink Rd., Totowa, NJ 07512 201-256-2200

Chambers, Radiation-2550

Instruments for Industry, Inc., 151 Toledo St., Farmingdale, NY 11735, 516-694-1414 .... D•1010
Centronic Inc., 1101 Bristol Rd., Mountainside, NJ 07092 201-233-7200
Nuclear Resch. Corp., 125 Titus Ave., Warrington, PA 18976 215-343-5900
† Power Sys. Grp., Rantec Div., Emerson Elec., 9401 Oso Ave., Chatsworth, CA 91311 818-885-8223

Chambers, RFI/EMI-2550

† Ark Elctrns. Corp., 1325 Industrial Hwy., Southampton, PA 18966 215-322-6510
† Brady Co., 574A Somerset St., N. Plainfield, NJ 07060 201-753-7988
Lectro Magnetics, Inc., 6056 W. Jefferson Blvd., Los Angeles, CA 90016 .... 800-325-9814;213-870-9383
† Lindgren RF Enclosures, Inc., 1228 Capitol Drive, Addison, IL 60101 312-628-9100

Chambers, Shock-2550

† Blue M, A Unit of General Signal, 138th & Chatham Sts., Blue Island, IL 60406, 312-385-9000 .... D•1165
† Tenney Engrg., 109 Springfield Rd., Union, NJ 07083, 201-686-7870 ..... D•1173
† Associated Environmental Systems, 10 Industrial Way, Amesbury, MA 01913-4848 617-388-5662
† Cincinnati Sub-Zero Prods., 12011 Mosteller Rd., Cincinnati, OH 45241 513-772-8810
§ Delta Design, 5775 Kearny Villa Rd., San Diego, CA 92123 619-292-5000
† Ransco Inds., Inc., Sub. Despatch Ind., Inc., 2201 Statham Blvd., Oxnard, CA 93033 805-487-7777
† Standard Environmental Systems, Inc., 383 Minnisink Rd., Totowa, NJ 07512 201-256-2200

Chambers, Space Simulation-3475

§† Cincinnati Sub-Zero Prods., 12011 Mosteller Rd., Cincinnati, OH 45241, 513-772-8810 .... D•1166
† Tenney Engrg., 109 Springfield Rd., Union, NJ 07083, 201-686-7870 ..... D•1173
§† Despatch Inds., P.O. Box 1320, Minneapolis, MN 55440 612-331-1873
Ransco Inds., Inc., Sub. Despatch Ind., Inc., 2201 Statham Blvd., Oxnard, CA 93033 805-487-7777
† Spectrolab, Inc., 12500 Gladstone Ave., Sylmar, CA 91342 213-365-4611
Vactronic Lab. Equip., 65 Brightside Ave., E. Northport, NY 11731 .... 516-AN1-2660
Varian Assocs., Indl. Equip. Grp., 611 Hansen Way, Palo Alto, CA 94303 415-493-4000

Chambers, Temperature-2550

† Blue M, A Unit of General Signal, 138th & Chatham Sts., Blue Island, IL 60406, 312-385-9000 .... D•1165
† Cincinnati Sub-Zero Prods., 12011 Mosteller Rd., Cincinnati, OH 45241, 513-772-8810 .... D•1166
† Hafstrom Technical Products, Inc., P.O. Box 9829, San Diego, CA 92109, 619-274-8822 .... D•1169
Sigma Systems Corp., 3163 Adams Ave., San Diego, CA 92116, 619-283-3193 .... D•1172
† Tenney Engrg., 109 Springfield Rd., Union, NJ 07083, 201-686-7870 ..... D•1173

§ Aerotronic Assocs., Inc., Riverside Dr., Contoocook, NH 03229 603-746-4631
Alpha-M Corp., 3009 Wildflower Dr., Dallas, TX 75229 214-620-0021
† Artronics Corporation, 3 Electronic Avenue, Danvers, MA 01923 617-777-2880
† Associated Environmental Systems, 10 Industrial Way, Amesbury, MA 01913-4848 617-388-5662
† Bemco, 9908 San Fernando Rd., Pacoima, CA 91331 818-899-5296
Continental Resources, Inc., 175 Middlesex Tpke., Bedford, MA 01730 617-275-0850
† Custom Sci. Instrs., 13 Wing Dr., Cedar Knolls, NJ 07927 201-538-8500
§ Delta Design, 5775 Kearny Villa Rd., San Diego, CA 92123 619-292-5000
§† Despatch Inds., P.O. Box 1320, Minneapolis, MN 55440 612-331-1873
Forma Scientific, Div. of Mallinckrodt Inc., Box 649, Marietta, OH 45750 614-373-4763
† FTS Sys., POB 158, Stone Ridge, NY 12484 800-824-0400
Gruenberg Oven Co., Inc., P.O. Box 3246, 2121 Reach Rd., Williamsport, PA 17701 717-326-1755
§ Guildline Instrs., 4403 Vineland Rd. Suite B-10, Orlando, FL 32811-9998 305-423-8215
Hotpack Corp., Heinicke Instrs., 10940 Dutton Rd., Philadelphia, PA 19154 .... 215-824-1700;800-523-3608
§ Hull Corp., Davisville Rd., Hatboro, PA 19040 215-672-7800
Instron Corp., 100 Royall St., Canton, MA 02021 617-828-2500
Lab-Line Instrs., 15th & Bloomingdale, Melrose Park, IL 60160 312-450-2600
Micro Instr., 2250 Micro Pl., Escondido, CA 92025 619-746-2010
OAL Assocs., P.O. Box J, Escondido, CA 92025 619-743-7143
Omega Engrg., Box 4047, Stamford, CT 06907 203-359-1660
Products for Resch., 88 Holten St., Danvers, MA 01923 617-774-3250
† Ransco Inds., Inc., Sub. Despatch Ind., Inc., 2201 Statham Blvd., Oxnard, CA 93033 805-487-7777
§ Reliability, Inc., 16400 Park Row, P.O. Box 218370, Houston, TX 77218 713-492-0550
§ Research, Inc., Box 24064, Minneapolis, MN 55424 612-941-3300
Science/Elctrns., 1224-26 McCook Ave., Dayton, OH 45404 513-228-6011
S. F. Products Corporation, P. O. Box 369, Southport, CT 06490 203-929-6180
† Standard Environmental Systems, Inc., 383 Minnisink Rd., Totowa, NJ 07512 201-256-2200
Sun Electronic Systems, Inc., 1601 NW 38th Ave., Ft. Lauderdale, FL 33311 305-587-5577
§ Temptronic, 55 Chapel St., Newton, MA 02158 617-969-2501

Chambers, Vacuum-2550

† **Blue M, A Unit of General Signal, 138th & Chatham Sts., Blue Island, IL 60406, 312-385-9000 .... D•1165**
† **Tenney Engrg., 109 Springfield Rd., Union, NJ 07083, 201-686-7870 .... D•1173**
§ Abalon Precision Mfg., 1040 Home Street, Bronx, NY 10459 212-589-5682
§ Alzbear Corp., 15411 Red Hill Ave., Unit F, Tustin, CA 92680 714-557-0910
† Associated Environmental Systems, 10 Industrial Way, Amesbury, MA 01913-4848 617-388-5662
† Astro Dynamics, Inc., 2 Gill St., Woburn, MA 01801 617-935-4944
† Bemco, 9908 San Fernando Rd., Pacoima, CA 91331 818-899-5296
§ Brew, Richard D., & Co., Inc., 90 Airport Rd., Concord, NH 03301 603-225-6605
Canberra Ind., One State St., Meriden, CT 06450 203-238-2351
CHA Industries, 3565 Haven Avenue, Menlo Park, CA 94025 415-363-8011
† Cincinnati Sub-Zero Prods., 12011 Mosteller Rd., Cincinnati, OH 45241 513-772-8810
§ CVC Prods., 525 Lee Rd., Rochester, NY 14603 716-458-2550
§ Epoxylite Corp., 9400 Toledo Way, P.O. Box 19671, Irvine, CA 92713 714-951-3231
Forma Scientific, Div. of Mallinckrodt Inc., Box 649, Marietta, OH 45750 614-373-4763
† FTS Sys., POB 158, Stone Ridge, NY 12484 800-824-0400
High Voltage Engrg. Corp., S. Bedford St., Burlington, MA 01803 617-272-1313
Hotpack Corp., Heinicke Instrs., 10940 Dutton Rd., Philadelphia, PA 19154 .... 215-824-1700;800-523-3608
§ Hull Corp., Davisville Rd., Hatboro, PA 19040 215-672-7800
Materials Resch., Route 303, Orangeburg, NY 10962 914-359-4200
Ransco Inds., Inc., Sub. Despatch Ind., Inc., 2201 Statham Blvd., Oxnard, CA 93033 805-487-7777
† Standard Environmental Systems, Inc., 383 Minnisink Rd., Totowa, NJ 07512 201-256-2200
Temescal, 2850 Seventh St., Berkeley, CA 94710 415-841-5720
§† ULVAC North America, P.O. Box 799, 105 York Street, Kennebunk, ME 04043 207-985-2973
Vactronic Lab. Equip., 65 Brightside Ave., E. Northport, NY 11731 .... 516-AN1-2660
Varian Assocs., Indl. Equip. Grp., 611 Hansen Way, Palo Alto, CA 94303 415-493-4000

Chambers, Vibration-2550

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† Cincinnati Sub-Zero Prods., 12011 Mosteller Rd., Cincinnati, OH 45241 513-772-8810
§† Despatch Inds., P.O. Box 1320, Minneapolis, MN 55440 612-331-1873
Instron Corp., 100 Royall St., Canton, MA 02021 617-828-2500
Ransco Inds., Inc., Sub. Despatch Ind., Inc., 2201 Statham Blvd., Oxnard, CA 93033 805-487-7777
† Standard Environmental Systems, Inc., 383 Minnisink Rd., Totowa, NJ 07512 201-256-2200

Chambers (MIL)-3475

† **Tenney Engrg., 109 Springfield Rd., Union, NJ 07083, 201-686-7870 .... D•1173**
† Ransco Inds., Inc., Sub. Despatch Ind., Inc., 2201 Statham Blvd., Oxnard, CA 93033 805-487-7777

Character Recognition Equip., Magnetic Ink-2000

Lundy Elctrns. & Systems, Inc., 1 Robert La., Glen Head, NY 11545 516-671-9000

Character Recognition Equip., Optical-2000

Burroughs Corp., Burroughs Place, Rm. 4C-51, Detroit, MI 48232 313-972-7000
§ Caere Corp., 100 Cooper St., Los Gatos, CA 95030 408-395-7000
Cognitronics, 25 Crescent St., Stamford, CT 06906 203-327-5307
§ EG&G Reticon, Div. of EG&G, 345 Potrero Ave., Sunnyvale, CA 94086-4197 408-738-4266
† FSI/Fork Standards Inc., 666 Western Ave., Lombard, IL 60148 .... 312-231-3511; 312-932-9380
Lundy Elctrns. & Systems, Inc., 1 Robert La., Glen Head, NY 11545 516-671-9000
Penn Video Inc., 929 Sweitzer Ave., Akron, OH 44311 216-762-4840
Rehlander Assocs., 118A Bridge St., Beverly, MA 01915 617-922-5961

Chargers, Battery-4000

Advance Conversion Devices Co., 274 S. Salem St., Randolph, NJ 07869, 201-989-0095 .... D•1886
Applied Power Conversion, Technology Dynamics, Inc., 100 School St., Bergenfield, NJ 07621, 201-664-7636 .... D•1507
ATR Elctrns., Inc., P.O. BOX 7008, St. Paul, MN 55107, 612-738-6520;414-297-7374 .... D•1889
§† **Ault, Incorporated, 1600 Freeway Blvd., Minneapolis, MN 55430, 612-560-9300 .... D•1518**
Christie Elec. Corp., 20665 Manhattan Pl., Torrance, CA 90501, 213-320-0808 .... D•1547-1549
Converter Concepts, Inc., Industrial Pkwy., Pardeeville, WI 53954, 608-429-2144 .... D•1603
† **D & B Power, Inc., 204 N. Fehr Way, P.O. Box 40M, Bayshore, NY 11706, 516-586-5955 .... D•1611**
§ **Displex, Inc., Alexander Place, Glen Cove, NY 11542, 516-671-4400 .... D•1619**
LZR Electronics, Inc., 8174 Beechcraft Ave., Gaithersburg, MD 20879, 301-921-9440 .... D•1718
Mid-Eastern Industries, 100 Campus Dr., RD 1, Mt. Holly, NJ 08060, 609-267-3811 .... D•1726
Pan-Magnetics Intl., Inc., 455-A Carson Plaza Dr., Carson, CA 90746, 213-532-1790 .... A•2213, D•1742
§† **Tauber Elctrns. Inc., 4901 Morena Blvd., Bldg. 314, San Diego, CA 92117, 619-274-7242 .... D•1439**
Technology Dynamics, 91 E. Carver Ave., Westwood, NJ 07675, 201-664-7636 .... D•1851
Transformation Elctrns. Corp., 170 Wilbur Pl., Bohemia, NY 11716, 516-563-1117 .... D•1857
§† **Union Carbide Corporation, Battery Prods. Div., 39 Old Ridgebury Road, Danbury, CT 06817-0001, 203-794-7540 .... D•1441**
Unitrode Corp., 5 Forbes Rd., Lexington, MA 02173, 617-861-6540 .... A•1698
Yardney Battery Div., Yardney Corp., 82 Mechanic St., Pawcatuck, CT 02891, 203-599-1100 .... D•1443
§ Able Power and Engineering Inc., 335 S. New Ave., #H, Monterey Park, CA 91754 714-891-3568
§† Adapter/Charger Prdts., Box 3218, Peoria, IL 61614 309-691-0810
AES Corp., 285 Newbury St., P.O. Box 2093, Peabody, MA 01960 617-535-7310
† Alarm Controls, 19 Brandywine Dr., Deer Park, NY 11729 516-586-4220
Albar, Inc., 19013 36th Ave. W., Lynnwood, WA 98036 206-771-4006
† American Monarch, 2801-37th Ave., N.E., Minneapolis, MN 55421 612-788-9161
Applied Control, 1275 Bloomfield Ave., Fairfield, NJ 07006-2828 201-227-5454
A-Systems Inc., 1500 Avon St. Extd., Charlottesville, VA 22901 804-295-7200
Automatic Switch Co., 50-60 Hanover Road, Florham Park, NJ 07932 1-201-966-2000
Avex Elctrns., 1683 Winchester Rd., P.O. Box 1026, Bensalem, PA 19020 215-638-1515
† Barnes & Reinecke, Inc., 2375 Estes Ave., Elk Grove Village, IL 60007 312-640-7200
Basler Elec., Rte. 143, Highland, IL 62249 618-654-2341
Behlman Engineering, 1142 Mark Ave., Carpinteria, CA 93013 805-684-8311
Blanck, A. R., Co., Box 249, Rutherford, NJ 07070 201-933-2091
† Cal-Power Corp., 140 Kansas St., El Segundo, CA 90245 213-772-2171
Cal-Tek Engrg., 36 Riverside Drive, Kingston, MA 02364 617-585-5666
C&D Power Systems, Allied Corp., 3043 Walton Rd., Plymouth Meeting, PA 19462 215-828-9000
Chloride Power Electronics, 10931 Pellicano Drive, El Paso, TX 79935 915-592-9985
† CML MACARR Div., Marine Electric RPD, Inc., 666 Pacific St., Brooklyn, NY 11217 718-857-2400
§ Computer Power, 124E W. Main St., High Bridge, NJ 08829 201-735-8000
Dattilo Electronics, 11621 Electron Dr., Louisville, KY 40299 502-267-4446
§ Dormeyer Inds., 3418 N. Milwaukee, Chicago, IL 60641 312-283-4000
Eastern Delta Corp., 29-09 S. Broadway, Fair Lawn, NJ 07410 201-797-4200
East Penn. Mfg. Co., Inc., Main Office, Lyon Station, PA 19536 215-682-6361
ECO Instrs. Div., Sea Data Corp., 1 Bridge St., Newton, MA 02158 617-964-8360
† EDMAN Corp., Subsidiary of Rospatch, 7500 Main St., P.O. Box 750, Fishers, NY 14453-0750 716-924-4000
† Eldec Corp., Power Conversion Div., 16700 13th Ave. W., P.O. Box 100, Lynnwood, WA 98036 206-743-1313
Electronic Prods. Corp., Interstate Indl. Plaza, R. D. #5, York, PA 17402 717-767-6517
§ Elgin Electronics, Combustion Engineering, 5533 New Perry Hwy., Erie, PA 16509-3570 814-864-4921
§ Elpower, 2117 S. Anne St., Santa Ana, CA 92704 714-540-6155
Engineering Design & Sls., Rt. 2, Box 305, Danville, VA 24540 804-685-7073
† Exide Elctrns., P.O. Box 58189, Raleigh, NC 27658 919-872-3020
§ Franek, John, Co., Inc., P.O. Box 11752, Santa Ana, CA 92711-1752 .... 714-832-0290; 800-854-9420
§ GC Elctrns., 400 S. Wyman St., Rockford, IL 61101 815-968-9661
General Electric Co., 333 W. Seymour Ave., Cincinnati, OH 45216 513-948-5050
§ GNB Batteries Inc., Ind'l. Battery Div., 2010 Cabot Blvd. W., Langhorne, PA 19047 215-752-0555
† Good-All Electric, Inc., 3725 Canal Drive, Fort Collins, CO 80524 303-484-3080
§ HDR Power Sys., Inc., 600 Oakland Park Ave., Columbus, OH 43214 614-262-6832
HGA Elctrns., 519 S. Fifth Ave., Mt. Vernon, NY 10550 914-664-5393
† Hitran Corp., Agex, Rte. 31, RD 5-65, Flemington, NJ 08822 201-782-5525

ITT Power Systems Corp., Box 688, Galion, OH 44833-0688 419-468-8100
Jerome Industries Corp., B 730 Division St., Elizabeth, NJ 07201 201-353-5700
§ Johnson Controls, Battery Div., 5757 N. Green Bay Ave., Milwaukee, WI 53201 414-228-2581
KGS Electronics, Inc., GAR Entprs., 2029 N. Lincoln Ave., Pasadena, CA 91103 818-798-0786
§ La Marche Mfg., 106 Bradrock Dr., Des Plaines, IL 60018 312-299-1188
Lark Electronics, Inc., Box 390, New York, NY 10040 212-569-0430
Lorain Prods., 1122 F St., Lorain, OH 44052 216-288-1122
Mag-Con, 1626 Terrace Dr., St. Paul, MN 55113 612-633-8820
Magnetran Corp., 5701 Savoy Lane, Houston, TX 77036 713-785-4202
§ Marathon Flite-Tronics Company, A Marathon Power Technologies Co., 2525 N. Naomi St., Burbank, CA 91504 818-841-3210
Modular Devices, 50 Orville Dr., Bohemia, NY 11716 516-567-9620
† N.C.E., Mail Station 331, 9925 Lyndale Ave. S., Bloomington, MN 55420 612-890-1360
Oeco Corp., 712 S.E. Hawthorne Blvd., Portland, OR 97214 503-238-2440
§ Power Control, 122 Gamma Dr., Pittsburgh, PA 15238 412-782-3120
Power Conversion Prods., 42 East St., Box 380, Crystal Lake, IL 60014 815-459-9100
Power Designs, Inc., 1700 Shames Dr., Westbury, NY 11590 516-333-6200
† Power Group International, Dept. 227, 2200 West 66th Street, Richfield, MN 55423 612-890-1360
§ Power-Sonic, Box 5242, 3106 Spring St., Redwood City, CA 94063 415-364-5001
Pylon Elex Development Co. Ltd., 2300 Victoria, Lachine, PQ, CANADA H8S 1Z3 514-637-1186
§ Ratelco, 1260 Mercer, Dept. EEM, Seattle, WA 98109 206-624-7770
Reliance Comm/Tec, Reliance Electric, P. O. Box 99502, Cleveland, OH 44199 ..... 800-245-4501;in OH 800-245-4497
Reliance Electric Co., Marketing Info Center, P.O. Box 99502, Cleveland, OH 44199 ..... 800-245-4501;800-245-4497 In Ohio
RIL Elctrns., Inc., 125 Titus Ave., P.O. Box H, Warrington, PA 18976 ..... 215-EL5-1361
§ RMS Electronics Inc., 50 Antin Pl., Bronx, NY 10462 212-892-6700
Ross Engrg. Corp., 540 Westchester Dr., Campbell, CA 95008 408-377-4621
Rutherford Resch. Prods., Box 249, Rutherford, NJ 07070 201-933-2091
Sanford-Miller Corp., 8 John St., Lynbrook, NY 11563 ..... 516-593-2025;Outside NY 800-645-5900
§ Sanken Elec. Co., 1-22-8 Nishi-Ikebukuro, Toshima-Ku, Tokyo, JAPAN 03-986-6151
Sanyo Elec. Inc., 200 Riser Rd., Little Ferry, NJ 07643 201-641-2333
§ Schauer Mfg., 4500 Alpine Ave., Cincinnati, OH 45242 513-791-3030
§ Shokai Far East, Ltd., 280 North Central Ave., Hartsdale, NY 10530 914-681-0700
Silicon Sensors, Hwy. 18 East, Dodgeville, WI 53533 608-935-2707
§ Sonnenschein Batteries Inc., 300 E. Johnson Ave., P.O. Box 339, Cheshire, CT 06410 203-271-0091
Technipower, A Penril Co., P.O. Box 222, Commerce Pk., Danbury, CT 06810 203-748-7001
§ Telco Products Co., 44 Sea Cliff, Glen Cove, NY 11542 516-759-0300
§† Terado, 1068 Raymond Ave., St. Paul, MN 55108 612-646-2868
Triac Electronic Systems, Inc., 87-27 Myrtle Ave., Glendale, NY 11385 718-441-4759
§ Triad-Utrad, 1124 E. Franklin St., Huntington, IN 46750 219-356-6500
† Trio Labs., 80 Dupont St., Plainview, NY 11803 516-349-0400
† Tungstone Batteries, Inc., 18 Billings St., Sharon, MA 02067 617-784-2000
Vega Precision Labs., 800 Follin La., Vienna, VA 22180 703-938-6300
† Voltampere Corp., 146 Horton Ave., Lynbrook, NY 11563 516-887-9443
† Ward Leonard Elec., 31 South St., Mt. Vernon, NY 10550 914-664-1000
§ Warren Comms., 101 Okner Pkwy., Livingston, NJ 07039 201-992-6200
† Western Reserve Elctrns., 2150 Highland Rd., Twinsburg, OH 44087 216-425-4951

Chargers, Magnet — See Magnetizers (Vol. D)

Chassis, Circuit Board Mounting-1400 — *See Vol. C*

Chassis Marking Kits — See Kits, Marking (Vol. C)

Chassis, Metal-1400 — *See Vol. C*

Chassis (MIL), Electrical-2440 — *See Vol. B*

Chassis Slides — See Slides, Cabinet, Chassis (Vol. C)

Checkers — See Analyzers (Vol. D), Testers (Vol. D)

Chemicals, Antistatic — See Coatings, Antistatic (Vol. C)

Chemicals, Electroplating-1600 — *See Vol. C*

Chemicals, Epoxy Stripping-1600 — *See Vol. C*

Chemicals, Etching-1700 — *See Vol. C*

Chemicals, Fungicidal — See Coatings, Fungicidal (Vol. C)

Chemicals, Tin Plating-1700 — *See Vol. C*

Chemicals, Wire Stripping-1600 — *See Vol. C*

Chestsets — See Handsets, Chestsets (Vol. D)

Chips, Integrated Circuit — See Integrated Circuits, Silicon Monolithic, Unpackaged Chips (Vol. A)

Chokes, AF — See Coils, AF (Vol. A)

Chokes, Filter-1800 — *See Vol. A*

Chokes, RF — See Coils, RF (Vol. A)

Chokes, Swinging-1800 — *See Vol. A*

Chokes, Waveguide-3450 — *See Vol. A*

Chokes (MIL)-2440 — *See Vol. B*

Choppers-Also See Light Choppers-4050

Advanced Kinetics, 1231 Victoria St., Costa Mesa, CA 92627 714-646-7165
Alpha Inds., Inc.-MSD Div., 20 Sylvan Rd., Woburn, MA 01801 617-935-5150
† Balzers Optical Grp., 170 Locke Dr., Marlboro, MA 01752 617-481-9860
Cherry Semiconductor Corp, 2000 S. County Trail, East Greenwich, RI 02818 401-885-3600
† Climatronics, 140 Wilbur Pl., Bohemia, NY 11716 516-567-7300
EG&G Gamma Scientific, Div. of EG&G Inc., 3777 Ruffin Rd., San Diego, CA 92123 619-279-8034
† Electro-Optical Inds., Box 3770, Santa Barbara, CA 93130 805-964-6701
Frequency Control Prods., Inc., American Time Prods. Div., 61-20 Woodside Ave., Woodside, NY 11377 212-458-5811
§ General Magnetics, 211 Grove St., Bloomfield, NJ 07003 201-743-2700
ITHACO, Inc., Meas. & Control Instrs. Div., 735 W. Clinton St., P.O. Box 6437, Ithaca, NY 14851-6437 607-272-7640
† Millivac Instrs., Box 997, Curry Rd. Ext., Schenectady, NY 12301 518-355-8300
† Philamon, Inc., 33 Dubon Ct., Farmingdale, NY 11735 516-249-2700
† Solid State Elctrns. Corp., 18646 Parthenia St., Northridge, CA 91324 818-993-8257

Choppers (MIL)-2440 — *See Vol. B*

Circuit Analyzers — See Testers, Signal Tracing (Vol. D)

Circuit Board Holders, Jig Type — See Holders, Circuit Board (Vol. D)

Circuit Breakers-4300 — *See Vol. B*

Circuit Breakers, Boxes, Panel Boards, Enclosures (MIL)-2440 — *See Vol. B*

Circuit Testers — See Testers, Signal Tracing (Vol. D)

Circuits, Hybrid, Custom-3130 — *See Vol. A*

Circuits, Hybrid, Thick Film-3130 — *See Vol. A*

Circuits, Hybrid, Thin Film-3130 — *See Vol. A*

Circuits, Integrated — See Integrated Circuits (Specific Types) (Vol. A)

Circuits, Printed Flexible-1700 — *See Vol. C*

Circuits, Printed, Multilayer-1700 — *See Vol. C*

Circuits, Printed, Rigid, One & Two Sided-1700 — *See Vol. C*

Circuits, Printed (With Components) — See Cards, Linear Function (Vol. D)

Circuits, Thick Film, Thin Film — See Circuits, Hybrid (Vol. A)

Circulators, Ferrite-3450 — *See Vol. A*

Clamps & Clips, Cable-Also See Wire & Cable Ties-2800 — *See Vol. C*

Clamps & Clips, Component-2825 — *See Vol. C*

Clamps & Clips, Ground-2825

§† Accessories for Elctrns., Inc., 800 Merrick Rd., Baldwin, NY 11510-3593 516-546-1751
Accurate Elctrns., 169 S. Abbe Rd., P.O. Box 1287, Elyria, OH 44036 216-365-1211
Autosplice, Inc., 59-12, 37th Ave, Woodside, NY 11377 718-429-0500
§ Daburn Elctrns. & Cable, 70 Oak St., Norwood, NJ 07648 201-768-5400
§ Fastex, 195 Algonquin Rd., Des Plaines, IL 60016 312-299-2222
§ GC Elctrns., 400 S. Wyman St., Rockford, IL 61101 815-968-9661
§† Keystone Elctrns. Corp., 49 Bleecker St., New York, NY 10012 212-475-4600
† Micro-Mounting Devices, 4092 Keith Dr., Campbell, CA 95008 408-866-4626
§† Mueller Elec. Co., 1583 E 31st St., Dept. 20, Cleveland, OH 44114 216-771-5225
Reliance Electric Co., Marketing Info Center, P.O. Box 99502, Cleveland, OH 44199 ..... 800-245-4501;800-245-4497 In Ohio
Sjoberg, C., & Son, Inc., 415 Station St., Cranston, RI 02910 401-461-8220
§ Kulka Smith, Inc., 1913 Atlantic Ave., Manasquan, NJ 08736 201-223-9400
§ Square D Co., Executive Plaza, Palatine, IL 60067 312-397-2600
§ Thomas & Betts, Electronics Group Hdqtrs., 920 Route 202, Raritan, NJ 08869 201-469-4000
§ Waldom Elctrns., 4301 W. 69th St., Dept. EEM, Chicago, IL 60629 312-585-1212
§ Zierick Mfg. Corp., 44 Radio Circle, Mt. Kisco, NY 10549 914-666-2911

Clamps, Synchro & Servo-2800 — *See Vol. C*

Clamps (MIL), Cable-2440 — *See Vol. B*

Cleaners, Magnetic Medium-1600 — *See Vol. C*

Cleaners, Ultrasonic-4100

§† Alpha Metals, 600 Rte 440, Jersey City, NJ 07304 201-434-6778
§ APA Division, 399 Executive Blvd., Elmsford, NY 10523 914-592-7322

Auric Corp., 470 Frelinghuysen Ave., Newark, NJ 07114 201-242-4100
Automated Production Concepts, 8 E. Garden Pl., Pompton Plains, NJ 07444 201-831-8300
† Automated Prod. Equip. Corp., 142 Peconic Ave., Medford, NY 11763 516-654-1197
Baron-Blakeslee, Inc., Sub. Purex Inds., Inc., 2001 N. Janice Ave., Melrose Pk., IL 60160 312-450-3900
§ Clean Room Prods., 56 W. Penataquit Ave., Bay Shore, NY 11706 516-968-8282
† DuPont de Nemours, E. I., & Co., 1007 Market St., Wilmington, DE 19898 302-773-3218
§† Electrovert Inc., 399 Executive Blvd., Elmsford, NY 10523 914-592-7322
Electrovert USA Corp., 10969 Shady Trail, #101, Dallas, TX 75220 214-353-9950
Fidelity Chem. Prods. Corp., 472 Frelinqhuysen Ave., Newark, NJ 07114 201-242-4110
§ Heath Co., Benton Harbor, MI 49022 616-982-3886
§ Heat Systems-Ultrasonics, Inc., 1938 New Hwy., Farmingdale, NY 11735 516-694-9555
§† Keuffel & Esser Co., 900 Lanidex Plaza, Parsippany, NJ 07054 201-428-7000
§† L & R Mfg. Co., 577 Elm St., Kearny, NJ 07032 201-991-5330
§† LPS Chemical Products, Holt Lloyd Corp., 4647 Hugh Howell Rd., P. O. Box 3050, Tucker, GA 30084 .... 404-934-7800;800-241-8334
§ Mann, Henry, Inc., 3983 Mann Road, Huntingdon Valley, PA 19006 215-355-7200
† Miller-Stephenson Chem. Co., Inc., George Washington Hwy., Danbury, CT 06810 203-743-4447
NTK Technical Ceramics, NGK Spark Plugs (U.S.A.), Inc., 1701 N. Greenville Ave. #205, Richardson, TX 75081 214-235-8332
Solder Absorbing Technology (SAT), South End Bridge Circle, Agawam, MA 01001 800-628-8862
Sonicor Instrument Corp., 1365 Marconi Blvd., Copiague, NY 11726 516-842-3344
§ Techni-Tool, 5 Apollo Rd., Box 368, Plymouth Meeting, PA 19462 215-825-4990
§ Tech Spray, Inc., Box 949, Amarillo, TX 79105 806-372-8523
Transene, Rte. 1, Rowley, MA 01969 617-948-2501

Cleaners & Degreasers, Machine — See Machines, Cleaning & Degreasing (Vol. D)

Cleaners & Solvents-1600 — *See Vol. C*

Clean Room Equipment & Supplies-2550

Blue M, A Unit of General Signal, 138th & Chatham Sts., Blue Island, IL 60406, 312-385-9000 .... D•1165
§† Aluminum Filter, P.O. Box 1311, Santa Barbara, CA 93102 805-684-7651
§ Alzbear Corp., 15411 Red Hill Ave., Unit F, Tustin, CA 92680 714-557-0910
† Baker Co., Inc., Drawer E - Sanford Airport, Sanford, ME 04073 207-324-8773
§ Cambridge Filter Corp., P.O. Box 4906, Syracuse, NY 13221-4906 315-457-1000
§† Chemtronics Inc., 681 Old Willets Path, Hauppauge, NY 11788 516-582-3322
† Clean Room Prods., 56 W. Penataquit Ave., Bay Shore, NY 11706 516-968-8282
† Controlled Envir. Equip. Corp., 3 Delta Drive, Westbrook, ME 04092 207-854-9126
Inter Metro Industries Corp., North Washington St., Wilkes-Barre, PA 18705 717-825-2741
International Instrumentation, 31131-602 Via Colinas, Westlake Vlg., CA 91362 213-991-9614
§ Mann, Henry, Inc., 3983 Mann Road, Huntingdon Valley, PA 19006 215-355-7200
† Manufacturing Sys., Div. LeDoux Inds., Inc., 2022-C S. Grand Ave., Santa Ana, CA 92705 714-540-6630
Precision Tech. Sewing, 921 E. Charleston Rd., Palo Alto, CA 94303 415-856-2128
§† Simco Co., 2257 North Penn Rd., Hatfield, PA 19440 215-822-2171
§ Solder Absorbing Technology (SAT), South End Bridge Circle, Agawam, MA 01001 800-628-8862
Static, Inc., Rte. 113 & Mensch Rd., P.O. Box 80, Skippack, PA 19474 215-584-9600
§ Techni-Tool, 5 Apollo Rd., Box 368, Plymouth Meeting, PA 19462 215-825-4990
§ Tech Spray, Inc., Box 949, Amarillo, TX 79105 806-372-8523
Tegal Scientific, Inc., Box 5905, Concord, CA 94524 415-827-1054

Clips, Alligator-2100 — *See Vol. C*

Clips & Holders, Fuse-Also See Panels, Fuse-4300 — *See Vol. B*

Clips, Battery-2100 — *See Vol. C*

Clips, Board, Harness-1700 — *See Vol. C*

Clips, Breadboard-4200 — *See Vol. C*

Clips, Fahnestock-2100 — *See Vol. C*

Clips, LED — See Retainers, Transistor & Diode

Clips, Logic Test-2900

§ ITT Pomona Electronics, 1500 E. 9th St., P.O. Box 2767, Pomona, CA 91766, 714-623-3463 .... C•1352-1354,1362-1366
§ A P PRODUCTS INCORPORATED, 9450 Pineneedle Dr., Box 540, Mentor, OH 44060 216-354-2101
Augat Inc., 33 Perry Ave., Box 779, Attleboro, MA 02703 617-222-2202
§† E-Z-Hook, Div. Tektest Inc., Box 450 - 225 N. Second Ave., Arcadia, CA 91006 818-446-6175
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
L-Com Inc., 1755 Osgood St., Unit 11EM, N. Andover, MA 01845 617-682-6936
§ Techni-Tool, 5 Apollo Rd., Box 368, Plymouth Meeting, PA 19462 215-825-4990

Clips, Test-2100 — *See Vol. C*

Clips, Transistor & Diode — See Retainers, Transistor & Diode (Vol. C)

Clips (MIL), Electrical-2440 — *See Vol. B*

Clocks, Time Keeping - Also See Oscillators, Clock-2200

Airpax Corp., Cheshire Div., Cheshire Indl. Pk., Box E, Cheshire, CT 06410, 203-272-0301 .... D•1110
† Austron, Inc., P.O. Box 14766, Exit 248 N. IH 35, Austin, TX 78761, 512-251-2341 .... A•1315
§† Catalyst Research, Mine Safety Appliances Co., 1421 Clarkview Rd., Baltimore, MD 21209, 301-296-7000, Ext. 304 .... D•1417
§ Chrono-log Corp., 2 W. Park Rd., Havertown, PA 19083, 215-853-1130 .... D•1061
§ C-Tek Inc., 4 Railroad Ave., Wakefield, MA 01880, 617-246-1720 .... D•1114
Dio-Rey, Div. of Info-Lite, 422 Cliff St., Fairview, NJ 07022, 201-941-4455 .... B•1044-1045
§† Fox Elctrns., P.O. Box 1078, Cape Coral, FL 33910, 813-482-7212 .... A•1363
† Frequency and Time Systems, Inc., DATUM, INC., 34 Tozer Rd., Beverly, MA 01915, 617-927-8220 .... A•1364, D•1148
§ Kessler-Ellis Prods., 120 1st Ave., Atlantic Highlands, NJ 07716, 201-291-0500;800-631-2165 .... D•1124
§ Midland-Ross Corp., NEL Unit, 357 Beloit St., Burlington, WI 53105, 414-763-3591 .... A•1387
§ NES, Inc. (Nationwide Electronic Systems), 3003 Wakefield, Carpentersville, IL 60110, 312-426-5900 .... D•1366
SaRonix, 4010 Transport at San Antonio, Palo Alto, CA 94303, 415-856-6900 .... A•1431
† TRAK Systems, Div. TRAK Microwave Corp., 4722 Eisenhower Blvd., Dept. E-5, Tampa, FL 33614, 813-884-1411 .... D•1076-1081
A.D. Data Sys., Techtran Industries, 200 Commerce Dr., Rochester, NY 14623 716-334-9649
§† Advanced Micro Devices, P.O. Box 3453, 901 Thompson Pl., Sunnyvale, CA 94088 408-732-2400
CDS - Colorado Data Sys., 3301 W. Hampden, Unit C, Englewood, CO 80110 303-762-1640
§ Codar Technology, Inc., 1428 Florida Avenue, Longmont, CO 80501 303-776-0472
CTS Electronics Corp., Knights Division, 400 Reimann Ave., Sandwich, IL 60548 815-786-8411
Custom Control Sys., 21 E. Canon Perdido St., Santa Barbara, CA 93101 805-965-7577
Dantronics, Inc., 3175 Hafner Ct., St. Paul, MN 55112 612-484-2108
Datum Inc., Timing/Aacom Divisions, 1363 S. State College Blvd., Anaheim, CA 92806 714-533-6333
DCI Inc., 14812 W. 117th Street, P.O. Box 215, Olathe, KS 66061 913-782-5672
† Devco Engrg., Control Sys. Div., 36 Pier Lane West, Fairfield, NJ 07006 .... 201-CA8-0321
Digital Equip., One Iron Way, Marlborough, MA 01752
Digital Pathways, Inc., 1060 E. Meadow Cir., Palo Alto, CA 94303 415-493-5544
Digitec Corp., 918 Woodley Rd., P.O. Box 458, Dayton, OH 45401 513-254-6251
§† Dukane Corp., Communications Sys. Div., 2900 Dukane Dr., St. Charles, IL 60174 312-584-2300
§† EFRATOM, a division of Ball Corp., 18851 Bardeen Ave, Irvine, CA 92715 714-752-2891
Electric Time Company, Inc., P.O. Box 298, Natick, MA 01760 617-653-1341
Engineered Comps. Co., P. O. Box 8121, San Luis Obispo, CA 93403-8121 805-544-3800
§ ESE, 142 Sierra St., El Segundo, CA 90245 213-322-2136
Frequency Control Prods., Inc., American Time Prods. Div., 61-20 Woodside Ave., Woodside, NY 11377 212-458-5811
† Frequency Elctrns., 55 Charles Lindbergh Blvd., Mitchel Field, NY 11553 516-794-4500
§ GC Elctrns., 400 S. Wyman St., Rockford, IL 61101 815-968-9661
† Greenray Inds., Inc., 840 W. Church Rd., Mechanicsburg, PA 17055 717-766-0223
Gregg Elec., 608 W. Emporia, Ontario, CA 91761 714-983-1794
Haydon Switch & Instr., 1500 Meriden Rd., P.O. Box 3329, Waterbury, CT 06705 203-756-7441
† Henschel, General Signal Corp., 9 Hoyt Drive, P.O. Box 30, Newburyport, MA 01950 617-462-2400
Holt Inc., 9351 Jeronimo Rd., Irvine, CA 92718 714-859-8800
Industrial Computer Designs, Inc., 31264 La Baya Drive, Westlake Village, CA 91362 818-889-3179
§ Inmac, 2465 Augustine Dr., Santa Clara, CA 95054 408-727-1970
† Isotemp Research, Inc, Box 3389, Charlottesville, VA 22901 804-295-3101
JF Microsystems, 3641 Frontier Road, Pasco, WA 99301 .... 509-297-4294; 800-JF-CARDS
§ Kinemetrics/Truetime, 3243 Santa Rose Ave, Santa Rosa, CA 95407 707-528-1230
Kode, 1515 S. Manchester Ave., Anaheim, CA 92802 714-758-0400
§† Lite-On Corp., Sub. Taiwan Liton Elctrn. Co. Ltd., 4951 Airport Pkwy., Ste. 570, Dallas, TX 75248
Motorola, Inc., Compt. Divs. Clock Oscillator Dept., 2553 N. Edgington, Franklin Park, IL 60131 312-451-1000
§ Newport Electronics, 630 E. Young St., Santa Ana, CA 92705 714-540-4914
§ Paccom, 3928 148th NE, Redmond, WA 98052 .... 206-883-9200;800-426-6254
Pulse Instrs. Co., 1234 Francisco, Torrance, CA 90502 213-515-5330
Spectracom, 101 Despatch Drive, East Rochester, NY 14445 716-381-4827
Spectrum Technology, Inc., 300 Lopez Rd., Goleta, CA 93116 805-964-7791
§† Systron-Donner Instr. Div., 2727 Systron Dr., Concord, CA 94518 415-676-5000
† UCE, Inc., 24 Fitch St., Norwalk, CT 06855 203-838-7509
§ Xycom, 750 N. Maple Rd., Saline, MI 48176 313-429-4971

Clocks & Controllers, Thermal-2200

§ Jumbo Process Control, Inc., 410 Garibaldi Ave., Lodi, NJ 07644 201-779-7744

Clutches, Friction-3500 — *See Vol. B*

Clutches, Magnetic-3500 — *See Vol. B*

Clutches, Positive-3500 — *See Vol. B*

Coating Services — See Services, Coating (Vol. D)

Coatings, Antistatic-1600 — *See Vol. C*

Coatings, Compounds, Lubricants, etc., Heat Conductive-1600 — *See Vol. C*

Coatings, Conductive, Electric-1600 — *See Vol. C*

Coatings, Corrosion Resistant-1600 — *See Vol. C*

Coatings, Electromagnetic Wave Absorbing-1600 — *See Vol. C*

Coatings, Fungicidal-1600 — *See Vol. C*

Coatings, High Temperature, Ceramic, Plasma Spray — See Services, Coating (Vol. D)

Coatings, Insulating-3100 — *See Vol. C*

Coatings, Moisture Repellant & Waterproofing-1600 — *See Vol. C*

Coatings, Protective-1600 — *See Vol. C*

Code Actuated Switches — See Switches, Data (Vol. D)

Code & Tab Markers — See Wire Markers (All Types) (Vol. C)

Coded Discs, Optical — See Encoders, Shaft Angle, Optical (Vol. B)

Coders, AF-1300
Douglas Randall, 6 Pawcatuck Ave., Pawcatuck, CT 06379 203-599-2075
† Fork Standards, Inc., 666 Western Ave., Lombard, IL 60148 312-932-9380
RFL Inds., A Dowty Grp. Co./Comms. Div., Powerville Rd., Boonton, NJ 07005 201-334-3100

Coders, Telephone, Dial-1900
Rath Microtech Corp., Rath Affiliated Cos., 2505 Foster Ave., Janesville, WI 53545 .... 608-754-2222;800-356-9464

Coders, Transponder-3400
† Computer Devices Corp., 63 Austin Blvd., Commack, NY 11725 516-543-4220
† Hazeltine Corp., 500 Commack Rd., Commack, NY 11725 516-462-5100
§ Seaboard Elctrns., 70 Church St., New Rochelle, NY 10805 914-235-8073
† Vega Precision Labs., 800 Follin La., Vienna, VA 22180 703-938-6300

Coil Assemblies & Forms-Also See Bobbins, Winding, Coil & Transformer-1800 — *See Vol. A*

Coil/Lens Aligners, Micropositioner-1800 — *See Vol. A*

Coil Standards — See Standards, Inductance (Vol. D)

Coil-Winding Equipment — See Machines, Coil Winding (Vol. D)

Coils, AF-1800 — *See Vol. A*

Coils, Antenna (Incl. Loading Type)-1800 — *See Vol. A*

Coils, pi Winding-1800 — *See Vol. A*

Coils, Broadcast-1800 — *See Vol. A*

Coils, Chip-1800 — *See Vol. A*

Coils, Degaussing-1800 — *See Vol. A*

Coils, Field-1800 — *See Vol. A*

Coils, Focusing-1800 — *See Vol. A*

Coils, Foil Wound-1800 — *See Vol. A*

Coils, High Q, Low Frequency-1800 — *See Vol. A*

Coils, Hum Eliminating — See Hum Eliminators (Vol. A)

Coils, Hybrid & Repeater-1800 — *See Vol. A*

Coils, IF-1800 — *See Vol. A*

Coils, Metallized Ceramic-1800 — *See Vol. A*

Coils, Metallized Glass-1800 — *See Vol. A*

Coils, Molded-1800 — *See Vol. A*

Coils, RF-1800 — *See Vol. A*

Coils, Relay-1800 — *See Vol. A*

Coils, Saturable Reactor-1800 — *See Vol. A*

Coils, Shielded-1800 — *See Vol. A*

Coils, Solenoid-1800 — *See Vol. A*

Coils, Telephone-1800 — *See Vol. A*

Coils, Telephone Pickup (Recording) — See Pickups, Telephone (Vol. D)

Coils, Toroidal-1800 — *See Vol. A*

Coils, Transducer-1800 — *See Vol. A*

Coils, Transformer-1800 — *See Vol. A*

Coils, TV (All Types)-1800 — *See Vol. A*

Coils, Variable-1800 — *See Vol. A*

Coils, Vidicon Alignment-1800 — *See Vol. A*

Coils (MIL), Non-RF-2440 — *See Vol. B*

Coils (MIL), RF-2440 — *See Vol. B*

Cold-Cathode Readout Tubes — See Tubes, Readout (Vol. A)

Cold Plates — See Thermal Platforms (Vol. D)

Collection Systems (MIL)-3475
Digital Radio Corp., 8901 La Cienega Blvd., Inglewood, CA 90301 213-670-8611
Dynamic Time Systems, Inc., 150 West 1230 North, Ste. 2, Provo, UT 84604 801-377-9154
† E-Systems, Greenville Div., P.O. Box 1056, Greenville, TX 75401 214-457-4694
GTE Sys.-Sylvania Sys. Grp., Western Div., P.O. Box 7188, Mountain View, CA 94039 415-966-2000

Collimators-2900
§ Alan Gordon Entprs., Inc., P.O. Box 3914, 5362 Cahuenga Blvd., N. Hollywood, CA 91605 818-985-5500
† Electro-Optical Inds., Box 3770, Santa Barbara, CA 93130 805-964-6701
KLC/Karl Lambrecht Corp., 4204 N. Lincoln Ave., Chicago, IL 60618 312-472-5442

Combiners, Microwave — See Couplers, Microwave (Vol. A)

Communications Intelligence (Comint) Systems (MIL)-3475
† Applied Communications, Amstar Tech. Prods. Co., 5490 Spectrum Drive, Frederick, MD 21701 301-694-5300
§† Audiosone, Inc., 617 Fan Hill Rd., Monroe, CT 06468 ..... 203-268-4372;203-268-6703
California Microwave, 990 Almanor Ave., Sunnyvale, CA 94086 408-732-4000
† Condor Systems, Inc., 2605 S. Winchester Blvd., Campbell, CA 95008 ... 408-866-5900
Digital Radio Corp., 8901 La Cienega Blvd., Inglewood, CA 90301 213-670-8611
† Electrospace Sys., Inc., P. O. Box 831359, Richardson, TX 75083-1359 214-783-2004
† E-Systems, Greenville Div., P.O. Box 1056, Greenville, TX 75401 214-457-4694
GTE Sys.-Sylvania Sys. Grp., Western Div., P.O. Box 7188, Mountain View, CA 94039 415-966-2000
Locus, Box 740, State College, PA 16804 814-466-6275
† Magnavox Advanced Prods. & Sys. Co., Magnavox Govt. Indl. Elctrns. Co., 2829 Maricopa St., Torrance, CA 90503 213-618-1200
† Microwave/Sys., 1 Adler Dr., E. Syracuse, NY 13057 315-437-9951
New Wave Instruments, 3760 Masters Court, San Jose, CA 95111 408-629-3105
§ Teltone, 10801-120 Ave. NE, Kirkland, WA 98033 206-827-9626
† Watkins-Johnson Co., 3333 Hillview Ave., Palo Alto, CA 94304 415-493-4141

Communications Systems, FM-1900
† **GRIM Corporation, Box 67, Medford, NJ 08055, 609-267-7950 .... D•1051**
† AN/COM Industries, P.O. Box 530, 5521 Cleon Ave., N. Hollywood, CA 91603 818-769-5518
† A.R.F. Prods., 2559 75th St., Boulder, CO 80301 303-443-4844
Artel Communications Corp., 93 Grand St., Worcester, MA 01602 617-752-5690
† Aydin Vector Div., Box 328, Newtown, PA 18940 215-968-4271
† California Microwave, 990 Almanor Ave., Sunnyvale, CA 94086 408-732-4000
† Cincinnati Elctrns., 2630 Glendale Milford Rd., Cincinnati, OH 45241 513-733-6100
§ Coastcom, P.O. Box 27068, Concord, CA 94527 415-825-7500
§ Data-Design Labs., P.O. Box 711, 7925 Center Ave., Cucamonga, CA 91730 714-987-2511
Digital Radio Corp., 8901 La Cienega Blvd., Inglewood, CA 90301 213-670-8611
§ Dyma Engrg., Box 1535, Los Lunas, NM 87031 505-865-6700
† Electrospace Sys., Inc., P. O. Box 831359, Richardson, TX 75083-1359 214-783-2004
§ Emergency Beacon Corp., 15 River St., New Rochelle, NY 10801 914-235-9400
† Foundation Instruments Inc., 24 Colonnade Rd., Nepean, ON, CANADA K2E 7J6 613-226-4000
§ Glatzer Industry Corp., 15 River St., New Rochelle, NY 10801 914-576-2700
HDS Inc., 12310 Pinecrest Rd., Reston, VA 22091 703-620-6200
§ Heath Co., Benton Harbor, MI 49022 616-982-3886
§ HM Elctrns., 6151 Fairmount Ave., San Diego, CA 92120 619-280-6050
† LNR Communications, Inc., 180 Marcus Blvd., Hauppauge, NY 11788 ... 516-273-7111
† Magnavox Advanced Prods. & Sys. Co., Magnavox Govt. Indl. Elctrns. Co., 2829 Maricopa St., Torrance, CA 90503 213-618-1200
† Microwave Assocs. Ltd., Humphrey Rd., Dunstable, Bedfordshire, ENGLAND LU5 4SX, England .... 44-(582) 60-14-41
Pacific Communications, 2041-A S. Grand Ave., Santa Ana, CA 92705 .. 714-546-0147

Pathcom, Inc., Pace Two-Way Radio Prods., 24105 S. Frampton Ave., Harbor City, CA 90710 213-325-1290
§ R-Columbia Prods. Co., Inc., 2008 St. Johns Ave., Highland Park, IL 60035 312-432-7915
§† REPCO, 2421 N. Orange Blossom Trail, Box 7065, Orlando, FL 32854 305-843-8484
Resdel Engrg., 300 E. Live Oak Ave., Arcadia, CA 91006 213-684-2600
† RHG Electronics Lab., Inc., 161 E. Industry Ct., Deer Park, NY 11729 516-242-1100
Solartron Instruments, Sangamo Weston, Inc., 2 Westchester Plaza, Elmsford, NY 10523 914-592-9168
† Solid State Elctrns. Corp., 18646 Parthenia St., Northridge, CA 91324 818-993-8257
§ SPECO Div., Components Specialties, Inc., P.O. Box 624, 1172 Rte. 109, Lindenhurst, NY 11757 .... 516-957-8700;800-645-5516
† G.T.E. Gov't Sys. Corp., Comm. Sys. Div., 77 A St., Needham Hgts., MA 02194 617-449-2000
Telcom Inc., 8027 Leesburg Pike, Vienna, VA 22180 703-893-7700
§ Telco Products Co., 44 Sea Cliff, Glen Cove, NY 11542 516-759-0300
§ Wilson Electronics, PO Box 19000, Las Vegas, NV 89119 702-739-1931

Communications Systems, Laser-1900

† MERET, Inc., 1815 24th St., Santa Monica, CA 90404-4998, 213-828-7496 .... B•1121
§ American Laser Sys., Inc., 106 Fowler Rd., Goleta, CA 93117 805-967-0423
Codenoll Technology Corp., 1086 N. Bwy., Yonkers, NY 10701 914-965-6300
Fairchild Camera & Instr. Corp., 464 Ellis St., 20-2271, Mountain View, CA 94042 415-962-5011
† Foundation Instruments Inc., 24 Colonnade Rd., Nepean, ON, CANADA K2E 7J6 613-226-4000
† General Optronics, 3005 Hadley Rd., So. Plainfield, NJ 07080 201-549-9000
§ International Laser Sys., 3404 N. Orange Blossom Trail, Orlando, FL 32804 305-295-4010
Karkar Electronics, Inc., 245 Eleventh St., San Francisco, CA 94103 415-552-1247
M/A-COM Laser Diode, Inc., M/A-COM, Inc., 1130 Somerset St., New Brunswick, NJ 08901 201-249-7000
† Optelecom, 15940 Luanne Dr., Gaithersburg, MD 20877 301-840-2121
Ortel Corp., 2015 W. Chestnut St., Alhambra, CA 91803 818-281-3636
RE Instruments Corp., 31029 Center Ridge Rd., Westlake, OH 44145 216-871-7617

Communications Systems, Microwave-3400

Atlantic Research, 5390 Cherokee Ave., Alexandria, VA 22312 703-642-4000
Avantek, Inc., 3175 Bowers Ave., Santa Clara, CA 95054 408-496-6710
† Aydin Corp., 700 Dresher Rd., Horsham, PA 19044 215-657-7510
† Aydin Microwave, 75 East Trimble Rd., San Jose, CA 95131 408-946-5600
California Microwave, 990 Almanor Ave., Sunnyvale, CA 94086 408-732-4000
† Cardion Elctrns., Div. of Gen. Sig. Conts., Inc. Unit of Gen. Sig. Corp., Long Island Expwy., Woodbury, NY 11797 516-921-7300
§ Coastcom, P.O. Box 27068, Concord, CA 94527 415-825-7500
† Cushman Elctrns., 2450 N. 1st St., San Jose, CA 95131 408-263-8100
§ Data-Control Sys., Commerce Dr., Box 860, Danbury, CT 06810 203-743-9241
Datum Inc., Timing/Aacom Divisions, 1363 S. State College Blvd., Anaheim, CA 92806 714-533-6333
Digital Radio Corp., 8901 La Cienega Blvd., Inglewood, CA 90301 213-670-8611
† Farinon Div., Harris Corp., 1691 Bayport, San Carlos, CA 94070 415-594-3000
FG Engrg., Box 476, Fredonia, AZ 86022 602-643-7375
† Granger Assocs., 3101 Scott Blvd., Santa Clara, CA 95051 408-727-3101
HDS Inc., 12310 Pinecrest Rd., Reston, VA 22091 703-620-6200
Hughes Aircraft Co., Electron Dynamics Div., 3100 W. Lomita Blvd., P.O. Box 2999, Torrance, CA 90509-2999 213-517-6000
† Hughes Aircraft Co., Microelctrn. Sys. Div., 2601 Campus Dr., Irvine, CA 92715 714-752-3800
Karkar Electronics, Inc., 245 Eleventh St., San Francisco, CA 94103 415-552-1247
Loral TerraCom, Div. of Loral Corp., 9020 Balboa Ave., San Diego, CA 92123 619-278-4100
† Microwave Assocs. Ltd., Humphrey Rd., Dunstable, Bedfordshire, ENGLAND LU5 4SX, England .... 44-(582) 60-14-41
† Microwave/Sys., 1 Adler Dr., E. Syracuse, NY 13057 315-437-9951
Resdel Engrg., 300 E. Live Oak Ave., Arcadia, CA 91006 213-684-2600
RHG Electronics Lab., Inc., 161 E. Industry Ct., Deer Park, NY 11729 516-242-1100
Rockwell Intl., Commercial Elctrns. Opers., 1200 N. Alma Rd., Richardson, TX 75081 214-996-5000
Solartron Instruments, Sangamo Weston, Inc., 2 Westchester Plaza, Elmsford, NY 10523 914-592-9168
Tasker Systems, 20131 Sunburst St., Chatsworth, CA 91311 213-341-3010
Telcom Inc., 8027 Leesburg Pike, Vienna, VA 22180 703-893-7700
† TRW Microwave, 825 Stewart Dr., Sunnyvale, CA 94086 408-732-0880
Varian Associates, Inc., Microwave Tube Div., 611 Hansen Way, Palo Alto, CA 94303 415-493-4000
§ Waveline, Box 718, W. Caldwell, NJ 07006 201-226-9100

Communications Systems, Multiplex-1900

† GRIM Corporation, Box 67, Medford, NJ 08055, 609-267-7950 .... D•1051
† Allied Corp. Aerospace Sector, Bendix Communications Div., East Joppa Rd., Towson, MD 21204 301-583-4000
Amdahl Communications Sys. Div., Amdahl Corp., 2500 Walnut Ave., Marina del Rey, CA 90291 213-822-3202
Applied Sys., 26401 Harper Ave., St. Clair Shores, MI 48081 313-779-8700
Artel Communications Corp., 93 Grand St., Worcester, MA 01602 617-752-5690
Aydin Corp., 700 Dresher Rd., Horsham, PA 19044 215-657-7510
Aydin Microwave, 75 East Trimble Rd., San Jose, CA 95131 408-946-5600
Bristol Babcock Inc., 40 Bristol St., Waterbury, CT 06708 203-575-3000
† Cardion Elctrns., Div. of Gen. Sig. Conts., Inc. Unit of Gen. Sig. Corp., Long Island Expwy., Woodbury, NY 11797 516-921-7300
§ Coastcom, P.O. Box 27068, Concord, CA 94527 415-825-7500
Coherent Communications Sys. Corp., 60 Commerce Dr., Hauppauge, NY 11788 516-231-1550
Computrol Div. Kidde Automated Sys., Inc., 15 Ethan Allen Hwy., Ridgefield, CT 06877-6297 203-544-9371
Control Module, 380 Enfield St., Enfield, CT 06082 203-745-2433
§† Data-Control Sys., Commerce Dr., Box 860, Danbury, CT 06810 203-743-9241
§ Data-Design Labs., P.O. Box 711, 7925 Center Ave., Cucamonga, CA 91730 714-987-2511
§ Dataprobe, 110 Palisades Blvd., Palisades Park, NJ 07650 201-947-9500
† Dataproducts, 6200 Canoga Ave., Woodland Hills, CA 91365 213-887-8000
§† Data Prods. New England, Barnes Park N. Caller Box 30, Wallingford, CT 06492 203-265-7151
Digital Radio Corp., 8901 La Cienega Blvd., Inglewood, CA 90301 213-670-8611
§ Dukane Corp., Communications Sys. Div., 2900 Dukane Dr., St. Charles, IL 60174 312-584-2300
† Electrospace Sys., Inc., P. O. Box 831359, Richardson, TX 75083-1359 214-783-2004
Enterprise Sys. Corp., P.O. Box 698, Dover, NH 03820 603-742-7363
† Evershed & Vignoles, Ltd., Acton Lane, Chiswick, London, ENGLAND W4 5HJ 01-994-3670
Fairchild - Weston - Telemetry, P.O. Box 3041, Sarasota, FL 33578 813-377-5566
† Farinon Div., Harris Corp., 1691 Bayport, San Carlos, CA 94070 415-594-3000
† Foundation Instruments Inc., 24 Colonnade Rd., Nepean, ON, CANADA K2E 7J6 613-226-4000
Gandalf Data, Inc., 1019 S. Noel Ave., Wheeling, IL 60090 312-541-6060
Granger Assocs., 3101 Scott Blvd., Santa Clara, CA 95051 408-727-3101
GTE SUPPLY, GTE Communications Systems, 5225 Wiley Post Way, Salt Lake City, UT 84116 801-537-5237
† Hughes Aircraft Co., Microelctrn. Sys. Div., 2601 Campus Dr., Irvine, CA 92715 714-752-3800
§ Intra-computer, 101 W. 31st St., New York, NY 10001 212-947-5533
Karkar Electronics, Inc., 245 Eleventh St., San Francisco, CA 94103 415-552-1247
Loral TerraCom, Div. of Loral Corp., 9020 Balboa Ave., San Diego, CA 92123 619-278-4100
Minntronics Corporation, 2599 White Bear Ave., St. Paul, MN 55109 612-770-5247
† Optelecom, 15940 Luanne Dr., Gaithersburg, MD 20877 301-840-2121
§ Poly-Scientific, Litton Inds., 1213 N. Main St., Blacksburg, VA 24060 703-552-3014
Proteon, Inc., 4 Tech Circle, Natick, MA 01760 617-655-3340
RE Instruments Corp., 31029 Center Ridge Rd., Westlake, OH 44145 216-871-7617
Reliance Electric Co., Marketing Info Center, P.O. Box 99502, Cleveland, OH 44199 .... 800-245-4501;800-245-4497 In Ohio
RFL Inds., A Dowty Grp. Co./Comms. Div., Powerville Rd., Boonton, NJ 07005 201-334-3100
Rockwell Intl., Commercial Elctrns. Opers., 1200 N. Alma Rd., Richardson, TX 75081 214-996-5000
† Singer Co., Librascope Div., 833 Sonora Ave., Glendale, CA 91201 818-244-6541
† Solid State Elctrns. Corp., 18646 Parthenia St., Northridge, CA 91324 818-993-8257
Techland Systems, Inc., 25 Waterside Plaza, New York, NY 10010 212-684-7788
Telephonics, 770 Park Ave., Huntington, NY 11743 516-549-6000
† Timeplex, Inc., 400 Chestnut Ridge Rd., Woodcliff Lake, NJ 07675 201-930-4600
† Tro Dyne Corp., 900 Corporate Dr., Mahwah, NJ 07430 201-529-1800

Communications Systems, Telemetering-1900

Amplifier Research, 160 School House Rd., Souderton, PA 18964-9990, 215-723-8181 .... D•1003
§ American Laser Sys., Inc., 106 Fowler Rd., Goleta, CA 93117 805-967-0423
Atlantic Research, 5390 Cherokee Ave., Alexandria, VA 22312 703-642-4000
† Aydin Corp., 700 Dresher Rd., Horsham, PA 19044 215-657-7510
† Aydin Monitor Sys., 502 Office Center Dr., Ft. Washington, PA 19034 215-646-8100
† Aydin Vector Div., Box 328, Newtown, PA 18940 215-968-4271
† Base Ten Sys., One Electronics Dr., Box 3151, Trenton, NJ 08619 609-586-7010
Bristol Babcock Inc., 40 Bristol St., Waterbury, CT 06708 203-575-3000
† Cardion Elctrns., Div. of Gen. Sig. Conts., Inc. Unit of Gen. Sig. Corp., Long Island Expwy., Woodbury, NY 11797 516-921-7300
† Climatronics, 140 Wilbur Pl., Bohemia, NY 11716 516-567-7300
§ Consell, 463 Payne Dr., Cheshire, CT 06410 203-272-5750
Continental Data Sys., 131 N. Ludlow St., Dayton, OH 45402 513-222-8626
Dantel, 2991 N. Argyle Ave., Fresno, CA 93727 209-292-1111
§† Data-Control Sys., Commerce Dr., Box 860, Danbury, CT 06810 203-743-9241
§ Dataprobe, 110 Palisades Blvd., Palisades Park, NJ 07650 201-947-9500
Data Signal Corp., 149 California St., Newton, MA 02158 617-926-5080
Datron Systems, Inc., 200 West Los Angeles Ave., Simi Valley, CA 93065-1650 805-584-1717
Datum Inc., Timing/Aacom Divisions, 1363 S. State College Blvd., Anaheim, CA 92806 714-533-6333
Decom Sys., 340 Rancheros Dr., San Marcos, CA 92069 619-744-1002
Digital Radio Corp., 8901 La Cienega Blvd., Inglewood, CA 90301 213-670-8611
§ Digital Transmission Techniques, Inc., P.O. Box 1847, Wayne, NJ 07470 201-831-1615
† EDMAN Corp., Subsidiary of Rospatch, 7500 Main St., P.O. Box 750, Fishers, NY 14453-0750 716-924-4000
† Electrac, Inc., 1614 Orangethrope Way, Anaheim, CA 92801 714-879-6021
§ Emergency Beacon Corp., 15 River St., New Rochelle, NY 10801 914-235-9400
§ EMR Data Systems, Div. Sangamo- Weston, Box 3041, Sarasota, FL 33578 813-371-0811
Erbtec Engineering, Inc., 5680 Valmont Rd., Boulder, CO 80301 303-447-8750
Fairchild - Weston - Telemetry, P.O. Box 3041, Sarasota, FL 33578 813-377-5566
FG Engrg., Box 476, Fredonia, AZ 86022 602-643-7375
† Foundation Instruments Inc., 24 Colonnade Rd., Nepean, ON, CANADA K2E 7J6 613-226-4000
Granger Assocs., 3101 Scott Blvd., Santa Clara, CA 95051 408-727-3101
Hughes Aircraft Co, Aerospace Grps./Support Sys., P.O. Box 90515, Los Angeles, CA 90009 213-670-1515
Hughes Aircraft Co., Electron Dynamics Div., 3100 W. Lomita Blvd., P.O. Box 2999, Torrance, CA 90509-2999 213-517-6000
Hughes Aircraft Co., Microelctrn. Sys. Div., 2601 Campus Dr., Irvine, CA 92715 714-752-3800
Metraplex Corp., Berkshire Indl. Park, Bethel, CT 06801 203-748-0606
† Microwave/Sys., 1 Adler Dr., E. Syracuse, NY 13057 315-437-9951

§ NES, Inc. (Nationwide Electronic Systems), 3003 Wakefield, Carpentersville, IL 60110 ... 312-426-5900
North Hills Elctrns., 1 Alexander Pl., Glen Cove, NY 11542 ... 516-671-5700
† Omnitek, Inc., P.O. Box 102, 820 Pennsylvania Blvd., Feasterville, PA 19047 ... 215-355-4443
Pacific Communications, 2041-A S. Grand Ave., Santa Ana, CA 92705 ... 714-546-0147
§ Phoenix Data, Inc., 3384 W. Osborn Rd., Phoenix, AZ 85017 ... 602-278-8528
RCI/Data, 1992 Lakewood Rd., Toms River, NJ 08753 ... 201-341-8361
§† REPCO, 2421 N. Orange Blossom Trail, Box 7065, Orlando, FL 32854 ... 305-843-8484
Resdel Engrg., 300 E. Live Oak Ave., Arcadia, CA 91006 ... 213-684-2600
RFL Inds., A Dowty Grp: Co./Comms. Div., Powerville Rd., Boonton, NJ 07005 ... 201-334-3100
† RHG Electronics Lab., Inc., 161 E. Industry Ct., Deer Park, NY 11729 ... 516-242-1100
Rockwell Intl., Commercial Elctrns. Opers., 1200 N. Alma Rd., Richardson, TX 75081 ... 214-996-5000
Schneider Instr., 8115 Camargo Rd., Cincinnati, OH 45243 ... 513-561-6803
§ Seaboard Elctrns., 70 Church St., New Rochelle, NY 10805 ... 914-235-8073
† Solid State Elctrns. Corp., 18646 Parthenia St., Northridge, CA 91324 ... 818-993-8257
† G.T.E. Gov't Sys. Corp., Comm. Sys. Div., 77 A St., Needham Hgts., MA 02194 ... 617-449-2000
§† Systron-Donner Inertial Div., 2700 Systron Dr., Concord, CA 94518 ... 415-682-6161
TANO Corp., 4301 Poche Ct., New Orleans, LA 70129 ... 504-254-3500
Tasker Systems, 20131 Sunburst St., Chatsworth, CA 91311 ... 213-341-3010
Teledyne/Geotech, 3401 Shiloh Rd., Garland, TX 75041 ... 214-271-2561
TransKinetic Sys., 110 Shawmut Rd., Canton, MA 02021 ... 617-828-3000
Tri-Com, Inc., 7304 Grove Rd., Frederick, MD 21701 ... 301-694-6666

Communications Systems, Telephone-1900

Motorola Semiconductor Prods. Sector, Adv. 72, Box 20912, Phoenix, AZ 85036, 602-244-6900 ... A•1689-1690
§ RTS Systems, Inc., Compact Video, Inc., 1100 W. Chestnut St., Burbank, CA 91506, 818-840-7119 ... D•1055
§ Acquis Communications, 17192 Gillette Ave., Irvine, CA 92714 ... 714-250-4964
ADC Magnetic Controls Co., 4900 W. 78th St., Minneapolis, MN 55435 ... 612-835-6800
ADC Prods., 4900 W. 78th St., Minneapolis, MN 55435 ... 612-835-6800
§ Aiphone, 1700 130th St. NE, Bellevue, WA 98005 ... 206-455-0510
§ American Laser Sys., Inc., 106 Fowler Rd., Goleta, CA 93117 ... 805-967-0423
§† Audiosone, Inc., 617 Fan Hill Rd., Monroe, CT 06468 ... 203-268-4372;203-268-6703
Aydin Corp., 700 Dresher Rd., Horsham, PA 19044 ... 215-657-7510
Beckman Industrial Corp., Electronic Technologies Div., 2500 Harbor Blvd., Fullerton, CA 92634 ... 714-871-4848
California Microwave, 990 Almanor Ave., Sunnyvale, CA 94086 ... 408-732-4000
Centigram Corp., 155A Moffett Park Dr., Sunnyvale, CA 94086 ... 408-734-3222
Coherent Communications Sys. Corp., 60 Commerce Dr., Hauppauge, NY 11788 ... 516-231-1550
Conklin Instr. Corp., West Rd., Pleasant Valley, NY 12569 ... 914-635-2136
Continental Data Sys., 131 N. Ludlow St., Dayton, OH 45402 ... 513-222-8626
Dantel, 2991 N. Argyle Ave., Fresno, CA 93727 ... 209-292-1111
Data Plus, Inc., 7205E Lockport Pl., Lorton, VA 22079 ... 800-368-3747
† Dataproducts, 6200 Canoga Ave., Woodland Hills, CA 91365 ... 213-887-8000
§† Data Prods. New England, Barnes Park N. Caller Box 30, Wallingford, CT 06492 ... 203-265-7151
§† Dukane Corp., Communications Sys. Div., 2900 Dukane Dr., St. Charles, IL 60174 ... 312-584-2300
Electro Physics, 1910 West Birchwood Ave., Chicago, IL 60626 ... 312-274-9669
† Electrospace Sys., Inc., P. O. Box 831359, Richardson, TX 75083-1359 ... 214-783-2004
† Foundation Instruments Inc., 24 Colonnade Rd., Nepean, ON, CANADA K2E 7J6 ... 613-226-4000
† GRIM Corporation, Box 67, Medford, NJ 08055 ... 609-267-7950
GTE SUPPLY, GTE Communications Systems, 5225 Wiley Post Way, Salt Lake City, UT 84116 ... 801-537-5237
GTE Switching & Telephone Products, 400 N. Wolf Rd., Northlake, IL 60164 ... 312-681-7100
HDS Inc., 12310 Pinecrest Rd., Reston, VA 22091 ... 703-620-6200
Henschel, General Signal Corp., 9 Hoyt Drive, P.O: Box 30, Newburyport, MA 01950 ... 617-462-2400
Information Technolgoy A.D.S.C., P.O. Box 470, College Park, MD 20740 ... 301-779-5110
§ ITT Telecommunications, Apparatus Dept., Fulton Dr., Corinth, MS 38834 ... 601-287-3771
Karkar Electronics, Inc., 245 Eleventh St., San Francisco, CA 94103 ... 415-552-1247
† Metric Sys., 645 Anchors St., Ft. Walton Beach, FL 32548 ... 904-244-9600
Optimum Applied Systems, 145 Palisade St., Dobbs Ferry, NY 10522-1696 ... 914-693-9001
RCI/Data, 1992 Lakewood Rd., Toms River, NJ 08753 ... 201-341-8361
§ R-Columbia Prods. Co., Inc., 2008 St. Johns Ave., Highland Park, IL 60035 ... 312-432-7915
Reliance Electric Co., Marketing Info Center, P.O. Box 99502, Cleveland, OH 44199 ... 800-245-4501;800-245-4497 In Ohio
RFL Inds., A Dowty Grp. Co./Comms. Div., Powerville Rd., Boonton, NJ 07005 ... 201-334-3100
Rolm Mil-Spec Computers, Rolm Corp., 1 River Oaks Pl., San Jose, CA 95134 ... 408-942-8000
Rolm Corp., 4900 Old Ironsides Dr., M/S 626, Santa Clara, CA 95054 ... 408-986-1000
Singer Data Products, Inc., 790 Maple Lane, Bensenville, IL 60106 ... 312-860-6500
§ Solid State Systems, 1990 Delk Industrial Blvd., Marietta, GA 30067 ... 404-952-9401
§ Soundlier, American Trading & Prod. Corp., 9380 Watson Ind'l. Pk., St. Louis, MO 63126 ... 314-962-9870
† G.T.E. Gov't Sys. Corp., Comm. Sys. Div., 77 A St., Needham Hgts., MA 02194 ... 617-449-2000
§ SYT, 1220 Barranca, El Paso, TX 79935 ... 915-593-1234
Techland Systems, Inc., 25 Waterside Plaza, New York, NY 10010 ... 212-684-7788
§ Tektone Sound & Signal, 1331 S. Killian Dr., Lake Park, FL 33403 ... 305-844-2383
Telcom Inc., 8027 Leesburg Pike, Vienna, VA 22180 ... 703-893-7700
§† Teledyne Semiconductor, 1300 Terra Bella Ave., PO Box 7267, Mountain View, CA 94039-7267 ... 415-968-9241
Telephonics, 770 Park Ave., Huntington, NY 11743 ... 516-549-6000
Telesensory Speech Sys., Telesensory Sys., Inc., 3408 Hillview Ave., Palo Alto, CA 94304 ... 415-856-8255
§ Television Equip. Assocs., Box 393, So. Salem, NY 10590-0393 ... 914-763-8893
§† TRW Connector Div., TRW Electronic Components Grp., 1501 Morse Ave., Elk Grove Village, IL 60007 ... 312-981-6000
Viking Electronics, Industrial St., Hudson, WI 54016 ... 715-386-8861

Commutators-3500 — *See Vol. B*

Comparators, Analog — See Comparators, Voltage (Vol. D)

Comparators, Attenuation-3400

Maury Microwave, 8610 Helms Ave., Cucamonga, CA 91730 ... 714-987-4715
Wavetek Indiana, Inc., 5808 Churchman, Beech Grove, IN 46107 ... 317-787-3332
Wide Band Engrg. Co., Inc., Box 21652, Phoenix, AZ 85036 ... 602-254-1570

Comparators, Capacitance — See Bridges, Capacitance (Vol. D)

Comparators, Digital-2900

§ C-Tek Inc., 4 Railroad Ave., Wakefield, MA 01880, 617-246-1720 ... D•1114
Data Tech, Div. of Penril Corp., 3110 W. Segerstrom, Santa Ana, CA 92704, 714-546-7160 ... D•1340
Digitec Corp., 918 Woodley Rd., P.O. Box 458, Dayton, OH 45401, 513-254-6251 ... D•1348
IET Labs, Inc., 534 Main St., Westbury, NY 11590, 516-334-5959 ... D•1242
† Interface Engrg., 386 Lindelof Ave., Stoughton, MA 02072, 617-344-7383 ... D•1156
§ NES, Inc. (Nationwide Electronic Systems), 3003 Wakefield, Carpentersville, IL 60110, 312-426-5900 ... D•1367-1368
§ Newport Electronics, 630 E. Young St., Santa Ana, CA 92705, 714-540-4914 ... D•1371
§† Advanced Micro Devices, P.O. Box 3453, 901 Thompson Pl., Sunnyvale, CA 94088 ... 408-732-2400
Analogic Corp., 8 Centennial Dr., Peabody, MA 01961 ... 617-532-5660;617-777-4500; 617-246-0300;800-451-1
§ API Instrs., 1601 Trapelo Rd., Waltham, MA 02254 ... 617-890-2000
† Atec, Inc., Box 19426, 8219 Kempwood Dr., Houston, TX 77055 ... 713-468-7971
† Automation Dynamics, 77 Brookside Pl., Hillsdale, NJ 07642 ... 201-666-2458
§ Bugtrap Instrumentation, 1209 Alderwood Avenue, Sunnyvale, CA 94089 ... 408-734-1118
Consolidated Controls, 15 Durant Ave., Bethel, CT 06801 ... 203-743-6721
DCI Inc., 14812 W. 117th Street, P.O. Box 215, Olathe, KS 66061 ... 913-782-5672
Dynage/Controls, Inc., 2 Willowbrook Rd., Cromwell, CT 06416 ... 203-635-6257
§ Electro-Numerics, 1811 Reynolds, Irvine, CA 92714 ... 714-250-1501
Electro Scientific Inds., 13900 N.W. Science Pk. Dr., Portland, OR 97229 ... 503-641-4141
§ ESE, 142 Sierra St., El Segundo, CA 90245 ... 213-322-2136
Frequency Elctrns., 55 Charles Lindbergh Blvd., Mitchel Field, NY 11553 ... 516-794-4500
† GAP Instr., 40 Oser Ave., Hauppauge, NY 11787 ... 516-273-0909
Innovatek Microsystems, Inc., Smithfield Rd., R1 Box 104, Millerton, NY 12546-9720 ... 914-373-9003
§ International Microtronics Corp., 4016 E. Tennessee St., Tucson, AZ 85714 ... 602-748-7900
Interswitch, 770 Airport Blvd., Burlingame, CA 94010 ... 415-347-8217
Micro Instr., 2250 Micro Pl., Escondido, CA 92025 ... 619-746-2010
§ North American Soar Corp., 11126 Cornell Ave., Cherry Hill, NJ 08002 ... 609-488-1060
† Northern Precision Labs., 11 Madison Rd., Fairfield, NJ 07006 ... 201-227-4800
PPM, Inc., 4521 Emery Ind. Pkwy., Cleveland, OH 44128 ... 216-292-6006
Sensor Corp., Box 140, Scottdale, PA 15683 ... 412-887-4080
Serial Lab Prods., Inc., 162 Cook Lane, P.O. Box 766, Marlboro, MA 01752 ... 617-481-1684
Struthers-Dunn, Inc., Lamb's Rd., Pitman, NJ 08071 ... 609-589-7500
§ Tau-Tron, Inc., A Unit of General Signal, 10 Lyberty Way, Westford, MA 01886 ... 617-692-5100
Texas Instrs., Inc., Box 225012-MS-84, Dallas, TX 75265 ... 214-995-6611
Texmate, Inc., 348 S. Cedros Ave., P.O. Box 2000, Solana Beach, CA 92075 ... 619-481-7177
† Transmagnetics, 210 Adams Blvd., Farmingdale, NY 11735 ... 516-293-3100

Comparators, Dimension Calibrators-4100

Astrosystems, 6 Nevada Dr., Lake Success, NY 11042 ... 516-328-1600
§ BEA electro-optics, Inc., 690 First Ave., Des Plaines, IL 60016 ... 312-298-1420
Trans-Tek, P.O. Box 338, Rte. 83, Ellington, CT 06029 ... 203-872-8351

Comparators, Frequency-2900

† Adams-Russell, Anzac Div., 80 Cambridge St., Burlington, MA 01803 ... 671-273-3333
§† Anaren Microwave, P.O. Box 178, 6635 Kirkville Rd., E. Syracuse, NY 13057 ... 315-432-8909
Autronics, 314 E. Live Oak, Ste. A, Arcadia, CA 91006 ... 818-445-5470
Burr-Brown Corp., P.O. Box 11400, Tucson, AZ 85734 ... 602-746-1111
Frequency Elctrns., 55 Charles Lindbergh Blvd., Mitchel Field, NY 11553 ... 516-794-4500
Kinemetrics, Inc., 222 Vista Ave., Pasadena, CA 91107 ... 818-795-2220
Sensor Corp., Box 140, Scottdale, PA 15683 ... 412-887-4080
† Solid State Elctrns. Corp., 18646 Parthenia St., Northridge, CA 91324 ... 818-993-8257
Spectracom, 101 Despatch Drive, East Rochester, NY 14445 ... 716-381-4827
† Tracor Instruments, 6500 Tracor La., Bldg. 27, Austin, TX 78725 ... 512-929-2051
† Transmagnetics, 210 Adams Blvd., Farmingdale, NY 11735 ... 516-293-3100

Comparators, Impedance — See Bridges, Impedance (Vol. D)

Comparators, Inductance — See Bridges, Inductance (Vol. D)

Comparators, Optical-2900
Cooner Wire Co., 9186 Independence Ave., Chatsworth, CA 91311 ... 818-882-8311
† Keyan Inds., Inc., P.O. Box 1228, Middleboro, MA 02346 ... 617-947-7719
Metron Optics Inc., P.O. Box 690, Solana Beach, CA 92075-0690 ... 619-755-4477
§ 3D Optics, Box 224, 4 Strathmore Cir., Braintree, MA 02184 ... 617-848-8002
§ Vision Engrg., Inc., 570 Danbury Rd., New Milford, CT 06776 ... 203-355-3776

Comparators, Phase-2900
Datum Inc., Timing/Aacom Divisions, 1363 S. State College Blvd., Anaheim, CA 92806, 714-533-6333 ... D•1148
Frequency and Time Systems, Inc., DATUM, INC., 34 Tozer Rd., Beverly, MA 01915, 617-927-8220 ... D•1148
† Adams-Russell, Anzac Div., 80 Cambridge St., Burlington, MA 01803 ... 671-273-3333
§† Anaren Microwave, P.O. Box 178, 6635 Kirkville Rd., E. Syracuse, NY 13057 ... 315-432-8909
Astrosystems, 6 Nevada Dr., Lake Success, NY 11042 ... 516-328-1600
Corcom, Inc., 1600 Winchester Rd., Libertyville, IL 60048 ... 312-680-7400
† Frequency Elctrns., 55 Charles Lindbergh Blvd., Mitchel Field, NY 11553 ... 516-794-4500
§ Kinemetrics/Truetime, 3243 Santa Rose Ave, Santa Rosa, CA 95407 ... 707-528-1230
† Lorch Elctrns., 105 Cedar La., Englewood, NJ 07631 ... 201-569-8282
M/A-Com Microwave Components, Inc., M/A-Com, South Avenue, Burlington, MA 01803 ... 617-272-3000
† Merrimac Inds., 41 Fairfield Pl., West Caldwell, NJ 07006 ... 201-575-1300
North Atlantic Inds., Instrument Div., 60 Plant Ave., Hauppauge, NY 11788 ... 516-582-6500
RE Instruments Corp., 31029 Center Ridge Rd., Westlake, OH 44145 ... 216-871-7617
Sanders Assocs., Flexprint Prods. Div., Grenier Fld., Manchester, NH 03103 ... 603-669-4615
Sensor Corp., Box 140, Scottdale, PA 15683 ... 412-887-4080
† Solid State Elctrns. Corp., 18646 Parthenia St., Northridge, CA 91324 ... 818-993-8257
Spectracom, 101 Despatch Drive, East Rochester, NY 14445 ... 716-381-4827
Universal Ad-Yu Elctrns., Inc., 2517 E. Norwich St., Milwaukee, WI 53207 ... 414-482-4100
† Vibration Instrs. Co., 1614 Orangethorpe Way, Anaheim, CA 92801 ... 714-879-6085
Watkins-Johnson Co., 3333 Hillview Ave., Palo Alto, CA 94304 ... 415-493-4141

Comparators, Resistance — See Bridges, Resistance (Vol. D)

Comparators, Voltage-2900
CTS Corporation, Microelectronics Div., 1201 Cumberland Ave., W. Lafayette, IN 47906, 317-463-2565 ... A•1663
CTS Electronics Corp., Halex Division, 1202 McGaw Ave., Irvine, CA 92714, 714-261-6381 ... A•1663
Koep Precision Standards, Inc., P. O. Box 191, So. Plainfield, NJ 07080, 201-549-9280 ... D•1257
Sensitive Research Instrs., 25 Dock St., Mt. Vernon, NY 10550, 914-699-9717 ... D•1305
§† Advanced Micro Devices, P.O. Box 3453, 901 Thompson Pl., Sunnyvale, CA 94088 ... 408-732-2400
† Analog Devices, P.O. Box 280, Norwood, MA 02062 ... 617-329-4700
† Analog Systems, P.O. Box 35879, Tucson, AZ 85740-5879 ... 602-293-4923
Applied Control, 1275 Bloomfield Ave., Fairfield, NJ 07006-2828 ... 201-227-5454
Burr-Brown Corp., P.O. Box 11400, Tucson, AZ 85734 ... 602-746-1111
† Calex Mfg. Co., Inc., 3355 Vincent Rd., Pleasant Hill, CA 94523 ... 415-932-3911
§ Control Prods., Devar, Inc., P.O. Box 589, Bridgeport, CT 06601 ... 203-368-6751
† Control Technology Co., 41-16 29th St., Long Island City, NY 11101 ... 718-361-2133
§ Dymec, 8 Lowell Ave., Winchester, MA 01890 ... 617-729-7870
Electrical Instr. Svc., 25 Dock St., Mt. Vernon, NY 10550 ... 914-699-9717
§† Fairchild Camera & Instr. Corp., Linear Div., 313 Fairchild Dr., Mountain View, CA 94139 ... 415-962-4011
General Resistance, Inc., A Prime Technology Company, Twin Lakes Rd., P.O. Box 185, N. Branford, CT 06471 ... 203-481-5721
§ Guildline Instrs., 4403 Vineland Rd, Suite B-10, Orlando, FL 32811-9998 ... 305-423-8215
Leeds & Northrup Instrs., A Unit of General Signal Corp., Sumneytown Pike, North Wales, PA 19454 ... 215-643-2000
§† Linear Technology Corp., 1630 McCarthy Blvd., Milpitas, CA 95035 ... 408-942-0810
MICRA Corp., 120 Ricefield Lane, Hauppauge, NY 11788 ... 516-231-8600
NEC Electronics, Inc., 401 Ellis Street, Mtn. View, CA 94039 ... 415-960-6000
§ NES, Inc. (Nationwide Electronic Systems), 3003 Wakefield, Carpentersville, IL 60110 ... 312-426-5900
§ North American Soar Corp., 11126 Cornell Ave., Cherry Hill, NJ 08002 ... 609-488-1060
Optical Electronics, Inc., Box 11140, Tucson, AZ 85734 ... 602-624-8358
§† Precision Monolithics, Inc., 1500 Space Dr., Santa Clara, CA 95054 ... 408-727-9222
§† Raytheon Semiconductor, 350 Ellis St., Mountain View, CA 94043 ... 415-968-9211
§ RCA Solid State Div., Linear Integrated Circuits, Rte. 202, Somerville, NJ 08876 ... 201-685-6000
SGS Semiconductor Corporation, 1000 E. Bell Road, Phoenix, AZ 85022 ... 602-867-6100
§† Silicon General, 11861 Western Ave., Garden Grove, CA 92641 ... 714-898-8121
§ Slaughter Co., Moore & Hailey Sts., P.O. Box 1805, Ardmore, OK 73402 ... 405-223-4773
Struthers-Dunn, Inc., Lamb's Rd., Pitman, NJ 08071 ... 609-589-7500
Sylvania Electronic Components, Philips ECG Inc., A North American Philips Co., 100 First Ave., Waltham, MA 02254 ... 617-890-6107
Tempo Instrument, Inc., 87 Modular Ave., Commack, NY 11725 ... 516-864-3700
Texmate, Inc., 348 S. Cedros Ave., P.O. Box 2000, Solana Beach, CA 92075 ... 619-481-7177
† Transmagnetics, 210 Adams Blvd., Farmingdale, NY 11735 ... 516-293-3100

ZI-TECH Instr. Corp., 2151 Park Blvd., Box 60490, Palo Alto, CA 94306 ... 415-326-2151

Compounds, Encapsulating, Molding, Potting-Also See Plastic Raw Materials-1600 — *See Vol. C*

Compounds, Insulating-3100 — *See Vol. C*

Computer-Aided Design Services — See Computers, CAD, CAM, & CAD/CAM (Vol. D), Services, Computer-Aided Design (Vol. D)

Computer Interfaces — See Interfaces, Computer

Computer Logic Circuits — See Cards, Logic (Vol. D), Circuits, Hybrid (Vol. A), Integrated Circuits (Vol. A), Modules, Logic (Vol. A)

Computer Tape Recorders — See Recorders, Computer Data (Vol. D)

Computer Type Indicators — See Displays, Indicator Lights (Vol. B)

Computers, Analog-2025
Action Instrs., 8601 Aero Dr., San Diego, CA 92123 ... 619-279-5726
Applied Sys., 26401 Harper Ave., St. Clair Shores, MI 48081 ... 313-779-8700
† Astronautics Corporation of America, P.O. Box 523, Milwaukee, WI 53201-0523 ... 414-447-8200
† Bailey Controls Co., 29801 Euclid Ave., Wickliffe, OH 44092 ... 216-585-5800
Cambridge Digital Sys., Compumart, P.O. Box 568, 65 Bent St., Cambridge, MA 02139 ... 617-491-2700
Control Prods., Devar, Inc., P.O. Box 589, Bridgeport, CT 06601 ... 203-368-6751
† Control Technology Co., 41-16 29th St., Long Island City, NY 11101 ... 718-361-2133
Data Translation, 100 Locke Dr., Marlboro, MA 01752 ... 617-481-3700
Decom Sys., 340 Rancheros Dr., San Marcos, CA 92069 ... 619-744-1002
† GAP Instr., 40 Oser Ave., Hauppauge, NY 11787 ... 516-273-0909
General Computers, 1624 Veteran Ave., Los Angeles, CA 90024
§† General Magnetics, 211 Grove St., Bloomfield, NJ 07003 ... 201-743-2700
† Hughes Aircraft Co., Microelctrn. Sys. Div., 2601 Campus Dr., Irvine, CA 92715 ... 714-752-3800
† Industrial Control Co., 3100 Pineda Ave., Rockledge, FL 32955 ... 305-259-7105
Leeds & Northrup Instrs., A Unit of General Signal Corp., Sumneytown Pike, North Wales, PA 19454 ... 215-643-2000
§ Midland Standard, Inc., 603 E. Chicago St., Box 38, Elgin, IL 60120 ... 312-741-6600
Serial Lab Prods., Inc., 162 Cook Lane, P.O. Box 766, Marlboro, MA 01752 ... 617-481-1684
§ STD Microsystems, 399 Sherman Ave., Palo Alto, CA 94306 ... 415-327-6800
† Telectro Sys., 96-18 43rd Ave., Corona, NY 11368 ... 212-651-8900

Computers, CAD, CAM, & CAD/CAM-2025
Wintek Corp., 1801 South St., Lafayette, IN 47904-2993, 317-742-8428 ... D•1105
§ Accugraph Corp., 50 Gervais Drive, Suite 204, Don Mills, ONT, CANADA M3C 1Z3 ... 416-441-2211
Advanced Elctrns. Design, Inc., 440 Potrero Ave., Sunnyvale, CA 94086 ... 408-733-3555;800-538-1730 (outside CA)
Artel Communications Corp., 93 Grand St., Worcester, MA 01602 ... 617-752-5690
§ Autodesk, 2658 Bridgeway, Sausalito, CA 94965 ... 415-331-0356
† Auto-trol Tech., 12500 N. Washington St., Denver, CO 80233 ... 303-452-4919
Aydin Corp., 700 Dresher Rd., Horsham, PA 19044 ... 215-657-7510
§† Aydin Controls, 414 Commerce Dr., Ft. Washington, PA 19034 ... 215-542-7800
Bishop Graphics, Inc., 5388 Sterling Center, Westlake Village, CA 91359 ... 818-991-2600
Burroughs Corp., Borroughs Place, Rm. 4C-51, Detroit, MI 48232 ... 313-972-7000
Calay Systems, Inc., 2698 White Road, Irvine, CA 92714 ... 714-863-1700
Capintec Instrs., 6 Arrow Rd., Ramsey, NJ 07446 ... 201-825-9500
§ Catronix Corp., 620 P/T Stne, Suite 1802, Atlanta, GA 30308 ... 404-881-1100
CGIS, A COMSAT Co., 7701 N. Lamar Blvd., Austin, TX 78752 ... 512-451-7938
Compact Software, Inc., Comsat Corp., 1131 San Antonia Rd., Palo Alto, CA 94303 ... 415-966-8440
§ Computerware, Inc., 8480-I Tyco Rd., Vienna, VA 22180 ... 703-821-8200
Control Systems, 2855 Anthony Lane, Minneapolis, MN 55418 ... 612-789-2421
General Numeric Corporation, 390 Kent Avenue, Elk Grove Village, IL 60007 ... 312-640-1595
Dasoft Design Systems, Inc., 2550 9th St. #113, Berkeley, CA 94710 ... 415-486-0822
Decision Graphics, 11 Main St., P.O. Box 306, Southboro, MA 01772 ... 617-481-4119
DGS Assocs., 1353 Sarita Way, Santa Clara, CA 95051 ... 408-554-1469
§ Evans & Sutherland Computer Corp., P.O. Box 8700, 580 Arapeen Dr., Salt Lake City, UT 84108 ... 801-582-5847
§ General Robotics Corp., 57 N. Main St., Hartford, WI 53027 ... 414-673-6800
Gerber Sys. Technlgy., Inc., 40 Gerber Rd. E., South Windsor, CT 06074 ... 203-644-2581
Harris Corp., Computer Systems Div., 2101 W. Cypress Creek Rd., Ft. Lauderdale, FL 33309 ... 305-974-1700
§ InfoCap, Inc., 31119 Via Colinas #502, Westlake Village, CA 91362 ... 818-991-1410
International Microelectronic Prods., 2830 North First Street, San Jose, CA 95134 ... 408-262-9100
Lexidata Corp., 755 Middlesex Tpke., Billerica, MA 01865 ... 617-663-8550; 800-472-4747
Lundy Elctrns. & Systems, Inc., 1 Robert La., Glen Head, NY 11545 ... 516-671-9000
Mathematical Applications Group/CAD/CAM, 3 Westchester Plaza, Elmsford, NY 10523 ... 914-592-4646
§† Megatek Corp., 9645 Scranton Road, San Diego, CA 92121 ... 619-455-5590

Seattle Computer Products, Inc., 1114 Ind. Dr., Seattle, WA 98188 .... 206-575-1830; 800-426-8936
Siltran Digital, 2250 Monterey Rd., Atascadero, CA 93422 805-466-3209
Spectragraphics Corp., 10260 Sorrento Valley Rd., San Diego, CA 92121 619-450-0611
§ Summit CAD Corp., 5222 FM 1960 W100, Houston, TX 77069 713-440-1468
§ T & W Systems Inc., 7372 Prince Dr. Ste 106, Huntington Beach, CA 92647 714-847-9960
† Tektronix, Inc., P. O. Box 500, Y3-314, Beaverton, OR 97077 ..... 800-547-1512;Oregon only 800-452-1877
Wayne Kerr, Inc., W.K.R. Ltd., 400 West Cummings Pk., Woburn, MA 01801 617-938-8390
Wire Graphics, Inc., 215 B. Central Ave., Farmingdale, NY 11735 516-293-1525
Xyztek Corp., 8000 E. Prentice Ave. Ste. B7, Englewood, CO 80111 303-850-9400

Computers, Digital, Mini-2025

§ Andromeda Sys., 9000 Eton Ave., Canoga Park, CA 91304 818-709-7600
Applied Sys., 26401 Harper Ave., St. Clair Shores, MI 48081 313-779-8700
† Astronautics Corporation of America, P.O. Box 523, Milwaukee, WI 53201-0523 414-447-8200
Aydin Corp., 700 Dresher Rd., Horsham, PA 19044 215-657-7510
Bristol Babcock Inc., 40 Bristol St., Waterbury, CT 06708 203-575-3000
Cambridge Digital Sys., Compumart, P.O. Box 568, 65 Bent St., Cambridge, MA 02139 617-491-2700
Central Data Corp., 1602 Newton Dr., Champaign, IL 61820 217-359-8010
§ Computer Maintenance Corp., 405 Murray Hill Pkwy, East Rutherford, NJ 07073 201-866-6400
Computer Talk, Inc., Box 148, Morrison, CO 80465 303-697-5485
§ Data General, 4400 Computer Dr., Westboro, MA 01581 617-366-8911
† Dataware Sys. Lease, Inc., 30 Bay St., Staten Island, NY 10301 212-447-4911
Decom Sys., 340 Rancheros Dr., San Marcos, CA 92069 619-744-1002
Digital Equip., One Iron Way, Marlborough, MA 01752
ECD Corp., 196 Broadway, Cambridge, MA 02139 617-661-4400
† EMM/SESCO, 20630 Plummer St., Chatsworth, CA 91311 213-998-9090
First Computer Corp., 645 Blackhawk Dr., Westmont, IL 60559 312-920-1050
† General Instr., Govt. Sys., 600 W. John St., Hicksville, NY 11802-0709 ... 516-933-3000
Gra-Mar Inc., 3165 McCrory Pl., Ste. 265, Orlando, FL 32803 305-894-3351
Harris Corp., Computer Systems Div., 2101 W. Cypress Creek Rd., Ft. Lauderdale, FL 33309 305-974-1700
Honeywell Info. Sys., 200 Smith St., MS 440, Waltham, MA 02154 617-895-6000
† Hughes Aircraft Co., Microelctrn. Sys. Div., 2601 Campus Dr., Irvine, CA 92715 714-752-3800
Inconix Corp., 10 Tech Circle, Natick, MA 01760 617-655-1170
Mylee Digital Sciences, 155 Weldon Pkwy., Maryland Heights, MO 63043 314-567-3420
§ NEC Information Systems, NEC Corporation, 1414 Massachusetts Ave., Boxborough, MA 01719 617-264-8000
§ Point 4 Data Corp., 2569 McCabe Way, Irvine, CA 92714 714-863-1111
† Rolm Mil-Spec Computers, Rolm Corp., 1 River Oaks Pl., San Jose, CA 95134 408-942-8000
Sperry Univac, Mini-Computer Operations, Box C-19504, Irvine, CA 92713 714-754-6900
† Teleram Communications, 2 Corporate Park Dr., White Plains, NY 10604 914-694-9270
§† Texas Instrs., Inc., Box 225012-MS-84, Dallas, TX 75265 214-995-6611
§ Texas Instrs., Data Sys. Group, P. O. Box 809063, Dallas, TX 75380-9063 1-800-527-3500
† Uniq Digital Technologies, 28 S. Water Street, Batavia, IL 60510 312-879-1008
Xebex Data Systems, 6610 Buckley Dr., Cambria, CA 93428 805-927-5008
Xyztek Corp., 8000 E. Prentice Ave. Ste. B7, Englewood, CO 80111 303-850-9400

Computers, Digital, Micro-2025

Heurikon Corporation, 3201 Latham Dr., Madison, WI 53713, 800-356-9602;608-271-8700 .... D•1091
Magnum Opus Custom Elctrn. Engrg., 284 Kennedy St., Iselin, NJ 08830, 201-283-4925 .... D•1093
Mizar, Inc., 302 Chester St., St. Paul, MN 55107, 612-224-8941 .... D•1095-1096,1106
Motorola Semiconductor Prods. Sector, Adv. 72, Box 20912, Phoenix, AZ 85036, 602-244-6900 .... D•1098-1099,1101
Wintek Corp., 1801 South St., Lafayette, IN 47904-2993, 317-742-8428 ... D•1105
Action Instrs., 8601 Aero Dr., San Diego, CA 92123 619-279-5726
† Adaptive Science, 4700 San Pablo Ave., Emeryville, CA 94608 415-652-1805
§ Adatek, Inc., P.O. Box 1339, Sandpoint, ID 83864 .... 208-263-1471;800-323-3343
§ Advanced Microcomputers, 3340 Scott Blvd., Santa Clara, CA 95051 ... 408-732-2400
† Analog Devices, P.O. Box 280, Norwood, MA 02062 617-329-4700
§ Andromeda Sys., 9000 Eton Ave., Canoga Park, CA 91304 818-709-7600
† Antona Corp., 2100 S. Sawtelle Blvd., Suite 205, Los Angeles, CA 90025 213-473-8995
† Applied Data Communications, 14272 Chambers Rd., Tustin, CA 92680 714-731-9000
§ Applied Digital Data Systems Inc., 100 Marcus Blvd., Hauppauge, NY 11787 516-231-5400
Applied Micro Technlg., A Burr Brown Co., 3669 E. 44th Street, Tucson, AZ 85713 602-622-8605
Applied Sys., 26401 Harper Ave., St. Clair Shores, MI 48081 313-779-8700
† Astronautics Corporation of America, P.O. Box 523, Milwaukee, WI 53201-0523 414-447-8200
Aydin Corp., 700 Dresher Rd., Horsham, PA 19044 215-657-7510
Boston Systems Office, 469 Moody St., Waltham, MA 02254-9164 617-894-7800
Bristol Babcock Inc., 40 Bristol St., Waterbury, CT 06708 203-575-3000
† BTU Engrg. Corp., Bruce Sys., Esquire Rd., N. Billerica, MA 01862 617-667-4111
§ Catronix Corp., 620 P/T Stne, Suite 1802, Atlanta, GA 30308 404-881-1100
CDS - Colorado Data Sys., 3301 W. Hampden, Unit C, Englewood, CO 80110 303-762-1640
Centent Co., 3879 S. Main St., Santa Ana, CA 92707 714-979-6491
Central Data Corp., 1602 Newton Dr., Champaign, IL 61820 217-359-8010
Charles River Data Systems, Inc., 983 Concord St., Framingham, MA 01701 617-626-1000
Chrislin Inds., 31352 Via Colinas, Westlake Village, CA 91362 818-991-2254
§ Colex, Incorporated, 15028 Beltway Dr., Dallas, TX 75234 214-458-2779
§ CompuPro, 3506 Breakwater Ct., Hayward, CA 94545 415-786-0909
§ Computer Devices, 749 Middlesex Turnpike, Nutting Lake, MA 01865 ... 617-663-4980
§ Computer Maintenance Corp., 405 Murray Hill Pkwy, East Rutherford, NJ 07073 201-866-6400
§ Computer System Assocs., 7564 Trade St., San Diego, CA 92121 619-566-3911
§ Comtek, Inc., 309 Breesport, San Antonio, TX 78216 512-340-8253
§† Cromemco, 280 Bernardo Ave., Mountain View, CA 94043 415-964-7400
Cybersystems, Inc., 7540 South Memorial Pkwy., Huntsville, AL 35802 .. 205-883-4410
§ Data General, 4400 Computer Dr., Westboro, MA 01581 617-366-8911
§ Dataprobe, 110 Palisades Blvd., Palisades Park, NJ 07650 201-947-9500
§ Data Rentals/Sls., Inc, P. O. Box 3257, Culver City, CA 90230 213-559-3822
Datatran Labs, P.O. Box 384, Sussex, NJ 07461 914-856-4313
Data Translation, 100 Locke Dr., Marlboro, MA 01752 617-481-3700
† Dataware Sys. Lease, Inc., 30 Bay St., Staten Island, NY 10301 212-447-4911
Decom Sys., 340 Rancheros Dr., San Marcos, CA 92069 619-744-1002
Digiac Corp., 175 Engineers Rd., Hauppauge, NY 11788 516-273-8600
Digital Data Sys., 1551 N.W. 65 Ave., Plantation, FL 33313 305-792-3290
Digital Equip., One Iron Way, Marlborough, MA 01752
§ Digital Microsystems, 1755 Embarcadera, Oakland, CA 94606 415-532-3686
Distributed Computer Sys., 223 Crescent St., Waltham, MA 02154 617-899-6619
Diversified Technlg., P.O. Box 748, Ridgeland, MS 39157 601-856-4121
§ Dynamics, Div. of Waugh Controls Corp., 9001 Fullbright Ave., Chatsworth, CA 91311 818-998-8281
ECD Corp., 196 Broadway, Cambridge, MA 02139 617-661-4400
† EMM/SESCO, 20630 Plummer St., Chatsworth, CA 91311 213-998-9090
Enterprise Sys. Corp., P.O. Box 698, Dover, NH 03820 603-742-7363
First Computer Corp., 645 Blackhawk Dr., Westmont, IL 60559 312-920-1050
General Digital Industries Inc., 7702 Governors Dr. W., Huntsville, AL 35805 205-837-8305
§ Giddings & Lewis Elctrns., A Unit of AMCA Intl., 666 S. Military Rd., P.O. Box 1658, Fond du Lac, WI 54935 414-921-7100
§ Giltronix, 3780 Fabian Way, Palo Alto, CA 94303 415-493-1300
§ Gimix, Inc., 1337 W. 37th Place, Chicago, IL 60609 312-927-5510
§ GMR Co., 8801 Sepulveda Blvd., Los Angeles, CA 90045 213-216-9516
§ Heath Co., Benton Harbor, MI 49022 616-982-3886
Honeywell Info. Sys., 200 Smith St., MS 440, Waltham, MA 02154 617-895-6000
† Hughes Aircraft Co., Microelctrn. Sys. Div., 2601 Campus Dr., Irvine, CA 92715 714-752-3800
Inconix Corp., 10 Tech Circle, Natick, MA 01760 617-655-1170
Indocomp, Inc., Newcor, 5409 Perry Dr., P.O. Box 157, Drayton Plains, MI 48020 313-674-2294
Industrial Computer Designs, Inc., 31264 La Baya Drive, Westlake Village, CA 91362 818-889-3179
§ InfoCap, Inc., 31119 Via Colinas #502, Westlake Village, CA 91362 818-991-1410
Information Technolgoy A.D.S.C., P.O. Box 470, College Park, MD 20740 301-779-5110
§ Innotronics, Brooks Rd., Lincoln, MA 01773 617-678-8720
† Innovatek Microsystems, Inc., Smithfield Rd., R1 Box 104, Millerton, NY 12546-9720 914-373-9003
Interface Electronics Inc., 21134 Bridge St., Southfield, MI 48034 313-352-8820
International Instrumentation, 31131-602 Via Colinas, Westlake Vlg., CA 91362 213-991-9614
§ Intra-computer, 101 W. 31st St., New York, NY 10001 212-947-5533
Kinetic Sys., 11 Maryknoll Dr., Lockport, IL 60441 815-838-0005
§ Kontron Elctrns., 1230 Charleston Rd., Mountain View, CA 94039-7230 415-965-7020
Matrix Corp., 1639 Green St., Raleigh, NC 27603 919-833-2837
Matrox Elctrn. Sys., 1055 St. Regis Blvd., Dorval, QU, CANADA H9P 2T4 514-685-2630
Micro Computer Rentals, 742D Hampshire Rd., Westlake Village, CA 91361 213-991-1704
Micro/sys, 1011 Grand Central Ave., Glendale, CA 91201-3010 818-244-4600
Mitronics, 2908 Oregon Court - Bldg. I-2, Torrance, CA 90503 213-320-7011
Monolithic Sys., 84 Inverness Circle E., Englewood, CO 80112 303-790-7400
Multi-Tronix, 3210 Terry Dr, Toledo, OH 43613 419-472-3360
§ NEC Information Systems, NEC Corporation, 1414 Massachusetts Ave., Boxborough, MA 01719 617-264-8000
Omnibyte Corp., 245 W. Roosevelt Rd., Bldg. 1-5, W. Chicago, IL 60185 312-231-6880
Onset Computer Corp., 199 Main St., PO Box 1030, N. Falmouth, MA 02556 617-563-2267
PCM-PAC Cyber-Metric, 6800 Sierra Ct., Dublin, CA 94568 415-829-8700
§ Quartic Systems, Inc., 3575 South West Temple #7, Salt Lake City, UT 84115 801-268-9264
Quay Corp., 22 Meridian Rd., P.O. Box 783, Eatontown, NJ 07724 201-542-7340
Qwint Systems, 3693 Commercial Ave., Northbrook, IL 60062 312-498-5060
RCA Solid State Div., Route 202, Somerville, NJ 08876 201-685-6000
RCI/Data, 1992 Lakewood Rd., Toms River, NJ 08753 201-341-8361
† Regency Systems, Inc., 3200 Farber Drive, Champaign, IL 61820 217-398-8067
§† Rockwell Int'l., 4311 Jamboree Rd., Newport Beach, CA 92660 800-854-8099
Serial Lab Prods., Inc., 162 Cook Lane, P.O. Box 766, Marlboro, MA 01752 617-481-1684
Standard Engrg., 44800 Industrial Dr., Fremont, CA 94538 415-657-7555
§ STD Microsystems, 399 Sherman Ave., Palo Alto, CA 94306 415-327-6800
§ Summit CAD Corp., 5222 FM 1960 W100, Houston, TX 77069 713-440-1468
SYMBICON, 89 Route 101A, Amherst, NH 03031 603-673-8898
Systek, 1023 N. Kellogg St., Kennewick, WA 99336 509-735-1200
§ Techno Vation, Inc., 14 Crandall Ave., Pompton Lakes, NJ 07442 201-839-0740
§ Tecmar, Inc., 6225 Cochran Rd., Solon, OH 44139 216-349-0600
Teleram Communications, 2 Corporate Park Dr., White Plains, NY 10604 914-694-9270

§† TeleVideo Sys., Inc., 1170 Morse Ave., Sunnyvale, CA 94086	408-745-7760
§ Terra Technlg. Corp., 3860 148th Ave. N.E., Redmond, WA 98052	206-883-7300
§ Texas Instrs., Inc., Box 225012-MS-84, Dallas, TX 75265	214-995-6611
§ Texas Instrs., Data Sys. Group, P. O. Box 809063, Dallas, TX 75380-9063	1-800-527-3500
† Trilobyte Computer Corporation, 801 W. Grand Ave., Oakland, CA 94607	415-839-1100
† Warren-Knight Instr. Co., Warren Inds., Inc., 2045 Bennett Rd., Philadelphia, PA 19116	215-464-9300
§ Wavetek Corporation, 9191 Towne Centre Drive, San Diego, CA 92122	619-450-9971
Xebex Data Systems, 6610 Buckley Dr., Cambria, CA 93428	805-927-5008
Ziatech, 3433 Roberto Ct., San Luis Obispo, CA 93401	805-541-0488

Computers, Hybrid, Analog/Digital-2025

† Analog Devices, P.O. Box 280, Norwood, MA 02062	617-329-4700
Analogic Corp., 8 Centennial Dr., Peabody, MA 01961	617-532-5660;617-777-4500; 617-246-0300;800-451-1
† Astronautics Corporation of America, P.O. Box 523, Milwaukee, WI 53201-0523	414-447-8200
† Bailey Controls Co., 29801 Euclid Ave., Wickliffe, OH 44092	216-585-5800
Chromatics, 2558 Mountain Indl. Bldg., Tucker, GA 30084	404-493-7000
Cyber Sys., Inc., 2031 E. Cerritos Ave., Anaheim, CA 92806	714-722-2051
Dataware Sys. Lease, Inc., 30 Bay St., Staten Island, NY 10301	212-447-4911
Decom Sys., 340 Rancheros Dr., San Marcos, CA 92069	619-744-1002
§ Encoder Prods., 1601B Dover Rd., Sandpoint, ID 83864	208-263-8541
General Computers, 1624 Veteran Ave., Los Angeles, CA 90024	
† General Instr., Govt. Sys., 600 W. John St., Hicksville, NY 11802-0709	516-933-3000
Heurikon Corporation, 3201 Latham Dr., Madison, WI 53713	800-356-9602; 608-271-8700
† Hughes Aircraft Co., Microelctrn. Sys. Div., 2601 Campus Dr., Irvine, CA 92715	714-752-3800
Industrial Computer Designs, Inc., 31264 La Baya Drive, Westlake Village, CA 91362	818-889-3179
† Litton Applied Technology, 645 Almanor Ave., P.O. Box 3478, Sunnyvale, CA 94088-3478	408-773-0777
Macro Electronics Corp., 23 Royalston Lane, So. Setauket, NY 11720	516-698-3357
Matrix Corp., 1639 Green St., Raleigh, NC 27603	919-833-2837
Serial Lab Prods., Inc., 162 Cook Lane, P.O. Box 766, Marlboro, MA 01752	617-481-1684
† Teledyne Microelectronics, 12964 Panama St., Los Angeles, CA 90066	213-822-8229;213-870-9831
† Teleram Communications, 2 Corporate Park Dr., White Plains, NY 10604	914-694-9270

Computers, Mainframe-2025

§ Vector Electronic Co., Inc., 12460 Gladstone Ave., Dept. EP, Box 4336, Sylmar, CA 91342, 818-365-9661	**C•1095**
Burroughs Corp., Borroughs Place, Rm. 4C-51, Detroit, MI 48232	313-972-7000
Cambridge Digital Sys., Compumart, P.O. Box 568, 65 Bent St., Cambridge, MA 02139	617-491-2700
Computervision Corp., 201 Burlington Rd., Bedford, MA 01730	617-275-1800
Digiac Corp., 175 Engineers Rd., Hauppauge, NY 11788	516-273-8600
§† Gould Inc., Computer Sys. Div., 6901 W. Sunrise Blvd., Ft. Lauderdale, FL 33313	305-587-2900
Honeywell Info. Sys., 200 Smith St., MS 440, Waltham, MA 02154	617-895-6000
§ Integrated Digital Products, 4208 E. La Palma Ave., Anaheim, CA 92807	714-793-5300

Computers, Micro-2025

ADAC Corp., 70 Tower Office Pk., Woburn, MA 01801, 617-935-6668	**D•1135**
Magnum Opus Custom Elctrn. Engrg., 284 Kennedy St., Iselin, NJ 08830, 201-283-4925	**D•1093**
Mizar, Inc., 302 Chester St., St. Paul, MN 55107, 612-224-8941	**D•1095-1096,1106**
Action Instrs., 8601 Aero Dr., San Diego, CA 92123	619-279-5726
Advanced Elctrns. Design, Inc., 440 Potrero Ave., Sunnyvale, CA 94086	408-733-3555;800-538-1730 (outside CA)
Analog Devices, P.O. Box 280, Norwood, MA 02062	617-329-4700
† Antona Corp., 2100 S. Sawtelle Blvd., Suite 205, Los Angeles, CA 90025	213-473-8995
Applied Micro Technlg., A Burr Brown Co., 3669 E. 44th Street, Tucson, AZ 85713	602-622-8605
Bridge Computer Co., Sea Data Corp., 1 Bridge St., Newton, MA 02158	617-244-8190
Bristol Babcock Inc., 40 Bristol St., Waterbury, CT 06708	203-575-3000
Burroughs Corp., Borroughs Place, Rm. 4C-51, Detroit, MI 48232	313-972-7000
§ California Computer Systems, 740 S. Milpitas Blvd., Milpitas, CA 95035	408-945-0500
CDS - Colorado Data Sys., 3301 W. Hampden, Unit C, Englewood, CO 80110	303-762-1640
Centent Co., 3879 S. Main St., Santa Ana, CA 92707	714-979-6491
Charles River Data Systems, Inc., 983 Concord St., Framingham, MA 01701	617-626-1000
Comark Corp., 93 W St., P. O. Box 474, Medfield, MA 02052	617-359-8161
§† Compucorp, 2211 Michigan Ave., Santa Monica, CA 90404	213-829-7453
§ CompuPro, 3506 Breakwater Ct., Hayward, CA 94545	415-786-0909
Computer Dynamics, 105 S. Main St., Greer, SC 29651	803-877-7471
The Computer Place, D & D Financial Entprs. Inc., 4595 Van Epps Rd., Brooklyn Hts., OH 44131	216-351-7444
§ Computer System Assocs., 7564 Trade St., San Diego, CA 92121	619-566-3911
§ Comtek, Inc., 309 Breesport, San Antonio, TX 78216	512-340-8253
Creative Micro Systems, 3822 Cerritos Ave., Los Alamitos, CA 90720	213-493-2484
§† Cromemco, 280 Bernardo Ave., Mountain View, CA 94043	415-964-7400
Cybersystems, Inc., 7540 South Memorial Pkwy., Huntsville, AL 35802	205-883-4410
§ Dataprobe, 110 Palisades Blvd., Palisades Park, NJ 07650	201-947-9500
§ Data Rentals/Sls., Inc, P. O. Box 3257, Culver City, CA 90230	213-559-3822
Data Translation, 100 Locke Dr., Marlboro, MA 01752	617-481-3700
Dexter Research Ctr., Inc., 7300 Huron River Dr., Dexter, MI 48130	313-426-3921
Distributed Computer Sys., 223 Crescent St., Waltham, MA 02154	617-899-6619
§ Electric Switches, Inc., 2478 Fletcher Dr., Los Angeles, CA 90039	213-660-1310
Enterprise Sys. Corp., P.O. Box 698, Dover, NH 03820	603-742-7363
† Exergetic Sys., Inc., 1499 Franklin St., Oakland, CA 94612	415-763-3460
§† Fairchild Microcontroller Div., Fairchild Camera & Instr. Corp., 450 National Ave., Mountain View, CA 94042	415-962-3838
Fast Feedback Technologies, 1505 Aviation Blvd., Redoudo Beach, CA 90278	213-379-6100
General Digital Industries Inc., 7702 Governors Dr. W., Huntsville, AL 35805	205-837-8305
§ General Instrument Corp., Microelectronics Div., 600 W. John St., Hicksville, NY 11802	516-733-3107
§ General Robotics Corp., 57 N. Main St., Hartford, WI 53027	414-673-6800
§ Gimix, Inc., 1337 W. 37th Place, Chicago, IL 60609	312-927-5510
§ GMR Co., 8801 Sepulveda Blvd., Los Angeles, CA 90045	213-216-9516
GTEK, Inc., 307 Coleman Ave., Waveland, MS 39576	601-467-8048
G W Three Incorporated, 7623 Fullerton Rd., 2nd Floor, Springfield, VA 22153	703-451-2043
§ Heurikon Corporation, 3201 Latham Dr., Madison, WI 53713	800-356-9602; 608-271-8700
† Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303	Call Local Sls. Off.
Honeywell Info. Sys., 200 Smith St., MS 440, Waltham, MA 02154	617-895-6000
Indocomp, Inc., Newcor, 5409 Perry Dr., P.O. Box 157, Drayton Plains, MI 48020	313-674-2294
§ Industrial Computer Designs, Inc., 31264 La Baya Drive, Westlake Village, CA 91362	818-889-3179
§ InfoCap, Inc., 31119 Via Colinas #502, Westlake Village, CA 91362	818-991-1410
Information Technolgoy A.D.S.C., P.O. Box 470, College Park, MD 20740	301-779-5110
§ Integrated Computer Systems, 6305 Arizona Pl., P.O. Box 45405, Los Angeles, CA 90045	213-417-8888
Interface Electronics Inc., 21134 Bridge St., Southfield, MI 48034	313-352-8820
JF Microsystems, 3641 Frontier Road, Pasco, WA 99301	509-297-4294; 800-JF-CARDS
§ Kontron Elctrns., 1230 Charleston Rd., Mountain View, CA 94039-7230	415-965-7020
Memodyne, 220 Reservoir St., Needham Hgts., MA 02194	617-444-7000
Microbar Systems, Inc., 785 Lucerne Drive, Sunnyvale, CA 94086	408-720-9300
† Micro/sys, 1011 Grand Central Ave., Glendale, CA 91201-3010	818-244-4600
Microsystems Dev. Corp. Inc., 1560 Teaneck Rd., Teaneck, NJ 07666	201-837-0051
§ Motorola Semiconductor Prods. Sector, Adv. 72, Box 20912, Phoenix, AZ 85036	602-244-6900
§ NEC Information Systems, NEC Corporation, 1414 Massachusetts Ave., Boxborough, MA 01719	617-264-8000
Omnibyte Corp., 245 W. Roosevelt Rd., Bldg. 1-5, W. Chicago, IL 60185	312-231-6880
Onset Computer Corp., 199 Main St., PO Box 1030, N. Falmouth, MA 02556	617-563-2267
Pacific Microcomputers, Inc., 160 Chesterfield Dr., Cardiff, CA 92007	619-436-8649
Penn Resch. Corp. (PRC), 2652 South Main St., P.O. Box 3357, Kennesaw, GA 30144	404-429-9061
§ Personal Micro Computers, 275 Santa Ana Ct., Sunnyvale, CA 94086	408-737-8441
§† Plessey Microsystems, Plessey Trading Corp., 1641 Kaiser Ave., Irvine, CA 92714	714-540-9931/9932
§ Quartic Systems, Inc., 3575 South West Temple #7, Salt Lake City, UT 84115	801-268-9264
Quay Corp., 22 Meridian Rd., P.O. Box 783, Eatontown, NJ 07724	201-542-7340
RCI/Data, 1992 Lakewood Rd., Toms River, NJ 08753	201-341-8361
Seattle Computer Products, Inc., 1114 Ind. Dr., Seattle, WA 98188	206-575-1830; 800-426-8936
Serial Lab Prods., Inc., 162 Cook Lane, P.O. Box 766, Marlboro, MA 01752	617-481-1684
SGS Semiconductor Corporation, 1000 E. Bell Road, Phoenix, AZ 85022	602-867-6100
Star-Kits, P.O. Box 209, Mt. Kisco, NY 10549	914-241-0287
§ STD Microsystems, 399 Sherman Ave., Palo Alto, CA 94306	415-327-6800
SYMBICON, 89 Route 101A, Amherst, NH 03031	603-673-8898
Systek, 1023 N. Kellogg St., Kennewick, WA 99336	509-735-1200
§ TANO Corp., 4301 Poche Ct., New Orleans, LA 70129	504-254-3500
Teleram Communications, 2 Corporate Park Dr., White Plains, NY 10604	914-694-9270
§† TeleVideo Sys., Inc., 1170 Morse Ave., Sunnyvale, CA 94086	408-745-7760
§ Texas Instrs., Data Sys. Group, P. O. Box 809063, Dallas, TX 75380-9063	1-800-527-3500
Unitronix Corp., 197 Meister Ave., Somerville, NJ 08876	201-231-9400
§ Wavetek Corporation, 9191 Towne Centre Drive, San Diego, CA 92122	619-450-9971
§ Win Systems, Inc., P.O. Box 121361, Arlington, TX 76012	817-274-7553
Xebex Data Systems, 6610 Buckley Dr., Cambria, CA 93428	805-927-5008
Zendex Corp., 6700 Sierra La., Dublin, CA 94566	415-828-3000
Ziatech, 3433 Roberto Ct, San Luis Obispo, CA 93401	805-541-0488

Computers, Mini, High End-2025

Cambridge Digital Sys., Compumart, P.O. Box 568, 65 Bent St., Cambridge, MA 02139	617-491-2700
Central Data Corp., 1602 Newton Dr., Champaign, IL 61820	217-359-8010
§ Computer Field Services, Inc., 6 Federal Street, Danvers, MA 01923	617-774-2930
First Computer Corp., 645 Blackhawk Dr., Westmont, IL 60559	312-920-1050
§ General Robotics Corp., 57 N. Main St., Hartford, WI 53027	414-673-6800
§† Gould Inc., Computer Sys. Div., 6901 W. Sunrise Blvd., Ft. Lauderdale, FL 33313	305-587-2900
Harris Corp., Computer Systems Div., 2101 W. Cypress Creek Rd., Ft. Lauderdale, FL 33309	305-974-1700
† Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303	Call Local Sls. Off.

Honeywell Info. Sys., 200 Smith St., MS 440, Waltham, MA 02154 617-895-6000
§ Integrated Digital Products, 4208 E. La Palma Ave., Anaheim, CA 92807 714-793-5300
§ Metier Management Sys., Inc., 5884 Point West Dr., Houston, TX 77036 713-988-9100
Modular Computer Systems, P.O. Box 6099, Ft. Lauderdale, FL 33310 .. 305-974-1380
§ NEC Information Systems, NEC Corporation, 1414 Massachusetts Ave., Boxborough, MA 01719 617-264-8000
§ Point 4 Data Corp., 2569 McCabe Way, Irvine, CA 92714 714-863-1111
Sperry Univac, Mini-Computer Operations, Box C-19504, Irvine, CA 92713 714-754-6900
† Teleram Communications, 2 Corporate Park Dr., White Plains, NY 10604 914-694-9270
§ Texas Instrs., Data Sys. Group, P. O. Box 809063, Dallas, TX 75380-9063 1-800-527-3500
† Uniq Digital Technologies, 28 S. Water Street, Batavia, IL 60510 312-879-1008
Unitronix Corp., 197 Meister Ave., Somerville, NJ 08876 201-231-9400

Computers, Mini, Low End-2025

Applied Sys., 26401 Harper Ave., St. Clair Shores, MI 48081 313-779-8700
Bridge Computer Co., Sea Data Corp., 1 Bridge St., Newton, MA 02158 .. 617-244-8190
Cambridge Digital Sys., Compumart, P.O. Box 568, 65 Bent St., Cambridge, MA 02139 617-491-2700
Central Data Corp., 1602 Newton Dr., Champaign, IL 61820 217-359-8010
§† Compucorp, 2211 Michigan Ave., Santa Monica, CA 90404 213-829-7453
§ Computer Field Services, Inc., 6 Federal Street, Danvers, MA 01923 617-774-2930
Computer Maintenance Corp., 405 Murray Hill Pkwy, East Rutherford, NJ 07073 201-866-6400
§ Data General, 4400 Computer Dr., Westboro, MA 01581 617-366-8911
§ General Robotics Corp., 57 N. Main St., Hartford, WI 53027 414-673-6800
Harris Corp., Computer Systems Div., 2101 W. Cypress Creek Rd., Ft. Lauderdale, FL 33309 305-974-1700
Honeywell Info. Sys., 200 Smith St., MS 440, Waltham, MA 02154 617-895-6000
† Metier Management Sys., Inc., 5884 Point West Dr., Houston, TX 77036 713-988-9100
§ NEC Information Systems, NEC Corporation, 1414 Massachusetts Ave., Boxborough, MA 01719 617-264-8000
§ NES, Inc. (Nationwide Electronic Systems), 3003 Wakefield, Carpentersville, IL 60110 312-426-5900
§ Point 4 Data Corp., 2569 McCabe Way, Irvine, CA 92714 714-863-1111
† Teleram Communications, 2 Corporate Park Dr., White Plains, NY 10604 914-694-9270
§ Texas Instrs., Data Sys. Group, P. O. Box 809063, Dallas, TX 75380-9063 1-800-527-3500
† Uniq Digital Technologies, 28 S. Water Street, Batavia, IL 60510 312-879-1008
Unitronix Corp., 197 Meister Ave., Somerville, NJ 08876 201-231-9400
§ Wavetek Corporation, 9191 Towne Centre Drive, San Diego, CA 92122 619-450-9971
Xebex Data Systems, 6610 Buckley Dr., Cambria, CA 93428 805-927-5008

Computers, Mini, Midrange-2025

Elctrn. Molding Corp., 96 Mill St., Woonsocket, RI 02895, 401-769-3800 .. C•1707
Burroughs Corp., Borroughs Place, Rm. 4C-51, Detroit, MI 48232 313-972-7000
Cambridge Digital Sys., Compumart, P.O. Box 568, 65 Bent St., Cambridge, MA 02139 617-491-2700
Central Data Corp., 1602 Newton Dr., Champaign, IL 61820 217-359-8010
§† Compucorp, 2211 Michigan Ave., Santa Monica, CA 90404 213-829-7453
§ Computer Field Services, Inc., 6 Federal Street, Danvers, MA 01923 617-774-2930
§ Data General, 4400 Computer Dr., Westboro, MA 01581 617-366-8911
Digitus Corporation, 22 West 25th Street, Baltimore, MD 21218 301-467-3223
First Computer Corp., 645 Blackhawk Dr., Westmont, IL 60559 312-920-1050
§ General Robotics Corp., 57 N. Main St., Hartford, WI 53027 414-673-6800
Harris Corp., Computer Systems Div., 2101 W. Cypress Creek Rd., Ft. Lauderdale, FL 33309 305-974-1700
† Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
Honeywell Info. Sys., 200 Smith St., MS 440, Waltham, MA 02154 617-895-6000
† Metier Management Sys., Inc., 5884 Point West Dr., Houston, TX 77036 713-988-9100
§ NEC Information Systems, NEC Corporation, 1414 Massachusetts Ave., Boxborough, MA 01719 617-264-8000
§ Point 4 Data Corp., 2569 McCabe Way, Irvine, CA 92714 714-863-1111
Sperry Univac, Mini-Computer Operations, Box C-19504, Irvine, CA 92713 714-754-6900
§ Texas Instrs., Data Sys. Group, P. O. Box 809063, Dallas, TX 75380-9063 1-800-527-3500
† Trilobyte Computer Corporation, 801 W. Grand Ave., Oakland, CA 94607 415-839-1100
† Uniq Digital Technologies, 28 S. Water Street, Batavia, IL 60510 312-879-1008
Unitronix Corp., 197 Meister Ave., Somerville, NJ 08876 201-231-9400

Computers, Personal-2025

§ Antona Corp., 2100 S. Sawtelle Blvd., Suite 205, Los Angeles, CA 90025 213-473-8995
Applied Sys., 26401 Harper Ave., St. Clair Shores, MI 48081 313-779-8700
Bridge Computer Co., Sea Data Corp., 1 Bridge St., Newton, MA 02158 .. 617-244-8190
§ Chorus Data Systems, P.O. Box 810, 27 Proctor Hill Rd., Hollis, NH 03049 603-465-7100
§ Cromemco, 280 Bernardo Ave., Mountain View, CA 94043 415-964-7400
§ Data General, 4400 Computer Dr., Westboro, MA 01581 617-366-8911
§ Data Rentals/Sls., Inc, P. O. Box 3257, Culver City, CA 90230 213-559-3822
Davidge Corp., 1951 Colony St., Mountain View, CA 94043 805-688-7707
Daytronic Corp., 2589 Corporate Pl, Miamisburg, OH 45342 513-866-3300
§ Electric Switches, Inc., 2478 Fletcher Dr., Los Angeles, CA 90039 213-660-1310
§ General Robotics Corp., 57 N. Main St., Hartford, WI 53027 414-673-6800
§ Gimix, Inc., 1337 W. 37th Place, Chicago, IL 60609 312-927-5510
† Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
Honeywell Info. Sys., 200 Smith St., MS 440, Waltham, MA 02154 617-895-6000
§ Industrial Computer Designs, Inc., 31264 La Baya Drive, Westlake Village, CA 91362 818-889-3179
Interface Electronics Inc., 21134 Bridge St., Southfield, MI 48034 313-352-8820
Magnum Opus Custom Elctrn. Engrg., 284 Kennedy St., Iselin, NJ 08830 201-283-4925
Metier Management Sys., Inc., 5884 Point West Dr., Houston, TX 77036 713-988-9100
Microsystems Dev. Corp. Inc., 1560 Teaneck Rd., Teaneck, NJ 07666 ... 201-837-0051
§ Multitech Elctrns. Inc., 195 W. El Camino Real, Sunnyvale, CA 94086 408-773-8400
§ NEC Information Systems, NEC Corporation, 1414 Massachusetts Ave., Boxborough, MA 01719 617-264-8000
§ Personal Micro Computers, 275 Santa Ana Ct., Sunnyvale, CA 94086 ... 408-737-8441
§ RVS Electronics, Inc., 40 North St., Middletown, NY 10940 914-342-3199
§ Summit CAD Corp., 5222 FM 1960 W100, Houston, TX 77069 713-440-1468
† Teleram Communications, 2 Corporate Park Dr., White Plains, NY 10604 914-694-9270
§ Texas Instrs., Data Sys. Group, P. O. Box 809063, Dallas, TX 75380-9063 1-800-527-3500
Unitronix Corp., 197 Meister Ave., Somerville, NJ 08876 201-231-9400
Xerox Corporation, 800 Long Ridge Rd., P.O. Box 1600, Stamford, CT 06904 203-329-8700

Computers, Small Business-2025

§ Antona Corp., 2100 S. Sawtelle Blvd., Suite 205, Los Angeles, CA 90025 213-473-8995
Applied Sys., 26401 Harper Ave., St. Clair Shores, MI 48081 313-779-8700
Bridge Computer Co., Sea Data Corp., 1 Bridge St., Newton, MA 02158 .. 617-244-8190
Burroughs Corp., Borroughs Place, Rm. 4C-51, Detroit, MI 48232 313-972-7000
§† Compucorp, 2211 Michigan Ave., Santa Monica, CA 90404 213-829-7453
§ CompuPro, 3506 Breakwater Ct., Hayward, CA 94545 415-786-0909
§ Computer Field Services, Inc., 6 Federal Street, Danvers, MA 01923 617-774-2930
Computer Maintenance Corp., 405 Murray Hill Pkwy, East Rutherford, NJ 07073 201-866-6400
§ Comtek, Inc., 309 Breesport, San Antonio, TX 78216 512-340-8253
§ Cromemco, 280 Bernardo Ave., Mountain View, CA 94043 415-964-7400
§ Data General, 4400 Computer Dr., Westboro, MA 01581 617-366-8911
Digiac Corp., 175 Engineers Rd., Hauppauge, NY 11788 516-273-8600
Dynamic Time Systems, Inc., 150 West 1230 North, Ste. 2, Provo, UT 84604 801-377-9154
§ EDL, Inc., 385 Oser Ave., Hauppauge, NY 11788 .... 516-435-2808;1-800-DIAL EDL
§ Electric Switches, Inc., 2478 Fletcher Dr., Los Angeles, CA 90039 213-660-1310
§ General Robotics Corp., 57 N. Main St., Hartford, WI 53027 414-673-6800
§ Gimix, Inc., 1337 W. 37th Place, Chicago, IL 60609 312-927-5510
§ GMR Co., 8801 Sepulveda Blvd., Los Angeles, CA 90045 213-216-9516
Harris Corp., Computer Systems Div., 2101 W. Cypress Creek Rd., Ft. Lauderdale, FL 33309 305-974-1700
† Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
Honeywell Info. Sys., 200 Smith St., MS 440, Waltham, MA 02154 617-895-6000
§ Industrial Computer Designs, Inc., 31264 La Baya Drive, Westlake Village, CA 91362 818-889-3179
Interface Electronics Inc., 21134 Bridge St., Southfield, MI 48034 313-352-8820
Magnum Opus Custom Elctrn. Engrg., 284 Kennedy St., Iselin, NJ 08830 201-283-4925
Mitsubishi Elctrns. America, Computer Peripheral Div., 991 Knox St., Torrance, CA 90502 213-515-3993
§ Multitech Elctrns. Inc., 195 W. El Camino Real, Sunnyvale, CA 94086 408-773-8400
§ NEC Information Systems, NEC Corporation, 1414 Massachusetts Ave., Boxborough, MA 01719 617-264-8000
§ Personal Micro Computers, 275 Santa Ana Ct., Sunnyvale, CA 94086 ... 408-737-8441
§† Plessey Microsystems, Plessey Trading Corp., 1641 Kaiser Ave., Irvine, CA 92714 .... 714-540-9931/9932
§ Point 4 Data Corp., 2569 McCabe Way, Irvine, CA 92714 714-863-1111
Quay Corp., 22 Meridian Rd., P.O. Box 783, Eatontown, NJ 07724 201-542-7340
§ RVS Electronics, Inc., 40 North St., Middletown, NY 10940 914-342-3199
§ Summit CAD Corp., 5222 FM 1960 W100, Houston, TX 77069 713-440-1468
† Teleram Communications, 2 Corporate Park Dr., White Plains, NY 10604 914-694-9270
§† TeleVideo Sys., Inc., 1170 Morse Ave., Sunnyvale, CA 94086 408-745-7760
Terminal Data Corp., 15733 Crabbs Branch Way, Rockville, MD 20855 .. 301-921-8282
§ Texas Instrs., Data Sys. Group, P. O. Box 809063, Dallas, TX 75380-9063 1-800-527-3500
Unitronix Corp., 197 Meister Ave., Somerville, NJ 08876 201-231-9400
Xebex Data Systems, 6610 Buckley Dr., Cambria, CA 93428 805-927-5008
Xyztek Corp., 8000 E. Prentice Ave. Ste. B7, Englewood, CO 80111 303-850-9400

Computer Sets (MIL), Digital Data-3475

† Analytics Communications Sys., 1820 Michael Faraday Dr., Reston, VA 22090 703-471-0892
§† Davidge Corp., 1951 Colony St., Mountain View, CA 94043 805-688-7707
General Digital Industries Inc., 7702 Governors Dr. W., Huntsville, AL 35805 205-837-8305
Information Technolgoy A.D.S.C., P.O. Box 470, College Park, MD 20740 301-779-5110
§† Plessey Microsystems, Plessey Trading Corp., 1641 Kaiser Ave., Irvine, CA 92714 .... 714-540-9931/9932
† Trilobyte Computer Corporation, 801 W. Grand Ave., Oakland, CA 94607 415-839-1100

Computer Systems (MIL)-3475

§ Air Land Systems Corporation, 2710 Prosperity Ave., Fairfax, VA 22031 703-573-1100
Amtek Digital Systems, Inc., 12740 28th N.E., Seattle, WA 98125 206-363-0217
Astec USA, Ltd., A BSR Intl. Co., 2880 San Tomas Expwy., # 200, Santa Clara, CA 95051 408-748-1200

† Astronautics Corporation of America, P.O. Box 523, Milwaukee, WI 53201-0523 414-447-8200
† Aydin Corp., 700 Dresher Rd., Horsham, PA 19044 215-657-7510
† Base Ten Sys., One Electronics Dr., Box 3151, Trenton, NJ 08619 609-586-7010
Burroughs Corp., Borroughs Place, Rm. 4C-51, Detroit, MI 48232 313-972-7000
§† Chorus Data Systems, P.O. Box 810, 27 Proctor Hill Rd., Hollis, NH 03049 603-465-7100
§† Compucart, Versa Tec Corp., 107 N. Rome Ave., Tampa, FL 33606 ...... 800-237-9024; 813-251-2431
Control Module, 380 Enfield St., Enfield, CT 06082 203-745-2433
§† Cromemco, 280 Bernardo Ave., Mountain View, CA 94043 415-964-7400
† Custom Prods. Grp., Sys. Dev. Corp.-A Burroughs Co., P.O. Box 517, Paoli, PA 19301 215-648-7660
† Cyber Sys., Inc., 2031 E. Cerritos Ave., Anaheim, CA 92806 714-722-2051
Data Engineering, Inc., 2515 N. State Rd. 7 Ste. 207, Margate, FL 33063 974-7861
Digital Radio Corp., 8901 La Cienega Blvd., Inglewood, CA 90301 213-670-8611
§ Electric Switches, Inc., 2478 Fletcher Dr., Los Angeles, CA 90039 213-660-1310
First Computer Corp., 645 Blackhawk Dr., Westmont, IL 60559 312-920-1050
General Digital Industries Inc., 7702 Governors Dr. W., Huntsville, AL 35805 205-837-8305
Harris Corp., Computer Systems Div., 2101 W. Cypress Creek Rd., Ft. Lauderdale, FL 33309 305-974-1700
§ InfoCap, Inc., 31119 Via Colinas #502, Westlake Village, CA 91362 818-991-1410
† Innovatek Microsystems, Inc., Smithfield Rd., R1 Box 104, Millerton, NY 12546-9720 914-373-9003
† Litton Applied Technology, 645 Almanor Ave., P.O. Box 3478, Sunnyvale, CA 94088-3478 408-773-0777
Lundy Elctrns. & Systems, Inc., 1 Robert La., Glen Head, NY 11545 516-671-9000
† Metier Management Sys., Inc., 5884 Point West Dr., Houston, TX 77036 713-988-9100
Peritek Corp., 5550 Redwood Rd., Oakland, CA 94619 415-531-6500
§† Plessey Microsystems, Plessey Trading Corp., 1641 Kaiser Ave., Irvine, CA 92714 ...... 714-540-9931/9932
† Spectral Dynamics, Scientific-Atlanta, Inc., 4255 Ruffin Rd., San Diego, CA 92123-0575 619-268-7100
Serial Lab Prods., Inc., 162 Cook Lane, P.O. Box 766, Marlboro, MA 01752 617-481-1684
Teleram Communications, 2 Corporate Park Dr., White Plains, NY 10604 914-694-9270
† Trilobyte Computer Corporation, 801 W. Grand Ave., Oakland, CA 94607 415-839-1100
† Uniq Digital Technologies, 28 S. Water Street, Batavia, IL 60510 312-879-1008
Zendex Corp., 6700 Sierra La., Dublin, CA 94566 415-828-3000

Computing Equipment, Peripheral — See Converters, Digital To Paper Tape (Vol. D), Printers (Vol. D), Terminals, Data Display (Vol. D), etc.

Concentrators, Communications-1900

Advanced Sys. Concepts, 435 N. Lake Ave., Pasadena, CA 91101, 818-793-8971 ...... D◦1137
§ Algo, Inc., 9198-C Red Branch Rd., Columbia, MD 21045 301-730-7442
Amdahl Communications Sys. Div., Amdahl Corp., 2500 Walnut Ave., Marina del Rey, CA 90291 213-822-3202
Applied Sys., 26401 Harper Ave., St. Clair Shores, MI 48081 313-779-8700
Artel Communications Corp., 93 Grand St., Worcester, MA 01602 617-752-5690
BLACK BOX Corp., Micom Sys., P.O. Box 12800, Pittsburgh, PA 15241 412-746-5500
Control Module, 380 Enfield St., Enfield, CT 06082 203-745-2433
Fibronics Intl. Inc., 325 Stevens St., Hyannis, MA 02601 617-778-0700
Foundation Instruments Inc., 24 Colonnade Rd., Nepean, ON, CANADA K2E 7J6 613-226-4000
§ Glasgal Communications, Inc., 207 Washington St., Northvale, NJ 07647 201-768-8082
§ InfoCap, Inc., 31119 Via Colinas #502, Westlake Village, CA 91362 818-991-1410
Kaufman Data Comms., Inc., Orange Nassau Elctrns. Co., 145 E. Dana St., Mountain View, CA 94041 415-962-8811
§ Micom Systems, Inc., 4100 Los Angeles Ave, P.O. Box 8100, Simi Valley, CA 93062-8100 805-583-8600
§ Multi-Tech Systems, Inc., 82 Second Ave. S.E., New Brighton, MN 55112 612-631-3550
Pylon Elex Development Co. Ltd., 2300 Victoria, Lachine, PQ, CANADA H8S 1Z3 514-637-1186
§† Timeplex, Inc., 400 Chestnut Ridge Rd., Woodcliff Lake, NJ 07675 201-930-4600
§ Via West Inc., 534 N. Stone Ave., Tucson, AZ 85705 602-623-5716

Conditioners, Power Line — See Regulators & Stabilizers, Voltage (Vol. D), Line Conditioners (Vol. D)

Conductive Elastomers-4525 — *See Vol. C*

Conductive Fabrics, Films & Tapes — See Fabrics, Conductive (Vol. C)

Conductive Plastic Materials & Parts-4525 — *See Vol. C*

Conduit, Electrical-6000 — *See Vol. C*

Connecting Blocks, Data-2100 — *See Vol. C*

Connecting Blocks, Modular Telephones-2100 — *See Vol. C*

Connector Adapters-2100 — *See Vol. C*

Connector Backshells-2100 — *See Vol. C*

Connector Blocks, Mother Board-2100 — *See Vol. C*

Connector Boxes & Strips, Power Outlet-2800 — *See Vol. C*

Connectors, Antenna — See Connectors, RF, Coaxial & Triaxial (Vol. C)

Connectors, AC Power-2100 — *See Vol. C*

Connectors, Audio-2100 — *See Vol. C*

Connectors, Back Panel — See Connectors, Wirewrap (Z-3 Level) (Vol. C)

Connectors, Battery-2100 — *See Vol. C*

Connectors, Cable-2100 — *See Vol. C*

Connectors, Circular, MS/AN-2100 — *See Vol. C*

Connectors, DIN-2100 — *See Vol. C*

Connectors, D Subminiature-2100 — *See Vol. C*

Connectors, Edgeboard — See Connectors, Printed Circuit, Card Edge (Vol. C)

Connectors, Elastomeric-2100 — *See Vol. C*

Connectors, Fiber Optic-2475 — *See Vol. B*

Connectors, Filtered-2100 — *See Vol. C*

Connectors, Flat Cable (Incl. Flexible)-2100 — *See Vol. C*

Connectors, Fused-2100 — *See Vol. C*

Connectors, Heavy Duty, Power-2100 — *See Vol. C*

Connectors, Hermetically Sealed, Pressurized, or Waterproof-2100 — *See Vol. C*

Connectors, High Voltage (1,000 Volts & Over)-2100 — *See Vol. C*

Connectors, IDC (Insulation Displacement Contact)-2100 — *See Vol. C*

Connectors, Integrated Circuit — See Sockets, Integrated Circuit (Vol. C)

Connectors, LCD-2100 — *See Vol. C*

Connectors, Magnetron-2100 — *See Vol. C*

Connectors, Miniature, Subminiature & Microminiature-2100 — *See Vol. C*

Connectors, Missile (Umbilicals, Interstage, Post Boost)-3475

§† TRW Cylindrical Connector Div., TRW Electronic Components Grp., 8821 Science Center Dr., Minneapolis, MN 55428, 612-537-1010 ...... C◦1566
† AirBorn, Inc., 4321 AirBorn Dr., Addison, TX 75001 214-931-3200
† Alden Products Co., P.O. Box 860, 117 N. Main St., Brockton, MA 02403 617-583-0160
† Amphenol, An Allied Co., 43 Commerce Ct., Lisle, IL 60532 312-983-3500
§ Astrolab Inc., 4 Powder Horn Drive, Warren, NJ 07060 1-201-560-3800
§† Bendix Corp., Electrical Comps. Div., Sidney, NY 13838 607-563-5324
§ Burndy Corporation, Richards Ave., Norwalk, CT 06852 203-838-4444
§ Dale Electronics, Inc., Yankton Div., E. Hwy. 50, Box 180, Yankton, SD 57078 605-665-9301
† Dataware Sys. Lease, Inc., 30 Bay St., Staten Island, NY 10301 212-447-4911
† Detoronics Corporation, 10660 E. Rush St., S. El Monte, CA 91733 818-579-7130
Hughes Aircraft Co., Connecting Devices Div., 17150 Von Karman Ave., Irvine, CA 92714 714-660-5701
† ITT Cannon, 666 E. Dyer Road, Santa Ana, CA 92705-5684 714-557-4700
† Milton Ross Co., 511 Second St. Pike, Southampton, PA 18966 215-355-0200
Pyle-National, Brand-Rex Company, 1334 N. Kostner Ave., Chicago, IL 60651 312-342-6300
† Rowe Industries, Inc., 6225 Benore Rd., P.O. Box 6877, Toledo, OH 43612 419-729-9761
Sabritec, 16631 Noyes Ave., Irvine, CA 92714 714-549-7350
§ Sealectro, 225 Hoyt St., Mamaroneck, NY 10543 914-698-5600
Souriau, Inc., 25158 Avenue Stanford, Valencia, CA 91355 805-257-4830
§† Viking Connectors, 21001 Nordhoff St., P.O. Box 2379, Chatsworth, CA 91311 818-341-4330

Connectors, Piggy Back — See Connectors, Wirewrap (Z-3 Level) (Vol. C)

Connectors, Plug-in, Program Board-2100 — *See Vol. C*

Connectors, Printed Circuit, Card Edge-2100 – *See Vol. C*

Connectors, Printed Circuit (Other than Card Edge)-2100 – *See Vol. C*

Connectors, Rack & Panel-2100 – *See Vol. C*

Connectors, RF, Coaxial & Triaxial-2100 – *See Vol. C*

Connectors, Solderless-2100 – *See Vol. C*

Connectors, Splicing-2100 – *See Vol. C*

Connectors, Stripline-2100 – *See Vol. C*

Connectors, Test-2100 – *See Vol. C*

Connectors, Thermocouple-2100 – *See Vol. C*

Connectors, Video-2100 – *See Vol. C*

Connectors, Wirewrap (Z-3 Level)-2100 – *See Vol. C*

Connectors, Wire – See Wire Nuts (Vol. C)

Connectors, Zero & Low Insertion Force-2100 – *See Vol. C*

Connectors & Terminals, Push-on, Quick Disconnect-2100 – *See Vol. C*

Connectors (MIL), Flat Cable-2440 – *See Vol. B*

Connectors (MIL), Power-2440 – *See Vol. B*

Connectors (MIL), Printed Circuit-2440 – *See Vol. B*

Connectors (MIL), RF-2440 – *See Vol. B*

Consoles, Cabinet – See Benches, Consoles etc. (Vol. C)

Consoles (MIL), ECCM-3475

† Amco Engrg., 3801 N. Rose St., Schiller Pk., IL 60176 312-671-6670

Contact Cleaners – See Cleaners & Solvents (Vol. C), Burnishers, Contact (Vol. C)

Contact Strips, Finger-4525 – *See Vol. C*

Contactors (MIL)-2440 – *See Vol. B*

Contactors – See Relays, Power (Vol. B)

Contacts, Electrical-2800 – *See Vol. C*

Contacts (MIL), Assemblies & Holders-2440 – *See Vol. B*

Containers, Shielded (All Types) – See Enclosures, Shielded (Vol. C)

Containers, Shipping, Metal & Fiberglass – See Enclosures, Shipping, Metallic & Nonmetallic (Vol. C)

Containers, Storage-3800 – *See Vol. C*

Controllers, Card Reader/Punch, Add-in-2000

† Astronautics Corporation of America, P.O. Box 523, Milwaukee, WI 53201-0523 414-447-8200
GEN/COMP Inc., 6 Algonquin Rd., Canton, MA 02021 617-828-2008

Controllers, Card Reader/Punch, Standalone-2000

† Astronautics Corporation of America, P.O. Box 523, Milwaukee, WI 53201-0523 414-447-8200

Controllers, Energy Conservation-2200

Centent Co., 3879 S. Main St., Santa Ana, CA 92707 714-979-6491
Dynage/Controls, Inc., 2 Willowbrook Rd., Cromwell, CT 06416 203-635-6257
Electronic Prods. Corp., Interstate Indl. Plaza, R. D. #5, York, PA 17402 717-767-6517
§ Industrial Computer Designs, Inc., 31264 La Baya Drive, Westlake Village, CA 91362 818-889-3179
Kaye Instruments, 15 De Angelo Dr., Bedford, MA 01730 617-275-0300
Macrotronix, Inc., 4016 N. Home St., Mishawaka, IN 46545 219-256-5503
† NWL Transformers, Rising Sun Rd., P.O. Box 358, Bordentown, NJ 08505 609-298-7300
Omega Engrg., Box 4047, Stamford, CT 06907 203-359-1660

Controllers, Error-1900

§ Micom Systems, Inc., 4100 Los Angeles Ave, P.O. Box 8100, Simi Valley, CA 93062-8100 805-583-8600
† Western DataCom, 5083 Market St., Youngstown, OH 44512 216-788-6583

Controllers, Floppy Disk Drive, Add-in-2000

Ciprico Inc., 2955 Xenium Lane, Plymouth, MN 55441, 612-559-2034 .... D•1062
G W Three Incorporated, 7623 Fullerton Rd., 2nd Floor, Springfield, VA 22153, 703-451-2043 .... D•1088
Motorola Semiconductor Prods. Sector, Adv. 72, Box 20912, Phoenix, AZ 85036,. 602-244-6900 .... D•1100-1101
Advanced Automation Concepts, Inc., 3760 Lower Roswell Rd., Marietta, GA 30067 404-973-0027
Advanced Elctrns. Design, Inc., 440 Potrero Ave., Sunnyvale, CA 94086 .... 408-733-3555;800-538-1730 (outside CA)
§ Advanced Micro Devices, P.O. Box 3453, 901 Thompson Pl., Sunnyvale, CA 94088 408-732-2400
§ Analog & Digital Peripherals, Inc. (ADPI), 815 Diana Dr., Troy, OH 45373 513-339-2241
† Antona Corp., 2100 S. Sawtelle Blvd., Suite 205, Los Angeles, CA 90025 213-473-8995
Applied Micro Technlg., A Burr Brown Co., 3669 E. 44th Street, Tucson, AZ 85713 602-622-8605
Bridge Computer Co., Sea Data Corp., 1 Bridge St., Newton, MA 02158 617-244-8190
Comark Corp., 93 W St., P. O. Box 474, Medfield, MA 02052 617-359-8161
§ CompuPro, 3506 Breakwater Ct., Hayward, CA 94545 415-786-0909
§ Computer System Assocs., 7564 Trade St., San Diego, CA 92121 619-566-3911
Creative Micro Systems, 3822 Cerritos Ave., Los Alamitos, CA 90720 213-493-2484
§ Cromemco, 280 Bernardo Ave., Mountain View, CA 94043 415-964-7400
§ Distributed Logic Corp. (DILOG), 12800-G Garden Grove Blvd., Garden Grove, CA 92643 714-534-8950
GEN/COMP Inc., 6 Algonquin Rd., Canton, MA 02021 617-828-2008
§ Industrial Computer Designs, Inc., 31264 La Baya Drive, Westlake Village, CA 91362 818-889-3179
JF Microsystems, 3641 Frontier Road, Pasco, WA 99301 .... 509-297-4294; 800-JF-CARDS
Matrox Elctrn. Sys., 1055 St. Regis Blvd., Dorval, QU, CANADA H9P 2T4 514-685-2630
Mega Logic, 9659 Natl. Rd., Brookville, OH 45309 513-833-5222
† Micro/sys, 1011 Grand Central Ave., Glendale, CA 91201-3010 818-244-4600
Peritek Corp., 5550 Redwood Rd., Oakland, CA 94619 415-531-6500
Sperry Univac, Mini-Computer Operations, Box C-19504, Irvine, CA 92713 714-754-6900
§ Western Digital Corp., 2445 McCabe Way, Irvine, CA 92714 714-557-3550
Wire Graphics, Inc., 215 B. Central Ave., Farmingdale, NY 11735 516-293-1525
Zendex Corp., 6700 Sierra La., Dublin, CA 94566 415-828-3000
Ziatech, 3433 Roberto Ct., San Luis Obispo, CA 93401 805-541-0488

Controllers, Floppy Disk Drive, Standalone-2000

Magnum Opus Custom Elctrn. Engrg., 284 Kennedy St., Iselin, NJ 08830, 201-283-4925 .... D•1093
Advanced Automation Concepts, Inc., 3760 Lower Roswell Rd., Marietta, GA 30067 404-973-0027
Bridge Computer Co., Sea Data Corp., 1 Bridge St., Newton, MA 02158 617-244-8190
§ Computer System Assocs., 7564 Trade St., San Diego, CA 92121 619-566-3911
Dai-Ichi Shoji of Amer., Inc., 150 Fifth Ave., New York, NY 10011 212-691-9050
§ Dataprobe, 110 Palisades Blvd., Palisades Park, NJ 07650 201-947-9500
§ EH Electronics, Inc., Sub. EH Intl., Inc., 48507 Milmont Drive, Fremont, CA 94538 415-651-2340
Information Technolgoy A.D.S.C., P.O. Box 470, College Park, MD 20740 301-779-5110
Kontron Elctrns., 1230 Charleston Rd., Mountain View, CA 94039-7230 415-965-7020
§ Western Digital Corp., 2445 McCabe Way, Irvine, CA 92714 714-557-3550
Wire Graphics, Inc., 215 B. Central Ave., Farmingdale, NY 11735 516-293-1525
Zendex Corp., 6700 Sierra La., Dublin, CA 94566 415-828-3000

Controllers, Hard Disk Drive, Add-in-2000

Motorola Semiconductor Prods. Sector, Adv. 72, Box 20912, Phoenix, AZ 85036, 602-244-6900 .... D•1100-1101
Advanced Automation Concepts, Inc., 3760 Lower Roswell Rd., Marietta, GA 30067 404-973-0027
Advanced Elctrns. Design, Inc., 440 Potrero Ave., Sunnyvale, CA 94086 .... 408-733-3555;800-538-1730 (outside CA)
§ Advanced Micro Devices, P.O. Box 3453, 901 Thompson Pl., Sunnyvale, CA 94088 408-732-2400
† Antona Corp., 2100 S. Sawtelle Blvd., Suite 205, Los Angeles, CA 90025 213-473-8995
Applied Micro Technlg., A Burr Brown Co., 3669 E. 44th Street, Tucson, AZ 85713 602-622-8605
Bridge Computer Co., Sea Data Corp., 1 Bridge St., Newton, MA 02158 617-244-8190
Ciprico Inc., 2955 Xenium Lane, Plymouth, MN 55441 612-559-2034
§ CompuPro, 3506 Breakwater Ct., Hayward, CA 94545 415-786-0909
§ Computer Field Services, Inc., 6 Federal Street, Danvers, MA 01923 617-774-2930
§ Computer System Assocs., 7564 Trade St., San Diego, CA 92121 619-566-3911
Creative Micro Systems, 3822 Cerritos Ave., Los Alamitos, CA 90720 213-493-2484
§ Cromemco, 280 Bernardo Ave., Mountain View, CA 94043 415-964-7400
Data Engineering, Inc., 2515 N. State Rd. 7 Ste. 207, Margate, FL 33063 974-7861
§ Datum, Storage Prods. Div., 1363 State College Blvd., Anaheim, CA 92806 714-533-6333
Distributed Computer Sys., 223 Crescent St., Waltham, MA 02154 617-899-6619
§ Distributed Logic Corp. (DILOG), 12800-G Garden Grove Blvd., Garden Grove, CA 92643 714-534-8950
GEN/COMP Inc., 6 Algonquin Rd., Canton, MA 02021 617-828-2008
Industrial Computer Designs, Inc., 31264 La Baya Drive, Westlake Village, CA 91362 818-889-3179
JF Microsystems, 3641 Frontier Road, Pasco, WA 99301 .... 509-297-4294; 800-JF-CARDS
§ Macrolink, 1500 N. Kellogg Drive, Anaheim, CA 92807 714-777-8800
Micro/sys, 1011 Grand Central Ave., Glendale, CA 91201-3010 818-244-4600
§ Mini Computer Technlg., 696 E. Trimble Rd., San Jose, CA 95131 408-942-1616
Peritek Corp., 5550 Redwood Rd., Oakland, CA 94619 415-531-6500
§ Point 4 Data Corp., 2569 McCabe Way, Irvine, CA 92714 714-863-1111

§ Software Dynamics, 2111 W. Crescent Ave-G, Anaheim, CA 92801 714-635-4760
Sperry Univac, Mini-Computer Operations, Box C-19504, Irvine, CA 92713 714-754-6900
§ Western Digital Corp., 2445 McCabe Way, Irvine, CA 92714 714-557-3550
Zendex Corp., 6700 Sierra La., Dublin, CA 94566 415-828-3000
Ziatech, 3433 Roberto Ct, San Luis Obispo, CA 93401 805-541-0488

Controllers, Hard Disk Drive, Standalone-2000

Bridge Computer Co., Sea Data Corp., 1 Bridge St., Newton, MA 02158 .. 617-244-8190
§ Computer Field Services, Inc., 6 Federal Street, Danvers, MA 01923 617-774-2930
§ Computer System Assocs., 7564 Trade St., San Diego, CA 92121 619-566-3911
§ Cromemco, 280 Bernardo Ave., Mountain View, CA 94043 415-964-7400
Data Engineering, Inc., 2515 N. State Rd. 7 Ste. 207, Margate, FL 33063 974-7861
§ Datum, Storage Prods. Div., 1363 State College Blvd., Anaheim, CA 92806 714-533-6333
Information Technolgoy A.D.S.C., P.O. Box 470, College Park, MD 20740 301-779-5110
§ Mini Computer Technlg., 696 E. Trimble Rd., San Jose, CA 95131 408-942-1616
§ Software Dynamics, 2111 W. Crescent Ave-G, Anaheim, CA 92801 714-635-4760
Sunol Systems, 1187 Quarry Lane, Pleasanton, CA 94586 415-484-3322
§ Western Digital Corp., 2445 McCabe Way, Irvine, CA 92714 714-557-3550
Zendex Corp., 6700 Sierra La., Dublin, CA 94566 415-828-3000

Controllers, IEEE 488 (GPIB) Bus-2900

Applied Micro Technlg., A Burr Brown Co., 3669 E. 44th Street, Tucson, AZ 85713 602-622-8605
Cambridge Digital Sys., Compumart, P.O. Box 568, 65 Bent St., Cambridge, MA 02139 617-491-2700
§ Computer Field Services, Inc., 6 Federal Street, Danvers, MA 01923 617-774-2930
§ Cromemco, 280 Bernardo Ave., Mountain View, CA 94043 415-964-7400
Distributed Computer Sys., 223 Crescent St., Waltham, MA 02154 617-899-6619
§ Dylon Data Corp., 9561 Ridgehaven Ct., San Diego, CA 92123 619-292-5584
Electrologic, Inc., 1359 28th St., Signal Hill, CA 90806 213-595-0551
Erbtec Engineering, Inc., 5680 Valmont Rd., Boulder, CO 80301 303-447-8750
§ Fairchild Camera & Instr. Corp., Digital Div., 333 Western Avenue, So. Portland, ME 04106 207-775-8700
§† Fairchild Microcontroller Div., Fairchild Camera & Instr. Corp., 450 National Ave., Mountain View, CA 94042 415-962-3838
§ ICS Electronics Corp., 2185 Old Oakland Rd., San Jose, CA 95131 408-263-4844
§ Innovative Data Technology, 5340 Eastgate Mall, San Diego, CA 92121 619-587-0555
Kinetic Sys., 11 Maryknoll Dr., Lockport, IL 60441 815-838-0005
Lambda Electronics, Veeco Instr., Inc., 515 Broad Hollow Rd., Melville, NY 11747 516-694-4200
§ National Instruments, 12109 Technology Blvd., Austin, TX 78759 512-250-9119
Pickles & Trout, P.O. Box 1206, Goleta, CA 93116 685-4641
Republic Electronics Co., 575 Broad Hollow Rd., Melville, NY 11747 516-249-1414
TL Industries, Inc., 2541 Tracy Road, Toledo, OH 43619 1-419-666-8144
Vistar Corp., 13740 McCormick Dr., Tampa, FL 33625 813-855-6611
Ziatech, 3433 Roberto Ct, San Luis Obispo, CA 93401 805-541-0488

Controllers, Magnetic Tape Drive, Add-in-2000

Ciprico Inc., 2955 Xenium Lane, Plymouth, MN 55441, 612-559-2034 .... D•1062
Phi Technologies, Inc., 4605 North Stiles, Oklahoma City, OK 73105, 405-521-9000 ..... D•1052-1053
§ Analog & Digital Peripherals, Inc. (ADPI), 815 Diana Dr., Troy, OH 45373 513-339-2241
Comark Corp., 93 W St., P. O. Box 474, Medfield, MA 02052 617-359-8161
§ Computer Field Services, Inc., 6 Federal Street, Danvers, MA 01923 617-774-2930
Computer Maintenance Corp., 405 Murray Hill Pkwy, East Rutherford, NJ 07073 201-866-6400
Data Engineering, Inc., 2515 N. State Rd. 7 Ste. 207, Margate, FL 33063 974-7861
§ Datum, Storage Prods. Div., 1363 State College Blvd., Anaheim, CA 92806 714-533-6333
§ Digi-Data Corp., 8580 Dorsey Run Rd., Jessup, MD 20794 301-498-0200
§ Distributed Logic Corp. (DILOG), 12800-G Garden Grove Blvd., Garden Grove, CA 92643 714-534-8950
§ Dylon Data Corp., 9561 Ridgehaven Ct., San Diego, CA 92123 619-292-5584
† ICI, 570 W. Lambert, Ste. C, Brea, CA 92621 714-990-1707
§ Innovative Data Technology, 5340 Eastgate Mall, San Diego, CA 92121 619-587-0555
§ Macrolink, 1500 N. Kellogg Drive, Anaheim, CA 92807 714-777-8800
Mega Logic, 9659 Natl. Rd., Brookville, OH 45309 513-833-5222
§ Mini Computer Technlg., 696 E. Trimble Rd., San Jose, CA 95131 408-942-1616
Sperry Univac, Mini-Computer Operations, Box C-19504, Irvine, CA 92713 714-754-6900
Texas Instrs., Data Sys. Group, P. O. Box 809063, Dallas, TX 75380-9063 1-800-527-3500

Controllers, Magnetic Tape Drive, Standalone-2000

Datum Inc., Timing/Aacom Divisions, 1363 S. State College Blvd., Anaheim, CA 92806, 714-533-6333 ..... D•1148
Frequency and Time Systems, Inc., DATUM, INC., 34 Tozer Rd., Beverly, MA 01915, 617-927-8220 ..... D•1148
Phi Technologies, Inc., 4605 North Stiles, Oklahoma City, OK 73105, 405-521-9000 ..... D•1052-1053
§ Algo, Inc., 9198-C Red Branch Rd., Columbia, MD 21045 301-730-7442
§ Analog & Digital Peripherals, Inc. (ADPI), 815 Diana Dr., Troy, OH 45373 513-339-2241
Austron, Inc., P.O. Box 14766, Exit 248 N. IH 35, Austin, TX 78761 512-251-2341
§ Datum, Storage Prods. Div., 1363 State College Blvd., Anaheim, CA 92806 714-533-6333
Digiac Corp., 175 Engineers Rd., Hauppauge, NY 11788 516-273-8600
§ Dylon Data Corp., 9561 Ridgehaven Ct., San Diego, CA 92123 619-292-5584
§ Innovative Data Technology, 5340 Eastgate Mall, San Diego, CA 92121 619-587-0555

Mega Logic, 9659 Natl. Rd., Brookville, OH 45309 513-833-5222
§ Mini Computer Technlg., 696 E. Trimble Rd., San Jose, CA 95131 408-942-1616

Controllers, Memory Device, Add-in-2000

Advanced Elctrns. Design, Inc., 440 Potrero Ave., Sunnyvale, CA 94086 ..... 408-733-3555;800-538-1730 (outside CA)
§ CompuPro, 3506 Breakwater Ct., Hayward, CA 94545 415-786-0909
§ Cromemco, 280 Bernardo Ave., Mountain View, CA 94043 415-964-7400
Data Engineering, Inc., 2515 N. State Rd. 7 Ste. 207, Margate, FL 33063 974-7861
§ General Robotics Corp., 57 N. Main St., Hartford, WI 53027 414-673-6800
ICI, 570 W. Lambert, Ste. C, Brea, CA 92621 714-990-1707
JF Microsystems, 3641 Frontier Road, Pasco, WA 99301 ..... 509-297-4294; 800-JF-CARDS
§ Macrolink, 1500 N. Kellogg Drive, Anaheim, CA 92807 714-777-8800
Peritek Corp., 5550 Redwood Rd., Oakland, CA 94619 415-531-6500
Texas Instrs., Data Sys. Group, P. O. Box 809063, Dallas, TX 75380-9063 1-800-527-3500
§ Western Digital Corp., 2445 McCabe Way, Irvine, CA 92714 714-557-3550

Controllers, Memory Device, Standalone-2000

Data Engineering, Inc., 2515 N. State Rd. 7 Ste. 207, Margate, FL 33063 974-7861
Digiac Corp., 175 Engineers Rd., Hauppauge, NY 11788 516-273-8600
§ Western Digital Corp., 2445 McCabe Way, Irvine, CA 92714 714-557-3550

Controllers, Paper Tape Reader/Punch, Add-in-2000

§ Dataprobe, 110 Palisades Blvd., Palisades Park, NJ 07650 201-947-9500
GEN/COMP Inc., 6 Algonquin Rd., Canton, MA 02021 617-828-2008
§ Remex Cam Operations, Ex-Cell-O Corporation, 1230 S. Lewis Street, Anaheim, CA 92805 714-535-4160
Wire Graphics, Inc., 215 B. Central Ave., Farmingdale, NY 11735 516-293-1525

Controllers, Paper Tape Reader/Punch, Standalone-2000

§ Dataprobe, 110 Palisades Blvd., Palisades Park, NJ 07650 201-947-9500
GEN/COMP Inc., 6 Algonquin Rd., Canton, MA 02021 617-828-2008
§ Remex Cam Operations, Ex-Cell-O Corporation, 1230 S. Lewis Street, Anaheim, CA 92805 714-535-4160
Wire Graphics, Inc., 215 B. Central Ave., Farmingdale, NY 11735 516-293-1525

Controllers, Plotter, Add-in-2000

Bridge Computer Co., Sea Data Corp., 1 Bridge St., Newton, MA 02158 .. 617-244-8190
Data Technology, Inc., 4 Gill St., Woburn, MA 01811 617-935-8820

Controllers, Plotter, Standalone-2000

Bridge Computer Co., Sea Data Corp., 1 Bridge St., Newton, MA 02158 .. 617-244-8190

Controllers, Power-3130

Pulizzi Engineering, Inc., 3260 S. Susan St., Santa Ana, CA 92704-6865, 714-540-4229 ..... D•1956-1958
Halmar Electronics, Inc., 900 N. Hague Ave., Columbus, OH 43204 614-275-0131
Loyola Controls Inc., 1099 N. Batavia St., Orange, CA 92667 714-639-0526
Macrotronix, Inc., 4016 N. Home St., Mishawaka, IN 46545 219-256-5503
RI/Control Systems, Research, Inc., P.O. Box 24064, Minneapolis, MN 55424 612-941-3300
Sigma Electronics Inc., 10830 Kinghurst Dr., Houston, TX 77099 713-933-4700
† Teledyne Microelectronics, 12964 Panama St., Los Angeles, CA 90066 ..... 213-822-8229;213-870-9831

Controllers, Printer, Add-in-2000

† Antona Corp., 2100 S. Sawtelle Blvd., Suite 205, Los Angeles, CA 90025 213-473-8995
Bridge Computer Co., Sea Data Corp., 1 Bridge St., Newton, MA 02158 .. 617-244-8190
Control Systems, 2855 Anthony Lane, Minneapolis, MN 55418 612-789-2421
§ Cromemco, 280 Bernardo Ave., Mountain View, CA 94043 415-964-7400
Cybernetic Micro Sys., P.O. Box 3000, 3000 Hwy. 84, San Gregorio, CA 94074 415-726-3000
Data Engineering, Inc., 2515 N. State Rd. 7 Ste. 207, Margate, FL 33063 974-7861
GEN/COMP Inc., 6 Algonquin Rd., Canton, MA 02021 617-828-2008
§ General Robotics Corp., 57 N. Main St., Hartford, WI 53027 414-673-6800
Highland Technology, Inc., 320 Judah Street, San Francisco, CA 94122 415-753-5814
ICI, 570 W. Lambert, Ste. C, Brea, CA 92621 714-990-1707
Interface Electronics Inc., 21134 Bridge St., Southfield, MI 48034 313-352-8820
JF Microsystems, 3641 Frontier Road, Pasco, WA 99301 ..... 509-297-4294; 800-JF-CARDS
§ Macrolink, 1500 N. Kellogg Drive, Anaheim, CA 92807 714-777-8800
Sperry Univac, Mini-Computer Operations, Box C-19504, Irvine, CA 92713 714-754-6900
§ Star Micronics, Inc., Components Div., 70-D Ethel Rd. W., Piscataway, NJ 08854 201-572-9512
Texas Instrs., Data Sys. Group, P. O. Box 809063, Dallas, TX 75380-9063 1-800-527-3500

Controllers, Printer, Standalone-2000

Bridge Computer Co., Sea Data Corp., 1 Bridge St., Newton, MA 02158 .. 617-244-8190
Data Engineering, Inc., 2515 N. State Rd. 7 Ste. 207, Margate, FL 33063 974-7861
Information Technolgoy A.D.S.C., P.O. Box 470, College Park, MD 20740 301-779-5110
Spur Products Corp., 13649 Beach Ave., Marina Del Rey, CA 90292 213-822-7100
§ Star Micronics, Inc., Components Div., 70-D Ethel Rd. W., Piscataway, NJ 08854 201-572-9512

Controllers, Programmable-2200

Astrosystems, 6 Nevada Dr., Lake Success, NY 11042, 516-328-1600 ... D•1183
BEI Motion Sys. Co., General Control Systems Div., 564 Alpha Dr., Pittsburgh, PA 15238, 412-963-0515 ..... B•1783

† Blue M, A Unit of General Signal, 138th & Chatham Sts., Blue Island, IL 60406, 312-385-9000 ... D•1165
Renco, 26 Coromar Dr., Goleta, CA 93017-3094, 805-968-1525 ... D•1131
TS Products, Inc., 12455 Branford St., Bldg. 22, Arleta, CA 91331, 818-896-6676 ... D•1990
§ Adatek, Inc., P.O. Box 1339, Sandpoint, ID 83864 ... 208-263-1471;800-323-3343
Advanced Control Sys., 24 Teed Dr., Randolph, MA 02368 ... 617-963-4543
§ Advanced Micro Devices, P.O. Box 3453, 901 Thompson Pl., Sunnyvale, CA 94088 ... 408-732-2400
† Aiken Advanced Sys., Amstar Technical Products Company, Inc., 5901 Edsall Rd., Alexandria, VA 22304-4197 ... 703-370-0900
§ Allen-Bradley Co., Industrial Control Div., 1201 S. Second St., Milwaukee, WI 53201 ... 414-671-2000
Allied Systems Corp., Box 18077, Greensboro, NC 27419 ... 919-299-2294
§ American Control Products, Div. of Precision Timer Co., Inc., 13 Westbrook Ind'l. Pk., Westbrook, CT 06498 ... 203-399-6253
§ American Magnetics, 740 Watson Center Rd., Carson, CA 90745 ... 213-775-8651
Analogic Corp., 8 Centennial Dr., Peabody, MA 01961 ... 617-532-5660;617-777-4500; 617-246-0300;800-451-1
† Analytics Communications Sys., 1820 Michael Faraday Dr., Reston, VA 22090 ... 703-471-0892
Applied Micro Technlg., A Burr Brown Co., 3669 E. 44th Street, Tucson, AZ 85713 ... 602-622-8605
Applied Sys., 26401 Harper Ave., St. Clair Shores, MI 48081 ... 313-779-8700
ARGA Controls, 35 E. Glenarm St., Pasadena, CA 91105 ... 213-682-3314
§ Athena Controls, Inc., 5145 Campus Dr., Whitemarsh Ind. Campus, Plymouth Meeting, PA 19462 ... 215-828-2490
Automation Unltd., 10H Roessler Rd., Woburn, MA 01801 ... 617-933-7288
B & B Motor & Control Corp., Apple Hill Commons, Burlington, CT 06013 ... 203-673-7151
Barber-Colman Co., Indl. Instrs. Div., P.O. Box 2940, 1354 Clifford Ave., Loves Park, IL 61132 ... 815-877-0241
Bruel & Kjaer Instrs. Inc., 185 Forest St., Marlboro, MA 01752 ... 617-481-7000
† BTU Engrg. Corp., Bruce Sys., Esquire Rd., N. Billerica, MA 01862 ... 617-667-4111
† Calcomp, 2411 W. La Palma Ave., Anaheim, CA 92801 ... 714-821-2011
Centent Co., 3879 S. Main St., Santa Ana, CA 92707 ... 714-979-6491
§ Cincinnati Electrosys., 469 Wards Corner Rd., Loveland, OH 45140 ... 513-831-4347
Ciprico Inc., 2955 Xenium Lane, Plymouth, MN 55441 ... 612-559-2034
§ Coastcom, P.O. Box 27068, Concord, CA 94527 ... 415-825-7500
† Cole Instr., 2650 S. Croddy Way, Santa Ana, CA 92704 ... 714-556-3100
§ Computer System Assocs., 7564 Trade St., San Diego, CA 92121 ... 619-566-3911
Controls Unlimited, Inc., 4823 North Ridge Rd., Perry, OH 44081 ... 216-259-2500
Control Technology Co., 41-16 29th St., Long Island City, NY 11101 ... 718-361-2133
Cross Elctrns., 100 Commonwealth Dr., Warrendale, PA 15086 ... 412-776-1591
General Numeric Corporation, 390 Kent Avenue, Elk Grove Village, IL 60007 ... 312-640-1595
§ CVC Prods., 525 Lee Rd., Rochester, NY 14603 ... 716-458-2550
Cybernetic Micro Sys., P.O. Box 3000, 3000 Hwy. 84, San Gregorio, CA 94074 ... 415-726-3000
Data Plus, Inc., 7205E Lockport Pl, Lorton, VA 22079 ... 800-368-3747
Dataprofits Corp., 2260 Distributors Dr., Indianapolis, IN 46241
Datatran Labs, P.O. Box 384, Sussex, NJ 07461 ... 914-856-4313
Datawest, 7333 E. Helm Dr., Scottsdale, AZ 85260 ... 602-948-3280
§ Delta Design, 5775 Kearny Villa Rd., San Diego, CA 92123 ... 619-292-5000
Digitec Corp., 918 Woodley Rd., P.O. Box 458, Dayton, OH 45401 ... 513-254-6251
Digitus Corporation, 22 West 25th Street, Baltimore, MD 21218 ... 301-467-3223
Dynage/Controls, Inc., 2 Willowbrook Rd., Cromwell, CT 06416 ... 203-635-6257
§ Eagle Signal Controls, Mfg. Div. Gulf & Western Inds., Box 16100, Austin, TX 78761 ... 512-837-8300
§ Eaton Corp, Durant Products, 901 S. 12th St., Watertown, WI 53094 ... 414-261-4070
§ Eaton Corp./Cutler-Hammer Prods, Aerospace & Commercial Controls Div., 4201 N. 27th St., Milwaukee, WI 53216 ... 414-449-7487
§ EG&G Reticon, Div. of EG&G, 345 Potrero Ave., Sunnyvale, CA 94086-4197 ... 408-738-4266
Electro-Craft, 1600 2nd St. S., Hopkins, MN 55343 ... 612-931-2700
Electrologic, Inc., 1359 28th St., Signal Hill, CA 90806 ... 213-595-0551
† Electro-Magnetic Processes, Inc., 9616 Owensmouth Ave., Chatsworth, CA 91311 ... 818-882-6333
§ Electromatic Controls Corp., 2495 Pembroke Road, Hoffman Estates, IL 60195-2010 ... 312-882-5757
Electronic Prods. Corp., Interstate Indl. Plaza, R. D. #5, York, PA 17402 ... 717-767-6517
Electrospace Sys., Inc., P. O. Box 831359, Richardson, TX 75083-1359 ... 214-783-2004
§ Encoder Prods., 1601B Dover Rd., Sandpoint, ID 83864 ... 208-263-8541
ESSCO Inds., P.O. Box 515, Sierra Madre, CA 91024-0515 ... 818-355-8315
Everett/Charles Test Equip. Inc., 2887 N. Towne Ave., Pomona, CA 91767 ... 714-621-9511
Fluke, John, Mfg. Co., Box C9090, MS 250C, Everett, WA 98206 ... 206-356-5400
§ Giddings & Lewis Elctrns., A Unit of AMCA Intl., 666 S. Military Rd., P.O. Box 1658, Fond du Lac, WI 54935 ... 414-921-7100
§ Giltronix, 3780 Fabian Way, Palo Alto, CA 94303 ... 415-493-1300
† Gulton Industries, Inc., Engineered Magnetics Division, 13041 Cerise Ave., Hawthorne, CA 90250 ... 213-679-0111
Harrel, Inc., 16 Fitch St., E. Norwalk, CT 06855 ... 203-866-2573
H-A-Z Laboratories, Brass Castle Rd., P.O. Box 67-M, Washington, NJ 07882 ... 201-689-0110
§ Hecon Corp., 31 Park Rd., Tinton Falls, NJ 07724 ... 201-542-9200
HEI Corporation, 290 S. Main Place, Carol Stream, IL 60188 ... 312-665-5500
§ Hobart Engrg., 4143 Cheshire Dr., Cypress, CA 90630 ... 714-827-2135
Honeywell Inc., Commercial Div., MN 27-7246, Honeywell Plaza, Minneapolis, MN 55408 ... 612-870-5357
† Honeywell, Process Control Div., 1100 Virginia Dr., Ft. Washington, PA 19034 ... 800-321-5111, Ext. 596
† Hughes Aircraft Co., Microelctrn. Sys. Div., 2601 Campus Dr., Irvine, CA 92715 ... 714-752-3800
§ IDEC Systems & Controls Corp., 1213 Elko Drive, Sunnyvale, CA 94089-2211 ... 408-747-0550
† Industrial Control Co., 3100 Pineda Ave., Rockledge, FL 32955 ... 305-259-7105
Information Technolgoy A.D.S.C., P.O. Box 470, College Park, MD 20740 ... 301-779-5110
Innovatek Microsystems, Inc., Smithfield Rd., R1 Box 104, Millerton, NY 12546-9720 ... 914-373-9003
§ Interstate Electronics Corp., Box 3117, 1001 E. Ball Rd., Anaheim, CA 92803 ... 714-635-7210
Iveron Pacific, 1150 Morena Boulevard, San Diego, CA 92110-3899 ... 619-275-1500
§ Jumbo Process Control, Inc., 410 Garibaldi Ave., Lodi, NJ 07644 ... 201-779-7744
Kaye Instruments, 15 De Angelo Dr., Bedford, MA 01730 ... 617-275-0300
§ Klockner Moeller, 4 Strathmore Rd., Natick, MA 01760 ... 617-655-1910
Kollmorgen Corp., Industrial Drives Div., 201 Rock Rd., Radford, VA 24141 ... 703-639-2495
§ H. Kuhnke, Inc., 26 W. Highland Ave., Atlantic Highlands, NJ 07716 ... 201-291-3334; 800-221-0714
Leeds & Northrup Instrs., A Unit of General Signal Corp., Sumneytown Pike, North Wales, PA 19454 ... 215-643-2000
Luft Instrs., Hillside Rd., P.O. Box 214, Lincoln, MA 01773 ... 617-259-9215
Magnum Opus Custom Elctrn. Engrg., 284 Kennedy St., Iselin, NJ 08830 ... 201-283-4925
Matrix Corp., 2260 Distributors Dr., Indianapolis, IN 46241 ... 317-248-2036
Matrox Elctrn. Sys., 1055 St. Regis Blvd., Dorval, QU, CANADA H9P 2T4 ... 514-685-2630
McGill Mfg. Co., Inc., Electrical Div., 1002 N. Campbell St., Valparaiso, IN 46383 ... 219-465-2200
† Megatran Electronic Power, Rising Sun Rd., Bordentown, NJ 08505 ... 609-298-7300
† Methods Research, 54D Asbury Ave., Farmingdale, NJ 07727 ... 201-938-6000
Metra Instrs., 2056 Bering Dr., San Jose, CA 95131 ... 408-297-8530
† Metric Sys., 645 Anchors St., Ft. Walton Beach, FL 32548 ... 904-244-9600
§ Midland Standard, Inc., 603 E. Chicago St., Box 38, Elgin, IL 60120 ... 312-741-6600
Modicon Programmable Control Div., Gould Inc., P.O. Box 83 S.V.S., Andover, MA 01810 ... 617-475-4700
§ NES, Inc. (Nationwide Electronic Systems), 3003 Wakefield, Carpentersville, IL 60110 ... 312-426-5900
† Northern Precision Labs., 11 Madison Rd., Fairfield, NJ 07006 ... 201-227-4800
† NWL Transformers, Rising Sun Rd., P.O. Box 358, Bordentown, NJ 08505 ... 609-298-7300
Omega Engrg., Box 4047, Stamford, CT 06907 ... 203-359-1660
§ Omron Elctrns., Inc., Control Comps. Div., One E. Commerce Dr., Schaumburg, IL 60195 ... 312-843-7900
Optimum Applied Systems, 145 Palisade St., Dobbs Ferry, NY 10522-1696 ... 914-693-9001
§† Philips ECG, Inc., 100 First Ave., Waltham, MA 02254 ... 617-890-6107
Phoenix Microsystems, P.O. Box 4206, Huntsville, AL 35802 ... 205-881-2173
Photobell, 26 Just Rd., Fairfield, NJ 07006 ... 201-227-3613
Polarad Elctrns., Inc., 5 Delaware Dr., Lake Success, NY 11042 ... 516-328-1100
PPM, Inc., 4521 Emery Ind. Pkwy., Cleveland, OH 44128 ... 216-292-6006
§ Ragen Data Systems, Inc., 3 Oval Dr., Central Islip, NY 11722 ... 516-234-3800
Rath Microtech Corp., Rath Affiliated Cos., 2505 Foster Ave., Janesville, WI 53545 ... 608-754-2222;800-356-9464
Reliance Electric Co., Marketing Info Center, P.O. Box 99502, Cleveland, OH 44199 ... 800-245-4501;800-245-4497 In Ohio
Research, Inc., Box 24064, Minneapolis, MN 55424 ... 612-941-3300
§ Sealectro, 225 Hoyt St., Mamaroneck, NY 10543 ... 914-698-5600
Sequential Info. Sys., 249 N. Saw Mill River Rd., Elmsford, NY 10523 ... 914-592-5930
Serial Lab Prods., Inc., 162 Cook Lane, P.O. Box 766, Marlboro, MA 01752 ... 617-481-1684
Siltran Digital, 2250 Monterey Rd., Atascadero, CA 93422 ... 805-466-3209
§ Sloan Technology, 602 E. Montecito St., Santa Barbara, CA 93103 ... 805-963-4431
§ Square D Co., Executive Plaza, Palatine, IL 60067 ... 312-397-2600
Standard Logic, 2215 S. Standard Ave., Santa Ana, CA 92707 ... 714-979-4770
Stock Drive Prods., Div. of Designatronics, Inc., 2101 Jericho Turnpike, New Hyde Pk., NY 11040 ... 516-328-0200;328-3300
§ Struthers-Dunn, Inc., Lamb's Rd., Pitman, NJ 08071 ... 609-589-7500
§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 ... 215-673-5600
§† Syracuse Elctrns., P.O. Box 4770, Syracuse, NY 13221 ... 315-488-4911
Systron-Donner Instr. Div., 2727 Systron Dr., Concord, CA 94518 ... 415-676-5000
Techniques, Inc., 235 Jackson St., Englewood, NJ 07631 ... 201-569-5900
§ Techno Vation, Inc., 14 Crandall Ave., Pompton Lakes, NJ 07442 ... 201-839-0740
† Tektronix, Inc., P. O. Box 500, Y3-314, Beaverton, OR 97077 ... 800-547-1512;Oregon only 800-452-1877
Telesis Laboratory, Box 1972, Chillocothe, OH 45601 ... 614-642-5000
Tenor, 17020 W. Rogers Dr., New Berlin, WI 53151 ... 414-782-3800
§ Tetragenics, Box 1338, Butte, MT 59701 ... 406-782-8606
Unico, 3725 Nicholson Rd., Franksville, WI 53126-0505 ... 414-886-5678
§ Veeder-Root, 70 Sargeant St., Hartford, CT 06102 ... 203-527-7201
§ West Division, Gulton Industries, Inc., 3860 N. River Rd., Schiller Park, IL 60176 ... 312-678-6400
† Western DataCom, 5083 Market St., Youngstown, OH 44512 ... 216-788-6583
Wire Graphics, Inc., 215 B. Central Ave., Farmingdale, NY 11735 ... 516-293-1525
§ Xycom, 750 N. Maple Rd., Saline, MI 48176 ... 313-429-4971
Ziatech, 3433 Roberto Ct., San Luis Obispo, CA 93401 ... 805-541-0488

Controllers, Protocol, Communications-2000

† Analytics Communications Sys., 1820 Michael Faraday Dr., Reston, VA 22090 ... 703-471-0892
Comark Corp., 93 W St., P. O. Box 474, Medfield, MA 02052 ... 617-359-8161
§ Cromemco, 280 Bernardo Ave., Mountain View, CA 94043 ... 415-964-7400
Data Plus, Inc., 7205E Lockport Pl., Lorton, VA 22079 ... 800-368-3747
Digital Communications Assocs., Inc., 303 Technology Pk., Norcross, GA 30092 ... 404-448-1400
§† Fairchild Microcontroller Div., Fairchild Camera & Instr. Corp., 450 National Ave., Mountain View, CA 94042 ... 415-962-3838

Gandalf Technologies, Inc., 350 E Dundee Rd., Suite 301, Wheeling, IL 60090 312-459-6630
General Digital Industries Inc., 7702 Governors Dr. W., Huntsville, AL 35805 205-837-8305
Information Technolgoy A.D.S.C., P.O. Box 470, College Park, MD 20740 301-779-5110
JF Microsystems, 3641 Frontier Road, Pasco, WA 99301 .... 509-297-4294; 800-JF-CARDS
Lee Data Corporation, 7075 Flying Cloud Drive, Minneapolis, MN 55344 612-828-0300
§ Micom Systems, Inc., 4100 Los Angeles Ave, P.O. Box 8100, Simi Valley, CA 93062-8100 805-583-8600
SYMBICON, 89 Route 101A, Amherst, NH 03031 603-673-8898
† Western DataCom, 5083 Market St, Youngstown, OH 44512 216-788-6583

Controllers, Terminal, Add-in-2000

† Antona Corp., 2100 S. Sawtelle Blvd., Suite 205, Los Angeles, CA 90025 213-473-8995
Applied Sys., 26401 Harper Ave., St. Clair Shores, MI 48081 313-779-8700
Bridge Computer Co., Sea Data Corp., 1 Bridge St., Newton, MA 02158 617-244-8190
Control Systems, 2855 Anthony Lane, Minneapolis, MN 55418 612-789-2421
§ Cromemco, 280 Bernardo Ave., Mountain View, CA 94043 415-964-7400
Distributed Computer Sys., 223 Crescent St., Waltham, MA 02154 617-899-6619
GEN/COMP Inc., 6 Algonquin Rd., Canton, MA 02021 617-828-2008
§ General Robotics Corp., 57 N. Main St., Hartford, WI 53027 414-673-6800
§ GMR Co., 8801 Sepulveda Blvd., Los Angeles, CA 90045 213-216-9516
§ G. R. Electronics, 1640 5th St., Suite 224, Santa Monica, CA 90401 213-395-4774
ICI, 570 W. Lambert, Ste. C, Brea, CA 92621 714-990-1707
Interface Electronics Inc., 21134 Bridge St., Southfield, MI 48034 313-352-8820
Lee Data Corporation, 7075 Flying Cloud Drive, Minneapolis, MN 55344 612-828-0300
§ Macrolink, 1500 N. Kellogg Drive, Anaheim, CA 92807 714-777-8800
§ Micom Systems, Inc., 4100 Los Angeles Ave, P.O. Box 8100, Simi Valley, CA 93062-8100 805-583-8600
Micro/sys, 1011 Grand Central Ave., Glendale, CA 91201-3010 818-244-4600
Motorola Semiconductor Prods. Sector, Adv. 72, Box 20912, Phoenix, AZ 85036 602-244-6900
† Tektronix, Inc., P. O. Box 500, Y3-314, Beaverton, OR 97077 .... 800-547-1512;Oregon only 800-452-1877
Texas Instrs., Data Sys. Group, P. O. Box 809063, Dallas, TX 75380-9063 1-800-527-3500
§ Western Digital Corp., 2445 McCabe Way, Irvine, CA 92714 714-557-3550

Controllers, Terminal, Standalone-2000

Applied Sys., 26401 Harper Ave., St. Clair Shores, MI 48081 313-779-8700
Bridge Computer Co., Sea Data Corp., 1 Bridge St., Newton, MA 02158 617-244-8190
Data Plus, Inc., 7205E Lockport Pl., Lorton, VA 22079 800-368-3747
§ Dataprobe, 110 Palisades Blvd., Palisades Park, NJ 07650 201-947-9500
§ GMR Co., 8801 Sepulveda Blvd., Los Angeles, CA 90045 213-216-9516
Information Technolgoy A.D.S.C., P.O. Box 470, College Park, MD 20740 301-779-5110
§ Micom Systems, Inc., 4100 Los Angeles Ave, P.O. Box 8100, Simi Valley, CA 93062-8100 805-583-8600
† Tektronix, Inc., P. O. Box 500, Y3-314, Beaverton, OR 97077 .... 800-547-1512;Oregon only 800-452-1877
§ Western Digital Corp., 2445 McCabe Way, Irvine, CA 92714 714-557-3550

Controls, Audio System Consoles-2200

Duncan Electronics, Inc., 2865 Fairview Rd., Costa Mesa, CA 92626, 714-545-8261 .... A•2013
§ **Opamp Labs, Inc., 1033 N. Sycamore Ave., Los Angeles, CA 90038, 213-934-3566 .... D•1014**
† Applied Control, 1275 Bloomfield Ave., Fairfield, NJ 07006-2828 201-227-5454
Electrospace Sys., Inc., P. O. Box 831359, Richardson, TX 75083-1359 214-783-2004
§ GC Elctrns., 400 S. Wyman St., Rockford, IL 61101 815-968-9661
† GRIM Corporation, Box 67, Medford, NJ 08055 609-267-7950
§ Ramko Resch., Inc., 11355A Folsom Blvd., Rancho Cordova, CA 95670 800-821-2545

Controls, Capacitance Operated-2200

Automatic Timing & Controls Co., 201 So. Gulph Rd., King of Prussia, PA 19406 .... 215-337-5500;800-441-8245
† Bailey Controls Co., 29801 Euclid Ave., Wickliffe, OH 44092 216-585-5800
Bindicator, P.O. Box 9, 1915 Dove St., Port Huron, MI 48060 313-987-2700
Efector, Inc., 201 So. Gulph Rd., King of Prussia, PA 19406 .... 215-337-5500; 800-441-8245
§ Electromatic Controls Corp., 2495 Pembroke Road, Hoffman Estates, IL 60195-2010 312-882-5757
Electron-Machine Corp., Box M, Umatilla, FL 32784 904-669-3101
ESSCO Inds., P.O. Box 515, Sierra Madre, CA 91024-0515 818-355-8315
§ Gordon Prods., 67 Del Mar Dr., Brookfield, CT 06804 203-775-4501
§ Hobart Engrg., 4143 Cheshire Dr., Cypress, CA 90630 714-827-2135
International Instrumentation, 31131-602 Via Colinas, Westlake Vlg., CA 91362 213-991-9614
§ Lion Precision, 60 Bridge St., Newton, MA 02195 617-969-4710
Litton Potentiometer Div., 750 So. Fulton Ave., Mt. Vernon, NY 10551 914-664-7733
Macrotronix, Inc., 4016 N. Home St., Mishawaka, IN 46545 219-256-5503
Omron Elctrns., Inc., Control Comps. Div., One E. Commerce Dr., Schaumburg, IL 60195 312-843-7900
Princo Instrs., Inc., 1020 Industrial Hwy., Southampton, PA 18966 215-355-1500
ZI-TECH Instr. Corp., 2151 Park Blvd., Box 60490, Palo Alto, CA 94306 415-326-2151

Controls, Carbon — See Potentiometers (Vol. A), Rheostats (Vol. A)

Controls, Computer Input, Joysticks, Mouse Devices, etc.-2000

Bowmar Instrument Corp., Aerospace Div., 8000 Bluffton Rd., Ft. Wayne, IN 46809, 219-747-3121 .... B•1707
Guardian Elec. Mfg. Co., 1550 W. Carroll Ave., Chicago, IL 60607, 312-243-1100 .... B•1387
† **Measurement Sys., Inc., 121 Water St., Norwalk, CT 06854, 203-838-5561 .... D•1126**
† **Orbit Instrument Corp., 80 Cabot Ct., Hauppauge, NY 11788, 516-435-8300 .... B•1735**
† ABA Electromechanical Sys. Inc., Box 500, Pinellas Pk., FL 34290-0500 813-541-6681
† Adams Rite Prods., Inc., 540 W. Chevy Chase Dr., Glendale, CA 91204 818-241-5121
§ Aerotech, Inc., 101 Zeta Dr., Pittsburgh, PA 15238 412-963-7470
§ Alco Elctrn. Prods., Inc., 1551 Osgood St., N. Andover, MA 01845 617-685-4371
Alessi Inds., Inc., 3195-C Airport Loop Dr., Costa Mesa, CA 92626 714-979-8912
§ Alps Electric (USA), Inc., 3553 N. First St., San Jose, CA 95134 408-946-6000
§ B & B Motor & Control Corp., Apple Hill Commons, Burlington, CT 06013 203-673-7151
§ Burgess Switch Co., Inc., 638 Anthony Trail, North Brook, IL 60062 312-291-1760
Capitol Machine & Switch Co., Box 890, Danbury, CT 06810 203-744-3300
Centent Co., 3879 S. Main St., Santa Ana, CA 92707 714-979-6491
Femco, Inc., P.O. Box 26710 Parkmoor Sta., San Jose, CA 95159 408-946-1188
§ GC Elctrns., 400 S. Wyman St., Rockford, IL 61101 815-968-9661
Icon, 156 Sixth St., Cambridge, MA 02142 617-868-5400
§ InfoCap, Inc., 31119 Via Colinas #502, Westlake Village, CA 91362 818-991-1410
† Microavionics Corp., 3198-K Airport Loop Dr., Costa Mesa, CA 92626 714-957-6904
§ Mouse Sys. Corp., 2336H Walsh Ave., Santa Clara, CA 95051 408-988-0211
Optomicronix, 10080 N. Wolfe Rd., SW 3-360, Cupertino, CA 95014 408-725-1220
† Orbit Instrument of Cal., 6431 Global Dr., Cypress, CA 90630 714-527-0561
Panasonic, Ind'l. Elctrn. Comps., Panasonic, Elctrn. Comps. Div., Box 1503, Secaucus, NJ 07094 201-348-7000
Power Functions Engrg., 3831 Cavalier Dr., Garland, TX 75042 214-278-0996
† PTL Elctrns., 10211 Vinemont St., Dallas, TX 75218 214-327-3180
§ Shokai Far East, Ltd., 280 North Central Ave., Hartsdale, NY 10530 914-681-0700
Summit Engineering Corp., Box 938, Bozeman, MT 59715 406-587-4511
Torrington Co., 59 Field St., Torrington, CT 06790 203-482-9511

Controls, Constant Impedance — See Attenuators (Vol. A)

Controls, Counting & Sorting-2200

§ **C-Tek Inc., 4 Railroad Ave., Wakefield, MA 01880, 617-246-1720 .... D•1114-1115**
Curtis Inds., 8000 West Tower Ave., Milwaukee, WI 53223, 414-354-1500 .... D•1978
Applied Control, 1275 Bloomfield Ave., Fairfield, NJ 07006-2828 201-227-5454
Applied Sys., 26401 Harper Ave., St. Clair Shores, MI 48081 313-779-8700
Astrosystems, 6 Nevada Dr., Lake Success, NY 11042 516-328-1600
† Control Technology Co., 41-16 29th St., Long Island City, NY 11101 718-361-2133
Datatran Labs, P.O. Box 384, Sussex, NJ 07461 914-856-4313
§ Dolan-Jenner Inds., Box 1020, Woburn, MA 01801 617-935-7444
Dynage/Controls, Inc., 2 Willowbrook Rd., Cromwell, CT 06416 203-635-6257
§ Dynapar, 1675 Delany Rd., Gurnee, IL 60031 312-662-2666
§ Eagle Signal Controls, Mfg. Div. Gulf & Western Inds., Box 16100, Austin, TX 78761 512-837-8300
§ Eaton Corp, Durant Products, 901 S. 12th St., Watertown, WI 53094 414-261-4070
Electric Device, PO Box 337, Canfield, OH 44406 216-533-3060
Electro-Craft, 1600 2nd St. S., Hopkins, MN 55343 612-931-2700
§ Electromatic Controls Corp., 2495 Pembroke Road, Hoffman Estates, IL 60195-2010 312-882-5757
Electron, Inc., P.O. Box 28640, San Diego, CA 92128 216-681-4700
Essex Group, 9933 13th St., Ft. Wayne, IN. 46809 219-478-1521
FSI/Fork Standards Inc., 666 Western Ave., Lombard, IL 60148 .... 312-231-3511; 312-932-9380
§ Hecon Corp., 31 Park Rd., Tinton Falls, NJ 07724 201-542-9200
HH Controls Co., Inc., 16 Frost St., Arlington, MA 02174 617-646-2626
§ International Microtronics Corp., 4016 E. Tennessee St., Tucson, AZ 85714 602-748-7900
Landis & Gyr, Inc., 4 Westchester Plaza, Elmsford, NY 10523 914-592-4400
Luft Instrs., Hillside Rd., P.O. Box 214, Lincoln, MA 01773 617-259-9215
Magnum Opus Custom Elctrn. Engrg., 284 Kennedy St., Iselin, NJ 08830 201-283-4925
§ Markat Div., Wild Oats Corp., 3 Country Dr., Plainview, NY 11803 516-549-9272
Micro Switch, A Honeywell Div., 11 W. Spring St., Freeport, IL 61032 815-235-6600
§ Midland Standard, Inc., 603 E. Chicago St., Box 38, Elgin, IL 60120 312-741-6600
§ National Sonics/Xertex Corp., 250 Marcus Blvd., Hauppauge, NY 11787 516-273-6600
§ NES, Inc. (Nationwide Electronic Systems), 3003 Wakefield, Carpentersville, IL 60110 312-426-5900
§ Photoswitch Div., Electronics Corp. of Amer., 265 Winter St., Waltham, MA 02154 617-466-8000
§ Redington Counters, 130 Addison Rd., Windsor, CT 06095 203-688-6205
§ Scientific Technlg., 1201 San Antonio Rd., Mountain View, CA 94043 .... CA 415-965-0910;800-221-7060
Sensor Corp., Box 140, Scottdale, PA 15683 412-887-4080
Siltran Digital, 2250 Monterey Rd., Atascadero, CA 93422 805-466-3209
Skan-A-Matic, Box S, Elbridge, NY 13060 315-689-3961
§ Square D Co., Executive Plaza, Palatine, IL 60067 312-397-2600
§ Techno Vation, Inc., 14 Crandall Ave., Pompton Lakes, NJ 07442 201-839-0740
Timeco, Inc., 1035 - 26th St., P.O. Box 8036, Huntington, WV 25705 304-523-5149
Tri-Tronics Co. Inc., 13420 Wright Cir., Tampa, FL 33624 813-855-4453
§ TRW, Dynalco Controls Div., 5200 NW 37th, P.O. Box 8187, Ft. Lauderdale, FL 33310 305-739-4300
§ Veeder-Root, 70 Sargeant St., Hartford, CT 06102 203-527-7201

Controls, Density-2200

† Automation Prods., Inc., 3030 Max Roy, Houston, TX 77008 713-869-0361

§ Dolan-Jenner Inds., Box 1020, Woburn, MA 01801 617-935-7444
Electron-Machine Corp., Box M, Umatilla, FL 32784 904-669-3101
§ Lektralab Technologies, Inc., 129-07 18th Ave., P.O. Box 222, College Point, NY 11356 718-939-7171
§ National Sonics/Xertex Corp., 250 Marcus Blvd., Hauppauge, NY 11787 516-273-6600
Nuclear Resch. Corp., 125 Titus Ave., Warrington, PA 18976 215-343-5900
Princo Instrs., Inc., 1020 Industrial Hwy., Southampton, PA 18966 215-355-1500
RIL Elctrns., Inc., 125 Titus Ave., P.O. Box H, Warrington, PA 18976 ..... 215-EL5-1361

Controls, Dimension-4100

API Instrs., 1601 Trapelo Rd., Waltham, MA 02254 617-890-2000
Astrosystems, 6 Nevada Dr., Lake Success, NY 11042 516-328-1600
Automatic Timing & Controls Co., 201 So. Gulph Rd., King of Prussia, PA 19406 ..... 215-337-5500;800-441-8245
† Columbia Resch. Labs., Macdade Blvd. & Bullens La., Woodlyn, PA 19094 215-532-9464
§ Dynapar, 1675 Delany Rd., Gurnee, IL 60031 312-662-2666
Electron-Machine Corp., Box M, Umatilla, FL 32784 904-669-3101
Innovatek Microsystems, Inc., Smithfield Rd., R1 Box 104, Millerton, NY 12546-9720 914-373-9003
§ Lion Precision, 60 Bridge St., Newton, MA 02195 617-969-4710
Luft Instrs., Hillside Rd., P.O. Box 214, Lincoln, MA 01773 617-259-9215
Magnetoelastic Devices, 326 Springside Ave., Box 625, Pittsfield, MA 01201 413-445-5608
§ Markat Div., Wild Oats Corp., 3 Country Dr., Plainview, NY 11803 516-549-9272
Siltran Digital, 2250 Monterey Rd., Atascadero, CA 93422 805-466-3209
Tempo Instrument, Inc., 87 Modular Ave., Commack, NY 11725 516-864-3700
Trans-Tek, P.O. Box 338, Rte. 83, Ellington, CT 06029 203-872-8351

Controls, Environmental Test Equipment-2550

† Blue M, A Unit of General Signal, 138th & Chatham Sts., Blue Island, IL 60406, 312-385-9000 ..... D•1165
† Tenney Engrg., 109 Springfield Rd., Union, NJ 07083, 201-686-7870 ..... D•1173
AES Corp., 285 Newbury St., P.O. Box 2093, Peabody, MA 01960 617-535-7310
Alpha-M Corp., 3009 Wildflower Dr., Dallas, TX 75229 214-620-0021
§ American Control Products, Div. of Precision Timer Co., Inc., 13 Westbrook Ind'l. Pk., Westbrook, CT 06498 203-399-6253
§† Analytical Meas., 31 Willow St., Chatham, NJ 07928 201-273-7500
Barber-Colman Co., Indl. Instrs. Div., P.O. Box 2940, 1354 Clifford Ave., Loves Park, IL 61132 815-877-0241
Chadwick-Helmuth, 4601 N. Arden Dr., El Monte, CA 91731 213-575-6161
† Cincinnati Sub-Zero Prods., 12011 Mosteller Rd., Cincinnati, OH 45241 513-772-8810
† Control Technology Co., 41-16 29th St., Long Island City, NY 11101 718-361-2133
§ Delta Design, 5775 Kearny Villa Rd., San Diego, CA 92123 619-292-5000
† FTS Sys., POB 158, Stone Ridge, NY 12484 800-824-0400
Harrel, Inc., 16 Fitch St., E. Norwalk, CT 06855 203-866-2573
International Instrumentation, 31131-602 Via Colinas, Westlake Vlg., CA 91362 213-991-9614
Iveron Pacific, 1150 Morena Boulevard, San Diego, CA 92110-3899 619-275-1500
Leeds & Northrup Instrs., A Unit of General Signal Corp., Sumneytown Pike, North Wales, PA 19454 215-643-2000
Luft Instrs., Hillside Rd., P.O. Box 214, Lincoln, MA 01773 617-259-9215
Markat Div., Wild Oats Corp., 3 Country Dr., Plainview, NY 11803 516-549-9272
OAL Assocs., P.O. Box J, Escondido, CA 92025 619-743-7143
Omega Engrg., Box 4047, Stamford, CT 06907 203-359-1660
† Oven Inds., 191 Hempt Rd., P.O. Box 290, Mechanicsburg, PA 17055 717-766-0721
Racal-Dana Instrs. Inc., 4 Goodyear St., Irvine, CA 92715 714-859-8999
Ransco Inds., Inc., Sub. Despatch Ind., Inc., 2201 Statham Blvd., Oxnard, CA 93033 805-487-7777
§ Research, Inc., Box 24064, Minneapolis, MN 55424 612-941-3300
Serial Lab Prods., Inc., 162 Cook Lane, P.O. Box 766, Marlboro, MA 01752 617-481-1684
Sigma Systems Corp., 3163 Adams Ave., San Diego, CA 92116 619-283-3193
Spectral Dynamics Div., Scientific-Atlanta, Box 671, San Diego, CA 92112 619-268-7100
§ Temptronic, 55 Chapel St., Newton, MA 02158 617-969-2501
Unholtz-Dickie Corp., 6 Brookside Dr., Wallingford, CT 06492 203-265-3929
§ United Elec. Controls, 85 School St., Watertown, MA 02172 ..... 617-WA6-1000
Varian Assocs., Indl. Equip. Grp., 611 Hansen Way, Palo Alto, CA 94303 415-493-4000
† Vibration Instrs. Co., 1614 Orangethorpe Way, Anaheim, CA 92801 714-879-6085
† Warren-Knight Instr. Co., Warren Inds., Inc., 2045 Bennett Rd., Philadelphia, PA 19116 215-464-9300

Controls, Fader-1300

§ Alps Electric (USA), Inc., 3553 N. First St., San Jose, CA 95134 408-946-6000
CTS Corporation, 905 North West Blvd., Elkart, IN 46514 219-293-7511
§ Duncan Electronics, Inc., 2865 Fairview Rd., Costa Mesa, CA 92626 714-545-8261
§ GC Elctrns., 400 S. Wyman St., Rockford, IL 61101 815-968-9661
Litton Potentiometer Div., 750 So. Fulton Ave., Mt. Vernon, NY 10551 914-664-7733
† Noble U.S.A., Inc., 151 Stanley St., Elk Grove Village, IL 60007 312-364-6038
§ Oaktron Inds., 1000 30th St., Monroe, WI 53566 608-328-5560
§ Sealectro, 225 Hoyt St., Mamaroneck, NY 10543 914-698-5600
§ Shokai Far East, Ltd., 280 North Central Ave., Hartsdale, NY 10530 914-681-0700

Controls, Fluid Conductivity-2200

Curtis Inds., 8000 West Tower Ave., Milwaukee, WI 53223, 414-354-1500 ..... D•1978
Applied Control, 1275 Bloomfield Ave., Fairfield, NJ 07006-2828 201-227-5454
Beckman Industrial Corp., Cedar Grove Div., 89 Commerce Rd., Cedar Grove, NJ 07009 201-239-6200
Control Prods., Devar, Inc., P.O. Box 589, Bridgeport, CT 06601 203-368-6751
Leeds & Northrup Instrs., A Unit of General Signal Corp., Sumneytown Pike, North Wales, PA 19454 215-643-2000
Mag-Con, 1626 Terrace Dr., St. Paul, MN 55113 612-633-8820
Markat Div., Wild Oats Corp., 3 Country Dr., Plainview, NY 11803 516-549-9272
Tempo Instrument, Inc., 87 Modular Ave., Commack, NY 11725 516-864-3700

Controls, Fluid Flow-2200

Kurz Instruments, Inc., P.O. Box 849, Carmel Valley, CA 93924, 800-424-7356 ..... B•1800
§ Airmatic-Allied, 185 Park Dr., Wilmington, OH 45177 513-382-1691
† Astro Dynamics, Inc., 2 Gill St., Woburn, MA 01801 617-935-4944
† Bailey Controls Co., 29801 Euclid Ave., Wickliffe, OH 44092 216-585-5800
§ Bellofram Corp., A Rexnord Co., 30 Blanchard Rd., Burlington, MA 01803 ..... 617-272-2100;800-225-1031
† Bendix Corp., Electrodynamics Div., 11600 Sherman Way, N. Hollywood, CA 91605 818-765-1010
Bristol Babcock Inc., 40 Bristol St., Waterbury, CT 06708 203-575-3000
† Brooks Instr. Div., Emerson Elec. Co., 407 W. Vine St., Hatfield, PA 19440 215-362-3500
Cambridge Aero Instruments, Inc., 6A Dunham Rd., Billerica, MA 01821 617-275-0889
Computer Instrs., 100 Madison Ave., Hempstead, NY 11550 516-483-8200
Control Prods., Devar, Inc., P.O. Box 589, Bridgeport, CT 06601 203-368-6751
Datatran Labs, P.O. Box 384, Sussex, NJ 07461 914-856-4313
§ Dynamics, Div. of Waugh Controls Corp., 9001 Fullbright Ave., Chatsworth, CA 91311 818-998-8281
† EEMCO Div., 4585 Electronics Pl., Los Angeles, CA 90039 213-247-7060
§ Harwil, 1548 17th St., Santa Monica, CA 90404 213-829-2310
† Honeywell, Process Control Div., 1100 Virginia Dr., Ft. Washington, PA 19034 ..... 800-321-5111, Ext. 596
Instrumentation & Control Sys., 520 Interstate Rd, Addison, IL 60101 312-543-6200
ITT General Controls Div., Intl. Telephone & Telegraph Corp., 801 Allen Ave., Glendale, CA 91201 213-842-6131
§ IVEK Corp., 43 School St., N. Springfield, VT 05150 802-886-8278
§ H. Kuhnke, Inc., 26 W. Highland Ave., Atlantic Highlands, NJ 07716 ..... 201-291-3334; 800-221-0714
Leeds & Northrup Instrs., A Unit of General Signal Corp., Sumneytown Pike, North Wales, PA 19454 215-643-2000
Luft Instrs., Hillside Rd., P.O. Box 214, Lincoln, MA 01773 617-259-9215
§ NES, Inc. (Nationwide Electronic Systems), 3003 Wakefield, Carpentersville, IL 60110 312-426-5900
Ocean Resch. Equip., Inc., Box 709, Falmouth, MA 02541 617-548-5800
Omega Engrg., Box 4047, Stamford, CT 06907 203-359-1660
Parker Hannifin Corp., 17325 Euclid Ave., Cleveland, OH 44112 216-531-3000
§ Plant Specialties, Inc., PO Box 1097, Carrollton, TX 75006 214-245-9673
† Pressure Controls, Inc., 406 Cortlandt St., Belleville, NJ 07109 201-751-5003
Sanders Assocs., Flexprint Prods. Div., Grenier Fld., Manchester, NH 03103 603-669-4615
§ Square D Co., Executive Plaza, Palatine, IL 60067 312-397-2600
§† Transamerica Delaval, Gems Sensors Div., Cowles Rd, Plainville, CT 06062-9990 203-677-1311
§ United Elec. Controls, 85 School St., Watertown, MA 02172 ..... 617-WA6-1000
§ Veeder-Root, 70 Sargeant St., Hartford, CT 06102 203-527-7201
† Whittaker Corp., 10880 Wilshire Blvd., Los Angeles, CA 90024 213-475-9411
§ ZI-TECH Instr. Corp., 2151 Park Blvd., Box 60490, Palo Alto, CA 94306 415-326-2151

Controls, Frequency-2200

Active Control Instrmn., P.O. Box 243-Wildwood Circle, Key Largo, FL 33037, 305-451-1000 ..... D•1109
Abacus Controls Inc., 89 Readington Rd., Somerville, NJ 08876 201-526-6010
† Acromag, 30765 Wixom Rd., Wixom, MI 48096 313-624-1541
§† Antex Electronics Corp., 16100 S. Figueroa St., Gardena, CA 90248 213-532-3092
† Applied Electro Technlg., Int., STI Company, 2220 So. Anne St., Santa Ana, CA 92704 714-556-6570
† Autronics, 314 E. Live Oak, Ste. A, Arcadia, CA 91006 818-445-5470
† CML MACARR Div., Marine Electric RPD, Inc., 666 Pacific St., Brooklyn, NY 11217 718-857-2400
† Control Technology Co., 41-16 29th St., Long Island City, NY 11101 718-361-2133
CTS Corporation, 905 North West Blvd., Elkart, IN 46514 219-293-7511
§ Diversified Elctrns., Inc., Indl. Controls Div., 119 N. Morton Ave., Evansville, IN 47711 812-426-2806
Douglas Randall, 6 Pawcatuck Ave., Pawcatuck, CT 06379 203-599-2075
§ Electromatic Controls Corp., 2495 Pembroke Road, Hoffman Estates, IL 60195-2010 312-882-5757
† Frequency Elctrns., 55 Charles Lindbergh Blvd., Mitchel Field, NY 11553 516-794-4500
† Hughes Solid State Products, 500 Superior Ave., Dept. E8, Newport Bch., CA 92658-8903 714-759-2411
Leeds & Northrup Instrs., A Unit of General Signal Corp., Sumneytown Pike, North Wales, PA 19454 215-643-2000
§ NES, Inc. (Nationwide Electronic Systems), 3003 Wakefield, Carpentersville, IL 60110 312-426-5900
Omega Engrg., Box 4047, Stamford, CT 06907 203-359-1660
Ovenaire, Electronic Technologies Inc., 706 Forrest St., Charlottesville, VA 22901 804-977-8050
Pacific Power Source Corp., 15122 Bolsa Chica St., Huntington Bch., CA 92649 ..... 714-898-2691;800-854-2433
Reliance Electric Co., Marketing Info Center, P.O. Box 99502, Cleveland, OH 44199 ..... 800-245-4501;800-245-4497 In Ohio
§ Scientific Technlg., 1201 San Antonio Rd., Mountain View, CA 94043 ..... CA 415-965-0910;800-221-7060
Tempo Instrument, Inc., 87 Modular Ave., Commack, NY 11725 516-864-3700
§ TRW, Dynalco Controls Div., 5200 NW 37th, P.O. Box 8187, Ft. Lauderdale, FL 33310 305-739-4300

Controls, Gas-2200

§ Airmatic-Allied, 185 Park Dr., Wilmington, OH 45177 513-382-1691

† Automatic Switch Co., 50-60 Hanover Road, Florham Park, NJ 07932 1-201-966-2000
† Bailey Controls Co., 29801 Euclid Ave., Wickliffe, OH 44092 216-585-5800
§ Bellofram Corp., A Rexnord Co., 30 Blanchard Rd., Burlington, MA 01803 ..... 617-272-2100;800-225-1031
Bristol Babcock Inc., 40 Bristol St., Waterbury, CT 06708 203-575-3000
† BTU Engrg. Corp., Bruce Sys., Esquire Rd., N. Billerica, MA 01862 617-667-4111
Cambridge Aero Instruments, Inc., 6A Dunham Rd., Billerica, MA 01821 617-275-0889
Datatran Labs, P.O. Box 384, Sussex, NJ 07461 914-856-4313
† Devco Engrg., Control Sys. Div., 36 Pier Lane West, Fairfield, NJ 07006 ..... 201-CA8-0321
Honeywell, Process Control Div., 1100 Virginia Dr., Ft. Washington, PA 19034 ..... 800-321-5111, Ext. 596
§ ITT General Controls Div., Intl. Telephone & Telegraph Corp., 801 Allen Ave., Glendale, CA 91201 213-842-6131
§ H. Kuhnke, Inc., 26 W. Highland Ave., Atlantic Highlands, NJ 07716 ..... 201-291-3334; 800-221-0714
§† MKS Instrs., Inc., 22 Third Ave., Burlington, MA 01803 617-272-9255
§† Pres-Air-Trol Corp., 1009 Boston Post Rd., Mamaroneck, NY 10543 ..... 914-698-2026-800-431-2625 (outside NY)
† Pressure Controls, Inc., 406 Cortlandt St., Belleville, NJ 07109 201-751-5003
Teledyne/Geotech, 3401 Shiloh Rd., Garland, TX 75041 214-271-2561
§ United Elec. Controls, 85 School St., Watertown, MA 02172 ..... 617-WA6-1000

Controls, Humidity-2200

Harrel, Inc., 16 Fitch St., E. Norwalk, CT 06855, 203-866-2573 ..... D•1122
AES Corp., 285 Newbury St., P.O. Box 2093, Peabody, MA 01960 617-535-7310
Applied Control, 1275 Bloomfield Ave., Fairfield, NJ 07006-2828 201-227-5454
Beckman Industrial Corp., Cedar Grove Div., 89 Commerce Rd., Cedar Grove, NJ 07009 201-239-6200
† Blue M, A Unit of General Signal, 138th & Chatham Sts., Blue Island, IL 60406 312-385-9000
Bristol Babcock Inc., 40 Bristol St., Waterbury, CT 06708 203-575-3000
Cincinnati Sub-Zero Prods., 12011 Mosteller Rd., Cincinnati, OH 45241 513-772-8810
§ Data Tech, Div. of Penril Corp., 3110 W. Segerstrom, Santa Ana, CA 92704 714-546-7160
§ Electromatic Controls Corp., 2495 Pembroke Road, Hoffman Estates, IL 60195-2010 312-882-5757
Electronic Prods. Corp., Interstate Indl. Plaza, R. D. #5, York, PA 17402 717-767-6517
Honeywell Inc., Commercial Div., MN 27-7246, Honeywell Plaza, Minneapolis, MN 55408 612-870-5357
† Honeywell, Process Control Div., 1100 Virginia Dr., Ft. Washington, PA 19034 ..... 800-321-5111, Ext. 596
Hy-Cal Engrg., 9650 Telstar Ave., El Monte, CA 91731 213-444-4000
Iveron Pacific, 1150 Morena Boulevard, San Diego, CA 92110-3899 619-275-1500
§ Jumbo Process Control, Inc., 410 Garibaldi Ave., Lodi, NJ 07644 201-779-7744
§ NES, Inc. (Nationwide Electronic Systems), 3003 Wakefield, Carpentersville, IL 60110 312-426-5900
Omega Engrg., Box 4047, Stamford, CT 06907 203-359-1660
Panametrics, 221 Cresent St., Waltham, MA 02254 617-899-2740
† PSG Inds., 1225 Tunnel Road, Perkasie, PA 18944 215-257-3621
Research, Inc., Box 24064, Minneapolis, MN 55424 612-941-3300
RI/Control Systems, Research, Inc., P.O. Box 24064, Minneapolis, MN 55424 612-941-3300
† Thunder Sci. Corp., 623 Wyoming S.E., Albuquerque, NM 87123 505-265-8701

Controls, Ignitron Firing-2200

Capitol Machine & Switch Co., Box 890, Danbury, CT 06810 203-744-3300
§ Delta Prods., Box 1147, Grand Junction, CO 81501 303-242-9000
§ Fenwal, Inc., 400 Main St., Ashland, MA 01721 617-881-2000
§ Research, Inc., Box 24064, Minneapolis, MN 55424 612-941-3300

Controls, Joystick, Mouse Devices, etc. — See Controls, Computer Input (Vol. D)

Controls, Lamp Dimming, Flashing-2200

Triac Electronic Systems, Inc., 87-27 Myrtle Ave., Glendale, NY 11385, 718-441-4759 ..... D•1132
Accurate Elctrns., 169 S. Abbe Rd., P.O. Box 1287, Elyria, OH 44036 216-365-1211
§ Adatek, Inc., P.O. Box 1339, Sandpoint, ID 83864 ..... 208-263-1471;800-323-3343
§ American Control Products, Div. of Precision Timer Co., Inc., 13 Westbrook Ind'l. Pk., Westbrook, CT 06498 203-399-6253
† Applied Electro Technlg., Int., STI Company, 2220 So. Anne St., Santa Ana, CA 92704 714-556-6570
§ Cole-Hersee Co., 20 Old Colony Ave., Boston, MA 02127-2467 617-268-2100
§ Douglas Randall, 6 Pawcatuck Ave., Pawcatuck, CT 06379 203-599-2075
Electronic Prods. Corp., Interstate Indl. Plaza, R. D. #5, York, PA 17402 717-767-6517
§ Hughey & Phillips, Inc., 3050 N. California St., Burbank, CA 91504 818-849-1104
§ International Controls and Measurements Corp., P. O. Box 2578, Syracuse, NY 13220 315-699-5262
§ Industrial Computer Designs, Inc., 31264 La Baya Drive, Westlake Village, CA 91362 818-889-3179
Innovatek Microsystems, Inc., Smithfield Rd., R1 Box 104, Millerton, NY 12546-9720 914-373-9003
Kalglo Elctrns. Co., Inc., 6584 Ruch Rd., E. Allen Twp., Bethlehem, PA 18017 215-837-0700
§ KB Elctrns., 73 Wortman Ave., Brooklyn, NY 11207 718-257-3300
KGS Electronics, Inc., GAR Entprs., 2029 N. Lincoln Ave., Pasadena, CA 91103 818-798-0786
† Litton Potentiometer Div., 750 So. Fulton Ave., Mt. Vernon, NY 10551 914-664-7733
† Loyola Controls Inc., 1099 N. Batavia St., Orange, CA 92667 714-639-0526
§ Lutron Elctrns., Box 205, Suter Rd., Coopersburg, PA 18036 215-282-3800
Macrotronix, Inc., 4016 N. Home St., Mishawaka, IN 46545 219-256-5503
Master Elctrn. Controls, P.O. Box 25905, Los Angeles, CA 90025 213-452-1336
§ Midland Standard, Inc., 603 E. Chicago St., Box 38, Elgin, IL 60120 312-741-6600
Modular Devices, 50 Orville Dr., Bohemia, NY 11716 516-567-9620
§† Ohmite Mfg. Co., 3601 W. Howard St., Skokie, IL 60076 312-675-2600
† Pacific Electro Dynamics, Inc., 11465 Willows Rd. N.E., Redmond, WA 98052 206-881-1700
§ Payne Engrg., Box 70, Scott Depot, WV 25560 304-757-7353
§ Plant Specialties, Inc., PO Box 1097, Carrollton, TX 75006 214-245-9673
Power Controls, P.O. Box 5860, San Antonio, TX 78201 512-734-7155
§ S S A C, Box 395, Liverpool, NY 13088 315-622-1000
§† Superior Elec. Co., 383 Middle St., Bristol, CT 06010 203-582-9561
Tempo Instrument, Inc., 87 Modular Ave., Commack, NY 11725 516-864-3700

Controls, Level, Dry Material-2200

† Automation Prods., Inc., 3030 Max Roy, Houston, TX 77008 713-869-0361
Bindicator, P.O. Box 9, 1915 Dove St., Port Huron, MI 48060 313-987-2700
Bristol Babcock Inc., 40 Bristol St., Waterbury, CT 06708 203-575-3000
Control Engrg., Inc., 1686 Riverdale St., West Springfield, MA 01089 413-781-1330
Control Prods., Devar, Inc., P.O. Box 589, Bridgeport, CT 06601 203-368-6751
† Control Technology Co., 41-16 29th St., Long Island City, NY 11101 718-361-2133
§ Dumont Instrumentation, Inc., 75 Mall Dr., Commack, NY 11725 516-864-8500
§ Electromatic Controls Corp., 2495 Pembroke Road, Hoffman Estates, IL 60195-2010 312-882-5757
Fork Standards, Inc., 666 Western Ave., Lombard, IL 60148 312-932-9380
§ Gordon Prods., 67 Del Mar Dr., Brookfield, CT 06804 203-775-4501
Litton Potentiometer Div., 750 So. Fulton Ave., Mt. Vernon, NY 10551 914-664-7733
§ Micro Switch, A Honeywell Div., 11 W. Spring St., Freeport, IL 61032 815-235-6600
§ National Sonics/Xertex Corp., 250 Marcus Blvd., Hauppauge, NY 11787 516-273-6600
§ NES, Inc. (Nationwide Electronic Systems), 3003 Wakefield, Carpentersville, IL 60110 312-426-5900
Nuclear Resch. Corp., 125 Titus Ave., Warrington, PA 18976 215-343-5900
§ Photoswitch Div., Electronics Corp. of Amer., 265 Winter St., Waltham, MA 02154 617-466-8000
§† Pres-Air-Trol Corp., 1009 Boston Post Rd., Mamaroneck, NY 10543 ..... 914-698-2026-800-431-2625 (outside NY)
Princo Instrs., Inc., 1020 Industrial Hwy., Southampton, PA 18966 215-355-1500
RIL Elctrns., Inc., 125 Titus Ave., P.O. Box H, Warrington, PA 18976 ..... 215-EL5-1361
§ Scientific Technlg., 1201 San Antonio Rd., Mountain View, CA 94043 ..... CA 415-965-0910;800-221-7060
Skan-A-Matic, Box S, Elbridge, NY 13060 315-689-3961
Tri-Tronics Co. Inc., 13420 Wright Cir., Tampa, FL 33624 813-855-4453
§ Veeder-Root, 70 Sargeant St., Hartford, CT 06102 203-527-7201
ZI-TECH Instr. Corp., 2151 Park Blvd., Box 60490, Palo Alto, CA 94306 415-326-2151

Controls, Level, Liquid-2200

§ Curtis Inds., 8000 West Tower Ave., Milwaukee, WI 53223, 414-354-1500 ..... D•1978
Triac Electronic Systems, Inc., 87-27 Myrtle Ave., Glendale, NY 11385, 718-441-4759 ..... D•1132
§ Air-O-Tronics Prods., Box K, Morrisville, NY 13408 315-684-3705
Allen-Bradley Co., Industrial Control Div., 1201 S. Second St., Milwaukee, WI 53201 414-671-2000
§ Ametek, 2 Station Square, Paoli, PA 19301 215-355-6900
ARGA Controls, 35 E. Glenarm St., Pasadena, CA 91105 213-682-3314
† Automatic Switch Co., 50-60 Hanover Road, Florham Park, NJ 07932 1-201-966-2000
† Automation Prods., Inc., 3030 Max Roy, Houston, TX 77008 713-869-0361
† Bailey Controls Co., 29801 Euclid Ave., Wickliffe, OH 44092 216-585-5800
Barksdale Controls Div., Transamenca DeLaval, 3211 Fruitland Ave., P.O. Box 58843, Los Angeles, CA 90058 213-589-6181
Bindicator, P.O. Box 9, 1915 Dove St., Port Huron, MI 48060 313-987-2700
Bristol Babcock Inc., 40 Bristol St., Waterbury, CT 06708 203-575-3000
† Brooks Instr. Div., Emerson Elec. Co., 407 W. Vine St., Hatfield, PA 19440 215-362-3500
Computer Instrs., 100 Madison Ave., Hempstead, NY 11550 516-483-8200
† Consolidated Controls, 15 Durant Ave., Bethel, CT 06801 203-743-6721
Control Engrg., Inc., 1686 Riverdale St., West Springfield, MA 01089 413-781-1330
Control Technology Co., 41-16 29th St., Long Island City, NY 11101 718-361-2133
§ Dolan-Jenner Inds., Box 1020, Woburn, MA 01801 617-935-7444
§ Dumont Instrumentation, Inc., 75 Mall Dr., Commack, NY 11725 516-864-8500
§ Eaton Corp./Cutler-Hammer Prods, Aerospace & Commercial Controls Div., 4201 N. 27th St., Milwaukee, WI 53216 414-449-7487
† EEMCO Div., 4585 Electronics Pl., Los Angeles, CA 90039 213-247-7060
§ Electromatic Controls Corp., 2495 Pembroke Road, Hoffman Estates, IL 60195-2010 312-882-5757
EOTec Corp., 420 Frontage Road, W. Haven, CT 06516 203-934-7961
§† Furnas Elec., 1197 McKee St., Batavia, IL 60510 312-879-6000
§ GIC Systems, 2324 A Ridgepoint Dr., Austin, TX 78754 512-926-8840
§ Gordon Prods., 67 Del Mar Dr., Brookfield, CT 06804 203-775-4501
§ Gordos Corporation, Gordos International Corp., 250 Glenwood Ave., Bloomfield, NJ 07003 201-743-6800
§ Gunther, W., GmbH, Virnsberger Strasse 51, D 8500 Nurnberg 82, WEST GERMANY ..... (0)911/65521 or 65520
§ Harwil, 1548 17th St., Santa Monica, CA 90404 213-829-2310
† Honeywell, Process Control Div., 1100 Virginia Dr., Ft. Washington, PA 19034 ..... 800-321-5111, Ext. 596
§ International Controls and Measurements Corp., P. O. Box 2578, Syracuse, NY 13220 315-699-5262
Inconix Corp., 10 Tech Circle, Natick, MA 01760 617-655-1170
Inland Motor Division, Kollmorgen Corp., 4020 E. Inland Rd., Sierra Vista, AZ 85635 602-459-1150
Kaye Instruments, 15 De Angelo Dr., Bedford, MA 01730 617-275-0300

§ Kessler-Ellis Prods., 120 1st Ave., Atlantic Highlands, NJ 07716 .... 201-291-0500; 800-631-2165
Keystone Carbon, Thermistor Div., St. Marys, PA 15857 814-781-1591
Leeds & Northrup Instrs., A Unit of General Signal Corp., Sumneytown Pike, North Wales, PA 19454 215-643-2000
Luft Instrs., Hillside Rd., P.O. Box 214, Lincoln, MA 01773 617-259-9215
Mag-Con, 1626 Terrace Dr., St. Paul, MN 55113 612-633-8820
Magnetoelastic Devices, 326 Springside Ave., Box 625, Pittsfield, MA 01201 413-445-5608
Markat Div., Wild Oats Corp., 3 Country Dr., Plainview, NY 11803 516-549-9272
§ Master Elctrn. Controls, P.O. Box 25905, Los Angeles, CA 90025 213-452-1336
§ Midland Standard, Inc., 603 E. Chicago St., Box 38, Elgin, IL 60120 312-741-6600
Midwest Comps., 1981 Port City Blvd., Muskegon, MI 49443 616-777-2602
§ National Controls Corp., 931 N. DuPage Ave., Lombard, IL 60148 312-932-6900
§† National Sonics/Xertex Corp., 250 Marcus Blvd., Hauppauge, NY 11787 516-273-6600
§ NES, Inc. (Nationwide Electronic Systems), 3003 Wakefield, Carpentersville, IL 60110 312-426-5900
Nuclear Resch. Corp., 125 Titus Ave., Warrington, PA 18976 215-343-5900
§ Omron Elctrns., Inc., Control Comps. Div., One E. Commerce Dr., Schaumburg, IL 60195 312-843-7900
§ Photoswitch Div., Electronics Corp. of Amer., 265 Winter St., Waltham, MA 02154 617-466-8000
§† Pres-Air-Trol Corp., 1009 Boston Post Rd., Mamaroneck, NY 10543 .... 914-698-2026-800-431-2625 (outside NY)
† Pressure Controls, Inc., 406 Cortlandt St., Belleville, NJ 07109 201-751-5003
Princo Instrs., Inc., 1020 Industrial Hwy., Southampton, PA 18966 215-355-1500
RIL Elctrns., Inc., 125 Titus Ave., P.O. Box H, Warrington, PA 18976 .... 215-EL5-1361
Robinson-Halpern, One Apollo Rd., P.O. Box 248, Plymouth Meeting, PA 19462-0248 215-825-9200
§ Scientific Technlg., 1201 San Antonio Rd., Mountain View, CA 94043 .... CA 415-965-0910;800-221-7060
Skan-A-Matic, Box S, Elbridge, NY 13060 315-689-3961
Solarcon Technology, Inc., P.O. Box 4715, Hayward, CA 94544 415-489-3141
§ Square D Co., Executive Plaza, Palatine, IL 60067 312-397-2600
§ S S A C, Box 395, Liverpool, NY 13088 315-622-1000
Tempo Instrument, Inc., 87 Modular Ave., Commack, NY 11725 516-864-3700
§ Temposonics, MTS Sys. Corp., 111 East Ames Ct., Plainview, NY 11803 516-349-1950
§† Transamerica Delaval, Gems Sensors Div., Cowles Rd, Plainville, CT 06062-9990 203-677-1311
§ United Elec. Controls, 85 School St., Watertown, MA 02172 .... 617-WA6-1000
Varian Assocs., Indl. Equip. Grp., 611 Hansen Way, Palo Alto, CA 94303 415-493-4000
§ Veeder-Root, 70 Sargeant St., Hartford, CT 06102 203-527-7201
§ ZI-TECH Instr. Corp., 2151 Park Blvd., Box 60490, Palo Alto, CA 94306 415-326-2151

Controls, Machine Tool-2200

BEI Motion Sys. Co., Digital Prods. Div., P.O. Box 3838, Little Rock, AR 72203, 501-851-4000 .... B•1782
BEI Motion Sys. Co., General Control Systems Div., 564 Alpha Dr., Pittsburgh, PA 15238, 412-963-0515 .... B•1783
Crydom Division, Int'l. Rectifier, 1521 Grand Ave., El Segundo, CA 90245, 213-322-4987 .... B•1312-1314
Curtis Inds., 8000 West Tower Ave., Milwaukee, WI 53223, 414-354-1500 .... D•1978
POWR-UPS Corp., 50 Orville Drive, Bohemia, NY 11716, 516-589-3602 .... B•1182
Triac Electronic Systems, Inc., 87-27 Myrtle Ave., Glendale, NY 11385, 718-441-4759 .... D•1132
Active Control Instrmn., P.O. Box 243-Wildwood Circle, Key Largo, FL 33037 305-451-1000
§ Adatek, Inc., P.O. Box 1339, Sandpoint, ID 83864 .... 208-263-1471;800-323-3343
§ Aerotech, Inc., 101 Zeta Dr., Pittsburgh, PA 15238 412-963-7470
AES Corp., 285 Newbury St., P.O. Box 2093, Peabody, MA 01960 617-535-7310
§ Allen-Bradley Co., Industrial Control Div., 1201 S. Second St., Milwaukee, WI 53201 414-671-2000
Ambi-Tech Inds., 319 Knickerbocker Ave., Hillsdale, NJ 07642 201-666-0504
§ American Control Products, Div. of Precision Timer Co., Inc., 13 Westbrook Ind'l. Pk., Westbrook, CT 06498 203-399-6253
Antex Electronics Corp., 16100 S. Figueroa St., Gardena, CA 90248 213-532-3092
Applied Control, 1275 Bloomfield Ave., Fairfield, NJ 07006-2828 201-227-5454
Applied Sys., 26401 Harper Ave., St. Clair Shores, MI 48081 313-779-8700
Astrosystems, 6 Nevada Dr., Lake Success, NY 11042 516-328-1600
Automatic Timing & Controls Co., 201 So. Gulph Rd., King of Prussia, PA 19406 .... 215-337-5500;800-441-8245
Barber-Colman Co., Indl. Instrs. Div., P.O. Box 2940, 1354 Clifford Ave., Loves Park, IL 61132 815-877-0241
BEI Motion Systems Co., Corporate Off., 166 Geary St., Ste. 1400, San Francisco, CA 94108 415-788-6840
BEI Motion Sys. Co., Computer Prod. Div., 1755 B La Costa Meadows Dr., San Marcos, CA 92069 619-471-2600
§ Bellofram Corp., A Rexnord Co., 30 Blanchard Rd., Burlington, MA 01803 .... 617-272-2100;800-225-1031
Cardinal Control Co., 110 Kensington Rd., Kensington, CT 06037 203-828-6379
Centent Co., 3879 S. Main St., Santa Ana, CA 92707 714-979-6491
† Computer Conversions Corp., 6 Dunton Ct., E. Northport, NY 11731 516-261-3300
Controls Unlimited, Inc., 4823 North Ridge Rd., Perry, OH 44081 216-259-2500
† Control Technology Co., 41-16 29th St., Long Island City, NY 11101 718-361-2133
Cross Elctrns., 100 Commonwealth Dr., Warrendale, PA 15086 412-776-1591
General Numeric Corporation, 390 Kent Avenue, Elk Grove Village, IL 60007 312-640-1595
C-Tek Inc., 4 Railroad Ave., Wakefield, MA 01880 617-246-1720
Data Instruments, Inc., 4 Hartwell Pl., Lexington, MA 02173 617-861-7450
† Devco Engrg., Control Sys. Div., 36 Pier Lane West, Fairfield, NJ 07006 .... 201-CA8-0321
Dynage/Controls, Inc., 2 Willowbrook Rd., Cromwell, CT 06416 203-635-6257
§ Eagle Signal Controls, Mfg. Div. Gulf & Western Inds., Box 16100, Austin, TX 78761 512-837-8300
§ Eaton Corp./Cutler-Hammer Prods, Aerospace & Commercial Controls Div., 4201 N. 27th St., Milwaukee, WI 53216 414-449-7487
§ Electrol Co., 321 Dewey St., P.O. Box 29, York, PA 17405 717-848-1722
Electrologic, Inc., 1359 28th St., Signal Hill, CA 90806 213-595-0551
Electron, Inc., P.O. Box 28640, San Diego, CA 92128 216-681-4700
Electronic Prods. Corp., Interstate Indl. Plaza, R. D. #5, York, PA 17402 717-767-6517
ESSCO Inds., P.O. Box 515, Sierra Madre, CA 91024-0515 818-355-8315
§† Furnas Elec., 1197 McKee St., Batavia, IL 60510 312-879-6000
General Digital Industries Inc., 7702 Governors Dr. W., Huntsville, AL 35805 205-837-8305
Giddings & Lewis Elctrns., A Unit of AMCA Intl., 666 S. Military Rd., P.O. Box 1658, Fond du Lac, WI 54935 414-921-7100
H-A-Z Laboratories, Brass Castle Rd., P.O. Box 67-M, Washington, NJ 07882 201-689-0110
Icon, 156 Sixth St., Cambridge, MA 02142 617-868-5400
Indocomp, Inc., Newcor, 5409 Perry Dr., P.O. Box 157, Drayton Plains, MI 48020 313-674-2294
Innovatek Microsystems, Inc., Smithfield Rd., R1 Box 104, Millerton, NY 12546-9720 914-373-9003
Instrumentation & Control Sys., 520 Interstate Rd, Addison, IL 60101 312-543-6200
§ International Microtronics Corp., 4016 E. Tennessee St., Tucson, AZ 85714 602-748-7900
IXYS Corp., 142 Charcot Ave., San Jose, CA 95131 408-262-8800
§ KB Elctrns., 73 Wortman Ave., Brooklyn, NY 11207 718-257-3300
Kollmorgen Corp., Industrial Drives Div., 201 Rock Rd., Radford, VA 24141 703-639-2495
Landis & Gyr, Inc., 4 Westchester Plaza, Elmsford, NY 10523 914-592-4400
Litton Potentiometer Div., 750 So. Fulton Ave., Mt. Vernon, NY 10551 914-664-7733
§ Markat Div., Wild Oats Corp., 3 Country Dr., Plainview, NY 11803 516-549-9272
† Measurement Sys., Inc., 121 Water St., Norwalk, CT 06854 203-838-5561
Mesur-Matic Elctrns., 50 Grove St., Salem, MA 01970-2294 617-745-7000
Metis, P.O. Box 1499, Bowie, MD 20716 301-249-1702
§ Micro Switch, A Honeywell Div., 11 W. Spring St., Freeport, IL 61032 815-235-6600
§ Midland Standard, Inc., 603 E. Chicago St., Box 38, Elgin, IL 60120 312-741-6600
§ Namco Controls, An Acme-Cleveland Co., 7567 Tyler Blvd., Mentor, OH 44060 216-946-9900
§† Nolatron, P.O. Box 4042, Harrisburg, PA 17111 717-564-3398
§ Ohmite Mfg. Co., 3601 W. Howard St., Skokie, IL 60076 312-675-2600
Payne Engrg., Box 70, Scott Depot, WV 25560 304-757-7353
Penn Resch. Corp. (PRC), 2652 South Main St., P.O. Box 3357, Kennesaw, GA 30144 404-429-9061
† Performance Controls Inc., 333-E Byberry Rd., Hatboro, PA 19040 215-675-6500
Reliance Electric Co., Marketing Info Center, P.O. Box 99502, Cleveland, OH 44199 .... 800-245-4501;800-245-4497 In Ohio
§ Remex Cam Operations, Ex-Cell-O Corporation, 1230 S. Lewis Street, Anaheim, CA 92805 714-535-4160
§ Scientific Technlg., 1201 San Antonio Rd., Mountain View, CA 94043 .... CA 415-965-0910;800-221-7060
§ Sealectro, 225 Hoyt St., Mamaroneck, NY 10543 914-698-5600
Skan-A-Matic, Box S, Elbridge, NY 13060 315-689-3961
§ Square D Co., Executive Plaza, Palatine, IL 60067 312-397-2600
§ Struthers-Dunn, Inc., Lamb's Rd., Pitman, NJ 08071 609-589-7500
Summit Engineering Corp., Box 938, Bozeman, MT 59715 406-587-4511
Superior Elec. Co., 383 Middle St., Bristol, CT 06010 203-582-9561
§ Syracuse Elctrns., P.O. Box 4770, Syracuse, NY 13221 315-488-4911
§ Tapeswitch Corp. of America, 100 Schmitt Blvd., Farmingdale, NY 11735 516-694-6312
§ Techno Vation, Inc., 14 Crandall Ave., Pompton Lakes, NJ 07442 201-839-0740
Teledyne Gurley, 514 Fulton St. P.O. Box 88, Troy, NY 12181 518-272-6300
Tempo Instrument, Inc., 87 Modular Ave., Commack, NY 11725 516-864-3700
§ Temposonics, MTS Sys. Corp., 111 East Ames Ct., Plainview, NY 11803 516-349-1950
Timeco, Inc., 1035 - 26th St., P.O. Box 8036, Huntington, WV 25705 304-523-5149
Transducer Systems, Inc., 1510 Delp Dr., Kulpsville, PA 19443 215-256-4611
Unico, 3725 Nicholson Rd., Franksville, WI 53126-0505 414-886-5678
§ Veeder-Root, 70 Sargeant St., Hartford, CT 06102 203-527-7201
§ Ward Leonard Elec., 31 South St., Mt. Vernon, NY 10550 914-664-1000
Westamp, 1542 15th St., Santa Monica, CA 90404 213-393-0401
§ Xycom, 750 N. Maple Rd., Saline, MI 48176 313-429-4971
ZI-TECH Instr. Corp., 2151 Park Blvd., Box 60490, Palo Alto, CA 94306 415-326-2151

Controls, Moisture — See Controls, Humidity (Vol. D)

Controls, Motor Speed-2200

Abacus Controls Inc., 89 Readington Rd., Somerville, NJ 08876, 201-526-6010 .... D•1880
BEI Motion Sys. Co., Digital Prods. Div., P.O. Box 3838, Little Rock, AR 72203, 501-851-4000 .... B•1782
BEI Motion Sys. Co., General Control Systems Div., 564 Alpha Dr., Pittsburgh, PA 15238, 412-963-0515 .... B•1783
§ Bodine Elec. Co., 2500 W. Bradley Pl., Chicago, IL 60618, 312-478-3515 .... B•1140
Canon U.S.A., Elctrn. Comps. Div., One Canon Plaza, Lake Success, NY 11042, 516-488-6700 .... B•1143
† Industrial Control Co., 3100 Pineda Ave., Rockledge, FL 32955, 305-259-7105 .... D•1988
Kollmorgen Corp., Industrial Drives Div., 201 Rock Rd., Radford, VA 24141, 703-639-2495 .... B•1163-1165
POWR-UPS Corp., 50 Orville Drive, Bohemia, NY 11716, 516-589-3602 .... B•1182-1183
Renco, 26 Coromar Dr., Goleta, CA 93017-3094, 805-968-1525 .... D•1131

† Sierracin/Magnedyne, 2258 Rutherford Rd., P.O. Box 458, Carlsbad, CA 92008, 619-438-3321 .... B•1189
§† Superior Elec. Co., 383 Middle St., Bristol, CT 06010, 203-582-9561 .... B•1193
Toko America, Inc., 1250 Feehanville Dr., Mt. Prospect,, IL 60056, 312-297-0070 .... D•1989
Triac Electronic Systems, Inc., 87-27 Myrtle Ave., Glendale, NY 11385, 718-441-4759 .... D•1132
TS Products, Inc., 12455 Branford St., Bldg. 22, Arleta, CA 91331, 818-896-6676 .... D•1990
Unitrode Corp., 5 Forbes Rd., Lexington, MA 02173, 617-861-6540 .... A•1699
Advanced Control Sys., 24 Teed Dr., Randolph, MA 02368 617-963-4543
§ Aerotech, Inc., 101 Zeta Dr., Pittsburgh, PA 15238 412-963-7470
§ Allen-Bradley Co., Industrial Control Div., 1201 S. Second St., Milwaukee, WI 53201 414-671-2000
† AMETEK, Dynamics Division, AMETEK, Inc., 5649 Peck Rd., Arcadia, CA 91006 818-442-5981
Amtek Digital Systems, Inc., 12740 28th N.E., Seattle, WA 98125 206-363-0217
§ Anaheim Automation, 910 E. Orangefair La., Anaheim, CA 92801 714-992-6990
Applied Control, 1275 Bloomfield Ave., Fairfield, NJ 07006-2828 201-227-5454
§ A. S. R. Servotron, Inc., (Sub. Baldor Elec. Co.), 7945 Deering Ave., Canoga Park, CA 91304 818-999-6193
Atec, Inc., Box 19426, 8219 Kempwood Dr., Houston, TX 77055 713-468-7971
§ B & B Motor & Control Corp., Apple Hill Commons, Burlington, CT 06013 203-673-7151
Basler Elec., Rte. 143, Highland, IL 62249 618-654-2341
Berkeley Process Control, Inc., 5327-K Jacuzzi St., Richmond, CA 94804 415-526-3333
Bertsch U.S., Sycamore Resch. Ctr., 2142F Industrial Ct., Vista, CA 92083 619-727-7420
Cambridge Aero Instruments, Inc., 6A Dunham Rd., Billerica, MA 01821 617-275-0889
Capitol Machine & Switch Co., Box 890, Danbury, CT 06810 203-744-3300
Carson Mfg. Co., Inc., 5453 N. Rural St., P.O. Box 20464, Indianapolis, IN 46220 317-257-3191
Centent Co., 3879 S. Main St., Santa Ana, CA 92707 714-979-6491
CML MACARR Div., Marine Electric RPD, Inc., 666 Pacific St., Brooklyn, NY 11217 718-857-2400
§ Cole-Hersee Co., 20 Old Colony Ave., Boston, MA 02127-2467 617-268-2100
Computer Optical Prods., Inc., Sub. of Hathaway Corp., 9353 Eton Ave., Chatsworth, CA 91311-5866 818-882-0424
Control Engrg., Inc., 1686 Riverdale St., West Springfield, MA 01089 413-781-1330
Controls Unlimited, Inc., 4823 North Ridge Rd., Perry, OH 44081 216-259-2500
† Control Technology Co., 41-16 29th St., Long Island City, NY 11101 718-361-2133
Cross Elctrns., 100 Commonwealth Dr., Warrendale, PA 15086 412-776-1591
General Numeric Corporation, 390 Kent Avenue, Elk Grove Village, IL 60007 312-640-1595
Cybernetic Micro Sys., P.O. Box 3000, 3000 Hwy. 84, San Gregorio, CA 94074 415-726-3000
Datatran Labs, P.O. Box 384, Sussex, NJ 07461 914-856-4313
Digitus Corporation, 22 West 25th Street, Baltimore, MD 21218 301-467-3223
Dodge-Master-Reeves, Reliance Electric, P. O. Box 99502, Cleveland, OH 44199 .... 800-245-4501;in OH 800-245-4497
§ Douglas Randall, 6 Pawcatuck Ave., Pawcatuck, CT 06379 203-599-2075
Dreefs Switch, Inc., 3782 Hawthorn Ct., Waukegan, IL 60087 .... 312-662-7667; 800-323-9605
Duncan Electronics, Inc., 2865 Fairview Rd., Costa Mesa, CA 92626 714-545-8261
§ Eaton Corp./Cutler-Hammer Prods, Aerospace & Commercial Controls Div., 4201 N. 27th St., Milwaukee, WI 53216 414-449-7487
§ Electro-Craft, 1600 2nd St. S., Hopkins, MN 55343 612-931-2700
§† Electrol Co., 321 Dewey St., P.O. Box 29, York, PA 17405 717-848-1722
Electronic Prods. Corp., Interstate Indl. Plaza, R. D. #5, York, PA 17402 717-767-6517
† Electrospace Sys., Inc., P. O. Box 831359, Richardson, TX 75083-1359 214-783-2004
Elmwood Sensors, 500 Narragansett Park Drive, Pawtucket, RI 02861 401-727-1300
§ Emerson, Indl. Controls Div., 3300 Standard St., Santa Ana, CA 92702 714-545-5581
EOTec Corp., 420 Frontage Road, W. Haven, CT 06516 203-934-7961
ETI Systems, Polaris Indl. Entprs., 215 Via Del Norte, Oceanside, CA 92054 619-757-7770
Fincor, 3750 E. Market St., York, PA 17402 717-757-4641
§ Gentron Corp., 6667 N. Sydney Pl., Milwaukee, WI 53209 414-351-1660
Harrel, Inc., 16 Fitch St., E. Norwalk, CT 06855 203-866-2573
H-A-Z Laboratories, Brass Castle Rd., P.O. Box 67-M, Washington, NJ 07882 201-689-0110
§ Hobart Engrg., 4143 Cheshire Dr., Cypress, CA 90630 714-827-2135
† Honeywell, Process Control Div., 1100 Virginia Dr., Ft. Washington, PA 19034 .... 800-321-5111, Ext. 596
§ International Controls and Measurements Corp., P. O. Box 2578, Syracuse, NY 13220 315-699-5262
Icon, 156 Sixth St., Cambridge, MA 02142 617-868-5400
Industrial Indexing Sys., Inc., 626 Fishers Run, Victor, NY 14564 716-924-9181
† Inland Motor, Kollmorgen Corp., 501 First St., Radford, VA 24141 703-639-9045
Innovatek Microsystems, Inc., Smithfield Rd., R1 Box 104, Millerton, NY 12546-9720 914-373-9003
§ Instrumentation & Control Sys., 520 Interstate Rd, Addison, IL 60101 312-543-6200
§ International Microtronics Corp., 4016 E. Tennessee St., Tucson, AZ 85714 602-748-7900
IXYS Corp., 142 Charcot Ave., San Jose, CA 95131 408-262-8800
Japanese Prods. Corp., 31368 Via Colinas, Ste. 103-104, West Lake Village, CA 91362 818-991-6111
Kalglo Elctrns. Co., Inc., 6584 Ruch Rd., E. Allen Twp., Bethlehem, PA 18017 215-837-0700
§ KB Elctrns., 73 Wortman Ave., Brooklyn, NY 11207 718-257-3300
Litton Potentiometer Div., 750 So. Fulton Ave., Mt. Vernon, NY 10551 914-664-7733
Loyola Controls Inc., 1099 N. Batavia St., Orange, CA 92667 714-639-0526
§ Lutron Elctrns., Box 205, Suter Rd., Coopersburg, PA 18036 215-282-3800
Macrotronix, Inc., 4016 N. Home St., Mishawaka, IN 46545 219-256-5503
§ Markat Div., Wild Oats Corp., 3 Country Dr., Plainview, NY 11803 516-549-9272
§ Master Elctrn. Controls, P.O. Box 25905, Los Angeles, CA 90025 213-452-1336
Mesur-Matic Elctrns., 50 Grove St., Salem, MA 01970-2294 617-745-7000
Metis, P.O. Box 1499, Bowie, MD 20716 301-249-1702
† Micro Mo Electronics, Inc., 742 2nd Ave. S., St. Petersburg, FL 33701 813-822-2529
Micronel U.S., 2142F Industrial Ct., Sycamore Research Center, Vista, CA 92083 619-727-7400
§ Midland Standard, Inc., 603 E. Chicago St., Box 38, Elgin, IL 60120 312-741-6600
Modular Devices, 50 Orville Dr., Bohemia, NY 11716 516-567-9620
§ Ohmite Mfg. Co., 3601 W. Howard St., Skokie, IL 60076 312-675-2600
Pacific Scientific Co., 4301 Kishwaukee, Rockford, IL 61105 815-966-3600
§ Payne Engrg., Box 70, Scott Depot, WV 25560 304-757-7353
† Performance Controls Inc., 333-E Byberry Rd., Hatboro, PA 19040 215-675-6500
PIC Design, P.O. Box 1004, Middlebury, CT 06762 203-758-8272
§ Plant Specialties, Inc., PO Box 1097, Carrollton, TX 75006 214-245-9673
PMI Motors, Kollmorgen Corp., 5 Aerial Way, Syosset, NY 11791 516-938-8000
§ Power Control, 122 Gamma Dr., Pittsburgh, PA 15238 412-782-3120
Power Controls, P.O. Box 5860, San Antonio, TX 78201 512-734-7155
Power Functions Engrg., 3831 Cavalier Dr., Garland, TX 75042 214-278-0996
Rapidsyn, 3233 Roymar Rd., Oceanside, CA 92054 619-439-7500
Reliance Electric Co., Marketing Info Center, P.O. Box 99502, Cleveland, OH 44199 .... 800-245-4501;800-245-4497 In Ohio
§ Schulz Controls, Inc., P.O. Box 9555, New Haven, CT 06511 203-562-2555
Sensor Corp., Box 140, Scottdale, PA 15683 412-887-4080
† Sequential Info. Sys., 249 N. Saw Mill River Rd., Elmsford, NY 10523 914-592-5930
Servo-Tek Prods. Co., 1086 Goffle Rd., Hawthorne, NJ 07506 201-427-3100
† Sigma Electronics Inc., 10830 Kinghurst Dr., Houston, TX 77099 713-933-4700
Sigma Instrs., 170 Pearl St., Braintree, MA 02184 617-843-5000
Silicon General, 11861 Western Ave., Garden Grove, CA 92641 714-898-8121
§ Square D Co., Executive Plaza, Palatine, IL 60067 312-397-2600
Stock Drive Prods., Div. of Designatronics, Inc., 2101 Jericho Turnpike, New Hyde Pk., NY 11040 .... 516-328-0200;328-3300
Synektron Corporation, 12000 S. W. Garden Place, Portland, OR 97223 503-684-3090
§ Syracuse Elctrns., P.O. Box 4770, Syracuse, NY 13221 315-488-4911
Systems Resch. Labs., Inc., 2800 Indian Ripple Rd., Dayton, OH 45440 513-426-6000
Teledyne Gurley, 514 Fulton St. P.O. Box 88, Troy, NY 12181 518-272-6300
Tempo Instrument, Inc., 87 Modular Ave., Commack, NY 11725 516-864-3700
Texas Instrs., Inc., Box 225012-MS-84, Dallas, TX 75265 214-995-6611
§ Torq Corp., 32 W. Monroe St., Bedford, OH 44146 216-232-4100
Transducer Systems, Inc., 1510 Delp Dr., Kulpsville, PA 19443 215-256-4611
† Trio Labs., 80 Dupont St., Plainview, NY 11803 516-349-0400
§ TRW, Dynalco Controls Div., 5200 NW 37th, P.O. Box 8187, Ft. Lauderdale, FL 33310 305-739-4300
Unico, 3725 Nicholson Rd., Franksville, WI 53126-0505 414-886-5678
§ Vectrol, Division of Westinghouse Elec. Corp., 110 Douglas Rd, Oldsmar, FL 33557 813-855-4621
§ Veeder-Root, 70 Sargeant St., Hartford, CT 06102 203-527-7201
Voltex, 3460 Great Neck Rd., Amityville, NY 11701 516-842-2772
Ward Leonard Elec., 31 South St., Mt. Vernon, NY 10550 914-664-1000
§ Westamp, 1542 15th St., Santa Monica, CA 90404 213-393-0401
Whedco, Inc., 6107 Jackson Rd., Ann Arbor, MI 48103 313-665-5473
Xylog Corp., 150 Tillman St., Westwood, NJ 07675 201-664-7997

Controls, Oscillator-2200

Anders, Inc., 77 Wolcott Rd., Simsbury, CT 06070 203-658-7666
Contraves Goerz Corp., 610 Epsilon Dr., Pittsburgh, PA 15238 412-967-7700
CTS Corporation, 905 North West Blvd., Elkart, IN 46514 219-293-7511
† Frequency Elctrns., 55 Charles Lindbergh Blvd., Mitchel Field, NY 11553 516-794-4500
† FSI/Fork Standards Inc., 666 Western Ave., Lombard, IL 60148 .... 312-231-3511; 312-932-9380
Power Functions Engrg., 3831 Cavalier Dr., Garland, TX 75042 214-278-0996
Unholtz-Dickie Corp., 6 Brookside Dr., Wallingford, CT 06492 203-265-3929
† Vectron Labs., 166 Glover Ave., Norwalk, CT 06850 203-853-4433

Controls, Photoelectric-2200

§ Curtis Inds., 8000 West Tower Ave., Milwaukee, WI 53223, 414-354-1500 .... D•1978
EG & G Vactec, 10900 Page Blvd., St. Louis, MO 63132, 314-423-4900 .... B•1210
HEI, Inc., 1495 Steiger Lake La., Victoria, MN 55386, 612-443-2500 .... B•1211
TRW Optoelectronics Div., 1207 Tappan Circle, Carrollton, TX 75006, 214-323-2200 .... B•1222-1223
A E G Telefunken, Semiconductor Grp., Rte. 22, Somerville, NJ 08876 201-722-9800
Applied Control, 1275 Bloomfield Ave., Fairfield, NJ 07006-2828 201-227-5454
Automatic Timing & Controls Co., 201 So. Gulph Rd., King of Prussia, PA 19406 .... 215-337-5500;800-441-8245
§ B & B Motor & Control Corp., Apple Hill Commons, Burlington, CT 06013 203-673-7151
§ Banner Engrg. Corp., 9714 - 10th Ave. N., Minneapolis, MN 55441 612-544-3164
§ Dolan-Jenner Inds., Box 1020, Woburn, MA 01801 617-935-7444
§ Eaton Corp./Cutler-Hammer Prods, Aerospace & Commercial Controls Div., 4201 N. 27th St., Milwaukee, WI 53216 414-449-7487
EG & G Rotron, Custom Div., Hasbrouck La., Woodstock, NY 12498 914-679-5201
§ Electromatic Controls Corp., 2495 Pembroke Road, Hoffman Estates, IL 60195-2010 312-882-5757
† Electron-Machine Corp., Box M, Umatilla, FL 32784 904-669-3101
Enerco, Inc., 9615 W. Marginal Way S., Seattle, WA 98108 206-762-1422
Evershed & Vignoles, Ltd., Acton Lane, Chiswick, London, ENGLAND W4 5HJ 01-994-3670
Fork Standards, Inc., 666 Western Ave., Lombard, IL 60148 312-932-9380
FSI/Fork Standards Inc., 666 Western Ave., Lombard, IL 60148 .... 312-231-3511; 312-932-9380
§ Grasslin Controls Corp., Dieter Grasslin Feinwerktechnik, 45 Spear Rd., Ramsey, NJ 07446 201-825-9696

HH Controls Co., Inc., 16 Frost St., Arlington, MA 02174 617-646-2626
§ Honeywell Optoelectronics, 830 E. Arapaho Dr., Richardson, TX 75080 214-234-4271
§ Hughey & Phillips, Inc., 3050 N. California St., Burbank, CA 91504 818-849-1104
§ Intermatic, Intermatic Plaza, Spring Grove, IL 60081 815-675-2321
Larson Instr., Greenbush Rd., Orangeburg, NY 10962 914-359-3800
§ Lektralab Technologies, Inc., 129-07 18th Ave., P.O. Box 222, College Point, NY 11356 718-939-7171
Luft Instrs., Hillside Rd., P.O. Box 214, Lincoln, MA 01773 617-259-9215
Macro Electronics Corp., 23 Royalston Lane, So. Setauket, NY 11720 516-698-3357
§ Markat Div., Wild Oats Corp., 3 Country Dr., Plainview, NY 11803 516-549-9272
§ Master Elctrn. Controls, P.O. Box 25905, Los Angeles, CA 90025 213-452-1336
McGill Mfg. Co., Inc., Electrical Div., 1002 N. Campbell St., Valparaiso, IN 46383 219-465-2200
§ Micro Switch, A Honeywell Div., 11 W. Spring St., Freeport, IL 61032 815-235-6600
§ Midland Standard, Inc., 603 E. Chicago St., Box 38, Elgin, IL 60120 312-741-6600
Namco-Leuze, A Namco Controls Affiliate Co., 7567 Tyler Blvd., Mentor, OH 44060 216-946-9900
§ Omron Elctrns., Inc., Control Comps. Div., One E. Commerce Dr., Schaumburg, IL 60195 312-843-7900
Optek Technology, Inc., 345 Industrial Blvd., McKinney, TX 75069 214-542-9461
§ Paragon Elect., 606 Parkway Blvd., Two Rivers, WI 54241 414-793-1161
Photobell, 26 Just Rd., Fairfield, NJ 07006 201-227-3613
§ Photoswitch Div., Electronics Corp. of Amer., 265 Winter St., Waltham, MA 02154 617-466-8000
§† Power Instrs. Products, Amatek/Mansfield & Green Div., 8600 Somerset Dr., Largo, FL 33543 813-536-7831
Regent Controls, 39 Fanny St., P.O. Box 767, Shelton, CT 06484-0767 203-736-2924
§ Ripley, 46 Nooks Hill Rd., Cromwell, CT 06416 203-635-2200
Scanning Devices, 108 Elm St., Waltham, MA 02154 617-891-8991
§ Scientific Technlg., 1201 San Antonio Rd., Mountain View, CA 94043 .... CA 415-965-0910;800-221-7060
Sensor Corp., Box 140, Scottdale, PA 15683 412-887-4080
§ Sigma Instrs., 170 Pearl St., Braintree, MA 02184 617-843-5000
Skan-A-Matic, Box S, Elbridge, NY 13060 315-689-3961
§ Square D Co., Executive Plaza, Palatine, IL 60067 312-397-2600
Tri-Tronics Co. Inc., 13420 Wright Cir., Tampa, FL 33624 813-855-4453
Unico, 3725 Nicholson Rd., Franksville, WI 53126-0505 414-886-5678
United Detector Tech., 12525 Chadron Ave., Hawthorne, CA 90250 213-978-0516
§ Veeder-Root, 70 Sargeant St., Hartford, CT 06102 203-527-7201
§ Xercon, Inc., P.O. Box 554, Portland, OR 97207 503-641-9525

Controls, Positioning-4100

BEI Motion Sys. Co., Digital Prods. Div., P.O. Box 3838, Little Rock, AR 72203, 501-851-4000 .... B•1782
BEI Motion Sys. Co., General Control Systems Div., 564 Alpha Dr., Pittsburgh, PA 15238, 412-963-0515 .... B•1783
§ Bodine Elec. Co., 2500 W. Bradley Pl., Chicago, IL 60618, 312-478-3515 .... B•1140
Electro-Craft, 1600 2nd St. S., Hopkins, MN 55343, 612-931-2700 .... B•1147,1149
ETI Systems, Polaris Indl. Entprs., 215 Via Del Norte, Oceanside, CA 92054, 619-757-7770 .... D•1120-1121
† Interface Engrg., 386 Lindelof Ave., Stoughton, MA 02072, 617-344-7383 .... D•1157
Magnum Opus Custom Elctrn. Engrg., 284 Kennedy St., Iselin, NJ 08830, 201-283-4925 .... D•1093
† Measurement Sys., Inc., 121 Water St., Norwalk, CT 06854, 203-838-5561 .... D•1126
§ Micro Switch, A Honeywell Div., 11 W. Spring St., Freeport, IL 61032, 815-235-6600 .... B•1626-1630
† Orbit Instrument Corp., 80 Cabot Ct., Hauppauge, NY 11788, 516-435-8300 .... B•1735, D•1129
Renco, 26 Coromar Dr., Goleta, CA 93017-3094, 805-968-1525 .... D•1131
Triac Electronic Systems, Inc., 87-27 Myrtle Ave., Glendale, NY 11385, 718-441-4759 .... D•1132
TS Products, Inc., 12455 Branford St., Bldg. 22, Arleta, CA 91331, 818-896-6676 .... D•1990
ABA Electromechanical Sys. Inc., Box 500, Pinellas Pk., FL 34290-0500 813-541-6681
Adams Rite Prods., Inc., 540 W. Chevy Chase Dr., Glendale, CA 91204 818-241-5121
§ Adatek, Inc., P.O. Box 1339, Sandpoint, ID 83864 .... 208-263-1471;800-323-3343
Advanced Control Sys., 24 Teed Dr., Randolph, MA 02368 617-963-4543
§ Aerotech, Inc., 101 Zeta Dr., Pittsburgh, PA 15238 412-963-7470
§ Allen-Bradley Co., Industrial Control Div., 1201 S. Second St., Milwaukee, WI 53201 414-671-2000
Amtek Digital Systems, Inc., 12740 28th N.E., Seattle, WA 98125 206-363-0217
§ Anaheim Automation, 910 E. Orangefair La., Anaheim, CA 92801 714-992-6990
Analog Systems, P.O. Box 35879, Tucson, AZ 85740-5879 602-293-4923
Applied Control, 1275 Bloomfield Ave., Fairfield, NJ 07006-2828 201-227-5454
§ A. S. R. Servotron, Inc., (Sub. Baldor Elec. Co.), 7945 Deering Ave., Canoga Park, CA 91304 818-999-6193
Astrosystems, 6 Nevada Dr., Lake Success, NY 11042 516-328-1600
Automatic Timing & Controls Co., 201 So. Gulph Rd., King of Prussia, PA 19406 .... 215-337-5500;800-441-8245
† Bailey Controls Co., 29801 Euclid Ave., Wickliffe, OH 44092 216-585-5800
§ B & B Motor & Control Corp., Apple Hill Commons, Burlington, CT 06013 203-673-7151
† BEI Motion Systems Co., Corporate Off., 166 Geary St., Ste. 1400, San Francisco, CA 94108 415-788-6840
BEI Motion Sys. Co., Computer Prod. Div., 1755 B La Costa Meadows Dr., San Marcos, CA 92069 619-471-2600
§ Bellofram Corp., A Rexnord Co., 30 Blanchard Rd., Burlington, MA 01803 .... 617-272-2100;800-225-1031
Bendix Corp., Electrodynamics Div., 11600 Sherman Way, N. Hollywood, CA 91605 818-765-1010
Berkeley Process Control, Inc., 5327-K Jacuzzi St., Richmond, CA 94804 415-526-3333
Bowmar/TIC, Inc., 850 Lawrence Dr., Newbury Park, CA 91320 805-498-2161
Bristol Babcock Inc., 40 Bristol St., Waterbury, CT 06708 203-575-3000
§ Burgess Switch Co., Inc., 638 Anthony Trail, North Brook, IL 60062 312-291-1760
Burleigh Instrs., Burleigh Pk., Fishers, NY 14453 716-924-9355
Capitol Machine & Switch Co., Box 890, Danbury, CT 06810 203-744-3300
Centent Co., 3879 S. Main St., Santa Ana, CA 92707 714-979-6491
† Columbia Resch. Labs., Macdade Blvd. & Bullens La., Woodlyn, PA 19094 215-532-9464
† Computer Conversions Corp., 6 Dunton Ct., E. Northport, NY 11731 516-261-3300
Computer Optical Prods., Inc., Sub. of Hathaway Corp., 9353 Eton Ave., Chatsworth, CA 91311-5866 818-882-0424
Contraves Goerz Corp., 610 Epsilon Dr., Pittsburgh, PA 15238 412-967-7700
Controls Unlimited, Inc., 4823 North Ridge Rd., Perry, OH 44081 216-259-2500
Control Technology Co., 41-16 29th St., Long Island City, NY 11101 718-361-2133
Cross Elctrns., 100 Commonwealth Dr., Warrendale, PA 15086 412-776-1591
General Numeric Corporation, 390 Kent Avenue, Elk Grove Village, IL 60007 312-640-1595
C-Tek Inc., 4 Railroad Ave., Wakefield, MA 01880 617-246-1720
Cybernetic Micro Sys., P.O. Box 3000, 3000 Hwy. 84, San Gregorio, CA 94074 415-726-3000
Data Technology, Inc., 4 Gill St., Woburn, MA 01811 617-935-8820
Datatran Labs, P.O. Box 384, Sussex, NJ 07461 914-856-4313
Datron Systems, Inc., 200 West Los Angeles Ave., Simi Valley, CA 93065-1650 805-584-1717
Digitus Corporation, 22 West 25th Street, Baltimore, MD 21218 301-467-3223
Disc Instruments, Honeywell, 102 E. Baker St., Costa Mesa, CA 92626 714-979-5300
Distributed Computer Sys., 223 Crescent St., Waltham, MA 02154 617-899-6619
§ Dolan-Jenner Inds., Box 1020, Woburn, MA 01801 617-935-7444
EG & G Torque Systems, 36 Arlington St., Watertown, MA 02172 617-924-6000
Electric Device, PO Box 337, Canfield, OH 44406 216-533-3060
Electrol Co., 321 Dewey St., P.O. Box 29, York, PA 17405 717-848-1722
† Electro-Magnetic Processes, Inc., 9616 Owensmouth Ave., Chatsworth, CA 91311 818-882-6333
† Electrospace Sys., Inc., P. O. Box 831359, Richardson, TX 75083-1359 214-783-2004
Evershed & Vignoles, Ltd., Acton Lane, Chiswick, London, ENGLAND W4 5HJ 01-994-3670
† GAP Instr., 40 Oser Ave., Hauppauge, NY 11787 516-273-0909
Giddings & Lewis Elctrns., A Unit of AMCA Intl., 666 S. Military Rd., P.O. Box 1658, Fond du Lac, WI 54935 414-921-7100
Gordos Corporation, Gordos International Corp., 250 Glenwood Ave., Bloomfield, NJ 07003 201-743-6800
Hecon Corp., 31 Park Rd., Tinton Falls, NJ 07724 201-542-9200
† Honeywell, Process Control Div., 1100 Virginia Dr., Ft. Washington, PA 19034 .... 800-321-5111, Ext. 596
Hughes Aircraft Co, Aerospace Grps./Support Sys., P.O. Box 90515, Los Angeles, CA 90009 213-670-1515
Hughes Aircraft Co., Microelctrn. Sys. Div., 2601 Campus Dr., Irvine, CA 92715 714-752-3800
Icon, 156 Sixth St., Cambridge, MA 02142 617-868-5400
† Industrial Control Co., 3100 Pineda Ave., Rockledge, FL 32955 305-259-7105
† Inland Motor, Kollmorgen Corp., 501 First St., Radford, VA 24141 703-639-9045
Innovatek Microsystems, Inc., Smithfield Rd., R1 Box 104, Millerton, NY 12546-9720 914-373-9003
Instrumentation & Control Sys., 520 Interstate Rd, Addison, IL 60101 312-543-6200
§ ITT General Controls Div., Intl. Telephone & Telegraph Corp., 801 Allen Ave., Glendale, CA 91201 213-842-6131
Leeds & Northrup Instrs., A Unit of General Signal Corp., Sumneytown Pike, North Wales, PA 19454 215-643-2000
§ Love Controls, 1475 S. Wheeling Rd., Wheeling, IL 60090 312-541-3232
Luft Instrs., Hillside Rd., P.O. Box 214, Lincoln, MA 01773 617-259-9215
Magnetoelastic Devices, 326 Springside Ave., Box 625, Pittsfield, MA 01201 413-445-5608
§ Markat Div., Wild Oats Corp., 3 Country Dr., Plainview, NY 11803 516-549-9272
Mesur-Matic Elctrns., 50 Grove St., Salem, MA 01970-2294 617-745-7000
Metis, P.O. Box 1499, Bowie, MD 20716 301-249-1702
† Microavionics Corp., 3198-K Airport Loop Dr., Costa Mesa, CA 92626 714-957-6904
Micro Mo Electronics, Inc., 742 2nd Ave. S., St. Petersburg, FL 33701 813-822-2529
§ MKS Electronics Corp., 454 E. Donovan Rd., Kansas City, KS 66115 913-371-1351
§ National Sonics/Xertex Corp., 250 Marcus Blvd., Hauppauge, NY 11787 516-273-6600
§ NES, Inc. (Nationwide Electronic Systems), 3003 Wakefield, Carpentersville, IL 60110 312-426-5900
Northern Precision Labs., 11 Madison Rd., Fairfield, NJ 07006 201-227-4800
† Orbit Instrument of Cal., 6431 Global Dr., Cypress, CA 90630 714-527-0561
† Performance Controls Inc., 333-E Byberry Rd., Hatboro, PA 19040 215-675-6500
PIC Design, P.O. Box 1004, Middlebury, CT 06762 203-758-8272
POWR-UPS Corp., 50 Orville Drive, Bohemia, NY 11716 516-589-3602
† Precision Mechanisms, 44 Brooklyn Ave., Westbury, NY 11590 .... 516-ED3-5955
Rapidsyn, 3233 Roymar Rd., Oceanside, CA 92054 619-439-7500
Reliance Electric Co., Marketing Info Center, P.O. Box 99502, Cleveland, OH 44199 .... 800-245-4501;800-245-4497 In Ohio
Research, Inc., Box 24064, Minneapolis, MN 55424 612-941-3300
Robinson-Halpern, One Apollo Rd., P.O. Box 248, Plymouth Meeting, PA 19462-0248 215-825-9200
Scanning Devices, 108 Elm St., Waltham, MA 02154 617-891-8991
§ Scientific Technlg., 1201 San Antonio Rd., Mountain View, CA 94043 .... CA 415-965-0910;800-221-7060
Sequential Info. Sys., 249 N. Saw Mill River Rd., Elmsford, NY 10523 914-592-5930
Servo-Tek Prods. Co., 1086 Goffle Rd., Hawthorne, NJ 07506 201-427-3100
Skan-A-Matic, Box S, Elbridge, NY 13060 315-689-3961
Summit Engineering Corp., Box 938, Bozeman, MT 59715 406-587-4511
§† Superior Elec. Co., 383 Middle St., Bristol, CT 06010 203-582-9561

Synektron Corporation, 12000 S. W. Garden Place, Portland, OR 97223 503-684-3090
§ Techno Vation, Inc., 14 Crandall Ave., Rompton Lakes, NJ 07442 201-839-0740
Teledyne Gurley, 514 Fulton St. P.O. Box 88, Troy, NY 12181 518-272-6300
§ Temposonics, MTS Sys. Corp., 111 East Ames Ct., Plainview, NY 11803 516-349-1950
Transducer Systems, Inc., 1510 Delp Dr., Kulpsville, PA 19443 215-256-4611
† Transicoil, Inc., Trooper Rd., P.O. Box 99, Worcester, PA 19490-9990 215-277-1300
† Transmagnetics, 210 Adams Blvd., Farmingdale, NY 11735 516-293-3100
Trans-Tek, P.O. Box 338, Rte. 83, Ellington, CT 06029 203-872-8351
Tri-Tronics Co. Inc., 13420 Wright Cir., Tampa, FL 33624 813-855-4453
Unico, 3725 Nicholson Rd., Franksville, WI 53126-0505 414-886-5678
United Solder Wrap Inc., 2608 Electronic La., Ste 509, Dallas, TX 75220 214-350-4978
§ Veeder-Root, 70 Sargeant St., Hartford, CT 06102 203-527-7201
† Vernitech, 300 Marcus Blvd., Deer Pk., NY 11729 516-586-5100
† Warren-Knight Instr. Co., Warren Inds., Inc., 2045 Bennett Rd., Philadelphia, PA 19116 215-464-9300
§ Westamp, 1542 15th St., Santa Monica, CA 90404 213-393-0401
Whedco, Inc., 6107 Jackson Rd., Ann Arbor, MI 48103 313-665-5473
Xycom, 750 N. Maple Rd., Saline, MI 48176 313-429-4971
ZI-TECH Instr. Corp., 2151 Park Blvd., Box 60490, Palo Alto, CA 94306 415-326-2151

Controls, Pressure-2200

Harrel, Inc., 16 Fitch St., E. Norwalk, CT 06855, 203-866-2573 ..... D•1122
§ **NES, Inc. (Nationwide Electronic Systems), 3003 Wakefield, Carpentersville, IL 60110, 312-426-5900 ..... D•1368**
§ Airmatic-Allied, 185 Park Dr., Wilmington, OH 45177 513-382-1691
Allen-Bradley Co., Industrial Control Div., 1201 S. Second St., Milwaukee, WI 53201 414-671-2000
§ Ametek, 2 Station Square, Paoli, PA 19301 215-355-6900
§ API Instrs., 1601 Trapelo Rd., Waltham, MA 02254 617-890-2000
† Atec, Inc., Box 19426, 8219 Kempwood Dr., Houston, TX 77055 713-468-7971
Automatic Switch Co., 50-60 Hanover Road, Florham Park, NJ 07932 1-201-966-2000
† Bailey Controls Co., 29801 Euclid Ave., Wickliffe, OH 44092 216-585-5800
Barber-Colman Co., Indl. Instrs. Div., P.O. Box 2940, 1354 Clifford Ave., Loves Park, IL 61132 815-877-0241
Barksdale Controls Div., Transamenca DeLaval, 3211 Fruitland Ave., P.O. Box 58843, Los Angeles, CA 90058 213-589-6181
§ Bellofram Corp., A Rexnord Co., 30 Blanchard Rd., Burlington, MA 01803 ..... 617-272-2100;800-225-1031
Bristol Babcock Inc., 40 Bristol St., Waterbury, CT 06708 203-575-3000
Cambridge Aero Instruments, Inc., 6A Dunham Rd., Billerica, MA 01821 617-275-0889
† Columbia Resch. Labs., Macdade Blvd. & Bullens La., Woodlyn, PA 19094 215-532-9464
Columbus Elec. Mfg., Box 289A Rt #2, Piney Flats, TN 37686 615-538-8191
Computer Instrs., 100 Madison Ave., Hempstead, NY 11550 516-483-8200
† Conrac Corp., System Comps. Div., 1700 S. Mountain Ave., Duarte, CA 91010 213-359-9141
† Consolidated Controls, 15 Durant Ave., Bethel, CT 06801 203-743-6721
† Control Technology Co., 41-16 29th St., Long Island City, NY 11101 718-361-2133
§ CVC Prods., 525 Lee Rd., Rochester, NY 14603 716-458-2550
Data Instruments, Inc., 4 Hartwell Pl., Lexington, MA 02173 617-861-7450
Datatran Labs, P.O. Box 384, Sussex, NJ 07461 914-856-4313
§ Dynisco, 10 Oceana Way, Norwood, MA 02062 617-769-6600
§ Electromatic Controls Corp., 2495 Pembroke Road, Hoffman Estates, IL 60195-2010 312-882-5757
Electronic Prods. Corp., Interstate Indl. Plaza, R. D. #5, York, PA 17402 717-767-6517
Fasco Industries, Inc., Div. of Hawker Siddeley Grp. Plc., 601 North Federal Highway, Boca Raton, FL 33432 305-368-0600
§† Furnas Elec., 1197 McKee St., Batavia, IL 60510 312-879-6000
Honeywell Inc., Commercial Div., MN 27-7246, Honeywell Plaza, Minneapolis, MN 55408 612-870-5357
† Honeywell, Process Control Div., 1100 Virginia Dr., Ft. Washington, PA 19034 ..... 800-321-5111, Ext. 596
Inconix Corp., 10 Tech Circle, Natick, MA 01760 617-655-1170
§ IVEK Corp., 43 School St., N. Springfield, VT 05150 802-886-8278
Iveron Pacific, 1150 Morena Boulevard, San Diego, CA 92110-3899 619-275-1500
§ Jumbo Process Control, Inc., 410 Garibaldi Ave., Lodi, NJ 07644 201-779-7744
Leeds & Northrup Instrs., A Unit of General Signal Corp., Sumneytown Pike, North Wales, PA 19454 215-643-2000
Litton Potentiometer Div., 750 So. Fulton Ave., Mt. Vernon, NY 10551 914-664-7733
§ Love Controls, 1475 S. Wheeling Rd., Wheeling, IL 60090 312-541-3232
Luft Instrs., Hillside Rd., P.O. Box 214, Lincoln, MA 01773 617-259-9215
Macro Electronics Corp., 23 Royalston Lane, So. Setauket, NY 11720 516-698-3357
§ Markat Div., Wild Oats Corp., 3 Country Dr., Plainview, NY 11803 516-549-9272
§† MKS Instrs., Inc., 22 Third Ave., Burlington, MA 01803 617-272-9255
C. A. Norgren Co., 5400 South Delaware, Littleton, CO 80120-1663 303-794-2611
Omega Engrg., Box 4047, Stamford, CT 06907 203-359-1660
Parker Hannifin Corp., 17325 Euclid Ave., Cleveland, OH 44112 216-531-3000
† Pressure Controls, Inc., 406 Cortlandt St., Belleville, NJ 07109 201-751-5003
Research, Inc., Box 24064, Minneapolis, MN 55424 612-941-3300
Robinson-Halpern, One Apollo Rd., P.O. Box 248, Plymouth Meeting, PA 19462-0248 215-825-9200
Sanders Assocs., Flexprint Prods. Div., Grenier Fld., Manchester, NH 03103 603-669-4615
§ Square D Co., Executive Plaza, Palatine, IL 60067 312-397-2600
Texas Instrs., Matls. & Controls Grp., 34 Forrest St., Attleboro, MA 02703 617-699-3800
Therm-O-Disc, Inc., Sub. Emerson Elec. Co., 1320 South Main St., P. O. Box 3538, Mansfield, OH 44907 419-756-5911
§ United Elec. Controls, 85 School St., Watertown, MA 02172 ..... 617-WA6-1000

Varian Assocs., Indl. Equip. Grp., 611 Hansen Way, Palo Alto, CA 94303 415-493-4000

Controls, Proportional-2200

§ **Douglas Randall, 6 Pawcatuck Ave., Pawcatuck, CT 06379, 203-599-2075 ..... B•1330-1331**
POWR-UPS Corp., 50 Orville Drive, Bohemia, NY 11716, 516-589-3602 ..... B•1182
Superior Elec. Co., 383 Middle St., Bristol, CT 06010, 203-582-9561 ..... B•1193
Triac Electronic Systems, Inc., 87-27 Myrtle Ave., Glendale, NY 11385, 718-441-4759 ..... D•1132
TS Products, Inc., 12455 Branford St., Bldg. 22, Arleta, CA 91331, 818-896-6676 ..... D•1990
§ American Control Products, Div. of Precision Timer Co., Inc., 13 Westbrook Ind'l. Pk., Westbrook, CT 06498 203-399-6253
§ Ametek, 2 Station Square, Paoli, PA 19301 215-355-6900
Antex Electronics Corp., 16100 S. Figueroa St., Gardena, CA 90248 213-532-3092
§ API Instrs., 1601 Trapelo Rd., Waltham, MA 02254 617-890-2000
Applied Control, 1275 Bloomfield Ave., Fairfield, NJ 07006-2828 201-227-5454
§ Athena Controls, Inc., 5145 Campus Dr., Whitemarsh Ind. Campus, Plymouth Meeting, PA 19462 215-828-2490
† Automation Prods., Inc., 3030 Max Roy, Houston, TX 77008 713-869-0361
† Bailey Controls Co., 29801 Euclid Ave., Wickliffe, OH 44092 216-585-5800
Barber-Colman Co., Indl. Instrs. Div., P.O. Box 2940, 1354 Clifford Ave., Loves Park, IL 61132 815-877-0241
† Bendix Corp., Electrodynamics Div., 11600 Sherman Way, N. Hollywood, CA 91605 818-765-1010
† Blue M, A Unit of General Signal, 138th & Chatham Sts., Blue Island, IL 60406 312-385-9000
Bristol Babcock Inc., 40 Bristol St., Waterbury, CT 06708 203-575-3000
Centent Co., 3879 S. Main St., Santa Ana, CA 92707 714-979-6491
Contraves Goerz Corp., 610 Epsilon Dr., Pittsburgh, PA 15238 412-967-7700
Control Prods., Devar, Inc., P.O. Box 589, Bridgeport, CT 06601 203-368-6751
† Control Technology Co., 41-16 29th St., Long Island City, NY 11101 718-361-2133
Cross Elctrns., 100 Commonwealth Dr., Warrendale, PA 15086 412-776-1591
Dantronics, Inc., 3175 Hafner Ct., St. Paul, MN 55112 612-484-2108
§ Dolan-Jenner Inds., Box 1020, Woburn, MA 01801 617-935-7444
§ Eagle Signal Controls, Mfg. Div. Gulf & Western Inds., Box 16100, Austin, TX 78761 512-837-8300
Elma Engrg., 1066 E. Meadow Circle, Palo Alto, CA 94303 415-494-7303
§ Giddings & Lewis Elctrns., A Unit of AMCA Intl., 666 S. Military Rd., P.O. Box 1658, Fond du Lac, WI 54935 414-921-7100
Harrel, Inc., 16 Fitch St., E. Norwalk, CT 06855 203-866-2573
§ Hobart Engrg., 4143 Cheshire Dr., Cypress, CA 90630 714-827-2135
Honeywell Inc., Commercial Div., MN 27-7246, Honeywell Plaza, Minneapolis, MN 55408 612-870-5357
† Honeywell, Process Control Div., 1100 Virginia Dr., Ft. Washington, PA 19034 ..... 800-321-5111, Ext. 596
Inconix Corp., 10 Tech Circle, Natick, MA 01760 617-655-1170
† Industrial Control Co., 3100 Pineda Ave., Rockledge, FL 32955 305-259-7105
§ ITT General Controls Div., Intl. Telephone & Telegraph Corp., 801 Allen Ave., Glendale, CA 91201 213-842-6131
§ IVEK Corp., 43 School St., N. Springfield, VT 05150 802-886-8278
Iveron Pacific, 1150 Morena Boulevard, San Diego, CA 92110-3899 619-275-1500
§ Jewell Electrical Instrs., Grenier Field, Manchester, NH 03108 603-669-6400
Kalglo Elctrns. Co., Inc., 6584 Ruch Rd., E. Allen Twp., Bethlehem, PA 18017 215-837-0700
Kaye Instruments, 15 De Angelo Dr., Bedford, MA 01730 617-275-0300
† Ledex Inc., P.O. Box 427, Vandalia, OH 45377 513-898-3621
Leeds & Northrup Instrs., A Unit of General Signal Corp., Sumneytown Pike, North Wales, PA 19454 215-643-2000
§ Love Controls, 1475 S. Wheeling Rd., Wheeling, IL 60090 312-541-3232
Machine Components Corp., 70 Newtown Rd., Plainview, NY 11803 516-694-7222
† Measurement Sys., Inc., 121 Water St., Norwalk, CT 06854 203-838-5561
§ MKS Electronics Corp., 454 E. Donovan Rd., Kansas City, KS 66115 913-371-1351
§† National Sonics/Xertex Corp., 250 Marcus Blvd., Hauppauge, NY 11787 516-273-6600
Omega Engrg., Box 4047, Stamford, CT 06907 203-359-1660
† Oven Inds., 191 Hempt Rd., P.O. Box 290, Mechanicsburg, PA 17055 717-766-0721
§ Payne Engrg., Box 70, Scott Depot, WV 25560 304-757-7353
Phalo Corp., Transitron Elctrn. Corp., 2 Friberg Parkway, Westborough, MA 01581 617-366-0830
§ Research, Inc., Box 24064, Minneapolis, MN 55424 612-941-3300
§ RFL Inds., Thermocontrol Div., W. Prospect St., Box 250, Brandon, VT 05733 802-247-6811
RI/Control Systems, Research, Inc., P.O. Box 24064, Minneapolis, MN 55424 612-941-3300
Scanning Devices, 108 Elm St., Waltham, MA 02154 617-891-8991
Sigma Instrs., 170 Pearl St., Braintree, MA 02184 617-843-5000
† Transmagnetics, 210 Adams Blvd., Farmingdale, NY 11735 516-293-3100
Unico, 3725 Nicholson Rd., Franksville, WI 53126-0505 414-886-5678
§ Vectrol, Division of Westinghouse Elec. Corp., 110 Douglas Rd, Oldsmar, FL 33557 813-855-4621
§ Veeder-Root, 70 Sargeant St., Hartford, CT 06102 203-527-7201
§ West Division, Gulton Industries, Inc., 3860 N. River Rd., Schiller Park, IL 60176 312-678-6400

Controls, Proximity-Also See Controls, Capacitance Operated-2200

Curtis Inds., 8000 West Tower Ave., Milwaukee, WI 53223, 414-354-1500 ..... D•1978
§ **Micro Switch, A Honeywell Div., 11 W. Spring St., Freeport, IL 61032, 815-235-6600 ..... B•1476**
Triac Electronic Systems, Inc., 87-27 Myrtle Ave., Glendale, NY 11385, 718-441-4759 ..... D•1132
§ Airmatic-Allied, 185 Park Dr., Wilmington, OH 45177 513-382-1691
§ Alco Elctrn. Prods., Inc., 1551 Osgood St., N. Andover, MA 01845 617-685-4371

Controls, Proximity-2200 (Cont'd)

Allen-Bradley Co., Industrial Control Div., 1201 S. Second St., Milwaukee, WI 53201 414-671-2000
Automatic Timing & Controls Co., 201 So. Gulph Rd., King of Prussia, PA 19406 .... 215-337-5500;800-441-8245
† Autronics, 314 E. Live Oak, Ste. A, Arcadia, CA 91006 818-445-5470
§ B & B Motor & Control Corp., Apple Hill Commons, Burlington, CT 06013 203-673-7151
Bindicator, P.O. Box 9, 1915 Dove St., Port Huron, MI 48060 313-987-2700
§ Clare Division, General Instrument Corp., 3101 W. Pratt Blvd., Chicago, IL 60645 312-262-7700
§ Crouzet Controls, Inc., 1083 State Pkwy., Schaumburg, IL 60195 312-843-2200
§ Dolan-Jenner Inds., Box 1020, Woburn, MA 01801 617-935-7444
Douglas Randall, 6 Pawcatuck Ave., Pawcatuck, CT 06379 203-599-2075
§ Eaton Corp./Cutler-Hammer Prods, Aerospace & Commercial Controls Div., 4201 N. 27th St., Milwaukee, WI 53216 414-449-7487
Efector, Inc., 201 So. Gulph Rd., King of Prussia, PA 19406 .... 215-337-5500; 800-441-8245
† Eldec Corporation, Sensing Systems Div., 16700 13th Ave. West, P.O. Box 100, Lynnwood, WA 98046-0100 206-487-4000
§ Electromatic Controls Corp., 2495 Pembroke Road, Hoffman Estates, IL 60195-2010 312-882-5757
EOTec Corp., 420 Frontage Road, W. Haven, CT 06516 203-934-7961
Essex Group, 9933 13th St., Ft. Wayne, IN. 46809 219-478-1521
Fork Standards, Inc., 666 Western Ave., Lombard, IL 60148 312-932-9380
§ Gordon Prods., 67 Del Mar Dr., Brookfield, CT 06804 203-775-4501
H-A-Z Laboratories, Brass Castle Rd., P.O. Box 67-M, Washington, NJ 07882 201-689-0110
§ Hobart Engrg., 4143 Cheshire Dr., Cypress, CA 90630 714-827-2135
Instrumentation & Control Sys., 520 Interstate Rd, Addison, IL 60101 312-543-6200
§ Lion Precision, 60 Bridge St., Newton, MA 02195 617-969-4710
§ Midland Standard, Inc., 603 E. Chicago St., Box 38, Elgin, IL 60120 312-741-6600
§ Namco Controls, An Acme-Cleveland Co., 7567 Tyler Blvd., Mentor, OH 44060 216-946-9900
C. A. Norgren Co., 5400 South Delaware, Littleton, CO 80120-1663 303-794-2611
§ Omron Elctrns., Inc., Control Comps. Div., One E. Commerce Dr., Schaumburg, IL 60195 312-843-7900
§ Photoswitch Div., Electronics Corp. of Amer., 265 Winter St., Waltham, MA 02154 617-466-8000
Princo Instrs., Inc., 1020 Industrial Hwy., Southampton, PA 18966 215-355-1500
§ Reed Switch Dev. Co. Inc., PO Box 1464, Kerrville, TX 78028 512-896-4444
§ Scientific Technlg., 1201 San Antonio Rd., Mountain View, CA 94043 .... CA 415-965-0910;800-221-7060
Sensor Corp., Box 140, Scottdale, PA 15683 412-887-4080
Skan-A-Matic, Box S, Elbridge, NY 13060 315-689-3961
§ Square D Co., Executive Plaza, Palatine, IL 60067 312-397-2600
§ Techno Vation, Inc., 14 Crandall Ave., Pompton Lakes, NJ 07442 201-839-0740
Transducer Systems, Inc., 1510 Delp Dr., Kulpsville, PA 19443 215-256-4611
Tri-Tronics Co. Inc., 13420 Wright Cir., Tampa, FL 33624 813-855-4453
§ Veeder-Root, 70 Sargeant St., Hartford, CT 06102 203-527-7201
† Whittaker Corp., 10880 Wilshire Blvd., Los Angeles, CA 90024 213-475-9411

Controls, Remote-2200

§ Bodine Elec. Co., 2500 W. Bradley Pl., Chicago, IL 60618, 312-478-3515 .... B•1140
Magnum Opus Custom Elctrn. Engrg., 284 Kennedy St., Iselin, NJ 08830, 201-283-4925 .... D•1093
§ Micro Switch, A Honeywell Div., 11 W. Spring St., Freeport, IL 61032, 815-235-6600 .... B•1476
Phi Technologies, Inc., 4605 North Stiles, Oklahoma City, OK 73105, 405-521-9000 .... D•1052-1054
Preh Electronics Industries, Inc., 5665 Howard Street, Niles, IL 60648, 312-647-8338 .... B•1736
Triac Electronic Systems, Inc., 87-27 Myrtle Ave., Glendale, NY 11385, 718-441-4759 .... D•1132
† Aeroflex Labs., Magnetic Prods. Div.,, 35 South Service Road, Plainview, NY 11803 516-694-6700
§ Alco Elctrn. Prods., Inc., 1551 Osgood St., N. Andover, MA 01845 617-685-4371
§ Allen-Bradley Co., Industrial Control Div., 1201 S. Second St., Milwaukee, WI 53201 414-671-2000
§ Alps Electric (USA), Inc., 3553 N. First St., San Jose, CA 95134 408-946-6000
§ American Control Products, Div. of Precision Timer Co., Inc., 13 Westbrook Ind'l. Pk., Westbrook, CT 06498 203-399-6253
Applied Control, 1275 Bloomfield Ave., Fairfield, NJ 07006-2828 201-227-5454
† A.R.F. Prods., 2559 75th St., Boulder, CO 80301 303-443-4844
Automatic Switch Co., 50-60 Hanover Road, Florham Park, NJ 07932 1-201-966-2000
Automatic Timing & Controls Co., 201 So. Gulph Rd., King of Prussia, PA 19406 .... 215-337-5500;800-441-8245
Automation Unltd., 10H Roessler Rd., Woburn, MA 01801 617-933-7288
† Bailey Controls Co., 29801 Euclid Ave., Wickliffe, OH 44092 216-585-5800
Barber-Colman Co., Indl. Instrs. Div., P.O. Box 2940, 1354 Clifford Ave., Loves Park, IL 61132 815-877-0241
§ Bellofram Corp., A Rexnord Co., 30 Blanchard Rd., Burlington, MA 01803 .... 617-272-2100;800-225-1031
Bindicator, P.O. Box 9, 1915 Dove St., Port Huron, MI 48060 313-987-2700
Bristol Babcock Inc., 40 Bristol St., Waterbury, CT 06708 203-575-3000
Burr-Brown Corp., P.O. Box 11400, Tucson, AZ 85734 602-746-1111
CDS - Colorado Data Sys., 3301 W. Hampden, Unit C, Englewood, CO 80110 303-762-1640
Coastcom, P.O. Box 27068, Concord, CA 94527 415-825-7500
† Columbia Resch. Labs., Macdade Blvd. & Bullens La., Woodlyn, PA 19094 215-532-9464
§ Control Prods., Devar, Inc., P.O. Box 589, Bridgeport, CT 06601 203-368-6751
† Control Technology Co., 41-16 29th St., Long Island City, NY 11101 718-361-2133
Dantel, 2991 N. Argyle Ave., Fresno, CA 93727 209-292-1111
§† Data-Control Sys., Commerce Dr., Box 860, Danbury, CT 06810 203-743-9241
§ Dataprobe, 110 Palisades Blvd., Palisades Park, NJ 07650 201-947-9500
Datron Systems, Inc., 200 West Los Angeles Ave., Simi Valley, CA 93065-1650 805-584-1717
Digital Transmission Techniques, Inc., P.O. Box 1847, Wayne, NJ 07470 201-831-1615
Digitek Inc., P.O. Box 468, Kenmore, WA 98028 206-485-6571
† D. O. Industries, 317 E. Chestnut St., E. Rochester, NY 14445 716-385-4920
§ Dolan-Jenner Inds., Box 1020, Woburn, MA 01801 617-935-7444
Dynage/Controls, Inc., 2 Willowbrook Rd., Cromwell, CT 06416 203-635-6257
§ Eaton Corp./Cutler-Hammer Prods, Aerospace & Commercial Controls Div., 4201 N. 27th St., Milwaukee, WI 53216 414-449-7487
Efector, Inc., 201 So. Gulph Rd., King of Prussia, PA 19406 .... 215-337-5500; 800-441-8245
Electro-Craft, 1600 2nd St. S., Hopkins, MN 55343 612-931-2700
§ Electrol Co., 321 Dewey St., P.O. Box 29, York, PA 17405 717-848-1722
§ Electromatic Controls Corp., 2495 Pembroke Road, Hoffman Estates, IL 60195-2010 312-882-5757
† Electrospace Sys., Inc., P. O. Box 831359, Richardson, TX 75083-1359 214-783-2004
ETI Systems, Polaris Indl. Entprs., 215 Via Del Norte, Oceanside, CA 92054 619-757-7770
Evershed & Vignoles, Ltd., Acton Lane, Chiswick, London, ENGLAND W4 5HJ 01-994-3670
§† Furnas Elec., 1197 McKee St., Batavia, IL 60510 312-879-6000
§ GC Elctrns., 400 S. Wyman St., Rockford, IL 61101 815-968-9661
† GRIM Corporation, Box 67, Medford, NJ 08055 609-267-7950
† Honeywell, Process Control Div., 1100 Virginia Dr., Ft. Washington, PA 19034 .... 800-321-5111, Ext. 596
§ Industrial Computer Designs, Inc., 31264 La Baya Drive, Westlake Village, CA 91362 818-889-3179
† Industrial Control Co., 3100 Pineda Ave., Rockledge, FL 32955 305-259-7105
Innovatek Microsystems, Inc., Smithfield Rd., R1 Box 104, Millerton, NY 12546-9720 914-373-9003
Kinetic Sys., 11 Maryknoll Dr., Lockport, IL 60441 815-838-0005
Landis & Gyr, Inc., 4 Westchester Plaza, Elmsford, NY 10523 914-592-4400
† Ledex Inc., P.O. Box 427, Vandalia, OH 45377 513-898-3621
Leeds & Northrup Instrs., A Unit of General Signal Corp., Sumneytown Pike, North Wales, PA 19454 215-643-2000
§ Love Controls, 1475 S. Wheeling Rd., Wheeling, IL 60090 312-541-3232
Luft Instrs., Hillside Rd., P.O. Box 214, Lincoln, MA 01773 617-259-9215
Markat Div., Wild Oats Corp., 3 Country Dr., Plainview, NY 11803 516-549-9272
† Measurement Sys., Inc., 121 Water St., Norwalk, CT 06854 203-838-5561
Metis, P.O. Box 1499, Bowie, MD 20716 301-249-1702
† Microavionics Corp., 3198-K Airport Loop Dr., Costa Mesa, CA 92626 714-957-6904
Oak Switch Sys., 100 S. Main St., Crystal Lake, IL 60014 815-459-5000
§ Ohmite Mfg. Co., 3601 W. Howard St., Skokie, IL 60076 312-675-2600
§† Pres-Air-Trol Corp., 1009 Boston Post Rd., Mamaroneck, NY 10543 .... 914-698-2026-800-431-2625 (outside NY)
RCI/Data, 1992 Lakewood Rd., Toms River, NJ 08753 201-341-8361
Reliance Electric Co., Marketing Info Center, P.O. Box 99502, Cleveland, OH 44199 .... 800-245-4501;800-245-4497 In Ohio
§ Scientific Technlg., 1201 San Antonio Rd., Mountain View, CA 94043 .... CA 415-965-0910;800-221-7060
§ Square D Co., Executive Plaza, Palatine, IL 60067 312-397-2600
Superior Elec. Co., 383 Middle St., Bristol, CT 06010 203-582-9561
§ Syracuse Elctrns., P.O. Box 4770, Syracuse, NY 13221 315-488-4911
Systems Resch. Labs., Inc., 2800 Indian Ripple Rd., Dayton, OH 45440 513-426-6000
§ SYT, 1220 Barranca, El Paso, TX 79935 915-593-1234
Teledyne/Geotech, 3401 Shiloh Rd., Garland, TX 75041 214-271-2561
† Transmagnetics, 210 Adams Blvd., Farmingdale, NY 11735 516-293-3100
§ Veeder-Root, 70 Sargeant St., Hartford, CT 06102 203-527-7201
§ Vicon Industries, Inc., 525 Broad Hollow Rd., Melville, NY 11747 516-293-2200
† Western DataCom, 5083 Market St., Youngstown, OH 44512 216-788-6583
§† Workman Elctrn. Prods., Box 3828, Sarasota, FL 33578 813-371-4242

Controls, Run, Shutdown Command, Start-2200

C-Tek Inc., 4 Railroad Ave., Wakefield, MA 01880, 617-246-1720 .... D•1114
NES, Inc. (Nationwide Electronic Systems), 3003 Wakefield, Carpentersville, IL 60110, 312-426-5900 .... D•1069,1127,1159
Active Control Instrmn., P.O. Box 243-Wildwood Circle, Key Largo, FL 33037 305-451-1000
Advanced Control Sys., 24 Teed Dr., Randolph, MA 02368 617-963-4543
Allen-Bradley Co., Industrial Control Div., 1201 S. Second St., Milwaukee, WI 53201 414-671-2000
Ambi-Tech Inds., 319 Knickerbocker Ave., Hillsdale, NJ 07642 201-666-0504
§ American Control Products, Div. of Precision Timer Co., Inc., 13 Westbrook Ind'l. Pk., Westbrook, CT 06498 203-399-6253
§ Anaheim Automation, 910 E. Orangefair La., Anaheim, CA 92801 714-992-6990
§ API Instrs., 1601 Trapelo Rd., Waltham, MA 02254 617-890-2000
Applied Control, 1275 Bloomfield Ave., Fairfield, NJ 07006-2828 201-227-5454
Applied Sys., 26401 Harper Ave., St. Clair Shores, MI 48081 313-779-8700
† Autronics, 314 E. Live Oak, Ste. A, Arcadia, CA 91006 818-445-5470
† Bailey Controls Co., 29801 Euclid Ave., Wickliffe, OH 44092 216-585-5800
Bindicator, P.O. Box 9, 1915 Dove St., Port Huron, MI 48060 313-987-2700
Capitol Machine & Switch Co., Box 890, Danbury, CT 06810 203-744-3300
Cardinal Control Co., 110 Kensington Rd., Kensington, CT 06037 203-828-6379
CDS - Colorado Data Sys., 3301 W. Hampden, Unit C, Englewood, CO 80110 303-762-1640
Control Prods., Devar, Inc., P.O. Box 589, Bridgeport, CT 06601 203-368-6751
Cybernetic Micro Sys., P.O. Box 3000, 3000 Hwy. 84, San Gregorio, CA 94074 415-726-3000
Digitek Inc., P.O. Box 468, Kenmore, WA 98028 206-485-6571
Dynage/Controls, Inc., 2 Willowbrook Rd., Cromwell, CT 06416 203-635-6257
Eldec Corp., Monitor & Control Div., 16700 13th Ave. W., P.O. Box 100, Lynnwood, WA 98046-0100 206-743-1313
§ Electrol Co., 321 Dewey St., P.O. Box 29, York, PA 17405 717-848-1722

Electronic Prods. Corp., Interstate Indl. Plaza, R. D. #5, York, PA 17402 717-767-6517
§† Furnas Elec., 1197 McKee St., Batavia, IL 60510 312-879-6000
H-A-Z Laboratories, Brass Castle Rd., P.O. Box 67-M, Washington, NJ 07882 201-689-0110
§ Hobart Engrg., 4143 Cheshire Dr., Cypress, CA 90630 714-827-2135
Instrumentation & Control Sys., 520 Interstate Rd, Addison, IL 60101 312-543-6200
Iveron Pacific, 1150 Morena Boulevard, San Diego, CA 92110-3899 619-275-1500
Ledex Inc., P.O. Box 427, Vandalia, OH 45377 513-898-3621
Macrotronix, Inc., 4016 N. Home St., Mishawaka, IN 46545 219-256-5503
Magnum Opus Custom Elctrn. Engrg., 284 Kennedy St., Iselin, NJ 08830 201-283-4925
§ Markat Div., Wild Oats Corp., 3 Country Dr., Plainview, NY 11803 516-549-9272
Mega Logic, 9659 Natl. Rd., Brookville, OH 45309 513-833-5222
Metra Instrs., 2056 Bering Dr., San Jose, CA 95131 408-297-8530
§ Micro Switch, A Honeywell Div., 11 W. Spring St., Freeport, IL 61032 815-235-6600
§† Nolatron, P.O. Box 4042, Harrisburg, PA 17111 717-564-3398
C. A. Norgren Co., 5400 South Delaware, Littleton, CO 80120-1663 303-794-2611
Research, Inc., Box 24064, Minneapolis, MN 55424 612-941-3300
§ Scientific Technlg., 1201 San Antonio Rd., Mountain View, CA 94043 .... CA 415-965-0910;800-221-7060
§ Square D Co., Executive Plaza, Palatine, IL 60067 312-397-2600
Tapeswitch Corp. of America, 100 Schmitt Blvd., Farmingdale, NY 11735 516-694-6312
Timeco, Inc., 1035 - 26th St., P.O. Box 8036, Huntington, WV 25705 304-523-5149
† TRAK Systems, Div. TRAK Microwave Corp., 4722 Eisenhower Blvd., Dept. E-5, Tampa, FL 33614 813-884-1411
Tri-Tronics Co. Inc., 13420 Wright Cir., Tampa, FL 33624 813-855-4453
§ TRW, Dynalco Controls Div., 5200 NW 37th, P.O. Box 8187, Ft. Lauderdale, FL 33310 305-739-4300

Controls, SCR-2200

§ Douglas Randall, 6 Pawcatuck Ave., Pawcatuck, CT 06379, 203-599-2075 .... B•1331
Motorola Semiconductor Prods. Sector, Adv. 72, Box 20912, Phoenix, AZ 85036, 602-244-6900 .... A•2083
† NWL Transformers, Rising Sun Rd., P.O. Box 358, Bordentown, NJ 08505, 609-298-7300 .... D•1735
† NWL Transformers, Rising Sun Rd., P.O. Box 358, Bordentown, NJ 08505, 609-298-7300 .... D•1735
Triac Electronic Systems, Inc., 87-27 Myrtle Ave., Glendale, NY 11385, 718-441-4759 .... D•1132
Allen-Bradley Co., Industrial Control Div., 1201 S. Second St., Milwaukee, WI 53201 414-671-2000
Anders, Inc., 77 Wolcott Rd., Simsbury, CT 06070 203-658-7666
API Instrs., 1601 Trapelo Rd., Waltham, MA 02254 617-890-2000
† Applied Control, 1275 Bloomfield Ave., Fairfield, NJ 07006-2828 201-227-5454
§ Athena Controls, Inc., 5145 Campus Dr., Whitemarsh Ind. Campus, Plymouth Meeting, PA 19462 215-828-2490
§ B & B Motor & Control Corp., Apple Hill Commons, Burlington, CT 06013 203-673-7151
Barber-Colman Co., Indl. Instrs. Div., P.O. Box 2940, 1354 Clifford Ave., Loves Park, IL 61132 815-877-0241
Basler Elec., Rte. 143, Highland, IL 62249 618-654-2341
† Blue M, A Unit of General Signal, 138th & Chatham Sts., Blue Island, IL 60406 312-385-9000
§ Bodine Elec. Co., 2500 W. Bradley Pl., Chicago, IL 60618 312-478-3515
† Cal-Power Corp., 140 Kansas St., El Segundo, CA 90245 213-772-2171
Centent Co., 3879 S. Main St., Santa Ana, CA 92707 714-979-6491
Chromalox Instrs. & Controls, 100 Heil-Quaker Blvd., La Vergne, TN 37086-3536 615-793-3900
† CML MACARR Div., Marine Electric RPD, Inc., 666 Pacific St., Brooklyn, NY 11217 718-857-2400
Conditioning Semiconductor Devices, Box 2116, Wayne, NJ 07470 201-335-6723
Cross Elctrns., 100 Commonwealth Dr., Warrendale, PA 15086 412-776-1591
General Numeric Corporation, 390 Kent Avenue, Elk Grove Village, IL 60007 312-640-1595
Cybernetic Micro Sys., P.O. Box 3000, 3000 Hwy. 84, San Gregorio, CA 94074 415-726-3000
Datatran Labs, P.O. Box 384, Sussex, NJ 07461 914-856-4313
Datron Systems, Inc., 200 West Los Angeles Ave., Simi Valley, CA 93065-1650 805-584-1717
† Del Elctrns. Corp., 250 E. Sandford Blvd., Mt. Vernon, NY 10550 914-699-2000
§† Despatch Inds., P.O. Box 1320, Minneapolis, MN 55440 612-331-1873
§ Eaton Corp./Cutler-Hammer Prods, Aerospace & Commercial Controls Div., 4201 N. 27th St., Milwaukee, WI 53216 414-449-7487
Elec-Trol, Inc., 26477 N. Golden Valley Rd., Saugus, CA 91350 805-252-8330
§† Electrol Co., 321 Dewey St., P.O. Box 29, York, PA 17405 717-848-1722
Electro-Pacific, 5782 Thornwood Dr., Goleta, CA 93017 805-964-0751
† Electrospace Sys., Inc., P. O. Box 831359, Richardson, TX 75083-1359 214-783-2004
Elma Engrg., 1066 E. Meadow Circle, Palo Alto, CA 94303 415-494-7303
Essex Group, 9933 13th St., Ft. Wayne, IN. 46809 219-478-1521
§ Gentron Corp., 6667 N. Sydney Pl., Milwaukee, WI 53209 414-351-1660
Halmar Electronics, Inc., 900 N. Hague Ave., Columbus, OH 43204 614-275-0131
International Devices Inc., 3200 Pendleton, Santa Ana, CA 92704 .... 714-557-9394; 800-854-7651
International Instruments, General Resistance, Inc., Twin Lakes Rd, P.O. Box 185, N. Branford, CT 06471 203-481-3450
Kalglo Elctrns. Co., Inc., 6584 Ruch Rd., E. Allen Twp., Bethlehem, PA 18017 215-837-0700
§ KB Elctrns., 73 Wortman Ave., Brooklyn, NY 11207 718-257-3300
Kollmorgen Corp., Industrial Drives Div., 201 Rock Rd., Radford, VA 24141 703-639-2495
§ Love Controls, 1475 S. Wheeling Rd., Wheeling, IL 60090 312-541-3232
† Loyola Controls Inc., 1099 N. Batavia St., Orange, CA 92667 714-639-0526
Magnetic Specs., 10 Albemarle Ave., Trenton, NJ 08638 609-883-3150
§ Markat Div., Wild Oats Corp., 3 Country Dr., Plainview, NY 11803 516-549-9272
§ Master Elctrn. Controls, P.O. Box 25905, Los Angeles, CA 90025 213-452-1336
† Megatran Electronic Power, Rising Sun Rd., Bordentown, NJ 08505 609-298-7300
§ Payne Engrg., Box 70, Scott Depot, WV 25560 304-757-7353
§† Philips ECG, Inc., 100 First Ave., Waltham, MA 02254 617-890-6107
§ Power Control, 122 Gamma Dr., Pittsburgh, PA 15238 412-782-3120
POWR-UPS Corp., 50 Orville Drive, Bohemia, NY 11716 516-589-3602
† PSG Inds., 1225 Tunnel Road, Perkasie, PA 18944 215-257-3621
† PTL Elctrns., 10211 Vinemont St., Dallas, TX 75218 214-327-3180
Reliance Electric Co., Marketing Info Center, P.O. Box 99502, Cleveland, OH 44199 .... 800-245-4501;800-245-4497 In Ohio
§ Research, Inc., Box 24064, Minneapolis, MN 55424 612-941-3300
§ RFL Inds., Thermocontrol Div., W. Prospect St., Box 250, Brandon, VT 05733 802-247-6811
RI/Control Systems, Research, Inc., P.O. Box 24064, Minneapolis, MN 55424 612-941-3300
Ross Engrg. Corp., 540 Westchester Dr., Campbell, CA 95008 408-377-4621
§ Schulz Controls, Inc., P.O. Box 9555, New Haven, CT 06511 203-562-2555
Servo-Tek Prods. Co., 1086 Goffle Rd., Hawthorne, NJ 07506 201-427-3100
† Sigma Electronics Inc., 10830 Kinghurst Dr., Houston, TX 77099 713-933-4700
Sigma Instrs., 170 Pearl St., Braintree, MA 02184 617-843-5000
§ Square D Co., Executive Plaza, Palatine, IL 60067 312-397-2600
Sylvania Electronic Components, Philips ECG Inc., A North American Philips Co., 100 First Ave., Waltham, MA 02254 617-890-6107
§ Syracuse Elctrns., P.O. Box 4770, Syracuse, NY 13221 315-488-4911
§ Thomson-CSF Comps. Corp., Semiconductor Div., 6660 Variel Ave., Canoga Pk., CA 91304 213-887-1010
Unico, 3725 Nicholson Rd., Franksville, WI 53126-0505 414-886-5678
§ Vectrol, Division of Westinghouse Elec. Corp., 110 Douglas Rd, Oldsmar, FL 33557 813-855-4621
Voltex, 3460 Great Neck Rd., Amityville, NY 11701 516-842-2772
Ward Leonard Elec., 31 South St., Mt. Vernon, NY 10550 914-664-1000
§† Westamp, 1542 15th St., Santa Monica, CA 90404 213-393-0401
§ West Division, Gulton Industries, Inc., 3860 N. River Rd., Schiller Park, IL 60176 312-678-6400
Xylog Corp., 150 Tillman St., Westwood, NJ 07675 201-664-7997

Controls, Sensing/Monitoring-Voltage, Phase, Frequency-2200

Active Control Instrmn., P.O. Box 243-Wildwood Circle, Key Largo, FL 33037, 305-451-1000 .... D•1109
Curtis Inds., 8000 West Tower Ave., Milwaukee, WI 53223, 414-354-1500 .... D•1978
Superior Elec. Co., 383 Middle St., Bristol, CT 06010, 203-582-9561 .... D•1968
Triac Electronic Systems, Inc., 87-27 Myrtle Ave., Glendale, NY 11385, 718-441-4759 .... D•1132
† Acromag, 30765 Wixom Rd., Wixom, MI 48096 313-624-1541
Advance Conversion Devices Co., 274 S. Salem St., Randolph, NJ 07869 201-989-0095
§ Antex Electronics Corp., 16100 S. Figueroa St., Gardena, CA 90248 213-532-3092
† Applied Electro Technlg., Int., STI Company, 2220 So. Anne St., Santa Ana, CA 92704 714-556-6570
ARGA Controls, 35 E. Glenarm St., Pasadena, CA 91105 213-682-3314
† Autronics, 314 E. Live Oak, Ste. A, Arcadia, CA 91006 818-445-5470
† Bailey Controls Co., 29801 Euclid Ave., Wickliffe, OH 44092 216-585-5800
Cardinal Control Co., 110 Kensington Rd., Kensington, CT 06037 203-828-6379
Centent Co., 3879 S. Main St., Santa Ana, CA 92707 714-979-6491
† Columbia Resch. Labs., Macdade Blvd. & Bullens La., Woodlyn, PA 19094 215-532-9464
Control Engrg., Inc., 1686 Riverdale St., West Springfield, MA 01089 413-781-1330
Control Prods., Devar, Inc., P.O. Box 589, Bridgeport, CT 06601 203-368-6751
† Control Technology Co., 41-16 29th St., Long Island City, NY 11101 718-361-2133
§ Cramer Co., Mill Rock Rd., Old Saybrook, CT 06475 203-388-3574
Cross Elctrns., 100 Commonwealth Dr., Warrendale, PA 15086 412-776-1591
General Numeric Corporation, 390 Kent Avenue, Elk Grove Village, IL 60007 312-640-1595
Cybernetic Micro Sys., P.O. Box 3000, 3000 Hwy. 84, San Gregorio, CA 94074 415-726-3000
Digitek Inc., P.O. Box 468, Kenmore, WA 98028 206-485-6571
§ Diversified Elctrns., Inc., Indl. Controls Div., 119 N. Morton Ave., Evansville, IN 47711 812-426-2806
§ Eaton Corp./Cutler-Hammer Prods, Aerospace & Commercial Controls Div., 4201 N. 27th St., Milwaukee, WI 53216 414-449-7487
§ Electrol Co., 321 Dewey St., P.O. Box 29, York, PA 17405 717-848-1722
§ Electromatic Controls Corp., 2495 Pembroke Road, Hoffman Estates, IL 60195-2010 312-882-5757
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
§† Hi-G Company, A Subsidiary of Nytronics Inc., 101 Locust St., Hartford, CT 06114 203-522-8600
† Honeywell, Process Control Div., 1100 Virginia Dr., Ft. Washington, PA 19034 .... 800-321-5111, Ext. 596
Hughes Aircraft Co, Aerospace Grps./Support Sys., P.O. Box 90515, Los Angeles, CA 90009 213-670-1515
Hughes Aircraft Co., Microelctrn. Sys. Div., 2601 Campus Dr., Irvine, CA 92715 714-752-3800
§ Hughey & Phillips, Inc., 3050 N. California St., Burbank, CA 91504 818-849-1104
Inconix Corp., 10 Tech Circle, Natick, MA 01760 617-655-1170
§ Industrial Computer Designs, Inc., 31264 La Baya Drive, Westlake Village, CA 91362 818-889-3179
Instrumentation & Control Sys., 520 Interstate Rd, Addison, IL 60101 312-543-6200
International Instruments, General Resistance, Inc., Twin Lakes Rd, P.O. Box 185, N. Branford, CT 06471 203-481-3450
KB Elctrns., 73 Wortman Ave., Brooklyn, NY 11207 718-257-3300
§ Kinemetrics/Truetime, 3243 Santa Rose Ave, Santa Rosa, CA 95407 707-528-1230
Kinetic Sys., 11 Maryknoll Dr., Lockport, IL 60441 815-838-0005

§† Kistler-Morse, 10201 Willows Road NE, Redmond, WA 98052 206-881-8000
§ H. Kuhnke, Inc., 26 W. Highland Ave., Atlantic Highlands, NJ 07716 .... 201-291-3334; 800-221-0714
Lark Electronics, Inc., Box 390, New York, NY 10040 212-569-0430
§† Leach Corp., Control Prods. Div., 6900 Orangethorpe Ave., Buena Pk., CA 90620 714-739-0770
Macrotronix, Inc., 4016 N. Home St., Mishawaka, IN 46545 219-256-5503
§ Markat Div., Wild Oats Corp., 3 Country Dr., Plainview, NY 11803 516-549-9272
Mega Logic, 9659 Natl. Rd., Brookville, OH 45309 513-833-5222
§ Midland Standard, Inc., 603 E. Chicago St., Box 38, Elgin, IL 60120 312-741-6600
§ NES, Inc. (Nationwide Electronic Systems), 3003 Wakefield, Carpentersville, IL 60110 312-426-5900
Ohio Semitronics, Inc., 1205 Chesapeake Ave., Columbus, OH 43212 ... 614-486-9561
Omega Engrg., Box 4047, Stamford, CT 06907 203-359-1660
† Optima Enclosures, 2166 Mountain Indl. Blvd., Tucker, GA 30084 404-939-6340
Optimum Applied Systems, 145 Palisade St., Dobbs Ferry, NY 10522-1696 914-693-9001
§ Power Control, 122 Gamma Dr., Pittsburgh, PA 15238 412-782-3120
Racal-Dana Instrs. Inc., 4 Goodyear St., Irvine, CA 92715 714-859-8999
§ Richard-Lee Co., Box 724, New Providence, NJ 07974 201-276-0710
§ Scientific Technlg., 1201 San Antonio Rd., Mountain View, CA 94043 .... CA 415-965-0910;800-221-7060
† Sigma Electronics Inc., 10830 Kinghurst Dr., Houston, TX 77099 713-933-4700
§ Simpson Elec. Co., 853 Dundee Ave., Elgin, IL 60120 312-697-2260
† Solid State Elctrns. Corp., 18646 Parthenia St., Northridge, CA 91324 ... 818-993-8257
§ Syracuse Elctrns., P.O. Box 4770, Syracuse, NY 13221 315-488-4911
† Transmagnetics, 210 Adams Blvd., Farmingdale, NY 11735 516-293-3100
Tri-Tronics Co. Inc., 13420 Wright Cir., Tampa, FL 33624 813-855-4453
§ TRW, Dynalco Controls Div., 5200 NW 37th, P.O. Box 8187, Ft. Lauderdale, FL 33310 305-739-4300
Warren Comms., 101 Okner Pkwy., Livingston, NJ 07039 201-992-6200
Xylog Corp., 150 Tillman St., Westwood, NJ 07675 201-664-7997

Controls, Servo System-4900

Astrosystems, 6 Nevada Dr., Lake Success, NY 11042, 516-328-1600 ... D•1183
BEI Motion Sys. Co., Digital Prods. Div., P.O. Box 3838, Little Rock, AR 72203, 501-851-4000 .... B•1782
BEI Motion Sys. Co., General Control Systems Div., 564 Alpha Dr., Pittsburgh, PA 15238, 412-963-0515 .... B•1783
† Control Technology Co., 41-16 29th St., Long Island City, NY 11101, 718-361-2133 .... D•1986-1987
§ Electro-Craft, 1600 2nd St. S., Hopkins, MN 55343, 612-931-2700 ... B•1147,1149
† Industrial Control Co., 3100 Pineda Ave., Rockledge, FL 32955, 305-259-7105 .... D•1988
† Interface Engrg., 386 Lindelof Ave., Stoughton, MA 02072, 617-344-7383 .... D•1157
Kollmorgen Corp., Industrial Drives Div., 201 Rock Rd., Radford, VA 24141, 703-639-2495 .... B•1163-1165
Modular Devices, 50 Orville Dr., Bohemia, NY 11716, 516-567-9620 ..... D•1011
POWR-UPS Corp., 50 Orville Drive, Bohemia, NY 11716, 516-589-3602 .. B•1182
Renco, 26 Coromar Dr., Goleta, CA 93017-3094, 805-968-1525 .... D•1131
Superior Elec. Co., 383 Middle St., Bristol, CT 06010, 203-582-9561 ..... B•1193
Toko America, Inc., 1250 Feehanville Dr., Mt. Prospect,, IL 60056, 312-297-0070 .... D•1989
† Transmagnetics, 210 Adams Blvd., Farmingdale, NY 11735, 516-293-3100 .... D•1162
TS Products, Inc., 12455 Branford St., Bldg. 22, Arleta, CA 91331, 818-896-6676 .... D•1990
† ABA Electromechanical Sys. Inc., Box 500, Pinellas Pk., FL 34290-0500 813-541-6681
§ Adatek, Inc., P.O. Box 1339, Sandpoint, ID 83864 .... 208-263-1471;800-323-3343
Advanced Control Sys., 24 Teed Dr., Randolph, MA 02368 617-963-4543
† Aeroflex Labs., Magnetic Prods. Div.,, 35 South Service Road, Plainview, NY 11803 516-694-6700
§ Aerotech, Inc., 101 Zeta Dr., Pittsburgh, PA 15238 412-963-7470
Amtek Digital Systems, Inc., 12740 28th N.E., Seattle, WA 98125 206-363-0217
§ A. S. R. Servotron, Inc., (Sub. Baldor Elec. Co.), 7945 Deering Ave., Canoga Park, CA 91304 818-999-6193
† Bailey Controls Co., 29801 Euclid Ave., Wickliffe, OH 44092 216-585-5800
§ B & B Motor & Control Corp., Apple Hill Commons, Burlington, CT 06013 203-673-7151
Barnes & Reinecke, Inc., 2375 Estes Ave., Elk Grove Village, IL 60007 .. 312-640-7200
† BEI Motion Systems Co., Corporate Off., 166 Geary St., Ste. 1400, San Francisco, CA 94108 415-788-6840
BEI Motion Sys. Co., Computer Prod. Div., 1755 B La Costa Meadows Dr., San Marcos, CA 92069 619-471-2600
† Bendix Corp., Electrodynamics Div., 11600 Sherman Way, N. Hollywood, CA 91605 818-765-1010
Berkeley Process Control, Inc., 5327-K Jacuzzi St., Richmond, CA 94804 415-526-3333
Bertsch U.S., Sycamore Resch. Ctr., 2142F Industrial Ct., Vista, CA 92083 619-727-7420
Bowmar/TIC, Inc., 850 Lawrence Dr., Newbury Park, CA 91320 805-498-2161
Capitol Machine & Switch Co., Box 890, Danbury, CT 06810 203-744-3300
Centent Co., 3879 S. Main St., Santa Ana, CA 92707 714-979-6491
Computer Optical Prods., Inc., Sub. of Hathaway Corp., 9353 Eton Ave., Chatsworth, CA 91311-5866 818-882-0424
Contraves Goerz Corp., 610 Epsilon Dr., Pittsburgh, PA 15238 412-967-7700
Controls Unlimited, Inc., 4823 North Ridge Rd., Perry, OH 44081 216-259-2500
General Numeric Corporation, 390 Kent Avenue, Elk Grove Village, IL 60007 312-640-1595
Dantronics, Inc., 3175 Hafner Ct., St. Paul, MN 55112 612-484-2108
Data Technology, Inc., 4 Gill St., Woburn, MA 01811 617-935-8820
Datron Systems, Inc., 200 West Los Angeles Ave., Simi Valley, CA 93065-1650 805-584-1717
Datum Inc., Timing/Aacom Divisions, 1363 S. State College Blvd., Anaheim, CA 92806 714-533-6333
§ Digiac Corp., 175 Engineers Rd., Hauppauge, NY 11788 516-273-8600
§ Dillon, W. C., & Co., National Controls, Inc., 2320 Airport Blvd., Santa Rosa, CA 95401 707-527-5555
Dynapar, 1675 Delany Rd., Gurnee, IL 60031 312-662-2666
EG & G Torque Systems, 36 Arlington St., Watertown, MA 02172 617-924-6000
Electric Device, PO Box 337, Canfield, OH 44406 216-533-3060
† Electro-Magnetic Processes, Inc., 9616 Owensmouth Ave., Chatsworth, CA 91311 818-882-6333
† Electrospace Sys., Inc., P. O. Box 831359, Richardson, TX 75083-1359 214-783-2004
ETI Systems, Polaris Indl. Entprs., 215 Via Del Norte, Oceanside, CA 92054 619-757-7770
† Evershed & Vignoles, Ltd., Acton Lane, Chiswick, London, ENGLAND W4 5HJ 01-994-3670
† Genisco Technlg. Corp., Rotating Test Div., 18435 Susana Rd., Rancho Dominguez, CA 90221 213-537-4750
Giddings & Lewis Elctrns., A Unit of AMCA Intl., 666 S. Military Rd., P.O. Box 1658, Fond du Lac, WI 54935 414-921-7100
Gould Inc., Programmable Control Div., Box 83, S.V.S., Andover, MA 01810 617-475-4700
§ Hobart Engrg., 4143 Cheshire Dr., Cypress, CA 90630 714-827-2135
† Honeywell, Process Control Div., 1100 Virginia Dr., Ft. Washington, PA 19034 .... 800-321-5111, Ext. 596
Icon, 156 Sixth St., Cambridge, MA 02142 617-868-5400
Industrial Indexing Sys., Inc., 626 Fishers Run, Victor, NY 14564 716-924-9181
§ Inertial Motors, 280 N. Broad St., Doylestown, PA 18901 215-345-1010
Inland Motor Division, Kollmorgen Corp., 4020 E. Inland Rd., Sierra Vista, AZ 85635 602-459-1150
† Inland Motor, Kollmorgen Corp., 501 First St., Radford, VA 24141 703-639-9045
Innovatek Microsystems, Inc., Smithfield Rd., R1 Box 104, Millerton, NY 12546-9720 914-373-9003
International Instruments, General Resistance, Inc., Twin Lakes Rd, P.O. Box 185, N. Branford, CT 06471 203-481-3450
IXYS Corp., 142 Charcot Ave., San Jose, CA 95131 408-262-8800
† Lear Siegler, Inc., 2850 Ocean Park Blvd., P.O. Box 2158, Santa Monica, CA 90406 213-452-5444
† Ledex Inc., P.O. Box 427, Vandalia, OH 45377 513-898-3621
Macro Electronics Corp., 23 Royalston Lane, So. Setauket, NY 11720 ... 516-698-3357
Magnetoelastic Devices, 326 Springside Ave., Box 625, Pittsfield, MA 01201 413-445-5608
§ Markat Div., Wild Oats Corp., 3 Country Dr., Plainview, NY 11803 516-549-9272
McFadden Sys., Inc., 8953 S. Atlantic Ave., South Gate, CA 90280-9990 213-564-5958
Mesur-Matic Elctrns., 50 Grove St., Salem, MA 01970-2294 617-745-7000
Micro Mo Electronics, Inc., 742 2nd Ave. S., St. Petersburg, FL 33701 ... 813-822-2529
Micronel U.S., 2142F Industrial Ct., Sycamore Research Center, Vista, CA 92083 619-727-7400
Modicon Programmable Control Div., Gould Inc., P.O. Box 83 S.V.S., Andover, MA 01810 617-475-4700
Muirhead, 1101 Briston Rd., Mountainside, NJ 07092 201-233-6010
North Atlantic Inds., Instrument Div., 60 Plant Ave., Hauppauge, NY 11788 516-582-6500
Northern Precision Labs., 11 Madison Rd., Fairfield, NJ 07006 201-227-4800
Penn Resch. Corp. (PRC), 2652 South Main St., P.O. Box 3357, Kennesaw, GA 30144 404-429-9061
† Performance Controls Inc., 333-E Byberry Rd., Hatboro, PA 19040 215-675-6500
PMI Motors, Kollmorgen Corp., 5 Aerial Way, Syosset, NY 11791 516-938-8000
§ Ragen Data Systems, Inc., 3 Oval Dr., Central Islip, NY 11722 516-234-3800
† Sequential Info. Sys., 249 N. Saw Mill River Rd., Elmsford, NY 10523 914-592-5930
Servo-Tek Prods. Co., 1086 Goffle Rd., Hawthorne, NJ 07506 201-427-3100
Singer Co., Kearfott Div., 1150 McBride Ave., Little Falls, NJ 07424 201-785-6000
Stock Drive Prods., Div. of Designatronics, Inc., 2101 Jericho Turnpike, New Hyde Pk., NY 11040 .... 516-328-0200;328-3300
§† Superior Mfg. & Instr., 19-36 38th St., Long Island City, NY 11105 212-932-1800
Synektron Corporation, 12000 S. W. Garden Place, Portland, OR 97223 503-684-3090
§ Temposonics, MTS Sys. Corp., 111 East Ames Ct., Plainview, NY 11803 516-349-1950
Transducer Systems, Inc., 1510 Delp Dr., Kulpsville, PA 19443 215-256-4611
† Transicoil, Inc., Trooper Rd., P.O. Box 99, Worcester, PA 19490-9990 215-277-1300
Trio Labs., 80 Dupont St., Plainview, NY 11803 516-349-0400
Unholtz-Dickie Corp., 6 Brookside Dr., Wallingford, CT 06492 203-265-3929
Unico, 3725 Nicholson Rd., Franksville, WI 53126-0505 414-886-5678
† Vernitech, 300 Marcus Blvd., Deer Pk., NY 11729 516-586-5100
† Vernitron Corp., Control Comps. Div., 1601 Precision Park La., San Diego, CA 92073 619-428-5581
Westamp, 1542 15th St., Santa Monica, CA 90404 213-393-0401

Controls, Stepping Motor-2200

§ Bodine Elec. Co., 2500 W. Bradley Pl., Chicago, IL 60618, 312-478-3515 .... B•1140
Kollmorgen Corp., Industrial Drives Div., 201 Rock Rd., Radford, VA 24141, 703-639-2495 .... B•1163-1165
Superior Elec. Co., 383 Middle St., Bristol, CT 06010, 203-582-9561 ..... B•1193
Toko America, Inc., 1250 Feehanville Dr., Mt. Prospect,, IL 60056, 312-297-0070 .... D•1989
Unitrode Corp., 5 Forbes Rd., Lexington, MA 02173, 617-861-6540 ...... A•1699
† ABA Electromechanical Sys. Inc., Box 500, Pinellas Pk., FL 34290-0500 813-541-6681
Advanced Control Sys., 24 Teed Dr., Randolph, MA 02368 617-963-4543
§ Aerotech, Inc., 101 Zeta Dr., Pittsburgh, PA 15238 412-963-7470
Airpax Corp., Cheshire Div., Cheshire Indl. Pk., Box E, Cheshire, CT 06410 203-272-0301
§ Astrosyn America, 14349 Victory Blvd., Ste. 304, Van Nuys, CA 91401 .. 213-785-2197

Automatic Timing & Controls Co., 201 So. Gulph Rd., King of Prussia, PA 19406 .... 215-337-5500;800-441-8245
§ B & B Motor & Control Corp., Apple Hill Commons, Burlington, CT 06013 203-673-7151
Berger-Lahr Corp., Fitzgerald Dr., Jaffrey, NH 03452 603-532-7701
Centent Co., 3879 S. Main St., Santa Ana, CA 92707 714-979-6491
Control-O-mation, Inc, 7300 W. Huron River Dr., Dexter, MI 48130 313-426-3935
Cybernetic Micro Sys., P.O. Box 3000, 3000 Hwy. 84, San Gregorio, CA 94074 415-726-3000
† Datron Systems, Inc., 200 West Los Angeles Ave., Simi Valley, CA 93065-1650 805-584-1717
Eastern Air Devices Motor Div., 1 Progress Dr., Dover, NH 03820 603-742-3330
§ Eaton Corp./Cutler-Hammer Prods, Aerospace & Commercial Controls Div., 4201 N. 27th St., Milwaukee, WI 53216 414-449-7487
Electrospace Sys., Inc., P. O. Box 831359, Richardson, TX 75083-1359 214-783-2004
† Evershed & Vignoles, Ltd., Acton Lane, Chiswick, London, ENGLAND W4 5HJ 01-994-3670
§† Furnas Elec., 1197 McKee St., Batavia, IL 60510 312-879-6000
† GAP Instr., 40 Oser Ave., Hauppauge, NY 11787 516-273-0909
§ Giddings & Lewis Elctrns., A Unit of AMCA Intl., 666 S. Military Rd., P.O. Box 1658, Fond du Lac, WI 54935 414-921-7100
Gould Inc., Programmable Control Div., Box 83, S.V.S., Andover, MA 01810 617-475-4700
† Honeywell, Process Control Div., 1100 Virginia Dr., Ft. Washington, PA 19034 .... 800-321-5111, Ext. 596
Icon, 156 Sixth St., Cambridge, MA 02142 617-868-5400
† IMC Magnetics Corp., Western Div., 12627 Hiddencreek Way, Cerritos, CA 90701 213-926-0927
§ Industrial Computer Designs, Inc., 31264 La Baya Drive, Westlake Village, CA 91362 818-889-3179
Inland Motor Division, Kollmorgen Corp., 4020 E. Inland Rd., Sierra Vista, AZ 85635 602-459-1150
Inland Motor, Kollmorgen Corp., 501 First St., Radford, VA 24141 703-639-9045
† Interface Engrg., 386 Lindelof Ave., Stoughton, MA 02072 617-344-7383
IXYS Corp., 142 Charcot Ave., San Jose, CA 95131 408-262-8800
Japanese Prods. Corp., 31368 Via Colinas, Ste. 103-104, West Lake Village, CA 91362 818-991-6111
Kinetic Sys., 11 Maryknoll Dr., Lockport, IL 60441 815-838-0005
Matrix Corp., 1639 Green St., Raleigh, NC 27603 919-833-2837
Mesur-Matic Elctrns., 50 Grove St., Salem, MA 01970-2294 617-745-7000
Metis, P.O. Box 1499, Bowie, MD 20716 301-249-1702
§ Midland Standard, Inc., 603 E. Chicago St., Box 38, Elgin, IL 60120 312-741-6600
Modicon Programmable Control Div., Gould Inc., P.O. Box 83 S.V.S., Andover, MA 01810 617-475-4700
MTS Sys., Box 24012, Minneapolis, MN 55424 612-937-4000
Muirhead, 1101 Briston Rd., Mountainside, NJ 07092 201-233-6010
Northern Precision Labs., 11 Madison Rd., Fairfield, NJ 07006 201-227-4800
Penn Resch. Corp. (PRC), 2652 South Main St., P.O. Box 3357, Kennesaw, GA 30144 404-429-9061
PKS - Digiplan Ltd., 1859 Charter Lane, Lancaster, PA 17601 717-299-2706
§ Ragen Data Systems, Inc., 3 Oval Dr., Central Islip, NY 11722 516-234-3800
§ Rapidsyn, 3233 Roymar Rd., Oceanside, CA 92054 619-439-7500
§ Sealectro, 225 Hoyt St., Mamaroneck, NY 10543 914-698-5600
Sigma Instrs., 170 Pearl St., Braintree, MA 02184 617-843-5000
Silicon General, 11861 Western Ave., Garden Grove, CA 92641 714-898-8121
Singer Co., Kearfott Div., 1150 McBride Ave., Little Falls, NJ 07424 201-785-6000
Stock Drive Prods., Div. of Designatronics, Inc., 2101 Jericho Turnpike, New Hyde Pk., NY 11040 .... 516-328-0200;328-3300
Summit Engineering Corp., Box 938, Bozeman, MT 59715 406-587-4511
§ Techno Vation, Inc., 14 Crandall Ave., Pompton Lakes, NJ 07442 201-839-0740
§ Tecmar, Inc., 6225 Cochran Rd., Solon, OH 44139 216-349-0600
Teledyne Gurley, 514 Fulton St. P.O. Box 88, Troy, NY 12181 518-272-6300
TransKinetic Sys., 110 Shawmut Rd., Canton, MA 02021 617-828-3000
† Vernitech, 300 Marcus Blvd., Deer Pk., NY 11729 516-586-5100
Whedco, Inc., 6107 Jackson Rd., Ann Arbor, MI 48103 313-665-5473
§ Xycom, 750 N. Maple Rd., Saline, MI 48176 313-429-4971

Controls, Temperature-2200

DCI Inc., 14812 W. 117th Street, P.O. Box 215, Olathe, KS 66061, 913-782-5672 .... D•1347
† Elmwood Sensors, 500 Narragansett Park Drive, Pawtucket, RI 02861, 401-727-1300 .... B•1750
Harrel, Inc., 16 Fitch St., E. Norwalk, CT 06855, 203-866-2573 .... D•1122
§ Jewell Electrical Instrs., Grenier Field, Manchester, NH 03108, 603-669-6400 .... D•1359
Kurz Instruments, Inc., P.O. Box 849, Carmel Valley, CA 93924, 800-424-7356 .... B•1800
† McLean Engrg., Div. of Zero Corp., 70 Washington Rd., Princeton Junction, NJ 08550, 609-799-0100 .... C•1648
Micro Devices Product Group, Therm-O-Disc, Inc., 1320 South Main Street, P.O. Box 3538, Mansfield, OH 44907, 419-756-5005 .... B•1775
Omega Engrg., Box 4047, Stamford, CT 06907, 203-359-1660 .... B•1683,1767,1820-1821, D•1128
TECA, ThermoElectric Cooling America Corp., 448 N. Halsted St., Chicago, IL 60622, 312-666-1600 .... C•1675-1677
Therm-O-Disc, Inc., Sub. Emerson Elec. Co., 1320 South Main St., P. O. Box 3538, Mansfield, OH 44907, 419-756-5911 .... B•1775
Triac Electronic Systems, Inc., 87-27 Myrtle Ave., Glendale, NY 11385, 718-441-4759 .... D•1132
Acme Elec. Heating Corp., 4685 E. 11th, Hialeah, FL 33013 305-685-8326
† Acromag, 30765 Wixom Rd., Wixom, MI 48096 313-624-1541
Advanced Kinetics, 1231 Victoria St., Costa Mesa, CA 92627 714-646-7165
§ AEMC, 99 Chauncy, Boston, MA 02111 .... 617-451-0227;800-343-1391
Airpax Corp., Frederick Div., A North American Philips Co., Husky Park P.O. Box 500, Frederick, MD 21701 301-663-5141
Allen-Bradley Co., Industrial Control Div., 1201 S. Second St., Milwaukee, WI 53201 414-671-2000
§ Alpha-M Corp., 3009 Wildflower Dr., Dallas, TX 75229 214-620-0021
§ Ametek, 2 Station Square, Paoli, PA 19301 215-355-6900
Analogic Corp., 8 Centennial Dr., Peabody, MA 01961 .... 617-532-5660;617-777-4500; 617-246-0300;800-451-1
§† Analytical Meas., 31 Willow St., Chatham, NJ 07928 201-273-7500
† Anders, Inc., 77 Wolcott Rd., Simsbury, CT 06070 203-658-7666
§ API Instrs., 1601 Trapelo Rd., Waltham, MA 02254 617-890-2000
Applied Sys., 26401 Harper Ave., St. Clair Shores, MI 48081 313-779-8700
† Atec, Inc., Box 19426, 8219 Kempwood Dr., Houston, TX 77055 713-468-7971
§ Athena Controls, Inc., 5145 Campus Dr., Whitemarsh Ind. Campus, Plymouth Meeting, PA 19462 215-828-2490
Automatic Switch Co., 50-60 Hanover Road, Florham Park, NJ 07932 1-201-966-2000
† Bailey Controls Co., 29801 Euclid Ave., Wickliffe, OH 44092 216-585-5800
Barber-Colman Co., Indl. Instrs. Div., P.O. Box 2940, 1354 Clifford Ave., Loves Park, IL 61132 815-877-0241
Barksdale Controls Div., Transamenca DeLaval, 3211 Fruitland Ave., P.O. Box 58843, Los Angeles, CA 90058 213-589-6181
† Barnes Engrg., 44 Commerce Rd., P.O. Box 53, Stamford, CT 06904 203-348-5381
§ Bayley Instr. Co., Box 357, Kenwood, CA 95452 707-833-6014
Beede Electrical Instr. Co., S. Main St., Penacook, NH 03303 603-753-6362
† Blue M, A Unit of General Signal, 138th & Chatham Sts., Blue Island, IL 60406 312-385-9000
Bristol Babcock Inc., 40 Bristol St., Waterbury, CT 06708 203-575-3000
† BTU Engrg. Corp., Bruce Sys., Esquire Rd., N. Billerica, MA 01862 617-667-4111
Burling Instr., P.O. Box 298, Chatham, NJ 07928 201-635-9481
Caig Labs., 1175-0 Industrial Ave., Escondido, CA 92025 619-743-7143
CAL Controls Inc., 1155 Waukegan Rd., Glenview, IL 60025 312-998-5720
Cambridge Aero Instruments, Inc., 6A Dunham Rd., Billerica, MA 01821 617-275-0889
Canadian Thermostats & Control Dev. Ltd., 8415 Mountian Sights, Montreal, PQ, CANADA H4P2B8 514-739-3274
Capintec Instrs., 6 Arrow Rd., Ramsey, NJ 07446 201-825-9500
Capitol Temptrol, 5 Coulton Rd., Old Lyme, CT 06371 203-739-4421
Centent Co., 3879 S. Main St., Santa Ana, CA 92707 714-979-6491
† Chatham Controls, 33 River Rd., Chatham, NJ 07928 201-635-8892
Chromalox Instrs. & Controls, 100 Heil-Quaker Blvd., La Vergne, TN 37086-3536 615-793-3900
† Climatronics, 140 Wilbur Pl., Bohemia, NY 11716 516-567-7300
† Columbia Resch. Labs., Macdade Blvd. & Bullens La., Woodlyn, PA 19094 215-532-9464
Columbus Elec. Mfg., Box 289A Rt #2, Piney Flats, TN 37686 615-538-8191
§ Control Prods., Devar, Inc., P.O. Box 589, Bridgeport, CT 06601 203-368-6751
† Control Technology Co., 41-16 29th St., Long Island City, NY 11101 718-361-2133
Cross Elctrns., 100 Commonwealth Dr., Warrendale, PA 15086 412-776-1591
§ Delta Design, 5775 Kearny Villa Rd., San Diego, CA 92123 619-292-5000
† Devco Engrg., Control Sys. Div., 36 Pier Lane West, Fairfield, NJ 07006 .... 201-CA8-0321
Digitec Corp., 918 Woodley Rd., P.O. Box 458, Dayton, OH 45401 513-254-6251
Dreefs Switch, Inc., 3782 Hawthorn Ct., Waukegan, IL 60087 .... 312-662-7667; 800-323-9605
Dynage/Controls, Inc., 2 Willowbrook Rd., Cromwell, CT 06416 203-635-6257
§ Eagle Signal Controls, Mfg. Div. Gulf & Western Inds., Box 16100, Austin, TX 78761 512-837-8300
§ Eaton Corp./Cutler-Hammer Prods, Aerospace & Commercial Controls Div., 4201 N. 27th St., Milwaukee, WI 53216 414-449-7487
§ EDL, Inc., 385 Oser Ave., Hauppauge, NY 11788 .... 516-435-2808;1-800-DIAL EDL
§ Electromatic Controls Corp., 2495 Pembroke Road, Hoffman Estates, IL 60195-2010 312-882-5757
Electronic Prods. Corp., Interstate Indl. Plaza, R. D. #5, York, PA 17402 717-767-6517
Elma Engrg., 1066 E. Meadow Circle, Palo Alto, CA 94303 415-494-7303
Elnik Instrs., 3 Edison Place, Fairfield, NJ 07006 201-882-8033
§ E^2 Technology Corp., 4475 Dupont Ct #9, Ventura, CA 93003 805-644-9544
ETI Systems, Polaris Indl. Entprs., 215 Via Del Norte, Oceanside, CA 92054 619-757-7770
Fasco Industries, Inc., Div. of Hawker Siddeley Grp. Plc., 601 North Federal Highway, Boca Raton, FL 33432 305-368-0600
§ Fenwal, Inc., 400 Main St., Ashland, MA 01721 617-881-2000
† FTS Sys., POB 158, Stone Ridge, NY 12484 800-824-0400
Gordon, Claud S., Co., 5710 Kenosha St., Richmond, IL 60071 815-678-2211
§ Gordon Prods., 67 Del Mar Dr., Brookfield, CT 06804 203-775-4501
§ Grasslin Controls Corp., Dieter Grasslin Feinwerktechnik, 45 Spear Rd., Ramsey, NJ 07446 201-825-9696
§ Hexacon Elec., 161 W. Clay Ave., Roselle Park, NJ 07204 201-245-6200
Honeywell Inc., Commercial Div., MN 27-7246, Honeywell Plaza, Minneapolis, MN 55408 612-870-5357
† Honeywell, Process Control Div., 1100 Virginia Dr., Ft. Washington, PA 19034 .... 800-321-5111, Ext. 596
Hy-Cal Engrg., 9650 Telstar Ave., El Monte, CA 91731 213-444-4000
Inconix Corp., 10 Tech Circle, Natick, MA 01760 617-655-1170
International Instrumentation, 31131-602 Via Colinas, Westlake Vlg., CA 91362 213-991-9614
§ International Instruments, General Resistance, Inc., Twin Lakes Rd, P.O. Box 185, N. Branford, CT 06471 203-481-3450
§ International Microtronics Corp., 4016 E. Tennessee St., Tucson, AZ 85714 602-748-7900
† Isotemp Research, Inc, Box 3389, Charlottesville, VA 22901 804-295-3101
§ ITT General Controls Div., Intl. Telephone & Telegraph Corp., 801 Allen Ave., Glendale, CA 91201 213-842-6131
Iveron Pacific, 1150 Morena Boulevard, San Diego, CA 92110-3899 619-275-1500
§ Jumbo Process Control, Inc., 410 Garibaldi Ave., Lodi, NJ 07644 201-779-7744
Kalglo Elctrns. Co., Inc., 6584 Ruch Rd., E. Allen Twp., Bethlehem, PA 18017 215-837-0700

Kaye Instruments, 15 De Angelo Dr., Bedford, MA 01730 617-275-0300
§ KB Elctrns., 73 Wortman Ave., Brooklyn, NY 11207 718-257-3300
Keystone Carbon, Thermistor Div., St. Marys, PA 15857 814-781-1591
Larson Instr., Greenbush Rd., Orangeburg, NY 10962 914-359-3800
Leeds & Northrup Instrs., A Unit of General Signal Corp., Sumneytown Pike, North Wales, PA 19454 215-643-2000
§ LFE, Process Control Div., 55 Green St., Clinton, MA 01510 617-835-1000
§ Love Controls, 1475 S. Wheeling Rd., Wheeling, IL 60090 312-541-3232
Luft Instrs., Hillside Rd., P.O. Box 214, Lincoln, MA 01773 617-259-9215
Macro Electronics Corp., 23 Royalston Lane, So. Setauket, NY 11720 516-698-3357
Mag-Con, 1626 Terrace Dr., St. Paul, MN 55113 612-633-8820
§ Markat Div., Wild Oats Corp., 3 Country Dr., Plainview, NY 11803 516-549-9272
† Marlow Inds., 10451 Vista Park Rd., Dallas, TX 75238 214-340-4900
§ Master Elctrn. Controls, P.O. Box 25905, Los Angeles, CA 90025 213-452-1336
Matrix Corp., 2260 Distributors Dr., Indianapolis, IN 46241 317-248-2036
Microavionics Corp., 3198-K Airport Loop Dr., Costa Mesa, CA 92626 714-957-6904
Midwest Comps., 1981 Port City Blvd., Muskegon, MI 49443 616-777-2602
Mikron Instr., Box 211, Ridgewood, NJ 07451 201-891-7330
Minco Prods., 7300 Commerce La., Minneapolis, MN 55432 612-571-3121
§ MKS Electronics Corp., 454 E. Donovan Rd., Kansas City, KS 66115 913-371-1351
† NANMAC Corp., 9 Mayhew St., Framingham, MA 01701 617-872-4811
§ NES, Inc. (Nationwide Electronic Systems), 3003 Wakefield, Carpentersville, IL 60110 312-426-5900
§ Newport Electronics, 630 E. Young St., Santa Ana, CA 92705 714-540-4914
Nuclear Resch. Corp., 125 Titus Ave., Warrington, PA 18976 215-343-5900
OAL Assocs., P.O. Box J, Escondido, CA 92025 619-743-7143
§ Omron Elctrns., Inc., Control Comps. Div., One E. Commerce Dr., Schaumburg, IL 60195 312-843-7900
Ovenaire, Electronic Technologies Inc., 706 Forrest St., Charlottesville, VA 22901 804-977-8050
† Oven Inds., 191 Hempt Rd., P.O. Box 290, Mechanicsburg, PA 17055 717-766-0721
§ Paragon Elect., 606 Parkway Blvd., Two Rivers, WI 54241 414-793-1161
§ Payne Engrg., Box 70, Scott Depot, WV 25560 304-757-7353
§† Power Control, 122 Gamma Dr., Pittsburgh, PA 15238 412-782-3120
PPM, Inc., 4521 Emery Ind. Pkwy., Cleveland, OH 44128 216-292-6006
Princo Instrs., Inc., 1020 Industrial Hwy., Southampton, PA 18966 215-355-1500
† PSG Inds., 1225 Tunnel Road, Perkasie, PA 18944 215-257-3621
† PTL Elctrns., 10211 Vinemont St., Dallas, TX 75218 214-327-3180
Raychem Corp., Elctrns. Grp., 300 Constitution Dr., Menlo Park, CA 94025 415-361-3860
§ Research, Inc., Box 24064, Minneapolis, MN 55424 612-941-3300
§ RFL Inds., Thermocontrol Div., W. Prospect St., Box 250, Brandon, VT 05733 802-247-6811
RI/Control Systems, Research, Inc., P.O. Box 24064, Minneapolis, MN 55424 612-941-3300
RIL Elctrns., Inc., 125 Titus Ave., P.O. Box H, Warrington, PA 18976 .... 215-EL5-1361
§ Schulz Controls, Inc., P.O. Box 9555, New Haven, CT 06511 203-562-2555
S. F. Products Corporation, P. O. Box 369, Southport, CT 06490 203-929-6180
† Sierracin/Thermal Sys., 13920 S. Broadway, Los Angeles, CA 90061 213-321-4350
§ Sigma Instrs., 170 Pearl St., Braintree, MA 02184 617-843-5000
Sigma Instrs., Intl. Instr. Div., 88 Marsh Hill Rd., Orange, CT 06477 203-795-4711
Sigma Systems Corp., 3163 Adams Ave., San Diego, CA 92116 619-283-3193
§ Simpson Elec. Co., 853 Dundee Ave., Elgin, IL 60120 312-697-2260
Solder Absorbing Technology (SAT), South End Bridge Circle, Agawam, MA 01001 800-628-8862
§ Square D Co., Executive Plaza, Palatine, IL 60067 312-397-2600
Strawberry Tree Computers, 949 Cascade Dr., Sunnyvale, CA 94087 408-736-3083
Sun Electronic Systems, Inc., 1601 NW 38th Ave., Ft. Lauderdale, FL 33311 305-587-5577
§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 215-673-5600
Sylvania GTE Control Devices, Rte. 35, Standish, ME 04084 207-642-4535
§† Syracuse Elctrns., P.O. Box 4770, Syracuse, NY 13221 315-488-4911
† Syscon Intl., Inc., 1108 So. High St., So. Bend, IN 46618-1096 .... 219-232-3900; 800-348-2993
§ TDK Corporation of America, 4711 Golf Rd., Skokie, IL 60076 312-679-8200
Tempo Instrument, Inc., 87 Modular Ave., Commack, NY 11725 516-864-3700
§ Temptronic, 55 Chapel St., Newton, MA 02158 617-969-2501
Texas Instrs., Matls. & Controls Grp., 34 Forrest St., Attleboro, MA 02703 617-699-3800
Texmate, Inc., 348 S. Cedros Ave., P.O. Box 2000, Solana Beach, CA 92075 619-481-7177
† Thermo Electric, 109 Fifth St., Saddle Brook, NJ 07662 201-843-5800
§ Tohoku Metal Inds., 5-8, 2-Chome, Kitaaoyama Minato-Ku, Tokyo, JAPAN .... Tokyo 03-402-6161
Trans-Met Engrg., 601 S. Palm St., La Habra, CA 90631 213-691-2266
§ TRW, Dynalco Controls Div., 5200 NW 37th, P.O. Box 8187, Ft. Lauderdale, FL 33310 305-739-4300
§† ULVAC North America, P.O. Box 799, 105 York Street, Kennebunk, ME 04043 207-985-2973
§ United Elec. Controls, 85 School St., Watertown, MA 02172 .... 617-WA6-1000
Varian Assocs., Indl. Equip. Grp., 611 Hansen Way, Palo Alto, CA 94303 415-493-4000
Vectrol, Division of Westinghouse Elec. Corp., 110 Douglas Rd, Oldsmar, FL 33557 813-855-4621
VirTis Co., Rte. 208, Gardiner, NY 12525 914-255-5000
Voltex, 3460 Great Neck Rd., Amityville, NY 11701 516-842-2772
Warren Comms., 101 Okner Pkwy., Livingston, NJ 07039 201-992-6200
§ Wellman Thermal Sys., 1 Progress Rd, Shelbyville, IN 46176 317-398-4411
§ West Division, Gulton Industries, Inc., 3860 N. River Rd., Schiller Park, IL 60176 312-678-6400
§ Yellow Springs Instr., Box 279, Yellow Springs, OH 45387 513-767-7241
Yokogawa Corp. of America, 2 Dart Rd., Shenandoah, GA 30265 404-253-7000

Controls, Timing — See Timers (Vol. D)

Controls, Torque, Electronic-2200

§ Bodine Elec. Co., 2500 W. Bradley Pl., Chicago, IL 60618, 312-478-3515 .... B•1140
Canon U.S.A., Elctrn. Comps. Div., One Canon Plaza, Lake Success, NY 11042, 516-488-6700 .... B•1143
POWR-UPS Corp., 50 Orville Drive, Bohemia, NY 11716, 516-589-3602 .... B•1182-1183
Superior Elec. Co., 383 Middle St., Bristol, CT 06010, 203-582-9561 .... B•1193
Triac Electronic Systems, Inc., 87-27 Myrtle Ave., Glendale, NY 11385, 718-441-4759 .... D•1132
† ABA Electromechanical Sys. Inc., Box 500, Pinellas Pk., FL 34290-0500 813-541-6681
Advance Conversion Devices Co., 274 S. Salem St., Randolph, NJ 07869 201-989-0095
Ambi-Tech Inds., 319 Knickerbocker Ave., Hillsdale, NJ 07642 201-666-0504
§ Ametek, 2 Station Square, Paoli, PA 19301 215-355-6900
Applied Sys., 26401 Harper Ave., St. Clair Shores, MI 48081 313-779-8700
§ A. S. R. Servotron, Inc., (Sub. Baldor Elec. Co.), 7945 Deering Ave., Canoga Park, CA 91304 818-999-6193
§† B & B Motor & Control Corp., Apple Hill Commons, Burlington, CT 06013 203-673-7151
Centent Co., 3879 S. Main St., Santa Ana, CA 92707 714-979-6491
† Columbia Resch. Labs., Macdade Blvd. & Bullens La., Woodlyn, PA 19094 215-532-9464
† Control Technology Co., 41-16 29th St., Long Island City, NY 11101 718-361-2133
§ Dillon, W. C., & Co., National Controls, Inc., 2320 Airport Blvd., Santa Rosa, CA 95401 707-527-5555
§ Eaton Corp./Cutler-Hammer Prods, Aerospace & Commercial Controls Div., 4201 N. 27th St., Milwaukee, WI 53216 414-449-7487
§ Electrol Co., 321 Dewey St., P.O. Box 29, York, PA 17405 717-848-1722
§ GSE, 23640 Research Dr., Farmington Hills, MI 48024 313-476-7875
† Honeywell, Process Control Div., 1100 Virginia Dr., Ft. Washington, PA 19034 .... 800-321-5111, Ext. 596
† Industrial Control Co., 3100 Pineda Ave., Rockledge, FL 32955 305-259-7105
§ KB Elctrns., 73 Wortman Ave., Brooklyn, NY 11207 718-257-3300
Kollmorgen Corp., Industrial Drives Div., 201 Rock Rd., Radford, VA 24141 703-639-2495
Magnetoelastic Devices, 326 Springside Ave., Box 625, Pittsfield, MA 01201 413-445-5608
§ Payne Engrg., Box 70, Scott Depot, WV 25560 304-757-7353
Reliance Electric Co., Marketing Info Center, P.O. Box 99502, Cleveland, OH 44199 .... 800-245-4501;800-245-4497 In Ohio
§ Schulz Controls, Inc., P.O. Box 9555, New Haven, CT 06511 203-562-2555
Vibrac, 1 Columbia Dr., Amherst, NH 03031 603-882-6777
Waters Mfg., Longfellow Ctr., Wayland, MA 01778 617-358-2777
§ Xycom, 750 N. Maple Rd., Saline, MI 48176 313-429-4971

Controls, Vibrator-2200

Anders, Inc., 77 Wolcott Rd., Simsbury, CT 06070 203-658-7666
§ Staco Energy Prods. Co., 301 Gaddis Blvd., Dayton, OH 45403 513-253-1191

Controls, Voltage Regulating — See Regulators & Stabilizers, Voltage (Vol. D)

Controls, Volume & Tone — See Potentiometers (Vol. A), Rheostats (Vol. A)

Control Systems, Air Traffic-3475

Capitol Machine & Switch Co., Box 890, Danbury, CT 06810 203-744-3300
† Cardion Elctrns., Div. of Gen. Sig. Conts., Inc. Unit of Gen. Sig. Corp., Long Island Expwy., Woodbury, NY 11797 516-921-7300
Seiko Instruments U.S.A., Inc., Robotics/Automation Div., 2990 W. Lomita Blvd., Torrance, CA 90505 213-530-8777

Control Systems, Robotics-4900

BEI Motion Sys. Co., General Control Systems Div., 564 Alpha Dr., Pittsburgh, PA 15238, 412-963-0515 .... B•1783
Magnum Opus Custom Elctrn. Engrg., 284 Kennedy St., Iselin, NJ 08830, 201-283-4925 .... D•1093
Preh Electronics Industries, Inc., 5665 Howard Street, Niles, IL 60648, 312-647-8338 .... B•1736
Toko America, Inc., 1250 Feehanville Dr., Mt. Prospect,, IL 60056, 312-297-0070 .... D•1989
TS Products, Inc., 12455 Branford St., Bldg. 22, Arleta, CA 91331, 818-896-6676 .... D•1990
Vernitech, 300 Marcus Blvd., Deer Pk., NY 11729, 516-586-5100 .... D•1991
† ABA Electromechanical Sys. Inc., Box 500, Pinellas Pk., FL 34290-0500 813-541-6681
Adams Rite Prods., Inc., 540 W. Chevy Chase Dr., Glendale, CA 91204 818-241-5121
Adaptive Intelligence, 1401 McCarthy Blvd., Milpitas, CA 95035 408-262-7222
Amtek Digital Systems, Inc., 12740 28th N.E., Seattle, WA 98125 206-363-0217
Astrosystems, 6 Nevada Dr., Lake Success, NY 11042 516-328-1600
§ B & B Motor & Control Corp., Apple Hill Commons, Burlington, CT 06013 203-673-7151
Berkeley Process Control, Inc., 5327-K Jacuzzi St., Richmond, CA 94804 415-526-3333
Capitol Machine & Switch Co., Box 890, Danbury, CT 06810 203-744-3300
Centent Co., 3879 S. Main St., Santa Ana, CA 92707 714-979-6491
† Computer Conversions Corp., 6 Dunton Ct., E. Northport, NY 11731 516-261-3300
Control Sciences, Inc., 9509 Vassar Ave., Chatsworth, CA 91311 818-709-5510
Controls Unlimited, Inc., 4823 North Ridge Rd., Perry, OH 44081 216-259-2500
† Control Technology Co., 41-16 29th St., Long Island City, NY 11101 718-361-2133
General Numeric Corporation, 390 Kent Avenue, Elk Grove Village, IL 60007 312-640-1595
Digitus Corporation, 22 West 25th Street, Baltimore, MD 21218 301-467-3223

Femco, Inc., P.O. Box 26710 Parkmoor Sta., San Jose, CA 95159 408-946-1188
General Digital Industries Inc., 7702 Governors Dr. W., Huntsville, AL 35805 205-837-8305
HEI Corporation, 290 S. Main Place, Carol Stream, IL 60188 312-665-5500
Indocomp, Inc., Newcor, 5409 Perry Dr., P.O. Box 157, Drayton Plains, MI 48020 313-674-2294
§ Industrial Computer Designs, Inc., 31264 La Baya Drive, Westlake Village, CA 91362 818-889-3179
IXYS Corp., 142 Charcot Ave., San Jose, CA 95131 408-262-8800
Kollmorgen Corp., Industrial Drives Div., 201 Rock Rd., Radford, VA 24141 703-639-2495
Mann, Henry, Inc., 3983 Mann Road, Huntingdon Valley, PA 19006 215-355-7200
† Performance Controls Inc., 333-E Byberry Rd., Hatboro, PA 19040 215-675-6500
† Law, R. E. Instrument, Inc., 7735 W. 112th Pl., Palos Hills, IL 60465 312-974-4000
§ Scientific Technlg., 1201 San Antonio Rd., Mountain View, CA 94043 .... CA 415-965-0910;800-221-7060
Serial Lab Prods., Inc., 162 Cook Lane, P.O. Box 766, Marlboro, MA 01752 617-481-1684
Silicon General, 11861 Western Ave., Garden Grove, CA 92641 714-898-8121
Stock Drive Prods., Div. of Designatronics, Inc., 2101 Jericho Turnpike, New Hyde Pk., NY 11040 .... 516-328-0200;328-3300
† Superior Mfg. & Instr., 19-36 38th St., Long Island City, NY 11105 212-932-1800
† Transmagnetics, 210 Adams Blvd., Farmingdale, NY 11735 516-293-3100
Unico, 3725 Nicholson Rd., Franksville, WI 53126-0505 414-886-5678

Convection Cooling Packages, Semiconductor – See Heat Sinks, Semiconductor (Vol. C)

Converters, AC to DC (Nonrotary) – See Power Supplies, AC Input, DC Output (Vol. D)

Converters, Analog to Digital-2325

ADAC Corp., 70 Tower Office Pk., Woburn, MA 01801, 617-935-6668 .... D•1135
Allen-Bradley Co., Electronics Group, Rockwell Corporation, 1201 S. Second St., Milwaukee, WI 53204, 414-671-2000 .... A•1797
Analogic Corp., Data Conversion Prods. Grp., Audubon Rd., Wakefield, MA 01880, 617-246-0300 .... D•1138
BEI Motion Sys. Co., Computer Prod. Div., 1755 B La Costa Meadows Dr., San Marcos, CA 92069, 619-471-2600 .... B•1783
† BEI Motion Sys. Co., Digital Prods. Div., P.O. Box 3838, Little Rock, AR 72203, 501-851-4000 .... B•1782
BEI Motion Sys. Co., Position Controls Div., 819 Reddick Ave., Santa Barbara, CA 93103, 805-966-1538 .... B•1782
† Datel, General Electric Co., 11 Cabot Blvd., Mansfield, MA 02048, 617-339-9341 .... D•1083,1147
Dio-Rey, Div. of Info-Lite, 422 Cliff St., Fairview, NJ 07022, 201-941-4455 .... B•1045
† ILC Data Device Corp., 105 Wilbur Pl., Bohemia, NY 11716, 516-567-5600 .... D•1151
§† Intech, Microcircuits Div., 2270 Martin Ave., Santa Clara, CA 95050, 408-988-4930 .... A•1672
† Interface Engrg., 386 Lindelof Ave., Stoughton, MA 02072, 617-344-7383 .... D•1156
§ Motorola Semiconductor Prods. Sector, Adv. 72, Box 20912, Phoenix, AZ 85036, 602-244-6900 .... A•1688
§ Preston Scientific, 805 E. Cerritos Ave., Anaheim, CA 92805, 714-776-6400 .... D•1161
† Transmagnetics, 210 Adams Blvd., Farmingdale, NY 11735, 516-293-3100 .... D•1162
† Acromag, 30765 Wixom Rd., Wixom, MI 48096 313-624-1541
Action Instrs., 8601 Aero Dr., San Diego, CA 92123 619-279-5726
† Addacon, Inc., 3702-C Alliance Dr., Greensboro, NC 27407 919-852-6200
A.D. Data Sys., Techtran Industries, 200 Commerce Dr., Rochester, NY 14623 716-334-9649
§† Advanced Microcomputers, 3340 Scott Blvd., Santa Clara, CA 95051 408-732-2400
§† Advanced Micro Devices, P.O. Box 3453, 901 Thompson Pl., Sunnyvale, CA 94088 408-732-2400
Allen-Bradley Co., Electronics Group, Div. of Rockwell Corp., Resistive Products Div., 1414 Allen-Bradley Dr., El Paso, TX 79935 915-592-4888
† Analog Devices, P.O. Box 280, Norwood, MA 02062 617-329-4700
§ Andromeda Sys., 9000 Eton Ave., Canoga Park, CA 91304 818-709-7600
Applied Micro Technlg., A Burr Brown Co., 3669 E. 44th Street, Tucson, AZ 85713 602-622-8605
Applied Sys., 26401 Harper Ave., St. Clair Shores, MI 48081 313-779-8700
† Astronautics Corporation of America, P.O. Box 523, Milwaukee, WI 53201-0523 414-447-8200
Astrosystems, 6 Nevada Dr., Lake Success, NY 11042 516-328-1600
† Bailey Controls Co., 29801 Euclid Ave., Wickliffe, OH 44092 216-585-5800
Barber-Colman Co., Indl. Instrs. Div., P.O. Box 2940, 1354 Clifford Ave., Loves Park, IL 61132 815-877-0241
BBK, Inc., 75 Travis Ave., Binghamton, NY 13904 607-772-8119
Beckman Instrs., 2500 Harbor Blvd., Fullerton, CA 92634 714-871-4848
BEI Motion Sys. Co., Industrial Encoder Div., 7230 Hollister Ave., Goleta, CA 93117 805-968-0782
† Burr-Brown Corp., P.O. Box 11400, Tucson, AZ 85734 602-746-1111
Canberra Ind., One State St., Meriden, CT 06450 203-238-2351
CDS - Colorado Data Sys., 3301 W. Hampden, Unit C, Englewood, CO 80110 303-762-1640
CGRS Microtech, P. O. Box 102, Langhorne, PA 19047 215-757-0284
§ Cincinnati Electrosys., 469 Wards Corner Rd., Loveland, OH 45140 513-831-4347
† Circuit Techn., 160 Smith St., Farmingdale, NY 11735 516-293-8686
§ CmC Instr. Div., Connecticut microComputer Inc., 568 Danbury Road, New Milford, CT 06776 203-354-9395
† Colorado Video, Inc., Box 928, Boulder, CO 80306 303-444-3972
§† Columbus Instruments, 950 N. Hague Ave., Columbus, OH 43204 614-488-6176
Comark Corp., 93 W St., P. O. Box 474, Medfield, MA 02052 617-359-8161
† Computer Conversions Corp., 6 Dunton Ct., E. Northport, NY 11731 516-261-3300
† Consolidated Controls, 15 Durant Ave., Bethel, CT 06801 203-743-6721
† Control Technology Co., 41-16 29th St., Long Island City, NY 11101 718-361-2133
§ Data General, 4400 Computer Dr., Westboro, MA 01581 617-366-8911
† Data Tech, Div. of Penril Corp., 3110 W. Segerstrom, Santa Ana, CA 92704 714-546-7160
§ Data Translation, 100 Locke Dr., Marlboro, MA 01752 617-481-3700
Datawest, 7333 E. Helm Dr., Scottsdale, AZ 85260 602-948-3280
Datron Instrs., Inc., 3401 SW 42nd Ave., Stuart, FL 33497 305-283-0935
Digital Equip., One Iron Way, Marlborough, MA 01752
Digital Graphic Sys., 2629 Terminal Blvd., Mountain View, CA 94043 415-962-0200
† Dymec, 8 Lowell Ave., Winchester, MA 01890 617-729-7870
† EMM/SESCO, 20630 Plummer St., Chatsworth, CA 91311 213-998-9090
§ EMR Data Systems, Div. Sangamo- Weston, Box 3041, Sarasota, FL 33578 813-371-0811
§† Fairchild Camera & Instr. Corp., 464 Ellis St., 20-2271, Mountain View, CA 94042 415-962-5011
§ Fairchild Camera & Instr. Corp., Digital Div., 333 Western Avenue, So. Portland, ME 04106 207-775-8700
§† Fairchild Camera & Instr. Corp., Linear Div., 313 Fairchild Dr., Mountain View, CA 94139 415-962-4011
Ferranti Elec., 87 Modula Ave., Commack, NY 11725 516-543-0200
First Computer Corp., 645 Blackhawk Dr., Westmont, IL 60559 312-920-1050
† GAP Instr., 40 Oser Ave., Hauppauge, NY 11787 516-273-0909
§ GIC Systems, 2324 A Ridgepoint Dr., Austin, TX 78754 512-926-8840
§ Giddings & Lewis Elctrns., A Unit of AMCA Intl., 666 S. Military Rd., P.O. Box 1658, Fond du Lac, WI 54935 414-921-7100
§ Gordos Corporation, Gordos International Corp., 250 Glenwood Ave., Bloomfield, NJ 07003 201-743-6800
Granger Assocs., 3101 Scott Blvd., Santa Clara, CA 95051 408-727-3101
§ Gunther, W., GmbH, Virnsberger Strasse 51, D 8500 Nurnberg 82, WEST GERMANY .... (0)911/65521 or 65520
Harris Microwave Semiconductor, 1530 McCarthy Blvd., Milpitas, CA 95035 408-262-2222
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
† Hughes Aircraft Co., Microelctrn. Sys. Div., 2601 Campus Dr., Irvine, CA 92715 714-752-3800
† Hybrid Systems Corp., 22 Linnell Circle, Billerica, MA 01821 617-667-8700
† HyComp Inc., 75 Union Ave., Box 377, Sudbury, MA 01776 617-443-4631
§ Industrial Computer Designs, Inc., 31264 La Baya Drive, Westlake Village, CA 91362 818-889-3179
† Innovatek Microsystems, Inc., Smithfield Rd., R1 Box 104, Millerton, NY 12546-9720 914-373-9003
§† Intersil, 10710 N. Tantau Ave., Cupertino, CA 95014 408-996-5000
Kinetic Sys., 11 Maryknoll Dr., Lockport, IL 60441 815-838-0005
LeCroy Resch. Sys. Corp., 700 S. Main St., Spring Vly., NY 10977 914-425-2000
LeCroy Resch. Sys. Corp. (Cal.), 1806 Embarcadero Rd., Palo Alto, CA 94303 415-856-1800
§ Macrodyne, 1004 Princetown Rd., Schenectady, NY 12301 518-356-3500
† Measurement Sys., Inc., 121 Water St., Norwalk, CT 06854 203-838-5561
† Micro Networks, 324 Clark St., Worcester, MA 01606 617-852-5400
§† Micro Power Sys. Inc., 3100 Alfred St., Santa Clara, CA 95050 408-727-5350
§ Mitsubishi Elctrns. America, Inc., Semiconductor Div., 1050 East Arques Ave., Sunnyvale, CA 94086 408-730-5900
† Natel Engrg. Co., Inc., 4550 Runway St., Simi Valley, CA 93063 805-581-3950
NEC Electronics, Inc., 401 Ellis Street, Mtn. View, CA 94039 415-960-6000
§ NES, Inc. (Nationwide Electronic Systems), 3003 Wakefield, Carpentersville, IL 60110 312-426-5900
§ Newport Electronics, 630 E. Young St., Santa Ana, CA 92705 714-540-4914
North Atlantic Inds., Instrument Div., 60 Plant Ave., Hauppauge, NY 11788 516-582-6500
† Northern Precision Labs., 11 Madison Rd., Fairfield, NJ 07006 201-227-4800
Omega Engrg., Box 4047, Stamford, CT 06907 203-359-1660
§† Phoenix Data, Inc., 3384 W. Osborn Rd., Phoenix, AZ 85017 602-278-8528
§† Precision Monolithics, Inc., 1500 Space Dr., Santa Clara, CA 95054 408-727-9222
§ Quartic Systems, Inc., 3575 South West Temple #7, Salt Lake City, UT 84115 801-268-9264
† Racal-Dana Instrs. Inc., 4 Goodyear St., Irvine, CA 92715 714-859-8999
§ Ragen Data Systems, Inc., 3 Oval Dr., Central Islip, NY 11722 516-234-3800
§† Raytheon Semiconductor, 350 Ellis St., Mountain View, CA 94043 415-968-9211
RCA Solid State Div., Route 202, Somerville, NJ 08876 201-685-6000
RCA Solid State Div., Linear Integrated Circuits, Rte. 202, Somerville, NJ 08876 201-685-6000
RFL Inds., A Dowty Grp. Co./Comms. Div., Powerville Rd., Boonton, NJ 07005 201-334-3100
Rochester Instr. Sys., 255 N. Union St., Rochester, NY 14605 716-263-7700
Serial Lab Prods., Inc., 162 Cook Lane, P.O. Box 766, Marlboro, MA 01752 617-481-1684
† Signatron, A Unit of Sundstrand Corp., 12 Hartwell Ave., Lexington, MA 02173 617-861-1500
§ Signetics, U.S. Philips Corp., 811 E. Arques Ave, P.O. Box 3409, Sunnyvale, CA 94088-3409 408-739-7700
Singer Co., Kearfott Div., 1150 McBride Ave., Little Falls, NJ 07424 201-785-6000
Sprague Electric Company, Distribution Division, 481 Marshall St., No. Adams, MA 01247 413-664-4481
§ Standard Grigsby, Inc., Gordos International Corp., 920 Rathbone Ave., Aurora, IL 60507 312-844-4300
Strawberry Tree Computers, 949 Cascade Dr., Sunnyvale, CA 94087 408-736-3083
SYMBICON, 89 Route 101A, Amherst, NH 03031 603-673-8898
§ Takeda Riken Co., Ltd., NS Bldg. 14th,4-1,Nishi-Shinjuku 2-Chome,Shinjuku-ku, Tokyo 160, Tokyo 176, JAPAN 03-342-7500
§ Tecmar, Inc., 6225 Cochran Rd., Solon, OH 44139 216-349-0600
Tedea USA, 7800 Deering Ave., Canoga Park, CA 91304 818-884-8818
† Tektronix, Inc., P. O. Box 500, Y3-314, Beaverton, OR 97077 .... 800-547-1512;Oregon only 800-452-1877

Teledyne Philbrick, Allied Dr. Rte 128, Dedham, MA 02026 617-329-1600
Teledyne Semiconductor, 1300 Terra Bella Ave., PO Box 7267, Mountain View, CA 94039-7267 415-968-9241
§ Tennelec, 601 Turnpike, Oak Ridge, TN 37830 615-483-8405
Texmate, Inc., 348 S. Cedros Ave., P.O. Box 2000, Solana Beach, CA 92075 619-481-7177
† Thaler Corp., 10940 N. Stallard Pl., Tucson, AZ 85704 602-742-5572
§† TRW LSI Products, PO Box 2472, La Jolla, CA 92038 619-457-1000
§ Tucker Elctrns., Box 461966, Garland, TX 75046 .... 214-348-8800;800-527-4642
Tustin Elctrns. Co., 1431 E. Saint Andrews Pl., Santa Ana, CA 92705 714-549-0391
§ Veeder-Root, 70 Sargeant St., Hartford, CT 06102 203-527-7201
§ Xycom, 750 N. Maple Rd., Saline, MI 48176 313-429-4971

Converters, Analog to Pulse-2325

Ohio Semitronics, Inc., 1205 Chesapeake Ave., Columbus, OH 43212, 614-486-9561 .... B•1811
† Acromag, 30765 Wixom Rd., Wixom, MI 48096 313-624-1541
Analogic Corp., Data Conversion Prods. Grp., Audubon Rd., Wakefield, MA 01880 617-246-0300
† Computer Conversions Corp., 6 Dunton Ct., E. Northport, NY 11731 516-261-3300
§ Control Prods., Devar, Inc., P.O. Box 589, Bridgeport, CT 06601 203-368-6751
† Control Technology Co., 41-16 29th St., Long Island City, NY 11101 718-361-2133
Datel, General Electric Co., 11 Cabot Blvd., Mansfield, MA 02048 617-339-9341
§ Dymec, 8 Lowell Ave., Winchester, MA 01890 617-729-7870
Hughes Aircraft Co, Aerospace Grps./Support Sys., P.O. Box 90515, Los Angeles, CA 90009 213-670-1515
Hughes Aircraft Co., Microelctrn. Sys. Div., 2601 Campus Dr., Irvine, CA 92715 714-752-3800
Hybrid Systems Corp., 22 Linnell Circle, Billerica, MA 01821 617-667-8700
† Measurement Sys., Inc., 121 Water St., Norwalk, CT 06854 203-838-5561
North Hills Elctrns., 1 Alexander Pl., Glen Cove, NY 11542 516-671-5700
† Power Instrs. Products, Amatek/Mansfield & Green Div., 8600 Somerset Dr., Largo, FL 33543 813-536-7831
† Racal-Dana Instrs. Inc., 4 Goodyear St., Irvine, CA 92715 714-859-8999
§ Ragen Data Systems, Inc., 3 Oval Dr., Central Islip, NY 11722 516-234-3800
§ Richard-Lee Co., Box 724, New Providence, NJ 07974 201-276-0710
Scientific Columbus, Inc., Esterline Corp., 1900 Arlingate La., Columbus, OH 43228 614-274-7160
Serial Lab Prods., Inc., 162 Cook Lane, P.O. Box 766, Marlboro, MA 01752 617-481-1684
† Solid State Elctrns. Corp., 18646 Parthenia St., Northridge, CA 91324 818-993-8257
§† Teledyne Semiconductor, 1300 Terra Bella Ave., PO Box 7267, Mountain View, CA 94039-7267 415-968-9241
TransKinetic Sys., 110 Shawmut Rd., Canton, MA 02021 617-828-3000

Converters, ASCII to Baudot-2325

§ Air Land Systems Corporation, 2710 Prosperity Ave., Fairfax, VA 22031 703-573-1100
Coherent Communications Sys. Corp., 60 Commerce Dr., Hauppauge, NY 11788 516-231-1550
Data Plus, Inc., 7205E Lockport Pl., Lorton, VA 22079 800-368-3747
§ Dataprobe, 110 Palisades Blvd., Palisades Park, NJ 07650 201-947-9500
Timeplex, Inc., 400 Chestnut Ridge Rd., Woodcliff Lake, NJ 07675 201-930-4600

Converters, ASCII to BCD-2325

§ Air Land Systems Corporation, 2710 Prosperity Ave., Fairfax, VA 22031 703-573-1100
Data Plus, Inc., 7205E Lockport Pl., Lorton, VA 22079 800-368-3747
§ Dataprobe, 110 Palisades Blvd., Palisades Park, NJ 07650 201-947-9500
NES, Inc. (Nationwide Electronic Systems), 3003 Wakefield, Carpentersville, IL 60110 312-426-5900
Timeplex, Inc., 400 Chestnut Ridge Rd., Woodcliff Lake, NJ 07675 201-930-4600

Converters, BCD to ASCII-2325

§ Air Land Systems Corporation, 2710 Prosperity Ave., Fairfax, VA 22031 703-573-1100
Data Plus, Inc., 7205E Lockport Pl., Lorton, VA 22079 800-368-3747
§ Dataprobe, 110 Palisades Blvd., Palisades Park, NJ 07650 201-947-9500
Innovative Electronics, Inc., 4714 N.W. 165th St., Miami, FL 33014 305-624-1644

Converters, Binary to BCD-2325

† Control Sciences, Inc., 9509 Vassar Ave., Chatsworth, CA 91311, 818-709-5510 .... D•1144,1146
† Transmagnetics, 210 Adams Blvd., Farmingdale, NY 11735, 516-293-3100 .... D•1162
Analog Devices, P.O. Box 280, Norwood, MA 02062 617-329-4700
CDS - Colorado Data Sys., 3301 W. Hampden, Unit C, Englewood, CO 80110 303-762-1640
† Computer Conversions Corp., 6 Dunton Ct., E. Northport, NY 11731 516-261-3300
Data Plus, Inc., 7205E Lockport Pl., Lorton, VA 22079 800-368-3747
Inconix Corp., 10 Tech Circle, Natick, MA 01760 617-655-1170
Interface Engrg., 386 Lindelof Ave., Stoughton, MA 02072 617-344-7383
† Racal-Dana Instrs. Inc., 4 Goodyear St., Irvine, CA 92715 714-859-8999
SGS Semiconductor Corporation, 1000 E. Bell Road, Phoenix, AZ 85022 602-867-6100

Converters, Binary to Decimal-2325

† Control Sciences, Inc., 9509 Vassar Ave., Chatsworth, CA 91311, 818-709-5510 .... D•1144,1146
† Interface Engrg., 386 Lindelof Ave., Stoughton, MA 02072, 617-344-7383 .... D•1156
Aydin Monitor Sys., 502 Office Center Dr., Ft. Washington, PA 19034 215-646-8100
CDS - Colorado Data Sys., 3301 W. Hampden, Unit C, Englewood, CO 80110 303-762-1640
† Computer Conversions Corp., 6 Dunton Ct., E. Northport, NY 11731 516-261-3300
Data Plus, Inc., 7205E Lockport Pl., Lorton, VA 22079 800-368-3747
Decom Sys., 340 Rancheros Dr., San Marcos, CA 92069 619-744-1002
Hughes Aircraft Co, Aerospace Grps./Support Sys., P.O. Box 90515, Los Angeles, CA 90009 213-670-1515
Hughes Aircraft Co., Microelctrn. Sys. Div., 2601 Campus Dr., Irvine, CA 92715 714-752-3800
† Metric Sys., 645 Anchors St., Ft. Walton Beach, FL 32548 904-244-9600
§ NES, Inc. (Nationwide Electronic Systems), 3003 Wakefield, Carpentersville, IL 60110 312-426-5900
Northern Precision Labs., 11 Madison Rd., Fairfield, NJ 07006 201-227-4800
§ Ragen Data Systems, Inc., 3 Oval Dr., Central Islip, NY 11722 516-234-3800
SGS Semiconductor Corporation, 1000 E. Bell Road, Phoenix, AZ 85022 602-867-6100
§† Teledyne Semiconductor, 1300 Terra Bella Ave., PO Box 7267, Mountain View, CA 94039-7267 415-968-9241
Texas Instrs., Inc., Box 225012-MS-84, Dallas, TX 75265 214-995-6611
† Transmagnetics, 210 Adams Blvd., Farmingdale, NY 11735 516-293-3100
† Vernitech, 300 Marcus Blvd., Deer Pk., NY 11729 516-586-5100

Converters, Card to Tape-2000

† Astronautics Corporation of America, P.O. Box 523, Milwaukee, WI 53201-0523 414-447-8200
Decom Sys., 340 Rancheros Dr., San Marcos, CA 92069 619-744-1002
Standard Logic, 2215 S. Standard Ave., Santa Ana, CA 92707 714-979-4770

Converters, CRT Display-2000

† EMCO High Voltage Co., 11126 Ridge Road, Sutter Creek, CA 95685, 209-223-3626 .... D•1632
§† Advanced Micro Devices, P.O. Box 3453, 901 Thompson Pl., Sunnyvale, CA 94088 408-732-2400
§ Air Land Systems Corporation, 2710 Prosperity Ave., Fairfax, VA 22031 703-573-1100
Analogic Corp., Data Conversion Prods. Grp., Audubon Rd., Wakefield, MA 01880 617-246-0300
§ Andromeda Sys., 9000 Eton Ave., Canoga Park, CA 91304 818-709-7600
† Arnold Magnetics, 11520 W. Jefferson Blvd., Culver City, CA 90230 .... 213-390-3537/8837
ATV Research, Inc., 1301 Broadway, Dakota City, NE 68731 402-987-3771
Bertan Assocs., 121 New South Rd., Hicksville, NY 11801 516-433-3110
† Cardion Elctrns., Div. of Gen. Sig. Conts., Inc. Unit of Gen. Sig. Corp., Long Island Expwy., Woodbury, NY 11797 516-921-7300
Data Translation, 100 Locke Dr., Marlboro, MA 01752 617-481-3700
† Del Elctrns. Corp., 250 E. Sandford Blvd., Mt. Vernon, NY 10550 914-699-2000
Dotronix, 160 First St. SE, New Brighton, MN 55112 612-633-1742
§ Dymec, 8 Lowell Ave., Winchester, MA 01890 617-729-7870
Enterprise Sys. Corp., P.O. Box 698, Dover, NH 03820 603-742-7363
EWC, Inc., 725 Federal Ave., Kenilworth, NJ 07033 .... 201-245-3200;800-526-4048
Gamma High Voltage Resch. Inc., 152 S. MacQuesten Pkwy., Mt. Vernon, NY 10550 914-667-5050
Hughes Aircraft Co, Aerospace Grps./Support Sys., P.O. Box 90515, Los Angeles, CA 90009 213-670-1515
Hughes Aircraft Co., Microelctrn. Sys. Div., 2601 Campus Dr., Irvine, CA 92715 714-752-3800
§ Intech, Microcircuits Div., 2270 Martin Ave., Santa Clara, CA 95050 408-988-4930
† Interface Engrg., 386 Lindelof Ave., Stoughton, MA 02072 617-344-7383
International High Voltage Elctrns., Inc., 98 Mill Plain Rd., Danbury, CT 06811 203-792-7820
Intronics, Inc., 57 Chapel St., Newton, MA 02158 617-964-4000
Lundy Elctrns. & Systems, Inc., 1 Robert La., Glen Head, NY 11545 516-671-9000
Penn-Tran Corp., Box 1321, Rte. 144N, Wingate, PA 16880 814-355-1521
† PTK Division, Emerson Electric Co., 1173 Los Olivos Ave., Los Osos, CA 93402 805-528-5858
† Spellman High Voltage Elctrns. Corp., 7 Fairchild Ave., Plainview, NY 11803 516-349-8686
Tektronix, Inc., P. O. Box 500, Y3-314, Beaverton, OR 97077 ..... 800-547-1512;Oregon only 800-452-1877
† Venus Scientific, Inc., 399 Smith St., Farmingdale, NY 11735 516-293-4100
§ Vidco, 8323 S.W. Cirrus Drive, Beaverton, OR 97005 503-641-1804

Converters, DC to DC, Less Than 30 VDC Output-4000

Abbott Transistor Labs., Industrial Products Div., 8203 Vineland Ave., Sun Valley, CA 91352, 818-504-0644 .... D•1449
† Abbott Transistor Labs., Power Supply Div., 5200 W. Jefferson Blvd., Los Angeles, CA 90016, 213-936-8185 .... D•1449,1455-1458
Acopian, Box 638, Easton, PA 18044, 215-258-5441 .... D•1470-1471
Applied Power Conversion, Technology Dynamics, Inc., 100 School St., Bergenfield, NJ 07621, 201-664-7636 .... D•1500,1506
† Arnold Magnetics, 11520 W. Jefferson Blvd., Culver City, CA 90230, 213-390-3537/8837 .... D•1508-1511
Astec USA, Ltd., A BSR Intl. Co., 2880 San Tomas Expwy., # 200, Santa Clara, CA 95051, 408-748-1200 .... D•1512-1513
† Bikor, 1504 W. 228th St., Torrance, CA 92718, 213-539-6320 .... D•1536
§ Calex Mfg. Co., Inc., 3355 Vincent Rd., Pleasant Hill, CA 94523, 415-932-3911 .... D•1006,1543-1545
Compower Div., Computer Prods., Inc., 2220 Lundy Ave., San Jose, CA 95131, 408-942-1600 .... D•1552,1554
Computer Prods. Inc., Power Conversion Grp., 2981 Gateway Dr., Pompano Bch., FL 33069-4803, 305-974-5500 .... D•1552,1554,1559,1568-1583
§ Converter Concepts, Inc., Industrial Pkwy., Pardeeville, WI 53954, 608-429-2144 .... D•1600-1603
Del Elctrns. Corp., 250 E. Sandford Blvd., Mt. Vernon, NY 10550, 914-699-2000 .... D•1615
§ Elpac Power Sys., 3131 S. Standard Ave., Santa Ana, CA 92705, 714-979-4440 .... D•1626-1627,1629
EMCO High Voltage Co., 11126 Ridge Road, Sutter Creek, CA 95685, 209-223-3626 .... D•1632
† Endicott Resch. Grp., Inc., 2601 Wayne St., P.O. Box 269, Endicott, NY 13760, 607-754-9187 .... B•1048-1049, D•1633

Hitran Corp., Agex, Rte. 31, RD 5-65, Flemington, NJ 08822, 201-782-5525	D•1660
§† Integrated Circuits, Inc., 10301 Willows Road, Redmond, WA 98052, 206-882-3100	D•1661-1665
Interelectronics Corp., Interelectronics Park, 550 U.S. Rte. 303, Congers, NY 10920, 914-EL8-8000	D•1667
Intronics, Inc., 57 Chapel St., Newton, MA 02158, 617-964-4000	D•1676-1677
Keltec Florida, P.O. Box 2917, Ft. Walton Bch., FL 32549, 904-651-9749	D•1688
§ Kepco, Inc., 131-38 Sanford Ave., Flushing, NY 11352, 718-461-7000	D•1689-1691,1696,1698
KGS Electronics, Inc., GAR Entprs., 2029 N. Lincoln Ave., Pasadena, CA 91103, 818-798-0786	D•1715,1942
Modular Devices, 50 Orville Dr., Bohemia, NY 11716, 516-567-9620	D•1011
Performance Controls Inc., 333-E Byberry Rd., Hatboro, PA 19040, 215-675-6500	B•1178
Pico Elctrns., 453 North MacQuesten Pkwy., Mt. Vernon, NY 10552, 914-699-5514;800-431-1064	D•1744-1751
Pioneer Magnetics, 1745 Berkeley St., Santa Monica, CA 90404, 213-829-6751	D•1752-1753
Polyphase Instr., 175 Commerce Dr., Ft. Washington, PA 19034, 215-643-6950	A•1622
Power General, Unitrode, 152 Will Dr., Canton, MA 02021, 617-828-6216	D•1764-1765
§ Power Products Div., Computer Products, Inc., 2981 Gateway Drive, Pompano Beach, FL 33069, 305-974-2442	D•1552,1559,1568-1572
Prime Power, Inc., Prime Technology Co., Twin Lakes Rd., P.O. Box 185, N. Branford, CT 06471, 203-481-5721	D•1801
Qualidyne Sys., Unitech Ltd., 3055 Del Sol Blvd., San Diego, CA 92154, 619-429-7440;619-575-4400	D•1805,1808-1809
RIFA, Inc., Greenwich Off. Pk. 3, P.O. Box 3110, Greenwich, CT 06836-3110, 203-625-7300	D•1810-1811
† RO Assocs., 246 Caspian Dr., Box 61419, Sunnyvale, CA 94088, 408-744-1450	D•1813-1814
§ Stevens-Arnold Div., Computer Prods., Inc., 7 Elkins St., So. Boston, MA 02127, 617-268-1170	D•1552,1573-1583
† Technipower, A Penril Co., P.O. Box 222, Commerce Pk., Danbury, CT 06810, 203-748-7001	D•1850
† Technology Dynamics, 91 E. Carver Ave., Westwood, NJ 07675, 201-664-7636	D•1851
Toko America, Inc., 1250 Feehanville Dr., Mt. Prospect,, IL 60056, 312-297-0070	D•1856
Velonex, 560 Robert Ave., Santa Clara, CA 95050, 408-727-7370	D•1383
Wilmore Elctrns. Co., Box 1329, Hillsborough, NC 27278, 919-732-9351	D•1867-1868
§ AAK Corp, 747 River St., Haverhill, MA 01830	617-373-3769
§† Able Power and Engineering Inc., 335 S. New Ave., # H, Monterey Park, CA 91754	714-891-3568
§ ACDC Electronics, 401 Jones Rd., Oceanside, CA 92054	619-757-1880
† Acromag, 30765 Wixom Rd., Wixom, MI 48096	313-624-1541
† Adtech Power Inc., 1620 S. Sunkist St., Anaheim, CA 92806	714-634-9211
Airpax Corp., Ft. Lauderdale Div., 6801 W. Sunrise Blvd., Ft. Lauderdale, FL 33313	305-587-1100
Albar, Inc., 19013 36th Ave. W., Lynnwood, WA 98036	206-771-4006
† American Elctrns., 1600 E. Valencia Dr., Fullerton, CA 92631	714-871-3020
American Monarch, 2801-37th Ave., N.E., Minneapolis, MN 55421	612-788-9161
† AMETEK, Dynamics Division, AMETEK, Inc., 5649 Peck Rd., Arcadia, CA 91006	818-442-5981
† Anadyne Power Supply Division, 721 W. Whittier Blvd., La Habra, CA 90631	213-697-3116
† Analog Devices, P.O. Box 280, Norwood, MA 02062	617-329-4700
Analogic Corp., Data Conversion Prods. Grp., Audubon Rd., Wakefield, MA 01880	617-246-0300
Astro-Geo-Marine, Inc., 202 E. Cota St., Santa Barbara, CA 93101	805-965-7005
§ Astron Corp., 2852 Walnut # E, Tustin, CA 92680	714-832-7770
AT&T, 1 Oak Way, Berkeley Heights, NJ 07922	1-800-372-2447
† ATC Power Systems, Inc., 472 Amherst Street, Nashua, NH 03063	603-882-1366
ATR Elctrns., Inc., P.O. BOX 7008, St. Paul, MN 55107	612-738-6520;414-297-7374
† Autronics, 314 E. Live Oak, Ste. A, Arcadia, CA 91006	818-445-5470
† Babcock, Inc., 1717 West Collins Ave., Orange, CA 92667	714-633-3700
§ B.H. Inds., Inc., 5784 Venice Blvd., Los Angeles, CA 90019	213-937-4763
§ Boschert Inc., 384 Santa Trinita Ave., Sunnyvale, CA 94086	408-732-2440
† Brandt Elctrns., Inc., 1220 Alderwood Ave., Sunnyvale, CA 94086	408-734-8310
Burr-Brown Corp., P.O. Box 11400, Tucson, AZ 85734	602-746-1111
§ Carter Motor, 2707 W. George St., Chicago, IL 60618-7898	312-588-7700
† CEA Division of Berkleonics, Inc., A Subsidiary of EG & G, 1 Aerovista Pk., San Luis Obispo, CA 93401	805-544-5454
† CEAG Elec. Corp., Power Supp. Div., 1324 Motor Pkwy., Hauppauge, NY 11788	516-582-4422
Cherry Semiconductor Corp, 2000 S. County Trail, East Greenwich, RI 02818	401-885-3600
† Chloride Power Electronics, 10931 Pellicano Drive, El Paso, TX 79935	915-592-9985
Computer Power, 124E W. Main St., High Bridge, NJ 08829	201-735-8000
§ Conver Corp., 10629 Bandley Dr., Cupertino, CA 95014	408-255-0151
† Cramer Coil & Transformer Co., Inc., 1121 15th Ave., Grafton, WI 53024	414-377-7040
Crestronics Div., Applied Electro Technlg., Int., 2220 S. Anne St., Santa Ana, CA 92704	714-556-6570
§ Dale Electronics, Inc., Yankton Div., E. Hwy. 50, Box 180, Yankton, SD 57078	605-665-9301
D & B Power, Inc., 204 N. Fehr Way, P.O. Box 40M, Bayshore, NY 11706	516-586-5955
† Datametrics Corp., Defense Products Div., 7630 Gloria Ave., Van Nuys, CA 91406	818-989-3840
Data Translation, 100 Locke Dr., Marlboro, MA 01752	617-481-3700
Datel, General Electric Co., 11 Cabot Blvd., Mansfield, MA 02048	617-339-9341
Delta Electronic Ind. USA, Delta Elctrn. Ind. Co. Ltd., 3401 Investment Blvd., Ste. 5, Hayward, CA 94545	415-785-5231;415-785-5235
§ Douglas Randall, 6 Pawcatuck Ave., Pawcatuck, CT 06379	203-599-2075
§† Dressen-Barnes Elctrns., 1600 E. Valencia Dr., Fullerton, CA 92631	714-871-3020
† EG & G Almond Instruments, 1330 E. Cypress St., Covina, CA 91724	818-967-9521
Electromech, Inc., 528 Elm Street, Kearny, NJ 07032	201-997-0950
Electronic Instr. & Specialty Corp., 42 Pleasant St., Stoneham, MA 02180	617-438-5300
Engd. Prod., Div. of Acme Elec. Corp., 40 Water St., Cuba, NY 14727	716-968-2400
† ERA Transpac Div., Sub. Elctrn. Research Assocs., 50 Graphic Place, Moonachie, NJ 07074	201-641-3650
§† E-Tronics, 16774 Schoenborn, Sepulveda, CA 91343	213-892-7279
§† Franek, John, Co., Inc., P.O. Box 11752, Santa Ana, CA 92711-1752	714-832-0290; 800-854-9420
† Freed Transformer, 1718 Weirfield St., Ridgewood, NY 11385	212-386-1300
Frequency Control Prods., Inc., American Time Prods. Div., 61-20 Woodside Ave., Woodside, NY 11377	212-458-5811
General Magnetics, 211 Grove St., Bloomfield, NJ 07003	201-743-2700
§† Gra-Mar Inc., 3165 McCrory Pl., Ste. 265, Orlando, FL 32803	305-894-3351
† Gulton Industries, Inc., Engineered Magnetics Division, 13041 Cerise Ave., Hawthorne, CA 90250	213-679-0111
§ Harris Corp., Dracon Div., 809 Calle Plano, Camarillo, CA 93010	805-987-9511
Hisonic, Inc., 249 N. Troost, P.O. Box 1130, Olathe, KS 66061-1130	913-782-0012
† Hughes Aircraft Co., Microelctrn. Sys. Div., 2601 Campus Dr., Irvine, CA 92715	714-752-3800
Hurricane Electrns. Lab, P.O. Box 1280, Hurricane, UT 84737	801-635-2003
Hybrid Systems Corp., 22 Linnell Circle, Billerica, MA 01821	617-667-8700
§† Intech, Microcircuits Div., 2270 Martin Ave., Santa Clara, CA 95050	408-988-4930
ITT Power Systems Corp., Box 688, Galion, OH 44833-0688	419-468-8100
§ La Marche Mfg., 106 Bradrock Dr., Des Plaines, IL 60018	312-299-1188
Lambda Electronics, Veeco Instr., Inc., 515 Broad Hollow Rd., Melville, NY 11747	516-694-4200
LH Research, Inc., 14402 Franklin Ave., Tustin, CA 92680	714-730-0162
§† Linear Technology Corp., 1630 McCarthy Blvd., Milpitas, CA 95035	408-942-0810
Lorain Prods., 1122 F St., Lorain, OH 44052	216-288-1122
§ Love Controls, 1475 S. Wheeling Rd., Wheeling, IL 60090	312-541-3232
† Magnetek, 7315 Red Deer Dr., Boulder, CO 80301-4696	303-442-6700
† Magnetico Inc., 182 Morris Ave., Holtsville, NY 11742	516-654-1166
Magnetran Corp., 5701 Savoy Lane, Houston, TX 77036	713-785-4202
§ Marathon Flite-Tronics Company, A Marathon Power Technologies Co., 2525 N. Naomi St., Burbank, CA 91504	818-841-3210
† Megatran Electronic Power, Rising Sun Rd., Bordentown, NJ 08505	609-298-7300
Melcher, Inc., 6290 Sunset Blvd., # 1126, Los Angeles, CA 90028	213-463-5617
Micro Power Intl., Inc., 9420 Activity Rd., San Diego, CA 92126	619-271-0831
Mid-Eastern Industries, 100 Campus Dr., RD 1, Mt. Holly, NJ 08060	609-267-3811
Midland-Ross Corp., Midtex Div., P.O. Box 3328, No. Mankato, MN 56001	507-625-6521
MIL Electronics, Inc., 1 Mill st., Dracut, MA 01826	617-453-8000
§ Motorola Semiconductor Prods. Sector, Adv. 72, Box 20912, Phoenix, AZ 85036	602-244-6900
MPC Sys., Div. of Consulting Systems, RFD Box 441, Fremont, NH 03044	603-642-5913
† Natel Engrg. Co., Inc., 4550 Runway St., Simi Valley, CA 93063	805-581-3950
† Novatronics, Box 878, Pompano Beach, FL 33061	305-942-5200
† OPT Inds. Inc., 300 Red School La., Phillipsburg, NJ 08865	201-454-2600
† Pacific Electro Dynamics, Inc., 11465 Willows Rd. N.E., Redmond, WA 98052	206-881-1700
† PCA Elctrns., 16799 Schoenborn St., Sepulveda, CA 91343	818-892-0761
§ Power Control, 122 Gamma Dr., Pittsburgh, PA 15238	412-782-3120
Power Conversion Prods., 42 East St., Box 380, Crystal Lake, IL 60014	815-459-9100
Power Designs, Inc., 1700 Shames Dr., Westbury, NY 11590	516-333-6200
Power Systems, 12 Tobey Rd., Bloomfield, CT 06002	203-243-0357
† Power Sys. Grp., Rantec Div., Emerson Elec., 9401 Oso Ave., Chatsworth, CA 91311	818-885-8223
§ Power Technology, Inc., P.O. Box 9769, Little Rock, AR 72219	501-568-1995
§ Ragen Data Systems, Inc., 3 Oval Dr., Central Islip, NY 11722	516-234-3800
† Rayco Elctrn. Mfg., 1625 12th St., Santa Monica, CA 90404	213-450-0777
§ Reliability, Inc., 16400 Park Row, P.O. Box 218370, Houston, TX 77218	713-492-0550
Reliance Comm/Tec, Reliance Electric, P. O. Box 99502, Cleveland, OH 44199	800-245-4501;in OH 800-245-4497
Reliance Electric Co., Marketing Info Center, P.O. Box 99502, Cleveland, OH 44199	800-245-4501;800-245-4497 In Ohio
RTE, Power/Mate Co., 514 S. River St., Hackensack, NJ 07601	201-440-3100
Sanford-Miller Corp., 8 John St., Lynbrook, NY 11563	516-593-2025; Outside NY 800-645-5900
§ Semiconductor Circuits, 49 Range Rd., Windham, NH 03087	603-893-2330
Sensor Corp., Box 140, Scottdale, PA 15683	412-887-4080
SGS Semiconductor Corporation, 1000 E. Bell Road, Phoenix, AZ 85022	602-867-6100
Sigma Instrs., 170 Pearl St., Braintree, MA 02184	617-843-5000
† Sigmapower, Inc., 20790 Leapwood Ave., Carson, CA 90746	213-32-Sigma
§ Sola, A Unit of General Sign., 1717 Busse Rd., Elk Grove Village, IL 60007	312-439-2800
Standard Logic, 2215 S. Standard Ave., Santa Ana, CA 92707	714-979-4770
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Texmate, Inc., 348 S. Cedros Ave., P.O. Box 2000, Solana Beach, CA 92075	619-481-7177
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† Abbott Transistor Labs., Power Supply Div., 5200 W. Jefferson Blvd., Los Angeles, CA 90016, 213-936-8185 ... D•1449,1456-1458
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Applied Power Conversion, Technology Dynamics, Inc., 100 School St., Bergenfield, NJ 07621, 201-664-7636 ... D•1500,1506
† Arnold Magnetics, 11520 W. Jefferson Blvd., Culver City, CA 90230, 213-390-3537/8837 ... D•1508-1511
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Crestronics Div., Applied Electro Technlg., Int., 2220 S. Anne St., Santa Ana, CA 92704, 714-556-6570 ... D•1609
† Del Elctrns. Corp., 250 E. Sandford Blvd., Mt. Vernon, NY 10550, 914-699-2000 ... D•1615
† EMCO High Voltage Co., 11126 Ridge Road, Sutter Creek, CA 95685, 209-223-3626 ... D•1632
† Endicott Resch. Grp., Inc., 2601 Wayne St., P.O. Box 269, Endicott, NY 13760, 607-754-9187 ... B•1048-1049, D•1633
Hitran Corp., Agex, Rte. 31, RD 5-65, Flemington, NJ 08822, 201-782-5525 ... D•1660
Interelectronics Corp., Interelectronics Park, 550 U.S. Rte. 303, Congers, NY 10920, 914-EL8-8000 ... D•1667
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Performance Controls Inc., 333-E Byberry Rd., Hatboro, PA 19040, 215-675-6500 ... B•1178
Pioneer Magnetics, 1745 Berkeley St., Santa Monica, CA 90404, 213-829-6751 ... D•1752-1753
Polyphase Instr., 175 Commerce Dr., Ft. Washington, PA 19034, 215-643-6950 ... A•1622
Power Products Div., Computer Products, Inc., 2981 Gateway Drive, Pompano Beach, FL 33069, 305-974-2442 ... D•1559
Prime Power, Inc., Prime Technology Co., Twin Lakes Rd., P.O. Box 185, N. Branford, CT 06471, 203-481-5721 ... D•1801
Qualidyne Sys., Unitech Ltd., 3055 Del Sol Blvd., San Diego, CA 92154, 619-429-7440;619-575-4400 ... D•1808
Stevens-Arnold Div., Computer Prods., Inc., 7 Elkins St., So. Boston, MA 02127, 617-268-1170 ... D•1573
† Technipower, A Penril Co., P.O. Box 222, Commerce Pk., Danbury, CT 06810, 203-748-7001 ... D•1850
† Technology Dynamics, 91 E. Carver Ave., Westwood, NJ 07675, 201-664-7636 ... D•1851
Toko America, Inc., 1250 Feehanville Dr., Mt. Prospect,, IL 60056, 312-297-0070 ... D•1856
Velonex, 560 Robert Ave., Santa Clara, CA 95050, 408-727-7370 ... D•1383
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† American Elctrns., 1600 E. Valencia Dr., Fullerton, CA 92631 ... 714-871-3020
American Monarch, 2801-37th Ave., N.E., Minneapolis, MN 55421 ... 612-788-9161
† Anadyne Power Supply Division, 721 W. Whittier Blvd., La Habra, CA 90631 ... 213-697-3116
† Analog Devices, P.O. Box 280, Norwood, MA 02062 ... 617-329-4700
Astro-Geo-Marine, Inc., 202 E. Cota St., Santa Barbara, CA 93101 ... 805-965-7005
† Autronics, 314 E. Live Oak, Ste. A, Arcadia, CA 91006 ... 818-445-5470
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† Brandt Elctrns., Inc., 1220 Alderwood Ave., Sunnyvale, CA 94086 ... 408-734-8310
Canyon Elctrns., 2001 W. North Lane, Phoenix, AZ 85021 ... 602-944-4421
§ Carter Motor, 2707 W. George St., Chicago, IL 60618-7898 ... 312-588-7700
CEA Division of Berkleonics, Inc., A Subsidiary of EG & G, 1 Aerovista Pk., San Luis Obispo, CA 93401 ... 805-544-5454
† CEAG Elec. Corp., Power Supp. Div., 1324 Motor Pkwy., Hauppauge, NY 11788 ... 516-582-4422
† Chloride Power Electronics, 10931 Pellicano Drive, El Paso, TX 79935 ... 915-592-9985
Computer Power, 124E W. Main St., High Bridge, NJ 08829 ... 201-735-8000
† Cramer Coil & Transformer Co., Inc., 1121 15th Ave., Grafton, WI 53024 ... 414-377-7040
§ Dale Electronics, Inc., Yankton Div., E. Hwy. 50, Box 180, Yankton, SD 57078 ... 605-665-9301
† Datametrics Corp., Defense Products Div., 7630 Gloria Ave., Van Nuys, CA 91406 ... 818-989-3840
Datel, General Electric Co., 11 Cabot Blvd., Mansfield, MA 02048 ... 617-339-9341
Delta Electronic Ind. USA, Delta Elctrn. Ind. Co. Ltd., 3401 Investment Blvd., Ste. 5, Hayward, CA 94545 ... 415-785-5231;415-785-5235
§ Douglas Randall, 6 Pawcatuck Ave., Pawcatuck, CT 06379 ... 203-599-2075
§† Dressen-Barnes Elctrns., 1600 E. Valencia Dr., Fullerton, CA 92631 ... 714-871-3020
Electromech, Inc., 528 Elm Street, Kearny, NJ 07032 ... 201-997-0950
Elgin Electronics, Combustion Engineering, 5533 New Perry Hwy., Erie, PA 16509-3570 ... 814-864-4921
Engd. Prod., Div. of Acme Elec. Corp., 40 Water St., Cuba, NY 14727 ... 716-968-2400
† ERA Transpac Div., Sub. Elctrn. Research Assocs., 50 Graphic Place, Moonachie, NJ 07074 ... 201-641-3650
§† E-Tronics, 16774 Schoenborn, Sepulveda, CA 91343 ... 213-892-7279
§ Franek, John, Co., Inc., P.O. Box 11752, Santa Ana, CA 92711-1752 ... 714-832-0290; ... 800-854-9420
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Gamma High Voltage Resch. Inc., 152 S. MacQuesten Pkwy., Mt. Vernon, NY 10550 ... 914-667-5050
§† Gra-Mar Inc., 3165 McCrory Pl., Ste. 265, Orlando, FL 32803 ... 305-894-3351
† Gulton Industries, Inc., Engineered Magnetics Division, 13041 Cerise Ave., Hawthorne, CA 90250 ... 213-679-0111
§ Harris Corp., Dracon Div., 809 Calle Plano, Camarillo, CA 93010 ... 805-987-9511
† Helionetics, Inc., DECC Div., 17312 Eastman St., Irvine, CA 92714 ... 714-546-4731; ... 800-421-7915
Hughes Aircraft Co, Aerospace Grps./Support Sys., P.O. Box 90515, Los Angeles, CA 90009 ... 213-670-1515
Hughes Aircraft Co., Microelctrn. Sys. Div., 2601 Campus Dr., Irvine, CA 92715 ... 714-752-3800
Hurricane Electrns. Lab, P.O. Box 1280, Hurricane, UT 84737 ... 801-635-2003
§† Integrated Circuits, Inc., 10301 Willows Road, Redmond, WA 98052 ... 206-882-3100
Intronics, Inc., 57 Chapel St., Newton, MA 02158 ... 617-964-4000
ITT Power Systems Corp., Box 688, Galion, OH 44833-0688 ... 419-468-8100
Lambda Electronics, Veeco Instr., Inc., 515 Broad Hollow Rd., Melville, NY 11747 ... 516-694-4200
Lorain Prods., 1122 F St., Lorain, OH 44052 ... 216-288-1122
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† Magnetico Inc., 182 Morris Ave., Holtsville, NY 11742 ... 516-654-1166
† Megatran Electronic Power, Rising Sun Rd., Bordentown, NJ 08505 ... 609-298-7300
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Mid-Eastern Industries, 100 Campus Dr., RD 1, Mt. Holly, NJ 08060 ... 609-267-3811
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Modular Devices, 50 Orville Dr., Bohemia, NY 11716 ... 516-567-9620
† Natel Engrg. Co., Inc., 4550 Runway St., Simi Valley, CA 93063 ... 805-581-3950
† Novatronics, Box 878, Pompano Beach, FL 33061 ... 305-942-5200
† OPT Inds. Inc., 300 Red School La., Phillipsburg, NJ 08865 ... 201-454-2600
† Pacific Electro Dynamics, Inc., 11465 Willows Rd. N.E., Redmond, WA 98052 ... 206-881-1700
Power Control, 122 Gamma Dr., Pittsburgh, PA 15238 ... 412-782-3120
Power Conversion Prods., 42 East St., Box 380, Crystal Lake, IL 60014 ... 815-459-9100
Power Designs, Inc., 1700 Shames Dr., Westbury, NY 11590 ... 516-333-6200
Power Systems, 12 Tobey Rd., Bloomfield, CT 06002 ... 203-243-0357
† Power Sys. Grp., Rantec Div., Emerson Elec., 9401 Oso Ave., Chatsworth, CA 91311 ... 818-885-8223
§ Power Technology, Inc., P.O. Box 9769, Little Rock, AR 72219 ... 501-568-1995
Pylon Elex Development Co. Ltd., 2300 Victoria, Lachine, PQ, CANADA H8S 1Z3 ... 514-637-1186
§ Ragen Data Systems, Inc., 3 Oval Dr., Central Islip, NY 11722 ... 516-234-3800
† Reich Assocs., Rt. 4, Box 4620, Lakehills, TX 78063 ... 512-751-3220
Reliability, Inc., 16400 Park Row, P.O. Box 218370, Houston, TX 77218 ... 713-492-0550
Reliance Electric Co., Marketing Info Center, P.O. Box 99502, Cleveland, OH 44199 ... 800-245-4501;800-245-4497 In Ohio
† RO Assocs., 246 Caspian Dr., Box 61419, Sunnyvale, CA 94088 ... 408-744-1450
§ Semiconductor Circuits, 49 Range Rd., Windham, NH 03087 ... 603-893-2330
† Sigmapower, Inc., 20790 Leapwood Ave., Carson, CA 90746 ... 213-32-Sigma
§ TDK Corporation of America, 4711 Golf Rd., Skokie, IL 60076 ... 312-679-8200
Tecnetics, Box 910, Boulder, CO 80306 ... 303-442-3837
Todd Prods. Corp., 50 Emjay Blvd., Brentwood, NY 11717 ... 516-231-3366
† Trio Labs., 80 Dupont St., Plainview, NY 11803 ... 516-349-0400
† Venus Scientific, Inc., 399 Smith St., Farmingdale, NY 11735 ... 516-293-4100
Warren Comms., 101 Okner Pkwy., Livingston, NJ 07039 ... 201-992-6200
§† Workman Elctrn. Prods., Box 3828, Sarasota, FL 33578 ... 813-371-4242
Xylog Corp., 150 Tillman St., Westwood, NJ 07675 ... 201-664-7997

Converters, DC to DC, 300 to 1,000 VDC Output-4000

Abbott Transistor Labs., Industrial Products Div., 8203 Vineland Ave., Sun Valley, CA 91352, 818-504-0644 ... D•1449
† Abbott Transistor Labs., Power Supply Div., 5200 W. Jefferson Blvd., Los Angeles, CA 90016, 213-936-8185 ... D•1449,1458
† Analog Modules, Inc., 126 Baywood Avenue, Longwood, FL 32750, 305-339-4356/4355 ... D•1004
† Arnold Magnetics, 11520 W. Jefferson Blvd., Culver City, CA 90230, 213-390-3537/8837 ... D•1511
Crestronics Div., Applied Electro Technlg., Int., 2220 S. Anne St., Santa Ana, CA 92704, 714-556-6570 ... D•1609
† Del Elctrns. Corp., 250 E. Sandford Blvd., Mt. Vernon, NY 10550, 914-699-2000 ... D•1614-1615
† EMCO High Voltage Co., 11126 Ridge Road, Sutter Creek, CA 95685, 209-223-3626 ... D•1632
† Endicott Resch. Grp., Inc., 2601 Wayne St., P.O. Box 269, Endicott, NY 13760, 607-754-9187 ... B•1048, D•1633

Hitran Corp., Agex, Rte. 31, RD 5-65, Flemington, NJ 08822, 201-782-5525	**D•1660**
Interelectronics Corp., Interelectronics Park, 550 U.S. Rte. 303, Congers, NY 10920, 914-EL8-8000	**D•1667**
Technipower, A Penril Co., P.O. Box 222, Commerce Pk., Danbury, CT 06810, 203-748-7001	**D•1850**
Velonex, 560 Robert Ave., Santa Clara, CA 95050, 408-727-7370	**D•1383**
§ Able Power and Engineering Inc., 335 S. New Ave., #H, Monterey Park, CA 91754	714-891-3568
Advanced High Voltage Co., Inc., P.O. Box 2136, Lancaster, CA 93539-2136	213-997-7222
Astro-Geo-Marine, Inc., 202 E. Cota St., Santa Barbara, CA 93101	805-965-7005
† Autronics, 314 E. Live Oak, Ste. A, Arcadia, CA 91006	818-445-5470
Bertan Assocs., 121 New South Rd., Hicksville, NY 11801	516-433-3110
Bikor, 1504 W. 228th St., Torrance, CA 92718	213-539-6320
† Brandt Elctrns., Inc., 1220 Alderwood Ave., Sunnyvale, CA 94086	408-734-8310
§ Carter Motor, 2707 W. George St., Chicago, IL 60618-7898	312-588-7700
† CEA Division of Berkleonics, Inc., A Subsidiary of EG & G, 1 Aerovista Pk., San Luis Obispo, CA 93401	805-544-5454
† Chloride Power Electronics, 10931 Pellicano Drive, El Paso, TX 79935	915-592-9985
§ Dale Electronics, Inc., Yankton Div., E. Hwy. 50, Box 180, Yankton, SD 57078	605-665-9301
† Datametrics Corp., Defense Products Div., 7630 Gloria Ave., Van Nuys, CA 91406	818-989-3840
Electromech, Inc., 528 Elm Street, Kearny, NJ 07032	201-997-0950
Frequency Control Prods., Inc., American Time Prods. Div., 61-20 Woodside Ave., Woodside, NY 11377	212-458-5811
Gamma High Voltage Resch. Inc., 152 S. MacQuesten Pkwy., Mt. Vernon, NY 10550	914-667-5050
§† Gra-Mar Inc., 3165 McCrory Pl., Ste. 265, Orlando, FL 32803	305-894-3351
† Helionetics, Inc., DECC Div., 17312 Eastman St., Irvine, CA 92714	714-546-4731; 800-421-7915
Hughes Aircraft Co, Aerospace Grps./Support Sys., P.O. Box 90515, Los Angeles, CA 90009	213-670-1515
Hughes Aircraft Co., Microelctrn. Sys. Div., 2601 Campus Dr., Irvine, CA 92715	714-752-3800
International High Voltage Elctrns., Inc., 98 Mill Plain Rd., Danbury, CT 06811	203-792-7820
ITT Power Systems Corp., Box 688, Galion, OH 44833-0688	419-468-8100
† Magnetico Inc., 182 Morris Ave., Holtsville, NY 11742	516-654-1166
† Megatran Electronic Power, Rising Sun Rd., Bordentown, NJ 08505	609-298-7300
MIL Electronics, Inc., 1 Mill st., Dracut, MA 01826	617-453-8000
Modular Devices, 50 Orville Dr., Bohemia, NY 11716	516-567-9620
Murata Erie North America, Inc., 1148 Franklin Rd., S.E., Marietta, GA 30067	404-952-9777
† Natel Engrg. Co., Inc., 4550 Runway St., Simi Valley, CA 93063	805-581-3950
† OPT Inds. Inc., 300 Red School La., Phillipsburg, NJ 08865	201-454-2600
Penn-Tran Corp., Box 1321, Rte. 144N, Wingate, PA 16880	814-355-1521
Power Designs, Inc., 1700 Shames Dr., Westbury, NY 11590	516-333-6200
§ Power Technology, Inc., P.O. Box 9769, Little Rock, AR 72219	501-568-1995
Pylon Elex Development Co. Ltd., 2300 Victoria, Lachine, PQ, CANADA H8S 1Z3	514-637-1186
§ Ragen Data Systems, Inc., 3 Oval Dr., Central Islip, NY 11722	516-234-3800
Reich Assocs., Rt. 4, Box 4620, Lakehills, TX 78063	512-751-3220
Reliance Electric Co., Marketing Info Center, P.O. Box 99502, Cleveland, OH 44199	800-245-4501;800-245-4497 In Ohio
† Sigmapower, Inc., 20790 Leapwood Ave., Carson, CA 90746	213-32-Sigma
† Spellman High Voltage Elctrns. Corp., 7 Fairchild Ave., Plainview, NY 11803	516-349-8686
§ TDK Corporation of America, 4711 Golf Rd., Skokie, IL 60076	312-679-8200
Tecnetics, Box 910, Boulder, CO 80306	303-442-3837
Toko America, Inc., 1250 Feehanville Dr., Mt. Prospect,, IL 60056	312-297-0070
† Venus Scientific, Inc., 399 Smith St., Farmingdale, NY 11735	516-293-4100
Wilmore Elctrns. Co., Box 1329, Hillsborough, NC 27278	919-732-9351
Xylog Corp., 150 Tillman St., Westwood, NJ 07675	201-664-7997

Converters, DC to DC, Greater Than 1,000 VDC Output-4000

† **Analog Modules, Inc., 126 Baywood Avenue, Longwood, FL 32750, 305-339-4356/4355**	**D•1004**
† **Arnold Magnetics, 11520 W. Jefferson Blvd., Culver City, CA 90230, 213-390-3537/8837**	**D•1511**
Bertan Assocs., 121 New South Rd., Hicksville, NY 11801, 516-433-3110	**D•1526-1527,1531,1533**
Crestronics Div., Applied Electro Technlg., Int., 2220 S. Anne St., Santa Ana, CA 92704, 714-556-6570	**D•1609**
† **Del Elctrns. Corp., 250 E. Sandford Blvd., Mt. Vernon, NY 10550, 914-699-2000**	**D•1614-1615**
† **EMCO High Voltage Co., 11126 Ridge Road, Sutter Creek, CA 95685, 209-223-3626**	**D•1632**
Gamma High Voltage Resch. Inc., 152 S. MacQuesten Pkwy., Mt. Vernon, NY 10550, 914-667-5050	**D•1644**
Hitran Corp., Agex, Rte. 31, RD 5-65, Flemington, NJ 08822, 201-782-5525	**D•1660**
Interelectronics Corp., Interelectronics Park, 550 U.S. Rte. 303, Congers, NY 10920, 914-EL8-8000	**D•1667**
Standard Energy, Div. WBH Scientific, Inc., Rte. 32, Greenville, NY 12083, 518-966-4197	**D•1844**
Varian Canada, Inc., Microwave Div., 45 River Drive, Georgetown, ON, CANADA L7G2J4, 416-877-0161	**D•1862**
Velonex, 560 Robert Ave., Santa Clara, CA 95050, 408-727-7370	**D•1383**
† **Venus Scientific, Inc., 399 Smith St., Farmingdale, NY 11735, 516-293-4100**	**D•1863**
Wilmore Elctrns. Co., Box 1329, Hillsborough, NC 27278, 919-732-9351	**D•1869**
§† Able Power and Engineering Inc., 335 S. New Ave., #H, Monterey Park, CA 91754	714-891-3568
Advanced High Voltage Co., Inc., P.O. Box 2136, Lancaster, CA 93539-2136	213-997-7222
† AMETEK, Dynamics Division, AMETEK, Inc., 5649 Peck Rd., Arcadia, CA 91006	818-442-5981
Bikor, 1504 W. 228th St., Torrance, CA 92718	213-539-6320
† Brandt Elctrns., Inc., 1220 Alderwood Ave., Sunnyvale, CA 94086	408-734-8310
† Chloride Power Electronics, 10931 Pellicano Drive, El Paso, TX 79935	915-592-9985
† Endicott Resch. Grp., Inc., 2601 Wayne St., P.O. Box 269, Endicott, NY 13760	607-754-9187
Frequency Control Prods., Inc., American Time Prods. Div., 61-20 Woodside Ave., Woodside, NY 11377	212-458-5811
Gra-Mar Inc., 3165 McCrory Pl., Ste. 265, Orlando, FL 32803	305-894-3351
Hughes Aircraft Co, Aerospace Grps./Support Sys., P.O. Box 90515, Los Angeles, CA 90009	213-670-1515
Hughes Aircraft Co., Microelctrn. Sys. Div., 2601 Campus Dr., Irvine, CA 92715	714-752-3800
International High Voltage Elctrns., Inc., 98 Mill Plain Rd., Danbury, CT 06811	203-792-7820
ITT Power Systems Corp., Box 688, Galion, OH 44833-0688	419-468-8100
† K & M Elctrns., 123 Interstate Dr., W. Springfield, MA 01089	413-781-1350
† Magnetico Inc., 182 Morris Ave., Holtsville, NY 11742	516-654-1166
† Megatran Electronic Power, Rising Sun Rd., Bordentown, NJ 08505	609-298-7300
MIL Electronics, Inc., 1 Mill st., Dracut, MA 01826	617-453-8000
Murata Erie North America, Inc., 1148 Franklin Rd., S.E., Marietta, GA 30067	404-952-9777
† Natel Engrg. Co., Inc., 4550 Runway St., Simi Valley, CA 93063	805-581-3950
† OPT Inds. Inc., 300 Red School La., Phillipsburg, NJ 08865	201-454-2600
§ Pacific Atlantic Elctrns., Box 754, El Cerrito, CA 94530	415-237-5837
Pacific Instrs. Inc., 215 Mason Circle, Concord, CA 94518	415-827-9010
Penn-Tran Corp., Box 1321, Rte. 144N, Wingate, PA 16880	814-355-1521
Power Designs, Inc., 1700 Shames Dr., Westbury, NY 11590	516-333-6200
§ Power Technology, Inc., P.O. Box 9769, Little Rock, AR 72219	501-568-1995
† PTK Division, Emerson Electric Co., 1173 Los Olivos Ave., Los Osos, CA 93402	805-528-5858
§ Ragen Data Systems, Inc., 3 Oval Dr., Central Islip, NY 11722	516-234-3800
† Reich Assocs., Rt. 4, Box 4620, Lakehills, TX 78063	512-751-3220
Reliance Electric Co., Marketing Info Center, P.O. Box 99502, Cleveland, OH 44199	800-245-4501;800-245-4497 In Ohio
† Sigmapower, Inc., 20790 Leapwood Ave., Carson, CA 90746	213-32-Sigma
† Spellman High Voltage Elctrns. Corp., 7 Fairchild Ave., Plainview, NY 11803	516-349-8686
§ TDK Corporation of America, 4711 Golf Rd., Skokie, IL 60076	312-679-8200
Tecnetics, Box 910, Boulder, CO 80306	303-442-3837
Wall Inds., 2 Franklin, Lawrence, MA 01840	617-688-1287
Wasatch High Voltage, P.O. Box 9027, Salt Lake City, UT 84109	801-265-9561
Xylog Corp., 150 Tillman St., Westwood, NJ 07675	201-664-7997

Converters, DC to Sine/Cosine-2325

† **Computer Conversions Corp., 6 Dunton Ct., E. Northport, NY 11731, 516-261-3300**	**D•1140**
§ **Displex, Inc., Alexander Place, Glen Cove, NY 11542, 516-671-4400**	**D•1619**
Interface Engrg., 386 Lindelof Ave., Stoughton, MA 02072, 617-344-7383	**D•1156**
† **Natel Engrg. Co., Inc., 4550 Runway St., Simi Valley, CA 93063, 805-581-3950**	**A•1694-1695**
Ocean Marine Instrument, 629 Terminal Way #15, Costa Mesa, CA 92627, 714-548-9569	**D•1947**
Performance Controls Inc., 333-E Byberry Rd., Hatboro, PA 19040, 215-675-6500	**B•1178**
Polyphase Instr., 175 Commerce Dr., Ft. Washington, PA 19034, 215-643-6950	**A•1622**
† **Transmagnetics, 210 Adams Blvd., Farmingdale, NY 11735, 516-293-3100**	**D•1162**
Abacus Controls Inc., 89 Readington Rd., Somerville, NJ 08876	201-526-6010
Abbott Transistor Labs., Industrial Products Div., 8203 Vineland Ave., Sun Valley, CA 91352	818-504-0644
† Abbott Transistor Labs., Power Supply Div., 5200 W. Jefferson Blvd., Los Angeles, CA 90016	213-936-8185
Astrosystems, 6 Nevada Dr., Lake Success, NY 11042	516-328-1600
† Avtel Div., Unitron Inc., 10925 Miller Rd., Dallas, TX 75238	214-340-8600
BBK, Inc., 75 Travis Ave., Binghamton, NY 13904	607-772-8119
Cherry Semiconductor Corp, 2000 S. County Trail, East Greenwich, RI 02818	401-885-3600
Control Technology Co., 41-16 29th St., Long Island City, NY 11101	718-361-2133
§† E-Tronics, 16774 Schoenborn, Sepulveda, CA 91343	213-892-7279
EWC, Inc., 725 Federal Ave., Kenilworth, NJ 07033	201-245-3200;800-526-4048
Frequency Control Prods., Inc., American Time Prods. Div., 61-20 Woodside Ave., Woodside, NY 11377	212-458-5811
Gamma High Voltage Resch. Inc., 152 S. MacQuesten Pkwy., Mt. Vernon, NY 10550	914-667-5050
† General Magnetics, 211 Grove St., Bloomfield, NJ 07003	201-743-2700
† Helionetics, Inc., DECC Div., 17312 Eastman St., Irvine, CA 92714	714-546-4731; 800-421-7915
† Industrial Control Co., 3100 Pineda Ave., Rockledge, FL 32955	305-259-7105
Northern Precision Labs., 11 Madison Rd., Fairfield, NJ 07006	201-227-4800
Optical Electronics, Inc., Box 11140, Tucson, AZ 85734	602-624-8358
§† Powermark, 3855 Ruffin Rd., San Diego, CA 92123	619-565-8363
Pylon Elex Development Co. Ltd., 2300 Victoria, Lachine, PQ, CANADA H8S 1Z3	514-637-1186
† Sigmapower, Inc., 20790 Leapwood Ave., Carson, CA 90746	213-32-Sigma
† Unitron Inc., 10925 Miller Rd., Dept. EE, Dallas, TX 75238	214-340-8600
† Vernitech, 300 Marcus Blvd., Deer Pk., NY 11729	516-586-5100

Converters, DC to Synchro-2325

† Computer Conversions Corp., 6 Dunton Ct., E. Northport, NY 11731, 516-261-3300 .... D•1140
Control Technology Co., 41-16 29th St., Long Island City, NY 11101, 718-361-2133 .... D•1986
† ILC Data Device Corp., 105 Wilbur Pl., Bohemia, NY 11716, 516-567-5600 .... D•1150
† Natel Engrg. Co., Inc., 4550 Runway St., Simi Valley, CA 93063, 805-581-3950 .... A•1694-1695
Astrosystems, 6 Nevada Dr., Lake Success, NY 11042 516-328-1600
BBK, Inc., 75 Travis Ave., Binghamton, NY 13904 607-772-8119
§† General Magnetics, 211 Grove St., Bloomfield, NJ 07003 201-743-2700
† Transmagnetics, 210 Adams Blvd., Farmingdale, NY 11735 516-293-3100

Converters, Digital to Analog-2325

ADAC Corp., 70 Tower Office Pk., Woburn, MA 01801, 617-935-6668 .... D•1135
Allen-Bradley Co., Electronics Group, Rockwell Corporation, 1201 S. Second St., Milwaukee, WI 53204, 414-671-2000 .... A•1797
Analogic Corp., Data Conversion Prods. Grp., Audubon Rd., Wakefield, MA 01880, 617-246-0300 .... D•1139
C-Tek Inc., 4 Railroad Ave., Wakefield, MA 01880, 617-246-1720 .... D•1115
† Datel, General Electric Co., 11 Cabot Blvd., Mansfield, MA 02048, 617-339-9341 .... D•1083
† ILC Data Device Corp., 105 Wilbur Pl., Bohemia, NY 11716, 516-567-5600 .... D•1151
§† Intech, Microcircuits Div., 2270 Martin Ave., Santa Clara, CA 95050, 408-988-4930 .... A•1672
Interface Engrg., 386 Lindelof Ave., Stoughton, MA 02072, 617-344-7383 .... D•1156
Motorola Semiconductor Prods. Sector, Adv. 72, Box 20912, Phoenix, AZ 85036, 602-244-6900 .... A•1688
Preston Scientific, 805 E. Cerritos Ave., Anaheim, CA 92805, 714-776-6400 .... D•1161
† Transmagnetics, 210 Adams Blvd., Farmingdale, NY 11735, 516-293-3100 .... D•1162
† Acromag, 30765 Wixom Rd., Wixom, MI 48096 313-624-1541
Action Instrs., 8601 Aero Dr., San Diego, CA 92123 619-279-5726
† Addacon, Inc., 3702-C Alliance Dr., Greensboro, NC 27407 919-852-6200
§† Advanced Microcomputers, 3340 Scott Blvd., Santa Clara, CA 95051 ... 408-732-2400
§† Advanced Micro Devices, P.O. Box 3453, 901 Thompson Pl., Sunnyvale, CA 94088 408-732-2400
Allen-Bradley Co., Electronics Group, Div. of Rockwell Corp., Resistive Products Div., 1414 Allen-Bradley Dr., El Paso, TX 79935 915-592-4888
† Analog Devices, P.O. Box 280, Norwood, MA 02062 617-329-4700
§ Andromeda Sys., 9000 Eton Ave., Canoga Park, CA 91304 818-709-7600
Applied Micro Technlg., A Burr Brown Co., 3669 E. 44th Street, Tucson, AZ 85713 602-622-8605
† Astronautics Corporation of America, P.O. Box 523, Milwaukee, WI 53201-0523 414-447-8200
† Aydin Monitor Sys., 502 Office Center Dr., Ft. Washington, PA 19034 215-646-8100
Barber-Colman Co., Indl. Instrs. Div., P.O. Box 2940, 1354 Clifford Ave., Loves Park, IL 61132 815-877-0241
BBK, Inc., 75 Travis Ave., Binghamton, NY 13904 607-772-8119
Beckman Instrs., 2500 Harbor Blvd., Fullerton, CA 92634 714-871-4848
† Burr-Brown Corp., P.O. Box 11400, Tucson, AZ 85734 602-746-1111
CDS - Colorado Data Sys., 3301 W. Hampden, Unit C, Englewood, CO 80110 303-762-1640
CGRS Microtech, P. O. Box 102, Langhorne, PA 19047 215-757-0284
† Circuit Techn., 160 Smith St., Farmingdale, NY 11735 516-293-8686
§ CmC Instr. Div., Connecticut microComputer Inc., 568 Danbury Road, New Milford, CT 06776 203-354-9395
† Colorado Video, Inc., Box 928, Boulder, CO 80306 303-444-3972
† Computer Conversions Corp., 6 Dunton Ct., E. Northport, NY 11731 516-261-3300
† Control Technology Co., 41-16 29th St., Long Island City, NY 11101 718-361-2133
† CTS Electronics Corp., Halex Division, 1202 McGaw Ave., Irvine, CA 92714 714-261-6381
§ Data General, 4400 Computer Dr., Westboro, MA 01581 617-366-8911
† Data Tech, Div. of Penril Corp., 3110 W. Segerstrom, Santa Ana, CA 92704 714-546-7160
§ Data Translation, 100 Locke Dr., Marlboro, MA 01752 617-481-3700
Datawest, 7333 E. Helm Dr., Scottsdale, AZ 85260 602-948-3280
Decom Sys., 340 Rancheros Dr., San Marcos, CA 92069 619-744-1002
§ Digiac Corp., 175 Engineers Rd., Hauppauge, NY 11788 516-273-8600
Digital Equip., One Iron Way, Marlborough, MA 01752
† Dymec, 8 Lowell Ave., Winchester, MA 01890 617-729-7870
† Electronic Dev. Corp., 11 Hamlin St., Boston, MA 02127-4198 617-268-9696
Elgar Corp, An Onan McGraw Edison Co., 9250 Brown Deer Rd., San Diego, CA 92121 619-450-0085
† EMM/SESCO, 20630 Plummer St., Chatsworth, CA 91311 213-998-9090
§ EMR Data Systems, Div. Sangamo- Weston, Box 3041, Sarasota, FL 33578 813-371-0811
§† Fairchild Camera & Instr. Corp., 464 Ellis St., 20-2271, Mountain View, CA 94042 415-962-5011
Ferranti Elec., 87 Modula Ave., Commack, NY 11725 516-543-0200
† GAP Instr., 40 Oser Ave., Hauppauge, NY 11787 516-273-0909
§ GIC Systems, 2324 A Ridgepoint Dr., Austin, TX 78754 512-926-8840
§ Gordos Corporation, Gordos International Corp., 250 Glenwood Ave., Bloomfield, NJ 07003 201-743-6800
§ Gunther, W., GmbH, Virnsberger Strasse 51, D 8500 Nurnberg 82, WEST GERMANY .... (0)911/65521 or 65520
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
† Hughes Aircraft Co., Microelctrn. Sys. Div., 2601 Campus Dr., Irvine, CA 92715 714-752-3800
† Hybrid Systems Corp., 22 Linnell Circle, Billerica, MA 01821 617-667-8700
† HyComp Inc., 75 Union Ave., Box 377, Sudbury, MA 01776 617-443-4631
Inconix Corp., 10 Tech Circle, Natick, MA 01760 617-655-1170
§ Industrial Computer Designs, Inc., 31264 La Baya Drive, Westlake Village, CA 91362 818-889-3179
† Innovatek Microsystems, Inc., Smithfield Rd., R1 Box 104, Millerton, NY 12546-9720 914-373-9003
§† Intersil, 10710 N. Tantau Ave., Cupertino, CA 95014 408-996-5000
§ Kepco, Inc., 131-38 Sanford Ave., Flushing, NY 11352 718-461-7000
Kinetic Sys., 11 Maryknoll Dr., Lockport, IL 60441 815-838-0005
LeCroy Resch. Sys. Corp. (Cal.), 1806 Embarcadero Rd., Palo Alto, CA 94303 415-856-1800
MICRA Corp., 120 Ricefield Lane, Hauppauge, NY 11788 516-231-8600
† Micro Networks, 324 Clark St., Worcester, MA 01606 617-852-5400
§† Micro Power Sys. Inc., 3100 Alfred St., Santa Clara, CA 95050 408-727-5350
§ Mitsubishi Elctrns. America, Inc., Semiconductor Div., 1050 East Arques Ave., Sunnyvale, CA 94086 408-730-5900
† Natel Engrg. Co., Inc., 4550 Runway St., Simi Valley, CA 93063 805-581-3950
NEC Electronics, Inc., 401 Ellis Street, Mtn. View, CA 94039 415-960-6000
Northern Precision Labs., 11 Madison Rd., Fairfield, NJ 07006 201-227-4800
† Perkin-Elmer Corp., Elctrn. Prods. Dept., Main Ave., Norwalk, CT 06856 .. 203-762-4786
§† Phoenix Data, Inc., 3384 W. Osborn Rd., Phoenix, AZ 85017 602-278-8528
§† Precision Monolithics, Inc., 1500 Space Dr., Santa Clara, CA 95054 408-727-9222
† Racal-Dana Instrs. Inc., 4 Goodyear St., Irvine, CA 92715 714-859-8999
§ Ragen Data Systems, Inc., 3 Oval Dr., Central Islip, NY 11722 516-234-3800
§† Raytheon Semiconductor, 350 Ellis St., Mountain View, CA 94043 415-968-9211
RCA Solid State Div., Linear Integrated Circuits, Rte. 202, Somerville, NJ 08876 201-685-6000
RFL Inds., A Dowty Grp. Co./Comms. Div., Powerville Rd., Boonton, NJ 07005 201-334-3100
Rochester Instr. Sys., 255 N. Union St., Rochester, NY 14605 716-263-7700
† Rolm Mil-Spec Computers, Rolm Corp., 1 River Oaks Pl., San Jose, CA 95134 408-942-8000
Serial Lab Prods., Inc., 162 Cook Lane, P.O. Box 766, Marlboro, MA 01752 617-481-1684
† Signatron, A Unit of Sundstrand Corp., 12 Hartwell Ave., Lexington, MA 02173 617-861-1500
§ Signetics, U.S. Philips Corp., 811 E. Arques Ave, P.O. Box 3409, Sunnyvale, CA 94088-3409 408-739-7700
Singer Co., Kearfott Div., 1150 McBride Ave., Little Falls, NJ 07424 201-785-6000
Sorensen Co., 676 E. Island Pond Rd., Manchester, NH 03103 603-668-4500
§ Takeda Riken Co., Ltd., NS Bldg. 14th,4-1,Nishi-Shinjuku 2-Chome,Shinjuku-ku, Tokyo 160, Tokyo 176, JAPAN 03-342-7500
§ Tecmar, Inc., 6225 Cochran Rd., Solon, OH 44139 216-349-0600
Teledyne Philbrick, Allied Dr. Rte 128, Dedham, MA 02026 617-329-1600
§† TRW LSI Products, PO Box 2472, La Jolla, CA 92038 619-457-1000
§ Tucker Elctrns., Box 461966, Garland, TX 75046 .... 214-348-8800;800-527-4642
Tustin Elctrns. Co., 1431 E. Saint Andrews Pl., Santa Ana, CA 92705 714-549-0391
† Vernitech, 300 Marcus Blvd., Deer Pk., NY 11729 516-586-5100
§ Xycom, 750 N. Maple Rd., Saline, MI 48176 313-429-4971

Converters, Digital to Paper Tape-2000

A.D. Data Sys., Techtran Industries, 200 Commerce Dr., Rochester, NY 14623 716-334-9649
† Astronautics Corporation of America, P.O. Box 523, Milwaukee, WI 53201-0523 414-447-8200
§ Dataprobe, 110 Palisades Blvd., Palisades Park, NJ 07650 201-947-9500
§ Data Specialties, Inc., 3455 Commercial Ave., Northbrook, IL 60062 312-564-1800
Decom Sys., 340 Rancheros Dr., San Marcos, CA 92069 619-744-1002
§ Digitec Corp., 918 Woodley Rd., P.O. Box 458, Dayton, OH 45401 513-254-6251
§ Itoh Electronics, Inc. (C.), 5301 Beethoven St., Los Angeles, CA 90066 .. 212-682-0420
Wire Graphics, Inc., 215 B. Central Ave., Farmingdale, NY 11735 516-293-1525

Converters, Digital to Resolver-2325

† Computer Conversions Corp., 6 Dunton Ct., E. Northport, NY 11731, 516-261-3300 .... D•1140
† Control Sciences, Inc., 9509 Vassar Ave., Chatsworth, CA 91311, 818-709-5510 .... D•1144-1145
† ILC Data Device Corp., 105 Wilbur Pl., Bohemia, NY 11716, 516-567-5600 .... D•1150
Interface Engrg., 386 Lindelof Ave., Stoughton, MA 02072, 617-344-7383 .... D•1156
† Natel Engrg. Co., Inc., 4550 Runway St., Simi Valley, CA 93063, 805-581-3950 .... A•1694-1695
† Transmagnetics, 210 Adams Blvd., Farmingdale, NY 11735, 516-293-3100 .... D•1162-1163
† Vernitech, 300 Marcus Blvd., Deer Pk., NY 11729, 516-586-5100 .... B•1011
† Analog Devices, P.O. Box 280, Norwood, MA 02062 617-329-4700
Astrosystems, 6 Nevada Dr., Lake Success, NY 11042 516-328-1600
BBK, Inc., 75 Travis Ave., Binghamton, NY 13904 607-772-8119
† Clifton Precision, Litton Systems, Inc., Marple at Broadway, Clifton Hgts., PA 19018 215-622-1000
† Control Technology Co., 41-16 29th St., Long Island City, NY 11101 718-361-2133
† GAP Instr., 40 Oser Ave., Hauppauge, NY 11787 516-273-0909
† North Atlantic Inds., Instrument Div., 60 Plant Ave., Hauppauge, NY 11788 516-582-6500
Northern Precision Labs., 11 Madison Rd., Fairfield, NJ 07006 201-227-4800
† Perkin-Elmer Corp., Elctrn. Prods. Dept., Main Ave., Norwalk, CT 06856 .. 203-762-4786
§ Ragen Data Systems, Inc., 3 Oval Dr., Central Islip, NY 11722 516-234-3800
Singer Co., Kearfott Div., 1150 McBride Ave., Little Falls, NJ 07424 201-785-6000

Converters, Digital to Synchro-2325

† Computer Conversions Corp., 6 Dunton Ct., E. Northport, NY 11731, 516-261-3300 .... D•1140
† Control Sciences, Inc., 9509 Vassar Ave., Chatsworth, CA 91311, 818-709-5510 .... D•1144-1145
† ILC Data Device Corp., 105 Wilbur Pl., Bohemia, NY 11716, 516-567-5600 .... D•1150

Interface Engrg., 386 Lindelof Ave., Stoughton, MA 02072, 617-344-7383 .... D•1156
† Natel Engrg. Co., Inc., 4550 Runway St., Simi Valley, CA 93063, 805-581-3950 .... A•1694-1695
† Transmagnetics, 210 Adams Blvd., Farmingdale, NY 11735, 516-293-3100 .... D•1162-1163
† Vernitech, 300 Marcus Blvd., Deer Pk., NY 11729, 516-586-5100 .... B•1011
† Analog Devices, P.O. Box 280, Norwood, MA 02062 617-329-4700
Astrosystems, 6 Nevada Dr., Lake Success, NY 11042 516-328-1600
BBK, Inc., 75 Travis Ave., Binghamton, NY 13904 607-772-8119
Control Technology Co., 41-16 29th St., Long Island City, NY 11101 718-361-2133
† GAP Instr., 40 Oser Ave., Hauppauge, NY 11787 516-273-0909
North Atlantic Inds., Instrument Div., 60 Plant Ave., Hauppauge, NY 11788 516-582-6500
Northern Precision Labs., 11 Madison Rd., Fairfield, NJ 07006 201-227-4800
† Perkin-Elmer Corp., Elctrn. Prods. Dept., Main Ave., Norwalk, CT 06856 .. 203-762-4786
Singer Co., Kearfott Div., 1150 McBride Ave., Little Falls, NJ 07424 201-785-6000

Converters, Frequency to Frequency-1900

Abacus Controls Inc., 89 Readington Rd., Somerville, NJ 08876, 201-526-6010 .... D•1880
Avionic Instrs., 943 E. Hazelwood Ave., Rahway, NJ 07065, 201-388-3500 .... D•1890-1893
Behlman Engineering, 1142 Mark Ave., Carpinteria, CA 93013, 805-684-8311 .... D•1898-1905
California Instruments, A Div. of Amstar Tech. Prods. Co., Inc., 5150-Convoy St., San Diego, CA 92111, 619-279-8620;800-356-2244;800-821-1634 ...... D•1907
CML MACARR Div., Marine Electric RPD, Inc., 666 Pacific St., Brooklyn, NY 11217, 718-857-2400 .... D•1909
Diego Power, 5350 Eastgate Mall, San Diego, CA 92121, 587-1925 ...... D•1916
§ Franek, John, Co., Inc., P.O. Box 11752, Santa Ana, CA 92711-1752, 714-832-0290;800-854-9420 .... D•1924-1927
KGS Electronics, Inc., GAR Entprs., 2029 N. Lincoln Ave., Pasadena, CA 91103, 818-798-0786 .... D•1943
North Hills Elctrns., 1 Alexander Pl., Glen Cove, NY 11542, 516-671-5700 .... A•1780
Nova Elec., Hobart Bros. Co., 263 Hillside Ave., Nutley, NJ 07110, 201-661-3434 .... D•1946
Pacific Power Source Corp., 15122 Bolsa Chica St., Huntington Bch., CA 92649, 714-898-2691;800-854-2433 .... D•1949-1950
Powermark, 3855 Ruffin Rd., San Diego, CA 92123, 619-565-8363 .... D•1955
Precision Filters, 240 Cherry St., Ithaca, NY 14850, 607-277-3550 .... A•1627
§ ATV Research, Inc., 1301 Broadway, Dakota City, NE 68731 402-987-3771
† Comtech Microwave Corp., Comtech Corp., 63 Oser Ave., Hauppauge, NY 11788 516-435-4646
† Georator Corp., Box 70, Manassas, VA 22110 703-368-2101
† LNR Communications, Inc., 180 Marcus Blvd., Hauppauge, NY 11788 ... 516-273-7111
† Megatran Electronic Power, Rising Sun Rd., Bordentown, NJ 08505 609-298-7300
Mu-Del Electronics, Inc., 2426 Linden Lane, Silver Spring, MD 20910-1288 301-587-6087
Pylon Elex Development Co. Ltd., 2300 Victoria, Lachine, PQ, CANADA H8S 1Z3 514-637-1186
Reliance Electric Co., Marketing Info Center, P.O. Box 99502, Cleveland, OH 44199 .... 800-245-4501;800-245-4497 In Ohio
Western Multiplex Corp., 1320 Bayport Avenue, San Carlos, CA 94070 .. 415-592-8832

Converters, Frequency to Voltage-2325

§ Intech, Microcircuits Div., 2270 Martin Ave., Santa Clara, CA 95050, 408-988-4930 .... A•1672
† Acromag, 30765 Wixom Rd., Wixom, MI 48096 313-624-1541
Active Control Instrmn., P.O. Box 243-Wildwood Circle, Key Largo, FL 33037 305-451-1000
Advance Conversion Devices Co., 274 S. Salem St., Randolph, NJ 07869 201-989-0095
† Analog Devices, P.O. Box 280, Norwood, MA 02062 617-329-4700
† Analog Modules, Inc., 126 Baywood Avenue, Longwood, FL 32750 .... 305-339-4356/4355
Avionic Instrs., 943 E. Hazelwood Ave., Rahway, NJ 07065 201-388-3500
† Avtel Div., Unitron Inc., 10925 Miller Rd., Dallas, TX 75238 214-340-8600
Brooks Instr. Div., Emerson Elec. Co., 407 W. Vine St., Hatfield, PA 19440 215-362-3500
D-B-Developments, 7709 Kilbourne Rd., Rome, NY 13440 315-339-1265
§† Dymec, 8 Lowell Ave., Winchester, MA 01890 617-729-7870
ERA Transpac Div., Sub. Elctrn. Research Assocs., 50 Graphic Place, Moonachie, NJ 07074 201-641-3650
General Power Sys., 1400 N. Baxter St., Anaheim, CA 92806-1201 714-956-9321
† Georator Corp., Box 70, Manassas, VA 22110 703-368-2101
Marel Instr. Co., 907 South East 13th Pl., Cape Coral, FL 33904 813-574-8788
North Hills Elctrns., 1 Alexander Pl., Glen Cove, NY 11542 516-671-5700
† Racal-Dana Instrs. Inc., 4 Goodyear St., Irvine, CA 92715 714-859-8999
§† Raytheon Semiconductor, 350 Ellis St., Mountain View, CA 94043 415-968-9211
RFL Inds., A Dowty Grp. Co./Comms. Div., Powerville Rd., Boonton, NJ 07005 201-334-3100
§ Richard-Lee Co., Box 724, New Providence, NJ 07974 201-276-0710
SGS Semiconductor Corporation, 1000 E. Bell Road, Phoenix, AZ 85022 602-867-6100
§† Teledyne Semiconductor, 1300 Terra Bella Ave., PO Box 7267, Mountain View, CA 94039-7267 415-968-9241
† Unitron Inc., 10925 Miller Rd., Dept. EE, Dallas, TX 75238 214-340-8600

Converters, Frequency, Logarithmic-4050

† Helionetics, Inc., DECC Div., 17312 Eastman St., Irvine, CA 92714 .... 714-546-4731; 800-421-7915
† Racal-Dana Instrs. Inc., 4 Goodyear St., Irvine, CA 92715 714-859-8999
† Transmagnetics, 210 Adams Blvd., Farmingdale, NY 11735 516-293-3100

Converters, Frequency Shift Keying-1900

† Alden Electronics, Inc., 40 Washington Street, Westboro, MA 01581 617-366-8851
Cal-Tek Engrg., 36 Riverside Drive, Kingston, MA 02364 617-585-5666
Dantel, 2991 N. Argyle Ave., Fresno, CA 93727 209-292-1111
Decom Sys., 340 Rancheros Dr., San Marcos, CA 92069 619-744-1002
† Electrocom Inds., 1105 N. Ironwood Dr., S. Bend, IN 46615 219-232-2743
Enterprise Sys. Corp., P.O. Box 698, Dover, NH 03820 603-742-7363
† Frederick Elctrns. Corp., 7630 Hayward Rd., P.O. Box 502, Frederick, MD 21701-0502 301-662-5901
Frequency Control Prods., Inc., American Time Prods. Div., 61-20 Woodside Ave., Woodside, NY 11377 212-458-5811
RFL Inds., A Dowty Grp. Co./Comms. Div., Powerville Rd., Boonton, NJ 07005 201-334-3100

Converters, Frequency to DC-Also See Power Supplies, AC Input, DC Output-4000

† Georator Corp., Box 70, Manassas, VA 22110, 703-368-2101 .... D•1931
Abbott Transistor Labs., Industrial Products Div., 8203 Vineland Ave., Sun Valley, CA 91352 818-504-0644
† Abbott Transistor Labs., Power Supply Div., 5200 W. Jefferson Blvd., Los Angeles, CA 90016 213-936-8185
† Acromag, 30765 Wixom Rd., Wixom, MI 48096 313-624-1541
§ Action Instrs., 8601 Aero Dr., San Diego, CA 92123 619-279-5726
Active Control Instrmn., P.O. Box 243-Wildwood Circle, Key Largo, FL 33037 305-451-1000
Airpax Corp., Ft. Lauderdale Div., 6801 W. Sunrise Blvd., Ft. Lauderdale, FL 33313 305-587-1100
† American Elctrns., 1600 E. Valencia Dr., Fullerton, CA 92631 714-871-3020
† AMETEK, Dynamics Division, AMETEK, Inc., 5649 Peck Rd., Arcadia, CA 91006 818-442-5981
Anadex, 1001 Flynn Rd., Camarillo, CA 93010 805-987-9660
† Analog Devices, P.O. Box 280, Norwood, MA 02062 617-329-4700
ARGA Controls, 35 E. Glenarm St., Pasadena, CA 91105 213-682-3314
† Arnold Magnetics, 11520 W. Jefferson Blvd., Culver City, CA 90230 .... 213-390-3537/8837
§ ATR Elctrns., Inc., P.O. BOX 7008, St. Paul, MN 55107 ... 612-738-6520;414-297-7374
Basler Elec., Rte. 143, Highland, IL 62249 618-654-2341
Brooks Instr. Div., Emerson Elec. Co., 407 W. Vine St., Hatfield, PA 19440 215-362-3500
Burr-Brown Corp., P.O. Box 11400, Tucson, AZ 85734 602-746-1111
† Cal-Power Corp., 140 Kansas St., El Segundo, CA 90245 213-772-2171
† CML MACARR Div., Marine Electric RPD, Inc., 666 Pacific St., Brooklyn, NY 11217 718-857-2400
† Computer Conversions Corp., 6 Dunton Ct., E. Northport, NY 11731 516-261-3300
§ Computer Power, 124E W. Main St., High Bridge, NJ 08829 201-735-8000
† Control Technology Co., 41-16 29th St., Long Island City, NY 11101 718-361-2133
Dantronics, Inc., 3175 Hafner Ct., St. Paul, MN 55112 612-484-2108
Datel, General Electric Co., 11 Cabot Blvd., Mansfield, MA 02048 617-339-9341
† Del Elctrns. Corp., 250 E. Sandford Blvd., Mt. Vernon, NY 10550 914-699-2000
§ Dormeyer Inds., 3418 N. Milwaukee, Chicago, IL 60641 312-283-4000
† Dymec, 8 Lowell Ave., Winchester, MA 01890 617-729-7870
† EG & G Almond Instruments, 1330 E. Cypress St., Covina, CA 91724 ... 818-967-9521
† ERA Transpac Div., Sub. Elctrn. Research Assocs., 50 Graphic Place, Moonachie, NJ 07074 201-641-3650
EWC, Inc., 725 Federal Ave., Kenilworth, NJ 07033 .... 201-245-3200;800-526-4048
† Flow Technology, Inc., Box 21346, Phoenix, AZ 85036 602-437-1315
† General Power Sys., 1400 N. Baxter St., Anaheim, CA 92806-1201 714-956-9321
§ Gra-Mar Inc., 3165 McCrory Pl., Ste. 265, Orlando, FL 32803 305-894-3351
† Helionetics, Inc., DECC Div., 17312 Eastman St., Irvine, CA 92714 .... 714-546-4731; 800-421-7915
† Intech, Microcircuits Div., 2270 Martin Ave., Santa Clara, CA 95050 408-988-4930
Interelectronics Corp., Interelectronics Park, 550 U.S. Rte. 303, Congers, NY 10920 .... 914-EL8-8000
† Magnetico Inc., 182 Morris Ave., Holtsville, NY 11742 516-654-1166
Mid-Eastern Industries, 100 Campus Dr., RD 1, Mt. Holly, NJ 08060 609-267-3811
Modular Devices, 50 Orville Dr., Bohemia, NY 11716 516-567-9620
† Novatronics, Box 878, Pompano Beach, FL 33061 305-942-5200
Oeco Corp., 712 S.E. Hawthorne Blvd., Portland, OR 97214 503-238-2440
§† Raytheon Semiconductor, 350 Ellis St., Mountain View, CA 94043 415-968-9211
RFL Inds., A Dowty Grp. Co./Comms. Div., Powerville Rd., Boonton, NJ 07005 201-334-3100
RIFA, Inc., Greenwich Off. Pk. 3, P.O. Box 3110, Greenwich, CT 06836-3110 203-625-7300
§ Schulz Controls, Inc., P.O. Box 9555, New Haven, CT 06511 203-562-2555
† Solid State Elctrns. Corp., 18646 Parthenia St., Northridge, CA 91324 ... 818-993-8257
Teledyne Inet, 2750 W. Lomita Blvd., Torrance, CA 90509 213-325-5040
Teledyne Philbrick, Allied Dr. Rte 128, Dedham, MA 02026 617-329-1600
Wilmore Elctrns. Co., Box 1329, Hillsborough, NC 27278 919-732-9351

Converters, Graphic to Digital-2000

Hughes Aircraft Co., Microelctrn. Sys. Div., 2601 Campus Dr., Irvine, CA 92715 714-752-3800
§ Summagraphics Corp., 35 Brentwood Ave., Fairfield, CT 06430 203-384-1344
§ Vidco, 8323 S.W. Cirrus Drive, Beaverton, OR 97005 503-641-1804

Converters, Multiplying, Analog to Digital & Digital to Analog-2325

† ILC Data Device Corp., 105 Wilbur Pl., Bohemia, NY 11716, 516-567-5600 .... D•1151
† Transmagnetics, 210 Adams Blvd., Farmingdale, NY 11735, 516-293-3100 .... D•1162
† Acromag, 30765 Wixom Rd., Wixom, MI 48096 313-624-1541
§† Advanced Microcomputers, 3340 Scott Blvd., Santa Clara, CA 95051 408-732-2400
§† Advanced Micro Devices, P.O. Box 3453, 901 Thompson Pl., Sunnyvale, CA 94088 408-732-2400

† Analog Devices, P.O. Box 280, Norwood, MA 02062 ... 617-329-4700
Analogic Corp., Data Conversion Prods. Grp., Audubon Rd., Wakefield, MA 01880 ... 617-246-0300
§ Data Translation, 100 Locke Dr., Marlboro, MA 01752 ... 617-481-3700
Datel, General Electric Co., 11 Cabot Blvd., Mansfield, MA 02048 ... 617-339-9341
§† Dymec, 8 Lowell Ave., Winchester, MA 01890 ... 617-729-7870
Hybrid Systems Corp., 22 Linnell Circle, Billerica, MA 01821 ... 617-667-8700
† HyComp Inc., 75 Union Ave., Box 377, Sudbury, MA 01776 ... 617-443-4631
§ Intech, Microcircuits Div., 2270 Martin Ave., Santa Clara, CA 95050 ... 408-988-4930
MICRA Corp., 120 Ricefield Lane, Hauppauge, NY 11788 ... 516-231-8600
§† Micro Power Sys. Inc., 3100 Alfred St., Santa Clara, CA 95050 ... 408-727-5350
† Natel Engrg. Co., Inc., 4550 Runway St., Simi Valley, CA 93063 ... 805-581-3950
§† Phoenix Data, Inc., 3384 W. Osborn Rd., Phoenix, AZ 85017 ... 602-278-8528
§† Precision Monolithics, Inc., 1500 Space Dr., Santa Clara, CA 95054 ... 408-727-9222
§ Preston Scientific, 805 E. Cerritos Ave., Anaheim, CA 92805 ... 714-776-6400
§† Raytheon Semiconductor, 350 Ellis St., Mountain View, CA 94043 ... 415-968-9211
Serial Lab Prods., Inc., 162 Cook Lane, P.O. Box 766, Marlboro, MA 01752 ... 617-481-1684

Converters, Paper Tape to Magnetic Tape-2000

§ Algo, Inc., 9198-C Red Branch Rd., Columbia, MD 21045 ... 301-730-7442
† Astronautics Corporation of America, P.O. Box 523, Milwaukee, WI 53201-0523 ... 414-447-8200

Converters, Phase-4050

† California Instruments, A Div. of Amstar Tech. Prods. Co., Inc., 5150-Convoy St., San Diego, CA 92111, 619-279-8620;800-356-2244;800-821-1634 ... D•1907
Triac Electronic Systems, Inc., 87-27 Myrtle Ave., Glendale, NY 11385, 718-441-4759 ... D•1132
Antex Electronics Corp., 16100 S. Figueroa St., Gardena, CA 90248 ... 213-532-3092
Behlman Div., California Instrs., Div. of Norlin Inds., 5150 Convoy St., San Diego, CA 92111 ... 619-279-8620
† Computer Conversions Corp., 6 Dunton Ct., E. Northport, NY 11731 ... 516-261-3300
† Electrac, Inc., 1614 Orangethrope Way, Anaheim, CA 92801 ... 714-879-6021
Elin Div., California Instrs. Co., Div. of Norlin Ind., 5150 Convoy St., San Diego, CA 92111 ... 619-279-8620
† General Microwave Corp., 155 Marine St., Farmingdale, NY 11735 ... 516-694-3600
† Georator Corp., Box 70, Manassas, VA 22110 ... 703-368-2101
† Industrial Control Co., 3100 Pineda Ave., Rockledge, FL 32955 ... 305-259-7105
† Megatran Electronic Power, Rising Sun Rd., Bordentown, NJ 08505 ... 609-298-7300
† North Atlantic Inds., Instrument Div., 60 Plant Ave., Hauppauge, NY 11788 ... 516-582-6500
† NWL Transformers, Rising Sun Rd., P.O. Box 358, Bordentown, NJ 08505 ... 609-298-7300
Pacific Power Source Corp., 15122 Bolsa Chica St., Huntington Bch., CA 92649 ... 714-898-2691;800-854-2433
† Transmagnetics, 210 Adams Blvd., Farmingdale, NY 11735 ... 516-293-3100

Converters, Polar to Rectangular Coordinates-2325

Interface Engrg., 386 Lindelof Ave., Stoughton, MA 02072, 617-344-7383 ... D•1157
† Transmagnetics, 210 Adams Blvd., Farmingdale, NY 11735, 516-293-3100 ... D•1162
† Computer Conversions Corp., 6 Dunton Ct., E. Northport, NY 11731 ... 516-261-3300
† Datacom, Inc., Box 278, Ft. Walton Beach, FL 32548 ... 904-244-6121
† G B Instruments Inc., 2030 Coolidge St., Hollywood, FL 33020 ... 305-920-0225
§ General Magnetics, 211 Grove St., Bloomfield, NJ 07003 ... 201-743-2700
† Industrial Control Co., 3100 Pineda Ave., Rockledge, FL 32955 ... 305-259-7105
† Metric Sys., 645 Anchors St., Ft. Walton Beach, FL 32548 ... 904-244-9600
§ Vidco, 8323 S.W. Cirrus Drive, Beaverton, OR 97005 ... 503-641-1804

Converters, Power Frequency, Electronic-4050

Abacus Controls Inc., 89 Readington Rd., Somerville, NJ 08876, 201-526-6010 ... D•1880-1881
Advance Conversion Devices Co., 274 S. Salem St., Randolph, NJ 07869, 201-989-0095 ... D•1886-1887
Applied Research, Inc., 160 Dupont St., Plainview, NY 11803, 516-349-9200 ... A•1702
† Avtel Div., Unitron Inc., 10925 Miller Rd., Dallas, TX 75238, 214-340-8600 ... D•1895-1897
Behlman Engineering, 1142 Mark Ave., Carpinteria, CA 93013, 805-684-8311 ... D•1898-1905
† California Instruments, A Div. of Amstar Tech. Prods. Co., Inc., 5150-Convoy St., San Diego, CA 92111, 619-279-8620;800-356-2244;800-821-1634 ... D•1907
† CML MACARR Div., Marine Electric RPD, Inc., 666 Pacific St., Brooklyn, NY 11217, 718-857-2400 ... D•1909
Diego Power, 5350 Eastgate Mall, San Diego, CA 92121, 587-1925 ... D•1916
§ Displex, Inc., Alexander Place, Glen Cove, NY 11542, 516-671-4400 ... D•1619
Elgar Corp, An Onan McGraw Edison Co., 9250 Brown Deer Rd., San Diego, CA 92121, 619-450-0085 ... D•1918-1919,1921
§† Franek, John, Co., Inc., P.O. Box 11752, Santa Ana, CA 92711-1752, 714-832-0290;800-854-9420 ... D•1924-1927
Industrial Test Equip., 21 Yennicock Ave., Port Washington, NY 11050, 516-883-1700 ... D•1247,1938
KGS Electronics, Inc., GAR Entprs., 2029 N. Lincoln Ave., Pasadena, CA 91103, 818-798-0786 ... D•1943
Nova Elec., Hobart Bros. Co., 263 Hillside Ave., Nutley, NJ 07110, 201-661-3434 ... D•1946
Pacific Power Source Corp., 15122 Bolsa Chica St., Huntington Bch., CA 92649, 714-898-2691;800-854-2433 ... D•1949-1950
§† Powermark, 3855 Ruffin Rd., San Diego, CA 92123, 619-565-8363 ... D•1955
† Unitron Inc., 10925 Miller Rd., Dept. EE, Dallas, TX 75238, 214-340-8600 ... D•1895-1897
Albar, Inc., 19013 36th Ave. W., Lynnwood, WA 98036 ... 206-771-4006
Avionic Instrs., 943 E. Hazelwood Ave., Rahway, NJ 07065 ... 201-388-3500
Basler Elec., Rte. 143, Highland, IL 62249 ... 618-654-2341
Behlman Div., California Instrs., Div. of Norlin Inds., 5150 Convoy St., San Diego, CA 92111 ... 619-279-8620
Bikor, 1504 W. 228th St., Torrance, CA 92718 ... 213-539-6320
† Cal-Power Corp., 140 Kansas St., El Segundo, CA 90245 ... 213-772-2171
§ Computer Power, 124E W. Main St., High Bridge, NJ 08829 ... 201-735-8000
† Control Technology Co., 41-16 29th St., Long Island City, NY 11101 ... 718-361-2133
§ Data-Design Labs., P.O. Box 711, 7925 Center Ave., Cucamonga, CA 91730 ... 714-987-2511
† EG & G Rotron, Custom Div., Hasbrouck La., Woodstock, NY 12498 ... 914-679-5201
† Eldec Corp., Power Conversion Div., 16700 13th Ave. W., P.O. Box 100, Lynnwood, WA 98036 ... 206-743-1313
Electro-Pacific, 5782 Thornwood Dr., Goleta, CA 93017 ... 805-964-0751
Elin Div., California Instrs. Co., Div. of Norlin Ind., 5150 Convoy St., San Diego, CA 92111 ... 619-279-8620
Energy, Ltd., 4714 Upshur Street, Bladensburg, MD 20710 ... 301-699-1144
† ERA Transpac Div., Sub. Elctrn. Research Assocs., 50 Graphic Place, Moonachie, NJ 07074 ... 201-641-3650
EWC, Inc., 725 Federal Ave., Kenilworth, NJ 07033 ... 201-245-3200;800-526-4048
Frequency Control Prods., Inc., American Time Prods. Div., 61-20 Woodside Ave., Woodside, NY 11377 ... 212-458-5811
† Helionetics, Inc., DECC Div., 17312 Eastman St., Irvine, CA 92714 ... 714-546-4731; 800-421-7915
Interelectronics Corp., Interelectronics Park, 550 U.S. Rte. 303, Congers, NY 10920 ... 914-EL8-8000
§ Liebert Corp., Programmed Power Div., 995 Benicia Ave., Sunnyvale, CA 94086 ... 408-245-8900
Mid-Eastern Industries, 100 Campus Dr., RD 1, Mt. Holly, NJ 08060 ... 609-267-3811
Modular Devices, 50 Orville Dr., Bohemia, NY 11716 ... 516-567-9620
NJE Corporation, 329 Culver Rd, P.O. Box 669, Dayton, NJ 08810-0669 ... 201-329-4611
Novatronics, Box 878, Pompano Beach, FL 33061 ... 305-942-5200
Oeco Corp., 712 S.E. Hawthorne Blvd., Portland, OR 97214 ... 503-238-2440
§ Power Control, 122 Gamma Dr., Pittsburgh, PA 15238 ... 412-782-3120
Reliance Electric Co., Marketing Info Center, P.O. Box 99502, Cleveland, OH 44199 ... 800-245-4501;800-245-4497 In Ohio
RFL Inds., A Dowty Grp. Co./Comms. Div., Powerville Rd., Boonton, NJ 07005 ... 201-334-3100
§ Schulz Controls, Inc., P.O. Box 9555, New Haven, CT 06511 ... 203-562-2555
† Sigmapower, Inc., 20790 Leapwood Ave., Carson, CA 90746 ... 213-32-Sigma
Teledyne Inet, 2750 W. Lomita Blvd., Torrance, CA 90509 ... 213-325-5040
† Trio Labs., 80 Dupont St., Plainview, NY 11803 ... 516-349-0400

Converters, Power Frequency, Rotary-4050

† Georator Corp., Box 70, Manassas, VA 22110, 703-368-2101 ... D•1930-1931
† Acromag, 30765 Wixom Rd., Wixom, MI 48096 ... 313-624-1541
† American Elctrns., 1600 E. Valencia Dr., Fullerton, CA 92631 ... 714-871-3020
Atlas Energy Sys., 9457 Rush St., S. El Monte, CA 91733 ... 213-575-0755
§ Carter Motor, 2707 W. George St., Chicago, IL 60618-7898 ... 312-588-7700
CML MACARR Div., Marine Electric RPD, Inc., 666 Pacific St., Brooklyn, NY 11217 ... 718-857-2400
§ Franek, John, Co., Inc., P.O. Box 11752, Santa Ana, CA 92711-1752 ... 714-832-0290; 800-854-9420
Teledyne Inet, 2750 W. Lomita Blvd., Torrance, CA 90509 ... 213-325-5040

Converters, Pressure to DC, Pressure to Frequency — See Transducers, Pressure (Vol. B)

Converters, Rectangular to Polar-2325

† Computer Conversions Corp., 6 Dunton Ct., E. Northport, NY 11731, 516-261-3300 ... D•1140
† Interface Engrg., 386 Lindelof Ave., Stoughton, MA 02072, 617-344-7383 ... D•1157
† Transmagnetics, 210 Adams Blvd., Farmingdale, NY 11735, 516-293-3100 ... D•1162
RCI/Data, 1992 Lakewood Rd., Toms River, NJ 08753 ... 201-341-8361

Converters, Resolver to Digital-2325

† Computer Conversions Corp., 6 Dunton Ct., E. Northport, NY 11731, 516-261-3300 ... D•1140
† Control Sciences, Inc., 9509 Vassar Ave., Chatsworth, CA 91311, 818-709-5510 ... D•1142-1143
† ILC Data Device Corp., 105 Wilbur Pl., Bohemia, NY 11716, 516-567-5600 ... D•1150
† Interface Engrg., 386 Lindelof Ave., Stoughton, MA 02072, 617-344-7383 ... D•1156
† Natel Engrg. Co., Inc., 4550 Runway St., Simi Valley, CA 93063, 805-581-3950 ... A•1694-1695
† Transmagnetics, 210 Adams Blvd., Farmingdale, NY 11735, 516-293-3100 ... D•1162-1163
† Vernitech, 300 Marcus Blvd., Deer Pk., NY 11729, 516-586-5100 ... B•1011
† Analog Devices, P.O. Box 280, Norwood, MA 02062 ... 617-329-4700
Astrosystems, 6 Nevada Dr., Lake Success, NY 11042 ... 516-328-1600
BBK, Inc., 75 Travis Ave., Binghamton, NY 13904 ... 607-772-8119
† Control Technology Co., 41-16 29th St., Long Island City, NY 11101 ... 718-361-2133
Farrand Controls, Div. of Farrand Industries, Inc., 99 Wall St., Valhalla, NY 10595 ... 914-RO1-2600
† GAP Instr., 40 Oser Ave., Hauppauge, NY 11787 ... 516-273-0909
† Innovatek Microsystems, Inc., Smithfield Rd., R1 Box 104, Millerton, NY 12546-9720 ... 914-373-9003
Muirhead, 1101 Briston Rd., Mountainside, NJ 07092 ... 201-233-6010
† North Atlantic Inds., Instrument Div., 60 Plant Ave., Hauppauge, NY 11788 ... 516-582-6500
Northern Precision Labs., 11 Madison Rd., Fairfield, NJ 07006 ... 201-227-4800
§ Ragen Data Systems, Inc., 3 Oval Dr., Central Islip, NY 11722 ... 516-234-3800
† Singer Co., Kearfott Div., 1150 McBride Ave., Little Falls, NJ 07424 ... 201-785-6000

Converters, Rotary – See Motor Generator Sets (Vol. D)

Converters, Serial to Parallel/Parallel to Serial-2325
NES, Inc. (Nationwide Electronic Systems), 3003 Wakefield, Carpentersville, IL 60110, 312-426-5900 .... D•1039,1127,1159
§ Air Land Systems Corporation, 2710 Prosperity Ave., Fairfax, VA 22031 703-573-1100
Kinetic Sys., 11 Maryknoll Dr., Lockport, IL 60441 815-838-0005

Converters, Synchro to Digital-2325
† Computer Conversions Corp., 6 Dunton Ct., E. Northport, NY 11731, 516-261-3300 .... D•1140-1141
† Control Sciences, Inc., 9509 Vassar Ave., Chatsworth, CA 91311, 818-709-5510 .... D•1142-1143
† ILC Data Device Corp., 105 Wilbur Pl., Bohemia, NY 11716, 516-567-5600 .... D•1150
† Interface Engrg., 386 Lindelof Ave., Stoughton, MA 02072, 617-344-7333 .... D•1156
† Natel Engrg. Co., Inc., 4550 Runway St., Simi Valley, CA 93063, 805-581-3950 .... A•1694-1695
† Transmagnetics, 210 Adams Blvd., Farmingdale, NY 11735, 516-293-3100 .... D•1162-1163
† Vernitech, 300 Marcus Blvd., Deer Pk., NY 11729, 516-586-5100 .... B•1011
† Analog Devices, P.O. Box 280, Norwood, MA 02062 617-329-4700
Astrosystems, 6 Nevada Dr., Lake Success, NY 11042 516-328-1600
BBK, Inc., 75 Travis Ave., Binghamton, NY 13904 607-772-8119
† Control Technology Co., 41-16 29th St, Long Island City, NY 11101 718-361-2133
Elin Div., California Instrs. Co., Div. of Norlin Ind., 5150 Convoy St, San Diego, CA 92111 619-279-8620
† GAP Instr., 40 Oser Ave., Hauppauge, NY 11787 516-273-0909
† Innovatek Microsystems, Inc., Smithfield Rd., R1 Box 104, Millerton, NY 12546-9720 914-373-9003
Kinetic Sys., 11 Maryknoll Dr., Lockport, IL 60441 815-838-0005
Metric Sys., 645 Anchors St, Ft. Walton Beach, FL 32548 904-244-9600
Muirhead, 1101 Briston Rd., Mountainside, NJ 07092 201-233-6010
† North Atlantic Inds., Instrument Div., 60 Plant Ave., Hauppauge, NY 11788 516-582-6500
† Northern Precision Labs., 11 Madison Rd., Fairfield, NJ 07006 201-227-4800
§ Ragen Data Systems, Inc., 3 Oval Dr., Central Islip, NY 11722 516-234-3800
Singer Co., Kearfott Div., 1150 McBride Ave., Little Falls, NJ 07424 201-785-6000

Converters, Synchro to Linear DC-2325
† Computer Conversions Corp., 6 Dunton Ct., E. Northport, NY 11731, 516-261-3300 .... D•1140
† Control Technology Co., 41-16 29th St., Long Island City, NY 11101, 718-361-2133 .... D•1986
† ILC Data Device Corp., 105 Wilbur Pl., Bohemia, NY 11716, 516-567-5600 .... D•1150
† Interface Engrg., 386 Lindelof Ave., Stoughton, MA 02072, 617-344-7333 .... D•1156
† Natel Engrg. Co., Inc., 4550 Runway St., Simi Valley, CA 93063, 805-581-3950 .... A•1694-1695
† Transmagnetics, 210 Adams Blvd., Farmingdale, NY 11735, 516-293-3100 .... D•1162
† Vernitech, 300 Marcus Blvd., Deer Pk., NY 11729, 516-586-5100 .... B•1011
† Analog Devices, P.O. Box 280, Norwood, MA 02062 617-329-4700
† Control Sciences, Inc., 9509 Vassar Ave., Chatsworth, CA 91311 818-709-5510
§† General Magnetics, 211 Grove St, Bloomfield, NJ 07003 201-743-2700
† Industrial Control Co., 3100 Pineda Ave., Rockledge, FL 32955 305-259-7105
Muirhead, 1101 Briston Rd., Mountainside, NJ 07092 201-233-6010
Northern Precision Labs., 11 Madison Rd., Fairfield, NJ 07006 201-227-4800
§ Ragen Data Systems, Inc., 3 Oval Dr., Central Islip, NY 11722 516-234-3800
Singer Co., Kearfott Div., 1150 McBride Ave., Little Falls, NJ 07424 201-785-6000

Converters, Synchro to Sine/Cosine-2325
† Computer Conversions Corp., 6 Dunton Ct., E. Northport, NY 11731, 516-261-3300 .... D•1140
ILC Data Device Corp., 105 Wilbur Pl., Bohemia, NY 11716, 516-567-5600 .... D•1150
† Interface Engrg., 386 Lindelof Ave., Stoughton, MA 02072, 617-344-7333 .... D•1156
† Transmagnetics, 210 Adams Blvd., Farmingdale, NY 11735, 516-293-3100 .... D•1162
† Control Sciences, Inc., 9509 Vassar Ave., Chatsworth, CA 91311 818-709-5510
† Control Technology Co., 41-16 29th St, Long Island City, NY 11101 718-361-2133
† GAP Instr., 40 Oser Ave., Hauppauge, NY 11787 516-273-0909
† General Magnetics, 211 Grove St, Bloomfield, NJ 07003 201-743-2700
† Industrial Control Co., 3100 Pineda Ave., Rockledge, FL 32955 305-259-7105
† Natel Engrg. Co., Inc., 4550 Runway St, Simi Valley, CA 93063 805-581-3950
Northern Precision Labs., 11 Madison Rd., Fairfield, NJ 07006 201-227-4800
† Perkin-Elmer Corp., Elctrn. Prods. Dept., Main Ave., Norwalk, CT 06856 203-762-4786
Shogyo Intl. Corp., 287 Northern Blvd., Great Neck, NY 11021 516-466-0911
† Sigmapower, Inc., 20790 Leapwood Ave., Carson, CA 90746 .... 213-32-Sigma
† Vernitech, 300 Marcus Blvd., Deer Pk., NY 11729 516-586-5100

Converters, Tape to Card-2000
† Astronautics Corporation of America, P.O. Box 523, Milwaukee, WI 53201-0523 414-447-8200

Converters, Telemetry-1900
† Applied Research, Inc., 160 Dupont St., Plainview, NY 11803, 516-349-9200 .... A•1702-1703
North Hills Elctrns., 1 Alexander Pl., Glen Cove, NY 11542, 516-671-5700 .... A•1780
§† Anaren Microwave, P.O. Box 178, 6635 Kirkville Rd., E. Syracuse, NY 13057 315-432-8909
† Base Ten Sys., One Electronics Dr., Box 3151, Trenton, NJ 08619 609-586-7010
Decom Sys., 340 Rancheros Dr., San Marcos, CA 92069 619-744-1002
Dio-Rey, Div. of Info-Lite, 422 Cliff St., Fairview, NJ 07022 201-941-4455
FG Engrg., Box 476, Fredonia, AZ 86022 602-643-7375
Hughes Aircraft Co, Aerospace Grps./Support Sys., P.O. Box 90515, Los Angeles, CA 90009 213-670-1515
Hughes Aircraft Co., Microelctrn. Sys. Div., 2601 Campus Dr., Irvine, CA 92715 714-752-3800
Interelectronics Corp., Interelectronics Park, 550 U.S. Rte. 303, Congers, NY 10920 .... 914-EL8-8000
† Lorch Elctrns., 105 Cedar La., Englewood, NJ 07631 201-569-8282
Magnum Opus Custom Elctrn. Engrg., 284 Kennedy St., Iselin, NJ 08830 201-283-4925
§† MITEQ Inc., 125 Ricefield Lane, Hauppauge, NY 11788 516-543-8873
§ NES, Inc. (Nationwide Electronic Systems), 3003 Wakefield, Carpentersville, IL 60110 312-426-5900
RCI/Data, 1992 Lakewood Rd., Toms River, NJ 08753 201-341-8361
RFL Inds., A Dowty Grp. Co./Comms. Div., Powerville Rd., Boonton, NJ 07005 201-334-3100
RHG Electronics Lab., Inc., 161 E. Industry Ct., Deer Park, NY 11729 516-242-1100
† TRW Microwave, 825 Stewart Dr., Sunnyvale, CA 94086 408-732-0880

Converters, Thermal-5800 – *See Vol. B*

Converters, UHF to VHF-1900
† Adams-Russell, Anzac Div., 80 Cambridge St, Burlington, MA 01803 671-273-3333
§ Applied Communications, Amstar Tech. Prods. Co., 5490 Spectrum Drive, Frederick, MD 21701 301-694-5300
§ Applied Communications, 9125 Gaither Rd., Gaithersburg, MD 20877 301-948-5210
† Applied Research, Inc., 160 Dupont St., Plainview, NY 11803 516-349-9200
† Argent Elctrns., 3245 S. County Rd., 25A, Troy, OH 45373 513-335-0031
§ Data-Design Labs., P.O. Box 711, 7925 Center Ave., Cucamonga, CA 91730 714-987-2511
FG Engrg., Box 476, Fredonia, AZ 86022 602-643-7375
Frequency Elctrns., 55 Charles Lindbergh Blvd., Mitchel Field, NY 11553 516-794-4500
† Lorch Elctrns., 105 Cedar La., Englewood, NJ 07631 201-569-8282
§ Macom Inds., 8230 Haskell Ave., Van Nuys, CA 91406
† M/A-COM Microwave Power Dvcs., 330 Oser Ave., Hauppauge, NY 11788 516-231-1400
† Microlab/FXR, 10 Microlab Rd., Livingston, NJ 07039 201-992-7700
§† MITEQ Inc., 125 Ricefield Lane, Hauppauge, NY 11788 516-543-8873

Converters, VLF to HF-1900
§ Applied Communications, Amstar Tech. Prods. Co., 5490 Spectrum Drive, Frederick, MD 21701 301-694-5300
§ Applied Communications, 9125 Gaither Rd., Gaithersburg, MD 20877 301-948-5210
§ Palomar Engrs., Box 455, Escondido, CA 92025 619-747-3343

Converters, Voltage to Frequency-2325
§† Intech, Microcircuits Div., 2270 Martin Ave., Santa Clara, CA 95050, 408-988-4930 .... A•1672
† Acromag, 30765 Wixom Rd., Wixom, MI 48096 313-624-1541
† Analog Devices, P.O. Box 280, Norwood, MA 02062 617-329-4700
† Autronics, 314 E. Live Oak, Ste. A, Arcadia, CA 91006 818-445-5470
† Avtel Div., Unitron Inc., 10925 Miller Rd., Dallas, TX 75238 214-340-8600
Behlman Div., California Instrs., Div. of Norlin Inds., 5150 Convoy St, San Diego, CA 92111 619-279-8620
† Burr-Brown Corp., P.O. Box 11400, Tucson, AZ 85734 602-746-1111
Cal-Tek Engrg., 36 Riverside Drive, Kingston, MA 02364 617-585-5666
CML MACARR Div., Marine Electric RPD, Inc., 666 Pacific St, Brooklyn, NY 11217 718-857-2400
† Computer Conversions Corp., 6 Dunton Ct, E. Northport, NY 11731 516-261-3300
Datel, General Electric Co., 11 Cabot Blvd., Mansfield, MA 02048 617-339-9341
§† Dymec, 8 Lowell Ave., Winchester, MA 01890 617-729-7870
† ERA Transpac Div., Sub. Elctrn. Research Assocs., 50 Graphic Place, Moonachie, NJ 07074 201-641-3650
§ Exar Corp., P. O. Box 62229, 750 Palomar Ave., Sunnyvale, CA 94086 408-732-7970
Frequency Control Prods., Inc., American Time Prods. Div., 61-20 Woodside Ave., Woodside, NY 11377 212-458-5811
† Georator Corp., Box 70, Manassas, VA 22110 703-368-2101
Kinetic Sys., 11 Maryknoll Dr., Lockport, IL 60441 815-838-0005
† Merrimac Inds., 41 Fairfield Pl., West Caldwell, NJ 07006 201-575-1300
North Hills Elctrns., 1 Alexander Pl., Glen Cove, NY 11542 516-671-5700
§† Raytheon Semiconductor, 350 Ellis St, Mountain View, CA 94043 415-968-9211
RFL Inds., A Dowty Grp. Co./Comms. Div., Powerville Rd., Boonton, NJ 07005 201-334-3100
§ Richard-Lee Co., Box 724, New Providence, NJ 07974 201-276-0710
Teledyne Philbrick, Allied Dr. Rte 128, Dedham, MA 02026 617-329-1600
§† Teledyne Semiconductor, 1300 Terra Bella Ave., PO Box 7267, Mountain View, CA 94039-7267 415-968-9241
† Unitron Inc., 10925 Miller Rd., Dept. EE, Dallas, TX 75238 214-340-8600

Converters (MIL) DC to DC-3475
† Abbott Transistor Labs., Power Supply Div., 5200 W. Jefferson Blvd., Los Angeles, CA 90016, 213-936-8185 .... D•1456-1458
† Arnold Magnetics, 11520 W. Jefferson Blvd., Culver City, CA 90230, 213-390-3537/8837 .... D•1508-1511
† EMCO High Voltage Co., 11126 Ridge Road, Sutter Creek, CA 95685, 209-223-3626 .... D•1632
Abbott Transistor Labs., Industrial Products Div., 8203 Vineland Ave., Sun Valley, CA 91352 818-504-0644
† Adtech Power Inc., 1620 S. Sunkist St., Anaheim, CA 92806 714-634-9211
† ATC Power Systems, Inc., 472 Amherst Street, Nashua, NH 03063 603-882-1366
CEA Division of Berkleonics, Inc., A Subsidiary of EG & G, 1 Aerovista Pk., San Luis Obispo, CA 93401 805-544-5454
† Del Elctrns. Corp., 250 E. Sandford Blvd., Mt. Vernon, NY 10550 914-699-2000

ERA Transpac Div., Sub. Elctrn. Research Assocs., 50 Graphic Place, Moonachie, NJ 07074 201-641-3650
† Gulton Industries, Inc., Engineered Magnetics Division, 13041 Cerise Ave., Hawthorne, CA 90250 213-679-0111
§ Harris Corp., Dracon Div., 809 Calle Plano, Camarillo, CA 93010 805-987-9511
§† Intech, Microcircuits Div., 2270 Martin Ave., Santa Clara, CA 95050 408-988-4930
Integrated Circuits, Inc., 10301 Willows Road, Redmond, WA 98052 206-882-3100
Interelectronics Corp., Interelectronics Park, 550 U.S. Rte. 303, Congers, NY 10920 .... 914-EL8-8000
Keltec Florida, P.O. Box 2917, Ft. Walton Bch., FL 32549 904-651-9749
MIL Electronics, Inc., 1 Mill st., Dracut, MA 01826 617-453-8000
† Milpower Source, Inc., 49 Range Rd., Windham, NH 03087 603-893-2834
Modular Devices, 50 Orville Dr., Bohemia, NY 11716 516-567-9620
† Rodale Elctrns. Corp., 603 Chestnut St., Garden City, NY 11530 516-222-0050
† Trio Labs., 80 Dupont St., Plainview, NY 11803 516-349-0400
§ Tripp-Lite, 500 No. Orleans, Chicago, IL 60610 312-329-1777

Converters (MIL), Frequency-3475

† Avtel Div., Unitron Inc., 10925 Miller Rd., Dallas, TX 75238, 214-340-8600 .... D•1895-1897
† Unitron Inc., 10925 Miller Rd., Dept. EE, Dallas, TX 75238, 214-340-8600 .... D•1895-1897
† Adams-Russell, Anzac Div., 80 Cambridge St., Burlington, MA 01803 671-273-3333
† Applied Electro Technlg., Int., STI Company, 2220 So. Anne St., Santa Ana, CA 92704 714-556-6570
† California Microwave, 990 Almanor Ave., Sunnyvale, CA 94086 408-732-4000
† EG & G Rotron, Custom Div., Hasbrouck La., Woodstock, NY 12498 914-679-5201
† Georator Corp., Box 70, Manassas, VA 22110 703-368-2101
† Microwave/Sys., 1 Adler Dr., E. Syracuse, NY 13057 315-437-9951
Modular Devices, 50 Orville Dr., Bohemia, NY 11716 516-567-9620
† Teledyne Microelectronics, 12964 Panama St., Los Angeles, CA 90066 .... 213-822-8229;213-870-9831
† Trio Labs., 80 Dupont St., Plainview, NY 11803 516-349-0400

Coolants, Circuit & Component — See Refrigerants, Spray (Vol. C)

Cooling Equipment — See Air Conditioners (Vol. C), Blowers & Fans (Vol. C), Heat Exchangers & Systems (Vol. C)

Cooling/Heating Modules, Thermoelectric-5300 — *See Vol. B*

Cooling Sprays — See Refrigerants, Spray (Vol. C)

Cords & Tapes, Lacing-6000 — *See Vol. C*

Cords, Communication, Control, Microphone, etc. — See Cable, Specific Type (Vol. C)

Cords, Line & Set, Extension-6000 — *See Vol. C*

Cords, Line (Lamp) — See Cable, Multiconductor (Vol. C)

Cords, Line, Resistance-6000 — *See Vol. C*

Cords, Patch-2100 — *See Vol. C*

Cords, Power — See Cable, Power (Vol. C)

Cords, Retractile-6000 — *See Vol. C*

Cords, Speaker Extension — See Cable, Audio (Vol. C)

Cords, Telephone, Modular — See Cable, Telephone (Vol. C)

Cords, Twin Lead — See Cable, Multiconductor (Vol. C)

Cords & Cable, Dial Drive-2400 — *See Vol. C*

Cords & Cord Sets, Telephone-6000 — *See Vol. C*

Cords & Cord Sets, International-6000 — *See Vol. C*

Cores, Ceramic-1850 — *See Vol. A*

Cores, Magnetic, Ferrite, L, E, etc.-1850 — *See Vol. A*

Cores, Magnetic, Ferrite, Pot/Cup-1850 — *See Vol. A*

Cores, Magnetic, Ferrite, Slug-1850 — *See Vol. A*

Cores, Magnetic, Ferrite, Toroid-1850 — *See Vol. A*

Cores, Magnetic, Ferrite, Yoke Section-1850 — *See Vol. A*

Cores, Magnetic, Metal Alloy (Other Than Silicon & Nickel-Iron)-1850 — *See Vol. A*

Cores, Magnetic, Nickel-Iron, L, EE, F, & Ring Laminations-1850 — *See Vol. A*

Cores, Magnetic, Nickel-Iron, Toroid-1850 — *See Vol. A*

Cores, Magnetic, Powdered Iron, Pot/Cup-1850 — *See Vol. A*

Cores, Magnetic, Powdered Iron, Slug-1850 — *See Vol. A*

Cores, Magnetic, Powdered Iron, Toroid-1850 — *See Vol. A*

Cores, Magnetic, Powdered Permalloy, Toroid-1850 — *See Vol. A*

Cores, Magnetic, Silicon C-1850 — *See Vol. A*

Cores, Magnetic, Silicon EI, EE, & F Laminations-1850 — *See Vol. A*

Cores, Magnetic, Silicon, Toroid-1850 — *See Vol. A*

Corners, Waveguide — See Bends & Twists, Microwave (Vol. A)

Coulometers — See Timers, Electrolytic Cell (Vol. D)

Countermeasures (CM) Sets (MIL), Airborne-3475

Digital Radio Corp., 8901 La Cienega Blvd., Inglewood, CA 90301 213-670-8611
† Flight Systems, Inc., Tracor, Inc., 1091 Dove St., Newport Beach, CA 92660 714-833-9661
† Microwave/Sys., 1 Adler Dr., E. Syracuse, NY 13057 315-437-9951
† Rodale Elctrns. Corp., 603 Chestnut St., Garden City, NY 11530 516-222-0050

CM Sets (MIL), Internal-3475

† Flight Systems, Inc., Tracor, Inc., 1091 Dove St., Newport Beach, CA 92660 714-833-9661

CM Sets (MIL), Mobile-3475

† Flight Systems, Inc., Tracor, Inc., 1091 Dove St., Newport Beach, CA 92660 714-833-9661
GTE Sys.-Sylvania Sys. Grp., Western Div., P.O. Box 7188, Mountain View, CA 94039 415-966-2000

Counter/Timers-2900

Airpax Corp., Cheshire Div., Cheshire Indl. Pk., Box E, Cheshire, CT 06410, 203-272-0301 .... D•1110
§ Chrono-log Corp., 2 W. Park Rd., Havertown, PA 19083, 215-853-1130 .... D•1061
C-Tek Inc., 4 Railroad Ave., Wakefield, MA 01880, 617-246-1720 .... D•1114-1115
Dio-Rey, Div. of Info-Lite, 422 Cliff St., Fairview, NJ 07022, 201-941-4455 .... B•1044
§ Kessler-Ellis Prods., 120 1st Ave., Atlantic Highlands, NJ 07716, 201-291-0500;800-631-2165 .... D•1124
§ NES, Inc. (Nationwide Electronic Systems), 3003 Wakefield, Carpentersville, IL 60110, 312-426-5900 .... D•1366
§ Newport Electronics, 630 E. Young St., Santa Ana, CA 92705, 714-540-4914 .... D•1371
Phi Technologies, Inc., 4605 North Stiles, Oklahoma City, OK 73105, 405-521-9000 .... D•1054
§† Statek Corp., 512 N. Main St., Orange, CA 92668, 714-639-7810 .... A•1441
§ Amerace Corporation, Newburgh Rd., Hackettstown, NJ 07840 201-852-1122
† Applied Electro Technlg., Int., STI Company, 2220 So. Anne St., Santa Ana, CA 92704 714-556-6570
§ Artisan Elctrns., 5 Eastmans Rd., Parsippany, NJ 07054 201-887-7100
Automatic Timing & Controls Co., 201 So. Gulph Rd., King of Prussia, PA 19406 .... 215-337-5500;800-441-8245
§† Ballantine Labs., 90 Fanny Rd., Boonton, NJ 07005 201-335-0900
§ Banner Engrg. Corp., 9714 - 10th Ave. N., Minneapolis, MN 55441 612-544-3164
Canberra Ind., One State St., Meriden, CT 06450 203-238-2351
CDS - Colorado Data Sys., 3301 W. Hampden, Unit C, Englewood, CO 80110 303-762-1640
§ Codar Technology, Inc., 1428 Florida Avenue, Longmont, CO 80501 303-776-0472
Cybernetic Micro Sys., P.O. Box 3000, 3000 Hwy. 84, San Gregorio, CA 94074 415-726-3000
Datel, General Electric Co., 11 Cabot Blvd., Mansfield, MA 02048 617-339-9341
Datum Inc., Timing/Aacom Divisions, 1363 S. State College Blvd., Anaheim, CA 92806 714-533-6333
DCI Inc., 14812 W. 117th Street, P.O. Box 215, Olathe, KS 66061 913-782-5672
§ Digitec Corp., 918 Woodley Rd., P.O. Box 458, Dayton, OH 45401 513-254-6251
§ Diversified Elctrns., Inc., Indl. Controls Div., 119 N. Morton Ave., Evansville, IN 47711 812-426-2806
Durgin & Browne, 80 Allen Rd., So. Burlington, VT 05401 802-863-6873
§ Eaton Corp, Durant Products, 901 S. 12th St., Watertown, WI 53094 414-261-4070
§ Eaton Corp./Cutler-Hammer Prods, Aerospace & Commercial Controls Div., 4201 N. 27th St., Milwaukee, WI 53216 414-449-7487
Eitel Mfg., 2835 Laguna Canyon Rd., Laguna Beach, CA 92652 714-494-2012
Eldorado Instrs., 7303 Edgewater Dr., Oakland, CA 94621 415-638-5656
§ Electromatic Controls Corp., 2495 Pembroke Road, Hoffman Estates, IL 60195-2010 312-882-5757
Electronic Prods. Corp., Interstate Indl. Plaza, R. D. #5, York, PA 17402 717-767-6517
§† Engler Instruments Operation, Stemco Truck Products Division, 250 Culver Ave., Jersey City, NJ 07305 201-332-5353
§ ESE, 142 Sierra St., El Segundo, CA 90245 213-322-2136
§ Extech International Corp., 150 Bear Hill Rd., Waltham, MA 02154 617-890-7440
§ Fluke, John, Mfg. Co., Box C9090, MS 250C, Everett, WA 98206 206-356-5400
Fork Standards, Inc., 666 Western Ave., Lombard, IL 60148 312-932-9380

§ Global Specialties, Interplex Electronics, Inc., 70 Fulton Terrace, P.O. Box 1942, New Haven, CT 06509 203-624-3103
§ Grasslin Controls Corp., Dieter Grasslin Feinwerktechnik, 45 Spear Rd., Ramsey, NJ 07446 201-825-9696
Hameg, Inc., 88-90 Harbor Rd., Port Washington, NY 11050 516-883-3837
H-A-Z Laboratories, Brass Castle Rd., P.O. Box 67-M, Washington, NJ 07882 201-689-0110
† Holt Inc., 9351 Jeronimo Rd., Irvine, CA 92718 714-859-8800
§ International Microtronics Corp., 4016 E. Tennessee St., Tucson, AZ 85714 602-748-7900
§† Intersil, 10710 N. Tantau Ave., Cupertino, CA 95014 408-996-5000
§ Jumbo Process Control, Inc., 410 Garibaldi Ave., Lodi, NJ 07644 201-779-7744
Kinetic Sys., 11 Maryknoll Dr., Lockport, IL 60441 815-838-0005
H. Kuhnke, Inc., 26 W. Highland Ave., Atlantic Highlands, NJ 07716 ...... 201-291-3334; 800-221-0714
LeCroy Resch. Sys. Corp., 700 S. Main St., Spring Vly., NY 10977 914-425-2000
LeCroy Resch. Sys. Corp. (Cal.), 1806 Embarcadero Rd., Palo Alto, CA 94303 415-856-1800
Magnum Opus Custom Elctrn. Engrg., 284 Kennedy St., Iselin, NJ 08830 201-283-4925
Martel Elctrns. Corp., 13 Heritage Hill Rd., Windham, NH 03087 ...... 800-821-0023; 617-275-5970
§ Master Elctrn. Controls, P.O. Box 25905, Los Angeles, CA 90025 213-452-1336
§ Non-Linear Systems/Div. of Kaypro Corp., 533 Stevens Ave., Solana Bch., CA 92075 619-481-3900
§ North American Soar Corp., 11126 Cornell Ave., Cherry Hill, NJ 08002 609-488-1060
§ Omron Elctrns., Inc., Control Comps. Div., One E. Commerce Dr., Schaumburg, IL 60195 312-843-7900
Philips Test & Measuring Instrs., 85 McKee Dr., Mahwah, NJ 07430 201-529-3800
Phoenix Microsystems, P.O. Box 4206, Huntsville, AL 35802 205-881-2173
PPM, Inc., 4521 Emery Ind. Pkwy., Cleveland, OH 44128 216-292-6006
Racal-Dana Instrs. Inc., 4 Goodyear St., Irvine, CA 92715 714-859-8999
§ RCA Solid State Div., Micro Processors/Memories/Peripherals, Route 202, Somerville, NJ 08876 201-685-6000
§ Redington Counters, 130 Addison Rd., Windsor, CT 06095 203-688-6205
Scanning Devices, 108 Elm St., Waltham, MA 02154 617-891-8991
Skan-A-Matic, Box S, Elbridge, NY 13060 315-689-3961
§ Square D Co., Executive Plaza, Palatine, IL 60067 312-397-2600
§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 215-673-5600
§† Syracuse Elctrns., P.O. Box 4770, Syracuse, NY 13221 315-488-4911
Techno Vation, Inc., 14 Crandall Ave., Pompton Lakes, NJ 07442 201-839-0740
§ Tecmar, Inc., 6225 Cochran Rd., Solon, OH 44139 216-349-0600
Tektronix, Inc., P. O. Box 500, Y3-314, Beaverton, OR 97077 ...... 800-547-1512;Oregon only 800-452-1877
§ Tennelec, 601 Turnpike, Oak Ridge, TN 37830 615-483-8405
Texmate, Inc., 348 S. Cedros Ave., P.O. Box 2000, Solana Beach, CA 92075 619-481-7177
Timeco, Inc., 1035 - 26th St., P.O. Box 8036, Huntington, WV 25705 304-523-5149
§ Triplett Corp.-A Penril Co., One Triplett Dr., Bluffton, OH 45817-9987 419-358-5015
§ TRW, Dynalco Controls Div., 5200 NW 37th, P.O. Box 8187, Ft. Lauderdale, FL 33310 305-739-4300
§ Tucker Elctrns., Box 461966, Garland, TX 75046 ...... 214-348-8800;800-527-4642
§ Veeder-Root, 70 Sargeant St., Hartford, CT 06102 203-527-7201

Counters, Bidirectional-2200

† Airpax Corp., Cheshire Div., Cheshire Indl. Pk., Box E, Cheshire, CT 06410, 203-272-0301 ...... D•1110
§ Chrono-log Corp., 2 W. Park Rd., Havertown, PA 19083, 215-853-1130 .. D•1061
C-Tek Inc., 4 Railroad Ave., Wakefield, MA 01880, 617-246-1720 ... D•1114-1115
DCI Inc., 14812 W. 117th Street, P.O. Box 215, Olathe, KS 66061, 913-782-5672 ...... D•1347
Dio-Rey, Div. of Info-Lite, 422 Cliff St., Fairview, NJ 07022, 201-941-4455 ...... B•1045
§ Kessler-Ellis Prods., 120 1st Ave., Atlantic Highlands, NJ 07716, 201-291-0500;800-631-2165 ...... D•1124
§ NES, Inc. (Nationwide Electronic Systems), 3003 Wakefield, Carpentersville, IL 60110, 312-426-5900 ...... D•1366
North American Soar Corp., 11126 Cornell Ave., Cherry Hill, NJ 08002, 609-488-1060 ...... D•1279
† Abrams Instr. Corp., P.O. Box 26007, Lansing, MI 48909 517-332-6405
† Atec, Inc., Box 19426, 8219 Kempwood Dr., Houston, TX 77055 713-468-7971
Automated Production Concepts, 8 E. Garden Pl., Pompton Plains, NJ 07444 201-831-8300
§ B & B Motor & Control Corp., Apple Hill Commons, Burlington, CT 06013 203-673-7151
Bausch & Lomb, 820 Linden Ave., Rochester, NY 14625 716-338-6000
† Bowmar Instrument Corp., Aerospace Div., 8000 Bluffton Rd., Ft. Wayne, IN 46809 219-747-3121
CDS - Colorado Data Sys., 3301 W. Hampden, Unit C, Englewood, CO 80110 303-762-1640
† Computer Conversions Corp., 6 Dunton Ct., E. Northport, NY 11731 516-261-3300
Continental Resources, Inc., 175 Middlesex Tpke., Bedford, MA 01730 .. 617-275-0850
§ Crouzet Controls, Inc., 1083 State Pkwy., Schaumburg, IL 60195 312-843-2200
§ Digitec Corp., 918 Woodley Rd., P.O. Box 458, Dayton, OH 45401 513-254-6251
§ Dynapar, 1675 Delany Rd., Gurnee, IL 60031 312-662-2666
§ Eaton Corp, Durant Products, 901 S. 12th St., Watertown, WI 53094 414-261-4070
§ Eaton Corp./Cutler-Hammer Prods, Aerospace & Commercial Controls Div., 4201 N. 27th St., Milwaukee, WI 53216 414-449-7487
§ Electromatic Controls Corp., 2495 Pembroke Road, Hoffman Estates, IL 60195-2010 312-882-5757
§ Electro-Numerics, 1811 Reynolds, Irvine, CA 92714 714-250-1501
§ ESE, 142 Sierra St., El Segundo, CA 90245 213-322-2136
H-A-Z Laboratories, Brass Castle Rd., P.O. Box 67-M, Washington, NJ 07882 201-689-0110
§ Hecon Corp., 31 Park Rd., Tinton Falls, NJ 07724 201-542-9200
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
§ International Microtronics Corp., 4016 E. Tennessee St., Tucson, AZ 85714 602-748-7900
Interswitch, 770 Airport Blvd., Burlingame, CA 94010 415-347-8217
Itek Measurement Sys., Div. Litton Inds., 27 Christina St., Newton, MA 02161 617-969-7300
§ IVO Inds., Inc., 201 Industrial Way W., P.O. Drawer 917, Eatontown, NJ 07724 201-542-5151
Kinetic Sys., 11 Maryknoll Dr., Lockport, IL 60441 815-838-0005
H. Kuhnke, Inc., 26 W. Highland Ave., Atlantic Highlands, NJ 07716 ...... 201-291-3334; 800-221-0714
§ Landis & Gyr, Inc., 4 Westchester Plaza, Elmsford, NY 10523 914-592-4400
Magnum Opus Custom Elctrn. Engrg., 284 Kennedy St., Iselin, NJ 08830 201-283-4925
§† Nitron, 10420 Bubb Rd., Cupertino, CA 95014 408-255-7550
§ Non-Linear Systems/Div. of Kaypro Corp., 533 Stevens Ave., Solana Bch., CA 92075 619-481-3900
§ Nu-Metrics, 947 Longdale Ave., Longwood, FL 32750 305-331-7717
§ Omron Elctrns., Inc., Control Comps. Div., One E. Commerce Dr., Schaumburg, IL 60195 312-843-7900
PPM, Inc., 4521 Emery Ind. Pkwy., Cleveland, OH 44128 216-292-6006
† Racal-Dana Instrs. Inc., 4 Goodyear St., Irvine, CA 92715 714-859-8999
§ Redington Counters, 130 Addison Rd., Windsor, CT 06095 203-688-6205
§ Relay Specialties, 1300 Plaza Rd., Fair Lawn, NJ 07410 .. 201-797-3313;800-526-5376
Sensor Corp., Box 140, Scottdale, PA 15683 412-887-4080
Transducer Systems, Inc., 1510 Delp Dr., Kulpsville, PA 19443 215-256-4611
Tri-Tronics Co. Inc., 13420 Wright Cir., Tampa, FL 33624 813-855-4453
§ TRW, Dynalco Controls Div., 5200 NW 37th, P.O. Box 8187, Ft. Lauderdale, FL 33310 305-739-4300
§† Veeder-Root, 70 Sargeant St., Hartford, CT 06102 203-527-7201
Wide Range Elctrns. Corp., 2119 Schultz Rd., St. Louis, MO 63146 314-567-5366
§ Xycom, 750 N. Maple Rd., Saline, MI 48176 313-429-4971

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† Bowmar Instrument Corp., Aerospace Div., 8000 Bluffton Rd., Ft. Wayne, IN 46809 219-747-3121
§ Crouzet Controls, Inc., 1083 State Pkwy., Schaumburg, IL 60195 312-843-2200
§ C-Tek Inc., 4 Railroad Ave., Wakefield, MA 01880 617-246-1720
§ Dynapar, 1675 Delany Rd., Gurnee, IL 60031 312-662-2666
§ Eagle Signal Controls, Mfg. Div. Gulf & Western Inds., Box 16100, Austin, TX 78761 512-837-8300
§ Eaton Corp, Durant Products, 901 S. 12th St., Watertown, WI 53094 414-261-4070
§ Electromatic Controls Corp., 2495 Pembroke Road, Hoffman Estates, IL 60195-2010 312-882-5757
H-A-Z Laboratories, Brass Castle Rd., P.O. Box 67-M, Washington, NJ 07882 201-689-0110
§ Hecon Corp., 31 Park Rd., Tinton Falls, NJ 07724 201-542-9200
§ IVO Inds., Inc., 201 Industrial Way W., P.O. Drawer 917, Eatontown, NJ 07724 201-542-5151
§ Kessler-Ellis Prods., 120 1st Ave., Atlantic Highlands, NJ 07716 ...... 201-291-0500; 800-631-2165
§ Landis & Gyr, Inc., 4 Westchester Plaza, Elmsford, NY 10523 914-592-4400
§ Non-Linear Systems/Div. of Kaypro Corp., 533 Stevens Ave., Solana Bch., CA 92075 619-481-3900
§ Redington Counters, 130 Addison Rd., Windsor, CT 06095 203-688-6205
§ Veeder-Root, 70 Sargeant St., Hartford, CT 06102 203-527-7201

Counters, Decade-2200

§ C-Tek Inc., 4 Railroad Ave., Wakefield, MA 01880, 617-246-1720 ...... D•1114
Dio-Rey, Div. of Info-Lite, 422 Cliff St., Fairview, NJ 07022, 201-941-4455 ...... B•1045
† Abrams Instr. Corp., P.O. Box 26007, Lansing, MI 48909 517-332-6405
† Bowmar Instrument Corp., Aerospace Div., 8000 Bluffton Rd., Ft. Wayne, IN 46809 219-747-3121
Canberra Ind., One State St., Meriden, CT 06450 203-238-2351
CDS - Colorado Data Sys., 3301 W. Hampden, Unit C, Englewood, CO 80110 303-762-1640
Centent Co., 3879 S. Main St., Santa Ana, CA 92707 714-979-6491
§ Crouzet Controls, Inc., 1083 State Pkwy., Schaumburg, IL 60195 312-843-2200
§ ESE, 142 Sierra St., El Segundo, CA 90245 213-322-2136
§† Fairchild Camera & Instr. Corp., Digital Div., 333 Western Avenue, So. Portland, ME 04106 207-775-8700
Landis & Gyr, Inc., 4 Westchester Plaza, Elmsford, NY 10523 914-592-4400
§ NES, Inc. (Nationwide Electronic Systems), 3003 Wakefield, Carpentersville, IL 60110 312-426-5900
§ Newport Electronics, 630 E. Young St., Santa Ana, CA 92705 714-540-4914
§† Nitron, 10420 Bubb Rd., Cupertino, CA 95014 408-255-7550
† Racal-Dana Instrs. Inc., 4 Goodyear St., Irvine, CA 92715 714-859-8999
Struthers-Dunn, Inc., Lamb's Rd., Pitman, NJ 08071 609-589-7500
Veeder-Root, 70 Sargeant St., Hartford, CT 06102 203-527-7201

Counters, Directional-2200

Automatic Timing & Controls Co., 201 So. Gulph Rd., King of Prussia, PA 19406, 215-337-5500;800-441-8245 ...... D•1112
§ C-Tek Inc., 4 Railroad Ave., Wakefield, MA 01880, 617-246-1720 ...... D•1114
Dio-Rey, Div. of Info-Lite, 422 Cliff St., Fairview, NJ 07022, 201-941-4455 ...... B•1045
§ NES, Inc. (Nationwide Electronic Systems), 3003 Wakefield, Carpentersville, IL 60110, 312-426-5900 ...... D•1069,1127,1159,1366
North American Soar Corp., 11126 Cornell Ave., Cherry Hill, NJ 08002, 609-488-1060 ...... D•1279
Anadex, 1001 Flynn Rd., Camarillo, CA 93010 805-987-9660
§ B & B Motor & Control Corp., Apple Hill Commons, Burlington, CT 06013 203-673-7151
§ Berg, W. M., Inc., 499 Ocean Ave., East Rockaway, NY 11518 516-599-5010
† Bowmar Instrument Corp., Aerospace Div., 8000 Bluffton Rd., Ft. Wayne, IN 46809 219-747-3121

§ Crouzet Controls, Inc., 1083 State Pkwy., Schaumburg, IL 60195 312-843-2200
DCI Inc., 14812 W. 117th Street, P.O. Box 215, Olathe, KS 66061 913-782-5672
Durgin & Browne, 80 Allen Rd., So. Burlington, VT 05401 802-863-6873
Dynage/Controls, Inc., 2 Willowbrook Rd., Cromwell, CT 06416 203-635-6257
§ Dynapar, 1675 Delany Rd., Gurnee, IL 60031 312-662-2666
§ Eaton Corp, Durant Products, 901 S. 12th St., Watertown, WI 53094 414-261-4070
§ ESE, 142 Sierra St., El Segundo, CA 90245 213-322-2136
H-A-Z Laboratories, Brass Castle Rd., P.O. Box 67-M, Washington, NJ 07882 201-689-0110
§ Hecon Corp., 31 Park Rd., Tinton Falls, NJ 07724 201-542-9200
HEI, Inc., 1495 Steiger Lake La., Victoria, MN 55386 612-443-2500
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
§ IVO Inds., Inc., 201 Industrial Way W., P.O. Drawer 917, Eatontown, NJ 07724 201-542-5151
§ Kessler-Ellis Prods., 120 1st Ave., Atlantic Highlands, NJ 07716 .... 201-291-0500; 800-631-2165
§ Landis & Gyr, Inc., 4 Westchester Plaza, Elmsford, NY 10523 914-592-4400
§ Master Elctrn. Controls, P.O. Box 25905, Los Angeles, CA 90025 213-452-1336
§ Non-Linear Systems/Div. of Kaypro Corp., 533 Stevens Ave., Solana Bch., CA 92075 619-481-3900
† Racal-Dana Instrs. Inc., 4 Goodyear St., Irvine, CA 92715 714-859-8999
Sensor Corp., Box 140, Scottdale, PA 15683 412-887-4080
§† Veeder-Root, 70 Sargeant St., Hartford, CT 06102 203-527-7201

Counters, Electromagnetic-2200

† Abrams Instr. Corp., P.O. Box 26007, Lansing, MI 48909 517-332-6405
† Aeroflex Labs., Magnetic Prods. Div.,, 35 South Service Road, Plainview, NY 11803 516-694-6700
Airpax Corp., Cheshire Div., Cheshire Indl. Pk., Box E, Cheshire, CT 06410 203-272-0301
Automatic Timing & Controls Co., 201 So. Gulph Rd., King of Prussia, PA 19406 .... 215-337-5500;800-441-8245
† Bowmar Instrument Corp., Aerospace Div., 8000 Bluffton Rd., Ft. Wayne, IN 46809 219-747-3121
§ Eaton Corp, Durant Products, 901 S. 12th St., Watertown, WI 53094 414-261-4070
Electric Tachometer, 68th & Upland Sts., Philadelphia, PA 19142 .... 215-SA6-7723
H-A-Z Laboratories, Brass Castle Rd., P.O. Box 67-M, Washington, NJ 07882 201-689-0110
§ Hecon Corp., 31 Park Rd., Tinton Falls, NJ 07724 201-542-9200
§ IVO Inds., Inc., 201 Industrial Way W., P.O. Drawer 917, Eatontown, NJ 07724 201-542-5151
§ Kessler-Ellis Prods., 120 1st Ave., Atlantic Highlands, NJ 07716 .... 201-291-0500; 800-631-2165
H. Kuhnke, Inc., 26 W. Highland Ave., Atlantic Highlands, NJ 07716 .... 201-291-3334; 800-221-0714
§ Landis & Gyr, Inc., 4 Westchester Plaza, Elmsford, NY 10523 914-592-4400
§ Master Elctrn. Controls, P.O. Box 25905, Los Angeles, CA 90025 213-452-1336
§ Redington Counters, 130 Addison Rd., Windsor, CT 06095 203-688-6205
§ Relay Specialties, 1300 Plaza Rd., Fair Lawn, NJ 07410 .. 201-797-3313;800-526-5376
§ Shokai Far East, Ltd., 280 North Central Ave., Hartsdale, NY 10530 914-681-0700
§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 215-673-5600
Transducer Systems, Inc., 1510 Delp Dr., Kulpsville, PA 19443 215-256-4611
§† Veeder-Root, 70 Sargeant St., Hartford, CT 06102 203-527-7201
† Whittaker Corp., 10880 Wilshire Blvd., Los Angeles, CA 90024 213-475-9411

Counters, Event-2200

† Airpax Corp., Cheshire Div., Cheshire Indl. Pk., Box E, Cheshire, CT 06410, 203-272-0301 .... D•1110
Automatic Timing & Controls Co., 201 So. Gulph Rd., King of Prussia, PA 19406, 215-337-5500;800-441-8245 .... D•1112
B & K Precision, Industrial Electronics Product Group, Dynascan Corporation, 6460 W. Cortland, Chicago, IL 60635, 312-889-9087 .... D•1188
§ C-Tek Inc., 4 Railroad Ave., Wakefield, MA 01880, 617-246-1720 .... D•1114
DCI Inc., 14812 W. 117th Street, P.O. Box 215, Olathe, KS 66061, 913-782-5672 .... D•1347
Dio-Rey, Div. of Info-Lite, 422 Cliff St., Fairview, NJ 07022, 201-941-4455 .... B•1044-1045
† Electrodynamics, Inc., A Talley Inds. Co., 1200 Hicks Rd., Rolling Meadows, IL 60008, 312-259-0740 .... D•1119
§ Gralex Inds., 295 Community Dr., Great Neck, NY 11021, 516-487-7289;800-645-6535 .... D•1354-1356
IET Labs, Inc., 534 Main St., Westbury, NY 11590, 516-334-5959 .... D•1242
§ Kessler-Ellis Prods., 120 1st Ave., Atlantic Highlands, NJ 07716, 201-291-0500;800-631-2165 .... D•1124
§ NES, Inc. (Nationwide Electronic Systems), 3003 Wakefield, Carpentersville, IL 60110, 312-426-5900 .... D•1069,1127,1159
§ North American Soar Corp., 11126 Cornell Ave., Cherry Hill, NJ 08002, 609-488-1060 .... D•1279
Texmate, Inc., 348 S. Cedros Ave., P.O. Box 2000, Solana Beach, CA 92075, 619-481-7177 .... D•1379
Velonex, 560 Robert Ave., Santa Clara, CA 95050, 408-727-7370 ... D•1324,1383
† Abrams Instr. Corp., P.O. Box 26007, Lansing, MI 48909 517-332-6405
§† Advanced Micro Devices, P.O. Box 3453, 901 Thompson Pl., Sunnyvale, CA 94088 408-732-2400
Airpax Corp., Ft. Lauderdale Div., 6801 W. Sunrise Blvd., Ft. Lauderdale, FL 33313 305-587-1100
† Atec, Inc., Box 19426, 8219 Kempwood Dr., Houston, TX 77055 713-468-7971
§ B & B Motor & Control Corp., Apple Hill Commons, Burlington, CT 06013 203-673-7151
† Bowmar Instrument Corp., Aerospace Div., 8000 Bluffton Rd., Ft. Wayne, IN 46809 219-747-3121
Canberra Ind., One State St., Meriden, CT 06450 203-238-2351
CDS - Colorado Data Sys., 3301 W. Hampden, Unit C, Englewood, CO 80110 303-762-1640
§ Chrono-log Corp., 2 W. Park Rd., Havertown, PA 19083 215-853-1130
Colorado Data Systems, Inc., 3301 W. Hampden Ave., Unit C, Englewood, CO 80110 303-762-1640
Continental Resources, Inc., 175 Middlesex Tpke., Bedford, MA 01730 .. 617-275-0850
Crouzet Controls, Inc., 1083 State Pkwy., Schaumburg, IL 60195 312-843-2200
§ Data Precision Corp., Electronics Ave., Danvers, MA 01923 617-246-1600
Datum Inc., Timing/Aacom Divisions, 1363 S. State College Blvd., Anaheim, CA 92806 714-533-6333
Digitec Corp., 918 Woodley Rd., P.O. Box 458, Dayton, OH 45401 513-254-6251
Durgin & Browne, 80 Allen Rd., So. Burlington, VT 05401 802-863-6873
§ Dynamics, Div. of Waugh Controls Corp., 9001 Fullbright Ave., Chatsworth, CA 91311 818-998-8281
§ Dynapar, 1675 Delany Rd., Gurnee, IL 60031 312-662-2666
§ Eaton Corp, Durant Products, 901 S. 12th St., Watertown, WI 53094 414-261-4070
§ Eaton Corp./Cutler-Hammer Prods, Aerospace & Commercial Controls Div., 4201 N. 27th St., Milwaukee, WI 53216 414-449-7487
Eitel Mfg., 2835 Laguna Canyon Rd., Laguna Beach, CA 92652 714-494-2012
Electric Device, PO Box 337, Canfield, OH 44406 216-533-3060
Electronic Prods. Corp., Interstate Indl. Plaza, R. D. #5, York, PA 17402 717-767-6517
Electronic Wattmeter Co., 2275 Sixth St., Sarasota, FL 33577 813-953-5355
§ Electro-Numerics, 1811 Reynolds, Irvine, CA 92714 714-250-1501
ESSCO Inds., P.O. Box 515, Sierra Madre, CA 91024-0515 818-355-8315
§ Fluke, John, Mfg. Co., Box C9090, MS 250C, Everett, WA 98206 206-356-5400
FSI/Fork Standards Inc., 666 Western Ave., Lombard, IL 60148 .... 312-231-3511; 312-932-9380
H-A-Z Laboratories, Brass Castle Rd., P.O. Box 67-M, Washington, NJ 07882 201-689-0110
§ Hecon Corp., 31 Park Rd., Tinton Falls, NJ 07724 201-542-9200
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
Hickok Elec. Instr., 10514 DuPont Ave., Cleveland, OH 44108 216-541-8060
Interswitch, 770 Airport Blvd., Burlingame, CA 94010 415-347-8217
§ IVO Inds., Inc., 201 Industrial Way W., P.O. Drawer 917, Eatontown, NJ 07724 201-542-5151
Kinetic Sys., 11 Maryknoll Dr., Lockport, IL 60441 815-838-0005
§ Landis & Gyr, Inc., 4 Westchester Plaza, Elmsford, NY 10523 914-592-4400
§ Leader Instrs. Corp., 380 Oser Ave., Hauppauge, NY 11788-3694 516-231-6900
§ Newport Electronics, 630 E. Young St., Santa Ana, CA 92705 714-540-4914
§ Non-Linear Systems/Div. of Kaypro Corp., 533 Stevens Ave., Solana Bch., CA 92075 619-481-3900
§ Nu-Metrics, 947 Longdale Ave., Longwood, FL 32750 305-331-7717
§ Pacer Industries, Inc., 1450 First Ave., Chippewa Falls, WI 54729 715-723-1141
PPM, Inc., 4521 Emery Ind. Pkwy., Cleveland, OH 44128 216-292-6006
† Racal-Dana Instrs. Inc., 4 Goodyear St., Irvine, CA 92715 714-859-8999
§ Redington Counters, 130 Addison Rd., Windsor, CT 06095 203-688-6205
§ Richard-Lee Co., Box 724, New Providence, NJ 07974 201-276-0710
Scanning Devices, 108 Elm St., Waltham, MA 02154 617-891-8991
Sensor Corp., Box 140, Scottdale, PA 15683 412-887-4080
§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 215-673-5600
§ Tucker Elctrns., Box 461966, Garland, TX 75046 .... 214-348-8800;800-527-4642
§† Veeder-Root, 70 Sargeant St., Hartford, CT 06102 203-527-7201
† Velonex, 560 Robert Ave., Santa Clara, CA 95050 408-727-7370
Whedco, Inc., 6107 Jackson Rd., Ann Arbor, MI 48103 313-665-5473

Counters, Frequency-2900

§† Ballantine Labs., 90 Fanny Rd., Boonton, NJ 07005, 201-335-0900 ...... D•1185
§ B & K Precision, Industrial Electronics Product Group, Dynascan Corporation, 6460 W. Cortland, Chicago, IL 60635, 312-889-9087 .... D•1188
IET Labs, Inc., 534 Main St., Westbury, NY 11590, 516-334-5959 .... D•1242
MARCONI INSTRUMENTS, 3 Pearl Court, Allendale, NJ 07401, 201-934-9050 .... D•1263
§ North American Soar Corp., 11126 Cornell Ave., Cherry Hill, NJ 08002, 609-488-1060 .... D•1279
Anadex, 1001 Flynn Rd., Camarillo, CA 93010 805-987-9660
§ Applied Communications, Amstar Tech. Prods. Co., 5490 Spectrum Drive, Frederick, MD 21701 301-694-5300
§ Applied Communications, 9125 Gaither Rd., Gaithersburg, MD 20877 ... 301-948-5210
† Applied Electro Technlg., Int., STI Company, 2220 So. Anne St., Santa Ana, CA 92704 714-556-6570
§ AQ Sys., 1736 Front St., Yorktown Hgts., NY 10598 800-431-2104
† Atec, Inc., Box 19426, 8219 Kempwood Dr., Houston, TX 77055 713-468-7971
† Bowmar Instrument Corp., Aerospace Div., 8000 Bluffton Rd., Ft. Wayne, IN 46809 219-747-3121
Canberra Ind., One State St., Meriden, CT 06450 203-238-2351
CDS - Colorado Data Sys., 3301 W. Hampden, Unit C, Englewood, CO 80110 303-762-1640
Coaxial Dynamics, 15210 Industrial Parkway, Cleveland, OH 44135 216-267-2233
Continental Resources, Inc., 175 Middlesex Tpke., Bedford, MA 01730 .. 617-275-0850
§ C-Tek Inc., 4 Railroad Ave., Wakefield, MA 01880 617-246-1720
§† Data Precision Corp., Electronics Ave., Danvers, MA 01923 617-246-1600
DCI Inc., 14812 W. 117th Street, P.O. Box 215, Olathe, KS 66061 913-782-5672
§ DigiMax Instrs. Corp., 5625 Kearny Villa Rd., San Diego, CA 92123 619-569-6582
§ Digitec Corp., 918 Woodley Rd., P.O. Box 458, Dayton, OH 45401 513-254-6251
§ Dynapar, 1675 Delany Rd., Gurnee, IL 60031 312-662-2666
EH Electronics, Inc., Sub. EH Intl., Inc., 48507 Milmont Drive, Fremont, CA 94538 415-651-2340
† EIP Microwave, Inc., 2731 North First St., San Jose, CA 95134 408-946-5700
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§ Global Specialties, Interplex Electronics, Inc., 70 Fulton Terrace, P.O. Box 1942, New Haven, CT 06509 203-624-3103

§ Hameg, Inc., 88-90 Harbor Rd., Port Washington, NY 11050 516-883-3837
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§ Optoelectronics, Inc., 5821 N.E. 14th Ave., Ft. Lauderdale, FL 33334 305-771-2050
§ Paccom, 3928 148th NE, Redmond, WA 98052 .... 206-883-9200;800-426-6254
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§ Simpson Elec. Co., 853 Dundee Ave., Elgin, IL 60120 312-697-2260
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§† Systron-Donner Instr. Div., 2727 Systron Dr., Concord, CA 94518 415-676-5000
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§ Telco Products Co., 44 Sea Cliff, Glen Cove, NY 11542 516-759-0300
Tettex Instruments, Inc., P.O. Box 281, Fairview Village, PA 19409-0281 215-539-6050
Texmate, Inc., 348 S. Cedros Ave., P.O. Box 2000, Solana Beach, CA 92075 619-481-7177
§ TRW, Dynalco Controls Div., 5200 NW 37th, P.O. Box 8187, Ft. Lauderdale, FL 33310 305-739-4300
§ Tucker Elctrns., Box 461966, Garland, TX 75046 .... 214-348-8800;800-527-4642
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§ VIZ Test Equipment, Div. VIZ Mfg., 335 E. Price St., Philadelphia, PA 19144 215-844-2626
§ Vu-Data, 7122 Convoy Ct., San Diego, CA 92111 619-279-6572
† Watkins-Johnson Co., 3333 Hillview Ave., Palo Alto, CA 94304 415-493-4141
† Wilson Electronics, PO Box 19000, Las Vegas, NV 89119 702-739-1931

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Counters, Predetermining – See Counters, Preset (Vol. D)

Counters, Preset-2200

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Counters, Proportional – See Counters, Particle (Vol. D)

Counters, Pulse-2200

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Counters, Reversible – See Counters, Bidirectional (Vol. D)

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H-A-Z Laboratories, Brass Castle Rd., P.O. Box 67-M, Washington, NJ 07882 201-689-0110
§ Hecon Corp., 31 Park Rd., Tinton Falls, NJ 07724 201-542-9200
HEI, Inc., 1495 Steiger Lake La., Victoria, MN 55386 612-443-2500
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
§ IVO Inds., Inc., 201 Industrial Way W., P.O. Drawer 917, Eatontown, NJ 07724 201-542-5151
Jan Hardware Mfg. Co., 47-27 36th St., Long Island City, NY 11101 212-361-0800
§ Kessler-Ellis Prods., 120 1st Ave., Atlantic Highlands, NJ 07716 .... 201-291-0500; 800-631-2165
Landis & Gyr, Inc., 4 Westchester Plaza, Elmsford, NY 10523 914-592-4400
§ NES, Inc. (Nationwide Electronic Systems), 3003 Wakefield, Carpentersville, IL 60110 312-426-5900
§ Non-Linear Systems/Div. of Kaypro Corp., 533 Stevens Ave., Solana Bch., CA 92075 619-481-3900
§ North American Soar Corp., 11126 Cornell Ave., Cherry Hill, NJ 08002 .. 609-488-1060
§ Ragen Data Systems, Inc., 3 Oval Dr., Central Islip, NY 11722 516-234-3800
§ Redington Counters, 130 Addison Rd., Windsor, CT 06095 203-688-6205
§ Scientific Technlg., 1201 San Antonio Rd., Mountain View, CA 94043 .... CA 415-965-0910;800-221-7060
Sensor Corp., Box 140, Scottdale, PA 15683 412-887-4080
† Shokai Far East, Ltd., 280 North Central Ave., Hartsdale, NY 10530 914-681-0700
Tri-Tronics Co. Inc., 13420 Wright Cir., Tampa, FL 33624 813-855-4453
§ TRW, Dynalco Controls Div., 5200 NW 37th, P.O. Box 8187, Ft. Lauderdale, FL 33310 305-739-4300
§† Veeder-Root, 70 Sargeant St., Hartford, CT 06102 203-527-7201

Counters, Universal-2900

Automatic Timing & Controls Co., 201 So. Gulph Rd., King of Prussia, PA 19406, 215-337-5500;800-441-8245 .... D•1112
North American Soar Corp., 11126 Cornell Ave., Cherry Hill, NJ 08002, 609-488-1060 .... D•1279
§ Triplett Corp.-A Penril Co., One Triplett Dr., Bluffton, OH 45817-9987, 419-358-5015 .... D•1321
† Ballantine Labs., 90 Fanny Rd., Boonton, NJ 07005 201-335-0900
Colorado Data Systems, Inc., 3301 W. Hampden Ave., Unit C, Englewood, CO 80110 303-762-1640
§ C-Tek Inc., 4 Railroad Ave., Wakefield, MA 01880 617-246-1720
Dio-Rey, Div. of Info-Lite, 422 Cliff St., Fairview, NJ 07022 201-941-4455
Eldorado Instrs., 7303 Edgewater Dr., Oakland, CA 94621 415-638-5656
Fluke, John, Mfg. Co., Box C9090, MS 250C, Everett, WA 98206 206-356-5400
H-A-Z Laboratories, Brass Castle Rd., P.O. Box 67-M, Washington, NJ 07882 201-689-0110
§† Intersil, 10710 N. Tantau Ave., Cupertino, CA 95014 408-996-5000
§ Non-Linear Systems/Div. of Kaypro Corp., 533 Stevens Ave., Solana Bch., CA 92075 619-481-3900
Philips Test & Measuring Instrs., 85 McKee Dr., Mahwah, NJ 07430 201-529-3800
† Racal-Dana Instrs. Inc., 4 Goodyear St., Irvine, CA 92715 714-859-8999
§ Richard-Lee Co., Box 724, New Providence, NJ 07974 201-276-0710
§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 215-673-5600
† Takeda Riken Co., Ltd., NS Bldg. 14th,4-1,Nishi-Shinjuku 2-Chome,Shinjuku-ku, Tokyo 160, Tokyo 176, JAPAN 03-342-7500
§ Veeder-Root, 70 Sargeant St., Hartford, CT 06102 203-527-7201
Vistar Corp., 13740 McCormick Dr., Tampa, FL 33625 813-855-6611

Couplers, Acoustic-1900

§† Datec, Inc., 200 Eastowne Dr., Ste. 116, Chapel Hill, NC 27514, 919-929-2135 .... D•1049
Bruel & Kjaer Instrs. Inc., 185 Forest St., Marlboro, MA 01752 617-481-7000
§ CTS Fabri-Tek, Inc., CTS Corporation, 6900 Shady Oak Rd., Eden Prairie, MN 55344 612-941-9100
Digital Equip., One Iron Way, Marlborough, MA 01752
§ Lexicon Corp. of Miami, 1541 N. W. 65th Ave., Ft. Lauderdale, FL 33313 305-792-4400
§ Multi-Tech Systems, Inc., 82 Second Ave. S.E., New Brighton, MN 55112 612-631-3550
§ Shure Bros., 222 Hartrey Ave., Evanston, IL 60204 312-866-2200
Soundcoat Co., Inc., 1 Burt Dr., Deer Park, NY 11729 516-242-2200
† Western DataCom, 5083 Market St., Youngstown, OH 44512 216-788-6583

Couplers, Antenna-1900

† Daico Inds., Inc., Box 5225, Compton, CA 90224, 213-631-1143 .... A•1708-1709
† Aiken Advanced Sys., Amstar Technical Products Company, Inc., 5901 Edsall Rd., Alexandria, VA 22304-4197 703-370-0900
† Airtron, Litton Industries, Inc., 200 E. Hanover Ave., Morris Plains, NJ 07950 201-539-5500
§ Amphenol, An Allied Co., 43 Commerce Ct., Lisle, IL 60532 312-983-3500
§† Anaren Microwave, P.O. Box 178, 6635 Kirkville Rd., E. Syracuse, NY 13057 315-432-8909
Antennacraft, Box 1005, Burlington, IA 52601 319-754-7575
† Applied Research, Inc., 160 Dupont St., Plainview, NY 11803 516-349-9200
† Argent Elctrns., 3245 S. County Rd., 25A, Troy, OH 45373 513-335-0031
† Arra Inc., 15 Harold Ct., Bay Shore, NY 11706 516-231-8400
§ Brelonix, 106 No. 36th St., Seattle, WA 98103 206-633-1964
C-COR Elctrns., 60 Decibel Rd., State College, PA 16801 814-238-2461
† Cincinnati Elctrns., 2630 Glendale Milford Rd., Cincinnati, OH 45241 513-733-6100
Coaxial Dynamics, 15210 Industrial Parkway, Cleveland, OH 44135 216-267-2233
Continental Electronics Mfg. Co., P.O. Box 270879, Dallas, TX 75227 214-381-7161
† Dielectric Communications, General Signal, Tower Hill Rd., Raymond, ME 04071 .... 207-655-4555;800-341-9678
§ Drake, R. L., Co., 540 Richard St., Miamisburg, OH 45342 513-866-2421
† Electro Impulse, Box 870, Red Bank, NJ 07701-0870 201-741-0404
Electrospace Sys., Inc., P. O. Box 831359, Richardson, TX 75083-1359 214-783-2004
Gabriel Elctrns., Box 70, Scarborough Indl. Pk., Scarborough, ME 04074 207-883-5161
§ GC Elctrns., 400 S. Wyman St., Rockford, IL 61101 815-968-9661
§ Heath Co., Benton Harbor, MI 49022 616-982-3886
§ Lance Inds., P.O. Box 4156, Sylmar, CA 91342-0156 818-367-1811
Maury Microwave, 8610 Helms Ave., Cucamonga, CA 91730 714-987-4715
† Merrimac Inds., 41 Fairfield Pl., West Caldwell, NJ 07006 201-575-1300
† Microlab/FXR, 10 Microlab Rd., Livingston, NJ 07039 201-992-7700
Microphase, 587 Connecticut Ave., Norwalk, CT 06856 203-866-8000
Microwave Development Labs., 10 Michigan Dr., Natick, MA 01760 617-655-0060
† Mitec Elctrns., 15 Commerce St., Williston, VT 05495 802-864-0064
† Narda Microwave Corp., 435 Moreland Rd., Hauppauge, NY 11788 516-231-1700
North Hills Elctrns., 1 Alexander Pl., Glen Cove, NY 11542 516-671-5700
Resdel Engrg., 300 E. Live Oak Ave., Arcadia, CA 91006 213-684-2600
§ RMS Electronics Inc., 50 Antin Pl., Bronx, NY 10462 212-892-6700
† Rodale Elctrns. Corp., 603 Chestnut St., Garden City, NY 11530 516-222-0050
§ Rye Inds., Inc., 125 Spencer Pl., P.O. Box M, Mamaroneck, NY 10543 ... 914-698-0080
§ Shokai Far East, Ltd., 280 North Central Ave., Hartsdale, NY 10530 914-681-0700
† Sinclair Radio Labs., 122 Rayette Rd., Concord, ONT, CANADA L9W2Y8 416-669-1244
§ Ten-Tec, Inc., Industrial Park, Sevierville, TN 37862 615-453-7172
† Transco Products, Inc., 4241 Glencoe Ave., Marina del Rey, CA 90295 .. 213-822-0800
§ Vidaire Electronics Mfg. Corp., P. O. Box 788, Freeport, NY 11520 516-623-6696
§ Waveline, Box 718, W. Caldwell, NJ 07006 201-226-9100
§† Workman Elctrn. Prods., Box 3828, Sarasota, FL 33578 813-371-4242

Couplers, Communications, Acoustic, Telephone-1900

§ Armiger & Assocs., Inc., Daniel Woodhead, Inc., 2525 Ridgmar Blvd., Fort Worth, TX 76116 817-737-2900
Electrospace Sys., Inc., P. O. Box 831359, Richardson, TX 75083-1359 214-783-2004
§ Glasgal Communications, Inc., 207 Washington St., Northvale, NJ 07647 201-768-8082
† Western DataCom, 5083 Market St., Youngstown, OH 44512 216-788-6583

Couplers, Directional-3450 – *See Vol. A*

Couplers, Fiber Optic-2475 – *See Vol. B*

Couplers, Microwave-3450 – *See Vol. A*

Couplers, Multiset – See Couplers, Antenna (Vol. D)

Couplers, Optoelectronic – See Isolators, Optoelectronic (Vol. B)

Couplers, Rotary-3450 – *See Vol. A*

Couplers (MIL), Directional-2440 – *See Vol. B*

Couplings, Quick-disconnect, Liquid or Gas-2500 – *See Vol. C*

Couplings, Shaft, Rigid & Flexible-2400 – *See Vol. C*

Covers, Protective (Incl. Dustcovers)-3800 – *See Vol. C*

Crimping Services – See Services, Crimping (Vol. D)

Crossbars – See Scanners, Crossbar (Vol. D)

Crystal Blanks-2300 – *See Vol. A*

Crystals, Frequency Control-2300 – *See Vol. A*

Crystals, Microprocessor-2300 – *See Vol. A*

Crystals, Piezoelectric-2300 – *See Vol. A*

Crystals, Quartz-2300 – *See Vol. A*

Crystals, Quartz, for Watches-2300 – *See Vol. A*

Crystals, Semiconductor(Ingots & Wafers)-2300 – *See Vol. A*

Crystals, YIG-2300 – *See Vol. A*

Crystals (MIL)-2440 – *See Vol. B*

Cups, Encapsulation-1600 – *See Vol. C*

Current Limiters (MIL)-2440 – *See Vol. B*

Current Sensors-Also See Transducers, Volt, etc.-2200

Active Control Instrmn., P.O. Box 243-Wildwood Circle, Key Largo, FL 33037, 305-451-1000 .... D•1109
† American Aerospace Controls, 570 Smith St., Farmingdale, NY 11735, 516-694-5100 .... B•1780-1781
§† Bell, F. W., Inc., 6120 Hanging Moss Rd., Orlando, FL 32807, 305-678-6900 .... D•1113
Flex-Core Div., Morlan & Assocs., Inc., 6625 McVey Blvd., Worthington, OH 43085, 614-889-6152 .... A•2149
Ion Physics Co., 323 Andover St., Wilmington, MA 01887, 617-658-6030 .... D•1123
§ Micro Switch, A Honeywell Div., 11 W. Spring St., Freeport, IL 61032, 815-235-6600 .... B•1476,1668,1804
Ohio Semitronics, Inc., 1205 Chesapeake Ave., Columbus, OH 43212, 614-486-9561 .... B•1806-1807,1813-1815
Triac Electronic Systems, Inc., 87-27 Myrtle Ave., Glendale, NY 11385, 718-441-4759 .... D•1132
Vishay Resistive Sys. Grp., 63 Lincoln Hwy., Malvern, PA 19355, 215-644-1300 .... A•1977
§ API Instrs., 1601 Trapelo Rd., Waltham, MA 02254 617-890-2000
† Applied Electro Technlg., Int., STI Company, 2220 So. Anne St., Santa Ana, CA 92704 714-556-6570
Centent Co., 3879 S. Main St., Santa Ana, CA 92707 714-979-6491
Crompton Instrs., Hawker Siddley, 2763 Old Higgins Rd., Elk Grove Village, IL 60007 312-593-1107
Cross Elctrns., 100 Commonwealth Dr., Warrendale, PA 15086 412-776-1591
§ Diversified Elctrns., Inc., Indl. Controls Div., 119 N. Morton Ave., Evansville, IN 47711 812-426-2806
Douglas Randall, 6 Pawcatuck Ave., Pawcatuck, CT 06379 203-599-2075
Electric Device, PO Box 337, Canfield, OH 44406 216-533-3060
§ Electromatic Controls Corp., 2495 Pembroke Road, Hoffman Estates, IL 60195-2010 312-882-5757
Electro Natl., Matthews Ave., Canton, MS 39046 601-859-5511
§† General Magnetics, 211 Grove St., Bloomfield, NJ 07003 201-743-2700
† Genisco Technlg. Corp., Filters Div., 18435 Susana Rd., Rancho Dominguez, CA 90221 213-537-4750
† Gulton Industries, Inc., Engineered Magnetics Division, 13041 Cerise Ave., Hawthorne, CA 90250 213-679-0111
Halmar Electronics, Inc., 900 N. Hague Ave., Columbus, OH 43204 614-275-0131
§ Industrial Devices, Inc., 7 Hudson St., Edgewater, NJ 07020 201-224-4700
§ Instrumentation & Control Sys., 520 Interstate Rd, Addison, IL 60101 312-543-6200
Leeds & Northrup Instrs., A Unit of General Signal Corp., Sumneytown Pike, North Wales, PA 19454 215-643-2000

Mag-Con, 1626 Terrace Dr., St. Paul, MN 55113 612-633-8820
§ Midwest Comps., 1981 Port City Blvd., Muskegon, MI 49443 616-777-2602
§ NES, Inc. (Nationwide Electronic Systems), 3003 Wakefield, Carpentersville, IL 60110 312-426-5900
Omega Engrg., Box 4047, Stamford, CT 06907 203-359-1660
§ Potter & Brumfield, AMF Incorporated, 200 S. Richland Creek Dr., Princeton, IN 47671-0001 812-386-1000
§ Scientific Technlg., 1201 San Antonio Rd., Mountain View, CA 94043 .... CA 415-965-0910;800-221-7060
Sensor Corp., Box 140, Scottdale, PA 15683 412-887-4080
Sigma Electronics Inc., 10830 Kinghurst Dr., Houston, TX 77099 713-933-4700
Specialized Elctrn. Magnetic Prods., Inc., 272 Loudon Ridge Rd. Route 8, Loudon, NH 03301 .... (603) 267-6892
Tektronix, Inc., P. O. Box 500, Y3-314, Beaverton, OR 97077 .... 800-547-1512; .... Oregon only 800-452-1877
Texas Instrs., Matls. & Controls Grp., 34 Forrest St., Attleboro, MA 02703 617-699-3800
Toroid Corp. of Maryland, 6000 Laurel-Bowie Rd., Bowie, MD 20715-4037 301-464-2100
† Torwico Elctrns. Inc., 410 Oberlin Ave. South, Lakewood, NJ 08701 201-364-1800
† Wilmar Elctrns., Inc., 2430 Amsler St., Torrance, CA 90505 213-326-6668

Current Sources-4000

§† **Ballantine Labs., 90 Fanny Rd., Boonton, NJ 07005, 201-335-0900 .... D•1185**
† **Calex Mfg. Co., Inc., 3355 Vincent Rd., Pleasant Hill, CA 94523, 415-932-3911 .... D•1006**
Clarke-Hess Comm. Resch. Corp., 17 West 17th St., New York, NY 10011, 212-255-2940 .... D•1200
† **Electronic Dev. Corp., 11 Hamlin St., Boston, MA 02127-4198, 617-268-9696 .... D•1214**
General Resistance, Inc., A Prime Technology Company, Twin Lakes Rd., P.O. Box 185, N. Branford, CT 06471, 203-481-5721 .... D•1233
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303, Call Local Sls. Off. .... D•1653,1656
IET Labs, Inc., 534 Main St., Westbury, NY 11590, 516-334-5959 .... D•1242
Julie Resch. Labs., 211 West 61st St., New York, NY 10023, 212-245-2727 .... D•1254,1256
North Hills Elctrns., 1 Alexander Pl., Glen Cove, NY 11542, 516-671-5700 .... D•1734
Advanced Kinetics, 1231 Victoria St., Costa Mesa, CA 92627 714-646-7165
Analog Systems, P.O. Box 35879, Tucson, AZ 85740-5879 602-293-4923
† California Instruments, A Div. of Amstar Tech. Prods. Co., Inc., 5150-Convoy St., San Diego, CA 92111 .... 619-279-8620;800-356-2244;800-821-1634
Capintec Instrs., 6 Arrow Rd., Ramsey, NJ 07446 201-825-9500
Christie Elec. Corp., 20665 Manhattan Pl., Torrance, CA 90501 213-320-0808
§ Digitec Corp., 918 Woodley Rd., P.O. Box 458, Dayton, OH 45401 513-254-6251
Fluke, John, Mfg. Co., Box C9090, MS 250C, Everett, WA 98206 206-356-5400
Freed Transformer, 1718 Weirfield St., Ridgewood, NY 11385 212-386-1300
† Gulton Industries, Inc., Engineered Magnetics Division, 13041 Cerise Ave., Hawthorne, CA 90250 213-679-0111
§ Integra, Inc., 2368 Walsh Ave., Santa Clara, CA 95051 408-727-9601
Keithley Instrs., 28775 Aurora Rd., Cleveland, OH 44139 216-248-0400
§ Kepco, Inc., 131-38 Sanford Ave., Flushing, NY 11352 718-461-7000
§† Linear Technology Corp., 1630 McCarthy Blvd., Milpitas, CA 95035 408-942-0810
Omega Engrg., Box 4047, Stamford, CT 06907 203-359-1660
Power Designs, Inc., 1700 Shames Dr., Westbury, NY 11590 516-333-6200
Pulse Instrs. Co., 1234 Francisco, Torrance, CA 90502 213-515-5330
RFL Inds., A Dowty Grp. Co./Instr. Div., Powerville Rd., Boonton, NJ 07005 201-334-3100
§† Solarex Corp., 1335 Piccard Dr., Rockville, MD 20850 301-948-0202
† TransKinetic Sys., 110 Shawmut Rd., Canton, MA 02021 617-828-3000
† Trio Labs., 80 Dupont St., Plainview, NY 11803 516-349-0400
Valhalla Scientific, 9955 Mesa Rim Rd., San Diego, CA 92126 619-457-5576
§ Voltex, 3460 Great Neck Rd., Amityville, NY 11701 516-842-2772
ZI-TECH Instr. Corp., 2151 Park Blvd., Box 60490, Palo Alto, CA 94306 415-326-2151

Custom Molding Services, Plastics — See Services, Custom Molding, Plastics (Vol. D)

Cutters, Diagonal — See Cutters, Manual (Vol. C)

Cutters, Wire, Automatic — See Machines, Wire Measuring & Cutting (Vol. D)

Cutters, Wire, Manual-5400 — *See Vol. C*

Dampers, Servo-4900

† **Vernitech, 300 Marcus Blvd., Deer Pk., NY 11729, 516-586-5100 .... D•1991**
Airpot, 27 Lois St., Norwalk, CT 06851 203-846-2021
† Control Technology Co., 41-16 29th St., Long Island City, NY 11101 718-361-2133
Honeywell Inc., Commercial Div., MN 27-7246, Honeywell Plaza, Minneapolis, MN 55408 612-870-5357
§ Industrial Computer Designs, Inc., 31264 La Baya Drive, Westlake Village, CA 91362 818-889-3179
† Industrial Control Co., 3100 Pineda Ave., Rockledge, FL 32955 305-259-7105
Singer Co., Kearfott Div., 1150 McBride Ave., Little Falls, NJ 07424 201-785-6000
Soundcoat Co., Inc., 1 Burt Dr., Deer Park, NY 11729 516-242-2200

Dampers, Structural, Chassis, Panel, etc. — See Mounts, Shock & Vibration (Vol. C)

Data Collection Equipment, Hand Held-2000

Applied Sys., 26401 Harper Ave., St. Clair Shores, MI 48081 313-779-8700
Bruel & Kjaer Instrs. Inc., 185 Forest St., Marlboro, MA 01752 617-481-7000
§ Caere Corp., 100 Cooper St., Los Gatos, CA 95030 408-395-7000
Control Module, 380 Enfield St., Enfield, CT 06082 203-745-2433
Dynamic Time Systems, Inc., 150 West 1230 North, Ste. 2, Provo, UT 84604 801-377-9154
HDS Inc., 12310 Pinecrest Rd., Reston, VA 22091 703-620-6200
§ Identatronics, Inc., 425 Lively Blvd., Elk Grove, IL 60007 .... 312-437-2654; 1-800-323-5403
Innovative Electronics, Inc., 4714 N.W. 165th St., Miami, FL 33014 305-624-1644
Interface Technology, 10500 Kahlmeyer Dr., St. Louis, MO 63132 314-426-6880
Lexicon Corp. of Miami, 1541 N. W. 65th Ave., Ft. Lauderdale, FL 33313 305-792-4400
Metrosonics, Inc., Box 23075, Rochester, NY 14692-3075 716-334-7300
Omega Engrg., Box 4047, Stamford, CT 06907 203-359-1660
§† Plessey Microsystems, Plessey Trading Corp., 1641 Kaiser Ave., Irvine, CA 92714 .... 714-540-9931/9932
PPM, Inc., 4521 Emery Ind. Pkwy., Cleveland, OH 44128 216-292-6006
Spectral Dynamics, Scientific-Atlanta, Inc., 4255 Ruffin Rd., San Diego, CA 92123-0575 619-268-7100
Skan-A-Matic, Box S, Elbridge, NY 13060 315-689-3961

Data Collection Equipment, Modular-2000

Memodyne, 220 Reservoir St., Needham Hgts., MA 02194, 617-444-7000 .... D•1068
Validyne Engrg. Corp., 8626 Wilbur Ave., Northridge, CA 91324, 818-886-2057 .... D•1164
† Acromag, 30765 Wixom Rd., Wixom, MI 48096 313-624-1541
§ Algo, Inc., 9198-C Red Branch Rd., Columbia, MD 21045 301-730-7442
Applied Micro Technlg., A Burr Brown Co., 3669 E. 44th Street, Tucson, AZ 85713 602-622-8605
Aydin Corp., 700 Dresher Rd., Horsham, PA 19044 215-657-7510
BMS Data Handling, Inc., 12155 Magnolia, Riverside, CA 92503 714-359-8824
Burr-Brown Corp., P.O. Box 11400, Tucson, AZ 85734 602-746-1111
† Climatronics, 140 Wilbur Pl., Bohemia, NY 11716 516-567-7300
Comark Corp., 93 W St., P. O. Box 474, Medfield, MA 02052 617-359-8161
Control Module, 380 Enfield St., Enfield, CT 06082 203-745-2433
Cyber Sys., Inc., 2031 E. Cerritos Ave., Anaheim, CA 92806 714-722-2051
Daytronic Corp., 2589 Corporate Pl., Miamisburg, OH 45342 513-866-3300
Dynage/Controls, Inc., 2 Willowbrook Rd., Cromwell, CT 06416 203-635-6257
Dynamic Time Systems, Inc., 150 West 1230 North, Ste. 2, Provo, UT 84604 801-377-9154
Elcom Industries, Inc., 10268 Bach Blvd., St. Louis, MO 63132 314-429-3100
§ Electronic Controls Design, 13626 S. Freeman Rd., Mulino, OR 97042 503-829-9108
Fast Feedback Technologies, 1505 Aviation Blvd., Redoudo Beach, CA 90278 213-379-6100
Halmar Electronics, Inc., 900 N. Hague Ave., Columbus, OH 43204 614-275-0131
§ InfoCap, Inc., 31119 Via Colinas # 502, Westlake Village, CA 91362 818-991-1410
Infolink Corp., 1925 Hoiste Rd., Northbrook, IL 60062 312-291-2900
Innovative Electronics, Inc., 4714 N.W. 165th St., Miami, FL 33014 305-624-1644
Measurements Group, Inc., Box 27777, Raleigh, NC 27611 919-365-3800
Metrosonics, Inc., Box 23075, Rochester, NY 14692-3075 716-334-7300
§ NES, Inc. (Nationwide Electronic Systems), 3003 Wakefield, Carpentersville, IL 60110 312-426-5900
Omega Engrg., Box 4047, Stamford, CT 06907 203-359-1660
§† Plessey Microsystems, Plessey Trading Corp., 1641 Kaiser Ave., Irvine, CA 92714 .... 714-540-9931/9932
Racal-Dana Instrs. Inc., 4 Goodyear St., Irvine, CA 92715 714-859-8999
§† Raytheon Ocean Sys. Co., Submarine Signal Div., Risho Ave., Westminster Pk., E. Providence, RI 02914 401-438-1780
Serial Lab Prods., Inc., 162 Cook Lane, P.O. Box 766, Marlboro, MA 01752 617-481-1684
Skan-A-Matic, Box S, Elbridge, NY 13060 315-689-3961
Solartron Instruments, Sangamo Weston, Inc., 2 Westchester Plaza, Elmsford, NY 10523 914-592-9168
SYMBICON, 89 Route 101A, Amherst, NH 03031 603-673-8898
Synergetics Intl., Inc., 6565 Odell Pl., P.O. Box E, Boulder, CO 80306-1236 303-530-2020
Taurus Computer Products, Inc., 1755 Woodward Dr., Ottawa, ON, CANADA K2COPQ 613-226-5361
Xico, Inc., 120 Ocean Way, Santa Monica, CA 90402 213-454-0302

Data Collection Equipment, Portable-2000

A.D. Data Sys., Techtran Industries, 200 Commerce Dr., Rochester, NY 14623 716-334-9649
§ Algo, Inc., 9198-C Red Branch Rd., Columbia, MD 21045 301-730-7442
Applied Sys., 26401 Harper Ave., St. Clair Shores, MI 48081 313-779-8700
Atlantic Research, 5390 Cherokee Ave., Alexandria, VA 22312 703-642-4000
B-G Instruments, P.O. Box 67, Alta Loma, CA 91701 .... 714-989-4802;980-2826
Biospherical Instrs., Inc., 4901 Morena Blvd. # 1003, San Diego, CA 92117 619-270-1315
Bruel & Kjaer Instrs. Inc., 185 Forest St., Marlboro, MA 01752 617-481-7000
§ Caere Corp., 100 Cooper St., Los Gatos, CA 95030 408-395-7000
† Climatronics, 140 Wilbur Pl., Bohemia, NY 11716 516-567-7300
Control Module, 380 Enfield St., Enfield, CT 06082 203-745-2433
Cyber Sys., Inc., 2031 E. Cerritos Ave., Anaheim, CA 92806 714-722-2051
§ Data-Match Corp., 3810 Oakcliff Ind. Ct., Doraville, GA 30340 404-441-0408
Daytronic Corp., 2589 Corporate Pl., Miamisburg, OH 45342 513-866-3300
Digital Radio Corp., 8901 La Cienega Blvd., Inglewood, CA 90301 213-670-8611
† Dranetz Technologies, Inc., Computer Products Division, 1000 New Durham Rd., P.O. Box 4019, Edison, NJ 08818-4019 201-287-3680
Fast Feedback Technologies, 1505 Aviation Blvd., Redoudo Beach, CA 90278 213-379-6100
§ GMR Co., 8801 Sepulveda Blvd., Los Angeles, CA 90045 213-216-9516
Halmar Electronics, Inc., 900 N. Hague Ave., Columbus, OH 43204 614-275-0131
§ InfoCap, Inc., 31119 Via Colinas # 502, Westlake Village, CA 91362 818-991-1410
† Instruments and Controls Div., Technology Inc., P.O. Box 3036, Overlook Branch, Dayton, OH 45431 513-426-2405

Lexicon Corp. of Miami, 1541 N. W. 65th Ave., Ft. Lauderdale, FL 33313 305-792-4400
Measurements Group, Inc., Box 27777, Raleigh, NC 27611 919-365-3800
Metrosonics, Inc., Box 23075, Rochester, NY 14692-3075 716-334-7300
Omega Engrg., Box 4047, Stamford, CT 06907 203-359-1660
§† Plessey Microsystems, Plessey Trading Corp., 1641 Kaiser Ave., Irvine, CA 92714 .... 714-540-9931/9932
PPM, Inc., 4521 Emery Ind. Pkwy., Cleveland, OH 44128 216-292-6006
§† Raytheon Ocean Sys. Co., Submarine Signal Div., Risho Ave., Westminster Pk., E. Providence, RI 02914 401-438-1780
Serial Lab Prods., Inc., 162 Cook Lane, P.O. Box 766, Marlboro, MA 01752 617-481-1684
§ Terra Technlg. Corp., 3860 148th Ave. N.E., Redmond, WA 98052 206-883-7300
† Warren-Knight Instr. Co., Warren Inds., Inc., 2045 Bennett Rd., Philadelphia, PA 19116 215-464-9300

Data Acquisition & Reduction Systems-Also See Modules, Data Acquisition-2325

ADAC Corp., 70 Tower Office Pk., Woburn, MA 01801, 617-935-6668 .... D•1135
Data Instruments, Inc., 4 Hartwell Pl., Lexington, MA 02173, 617-861-7450 .... B•1790
† Datel, General Electric Co., 11 Cabot Blvd., Mansfield, MA 02048, 617-339-9341 .... D•1083,1147
Digitec Corp., 918 Woodley Rd., P.O. Box 458, Dayton, OH 45401, 513-254-6251 .... D•1149
† ILC Data Device Corp., 105 Wilbur Pl., Bohemia, NY 11716, 516-567-5600 .... D•1151
§† Intech, Microcircuits Div., 2270 Martin Ave., Santa Clara, CA 95050, 408-988-4930 .... A•1672
† Interface Engrg., 386 Lindelof Ave., Stoughton, MA 02072, 617-344-7383 .... D•1156
Memodyne, 220 Reservoir St., Needham Hgts., MA 02194, 617-444-7000 .... D•1068
Omega Engrg., Box 4047, Stamford, CT 06907, 203-359-1660 .... D•1160
Pacific Instrs. Inc., 215 Mason Circle, Concord, CA 94518, 415-827-9010 .... D•1015
PPM, Inc., 4521 Emery Ind. Pkwy., Cleveland, OH 44128, 216-292-6006 .. D•1291
Precision Filters, 240 Cherry St., Ithaca, NY 14850, 607-277-3550 .... D•1017
† TRAK Systems, Div. TRAK Microwave Corp., 4722 Eisenhower Blvd., Dept. E-5, Tampa, FL 33614, 813-884-1411 .... D•1079-1080
† Transmagnetics, 210 Adams Blvd., Farmingdale, NY 11735, 516-293-3100 .... D•1162-1163
Validyne Engrg. Corp., 8626 Wilbur Ave., Northridge, CA 91324, 818-886-2057 .... D•1164
† Acromag, 30765 Wixom Rd., Wixom, MI 48096 313-624-1541
§ Acurex-Autodata, 555 Clyde, Mountain View, CA 94039 415-964-3200
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Advanced Techn. Research Labs., 5645 K General Washington Dr., Alexandria, VA 22312 703-750-2920
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Androtek/dmi, Box 29098, Columbus, OH 43229 614-882-7821
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Applied Sys., 26401 Harper Ave., St. Clair Shores, MI 48081 313-779-8700
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† Astro Dynamics, Inc., 2 Gill St., Woburn, MA 01801 617-935-4944
Astrosystems, 6 Nevada Dr., Lake Success, NY 11042 516-328-1600
† Automation Dynamics, 77 Brookside Pl., Hillsdale, NJ 07642 201-666-2458
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† Aydin Monitor Sys., 502 Office Center Dr., Ft. Washington, PA 19034 215-646-8100
† Aydin Vector Div., Box 328, Newtown, PA 18940 215-968-4271
† Bailey Controls Co., 29801 Euclid Ave., Wickliffe, OH 44092 216-585-5800
Bascom-Turner Instrs., 111 Downey St., Norwood, MA 02062 617-769-9660
† Base Ten Sys., One Electronics Dr., Box 3151, Trenton, NJ 08619 609-586-7010
Beckman Instrs., 2500 Harbor Blvd., Fullerton, CA 92634 714-871-4848
† Bendix Corp., Electrodynamics Div., 11600 Sherman Way, N. Hollywood, CA 91605 818-765-1010
Bently Nevada Corp., P.O. Box 157, Minden, NV 89423 702-782-3611
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Biospherical Instrs., Inc., 4901 Morena Blvd. #1003, San Diego, CA 92117 619-270-1315
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Bristol Babcock Inc., 40 Bristol St., Waterbury, CT 06708 203-575-3000
Burr-Brown Corp., P.O. Box 11400, Tucson, AZ 85734 602-746-1111
† Cardion Elctrns., Div. of Gen. Sig. Conts., Inc. Unit of Gen. Sig. Corp., Long Island Expwy., Woodbury, NY 11797 516-921-7300
CDS - Colorado Data Sys., 3301 W. Hampden, Unit C, Englewood, CO 80110 303-762-1640
† Climatronics, 140 Wilbur Pl., Bohemia, NY 11716 516-567-7300
§ CmC Instr. Div., Connecticut microComputer Inc., 568 Danbury Road, New Milford, CT 06776 203-354-9395
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Computer Design & Applications Inc., 411 Waverly Oaks Rd., Waltham, MA 02154 617-647-1900
Computrol Div. Kidde Automated Sys., Inc., 15 Ethan Allen Hwy., Ridgefield, CT 06877-6297 203-544-9371
† Consolidated Controls, 15 Durant Ave., Bethel, CT 06801 203-743-6721
Continental Data Sys., 131 N. Ludlow St., Dayton, OH 45402 513-222-8626
§ Control Equip. Corp., 171 Lincoln St., Lowell, MA 01851 617-459-0573
† Control Technology Co., 41-16 29th St., Long Island City, NY 11101 718-361-2133
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† Datacom, Inc., Box 278, Ft. Walton Beach, FL 32548 904-244-6121
§† Data-Control Sys., Commerce Dr., Box 860, Danbury, CT 06810 203-743-9241
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Data Tech, Div. of Penril Corp., 3110 W. Segerstrom, Santa Ana, CA 92704 714-546-7160
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D-B-Developments, 7709 Kilbourne Rd., Rome, NY 13440 315-339-1265
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Digital Radio Corp., 8901 La Cienega Blvd., Inglewood, CA 90301 213-670-8611
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§ Dynamics, Div. of Waugh Controls Corp., 9001 Fullbright Ave., Chatsworth, CA 91311 818-998-8281
Electron, Inc., P.O. Box 28640, San Diego, CA 92128 216-681-4700
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† EMM/SESCO, 20630 Plummer St., Chatsworth, CA 91311 213-998-9090
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§ Esterline Angus Instr. Corp., Box 24000, Indianapolis, IN 46224 317-244-7611
§† E-Systems, Garland Div., Box 226118, Dallas, TX 75266 214-272-0515
Fairchild - Weston - Telemetry, P.O. Box 3041, Sarasota, FL 33578 813-377-5566
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Fluke, John, Mfg. Co., Box C9090, MS 250C, Everett, WA 98206 206-356-5400
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GIC Systems, 2324 A Ridgepoint Dr., Austin, TX 78754 512-926-8840
Gould Inc., Recording Systems Div., 3631 Perkins Ave., Cleveland, OH 44114 216-361-3315
Granger Assocs., 3101 Scott Blvd., Santa Clara, CA 95051 408-727-3101
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HDS Inc., 12310 Pinecrest Rd., Reston, VA 22091 703-620-6200
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
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Howell Instrs., 3479 W. Vickery Blvd., Ft. Worth, TX 76107 817-336-7411
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§ Industrial Computer Designs, Inc., 31264 La Baya Drive, Westlake Village, CA 91362 818-889-3179
§ InfoCap, Inc., 31119 Via Colinas #502, Westlake Village, CA 91362 818-991-1410
Information Transfer Indl., Box 357, Holcomb, NY 14469 716-657-7074
† Innovatek Microsystems, Inc., Smithfield Rd., R1 Box 104, Millerton, NY 12546-9720 914-373-9003
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Kinetic Sys., 11 Maryknoll Dr., Lockport, IL 60441 815-838-0005
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LeCroy Resch. Sys. Corp. (Cal.), 1806 Embarcadero Rd., Palo Alto, CA 94303 415-856-1800
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† Metraplex Corp., Berkshire Indl. Park, Bethel, CT 06801 203-748-0606
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§ NES, Inc. (Nationwide Electronic Systems), 3003 Wakefield, Carpentersville, IL 60110 312-426-5900
† Norland Corp., Norland Dr., Ft. Atkinson, WI 53538 414-563-8456
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§† Phoenix Data, Inc., 3384 W. Osborn Rd., Phoenix, AZ 85017 602-278-8528
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† R. C. Elctrns. Inc., 5386 Hollister Ave., Santa Barbara, CA 93111 805-964-6708
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† Rolm Mil-Spec Computers, Rolm Corp., 1 River Oaks Pl., San Jose, CA 95134 408-942-8000
† Schaevitz Engrg., U.S. 130, Union Ave., Pennsauken, NJ 08110 609-662-8000
Schneider Instr., 8115 Camargo Rd., Cincinnati, OH 45243 513-561-6803
† Spectral Dynamics, Scientific-Atlanta, Inc., 4255 Ruffin Rd., San Diego, CA 92123-0575 619-268-7100
Scope, Inc., 1860 Michael Faraday Dr., Reston, VA 22090 703-471-5600
Sea Data Corp., One Bridge St., Newton, MA 02158 617-244-3216
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† Singer Co., Librascope Div., 833 Sonora Ave., Glendale, CA 91201 818-244-6541

Solartron Instruments, Sangamo Weston, Inc., 2 Westchester Plaza, Elmsford, NY 10523 914-592-9168
Strawberry Tree Computers, 949 Cascade Dr., Sunnyvale, CA 94087 408-736-3083
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Teledyne/Geotech, 3401 Shiloh Rd., Garland, TX 75041 214-271-2561
Teleram Communications, 2 Corporate Park Dr., White Plains, NY 10604 914-694-9270
Telesis Laboratory, Box 1972, Chillocothe, OH 45601 614-642-5000
§ Tennelec, 601 Turnpike, Oak Ridge, TN 37830 615-483-8405
§ Tetragenics, Box 1338, Butte, MT 59701 406-782-8606
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Tustin Elctrns. Co., 1431 E. Saint Andrews Pl., Santa Ana, CA 92705 714-549-0391
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Xico, Inc., 120 Ocean Way, Santa Monica, CA 90402 213-454-0302
Xycom, 750 N. Maple Rd., Saline, MI 48176 313-429-4971
Ziatech, 3433 Roberto Ct., San Luis Obispo, CA 93401 805-541-0488

Data Compressors, Digital-2000

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§ Algo, Inc., 9198-C Red Branch Rd., Columbia, MD 21045 301-730-7442
† Aydin Monitor Sys., 502 Office Center Dr., Ft. Washington, PA 19034 215-646-8100
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Hughes Aircraft Co., Microelctrn. Sys. Div., 2601 Campus Dr., Irvine, CA 92715 714-752-3800
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† Metric Sys., 645 Anchors St., Ft. Walton Beach, FL 32548 904-244-9600
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Neff Instr., 700 S. Myrtle Ave., Monrovia, CA 91016 818-357-2281
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§† Systron-Donner Inertial Div., 2700 Systron Dr., Concord, CA 94518 415-682-6161
Taurus Computer Products, Inc., 1755 Woodward Dr., Ottawa, ON, CANADA K2COPQ 613-226-5361

Data Display Indicators — See Displays Indicator Lights (Vol. B)

Data Display Systems — See Displays, CRT (Vol. A), Terminals, Data Display (Vol. D)

Data Links, Fiber Optic-2475 — *See Vol. B*

Data Links, Optical-2000

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EOTec Corporation, Fiber Optic Interconnect Group, 420 Frontage Road, West Haven, CT 06516 203-934-7961
† Foundation Instruments Inc., 24 Colonnade Rd., Nepean, ON, CANADA K2E 7J6 613-226-4000
§ Glasgal Communications, Inc., 207 Washington St., Northvale, NJ 07647 201-768-8082
NEC Electronics, Inc., 401 Ellis Street, Mtn. View, CA 94039 415-960-6000
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§ Scientific Technlg., 1201 San Antonio Rd., Mountain View, CA 94043 .... CA 415-965-0910;800-221-7060

Data Loggers-2325

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† Memodyne, 220 Reservoir St., Needham Hgts., MA 02194, 617-444-7000 .... D•1068
Omega Engrg., Box 4047, Stamford, CT 06907, 203-359-1660 .... D•1160,1290, 1407
PPM, Inc., 4521 Emery Ind. Pkwy., Cleveland, OH 44128, 216-292-6006 .. D•1291
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§ AEMC, 99 Chauncy, Boston, MA 02111 .... 617-451-0227;800-343-1391
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Applied Sys., 26401 Harper Ave., St. Clair Shores, MI 48081 313-779-8700
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† Consolidated Controls, 15 Durant Ave., Bethel, CT 06801 203-743-6721
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Dynage/Controls, Inc., 2 Willowbrook Rd., Cromwell, CT 06416 203-635-6257
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HDS Inc., 12310 Pinecrest Rd., Reston, VA 22091 703-620-6200
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† Honeywell, Process Control Div., 1100 Virginia Dr., Ft. Washington, PA 19034 .... 800-321-5111, Ext. 596
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Inconix Corp., 10 Tech Circle, Natick, MA 01760 617-655-1170
Instrulab, P.O. B. 98, Dayton, OH 45404 513-223-2241
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Kaye Instruments, 15 De Angelo Dr., Bedford, MA 01730 617-275-0300
Kinetic Sys., 11 Maryknoll Dr., Lockport, IL 60441 815-838-0005
LeCroy Resch. Sys. Corp., 700 S. Main St., Spring Vly., NY 10977 914-425-2000
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Measurements Group, Inc., Box 27777, Raleigh, NC 27611 919-365-3800
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§ Micom Systems, Inc., 4100 Los Angeles Ave, P.O. Box 8100, Simi Valley, CA 93062-8100 805-583-8600
§ Newport Electronics, 630 E. Young St., Santa Ana, CA 92705 714-540-4914
§ PrimeLine-Soltec Distbn., Soltec Corp., P.O. Box 818, Sun Valley, CA 91353-0818 .... 800-525-5554;818-764-5400
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Serial Lab Prods., Inc., 162 Cook Lane, P.O. Box 766, Marlboro, MA 01752 617-481-1684
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Teledyne/Geotech, 3401 Shiloh Rd., Garland, TX 75041 214-271-2561
§ Tennelec, 601 Turnpike, Oak Ridge, TN 37830 615-483-8405
§ Terra Technlg. Corp., 3860 148th Ave. N.E., Redmond, WA 98052 206-883-7300
Tri-Data Corp., 505 E Middlefield Rd., Mountain View, CA 94043 415-969-3700
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§ ZI-TECH Instr. Corp., 2151 Park Blvd., Box 60490, Palo Alto, CA 94306 415-326-2151

Data Security Devices: Encryptors, Decryptors — See Security Systems, Data

Data Switches — See Switches, Data (Vol. D)

Data Systems (MIL), Naval Tactical-3475

† Alden Electronics, Inc., 40 Washington Street, Westboro, MA 01581 617-366-8851
† Evershed & Vignoles, Ltd., Acton Lane, Chiswick, London, ENGLAND W4 5HJ 01-994-3670
† Pacific Electro Dynamics, Inc., 11465 Willows Rd. N.E., Redmond, WA 98052 206-881-1700

Data Translators — See Translators, Data

DCXO — See Oscillators, Digitally Compensated Crystal

Decade Boxes, Capacitance-2900

IET Labs, Inc., 534 Main St., Westbury, NY 11590, 516-334-5959 ... D•1243-1244
§ Ohmite Mfg. Co., 3601 W. Howard St., Skokie, IL 60076, 312-675-2600 ... A•1919
Tettex Instruments, Inc., P.O. Box 281, Fairview Village, PA 19409-0281, 215-539-6050 ... D•1312
§ AEMC, 99 Chauncy, Boston, MA 02111 ... 617-451-0227;800-343-1391
Continental Resources, Inc., 175 Middlesex Tpke., Bedford, MA 01730 ... 617-275-0850
Freed Transformer, 1718 Weirfield St., Ridgewood, NY 11385 ... 212-386-1300
GenRad, Inc., 300 Baker Ave., Concord, MA 01742 ... 617-369-4400
§ Heath Co., Benton Harbor, MI 49022 ... 616-982-3886
International Instrumentation, 31131-602 Via Colinas, Westlake Vlg., CA 91362 ... 213-991-9614
RE Instruments Corp., 31029 Center Ridge Rd., Westlake, OH 44145 ... 216-871-7617
§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 ... 215-673-5600
§ Tucker Elctrns., Box 461966, Garland, TX 75046 ... 214-348-8800;800-527-4642
Wide Range Elctrns. Corp., 2119 Schultz Rd., St. Louis, MO 63146 ... 314-567-5366
ZI-TECH Instr. Corp., 2151 Park Blvd., Box 60490, Palo Alto, CA 94306 ... 415-326-2151

Decade Boxes, Inductance-2900

IET Labs, Inc., 534 Main St., Westbury, NY 11590, 516-334-5959 ... D•1243-1244
Tettex Instruments, Inc., P.O. Box 281, Fairview Village, PA 19409-0281, 215-539-6050 ... D•1312
Coast Coil Co., 5333 W. Washington Blvd., Los Angeles, CA 90016 ... 213-936-6188
Electrical Instr. Svc., 25 Dock St., Mt. Vernon, NY 10550 ... 914-699-9717
Electrocom Inds., 1105 N. Ironwood Dr., S. Bend, IN 46615 ... 219-232-2743
GenRad, Inc., 300 Baker Ave., Concord, MA 01742 ... 617-369-4400
† Magnetek, 7315 Red Deer Dr., Boulder, CO 80301-4696 ... 303-442-6700
Microtran Co. Inc., 145 E. Mineola Ave., Valley Stream, NY 11580 ... 516-561-6050
RE Instruments Corp., 31029 Center Ridge Rd., Westlake, OH 44145 ... 216-871-7617
Solid State Elctrns. Corp., 18646 Parthenia St., Northridge, CA 91324 ... 818-993-8257
§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 ... 215-673-5600
§ Tucker Elctrns., Box 461966, Garland, TX 75046 ... 214-348-8800;800-527-4642
Wide Range Elctrns. Corp., 2119 Schultz Rd., St. Louis, MO 63146 ... 314-567-5366

Decade Boxes, Resistance-2900

General Resistance, Inc., A Prime Technology Company, Twin Lakes Rd., P.O. Box 185, N. Branford, CT 06471, 203-481-5721 ... D•1233
IET Labs, Inc., 534 Main St., Westbury, NY 11590, 516-334-5959 ... D•1243-1244
Julie Resch. Labs., 211 West 61st St., New York, NY 10023, 212-245-2727 ... D•1255
§ Ohmite Mfg. Co., 3601 W. Howard St., Skokie, IL 60076, 312-675-2600 ... A•1919
Shalltronix Corp., Preston St., P.O. Box 235, Selma, NC 27576, 919-965-6346 ... D•1307
† Tech Labs., Inc., Bergen & Edsall Blvds., Palisades Pk., NJ 07650, 201-944-2221 ... B•1701
Tettex Instruments, Inc., P.O. Box 281, Fairview Village, PA 19409-0281, 215-539-6050 ... D•1312
§ AEMC, 99 Chauncy, Boston, MA 02111 ... 617-451-0227;800-343-1391
Beckman Industrial Corp., Cedar Grove Div., 89 Commerce Rd., Cedar Grove, NJ 07009 ... 201-239-6200
† Biddle Instruments, A Thorn EMI Co., 510 Township Line Rd., Blue Bell, PA 19422 ... 215-646-9200
§ Clarostat Mfg., Washington St., Dover, NH 03820 ... 603-742-1120
Continental Resources, Inc., 175 Middlesex Tpke., Bedford, MA 01730 ... 617-275-0850
Electro Scientific Inds., 13900 N.W. Science Pk. Dr., Portland, OR 97229 ... 503-641-4141
GenRad, Inc., 300 Baker Ave., Concord, MA 01742 ... 617-369-4400
§ Guildline Instrs., 4403 Vineland Rd, Suite B-10, Orlando, FL 32811-9998 ... 305-423-8215
§ Heath Co., Benton Harbor, MI 49022 ... 616-982-3886
Leeds & Northrup Instrs., A Unit of General Signal Corp., Sumneytown Pike, North Wales, PA 19454 ... 215-643-2000
Meissner Inds., 551 Rte. 10, Dover, NJ 07801 ... 201-366-1700
RE Instruments Corp., 31029 Center Ridge Rd., Westlake, OH 44145 ... 216-871-7617
§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 ... 215-673-5600
§ Tucker Elctrns., Box 461966, Garland, TX 75046 ... 214-348-8800;800-527-4642
Valhalla Scientific, 9955 Mesa Rim Rd., San Diego, CA 92126 ... 619-457-5576
Wide Range Elctrns. Corp., 2119 Schultz Rd., St. Louis, MO 63146 ... 314-567-5366
Yokogawa Corp. of America, 2 Dart Rd., Shenandoah, GA 30265 ... 404-253-7000
ZI-TECH Instr. Corp., 2151 Park Blvd., Box 60490, Palo Alto, CA 94306 ... 415-326-2151

Decade Boxes, Transformer-2900

Astrosystems, 6 Nevada Dr., Lake Success, NY 11042 ... 516-328-1600
Coast Coil Co., 5333 W. Washington Blvd., Los Angeles, CA 90016 ... 213-936-6188
Electro Scientific Inds., 13900 N.W. Science Pk. Dr., Portland, OR 97229 ... 503-641-4141
† Magnetico Inc., 182 Morris Ave., Holtsville, NY 11742 ... 516-654-1166

Decalcomania-Also See Labels, Pressure Sensitive-2400 – *See Vol. C*

Decapsulation Services — See Services, Decapsulation (Vol. D)

Decoders, Binary To Decimal — See Converters, Binary To Decimal (Vol. D)

Decoders, Digital To Analog — See Converters, Digital To Analog (Vol. D)

Decoders, Pulse-1900

Data Delay Devices, 385 Lakeview Ave., Clifton, NJ 07011, 201-772-1106 ... A•1491
§ American Microsignal, 8431 Monroe Ave., Stanton, CA 90680 ... 714-761-1222
§† Cal Count, 5407 Port Royal Rd., Springfield, VA 22151 ... 703-321-9625
† Cardion Elctrns., Div. of Gen. Sig. Conts., Inc. Unit of Gen. Sig. Corp., Long Island Expwy., Woodbury, NY 11797 ... 516-921-7300
† Cincinnati Elctrns., 2630 Glendale Milford Rd., Cincinnati, OH 45241 ... 513-733-6100
§ C-Tek Inc., 4 Railroad Ave., Wakefield, MA 01880 ... 617-246-1720
Hughes Aircraft Co, Aerospace Grps./Support Sys., P.O. Box 90515, Los Angeles, CA 90009 ... 213-670-1515
Hughes Aircraft Co., Microelctrn. Sys. Div., 2601 Campus Dr., Irvine, CA 92715 ... 714-752-3800
NES, Inc. (Nationwide Electronic Systems), 3003 Wakefield, Carpentersville, IL 60110 ... 312-426-5900
§ Supertex, Inc., 1225 Bordeaux Dr., P.O. Box 3607, Sunnyvale, CA 94088 ... 408-744-0100
Tasker Systems, 20131 Sunburst St., Chatsworth, CA 91311 ... 213-341-3010
† Teledyne Microelectronics, 12964 Panama St., Los Angeles, CA 90066 ... 213-822-8229;213-870-9831
Vega Precision Labs., 800 Follin La., Vienna, VA 22180 ... 703-938-6300
Voice Identification, Box 714, Somerville, NJ 08876 ... 201-526-3408

Decoders, Readout — See Drivers & Decoders For Readouts (Vol. B)

Decoders, Telemetry — See Decoders, Tone (Vol. D)

Decoders, Tone-1900

§† Exar Corp., P. O. Box 62229, 750 Palomar Ave., Sunnyvale, CA 94086, 408-732-7970 ... A•1668-1669
§ American Microsignal, 8431 Monroe Ave., Stanton, CA 90680 ... 714-761-1222
† A.R.F. Prods., 2559 75th St., Boulder, CO 80301 ... 303-443-4844
Atlantic Research, 5390 Cherokee Ave., Alexandria, VA 22312 ... 703-642-4000
Beckman Industrial Corp., Electronic Technologies Div., 2500 Harbor Blvd., Fullerton, CA 92634 ... 714-871-4848
§ Comdata Corp., 7900 N. Nagle Ave., Morton Grove, IL 60053 ... 312-470-9600
Dantel, 2991 N. Argyle Ave., Fresno, CA 93727 ... 209-292-1111
Data Signal Corp., 149 California St., Newton, MA 02158 ... 617-926-5080
Datum Inc., Timing/Aacom Divisions, 1363 S. State College Blvd., Anaheim, CA 92806 ... 714-533-6333
Digital Transmission Techniques, Inc., P.O. Box 1847, Wayne, NJ 07470 ... 201-831-1615
Dio-Rey, Div. of Info-Lite, 422 Cliff St., Fairview, NJ 07022 ... 201-941-4455
Douglas Randall, 6 Pawcatuck Ave., Pawcatuck, CT 06379 ... 203-599-2075
Electrocom Inds., 1105 N. Ironwood Dr., S. Bend, IN 46615 ... 219-232-2743
Frequency Devices, Inc., 25 Locust St., Haverhill, MA 01830 ... 617-374-0761
† Gorman-Redlich Mfg. Co., 6 Curtis St., Athens, OH 45701 ... 614-593-3150
Magnum Opus Custom Elctrn. Engrg., 284 Kennedy St., Iselin, NJ 08830 ... 201-283-4925
† Mel Tec, Div. Epsco, Inc., 411 Providence Hwy., Westwood, MA 02090 ... 617-329-1508
Palomar Engrs., Box 455, Escondido, CA 92025 ... 619-747-3343
RCI/Data, 1992 Lakewood Rd., Toms River, NJ 08753 ... 201-341-8361
SGS Semiconductor Corporation, 1000 E. Bell Road, Phoenix, AZ 85022 ... 602-867-6100
Silicon Systems Inc., 14351 Myford Rd., Tustin, CA 92680 ... 714-979-0941
† Solid State Elctrns. Corp., 18646 Parthenia St., Northridge, CA 91324 ... 818-993-8257
§ SYT, 1220 Barranca, El Paso, TX 79935 ... 915-593-1234
§ Teltone, 10801-120 Ave. NE, Kirkland, WA 98033 ... 206-827-9626
† Western DataCom, 5083 Market St., Youngstown, OH 44512 ... 216-788-6583

Decoders, Video-1900

Datum Inc., Timing/Aacom Divisions, 1363 S. State College Blvd., Anaheim, CA 92806, 714-533-6333 ... D•1148
Frequency and Time Systems, Inc., DATUM, INC., 34 Tozer Rd., Beverly, MA 01915, 617-927-8220 ... D•1148
Allen Avionics, 224 E. 2nd St., Mineola, NY 11501 ... 516-248-8080
§ Asaca Shibasku Corp. of Amer., 12509 Beatrice St., Los Angeles, CA 90066 ... 827-7144
† Cardion Elctrns., Div. of Gen. Sig. Conts., Inc. Unit of Gen. Sig. Corp., Long Island Expwy., Woodbury, NY 11797 ... 516-921-7300
Hughes Aircraft Co, Aerospace Grps./Support Sys., P.O. Box 90515, Los Angeles, CA 90009 ... 213-670-1515
Hughes Aircraft Co., Microelctrn. Sys. Div., 2601 Campus Dr., Irvine, CA 92715 ... 714-752-3800
Magnum Opus Custom Elctrn. Engrg., 284 Kennedy St., Iselin, NJ 08830 ... 201-283-4925
SGS Semiconductor Corporation, 1000 E. Bell Road, Phoenix, AZ 85022 ... 602-867-6100
Video Automation Systems, Upper Shad Rd., Pound Ridge, NY 10576 ... 914-764-4613

Decontaminants — See Cleaners & Solvents (Vol. C)

Decoys (MIL), Buoy-3475

† Hazeltine Corp., 500 Commack Rd., Commack, NY 11725 ... 516-462-5100

Decryptors — See Security Systems, Data

Degaussers — See Demagnetizers (Vol. C), Coils, Degaussing (Vol. A)

Degreasers & Cleaners, Machine — See Machines, Cleaning & Degreasing (Vol. D)

Degreasing Chemicals — See Cleaners & Solvents (Vol. C)

Dehumidifiers (For Equipment)-2600 – *See Vol. C*

Dehydrators-4100

Andrew Corp., 10500 W. 153rd St., Orland Pk., IL 60462 ... 312-349-3300

† Cablewave Sys., 60 Dodge Ave., North Haven, CT 06473 203-239-3311
† Dielectric Communications, General Signal, Tower Hill Rd., Raymond, ME 04071 .... 207-655-4555;800-341-9678
Electro Impulse, Box 870, Red Bank, NJ 07701-0870 201-741-0404
† Gabriel Elctrns., Box 70, Scarborough Indl. Pk., Scarborough, ME 04074 207-883-5161
Lear Siegler, Inc., 2850 Ocean Park Blvd., P.O. Box 2158, Santa Monica, CA 90406 213-452-5444
Pall Ultrafine Filtration Corp., 2200 Northern Blvd., East Hills, NY 11548 516-484-5400

Delay Lines, Active-2350 – *See Vol. A*

Delay Lines, Cable-2350 – *See Vol. A*

Delay Lines, Digital-2350 – *See Vol. A*

Delay Lines, Dispersive (Frequency Variable)-2350 – *See Vol. A*

Delay Lines, Distributed, Constant (Fixed)-2350 – *See Vol. A*

Delay Lines, Distributed, Constant (Variable)-2350 – *See Vol. A*

Delay Lines, Glass & Quartz-2350 – *See Vol. A*

Delay Lines, Liquid-2350 – *See Vol. A*

Delay Lines, Lumped Constant (Electrically Variable)-2350 – *See Vol. A*

Delay Lines, Lumped Constant (Fixed)-2350 – *See Vol. A*

Delay Lines, Lumped Constant (Mechanically Variable)-2350 – *See Vol. A*

Delay Lines, Magnetostrictive-2350 – *See Vol. A*

Delay Lines, Programmable-2350 – *See Vol. A*

Delay Lines, SAW – See Surface Acoustic Wave Devices

Delay Lines, Strip-2350 – *See Vol. A*

Delay Lines, Trimmer-2350 – *See Vol. A*

Delay Lines, Ultrasonic-2350 – *See Vol. A*

Delay Lines, Video – See Delay Lines, Ultrasonic (Vol. A)

Delay Lines, Waveguide-2350 – *See Vol. A*

Delay Lines (MIL)-2440 – *See Vol. B*

Demagnetizers-4525 – *See Vol. C*

Demodulators-1900

† Computer Conversions Corp., 6 Dunton Ct., E. Northport, NY 11731, 516-261-3300 .... D•1141
Pacific Instrs. Inc., 215 Mason Circle, Concord, CA 94518, 415-827-9010 .... D•1015
Polyphase Instr., 175 Commerce Dr., Ft. Washington, PA 19034, 215-643-6950 .... A•1622
† Transmagnetics, 210 Adams Blvd., Farmingdale, NY 11735, 516-293-3100 .... D•1162
§† Anaren Microwave, P.O. Box 178, 6635 Kirkville Rd., E. Syracuse, NY 13057 315-432-8909
§ Applied Communications, Amstar Tech. Prods. Co., 5490 Spectrum Drive, Frederick, MD 21701 301-694-5300
§ Applied Communications, 9125 Gaither Rd., Gaithersburg, MD 20877 301-948-5210
† A.R.F. Prods., 2559 75th St., Boulder, CO 80301 303-443-4844
Automatic Timing & Controls Co., 201 So. Gulph Rd., King of Prussia, PA 19406 .... 215-337-5500;800-441-8245
Aydin Microwave, 75 East Trimble Rd., San Jose, CA 95131 408-946-5600
† Aydin Monitor Sys., 502 Office Center Dr., Ft. Washington, PA 19034 215-646-8100
† CATEL Telecommunications, United Scientific Corp., 4800 Patrick Henry Dr., Santa Clara, CA 95054 408-988-7722
Cermetek Microelectronics Inc., 1308 Borregas Ave., Sunnyvale, CA 94088 408-752-5000
† Cincinnati Elctrns., 2630 Glendale Milford Rd., Cincinnati, OH 45241 513-733-6100
Coastcom, P.O. Box 27068, Concord, CA 94527 415-825-7500
§ Comdata Corp., 7900 N. Nagle Ave., Morton Grove, IL 60053 312-470-9600
† Control Technology Co., 41-16 29th St., Long Island City, NY 11101 718-361-2133
Dantel, 2991 N. Argyle Ave., Fresno, CA 93727 209-292-1111
§† Data-Control Sys., Commerce Dr., Box 860, Danbury, CT 06810 203-743-9241
§ Data-Design Labs., P.O. Box 711, 7925 Center Ave., Cucamonga, CA 91730 714-987-2511
Decom Sys., 340 Rancheros Dr., San Marcos, CA 92069 619-744-1002
† Electrac, Inc., 1614 Orangethrope Way, Anaheim, CA 92801 714-879-6021
† Electrocom Inds., 1105 N. Ironwood Dr., S. Bend, IN 46615 219-232-2743
Enterprise Sys. Corp., P.O. Box 698, Dover, NH 03820 603-742-7363
§† Exar Corp., P. O. Box 62229, 750 Palomar Ave., Sunnyvale, CA 94086 408-732-7970
Fairchild - Weston - Telemetry, P.O. Box 3041, Sarasota, FL 33578 813-377-5566
§ Feedback, 620 Springfield Ave., Berkeley Hghts., NJ 07922 201-464-5181
FG Engrg., Box 476, Fredonia, AZ 86022 602-643-7375
† Frederick Elctrns. Corp., 7630 Hayward Rd., P.O. Box 502, Frederick, MD 21701-0502 301-662-5901
§† General Magnetics, 211 Grove St., Bloomfield, NJ 07003 201-743-2700
Hughes Aircraft Co, Aerospace Grps./Support Sys., P.O. Box 90515, Los Angeles, CA 90009 213-670-1515
Hughes Aircraft Co., Microelctrn. Sys. Div., 2601 Campus Dr., Irvine, CA 92715 714-752-3800
† Industrial Control Co., 3100 Pineda Ave., Rockledge, FL 32955 305-259-7105
§ Lenco Elctrns., Inc., 300 N. Maryland St., Jackson, MO 63755 314-243-3147
† Lorch Elctrns., 105 Cedar La., Englewood, NJ 07631 201-569-8282
M/A-COM Microwave Circuits, Inc., South Ave., Burlington, MA 01803 617-272-3000
§ NEC Elctrns. USA Inc., NEC Electron Div., 252 Humboldt Ct., Sunnyvale, CA 94086 408-745-6520
† North Atlantic Inds., Instrument Div., 60 Plant Ave., Hauppauge, NY. 11788 516-582-6500
Peca, Inc., 592 Winks Lane, Bensalem, PA 19020 215-245-1550
§† Plessey Semiconductors, 1641 Kaiser Ave., Irvine, CA 92714 714-540-9979
§† Raytheon Semiconductor, 350 Ellis St., Mountain View, CA 94043 415-968-9211
Resdel Engrg., 300 E. Live Oak Ave., Arcadia, CA 91006 213-684-2600
RHG Electronics Lab., Inc., 161 E. Industry Ct., Deer Park, NY 11729 516-242-1100
Scientific-Atlanta, Inc., P.O. Box 105600, Atlanta, GA 30348 404-441-4000
† Solid State Elctrns. Corp., 18646 Parthenia St., Northridge, CA 91324 818-993-8257
Technology Prods., Inc., 8900 Eton Ave., Canoga Park, CA 91304 213-998-8555
Telemet, 185 Dixon Ave., Amityville, NY 11701 516-842-2300
Tri-Com, Inc., 7304 Grove Rd., Frederick, MD 21701 301-694-6666
† TRW Microwave, 825 Stewart Dr., Sunnyvale, CA 94086 408-732-0880
Validyne Engrg. Corp., 8626 Wilbur Ave., Northridge, CA 91324 818-886-2057
† Watkins-Johnson Co., 3333 Hillview Ave., Palo Alto, CA 94304 415-493-4141

Demodulators, Magnetic-2200

† Computer Conversions Corp., 6 Dunton Ct., E. Northport, NY 11731 516-261-3300
Control Technology Co., 41-16 29th St., Long Island City, NY 11101 718-361-2133
† General Magnetics, 211 Grove St., Bloomfield, NJ 07003 201-743-2700
† Transmagnetics, 210 Adams Blvd., Farmingdale, NY 11735 516-293-3100

Densitometers-2900

EG&G Gamma Scientific, Div. of EG&G Inc., 3777 Ruffin Rd., San Diego, CA 92123 619-279-8034
Vickers Inst., Inc., Vickers Instruments, P.O. Box 99, Malden, MA 02148 617-324-0350

Deposition Equipment, Vacuum & Accessories-Also See Evaporation Equipment, Electron Beam-4100

§ Alzbear Corp., 15411 Red Hill Ave., Unit F, Tustin, CA 92680 714-557-0910
API Instrs., 1601 Trapelo Rd., Waltham, MA 02254 617-890-2000
Ceramaseal, Box 25, New Lebanon Center, NY 12126 518-794-7800
CHA Industries, 3565 Haven Avenue, Menlo Park, CA 94025 415-363-8011
§ CVC Prods., 525 Lee Rd., Rochester, NY 14603 716-458-2550
Hitran Corp., Agex, Rte. 31, RD 5-65, Flemington, NJ 08822 201-782-5525
§ Inficon Leybold-Heraeus, Inc., 6500 Fly Rd, E. Syracuse, NY 13057 315-437-0377
Jori Resources, 2128 Knoll Dr., Ventura, CA 93003 805-642-2266
Microscience, Inc., 182 Forbes Rd., Braintree, MA 02184 617-849-1952
Plasma-Therm, Inc., Rt. 73, Kresson, NJ 08053 609-767-6120
Temescal, 2850 Seventh St., Berkeley, CA 94710 415-841-5720
§† ULVAC North America, P.O. Box 799, 105 York Street, Kennebunk, ME 04043 207-985-2973
§ UTI Instruments Co., 325 N. Mathilda Ave., Sunnyvale, CA 94086 408-738-3301
Vactronic Lab. Equip., 65 Brightside Ave., E. Northport, NY 11731 .... 516-AN1-2660
Varian Assocs., Indl. Equip. Grp., 611 Hansen Way, Palo Alto, CA 94303 415-493-4000
Veeco Instruments Inc., Terminal Dr., Plainview, NY 11803 516-349-8300

Desiccators – See Dehumidifiers (Vol. C)

Desks, Data Terminal – See Benches, Consoles, Tables (Vol. C)

Desoldering Tools & Equipment – See Soldering Accessories (Vol. C), Soldering Equip. (Vol. C), Soldering Guns (Vol. C), etc.

Detection & Ranging Systems (MIL)-3475

† Honeywell Inc., Aerospace & Defense Grp., Honeywell Plaza, Minneapolis, MN 55408 612-870-5186
MERET, Inc., 1815 24th St., Santa Monica, CA 90404-4998 213-828-7496
† Microwave Assocs. Ltd., Humphrey Rd., Dunstable, Bedfordshire, ENGLAND LU5 4SX, England .... 44-(582) 60-14-41
† Radiometrics, Inc., 12021 South Memorial Pkwy., Huntsville, AL 35803 205-881-1272
† Raytheon Co., Submarine Signal Div., 1847 W. Main Rd., P.O. Box 360, Portsmouth, RI 02871 401-847-8000
† Rodale Elctrns. Corp., 603 Chestnut St., Garden City, NY 11530 516-222-0050

Detection Sets (MIL), IR-3475

† Cincinnati Elctrns., 2630 Glendale Milford Rd., Cincinnati, OH 45241 513-733-6100
† Radiometrics, Inc., 12021 South Memorial Pkwy., Huntsville, AL 35803 205-881-1272
Spiricon, Inc., 2600 North Main, Logan, UT 84321 801-753-3729

Detection Systems, Laser-3700 – *See Vol. B*

Detection Systems (MIL), Passive-3475

† General Instr., Govt. Sys., 600 W. John St., Hicksville, NY 11802-0709 516-933-3000
GTE Sys.-Sylvania Sys. Grp., Western Div., P.O. Box 7188, Mountain View, CA 94039 415-966-2000
Honeywell Inc., Aerospace & Defense Grp., Honeywell Plaza, Minneapolis, MN 55408 612-870-5186

† Litton Applied Technology, 645 Almanor Ave., P.O. Box 3478, Sunnyvale, CA 94088-3478 ... 408-773-0777
† Signatron, A Unit of Sundstrand Corp., 12 Hartwell Ave., Lexington, MA 02173 ... 617-861-1500
Spiricon, Inc., 2600 North Main, Logan, UT 84321 ... 801-753-3729

Detection Systems (MIL), Submarine-3475

† EDMAN Corp., Subsidiary of Rospatch, 7500 Main St., P.O. Box 750, Fishers, NY 14453-0750 ... 716-924-4000
† Honeywell Inc., Aerospace & Defense Grp., Honeywell Plaza, Minneapolis, MN 55408 ... 612-870-5186
† Raytheon Co., Submarine Signal Div., 1847 W. Main Rd., P.O. Box 360, Portsmouth, RI 02871 ... 401-847-8000

Detector Arrays, Infrared-3700 – *See Vol. B*

Detectors, Air Flow-2900

Kurz Instruments, Inc., P.O. Box 849, Carmel Valley, CA 93924, 800-424-7356 ... B•1800
Cambridge Aero Instruments, Inc., 6A Dunham Rd., Billerica, MA 01821 ... 617-275-0889
† Devco Engrg., Control Sys. Div., 36 Pier Lane West, Fairfield, NJ 07006 ... 201-CA8-0321
Validyne Engrg. Corp., 8626 Wilbur Ave., Northridge, CA 91324 ... 818-886-2057

Detectors, AM/FM-2900

† A.R.F. Prods., 2559 75th St., Boulder, CO 80301 ... 303-443-4844
Honeywell Inc., Aerospace & Defense Grp., Honeywell Plaza, Minneapolis, MN 55408 ... 612-870-5186
§ Silicon Detector Corp., 855 Lawrence Dr., Newbury Park, CA 91320 ... 805-498-6737

Detectors, Bar Code — See Readers, Bar Code (Vol. D)

Detectors, Coaxial-2900

† Adams-Russell, Anzac Div., 80 Cambridge St., Burlington, MA 01803 ... 671-273-3333
† Alan Inds., P.O. Box 1203, Columbus, IN 47201 ... 812-372-8869
Alford Mfg. Co., P.O. Box 2116, 32 Sixth Rd., Woburn, MA 01888 ... 617-935-8610
Alpha Inds., Inc., Microwave Comp. Div., 90 Glenn St., Lawrence, MA 01843 ... 617-681-8520
American Electronic Labs., Box 552, Lansdale, PA 19446 ... 215-822-2929
Bird Elctrn., 30303 Aurora Rd., Cleveland, OH 44139 ... 216-248-1200
Elcom Systems, Inc., 932 Clint Moore Rd., Boca Raton, FL 33431 ... 305-994-1774
Engelmann Microwave Co., KDI Pyrofilm, 60 S. Jefferson Rd., Whippany, NJ 07981 ... 201-887-5700
† General Microwave Corp., 155 Marine St., Farmingdale, NY 11735 ... 516-694-3600
§† Harris Corp., PRD Elctrns. Div., 6801 Jericho Tpke., Syosset, NY 11791 ... 516-364-0400
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
§† JFW Inds., Inc., 2719 E. Troy Ave., Indianapolis, IN 46203 ... 317-783-9875
KDI Electronics, Inc., Engelmann & Pyrofilm Divisions, 60 S. Jefferson Rd., Whippany, NJ 07981 ... 201-887-8100
M/A-COM Microwave Circuits, Inc., South Ave., Burlington, MA 01803 .. 617-272-3000
§† M/A-COM Omni Spectra, Inc., 21 Continental Blvd., Merrimack, NH 03054 ... 603-424-4111
Maury Microwave, 8610 Helms Ave., Cucamonga, CA 91730 ... 714-987-4715
† Microlab/FXR, 10 Microlab Rd., Livingston, NJ 07039 ... 201-992-7700
§† Micronetics, 36 Oak St., Norwood, NJ 07648 ... 201-767-1320
Microphase, 587 Connecticut Ave., Norwalk, CT 06856 ... 203-866-8000
† Microwave Assocs. Ltd., Humphrey Rd., Dunstable, Bedfordshire, ENGLAND LU5 4SX, England ... 44-(582) 60-14-41
§† Omni Spectra, 21 Continental Blvd., Merrimack, NH 03054 ... 603-424-4111
† Premier Microwave, 35 New Broad St., Port Chester, NY 10573 ... 914-939-8900
RLC Elctrns., Inc., 83 Radio Cir., Mt. Kisco, NY 10549 ... 914-241-1334
§ Scientific Technlg., 1201 San Antonio Rd., Mountain View, CA 94043 ... CA 415-965-0910;800-221-7060
Sivers IMA, 5669 Selmaraine Drive, Culver City, CA 90230 ... 213-390-7477
§† Systron-Donner Microwave Div., 14844 Oxnard St., Van Nuys, CA 91409 ... 818-786-1760
Texscan Instruments, 3169 N. Shadeland, Indianapolis, IN 46226 ... 317-545-4196
† TRW Microwave, 825 Stewart Dr., Sunnyvale, CA 94086 ... 408-732-0880
§† Waveline, Box 718, W. Caldwell, NJ 07006 ... 201-226-9100
Wide Band Engrg. Co., Inc., Box 21652, Phoenix, AZ 85036 ... 602-254-1570

Detectors, Corona — See Testers, Corona (Vol. D)

Detectors, Crystal-2300 – *See Vol. A*

Detectors, Fiber Optic-Also See Diodes, PIN-2475 – *See Vol. B*

Detectors, Flaw & Defect-2900

TRAK Systems, Div. TRAK Microwave Corp., 4722 Eisenhower Blvd., Dept. E-5, Tampa, FL 33614, 813-884-1411 ... D•1079
Airpax Corp., Cheshire Div., Cheshire Indl. Pk., Box E, Cheshire, CT 06410 ... 203-272-0301
§ Banner Engrg. Corp., 9714 - 10th Ave. N., Minneapolis, MN 55441 ... 612-544-3164
§ Dolan-Jenner Inds., Box 1020, Woburn, MA 01801 ... 617-935-7444
Dunegan Corporation, P.O. Box 3238, Mission Viejo, CA 92690 ... 714-831-9131
† Electron-Machine Corp., Box M, Umatilla, FL 32784 ... 904-669-3101
§ Endevco, 30700 Rancho Viejo Rd., San Juan Capistrano, CA 92675 ... 714-493-8181
§ GC Elctrns., 400 S. Wyman St., Rockford, IL 61101 ... 815-968-9661
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
Hipotronics, P.O. Drawer A, Brewster, NY 10509 ... 914-279-8091
§ Hobart Engrg., 4143 Cheshire Dr., Cypress, CA 90630 ... 714-827-2135
Jaycor, P.O. Box 85154, San Diego, CA 92138 ... 619-453-6580
Panametrics, 221 Cresent St., Waltham, MA 02254 ... 617-899-2740
Photobell, 26 Just Rd., Fairfield, NJ 07006 ... 201-227-3613
§ Scientific Technlg., 1201 San Antonio Rd., Mountain View, CA 94043 ... CA 415-965-0910;800-221-7060
Skan-A-Matic, Box S, Elbridge, NY 13060 ... 315-689-3961
† Systems Resch. Labs., Inc., 2800 Indian Ripple Rd., Dayton, OH 45440 .. 513-426-6000
§ UVP, Inc., 5100 Walnut Grove Ave., P.O. Box 1501, San Gabriel, CA 91778 ... 818-285-3123

Detectors, GaAs-3450 – *See Vol. A*

Detectors, Ground Fault-4300

ROD-L Electronics, Inc., 1098 Hamilton Ct., Menlo Park, CA 94025, 415-322-0711 ... D•1297,1299
Shalltronix Corp., Preston St., P.O. Box 235, Selma, NC 27576, 919-965-6346 ... D•1307
§ AEMC, 99 Chauncy, Boston, MA 02111 ... 617-451-0227;800-343-1391
Bluffton Products, Inc., Tegam, Inc., 7230 North Ridge Road, Madison, OH 44057 ... 216-946-3572
§ Brim Elctrns., 120E Home Pl., Lodi, NJ 07644 ... 201-796-2886
§ Ericson Mfg. Co., 4215 Hamann Pkwy., Willoughby, OH 44094 ... 216-951-8000
† Hughes Aircraft Co., Microelctrn. Sys. Div., 2601 Campus Dr., Irvine, CA 92715 ... 714-752-3800
Lear Siegler, Inc., 2850 Ocean Park Blvd., P.O. Box 2158, Santa Monica, CA 90406 ... 213-452-5444
Magnetic Metals Co., Hayes Ave. at 21st St., Camden, NJ 08105 ... 609-964-7842
Multi-Tech Inds., 64 S. Main St., P.O. Box A, Marlboro, NJ 07746 ... 201-431-0550
§ Potter & Brumfield, AMF Incorporated, 200 S. Richland Creek Dr., Princeton, IN 47671-0001 ... 812-386-1000
Reliance Electric Co., Marketing Info Center, P.O. Box 99502, Cleveland, OH 44199 ... 800-245-4501;800-245-4497 In Ohio
SL Electronics, 300 Harvard Ave., Westville, NJ 08093 ... 609-456-7300
§ Square D Co., Executive Plaza, Palatine, IL 60067 ... 312-397-2600
§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 ... 215-673-5600
Trinetics Inc., 55807 Currant Rd., Mishawaka, IN 46545-4899 ... 219-259-8535
§ The Wadsworth Elec. Mfg. Co., Inc., 20 W. 11th St., Covington, KY 41012 ... 606-431-0900

Detectors, Impedance — See Meters, Impedance (Vol. D)

Detectors, Infrared-3700 – *See Vol. B*

Detectors, Light Intensity — See Meters, Light, Nonphotographic (Vol. D)

Detectors, Magnetic — See Meters, Gauss (Vol. D)

Detectors, Microwave-3400

North Hills Elctrns., 1 Alexander Pl., Glen Cove, NY 11542, 516-671-5700 ... A•1780
Alpha Inds., Inc., Microwave Comp. Div., 90 Glenn St., Lawrence, MA 01843 ... 617-681-8520
Alpha Inds., Inc.-MSD Div., 20 Sylvan Rd., Woburn, MA 01801 ... 617-935-5150
Alpha Inds., Inc. - TRG Millimeter Comp., 20 Sylvan Rd., Woburn, MA 01801 ... 617-935-5150
American Electronic Labs., Box 552, Lansdale, PA 19446 ... 215-822-2929
§† Anaren Microwave, P.O. Box 178, 6635 Kirkville Rd., E. Syracuse, NY 13057 ... 315-432-8909
§† Avantek, Inc., 3175 Bowers Ave., Santa Clara, CA 95054 ... 408-496-6710
Bird Elctrn., 30303 Aurora Rd., Cleveland, OH 44139 ... 216-248-1200
Coaxial Dynamics, 15210 Industrial Parkway, Cleveland, OH 44135 ... 216-267-2233
† Eastern Microwave, 4 Gill St., Woburn, MA 01801 ... 617-935-8600
† Eaton Corp., A.I.L. Div., Comac Rd., Deer Park, NY 11729 ... 516-595-3094
Elcom Systems, Inc., 932 Clint Moore Rd., Boca Raton, FL 33431 ... 305-994-1774
Engelmann Microwave Co., KDI Pyrofilm, 60 S. Jefferson Rd., Whippany, NJ 07981 ... 201-887-5700
Freed Transformer, 1718 Weirfield St., Ridgewood, NY 11385 ... 212-386-1300
† General Microwave Corp., 155 Marine St., Farmingdale, NY 11735 ... 516-694-3600
§† Harris Corp., PRD Elctrns. Div., 6801 Jericho Tpke., Syosset, NY 11791 ... 516-364-0400
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
Hughes Aircraft Co, Aerospace Grps./Support Sys., P.O. Box 90515, Los Angeles, CA 90009 ... 213-670-1515
Hughes Aircraft Co., Microelctrn. Sys. Div., 2601 Campus Dr., Irvine, CA 92715 ... 714-752-3800
Hyletronics, Newtown Rd., Littleton, MA 01460 ... 617-486-8911
KDI Electronics, Inc., Engelmann & Pyrofilm Divisions, 60 S. Jefferson Rd., Whippany, NJ 07981 ... 201-887-8100
M/A-COM Microwave Circuits, Inc., South Ave., Burlington, MA 01803 .. 617-272-3000
M/A-Com Microwave Components, Inc., M/A-Com, South Avenue, Burlington, MA 01803 ... 617-272-3000
M/A-Com Millimeter Products, M/A-Com, Inc., Second Avenue, Burlington, MA 01803 ... 617-272-3000
§† M/A-COM Omni Spectra, Inc., 21 Continental Blvd., Merrimack, NH 03054 ... 603-424-4111
Maury Microwave, 8610 Helms Ave., Cucamonga, CA 91730 ... 714-987-4715
† Microlab/FXR, 10 Microlab Rd., Livingston, NJ 07039 ... 201-992-7700
Microphase, 587 Connecticut Ave., Norwalk, CT 06856 ... 203-866-8000
Microwave Development Labs., 10 Michigan Dr., Natick, MA 01760 ... 617-655-0060
Microwave Filter Inc., 6743 Kinne St., East Syracuse, NY 13057-0486 ... 315-437-3953; 800-448-1666
† Mini-Circuits Lab., 2625 E. 14th St., P.O. Box 166, Brooklyn, NY 11235 .. 718-934-4500
† Mitec Elctrns., 15 Commerce St., Williston, VT 05495 ... 802-864-0064
† Norsal Inds., 85 D Hoffman Lane So., Central Islip, NY 11722 ... 516-234-1200
§† Omni Spectra, 21 Continental Blvd., Merrimack, NH 03054 ... 603-424-4111
Ortel Corp., 2015 W. Chestnut St., Alhambra, CA 91803 ... 818-281-3636
† Premier Microwave, 35 New Broad St., Port Chester, NY 10573 ... 914-939-8900
RLC Elctrns., Inc., 83 Radio Cir., Mt. Kisco, NY 10549 ... 914-241-1334

† Sage Laboratories, Inc., 3 Huron Dr., Natick, MA 01778	617-653-0844
§ Simpson Elec. Co., 853 Dundee Ave., Elgin, IL 60120	312-697-2260
Sivers IMA, 5669 Selmaraine Drive, Culver City, CA 90230	213-390-7477
§† Systron-Donner Microwave Div., 14844 Oxnard St., Van Nuys, CA 91409	818-786-1760
† Technical Research & Mfg., Inc., R.F.D. #10, Manchester, NH 03103	603-627-6000
† Telonic/Berkeley, 2825 Laguna Canyon Rd., Laguna Beach, CA 92652	714-494-9401
Texscan Instruments, 3169 N. Shadeland, Indianapolis, IN 46226	317-545-4196
† TRW Microwave, 825 Stewart Dr., Sunnyvale, CA 94086	408-732-0880
Varian Assocs., Indl. Equip. Grp., 611 Hansen Way, Palo Alto, CA 94303	415-493-4000
† Vectronics Microwave Corp., 276 Lincoln Blvd., Middlesex, NJ 08846	201-356-2377
§ Waveline, Box 718, W. Caldwell, NJ 07006	201-226-9100
† Wavetek Indiana, Inc., 5808 Churchman, Beech Grove, IN 46107	317-787-3332
§ Wiltron, 805 E. Middlefield Rd., P.O. Box 7290, Mountain View, CA 94042-7290	415-969-6500

Detectors, Null – See Indicators, Null (Vol. D)

Detectors, Phase Sensitive-2900

† Mini-Circuits Lab., 2625 E. 14th St., P.O. Box 166, Brooklyn, NY 11235, 718-934-4500	**A•1719-1720,1758**
Triac Electronic Systems, Inc., 87-27 Myrtle Ave., Glendale, NY 11385, 718-441-4759	**D•1132**
§ A E G Telefunken, Semiconductor Grp., Rte. 22, Somerville, NJ 08876	201-722-9800
Alpha Inds., Inc., Microwave Comp. Div., 90 Glenn St., Lawrence, MA 01843	617-681-8520
Alpha Inds., Inc.-MSD Div., 20 Sylvan Rd., Woburn, MA 01801	617-935-5150
§ Antex Electronics Corp., 16100 S. Figueroa St., Gardena, CA 90248	213-532-3092
† Applied Electro Technlg., Int., STI Company, 2220 So. Anne St., Santa Ana, CA 92704	714-556-6570
† Control Technology Co., 41-16 29th St., Long Island City, NY 11101	718-361-2133
Evans Electronics, Box 5055, Berkeley, CA 94705	415-653-3083
§† General Magnetics, 211 Grove St., Bloomfield, NJ 07003	201-743-2700
§† Hi-G Company, A Subsidiary of Nytronics Inc., 101 Locust St., Hartford, CT 06114	203-522-8600
† Industrial Control Co., 3100 Pineda Ave., Rockledge, FL 32955	305-259-7105
† Lorch Elctrns., 105 Cedar La., Englewood, NJ 07631	201-569-8282
† Narda Microwave Corp., 435 Moreland Rd., Hauppauge, NY 11788	516-231-1700
† North Atlantic Inds., Instrument Div., 60 Plant Ave., Hauppauge, NY 11788	516-582-6500
Silicon Detector Corp., 855 Lawrence Dr., Newbury Park, CA 91320	805-498-6737
Silicon Sensors, Hwy. 18 East, Dodgeville, WI 53533	608-935-2707
† Solid State Elctrns. Corp., 18646 Parthenia St., Northridge, CA 91324	818-993-8257
Technology Prods., Inc., 8900 Eton Ave., Canoga Park, CA 91304	213-998-8555
Tettex Instruments, Inc., P.O. Box 281, Fairview Village, PA 19409-0281	215-539-6050
† TRW Microwave, 825 Stewart Dr., Sunnyvale, CA 94086	408-732-0880
Universal Ad-Yu Elctrns., Inc., 2517 E. Norwich St., Milwaukee, WI 53207	414-482-4100
Varian Assocs., Indl. Equip. Grp., 611 Hansen Way, Palo Alto, CA 94303	415-493-4000
Watkins-Johnson Co., 3333 Hillview Ave., Palo Alto, CA 94304	415-493-4141

Detectors, Photovoltaic – See Cells, Photovoltaic (Vol. B)

Detectors, RF-2900

† Adams-Russell, Anzac Div., 80 Cambridge St., Burlington, MA 01803	671-273-3333
AERCOM, 405 Tasman Dr., Sunnyvale, CA 94086	408-744-1320
Alpha Inds., Inc., Microwave Comp. Div., 90 Glenn St., Lawrence, MA 01843	617-681-8520
Alpha Inds., Inc.-MSD Div., 20 Sylvan Rd., Woburn, MA 01801	617-935-5150
§† Avantek, Inc., 3175 Bowers Ave., Santa Clara, CA 95054	408-496-6710
Coaxial Dynamics, 15210 Industrial Parkway, Cleveland, OH 44135	216-267-2233
Elcom Systems, Inc., 932 Clint Moore Rd., Boca Raton, FL 33431	305-994-1774
Engelmann Microwave Co., KDI Pyrofilm, 60 S. Jefferson Rd., Whippany, NJ 07981	201-887-5700
Honeywell Inc., Aerospace & Defense Grp., Honeywell Plaza, Minneapolis, MN 55408	612-870-5186
Hyletronics, Newtown Rd., Littleton, MA 01460	617-486-8911
Instruments for Industry, Inc., 151 Toledo St., Farmingdale, NY 11735	516-694-1414
KDI Electronics, Inc., Engelmann & Pyrofilm Divisions, 60 S. Jefferson Rd., Whippany, NJ 07981	201-887-8100
M/A-COM Microwave Circuits, Inc., South Ave., Burlington, MA 01803	617-272-3000
§† M/A-COM Omni Spectra, Inc., 21 Continental Blvd., Merrimack, NH 03054	603-424-4111
† Metropole Products Inc., P.O. Box 10275, Alexandria, VA 22310	703-971-8606; 703-971-7082
Micro-Coax Components, Inc., a UTI Company, Box E, Collegeville, PA 19426	215-489-3700
Mini-Circuits Lab., 2625 E. 14th St., P.O. Box 166, Brooklyn, NY 11235	718-934-4500
Peca, Inc., 592 Winks Lane, Bensalem, PA 19020	215-245-1550
RLC Elctrns., Inc., 83 Radio Cir., Mt. Kisco, NY 10549	914-241-1334
Telonic/Berkeley, 2825 Laguna Canyon Rd., Laguna Beach, CA 92652	714-494-9401
Texscan Instruments, 3169 N. Shadeland, Indianapolis, IN 46226	317-545-4196
Vitek Elctrns., 4 Gladys Ct., Edison, NJ 08817	201-287-3200
§ Wiltron, 805 E. Middlefield Rd., P.O. Box 7290, Mountain View, CA 94042-7290	415-969-6500

Detectors, Radiation-2900

† General Microwave Corp., 155 Marine St., Farmingdale, NY 11735, 516-694-3600	**D•1232**
§ Amperex Electronic Corp., Hicksville Div., Box 418 - 230 Duffy Ave., Hicksville, NY 11802	516-931-6200
† Beam Tube Co., Inc., 11 Beach St., Milford, MA 01757	617-473-0660
Canberra Ind., One State St., Meriden, CT 06450	203-238-2351
Capintec Instrs., 6 Arrow Rd., Ramsey, NJ 07446	201-825-9500
Centronic Inc., 1101 Bristol Rd., Mountainside, NJ 07092	201-233-7200
† Eaton Corp., A.I.L. Div., Comac Rd., Deer Park, NY 11729	516-595-3094
§ EDL, Inc., 385 Oser Ave., Hauppauge, NY 11788	516-435-2808;1-800-DIAL EDL
§ EG&G Geometrics, Div. of EG&G Inc., 395 Java Dr., Sunnyvale, CA 94089	408-734-4616
Gamma Scientific Inc., 3777 Ruffin Rd., San Diego, CA 92123	619-279-8034
Hamamatsu Photonics K.K., 325-6 Sunayama-Cho, Hamamatsu City, Shizuoka Pref, JAPAN	0534-52-2141
Harshaw Filtrol Partnership, 1945 E. 97th St., Cleveland, OH 44106	216-721-8300
Infrared Inds., Inc., P.O. Box 14200, Orlando, FL 32857	305-282-7700
† Narda Microwave Corp., 435 Moreland Rd., Hauppauge, NY 11788	516-231-1700
Nuclear Resch. Corp., 125 Titus Ave., Warrington, PA 18976	215-343-5900
Sanders Assocs., Flexprint Prods. Div., Grenier Fld., Manchester, NH 03103	603-669-4615
§ Tennelec, 601 Turnpike, Oak Ridge, TN 37830	615-483-8405
Thomson-CSF Comps. Corp., Special Prods. Div., 301 Rte. 17 North, Rutherford, NJ 07070	201-438-2300
§ THORN EMI Gencom Inc., 23 Madison Rd., Fairfield, NJ 07006	201-575-5586
Westinghouse Electric Corp., Indl. Govt. Tube Div., Westinghouse Circle, Horseheads, NY 14845	607-796-3211
Whittaker Corp., Electronic Resources Div., 100 E. Tujunga Ave., Burbank, CA 91502	818-843-5770

Detectors, Resistance Temperature (RTDs) – See Thermometers, Resistance (Vol. D)

Detectors, Standing Wave-2900

Alford Mfg. Co., P.O. Box 2116, 32 Sixth Rd., Woburn, MA 01888	617-935-8610
Alpha Inds., Inc.-MSD Div., 20 Sylvan Rd., Woburn, MA 01801	617-935-5150
Bird Elctrn., 30303 Aurora Rd., Cleveland, OH 44139	216-248-1200
Coaxial Dynamics, 15210 Industrial Parkway, Cleveland, OH 44135	216-267-2233
Continental Resources, Inc., 175 Middlesex Tpke., Bedford, MA 01730	617-275-0850
§† Harris Corp., PRD Elctrns. Div., 6801 Jericho Tpke., Syosset, NY 11791	516-364-0400
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303	Call Local Sls. Off.
Maury Microwave, 8610 Helms Ave., Cucamonga, CA 91730	714-987-4715
† Microlab/FXR, 10 Microlab Rd., Livingston, NJ 07039	201-992-7700
† Telonic/Berkeley, 2825 Laguna Canyon Rd., Laguna Beach, CA 92652	714-494-9401
§ Tucker Elctrns., Box 461966, Garland, TX 75046	214-348-8800;800-527-4642
Varian Assocs., Indl. Equip. Grp., 611 Hansen Way, Palo Alto, CA 94303	415-493-4000
§ Wiltron, 805 E. Middlefield Rd., P.O. Box 7290, Mountain View, CA 94042-7290	415-969-6500

Detectors, Synchronous-2900

Hobart Engrg., 4143 Cheshire Dr., Cypress, CA 90630	714-827-2135

Detectors, Tone-1900

Digital Transmission Techniques, Inc., P.O. Box 1847, Wayne, NJ 07470	201-831-1615
Frequency Devices, Inc., 25 Locust St., Haverhill, MA 01830	617-374-0761
Magnum Opus Custom Elctrn. Engrg., 284 Kennedy St., Iselin, NJ 08830	201-283-4925
† Mel Tec, Div. Epsco, Inc., 411 Providence Hwy., Westwood, MA 02090	617-329-1508

Detectors, Ultraviolet-2900

Advanced Detector Corp., Applied Solar Energy Corp., 15251 E. Don Julian Rd., Industry, CA 91746, 818-369-6886	**B•1203**
† Analog Modules, Inc., 126 Baywood Avenue, Longwood, FL 32750, 305-339-4356/4355	**D•1004**
§ EG & G Vactec, 10900 Page Blvd., St. Louis, MO 63132, 314-423-4900	**B•1210**
Silonex Inc., 331 Cornelia St., Plattsburgh, NY 12901, 518-561-3160	**B•1215**
§ American Ultraviolet, 320 Commerce St., Chatham, NJ 07928	201-635-8355
† Applied Solar Energy Corp., Photosensor Div., 15251 E. Don Julian Rd., City of Industry, CA 91749	818-968-6581
† Artech Corp., 2901 Telestar Ct., Falls Church, VA 22042	703-560-3292
§ BEA electro-optics, Inc., 690 First Ave., Des Plaines, IL 60016	312-298-1420
Beckman Instrs., 2500 Harbor Blvd., Fullerton, CA 92634	714-871-4848
† Centronic Inc., 1101 Bristol Rd., Mountainside, NJ 07092	201-233-7200
EG&G, Inc., Electro-Optics Div., 35 Congress St., Salem, MA 01970	617-745-3200
EG & G Rotron, Custom Div., Hasbrouck La., Woodstock, NY 12498	914-679-5201
Eltec Instruments Inc., P.O. Box 9610, Daytona Bch., FL 32020	904-253-5328
Galileo Electro-Optics Corp., Galileo Pk., Sturbridge, MA 01518	617-347-9191
Gamma Scientific Inc., 3777 Ruffin Rd., San Diego, CA 92123	619-279-8034
Hamamatsu Photonics K.K., 325-6 Sunayama-Cho, Hamamatsu City, Shizuoka Pref, JAPAN	0534-52-2141
Infrared Inds., Inc., P.O. Box 14200, Orlando, FL 32857	305-282-7700
Poulin Associates, Inc., 302 North Rd., Sudbury, MA 01776	617-443-7333
Sanders Assocs., Flexprint Prods. Div., Grenier Fld., Manchester, NH 03103	603-669-4615
† Scientech, Inc., 5649 Arapahoe Ave., Boulder, CO 80303	303-444-1361;800-525-0522
Sensor Techn., 21012 Lassen St., Chatsworth, CA 91311	213-882-4100
Silicon Detector Corp., 855 Lawrence Dr., Newbury Park, CA 91320	805-498-6737
§† Spectronics Corp., 956 Brush Hollow Rd., Westbury, NY 11590	516-333-4840
Spiricon, Inc., 2600 North Main, Logan, UT 84321	801-753-3729
§ THORN EMI Gencom Inc., 23 Madison Rd., Fairfield, NJ 07006	201-575-5586
United Detector Tech., 12525 Chadron Ave., Hawthorne, CA 90250	213-978-0516
§ UVP, Inc., 5100 Walnut Grove Ave., P.O. Box 1501, San Gabriel, CA 91778	818-285-3123

Detectors, Vacuum-4100

Barksdale Controls Div., Transamenca DeLaval, 3211 Fruitland Ave., P.O. Box 58843, Los Angeles, CA 90058	213-589-6181

Cambridge Aero Instruments, Inc., 6A Dunham Rd., Billerica, MA 01821 617-275-0889
DuPont de Nemours, E. I., & Co., 1007 Market St., Wilmington, DE 19898 302-773-3218
Inficon Leybold-Heraeus, Inc., 6500 Fly Rd, E. Syracuse, NY 13057 315-437-0377
§ United Elec. Controls, 85 School St., Watertown, MA 02172 .... 617-WA6-1000
† Vactronic Lab. Equip., 65 Brightside Ave., E. Northport, NY 11731 .... 516-AN1-2660
Varian Assocs., Indl. Equip. Grp., 611 Hansen Way, Palo Alto, CA 94303 415-493-4000

Detectors, Vibration — See Transducers, Vibration (Vol. B)

Detectors, Video-2900

Alpha Inds., Inc.-MSD Div., 20 Sylvan Rd., Woburn, MA 01801 617-935-5150
American Electronic Labs., Box 552, Lansdale, PA 19446 215-822-2929
§ CCD Imaging, Fairchild Camera & Instr. Corp., 450 National Ave., Mountain View, CA 94043 415-493-8001
† Colorado Video, Inc., Box 928, Boulder, CO 80306 303-444-3972
Engelmann Microwave Co., KDI Pyrofilm, 60 S. Jefferson Rd., Whippany, NJ 07981 201-887-5700
KDI Electronics, Inc., Engelmann & Pyrofilm Divisions, 60 S. Jefferson Rd., Whippany, NJ 07981 201-887-8100
§ Lenco Elctrns., Inc., 300 N. Maryland St., Jackson, MO 63755 314-243-3147
M/A-COM Microwave Circuits, Inc., South Ave., Burlington, MA 01803 .. 617-272-3000
† Metropole Products Inc., P.O. Box 10275, Alexandria, VA 22310 .... 703-971-8606; 703-971-7082
Microphase, 587 Connecticut Ave., Norwalk, CT 06856 203-866-8000
§† Plessey Semiconductors, 1641 Kaiser Ave., Irvine, CA 92714 714-540-9979
Sanders Assocs., Flexprint Prods. Div., Grenier Fld., Manchester, NH 03103 603-669-4615
† TRW Microwave, 825 Stewart Dr., Sunnyvale, CA 94086 408-732-0880
§ Waveline, Box 718, W. Caldwell, NJ 07006 201-226-9100
Wide Band Engrg. Co., Inc., Box 21652, Phoenix, AZ 85036 602-254-1570

Detectors, Voltage-2900

† Calex Mfg. Co., Inc., 3355 Vincent Rd., Pleasant Hill, CA 94523, 415-932-3911 .... D•1006
§ AEMC, 99 Chauncy, Boston, MA 02111 .... 617-451-0227;800-343-1391
§† Antex Electronics Corp., 16100 S. Figueroa St., Gardena, CA 90248 213-532-3092
Applied Control, 1275 Bloomfield Ave., Fairfield, NJ 07006-2828 201-227-5454
† Applied Electro Technlg., Int., STI Company, 2220 So. Anne St., Santa Ana, CA 92704 714-556-6570
§ Biddle Instruments, A Thorn EMI Co., 510 Township Line Rd., Blue Bell, PA 19422 215-646-9200
Bluffton Products, Inc., Tegam, Inc., 7230 North Ridge Road, Madison, OH 44057 216-946-3572
CDS - Colorado Data Sys., 3301 W. Hampden, Unit C, Englewood, CO 80110 303-762-1640
Centent Co., 3879 S. Main St., Santa Ana, CA 92707 714-979-6491
Electrical Instr. Svc., 25 Dock St., Mt. Vernon, NY 10550 914-699-9717
§ General Magnetics, 211 Grove St., Bloomfield, NJ 07003 201-743-2700
M/A-COM Microwave Circuits, Inc., South Ave., Burlington, MA 01803 .. 617-272-3000
Mag-Con, 1626 Terrace Dr., St. Paul, MN 55113 612-633-8820
§ NES, Inc. (Nationwide Electronic Systems), 3003 Wakefield, Carpentersville, IL 60110 312-426-5900
Ohio Semitronics, Inc., 1205 Chesapeake Ave., Columbus, OH 43212 614-486-9561
§ Potter & Brumfield, AMF Incorporated, 200 S. Richland Creek Dr., Princeton, IN 47671-0001 812-386-1000
Q-Systems, PO Box 35879, Tucson, AZ 85740 602-293-4923
Ross Engrg. Corp., 540 Westchester Dr., Campbell, CA 95008 408-377-4621
§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 215-673-5600
† Tempo Instrument, Inc., 87 Modular Ave., Commack, NY 11725 516-864-3700
TIF Instrs., Inc., 9101 N.W. 7th Ave., Miami, FL 33150 305-757-8811
§ Triplett Corp.-A Penril Co., One Triplett Dr., Bluffton, OH 45817-9987 419-358-5015
Warren Comms., 101 Okner Pkwy., Livingston, NJ 07039 201-992-6200
§ Western Electro. Mech. Co. Inc., 300 Broadway, Oakland, CA 94607 415-452-1936
† Wilmar Elctrns., Inc., 2430 Amsler St., Torrance, CA 90505 213-326-6668

Detectors (MIL), IR-3475

† Alan Inds., P.O. Box 1203, Columbus, IN 47201 812-372-8869
Centronic Inc., 1101 Bristol Rd., Mountainside, NJ 07092 201-233-7200
† Cincinnati Elctrns., 2630 Glendale Milford Rd., Cincinnati, OH 45241 513-733-6100
† Honeywell Inc., Aerospace & Defense Grp., Honeywell Plaza, Minneapolis, MN 55408 612-870-5186
§† Laser Precision Corp., 1231 Hart St., Utica, NY 13502 315-797-4449
† Litton Applied Technology, 645 Almanor Ave., P.O. Box 3478, Sunnyvale, CA 94088-3478 408-773-0777
† Santa Barbara Resch. Ctr., 75 Coromar Dr., Goleta, CA 93117 805-968-3511
Spiricon, Inc., 2600 North Main, Logan, UT 84321 801-753-3729
Texas Instrs., Data Sys. Group, P. O. Box 809063, Dallas, TX 75380-9063 1-800-527-3500
† TRW Optoelectronics Div., 1207 Tappan Circle, Carrollton, TX 75006 214-323-2200

Detectors (MIL), Radar-3475

† General Instr., Govt. Sys., 600 W. John St., Hicksville, NY 11802-0709 516-933-3000
† Honeywell Inc., Aerospace & Defense Grp., Honeywell Plaza, Minneapolis, MN 55408 612-870-5186
† Litton Applied Technology, 645 Almanor Ave., P.O. Box 3478, Sunnyvale, CA 94088-3478 408-773-0777
† M/A-COM Microwave Circuits, Inc., South Ave., Burlington, MA 01803 .. 617-272-3000
† Microwave Assocs. Ltd., Humphrey Rd., Dunstable, Bedfordshire, ENGLAND, LU5 4SX, England .... 44-(582) 60-14-41

DIACs-4800 — *See Vol. A*

Dials, Instrument, Metal, Plastic, etc.-2400 — *See Vol. C*

Dials, Turns Counting-2400 — *See Vol. C*

Dielectric Heating Equipment-4100

§ American HV Test Systems Inc., Central Garrett Ind'l. Plc, Accident, MD 21520 301-826-8651
Easy Heat-Wirekraft, 555 North Michigan St., Lakeville, IN 46536 219-784-3011
§ EDL, Inc., 385 Oser Ave., Hauppauge, NY 11788 .... 516-435-2808;1-800-DIAL EDL
Microdry Corp., Golden Grain Macaroni Co., 3111 Fostoria Way, San Ramon, CA 94583 415-837-9106
† Reeve Electronics, Mellish E. Murray, 1720 W. Fulton St., Chicago, IL 60612 312-670-0150

Dielectrics — See Films (Vol. C), Insulation Materials (Vol. C)

Differentials, Mechanical — See Gears & Gear Mechanisms (Vol. B)

Digital Panel Meters — See Meters, Panel (Digital) (Vol. D)

Digital Tape Recorders — See Recorders, Computer Data (Vol. D)

Digitizers, Audio (Sonic)-2000

† Astronautics Corporation of America, P.O. Box 523, Milwaukee, WI 53201-0523 414-447-8200
Centigram Corp., 155A Moffett Park Dr., Sunnyvale, CA 94086 408-734-3222
Digital Transmission Techniques, Inc., P.O. Box 1847, Wayne, NJ 07470 201-831-1615
§ Industrial Computer Designs, Inc., 31264 La Baya Drive, Westlake Village, CA 91362 818-889-3179
§ Intech, Microcircuits Div., 2270 Martin Ave., Santa Clara, CA 95050 408-988-4930
† LNR Communications, Inc., 180 Marcus Blvd., Hauppauge, NY 11788 516-273-7111
† Mimic, Inc., P.O. Box 921, Acton, MA 01720 617-263-2101
† MSC Prods./Eaton Corp., 1640 Monrovia St., Costa Mesa, CA 92627 714-642-2427
Science Accessories Corp., 970 Kings Hwy. W., Southport, CT 06490 203-255-1526
Summagraphics Corp., 35 Brentwood Ave., Fairfield, CT 06430 203-384-1344

Digitizers, Video-2000

Applied Sys., 26401 Harper Ave., St. Clair Shores, MI 48081 313-779-8700
† Astronautics Corporation of America, P.O. Box 523, Milwaukee, WI 53201-0523 414-447-8200
ATV Research, Inc., 1301 Broadway, Dakota City, NE 68731 402-987-3771
§ Chorus Data Systems, P.O. Box 810, 27 Proctor Hill Rd., Hollis, NH 03049 603-465-7100
† Colorado Video, Inc., Box 928, Boulder, CO 80306 303-444-3972
Control Systems, 2855 Anthony Lane, Minneapolis, MN 55418 612-789-2421
Display Interface Corp., 525 Boston Post Rd., P.O. Box 250, Milford, CT 06460 203-877-7661
Eikonix Corp., 23 Crosby Dr., Bedford, MA 01730 617-275-5070
Image Technology Methods Corp., 103 Moody St., Waltham, MA 02154 617-894-1720
Imaging Technology, Inc., 600 W. Cummings Park, Woburn, MA 01801 .. 617-938-8444
Interpretation Sys., Inc., A DBA Systems Company, 420 S. Fairview Ave., Goleta, CA 93117 805-967-2383
Matrox Elctrn. Sys., 1055 St. Regis Blvd., Dorval, QU, CANADA H9P 2T4 514-685-2630
Spatial Data Systems, A DBA Systems Co., 508 S. Fairview, Goleta, CA 93117 805-967-2383
Summagraphics Corp., 35 Brentwood Ave., Fairfield, CT 06430 203-384-1344
Third Domain, P.O. Box 35400, Tucson, AZ 85740-5400 602-293-6310

Digitizers, Pencil Follower (Incl. Coordinate & Graphic)-2000

§† ALTEK Corp., 2150E Indl. Pkwy., Silver Spring, MD 20904 301-622-3906
Applied Sys., 26401 Harper Ave., St. Clair Shores, MI 48081 313-779-8700
† Auto-trol Tech., 12500 N. Washington St., Denver, CO 80233 303-452-4919
† Calcomp, 2411 W. La Palma Ave., Anaheim, CA 92801 714-821-2011
Computer Talk, Inc., Box 148, Morrison, CO 80465 303-697-5485
Display Interface Corp., 525 Boston Post Rd., P.O. Box 250, Milford, CT 06460 203-877-7661
Elographics, 105 Randolph Rd., Oak Ridge, TN 37830 615-482-4100
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
§ Houston Instrument, 8500 Cameron Rd., Austin, TX 78753 512-835-0900
Interface Electronics Inc., 21134 Bridge St., Southfield, MI 48034 313-352-8820
§ Mouse Sys. Corp., 2336H Walsh Ave., Santa Clara, CA 95051 408-988-0211
Summagraphics Corp., 35 Brentwood Ave., Fairfield, CT 06430 203-384-1344
§ Summit CAD Corp., 5222 FM 1960 W100, Houston, TX 77069 713-440-1468
§ Sun-Flex Co., Inc., 20 Pimentel Ct., Novato, CA 94947 415-883-1221
Viable Systems Inc., Box 438, Needham, MA 02192 617-449-4570
Xyztek Corp., 8000 E. Prentice Ave. Ste. B7, Englewood, CO 80111 303-850-9400

Digitizers, Transient & Waveform-2900

† Calcomp, 2411 W. La Palma Ave., Anaheim, CA 92801 714-821-2011
CDS - Colorado Data Sys., 3301 W. Hampden, Unit C, Englewood, CO 80110 303-762-1640
† Gould Inc., Recording Systems Div., 3631 Perkins Ave., Cleveland, OH 44114 216-361-3315
LeCroy Resch. Sys. Corp., 700 S. Main St., Spring Vly., NY 10977 914-425-2000
LeCroy Resch. Sys. Corp. (Cal.), 1806 Embarcadero Rd., Palo Alto, CA 94303 415-856-1800
† Norland Corp., Norland Dr., Ft. Atkinson, WI 53538 414-563-8456
§ PrimeLine-Soltec Distbn., Soltec Corp., P.O. Box 818, Sun Valley, CA 91353-0818 .... 800-525-5554;818-764-5400
Racal-Dana Instrs. Inc., 4 Goodyear St., Irvine, CA 92715 714-859-8999
Tektronix, Inc., P. O. Box 500, Y3-314, Beaverton, OR 97077 .... 800-547-1512;Oregon only 800-452-1877

Test & Measurement Systems, Inc., 349 Cobalt Way, Ste. 301, Sunnyvale, CA 94086 408-720-8877

Dimmers, Light — See Controls, Lamp Dimming, Flashing (Vol. D)

Diode Arrays (Incl. Photo)-3700 — *See Vol. B*

Diodes, Avalanche-4800 — *See Vol. A*

Diodes, Backward-4800 — *See Vol. A*

Diodes, Breakdown — See Diodes, Avalanche (Vol. A)

Diodes, Chip, Unpackaged-4800 — *See Vol. A*

Diodes, Electroluminescent (Radiating)-4800 — *See Vol. A*

Diodes, Frequency Multiplier-4800 — *See Vol. A*

Diodes, Germanium-4800 — *See Vol. A*

Diodes, Gunn-4800 — *See Vol. A*

Diodes, High Voltage (1,000 Volts & Over)-4800 — *See Vol. A*

Diodes, Hot Carrier-4800 — *See Vol. A*

Diodes, Impatt-4800 — *See Vol. A*

Diodes, Infrared-4800 — *See Vol. A*

Diodes, Laser-4800 — *See Vol. A*

Diodes, Light Emitting (LEDs)-3700 — *See Vol. B*

Diodes, Limiting-4800 — *See Vol. A*

Diodes, Liquid Crystal (LCDs)-3700 — *See Vol. B*

Diodes, Matched Pairs-4800 — *See Vol. A*

Diodes, Matched Quads-4800 — *See Vol. A*

Diodes, Microwave Detector-4800 — *See Vol. A*

Diodes, Microwave Mixer-4800 — *See Vol. A*

Diodes, Noise-4800 — *See Vol. A*

Diodes, Photoelectric-3700 — *See Vol. B*

Diodes, PIN-4800 — *See Vol. A*

Diodes, Schottky-4800 — *See Vol. A*

Diodes, Selenium — See Rectifiers, Selenium (Vol. A)

Diodes, Silicon-4800 — *See Vol. A*

Diodes, Step Recovery-4800 — *See Vol. A*

Diodes, Switching-4800 — *See Vol. A*

Diodes, Temperature Compensating-4800 — *See Vol. A*

Diodes, Trigger — See Diodes, Avalanche (Vol. A)

Diodes, Tunnel-4800 — *See Vol. A*

Diodes, Varactor-4800 — *See Vol. A*

Diodes, Video Detector — See Diodes, Microwave Detector (Vol. A)

Diodes, Zener & Stabistors (Forward Reference Diodes)-4800 — *See Vol. A*

Diodes (MIL)-2440 — *See Vol. B*

Diplexers, Antenna-1900

† Premier Microwave, 35 New Broad St., Port Chester, NY 10573, 914-939-8900 .... A•1781
† Airtron, Litton Industries, Inc., 200 E. Hanover Ave., Morris Plains, NJ 07950 201-539-5500
Alford Mfg. Co., P.O. Box 2116, 32 Sixth Rd., Woburn, MA 01888 617-935-8610
† Applied Research, Inc., 160 Dupont St., Plainview, NY 11803 516-349-9200
§† Cal Count, 5407 Port Royal Rd., Springfield, VA 22151 703-321-9625
Chesterfield Prods., 37 Midland Ave., Elmwood Park, NJ 07407 201-797-9655
Continental Electronics Mfg. Co., P.O. Box 270879, Dallas, TX 75227 214-381-7161
† Eaton Corp., A.I.L. Div., Comac Rd., Deer Park, NY 11729 516-595-3094
Eaton Corp., Microwave Products Division, 955 Benicia Avenue, Sunnyvale, CA 94086 408-730-6300
† Electro-Magnetic Processes, Inc., 9616 Owensmouth Ave., Chatsworth, CA 91311 818-882-6333
Hughes Aircraft Co, Aerospace Grps./Support Sys., P.O. Box 90515, Los Angeles, CA 90009 213-670-1515
Hughes Aircraft Co., Microelctrn. Sys. Div., 2601 Campus Dr., Irvine, CA 92715 714-752-3800
† Metropole Products Inc., P.O. Box 10275, Alexandria, VA 22310 .... 703-971-8606; 703-971-7082
Microphase, 587 Connecticut Ave., Norwalk, CT 06856 203-866-8000
Microwave Development Labs., 10 Michigan Dr., Natick, MA 01760 617-655-0060
North Hills Elctrns., 1 Alexander Pl., Glen Cove, NY 11542 516-671-5700
† Sage Laboratories, Inc., 3 Huron Dr., Natick, MA 01778 617-653-0844
† Wavecom, 9036 Winnetka Ave., Northridge, CA 91324 818-882-3010

Direction Finders (MIL), High Frequency-3475

American Elctrn. Labs., Inc., Govt. Grp. Div., P.O. Box 552, Lansdale, PA 19446
† Litton Applied Technology, 645 Almanor Ave., P.O. Box 3478, Sunnyvale, CA 94088-3478 408-773-0777
† Microwave/Sys., 1 Adler Dr., E. Syracuse, NY 13057 315-437-9951
OAR Corp., A CompuDyne Co., 10447 Roselle St., San Diego, CA 92121 619-453-4013
† Signatron, A Unit of Sundstrand Corp., 12 Hartwell Ave., Lexington, MA 02173 617-861-1500

Direction Finders (MIL), Radio-3475

† Collins Avionics Divisions, Rockwell Intl., 400 Collins Rd. NE, Cedar Rapids, IA 52498 319-395-1000
† Litton Applied Technology, 645 Almanor Ave., P.O. Box 3478, Sunnyvale, CA 94088-3478 408-773-0777
† Microwave/Sys., 1 Adler Dr., E. Syracuse, NY 13057 315-437-9951
OAR Corp., A CompuDyne Co., 10447 Roselle St., San Diego, CA 92121 619-453-4013
† Signatron, A Unit of Sundstrand Corp., 12 Hartwell Ave., Lexington, MA 02173 617-861-1500

Direction Finding Sets & Systems (MIL)-3475

† General Instr., Govt. Sys., 600 W. John St., Hicksville, NY 11802-0709 516-933-3000
† Microwave/Sys., 1 Adler Dr., E. Syracuse, NY 13057 315-437-9951
OAR Corp., A CompuDyne Co., 10447 Roselle St., San Diego, CA 92121 619-453-4013
† Radio Resch. Instr. Co., Inc., Two Lake Ave. Extension, Danbury, CT 06811-5295 203-792-6666
† Rodale Elctrns. Corp., 603 Chestnut St., Garden City, NY 11530 516-222-0050

Discharge Systems, Energy-4000

Advanced Kinetics, 1231 Victoria St., Costa Mesa, CA 92627 714-646-7165
CML MACARR Div., Marine Electric RPD, Inc., 666 Pacific St., Brooklyn, NY 11217 718-857-2400
Maxwell Labs., 8835 Balboa Ave., San Diego, CA 92123 619-279-5100
Pulsar Products Div., 2700 Merced St., San Leandro, CA 94577 415-577-7236
Simmonds Precision, P.O. Box 310, Norwich, NY 13815 607-335-5000
U.S. Scientific Instrs., 61 North Beacon St., Boston, MA 02134 617-787-2411

Discriminators-1900

† Frequency Elctrns., 55 Charles Lindbergh Blvd., Mitchel Field, NY 11553, 516-794-4500 .... A•1367
† Frequency Selective Networks, Inc., 69-20 Garfield Ave., Woodside, NY 11377, 718-424-7500 .... A•1369
† Microsonics Inc., 60 Winter St., Weymouth, MA 02188, 617-337-4200 .... A•1386
Piezo Technology Inc., 2525 Shader Rd., Orlando, FL 32804, 305-298-2000 .... A•1413
Polyphase Instr., 175 Commerce Dr., Ft. Washington, PA 19034, 215-643-6950 .... A•1622
Reeves-Hoffman Div., 400 W. North St., Carlisle, PA 17013, 717-243-5929 .... A•1425
Sokol Crystal Prods., Inc., 121 Water St., Mineral Point, WI 53565, 608-987-3363 .... A•1435-1436
THORN EMI Gencom Inc., 23 Madison Rd., Fairfield, NJ 07006, 201-575-5586 .... A•2343
† Alpha Comps., 1106 E. Simpson Rd., Mechanicsburg, PA 17055 717-697-8595
§† Anaren Microwave, P.O. Box 178, 6635 Kirkville Rd., E. Syracuse, NY 13057 315-432-8909
Cirtech, EG & G, 15237 Cherry St., Stanley, KS 66223 913-681-2801
CTS Electronics Corp., Knights Division, 400 Reimann Ave., Sandwich, IL 60548 815-786-8411
Damon/Elctrns. Div., 80 Wilson Way, Westwood, MA 02090 617-329-2460
§† Data-Control Sys., Commerce Dr., Box 860, Danbury, CT 06810 203-743-9241
§ EMR Data Systems, Div. Sangamo- Weston, Box 3041, Sarasota, FL 33578 813-371-0811
† Environmental Comm., 3150 Pullman St., Costa Mesa, CA 92627 714-557-7800
† General Optronics, 3005 Hadley Rd., So. Plainfield, NJ 07080 201-549-9000
Hughes Aircraft Co, Aerospace Grps./Support Sys., P.O. Box 90515, Los Angeles, CA 90009 213-670-1515
Hughes Aircraft Co., Microelctrn. Sys. Div., 2601 Campus Dr., Irvine, CA 92715 714-752-3800
† Hughes Solid State Products, 500 Superior Ave., Dept. E8, Newport Bch., CA 92658-8903 714-759-2411
LeCroy Resch. Sys. Corp., 700 S. Main St., Spring Vly., NY 10977 914-425-2000
M/A-Com Microwave Components, Inc., M/A-Com, South Avenue, Burlington, MA 01803 617-272-3000
† McCoy Electronics Co., Sub. Oak Technology Inc., 100 Watts St., P.O. Box B, Mt. Holly Springs, PA 17065 717-486-3411
Murata Erie North America, Inc., 1148 Franklin Rd., S.E., Marietta, GA 30067 404-952-9777
† Piezo Crystal, 100 "K" St., Box 619, Carlisle, PA 17013 717-249-2151
† Premier Microwave, 35 New Broad St., Port Chester, NY 10573 914-939-8900
† Solid State Elctrns. Corp., 18646 Parthenia St., Northridge, CA 91324 818-993-8257
§ Tau-Tron, Inc., A Unit of General Signal, 10 Lyberty Way, Westford, MA 01886 617-692-5100
§ Tennelec, 601 Turnpike, Oak Ridge, TN 37830 615-483-8405
Tri-Com, Inc., 7304 Grove Rd., Frederick, MD 21701 301-694-6666

† Watkins-Johnson Co., 3333 Hillview Ave., Palo Alto, CA 94304 415-493-4141

Disks, Computer Memory – See Memory Systems, Disk (Vol. D)

Disks, Magnetic 3½″-2000

§ BASF Sys., Crosby Dr., Bedford, MA 01730 .... 617-271-4000;800-343-4600
Burroughs Corp., Borroughs Place, Rm. 4C-51, Detroit, MI 48232 313-972-7000
§ Computerware, Inc., 8480-I Tyco Rd., Vienna, VA 22180 703-821-8200
Stanford Applied Engrg. Inc., 3520 De La Cruz Blvd., Santa Clara, CA 95050 400-988-0700
§ Sumitronics, Inc,, Sumitomo Corporation, 1270 Oakmead Pkwy. Ste. 201, Sunnyvale, CA 94086 408-737-7683

Disks, Magnetic, 5¼″ Flexible-2000

§ ATV Research, Inc., 1301 Broadway, Dakota City, NE 68731 402-987-3771
§ BASF Sys., Crosby Dr., Bedford, MA 01730 .... 617-271-4000;800-343-4600
Burroughs Corp., Borroughs Place, Rm. 4C-51, Detroit, MI 48232 313-972-7000
§ Computerware, Inc., 8480-I Tyco Rd., Vienna, VA 22180 703-821-8200
Control Data Corp., P.O. Box O, Minneapolis, MN 55440 .... 1-800-828-8001 Operator 82;In MN 612-921-4400
Dysan Corp., 5201 Patrick Henry Dr., P.O. Box 58053, Santa Clara, CA 95050 408-988-3472
§ Electric Switches, Inc., 2478 Fletcher Dr., Los Angeles, CA 90039 213-660-1310
Gra-Mar Inc., 3165 McCrory Pl., Ste. 265, Orlando, FL 32803 305-894-3351
Hitachi America, Ltd., 59 Route 17 South, Allendale, NJ 07401 201-825-8000
I^2 Interface, Inc., 21101 Osborne St., Canoga Park, CA 91304 818-341-7014
§ Micro Peripherals Inc., 9754 Deering Ave., Chatsworth, CA 91311 213-709-4202
Nashua Corp., 44 Franklin St., Nashua, NH 03061 603-880-2889
Omega Engrg., Box 4047, Stamford, CT 06907 203-359-1660
§ Personal Micro Computers, 275 Santa Ana Ct., Sunnyvale, CA 94086 ... 408-737-8441
§ Polaroid Corp., 119 Windsor St., Cambridge, MA 02139 617-577-2237
§ Sumitronics, Inc,, Sumitomo Corporation, 1270 Oakmead Pkwy. Ste. 201, Sunnyvale, CA 94086 408-737-7683
§ TEAC Corp. of America, Indl. Prod. Div., 7733 Telegraph Rd., Montebello, CA 90640 213-726-0303
§ Verbatim Corp., 323 Soquel Way, Sunnyvale, CA 94086 408-245-4400

Disks, Magnetic, 8″ Flexible-2000

§ BASF Sys., Crosby Dr., Bedford, MA 01730 .... 617-271-4000;800-343-4600
Burroughs Corp., Borroughs Place, Rm. 4C-51, Detroit, MI 48232 313-972-7000
§ Computerware, Inc., 8480-I Tyco Rd., Vienna, VA 22180 703-821-8200
Control Data Corp., P.O. Box O, Minneapolis, MN 55440 .... 1-800-828-8001 Operator 82;In MN 612-921-4400
Digiac Corp., 175 Engineers Rd., Hauppauge, NY 11788 516-273-8600
Dysan Corp., 5201 Patrick Henry Dr., P.O. Box 58053, Santa Clara, CA 95050 408-988-3472
§ Micro Peripherals Inc., 9754 Deering Ave., Chatsworth, CA 91311 213-709-4202
Nashua Corp., 44 Franklin St., Nashua, NH 03061 603-880-2889
NEC Information Systems, NEC Corporation, 1414 Massachusetts Ave., Boxborough, MA 01719 617-264-8000
§ Polaroid Corp., 119 Windsor St., Cambridge, MA 02139 617-577-2237
§ Verbatim Corp., 323 Soquel Way, Sunnyvale, CA 94086 408-245-4400

Disks, Magnetic, Front-loading Cartridge-2000

§ BASF Sys., Crosby Dr., Bedford, MA 01730 .... 617-271-4000;800-343-4600
§ Computer Field Services, Inc., 6 Federal Street, Danvers, MA 01923 617-774-2930
§ Computerware, Inc., 8480-I Tyco Rd., Vienna, VA 22180 703-821-8200
Control Data Corp., P.O. Box O, Minneapolis, MN 55440 .... 1-800-828-8001 Operator 82;In MN 612-921-4400
§ Datum, Storage Prods. Div., 1363 State College Blvd., Anaheim, CA 92806 714-533-6333
Dysan Corp., 5201 Patrick Henry Dr., P.O. Box 58053, Santa Clara, CA 95050 408-988-3472
§ Electric Switches, Inc., 2478 Fletcher Dr., Los Angeles, CA 90039 213-660-1310
Gra-Mar Inc., 3165 McCrory Pl., Ste. 265, Orlando, FL 32803 305-894-3351
ICI, 570 W. Lambert, Ste. C, Brea, CA 92621 714-990-1707
I^2 Interface, Inc., 21101 Osborne St., Canoga Park, CA 91304 818-341-7014
Mohawk Data Sciences, MDS Center, Herkimer, NY 13350 315-866-5300
Nashua Corp., 44 Franklin St., Nashua, NH 03061 603-880-2889
Vermont Resch. Corp., Precision Pk., N. Springfield, VT 05150 802-886-2256

Disks, Magnetic, Pack-2000

§ BASF Sys., Crosby Dr., Bedford, MA 01730 .... 617-271-4000;800-343-4600
§ Computer Field Services, Inc., 6 Federal Street, Danvers, MA 01923 617-774-2930
§ Computerware, Inc., 8480-I Tyco Rd., Vienna, VA 22180 703-821-8200
Control Data Corp., P.O. Box O, Minneapolis, MN 55440 .... 1-800-828-8001 Operator 82;In MN 612-921-4400
Dysan Corp., 5201 Patrick Henry Dr., P.O. Box 58053, Santa Clara, CA 95050 408-988-3472
Gra-Mar Inc., 3165 McCrory Pl., Ste. 265, Orlando, FL 32803 305-894-3351
Mohawk Data Sciences, MDS Center, Herkimer, NY 13350 315-866-5300
Nashua Corp., 44 Franklin St., Nashua, NH 03061 603-880-2889

Disks, Magnetic, Sub-4″-2000

Micro Peripherals Inc., 9754 Deering Ave., Chatsworth, CA 91311 213-709-4202
Stanford Applied Engrg. Inc., 3520 De La Cruz Blvd., Santa Clara, CA 95050 400-988-0700
TEAC Corp. of America, Indl. Prod. Div., 7733 Telegraph Rd., Montebello, CA 90640 213-726-0303

Disks, Magnetic, Top-loading Cartridge-2000

§ BASF Sys., Crosby Dr., Bedford, MA 01730 .... 617-271-4000;800-343-4600
§ Computer Field Services, Inc., 6 Federal Street, Danvers, MA 01923 617-774-2930
§ Computerware, Inc., 8480-I Tyco Rd., Vienna, VA 22180 703-821-8200
§ Datum, Storage Prods. Div., 1363 State College Blvd., Anaheim, CA 92806 714-533-6333
Dysan Corp., 5201 Patrick Henry Dr., P.O. Box 58053, Santa Clara, CA 95050 408-988-3472
§ Electric Switches, Inc., 2478 Fletcher Dr., Los Angeles, CA 90039 213-660-1310
Gra-Mar Inc., 3165 McCrory Pl., Ste. 265, Orlando, FL 32803 305-894-3351
Mohawk Data Sciences, MDS Center, Herkimer, NY 13350 315-866-5300
Nashua Corp., 44 Franklin St., Nashua, NH 03061 603-880-2889
Stanford Applied Engrg. Inc., 3520 De La Cruz Blvd., Santa Clara, CA 95050 400-988-0700

Disks, Magnetic, Winchester Module-2000

Alpha Data, 20750 Marilla St., Chatsworth, CA 91311 818-882-6500
§ Antona Corp., 2100 S. Sawtelle Blvd., Suite 205, Los Angeles, CA 90025 213-473-8995
§ BASF Sys., Crosby Dr., Bedford, MA 01730 .... 617-271-4000;800-343-4600
§ Colorado Video, Inc., Box 928, Boulder, CO 80306 303-444-3972
§† Compucorp, 2211 Michigan Ave., Santa Monica, CA 90404 213-829-7453
§ Computer Field Services, Inc., 6 Federal Street, Danvers, MA 01923 617-774-2930
§ Computerware, Inc., 8480-I Tyco Rd., Vienna, VA 22180 703-821-8200
Dysan Corp., 5201 Patrick Henry Dr., P.O. Box 58053, Santa Clara, CA 95050 408-988-3472
Hitachi America, Ltd., 59 Route 17 South, Allendale, NJ 07401 201-825-8000
I^2 Interface, Inc., 21101 Osborne St., Canoga Park, CA 91304 818-341-7014
Kearney Magnetics, 150 Charcot Ave., San Jose, CA 95131 408-262-4136
NEC Information Systems, NEC Corporation, 1414 Massachusetts Ave., Boxborough, MA 01719 617-264-8000
Personal Micro Computers, 275 Santa Ana Ct., Sunnyvale, CA 94086 ... 408-737-8441
§ Stanford Applied Engrg. Inc., 3520 De La Cruz Blvd., Santa Clara, CA 95050 400-988-0700
TEAC Corp. of America, Indl. Prod. Div., 7733 Telegraph Rd., Montebello, CA 90640 213-726-0303
Tecstor, Inc., 16161 Gothard Street, Huntington Beach, CA 92647 714-842-0077
Texas Instrs., Data Sys. Group, P. O. Box 809063, Dallas, TX 75380-9063 1-800-527-3500
† Trilobyte Computer Corporation, 801 W. Grand Ave., Oakland, CA 94607 415-839-1100
Zendex Corp., 6700 Sierra La., Dublin, CA 94566 415-828-3000

Disks, Memory, Flexible – See Memory Systems, Disk, Flexible (Vol. D)

Disks, Optical Encoder – See Encoders, Shaft Angle, Optical (Vol. B)

Dispensers, Adhesive-1600 – *See Vol. C*

Dispensers, DIP & IC – See Machines, Component Handling (Vol. D)

Dispensers (MIL), Chaff-3475

† Lundy Elctrns. & Systems, Inc., 1 Robert La., Glen Head, NY 11545 516-671-9000

Dispensing Pods (MIL), Chaff-3475

† Lundy Elctrns. & Systems, Inc., 1 Robert La., Glen Head, NY 11545 516-671-9000

Display Modules-2450 – *See Vol. B*

Display Power Supplies – See Converters, DC to DC (Vol. D), Power Supplies, AC Output (Vol. D)

Displays, CRT-5700 – *See Vol. A*

Displays, Dot Matrix-2450 – *See Vol. B*

Displays, Edge Lighted & Back Lighted-2450 – *See Vol. B*

Displays, Electroluminescent-2450 – *See Vol. B*

Displays, Electromagnetic-2450 – *See Vol. B*

Displays, Electromechanical-2450 – *See Vol. B*

Displays, Fiber Optic-2450 – *See Vol. B*

Displays, Graphic-2450 – *See Vol. B*

Displays, Indicator Lights-2450 – *See Vol. B*

Displays, Graphic Systems-2000

Telpar, Inc., 4137 Billy Mitchell Rd., P.O. Box 796, Addison, TX 75001, 214-233-6631 .... D•1075
VL Electronics, 2775 Glendower Ave., Los Angeles, CA 90027, 213-661-8883 .... B•1117
§ Antona Corp., 2100 S. Sawtelle Blvd., Suite 205, Los Angeles, CA 90025 213-473-8995
Applied Sys., 26401 Harper Ave., St. Clair Shores, MI 48081 313-779-8700
† Astronautics Corporation of America, P.O. Box 523, Milwaukee, WI 53201-0523 414-447-8200
† Aydin Corp., 700 Dresher Rd., Horsham, PA 19044 215-657-7510
§† Aydin Controls, 414 Commerce Dr., Ft. Washington, PA 19034 215-542-7800
CELCO, 70 Constantine Dr., Mahwah, NJ 07430 201-327-1123
† Collins Avionics Divisions, Rockwell Intl., 400 Collins Rd. NE, Cedar Rapids, IA 52498 319-395-1000
§ Data General, 4400 Computer Dr., Westboro, MA 01581 617-366-8911
§ Densitron Corp., 20775 Western Ave., Torrance, CA 90501 213-618-9647
Dio-Rey, Div. of Info-Lite, 422 Cliff St., Fairview, NJ 07022 201-941-4455

General Digital Industries Inc., 7702 Governors Dr. W., Huntsville, AL 35805 205-837-8305
† Hallmark Nameplate, Inc./Electropanel Co., 1855 New Highway, Farmingdale, NY 11735 516-454-0700
† Hartman Systems, Figgie Intl., 360 Wolf Hill Rd., Huntington Sta., NY 11746 516-427-7500
† Hazeltine Corp., 500 Commack Rd., Commack, NY 11725 516-462-5100
† Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
Image Technology Methods Corp., 103 Moody St., Waltham, MA 02154 617-894-1720
KMC Systems, Inc., 140 Greenwood Ave. (Bldg. 3), Midland Pk., NJ 07432 201-447-0007
Laser Concepts, Omega Organization Intl., P.O. Box 687, Mercer Island, WA 98040 206-232-6256
Lexidata Corp., 755 Middlesex Tpke., Billerica, MA 01865 .... 617-663-8550; 800-472-4747
Lundy Elctrns. & Systems, Inc., 1 Robert La., Glen Head, NY 11545 516-671-9000
† Metier Management Sys., Inc., 5884 Point West Dr., Houston, TX 77036 713-988-9100
Metra Instrs., 2056 Bering Dr., San Jose, CA 95131 408-297-8530
New Media Graphics Corp., 279 Cambridge St. #5, Burlington, MA 01803 617-272-8501
Peritek Corp., 5550 Redwood Rd., Oakland, CA 94619 415-531-6500
§ PlasmaGraphics Corp., 141 Mount Bethel Rd., P.O. Box 4903, Warren, NJ 07060 201-757-5000
§ Ramtek, 2211 Lawson Lane, Santa Clara, CA 95050 408-988-2211
† SAI Technlg. Co., Science Applications Inc., 4060 Sorrento Valley Blvd., San Diego, CA 92121 619-452-9150
Show 'N Tell Products, AMG, Inc., 155 Franklin Street, Dayton, OH 45402 513-223-8211
§ Spatial Data Systems, A DBA Systems Co., 508 S. Fairview, Goleta, CA 93117 805-967-2383
† UCE, Inc., 24 Fitch St., Norwalk, CT 06855 203-838-7509
§ Vidco, 8323 S.W. Cirrus Drive, Beaverton, OR 97005 503-641-1804

Displays, Laser-2450 – *See Vol. B*

Displays, Light-emitting Diode (LED)-2450 – *See Vol. B*

Displays, Lighted Segment-2450 – *See Vol. B*

Displays, Liquid Crystal (LCD)-2450 – *See Vol. B*

Displays, Message-2450 – *See Vol. B*

Displays, Planar Gas Discharge-2450 – *See Vol. B*

Displays, Plasma-2450 – *See Vol. B*

Displays, Projection Type (CRT; Electromechanical; Film; Light Valve)-2450 – *See Vol. B*

Displays, Remote-2450 – *See Vol. B*

Displays, Status-2450 – *See Vol. B*

Displays, Storage Tube – See Displays, CRT (Vol. A)

Displays, Touch Sensitive (Infrared & Mechanical) – See Touch Monitors (Vol.), Touch Panels (Vol.), Touch Terminals

Displays, Tube – See Tubes, Readout (Vol. A)

Displays, Vacuum Fluorescent-2450 – *See Vol. B*

Display Sets (MIL), Computer-3475

† Custom Prods. Grp., Sys. Dev. Corp.-A Burroughs Co., P.O. Box 517, Paoli, PA 19301 215-648-7660
Data General, 4400 Computer Dr., Westboro, MA 01581 617-366-8911
General Digital Industries Inc., 7702 Governors Dr. W., Huntsville, AL 35805 205-837-8305
† Hartman Systems, Figgie Intl., 360 Wolf Hill Rd., Huntington Sta., NY 11746 516-427-7500
† SAI Technlg. Co., Science Applications Inc., 4060 Sorrento Valley Blvd., San Diego, CA 92121 619-452-9150
Show 'N Tell Products, AMG, Inc., 155 Franklin Street, Dayton, OH 45402 513-223-8211
† Singer Co., Librascope Div., 833 Sonora Ave., Glendale, CA 91201 818-244-6541

Dissipators, Heat – See Heat Sinks, Semiconductor (Vol. C), Heat Sinks, Soldering (Vol. C)

Distortion Analyzers, Indicators – See Analyzers, AF (Vol. D)

Dividers, Analog-3130 – *See Vol. A*

Dividers, Frequency-3450 – *See Vol. A*

Dividers, Power (LF, HF, VHF, UHF)-3450 – *See Vol. A*

Dividers, Power, Microwave-3450 – *See Vol. A*

Dividers, Voltage-Also See Networks, Resistance; Transformers, Voltage Dividing-2900

Allen-Bradley Co., Electronics Group, Rockwell Corporation, 1201 S. Second St., Milwaukee, WI 53204, 414-671-2000 .... A•1795,1797
§ Caddock Electronics, Inc., 1717 Chicago Ave., Riverside, CA 92507, 714-788-1700 .... A•1805,1820-1821
EECO Incorporated, 1601 E. Chestnut Ave., P.O. Box 659, Santa Ana, CA 92702-0659, 714-835-6000 .... B•1559
General Resistance, Inc., A Prime Technology Company, Twin Lakes Rd., P.O. Box 185, N. Branford, CT 06471, 203-481-5721 .... D•1233
† HyComp Inc., 75 Union Ave., Box 377, Sudbury, MA 01776, 617-443-4631 .... A•1872
† Jennings, 970 McLaughlin Ave., San Jose, CA 95122, 408-292-4025 ..... D•1251
Julie Resch. Labs., 211 West 61st St., New York, NY 10023, 212-245-2727 .... D•1254
K & M Elctrns., 123 Interstate Dr., W. Springfield, MA 01089, 413-781-1350 .... A•1879
Koep Precision Standards, Inc., P. O. Box 191, So. Plainfield, NJ 07080, 201-549-9280 .... D•1257
North Hills Elctrns., 1 Alexander Pl., Glen Cove, NY 11542, 516-671-5700 .... A•2210
§† Ohmite Mfg. Co., 3601 W. Howard St., Skokie, IL 60076, 312-675-2600 ... A•1918
Ohmtek, Inc., 2160 Liberty Dr., Niagara Falls, NY 14304, 716-283-4025 ... A•1924
† Ross Engrg. Corp., 540 Westchester Dr., Campbell, CA 95008, 408-377-4621 .... B•1443
† Sensitive Research Instrs., 25 Dock St., Mt. Vernon, NY 10550, 914-699-9717 .... D•1306
Standard Energy, Div. WBH Scientific, Inc., Rte. 32, Greenville, NY 12083, 518-966-4197 .... D•1844
Tech Labs., Inc., Bergen & Edsall Blvds., Palisades Pk., NJ 07650, 201-944-2221 .... B•1701
Tettex Instruments, Inc., P.O. Box 281, Fairview Village, PA 19409-0281, 215-539-6050 .... D•1312
Vishay Resistive Sys. Grp., 63 Lincoln Hwy., Malvern, PA 19355, 215-644-1300 .... A•1976
Allen-Bradley Co., Industrial Control Div., 1201 S. Second St., Milwaukee, WI 53201 414-671-2000
§ American HV Test Systems Inc., Central Garrett Ind'l. Pk., Accident, MD 21520 301-826-8651
† Analog Devices, P.O. Box 280, Norwood, MA 02062 617-329-4700
Assembly Specialists, 914 Main St., Box 965, Acton, MA 01720 617-263-9100
Beckman Industrial Corp., Cedar Grove Div., 89 Commerce Rd., Cedar Grove, NJ 07009 201-239-6200
§† Beckman Industrial Corp., Electronic Technologies Div., 2500 Harbor Blvd., Fullerton, CA 92634 714-871-4848
Bertan Assocs., 121 New South Rd., Hicksville, NY 11801 516-433-3110
Coast Coil Co., 5333 W. Washington Blvd., Los Angeles, CA 90016 213-936-6188
§ Dale Electronics, Inc., Norfolk Div., 2300 Riverside Blvd., Norfolk, NE 68701 402-371-0080
Del Elctrns. Corp., 250 E. Sandford Blvd., Mt. Vernon, NY 10550 914-699-2000
§† Digitran Co., Becton Dickinson & Co., 3100 New York Dr., Pasadena, CA 91107 818-791-5600
Electrical Instr. Svc., 25 Dock St., Mt. Vernon, NY 10550 914-699-9717
Electrical Standards Div., E.S.R.S., Inc., 7337 Greenbush, N. Hollywood, CA 91605 818-765-4224
Electro Scientific Inds., 13900 N.W. Science Pk. Dr., Portland, OR 97229 503-641-4141
Fluke, John, Mfg. Co., Box C9090, MS 250C, Everett, WA 98206 206-356-5400
Gamble, Charles T., Inds., 605 Perkins La., Delanco, NJ 08075 609-461-1900
Gamma High Voltage Resch. Inc., 152 S. MacQuesten Pkwy., Mt. Vernon, NY 10550 914-667-5050
Glassman High Voltage Inc., P.O. Box 551, Salem Indl. Pk., Whitehouse Sta., NJ 08889 201-534-9007
§ Guildline Instrs., 4403 Vineland Rd, Suite B-10, Orlando, FL 32811-9998 305-423-8215
Hipotronics, P.O. Drawer A, Brewster, NY 10509 914-279-8091
KDI Electronics, Inc., Engelmann & Pyrofilm Divisions, 60 S. Jefferson Rd., Whippany, NJ 07981 201-887-8100
Kelvin, 5919 Noble Ave., Van Nuys, CA 91411 818-782-6662
Leeds & Northrup Instrs., A Unit of General Signal Corp., Sumneytown Pike, North Wales, PA 19454 215-643-2000
† Litton Potentiometer Div., 750 So. Fulton Ave., Mt. Vernon, NY 10551 ... 914-664-7733
† Megatran Electronic Power, Rising Sun Rd., Bordentown, NJ 08505 609-298-7300
§ New-Tone Electronics, Inc., 44 Farrand St., Bloomfield, NJ 07003 201-748-5089
† North Atlantic Inds., Instrument Div., 60 Plant Ave., Hauppauge, NY 11788 516-582-6500
† NWL Transformers, Rising Sun Rd., P.O. Box 358, Bordentown, NJ 08505 609-298-7300
Oeco Corp., 712 S.E. Hawthorne Blvd., Portland, OR 97214 503-238-2440
Oram Elctrns., Rte. 22, Putnam Business Park, Brewster, NY 10509-9587 914-279-2966
Pearson Elctrns., 1860 Embarcadero Rd., Palo Alto, CA 94303 415-494-6444
Power Designs, Inc., 1700 Shames Dr., Westbury, NY 11590 516-333-6200
Pulsar Products Div., 2700 Merced St., San Leandro, CA 94577 415-577-7236
§† RCD Components, Inc., 330 Bedford St., Manchester, NH 03101 603-669-0054
Shalltronix Corp., Preston St., P.O. Box 235, Selma, NC 27576 919-965-6346
Thickfilm Int'l., Rt. 1-Box 85-0, Indian Head, MD 20640 301-375-8666
§ THORN EMI Gencom Inc., 23 Madison Rd., Fairfield, NJ 07006 201-575-5586
TRW Resistive Products Div., TRW Electronic Components Grp., 401 N. Broad St., Philadelphia, PA 19108 215-923-8230
Universal Voltronics, 27 Radio Circle Dr., Mt. Kisco, NY 10549 914-241-1300
ZI-TECH Instr. Corp., 2151 Park Blvd., Box 60490, Palo Alto, CA 94306 415-326-2151

Doublers, Frequency – See Multipliers, Frequency (Vol. A)

Doublers, Voltage-Also See Rectifiers, Bridges & Assemblies-4900 — See *Vol. A*

Down Converters-3400

North Hills Elctrns., 1 Alexander Pl., Glen Cove, NY 11542, 516-671-5700 ...... A∘1700
† Airtron, Litton Industries, Inc., 200 E. Hanover Ave., Morris Plains, NJ 07950 201-539-5500
California Microwave, 990 Almanor Ave., Sunnyvale, CA 94086 408-732-4000
§ Dexcel, Div. of Gould, 2285C Martin Ave., Santa Clara, CA 95050 408-727-9833
Eaton Corp., Microwave Products Division, 955 Benicia Avenue, Sunnyvale, CA 94086 408-730-6300
M/A-Com Microwave Components, Inc., M/A-Com, South Avenue, Burlington, MA 01803 617-272-3000
† Microwave/Sys., 1 Adler Dr., E. Syracuse, NY 13057 315-437-9951
† Sage Laboratories, Inc., 3 Huron Dr., Natick, MA 01778 617-653-0844
† TRW Microwave, 825 Stewart Dr., Sunnyvale, CA 94086 408-732-0880

Drafting Machines-4200 — See *Vol. C*

Drafting Symbols, Dry Transfer, Pressure Sensitive, etc. (Incl. Lettering)-4200 — See *Vol. C*

Drawers, Sliding-1400 — See *Vol. C*

Drills & Accessories, Manual & Power-5400 — See *Vol. C*

Drivers & Decoders For Readouts-2450 — See *Vol. B*

Drivers, Chopper-1100

§ Anaheim Automation, 910 E. Orangefair La., Anaheim, CA 92801 714-992-6990
Frequency Control Prods., Inc., American Time Prods. Div., 61-20 Woodside Ave., Woodside, NY 11377 212-458-5811
Icon, 156 Sixth St., Cambridge, MA 02142 617-868-5400
IXYS Corp., 142 Charcot Ave., San Jose, CA 95131 408-262-8800
Metis, P.O. Box 1499, Bowie, MD 20716 301-249-1702
PKS - Digiplan Ltd., 1859 Charter Lane, Lancaster, PA 17601 717-299-2706
Sigma Instrs., 170 Pearl St., Braintree, MA 02184 617-843-5000
Silicon General, 11861 Western Ave., Garden Grove, CA 92641 714-898-8121
† Solid State Elctrns. Corp., 18646 Parthenia St., Northridge, CA 91324 818-993-8257

Drivers, Nut-5400 — See *Vol. C*

Drivers, Solenoid-4550 — See *Vol. B*

Drivers, Speaker-1300

AES Corp., 285 Newbury St., P.O. Box 2093, Peabody, MA 01960 617-535-7310
§ Altec Lansing, Altec Corp., 1250 N. Red Gum St., Anaheim, CA 92806 714-632-7117
§ Atlas Sound Div., 10 Pomeroy Rd., Parsippany, NJ 07054 201-887-7800
§† Audiosone, Inc., 617 Fan Hill Rd., Monroe, CT 06468 ...... 203-268-4372;203-268-6703
§ ERA Poly-Planar Div., 311 E. Park St., Moonachie, NJ 07074 201-641-3650
§ Frazier, 1930 Valley View La., Dallas, TX 75234 214-241-3441
§† Hartley Prods., 620 Island Rd., Ramsey, NJ 07446 201-327-4443
§ Martin Sound Prods., 28 Alpha Park, Cleveland, OH 44143-2297 216-442-2286
§ MG Electronics, 32 Ranick Rd., Hauppauge, NY 11788 516-582-3400
§† Oaktron Inds., 1000 30th St., Monroe, WI 53566 608-328-5560
§ Panasonic, Ind'l. Elctrn. Comps., Panasonic, Elctrn. Comps. Div., Box 1503, Secaucus, NJ 07094 201-348-7000
§ Paso Sound Prods., 14 First St, Pelham, NY 10803 914-738-4800
§ Pyle Industries, Inc., 501 Center St, P.O. Box 620, Huntington, IN 46750 219-356-1200
Shogyo Intl. Corp., 287 Northern Blvd., Great Neck, NY 11021 516-466-0911
§ Shokai Far East, Ltd., 280 North Central Ave., Hartsdale, NY 10530 914-681-0700
§ Soundlier, American Trading & Prod. Corp., 9380 Watson Ind'l. Pk., St. Louis, MO 63126 314-962-9870

Drivers, Switch-3450 — See *Vol. A*

Drivers, Tube — See Drivers & Decoders for Readouts (Vol. B)

Drives & Drive Mechanisms (Dial)-2400 — See *Vol. C*

Drives/Subsystems, Core Disk Emulator-2000

Bridge Computer Co., Sea Data Corp., 1 Bridge St., Newton, MA 02158 617-244-8190
Information Technolgoy A.D.S.C., P.O. Box 470, College Park, MD 20740 301-779-5110
§ Summit CAD Corp., 5222 FM 1960 W100, Houston, TX 77069 713-440-1468
Wire Graphics, Inc., 215 B. Central Ave., Farmingdale, NY 11735 516-293-1525

Drives/Subsystems, Disk, 3½" Diskette-2000

Computer Maintenance Corp., 405 Murray Hill Pkwy, East Rutherford, NJ 07073 201-866-6400
§ Sumitronics, Inc,, Sumitomo Corporation, 1270 Oakmead Pkwy. Ste. 201, Sunnyvale, CA 94086 408-737-7683
Wire Graphics, Inc., 215 B. Central Ave., Farmingdale, NY 11735 516-293-1525

Drives/Subsystems, Disk, 5¼" Diskette-2000

§ Alps Electric (USA), Inc., 3553 N. First St., San Jose, CA 95134, 408-946-6000 ...... D∘1057
Heurikon Corporation, 3201 Latham Dr., Madison, WI 53713, 800-356-9602;608-271-8700 ...... D∘1091
§ Antona Corp., 2100 S. Sawtelle Blvd., Suite 205, Los Angeles, CA 90025 213-473-8995
Applied Micro Technlg., A Burr Brown Co., 3669 E. 44th Street, Tucson, AZ 85713 602-622-8605
Bridge Computer Co., Sea Data Corp., 1 Bridge St., Newton, MA 02158 617-244-8190
Cambridge Digital Sys., Compumart, P.O. Box 568, 65 Bent St., Cambridge, MA 02139 617-491-2700
CGRS Microtech, P. O. Box 102, Langhorne, PA 19047 215-757-0284
§ CompuPro, 3506 Breakwater Ct., Hayward, CA 94545 415-786-0909
Computer Maintenance Corp., 405 Murray Hill Pkwy, East Rutherford, NJ 07073 201-866-6400
§ Comtek, Inc., 309 Breesport, San Antonio, TX 78216 512-340-8253
Control Data Corp., P.O. Box O, Minneapolis, MN 55440 ...... 1-800-828-8001 Operator 82;In MN 612-921-4400
§ General Robotics Corp., 57 N. Main St., Hartford, WI 53027 414-673-6800
I^2 Interface, Inc., 21101 Osborne St., Canoga Park, CA 91304 818-341-7014
Sperry Univac, Mini-Computer Operations, Box C-19504, Irvine, CA 92713 714-754-6900
§ Sumitronics, Inc,, Sumitomo Corporation, 1270 Oakmead Pkwy. Ste. 201, Sunnyvale, CA 94086 408-737-7683
Wire Graphics, Inc., 215 B. Central Ave., Farmingdale, NY 11735 516-293-1525

Drives/Subsystems, Disk, 5¼" Winchester-2000

Heurikon Corporation, 3201 Latham Dr., Madison, WI 53713, 800-356-9602;608-271-8700 ...... D∘1091
† Ampex Corp., 401 Broadway, Redwood City, CA 94063 415-367-2011
§ Antona Corp., 2100 S. Sawtelle Blvd., Suite 205, Los Angeles, CA 90025 213-473-8995
Applied Micro Technlg., A Burr Brown Co., 3669 E. 44th Street, Tucson, AZ 85713 602-622-8605
Bridge Computer Co., Sea Data Corp., 1 Bridge St., Newton, MA 02158 617-244-8190
§ California Computer Systems, 740 S. Milpitas Blvd., Milpitas, CA 95035 408-945-0500
Cambridge Digital Sys., Compumart, P.O. Box 568, 65 Bent St., Cambridge, MA 02139 617-491-2700
§ CompuPro, 3506 Breakwater Ct., Hayward, CA 94545 415-786-0909
§† Computer Field Services, Inc., 6 Federal Street, Danvers, MA 01923 617-774-2930
Computer Maintenance Corp., 405 Murray Hill Pkwy, East Rutherford, NJ 07073 201-866-6400
Computer System Assocs., 7564 Trade St., San Diego, CA 92121 619-566-3911
§ Comtek, Inc., 309 Breesport, San Antonio, TX 78216 512-340-8253
Control Data Corp., P.O. Box O, Minneapolis, MN 55440 ...... 1-800-828-8001 Operator 82;In MN 612-921-4400
§ Davong Systems, Inc., 217 Humboldt Ct., Sunnyvale, CA 94089 408-734-4900
DMA Sys., 601 Pine St., Goleta, CA 93117 805-683-3811
First Computer Corp., 645 Blackhawk Dr., Westmont, IL 60559 312-920-1050
§ General Robotics Corp., 57 N. Main St., Hartford, WI 53027 414-673-6800
§ Genisco Memory Prods. Corp., 10874 Hope St., Cypress, CA 90630 714-220-0720
IDE Associates, Inc., 35 Dunham Rd., Billerica, MA 01821 617-663-6878
§ Innovative Data Technology, 5340 Eastgate Mall, San Diego, CA 92121 619-587-0555
Interface Electronics Inc., 21134 Bridge St., Southfield, MI 48034 313-352-8820
I^2 Interface, Inc., 21101 Osborne St., Canoga Park, CA 91304 818-341-7014
§ RACET Computes, Ltd., 1855 W Katella Ste. 255, Orange, CA 92667 714-997-4950
§ Software Dynamics, 2111 W. Crescent Ave-G, Anaheim, CA 92801 714-635-4760
Sperry Univac, Mini-Computer Operations, Box C-19504, Irvine, CA 92713 714-754-6900
§ Sumitronics, Inc,, Sumitomo Corporation, 1270 Oakmead Pkwy. Ste. 201, Sunnyvale, CA 94086 408-737-7683
§ Summit CAD Corp., 5222 FM 1960 W100, Houston, TX 77069 713-440-1468
Sunol Systems, 1187 Quarry Lane, Pleasanton, CA 94586 415-484-3322
§ Texas Instrs., Data Sys. Group, P. O. Box 809063, Dallas, TX 75380-9063 1-800-527-3500

Drives, Subsystems, Disk, 8" Diskette-2000

† Antona Corp., 2100 S. Sawtelle Blvd., Suite 205, Los Angeles, CA 90025 213-473-8995
Applied Micro Technlg., A Burr Brown Co., 3669 E. 44th Street, Tucson, AZ 85713 602-622-8605
Bridge Computer Co., Sea Data Corp., 1 Bridge St., Newton, MA 02158 617-244-8190
Cambridge Digital Sys., Compumart, P.O. Box 568, 65 Bent St., Cambridge, MA 02139 617-491-2700
§ CompuPro, 3506 Breakwater Ct., Hayward, CA 94545 415-786-0909
Computer System Assocs., 7564 Trade St., San Diego, CA 92121 619-566-3911
First Computer Corp., 645 Blackhawk Dr., Westmont, IL 60559 312-920-1050
§ General Robotics Corp., 57 N. Main St., Hartford, WI 53027 414-673-6800
NEC Information Systems, NEC Corporation, 1414 Massachusetts Ave., Boxborough, MA 01719 617-264-8000
Sperry Univac, Mini-Computer Operations, Box C-19504, Irvine, CA 92713 714-754-6900
Wire Graphics, Inc., 215 B. Central Ave., Farmingdale, NY 11735 516-293-1525
Zendex Corp., 6700 Sierra La., Dublin, CA 94566 415-828-3000

Drives/Subsystems, Disk, 8" Winchester-2000

† Ampex Corp., 401 Broadway, Redwood City, CA 94063 415-367-2011
§ Antona Corp., 2100 S. Sawtelle Blvd., Suite 205, Los Angeles, CA 90025 213-473-8995
Applied Micro Technlg., A Burr Brown Co., 3669 E. 44th Street, Tucson, AZ 85713 602-622-8605
Bridge Computer Co., Sea Data Corp., 1 Bridge St., Newton, MA 02158 617-244-8190
Cambridge Digital Sys., Compumart, P.O. Box 568, 65 Bent St., Cambridge, MA 02139 617-491-2700
Computer Dynamics, 105 S. Main St., Greer, SC 29651 803-877-7471
§† Computer Field Services, Inc., 6 Federal Street, Danvers, MA 01923 617-774-2930
Computer Maintenance Corp., 405 Murray Hill Pkwy, East Rutherford, NJ 07073 201-866-6400
Computer System Assocs., 7564 Trade St., San Diego, CA 92121 619-566-3911

Control Data Corp., P.O. Box O, Minneapolis, MN 55440 .... 1-800-828-8001 Operator 82;In MN 612-921-4400
§ Data General, 4400 Computer Dr., Westboro, MA 01581 617-366-8911
First Computer Corp., 645 Blackhawk Dr., Westmont, IL 60559 312-920-1050
§ General Robotics Corp., 57 N. Main St., Hartford, WI 53027 414-673-6800
NEC Information Systems, NEC Corporation, 1414 Massachusetts Ave., Boxborough, MA 01719 617-264-8000
§ Point 4 Data Corp., 2569 McCabe Way, Irvine, CA 92714 714-863-1111
§ RACET Computes, Ltd., 1855 W Katella Ste. 255, Orange, CA 92667 714-997-4950
§ Software Dynamics, 2111 W. Crescent Ave-G, Anaheim, CA 92801 714-635-4760
Sperry Univac, Mini-Computer Operations, Box C-19504, Irvine, CA 92713 714-754-6900
Zendex Corp., 6700 Sierra La., Dublin, CA 94566 415-828-3000

Drives/Subsystems, Disk, 14" Winchester-2000

Alpha Data, 20750 Marilla St., Chatsworth, CA 91311 818-882-6500
Ampex Corp., 401 Broadway, Redwood City, CA 94063 415-367-2011
§† Computer Field Services, Inc., 6 Federal Street, Danvers, MA 01923 617-774-2930
Control Data Corp., P.O. Box O, Minneapolis, MN 55440 .... 1-800-828-8001 Operator 82;In MN 612-921-4400
§ Data General, 4400 Computer Dr., Westboro, MA 01581 617-366-8911
First Computer Corp., 645 Blackhawk Dr., Westmont, IL 60559 312-920-1050
NEC Information Systems, NEC Corporation, 1414 Massachusetts Ave., Boxborough, MA 01719 617-264-8000
§ RACET Computes, Ltd., 1855 W Katella Ste. 255, Orange, CA 92667 714-997-4950
Sperry Univac, Mini-Computer Operations, Box C-19504, Irvine, CA 92713 714-754-6900

Drives/Subsystems, Disk, Fixed-2000

Alpha Data, 20750 Marilla St., Chatsworth, CA 91311 818-882-6500
† Ampex Corp., 401 Broadway, Redwood City, CA 94063 415-367-2011
Bridge Computer Co., Sea Data Corp., 1 Bridge St., Newton, MA 02158 .. 617-244-8190
Cambridge Digital Sys., Compumart, P.O. Box 568, 65 Bent St., Cambridge, MA 02139 617-491-2700
§† Computer Field Services, Inc., 6 Federal Street, Danvers, MA 01923 617-774-2930
Control Data Corp., P.O. Box O, Minneapolis, MN 55440 .... 1-800-828-8001 Operator 82;In MN 612-921-4400
§ Data General, 4400 Computer Dr., Westboro, MA 01581 617-366-8911
First Computer Corp., 645 Blackhawk Dr., Westmont, IL 60559 312-920-1050
IDE Associates, Inc., 35 Dunham Rd., Billerica, MA 01821 617-663-6878
I² Interface, Inc., 21101 Osborne St., Canoga Park, CA 91304 818-341-7014
NEC Information Systems, NEC Corporation, 1414 Massachusetts Ave., Boxborough, MA 01719 617-264-8000
§ Pertec Peripherals Corp., P.O. Box 2198, Chatsworth, CA 91311 818-882-0030
Sperry Univac, Mini-Computer Operations, Box C-19504, Irvine, CA 92713 714-754-6900
§ Sumitronics, Inc,, Sumitomo Corporation, 1270 Oakmead Pkwy. Ste. 201, Sunnyvale, CA 94086 408-737-7683
Vermont Resch. Corp., Precision Pk., N. Springfield, VT 05150 802-886-2256

Drives/Subsystems, Disk, Fixed/Removable-2000

† Ampex Corp., 401 Broadway, Redwood City, CA 94063 415-367-2011
Applied Sys., 26401 Harper Ave., St. Clair Shores, MI 48081 313-779-8700
Cambridge Digital Sys., Compumart, P.O. Box 568, 65 Bent St., Cambridge, MA 02139 617-491-2700
§† Computer Field Services, Inc., 6 Federal Street, Danvers, MA 01923 617-774-2930
Computer Maintenance Corp., 405 Murray Hill Pkwy, East Rutherford, NJ 07073 201-866-6400
Computer System Assocs., 7564 Trade St., San Diego, CA 92121 619-566-3911
Control Data Corp., P.O. Box O, Minneapolis, MN 55440 .... 1-800-828-8001 Operator 82;In MN 612-921-4400
§ Data General, 4400 Computer Dr., Westboro, MA 01581 617-366-8911
First Computer Corp., 645 Blackhawk Dr., Westmont, IL 60559 312-920-1050
IDE Associates, Inc., 35 Dunham Rd., Billerica, MA 01821 617-663-6878
I² Interface, Inc., 21101 Osborne St., Canoga Park, CA 91304 818-341-7014
§ Pertec Peripherals Corp., P.O. Box 2198, Chatsworth, CA 91311 818-882-0030
Vermont Resch. Corp., Precision Pk., N. Springfield, VT 05150 802-886-2256

Drives/Subsystems, Magnetic Tape, ¼" Cartridge-2000

§ Algo, Inc., 9198-C Red Branch Rd., Columbia, MD 21045 301-730-7442
Amilon Corp., 49-12 30th Ave., Woodside, NY 11377 718-274-1794
§ Analog & Digital Peripherals, Inc. (ADPI), 815 Diana Dr., Troy, OH 45373 513-339-2241
Cambridge Digital Sys., Compumart, P.O. Box 568, 65 Bent St., Cambridge, MA 02139 617-491-2700
Cipher Data Prods., Inc., P.O. Box 85170, San Diego, CA 92138 619-578-9100
Computer Maintenance Corp., 405 Murray Hill Pkwy, East Rutherford, NJ 07073 201-866-6400
Control Data Corp., P.O. Box O, Minneapolis, MN 55440 .... 1-800-828-8001 Operator 82;In MN 612-921-4400
§ Data General, 4400 Computer Dr., Westboro, MA 01581 617-366-8911
§ Datum, Storage Prods. Div., 1363 State College Blvd., Anaheim, CA 92806 714-533-6333
§ Davong Systems, Inc., 217 Humboldt Ct., Sunnyvale, CA 94089 408-734-4900
§ Digi-Data Corp., 8580 Dorsey Run Rd., Jessup, MD 20794 301-498-0200
§ Dylon Data Corp., 9561 Ridgehaven Ct., San Diego, CA 92123 619-292-5584
§ General Robotics Corp., 57 N. Main St., Hartford, WI 53027 414-673-6800
IDE Associates, Inc., 35 Dunham Rd., Billerica, MA 01821 617-663-6878
§ Innovative Data Technology, 5340 Eastgate Mall, San Diego, CA 92121 619-587-0555
I² Interface, Inc., 21101 Osborne St., Canoga Park, CA 91304 818-341-7014
§ Point 4 Data Corp., 2569 McCabe Way, Irvine, CA 92714 714-863-1111
§ RACET Computes, Ltd., 1855 W Katella Ste. 255, Orange, CA 92667 714-997-4950
Sperry Univac, Mini-Computer Operations, Box C-19504, Irvine, CA 92713 714-754-6900

§ Sumitronics, Inc,, Sumitomo Corporation, 1270 Oakmead Pkwy. Ste. 201, Sunnyvale, CA 94086 408-737-7683

Drives/Subsystems, Magnetic Tape, Cassette-2000

Phi Technologies, Inc., 4605 North Stiles, Oklahoma City, OK 73105, 405-521-9000 .... D•1052-1053
Amilon Corp., 49-12 30th Ave., Woodside, NY 11377 718-274-1794
§ Analog & Digital Peripherals, Inc. (ADPI), 815 Diana Dr., Troy, OH 45373 513-339-2241
§ Braemar Corp., 11400 Rupp Drive, Burnsville, MN 55337 612-890-5135
Cambridge Digital Sys., Compumart, P.O. Box 568, 65 Bent St., Cambridge, MA 02139 617-491-2700
Control Data Corp., P.O. Box O, Minneapolis, MN 55440 .... 1-800-828-8001 Operator 82;In MN 612-921-4400
† Data Capture Technology, Hathaway Instruments, 5436-F South Mingo Rd., Tulsa, OK 74146 918-627-7521
§ Data General, 4400 Computer Dr., Westboro, MA 01581 617-366-8911
International Electro Magnetics, Inc., 350 N. Eric Dr., Palatine, IL 60067 .. 312-358-4622
Kogyosha, 179 Riveredge Rd., Tenafly, NJ 07670 201-569-8769
Sperry Univac, Mini-Computer Operations, Box C-19504, Irvine, CA 92713 714-754-6900
§ TEAC Corp. of America, Indl. Prod. Div., 7733 Telegraph Rd., Montebello, CA 90640 213-726-0303

Drives/Subsystems, Magnetic Tape, Reel-to-Reel-2000

† Reproduction Technologies Inc., Dept. EM, P.O. Box 815, Bristol, IN 46507-0518, 219-848-5233;219-848-5333 .... D•1034
Shinano Kenshi Corp. (SKC), 7525 Ethel Ave., Ste. 1, N. Hollywood, CA 91605, 818-764-4266 .... B•1187
Tape Concepts, Inc., P. O. Box 815, 110 E. Vistula St., Bristol, IN 46507, 219-848-5234 .... D•1035
Accardi Laboratories, 66-45 69th St., Middle Village, NY 11379 212-326-0570
Cipher Data Prods., Inc., P.O. Box 85170, San Diego, CA 92138 619-578-9100
Computer Maintenance Corp., 405 Murray Hill Pkwy, East Rutherford, NJ 07073 201-866-6400
Control Data Corp., P.O. Box O, Minneapolis, MN 55440 .... 1-800-828-8001 Operator 82;In MN 612-921-4400
† Data Capture Technology, Hathaway Instruments, 5436-F South Mingo Rd., Tulsa, OK 74146 918-627-7521
§ Data General, 4400 Computer Dr., Westboro, MA 01581 617-366-8911
§ Datum, Storage Prods. Div., 1363 State College Blvd., Anaheim, CA 92806 714-533-6333
§ Digi-Data Corp., 8580 Dorsey Run Rd., Jessup, MD 20794 301-498-0200
§ Dylon Data Corp., 9561 Ridgehaven Ct., San Diego, CA 92123 619-292-5584
Gra-Mar Inc., 3165 McCrory Pl., Ste. 265, Orlando, FL 32803 305-894-3351
Honeywell, Test Instrs. Div., P.O. Box 5227, Denver, CO 80217 303-773-4700
§ Innovative Data Technology, 5340 Eastgate Mall, San Diego, CA 92121 619-587-0555
§ Pertec Peripherals Corp., P.O. Box 2198, Chatsworth, CA 91311 818-882-0030
§ RACET Computes, Ltd., 1855 W Katella Ste. 255, Orange, CA 92667 714-997-4950
Texas Instrs., Data Sys. Group, P. O. Box 809063, Dallas, TX 75380-9063 1-800-527-3500

Drives/Subsystems, Semiconductor Emulator-2000

Targa Electronics, Systems Inc., 3101 Hawthorne Rd., P. O. Box 8485, Ottawa, ON, CANADA K1G 3H9 613-731-9941

Dry Transfer Letters & Numbers — See Kits, Marking (Vol. C)

Ducts, Wiring-6000 — *See Vol. C*

Dummy Loads, Electronic-2900

† Arra Inc., 15 Harold Ct., Bay Shore, NY 11706, 516-231-8400 .... A•1705
Coaxial Dynamics, 15210 Industrial Parkway, Cleveland, OH 44135, 216-267-2233 .... D•1203
† Electro Impulse, Box 870, Red Bank, NJ 07701-0870, 201-741-0404 .... D•1211
Transistor Devices, 274 S. Salem St., Randolph, NJ 07869, 201-361-6622 .... D•1316-1317
Triac Electronic Systems, Inc., 87-27 Myrtle Ave., Glendale, NY 11385, 718-441-4759 .... D•1132
† Alan Inds., P.O. Box 1203, Columbus, IN 47201 812-372-8869
Alford Mfg. Co., P.O. Box 2116, 32 Sixth Rd., Woburn, MA 01888 617-935-8610
§ Amphenol, An Allied Co., 43 Commerce Ct., Lisle, IL 60532 312-983-3500
† Applied Research, Inc., 160 Dupont St., Plainview, NY 11803 516-349-9200
§ Astrolab Inc., 4 Powder Horn Drive, Warren, NJ 07060 1-201-560-3800
Automatic Connector, Inc., 400 Moreland Rd., Commack, NY 11725 516-543-5000
§† Bird Elctrn., 30303 Aurora Rd., Cleveland, OH 44139 216-248-1200
§ CES Elctrns., 2968 Avenue Z, Brooklyn, NY 11235
Compac, 279 Skidmore Rd., Deer Park, NY 11729 516-667-3933
† Connecticut Microwave Corp., 106 Powder Mill Rd., Box 389, Canton, CT 06019 203-693-4247
Continental Electronics Mfg. Co., P.O. Box 270879, Dallas, TX 75227 214-381-7161
§ Dielectric Communications, General Signal, Tower Hill Rd., Raymond, ME 04071 .... 207-655-4555;800-341-9678
† Elcom Systems, Inc., 932 Clint Moore Rd., Boca Raton, FL 33431 305-994-1774
Elgar Corp, An Onan McGraw Edison Co., 9250 Brown Deer Rd., San Diego, CA 92121 619-450-0085
§† EMC Technology Inc, 1971 Old Cuthbert Rd., Cherry Hill, NJ 08034 609-429-7800
Engelmann Microwave Co., KDI Pyrofilm, 60 S. Jefferson Rd., Whippany, NJ 07981 201-887-5700
ETM Electromatic, 470 San Antonio Ave., Palo Alto, CA 94306 415-494-1505
† Ferro Ceramic Grinding, Inc., 247 Water St., Wakefield, MA 01880 617-245-1833
§ GC Elctrns., 400 S. Wyman St., Rockford, IL 61101 815-968-9661
§ Heath Co., Benton Harbor, MI 49022 616-982-3886
JFW Inds., Inc., 2719 E. Troy Ave., Indianapolis, IN 46203 317-783-9875

KDI Electronics, Inc., Engelmann & Pyrofilm Divisions, 60 S. Jefferson Rd., Whippany, NJ 07981 201-887-8100
§ Leader Instrs. Corp., 380 Oser Ave., Hauppauge, NY 11788-3694 516-231-6900
§† M/A-COM Omni Spectra, Inc., 21 Continental Blvd., Merrimack, NH 03054 603-424-4111
Maury Microwave, 8610 Helms Ave., Cucamonga, CA 91730 714-987-4715
† Microlab/FXR, 10 Microlab Rd., Livingston, NJ 07039 201-992-7700
† Micro Mode Prods., 1870 John Towers Ave., El Cajon, CA 92020 619-449-3844
§† Micronetics, 36 Oak St., Norwood, NJ 07648 201-767-1320
§ Microwave Development Labs., 10 Michigan Dr., Natick, MA 01760 617-655-0060
§† Microwave Filter Inc., 6743 Kinne St., East Syracuse, NY 13057-0486 .... 315-437-3953; 800-448-1666
† Mitec Elctrns., 15 Commerce St., Williston, VT 05495 802-864-0064
† Norsal Inds., 85 D Hoffman Lane So., Central Islip, NY 11722 516-234-1200
North Hills Elctrns., 1 Alexander Pl., Glen Cove, NY 11542 516-671-5700
§ Ohmite Mfg. Co., 3601 W. Howard St., Skokie, IL 60076 312-675-2600
† Premier Microwave, 35 New Broad St., Port Chester, NY 10573 914-939-8900
† Quartzite Processing, Inc., 6 Holyoke St., Malden, MA 02148 617-322-1380
† Reeve Electronics, Mellish E. Murray, 1720 W. Fulton St., Chicago, IL 60612 312-670-0150
§ Sinclair Radio Labs., 122 Rayette Rd., Concord, ONT, CANADA L9W2Y8 416-669-1244
Sivers IMA, 5669 Selmaraine Drive, Culver City, CA 90230 213-390-7477
† Sohio Engineered Materials Co., Unit of Sohio, P. O. Box 156, Niagara Falls, NY 14302 716-278-2000
Standard Power, Inc., 1400 S. Village Way, Santa Ana, CA 92705 714-558-8512
§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 215-673-5600
§† Systron-Donner Microwave Div., 14844 Oxnard St., Van Nuys, CA 91409 818-786-1760
† Torotel Prods. Inc., 13402 S. 71 Hwy., Grandview, MO 64030 816-761-6314
§† Waveline, Box 718, W. Caldwell, NJ 07006 201-226-9100
§† Workman Elctrn. Prods., Box 3828, Sarasota, FL 33578 813-371-4242

Dummy Loads, Microwave-2900

† Airtron, Litton Industries, Inc., 200 E. Hanover Ave., Morris Plains, NJ 07950 201-539-5500
Arra Inc., 15 Harold Ct., Bay Shore, NY 11706 516-231-8400
JFW Inds., Inc., 2719 E. Troy Ave., Indianapolis, IN 46203 317-783-9875
RLC Elctrns., Inc., 83 Radio Cir., Mt. Kisco, NY 10549 914-241-1334
† Sage Laboratories, Inc., 3 Huron Dr., Natick, MA 01778 617-653-0844

Dummy Loads, Power-2900

IET Labs, Inc., 534 Main St., Westbury, NY 11590, 516-334-5959 .... D•1244
Milwaukee Resistor Corp., 700 W. Virginia St., Milwaukee, WI 53204, 414-271-9900 .... A•1903
Triac Electronic Systems, Inc., 87-27 Myrtle Ave., Glendale, NY 11385, 718-441-4759 .... D•1132
† Airtron, Litton Industries, Inc., 200 E. Hanover Ave., Morris Plains, NJ 07950 201-539-5500
JFW Inds., Inc., 2719 E. Troy Ave., Indianapolis, IN 46203 317-783-9875
Standard Power, Inc., 1400 S. Village Way, Santa Ana, CA 92705 714-558-8512

Dummy Loads, Programmable-2900

IET Labs, Inc., 534 Main St., Westbury, NY 11590, 516-334-5959 .... D•1244
Triac Electronic Systems, Inc., 87-27 Myrtle Ave., Glendale, NY 11385, 718-441-4759 .... D•1132

Dummy Loads, Resistive-2900

IET Labs, Inc., 534 Main St., Westbury, NY 11590, 516-334-5959 .... D•1244
Milwaukee Resistor Corp., 700 W. Virginia St., Milwaukee, WI 53204, 414-271-9900 .... A•1903
Triac Electronic Systems, Inc., 87-27 Myrtle Ave., Glendale, NY 11385, 718-441-4759 .... D•1132
JFW Inds., Inc., 2719 E. Troy Ave., Indianapolis, IN 46203 317-783-9875
§ Leader Instrs. Corp., 380 Oser Ave., Hauppauge, NY 11788-3694 516-231-6900
§ Sinclair Radio Labs., 122 Rayette Rd., Concord, ONT, CANADA L9W2Y8 416-669-1244
† Trompeter Electronics, Inc., 8936 Comanche, Chatsworth, CA 91311 818-882-1020

Dummy Loads (MIL), RF-2440 — *See Vol. B*

Duplexers, Microwave-3400

† Airtron, Litton Industries, Inc., 200 E. Hanover Ave., Morris Plains, NJ 07950 201-539-5500
† Applied Research, Inc., 160 Dupont St., Plainview, NY 11803 516-349-9200
Engelmann Microwave Co., KDI Pyrofilm, 60 S. Jefferson Rd., Whippany, NJ 07981 201-887-5700
Hughes Aircraft Co, Aerospace Grps./Support Sys., P.O. Box 90515, Los Angeles, CA 90009 213-670-1515
Hughes Aircraft Co., Microelctrn. Sys. Div., 2601 Campus Dr., Irvine, CA 92715 714-752-3800
K&L Microwave, Inc., 408 Coles Circle, Salisbury, MD 21801 301-749-2424
KDI Electronics, Inc., Engelmann & Pyrofilm Divisions, 60 S. Jefferson Rd., Whippany, NJ 07981 201-887-8100
† Lorch Elctrns., 105 Cedar La., Englewood, NJ 07631 201-569-8282
M/A-Com Microwave Components, Inc., M/A-Com, South Avenue, Burlington, MA 01803 617-272-3000
Microphase, 587 Connecticut Ave., Norwalk, CT 06856 203-866-8000
§ Microwave Development Labs., 10 Michigan Dr., Natick, MA 01760 617-655-0060
† Microwave/Sys., 1 Adler Dr., E. Syracuse, NY 13057 315-437-9951
† Mitec Elctrns., 15 Commerce St., Williston, VT 05495 802-864-0064
† Premier Microwave, 35 New Broad St., Port Chester, NY 10573 914-939-8900
RCI/Data, 1992 Lakewood Rd., Toms River, NJ 08753 201-341-8361
† Sage Laboratories, Inc., 3 Huron Dr., Natick, MA 01778 617-653-0844
§ Sinclair Radio Labs., 122 Rayette Rd., Concord, ONT, CANADA L9W2Y8 416-669-1244
§† Systron-Donner Instr. Div., 2727 Systron Dr., Concord, CA 94518 415-676-5000
§† Systron-Donner Microwave Div., 14844 Oxnard St., Van Nuys, CA 91409 818-786-1760
† Technical Research & Mfg., Inc., R.F.D. #10, Manchester, NH 03103 603-627-6000
† Transco Products, Inc., 4241 Glencoe Ave., Marina del Rey, CA 90295 213-822-0800
† UTE Microwave, 3500 Sunset Ave., Asbury Park, NJ 07712 201-922-1009
Varian Associates, Inc., Microwave Tube Div., 611 Hansen Way, Palo Alto, CA 94303 415-493-4000

Duplexers, Nonmicrowave-1900

Chesterfield Prods., 37 Midland Ave., Elmwood Park, NJ 07407 201-797-9655
K&L Microwave, Inc., 408 Coles Circle, Salisbury, MD 21801 301-749-2424
RCI/Data, 1992 Lakewood Rd., Toms River, NJ 08753 201-341-8361
§ Sinclair Radio Labs., 122 Rayette Rd., Concord, ONT, CANADA L9W2Y8 416-669-1244

Duplicators, Magnetic Tape-1300

† Ampex Corp., 401 Broadway, Redwood City, CA 94063 415-367-2011
† Reproduction Technologies Inc., Dept. EM, P.O. Box 815, Bristol, IN 46507-0518 .... 219-848-5233;219-848-5333
§ Superex Electronics Corp., 151 Ludlow St., Yonkers, NY 10705 914-965-6906
Tape Concepts, Inc., P. O. Box 815, 110 E. Vistula St., Bristol, IN 46507 219-848-5234
† Telectro Sys., 96-18 43rd Ave., Corona, NY 11368 212-651-8900
Video Automation Systems, Upper Shad Rd., Pound Ridge, NY 10576 914-764-4613

Dust Covers — See Covers, Protective (Vol. C)

DVMs — See Meters, Volt, Digital (Vol. D)

Earphones — See Headphones (Vol. D)

Earth Stations, TV, Receive Only-1900

Andrew Corp., 10500 W. 153rd St., Orland Pk., IL 60462 312-349-3300
Avantek, Inc., 3175 Bowers Ave., Santa Clara, CA 95054 408-496-6710
§ Drake, R. L., Co., 540 Richard St., Miamisburg, OH 45342 513-866-2421
International Crystal Mfg., 10 N. Lee, P.O. Box 26330, Oklahoma City, OK 73126 405-236-3741
Scientific-Atlanta, Inc., P.O. Box 105600, Atlanta, GA 30348 404-441-4000

Editing Equipment, Tape-1300

† Ampex Corp., 401 Broadway, Redwood City, CA 94063 415-367-2011
§ Data Specialties, Inc., 3455 Commercial Ave., Northbrook, IL 60062 312-564-1800
§ Microtran Co. Inc., 145 E. Mineola Ave., Valley Stream, NY 11580 516-561-6050

Ejectors & Extractors, PC Boards — See Pullers, Circuit Board (Vol. C)

Elastomers, Conductive — See Conductive Elastomers (Vol. C)

Elastomers, Heat Shrinkable — See Caps, Forms & Tapes, Heat Shrinkable (Vol. C)

Electret — See Microphones, Condenser (Vol. D)

Electrical Measurement & Test Services — See Services, Electrical Measurement & Test (Vol. D)

Electrodes, Electroplating — See Electroplating Equipment & Supplies (Vol. D)

Electrodes, High Voltage-2900

§ American HV Test Systems Inc., Central Garrett Ind'l. Pk., Accident, MD 21520 301-826-8651
Maxwell Labs., 8835 Balboa Ave., San Diego, CA 92123 619-279-5100

Electromagnets-1850 — *See Vol. A*

Electronic Counter Countermeasures (ECCM) Fixes (MIL)-3475

† Cincinnati Elctrns., 2630 Glendale Milford Rd., Cincinnati, OH 45241 513-733-6100
Digital Radio Corp., 8901 La Cienega Blvd., Inglewood, CA 90301 213-670-8611
† Eaton Corp., A.I.L. Div., Comac Rd., Deer Park, NY 11729 516-595-3094
† General Instr., Govt. Sys., 600 W. John St., Hicksville, NY 11802-0709 516-933-3000
† Magnavox Advanced Prods. & Sys. Co., Magnavox Govt. Indl. Elctrns. Co., 2829 Maricopa St., Torrance, CA 90503 213-618-1200
† Microwave/Sys., 1 Adler Dr., E. Syracuse, NY 13057 315-437-9951
New Wave Instruments, 3760 Masters Court, San Jose, CA 95111 408-629-3105
† Optical & Conductive Coatings, Meridian Inds., Inc., 428 N. Buchanan Cir., # 8, Pacheco, CA 94553 415-798-6066
† Signatron, A Unit of Sundstrand Corp., 12 Hartwell Ave., Lexington, MA 02173 617-861-1500

Electronic Countermeasures (ECM) (MIL), Cruise Missiles-3475

† Eaton Corp., A.I.L. Div., Comac Rd., Deer Park, NY 11729 516-595-3094
† Microwave/Sys., 1 Adler Dr., E. Syracuse, NY 13057 315-437-9951
† Rodale Elctrns. Corp., 603 Chestnut St., Garden City, NY 11530 516-222-0050

ECMs (MIL), Torpedo Defense-3475

† Microwave/Sys., 1 Adler Dr., E. Syracuse, NY 13057 315-437-9951

ECM Sets (MIL)-3475

American Elctrn. Labs., Inc., Govt. Grp. Div., P.O. Box 552, Lansdale, PA 19446
† Eaton Corp., A.I.L. Div., Comac Rd., Deer Park, NY 11729 516-595-3094

ECM Sets (MIL)-3475 (Cont'd)

† Flight Systems, Inc., Tracor, Inc., 1091 Dove St., Newport Beach, CA 92660 714-833-9661
† General Instr., Govt. Sys., 600 W. John St., Hicksville, NY 11802-0709 ... 516-933-3000
† Microwave/Sys., 1 Adler Dr., E. Syracuse, NY 13057 315-437-9951
† Radio Resch. Instr. Co., Inc., Two Lake Ave. Extension, Danbury, CT 06811-5295 203-792-6666
† Rodale Elctrns. Corp., 603 Chestnut St., Garden City, NY 11530 516-222-0050
† Signatron, A Unit of Sundstrand Corp., 12 Hartwell Ave., Lexington, MA 02173 617-861-1500
† Systems Resch. Labs., Inc., 2800 Indian Ripple Rd., Dayton, OH 45440 .. 513-426-6000

ECM Sets (MIL), Close Air Support-3475

American Elctrn. Labs., Inc., Govt. Grp. Div., P.O. Box 552, Lansdale, PA 19446
† Eaton Corp., A.I.L. Div., Comac Rd., Deer Park, NY 11729 516-595-3094
† Flight Systems, Inc., Tracor, Inc., 1091 Dove St., Newport Beach, CA 92660 714-833-9661
† General Instr., Govt. Sys., 600 W. John St., Hicksville, NY 11802-0709 ... 516-933-3000
† Microwave/Sys., 1 Adler Dr., E. Syracuse, NY 13057 315-437-9951
† Rodale Elctrns. Corp., 603 Chestnut St., Garden City, NY 11530 516-222-0050

ECM Sets (MIL), Shipboard-3475

American Elctrn. Labs., Inc., Govt. Grp. Div., P.O. Box 552, Lansdale, PA 19446
† Flight Systems, Inc., Tracor, Inc., 1091 Dove St., Newport Beach, CA 92660 714-833-9661
† General Instr., Govt. Sys., 600 W. John St., Hicksville, NY 11802-0709 ... 516-933-3000
† Microwave/Sys., 1 Adler Dr., E. Syracuse, NY 13057 315-437-9951

ECM Systems (MIL)-3475

American Elctrn. Labs., Inc., Govt. Grp. Div., P.O. Box 552, Lansdale, PA 19446
Digital Radio Corp., 8901 La Cienega Blvd., Inglewood, CA 90301 213-670-8611
† Eaton Corp., A.I.L. Div., Comac Rd., Deer Park, NY 11729 516-595-3094
Electrospace Sys., Inc., P. O. Box 831359, Richardson, TX 75083-1359 214-783-2004
† E-Systems, Greenville Div., P.O. Box 1056, Greenville, TX 75401 214-457-4694
† Flight Systems, Inc., Tracor, Inc., 1091 Dove St., Newport Beach, CA 92660 714-833-9661
† General Instr., Govt. Sys., 600 W. John St., Hicksville, NY 11802-0709 ... 516-933-3000
† Microwave/Sys., 1 Adler Dr., E. Syracuse, NY 13057 315-437-9951
† Systems Resch. Labs., Inc., 2800 Indian Ripple Rd., Dayton, OH 45440 .. 513-426-6000
† Watkins-Johnson Co., 3333 Hillview Ave., Palo Alto, CA 94304 415-493-4141

ECM Systems (MIL), Deceptive-3475

American Elctrn. Labs., Inc., Govt. Grp. Div., P.O. Box 552, Lansdale, PA 19446
Digital Radio Corp., 8901 La Cienega Blvd., Inglewood, CA 90301 213-670-8611
† Eaton Corp., A.I.L. Div., Comac Rd., Deer Park, NY 11729 516-595-3094
Electrospace Sys., Inc., P. O. Box 831359, Richardson, TX 75083-1359 214-783-2004
† General Instr., Govt. Sys., 600 W. John St., Hicksville, NY 11802-0709 ... 516-933-3000
† Microwave/Sys., 1 Adler Dr., E. Syracuse, NY 13057 315-437-9951
† Rodale Elctrns. Corp., 603 Chestnut St., Garden City, NY 11530 516-222-0050
† Systems Resch. Labs., Inc., 2800 Indian Ripple Rd., Dayton, OH 45440 .. 513-426-6000

Electronic Intelligence (Elint) (MIL)-3475

American Elctrn. Labs., Inc., Govt. Grp. Div., P.O. Box 552, Lansdale, PA 19446
† Astronautics Corporation of America, P.O. Box 523, Milwaukee, WI 53201-0523 414-447-8200
Digital Radio Corp., 8901 La Cienega Blvd., Inglewood, CA 90301 213-670-8611
† Eaton Corp., A.I.L. Div., Comac Rd., Deer Park, NY 11729 516-595-3094
Electrospace Sys., Inc., P. O. Box 831359, Richardson, TX 75083-1359 214-783-2004
† E-Systems, Greenville Div., P.O. Box 1056, Greenville, TX 75401 214-457-4694
† General Instr., Govt. Sys., 600 W. John St., Hicksville, NY 11802-0709 ... 516-933-3000
† Litton Applied Technology, 645 Almanor Ave., P.O. Box 3478, Sunnyvale, CA 94088-3478 408-773-0777
† Microwave/Sys., 1 Adler Dr., E. Syracuse, NY 13057 315-437-9951
† Watkins-Johnson Co., 3333 Hillview Ave., Palo Alto, CA 94304 415-493-4141

Electronic Loads — See Dummy Loads (Vol. D)

Electronic Support Measures (ESM) Sets (MIL)-3475

American Elctrn. Labs., Inc., Govt. Grp. Div., P.O. Box 552, Lansdale, PA 19446
† Applied Communications, Amstar Tech. Prods. Co., 5490 Spectrum Drive, Frederick, MD 21701 301-694-5300
† Applied Communications, 9125 Gaither Rd., Gaithersburg, MD 20877 ... 301-948-5210
† Eaton Corp., A.I.L. Div., Comac Rd., Deer Park, NY 11729 516-595-3094
Electrospace Sys., Inc., P. O. Box 831359, Richardson, TX 75083-1359 214-783-2004
† General Instr., Govt. Sys., 600 W. John St., Hicksville, NY 11802-0709 ... 516-933-3000
GTE Sys.-Sylvania Sys. Grp., Western Div., P.O. Box 7188, Mountain View, CA 94039 415-966-2000
† Hartman Systems, Figgie Intl., 360 Wolf Hill Rd., Huntington Sta., NY 11746 516-427-7500
† Litton Applied Technology, 645 Almanor Ave., P.O. Box 3478, Sunnyvale, CA 94088-3478 408-773-0777
† Microwave/Sys., 1 Adler Dr., E. Syracuse, NY 13057 315-437-9951
† Pacific Electro Dynamics, Inc., 11465 Willows Rd. N.E., Redmond, WA 98052 206-881-1700
† Watkins-Johnson Co., 3333 Hillview Ave., Palo Alto, CA 94304 415-493-4141

ESM (MIL), Digitally Controlled-3475

American Elctrn. Labs., Inc., Govt. Grp. Div., P.O. Box 552, Lansdale, PA 19446
† Applied Communications, Amstar Tech. Prods. Co., 5490 Spectrum Drive, Frederick, MD 21701 301-694-5300
† Applied Communications, 9125 Gaither Rd., Gaithersburg, MD 20877 ... 301-948-5210
Digital Radio Corp., 8901 La Cienega Blvd., Inglewood, CA 90301 213-670-8611
Electrospace Sys., Inc., P. O. Box 831359, Richardson, TX 75083-1359 214-783-2004
† General Instr., Govt. Sys., 600 W. John St., Hicksville, NY 11802-0709 ... 516-933-3000
† Litton Applied Technology, 645 Almanor Ave., P.O. Box 3478, Sunnyvale, CA 94088-3478 408-773-0777
† Microwave/Sys., 1 Adler Dr., E. Syracuse, NY 13057 315-437-9951

ESM (MIL), Ships-3475

American Elctrn. Labs., Inc., Govt. Grp. Div., P.O. Box 552, Lansdale, PA 19446
† Applied Communications, Amstar Tech. Prods. Co., 5490 Spectrum Drive, Frederick, MD 21701 301-694-5300
† Applied Communications, 9125 Gaither Rd., Gaithersburg, MD 20877 ... 301-948-5210
Electrospace Sys., Inc., P. O. Box 831359, Richardson, TX 75083-1359 214-783-2004
† E-Systems, Greenville Div., P.O. Box 1056, Greenville, TX 75401 214-457-4694
† General Instr., Govt. Sys., 600 W. John St., Hicksville, NY 11802-0709 ... 516-933-3000
† Microwave/Sys., 1 Adler Dr., E. Syracuse, NY 13057 315-437-9951

ESM Suites (MIL)-3475

† Eaton Corp., A.I.L. Div., Comac Rd., Deer Park, NY 11729 516-595-3094
Electrospace Sys., Inc., P. O. Box 831359, Richardson, TX 75083-1359 214-783-2004
† E-Systems, Greenville Div., P.O. Box 1056, Greenville, TX 75401 214-457-4694
† General Instr., Govt. Sys., 600 W. John St., Hicksville, NY 11802-0709 ... 516-933-3000
† Litton Applied Technology, 645 Almanor Ave., P.O. Box 3478, Sunnyvale, CA 94088-3478 408-773-0777
† Microwave/Sys., 1 Adler Dr., E. Syracuse, NY 13057 315-437-9951

ESM Systems (MIL), Automated-3475

† Applied Communications, Amstar Tech. Prods. Co., 5490 Spectrum Drive, Frederick, MD 21701 301-694-5300
† Applied Communications, 9125 Gaither Rd., Gaithersburg, MD 20877 ... 301-948-5210
Electrospace Sys., Inc., P. O. Box 831359, Richardson, TX 75083-1359 214-783-2004
† E-Systems, Greenville Div., P.O. Box 1056, Greenville, TX 75401 214-457-4694
† General Instr., Govt. Sys., 600 W. John St., Hicksville, NY 11802-0709 ... 516-933-3000
† Litton Applied Technology, 645 Almanor Ave., P.O. Box 3478, Sunnyvale, CA 94088-3478 408-773-0777
† Microwave/Sys., 1 Adler Dr., E. Syracuse, NY 13057 315-437-9951

ESM Systems (MIL), IFM Receiver-3475

American Elctrn. Labs., Inc., Govt. Grp. Div., P.O. Box 552, Lansdale, PA 19446
† Litton Applied Technology, 645 Almanor Ave., P.O. Box 3478, Sunnyvale, CA 94088-3478 408-773-0777
† Microwave/Sys., 1 Adler Dr., E. Syracuse, NY 13057 315-437-9951
† TRW Microwave, 825 Stewart Dr., Sunnyvale, CA 94086 408-732-0880

Electronic Warfare (EW) Sets (MIL)-3475

† ABA Electromechanical Sys. Inc., Box 500, Pinellas Pk., FL 34290-0500 813-541-6681
American Elctrn. Labs., Inc., Govt. Grp. Div., P.O. Box 552, Lansdale, PA 19446
† Astronautics Corporation of America, P.O. Box 523, Milwaukee, WI 53201-0523 414-447-8200
Digital Radio Corp., 8901 La Cienega Blvd., Inglewood, CA 90301 213-670-8611
† Eaton Corp., A.I.L. Div., Comac Rd., Deer Park, NY 11729 516-595-3094
† Flight Systems, Inc., Tracor, Inc., 1091 Dove St., Newport Beach, CA 92660 714-833-9661
† General Instr., Govt. Sys., 600 W. John St., Hicksville, NY 11802-0709 ... 516-933-3000
† Litton Applied Technology, 645 Almanor Ave., P.O. Box 3478, Sunnyvale, CA 94088-3478 408-773-0777
† Microwave/Sys., 1 Adler Dr., E. Syracuse, NY 13057 315-437-9951
† Radio Resch. Instr. Co., Inc., Two Lake Ave. Extension, Danbury, CT 06811-5295 203-792-6666
Republic Electronics Co., 575 Broad Hollow Rd., Melville, NY 11747 516-249-1414
† Rodale Elctrns. Corp., 603 Chestnut St., Garden City, NY 11530 516-222-0050
† Signatron, A Unit of Sundstrand Corp., 12 Hartwell Ave., Lexington, MA 02173 617-861-1500
† Systems Resch. Labs., Inc., 2800 Indian Ripple Rd., Dayton, OH 45440 .. 513-426-6000

EW Sets (MIL), Ground Multitarget-3475

Digital Radio Corp., 8901 La Cienega Blvd., Inglewood, CA 90301 213-670-8611
† Flight Systems, Inc., Tracor, Inc., 1091 Dove St., Newport Beach, CA 92660 714-833-9661
† General Instr., Govt. Sys., 600 W. John St., Hicksville, NY 11802-0709 ... 516-933-3000
† Microwave/Sys., 1 Adler Dr., E. Syracuse, NY 13057 315-437-9951
Republic Electronics Co., 575 Broad Hollow Rd., Melville, NY 11747 516-249-1414

EW Sets (MIL), Portable-3475

American Elctrn. Labs., Inc., Govt. Grp. Div., P.O. Box 552, Lansdale, PA 19446
Digital Radio Corp., 8901 La Cienega Blvd., Inglewood, CA 90301 213-670-8611
† Flight Systems, Inc., Tracor, Inc., 1091 Dove St., Newport Beach, CA 92660 714-833-9661
† General Instr., Govt. Sys., 600 W. John St., Hicksville, NY 11802-0709 ... 516-933-3000
† Microwave/Sys., 1 Adler Dr., E. Syracuse, NY 13057 315-437-9951
† Republic Electronics Co., 575 Broad Hollow Rd., Melville, NY 11747 516-249-1414
† Signatron, A Unit of Sundstrand Corp., 12 Hartwell Ave., Lexington, MA 02173 617-861-1500

EW Suites (MIL), Ships-3475

Digital Radio Corp., 8901 La Cienega Blvd., Inglewood, CA 90301 213-670-8611
† E-Systems, Greenville Div., P.O. Box 1056, Greenville, TX 75401 214-457-4694
† Flight Systems, Inc., Tracor, Inc., 1091 Dove St., Newport Beach, CA 92660 714-833-9661
† General Instr., Govt. Sys., 600 W. John St., Hicksville, NY 11802-0709 ... 516-933-3000

EW Systems (MIL), Advanced Airborne Multitarget-3475

American Elctrn. Labs., Inc., Govt. Grp. Div., P.O. Box 552, Lansdale, PA 19446
† Astronautics Corporation of America, P.O. Box 523, Milwaukee, WI 53201-0523 414-447-8200

Digital Radio Corp., 8901 La Cienega Blvd., Inglewood, CA 90301 213-670-8611
† Eaton Corp., A.I.L. Div., Comac Rd., Deer Park, NY 11729 516-595-3094
† E-Systems, Greenville Div., P.O. Box 1056, Greenville, TX 75401 214-457-4694
† General Instr., Govt. Sys., 600 W. John St., Hicksville, NY 11802-0709 ... 516-933-3000
† Hazeltine Corp., 500 Commack Rd., Commack, NY 11725 516-462-5100
† Litton Applied Technology, 645 Almanor Ave., P.O. Box 3478, Sunnyvale, CA 94088-3478 408-773-0777
† Microwave/Sys., 1 Adler Dr., E. Syracuse, NY 13057 315-437-9951
† Rodale Elctrns. Corp., 603 Chestnut St., Garden City, NY 11530 516-222-0050
† Systems Resch. Labs., Inc., 2800 Indian Ripple Rd., Dayton, OH 45440 .. 513-426-6000

Electroplating Equipment & Supplies-4100

SIDAC Enclosures, Div. of Triac Electronic Systems, Inc., 87-27 Myrtle Ave., Glendale, NY 11385, 718-441-4728 .... C•1082
Auric Corp., 470 Frelinghuysen Ave., Newark, NJ 07114 201-242-4100
† Automated Prod. Equip. Corp., 142 Peconic Ave., Medford, NY 11763 ... 516-654-1197
Corning Glass Works, Corning Elctrns., Houghton Pk., Bldg. A-2, Corning, NY 14830 607-974-8725
† DuPont de Nemours, E. I., & Co., 1007 Market St., Wilmington, DE 19898 302-773-3218
§ Dynatronix, Inc., 105 Power St., Amery, WI 54001 .... 715-268-8118;800-826-7172
† Engelhard Corp., 70 Wood Ave. S., Iselin, NJ 08830 201-321-5900
Fidelity Chem. Prods. Corp., 472 Frelinqhuysen Ave., Newark, NJ 07114 201-242-4110
Hitran Corp., Agex, Rte. 31, RD 5-65, Flemington, NJ 08822 201-782-5525
Lehighton Elctrns., Inc., Box 328, Dept M, Lehighton, PA 18235 .... 717-386-4156; 215-377-5990
† M&T Chemicals, Inc., Woodbridge Rd. & Randolph Ave., Rahway, NJ 07065 201-499-0200
§ Pace Inc., 9893 Brewers Ct., Laurel, MD 20707 301-490-9860
Sel-Rex Div., OMI Intl. Corp., 75 River Rd., Nutley, NJ 07110 201-667-5200
† Technic, Inc., Box 965, Providence, RI 02901 401-781-6100
Triac Electronic Systems, Inc., 87-27 Myrtle Ave., Glendale, NY 11385 .. 718-441-4759

Electrostatic Discharge Guns - Also See Generators, ESD-2900

§ NRD, Mark IV Ind., Inc., 2937 Alt Blvd. N., Grand Island, NY 14072, 716-773-7634 .... D•1983
Brady Co., 574A Somerset St., N. Plainfield, NJ 07060 201-753-7988
Compliance Design Inc., 593 Massachusetts Ave., Boxboro, MA 01719 .. 617-264-4668
† Electro-Tech Sys., Inc., 115 E. Glenside Ave., Glenside, PA 19038 215-887-2196
Schaffner EMC, Inc., Instr. Div., 825 Lehigh Avenue, Union, NJ 07083 201-851-0644
§ Semtronics Corp., 310 Hwy 7 74 S, P.O. Box 2248, Peachtree City, GA 30269 404-487-6681
§ Simco Co., 2257 North Penn Rd., Hatfield, PA 19440 215-822-2171

Electrostatic Discharge (MIL)-2440 — See *Vol. B*

Elements, Sensing — See Transducers (Vol. B)

Eliminators, Battery — See Power Supplies, AC to DC Adapter (Vol. D)

Emitter Location & Identification System (MIL), Automatic Ground Transportable-3475

† General Instr., Govt. Sys., 600 W. John St., Hicksville, NY 11802-0709 ... 516-933-3000
† Signatron, A Unit of Sundstrand Corp., 12 Hartwell Ave., Lexington, MA 02173 617-861-1500
† Watkins-Johnson Co., 3333 Hillview Ave., Palo Alto, CA 94304 415-493-4141

Emitters/Detectors, Infrared-3700 — See *Vol. A*

Emitters, Fiber Optic-Also See Diodes, Laser-2475 — See *Vol. B*

Emulators, In-circuit-2900

§ Gould Inc., Design & Test Sys. Div., 4650 Old Ironsides Dr., Santa Clara, CA 95054-1279, 408-988-6800 .... D•1237
§ Advanced Digital Tech, 13400 Northrup Wy Ste 27, Bellevue, WA 98005 206-643-2382
§ Computer System Assocs., 7564 Trade St, San Diego, CA 92121 619-566-3911
Development Associates, 1520 S. Lyon, Santa Ana, CA 92705 714-835-9512
Information Technolgoy A.D.S.C., P.O. Box 470, College Park, MD 20740 301-779-5110
Motorola Semiconductor Prods. Sector, Adv. 72, Box 20912, Phoenix, AZ 85036 602-244-6900
SGS Semiconductor Corporation, 1000 E. Bell Road, Phoenix, AZ 85022 602-867-6100
Techland Systems, Inc., 25 Waterside Plaza, New York, NY 10010 212-684-7788
Thorson Engrg. Co., 6225 76th St. S.E., Snohomish, WA 98290 206-334-4214

Emulators, RTS-2900

American Automation, 14731 Franklin Avenue, Tustin, CA 92680, 714-731-1661 .... D•1179
§ Gould Inc., Design & Test Sys. Div., 4650 Old Ironsides Dr., Santa Clara, CA 95054-1279, 408-988-6800 .... D•1237
Applied Microsystems Corp., 5020-148th Ave. NE C-1002, Redmond, WA 98073-1002 .... 206-882-2000;800-426-3925
Atlantic Research, 5390 Cherokee Ave., Alexandria, VA 22312 703-642-4000
Com/Tech Systems, 505 Eighth Ave., New York, NY 10018 212-594-5377
Signum Systems, 726 Santa Monica Blvd., Santa Monica, CA 90401 213-451-5382
§ Zax Corp., 2572 White Rd., Irvine, CA 92714 .... 714-474-1170;800-421-0982

Encapsulating Materials — See Compounds, Encapsulating, Molding, Potting (Vol. C)

Encapsulation Services — See Services, Encapsulation (Vol. D)

Enclosures, Circuit Board, Module, & Relay Mounting-1400 — See *Vol. C*

Enclosures, CRT — See Mounts CRT

Enclosures, Equipment & Panel Mounting-1400 — See *Vol. C*

Enclosures, Instrument, With Integral Connectors-1400 — See *Vol. C*

Enclosures, Keyboard-1400 — See *Vol. C*

Enclosures, Nonmetallic-1400 — See *Vol. C*

Enclosures, Portable, Metallic & Nonmetallic-1400 — See *Vol. C*

Enclosures, Shielded-1400 — See *Vol. C*

Enclosures, Shipping, Metallic & Nonmetallic-3800 — See *Vol. C*

Enclosures, (MIL)-2440 — See *Vol. B*

Encoders, Digital — See Encoders, Shaft Angle (Vol. B)

Encoders, Displacement, Linear-5500 — See *Vol. B*

Encoders, Fiber Optic-2475 — See *Vol. B*

Encoders, Magnetic Strip-5500 — See *Vol. B*

Encoders, Proof-2000

Litton Encoder Div., 20745 Nordhoff St., Chatsworth, CA 91311 818-341-6161

Encoders, Shaft Angle, Contacting-5500 — See *Vol. B*

Encoders, Shaft Angle, Magnetic-5500 — See *Vol. B*

Encoders, Shaft Angle, Optical-5500 — See *Vol. B*

Encoders, Shaft Position — See Encoders, Shaft Angle (Vol. B), Resolvers, Synchro (Vol. D)

Encoders, Tone-1900

§ American Microsignal, 8431 Monroe Ave., Stanton, CA 90680 714-761-1222
† A.R.F. Prods., 2559 75th St., Boulder, CO 80301 303-443-4844
† Aydin Vector Div., Box 328, Newtown, PA 18940 215-968-4271
Dantel, 2991 N. Argyle Ave., Fresno, CA 93727 209-292-1111
Data Signal Corp., 149 California St., Newton, MA 02158 617-926-5080
Digital Transmission Techniques, Inc., P.O. Box 1847, Wayne, NJ 07470 201-831-1615
Douglas Randall, 6 Pawcatuck Ave., Pawcatuck, CT 06379 203-599-2075
Electrocom Inds., 1105 N. Ironwood Dr., S. Bend, IN 46615 219-232-2743
Frequency Devices, Inc., 25 Locust St., Haverhill, MA 01830 617-374-0761
† Gorman-Redlich Mfg. Co., 6 Curtis St., Athens, OH 45701 614-593-3150
§† Intersil, 10710 N. Tantau Ave., Cupertino, CA 95014 408-996-5000
Magnum Opus Custom Elctrn. Engrg., 284 Kennedy St., Iselin, NJ 08830 201-283-4925
Palomar Engrs., Box 455, Escondido, CA 92025 619-747-3343
RCI/Data, 1992 Lakewood Rd., Toms River, NJ 08753 201-341-8361
§ SYT, 1220 Barranca, El Paso, TX 79935 915-593-1234
§ Teltone, 10801-120 Ave. NE, Kirkland, WA 98033 206-827-9626

Encryptors — See Security Systems, Data

Engineering Reference Books — See Technical Books (Vol. D)

Energy Management Systems-2200

Acurex-Autodata, 555 Clyde, Mountain View, CA 94039 415-964-3200
Advanced Automation Concepts, Inc., 3760 Lower Roswell Rd., Marietta, GA 30067 404-973-0027
§ Algo, Inc., 9198-C Red Branch Rd., Columbia, MD 21045 301-730-7442
Automatic Switch Co., 50-60 Hanover Road, Florham Park, NJ 07932 1-201-966-2000
Base Ten Sys., One Electronics Dr., Box 3151, Trenton, NJ 08619 609-586-7010
§ Consumertronics, 2011 Crescent Dr., Alamogordo, NM 88310 505-434-0234
Data Signal Corp., 149 California St., Newton, MA 02158 617-926-5080
Daytronic Corp., 2589 Corporate Pl., Miamisburg, OH 45342 513-866-3300
§ Delta Prods., Box 1147, Grand Junction, CO 81501 303-242-9000
Diversified Elctrns., Inc., Indl. Controls Div., 119 N. Morton Ave., Evansville, IN 47711 812-426-2806
Dynage/Controls, Inc., 2 Willowbrook Rd., Cromwell, CT 06416 203-635-6257
Electronic Prods. Corp., Interstate Indl. Plaza, R. D. #5, York, PA 17402 717-767-6517
† Honeywell Inc., Commercial Div., MN 27-7246, Honeywell Plaza, Minneapolis, MN 55408 612-870-5357
Hy-Cal Engrg., 9650 Telstar Ave., El Monte, CA 91731 213-444-4000
§ Industrial Computer Designs, Inc., 31264 La Baya Drive, Westlake Village, CA 91362 818-889-3179

Kaye Instruments, 15 De Angelo Dr., Bedford, MA 01730 ... 617-275-0300
§ Lutron Elctrns., Box 205, Suter Rd., Coopersburg, PA 18036 ... 215-282-3800
North Hills Elctrns., 1 Alexander Pl., Glen Cove, NY 11542 ... 516-671-5700
Ohio Semitronics, Inc., 1205 Chesapeake Ave., Columbus, OH 43212 ... 614-486-9561
Optimum Applied Systems, 145 Palisade St., Dobbs Ferry, NY 10522-1696 ... 914-693-9001
Paragon Elect., 606 Parkway Blvd., Two Rivers, WI 54241 ... 414-793-1161
§ Poly-Scientific, Litton Inds., 1213 N. Main St., Blacksburg, VA 24060 ... 703-552-3014
PPM, Inc., 4521 Emery Ind. Pkwy., Cleveland, OH 44128 ... 216-292-6006
Scientific-Atlanta, Inc., P.O. Box 105600, Atlanta, GA 30348 ... 404-441-4000
Serial Lab Prods., Inc., 162 Cook Lane, P.O. Box 766, Marlboro, MA 01752 ... 617-481-1684
§ Solid State Systems, 1990 Delk Industrial Blvd., Marietta, GA 30067 ... 404-952-9401
Staco Energy Prods. Co., 301 Gaddis Blvd., Dayton, OH 45403 ... 513-253-1191
TANO Corp., 4301 Poche Ct., New Orleans, LA 70129 ... 504-254-3500
Trio Labs., 80 Dupont St., Plainview, NY 11803 ... 516-349-0400
§ Vermont Automation Co., Inc., 18 Morse Dr., Essex Junction, VT 05452 ... 802-879-7571
Warren Comms., 101 Okner Pkwy., Livingston, NJ 07039 ... 201-992-6200

Environmental Testing Services — See Services, Environmental Testing (Vol. D)

Epoxies — See Compounds, Enscapsulating, Molding, Potting (Vol. C), Adhesives (Vol. C)

Equalizers, Audio-1300

Allen Avionics, 224 E. 2nd St., Mineola, NY 11501 ... 516-248-8080
† Alpha Comps., 1106 E. Simpson Rd., Mechanicsburg, PA 17055 ... 717-697-8595
§ Altec Lansing, Altec Corp., 1250 N. Red Gum St., Anaheim, CA 92806 ... 714-632-7117
† BG Elctrns., 30 South St., Mt. Vernon, NY 10550 ... 914-664-5591
§ Dukane Corp., Communications Sys. Div., 2900 Dukane Dr., St. Charles, IL 60174 ... 312-584-2300
§ Dyma Engrg., Box 1535, Los Lunas, NM 87031 ... 505-865-6700
† ESC Elctrns. Corp., 534 Bergen Blvd., Palisades Pk., NJ 07650 ... 201-947-0400
§ Frazier, 1930 Valley View La., Dallas, TX 75234 ... 214-241-3441
† Frequency Selective Networks, Inc., 69-20 Garfield Ave., Woodside, NY 11377 ... 718-424-7500
§ Furman Sound, Inc., 30 Rich St., Greenbrae, CA 94904 ... 415-927-1225
§ Heath Co., Benton Harbor, MI 49022 ... 616-982-3886
† Hisonic, Inc., 249 N. Troost, P.O. Box 1130, Olathe, KS 66061-1130 ... 913-782-0012
International Electro Magnetics, Inc., 350 N. Eric Dr., Palatine, IL 60067 ... 312-358-4622
Kappa Networks, Inc., 1443 Pinewood St., Rahway, NJ 07065 ... 201-541-1600
§ Lear Siegler, Inc., 2850 Ocean Park Blvd., P.O. Box 2158, Santa Monica, CA 90406 ... 213-452-5444
Modular Audio Prods., Modular Devices Inc., 50 Orville Dr., Bohemia, NY 11716 ... 516-567-9620
† OPT Inds. Inc., 300 Red School La., Phillipsburg, NJ 08865 ... 201-454-2600
§ Paccom, 3928 148th NE, Redmond, WA 98052 ... 206-883-9200;800-426-6254
§ Precision Elctrns., 9101 King Ave., Franklin Park, IL 60131 ... 312-678-5350
RFL Inds., A Dowty Grp. Co./Comms. Div., Powerville Rd., Boonton, NJ 07005 ... 201-334-3100
† Rockwell Filter Prods., 2990 Airway Ave., Costa Mesa, CA 92626 ... 714-641-5311
§ SPECO Div., Components Specialties, Inc., P.O. Box 624, 1172 Rte. 109, Lindenhurst, NY 11757 ... 516-957-8700;800-645-5516
§ Spectra Sonics, 3750 Airport Rd., Ogden, UT 84403 ... 801-392-7531
Superex Electronics Corp., 151 Ludlow St., Yonkers, NY 10705 ... 914-965-6906
TTE, Inc., 11650 W. Olympic Blvd., Los Angeles, CA 90064 ... 213-478-8224
Unholtz-Dickie Corp., 6 Brookside Dr., Wallingford, CT 06492 ... 203-265-3929
† Wavetek Rockland Scientific, Inc., 10 Volvo Dr., Rockleigh Indl. Pk., Rockleigh, NJ 07647 ... 201-767-7900

Equalizers, Delay-1900

Allen Avionics, 224 E. 2nd St., Mineola, NY 11501, 516-248-8080 ... A•1588
† Data Delay Devices, 385 Lakeview Ave., Clifton, NJ 07011, 201-772-1106 ... A•1490-1491
† Frequency Selective Networks, Inc., 69-20 Garfield Ave., Woodside, NY 11377, 718-424-7500 ... A•1369
KR Electronics, Inc., 91 Avenel St., Avenel, NJ 07001, 201-636-1900 ... A•1613
† Alpha Comps., 1106 E. Simpson Rd., Mechanicsburg, PA 17055 ... 717-697-8595
† BG Elctrns., 30 South St., Mt. Vernon, NY 10550 ... 914-664-5591
Chesterfield Prods., 37 Midland Ave., Elmwood Park, NJ 07407 ... 201-797-9655
† Computer Devices Corp., 63 Austin Blvd., Commack, NY 11725 ... 516-543-4220
Convex Corp., P.O. Box 17225, Dulles Intl. Airport, Washington, DC 20041 ... 703-661-8900
† ESC Elctrns. Corp., 534 Bergen Blvd., Palisades Pk., NJ 07650 ... 201-947-0400
† Hisonic, Inc., 249 N. Troost, P.O. Box 1130, Olathe, KS 66061-1130 ... 913-782-0012
† Integrated Microwave, 11526 Sorrento Valley Rd., San Diego, CA 92121 ... 619-457-0277
Kappa Networks, Inc., 1443 Pinewood St., Rahway, NJ 07065 ... 201-541-1600
† LNR Communications, Inc., 180 Marcus Blvd., Hauppauge, NY 11788 ... 516-273-7111
† OPT Inds. Inc., 300 Red School La., Phillipsburg, NJ 08865 ... 201-454-2600
RFL Inds., A Dowty Grp. Co./Comms. Div., Powerville Rd., Boonton, NJ 07005 ... 201-334-3100
† Rockwell Filter Prods., 2990 Airway Ave., Costa Mesa, CA 92626 ... 714-641-5311
TTE, Inc., 11650 W. Olympic Blvd., Los Angeles, CA 90064 ... 213-478-8224
Western Multiplex Corp., 1320 Bayport Avenue, San Carlos, CA 94070 ... 415-592-8832

Equalizers, Phase-1900

† Frequency Selective Networks, Inc., 69-20 Garfield Ave., Woodside, NY 11377, 718-424-7500 ... A•1369
† Hisonic, Inc., 249 N. Troost, P.O. Box 1130, Olathe, KS 66061-1130, 913-782-0012 ... A•2157
KR Electronics, Inc., 91 Avenel St., Avenel, NJ 07001, 201-636-1900 ... A•1613
Allen Avionics, 224 E. 2nd St., Mineola, NY 11501 ... 516-248-8080
† Alpha Comps., 1106 E. Simpson Rd., Mechanicsburg, PA 17055 ... 717-697-8595
† BG Elctrns., 30 South St., Mt. Vernon, NY 10550 ... 914-664-5591
Chesterfield Prods., 37 Midland Ave., Elmwood Park, NJ 07407 ... 201-797-9655
† Computer Devices Corp., 63 Austin Blvd., Commack, NY 11725 ... 516-543-4220
Convex Corp., P.O. Box 17225, Dulles Intl. Airport, Washington, DC 20041 ... 703-661-8900
† Eaton Corp., A.I.L. Div., Comac Rd., Deer Park, NY 11729 ... 516-595-3094
† ESC Elctrns. Corp., 534 Bergen Blvd., Palisades Pk., NJ 07650 ... 201-947-0400
† Integrated Microwave, 11526 Sorrento Valley Rd., San Diego, CA 92121 ... 619-457-0277
Kappa Networks, Inc., 1443 Pinewood St., Rahway, NJ 07065 ... 201-541-1600
† Narda Microwave Corp., 435 Moreland Rd., Hauppauge, NY 11788 ... 516-231-1700
† OPT Inds. Inc., 300 Red School La., Phillipsburg, NJ 08865 ... 201-454-2600
† Rockwell Filter Prods., 2990 Airway Ave., Costa Mesa, CA 92626 ... 714-641-5311
TTE, Inc., 11650 W. Olympic Blvd., Los Angeles, CA 90064 ... 213-478-8224
Varian Associates, Inc., Microwave Tube Div., 611 Hansen Way, Palo Alto, CA 94303 ... 415-493-4000
Western Multiplex Corp., 1320 Bayport Avenue, San Carlos, CA 94070 ... 415-592-8832

Erasers, Magnetic Tape (Bulk)-1300

† Ampex Corp., 401 Broadway, Redwood City, CA 94063 ... 415-367-2011
§† Benjamin electroproducts, inc., Robins Div., 80 Smith St., Farmingdale, NY 11735 ... 516-293-7744
§ Duotone, 6875 S.W. 81st St., S. Miami, FL 33143 ... 305-665-1121
§ Hammond Mfg. Co., 1690 Walden Ave., Buffalo, NY 14225 ... 716-894-5710
§ Microtran Co. Inc., 145 E. Mineola Ave., Valley Stream, NY 11580 ... 516-561-6050
§ Wide Range Elctrns. Corp., 2119 Schultz Rd., St. Louis, MO 63146 ... 314-567-5366

Erasing Equipment, EPROM-3130 — *See Vol. A*

Escutcheons-2400 — *See Vol. C*

Etchants, Fluorocarbon-1600 — *See Vol. C*

Etchants, Printed Circuit-1700 — *See Vol. C*

Etching & Engraving — See Services, Metal Etching, Engraving (Vol. D)

Ethernet Extenders-2475 — *See Vol. B*

Evaporation Equipment, Electron Beam-4100

§ Alzbear Corp., 15411 Red Hill Ave., Unit F, Tustin, CA 92680 ... 714-557-0910
CHA Industries, 3565 Haven Avenue, Menlo Park, CA 94025 ... 415-363-8011
† Corning Glass Works, Corning Elctrns., Houghton Pk., Bldg. A-2, Corning, NY 14830 ... 607-974-8725
§ CVC Prods., 525 Lee Rd., Rochester, NY 14603 ... 716-458-2550
Hitran Corp., Agex, Rte. 31, RD 5-65, Flemington, NJ 08822 ... 201-782-5525
Jori Resources, 2128 Knoll Dr., Ventura, CA 93003 ... 805-642-2266
KLC/Karl Lambrecht Corp., 4204 N. Lincoln Ave., Chicago, IL 60618 ... 312-472-5442
Temescal, 2850 Seventh St., Berkeley, CA 94710 ... 415-841-5720
§† ULVAC North America, P.O. Box 799, 105 York Street, Kennebunk, ME 04043 ... 207-985-2973
Varian Assocs., Indl. Equip. Grp., 611 Hansen Way, Palo Alto, CA 94303 ... 415-493-4000
Veeco Instruments Inc., Terminal Dr., Plainview, NY 11803 ... 516-349-8300

Exciters — See Oscillators (Vol. A)

Exciters, Vibration — See Testers, Vibration (Vol. D)

Expanders, Data-3475

Del-Teleproducts, 230 N. Market Pl., Escondido, CA 92025 ... 619-743-8344

Expanders, Meter — See Multipliers, Meter (Vol. D)

Extractors, Circuit Board, Tube — See Pullers, Circuit Board (Vol. C)

Extractors, DIP, IC, & Pin Grid Array-5400 — *See Vol. C*

Eyelets-2825 — *See Vol. C*

Fabrics, Conductive-4525 — *See Vol. C*

Facsimile Equipment, Receive Only-1900

† Alden Electronics, Inc., 40 Washington Street, Westboro, MA 01581 ... 617-366-8851
PPM, Inc., 4521 Emery Ind. Pkwy., Cleveland, OH 44128 ... 216-292-6006
§† Raytheon Ocean Sys. Co., Submarine Signal Div., Risho Ave., Westminster Pk., E. Providence, RI 02914 ... 401-438-1780

Facsmile Equipment, Send Only-1900

† Alden Electronics, Inc., 40 Washington Street, Westboro, MA 01581 ... 617-366-8851
Noble U.S.A., Inc., 151 Stanley St., Elk Grove Village, IL 60007 ... 312-364-6038

Facsimile Equipment, Send/Receive-1900

† Alden Electronics, Inc., 40 Washington Street, Westboro, MA 01581 ... 617-366-8851
† Magnavox Advanced Prods. & Sys. Co., Magnavox Govt. Indl. Elctrns. Co., 2829 Maricopa St., Torrance, CA 90503 ... 213-618-1200
Muirhead, 1101 Briston Rd., Mountainside, NJ 07092 ... 201-233-6010

Fans, Axial-2600 — *See Vol. C*

Fans, Propeller-2600 — *See Vol. C*

Fans, Tubeaxial-2600 — *See Vol. C*

Fans, Vaneaxial-2600 — *See Vol. C*

Fans/Blowers (MIL)-2440 — *See Vol. B*

Fasteners, Cable & Wire — See Wire & Cable Ties (Vol. C)

Fasteners, Metal-2825 — *See Vol. C*

Fasteners, Nonmetallic-2825 — *See Vol. C*

Fault Locators — See Detectors (Vol. D)

Feedthrus & Seals, Environmental-2500 — *See Vol. C*

Ferrite Material & Parts-1850 — *See Vol. A*

Ferrules, Cable-end-2825 — *See Vol. C*

Fiber Optic Components — See Adapters (Vol. B), Attenuators (Vol. B), Cable (Vol. B), Connectors (Vol. B), Couplers (Vol. B), Detectors (Vol. B), Isolators (Vol. B), Light Sources (Vol. B), Receivers (Vol. B), Transmitters (Vol. B)

Fiber Optic Data Links — See Data Links, Fiber Optic

Fiber Optic Scanners — See Scanners, Fiber Optic (Vol. B)

Fiber Optic Splices & Splicing Equipment-2475 — *See Vol. B*

Fiber Optics (MIL)-2440 — *See Vol. B*

Fiber Optic Test Equipment — See Test Equipment, Fiber Optic (Vol. B), Testers, Fiber Optic (Vol. D)

Films, Masking (Incl. Photographic)-3100 — *See Vol. C*

Films, Resistance-4700 — *See Vol. A*

Filters, AF-2700 — *See Vol. A*

Filters, Air — See Air Cleaners & Filters (Vol. C)

Filters, Antialias-2700 — *See Vol. A*

Filters, Analog — See Filters, Continuously Variable (Vol. A)

Filters, Antenna-2700 — *See Vol. A*

Filters, Band Elimination-2700 — *See Vol. A*

Filters, Bandpass-2700 — *See Vol. A*

Filters, Bandpass, SAW (Surface Acoustic Wave)-2700 — *See Vol. A*

Filters, Band Reject, Band Stop — See Filters, Band Elimination (Vol. A)

Filters, Ceramic-2700 — *See Vol. A*

Filters, Coaxial-2700 — *See Vol. A*

Filters, Color, Panel Light - Also see Lenses, Readout & Display; Lenses, Filters, Windows, Infrared-2450 — *See Vol. B*

Filters, Comb-2700 — *See Vol. A*

Filters, Continuously Variable-2700 — *See Vol. A*

Filters, Crystal (Incl. Monolithic Devices)-2300 — *See Vol. A*

Filters, Delay-2700 — *See Vol. A*

Filters, Digital-2700 — *See Vol. A*

Filters, Display-2450 — *See Vol. B*

Filters, EMI/RFI-2700 — *See Vol. A*

Filters, Equalizer-2700 — *See Vol. A*

Filters, Harmonic-2700 — *See Vol. A*

Filters, High Pass-2700 — *See Vol. A*

Filters, Hybrid-2700 — *See Vol. A*

Filters, IF-2700 — *See Vol. A*

Filters, Ladder-2700 — *See Vol. A*

Filters, LC-2700 — *See Vol. A*

Filters, Line — See Filters, EMI/RFI (Vol. A)

Filters, Linear Phase-2700 — *See Vol. A*

Filters, Low Pass-2700 — *See Vol. A*

Filters, Mechanical-2700 — *See Vol. A*

Filters, Microwave-3450 — *See Vol. A*

Filters, Miniature, Subminiature, Microminiature - Also see specific types of filters-2700 — *See Vol. A*

Filters, Notch — See Filters, Band Elimination (Vol. A)

Filters, Optical-2700 — *See Vol. A*

Filters, Programmable — See Filters, Variable (Vol. A)

Filters, RF-2700 — *See Vol. A*

Filters, Single Sideband-2700 — *See Vol. A*

Filters, Synchronous Tracking-2700 — *See Vol. A*

Filters, Telemetering-1900

† **Comstron Corp., 200 E. Sunrise Hwy., Freeport, NY 11520, 516-546-9700** .... A•1327,1595
Elect. Prec. Comp. Corp., 11 W. Sandford Blvd., Mt. Vernon, NY 10550, 914-664-2333 .... A•1603
Freed Transformer, 1718 Weirfield St., Ridgewood, NY 11385, 212-386-1300 .... A•2151
† **Frequency Elctrns., 55 Charles Lindbergh Blvd., Mitchel Field, NY 11553, 516-794-4500** .... A•1367
Sokol Crystal Prods., Inc., 121 Water St., Mineral Point, WI 53565, 608-987-3363 .... A•1435
TTE, Inc., 11650 W. Olympic Blvd., Los Angeles, CA 90064, 213-478-8224 .... A•1646
Advanced Filter Devices, Inc., 6241 Yarrow Dr., Ste. D, Carlsbad, CA 92008 619-438-2074
† Alpha Comps., 1106 E. Simpson Rd., Mechanicsburg, PA 17055 717-697-8595
A. P. Circuit Corp., 513 East 86th St., P.O. Box 1350, New York, NY 10028 212-737-1348
† Axel Elctrns., General Signal Corp., 134-20 Jamaica Ave., Jamaica, NY 11418 718-291-3900
Beckman Industrial Corp., Electronic Technologies Div., 2500 Harbor Blvd., Fullerton, CA 92634 714-871-4848
† BG Elctrns., 30 South St., Mt. Vernon, NY 10550 914-664-5591
Chesterfield Prods., 37 Midland Ave., Elmwood Park, NJ 07407 201-797-9655
† Cirtech, EG & G, 15237 Cherry St., Stanley, KS 66223 913-681-2801
Coast Coil Co., 5333 W. Washington Blvd., Los Angeles, CA 90016 213-936-6188
Dantel, 2991 N. Argyle Ave., Fresno, CA 93727 209-292-1111
§† Data-Control Sys., Commerce Dr., Box 860, Danbury, CT 06810 203-743-9241
§ De Coursey Engrg. Lab., 11828 W. Jefferson, Culver City, CA 90230 .... 213-EX7-9668
† Dietz Design, Inc., 100 Electronics Pkwy., Belton, MO 64012 816-331-4911
§ EMR Data Systems, Div. Sangamo- Weston, Box 3041, Sarasota, FL 33578 813-371-0811
† ESC Elctrns. Corp., 534 Bergen Blvd., Palisades Pk., NJ 07650 201-947-0400
§ EWC, Inc., 725 Federal Ave., Kenilworth, NJ 07033 .... 201-245-3200;800-526-4048
Fogg Sys., 15592 E. Batavia Dr., Aurora, CO 80011 303-344-1883
† Frequency Selective Networks, Inc., 69-20 Garfield Ave., Woodside, NY 11377 718-424-7500
† Genisco Technlg. Corp., Filters Div., 18435 Susana Rd., Rancho Dominguez, CA 90221 213-537-4750
† Hisonic, Inc., 249 N. Troost, P.O. Box 1130, Olathe, KS 66061-1130 913-782-0012
† K&L Microwave, Inc., 408 Coles Circle, Salisbury, MD 21801 301-749-2424
† KR Electronics, Inc., 91 Avenel St., Avenel, NJ 07001 201-636-1900
† Lorch Elctrns., 105 Cedar La., Englewood, NJ 07631 201-569-8282
Maury Microwave, 8610 Helms Ave., Cucamonga, CA 91730 714-987-4715
McCoy Electronics Co., Sub. Oak Technology Inc., 100 Watts St., P.O. Box B, Mt. Holly Springs, PA 17065 717-486-3411
† Mel Tec, Div. Epsco, Inc., 411 Providence Hwy., Westwood, MA 02090 617-329-1508
† Metropole Products Inc., P.O. Box 10275, Alexandria, VA 22310 .... 703-971-8606; 703-971-7082
† Microlab/FXR, 10 Microlab Rd., Livingston, NJ 07039 201-992-7700
Microwave Development Labs., 10 Michigan Dr., Natick, MA 01760 617-655-0060
† Omnitek, Inc., P.O. Box 102, 820 Pennsylvania Blvd., Feasterville, PA 19047 215-355-4443
† OPT Inds. Inc., 300 Red School La., Phillipsburg, NJ 08865 201-454-2600
† Piezo Crystal, 100 "K" St., Box 619, Carlisle, PA 17013 717-249-2151
† Polyphase Instr., 175 Commerce Dr., Ft. Washington, PA 19034 215-643-6950
† RFI Corporation, 100 E. Pine Aire Dr., Bay Shore, NY 11706 516-231-6400
† Rockwell Filter Prods., 2990 Airway Ave., Costa Mesa, CA 92626 714-641-5311
† Stanford Applied Engrg. Inc., 3520 De La Cruz Blvd., Santa Clara, CA 95050 400-988-0700
† Teledyne Microwave, 1290 Terra Bella Ave., Mountain View, CA 94043 415-968-2211
† Telonic/Berkeley, 2825 Laguna Canyon Rd., Laguna Beach, CA 92652 714-494-9401
† Torotron Corp., 519 South Fifth Ave., Mt. Vernon, NY 10550 914-664-2050
§† Transformer & Coil Products, TRW Electronic Assemblies Division, 150 Varick St., New York, NY 10013 212-255-3500
Vernitron Piezoelectric Div., 232 Forbes Rd., Bedford, OH 44146-5478 216-232-8600
† Wavecom, 9036 Winnetka Ave., Northridge, CA 91324 818-882-3010
Wavetek Rockland Scientific, Inc., 10 Volvo Dr., Rockleigh Indl. Pk., Rockleigh, NJ 07647 201-767-7900
Wide Band Engrg. Co., Inc., Box 21652, Phoenix, AZ 85036 602-254-1570

Filters, Tone, Telegraph-2700 — *See Vol. A*

Filters, Tunable — See Filters, Continuously Variable (Vol. A)

Filters, Tuning Fork-2300 — *See Vol. A*

Filters, UHF & VHF-2700 — *See Vol. A*

Filters, Variable-2700 — *See Vol. A*

Filters, Vestigial Sideband-2700 — *See Vol. A*

Filters, Video-2700 — *See Vol. A*

Filters, Waveguide-3450 — *See Vol. A*

Filters, YIG-2700 — *See Vol. A*

Filters (MIL), Electrical & Networks-2440 — *See Vol. B*

Flanges, Waveguide-3450 — *See Vol. A*

Flanges (MIL), Waveguide-2440 — *See Vol. B*

Flashers-2200

† Logitek, Inc., 101 Christopher St., Ronkonkoma, NY 11779, 516-467-4200 .... B•1437
§ American Control Products, Div. of Precision Timer Co., Inc., 13 Westbrook Ind'l. Pk., Westbrook, CT 06498 203-399-6253
§† Amperite Co., Inc., 600 Palisade Ave., Union City, NJ 07087 201-864-9503
† Applied Electro Technlg., Int., STI Company, 2220 So. Anne St., Santa Ana, CA 92704 714-556-6570
Cardinal Control Co., 110 Kensington Rd., Kensington, CT 06037 203-828-6379
§ Cole-Hersee Co., 20 Old Colony Ave., Boston, MA 02127-2467 617-268-2100
§ Durakool, 1010 N. Main St., Elkhart, IN 46514 219-264-1116
Electronic Prods. Corp., Interstate Indl. Plaza, R. D. #5, York, PA 17402 717-767-6517
Enerco, Inc., 9615 W. Marginal Way S., Seattle, WA 98108 206-762-1422
§† Hi-G Company, A Subsidiary of Nytronics Inc., 101 Locust St., Hartford, CT 06114 203-522-8600
§ Hughey & Phillips, Inc., 3050 N. California St., Burbank, CA 91504 818-849-1104
§ Industrial Devices, Inc., 7 Hudson St., Edgewater, NJ 07020 201-224-4700
Innovatek Microsystems, Inc., Smithfield Rd., R1 Box 104, Millerton, NY 12546-9720 914-373-9003
Lark Electronics, Inc., Box 390, New York, NY 10040 212-569-0430
§ Leecraft Mfg., 21-02 44th Rd., Long Island City, NY 11101 718-392-8800
§ Master Elctrn. Controls, P.O. Box 25905, Los Angeles, CA 90025 213-452-1336
OAR Corp., A CompuDyne Co., 10447 Roselle St., San Diego, CA 92121 619-453-4013
Oeco Corp., 712 S.E. Hawthorne Blvd., Portland, OR 97214 503-238-2440
Pacific Timer Inc., 21739 N.E. 18th Way, Redmond, WA 98052 206-881-1785
§ Projects Unltd., 3680 Wyse Rd., Dayton, OH 45414 513-890-1918
§ Relay Specialties, 1300 Plaza Rd., Fair Lawn, NJ 07410 .. 201-797-3313;800-526-5376
§ Scientific Technlg., 1201 San Antonio Rd., Mountain View, CA 94043 .... CA 415-965-0910;800-221-7060
§ Shokai Far East, Ltd., 280 North Central Ave., Hartsdale, NY 10530 914-681-0700
† Sigmapower, Inc., 20790 Leapwood Ave., Carson, CA 90746 .... 213-32-Sigma
§ S S A C, Box 395, Liverpool, NY 13088 315-622-1000
Tempo Instrument, Inc., 87 Modular Ave., Commack, NY 11725 516-864-3700
Triac Electronic Systems, Inc., 87-27 Myrtle Ave., Glendale, NY 11385 .. 718-441-4759
Vanguard Relay Corp., 225 Cortland St., Lindenhurst, NY 11757 516-226-5000
§ Waldom Elctrns., 4301 W. 69th St., Dept. EEM, Chicago, IL 60629 312-585-1212
† Wilmar Elctrns., Inc., 2430 Amsler St., Torrance, CA 90505 213-326-6668

Flashers (MIL)-2440 — *See Vol. B*

Flashlights & Lanterns-4000

† Accurate Elctrns., 169 S. Abbe Rd., P.O. Box 1287, Elyria, OH 44036 216-365-1211
§ Jensen Tools, Inc., Axia, Inc., 7815 S. 46th St., Phoenix, AZ 85040 602-968-6241
§ Rayovac Corporation, 101 E. Washington Ave., Madison, WI 53703 608-252-7400
§ Shokai Far East, Ltd., 280 North Central Ave., Hartsdale, NY 10530 914-681-0700
§ Techni-Tool, 5 Apollo Rd., Box 368, Plymouth Meeting, PA 19462 215-825-4990
§† Union Carbide Corporation, Battery Prods. Div., 39 Old Ridgebury Road, Danbury, CT 06817-0001 203-794-7548
† Whittaker Corp., 10880 Wilshire Blvd., Los Angeles, CA 90024 213-475-9411
§ Wonder Corp of America, 22 Elizabeth St., South Norwalk, CT 06856 ... 203-866-3033

Flat Packages, Integrated Circuit — See Packages, Integrated Circuit (Vol. A)

Fluid Flow Indicators — See Meters, Fluid Flow (Vol. D)

Flux, Brazing & Soldering Materials-4600 — *See Vol. C*

Foil, Magnetic-1850 — *See Vol. A*

Foil, Magnetic Shielding — See Shields, Magnetic (Vol. C)

Forks, Tuning — See Tuning Forks (Vol. A)

Forms, Coil — See Coil Assemblies & Forms (Vol. A)

Frames, Cabinet & Rack-1400 — *See Vol. C*

Freeze Spray — See Refrigerants, Spray (Vol. C), Coolants, Circuit & Component (Vol. C)

Freezer Cabinets — See Refrigerators, Environmental Test (Vol. D)

Frequency Analyzers — See Analyzers, Spectrum (Vol. D)

Frequency Extenders — See Dividers, Frequency (Vol. A)

Frequency Sources — See Oscillators (Vol. A)

Frequency Standards — See Standards, Frequency (Vol. D)

Frozen Epoxies — See Compounds, Encapsulating, Molding, Potting

Furnaces, Electric-4100

† Blue M, A Unit of General Signal, 138th & Chatham Sts., Blue Island, IL 60406, 312-385-9000 .... D•1165
Acme Elec. Heating Corp., 4685 E. 11th, Hialeah, FL 33013 305-685-8326
† Ajax Magnethermic Corp., 1745 Overland Ave., N.E., Warren, OH 44482 216-372-8511
§ Alzbear Corp., 15411 Red Hill Ave., Unit F, Tustin, CA 92680 714-557-0910
Aremco Prods., Box 429, Ossining, NY 10562 914-762-0685
† BTU Engrg. Corp., Bruce Sys., Esquire Rd., N. Billerica, MA 01862 617-667-4111
§† Casso-Solar, P.O. Box 163, U.S. Route 202, Pomona, NY 10970 914-354-2500
§† Despatch Inds., P.O. Box 1320, Minneapolis, MN 55440 612-331-1873
Hotpack Corp., Heinicke Instrs., 10940 Dutton Rd., Philadelphia, PA 19154 .... 215-824-1700;800-523-3608
§ Lab-Line Instrs., 15th & Bloomingdale, Melrose Park, IL 60160 312-450-2600
§† L & L Special Furnace, 166 Kent Rd., Aston, PA 19014 215-459-9216
OAL Assocs., P.O. Box J, Escondido, CA 92025 619-743-7143
Odell, M. P., Co., 1620 Chesapeake Dr., Hoffman Estates, IL 60195 312-991-2828
§ Research, Inc., Box 24064, Minneapolis, MN 55424 612-941-3300
S. F. Products Corporation, P. O. Box 369, Southport, CT 06490 203-929-6180
† Trent, Inc., 201 Leverington Ave., Philadelphia, PA 19127 215-482-5000
§† Wellman Thermal Sys., 1 Progress Rd, Shelbyville, IN 46176 317-398-4411

Furnaces, Gas (Production)-4100

† BTU Engrg. Corp., Bruce Sys., Esquire Rd., N. Billerica, MA 01862 617-667-4111
§† Despatch Inds., P.O. Box 1320, Minneapolis, MN 55440 612-331-1873
Kahle Engrg., Div. Joule Machinery Grp., 3344 Hudson Ave., P.O. Box 877, Union City, NJ 07087 201-867-6500
Research, Inc., Box 24064, Minneapolis, MN 55424 612-941-3300
S. F. Products Corporation, P. O. Box 369, Southport, CT 06490 203-929-6180
Solder Absorbing Technology (SAT), South End Bridge Circle, Agawam, MA 01001 800-628-8862
Watkins-Johnson Co., 3333 Hillview Ave., Palo Alto, CA 94304 415-493-4141
§† Wellman Thermal Sys., 1 Progress Rd, Shelbyville, IN 46176 317-398-4411

Furnaces, Vacuum-4100

Ceramaseal, Box 25, New Lebanon Center, NY 12126, 518-794-7800 .... C•1173
† Ajax Magnethermic Corp., 1745 Overland Ave., N.E., Warren, OH 44482 216-372-8511
§ Alzbear Corp., 15411 Red Hill Ave., Unit F, Tustin, CA 92680 714-557-0910
§ Brew, Richard D., & Co., Inc., 90 Airport Rd., Concord, NH 03301 603-225-6605
§ CVC Prods., 525 Lee Rd., Rochester, NY 14603 716-458-2550
§ Hull Corp., Davisville Rd., Hatboro, PA 19040 215-672-7800
Kahle Engrg., Div. Joule Machinery Grp., 3344 Hudson Ave., P.O. Box 877, Union City, NJ 07087 201-867-6500
S. F. Products Corporation, P. O. Box 369, Southport, CT 06490 203-929-6180
§† ULVAC North America, P.O. Box 799, 105 York Street, Kennebunk, ME 04043 207-985-2973
Vactronic Lab. Equip., 65 Brightside Ave., E. Northport, NY 11731 .... 516-AN1-2660
Varian Assocs., Indl. Equip. Grp., 611 Hansen Way, Palo Alto, CA 94303 415-493-4000
§† Wellman Thermal Sys., 1 Progress Rd, Shelbyville, IN 46176 317-398-4411

Furniture, Electronic Lab. — See Benches, Consoles, Stools, Tables (Lab & Shop) (Vol. C)

Fuse Clips — See Clips & Holders, Fuse (Vol. B)

Fuse Elements-4300 — *See Vol. B*

Fuseholders — See Clips & Holders, Fuse

Fuses-4300 — *See Vol. B*

Fuses, Failure Indicating-4300 — *See Vol. B*

Fuses, Fuseholders, Boxes & Panels (MIL)-2440 — *See Vol. B*

Fuses, Thermal-4300 — *See Vol. B*

Gauges, Displacement, Linear-5400 — *See Vol. C*

Gauges, Humidity-2900

Bluffton Products, Inc., Tegam, Inc., 7230 North Ridge Road, Madison, OH 44057 216-946-3572
Omega Engrg., Box 4047, Stamford, CT 06907 203-359-1660
Panametrics, 221 Cresent St., Waltham, MA 02254 617-899-2740
Princo Instrs., Inc., 1020 Industrial Hwy., Southampton, PA 18966 215-355-1500

Gauges, Ionization-2900

§ CVC Prods., 525 Lee Rd., Rochester, NY 14603 716-458-2550
Fredericks Co., Philmont & Anne Sts., Huntingdon Valley, PA 19006 215-947-2500
High Voltage Engrg. Corp., S. Bedford St., Burlington, MA 01803 617-272-1313

Nuclear Resch. Corp., 125 Titus Ave., Warrington, PA 18976 215-343-5900
§† ULVAC North America, P.O. Box 799, 105 York Street, Kennebunk, ME 04043 207-985-2973
Vactronic Lab. Equip., 65 Brightside Ave., E. Northport, NY 11731 .... 516-AN1-2660
Varian Assocs., Indl. Equip. Grp., 611 Hansen Way, Palo Alto, CA 94303 415-493-4000
Veeco Instruments Inc., Terminal Dr., Plainview, NY 11803 516-349-8300
§ Westinghouse Electric Corp., Indl. Govt. Tube Div., Westinghouse Circle, Horseheads, NY 14845 607-796-3211

Gauges, Pressure-Also See Transducers, Pressure-2900

EMICO Inc., Box 368, Dublin, PA 18917, 215-249-9330 .... D∘1353
Setra Systems, Inc., 45 Nagog Park, Acton, MA 01720, 617-263-1400 .... B∘1826
Validyne Engrg. Corp., 8626 Wilbur Ave., Northridge, CA 91324, 818-886-2057 .... D∘1164
§ Airmatic-Allied, 185 Park Dr., Wilmington, OH 45177 513-382-1691
† Astronautics Corporation of America, P.O. Box 523, Milwaukee, WI 53201-0523 414-447-8200
§† Bailey Controls Co., 29801 Euclid Ave., Wickliffe, OH 44092 216-585-5800
§ Bellofram Corp., A Rexnord Co., 30 Blanchard Rd., Burlington, MA 01803 .... 617-272-2100;800-225-1031
§† Bourns Instrs., Inc., Technical Prods. Grp., 6135 Magnolia Ave., Riverside, CA 92506 714-781-5433
§ Bourns Instrs., Inc., Industrial Div., 1960 Chicago Ave., Unit F, Riverside, CA 92503 714-781-5147
Cambridge Aero Instruments, Inc., 6A Dunham Rd., Billerica, MA 01821 617-275-0889
Data-Design Labs., P.O. Box 711, 7925 Center Ave., Cucamonga, CA 91730 714-987-2511
§ Dillon, W. C., & Co., National Controls, Inc., 2320 Airport Blvd., Santa Rosa, CA 95401 707-527-5555
§† Electrovert Inc., 399 Executive Blvd., Elmsford, NY 10523 914-592-7322
Entran Devices, 10 Washington Ave., Fairfield, NJ 07006 201-227-1002
† Faria, Thomas G., Corp., P.O. Box 0983, Uncasville, CT 06382 203-848-9271
§† Gould Inc., Meas. Sys. Div., 2230 Statham Blvd., Oxnard, CA 93030 805-487-8511
Harrel, Inc., 16 Fitch St., E. Norwalk, CT 06855 203-866-2573
† Honeywell, Process Control Div., 1100 Virginia Dr., Ft. Washington, PA 19034 .... 800-321-5111, Ext. 596
Jonard Industries Corp., 134 Marbledale Rd., Tuckahoe, NY 10707 914-793-0700
§ Jumbo Process Control, Inc., 410 Garibaldi Ave., Lodi, NJ 07644 201-779-7744
§ H. Kuhnke, Inc., 26 W. Highland Ave., Atlantic Highlands, NJ 07716 .... 201-291-3334; 800-221-0714
† Kulite Semiconductor Prods., Inc., 1039 Hoyt Ave., Ridgefield, NJ 07657 201-945-3000
§† MKS Instrs., Inc., 22 Third Ave., Burlington, MA 01803 617-272-9255
§ NES, Inc. (Nationwide Electronic Systems), 3003 Wakefield, Carpentersville, IL 60110 312-426-5900
C. A. Norgren Co., 5400 South Delaware, Littleton, CO 80120-1663 303-794-2611
Omega Engrg., Box 4047, Stamford, CT 06907 203-359-1660
Princo Instrs., Inc., 1020 Industrial Hwy., Southampton, PA 18966 215-355-1500
Rochester Instr. Sys., 255 N. Union St., Rochester, NY 14605 716-263-7700
Schaevitz Engrg., U.S. 130, Union Ave., Pennsauken, NJ 08110 609-662-8000
Sea Data Corp., One Bridge St., Newton, MA 02158 617-244-3216
Systonics, Inc., Box 121, Winchester, MA 01890 617-729-4439
Texas Instrs., Data Sys. Group, P. O. Box 809063, Dallas, TX 75380-9063 1-800-527-3500
† Tro Dyne Corp., 900 Corporate Dr., Mahwah, NJ 07430 201-529-1800
Varian Assocs., Indl. Equip. Grp., 611 Hansen Way, Palo Alto, CA 94303 415-493-4000
† Vernitech, 300 Marcus Blvd., Deer Pk., NY 11729 516-586-5100
§ Yellow Springs Instr., Box 279, Yellow Springs, OH 45387 513-767-7241

Gauges, Strain-5500 — *See Vol. B*

Gauges, Temperature-2900

EMICO Inc., Box 368, Dublin, PA 18917, 215-249-9330 .... D∘1353
Omega Engrg., Box 4047, Stamford, CT 06907, 203-359-1660 .... B∘1683
§ Athena Controls, Inc., 5145 Campus Dr., Whitemarsh Ind. Campus, Plymouth Meeting, PA 19462 215-828-2490
Bluffton Products, Inc., Tegam, Inc., 7230 North Ridge Road, Madison, OH 44057 216-946-3572
Cambridge Aero Instruments, Inc., 6A Dunham Rd., Billerica, MA 01821 617-275-0889
Data-Design Labs., P.O. Box 711, 7925 Center Ave., Cucamonga, CA 91730 714-987-2511
§ EDL, Inc., 385 Oser Ave., Hauppauge, NY 11788 .... 516-435-2808;1-800-DIAL EDL
† Faria, Thomas G., Corp., P.O. Box 0983, Uncasville, CT 06382 203-848-9271
§ Jumbo Process Control, Inc., 410 Garibaldi Ave., Lodi, NJ 07644 201-779-7744
§ Pacific Transducer, 2301 Federal, Los Angeles, CA 90064 213-478-1134
PPM, Inc., 4521 Emery Ind. Pkwy., Cleveland, OH 44128 216-292-6006
Princo Instrs., Inc., 1020 Industrial Hwy., Southampton, PA 18966 215-355-1500
Sea Data Corp., One Bridge St., Newton, MA 02158 617-244-3216
United States Testing Co., Inc., 1415 Park Ave., Hoboken, NJ 07030 ..... 800-631-3096; 201-792-2400
§ Westberg Mfg., Inc., 3400 Westach Way, Sonoma, CA 95476 707-938-2121

Galvanometers — See Meters, Galvanometer (Vol. D)

Gaskets — See Seals (Vol. C)

Gaskets, Shielding, RF-Also See Shields, RF-4525 — *See Vol. C*

Gates, Computer Circuit (AND, OR, NOR, etc.) — See Cards, Logic (Vol. D)

Gearheads & Speed Reducers - Also see gears and gear mechanisms-3500 — *See Vol. B*

Gears & Gear Mechanisms (Precision)-2500 — *See Vol. C*

Generator Groups (MIL), Signal-3475

† EDMAN Corp., Subsidiary of Rospatch, 7500 Main St., P.O. Box 750, Fishers, NY 14453-0750 716-924-4000
† Polarad Elctrns., Inc., 5 Delaware Dr., Lake Success, NY 11042 516-328-1100

Generators, AM-2900

MARCONI INSTRUMENTS, 3 Pearl Court, Allendale, NJ 07401, 201-934-9050 .... D∘1262
RE Instruments Corp., 31029 Center Ridge Rd., Westlake, OH 44145, 216-871-7617 .... D∘1295
§ B & K Precision, Industrial Electronics Product Group, Dynascan Corporation, 6460 W. Cortland, Chicago, IL 60635 312-889-9087
Boonton Elctrns. Corp., 791 Route 10, Randolph, NJ 07869 201-584-1077
Clarke-Hess Comm. Resch. Corp., 17 West 17th St., New York, NY 10011 212-255-2940
† Clemens Mfg., 630 So. Berry Rd., St. Louis, MO 63122 314-961-7228
† Comstron Corp., 200 E. Sunrise Hwy., Freeport, NY 11520 516-546-9700
Continental Electronics Mfg. Co., P.O. Box 270879, Dallas, TX 75227 214-381-7161
Eaton Corp., Elctrn. Instrmn. Div., 5340 Alla Rd., Los Angeles, CA 90066
Exact Electronics, Div. of Dynatech Nevada Inc., Box 1925, 2000 Arrowhead Dr., Carson City, NV 89701 .... 702-883-3400;800-648-7952
§ Heath Co., Benton Harbor, MI 49022 616-982-3886
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
Industrial Test Equip., 21 Yennicock Ave., Port Washington, NY 11050 .. 516-883-1700
Krohn-Hite Corp., Avon Indl. Pk., Bodwell St., Avon, MA 02322 617-580-1660
§ Leader Instrs. Corp., 380 Oser Ave., Hauppauge, NY 11788-3694 516-231-6900
† LogiMetrics, 121-03 Dupont St., Plainview, NY 11803 516-349-1700
† Polarad Elctrns., Inc., 5 Delaware Dr., Lake Success, NY 11042 516-328-1100
† Racal-Dana Instrs. Inc., 4 Goodyear St., Irvine, CA 92715 714-859-8999
§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 215-673-5600
§† Systron-Donner Instr. Div., 2727 Systron Dr., Concord, CA 94518 415-676-5000
§ Tucker Elctrns., Box 461966, Garland, TX 75046 .... 214-348-8800;800-527-4642
Wavetek Indiana, Inc., 5808 Churchman, Beech Grove, IN 46107 317-787-3332
Wavetek Rockland Scientific, Inc., 10 Volvo Dr., Rockleigh Indl. Pk., Rockleigh, NJ 07647 201-767-7900
§ Wavetek Corporation, 9191 Towne Centre Drive, San Diego, CA 92122 619-450-9971
§ Wilson, H. M., Co., 11501 Chimney Rock Rd., Houston, TX 77035 713-729-1183

Generators, AM/FM-2900

MARCONI INSTRUMENTS, 3 Pearl Court, Allendale, NJ 07401, 201-934-9050 .... D∘1262
RE Instruments Corp., 31029 Center Ridge Rd., Westlake, OH 44145, 216-871-7617 .... D∘1295
Boonton Elctrns. Corp., 791 Route 10, Randolph, NJ 07869 201-584-1077
Clarke-Hess Comm. Resch. Corp., 17 West 17th St., New York, NY 10011 212-255-2940
† Collins Avionics Divisions, Rockwell Intl., 400 Collins Rd. NE, Cedar Rapids, IA 52498 319-395-1000
† Comstron Corp., 200 E. Sunrise Hwy., Freeport, NY 11520 516-546-9700
Continental Electronics Mfg. Co., P.O. Box 270879, Dallas, TX 75227 214-381-7161
† Cushman Elctrns., 2450 N. 1st St., San Jose, CA 95131 408-263-8100
Eaton Corp., Elctrn. Instrmn. Div., 5340 Alla Rd., Los Angeles, CA 90066
Exact Electronics, Div. of Dynatech Nevada Inc., Box 1925, 2000 Arrowhead Dr., Carson City, NV 89701 .... 702-883-3400;800-648-7952
Genstar Rental Elctrns., 2445 Faber Pl., Palo Alto, CA 94303 415-856-7600
§ Hickok Elec. Instr., 10514 DuPont Ave., Cleveland, OH 44108 216-541-8060
§ Interstate Electronics Corp., Box 3117, 1001 E. Ball Rd., Anaheim, CA 92803 714-635-7210
Krohn-Hite Corp., Avon Indl. Pk., Bodwell St., Avon, MA 02322 617-580-1660
§ Leader Instrs. Corp., 380 Oser Ave., Hauppauge, NY 11788-3694 516-231-6900
† LogiMetrics, 121-03 Dupont St., Plainview, NY 11803 516-349-1700
† Polarad Elctrns., Inc., 5 Delaware Dr., Lake Success, NY 11042 516-328-1100
† Racal-Dana Instrs. Inc., 4 Goodyear St., Irvine, CA 92715 714-859-8999
§ REI Sls., 19525 Business Centre Dr., Northridge, CA 91324 617-938-0900
Sencore, 3200 Sencore Dr., Sioux Falls, SD 57107 605-339-0100
§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 215-673-5600
Telonic/Berkeley, 2825 Laguna Canyon Rd., Laguna Beach, CA 92652 714-494-9401
§ Tucker Elctrns., Box 461966, Garland, TX 75046 .... 214-348-8800;800-527-4642
† Wavetek Indiana, Inc., 5808 Churchman, Beech Grove, IN 46107 317-787-3332
† Wavetek Rockland Scientific, Inc., 10 Volvo Dr., Rockleigh Indl. Pk., Rockleigh, NJ 07647 201-767-7900
§ Wavetek Corporation, 9191 Towne Centre Drive, San Diego, CA 92122 619-450-9971
§ Wiltron, 805 E. Middlefield Rd., P.O. Box 7290, Mountain View, CA 94042-7290 415-969-6500

Generators, Arbitrary Waveform-2900

Krohn-Hite Corp., Avon Indl. Pk., Bodwell St., Avon, MA 02322, 617-580-1660 .... D∘1258
Pacific Micro Sys., Inc., 160 Gate 5 Rd., Sausalito, CA 94965 415-331-2525
§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 215-673-5600
§ Wavetek Corporation, 9191 Towne Centre Drive, San Diego, CA 92122 619-450-9971

Generators, Audio-2900

Boonton Elctrns. Corp., 791 Route 10, Randolph, NJ 07869, 201-584-1077 .... D∘1197

Industrial Test Equip., 21 Yennicock Ave., Port Washington, NY 11050, 516-883-1700 .... D•1247
Julie Resch. Labs., 211 West 61st St., New York, NY 10023, 212-245-2727 .... D•1256
MARCONI INSTRUMENTS, 3 Pearl Court, Allendale, NJ 07401, 201-934-9050 .... D•1262
A E Corp., 65 Wellesley Ave., Needham, MA 02194 617-449-3142
Alpha-M Corp., 3009 Wildflower Dr., Dallas, TX 75229 214-620-0021
Amber Electro Design Inc., 4810 Jean Talon Blvd. W Ste 321, Montreal, Quebec, CANADA H4P2N5 514-735-4105
§ Asaca Shibasku Corp. of Amer., 12509 Beatrice St., Los Angeles, CA 90066 .. 827-7144
Bruel & Kjaer Instrs. Inc., 185 Forest St., Marlboro, MA 01752 617-481-7000
CML MACARR Div., Marine Electric RPD, Inc., 666 Pacific St., Brooklyn, NY 11217 718-857-2400
† Comstron Corp., 200 E. Sunrise Hwy., Freeport, NY 11520 516-546-9700
† Cushman Elctrns., 2450 N. 1st St., San Jose, CA 95131 408-263-8100
Cybernetic Micro Sys., P.O. Box 3000, 3000 Hwy. 84, San Gregorio, CA 94074 415-726-3000
DigiMax Instrs. Corp., 5625 Kearny Villa Rd., San Diego, CA 92123 619-569-6582
§ Eaton Corp., Elctrn. Instrmn. Div., 5340 Alla Rd., Los Angeles, CA 90066
§ Electrodata, Inc., 23020 Miles Rd., Bedford Heights, OH 44128 216-663-3333
Exact Electronics, Div. of Dynatech Nevada Inc., Box 1925, 2000 Arrowhead Dr., Carson City, NV 89701 .... 702-883-3400;800-648-7952
† Fork Standards, Inc., 666 Western Ave., Lombard, IL 60148 312-932-9380
Frequency Devices, Inc., 25 Locust St., Haverhill, MA 01830 617-374-0761
† Frequency Elctrns., 55 Charles Lindbergh Blvd., Mitchel Field, NY 11553 516-794-4500
† FSI/Fork Standards Inc., 666 Western Ave., Lombard, IL 60148 .... 312-231-3511; 312-932-9380
Golden Pacific Elctrns., Inc., 1020 N. Batavia St., Ste. Q, Orange, CA 92667 .... 714-538-9752/9753
§ Harris Corp., Dracon Div., 809 Calle Plano, Camarillo, CA 93010 805-987-9511
§ Heath Co., Benton Harbor, MI 49022 616-982-3886
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
§ Hickok Elec. Instr., 10514 DuPont Ave., Cleveland, OH 44108 216-541-8060
Krohn-Hite Corp., Avon Indl. Pk., Bodwell St., Avon, MA 02322 617-580-1660
§ Leader Instrs. Corp., 380 Oser Ave., Hauppauge, NY 11788-3694 516-231-6900
Modular Audio Prods., Modular Devices Inc., 50 Orville Dr., Bohemia, NY 11716 516-567-9620
† Polarad Elctrns., Inc., 5 Delaware Dr., Lake Success, NY 11042 516-328-1100
Real Time Sys., 152 S. MacQuesten Pkwy., Mt. Vernon, NY 10550 914-667-0425
RE Instruments Corp., 31029 Center Ridge Rd., Westlake, OH 44145 ... 216-871-7617
§ Shure Bros., 222 Hartrey Ave., Evanston, IL 60204 312-866-2200
Solar Elctrns. Co., 901 N. Highland, Hollywood, CA 90038 213-462-0806
§ Soundlier, American Trading & Prod. Corp., 9380 Watson Ind'l. Pk., St. Louis, MO 63126 314-962-9870
§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 215-673-5600
Telonic/Berkeley, 2825 Laguna Canyon Rd., Laguna Beach, CA 92652 714-494-9401
§ Tucker Elctrns., Box 461966, Garland, TX 75046 .... 214-348-8800;800-527-4642
Vistar Corp., 13740 McCormick Dr., Tampa, FL 33625 813-855-6611
§ VIZ Test Equipment, Div. VIZ Mfg., 335 E. Price St., Philadelphia, PA 19144 215-844-2626
Wavetek Indiana, Inc., 5808 Churchman, Beech Grove, IN 46107 317-787-3332
† Wavetek Rockland Scientific, Inc., 10 Volvo Dr., Rockleigh Indl. Pk., Rockleigh, NJ 07647 201-767-7900
§ Wavetek Corporation, 9191 Towne Centre Drive, San Diego, CA 92122 619-450-9971
§ Wilson, H. M., Co., 11501 Chimney Rock Rd., Houston, TX 77035 713-729-1183
§ Wiltron, 805 E. Middlefield Rd., P.O. Box 7290, Mountain View, CA 94042-7290 415-969-6500

Generators, Bar, Dot & Crosshatch-2900

§ Quantum Data, Inc., 455 E. Kehoe, Carol Stream, IL 60188, 312-668-3301 .... D•1293
§ B & K Precision, Industrial Electronics Product Group, Dynascan Corporation, 6460 W. Cortland, Chicago, IL 60635 312-889-9087
† Colorado Video, Inc., Box 928, Boulder, CO 80306 303-444-3972
§ Heath Co., Benton Harbor, MI 49022 616-982-3886
§ Hickok Elec. Instr., 10514 DuPont Ave., Cleveland, OH 44108 216-541-8060
§ Leader Instrs. Corp., 380 Oser Ave., Hauppauge, NY 11788-3694 516-231-6900
§† Lenco Elctrns., Inc., 300 N. Maryland St., Jackson, MO 63755 314-243-3147
Nuclear Resch. Corp., 125 Titus Ave., Warrington, PA 18976 215-343-5900
Sencore, 3200 Sencore Dr., Sioux Falls, SD 57107 605-339-0100
§ Simpson Elec. Co., 853 Dundee Ave., Elgin, IL 60120 312-697-2260
§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 215-673-5600
Test & Measurement Systems, Inc., 349 Cobalt Way, Ste. 301, Sunnyvale, CA 94086 408-720-8877
Visual Info. Institute, Box 33, Xenia, OH 45385 513-376-4361

Generators, Baud Rate-1900

† Leach Corp., Control Prods. Div., 6900 Orangethorpe Ave., Buena Pk., CA 90620, 714-739-0770 .... A•1378
Motorola, Inc., Compt. Divs. Clock Oscillator Dept., 2553 N. Edgington, Franklin Park, IL 60131, 312-451-1000 .... A•1393
M-Tron Inds., P.O. Box 630, E. Hwy. 50, Yankton, SD 57078, 605-665-9321 .... A•1395
Oscillatek Corp., 620 North Lindenwood Dr., Olathe, KS 66062, 913-829-1777 .... A•1402
† Q-Tech Corp., 2201 Carmelina Ave., Los Angeles, CA 90064, 213-820-4921 .... A•1422
§ General Instrument Corp., Microelectronics Div., 600 W. John St., Hicksville, NY 11802 516-733-3107
Industrial Computer Designs, Inc., 31264 La Baya Drive, Westlake Village, CA 91362 818-889-3179
Monitor Prods. Co., Inc., Post Office Box 1966, Oceanside, CA 92054 ... 619-433-4510
SaRonix, 4010 Transport at San Antonio, Palo Alto, CA 94303 415-856-6900
† Telecommunications Techniques Corp., 444 N. Frederick Ave., Gaithersburg, MD 20877 301-258-5011

Generators, Character-2325

§ Chrono-log Corp., 2 W. Park Rd., Havertown, PA 19083, 215-853-1130 .. D•1061
§ Quantum Data, Inc., 455 E. Kehoe, Carol Stream, IL 60188, 312-668-3301 .... D•1293
§† Advanced Micro Devices, P.O. Box 3453, 901 Thompson Pl., Sunnyvale, CA 94088 408-732-2400
Aston Electronics, Inc., Aston Electronic Designs, Ltd., 531 North Murlen Rd., Olathe, KS 66062 913-782-4007
Cybernetic Micro Sys., P.O. Box 3000, 3000 Hwy. 84, San Gregorio, CA 94074 415-726-3000
† Datum Inc., Timing/Aacom Divisions, 1363 S. State College Blvd., Anaheim, CA 92806 714-533-6333
§† Digitech Industries, Inc., 66 Grove St., Ridgefield, CT 06877 203-438-3731
§ Electrodata, Inc., 23020 Miles Rd., Bedford Heights, OH 44128 216-663-3333
Enterprise Sys. Corp., P.O. Box 698, Dover, NH 03820 603-742-7363
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
Information Technolgoy A.D.S.C., P.O. Box 470, College Park, MD 20740 301-779-5110
Kode, 1515 S. Manchester Ave., Anaheim, CA 92802 714-758-0400
§ Leader Instrs. Corp., 380 Oser Ave., Hauppauge, NY 11788-3694 516-231-6900
Matrox Elctrn. Sys., 1055 St. Regis Blvd., Dorval, QU, CANADA H9P 2T4 514-685-2630
Nu Data, 32 Fairview Ave., Little Silver, NJ 07739 201-842-5757
† Telecommunications Techniques Corp., 444 N. Frederick Ave., Gaithersburg, MD 20877 301-258-5011
Telpar, Inc., 4137 Billy Mitchell Rd., P.O. Box 796, Addison, TX 75001 ... 214-233-6631
Tucker Elctrns., Box 461966, Garland, TX 75046 .... 214-348-8800;800-527-4642

Generators, Color Bar-2900

§ Quantum Data, Inc., 455 E. Kehoe, Carol Stream, IL 60188, 312-668-3301 .... D•1293
§ Asaca Shibasku Corp. of Amer., 12509 Beatrice St., Los Angeles, CA 90066 .. 827-7144
§ B & K Precision, Industrial Electronics Product Group, Dynascan Corporation, 6460 W. Cortland, Chicago, IL 60635 312-889-9087
Continental Resources, Inc., 175 Middlesex Tpke., Bedford, MA 01730 .. 617-275-0850
§ Heath Co., Benton Harbor, MI 49022 616-982-3886
§ Hickok Elec. Instr., 10514 DuPont Ave., Cleveland, OH 44108 216-541-8060
§ Leader Instrs. Corp., 380 Oser Ave., Hauppauge, NY 11788-3694 516-231-6900
§ Lectrotech, Inc., 5810 N. Western Ave., Chicago, IL 60659 312-769-6262
§† Lenco Elctrns., Inc., 300 N. Maryland St., Jackson, MO 63755 314-243-3147
Sencore, 3200 Sencore Dr., Sioux Falls, SD 57107 605-339-0100
§ Simpson Elec. Co., 853 Dundee Ave., Elgin, IL 60120 312-697-2260
§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 215-673-5600
Telemet, 185 Dixon Ave., Amityville, NY 11701 516-842-2300
Test & Measurement Systems, Inc., 349 Cobalt Way, Ste. 301, Sunnyvale, CA 94086 408-720-8877
Visual Info. Institute, Box 33, Xenia, OH 45385 513-376-4361
§ VIZ Test Equipment, Div. VIZ Mfg., 335 E. Price St., Philadelphia, PA 19144 215-844-2626

Generators, Digital Delay – See Generators, Timing, Digital (Vol. D)

Generators, Electrical Power-4000

† Georator Corp., Box 70, Manassas, VA 22110, 703-368-2101 ...... D•1930-1931
Abacus Controls Inc., 89 Readington Rd., Somerville, NJ 08876 201-526-6010
† American Elctrns., 1600 E. Valencia Dr., Fullerton, CA 92631 714-871-3020
Atlas Energy Sys., 9457 Rush St., S. El Monte, CA 91733 213-575-0755
Behlman Engineering, 1142 Mark Ave., Carpinteria, CA 93013 805-684-8311
CML MACARR Div., Marine Electric RPD, Inc., 666 Pacific St., Brooklyn, NY 11217 718-857-2400
§ Computer Power, 124E W. Main St., High Bridge, NJ 08829 201-735-8000
† Dresser Inds., 1505 Elm St., Dallas, TX 75201 214-746-6000
† Electro Kinetics Co., Sub. HTL Inds., Inc., 402 E. Gutierrez St., Santa Barbara, CA 93102 805-963-2055
Electro-Pacific, 5782 Thornwood Dr., Goleta, CA 93017 805-964-0751
† Giannini Petro Marine, 9474 Chesapeake Dr., San Diego, CA 92123 619-569-1668
† HTL Electro Kinetics, 402 E. Gutierrez St., Santa Barbara, CA 93101 805-963-2055
Kato Engineering, Reliance Electric, P. O. Box 99502, Cleveland, OH 44199 .... 800-245-4501;in OH 800-245-4497
† Lear Siegler, Inc., 2850 Ocean Park Blvd., P.O. Box 2158, Santa Monica, CA 90406 213-452-5444
Q-S Products Co., Inc., 3605 S.W. Snoqualmie St., Seattle, WA 98126 206-937-5505
Reliance Electric Co., Marketing Info Center, P.O. Box 99502, Cleveland, OH 44199 .... 800-245-4501;800-245-4497 In Ohio
Simmonds Precision, P.O. Box 310, Norwich, NY 13815 607-335-5000
Teledyne Inet, 2750 W. Lomita Blvd., Torrance, CA 90509 213-325-5040
† TRW Motor Div. (Military), 2275 Stanley Ave., Dayton, OH 45404 513-228-3171
Vernitech, 300 Marcus Blvd., Deer Pk., NY 11729 516-586-5100
† Western Gear Corp., Applied Tech. Div., 14724 E. Proctor, City of Industry, CA 91744 818-968-6525

Generators, Electrostatic Discharge - Also See Electrostatic Discharge Guns-2900

§ American HV Test Systems Inc., Central Garrett Ind'l. Pk., Accident, MD 21520 301-826-8651
Brady Co., 574A Somerset St., N. Plainfield, NJ 07060 201-753-7988
Compliance Design Inc., 593 Massachusetts Ave., Boxboro, MA 01719 .. 617-264-4668
S & H Inds., 119 Glen Cove Dr., Glen Head, NY 11545 516-671-5600
Schaffner EMC, Inc., Instr. Div., 825 Lehigh Avenue, Union, NJ 07083 201-851-0644
§ Simco Co., 2257 North Penn Rd., Hatfield, PA 19440 215-822-2171
Velonex, 560 Robert Ave., Santa Clara, CA 95050 408-727-7370

Generators, FM-2900

MARCONI INSTRUMENTS, 3 Pearl Court, Allendale, NJ 07401, 201-934-9050 .... D•1262
RE Instruments Corp., 31029 Center Ridge Rd., Westlake, OH 44145, 216-871-7617 .... D•1295
Boonton Elctrns. Corp., 791 Route 10, Randolph, NJ 07869 201-584-1077
Cal-Tek Engrg., 36 Riverside Drive, Kingston, MA 02364 617-585-5666
Clarke-Hess Comm. Resch. Corp., 17 West 17th St., New York, NY 10011 212-255-2940
† Comstron Corp., 200 E. Sunrise Hwy., Freeport, NY 11520 516-546-9700
Continental Electronics Mfg. Co., P.O. Box 270879, Dallas, TX 75227 214-381-7161
Continental Resources, Inc., 175 Middlesex Tpke., Bedford, MA 01730 617-275-0850
† Cushman Elctrns., 2450 N. 1st St., San Jose, CA 95131 408-263-8100
Eaton Corp., Elctrn. Instrmn. Div., 5340 Alla Rd., Los Angeles, CA 90066
Exact Electronics, Div. of Dynatech Nevada Inc., Box 1925, 2000 Arrowhead Dr., Carson City, NV 89701 .... 702-883-3400;800-648-7952
§† Harris Corp., PRD Elctrns. Div., 6801 Jericho Tpke., Syosset, NY 11791 516-364-0400
§ Heath Co., Benton Harbor, MI 49022 616-982-3886
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
§ Hickok Elec. Instr., 10514 DuPont Ave., Cleveland, OH 44108 216-541-8060
Industrial Test Equip., 21 Yennicock Ave., Port Washington, NY 11050 516-883-1700
§ Interstate Electronics Corp., Box 3117, 1001 E. Ball Rd., Anaheim, CA 92803 714-635-7210
Krohn-Hite Corp., Avon Indl. Pk., Bodwell St., Avon, MA 02322 617-580-1660
† LogiMetrics, 121-03 Dupont St., Plainview, NY 11803 516-349-1700
† Polarad Elctrns., Inc., 5 Delaware Dr., Lake Success, NY 11042 516-328-1100
† Racal-Dana Instrs. Inc., 4 Goodyear St., Irvine, CA 92715 714-859-8999
† Solid State Elctrns. Corp., 18646 Parthenia St., Northridge, CA 91324 818-993-8257
§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 215-673-5600
§† Systron-Donner Instr. Div., 2727 Systron Dr., Concord, CA 94518 415-676-5000
Tektronix, Inc., P. O. Box 500, Y3-314, Beaverton, OR 97077 ..... 800-547-1512;Oregon only 800-452-1877
§ Tucker Elctrns., Box 461966, Garland, TX 75046 .... 214-348-8800;800-527-4642
Wavetek Rockland Scientific, Inc., 10 Volvo Dr., Rockleigh Indl. Pk., Rockleigh, NJ 07647 201-767-7900
§ Wavetek Corporation, 9191 Towne Centre Drive, San Diego, CA 92122 619-450-9971

Generators, FM/Stereo-2900

RE Instruments Corp., 31029 Center Ridge Rd., Westlake, OH 44145, 216-871-7617 .... D•1295
Continental Electronics Mfg. Co., P.O. Box 270879, Dallas, TX 75227 214-381-7161
§ Heath Co., Benton Harbor, MI 49022 616-982-3886
§ Leader Instrs. Corp., 380 Oser Ave., Hauppauge, NY 11788-3694 516-231-6900
Philips Test & Measuring Instrs., 85 McKee Dr., Mahwah, NJ 07430 201-529-3800
Sencore, 3200 Sencore Dr., Sioux Falls, SD 57107 605-339-0100
§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 215-673-5600

Generators, Frequency Synthesizer-2900

IET Labs, Inc., 534 Main St., Westbury, NY 11590, 516-334-5959 .... D•1245
† Microwave/Sys., 1 Adler Dr., E. Syracuse, NY 13057 315-437-9951
§ Tucker Elctrns., Box 461966, Garland, TX 75046 .... 214-348-8800;800-527-4642

Generators, Function-2900

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Atlantic Research, 5390 Cherokee Ave., Alexandria, VA 22312 703-642-4000
Cal-Tek Engrg., 36 Riverside Drive, Kingston, MA 02364 617-585-5666
† Cardion Elctrns., Div. of Gen. Sig. Conts., Inc. Unit of Gen. Sig. Corp., Long Island Expwy., Woodbury, NY 11797 516-921-7300
CDS - Colorado Data Sys., 3301 W. Hampden, Unit C, Englewood, CO 80110 303-762-1640
§ Cincinnati Electrosys., 469 Wards Corner Rd., Loveland, OH 45140 513-831-4347
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Colorado Data Systems, Inc., 3301 W. Hampden Ave., Unit C, Englewood, CO 80110 303-762-1640
Continental Resources, Inc., 175 Middlesex Tpke., Bedford, MA 01730 .. 617-275-0850
Cybernetic Micro Sys., P.O. Box 3000, 3000 Hwy. 84, San Gregorio, CA 94074 415-726-3000
Disc Instruments, Honeywell, 102 E. Baker St., Costa Mesa, CA 92626 .. 714-979-5300
§ Dynapar, 1675 Delany Rd., Gurnee, IL 60031 312-662-2666
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Eldorado Instrs., 7303 Edgewater Dr., Oakland, CA 94621 415-638-5656
Engineered Comps. Co., P. O. Box 8121, San Luis Obispo, CA 93403-8121 805-544-3800
† EPSCO Microwave, 411 Providence Hwy., Westwood, MA 02090 617-329-1500
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§ Global Specialties, Interplex Electronics, Inc., 70 Fulton Terrace, P.O. Box 1942, New Haven, CT 06509 203-624-3103
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KeyTek Instr. Corp., 12 Cambridge St., Burlington, MA 01803 617-272-5170
Krohn-Hite Corp., Avon Indl. Pk., Bodwell St., Avon, MA 02322 617-580-1660
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§† Lenco Elctrns., Inc., 300 N. Maryland St., Jackson, MO 63755 314-243-3147
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† Magnetic Technology, 21001 Kittridge St., Canoga Pk., CA 91303 818-887-7700
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† MCL, Inc., 10 North Beach Ave., La Grange, IL 60525-2092 312-354-4350
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§ Pacific Atlantic Elctrns., Box 754, El Cerrito, CA 94530 415-237-5837
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Pulse Instrs. Co., 1234 Francisco, Torrance, CA 90502 213-515-5330
† Racal-Dana Instrs. Inc., 4 Goodyear St., Irvine, CA 92715 714-859-8999
† Radio Resch. Instr. Co., Inc., Two Lake Ave. Extension, Danbury, CT 06811-5295 203-792-6666
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Republic Electronics Co., 575 Broad Hollow Rd., Melville, NY 11747 516-249-1414
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Seven Mountains Sci. Inc., P.O. Box 650, Boalsburg, PA 16827 814-466-6559
† Solid State Elctrns. Corp., 18646 Parthenia St., Northridge, CA 91324 ... 818-993-8257
§ Spanta, Inc., Box 193, Franklin Lakes, NJ 07417 201-337-0044
§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 215-673-5600
§† Systron-Donner Instr. Div., 2727 Systron Dr., Concord, CA 94518 415-676-5000
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Teledyne Gurley, 514 Fulton St P.O. Box 88, Troy, NY 12181 518-272-6300
† Tobe Deutschmann Labs., Inc., 550 Turnpike St., Canton, MA 02021 617-828-3366
§ Tucker Elctrns., Box 461966, Garland, TX 75046 .... 214-348-8800;800-527-4642
† Velonex, 560 Robert Ave., Santa Clara, CA 95050 408-727-7370
§ Wavetek Corporation, 9191 Towne Centre Drive, San Diego, CA 92122 619-450-9971

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Canberra Ind., One State St., Meriden, CT 06450 203-238-2351
LeCroy Resch. Sys. Corp., 700 S. Main St., Spring Vly., NY 10977 914-425-2000
§ Tennelec, 601 Turnpike, Oak Ridge, TN 37830 615-483-8405
Velonex, 560 Robert Ave., Santa Clara, CA 95050 408-727-7370

Generators, RF-2900

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† **Comstron Corp., 200 E. Sunrise Hwy., Freeport, NY 11520, 516-546-9700 .... D•1204**
Datum Inc., Timing/Aacom Divisions, 1363 S. State College Blvd., Anaheim, CA 92806, 714-533-6333 .... D•1050
Krohn-Hite Corp., Avon Indl. Pk., Bodwell St., Avon, MA 02322, 617-580-1660 .... D•1258
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† **MCL, Inc., 10 North Beach Ave., La Grange, IL 60525-2092, 312-354-4350 .... D•1409**
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RE Instruments Corp., 31029 Center Ridge Rd., Westlake, OH 44145, 216-871-7617 .... D•1295
† Ajax Magnethermic Corp., 1745 Overland Ave., N.E., Warren, OH 44482 216-372-8511
Alpha Inds., Inc.-MSD Div., 20 Sylvan Rd., Woburn, MA 01801 617-935-5150
Applied Research, Inc., 160 Dupont St., Plainview, NY 11803 516-349-9200
† A.R.F. Prods., 2559 75th St., Boulder, CO 80301 303-443-4844
Boonton Elctrns. Corp., 791 Route 10, Randolph, NJ 07869 201-584-1077
† Clemens Mfg., 630 So. Berry Rd., St. Louis, MO 63122 314-961-7228
Cober Elctrns., 102 Hamilton Ave., Stamford, CT 06902 203-327-0003
† Collins Avionics Divisions, Rockwell Intl., 400 Collins Rd. NE, Cedar Rapids, IA 52498 319-395-1000
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† Cushman Elctrns., 2450 N. 1st St., San Jose, CA 95131 408-263-8100
§ Digiac Corp., 175 Engineers Rd., Hauppauge, NY 11788 516-273-8600
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† EDMAN Corp., Subsidiary of Rospatch, 7500 Main St., P.O. Box 750, Fishers, NY 14453-0750 716-924-4000
Ehrhorn Technological Opers., Inc., P.O. Box 888, Canon City, CO 81212 303-275-1613
† EPSCO Microwave, 411 Providence Hwy., Westwood, MA 02090 617-329-1500
Exact Electronics, Div. of Dynatech Nevada Inc., Box 1925, 2000 Arrowhead Dr., Carson City, NV 89701 .... 702-883-3400;800-648-7952
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§† Harris Circuits Mfg., 2706 Colley Ave., Norfolk, VA. 23517 804-467-1116
§† Harris Corp., PRD Elctrns. Div., 6801 Jericho Tpke., Syosset, NY 11791 516-364-0400
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§ Laboratory Products, Inc., 57 Cornwall St., P. O. Box 1750, Jamaica Plain, MA 02130 617-522-7800
§ Leader Instrs. Corp., 380 Oser Ave., Hauppauge, NY 11788-3694 516-231-6900
† Lepel, 59-21 Queens-Midtown Expwy., Maspeth, NY 11378 718-426-4580
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† Polarad Elctrns., Inc., 5 Delaware Dr., Lake Success, NY 11042 516-328-1100
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§† Systron-Donner Instr. Div., 2727 Systron Dr., Concord, CA 94518 415-676-5000
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† Wavetek Indiana, Inc., 5808 Churchman, Beech Grove, IN 46107 317-787-3332
† Wavetek Rockland Scientific, Inc., 10 Volvo Dr., Rockleigh Indl. Pk., Rockleigh, NJ 07647 201-767-7900
§ Wavetek Corporation, 9191 Towne Centre Drive, San Diego, CA 92122 619-450-9971
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§ Wiltron, 805 E. Middlefield Rd., P.O. Box 7290, Mountain View, CA 94042-7290 415-969-6500

Generators, Sawtooth, Sine — See Generators, Function (Vol. D)

Generators, Signal-Also See Generators, Specific Type-2900

§ B & K Precision, Industrial Electronics Product Group, Dynascan Corporation, 6460 W. Cortland, Chicago, IL 60635, 312-889-9087 .... D•1189-1190
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† Industrial Control Co., 3100 Pineda Ave., Rockledge, FL 32955, 305-259-7105 .... D•1988
Julie Resch. Labs., 211 West 61st St., New York, NY 10023, 212-245-2727 .... D•1256
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† Applied Electro Technlg., Int., STI Company, 2220 So. Anne St., Santa Ana, CA 92704 714-556-6570
§† Audiosone, Inc., 617 Fan Hill Rd., Monroe, CT 06468 ..... 203-268-4372;203-268-6703
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§ Heath Co., Benton Harbor, MI 49022 616-982-3886
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LeCroy Resch. Sys. Corp. (Cal.), 1806 Embarcadero Rd., Palo Alto, CA 94303 415-856-1800
Norland Corp., Norland Dr., Ft. Atkinson, WI 53538 414-563-8456
Plainview Elctrns., 28 Cain Dr., Plainview, NY 11803 516-249-6677
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§† Systron-Donner Instr. Div., 2727 Systron Dr., Concord, CA 94518 415-676-5000
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Texscan Instruments, 3169 N. Shadeland, Indianapolis, IN 46226 317-545-4196
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Visual Info. Institute, Box 33, Xenia, OH 45385 513-376-4361
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Wavetek Corporation, 9191 Towne Centre Drive, San Diego, CA 92122 619-450-9971
Zeta Labs., 3265 Scott Blvd., Santa Clara, CA 95054 408-727-6001

Generators, Sine/Cosine Function (Module)-3130 — *See Vol. A*

Generators, Spectrum — See Generators, Sweep (Vol. D)

Generators, Spike-2900

† Velonex, 560 Robert Ave., Santa Clara, CA 95050, 408-727-7370 .... D•1325
§ Power-Science, 7667 Vickers St., San Diego, CA 92111 619-292-4322
Velonex, 560 Robert Ave., Santa Clara, CA 95050 408-727-7370

Generators, Square Wave — See Generators, Function (Vol. D)

Generators, Sweep-2900

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Eaton Corp., Elctrn. Instrmn. Div., 5340 Alla Rd., Los Angeles, CA 90066
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Polarad Elctrns., Inc., 5 Delaware Dr., Lake Success, NY 11042 516-328-1100
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† Wavetek Indiana, Inc., 5808 Churchman, Beech Grove, IN 46107 317-787-3332
† Wavetek Rockland Scientific, Inc., 10 Volvo Dr., Rockleigh Indl. Pk., Rockleigh, NJ 07647 201-767-7900
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§ Wilson, H. M., Co., 11501 Chimney Rock Rd., Houston, TX 77035 713-729-1183

§ Wiltron, 805 E. Middlefield Rd., P.O. Box 7290, Mountain View, CA 94042-7290 ... 415-969-6500

Generators, Time Code-2000

Austron, Inc., P.O. Box 14766, Exit 248 N. IH 35, Austin, TX 78761, 512-251-2341 ... A•1315
† Datum Inc., Timing/Aacom Divisions, 1363 S. State College Blvd., Anaheim, CA 92806, 714-533-6333 ... D•1148
† Frequency and Time Systems, Inc., DATUM, INC., 34 Tozer Rd., Beverly, MA 01915, 617-927-8220 ... A•1365, D•1148
† TRAK Systems, Div. TRAK Microwave Corp., 4722 Eisenhower Blvd., Dept. E-5, Tampa, FL 33614, 813-884-1411 ... D•1076-1081
† Base Ten Sys., One Electronics Dr., Box 3151, Trenton, NJ 08619 ... 609-586-7010
§ Chrono-log Corp., 2 W. Park Rd., Havertown, PA 19083 ... 215-853-1130
† Computer Devices Corp., 63 Austin Blvd., Commack, NY 11725 ... 516-543-4220
Datachron Inc., 3186 J Airway Ave., Costa Mesa, CA 92626 ... 714-751-2211
§ ESE, 142 Sierra St., El Segundo, CA 90245 ... 213-322-2136
Frequency Control Prods., Inc., American Time Prods. Div., 61-20 Woodside Ave., Woodside, NY 11377 ... 212-458-5811
Genstar Rental Elctrns., 2445 Faber Pl., Palo Alto, CA 94303 ... 415-856-7600
Kode, 1515 S. Manchester Ave., Anaheim, CA 92802 ... 714-758-0400
K-Systems, Inc., 3902 Lilac, Las Cruces, NM 88005 ... 505-526-3209
† Metric Sys., 645 Anchors St, Ft. Walton Beach, FL 32548 ... 904-244-9600
§ NES, Inc. (Nationwide Electronic Systems), 3003 Wakefield, Carpentersville, IL 60110 ... 312-426-5900
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Spectracom, 101 Despatch Drive, East Rochester, NY 14445 ... 716-381-4827
§† Systron-Donner Instr. Div., 2727 Systron Dr., Concord, CA 94518 ... 415-676-5000
Wide Range Elctrns. Corp., 2119 Schultz Rd., St. Louis, MO 63146 ... 314-567-5366

Generators, Timing, Digital-2000

Berkeley Nucleonics Corp., 1198 Tenth St., Berkeley, CA 94710, 415-527-1121 ... D•1196
California Avionics Labs., Box 701, Palo Alto, CA 94302, 415-328-7999 ... D•1198
† TRAK Systems, Div. TRAK Microwave Corp., 4722 Eisenhower Blvd., Dept. E-5, Tampa, FL 33614, 813-884-1411 ... D•1076-1081
§ Chrono-log Corp., 2 W. Park Rd., Havertown, PA 19083 ... 215-853-1130
† Computer Devices Corp., 63 Austin Blvd., Commack, NY 11725 ... 516-543-4220
Com/Tech Systems, 505 Eighth Ave., New York, NY 10018 ... 212-594-5377
C-Tek Inc., 4 Railroad Ave., Wakefield, MA 01880 ... 617-246-1720
Cybernetic Micro Sys., P.O. Box 3000, 3000 Hwy. 84, San Gregorio, CA 94074 ... 415-726-3000
Datachron Inc., 3186 J Airway Ave., Costa Mesa, CA 92626 ... 714-751-2211
§ Dataprobe, 110 Palisades Blvd., Palisades Park, NJ 07650 ... 201-947-9500
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† Fork Standards, Inc., 666 Western Ave., Lombard, IL 60148 ... 312-932-9380
FSI/Fork Standards Inc., 666 Western Ave., Lombard, IL 60148 ... 312-231-3511; 312-932-9380
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§ Kinemetrics/Truetime, 3243 Santa Rose Ave, Santa Rosa, CA 95407 ... 707-528-1230
Kode, 1515 S. Manchester Ave., Anaheim, CA 92802 ... 714-758-0400
† Metric Sys., 645 Anchors St, Ft. Walton Beach, FL 32548 ... 904-244-9600
† Motorola, Inc., Compt. Divs. Clock Oscillator Dept., 2553 N. Edgington, Franklin Park, IL 60131 ... 312-451-1000
§ NES, Inc. (Nationwide Electronic Systems), 3003 Wakefield, Carpentersville, IL 60110 ... 312-426-5900
PPM, Inc., 4521 Emery Ind. Pkwy., Cleveland, OH 44128 ... 216-292-6006
Practical Technology, 12 Village Ctr., Box 449, Carmel Valley, CA 93924 ... 408-659-3128
† Racal-Dana Instrs. Inc., 4 Goodyear St, Irvine, CA 92715 ... 714-859-8999
Sensor Corp., Box 140, Scottdale, PA 15683 ... 412-887-4080
§ Tau-Tron, Inc., A Unit of General Signal, 10 Lyberty Way, Westford, MA 01886 ... 617-692-5100
Tempo Instrument, Inc., 87 Modular Ave., Commack, NY 11725 ... 516-864-3700
§ Tennelec, 601 Turnpike, Oak Ridge, TN 37830 ... 615-483-8405
Test & Measurement Systems, Inc., 349 Cobalt Way, Ste. 301, Sunnyvale, CA 94086 ... 408-720-8877

Generators, Tone-2900

A E Corp., 65 Wellesley Ave., Needham, MA 02194 ... 617-449-3142
AES Corp., 285 Newbury St., P.O. Box 2093, Peabody, MA 01960 ... 617-535-7310
§ American Microsignal, 8431 Monroe Ave., Stanton, CA 90680 ... 714-761-1222
Aptek Microsystems, 700 N. W. 12th Ave., Deerfield Beach, FL 33441 ... 305-421-8450
Astro-Geo-Marine, Inc., 202 E. Cota St., Santa Barbara, CA 93101 ... 805-965-7005
Biddle Instruments, A Thorn EMI Co., 510 Township Line Rd., Blue Bell, PA 19422 ... 215-646-9200
† Cushman Elctrns., 2450 N. 1st St., San Jose, CA 95131 ... 408-263-8100
Cybernetic Micro Sys., P.O. Box 3000, 3000 Hwy. 84, San Gregorio, CA 94074 ... 415-726-3000
§ Dukane Corp., Communications Sys. Div., 2900 Dukane Dr., St. Charles, IL 60174 ... 312-584-2300
§ Dyma Engrg., Box 1535, Los Lunas, NM 87031 ... 505-865-6700
Eaton Corp., Elctrn. Instrmn. Div., 5340 Alla Rd., Los Angeles, CA 90066
Elgin Electronics, Combustion Engineering, 5533 New Perry Hwy., Erie, PA 16509-3570 ... 814-864-4921
Engineered Comps. Co., P. O. Box 8121, San Luis Obispo, CA 93403-8121 ... 805-544-3800
Exact Electronics, Div. of Dynatech Nevada Inc., Box 1925, 2000 Arrowhead Dr., Carson City, NV 89701 ... 702-883-3400;800-648-7952
Fork Standards, Inc., 666 Western Ave., Lombard, IL 60148 ... 312-932-9380
Frequency Devices, Inc., 25 Locust St., Haverhill, MA 01830 ... 617-374-0761
† Gorman-Redlich Mfg. Co., 6 Curtis St., Athens, OH 45701 ... 614-593-3150
Industrial Test Equip., 21 Yennicock Ave., Port Washington, NY 11050 ... 516-883-1700
§† Nitron, 10420 Bubb Rd., Cupertino, CA 95014 ... 408-255-7550
† Polarad Elctrns., Inc., 5 Delaware Dr., Lake Success, NY 11042 ... 516-328-1100
† Racal-Dana Instrs. Inc., 4 Goodyear St., Irvine, CA 92715 ... 714-859-8999
§† RCA Solid State Div., CMOS IC Mktg., Rte. 202, Somerville, NJ 08876 ... 201-685-6000
§ Shure Bros., 222 Hartrey Ave., Evanston, IL 60204 ... 312-866-2200
† Solid State Elctrns. Corp., 18646 Parthenia St., Northridge, CA 91324 ... 818-993-8257
† Tempo Instrument, Inc., 87 Modular Ave., Commack, NY 11725 ... 516-864-3700
§ Tucker Elctrns., Box 461966, Garland, TX 75046 ... 214-348-8800;800-527-4642
Warren Comms., 101 Okner Pkwy., Livingston, NJ 07039 ... 201-992-6200
† Wavetek Rockland Scientific, Inc., 10 Volvo Dr., Rockleigh Indl. Pk., Rockleigh, NJ 07647 ... 201-767-7900
§ Wavetek Corporation, 9191 Towne Centre Drive, San Diego, CA 92122 ... 619-450-9971
§ Wiltron, 805 E. Middlefield Rd., P.O. Box 7290, Mountain View, CA 94042-7290 ... 415-969-6500

Generators, Tone Burst-2900

A E Corp., 65 Wellesley Ave., Needham, MA 02194 ... 617-449-3142
§ American Microsignal, 8431 Monroe Ave., Stanton, CA 90680 ... 714-761-1222
Bruel & Kjaer Instrs. Inc., 185 Forest St., Marlboro, MA 01752 ... 617-481-7000
Clarke-Hess Comm. Resch. Corp., 17 West 17th St., New York, NY 10011 ... 212-255-2940
† Cushman Elctrns., 2450 N. 1st St., San Jose, CA 95131 ... 408-263-8100
Cybernetic Micro Sys., P.O. Box 3000, 3000 Hwy. 84, San Gregorio, CA 94074 ... 415-726-3000
Exact Electronics, Div. of Dynatech Nevada Inc., Box 1925, 2000 Arrowhead Dr., Carson City, NV 89701 ... 702-883-3400;800-648-7952
§ Feedback, 620 Springfield Ave., Berkeley Hghts., NJ 07922 ... 201-464-5181
Krohn-Hite Corp., Avon Indl. Pk., Bodwell St., Avon, MA 02322 ... 617-580-1660
Racal-Dana Instrs. Inc., 4 Goodyear St., Irvine, CA 92715 ... 714-859-8999
Real Time Sys., 152 S. MacQuesten Pkwy., Mt. Vernon, NY 10550 ... 914-667-0425
† Wavetek Rockland Scientific, Inc., 10 Volvo Dr., Rockleigh Indl. Pk., Rockleigh, NJ 07647 ... 201-767-7900
§ Wavetek Corporation, 9191 Towne Centre Drive, San Diego, CA 92122 ... 619-450-9971

Generators, Transient Line Voltage-2900

§ Power-Science, 7667 Vickers St., San Diego, CA 92111 ... 619-292-4322
Velonex, 560 Robert Ave., Santa Clara, CA 95050 ... 408-727-7370

Generators, UHF/VHF-2900

MARCONI INSTRUMENTS, 3 Pearl Court, Allendale, NJ 07401, 201-934-9050 ... D•1262
Programmed Test Sources, Beaver Brook Rd., Littleton, MA 01460, 617-486-3008 ... D•1292
Applied Research, Inc., 160 Dupont St., Plainview, NY 11803 ... 516-349-9200
Boonton Elctrns. Corp., 791 Route 10, Randolph, NJ 07869 ... 201-584-1077
† Comstron Corp., 200 E. Sunrise Hwy., Freeport, NY 11520 ... 516-546-9700
Continental Resources, Inc., 175 Middlesex Tpke., Bedford, MA 01730 ... 617-275-0850
† Cushman Elctrns., 2450 N. 1st St., San Jose, CA 95131 ... 408-263-8100
Eaton Corp., Elctrn. Instrmn. Div., 5340 Alla Rd., Los Angeles, CA 90066
Fluke, John, Mfg. Co., Box C9090, MS 250C, Everett, WA 98206 ... 206-356-5400
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 ... Call Local Sls. Off.
Kay Elemetrics Corp., 12 Maple Ave., Pine Brook, NJ 07058-9797 ... 201-227-2000
§ Leader Instrs. Corp., 380 Oser Ave., Hauppauge, NY 11788-3694 ... 516-231-6900
† LogiMetrics, 121-03 Dupont St., Plainview, NY 11803 ... 516-349-1700
† MCL, Inc., 10 North Beach Ave., La Grange, IL 60525-2092 ... 312-354-4350
Pacific Meas., Inc., 488 Tasman Drive, Sunnyvale, CA 94086 ... 408-734-5780
† Polarad Elctrns., Inc., 5 Delaware Dr., Lake Success, NY 11042 ... 516-328-1100
† Racal-Dana Instrs. Inc., 4 Goodyear St., Irvine, CA 92715 ... 714-859-8999
Resdel Engrg., 300 E. Live Oak Ave., Arcadia, CA 91006 ... 213-684-2600
Tektronix, Inc., P. O. Box 500, Y3-314, Beaverton, OR 97077 ... 800-547-1512;Oregon only 800-452-1877
Telonic/Berkeley, 2825 Laguna Canyon Rd., Laguna Beach, CA 92652 ... 714-494-9401
Texscan Instruments, 3169 N. Shadeland, Indianapolis, IN 46226 ... 317-545-4196
§ Tucker Elctrns., Box 461966, Garland, TX 75046 ... 214-348-8800;800-527-4642
† Vectron Labs., 166 Glover Ave., Norwalk, CT 06850 ... 203-853-4433
† Wavetek Indiana, Inc., 5808 Churchman, Beech Grove, IN 46107 ... 317-787-3332
§ Wavetek Corporation, 9191 Towne Centre Drive, San Diego, CA 92122 ... 619-450-9971
§ Wiltron, 805 E. Middlefield Rd., P.O. Box 7290, Mountain View, CA 94042-7290 ... 415-969-6500

Generators, Ultrasonic-2900

§ Dukane Corp., Communications Sys. Div., 2900 Dukane Dr., St. Charles, IL 60174 ... 312-584-2300
§ Electronic Navigation Inds, Emerson Electric Co., 100 Highpower Road, Rochester, NY 14623 ... 716-427-8300
ENI Power Sys., 3000 Winton Rd. S., Rochester, NY 14623 ... 716-473-7330
Exact Electronics, Div. of Dynatech Nevada Inc., Box 1925, 2000 Arrowhead Dr., Carson City, NV 89701 ... 702-883-3400;800-648-7952
§ Heat Systems-Ultrasonics, Inc., 1938 New Hwy., Farmingdale, NY 11735 ... 516-694-9555
Instrument Research Co., Box 40207, Santa Barbara, CA 93103 ... 805-962-8336
§ Laboratory Products, Inc., 57 Cornwall St., P. O. Box 1750, Jamaica Plain, MA 02130 ... 617-522-7800
L & R Mfg. Co., 577 Elm St., Kearny, NJ 07032 ... 201-991-5330
Matec Instruments, Inc., 60 Metebello Rd., Warwick, RI 02886 ... 401-739-9030
Panametrics, 221 Cresent St., Waltham, MA 02254 ... 617-899-2740
Sonicor Instrument Corp., 1365 Marconi Blvd., Copiague, NY 11726 ... 516-842-3344
§ Sonobond, 200 E. Rosedale Ave., West Chester, PA 19380 ... 215-696-4710

§ Tohoku Metal Inds., 5-8, 2-Chome, Kitaaoyama Minato-Ku, Tokyo, JAPAN .... Tokyo 03-402-6161
† Wavetek Rockland Scientific, Inc., 10 Volvo Dr., Rockleigh Indl. Pk., Rockleigh, NJ 07647 201-767-7900

Generators, White Noise-2900

† Koep Precision Standards, Inc., P. O. Box 191, So. Plainfield, NJ 07080, 201-549-9280 .... D•1257
† MDF Products Inc., 7 Johnson Dr., Danbury, CT 06811, 203-743-3579 ... D•1265
§ Soundlier, American Trading & Prod. Corp., 9380 Watson Ind'l. Pk., St. Louis, MO 63126 314-962-9870
§ Spanta, Inc., Box 193, Franklin Lakes, NJ 07417 201-337-0044

Generators, Word-2900

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Continental Resources, Inc., 175 Middlesex Tpke., Bedford, MA 01730 .. 617-275-0850
§† Digitech Industries, Inc., 66 Grove St., Ridgefield, CT 06877 203-438-3731
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
Information Technolgoy A.D.S.C., P.O. Box 470, College Park, MD 20740 301-779-5110
INTERFACE TECH. DYNATECH, 150 East Arrow Highway, San Dimas, CA 91773 714-592-2971
§ International Data Sciences, 7 Wellington Rd., Lincoln, RI 02865 401-333-6200
Kode, 1515 S. Manchester Ave., Anaheim, CA 92802 714-758-0400
§ NES, Inc. (Nationwide Electronic Systems), 3003 Wakefield, Carpentersville, IL 60110 312-426-5900
Pacific Micro Sys., Inc., 160 Gate 5 Rd., Sausalito, CA 94965 415-331-2525
Practical Technology, 12 Village Ctr., Box 449, Carmel Valley, CA 93924 408-659-3128
Pulse Instrs. Co., 1234 Francisco, Torrance, CA 90502 213-515-5330
Step Engineering, P.O. Box 61166, Sunnyvale, CA 94088 408-733-7837
§ Tau-Tron, Inc., A Unit of General Signal, 10 Lyberty Way, Westford, MA 01886 617-692-5100
† Terminal Data Corp., 15733 Crabbs Branch Way, Rockville, MD 20855 .. 301-921-8282
§ Tucker Elctrns., Box 461966, Garland, TX 75046 .... 214-348-8800;800-527-4642

Geophysical Equip. — See Transducers (Vol. B)

Germanium — See Crystals, Semiconductor (Vol. A)

Glass Diode Sleeves-2500 — *See Vol. C*

Glues — See Adhesives (Vol. C)

Glass Parts-2500 — *See Vol. C*

Graphic Recording Instruments — See Recorders (Vol. D)

Graphic Recording Paper & Supplies-3000

Bluffton Products, Inc., Tegam, Inc., 7230 North Ridge Road, Madison, OH 44057 216-946-3572
† Gould Inc., Recording Systems Div., 3631 Perkins Ave., Cleveland, OH 44114 216-361-3315
§ Jumbo Process Control, Inc., 410 Garibaldi Ave., Lodi, NJ 07644 201-779-7744
§† Keuffel & Esser Co., 900 Lanidex Plaza, Parsippany, NJ 07054 201-428-7000
§ PrimeLine-Soltec Distbn., Soltec Corp., P.O. Box 818, Sun Valley, CA 91353-0818 .... 800-525-5554;818-764-5400
§† Raytheon Ocean Sys. Co., Submarine Signal Div., Risho Ave., Westminster Pk., E. Providence, RI 02914 401-438-1780

Graphite Parts-2500 — *See Vol. C*

Grilles & Accessories, Speaker-1300

§ Dukane Corp., Communications Sys. Div., 2900 Dukane Dr., St. Charles, IL 60174 312-584-2300
§ Fourjay Industries, Box 14617 Northridge Br., Dayton, OH 45414 513-278-9416
§ GC Elctrns., 400 S. Wyman St., Rockford, IL 61101 815-968-9661
§ Hartley Prods., 620 Island Rd., Ramsey, NJ 07446 201-327-4443
International Comps. Corp., 105 Maxess Rd., Melville, NY 11747 516-293-1500
LaFrance Corp., Entprs & Exec Aves, Philadelphia, PA 19153 215-365-8000
§ Martin Sound Prods., 28 Alpha Park, Cleveland, OH 44143-2297 216-442-2286
§ Oaktron Inds., 1000 30th St., Monroe, WI 53566 608-328-5560
§ PacTec Div., LaFrance Corp., Enterprise & Executive Avenues, Philadelphia, PA 19153 215-365-8400
§ Quam-Nichols Co., 234 E. Marquette Rd., Chicago, IL 60637 312-488-5800
§ Shokai Far East, Ltd., 280 North Central Ave., Hartsdale, NY 10530 914-681-0700
§ Soundlier, American Trading & Prod. Corp., 9380 Watson Ind'l. Pk., St. Louis, MO 63126 314-962-9870
Sparkomatic, Rte. 6 & 209, Milford, PA 18337 717-296-6444
§ SPECO Div., Components Specialties, Inc., P.O. Box 624, 1172 Rte. 109, Lindenhurst, NY 11757 .... 516-957-8700;800-645-5516
Zero Corp., 777 Front St., Burbank, CA 91503 213-846-4191

Grilles, Metal, Plastic-1400 — *See Vol. C*

Grommets & Bushings-2800 — *See Vol. C*

Ground Fault Detectors & Accessories — See Detectors, Ground Fault (Vol. D)

Guides, Circuit Board-1400 — *See Vol. C*

Gyros (All Types)-2200

† Astronautics Corporation of America, P.O. Box 523, Milwaukee, WI 53201-0523 414-447-8200
Condor Pacific Inds., Inc., 8053 Deering Ave., Canoga Park, CA 91304 .. 818-347-8331
† General Optronics, 3005 Hadley Rd., So. Plainfield, NJ 07080 201-549-9000
† Honeywell Inc., Aerospace & Defense Grp., Honeywell Plaza, Minneapolis, MN 55408 612-870-5186
† Humphrey, Inc., 9212 Balboa Ave., San Diego, CA 92123 619-565-6631
† Lear Siegler, Inc., 2850 Ocean Park Blvd., P.O. Box 2158, Santa Monica, CA 90406 213-452-5444
MPB Corp., Precision Park, Keene, NH 03431 603-352-0310
Sanders Assocs., Flexprint Prods. Div., Grenier Fld., Manchester, NH 03103 603-669-4615
Singer Co., Kearfott Div., 1150 McBride Ave., Little Falls, NJ 07424 201-785-6000
§† Systron-Donner Inertial Div., 2700 Systron Dr., Concord, CA 94518 415-682-6161

Hall Effect Devices — See Generators, Hall (Vol. B), Magnetoresistors, Hall (Vol. A), Multipliers, Hall (Vol. A), Probes, Hall (Vol. A), Switches, Hall Effect (Vol. B)

Handlers, Integrated Circuit (Automatic)-4100

§ Adcotech, 1980 Tarob Ct., Milpitas, CA 95035 408-943-9430
§ Delta Design, 5775 Kearny Villa Rd., San Diego, CA 92123 619-292-5000
§ Eraser Co., Box 4961, Syracuse, NY 13221 315-454-3237
Exatron Automatic Test Equip., 3513 Ryder St., Santa Clara, CA 95051 .... 408-737-7111;800-EXA-TRON
Mann, Henry, Inc., 3983 Mann Road, Huntingdon Valley, PA 19006 215-355-7200
Micro Component Technlg., Inc., P.O. Box 64013, St. Paul, MN 55164 ... 612-482-5100
§ Sym-Tek Sys., Inc., 3912 Calle Fortunada, San Diego, CA 92123 619-569-6800

Handles For Cabinets, Circuit Boards, Racks, etc.-1400 — *See Vol. C*

Handsets, Chestsets, Headsets, etc.-1300

† Accusonic Systems Corp., 12 Kulick Rd., Fairfield, NJ 07006 201-575-1570
§ AKG Acoustics, Inc., 77 Selleck St., Stamford, CT 06902 203-348-2121
§ Alpha Products, Inc., 5740 Corsa Ave. #104, Westlake Village, CA 91362 818-889-9304
§† Audiosears, South St., Stamford, NY 12167 607-652-7305
Cord Electronics, Inc., 177 Cantiague Rock Rd., Westbury, NY 11590 ... 516-935-3640
GTE SUPPLY, GTE Communications Systems, 5225 Wiley Post Way, Salt Lake City, UT 84116 801-537-5237
GTE Switching & Telephone Products, 400 N. Wolf Rd., Northlake, IL 60164 312-681-7100
† Henschel, General Signal Corp., 9 Hoyt Drive, P.O. Box 30, Newburyport, MA 01950 617-462-2400
Multi Prods. Intl., 218 Little Falls Rd., P.O. Box 238, Cedar Grove, NJ 07009 201-239-8183
Panasonic, Ind'l. Elctrn. Comps., Panasonic, Elctrn. Comps. Div., Box 1503, Secaucus, NJ 07094 201-348-7000
§ R-Columbia Prods. Co., Inc., 2008 St. Johns Ave., Highland Park, IL 60035 312-432-7915
† Roanwell, 180 Varick St., New York, NY 10014 212-989-1090
† Rye Inds., Inc., 125 Spencer Pl., P.O. Box M, Mamaroneck, NY 10543 ... 914-698-0080
§ Shokai Far East, Ltd., 280 North Central Ave., Hartsdale, NY 10530 914-681-0700
§ Shure Bros., 222 Hartrey Ave., Evanston, IL 60204 312-866-2200
Stanton Magnetics, Inc., Terminal Dr., Plainview, NY 11803 .... 718-445-0063; 516-349-0235
§ Superex Electronics Corp., 151 Ludlow St., Yonkers, NY 10705 914-965-6906
SYT, 1220 Barranca, El Paso, TX 79935 915-593-1234
† Telephonics, 770 Park Ave., Huntington, NY 11743 516-549-6000
§† Television Equip. Assocs., Box 393, So. Salem, NY 10590-0393 914-763-8893
§ Trimm, Inc., Div. of Newton Instr. Co., 400 W. Lake St., Box 489, Libertyville, IL 60048 312-362-3700
Vidaire Electronics Mfg. Corp., P. O. Box 788, Freeport, NY 11520 516-623-6696
§† Workman Elctrn. Prods., Box 3828, Sarasota, FL 33578 813-371-4242

Hardware — See Fasteners (Vol. C), Clamps (Vol. C), Terminals (Vol. C), etc.

Hardware (MIL), Connector-2440 — *See Vol. B*

Harnesses, Wire — See Cable Assemblies & Harnesses (Vol. C)

Headers, Connector — See Connectors, Cable (Vol. C), Connectors, Flat Cable (Vol. C), etc.

Headers, DIP-2100 — *See Vol. C*

Headers, Hermetic — See Seals, Hermetic (Vol. C), Services, Hermetic Sealing (Vol. D)

Headers, Relay & Transformer-2100 — *See Vol. C*

Headers, Shrouded-2100 — *See Vol. C*

Headers, Socket-2100 — *See Vol. C*

Headers, Transistor & Diode-2500 — *See Vol. C*

Headphones-1300

§ Shokai Far East, Ltd., 280 North Central Ave., Hartsdale, NY 10530, 914-681-0700 .... D•1039
§ AKG Acoustics, Inc., 77 Selleck St., Stamford, CT 06902 203-348-2121
§ Alpha Products, Inc., 5740 Corsa Ave. #104, Westlake Village, CA 91362 818-889-9304
Audiosears, South St., Stamford, NY 12167 607-652-7305
§ Audiotronics Corp., 7428 Bellaire Ave., N. Hollywood, CA 91605 818-765-2645
Cord Electronics, Inc., 177 Cantiague Rock Rd., Westbury, NY 11590 ... 516-935-3640

§ GC Elctrns., 400 S.'Wyman St, Rockford, IL 61101	815-968-9661
GTE SUPPLY, GTE Communications Systems, 5225 Wiley Post Way, Salt Lake City, UT 84116	801-537-5237
International Comps. Corp., 105 Maxess Rd., Melville, NY 11747	516-293-1500
§ Philmore Mfg., 40 Inip Dr., Inwood, NY 11696	516-239-6161
§† R-Columbia Prods. Co., Inc., 2008 St. Johns Ave., Highland Park, IL 60035	312-432-7915
§ Recoton Corp., 46-23 Crane St., Long Island City, NY 11101	718-392-6442
† Roanwell, 180 Varick St., New York, NY 10014	212-989-1090
† Shogyo Intl. Corp., 287 Northern Blvd., Great Neck, NY 11021	516-466-0911
§ SPECO Div., Components Specialties, Inc., P.O. Box 624, 1172 Rte. 109, Lindenhurst, NY 11757	516-957-8700;800-645-5516
† Telephonics, 770 Park Ave., Huntington, NY 11743	516-549-6000
Trimm, Inc., Div. of Newton Instr. Co., 400 W. Lake St., Box 489, Libertyville, IL 60048	312-362-3700

Heads, Magnetic Recording-1300

† Apollo Magnetics Corp., 2720 W. Beverly Blvd., Los Angeles, CA 90057, 213-381-2500	**D◦1058**
§† International Electro Magnetics, Inc., 350 N. Eric Dr., Palatine, IL 60067, 312-358-4622	**D◦1026**
§ American Magnetics, 740 Watson Center Rd., Carson, CA 90745	213-775-8651
Applied Magnetics, 75 Robin Hill Rd., Goleta, CA 93117	805-683-5353
† Brush Magnetic Heads, Div. of Brush Ind., Inc., 3rd & Reagan Sts., P.O. Box 638, Sunbury, PA 17801-0638	717-286-5611;800-233-0362
§ Canon U.S.A., Elctrn. Comps. Div., One Canon Plaza, Lake Success, NY 11042	516-488-6700
Field-Fab, 43 School St., N. Springfield, VT 05150	802-886-8278
Magnusonic Devices, 290 Duffy Ave., Hicksville, NY 11801	516-938-4700
§† Michigan Magnetics, 203 W. Third St., Vermontville, MI 49096	517-726-0590
Namiki Precision Jewel Co., Ltd., 15 Warren Street, Hackensack, NJ 07601	201-343-3080
National Micronetics, Route 28, West Hurley, NY 12136	914-338-0333
Norton Assocs., 10 Di Tomas Ct., Copiague, NY 11726	516-842-4666
Pacific Magnetics Corp., 2602 Transportation Ave., Ste. F, National City, CA 92050	619-474-8216
§ Ramko Resch., Inc., 11355A Folsom Blvd., Rancho Cordova, CA 95670	800-821-2545
† Reproduction Technologies Inc., Dept. EM, P.O. Box 815, Bristol, IN 46507-0518	219-848-5233;219-848-5333
§ Shokai Far East, Ltd., 280 North Central Ave., Hartsdale, NY 10530	914-681-0700
Stanford Applied Engrg. Inc., 3520 De La Cruz Blvd., Santa Clara, CA 95050	400-988-0700
Tape Concepts, Inc., P. O. Box 815, 110 E. Vistula St., Bristol, IN 46507	219-848-5234
Thomson-CSF Comps. Corp., Passive Comp. Div., 5850 Canoga Ave., Suite 300, Woodland Hills, CA 91367	818-887-1010
§ Tohoku Metal Inds., 5-8, 2-Chome, Kitaaoyama Minato-Ku, Tokyo, JAPAN	Tokyo 03-402-6161

Heads, Reflective-3700 — *See Vol. B*

Headsets (MIL)-2440 — *See Vol. B*

Heat Dissipators — See Heat Sinks, Semiconductor (Vol. C), Heat Sinks, Soldering (Vol. C)

Heaters, Immersion-4100

Acme Elec. Heating Corp., 4685 E. 11th, Hialeah, FL 33013	305-685-8326
Capitol Temptrol, 5 Coulton Rd., Old Lyme, CT 06371	203-739-4421
Corning Glass Works, Corning Elctrns., Houghton Pk., Bldg. A-2, Corning, NY 14830	607-974-8725
Corning Glass Works, Telecomm Prods Dept., BH-5, Corning, NY 14830	607-974-9000
† Engelhard Corp., 70 Wood Ave. S., Iselin, NJ 08830	201-321-5900
Norton Chemplast, 31-150 Dey Rd., Wayne, NJ 07470	201-696-4700
Science/Elctrns., 1224-26 McCook Ave., Dayton, OH 45404	513-228-6011
§ Shokai Far East, Ltd., 280 North Central Ave., Hartsdale, NY 10530	914-681-0700
§ Technic, Inc., Box 965, Providence, RI 02901	401-781-6100
† Trent, Inc., 201 Leverington Ave., Philadelphia, PA 19127	215-482-5000
§ Wellman Thermal Sys., 1 Progress Rd, Shelbyville, IN 46176	317-398-4411

Heaters & Heating Elements (For Components & Equipment)-Also See Ovens-5300 — *See Vol. B*

Heat Exchangers & Systems-2600 — *See Vol. C*

Heat Guns, Production-5400 — *See Vol. C*

Heating Elements, Infrared-5300 — *See Vol. B*

Heat Pumps — See Cooling/Heating Modules, Thermoelectric (Vol. B)

Heat Shrinkable Elastomers, Plastics — See Caps, Forms & Tapes, Heat Shrinkable (Vol. C), Tubing, Heat Shrinkable (Vol. C)

Heat Sinks, Semiconductor-2600 — *See Vol. C*

Heat Sinks, Soldering-4600 — *See Vol. C*

Heat Sinks (MIL)-2440 — *See Vol. B*

Hermetic Sealing — See Machines, Hermetic Sealing (Vol. D), Seals, Hermetic (Vol. C), Services, Hermetic Sealing (Vol. D)

High Vacuum Services — See Services, High Vacuum (Vol. D)

Hinges-2825 — *See Vol. C*

Holders, Battery — See Retainers, Battery (Vol. C), Connectors, Battery (Vol. C)

Holders, Brush — See Brushes & Brush Assemblies (Vol. B)

Holders, Circuit Board (Production Type)-4100

§ Bivar, Inc., 4 Thomas, Irvine, CA 92718, 714-951-8808	**C◦1025**
§ Accessories for Elctrns., Inc., 800 Merrick Rd., Baldwin, NY 11510-3593	516-546-1751
Amlan, Inc., 97 Thornwood Rd., Stamford, CT 06903	203-322-1913
§ Atlee Inc., One Gill St., Woburn, MA 01801	617-933-3510
† Automated Prod. Equip. Corp., 142 Peconic Ave., Medford, NY 11763	516-654-1197
§ BICC-Vero Elctrns., Inc., 40 Lindeman Drive, Trumbull, CT 06611	203-372-0038
§† Bud Inds., Inc., 4605 E. 355th St., Willoughby, OH 44094	216-946-3200
§† Bud Radio, 4605 E. 355th St., Willoughby, OH 44094	216-946-3200
§ Calmark Corp., 4915 Walnut Grove Ave., San Gabriel, CA 91776	818-287-0451
EG & G Birtcher, 4505 N. Arden Dr., El Monte, CA 91731	818-442-2572
Electrovert USA Corp., 10969 Shady Trail, # 101, Dallas, TX 75220	214-353-9950
† E.P.E. Corp., P.O. Box 5238, Manchester, NH 03108	603-669-9181
§ Eraser Co., Box 4961, Syracuse, NY 13221	315-454-3237
§ Fancort Industries, Inc., 31 Fairfield Place, W. Caldwell, NJ 07006	201-575-0610
§ Fastex, 195 Algonquin Rd., Des Plaines, IL 60016	312-299-2222
§ GC Elctrns., 400 S. Wyman St., Rockford, IL 61101	815-968-9661
§ General Hardware Mfg., 80 White St., New York, NY 10013	212-431-6100
Gibson/Egan, 2666 E. Huntington Dr., Duarte, CA 91010	818-358-0191
HMW Enterprises, Inc., 604 Salem Road, Etters, PA 17319	717-938-4691
§ Hunter Tools, 6721 Baymeadow Dr., Glen Burnie, MD 21061	301-760-2200
Jonard Industries Corp., 134 Marbledale Rd., Tuckahoe, NY 10707	914-793-0700
§ Mann, Henry, Inc., 3983 Mann Road, Huntingdon Valley, PA 19006	215-355-7200
† Manufacturing Sys., Div. LeDoux Inds., Inc., 2022-C S. Grand Ave., Santa Ana, CA 92705	714-540-6630
§ Matrix Engineering Corp., 17000 S. Western Ave. 19, Gardena, CA 90247	213-770-0521
§ Micro Electronic Sys., Inc., 3 Quarry Road, Brookfield, CT 06804	203-775-1440; 800-243-7254
Micro Plastics Inc., Hwy 178 North, Flippin, AR 72634	501-453-2261;1-800-643-2356
† Milton Ross Co., 511 Second St. Pike, Southampton, PA 18966	215-355-0200
Pace Inc., 9893 Brewers Ct., Laurel, MD 20707	301-490-9860
§ PanaVise Prods., 2850 E. 29th St., Long Beach, CA 90806	213-595-7621
Parsons Mfg., 1055 O'Brien Dr., Menlo Park, CA 94025	415-324-4726
Richco Plastic Co., 5825 N. Tripp Ave., Chicago, IL 60646	312-539-4060
† Rush/Houston, Inc., 600 Kealrick, Ste C-40, Houston, TX 77060	713-682-5151
Schroff Inc., 170 Commerce Dr., Warwick, RI 02886	401-732-3770
† Stevens Products, Inc., 128 N. Park St., E. Orange, NJ 07019	201-672-2140
§ Technical Devices, 560 Alaska Ave., Torrance, CA 90503	213-618-8437
§ Techni-Tool, 5 Apollo Rd., Box 368, Plymouth Meeting, PA 19462	215-825-4990
† Titchener, E. H., & Co., 1 Titchener Pl., Binghamton, NY 13902	607-772-1161
UNITRACK Div., Calabro Inds., Inc., Goshen Corp. Pk., P.O. Box 1927, 1372 Enterprise Dr., West Chester, PA 19380	215-692-0800
§ Waldom Elctrns., 4301 W. 69th St., Dept. EEM, Chicago, IL 60629	312-585-1212

Holders, Crystal-2300 — *See Vol. A*

Holders, Diode-2500 — *See Vol. C*

Holders, Fuse — See Clips & Holders, Fuse (Vol. B), Panels, Fuse (Vol. B)

Holders, Lamp — See Sockets, Lamp & Lamp Assemblies (Vol. B)

Holders, Test Lead-2900

§ ITT Pomona Electronics, 1500 E. 9th St., P.O. Box 2767, Pomona, CA 91766, 714-623-3463	**C◦1378**
§ Hunter Tools, 6721 Baymeadow Dr., Glen Burnie, MD 21061	301-760-2200
§ Kulka Smith, Inc., 1913 Atlantic Ave., Manasquan, NJ 08736	201-223-9400
§ Techni-Tool, 5 Apollo Rd., Box 368, Plymouth Meeting, PA 19462	215-825-4990

Holders, Tube — See Retainers, Tube (Vol. A)

Holders & Carriers, Chip (Capacitor, IC, LSI)-2100 — *See Vol. C*

Holders & Carriers, IC, LSI (Packaged)-3130 — *See Vol. A*

Honeycomb Sheets, Panels, etc.-2500 — *See Vol. C*

Hoods, Oscilloscope-2975

Jan Hardware Mfg. Co., 47-27 36th St., Long Island City, NY 11101	212-361-0800
§ Leader Instrs. Corp., 380 Oser Ave., Hauppauge, NY 11788-3694	516-231-6900

Housings, Circuit Module — See Enclosures, Circuit Board, Module & Relay Mounting (Vol. C)

Housings, Photomultiplier Tube — See Photomultiplier Tube Housings (Vol. A)

Housings, Terminal-1400 — *See Vol. C*

Hum Eliminators-2700 — *See Vol. A*

Hybrid Circuits — See Circuits, Hybrid (Vol. A)

Hybrid Voltage Regulators — See Regulators & Stabilizers

Identification, Friend or Foe (IFF) ESM (MIL)-3475

† Cardion Elctrns., Div. of Gen. Sig. Conts., Inc. Unit of Gen. Sig. Corp., Long Island Expwy., Woodbury, NY 11797 516-921-7300
† Collins Avionics Divisions, Rockwell Intl., 400 Collins Rd. NE, Cedar Rapids, IA 52498 319-395-1000
† Hazeltine Corp., 500 Commack Rd., Commack, NY 11725 516-462-5100
† Microwave Assocs. Ltd., Humphrey Rd., Dunstable, Bedfordshire, ENGLAND LU5 4SX, England .... 44-(582) 60-14-41
† Radio Resch. Instr. Co., Inc., Two Lake Ave. Extension, Danbury, CT 06811-5295 203-792-6666
† Republic Electronics Co., 575 Broad Hollow Rd., Melville, NY 11747 516-249-1414
† Signatron, A Unit of Sundstrand Corp., 12 Hartwell Ave., Lexington, MA 02173 617-861-1500
† Western DataCom, 5083 Market St., Youngstown, OH 44512 216-788-6583

Image Processing Systems — See Processors, Image

Imagers, Thermal-2900

ElectroPhysics Corp., 48 Spruce St., Nutley, NJ 07110 201-667-2262
† Hughes Aircraft Co., 6155 El Camino Real, Carlsbad, CA 92008 619-931-3000
§ IR Scientific, Box 110, Carlisle, MA 01741 617-369-7118

IEEE 488 (GPIB) Bus — See Controllers, IEEE 488 (GPIB) (Vol. D)

Impedance Comparators — See Bridges, Impedance (Vol. D)

Impedance Converters, Microwave-3400

Alpha Inds., Inc.-MSD Div., 20 Sylvan Rd., Woburn, MA 01801 617-935-5150
Eltec Instruments Inc., P.O. Box 9610, Daytona Bch., FL 32020 904-253-5328
Hughes Aircraft Co, Aerospace Grps./Support Sys., P.O. Box 90515, Los Angeles, CA 90009 213-670-1515
Hughes Aircraft Co., Microelctrn. Sys. Div., 2601 Campus Dr., Irvine, CA 92715 714-752-3800
Micro-Coax Components, Inc., a UTI Company, Box E, Collegeville, PA 19426 215-489-3700
† Premier Microwave, 35 New Broad St., Port Chester, NY 10573 914-939-8900
† Technical Research & Mfg., Inc., R.F.D. # 10, Manchester, NH 03103 ... 603-627-6000

Inclinometers-2900

Precision Level Vial Co., Warren Industries Inc., 1800-D Mearns Rd., Warminster, PA 18974 215-675-2355
† Schaevitz Engrg., U.S. 130, Union Ave., Pennsauken, NJ 08110 609-662-8000

Incremental Magnetic Recorders — See Recorders, Computer Data (Vol. D)

Indexers (Stepping Motor)-3500 — *See Vol. B*

Indicator Lights — See Lights, Indicator (Vol. B)

Indicators, Angle-Also See Encoders, Shaft Position-5500 — *See Vol. B*

Indicators, Azimuth-5500 — *See Vol. B*

Indicators, Capacitor Leakage — See Testers, Capacitor (Vol. D)

Indicators, Circuit Condition, On, Off, etc. (Electromechanical)-Also See Indicators, Instrument, Flag, Pointer, etc.-2450 — *See Vol. B*

Indicators, Computer Type & Data Display — See Lamps, Dial, Panel, Pilot Incandescent & Accessories (Vol. B)

Indicators, Distortion — See Analyzers, AF (Vol. D)

Indicators, Elapsed Time-2200

† Airpax Corp., Cheshire Div., Cheshire Indl. Pk., Box E, Cheshire, CT 06410, 203-272-0301 .... D•1110
§ Chrono-log Corp., 2 W. Park Rd., Havertown, PA 19083, 215-853-1130 .. D•1061
Curtis Instrs., Inc., 200 Kisco Ave., Mt. Kisco, NY 10549, 914-666-2971 .. D•1117
† Electrodynamics, Inc., A Talley Inds. Co., 1200 Hicks Rd., Rolling Meadows, IL 60008, 312-259-0740 .... D•1119
EMICO Inc., Box 368, Dublin, PA 18917, 215-249-9330 .... D•1352
§ J-B-T Instrs., Box 1818, New Haven, CT 06508, 203-776-1111 .... D•1358
§ Kessler-Ellis Prods., 120 1st Ave., Atlantic Highlands, NJ 07716, 201-291-0500;800-631-2165 .... D•1124-1125
§ Modutec, 18 Marshall St., Norwalk, CT 06854, 203-853-3636 .... D•1362
NES, Inc. (Nationwide Electronic Systems), 3003 Wakefield, Carpentersville, IL 60110, 312-426-5900 .... D•1366,1368
§ Simpson Elec. Co., 853 Dundee Ave., Elgin, IL 60120, 312-697-2260 ..... D•1377
† TRAK Systems, Div. TRAK Microwave Corp., 4722 Eisenhower Blvd., Dept. E-5, Tampa, FL 33614, 813-884-1411 .... D•1080
A & D Elec. Instrs., 73-07 88th St., Glendale, NY 11385 718-275-6516
§ American Control Products, Div. of Precision Timer Co., Inc., 13 Westbrook Ind'l. Pk., Westbrook, CT 06498 203-399-6253
Automatic Timing & Controls Co., 201 So. Gulph Rd., King of Prussia, PA 19406 .... 215-337-5500;800-441-8245
§† Bailey Controls Co., 29801 Euclid Ave., Wickliffe, OH 44092 216-585-5800
Bluffton Products, Inc., Tegam, Inc., 7230 North Ridge Road, Madison, OH 44057 216-946-3572
§ Bristol Saybrook, 97 Coulter St., Old Saybrook, CT 06475 203-388-3414
§ Cramer Co., Mill Rock Rd., Old Saybrook, CT 06475 203-388-3574
Crompton Instrs., 2763 Higgins Road, Elk Grove Village, IL 60007 714-841-2901
Crompton Instrs., Hawker Siddley, 2763 Old Higgins Rd., Elk Grove Village, IL 60007 312-593-1107
§† Data Precision Corp., Electronics Ave., Danvers, MA 01923 617-246-1600
† Datum Inc., Timing/Aacom Divisions, 1363 S. State College Blvd., Anaheim, CA 92806 714-533-6333
DCI Inc., 14812 W. 117th Street, P.O. Box 215, Olathe, KS 66061 913-782-5672
Digitec Corp., 918 Woodley Rd., P.O. Box 458, Dayton, OH 45401 513-254-6251
Durgin & Browne, 80 Allen Rd., So. Burlington, VT 05401 802-863-6873
§ Dynapar, 1675 Delany Rd., Gurnee, IL 60031 312-662-2666
§ Eagle Signal Controls, Mfg. Div. Gulf & Western Inds., Box 16100, Austin, TX 78761 512-837-8300
Electric Tachometer, 68th & Upland Sts., Philadelphia, PA 19142 .... 215-SA6-7723
§ Electromatic Controls Corp., 2495 Pembroke Road, Hoffman Estates, IL 60195-2010 312-882-5757
† Engler Instruments Operation, Stemco Truck Products Division, 250 Culver Ave., Jersey City, NJ 07305 201-332-5353
§ Epic, Inc., 150 Nassau St., New York, NY 10038 212-349-2470
§ ESE, 142 Sierra St., El Segundo, CA 90245 213-322-2136
§ Faria, Thomas G., Corp., P.O. Box 0983, Uncasville, CT 06382 203-848-9271
Frank, B.H., Co., 3733 W. 139th St., Hawthorne, CA 90250 213-675-9182
§ Grasslin Controls Corp., Dieter Grasslin Feinwerktechnik, 45 Spear Rd., Ramsey, NJ 07446 201-825-9696
† Ideal Precision Meter, 214 Franklin St., Brooklyn, NY 11222 212-383-6904
§ IVO Inds., Inc., 201 Industrial Way W., P.O. Drawer 917, Eatontown, NJ 07724 201-542-5151
§ Kinemetrics/Truetime, 3243 Santa Rose Ave, Santa Rosa, CA 95407 ... 707-528-1230
Ledtronics, Inc., 4009 Pacific Coast Hwy., Torrance, CA 90505 213-534-1505
Mallory Timers, Emhart Elec./Elctrn. Grp., 3029 E. Washington St., Indianapolis, IN 46201 317-636-5353
§ Newport Electronics, 630 E. Young St., Santa Ana, CA 92705 714-540-4914
PPM, Inc., 4521 Emery Ind. Pkwy., Cleveland, OH 44128 216-292-6006
§† Pres-Air-Trol Corp., 1009 Boston Post Rd., Mamaroneck, NY 10543 .... 914-698-2026-800-431-2625 (outside NY)
§ Redington Counters, 130 Addison Rd., Windsor, CT 06095 203-688-6205
§ Shokai Far East, Ltd., 280 North Central Ave., Hartsdale, NY 10530 914-681-0700
§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 215-673-5600
Texmate, Inc., 348 S. Cedros Ave., P.O. Box 2000, Solana Beach, CA 92075 619-481-7177
Thermographics Measurements Ltd., 3733 W. 139th St., Hawthorne, CA 90250 213-675-9182
§ Veeder-Root, 70 Sargeant St., Hartford, CT 06102 203-527-7201

Indicators, Electromechanical — See Indicators, Circuit Condition, On / Off (Vol. B)

Indicators, Frequency — See Meters, Frequency (Vol. D)

Indicators, Directional-2200

† CDRL Data, Inc., 320 West Lone Cactus Drive Ste. 6, Phoenix, AZ 85027 602-582-8844
† Evershed & Vignoles, Ltd., Acton Lane, Chiswick, London, ENGLAND W4 5HJ 01-994-3670

Indicators, Illumination — See Meters, Light (Nonphotographic) (Vol. D)

Indicators, Instrument, Flag, Pointer, etc.-2450 — See *Vol. B*

Indicators, Liquid Level-2200

Triac Electronic Systems, Inc., 87-27 Myrtle Ave., Glendale, NY 11385, 718-441-4759 .... D•1132
Advanced Kinetics, 1231 Victoria St., Costa Mesa, CA 92627 714-646-7165
§ Ametek, 2 Station Square, Paoli, PA 19301 215-355-6900
ARGA Controls, 35 E. Glenarm St., Pasadena, CA 91105 213-682-3314
† Automation Prods., Inc., 3030 Max Roy, Houston, TX 77008 713-869-0361
§† Bailey Controls Co., 29801 Euclid Ave., Wickliffe, OH 44092 216-585-5800
Bindicator, P.O. Box 9, 1915 Dove St., Port Huron, MI 48060 313-987-2700
Bristol Babcock Inc., 40 Bristol St., Waterbury, CT 06708 203-575-3000
Brooks Instr. Div., Emerson Elec. Co., 407 W. Vine St., Hatfield, PA 19440 215-362-3500
Chessell Corp., Penns Trail, Newtown, PA 18940 215-968-0660
† Consolidated Controls, 15 Durant Ave., Bethel, CT 06801 203-743-6721
Continental Data Sys., 131 N. Ludlow St., Dayton, OH 45402 513-222-8626
§ Curtis Inds., 8000 West Tower Ave., Milwaukee, WI 53223 414-354-1500
† Faria, Thomas G., Corp., P.O. Box 0983, Uncasville, CT 06382 203-848-9271
† Flow Technology, Inc., Box 21346, Phoenix, AZ 85036 602-437-1315
† Honeywell Inc., Aerospace & Defense Grp., Honeywell Plaza, Minneapolis, MN 55408 612-870-5186
† Honeywell, Process Control Div., 1100 Virginia Dr., Ft. Washington, PA 19034 .... 800-321-5111, Ext. 596
† Industrial Control Co., 3100 Pineda Ave., Rockledge, FL 32955 305-259-7105

Keystone Carbon, Thermistor Div., St. Marys, PA 15857 814-781-1591
§† Kistler-Morse, 10201 Willows Road NE, Redmond, WA 98052 206-881-8000
Midwest Comps., 1981 Port City Blvd., Muskegon, MI 49443 616-777-2602
§† National Sonics/Xertex Corp., 250 Marcus Blvd., Hauppauge, NY 11787 516-273-6600
Nuclear Resch. Corp., 125 Titus Ave., Warrington, PA 18976 215-343-5900
Omega Engrg., Box 4047, Stamford, CT 06907 203-359-1660
† Penn Airborne Prods., Industrial Hwy., Southampton, PA 18966 215-355-3400
Princo Instrs., Inc., 1020 Industrial Hwy., Southampton, PA 18966 215-355-1500
§† Revere Corp. of Amer., 845 N. Colony Rd., Wallingford, CT 06492 203-269-7701
Robinson-Halpern, One Apollo Rd., P.O. Box 248, Plymouth Meeting, PA 19462-0248 215-825-9200
Sensotec, Inc., 1200 Chesapeake Ave., Columbus, OH 43212 614-486-7723
SGS Semiconductor Corporation, 1000 E. Bell Road, Phoenix, AZ 85022 602-867-6100
Skan-A-Matic, Box S, Elbridge, NY 13060 315-689-3961
§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 215-673-5600
§† Transamerica Delaval, Gems Sensors Div., Cowles Rd, Plainville, CT 06062-9990 203-677-1311
† Transmagnetics, 210 Adams Blvd., Farmingdale, NY 11735 516-293-3100
United Detector Tech., 12525 Chadron Ave., Hawthorne, CA 90250 213-978-0516
Westronics Inc. of Texas, 2441 Northeast Pkwy., Box 4619, Ft. Worth, TX 76106 817-625-2311
§ ZI-TECH Instr. Corp., 2151 Park Blvd., Box 60490, Palo Alto, CA 94306 415-326-2151

Indicators, Null-2900

Freed Transformer, 1718 Weirfield St., Ridgewood, NY 11385, 212-386-1300 ..... D•1229
Tettex Instruments, Inc., P.O. Box 281, Fairview Village, PA 19409-0281, 215-539-6050 ..... D•1312
API Instrs., 1601 Trapelo Rd., Waltham, MA 02254 617-890-2000
Beckman Instrs., 2500 Harbor Blvd., Fullerton, CA 92634 714-871-4848
Beede Electrical Instr. Co., S. Main St., Penacook, NH 03303 603-753-6362
Biddle Instruments, A Thorn EMI Co., 510 Township Line Rd., Blue Bell, PA 19422 215-646-9200
† Control Technology Co., 41-16 29th St., Long Island City, NY 11101 718-361-2133
Electrical Instr. Svc., 25 Dock St., Mt. Vernon, NY 10550 914-699-9717
† Electronic Dev. Corp., 11 Hamlin St., Boston, MA 02127-4198 617-268-9696
§ Greibach Instrs. Div., 25 Dock St., Mt. Vernon, NY 10550 914-699-9717
§ Guildline Instrs., 4403 Vineland Rd, Suite B-10, Orlando, FL 32811-9998 305-423-8215
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
† Honeywell, Process Control Div., 1100 Virginia Dr., Ft. Washington, PA 19034 ..... 800-321-5111, Ext. 596
§ Jewell Electrical Instrs., Grenier Field, Manchester, NH 03108 603-669-6400
Julie Resch. Labs., 211 West 61st St., New York, NY 10023 212-245-2727
Leeds & Northrup Instrs., A Unit of General Signal Corp., Sumneytown Pike, North Wales, PA 19454 215-643-2000
† Millivac Instrs., Box 997, Curry Rd. Ext., Schenectady, NY 12301 518-355-8300
† North Atlantic Inds., Instrument Div., 60 Plant Ave., Hauppauge, NY 11788 516-582-6500
Penn Airborne Prods., Industrial Hwy., Southampton, PA 18966 215-355-3400
Sensitive Research Instrs., 25 Dock St., Mt. Vernon, NY 10550 914-699-9717
Shogyo Intl. Corp., 287 Northern Blvd., Great Neck, NY 10023 516-466-0911
§ Shokai Far East, Ltd., 280 North Central Ave., Hartsdale, NY 10530 914-681-0700
† Stock Drive Prods., Div. of Designatronics, Inc., 2101 Jericho Turnpike, New Hyde Pk., NY 11040 ..... 516-328-0200;328-3300
† Transmagnetics, 210 Adams Blvd., Farmingdale, NY 11735 516-293-3100
§ Triplett Corp.-A Penril Co., One Triplett Dr., Bluffton, OH 45817-9987 419-358-5015
§ Tucker Elctrns., Box 461966, Garland, TX 75046 ..... 214-348-8800;800-527-4642
United Detector Tech., 12525 Chadron Ave., Hawthorne, CA 90250 213-978-0516
ZI-TECH Instr. Corp., 2151 Park Blvd., Box 60490, Palo Alto, CA 94306 415-326-2151

Indicators, Numeric Readout — See Tubes, Readout (Vol. A)

Indicators, Phase Rotation-2200

§ Associated Research, Inc., 8221 N. Kimball Ave., Skokie, IL 60076, 312-647-7850 ..... D•1181
Triac Electronic Systems, Inc., 87-27 Myrtle Ave., Glendale, NY 11385, 718-441-4759 ..... D•1132
§ Biddle Instruments, A Thorn EMI Co., 510 Township Line Rd., Blue Bell, PA 19422 215-646-9200
Bluffton Products, Inc., Tegam, Inc., 7230 North Ridge Road, Madison, OH 44057 216-946-3572
SGS Semiconductor Corporation, 1000 E. Bell Road, Phoenix, AZ 85022 602-867-6100
§† Syntel Div., Tegam, Inc., 7230 North Ridge Rd., Madison, OH 44057 216-428-7505

Indicators, Phase Sequence-2200

§ Associated Research, Inc., 8221 N. Kimball Ave., Skokie, IL 60076, 312-647-7850 ..... D•1181
§ Biddle Instruments, A Thorn EMI Co., 510 Township Line Rd., Blue Bell, PA 19422 215-646-9200
Bluffton Products, Inc., Tegam, Inc., 7230 North Ridge Road, Madison, OH 44057 216-946-3572
§† Syntel Div., Tegam, Inc., 7230 North Ridge Rd., Madison, OH 44057 216-428-7505

Indicators, Positioning-2200

† Control Technology Co., 41-16 29th St., Long Island City, NY 11101, 718-361-2133 ..... D•1987
† Interface Engrg., 386 Lindelof Ave., Stoughton, MA 02072, 617-344-7383 ..... D•1156-1157
† Vernitech, 300 Marcus Blvd., Deer Pk., NY 11729, 516-586-5100 ..... B•1011

§ Ametek, 2 Station Square, Paoli, PA 19301 215-355-6900
§† Applied Electro Technlg., Int., STI Company, 2220 So. Anne St., Santa Ana, CA 92704 714-556-6570
† Astronautics Corporation of America, P.O. Box 523, Milwaukee, WI 53201-0523 414-447-8200
Astrosystems, 6 Nevada Dr., Lake Success, NY 11042 516-328-1600
† Atec, Inc., Box 19426, 8219 Kempwood Dr., Houston, TX 77055 713-468-7971
§† Bailey Controls Co., 29801 Euclid Ave., Wickliffe, OH 44092 216-585-5800
† Clifton Precision, Litton Systems, Inc., Marple at Broadway, Clifton Hgts., PA 19018 215-622-1000
† Computer Conversions Corp., 6 Dunton Ct., E. Northport, NY 11731 516-261-3300
Computer Optical Prods., Inc., Sub. of Hathaway Corp., 9353 Eton Ave., Chatsworth, CA 91311-5866 818-882-0424
C-Tek Inc., 4 Railroad Ave., Wakefield, MA 01880 617-246-1720
† Datron Systems, Inc., 200 West Los Angeles Ave., Simi Valley, CA 93065-1650 805-584-1717
Disc Instruments, Honeywell, 102 E. Baker St., Costa Mesa, CA 92626 .. 714-979-5300
† Dupree, Inc., 9835 Dupree St., So. El Monte, CA 91733 818-442-4700
Durakool, 1010 N. Main St., Elkhart, IN 46514 219-264-1116
§ Dynapar, 1675 Delany Rd., Gurnee, IL 60031 312-662-2666
† Electric Tachometer, 68th & Upland Sts., Philadelphia, PA 19142 ..... 215-SA6-7723
Electro-Craft, 1600 2nd St. S., Hopkins, MN 55343 612-931-2700
† Electro-Magnetic Processes, Inc., 9616 Owensmouth Ave., Chatsworth, CA 91311 818-882-6333
Esterline Angus Instr. Corp., Box 24000, Indianapolis, IN 46224 317-244-7611
Farrand Controls, Div. of Farrand Industries, Inc., 99 Wall St., Valhalla, NY 10595 ..... 914-RO1-2600
† GAP Instr., 40 Oser Ave., Hauppauge, NY 11787 516-273-0909
Honeywell Inc., Aerospace & Defense Grp., Honeywell Plaza, Minneapolis, MN 55408 612-870-5186
† Honeywell, Process Control Div., 1100 Virginia Dr., Ft. Washington, PA 19034 ..... 800-321-5111, Ext. 596
† Humphrey, Inc., 9212 Balboa Ave., San Diego, CA 92123 619-565-6631
ILC Data Device Corp., 105 Wilbur Pl., Bohemia, NY 11716 516-567-5600
† Industrial Control Co., 3100 Pineda Ave., Rockledge, FL 32955 305-259-7105
Itek Measurement Sys., Div. Litton Inds., 27 Christina St., Newton, MA 02161 617-969-7300
§ Jumbo Process Control, Inc., 410 Garibaldi Ave., Lodi, NJ 07644 201-779-7744
§ H. Kuhnke, Inc., 26 W. Highland Ave., Atlantic Highlands, NJ 07716 ..... 201-291-3334; 800-221-0714
Magnetoelastic Devices, 326 Springside Ave., Box 625, Pittsfield, MA 01201 413-445-5608
§ Micro Switch, A Honeywell Div., 11 W. Spring St., Freeport, IL 61032 815-235-6600
† Natel Engrg. Co., Inc., 4550 Runway St., Simi Valley, CA 93063 805-581-3950
§ NES, Inc. (Nationwide Electronic Systems), 3003 Wakefield, Carpentersville, IL 60110 312-426-5900
† North Atlantic Inds., Instrument Div., 60 Plant Ave., Hauppauge, NY 11788 516-582-6500
Northern Precision Labs., 11 Madison Rd., Fairfield, NJ 07006 201-227-4800
† Penn Keystone Corp., Unimax Switch Corp., Ives Rd., P.O. Box 152, Wallingford, CT 06492 203-269-8701
§ Ragen Data Systems, Inc., 3 Oval Dr., Central Islip, NY 11722 516-234-3800
Robinson-Halpern, One Apollo Rd., P.O. Box 248, Plymouth Meeting, PA 19462-0248 215-825-9200
Schaevitz Engrg., U.S. 130, Union Ave., Pennsauken, NJ 08110 609-662-8000
Sensor Corp., Box 140, Scottdale, PA 15683 412-887-4080
SGS Semiconductor Corporation, 1000 E. Bell Road, Phoenix, AZ 85022 602-867-6100
Siltran Digital, 2250 Monterey Rd., Atascadero, CA 93422 805-466-3209
Skan-A-Matic, Box S, Elbridge, NY 13060 315-689-3961
§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 215-673-5600
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§† Transamerica Delaval, Gems Sensors Div., Cowles Rd, Plainville, CT 06062-9990 203-677-1311
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Indicators, Power Level — See Monitors, Power (Vol. D)

Indicators, Pressure — See Gauges, Pressure (Vol. D)

Indicators, Proximity — See Sensors, Proximity (Vol. D)

Indicators, RF — See Meters, Frequency (Vol. D)

Indicators, Rotary Shaft Position — See Encoders, Shaft Angle (Vol. B)

Indicators, Servo-4900

† Control Technology Co., 41-16 29th St., Long Island City, NY 11101, 718-361-2133 ..... D•1987
† Industrial Control Co., 3100 Pineda Ave., Rockledge, FL 32955, 305-259-7105 ..... D•1988
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† North Atlantic Inds., Instrument Div., 60 Plant Ave., Hauppauge, NY 11788, 516-582-6500 ..... D•1373
† Vernitech, 300 Marcus Blvd., Deer Pk., NY 11729, 516-586-5100 ..... D•1991

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Indicators, Shorted Turn — See Testers, Coil (Vol. D)

Indicators, Sound Level — See Meters, Audio Level (Vol. D)

Indicators, Speed-3500 — *See Vol. B*

Indicators, Temperature — See Meters, Temperature (Vol. D)

Indicators, Temperature (Not Meter Type)-5300 — *See Vol. B*

Indicators, Tilt-2200

Precision Level Vial Co., Warren Industries Inc., 1800-D Mearns Rd., Warminster, PA 18974 ... 215-675-2355

Indicators, VSWR — See Meters, Standing Wave Ratio (Vol. D)

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† Minelco Inc. - A Talley Ind., 135 S. Main St., Thomaston, CT 06787-0459 ... 203-283-8261
† Systems Resch. Labs., Inc., 2800 Indian Ripple Rd., Dayton, OH 45440 ... 513-426-6000

Inductance Comparators — See Bridges, Inductance (Vol. D)

Inductance Standards — See Standards, Inductance (Vol. D)

Induction Potentiometers — See Resolvers, Synchro (Vol. D)

Inductors — See Coils (Vol. A)

Inductors (MIL) — See Coils (MIL)

Infrared Emitter Detectors — See Emitters/Detectors, Infrared

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† Penn Resch. Corp. (PRC), 2652 South Main St., P.O. Box 3357, Kennesaw, GA 30144 ... 404-429-9061
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§ Research, Inc., Box 24064, Minneapolis, MN 55424 ... 612-941-3300
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§ Scientific Technlg., 1201 San Antonio Rd., Mountain View, CA 94043 ... CA 415-965-0910;800-221-7060
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Infrared Soldering — See Soldering Equipment, Infrared

Inks for Thick Film Microcircuits-1700 — *See Vol. C*

Input/Output Equipment, Voice-2000

Centigram Corp., 155A Moffett Park Dr., Sunnyvale, CA 94086 ... 408-734-3222
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Input/Output Switching Modules — See Modules, Control & Switching (Vol. D)

Inserters, DIP & IC — See Extractors, DIP & IC (Vol. C)

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Inserts — See Bushings, etc. (Vol. C)

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† Fibronics Intl. Inc., 325 Stevens St., Hyannis, MA 02601 ... 617-778-0700
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† Ross Engrg. Corp., 540 Westchester Dr., Campbell, CA 95008 ... 408-377-4621
§ Carl Zeiss, Inc., One Zeiss Drive, Thornwood, NY 10594 ... 914-681-7670

Instrument Design Services (Industrial) — See Services, Instrument Design (Industrial) (Vol. D)

Instrument Parts, Precision — See Bearings (Vol. C), Gears & Gear Mechanisms (Precision) (Vol. C)

Instruments, Test & Measuring, GPIB (IEEE 488) Compatible-2900

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California Avionics Labs., Box 701, Palo Alto, CA 94302, 415-328-7999 .. D•1198
California Instruments, A Div. of Amstar Tech. Prods. Co., Inc., 5150-Convoy St., San Diego, CA 92111, 619-279-8620;800-356-2244;800-821-1634 ...... D•1907
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Comstron Corp., 200 E. Sunrise Hwy., Freeport, NY 11520, 516-546-9700 ...... D•1204
CYTEC Corp., 107 N. Washington St., E. Rochester, NY 14445, 716-381-4740 ...... D•1207
Diego Power, 5350 Eastgate Mall, San Diego, CA 92121, 587-1925 ...... D•1916
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ILC Data Device Corp., 105 Wilbur Pl., Bohemia, NY 11716, 516-567-5800 ...... D•1150
Industrial Test Equip., 21 Yennicock Ave., Port Washington, NY 11050, 516-883-1700 ...... D•1938
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Krohn-Hite Corp., Avon Indl. Pk., Bodwell St., Avon, MA 02322, 617-580-1660 ...... D•1253-1259
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THORN EMI Technology Inc., 8601 Dunwoody Pl., Atlanta, GA 30338, 404-587-0017;800-243-2572 ...... D•1313
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Insulation Materials-3100 — *See Vol. C*

Insulation Parts, Fabricated-3100 — *See Vol. C*

Insulators, Antenna-3100 — *See Vol. C*

Insulators, Bushing (Metallized) — See Bushings, etc. (Vol. C)

Insulators, Clip, Test & Battery-3100 — *See Vol. C*

Insulators, Mica-3100 — *See Vol. C*

Integrated Circuit Handlers — See Handlers, Integrated Circuit (Automatic) (Vol. D)

Integrated Circuit Interconnect Systems-3200 — *See Vol. C*

Integrated Circuit Design Aids-4200 — *See Vol. C*

Integrated Circuits, Custom/Semicustom-3130 — *See Vol. A*

Integrated Circuits, Digital-3130 — *See Vol. A*

Integrated Circuits, Interface-3130 — *See Vol. A*

Integrated Circuits, Linear-3130 — *See Vol. A*

Integrated Circuits, Memory-3130 — *See Vol. A*

Integrated Circuits, Microprocessor-3130 — *See Vol. A*

Integrated Circuits, Silicon Monolithic, Unpackaged Chips-3130 — *See Vol. A*

Integrators, Electronic-2325

Curtis Instrs., Inc., 200 Kisco Ave., Mt. Kisco, NY 10549, 914-666-2971 .. D•1117
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† Analog Devices, P.O. Box 280, Norwood, MA 02062 617-329-4700
† Circuit Techn., 160 Smith St., Farmingdale, NY 11735 516-293-8686
§ Colorado Video, Inc., Box 928, Boulder, CO 80306 303-444-3972
† Control Technology Co., 41-16 29th St., Long Island City, NY 11101 718-361-2133
Cybernetic Micro Sys., P.O. Box 3000, 3000 Hwy. 84, San Gregorio, CA 94074 415-726-3000
ECO Instrs. Div., Sea Data Corp., 1 Bridge St., Newton, MA 02158 617-964-8360
Esterline Angus Instr. Corp., Box 24000, Indianapolis, IN 46224 317-244-7611
Evans Electronics, Box 5055, Berkeley, CA 94705 415-653-3083
Gould Inc., Recording Systems Div., 3631 Perkins Ave., Cleveland, OH 44114 216-361-3315
Halmar Electronics, Inc., 900 N. Hague Ave., Columbus, OH 43204 614-275-0131
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
Innovatek Microsystems, Inc., Smithfield Rd., R1 Box 104, Millerton, NY 12546-9720 914-373-9003
Instron Corp., 100 Royall St., Canton, MA 02021 617-828-2500
Magnetic Instrumentation, 8350 E. 48TH ST., Indianapolis, IN 46226 317-545-2102
North Hills Elctrns., 1 Alexander Pl., Glen Cove, NY 11542 516-671-5700
Optical Electronics, Inc., Box 11140, Tucson, AZ 85734 602-624-8358
† Plessey Electro-Products, 3860 Centinela Ave., Los Angeles, CA 90066 213-390-3585
§† Texas Instrs., Inc., Box 225012-MS-84, Dallas, TX 75265 214-995-6611
§ Vibra-Metrics, 1014 Sherman Ave., Hamden, CT 06514 .... 203-288-6158; 1-800-352-2001
Walker Scientific, Rockdale St., Worcester, MA 01606 617-852-3674

Integrators, Mechanical & Electromechanical-2200

Ohio Semitronics, Inc., 1205 Chesapeake Ave., Columbus, OH 43212, 614-486-9561 .... B•1811
† Acromag, 30765 Wixom Rd., Wixom, MI 48096 313-624-1541
ECO Instrs. Div., Sea Data Corp., 1 Bridge St., Newton, MA 02158 617-964-8360
† Industrial Control Co., 3100 Pineda Ave., Rockledge, FL 32955 305-259-7105
† Vernitech, 300 Marcus Blvd., Deer Pk., NY 11729 516-586-5100

Intensifiers, Image-5700 — *See Vol. A*

Intercom Systems — See Switching Systems, Audio (Vol. D)

Interconnection Systems-3200 — *See Vol. C*

Interfaces, Computer/Peripheral-2000

ADAC Corp., 70 Tower Office Pk., Woburn, MA 01801, 617-935-6668 .... D•1135
Augat Inc., 33 Perry Ave., Box 779, Attleboro, MA 02703, 617-222-2202 ...... C•1702
Bowmar Instrument Corp., Aerospace Div., 8000 Bluffton Rd., Ft. Wayne, IN 46809, 219-747-3121 .... B•1707
C-Tek Inc., 4 Railroad Ave., Wakefield, MA 01880, 617-246-1720 ... D•1114-1115
Dio-Rey, Div. of Info-Lite, 422 Cliff St., Fairview, NJ 07022, 201-941-4455 .... B•1045
§ Gordos Arkansas, Gordos International Corp., 1000 N. Second St., Rogers, AR 72756, 501-636-5000 .... B•1383
ILC Data Device Corp., 105 Wilbur Pl., Bohemia, NY 11716, 516-567-5600 .... D•1150
Interface Engrg., 386 Lindelof Ave., Stoughton, MA 02072, 617-344-7383 .... D•1157
Matrix Corp., 2260 Distributors Dr., Indianapolis, IN 46241, 317-248-2036 .... D•1158
NES, Inc. (Nationwide Electronic Systems), 3003 Wakefield, Carpentersville, IL 60110, 312-426-5900 .... D•1069,1127,1159,1365,1367
Omega Engrg., Box 4047, Stamford, CT 06907, 203-359-1660 .... B•1767, D•1070,1128,1160,1375
§ Opto 22, 15461 Springdale St., Huntington Bch., CA 92649, 714-891-5861 .... B•1440
Phoenix Contact, 1900 Greenwood St., Harrisburg, PA 17104, 717-232-0500 .... C•1488
Vector Electronic Co., Inc., 12460 Gladstone Ave., Dept. EP, Box 4336, Sylmar, CA 91342, 818-365-9661 .... C•1103
† Acromag, 30765 Wixom Rd., Wixom, MI 48096 313-624-1541
Action Instrs., 8601 Aero Dr., San Diego, CA 92123 619-279-5726
A.D. Data Sys., Techtran Industries, 200 Commerce Dr., Rochester, NY 14623 716-334-9649
§ Air Land Systems Corporation, 2710 Prosperity Ave., Fairfax, VA 22031 703-573-1100
§ American Computer Hardware Corp., 2205 S. Wright St., Santa Ana, CA 92705 714-549-2688
Atlantic Research, 5390 Cherokee Ave., Alexandria, VA 22312 703-642-4000
Beal Communications, Beneficial Properties, 11020 Audelia Rd. Ste. C 101, Dallas, TX 75243 .... 214-340-2044;214-340-2045
CDS - Colorado Data Sys., 3301 W. Hampden, Unit C, Englewood, CO 80110 303-762-1640
§ CmC Instr. Div., Connecticut microComputer Inc., 568 Danbury Road, New Milford, CT 06776 203-354-9395
Coastcom, P.O. Box 27068, Concord, CA 94527 415-825-7500
Computrol Div. Kidde Automated Sys., Inc., 15 Ethan Allen Hwy., Ridgefield, CT 06877-6297 203-544-9371
Control-O-mation, Inc, 7300 W. Huron River Dr., Dexter, MI 48130 313-426-3935
Control Technology Co., 41-16 29th St., Long Island City, NY 11101 718-361-2133
Cybernetic Micro Sys., P.O. Box 3000, 3000 Hwy. 84, San Gregorio, CA 94074 415-726-3000
Cybersystems, Inc., 7540 South Memorial Pkwy., Huntsville, AL 35802 .. 205-883-4410
Data Engineering, Inc., 2515 N. State Rd. 7 Ste. 207, Margate, FL 33063 974-7861
§ Data General, 4400 Computer Dr., Westboro, MA 01581 617-366-8911
Data I/O Corp., 10525 Willows Rd. N.E., Redmond, WA 98073-9746 206-881-6444
Del-Teleproducts, 230 N. Market Pl., Escondido, CA 92025 619-743-8344
Distributed Computer Sys., 223 Crescent St., Waltham, MA 02154 617-899-6619
§ Dylon Data Corp., 9561 Ridgehaven Ct., San Diego, CA 92123 619-292-5584
Erbtec Engineering, Inc., 5680 Valmont Rd., Boulder, CO 80301 303-447-8750
§† Fairchild Camera & Instr. Corp., Linear Div., 313 Fairchild Dr., Mountain View, CA 94139 415-962-4011
Garry Mfg. Co., Div. of Brand-Rex Co., 9 Queen Anne Ct., Laghorne, PA 19047 215-949-2300
GEN/COMP Inc., 6 Algonquin Rd., Canton, MA 02021 617-828-2008
§ GIC Systems, 2324 A Ridgepoint Dr., Austin, TX 78754 512-926-8840
§ Giltronix, 3780 Fabian Way, Palo Alto, CA 94303 415-493-1300
§ GMR Co., 8801 Sepulveda Blvd., Los Angeles, CA 90045 213-216-9516
§ Gordos Corporation, Gordos International Corp., 250 Glenwood Ave., Bloomfield, NJ 07003 201-743-6800
§ Gunther, W., GmbH, Virnsberger Strasse 51, D 8500 Nurnberg 82, WEST GERMANY .... (0)911/65521 or 65520
ICI, 570 W. Lambert, Ste. C, Brea, CA 92621 714-990-1707
§ ICS Electronics Corp., 2185 Old Oakland Rd., San Jose, CA 95131 408-263-4844
Information Transfer Indl., Box 357, Holcomb, NY 14469 716-657-7074
Innovatek Microsystems, Inc., Smithfield Rd., R1 Box 104, Millerton, NY 12546-9720 914-373-9003
Kinetic Sys., 11 Maryknoll Dr., Lockport, IL 60441 815-838-0005
KMC Systems, Inc., 140 Greenwood Ave. (Bldg. 3), Midland Pk., NJ 07432 201-447-0007
K-Systems, Inc., 3902 Lilac, Las Cruces, NM 88005 505-526-3209
§ Macrolink, 1500 N. Kellogg Drive, Anaheim, CA 92807 714-777-8800
Magnum Opus Custom Elctrn. Engrg., 284 Kennedy St., Iselin, NJ 08830 201-283-4925
MDB Sys., 1995 N Batavia St., Orange, CA 92665 714-998-6900
§ Micom Systems, Inc., 4100 Los Angeles Ave, P.O. Box 8100, Simi Valley, CA 93062-8100 805-583-8600
† Micro/sys, 1011 Grand Central Ave., Glendale, CA 91201-3010 818-244-4600
Minntronics Corporation, 2599 White Bear Ave., St. Paul, MN 55109 612-770-5247
Motorola Semiconductor Prods. Sector, Adv. 72, Box 20912, Phoenix, AZ 85036 602-244-6900
§ National Instruments, 12109 Technology Blvd., Austin, TX 78759 512-250-9119
§ New-Tone Electronics, Inc., 44 Farrand St., Bloomfield, NJ 07003 201-748-5089
Nu Data, 32 Fairview Ave., Little Silver, NJ 07739 201-842-5757
Omnibyte Corp., 245 W. Roosevelt Rd., Bldg. 1-5, W. Chicago, IL 60185 312-231-6880
§† Phoenix Data, Inc., 3384 W. Osborn Rd., Phoenix, AZ 85017 602-278-8528
Pickles & Trout, P.O. Box 1206, Goleta, CA 93116 685-4641
§ RACET Computes, Ltd., 1855 W Katella Ste. 255, Orange, CA 92667 714-997-4950
§† RCA Solid State Div., Micro Processors/Memories/Peripherals, Route 202, Somerville, NJ 08876 201-685-6000
RCI/Data, 1992 Lakewood Rd., Toms River, NJ 08753 201-341-8361
Seiko Instrs. U.S.A., Inc., 2990 W. Lomita Blvd., Torrance, CA 90505 213-530-8777
Serial Lab Prods., Inc., 162 Cook Lane, P.O. Box 766, Marlboro, MA 01752 617-481-1684
Texas Instrs., Data Sys. Group, P. O. Box 809063, Dallas, TX 75380-9063 1-800-527-3500
§ Videx Inc., 1105 NW Circle Blvd., Corvallis, OR 97330 503-758-0521
Zendex Corp., 6700 Sierra La., Dublin, CA 94566 415-828-3000

Interfaces, Telex/Computer-1900

Teleface Corp., 111 Rivington St., New York, NY 10002 212-477-6802

Interrupters, Photo-3700 — *See Vol. B*

Interrupters, Ground Fault-4300 — *See Vol. B*

Interrupters, Optoelectronic-3700 — *See Vol. B*

Interrupters, Power-4300 — *See Vol. B*

Interrupters, Vacuum-4300 — *See Vol. B*

Intervalometers — See Timers (Vol. D)

Inverters, DC to AC — See Power Supplies, AC Output (Vol. D)

Isolators, Antenna-1900
† Airtron, Litton Industries, Inc., 200 E. Hanover Ave., Morris Plains, NJ 07950 201-539-5500
Budwig Mfg., P.O. Box 829, Ramona, CA 92065-0829 619-789-0900
Zenith CRT & Components Operations, 1000 Milwaukee Ave., Glenview, IL 60025 312-391-7733

Isolators, Ferrite-3450 — *See Vol. A*

Isolators, Line-4050
Elgar Corp, An Onan McGraw Edison Co., 9250 Brown Deer Rd., San Diego, CA 92121, 619-450-0085 .... D•1920
† Georator Corp., Box 70, Manassas, VA 22110, 703-368-2101 .... D•1930
Hitran Corp., Agex, Rte. 31, RD 5-65, Flemington, NJ 08822, 201-782-5525 .... D•1936-1937
Pacific Power Source Corp., 15122 Bolsa Chica St., Huntington Bch., CA 92649, 714-898-2691;800-854-2433 .... D•1949-1952
† Acromag, 30765 Wixom Rd., Wixom, MI 48096 313-624-1541
Action Instrs., 8601 Aero Dr., San Diego, CA 92123 619-279-5726
Allen-Bradley Co., Industrial Control Div., 1201 S. Second St., Milwaukee, WI 53201 414-671-2000
Atlas Energy Sys., 9457 Rush St., S. El Monte, CA 91733 213-575-0755
† CEA Division of Berkleonics, Inc., A Subsidiary of EG & G, 1 Aerovista Pk., San Luis Obispo, CA 93401 805-544-5454
§ Computer Power, 124E W. Main St., High Bridge, NJ 08829 201-735-8000
† Diamond Magnetics, P.O. Box 4736, San Luis Obispo, CA 93403 805-544-4019
§ Electronic Specialists, 171 South Main St., Natick, MA 01760 .... 617-655-1532; 800-225-4876
Elin Div., California Instrs. Co., Div. of Norlin Ind., 5150 Convoy St., San Diego, CA 92111 619-279-8620
Halmar Electronics, Inc., 900 N. Hague Ave., Columbus, OH 43204 614-275-0131
§ Hammond Mfg. Co., 1690 Walden Ave., Buffalo, NY 14225 716-894-5710
Hipotronics, P.O. Drawer A, Brewster, NY 10509 914-279-8091
Powermark, 3855 Ruffin Rd., San Diego, CA 92123 619-565-8363
§† Topaz Electronics, 9192 Topaz Way, San Diego, CA 92123-1164 619-279-0831
Xentek, Inc., 279 S. Pacific St., San Marcos, CA 92069 619-744-3346

Isolators, Microwave (All Types)-3450 — *See Vol. A*

Isolators, Optoelectronic-3700 — *See Vol. B*

Isolators, Source — See Isolators, Line (Vol. D)

Jack Adapters (All Types)-2100 — *See Vol. C*

Jack Covers-2100 — *See Vol. C*

Jack Panel Assemblies & Access. — See Panels, Jack (Vol. C)

Jacks (All Types)-2100 — *See Vol. C*

Jacks, Modular Telephones-2100 — *See Vol. C*

Jacks (MIL)-2440 — *See Vol. B*

Jammers (MIL)-3475
American Elctrn. Labs., Inc., Govt. Grp. Div., P.O. Box 552, Lansdale, PA 19446
† Cincinnati Elctrns., 2630 Glendale Milford Rd., Cincinnati, OH 45241 513-733-6100
† Signatron, A Unit of Sundstrand Corp., 12 Hartwell Ave., Lexington, MA 02173 617-861-1500
† Watkins-Johnson Co., 3333 Hillview Ave., Palo Alto, CA 94304 415-493-4141

Jammers (MIL), Advanced Self Protection-3475
American Elctrn. Labs., Inc., Govt. Grp. Div., P.O. Box 552, Lansdale, PA 19446

Jammers (MIL), Chaff, Flares-3475
American Cyanamid Co., Metal Coated Fibers Dept., One Cyanamid Plaza, Wayne, NJ 07470 201-831-3148

Jammers (MIL), Communications (Commjam)-3475
American Elctrn. Labs., Inc., Govt. Grp. Div., P.O. Box 552, Lansdale, PA 19446
† Cincinnati Elctrns., 2630 Glendale Milford Rd., Cincinnati, OH 45241 513-733-6100
† Flight Systems, Inc., Tracor, Inc., 1091 Dove St., Newport Beach, CA 92660 714-833-9661
GTE Sys.-Sylvania Sys. Grp., Western Div., P.O. Box 7188, Mountain View, CA 94039 415-966-2000
† Signatron, A Unit of Sundstrand Corp., 12 Hartwell Ave., Lexington, MA 02173 617-861-1500
Telcom Inc., 8027 Leesburg Pike, Vienna, VA 22180 703-893-7700
† Watkins-Johnson Co., 3333 Hillview Ave., Palo Alto, CA 94304 415-493-4141

Jammers (MIL), Commjam, Truck Mounted-3475
American Elctrn. Labs., Inc., Govt. Grp. Div., P.O. Box 552, Lansdale, PA 19446
† Flight Systems, Inc., Tracor, Inc., 1091 Dove St., Newport Beach, CA 92660 714-833-9661
† Signatron, A Unit of Sundstrand Corp., 12 Hartwell Ave., Lexington, MA 02173 617-861-1500

Jammers (MIL), Drone Borne-3475
† Cincinnati Elctrns., 2630 Glendale Milford Rd., Cincinnati, OH 45241 513-733-6100
† Flight Systems, Inc., Tracor, Inc., 1091 Dove St., Newport Beach, CA 92660 714-833-9661

Jammers (MIL), Expendable-3475
† Cincinnati Elctrns., 2630 Glendale Milford Rd., Cincinnati, OH 45241 513-733-6100
† Flight Systems, Inc., Tracor, Inc., 1091 Dove St., Newport Beach, CA 92660 714-833-9661

Jammers (MIL), High Band-3475
† Flight Systems, Inc., Tracor, Inc., 1091 Dove St., Newport Beach, CA 92660 714-833-9661

Jammers (MIL), Integrated Command-3475
† Flight Systems, Inc., Tracor, Inc., 1091 Dove St., Newport Beach, CA 92660 714-833-9661

Jammers (MIL), J-band-3475
† Flight Systems, Inc., Tracor, Inc., 1091 Dove St., Newport Beach, CA 92660 714-833-9661

Jammers (MIL), Low Band-3475
American Elctrn. Labs., Inc., Govt. Grp. Div., P.O. Box 552, Lansdale, PA 19446
† Flight Systems, Inc., Tracor, Inc., 1091 Dove St., Newport Beach, CA 92660 714-833-9661

Jammers (MIL), Portable-3475
American Elctrn. Labs., Inc., Govt. Grp. Div., P.O. Box 552, Lansdale, PA 19446
† Signatron, A Unit of Sundstrand Corp., 12 Hartwell Ave., Lexington, MA 02173 617-861-1500

Jammers (MIL), Radar-3475
American Elctrn. Labs., Inc., Govt. Grp. Div., P.O. Box 552, Lansdale, PA 19446
† Flight Systems, Inc., Tracor, Inc., 1091 Dove St., Newport Beach, CA 92660 714-833-9661
† Microwave/Sys., 1 Adler Dr., E. Syracuse, NY 13057 315-437-9951
† Radio Resch. Instr. Co., Inc., Two Lake Ave. Extension, Danbury, CT 06811-5295 203-792-6666

Jammers (MIL), Shipboard-3475
American Elctrn. Labs., Inc., Govt. Grp. Div., P.O. Box 552, Lansdale, PA 19446
† Flight Systems, Inc., Tracor, Inc., 1091 Dove St., Newport Beach, CA 92660 714-833-9661
† Microwave/Sys., 1 Adler Dr., E. Syracuse, NY 13057 315-437-9951

Jammers (MIL), Standoff-3475
† Flight Systems, Inc., Tracor, Inc., 1091 Dove St., Newport Beach, CA 92660 714-833-9661
† Microwave/Sys., 1 Adler Dr., E. Syracuse, NY 13057 315-437-9951

Jammers (MIL), Tactical-3475
† Flight Systems, Inc., Tracor, Inc., 1091 Dove St., Newport Beach, CA 92660 714-833-9661
† Microwave/Sys., 1 Adler Dr., E. Syracuse, NY 13057 315-437-9951
† Watkins-Johnson Co., 3333 Hillview Ave., Palo Alto, CA 94304 415-493-4141

Jamming Pods (MIL), ECM-3475
American Elctrn. Labs., Inc., Govt. Grp. Div., P.O. Box 552, Lansdale, PA 19446
† Flight Systems, Inc., Tracor, Inc., 1091 Dove St., Newport Beach, CA 92660 714-833-9661

Jamming Sets (MIL), Multipurpose-3475
American Elctrn. Labs., Inc., Govt. Grp. Div., P.O. Box 552, Lansdale, PA 19446
† Flight Systems, Inc., Tracor, Inc., 1091 Dove St., Newport Beach, CA 92660 714-833-9661

Jamming Systems (MIL)-3475
American Elctrn. Labs., Inc., Govt. Grp. Div., P.O. Box 552, Lansdale, PA 19446
† E-Systems, Greenville Div., P.O. Box 1056, Greenville, TX 75401 214-457-4694
† Flight Systems, Inc., Tracor, Inc., 1091 Dove St., Newport Beach, CA 92660 714-833-9661
† Signatron, A Unit of Sundstrand Corp., 12 Hartwell Ave., Lexington, MA 02173 617-861-1500
Telcom Inc., 8027 Leesburg Pike, Vienna, VA 22180 703-893-7700
† Watkins-Johnson Co., 3333 Hillview Ave., Palo Alto, CA 94304 415-493-4141

Jamming Systems (MIL), Mobile-3475
American Elctrn. Labs., Inc., Govt. Grp. Div., P.O. Box 552, Lansdale, PA 19446
† Flight Systems, Inc., Tracor, Inc., 1091 Dove St., Newport Beach, CA 92660 714-833-9661
GTE Sys.-Sylvania Sys. Grp., Western Div., P.O. Box 7188, Mountain View, CA 94039 415-966-2000
† Signatron, A Unit of Sundstrand Corp., 12 Hartwell Ave., Lexington, MA 02173 617-861-1500

Jamming Systems (MIL), Multipurpose-3475
American Elctrn. Labs., Inc., Govt. Grp. Div., P.O. Box 552, Lansdale, PA 19446
† Flight Systems, Inc., Tracor, Inc., 1091 Dove St., Newport Beach, CA 92660 714-833-9661
† Signatron, A Unit of Sundstrand Corp., 12 Hartwell Ave., Lexington, MA 02173 617-861-1500

Jamming Systems (MIL), Tactical Communications (TACJAM)-3475
American Elctrn. Labs., Inc., Govt. Grp. Div., P.O. Box 552, Lansdale, PA 19446
† Flight Systems, Inc., Tracor, Inc., 1091 Dove St., Newport Beach, CA 92660 714-833-9661
GTE Sys.-Sylvania Sys. Grp., Western Div., P.O. Box 7188, Mountain View, CA 94039 415-966-2000
† Watkins-Johnson Co., 3333 Hillview Ave., Palo Alto, CA 94304 415-493-4141

Jigs And Fixtures, Chassis & Circuit Board-4100
† Anchor Specialty Mfg. Inc., 300 Hollister Rd., Teterboro, NJ 07608 201-288-1939
Augat/ES•P. Inc., /Augat, Inc., 12832 Chadron Ave., Hawthorne, CA 90250 213-973-0262
§ Berg, W. M., Inc., 499 Ocean Ave., East Rockaway, NY 11518 516-599-5010

Carbone Lorraine Inds., 400 Myrtle Ave., Boonton, NJ 07005 .... 201-DE4-0700

Everett/Charles Test Equip. Inc., 2887 N. Towne Ave., Pomona, CA 91767 714-621-9511

§ Fancort Industries, Inc., 31 Fairfield Place, W. Caldwell, NJ 07006 201-575-0610

Jan Hardware Mfg. Co., 47-27 36th St., Long Island City, NY 11101 212-361-0800

† Jettron Prods., P.O. Box 337, E. Hanover, NJ 07936 201-887-0571

Mac Panel Co., Box 5027, 216 Pine St., High Point, NC 27262 919-884-8111

§ Mann, Henry, Inc., 3983 Mann Road, Huntingdon Valley, PA 19006 215-355-7200

§ Matrix Engineering Corp., 17000 S. Western Ave. 19, Gardena, CA 90247 213-770-0521

§ PanaVise Prods., 2850 E. 29th St., Long Beach, CA 90806 213-595-7621

§ Techni-Tool, 5 Apollo Rd., Box 368, Plymouth Meeting, PA 19462 215-825-4990

Ultra Carbon, Box X-924, Bay City, MI 48707 517-894-2911

Joint Compounds, Semiconductor — See Coatings, Compounds, Lubricants, etc., Heat Conductive (Vol. C)

Joints, Rotary, Fiber Optic-2475 — *See Vol. B*

Joints, Rotary, Microwave-3450 — *See Vol. A*

Joysticks — See Controls, Computer Input (Vol. D)

Jumpers, Bonding-2100 — *See Vol. C*

Jumpers, Circuit Board-2100 — *See Vol. C*

Jumpers, Wire, Terminated — See Cords, Patch (Vol. C)

Junctions, Hybrid, Microwave-3450 — *See Vol. A*

Keyboard Legends and Symbols-5150 — *See Vol. B*

Keyboards, Address Encoded-5150 — *See Vol. B*

Keyboards, Capacitive-5150 — *See Vol. B*

Keyboards, Ferrite Core-5150 — *See Vol. B*

Keyboards, Full Travel-5150 — *See Vol. B*

Keyboards, Hall Effect-5150 — *See Vol. B*

Keyboards, Hard Contact-5150 — *See Vol. B*

Keyboards, Lighted-5150 — *See Vol. B*

Keyboards, Low Profile-5150 — *See Vol. B*

Keyboards, Membrane-5150 — *See Vol. B*

Keyboards, Modular-5150 — *See Vol. B*

Keyboards, Pad-5150 — *See Vol. B*

Keyboards, Photo-optical-5150 — *See Vol. B*

Keyboards, Reed-5150 — *See Vol. B*

Keyboards, Solid State-5150 — *See Vol. B*

Keyboards & Keypads (MIL)-2440 — *See Vol. B*

Keyers, Tone-1900

Electrocom Inds., 1105 N. Ironwood Dr., S. Bend, IN 46615 219-232-2743

Electrospace Sys., Inc., P. O. Box 831359, Richardson, TX 75083-1359 214-783-2004

Flex-Key Division, Rogers Corp., 18 Sargent St., Gloucester, MA 01930 617-281-2040

Frederick Elctrns. Corp., 7630 Hayward Rd., P.O. Box 502, Frederick, MD 21701-0502 301-662-5901

Rath Microtech Corp., Rath Affiliated Cos., 2505 Foster Ave., Janesville, WI 53545 .... 608-754-2222;800-356-9464

† Solid State Elctrns. Corp., 18646 Parthenia St., Northridge, CA 91324 ... 818-993-8257

Keypads-5150 — *See Vol. B*

Kits, Breadboarding (For Engineers)-4200 — *See Vol. C*

Kits, Connector-2100 — *See Vol. C*

Kits, Enclosure Prototyping-1400 — *See Vol. C*

Kits, Fiber Optic-2475 — *See Vol. B*

Kits, Marking (Dial, Instrument, Equipment, etc.)-2400 — *See Vol. C*

Kits, Potentiometer, Rheostat-4750 — *See Vol. A*

Kits, Printed Circuit-1700 — *See Vol. C*

Kits, Programming Board-4200 — *See Vol. C*

Kits, Shielding-4525 — *See Vol. C*

Kits, Terminal-2100 — *See Vol. C*

Kits, Training Aid-4200 — *See Vol. C*

Knobs - Also see Dials, Instrument-2400 — *See Vol. C*

Knobs, Collet-2400 — *See Vol. C*

Knobs, Limit Stop-2400 — *See Vol. C*

Knobs, Locking, Control Shaft-2400 — *See Vol. C*

Knobs, Slip Clutch-2400 — *See Vol. C*

Knobs, Torque, Incremental, Ratio Drive-2400 — *See Vol. C*

Labels, Pressure Sensitive, Adhesive-2400 — *See Vol. C*

Labels, Coatings, Crayons, Pellets, etc., Temperature Indicating-5300 — *See Vol. B*

Laboratories, Testing — See Services, Electrical Measurement & Test (Vol. D)

Lacing, Cable — See Cords & Tapes, Lacing (Vol. C)

Laminates, Metal Clad (Including Copper)-2500 — *See Vol. C*

Laminates, Plastic Impregnated (Unclad)-2500 — *See Vol. C*

Laminates, Plastic (With Integral Heating Elements)-5300 — *See Vol. B*

Lamp Adapters-2450 — *See Vol. B*

Lamp Assembly Color Filters, Lens Mountable-2450 — *See Vol. B*

Lamp Drivers-2450 — *See Vol. B*

Lamp Holders — See Sockets, Lamp & Lamp Assemblies (Vol. B)

Lamps, Arc-2450 — *See Vol. B*

Lamps, Edge Lighting, Panel-2450 — *See Vol. B*

Lamps, Electroluminescent-2450 — *See Vol. B*

Lamps, Exciter, Photographic-2450 — *See Vol. B*

Lamps, Flashtube-2450 — *See Vol. B*

Lamps, Fluorescent-2450 — *See Vol. B*

Lamps, Glow — See Lamps, Neon (Vol. B)

Lamps, Incandescent-2450 — *See Vol. B*

Lamps, Indicator — See Lamps, Miniature & Subminiature (Vol. B)

Lamps, Infrared-2450 — *See Vol. B*

Lamps, LED & LCD — See Diodes, Light Emitting (Vol. B), Diodes, Liquid Crystal (Vol. B)

Lamps, Magnifying, Inspection-4100

Aristo Grid Lamp Prods., 65 Harbor Rd., Port Washington, NY 11050 516-944-3030

§ GC Elctrns., 400 S. Wyman St., Rockford, IL 61101 815-968-9661

§ General Hardware Mfg., 80 White St., New York, NY 10013 212-431-6100

§† Luxo Lamp, Jac Jacobsen Industries, Inc., P.O. Box 951, Port Chester, NY 10573 914-937-4433

§ Mann, Henry, Inc., 3983 Mann Road, Huntingdon Valley, PA 19006 215-355-7200

Pace Inc., 9893 Brewers Ct., Laurel, MD 20707 301-490-9860

Solder Absorbing Technology (SAT), South End Bridge Circle, Agawam, MA 01001 800-628-8862

§† Spectronics Corp., 956 Brush Hollow Rd., Westbury, NY 11590 516-333-4840

§ Techni-Tool, 5 Apollo Rd., Box 368, Plymouth Meeting, PA 19462 215-825-4990

ZI-TECH Instr. Corp., 2151 Park Blvd., Box 60490, Palo Alto, CA 94306 415-326-2151

Lamps, Mercury Vapor-2450 — *See Vol. B*

Lamps, Miniature & Subminiature-2450 — *See Vol. B*

Lamps, Neon-2450 — *See Vol. B*

Lamps, Oil Tight-2450 — *See Vol. B*

Lamps, Press-to-Test-2450 — *See Vol. B*

Lamps, Projection-2450 — *See Vol. B*

Lamps, Solid State — See Diodes, Light Emitting (Vol. B), Diodes, Liquid Crystal (Vol. B)

Lamps, Stroboscopic Source-2450 — *See Vol. B*

Lamps, Tritium (Hydrogen 3) Powered-2450 — *See Vol. B*

Lamps, Tungsten Halogen-2450 — *See Vol. B*

Lamps, Ultraviolet-2450 — *See Vol. B*

Lamps, Xenon-2450 — *See Vol. B*

Laser Systems-4100

† Analog Modules, Inc., 126 Baywood Avenue, Longwood, FL 32750, 305-339-4356/4355 .... D•1004
MERET, Inc., 1815 24th St., Santa Monica, CA 90404-4998, 213-828-7496 .... B•1121
§ Adcotech, 1980 Tarob Ct., Milpitas, CA 95035 408-943-9430
§ American Laser Sys., Inc., 106 Fowler Rd., Goleta, CA 93117 805-967-0423
§ BEA electro-optics, Inc., 690 First Ave., Des Plaines, IL 60016 312-298-1420
Burleigh Instrs., Burleigh Pk., Fishers, NY 14453 716-924-9355
Chicago Laser Systems, Inc., 4034 N. Nashville Ave., Chicago, IL 60634 312-282-2710
Coherent, Inc., 3210 Porter Dr., Palo Alto, CA 94304 415-493-2111
† Control Laser Corp., 11222 Astronaut, Orlando, FL 32821 305-851-2540
General Laser, Inc., 7662 East Gray Rd., Scottsdale, AZ 85260 602-991-0674
† General Optronics, 3005 Hadley Rd., So. Plainfield, NJ 07080 201-549-9000
GTE Sys.-Sylvania Sys. Grp., Western Div., P.O. Box 7188, Mountain View, CA 94039 415-966-2000
Hamamatsu Photonics K.K., 325-6 Sunayama-Cho, Hamamatsu City, Shizuoka Pref, JAPAN 0534-52-2141
§† Hughes Aircraft Co., 6155 El Camino Real, Carlsbad, CA 92008 619-931-3000
§† International Laser Sys., 3404 N. Orange Blossom Trail, Orlando, FL 32804 305-295-4010
§† Laakmann Electro-Optics, Inc., 33052 Calle Aviador, San Juan Capistrano, CA 92675 714-493-6624
Laser Applications, 91 Carver Ave., Westwood, NJ 07675 201-664-7636
† Laser Concepts, Omega Organization Intl., P.O. Box 687, Mercer Island, WA 98040 206-232-6256
Laser Diode Labs, 1130 Somerset St., New Brunswick, NJ 08901 201-249-7000
† Laser Inc., Laser Lane, Box 537, Sturbridge, MA 01566 617-347-7314
† Lenox Laser, 504 Pittsfield Rd., Lenox, MA 01240 413-637-0444
Lincoln Laser Co., 234 East Mohave, Phoenix, AZ 85004 602-257-0407
† Melles Griot, 1770 Kettering St., Irvine, CA 92714 714-261-5600
§ Photon Sources, Inc., 12163 Globe Rd., Livonia, MI 48150 313-591-0101
Ortel Corp., 2015 W. Chestnut St., Alhambra, CA 91803 818-281-3636
† Penn Resch. Corp. (PRC), 2652 South Main St., P.O. Box 3357, Kennesaw, GA 30144 404-429-9061
Photon, Inc., 14125 Capri Dr. #4, Los Gatos, CA 95030 408-866-0566
Quantronix, 225 Engineers Rd., Smithtown, NY 11787 516-273-6900
Raytheon Co., Laser Products, Fourth Ave., Burlington, MA 01803 617-272-6402
RMF Prods., Inc., 1275 Paramount Pkwy., P.O. Box 520, Batavia, IL 60510 312-879-0020
Staffall Inc., 7 Woodland St., Providence, RI 02908 401-351-8282
§ Summit CAD Corp., 5222 FM 1960 W100, Houston, TX 77069 713-440-1468
§ Sun Research, Inc.,, Box 210, Old Bay Rd., New Durham, NH 03855 603-859-7110

Laser Components & Laser Accessories-3700 — *See Vol. B*

Laser Diodes — See Diodes, Laser

LCDs — See Diodes, Liquid Crystal (Vol. B)

Lead Assemblies, High Voltage-Also See Connectors; Cable Assemblies & Harnesses-6000 — *See Vol. C*

Leads, Test & Adapters-2900

Daburn Elctrns. & Cable, 70 Oak St., Norwood, NJ 07648, 201-768-5400 .... C•1836
§ ITT Pomona Electronics, 1500 E. 9th St., P.O. Box 2767, Pomona, CA 91766, 714-623-3463 .... C•1292,1308,1352-1361,1366-1375,1379,1386-1391
§ Mueller Elec. Co., 1583 E 31st St., Dept. 20, Cleveland, OH 44114, 216-771-5225 .... C•1470,1472
§ National Tel-Tronics, State Road Hill, Meadville, PA 16335, 814-724-6440 .... C•1473
§ Kulka Smith, Inc., 1913 Atlantic Ave., Manasquan, NJ 08736, 201-223-9400 .... C•1509
Accurate Elctrns., 169 S. Abbe Rd., P.O. Box 1287, Elyria, OH 44036 216-365-1211
§ AEMC, 99 Chauncy, Boston, MA 02111 .... 617-451-0227;800-343-1391
Alden Products Co., P.O. Box 860, 117 N. Main St., Brockton, MA 02403 617-583-0160
Allied Systems Corp., Box 18077, Greensboro, NC 27419 919-299-2294
† Anchor Specialty Mfg. Inc., 300 Hollister Rd., Teterboro, NJ 07608 201-288-1939
§ Augat/Pylon Co., Inc., P.O. Box 2510, Attleboro Falls, MA 02763 617-699-7646
§† Brim Elctrns., 120E Home Pl., Lodi, NJ 07644 201-796-2886
California Avionics Labs., Box 701, Palo Alto, CA 94302 415-328-7999
Compac, 279 Skidmore Rd., Deer Park, NY 11729 516-667-3933
Concord Elctrns., 30 Great Jones St., Dept. JE, New York, NY 10012 212-777-6571
§† Consolidated Electronic Wire & Cable, 11044 King St., Franklin Park, IL 60131 312-455-8830
Easy Heat-Wirekraft, 555 North Michigan St., Lakeville, IN 46536 219-784-3011
Electro Scientific Inds., 13900 N.W. Science Pk. Dr., Portland, OR 97229 503-641-4141
§† Excel Specialty Corp., 6335 N. Broadway, Chicago, IL 60660 312-262-4781
§† E-Z-Hook, Div. Tektest Inc., Box 450 - 225 N. Second Ave., Arcadia, CA 91006 818-446-6175
§ Fluke, John, Mfg. Co., Box C9090, MS 250C, Everett, WA 98206 206-356-5400
§ GC Elctrns., 400 S. Wyman St., Rockford, IL 61101 815-968-9661
† General Optronics, 3005 Hadley Rd., So. Plainfield, NJ 07080 201-549-9000
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
§ Interlok, 770 Airport Blvd., Burlingame, CA 94010 415-348-5625
Jonard Industries Corp., 134 Marbledale Rd., Tuckahoe, NY 10707 914-793-0700
† Mac Panel Co., Box 5027, 216 Pine St., High Point, NC 27262 919-884-8111
Multi Prods. Intl., 218 Little Falls Rd., P.O. Box 238, Cedar Grove, NJ 07009 201-239-8183
§ Philmore Mfg., 40 Inip Dr., Inwood, NY 11696 516-239-6161
† Rowe Industries, Inc., 6225 Benore Rd., P.O. Box 6877, Toledo, OH 43612 419-729-9761
§ Schroff UK Ltd., Maylands Ave., Hemel Hempstead, Herts, ENGLAND HP2 4SG 0442-40471/6
§ Shokai Far East, Ltd., 280 North Central Ave., Hartsdale, NY 10530 914-681-0700
§ SPECO Div., Components Specialties, Inc., P.O. Box 624, 1172 Rte. 109, Lindenhurst, NY 11757 .... 516-957-8700;800-645-5516
§ Techni-Tool, 5 Apollo Rd., Box 368, Plymouth Meeting, PA 19462 215-825-4990
§ Test Probes, Inc., Box 2113, La Jolla, CA 92038 619-459-4197
§ Triplett Corp.-A Penril Co., One Triplett Dr., Bluffton, OH 45817-9987 419-358-5015
§ Vaco Prods., 1510 Skokie Blvd., Northbrook, IL 60062 312-564-3300

LEDs — See Diodes, Light Emitting (LEDs) (Vol. B)

Lenses, Filters, Windows, Infrared - Also see Filters, Color, Panel light; Lenses, Readout & Display-3700 — *See Vol. B*

Lenses, Optical & Camera-3700 — *See Vol. B*

Lenses, Readout & Display - Also see Filters, Color, Panel light; Lenses, filters, Windows, Infrared-2450 — *See Vol. B*

Light Choppers-3700 — *See Vol. B*

Light Pens-2900

NEI, Inc., 1495 Steiger Lake La., Victoria, MN 55386, 612-443-2500 .... D•1211
Design Technology, 7760 Vickers St., San Diego, CA 92111-1871 619-268-8194
Femco, Inc., P.O. Box 26710 Parkmoor Sta., San Jose, CA 95159 408-946-1188
§ InfoCap, Inc., 31119 Via Colinas #502, Westlake Village, CA 91362 818-991-1410
Information Control, Dept. EM7 9610 Bellanca Ave., Los Angeles, CA 90045 213-641-8520
† Information Control Corp., 9610 Bellanca Ave., Los Angeles, CA 90045 213-641-8520
† Interactive Computer Products, Inc., 23591 El Toro Rd., Ste. 180, El Toro, CA 92630 714-770-5332
Matrox Elctrn. Sys., 1055 St. Regis Blvd., Dorval, QU, CANADA H9P 2T4 514-685-2630
Opto Technology, Inc., 1674 S. Wolf Rd., Wheeling, IL 60090 312-537-4277
Photobell, 26 Just Rd., Fairfield, NJ 07006 201-227-3613
Poulin Associates, Inc., 302 North Rd., Sudbury, MA 01776 617-443-7333
Rehlander Assocs., 118A Bridge St., Beverly, MA 01915 617-922-5961
Summit CAD Corp., 5222 FM 1960 W100, Houston, TX 77069 713-440-1468

Light Sources, Fiber Optic-2475 — *See Vol. B*

Light Sources, Infrared-3700 — *See Vol. B*

Light Sources, Photoelectric-3700 — *See Vol. B*

Light Sources, Stroboscopic-3700 — *See Vol. B*

Light Sources, Ultraviolet-3700 — *See Vol. B*

Lights, Indicator-2450 — *See Vol. B*

Lights, Panel — See Lights, Indicator (Vol. B)

Lights, Pilot — See Lights, Indicator (Vol. B)

Limit Stops — See Knobs, Limit Stop (Vol. C)

Limit Stops, Mechanical-2500 — *See Vol. C*

Limiters, Current-4300 — *See Vol. B*

Limiters, Microwave-3450 — *See Vol. A*

Limiters, Surge — See Suppressors, Transient Voltage

Line Assemblies (MIL), RF Transmission-2440 — *See Vol. B*

Line Conditioners-4050

Control Concepts Corp., P.O. Box 1380, Binghamton, NY 13902-1380, 607-724-2484 .... B•1233
† Controlled Power Co., 1955 Stephenson Hwy., Troy, MI 48083, 1-800-521-4792 .... D•1876,1913-1914
§ Displex, Inc., Alexander Place, Glen Cove, NY 11542, 516-671-4400 .... D•1619,1917
§ Franek, John, Co., Inc., P.O. Box 11752, Santa Ana, CA 92711-1752, 714-832-0290;800-854-3420 .... D•1924-1927
MCG Elctrns., 12 Burt Dr., Deer Park, NY 11729, 516-586-5125 .... B•1248-1253
Pacific Power Source Corp., 15122 Bolsa Chica St., Huntington Bch., CA 92649, 714-898-2691;800-854-2433 .... D•1949-1952
† RTE Deltec Corp., 2727 Kurtz St., San Diego, CA 92110, 619-291-4211;800-854-2658 .... D•1959

Sola, A Unit of General Sign., 1717 Busse Rd., Elk Grove Village, IL 60007, 312-439-2800 .... D•1964-1967
§ Adtech Power Inc., 1620 S. Sunkist St., Anaheim, CA 92806 714-634-9211
Albar, Inc., 19013 36th Ave. W., Lynnwood, WA 98036 206-771-4006
Ansco, 1243 West 134th St., Gardena, CA 90247 .... 1-800-421-1270;1-800-821-3308; 213-532-7780
Atlas Energy Sys., 9457 Rush St., S. El Monte, CA 91733 213-575-0755
Basic Measuring Insts., 402 Lincoln Centre Dr., Foster City, CA 94404 415-570-5355
Behlman Engineering, 1142 Mark Ave., Carpinteria, CA 93013 805-684-8311
California Instruments, A Div. of Amstar Tech. Prods. Co., Inc., 5150-Convoy St., San Diego, CA 92111 .... 619-279-8620;800-356-2244;800-821-1634
Clary Corp., Precision Instrs. Div., 320 W. Clary Ave., San Gabriel, CA 91776 818-287-6111
§ Deltron, Inc., P.O. Box 1369, Wissahickon Ave., N. Wales, PA 19454-9990 215-699-9261
EFI Corporation, 350 West 2700 South, Salt Lake City, UT 84115 801-486-5871
§ Electronic Specialists, 171 South Main St., Natick, MA 01760 .... 617-655-1532; 800-225-4876
Energy, Ltd., 4714 Upshur Street, Bladensburg, MD 20710 301-699-1144
Georator Corp., Box 70, Manassas, VA 22110 703-368-2101
§ Hammond Mfg. Co., 1690 Walden Ave., Buffalo, NY 14225 716-894-5710
Oram Electronics, 12 Cranston Rd., Pittsford, NY 14534 716-381-4673
§ PolyPhaser Corporation, 1425 Industrial Way, P.O. Box 1237, Gardnerville, NV 89410-1237 .... 702-782-2511;800-325-7170
§† Power Integrity Corp., 1840 Pembroke Rd., P.O. Box 9682, Greensboro, NC 27408 919-379-9773
§ SAFT America, Inc., Elctrns. Sys. Div., 2414 W. 14th St., Tempe, AZ 85281 602-894-6864
SL Waber, 300 Harvard Ave., Westville, NJ 08093 .... 609-456-5400;800-257-8384
Ulveco, Inc., 323 Vintage Park Drive, Foster City, CA 94404 415-574-1100

Line Controlled Switches — See Switches, Data (Vol. D)

Line Stretchers, Microwave-3450 — *See Vol. A*

Liners, Tube Shield — See Shields, Tube (Vol. C)

Loads, Electronic, Variable-Also See Dummy Loads-2900

Bertan Assocs., 121 New South Rd., Hicksville, NY 11801, 516-433-3110 .... D•1523
Electro Impulse, Box 870, Red Bank, NJ 07701-0870, 201-741-0404 .... D•1211
Kikusui Intl. Corp., 17819 S. Figueroa St., Gardena, CA 90248, 213-515-6432;800-421-5334 .... D•1652
Transistor Devices, 274 S. Salem St., Randolph, NJ 07869, 201-361-6622 .... D•1316-1317
Triac Electronic Systems, Inc., 87-27 Myrtle Ave., Glendale, NY 11385, 718-441-4759 .... D•1132
§ ACDC Electronics, 401 Jones Rd., Oceanside, CA 92054 619-757-1880
Datapower, Inc., 3328 West First St., Santa Ana, CA 92703 714-775-2000
§† Dielectric Communications, General Signal, Tower Hill Rd., Raymond, ME 04071 .... 207-655-4555;800-341-9678
Elgar Corp, An Onan McGraw Edison Co., 9250 Brown Deer Rd., San Diego, CA 92121 619-450-0085
Melcher, Inc., 6290 Sunset Blvd., #1126, Los Angeles, CA 90028 213-463-5617
† Mitec Elctrns., 15 Commerce St., Williston, VT 05495 802-864-0064
Power Designs, Inc., 1700 Shames Dr., Westbury, NY 11590 516-333-6200
† Raytheon Co., Microwave & Power Tube Div., 190 Willow St., Waltham, MA 02154 617-899-8400
† Reeve Electronics, Mellish E. Murray, 1720 W. Fulton St., Chicago, IL 60612 312-670-0150
RLC Elctrns., Inc., 83 Radio Cir., Mt. Kisco, NY 10549 914-241-1334
§ RTE, Power/Mate Co., 514 S. River St., Hackensack, NJ 07601 201-440-3100
§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 215-673-5600
Varian Associates, Inc., Microwave Tube Div., 611 Hansen Way, Palo Alto, CA 94303 415-493-4000
§† Waveline, Box 718, W. Caldwell, NJ 07006 201-226-9100
Wide Band Engrg. Co., Inc., Box 21652, Phoenix, AZ 85036 602-254-1570

Locators, Static-2900

Static, Inc., Rte. 113 & Mensch Rd., P.O. Box 80, Skippack, PA 19474 215-584-9600

Locators, Open Short-2900

§ Associated Research, Inc., 8221 N. Kimball Ave., Skokie, IL 60076 312-647-7850
§ Biddle Instruments, A Thorn EMI Co., 510 Township Line Rd., Blue Bell, PA 19422 215-646-9200

Locks, Dial & Shaft-2400 — *See Vol. C*

Logic Cards (without Components) — See Boards, Plug-in (Vol. C)

Logic Circuits — See Cards, Logic (Vol. D), Modules, Logic (Vol. A)

Loudspeakers — See Speakers (Vol. D)

Louvers, Vents, & Windows (For Equipment) — See Enclosures, Equipment & Panel Mounting (Vol. C)

Lubricants-1600 — *See Vol. C*

Lugs, Terminal — See Terminals, Lug (Vol. C)

LVDTs — See Transducers, Displacement (Vol. B)

Machines & Accessories, Semiconductor Manufacturing-4100

TS Products, Inc., 12455 Branford St., Bldg. 22, Arleta, CA 91331, 818-896-6676 .... D•1990
§ Adcotech, 1980 Tarob Ct., Milpitas, CA 95035 408-943-9430
API Instrs., 1601 Trapelo Rd., Waltham, MA 02254 617-890-2000
§ Apollo Lasers, Inc., 9201 Independence Ave., Chatsworth, CA 91311 213-709-1111
§ Astro Tool Co., Inc., 21615 Southwest Tualatin Valley Hwy., Beaverton, OR 97006 503-642-9853
§† Casso-Solar, P.O. Box 163, U.S. Route 202, Pomona, NY 10970 914-354-2500
Electro Scientific Inds., 13900 N.W. Science Pk. Dr., Portland, OR 97229 503-641-4141
§ Excellon Automation, 24215 Garnier St., Torrance, CA 90505 213-325-8000
Fancort Industries, Inc., 31 Fairfield Place, W. Caldwell, NJ 07006 201-575-0610
GTI/Elctrns. Div., P.O. Box 96, Hadley, PA 16130 412-253-3161
§ Hull Corp., Davisville Rd., Hatboro, PA 19040 215-672-7800
Kahle Engrg., Div. Joule Machinery Grp., 3344 Hudson Ave., P.O. Box 877, Union City, NJ 07087 201-867-6500
Magnum Opus Custom Elctrn. Engrg., 284 Kennedy St., Iselin, NJ 08830 201-283-4925
Micro Component Technlg., Inc., P.O. Box 64013, St. Paul, MN 55164 612-482-5100
† Milton Ross Co., 511 Second St. Pike, Southampton, PA 18966 215-355-0200
† Penn Resch. Corp. (PRC), 2652 South Main St., P.O. Box 3357, Kennesaw, GA 30144 404-429-9061
Plasma-Therm, Inc., Rt. 73, Kresson, NJ 08053 609-767-6120
† PTX-Pentronix Inc., 1737 Cicotte, Lincoln Park, MI 48146 313-388-3100
§† Systonics, Inc., Box 121, Winchester, MA 01890 617-729-4439
§ TDK Corporation of America, 4711 Golf Rd., Skokie, IL 60076 312-679-8200
† Technic, Inc., Box 965, Providence, RI 02901 401-781-6100
§ Temptronic, 55 Chapel St., Newton, MA 02158 617-969-2501
Veeco Instruments Inc., Terminal Dr., Plainview, NY 11803 516-349-8300

Machines & Tools, Crimping — See Tools, Crimping & Swaging (Vol. C)

Machines, Cleaning & Degreasing-Also See Cleaners, Ultrasonic-4100

API Instrs., 1601 Trapelo Rd., Waltham, MA 02254 617-890-2000
Automated Production Concepts, 8 E. Garden Pl., Pompton Plains, NJ 07444 201-831-8300
† Automated Prod. Equip. Corp., 142 Peconic Ave., Medford, NY 11763 516-654-1197
Baron-Blakeslee, Inc., Sub. Purex Inds., Inc., 2001 N. Janice Ave., Melrose Pk., IL 60160 312-450-3900
§ Clean Room Prods., 56 W. Penataquit Ave., Bay Shore, NY 11706 516-968-8282
§† Cobehn, Inc., 226 Passaic Ave., Fairfield, NJ 07006 201-227-6675
§† Cyclo-Tronics, Inc., 1345 N. Old Rand Rd., Wauconda, IL 60084 312-526-0800
Electronic Controls Design, 13626 S. Freeman Rd., Mulino, OR 97042 503-829-9108
Electrovert USA Corp., 10969 Shady Trail, #101, Dallas, TX 75220 214-353-9950
§ Gardiner Solder Co., Div. of Gardiner Metal Co., 4820 S. Campbell Ave., Chicago, IL 60632 312-847-0100
Headway Resch., Inc., 3713 Forest La., Garland, TX 75042 214-272-5431
§ Heat Systems-Ultrasonics, Inc., 1938 New Hwy., Farmingdale, NY 11735 516-694-9555
§ Hollis Engrg., Inc., Charron Ave., Box 1189, Nashua, NH 03061 603-889-1121
§ Hollis Engrg./Wire-Wrap, 15 Charron Ave., Nashua, NH 03061 603-889-1121
Impandex, Inc., 203 Brookdale St., Maywood, NJ 07607 201-845-4664
§† L & R Mfg. Co., 577 Elm St., Kearny, NJ 07032 201-991-5330
§ Mann, Henry, Inc., 3983 Mann Road, Huntingdon Valley, PA 19006 215-355-7200
§† Multicore Solders, Cantiague Rock Rd., Westbury, NY 11590 516-334-7997
Odell, M. P., Co., 1620 Chesapeake Dr., Hoffman Estates, IL 60195 312-991-2828
Recyclene Products, 1910 Trade Zone, San Jose, CA 95131 408-945-8600
Sonicor Instrument Corp., 1365 Marconi Blvd., Copiague, NY 11726 516-842-3344
† Technic, Inc., Box 965, Providence, RI 02901 401-781-6100
§ Techni-Tool, 5 Apollo Rd., Box 368, Plymouth Meeting, PA 19462 215-825-4990
§† Tech Spray, Inc., Box 949, Amarillo, TX 79105 806-372-8523
Zenrad Circuits Co., 529 E. Gutierrez St., Santa Barbara, CA 93103 805-963-3527

Machines, Coil Winding-4100

Adams-Maxwell Division, Coast Magnetics, 1207 North La Brea Ave., Inglewood, CA 90302 213-673-3245
Bluffton Products, Inc., Tegam, Inc., 7230 North Ridge Road, Madison, OH 44057 216-946-3572
† Coast Coil Co., 5333 W. Washington Blvd., Los Angeles, CA 90016 213-936-6188
† Gorman Machine Corp., 7 Burke Dr., Brockton, MA 02401 617-588-2900
Hilton Industries, Inc., Div. of Core Industries, 1177 Cattlemen Road, Sarasota, FL 33582 813-371-2600
Kahle Engrg., Div. Joule Machinery Grp., 3344 Hudson Ave., P.O. Box 877, Union City, NJ 07087 201-867-6500
Meissner Inds., 551 Rte. 10, Dover, NJ 07801 201-366-1700
Solatron Enterprises, 421 E. Beach Ave., Inglewood, CA 90302 213-678-4981
§ Universal Mfg. Co., Inc., 1168 Grove St., Irvington, NJ 07111 201-374-9800

Machines, Component Handling, Feeding, Insertion & Sorting-4100

§ Adcotech, 1980 Tarob Ct., Milpitas, CA 95035 408-943-9430
Amphenol, An Allied Co., 43 Commerce Ct., Lisle, IL 60532 312-983-3500
Automated Production Concepts, 8 E. Garden Pl., Pompton Plains, NJ 07444 201-831-8300
Autosplice, Inc., 59-12, 37th Ave, Woodside, NY 11377 718-429-0500
† Black & Webster, 219 Bear Hill Rd., Waltham, MA 02254 617-890-9100
Conforming Matrix, Box 5126, Pt. Pl. Sta., Toledo, OH 43611 419-729-3777
§ Delta Design, 5775 Kearny Villa Rd., San Diego, CA 92123 619-292-5000
Du Pont Connector Systems, 30 Hunter La., Camp Hill, PA 17011 800-237-2374

Everett/Charles Automation Sys. Inc., 6101 Cherry Ave., Fontana, CA 92335 ... 714-899-2411
§ Excellon Automation, 24215 Garnier St., Torrance, CA 90505 ... 213-325-8000
Fancort Industries, Inc., 31 Fairfield Place, W. Caldwell, NJ 07006 ... 201-575-0610
GTI/Elctrns. Div., P.O. Box 96, Hadley, PA 16130 ... 412-253-3161
§ Hollis Engrg., Inc., Charron Ave., Box 1189, Nashua, NH 03061 ... 603-889-1121
Mann, Henry, Inc., 3983 Mann Road, Huntingdon Valley, PA 19006 ... 215-355-7200
† Mark Eyelet & Stamping, 202 Wakelee Rd., Wolcott, CT 06716 ... 203-756-8847
Micro Component Technlg., Inc., P.O. Box 64013, St. Paul, MN 55164 ... 612-482-5100
† Milton Ross Co., 511 Second St. Pike, Southampton, PA 18966 ... 215-355-0200
MOLEX, Inc., 2222 Wellington Ct., Lisle, IL 60532 ... 312-969-4550
Penn Engrg. & Mfg., P.O. Box 1000, Danboro, PA 18916 ... 215-766-8853
Ragen Corp., Systems Div., 9 Porete Ave., N. Arlington, NJ 07032 ... 201-997-1000
Solatron Enterprises, 421 E. Beach Ave., Inglewood, CA 90302 ... 213-678-4981
Thermonics, 3350 Scott Blvd., Bldg. 32, Santa Clara, CA 95054 ... 408-496-6838
Trio-Tech Intl., 2040 N. Lincoln St., Burbank, CA 91504 ... 818-846-9200
Universal Instrs., P.O. Box 825, Binghamton, NY 13902 ... 607-775-1102

Machines, Hermetic Sealing-4100

Coherent, Inc., 3210 Porter Dr., Palo Alto, CA 94304 ... 415-493-2111
Kahle Engrg., Div. Joule Machinery Grp., 3344 Hudson Ave., P.O. Box 877, Union City, NJ 07087 ... 201-867-6500
† Laser Inc., Laser Lane, Box 537, Sturbridge, MA 01566 ... 617-347-7314
† Lepel, 59-21 Queens-Midtown Expwy., Maspeth, NY 11378 ... 718-426-4580
Penn Resch. Corp. (PRC), 2652 South Main St., P.O. Box 3357, Kennesaw, GA 30144 ... 404-429-9061
Raytheon Co., Laser Products, Fourth Ave., Burlington, MA 01803 ... 617-272-6402

Machines, Induction Heating (Electronic)-4100

† Lepel, 59-21 Queens-Midtown Expwy., Maspeth, NY 11378 ... 718-426-4580
† Reeve Electronics, Mellish E. Murray, 1720 W. Fulton St., Chicago, IL 60612 ... 312-670-0150

Machines, Lead Cutting & Forming-4100

§ Adcotech, 1980 Tarob Ct., Milpitas, CA 95035 ... 408-943-9430
AMP Incorporated, Box 3608, Harrisburg, PA 17105 ... 717-564-0100
Automated Production Concepts, 8 E. Garden Pl., Pompton Plains, NJ 07444 ... 201-831-8300
Burndy Corporation, Richards Ave., Norwalk, CT 06852 ... 203-838-4444
Electrovert USA Corp., 10969 Shady Trail, #101, Dallas, TX 75220 ... 214-353-9950
§ Eraser Co., Box 4961, Syracuse, NY 13221 ... 315-454-3237
† Fancort Industries, Inc., 31 Fairfield Place, W. Caldwell, NJ 07006 ... 201-575-0610
§ Harwil, 1548 17th St., Santa Monica, CA 90404 ... 213-829-2310
Hollis Engrg., Inc., Charron Ave., Box 1189, Nashua, NH 03061 ... 603-889-1121
§ Hollis Engrg./Wire-Wrap, 15 Charron Ave., Nashua, NH 03061 ... 603-889-1121
† Mann, Henry, Inc., 3983 Mann Road, Huntingdon Valley, PA 19006 ... 215-355-7200
Penn Resch. Corp. (PRC), 2652 South Main St., P.O. Box 3357, Kennesaw, GA 30144 ... 404-429-9061
† Plessey Electro-Products, 3860 Centinela Ave., Los Angeles, CA 90066 ... 213-390-3585
Technical Devices, 560 Alaska Ave., Torrance, CA 90503 ... 213-618-8437
§ Techni-Tool, 5 Apollo Rd., Box 368, Plymouth Meeting, PA 19462 ... 215-825-4990
Universal Instrs., P.O. Box 825, Binghamton, NY 13902 ... 607-775-1102

Machines, Magnet Wire Twisting-4100

§ Eraser Co., Box 4961, Syracuse, NY 13221 ... 315-454-3237

Machines, Marking & Numbering-4100

† Acromark, 60 Locust/Dept. 397, Berkeley Hgts., NJ 07922 ... 201-464-6474
§ Adcotech, 1980 Tarob Ct., Milpitas, CA 95035 ... 408-943-9430
† Alan Gordon Entprs., Inc., P.O. Box 3914, 5362 Cahuenga Blvd., N. Hollywood, CA 91605 ... 818-985-5500
Allen Avionics, 224 E. 2nd St., Mineola, NY 11501 ... 516-248-8080
§ BEA electro-optics, Inc., 690 First Ave., Des Plaines, IL 60016 ... 312-298-1420
Bell Co., Inc., 106 Morrow Ave., Box 92E, Trussville, AL 35173 ... 205-655-2135
† Black & Webster, 219 Bear Hill Rd., Waltham, MA 02254 ... 617-890-9100
§† Brady, W. H., Co., Indl. Prods. Div., 2221 W. Camden Rd., Milwaukee, WI 53201 ... 414-351-6630
Burndy Corporation, Richards Ave., Norwalk, CT 06852 ... 203-838-4444
Coherent, Inc., 3210 Porter Dr., Palo Alto, CA 94304 ... 415-493-2111
§† Di/An Controls, Inc., 944 Dorchester Ave., Boston, MA 02125 ... 617-288-7700
§ Eastern Marking Machines, 422 S Franklin St., Hempstead, NY 11550 ... 516-483-7070
Electro Stylus, 31 Cheyenne Blvd., Colorado Springs, CO 80906 ... 303-633-5969
GTI/Elctrns. Div., P.O. Box 96, Hadley, PA 16130 ... 412-253-3161
Kensol Wire Marking, Kensol Olsenmark Inc., 40 Melville Park Road, Melville, NY 11747 ... 516-694-7773
Markem Corp., 1000 Congress St., Keene, NH 03431 ... 603-352-1130
§ Photon Sources, Inc., 12163 Globe Rd., Livonia, MI 48150 ... 313-591-0101
Penn Resch. Corp. (PRC), 2652 South Main St., P.O. Box 3357, Kennesaw, GA 30144 ... 404-429-9061
§† Pioner Components, 2352 E. 66th St., Brooklyn, NY 11234 ... 718-444-3880
Quantronix, 225 Engineers Rd., Smithtown, NY 11787 ... 516-273-6900
Raytheon Co., Laser Products, Fourth Ave., Burlington, MA 01803 ... 617-272-6402
Solatron Enterprises, 421 E. Beach Ave., Inglewood, CA 90302 ... 213-678-4981
Technical Marking Sys., P.O. Box 10, Lynnfield, MA 01940 ... 617-334-6940
Techno Vation, Inc., 14 Crandall Ave., Pompton Lakes, NJ 07442 ... 201-839-0740
Telesis Laboratory, Box 1972, Chillocothe, OH 45601 ... 614-642-5000

Machines, Mask Alignment & Exposure-4100

§ BEA electro-optics, Inc., 690 First Ave., Des Plaines, IL 60016 ... 312-298-1420
† DuPont de Nemours, E. I., & Co., 1007 Market St., Wilmington, DE 19898 ... 302-773-3218
Grover Patent Products, 339 W. Arden Ave., Glendale, CA 91203 ... 213-245-4400

Machines, Metallizing, Vacuum — See Deposition Equipment, Vacuum & Accessories (Vol. D)

Machines, Plastic Molding-4100

Custom Sci. Instrs., 13 Wing Dr., Cedar Knolls, NJ 07927 ... 201-538-8500
§ Hull Corp., Davisville Rd., Hatboro, PA 19040 ... 215-672-7800
Jaco Mfg. Co., 468 Geiger St., Berea, OH 44017 ... 216-234-4000
United Technologies Automotive, 1230 Sabine St., Huntington, IN 46750 ... 219-356-2700

Machines, Plating-4100

Auric Corp., 470 Frelinghuysen Ave., Newark, NJ 07114 ... 201-242-4100
§ Electronic Trend Prods., 10080 N. Wolfe Rd., Ste. 372, Cupertino, CA 95014 ... 408-996-7401
† Electrovert USA Corp., 10969 Shady Trail, #101, Dallas, TX 75220 ... 214-353-9950
† Engelhard Corp., 70 Wood Ave. S., Iselin, NJ 08830 ... 201-321-5900
HBS Equipment Div., 3000 Supply Ave., Los Angeles, CA 90040 ... 213-726-3033
§† Kepro Circuit Sys., 630 Axminister Dr., Fenton, MO 63026 ... 314-343-1630
PCK Technology Div., Kollmorgen Corp., 322 South Service Rd., Melville, NY 11747 ... 516-454-4400
Sel-Rex Div., OMI Intl. Corp., 75 River Rd., Nutley, NJ 07110 ... 201-667-5200
† Technic, Inc., Box 965, Providence, RI 02901 ... 401-781-6100
Waldes Kohinoor, 47-16 Austel Pl., Long Island City, NY 11101-4478 ... 718-392-3100

Machines, Printed Circuit Drilling, Etching & Punching-4100

Aremco Prods., Box 429, Ossining, NY 10562 ... 914-762-0685
† Automated Prod. Equip. Corp., 142 Peconic Ave., Medford, NY 11763 ... 516-654-1197
§ BEA electro-optics, Inc., 690 First Ave., Des Plaines, IL 60016 ... 312-298-1420
Coherent, Inc., 3210 Porter Dr., Palo Alto, CA 94304 ... 415-493-2111
§† Cyclo-Tronics, Inc., 1345 N. Old Rand Rd., Wauconda, IL 60084 ... 312-526-0800
§ Electronic Trend Prods., 10080 N. Wolfe Rd., Ste. 372, Cupertino, CA 95014 ... 408-996-7401
§ Foredom Elec. Co., Blackstone Inds. Inc., Route 6, Bethel, CT 06801 ... 203-792-8622
§ Garry Mfg. Co., Div. of Brand-Rex Co., 9 Queen Anne Ct., Laghorne, PA 19047 ... 215-949-2300
§† Kepro Circuit Sys., 630 Axminister Dr., Fenton, MO 63026 ... 314-343-1630
§ LPKF Pacific Inc., LPKF Pacific Gesellschaft fuer internationalen Maschinenhandel m.b.h., 20C Pamaron Way, Novato, CA 94947 ... 415-883-1717
§ Photon Sources, Inc., 12163 Globe Rd., Livonia, MI 48150 ... 313-591-0101
PCK Technology Div., Kollmorgen Corp., 322 South Service Rd., Melville, NY 11747 ... 516-454-4400
Penn Resch. Corp. (PRC), 2652 South Main St., P.O. Box 3357, Kennesaw, GA 30144 ... 404-429-9061

Machines, Terminal Installing-4100

Panduit Corp., 17301 Ridgeland Ave., Tinley Park, IL 60477-0981, 312-532-1800 ... C•1475
AMP Incorporated, Box 3608, Harrisburg, PA 17105 ... 717-564-0100
Ark-Les, 51 Water St., Watertown, MA 02172 ... 617-924-2330
§ Astro Tool Co., Inc., 21615 Southwest Tualatin Valley Hwy., Beaverton, OR 97006 ... 503-642-9853
Augat Inc., 33 Perry Ave., Box 779, Attleboro, MA 02703 ... 617-222-2202
Automated Production Concepts, 8 E. Garden Pl., Pompton Plains, NJ 07444 ... 201-831-8300
Autosplice, Inc., 59-12, 37th Ave, Woodside, NY 11377 ... 718-429-0500
† Black & Webster, 219 Bear Hill Rd., Waltham, MA 02254 ... 617-890-9100
Burndy Corporation, Richards Ave., Norwalk, CT 06852 ... 203-838-4444
§† Du Pont Connector Systems, 30 Hunter La., Camp Hill, PA 17011 ... 800-237-2374
§ Malco, Div. Microdot Electronic Components Group, 12 Progress Dr., Montgomeryville, PA 18936 ... 215-699-5373
Nichifu America, Inc., 1494 N. Charlotte St., Pottstown, PA 19464 ... 215-323-7120
Scanbe Div., 3445 Fletcher Ave., El Monte, CA 91731 ... 213-579-2300
Sjoberg, C., & Son, Inc., 415 Station St., Cranston, RI 02910 ... 401-461-8220
United Technologies Automotive, 1230 Sabine St., Huntington, IN 46750 ... 219-356-2700
Universal Instrs., P.O. Box 825, Binghamton, NY 13902 ... 607-775-1102
§ Waldom Elctrns., 4301 W. 69th St., Dept. EEM, Chicago, IL 60629 ... 312-585-1212
Zierick Mfg. Corp., 44 Radio Circle, Mt. Kisco, NY 10549 ... 914-666-2911

Machines, Ultrasonic Bonding-4100

§ Excellon Automation, 24215 Garnier St., Torrance, CA 90505 ... 213-325-8000
§† Sonobond, 200 E. Rosedale Ave., West Chester, PA 19380 ... 215-696-4710

Machines, Vibration Fatigue Testing — See Testers, Vibration (Vol. D)

Machines, Wafer Alignment — See Machines, Mask Alignment & Exposure (Vol. D)

Machines, Wire Marking, Manual & Automatic-4100

† Acromark, 60 Locust/Dept. 397, Berkeley Hgts., NJ 07922 ... 201-464-6474
Autosplice, Inc., 59-12, 37th Ave, Woodside, NY 11377 ... 718-429-0500
§† Brady, W. H., Co., Indl. Prods. Div., 2221 W. Camden Rd., Milwaukee, WI 53201 ... 414-351-6630
Burndy Corporation, Richards Ave., Norwalk, CT 06852 ... 203-838-4444
Garry Mfg. Co., Div. of Brand-Rex Co., 9 Queen Anne Ct., Laghorne, PA 19047 ... 215-949-2300
Kensol Wire Marking, Kensol Olsenmark Inc., 40 Melville Park Road, Melville, NY 11747 ... 516-694-7773
§ Kingsley Machine Co., 850 Cahuenga Blvd., Hollywood, CA 90038 ... 213-469-7243
Techno Vation, Inc., 14 Crandall Ave., Pompton Lakes, NJ 07442 ... 201-839-0740
§ Zippertubing Co., P.O. Box 61129, Los Angeles, CA 90061 ... 213-321-3901

Machines, Wire Measuring & Cutting-4100

§ Assem-Pro Instrs., Div. of Overnight Engineering Inc., 1859 Andrews Ave., San Jose, CA 95124 ... 408-267-1168

Automated Production Concepts, 8 E. Garden Pl., Pompton Plains, NJ 07444 201-831-8300
§ BEA electro-optics, Inc., 690 First Ave., Des Plaines, IL 60016 312-298-1420
Burndy Corporation, Richards Ave., Norwalk, CT 06852 203-838-4444
Carpenter Mfg. Co., Inc., Fairgrounds Dr., P.O. Box 188, Manlius, NY 13104-0188 315-682-9176
Du Pont Connector Systems, 30 Hunter La., Camp Hill, PA 17011 800-237-2374
§ Eraser Co., Box 4961, Syracuse, NY 13221 315-454-3237
Eubanks Engrg., 1307 So. Myrtle Ave., Monrovia, CA 91016 818-357-7011
Excel Prods., 401 Joyce Kilmer Ave., New Brunswick, NJ 08903 201-249-6600
§ Garry Mfg. Co., Div. of Brand-Rex Co., 9 Queen Anne Ct., Laghorne, PA 19047 215-949-2300
Hollis Engrg./Wire-Wrap, 15 Charron Ave., Nashua, NH 03061 603-889-1121
§ Ideal Industries, 4450 Becker Pl., Sycamore, IL 60178 815-895-5181
Kensol Wire Marking, Kensol Olsenmark Inc., 40 Melville Park Road, Melville, NY 11747 516-694-7773
§ Kingsley Machine Co., 850 Cahuenga Blvd., Hollywood, CA 90038 213-469-7243
† Mann, Henry, Inc., 3983 Mann Road, Huntingdon Valley, PA 19006 215-355-7200
§ Photon Sources, Inc., 12163 Globe Rd., Livonia, MI 48150 313-591-0101
MOLEX, Inc., 2222 Wellington Ct., Lisle, IL 60532 312-969-4550
§ Techni-Tool, 5 Apollo Rd., Box 368, Plymouth Meeting, PA 19462 215-825-4990
† Western Elctrn. Prods., 107 Los Molinos, San Clemente, CA 92672 714-492-4677

Machines, Wire Wrapping — See Tools, Wire Wrapping (Vol. C)

Magnetic Materials — See Cores, Magnetic (All Types) (Vol. C), Ferrite Material & Parts (Vol. C)

Magnetizers-2900

§ Bell, F. W., Inc., 6120 Hanging Moss Rd., Orlando, FL 32807, 305-678-6900 ..... D•1194,1977
LDJ Incorporated, 2200 Stephenson Hwy., P.O. Box 219, Troy, MI 48099-0219, 313-528-2202 ..... D•1260
Magnetic Instrumentation, 8350 E. 48TH ST., Indianapolis, IN 46226, 317-545-2102 ..... D•1261
Androtek/dmi, Box 29098, Columbus, OH 43229 614-882-7821
Axial Magnetics, 15922 Strathern, Van Nuys, CA 91406 818-994-3346
Indiana General/Div. Emm Corp., Magnet Prods., 405 Elm St., Valparaiso, IN 46383 219-462-3131
Mag-Con, 1626 Terrace Dr., St. Paul, MN 55113 612-633-8820
Magnetran Corp., 5701 Savoy Lane, Houston, TX 77036 713-785-4202
† Magnet Sales & Mfg. Co. Inc., 11250 Playa Court, Culver City, CA 90230-6127 ..... 213-391-7213;800-421-6692
§ Magnos, Old School House Rd., Harvard, MA 01451 617-456-8880
Permag, 400 Karin La., Hicksville, NY 11801 516-822-3311
RFL Inds., A Dowty Grp. Co./Instr. Div., Powerville Rd., Boonton, NJ 07005 201-334-3100
§ Tohoku Metal Inds., 5-8, 2-Chome, Kitaaoyama Minato-Ku, Tokyo, JAPAN ..... Tokyo 03-402-6161
Walker Scientific, Rockdale St., Worcester, MA 01606 617-852-3674

Magnetodiodes — See Magnetoresistors, Hall (Vol. A)

Magnetometers-2900

§ Bell, F. W., Inc., 6120 Hanging Moss Rd., Orlando, FL 32807, 305-678-6900 ..... D•1977
LDJ Incorporated, 2200 Stephenson Hwy., P.O. Box 219, Troy, MI 48099-0219, 313-528-2202 ..... D•1260
Magnetic Instrumentation, 8350 E. 48TH ST., Indianapolis, IN 46226, 317-545-2102 ..... D•1261
Advanced Kinetics, 1231 Victoria St., Costa Mesa, CA 92627 714-646-7165
Bluffton Products, Inc., Tegam, Inc., 7230 North Ridge Road, Madison, OH 44057 216-946-3572
DEVELCO, Inc., 404 Tasman Dr., Sunnyvale, CA 94089-1797 408-734-5700
EG&G Geometrics, Div. of EG&G Inc., 395 Java Dr., Sunnyvale, CA 94089 408-734-4616
† Electro Mechanical Design Services, Inc., 16698 Oakmont Ave., Gaithersburg, MD 20877 301-840-5710
Electro-Mechanics Co., Box 1546, Austin, TX 78767 512-835-4684
† E M S Development Corp., 200 Allen Blvd., Farmingdale, NY 11735 516-694-2886
† Humphrey, Inc., 9212 Balboa Ave., San Diego, CA 92123 619-565-6631
† Magnet Sales & Mfg. Co. Inc., 11250 Playa Court, Culver City, CA 90230-6127 ..... 213-391-7213;800-421-6692
MEDA, Inc., MacIntyre Electronics Design Assocs., Inc., 1930 Isaac Newton Sq., Reston, VA 22090 703-471-1445
RFL Inds., A Dowty Grp. Co./Instr. Div., Powerville Rd., Boonton, NJ 07005 201-334-3100
† Schonstedt Instr. Co., 1775 Wiehle Ave., Reston, VA 22090 703-471-1050
Tensor, Box 14843, Austin, TX 78761 512-251-4131
Walker Scientific, Rockdale St., Worcester, MA 01606 617-852-3674

Magnetoresistors, Hall-4800 — *See Vol. A*

Magnetrons — See Tubes, Microwave (Vol. A)

Magnets, Focusing — See Magnets, Permanent (Vol. C)

Magnets (Lab. Type)-1850 — *See Vol. A*

Magnets, Permanent-1850 — *See Vol. A*

Magnets, Superconducting-1850 — *See Vol. A*

Magnets (MIL), Permanent-2440 — *See Vol. B*

Magnifying Glasses, Inspection-4100

Bishop Graphics, Inc., 5388 Sterling Center, Westlake Village, CA 91359 818-991-2600
§ Erem Corp., 3740 Skypark Dr., Torrance, CA 90505 213-772-0751
§ GC Elctrns., 400 S. Wyman St., Rockford, IL 61101 815-968-9661
§ General Hardware Mfg., 80 White St., New York, NY 10013 212-431-6100
† Keyan Inds., Inc., P.O. Box 1228, Middleboro, MA 02346 617-947-7719
§ Mann, Henry, Inc., 3983 Mann Road, Huntingdon Valley, PA 19006 215-355-7200
† Melles Griot, 1770 Kettering St., Irvine, CA 92714 714-261-5600
† Shogyo Intl. Corp., 287 Northern Blvd., Great Neck, NY 11021 516-466-0911
§ Kulka Smith, Inc., 1913 Atlantic Ave., Manasquan, NJ 08736 201-223-9400
§ Techni-Tool, 5 Apollo Rd., Box 368, Plymouth Meeting, PA 19462 215-825-4990
3D Optics, Box 224, 4 Strathmore Cir., Braintree, MA 02184 617-848-8002

Mainteance, Self, Computers-2000

Digital Equipment Corp., 33 Cabot Rd., Woburn, MA 01801, 800-225-5385 ..... D•1063-1065

Markers, Dry Transfer — See Kits, Marking (Vol. C)

Markers, Identification — See Labels (Vol. C), Nameplates (Vol. B), Machines, Marking and Numbering (Vol. D)

Markers, RF — See Generators, Marker (Vol. D)

Markers, Terminal — See Kits, Marking, etc. (Vol. C)

Markers, Wire, Tab & Sleeve — See Wire Markers (Vol. C)

Mark Recognition Equipment, Optical-2000

BMS Data Handling, Inc., 12155 Magnolia, Riverside, CA 92503 714-359-8824
Cognitronics, 25 Crescent St., Stamford, CT 06906 203-327-5307
§ InfoCap, Inc., 31119 Via Colinas #502, Westlake Village, CA 91362 818-991-1410
Rehlander Assocs., 118A Bridge St., Beverly, MA 01915 617-922-5961
3D Optics, Box 224, 4 Strathmore Cir., Braintree, MA 02184 617-848-8002

Mask Alignment & Exposure Systems — See Machines, Mask Alignment & Exposure (Vol. D)

Material, Permanent Magnet-1850 — *See Vol. A*

Materials, Shock, Noise, & Vibration Control-2500 — See *Vol. C*

Matrices, Switching-Also See Boards, Programming-2000

Crosspoint, Div. of Info-Lite, 422 Cliff St., Fairview, NJ 07022, 201-941-4455 ..... B•1539
CYTEC Corp., 107 N. Washington St., E. Rochester, NY 14445, 716-381-4740 ..... D•1207
Information Transfer Indl., Box 357, Holcomb, NY 14469, 716-657-7074 ..... D•1152-1154
Mac Panel Co., Box 5027, 216 Pine St., High Point, NC 27262, 919-884-8111 ..... C•1712-1713
Allied Systems Corp., Box 18077, Greensboro, NC 27419 919-299-2294
AMP Incorporated, Box 3608, Harrisburg, PA 17105 717-564-0100
† Astronautics Corporation of America, P.O. Box 523, Milwaukee, WI 53201-0523 414-447-8200
Atec Sys., 107 N. Washington St., E. Rochester, NY 14445 716-381-4740
§ Bowmar Instrument Corp., Commercial Products Div., 4640 126th Ave. N., Clearwater, FL 33520 813-576-2525
Cherry Electrical Prods. Corp., 3623 Sunset Ave., Waukegan, IL 60087 312-578-3500
Enerco, Inc., 9615 W. Marginal Way S., Seattle, WA 98108 206-762-1422
† Frequency Elctrns., 55 Charles Lindbergh Blvd., Mitchel Field, NY 11553 516-794-4500
LVC Inds., Inc., CO-ORD Switch Div., 23 Hanse Ave., Freeport, NY 11520 516-868-1900
MarLee Switch Co., 933-D N. Central Ave., Upland, CA 91786 714-982-8988
Matrix Corp., 2260 Distributors Dr., Indianapolis, IN 46241 317-248-2036
Matrix Sys. Corp., 5177 N. Douglas Fir Rd., Calabasas, CA 91302 818-992-6776
MEC A/S, Industriparken 23, Ballerup, DENMARK DK-2750 452-973366
† North Hills Elctrns., 1 Alexander Pl., Glen Cove, NY 11542 516-671-5700
† Racal-Dana Instrs. Inc., 4 Goodyear St., Irvine, CA 92715 714-859-8999
Sealectro, 225 Hoyt St., Mamaroneck, NY 10543 914-698-5600
† Virginia Panel, 1400 New Hope Rd., Waynesboro, VA 22980 703-949-8376

Measuring Equipment, Fiber Optic, Attenuation & Bandwidth-2200

§ AEMC, 99 Chauncy, Boston, MA 02111 ..... 617-451-0227;800-343-1391
Biddle Instruments, A Thorn EMI Co., 510 Township Line Rd., Blue Bell, PA 19422 215-646-9200
EG&G Gamma Scientific, Div. of EG&G Inc., 3777 Ruffin Rd., San Diego, CA 92123 619-279-8034
Foundation Instruments Inc., 24 Colonnade Rd., Nepean, ON, CANADA K2E 7J6 613-226-4000
Poulin Associates, Inc., 302 North Rd., Sudbury, MA 01776 617-443-7333
Scientific-Atlanta, Inc., P.O. Box 105600, Atlanta, GA 30348 404-441-4000

Media, Magnetic — See Disks, Magnetic (Vol. D), Tape, Magnetic (Vol. D)

Megaphones — See Amplifiers (Vol. D)

Memory Devices/Controllers, Bipolar, Add-in-2000

Central Data Corp., 1602 Newton Dr., Champaign, IL 61820 217-359-8010

Eventide, Inc., One Alsan Way, Little Ferry, NJ 07643 201-641-1200
Peritek Corp., 5550 Redwood Rd., Oakland, CA 94619 415-531-6500
§† Plessey Microsystems, Plessey Trading Corp., 1641 Kaiser Ave., Irvine, CA 92714 .... 714-540-9931/9932
SGS Semiconductor Corporation, 1000 E. Bell Road, Phoenix, AZ 85022 602-867-6100
SYMBICON, 89 Route 101A, Amherst, NH 03031 603-673-8898

Memory Devices/Controllers, Bipolar, Add-on-2000

Alpha Data, 20750 Marilla St., Chatsworth, CA 91311 818-882-6500
Peritek Corp., 5550 Redwood Rd., Oakland, CA 94619 415-531-6500
§† Plessey Microsystems, Plessey Trading Corp., 1641 Kaiser Ave., Irvine, CA 92714 .... 714-540-9931/9932
SYMBICON, 89 Route 101A, Amherst, NH 03031 603-673-8898
Terminal Data Corp., 15733 Crabbs Branch Way, Rockville, MD 20855 .. 301-921-8282

Memory Devices/Controllers, Bubble, Add-in-2000

Eventide, Inc., One Alsan Way, Little Ferry, NJ 07643 201-641-1200
§† Plessey Microsystems, Plessey Trading Corp., 1641 Kaiser Ave., Irvine, CA 92714 .... 714-540-9931/9932
Targa Electronics, Systems Inc., 3101 Hawthorne Rd., P. O. Box 8485, Ottawa, ON, CANADA K1G 3H9 613-731-9941
Teleram Communications, 2 Corporate Park Dr., White Plains, NY 10604 914-694-9270

Memory Devices/Controllers, Bubble, Add-on-2000

† Bubbl-Tec, 6800 Sierra Ct., Dublin, CA 94566 415-829-8705
Eventide, Inc., One Alsan Way, Little Ferry, NJ 07643 201-641-1200
† Pacific Cyber/Metrix Inc., 6800 Sierra Ct., Dublin, CA 94568 415-829-8700
§† Plessey Microsystems, Plessey Trading Corp., 1641 Kaiser Ave., Irvine, CA 92714 .... 714-540-9931/9932
Targa Electronics, Systems Inc., 3101 Hawthorne Rd., P. O. Box 8485, Ottawa, ON, CANADA K1G 3H9 613-731-9941

Memory Devices/Controllers, Magnetic Core, Add-in-2000

§† Plessey Microsystems, Plessey Trading Corp., 1641 Kaiser Ave., Irvine, CA 92714 .... 714-540-9931/9932

Memory Devices/Controllers, Magnetic Core, Add-on-2000

Alpha Data, 20750 Marilla St., Chatsworth, CA 91311 818-882-6500
§† Plessey Microsystems, Plessey Trading Corp., 1641 Kaiser Ave., Irvine, CA 92714 .... 714-540-9931/9932

Memory Devices/Controllers, MOS, Add-in-2000

Motorola Semiconductor Prods. Sector, Adv. 72, Box 20912, Phoenix, AZ 85036, 602-244-6900 .... A∘1683
Advanced Automation Concepts, Inc., 3760 Lower Roswell Rd., Marietta, GA 30067 404-973-0027
Allen-Bradley Co., Electronics Group, Rockwell Corporation, 1201 S. Second St., Milwaukee, WI 53204 414-671-2000
§† Catalyst Research, Mine Safety Appliances Co., 1421 Clarkview Rd., Baltimore, MD 21209 .... 301-296-7000, Ext. 304
Central Data Corp., 1602 Newton Dr., Champaign, IL 61820 217-359-8010
Dataram Corp., Princeton Road, Cranbury, NJ 08512 609-799-0071
Diversified Technlg., P.O. Box 748, Ridgeland, MS 39157 601-856-4121
Eventide, Inc., One Alsan Way, Little Ferry, NJ 07643 201-641-1200
§ General Robotics Corp., 57 N. Main St., Hartford, WI 53027 414-673-6800
ICI, 570 W. Lambert, Ste. C, Brea, CA 92621 714-990-1707
§ Macrolink, 1500 N. Kellogg Drive, Anaheim, CA 92807 714-777-8800
§† NCR Microelectronics Div., NCR Corp., 8181 Byers Rd., Miamisburg, OH 45342 .... 800-543-5618;513-866-7471
§† Plessey Microsystems, Plessey Trading Corp., 1641 Kaiser Ave., Irvine, CA 92714 .... 714-540-9931/9932
§ Point 4 Data Corp., 2569 McCabe Way, Irvine, CA 92714 714-863-1111
RCI/Data, 1992 Lakewood Rd., Toms River, NJ 08753 201-341-8361
SGS Semiconductor Corporation, 1000 E. Bell Road, Phoenix, AZ 85022 602-867-6100
Texas Instrs., Data Sys. Group, P. O. Box 809063, Dallas, TX 75380-9063 1-800-527-3500
§ Western Digital Corp., 2445 McCabe Way, Irvine, CA 92714 714-557-3550

Memory Devices/Controllers, MOS, Add-on-2000

Allen-Bradley Co., Electronics Group, Rockwell Corporation, 1201 S. Second St., Milwaukee, WI 53204 414-671-2000
§† Catalyst Research, Mine Safety Appliances Co., 1421 Clarkview Rd., Baltimore, MD 21209 .... 301-296-7000, Ext. 304
Central Data Corp., 1602 Newton Dr., Champaign, IL 61820 217-359-8010
§ Data-Match Corp., 3810 Oakcliff Ind. Ct., Doraville, GA 30340 404-441-0408
Dataram Corp., Princeton Road, Cranbury, NJ 08512 609-799-0071
Eventide, Inc., One Alsan Way, Little Ferry, NJ 07643 201-641-1200
Motorola Semiconductor Prods. Sector, Adv. 72, Box 20912, Phoenix, AZ 85036 602-244-6900
§† NCR Microelectronics Div., NCR Corp., 8181 Byers Rd., Miamisburg, OH 45342 .... 800-543-5618;513-866-7471
§† Plessey Microsystems, Plessey Trading Corp., 1641 Kaiser Ave., Irvine, CA 92714 .... 714-540-9931/9932
SGS Semiconductor Corporation, 1000 E. Bell Road, Phoenix, AZ 85022 602-867-6100

Memory Systems, Bubble-2000

† Bubbl-Tec, 6800 Sierra Ct., Dublin, CA 94566 415-829-8705
Fujitsu America, Inc., 918 Sherwood Dr., Lake Bluff, IL 60044 312-295-2610
Hitachi America, 1800 Bering Dr., San Jose, CA 95112 408-292-6404
† Pacific Cyber/Metrix Inc., 6800 Sierra Ct., Dublin, CA 94568 415-829-8700
PCM-PAC Cyber-Metric, 6800 Sierra Ct., Dublin, CA 94568 415-829-8700
§† Plessey Microsystems, Plessey Trading Corp., 1641 Kaiser Ave., Irvine, CA 92714 .... 714-540-9931/9932
Plessey Microsystems, The Plessey Co., Ltd., One Blue Hill Pla., Pearl River, NY 10965 914-735-4661
† Singer Co., Librascope Div., 833 Sonora Ave., Glendale, CA 91201 818-244-6541
Targa Electronics, Systems Inc., 3101 Hawthorne Rd., P. O. Box 8485, Ottawa, ON, CANADA K1G 3H9 613-731-9941
† Teleram Communications, 2 Corporate Park Dr., White Plains, NY 10604 914-694-9270

Memory Systems, Core-2000

Alpha Data, 20750 Marilla St., Chatsworth, CA 91311 818-882-6500
† Ampex Corp., 401 Broadway, Redwood City, CA 94063 415-367-2011
§ Applied Data Communications, 14272 Chambers Rd., Tustin, CA 92680 714-731-9000
California Minicomputer Sys., 5534 Westlawn Ave., Los Angeles, CA 90066 213-640-2930
† CTS Fabri-Tek, Inc., CTS Corporation, 6900 Shady Oak Rd., Eden Prairie, MN 55344 612-941-9100
Data General, 4400 Computer Dr., Westboro, MA 01581 617-366-8911
† Digital Data Sys., 1551 N.W. 65 Ave., Plantation, FL 33313 305-792-3290
† EMM/SESCO, 20630 Plummer St., Chatsworth, CA 91311 213-998-9090
† Hughes Aircraft Co., Microelctrn. Sys. Div., 2601 Campus Dr., Irvine, CA 92715 714-752-3800
Lexidata Corp., 755 Middlesex Tpke., Billerica, MA 01865 .... 617-663-8550; 800-472-4747
Memorex Corp., San Thomas at Central Expwy., Santa Clara, CA 95052 408-987-1000
Mitronics, 2908 Oregon Court - Bldg. I-2, Torrance, CA 90503 213-320-7011
National Micronetics, Route 28, West Hurley, NY 12136 914-338-0333
§† Plessey Microsystems, Plessey Trading Corp., 1641 Kaiser Ave., Irvine, CA 92714 .... 714-540-9931/9932
Plessey Microsystems, The Plessey Co., Ltd., One Blue Hill Pla., Pearl River, NY 10965 914-735-4661
† Rolm Mil-Spec Computers, Rolm Corp., 1 River Oaks Pl., San Jose, CA 95134 408-942-8000
Trendata/Standard Memories, 3400 W. Segerstrom, Santa Ana, CA 92704 714-540-3605

Memory Systems, Delay Line-2000

† Computer Devices Corp., 63 Austin Blvd., Commack, NY 11725, 516-543-4220 .... A∘1487
Anders, Inc., 77 Wolcott Rd., Simsbury, CT 06070 203-658-7666
† Control Elctrns. Co., Inc., 107-B Allen Blvd., Farmingdale, NY 11735 516-694-0125
Corning Glass Works, Memory Prods Dept., 3900 Electronic Dr., Raleigh, NC 27604 919-876-1100
† Hughes Aircraft Co., Microelctrn. Sys. Div., 2601 Campus Dr., Irvine, CA 92715 714-752-3800
† Microsonics Inc., 60 Winter St., Weymouth, MA 02188 617-337-4200

Memory Systems, Disk-2000

Alpha Data, 20750 Marilla St., Chatsworth, CA 91311 818-882-6500
§ Alps Electric (USA), Inc., 3553 N. First St., San Jose, CA 95134 408-946-6000
† Ampex Corp., 401 Broadway, Redwood City, CA 94063 415-367-2011
§ Andromeda Sys., 9000 Eton Ave., Canoga Park, CA 91304 818-709-7600
Applied Micro Technlg., A Burr Brown Co., 3669 E. 44th Street, Tucson, AZ 85713 602-622-8605
Applied Sys., 26401 Harper Ave., St. Clair Shores, MI 48081 313-779-8700
§ BASF Sys., Crosby Dr., Bedford, MA 01730 .... 617-271-4000;800-343-4600
Central Data Corp., 1602 Newton Dr., Champaign, IL 61820 217-359-8010
§ Colorado Video, Inc., Box 928, Boulder, CO 80306 303-444-3972
Data Engineering, Inc., 2515 N. State Rd. 7 Ste. 207, Margate, FL 33063 974-7861
§ Data General, 4400 Computer Dr., Westboro, MA 01581 617-366-8911
Datapoint Corp., Peripheral Operations Division, 686 West Maude Avenue, Sunnyvale, CA 94086 408-732-7330
§ Datum, Storage Prods. Div., 1363 State College Blvd., Anaheim, CA 92806 714-533-6333
† Digital Dev. Corp., 8650 Balboa Ave., San Diego, CA 92123 619-278-9920
Digital Equip., One Iron Way, Marlborough, MA 01752
Dysan Corp., 5201 Patrick Henry Dr., P.O. Box 58053, Santa Clara, CA 95050 408-988-3472
§ Eigen Video, P.O. Box 848, Nevada City, CA 95959 916-272-3461
Harris Corp., Computer Systems Div., 2101 W. Cypress Creek Rd., Ft. Lauderdale, FL 33309 305-974-1700
§ Heath Co., Benton Harbor, MI 49022 616-982-3886
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
§ Innotronics, Brooks Rd., Lincoln, MA 01773 617-678-8720
Innovatek Microsystems, Inc., Smithfield Rd., R1 Box 104, Millerton, NY 12546-9720 914-373-9003
§ Innovative Data Technology, 5340 Eastgate Mall, San Diego, CA 92121 619-587-0555
Interface Electronics Inc., 21134 Bridge St., Southfield, MI 48034 313-352-8820
§ IQ Systems, Applied Circuit Tech., 2931 La Jolla St., Anaheim, CA 92806 714-630-6834
I^2 Interface, Inc., 21101 Osborne St., Canoga Park, CA 91304 818-341-7014
JF Microsystems, 3641 Frontier Road, Pasco, WA 99301 .... 509-297-4294; 800-JF-CARDS
Lancore Technologies, Inc., 31324 Via Colinas, Westlake Village, CA 91362 818-991-5100
† Memorex Corp., San Thomas at Central Expwy., Santa Clara, CA 95052 408-987-1000
Microdata Corp., 17481 Red Hill Ave., Irvine, CA 92705 714-540-6730
§ Micro Peripherals Inc., 9754 Deering Ave., Chatsworth, CA 91311 213-709-4202
§ Mini Computer Technlg., 696 E. Trimble Rd., San Jose, CA 95131 408-942-1616
Mitronics, 2908 Oregon Court - Bldg. I-2, Torrance, CA 90503 213-320-7011

NEC Information Systems, NEC Corporation, 1414 Massachusetts Ave., Boxborough, MA 01719 617-264-8000
Peripherals, 3001 Red Hill, Bldg. 6, Ste. 107, Costa Mesa, CA 92626 714-540-4925
Personal Micro Computers, 275 Santa Ana Ct., Sunnyvale, CA 94086 ... 408-737-8441
§ Pertec Peripherals Corp., P.O. Box 2198, Chatsworth, CA 91311 818-882-0030
Potter Instr., 10 Main St., Gonic, NH 03867 603-332-1991
§ RACET Computes, Ltd., 1855 W Katella Ste. 255, Orange, CA 92667 714-997-4950
Renaissance Marketing, Inc., 463 Union Ave., Westbury, NY 11590 516-271-2389
† Rolm Mil-Spec Computers, Rolm Corp., 1 River Oaks Pl., San Jose, CA 95134 408-942-8000
† Singer Co., Librascope Div., 833 Sonora Ave., Glendale, CA 91201 818-244-6541
Sperry Univac, Mini-Computer Operations, Box C-19504, Irvine, CA 92713 714-754-6900
Standard Logic, 2215 S. Standard Ave., Santa Ana, CA 92707 714-979-4770
Sunol Systems, 1187 Quarry Lane, Pleasanton, CA 94586 415-484-3322
§ Tallgrass Technologies, 11100 W. 82nd St., Overland Park, KS 66214 .. 913-492-6002
Tecstor, Inc., 16161 Gothard Street, Huntington Beach, CA 92647 714-842-0077
Teleram Communications, 2 Corporate Park Dr., White Plains, NY 10604 914-694-9270
Tri-Data Corp., 505 E Middlefield Rd., Mountain View, CA 94043 415-969-3700
Vermont Resch. Corp., Precision Pk., N. Springfield, VT 05150 802-886-2256

Memory Systems, Disk, Flexible-2000

§ Alps Electric (USA), Inc., 3553 N. First St., San Jose, CA 95134 408-946-6000
§ Andromeda Sys., 9000 Eton Ave., Canoga Park, CA 91304 818-709-7600
§ Applied Data Communications, 14272 Chambers Rd., Tustin, CA 92680 714-731-9000
Applied Micro Technlg., A Burr Brown Co., 3669 E. 44th Street, Tucson, AZ 85713 602-622-8605
Applied Sys., 26401 Harper Ave., St. Clair Shores, MI 48081 313-779-8700
§ BASF Sys., Crosby Dr., Bedford, MA 01730 .... 617-271-4000;800-343-4600
Central Data Corp., 1602 Newton Dr., Champaign, IL 61820 217-359-8010
Chrislin Inds., 31352 Via Colinas, Westlake Village, CA 91362 818-991-2254
§ Cromemco, 280 Bernardo Ave., Mountain View, CA 94043 415-964-7400
§ Data General, 4400 Computer Dr., Westboro, MA 01581 617-366-8911
Digital Equip., One Iron Way, Marlborough, MA 01752
Dysan Corp., 5201 Patrick Henry Dr., P.O. Box 58053, Santa Clara, CA 95050 408-988-3472
§ Eigen Video, P.O. Box 848, Nevada City, CA 95959 916-272-3461
§ Heath Co., Benton Harbor, MI 49022 616-982-3886
§ Innotronics, Brooks Rd., Lincoln, MA 01773 617-678-8720
I² Interface, Inc., 21101 Osborne St., Canoga Park, CA 91304 818-341-7014
JF Microsystems, 3641 Frontier Road, Pasco, WA 99301 .... 509-297-4294; 800-JF-CARDS
Memorex Corp., San Thomas at Central Expwy., Santa Clara, CA 95052 408-987-1000
§ Micro Peripherals Inc., 9754 Deering Ave., Chatsworth, CA 91311 213-709-4202
NEC Information Systems, NEC Corporation, 1414 Massachusetts Ave., Boxborough, MA 01719 617-264-8000
Personal Micro Computers, 275 Santa Ana Ct., Sunnyvale, CA 94086 ... 408-737-8441
§ Qume, 2350 Qume Dr., San Jose, CA 95131 408-942-4000
Sony Corp. of America, Component Prods. Div., 15 Essex Road, Paramus, NJ 07652 201-368-5000
Sperry Univac, Mini-Computer Operations, Box C-19504, Irvine, CA 92713 714-754-6900
† Terminal Data Corp., 15733 Crabbs Branch Way, Rockville, MD 20855 .. 301-921-8282

Memory Systems, Tape-2000

Phi Technologies, Inc., 4605 North Stiles, Oklahoma City, OK 73105, 405-521-9000 .... D•1052-1053
§ Algo, Inc., 9198-C Red Branch Rd., Columbia, MD 21045 301-730-7442
Amilon Corp., 49-12 30th Ave., Woodside, NY 11377 718-274-1794
† Ampex Corp., 401 Broadway, Redwood City, CA 94063 415-367-2011
§ BASF Sys., Crosby Dr., Bedford, MA 01730 .... 617-271-4000;800-343-4600
§ Braemar Corp., 11400 Rupp Drive, Burnsville, MN 55337 612-890-5135
California Minicomputer Sys., 5534 Westlawn Ave., Los Angeles, CA 90066 213-640-2930
Central Data Corp., 1602 Newton Dr., Champaign, IL 61820 217-359-8010
† Data Capture Technology, Hathaway Instruments, 5436-F South Mingo Rd., Tulsa, OK 74146 918-627-7521
§ Data General, 4400 Computer Dr., Westboro, MA 01581 617-366-8911
Datapoint Corp., Peripheral Operations Division, 686 West Maude Avenue, Sunnyvale, CA 94086 408-732-7330
§ Datum, Storage Prods. Div., 1363 State College Blvd., Anaheim, CA 92806 714-533-6333
Digital Dev. Corp., 8650 Balboa Ave., San Diego, CA 92123 619-278-9920
Digital Equip., One Iron Way, Marlborough, MA 01752
† EMM/SESCO, 20630 Plummer St., Chatsworth, CA 91311 213-998-9090
Harris Corp., Computer Systems Div., 2101 W. Cypress Creek Rd., Ft. Lauderdale, FL 33309 305-974-1700
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
Honeywell, Test Instrs. Div., P.O. Box 5227, Denver, CO 80217 303-773-4700
§ Innovative Data Technology, 5340 Eastgate Mall, San Diego, CA 92121 619-587-0555
Interdyne Co., 157 Topaz St., Milpitas, CA 95035 408-943-9133
I² Interface, Inc., 21101 Osborne St., Canoga Park, CA 91304 818-341-7014
Lancore Technologies, Inc., 31324 Via Colinas, Westlake Village, CA 91362 818-991-5100
Mega Logic, 9659 Natl. Rd., Brookville, OH 45309 513-833-5222
Memorex Corp., San Thomas at Central Expwy., Santa Clara, CA 95052 408-987-1000
Microdata Corp., 17481 Red Hill Ave., Irvine, CA 92705 714-540-6730
Mitronics, 2908 Oregon Court - Bldg. I-2, Torrance, CA 90503 213-320-7011
Mohawk Data Sciences, MDS Center, Herkimer, NY 13350 315-866-5300
§ Pertec Peripherals Corp., P.O. Box 2198, Chatsworth, CA 91311 818-882-0030
§ RACET Computes, Ltd., 1855 W Katella Ste. 255, Orange, CA 92667 714-997-4950
† Raymond Engrg. Inc., Raycorder Prods. Div., 217 Smith St., Middletown, CT 06457 203-632-1000
Sperry Univac, Mini-Computer Operations, Box C-19504, Irvine, CA 92713 714-754-6900
Sunol Systems, 1187 Quarry Lane, Pleasanton, CA 94586 415-484-3322
Tri-Data Corp., 505 E Middlefield Rd., Mountain View, CA 94043 415-969-3700

Memory Systems, Semiconductor-2000

§† Catalyst Research, Mine Safety Appliances Co., 1421 Clarkview Rd., Baltimore, MD 21209, 301-296-7000, Ext. 304 .... D•1417
§ Electronic Solutions, 9255 Chesapeake Drive, San Diego, CA 92123, 619-292-0242;800-854-7086 .... D•1084
§ Motorola Semiconductor Prods. Sector, Adv. 72, Box 20912, Phoenix, AZ 85036, 602-244-6900 .... D•1100-1101
§ Algo, Inc., 9198-C Red Branch Rd., Columbia, MD 21045 301-730-7442
† Ampex Corp., 401 Broadway, Redwood City, CA 94063 415-367-2011
§ Andromeda Sys., 9000 Eton Ave., Canoga Park, CA 91304 818-709-7600
Applied Sys., 26401 Harper Ave., St. Clair Shores, MI 48081 313-779-8700
Central Data Corp., 1602 Newton Dr., Champaign, IL 61820 217-359-8010
Chrislin Inds., 31352 Via Colinas, Westlake Village, CA 91362 818-991-2254
† Computer Devices Corp., 63 Austin Blvd., Commack, NY 11725 516-543-4220
Data Engineering, Inc., 2515 N. State Rd. 7 Ste. 207, Margate, FL 33063 974-7861
§ Data General, 4400 Computer Dr., Westboro, MA 01581 617-366-8911
Dataram Corp., Princeton Road, Cranbury, NJ 08512 609-799-0071
† Digital Data Sys., 1551 N.W. 65 Ave., Plantation, FL 33313 305-792-3290
Digital Dev. Corp., 8650 Balboa Ave., San Diego, CA 92123 619-278-9920
Digital Equip., One Iron Way, Marlborough, MA 01752
Digital Pathways, Inc., 1060 E. Meadow Cir., Palo Alto, CA 94303 415-493-5544
Diversified Technlg., P.O. Box 748, Ridgeland, MS 39157 601-856-4121
† EMM/SESCO, 20630 Plummer St., Chatsworth, CA 91311 213-998-9090
Enterprise Sys. Corp., P.O. Box 698, Dover, NH 03820 603-742-7363
§† Fairchild Microcontroller Div., Fairchild Camera & Instr. Corp., 450 National Ave., Mountain View, CA 94042 415-962-3838
Harris Corp., Computer Systems Div., 2101 W. Cypress Creek Rd., Ft. Lauderdale, FL 33309 305-974-1700
Hughes Aircraft Co, Aerospace Grps./Support Sys., P.O. Box 90515, Los Angeles, CA 90009 213-670-1515
Hughes Aircraft Co., Microelctrn. Sys. Div., 2601 Campus Dr., Irvine, CA 92715 714-752-3800
Industrial Computer Designs, Inc., 31264 La Baya Drive, Westlake Village, CA 91362 818-889-3179
§ Integrated Digital Products, 4208 E. La Palma Ave., Anaheim, CA 92807 714-793-5300
§ Intel Memory Systems, 1302 N. Mathilda, Sunnyvale, CA 94086 408-734-8102
JF Microsystems, 3641 Frontier Road, Pasco, WA 99301 .... 509-297-4294; 800-JF-CARDS
Lexidata Corp., 755 Middlesex Tpke., Billerica, MA 01865 .... 617-663-8550; 800-472-4747
† Memorex Corp., San Thomas at Central Expwy., Santa Clara, CA 95052 408-987-1000
Monolithic Sys., 84 Inverness Circle E., Englewood, CO 80112 303-790-7400
§† Nitron, 10420 Bubb Rd., Cupertino, CA 95014 408-255-7550
Phoenix Data, Inc., 3384 W. Osborn Rd., Phoenix, AZ 85017 602-278-8528
Plessey Microsystems, The Plessey Co., Ltd., One Blue Hill Pla., Pearl River, NY 10965 914-735-4661
PPM, Inc., 4521 Emery Ind. Pkwy., Cleveland, OH 44128 216-292-6006
RCI/Data, 1992 Lakewood Rd., Toms River, NJ 08753 201-341-8361
§ Rockwell Int'l., 4311 Jamboree Rd., Newport Beach, CA 92660 800-854-8099
Schneider Instr., 8115 Camargo Rd., Cincinnati, OH 45243 513-561-6803
SGS Semiconductor Corporation, 1000 E. Bell Road, Phoenix, AZ 85022 602-867-6100
Standard Engrg., 44800 Industrial Dr., Fremont, CA 94538 415-657-7555
Sylvania Electronic Components, Philips ECG Inc., A North American Philips Co., 100 First Ave., Waltham, MA 02254 617-890-6107
Targa Electronics, Systems Inc., 3101 Hawthorne Rd., P. O. Box 8485, Ottawa, ON, CANADA K1G 3H9 613-731-9941
Trendata/Standard Memories, 3400 W. Segerstrom, Santa Ana, CA 92704 714-540-3605

Meter Cases — See Enclosures, Equipment & Panel Mounting (Vol. C)

Meter Controllers — See Relays, Meter (Vol. B)

Meter Expanders — See Multipliers, Meter (Vol. D)

Meters, Acceleration — See Accelerometers

Meters, Admittance-2900

Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.

Meters, Ampere, AC-2900

§ Bell, F. W., Inc., 6120 Hanging Moss Rd., Orlando, FL 32807, 305-678-6900 .... D•1195
Clarke-Hess Comm. Resch. Corp., 17 West 17th St., New York, NY 10011, 212-255-2940 .... D•1200
§ Digitec Corp., 918 Woodley Rd., P.O. Box 458, Dayton, OH 45401, 513-254-6251 .... D•1348
§ Electro Industries, Div. E.I. Elctrns., Inc., 1800 Shames Drive, Westbury, NY 11590, 516-334-0870 .... D•1350-1351
§ EMICO Inc., Box 368, Dublin, PA 18917, 215-249-9330 .... D•1352-1353
IET Labs, Inc., 534 Main St., Westbury, NY 11590, 516-334-5959 .... D•1242
§ Modutec, 18 Marshall St., Norwalk, CT 06854, 203-853-3636 .... D•1362-1363
§ NES, Inc. (Nationwide Electronic Systems), 3003 Wakefield, Carpentersville, IL 60110, 312-426-5900 .... D•1367

§ North American Soar Corp., 11126 Cornell Ave., Cherry Hill, NJ 08002, 609-488-1060 .... D›1263,1273-1274,1278
PPM, Inc., 4521 Emery Ind. Pkwy., Cleveland, OH 44128, 216-292-6006 .. D›1291
† Sensitive Research Instrs., 25 Dock St., Mt. Vernon, NY 10550, 914-699-9717 .... D›1304
Shogyo Intl. Corp., 287 Northern Blvd., Great Neck, NY 11021, 516-466-0911 .... D›1376
§ Triplett Corp.-A Penril Co., One Triplett Dr., Bluffton, OH 45817-9987, 419-358-5015 .... D›1320,1380
A & D Elec. Instrs., 73-07 88th St., Glendale, NY 11385 718-275-6516
§ AEMC, 99 Chauncy, Boston, MA 02111 .... 617-451-0227;800-343-1391
Airpax Corp., Ft. Lauderdale Div., 6801 W. Sunrise Blvd., Ft. Lauderdale, FL 33313 305-587-1100
† Amprobe Instr., 630 Merrick Rd., Lynbrook, NY 11563 .... 516-LY3-5600
Analogic Corp., 8 Centennial Dr., Peabody, MA 01961 ..... 617-532-5660;617-777-4500; 617-246-0300;800-451-1
§ API Instrs., 1601 Trapelo Rd., Waltham, MA 02254 617-890-2000
ARGA Controls, 35 E. Glenarm St., Pasadena, CA 91105 213-682-3314
§ Ballantine Labs., 90 Fanny Rd., Boonton, NJ 07005 201-335-0900
§ BBC-Metrawatt/Goerz, 2150 W. 6th Ave., Broomfield, CO 80020 .... 303-469-5231; 800-821-6327
§ Beckman Industrial Corp., Emerson Electric Co., 630 Puente Street, Brea, CA 92621 714-773-8111
§ Beede Electrical Instr. Co., S. Main St., Penacook, NH 03303 603-753-6362
Bluffton Products, Inc., Tegam, Inc., 7230 North Ridge Road, Madison, OH 44057 216-946-3572
§ Calibron Instrs., Burton-Rogers Co., 220 Grove St., Waltham, MA 02154 617-894-6440
§† Columbia Elec. Mfg., 4519 Hamilton Ave. N.W., Cleveland, OH 44114 ... 216-361-8060
Cord Electronics, Inc., 177 Cantiague Rock Rd., Westbury, NY 11590 ... 516-935-3640
Crompton Instrs., 2763 Higgins Road, Elk Grove Village, IL 60007 714-841-2901
Crompton Instrs., Hawker Siddley, 2763 Old Higgins Rd., Elk Grove Village, IL 60007 312-593-1107
§† Data Precision Corp., Electronics Ave., Danvers, MA 01923 617-246-1600
§ Data Tech, Div. of Penril Corp., 3110 W. Segerstrom, Santa Ana, CA 92704 714-546-7160
Datron Instrs., Inc., 3401 SW 42nd Ave., Stuart, FL 33497 305-283-0935
Dixson, Inc., Instrument Div., Box 1449, Grand Junction, CO 81502 303-242-8863
Dranetz Technologies, Inc, Computer Products Division, 1000 New Durham Rd., P.O. Box 4019, Edison, NJ 08818-4019 201-287-3680
Dranetz Technologies, Inc., Industrial Products Division, 1000 New Durham Rd., P.O. Box 4019, Edison, NJ 08818-4019 201-287-3680
ECO Instrs. Div., Sea Data Corp., 1 Bridge St., Newton, MA 02158 617-964-8360
† Electrical Instr. Svc., 25 Dock St., Mt. Vernon, NY 10550 914-699-9717
§ Epoch Enterprises, Ltd., 3541 N. Olive Rd., Tucson, AZ 85719 .... 602-887-1970; 888-5167
§ Esterline Angus Instr. Corp., Box 24000, Indianapolis, IN 46224 317-244-7611
§ Fluke, John, Mfg. Co., Box C9090, MS 250C, Everett, WA 98206 206-356-5400
§ GC Elctrns., 400 S. Wyman St., Rockford, IL 61101 815-968-9661
§ Greibach Instrs. Div., 25 Dock St., Mt. Vernon, NY 10550 914-699-9717
Halmar Electronics, Inc., 900 N. Hague Ave., Columbus, OH 43204 614-275-0131
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Ofl.
Hickok Elec. Instr., 10514 DuPont Ave., Cleveland, OH 44108 216-541-8060
† Ideal Precision Meter, 214 Franklin St., Brooklyn, NY 11222 212-383-6904
† Imtronics Inds., 11930 31st Ct., St. Petersburg, FL 33715 813-577-9010
§† International Instruments, General Resistance, Inc., Twin Lakes Rd, P.O. Box 185, N. Branford, CT 06471 203-481-3450
§ Jewell Electrical Instrs., Grenier Field, Manchester, NH 03108 603-669-6400
Jonard Industries Corp., 134 Marbledale Rd., Tuckahoe, NY 10707 914-793-0700
§ Keithley Instrs., 28775 Aurora Rd., Cleveland, OH 44139 216-248-0400
Larson Instr., Greenbush Rd., Orangeburg, NY 10962 914-359-3800
§ Leader Instrs. Corp., 380 Oser Ave., Hauppauge, NY 11788-3694 516-231-6900
† Millivac Instrs., Box 997, Curry Rd. Ext., Schenectady, NY 12301 518-355-8300
Multi-Amp Corp., TBG, 4271 Bronze Way, Dallas, TX 75237 214-333-3201
§ Newport Electronics, 630 E. Young St., Santa Ana, CA 92705 714-540-4914
§ Non-Linear Systems/Div. of Kaypro Corp., 533 Stevens Ave., Solana Bch., CA 92075 619-481-3900
Ohio Semitronics, Inc., 1205 Chesapeake Ave., Columbus, OH 43212 ... 614-486-9561
§ Pacer Industries, Inc., 1450 First Ave., Chippewa Falls, WI 54729 715-723-1141
† Q.V.S., Inc., 20 North 15th St., East Orange, NJ 07017 201-673-3996
† Racal-Dana Instrs. Inc., 4 Goodyear St., Irvine, CA 92715 714-859-8999
RFL Inds., A Dowty Grp. Co./Instr. Div., Powerville Rd., Boonton, NJ 07005 201-334-3100
Scientific Columbus, Inc., Esterline Corp., 1900 Arlingate La., Columbus, OH 43228 614-274-7160
† Shokai Far East, Ltd., 280 North Central Ave., Hartsdale, NY 10530 914-681-0700
§ Shurite Meters, Inc., 577 Grand Ave., P.O. Box 1848, New Haven, CT 06508 203-624-1188
§ Simpson Elec. Co., 853 Dundee Ave., Elgin, IL 60120 312-697-2260
§ Spanta, Inc., Box 193, Franklin Lakes, NJ 07417 201-337-0044
§ Sperry, A. W., Instrs., P.O. Box 9300, Smithtown, NY 11787 516-231-7050
§ Square D Co., Executive Plaza, Palatine, IL 60067 312-397-2600
§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 215-673-5600
Texmate, Inc., 348 S. Cedros Ave., P.O. Box 2000, Solana Beach, CA 92075 619-481-7177
TIF Instrs., Inc., 9101 N.W. 7th Ave., Miami, FL 33150 305-757-8811
Valhalla Scientific, 9955 Mesa Rim Rd., San Diego, CA 92126 619-457-5576
Velonex, 560 Robert Ave., Santa Clara, CA 95050 408-727-7370
§ VIZ Test Equipment, Div. VIZ Mfg., 335 E. Price St., Philadelphia, PA 19144 215-844-2626
§ Westberg Mfg., Inc., 3400 Westach Way, Sonoma, CA 95476 707-938-2121
§ Western Electro. Mech. Co. Inc., 300 Broadway, Oakland, CA 94607 415-452-1936
§ Yokogawa Corp. of America, 2 Dart Rd., Shenandoah, GA 30265 404-253-7000

Meters, Ampere, DC-2900

§ Bell, F. W., Inc., 6120 Hanging Moss Rd., Orlando, FL 32807, 305-678-6900 .... D›1195
Datel, General Electric Co., 11 Cabot Blvd., Mansfield, MA 02048, 617-339-9341 .... D›1346
§ Digitec Corp., 918 Woodley Rd., P.O. Box 458, Dayton, OH 45401, 513-254-6251 .... D›1348
§ Electro Industries, Div. E.I. Elctrns., Inc., 1800 Shames Drive, Westbury, NY 11590, 516-334-0870 .... D›1350-1351
EMCO Inc., Box 368, Dublin, PA 18917, 215-249-3380 .... D›1352-1353
IET Labs, Inc., 534 Main St., Westbury, NY 11590, 516-334-5959 .... D›1242
Modutec, 18 Marshall St., Norwalk, CT 06854, 203-853-3636 .... D›1362-1363
§ NES, Inc. (Nationwide Electronic Systems), 3003 Wakefield, Carpentersville, IL 60110, 312-426-5900 .... D›1337
§ North American Soar Corp., 11126 Cornell Ave., Cherry Hill, NJ 08002, 609-488-1060 .... D›1263,1273-1274
Ohio Semitronics, Inc., 1205 Chesapeake Ave., Columbus, OH 43212, 614-486-9561 .... D›1287
Sensitive Research Instrs., 25 Dock St., Mt. Vernon, NY 10550, 914-699-9717 .... D›1304
† Shogyo Intl. Corp., 287 Northern Blvd., Great Neck, NY 11021, 516-466-0911 .... D›1376
Texmate, Inc., 348 S. Cedros Ave., P.O. Box 2000, Solana Beach, CA 92075, 619-481-7177 .... D›1373
§ Triplett Corp.-A Penril Co., One Triplett Dr., Bluffton, OH 45817-9987, 419-358-5015 .... D›1320,1380
§ API Instrs., 1601 Trapelo Rd., Waltham, MA 02254 617-890-2000
Ballantine Labs., 90 Fanny Rd., Boonton, NJ 07005 201-335-0900
Bartlett Instrument Co., 14th & Ave. "M', P.O. Box 445, Ft. Madison, IA 52627 319-372-8366
§ BBC-Metrawatt/Goerz, 2150 W. 6th Ave., Broomfield, CO 80020 .... 303-469-5231; 800-821-6327
§ Beckman Industrial Corp., Emerson Electric Co., 630 Puente Street, Brea, CA 92621 714-773-8111
Beede Electrical Instr. Co., S. Main St., Penacook, NH 03303 603-753-6362
Bluffton Products, Inc., Tegam, Inc., 7230 North Ridge Road, Madison, OH 44057 216-946-3572
§ Calibron Instrs., Burton-Rogers Co., 220 Grove St., Waltham, MA 02154 617-894-6440
Clarke-Hess Comm. Resch. Corp., 17 West 17th St., New York, NY 10011 212-255-2940
§† Columbia Elec. Mfg., 4519 Hamilton Ave. N.W., Cleveland, OH 44114 ... 216-361-8060
Cord Electronics, Inc., 177 Cantiague Rock Rd., Westbury, NY 11590 ... 516-935-3640
Crompton Instrs., 2763 Higgins Road, Elk Grove Village, IL 60007 714-841-2901
Crompton Instrs., Hawker Siddley, 2763 Old Higgins Rd., Elk Grove Village, IL 60007 312-593-1107
Datron Instrs., Inc., 3401 SW 42nd Ave., Stuart, FL 33497 305-283-0935
Dixson, Inc., Instrument Div., Box 1449, Grand Junction, CO 81502 303-242-8863
ECO Instrs. Div., Sea Data Corp., 1 Bridge St., Newton, MA 02158 617-964-8360
Electrical Instr. Svc., 25 Dock St., Mt. Vernon, NY 10550 914-699-9717
§ Epoch Enterprises, Ltd., 3541 N. Olive Rd., Tucson, AZ 85719 .... 602-887-1970; 888-5167
† Faria, Thomas G., Corp., P.O. Box 0983, Uncasville, CT 06382 203-848-9271
§ Fluke, John, Mfg. Co., Box C9090, MS 250C, Everett, WA 98206 206-356-5400
Greibach Instrs. Div., 25 Dock St., Mt. Vernon, NY 10550 914-699-9717
Halmar Electronics, Inc., 900 N. Hague Ave., Columbus, OH 43204 614-275-0131
† Hickok Elec. Instr., 10514 DuPont Ave., Cleveland, OH 44108 216-541-8060
† Ideal Precision Meter, 214 Franklin St., Brooklyn, NY 11222 212-383-6904
† Imtronics Inds., 11930 31st Ct., St. Petersburg, FL 33715 813-577-9010
§ Jewell Electrical Instrs., Grenier Field, Manchester, NH 03108 603-669-6400
§ Keithley Instrs., 28775 Aurora Rd., Cleveland, OH 44139 216-248-0400
† Millivac Instrs., Box 997, Curry Rd. Ext., Schenectady, NY 12301 518-355-8300
Multi-Amp Corp., TBG, 4271 Bronze Way, Dallas, TX 75237 214-333-3201
§ Newport Electronics, 630 E. Young St., Santa Ana, CA 92705 714-540-4914
Non-Linear Systems/Div. of Kaypro Corp., 533 Stevens Ave., Solana Bch., CA 92075 619-481-3900
Omega Engrg., Box 4047, Stamford, CT 06907 203-359-1660
§ Pacer Industries, Inc., 1450 First Ave., Chippewa Falls, WI 54729 715-723-1141
Racal-Dana Instrs. Inc., 4 Goodyear St., Irvine, CA 92715 714-859-8999
§ Shurite Meters, Inc., 577 Grand Ave., P.O. Box 1848, New Haven, CT 06508 203-624-1188
§ Simpson Elec. Co., 853 Dundee Ave., Elgin, IL 60120 312-697-2260
§ Spanta, Inc., Box 193, Franklin Lakes, NJ 07417 201-337-0044
§ Sperry, A. W., Instrs., P.O. Box 9300, Smithtown, NY 11787 516-231-7050
§ Square D Co., Executive Plaza, Palatine, IL 60067 312-397-2600
§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 215-673-5600
TIF Instrs., Inc., 9101 N.W. 7th Ave., Miami, FL 33150 305-757-8811
Valhalla Scientific, 9955 Mesa Rim Rd., San Diego, CA 92126 619-457-5576
Velonex, 560 Robert Ave., Santa Clara, CA 95050 408-727-7370
§ Westberg Mfg., Inc., 3400 Westach Way, Sonoma, CA 95476 707-938-2121
§ Yokogawa Corp. of America, 2 Dart Rd., Shenandoah, GA 30265 404-253-7000

Meters, Ampere, RF-2900

Sensitive Research Instrs., 25 Dock St., Mt. Vernon, NY 10550, 914-699-9717 .... D›1304
§ Simpson Elec. Co., 853 Dundee Ave., Elgin, IL 60120, 312-697-2260 ..... D›1377
§ API Instrs., 1601 Trapelo Rd., Waltham, MA 02254 617-890-2000
§ Ballantine Labs., 90 Fanny Rd., Boonton, NJ 07005 201-335-0900
§ Bartlett Instrument Co., 14th & Ave. "M', P.O. Box 445, Ft. Madison, IA 52627 319-372-8366
Cord Electronics, Inc., 177 Cantiague Rock Rd., Westbury, NY 11590 ... 516-935-3640
Electrical Instr. Svc., 25 Dock St., Mt. Vernon, NY 10550 914-699-9717
§ Fluke, John, Mfg. Co., Box C9090, MS 250C, Everett, WA 98206 206-356-5400
§ Greibach Instrs. Div., 25 Dock St., Mt. Vernon, NY 10550 914-699-9717
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Ofl.
Hipotronics, P.O. Drawer A, Brewster, NY 10509 914-279-8091

† Ideal Precision Meter, 214 Franklin St., Brooklyn, NY 11222 212-383-6904
Larson Instr., Greenbush Rd., Orangeburg, NY 10962 914-359-3800
§ Modutec, 18 Marshall St., Norwalk, CT 06854 203-853-3636
† Q.V.S., Inc., 20 North 15th St., East Orange, NJ 07017 201-673-3996
† Racal-Dana Instrs. Inc., 4 Goodyear St., Irvine, CA 92715 714-859-8999
Shogyo Intl. Corp., 287 Northern Blvd., Great Neck, NY 11021 516-466-0911
§ Shokai Far East, Ltd., 280 North Central Ave., Hartsdale, NY 10530 914-681-0700
§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 215-673-5600
Texmate, Inc., 348 S. Cedros Ave., P.O. Box 2000, Solana Beach, CA 92075 619-481-7177
§ Triplett Corp.-A Penril Co., One Triplett Dr., Bluffton, OH 45817-9987 419-358-5015

Meters, Ampere, True RMS-2900

Clarke-Hess Comm. Resch. Corp., 17 West 17th St., New York, NY 10011, 212-255-2940 .... D•1200
§ Electro Industries, Div. E.I. Elctrns., Inc., 1800 Shames Drive, Westbury, NY 11590, 516-334-0870 .... D•1350
IET Labs, Inc., 534 Main St., Westbury, NY 11590, 516-334-5959 .... D•1242
§ NES, Inc. (Nationwide Electronic Systems), 3003 Wakefield, Carpentersville, IL 60110, 312-426-5900 .... D•1367
§ North American Soar Corp., 11126 Cornell Ave., Cherry Hill, NJ 08002, 609-488-1060 .... D•1268,1274
§ Simpson Elec. Co., 853 Dundee Ave., Elgin, IL 60120, 312-697-2260 .... D•1377
Texmate, Inc., 348 S. Cedros Ave., P.O. Box 2000, Solana Beach, CA 92075, 619-481-7177 .... D•1378
§ Triplett Corp.-A Penril Co., One Triplett Dr., Bluffton, OH 45817-9987, 419-358-5015 .... D•1320
§ AEMC, 99 Chauncy, Boston, MA 02111 .... 617-451-0227;800-343-1391
ARGA Controls, 35 E. Glenarm St., Pasadena, CA 91105 213-682-3314
§ Ballantine Labs., 90 Fanny Rd., Boonton, NJ 07005 201-335-0900
§ Bartlett Instrument Co., 14th & Ave. "M', P.O. Box 445, Ft. Madison, IA 52627 319-372-8366
§ BBC-Metrawatt/Goerz, 2150 W. 6th Ave., Broomfield, CO 80020 .... 303-469-5231; 800-821-6327
§ Beckman Industrial Corp., Emerson Electric Co., 630 Puente Street, Brea, CA 92621 714-773-8111
§ Beede Electrical Instr. Co., S. Main St., Penacook, NH 03303 603-753-6362
Bluffton Products, Inc., Tegam, Inc., 7230 North Ridge Road, Madison, OH 44057 216-946-3572
§† Columbia Elec. Mfg., 4519 Hamilton Ave. N.W., Cleveland, OH 44114 216-361-8060
Continental Resources, Inc., 175 Middlesex Tpke., Bedford, MA 01730 617-275-0850
Crompton Instrs., 2763 Higgins Road, Elk Grove Village, IL 60007 714-841-2901
Crompton Instrs., Hawker Siddley, 2763 Old Higgins Rd., Elk Grove Village, IL 60007 312-593-1107
§† Data Precision Corp., Electronics Ave., Danvers, MA 01923 617-246-1600
§ Data Tech, Div. of Penril Corp., 3110 W. Segerstrom, Santa Ana, CA 92704 714-546-7160
Datron Instrs., Inc., 3401 SW 42nd Ave., Stuart, FL 33497 305-283-0935
§ Digitec Corp., 918 Woodley Rd., P.O. Box 458, Dayton, OH 45401 513-254-6251
Dranetz Technologies, Inc, Computer Products Division, 1000 New Durham Rd., P.O. Box 4019, Edison, NJ 08818-4019 201-287-3680
Dranetz Technologies, Inc., Industrial Products Division, 1000 New Durham Rd., P.O. Box 4019, Edison, NJ 08818-4019 201-287-3680
Electrical Instr. Svc., 25 Dock St., Mt. Vernon, NY 10550 914-699-9717
§ Epoch Enterprises, Ltd., 3541 N. Olive Rd., Tucson, AZ 85719 .... 602-887-1970; 888-5167
Esterline Angus Instr. Corp., Box 24000, Indianapolis, IN 46224 317-244-7611
§ Fluke, John, Mfg. Co., Box C9090, MS 250C, Everett, WA 98206 206-356-5400
§ Greibach Instrs. Div., 25 Dock St., Mt. Vernon, NY 10550 914-699-9717
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
§ Jewell Electrical Instrs., Grenier Field, Manchester, NH 03108 603-669-6400
§ Keithley Instrs., 28775 Aurora Rd., Cleveland, OH 44139 216-248-0400
Larson Instr., Greenbush Rd., Orangeburg, NY 10962 914-359-3800
§ Newport Electronics, 630 E. Young St., Santa Ana, CA 92705 714-540-4914
§ Non-Linear Systems/Div. of Kaypro Corp., 533 Stevens Ave., Solana Bch., CA 92075 619-481-3900
Ohio Semitronics, Inc., 1205 Chesapeake Ave., Columbus, OH 43212 614-486-9561
§ Pacer Industries, Inc., 1450 First Ave., Chippewa Falls, WI 54729 715-723-1141
PPM, Inc., 4521 Emery Ind. Pkwy., Cleveland, OH 44128 216-292-6006
Q.V.S., Inc., 20 North 15th St., East Orange, NJ 07017 201-673-3996
† Racal-Dana Instrs. Inc., 4 Goodyear St., Irvine, CA 92715 714-859-8999
RFL Inds., A Dowty Grp. Co./Instr. Div., Powerville Rd., Boonton, NJ 07005 201-334-3100
Scientific Columbus, Inc., Esterline Corp., 1900 Arlingate La., Columbus, OH 43228 614-274-7160
Sensitive Research Instrs., 25 Dock St., Mt. Vernon, NY 10550 914-699-9717
† Shokai Far East, Ltd., 280 North Central Ave., Hartsdale, NY 10530 914-681-0700
§ Spanta, Inc., Box 193, Franklin Lakes, NJ 07417 201-337-0044
§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 215-673-5600
Telco Products Co., 44 Sea Cliff, Glen Cove, NY 11542 516-759-0300
TIF Instrs., Inc., 9101 N.W. 7th Ave., Miami, FL 33150 305-757-8811
Valhalla Scientific, 9955 Mesa Rim Rd., San Diego, CA 92126 619-457-5576
§ Yokogawa Corp. of America, 2 Dart Rd., Shenandoah, GA 30265 404-253-7000

Meters, Ampere Hour-2900

Curtis Instrs., Inc., 200 Kisco Ave., Mt. Kisco, NY 10549, 914-666-2971 .. D•1117
Ohio Semitronics, Inc., 1205 Chesapeake Ave., Columbus, OH 43212, 614-486-9561 .... D•1287
A & D Elec. Instrs., 73-07 88th St., Glendale, NY 11385 718-275-6516
§ BBC-Metrawatt/Goerz, 2150 W. 6th Ave., Broomfield, CO 80020 .... 303-469-5231; 800-821-6327
Bluffton Products, Inc., Tegam, Inc., 7230 North Ridge Road, Madison, OH 44057 216-946-3572
§ Dynatronix, Inc., 105 Power St., Amery, WI 54001 .... 715-268-8118;800-826-7172
ECO Instrs. Div., Sea Data Corp., 1 Bridge St., Newton, MA 02158 617-964-8360
† Engelhard Corp., 70 Wood Ave. S., Iselin, NJ 08830 201-321-5900
Halmar Electronics, Inc., 900 N. Hague Ave., Columbus, OH 43204 614-275-0131
HBS Equipment Div., 3000 Supply Ave., Los Angeles, CA 90040 213-726-3033
§ IVEK Corp., 43 School St., N. Springfield, VT 05150 802-886-8278
§ NES, Inc. (Nationwide Electronic Systems), 3003 Wakefield, Carpentersville, IL 60110 312-426-5900
North Hills Elctrns., 1 Alexander Pl., Glen Cove, NY 11542 516-671-5700
† Racal-Dana Instrs. Inc., 4 Goodyear St., Irvine, CA 92715 714-859-8999
† Technic, Inc., Box 965, Providence, RI 02901 401-781-6100
TIF Instrs., Inc., 9101 N.W. 7th Ave., Miami, FL 33150 305-757-8811
Valhalla Scientific, 9955 Mesa Rim Rd., San Diego, CA 92126 619-457-5576
§ Westberg Mfg., Inc., 3400 Westach Way, Sonoma, CA 95476 707-938-2121

Meters, Attenuation-2900

Beede Electrical Instr. Co., S. Main St., Penacook, NH 03303 603-753-6362
† Cushman Elctrns., 2450 N. 1st St., San Jose, CA 95131 408-263-8100
§ Eaton Corp., Elctrn. Instrmn. Div., 5340 Alla Rd., Los Angeles, CA 90066
Genstar Rental Elctrns., 2445 Faber Pl., Palo Alto, CA 94303 415-856-7600
§† Harris Corp., PRD Elctrns. Div., 6801 Jericho Tpke., Syosset, NY 11791 516-364-0400
Maury Microwave, 8610 Helms Ave., Cucamonga, CA 91730 714-987-4715
† Microlab/FXR, 10 Microlab Rd., Livingston, NJ 07039 201-992-7700
† Narda Microwave Corp., 435 Moreland Rd., Hauppauge, NY 11788 516-231-1700
† Q.V.S., Inc., 20 North 15th St., East Orange, NJ 07017 201-673-3996
Racal-Dana Instrs. Inc., 4 Goodyear St., Irvine, CA 92715 714-859-8999
Weinschel Engrg., One Weinschel La., Gaithersburg, MD 20877 .... 301-948-3434; 800-638-2048

Meters, Audio Level-2900

IET Labs, Inc., 534 Main St., Westbury, NY 11590, 516-334-5959 .... D•1242
Jennings, 970 McLaughlin Ave., San Jose, CA 95122, 408-292-4025 .... D•1251
MARCONI INSTRUMENTS, 3 Pearl Court, Allendale, NJ 07401, 201-934-9050 .... D•1264
† Shogyo Intl. Corp., 287 Northern Blvd., Great Neck, NY 11021, 516-466-0911 .... D•1376
§ Shokai Far East, Ltd., 280 North Central Ave., Hartsdale, NY 10530, 914-681-0700 .... D•1039
A & D Elec. Instrs., 73-07 88th St., Glendale, NY 11385 718-275-6516
§ AEMC, 99 Chauncy, Boston, MA 02111 .... 617-451-0227;800-343-1391
§ API Instrs., 1601 Trapelo Rd., Waltham, MA 02254 617-890-2000
§ Ballantine Labs., 90 Fanny Rd., Boonton, NJ 07005 201-335-0900
§ Bartlett Instrument Co., 14th & Ave. "M', P.O. Box 445, Ft. Madison, IA 52627 319-372-8366
Beede Electrical Instr. Co., S. Main St., Penacook, NH 03303 603-753-6362
Bluffton Products, Inc., Tegam, Inc., 7230 North Ridge Road, Madison, OH 44057 216-946-3572
Bruel & Kjaer Instrs. Inc., 185 Forest St., Marlboro, MA 01752 617-481-7000
§† Columbia Resch. Labs., Macdade Blvd. & Bullens La., Woodlyn, PA 19094 215-532-9464
Cord Electronics, Inc., 177 Cantiague Rock Rd., Westbury, NY 11590 516-935-3640
Crompton Instrs., 2763 Higgins Road, Elk Grove Village, IL 60007 714-841-2901
Crompton Instrs., Hawker Siddley, 2763 Old Higgins Rd., Elk Grove Village, IL 60007 312-593-1107
§ Digitec Corp., 918 Woodley Rd., P.O. Box 458, Dayton, OH 45401 513-254-6251
Dixson, Inc., Instrument Div., Box 1449, Grand Junction, CO 81502 303-242-8863
§ Electrodata, Inc., 23020 Miles Rd., Bedford Heights, OH 44128 216-663-3333
Electro-Dynamics Dev. Co., 475 Mt. Hood Dr. S.W., Issaquah, WA 98027 206-392-2493
§ Electro Industries, Div. E.I. Elctrns., Inc., 1800 Shames Drive, Westbury, NY 11590 516-334-0870
Electronic Wattmeter Co., 2275 Sixth St., Sarasota, FL 33577 813-953-5355
§ ESE, 142 Sierra St., El Segundo, CA 90245 213-322-2136
§ GC Elctrns., 400 S. Wyman St., Rockford, IL 61101 815-968-9661
† Ideal Precision Meter, 214 Franklin St., Brooklyn, NY 11222 212-383-6904
§ International Instruments, General Resistance, Inc., Twin Lakes Rd, P.O. Box 185, N. Branford, CT 06471 203-481-3450
Modular Audio Prods., Modular Devices Inc., 50 Orville Dr., Bohemia, NY 11716 516-567-9620
Modutec, 18 Marshall St., Norwalk, CT 06854 203-853-3636
† Q.V.S., Inc., 20 North 15th St., East Orange, NJ 07017 201-673-3996
§ Ramko Resch., Inc., 11355A Folsom Blvd., Rancho Cordova, CA 95670 800-821-2545
Selco Products Co., SEL Sales, Inc., 7580 Stage Rd., Buena Park, CA 90621 714-521-8673
§ Shurite Meters, Inc., 577 Grand Ave., P.O. Box 1848, New Haven, CT 06508 203-624-1188
§ Simpson Elec. Co., 853 Dundee Ave., Elgin, IL 60120 312-697-2260
§ Triplett Corp.-A Penril Co., One Triplett Dr., Bluffton, OH 45817-9987 419-358-5015
§ Tucker Elctrns., Box 461966, Garland, TX 75046 .... 214-348-8800;800-527-4642
§ Yokogawa Corp. of America, 2 Dart Rd., Shenandoah, GA 30265 404-253-7000

Meters, Bar Graph-2950

Bowmar/ALI, Bowmar Instr. Corp., 531 Main St., Acton, MA 01720, 617-263-8365 .... D•1331-1333
Dixson, Inc., Instrument Div., Box 1449, Grand Junction, CO 81502, 303-242-8863 .... D•1349
International Instruments, General Resistance, Inc., Twin Lakes Rd, P.O. Box 185, N. Branford, CT 06471, 203-481-3450 .... D•1357
§ Modutec, 18 Marshall St., Norwalk, CT 06854, 203-853-3636 .... D•1363
§ Simpson Elec. Co., 853 Dundee Ave., Elgin, IL 60120, 312-697-2260 .... D•1377
Texmate, Inc., 348 S. Cedros Ave., P.O. Box 2000, Solana Beach, CA 92075, 619-481-7177 .... D•1378
Crompton Instrs., 2763 Higgins Road, Elk Grove Village, IL 60007 714-841-2901
Crompton Instrs., Hawker Siddley, 2763 Old Higgins Rd., Elk Grove Village, IL 60007 312-593-1107
Modular Audio Prods., Modular Devices Inc., 50 Orville Dr., Bohemia, NY 11716 516-567-9620

Sensotec, Inc., 1200 Chesapeake Ave., Columbus, OH 43212 614-486-7723
§ Square D Co., Executive Plaza, Palatine, IL 60067 312-397-2600
§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 215-673-5600
§ Triplett Corp.-A Penril Co., One Triplett Dr., Bluffton, OH 45817-9987 419-358-5015

Meters, Battery Capacity-2900

§ Epic, Inc., 150 Nassau St., New York, NY 10038 212-349-2470

Meters, Capacitance, Inductance-2900

IET Labs, Inc., 534 Main St., Westbury, NY 11590, 516-334-5959 ... D•1242,1245
§ North American Soar Corp., 11126 Cornell Ave., Cherry Hill, NJ 08002, 609-488-1060 .... D•1273-1274
RE Instruments Corp., 31029 Center Ridge Rd., Westlake, OH 44145, 216-871-7617 .... D•1295
Tettex Instruments, Inc., P.O. Box 281, Fairview Village, PA 19409-0281, 215-539-6050 .... D•1312
§ AEMC, 99 Chauncy, Boston, MA 02111 .... 617-451-0227;800-343-1391
Alpha Comps., 115 Eucalyptus Dr., El Segundo, CA 90245 213-322-7780
Amprobe Instr., 630 Merrick Rd., Lynbrook, NY 11563 .... 516-LY3-5600
Andeen-Hagerling, Inc., 31899 Miles Road, Chagrin Falls, OH 44022 216-349-0370
§ B & K Precision, Industrial Electronics Product Group, Dynascan Corporation, 6460 W. Cortland, Chicago, IL 60635 312-889-9087
§ BBC-Metrawatt/Goerz, 2150 W. 6th Ave., Broomfield, CO 80020 .... 303-469-5231; 800-821-6327
Boonton Elctrns. Corp., 791 Route 10, Randolph, NJ 07869 201-584-1077
Clarke-Hess Comm. Resch. Corp., 17 West 17th St., New York, NY 10011 212-255-2940
§† Data Precision Corp., Electronics Ave., Danvers, MA 01923 617-246-1600
Electro Scientific Inds., 13900 N.W. Science Pk. Dr., Portland, OR 97229 503-641-4141
Fast Feedback Technologies, 1505 Aviation Blvd., Redoudo Beach, CA 90278 213-379-6100
Federal Pacific, Reliance Electric, P. O. Box 99502, Cleveland, OH 44199 .... 800-245-4501;in OH 800-245-4497
Genstar Rental Elctrns., 2445 Faber Pl., Palo Alto, CA 94303 415-856-7600
Hameg, Inc., 88-90 Harbor Rd., Port Washington, NY 11050 516-883-3837
§ Harris Corp., Dracon Div., 809 Calle Plano, Camarillo, CA 93010 805-987-9511
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
Hickok Elec. Instr., 10514 DuPont Ave., Cleveland, OH 44108 216-541-8060
International Instrumentation, 31131-602 Via Colinas, Westlake Vlg., CA 91362 213-991-9614
MSI Electronics, Inc., 34-32 57th St., Woodside, NY 11377 212-672-6500
§ Non-Linear Systems/Div. of Kaypro Corp., 533 Stevens Ave., Solana Bch., CA 92075 619-481-3900
Penn Airborne Prods., Industrial Hwy., Southampton, PA 18966 215-355-3400
† Racal-Dana Instrs. Inc., 4 Goodyear St., Irvine, CA 92715 714-859-8999
Reliance Electric Co., Marketing Info Center, P.O. Box 99502, Cleveland, OH 44199 .... 800-245-4501;800-245-4497 In Ohio
Sencore, 3200 Sencore Dr., Sioux Falls, SD 57107 605-339-0100
Shogyo Intl. Corp., 287 Northern Blvd., Great Neck, NY 11021 516-466-0911
§ Spanta, Inc., Box 193, Franklin Lakes, NJ 07417 201-337-0044
Sprague Electric Company, Distribution Division, 481 Marshall St., No. Adams, MA 01247 413-664-4481
§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 215-673-5600
§ Tucker Elctrns., Box 461966, Garland, TX 75046 .... 214-348-8800;800-527-4642
Wayne Kerr, Inc., W.K.R. Ltd., 400 West Cummings Pk., Woburn, MA 01801 617-938-8390

Meters, Clamp-on-2900

§ North American Soar Corp., 11126 Cornell Ave., Cherry Hill, NJ 08002, 609-488-1060 .... D•1268,1278
§ Simpson Elec. Co., 853 Dundee Ave., Elgin, IL 60120, 312-697-2260 ..... D•1308
Triac Electronic Systems, Inc., 87-27 Myrtle Ave., Glendale, NY 11385, 718-441-4759 .... D•1132
§ AEMC, 99 Chauncy, Boston, MA 02111 .... 617-451-0227;800-343-1391
† Amprobe Instr., 630 Merrick Rd., Lynbrook, NY 11563 .... 516-LY3-5600
§ BBC-Metrawatt/Goerz, 2150 W. 6th Ave., Broomfield, CO 80020 .... 303-469-5231; 800-821-6327
§ Bell, F. W., Inc., 6120 Hanging Moss Rd., Orlando, FL 32807 305-678-6900
§ Biddle Instruments, A Thorn EMI Co., 510 Township Line Rd., Blue Bell, PA 19422 215-646-9200
Bluffton Products, Inc., Tegam, Inc., 7230 North Ridge Road, Madison, OH 44057 216-946-3572
§† Columbia Elec. Mfg., 4519 Hamilton Ave. N.W., Cleveland, OH 44114 216-361-8060
Crompton Instrs., 2763 Higgins Road, Elk Grove Village, IL 60007 714-841-2901
Crompton Instrs., Hawker Siddley, 2763 Old Higgins Rd., Elk Grove Village, IL 60007 312-593-1107
Dranetz Technologies, Inc., Computer Products Division, 1000 New Durham Rd., P.O. Box 4019, Edison, NJ 08818-4019 201-287-3680
Dranetz Technologies, Inc., Industrial Products Division, 1000 New Durham Rd., P.O. Box 4019, Edison, NJ 08818-4019 201-287-3680
§ Esterline Angus Instr. Corp., Box 24000, Indianapolis, IN 46224 317-244-7611
§ Fluke, John, Mfg. Co., Box C9090, MS 250C, Everett, WA 98206 206-356-5400
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
Jonard Industries Corp., 134 Marbledale Rd., Tuckahoe, NY 10707 914-793-0700
L-Com Inc., 1755 Osgood St., Unit 11EM, N. Andover, MA 01845 617-682-6936
§† Modutec, 18 Marshall St., Norwalk, CT 06854 203-853-3636
§ NES, Inc. (Nationwide Electronic Systems), 3003 Wakefield, Carpentersville, IL 60110 312-426-5900
Ohio Semitronics, Inc., 1205 Chesapeake Ave., Columbus, OH 43212 ... 614-486-9561
§ Pacer Industries, Inc., 1450 First Ave., Chippewa Falls, WI 54729 715-723-1141
§ PrimeLine-Soltec Distbn., Soltec Corp., P.O. Box 818, Sun Valley, CA 91353-0818 .... 800-525-5554;818-764-5400
§ Spanta, Inc., Box 193, Franklin Lakes, NJ 07417 201-337-0044
§ Sperry, A. W., Instrs., P.O. Box 9300, Smithtown, NY 11787 516-231-7050
§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 215-673-5600
§ Techni-Tool, 5 Apollo Rd., Box 368, Plymouth Meeting, PA 19462 215-825-4990
TIF Instrs., Inc., 9101 N.W. 7th Ave., Miami, FL 33150 305-757-8811
§ Triplett Corp.-A Penril Co., One Triplett Dr., Bluffton, OH 45817-9987 419-358-5015
§ VIZ Test Equipment, Div. VIZ Mfg., 335 E. Price St., Philadelphia, PA 19144 215-844-2626
§ Western Electro. Mech. Co. Inc., 300 Broadway, Oakland, CA 94607 415-452-1936
§ Yokogawa Corp. of America, 2 Dart Rd., Shenandoah, GA 30265 404-253-7000

Meters, Conductance-2900

IET Labs, Inc., 534 Main St., Westbury, NY 11590, 516-334-5959 .... D•1242
Andeen-Hagerling, Inc., 31899 Miles Road, Chagrin Falls, OH 44022 216-349-0370
Beckman Industrial Corp., Cedar Grove Div., 89 Commerce Rd., Cedar Grove, NJ 07009 201-239-6200
Electro Scientific Inds., 13900 N.W. Science Pk. Dr., Portland, OR 97229 503-641-4141
§ Fluke, John, Mfg. Co., Box C9090, MS 250C, Everett, WA 98206 206-356-5400
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
Lab-Line Instrs., 15th & Bloomingdale, Melrose Park, IL 60160 312-450-2600
Leeds & Northrup Instrs., A Unit of General Signal Corp., Sumneytown Pike, North Wales, PA 19454 215-643-2000
§ NES, Inc. (Nationwide Electronic Systems), 3003 Wakefield, Carpentersville, IL 60110 312-426-5900
§ Non-Linear Systems/Div. of Kaypro Corp., 533 Stevens Ave., Solana Bch., CA 92075 619-481-3900
† Racal-Dana Instrs. Inc., 4 Goodyear St., Irvine, CA 92715 714-859-8999
§ Spanta, Inc., Box 193, Franklin Lakes, NJ 07417 201-337-0044
Wayne Kerr, Inc., W.K.R. Ltd., 400 West Cummings Pk., Woburn, MA 01801 617-938-8390
Yellow Springs Instr., Box 279, Yellow Springs, OH 45387 513-767-7241

Meters, Counting Rate, Nuclear-2900

§ Capintec Instrs., 6 Arrow Rd., Ramsey, NJ 07446 201-825-9500
§ Electro Industries, Div. E.I. Elctrns., Inc., 1800 Shames Drive, Westbury, NY 11590 516-334-0870
§ Gralex Inds., 295 Community Dr., Great Neck, NY 11021 .. 516-487-7289;800-645-6535
† Nuclear Resch. Corp., 125 Titus Ave., Warrington, PA 18976 215-343-5900
§ Tennelec, 601 Turnpike, Oak Ridge, TN 37830 615-483-8405

Meters, Decibel Indicating-2900

IET Labs, Inc., 534 Main St., Westbury, NY 11590, 516-334-5959 ... D•1242,1245
Photodyne, 1175 Tourmaline Dr., Newbury Park, CA 91320, 818-889-8770 .... B•1122
Shogyo Intl. Corp., 287 Northern Blvd., Great Neck, NY 11021, 516-466-0911 .... D•1376
§ Triplett Corp.-A Penril Co., One Triplett Dr., Bluffton, OH 45817-9987, 419-358-5015 .... D•1380
A & D Elec. Instrs., 73-07 88th St., Glendale, NY 11385 718-275-6516
Amber Electro Design Inc., 4810 Jean Talon Blvd. W Ste 321, Montreal, Quebec, CANADA H4P2N5 514-735-4105
§ API Instrs., 1601 Trapelo Rd., Waltham, MA 02254 617-890-2000
§ AQ Sys., 1736 Front St., Yorktown Hgts., NY 10598 800-431-2104
§ Ballantine Labs., 90 Fanny Rd., Boonton, NJ 07005 201-335-0900
§ Bartlett Instrument Co., 14th & Ave. "M", P.O. Box 445, Ft. Madison, IA 52627 319-372-8366
Beede Electrical Instr. Co., S. Main St., Penacook, NH 03303 603-753-6362
Bluffton Products, Inc., Tegam, Inc., 7230 North Ridge Road, Madison, OH 44057 216-946-3572
Boonton Elctrns. Corp., 791 Route 10, Randolph, NJ 07869 201-584-1077
Bruel & Kjaer Instrs. Inc., 185 Forest St., Marlboro, MA 01752 617-481-7000
Chesterfield Prods., 37 Midland Ave., Elmwood Park, NJ 07407 201-797-9655
Continental Resources, Inc., 175 Middlesex Tpke., Bedford, MA 01730 .. 617-275-0850
Cord Electronics, Inc., 177 Cantiague Rock Rd., Westbury, NY 11590 ... 516-935-3640
Crompton Instrs., Hawker Siddley, 2763 Old Higgins Rd., Elk Grove Village, IL 60007 312-593-1107
§ Digitec Corp., 918 Woodley Rd., P.O. Box 458, Dayton, OH 45401 513-254-6251
§† Digitech Industries, Inc., 66 Grove St., Ridgefield, CT 06877 203-438-3731
Dixson, Inc., Instrument Div., Box 1449, Grand Junction, CO 81502 303-242-8863
§ Electrodata, Inc., 23020 Miles Rd., Bedford Heights, OH 44128 216-663-3333
Electro-Dynamics Dev. Co., 475 Mt. Hood Dr. S.W., Issaquah, WA 98027 206-392-2493
EMICO Inc., Box 368, Dublin, PA 18917 215-249-9330
§ Fluke, John, Mfg. Co., Box C9090, MS 250C, Everett, WA 98206 206-356-5400
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
† Ideal Precision Meter, 214 Franklin St., Brooklyn, NY 11222 212-383-6904
§ International Instruments, General Resistance, Inc., Twin Lakes Rd, P.O. Box 185, N. Branford, CT 06471 203-481-3450
Modular Audio Prods., Modular Devices Inc., 50 Orville Dr., Bohemia, NY 11716 516-567-9620
Modutec, 18 Marshall St., Norwalk, CT 06854 203-853-3636
† Q.V.S., Inc., 20 North 15th St., East Orange, NJ 07017 201-673-3996
† Racal-Dana Instrs. Inc., 4 Goodyear St., Irvine, CA 92715 714-859-8999
§ REI Sls., 19525 Business Centre Dr., Northridge, CA 91324 617-938-0900
§ Shokai Far East, Ltd., 280 North Central Ave., Hartsdale, NY 10530 914-681-0700
§ Simpson Elec. Co., 853 Dundee Ave., Elgin, IL 60120 312-697-2260
§ Spanta, Inc., Box 193, Franklin Lakes, NJ 07417 201-337-0044
§ Sperry, A. W., Instrs., P.O. Box 9300, Smithtown, NY 11787 516-231-7050
§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 215-673-5600
§ Techni-Tool, 5 Apollo Rd., Box 368, Plymouth Meeting, PA 19462 215-825-4990
Texscan Instruments, 3169 N. Shadeland, Indianapolis, IN 46226 317-545-4196
§ Wiltron, 805 E. Middlefield Rd., P.O. Box 7290, Mountain View, CA 94042-7290 415-969-6500

Meters, Deviation-2900

§ API Instrs., 1601 Trapelo Rd., Waltham, MA 02254 617-890-2000
† Astronautics Corporation of America, P.O. Box 523, Milwaukee, WI 53201-0523 414-447-8200

Meters, Deviation-2900 (Cont'd)

Beede Electrical Instr. Co., S. Main St, Penacook, NH 03303 603-753-6362
† Electronic Dev. Corp., 11 Hamlin St., Boston, MA 02127-4198 617-268-9696
† Imtronics Inds., 11930 31st Ct, St. Petersburg, FL 33715 813-577-9010
§ NES, Inc. (Nationwide Electronic Systems), 3003 Wakefield, Carpentersville, IL 60110 312-426-5900
† Racal-Dana Instrs. Inc., 4 Goodyear St, Irvine, CA 92715 714-859-8999
RE Instruments Corp., 31029 Center Ridge Rd., Westlake, OH 44145 216-871-7617
§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 215-673-5600

Meters, Digital ESR-2900

Clarke-Hess Comm. Resch. Corp., 17 West 17th St., New York, NY 10011, 212-255-2940 .... D◦1200
Datel, General Electric Co., 11 Cabot Blvd., Mansfield, MA 02048 617-339-9341
Electro Scientific Inds., 13900 N.W. Science Pk. Dr., Portland, OR 97229 503-641-4141
§ International Instruments, General Resistance, Inc., Twin Lakes Rd, P.O. Box 185, N. Branford, CT 06471 203-481-3450

Meters, Digital, 2-wire, 4-20 mA Current Loop-2950

Dio-Rey, Div. of Info-Lite, 422 Cliff St., Fairview, NJ 07022, 201-941-4455 .... B◦1044
Kurz Instruments, Inc., P.O. Box 849, Carmel Valley, CA 93924, 800-424-7356 .... B◦1800
NES, Inc. (Nationwide Electronic Systems), 3003 Wakefield, Carpentersville, IL 60110, 312-426-5900 .... D◦1367
Texmate, Inc., 348 S. Cedros Ave., P.O. Box 2000, Solana Beach, CA 92075, 619-481-7177 .... D◦1378
Biddle Instruments, A Thorn EMI Co., 510 Township Line Rd., Blue Bell, PA 19422 215-646-9200
DCI Inc., 14812 W. 117th Street, P.O. Box 215, Olathe, KS 66061 913-782-5672
§ Electro-Numerics, 1811 Reynolds, Irvine, CA 92714 714-250-1501
Entran Devices, 10 Washington Ave., Fairfield, NJ 07006 201-227-1002
International Instruments, General Resistance, Inc., Twin Lakes Rd, P.O. Box 185, N. Branford, CT 06471 203-481-3450
Martel Elctrns. Corp., 13 Heritage Hill Rd., Windham, NH 03087 .... 800-821-0023; 617-275-5970
§ Modutec, 18 Marshall St., Norwalk, CT 06854 203-853-3636
§ Newport Electronics, 630 E. Young St., Santa Ana, CA 92705 714-540-4914
Omega Engrg., Box 4047, Stamford, CT 06907 203-359-1660
§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 215-673-5600
Validyne Engrg. Corp., 8626 Wilbur Ave., Northridge, CA 91324 818-886-2057
Yellow Springs Instr., Box 279, Yellow Springs, OH 45387 513-767-7241

Meters, Distortion & Noise-2900

Amber Electro Design Inc., 4810 Jean Talon Blvd. W Ste 321, Montreal, Quebec, CANADA H4P2N5 514-735-4105
Atlantic Research, 5390 Cherokee Ave., Alexandria, VA 22312 703-642-4000
Bruel & Kjaer Instrs. Inc., 185 Forest St, Marlboro, MA 01752 617-481-7000
† Cushman Elctrns., 2450 N. 1st St., San Jose, CA 95131 408-263-8100
Eitel Mfg., 2835 Laguna Canyon Rd., Laguna Beach, CA 92652 714-494-2012
Genstar Rental Elctrns., 2445 Faber Pl., Palo Alto, CA 94303 415-856-7600
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
IET Labs, Inc., 534 Main St., Westbury, NY 11590 516-334-5959
Krohn-Hite Corp., Avon Indl. Pk., Bodwell St., Avon, MA 02322 617-580-1660
MARCONI INSTRUMENTS, 3 Pearl Court, Allendale, NJ 07401 201-934-9050
† Racal-Dana Instrs. Inc., 4 Goodyear St., Irvine, CA 92715 714-859-8999
RE Instruments Corp., 31029 Center Ridge Rd., Westlake, OH 44145 216-871-7617
§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 215-673-5600
§ Tucker Elctrns., Box 461966, Garland, TX 75046 .... 214-348-8800;800-527-4642

Meters, Edgewise-2950

Dixson, Inc., Instrument Div., Box 1449, Grand Junction, CO 81502, 303-242-8863 .... D◦1349
§ EMICO Inc., Box 368, Dublin, PA 18917, 215-249-9330 .... D◦1352
§† International Instruments, General Resistance, Inc., Twin Lakes Rd, P.O. Box 185, N. Branford, CT 06471, 203-481-3450 .... D◦1357
§ Jewell Electrical Instrs., Grenier Field, Manchester, NH 03108, 603-669-6400 .... D◦1359
§† Modutec, 18 Marshall St., Norwalk, CT 06854, 203-853-3636 .... D◦1362-1363
† Shogyo Intl. Corp., 287 Northern Blvd., Great Neck, NY 11021, 516-466-0911 .... D◦1376
§ Simpson Elec. Co., 853 Dundee Ave., Elgin, IL 60120, 312-697-2260 .... D◦1377
§ Triplett Corp.-A Penril Co., One Triplett Dr., Bluffton, OH 45817-9987, 419-358-5015 .... D◦1321,1381
A & D Elec. Instrs., 73-07 88th St., Glendale, NY 11385 718-275-6516
Airpax Corp., Ft. Lauderdale Div., 6801 W. Sunrise Blvd., Ft. Lauderdale, FL 33313 305-587-1100
§ API Instrs., 1601 Trapelo Rd., Waltham, MA 02254 617-890-2000
§ Beede Electrical Instr. Co., S. Main St., Penacook, NH 03303 603-753-6362
§ Calibron Instrs., Burton-Rogers Co., 220 Grove St., Waltham, MA 02154 617-894-6440
Cord Electronics, Inc., 177 Cantiague Rock Rd., Westbury, NY 11590 516-935-3640
Crompton Instrs., 2763 Higgins Road, Elk Grove Village, IL 60007 714-841-2901
Crompton Instrs., Hawker Siddley, 2763 Old Higgins Rd., Elk Grove Village, IL 60007 312-593-1107
§ Curtis Instrs., Inc., 200 Kisco Ave., Mt. Kisco, NY 10549 914-666-2971
Electrical Instr. Svc., 25 Dock St., Mt. Vernon, NY 10550 914-699-9717
§ GC Elctrns., 400 S. Wyman St., Rockford, IL 61101 815-968-9661
§ Greibach Instrs. Div., 25 Dock St., Mt. Vernon, NY 10550 914-699-9717
Ideal Precision Meter, 214 Franklin St., Brooklyn, NY 11222 212-383-6904
† Imtronics Inds., 11930 31st Ct., St. Petersburg, FL 33715 813-577-9010
§ Larson Instr., Greenbush Rd., Orangeburg, NY 10962 914-359-3800
LFE, Process Control Div., 55 Green St., Clinton, MA 01510 617-835-1000
§ Newport Electronics, 630 E. Young St., Santa Ana, CA 92705 714-540-4914
§ Non-Linear Systems/Div. of Kaypro Corp., 533 Stevens Ave., Solana Bch., CA 92075 619-481-3900
Sensitive Research Instrs., 25 Dock St., Mt. Vernon, NY 10550 914-699-9717
§ Shokai Far East, Ltd., 280 North Central Ave., Hartsdale, NY 10530 914-681-0700
§ Shurite Meters, Inc., 577 Grand Ave., P.O. Box 1848, New Haven, CT 06508 203-624-1188
Sigma Instrs., Intl. Instr. Div., 88 Marsh Hill Rd., Orange, CT 06477 203-795-4711
§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 215-673-5600

Meters, Elapsed Time — See Indicators, Elapsed Time (Vol. D)

Meters, Electrometer-2900

Beckman Instrs., 2500 Harbor Blvd., Fullerton, CA 92634 714-871-4848
§ Capintec Instrs., 6 Arrow Rd., Ramsey, NJ 07446 201-825-9500
Chapman Corp., P.O. Box 10700, Portland, ME 04104 207-773-4726
Continental Resources, Inc., 175 Middlesex Tpke., Bedford, MA 01730 617-275-0850
ECO Instrs. Div., Sea Data Corp., 1 Bridge St., Newton, MA 02158 617-964-8360
Electrical Instr. Svc., 25 Dock St., Mt. Vernon, NY 10550 914-699-9717
Electron-Machine Corp., Box M, Umatilla, FL 32784 904-669-3101
§ International Instruments, General Resistance, Inc., Twin Lakes Rd, P.O. Box 185, N. Branford, CT 06471 203-481-3450
Jonard Industries Corp., 134 Marbledale Rd., Tuckahoe, NY 10707 914-793-0700
Keithley Instrs., 28775 Aurora Rd., Cleveland, OH 44139 216-248-0400
Pacific Instrs. Inc., 215 Mason Circle, Concord, CA 94518 415-827-9010
Sensitive Research Instrs., 25 Dock St., Mt. Vernon, NY 10550 914-699-9717
§ Simco Co., 2257 North Penn Rd., Hatfield, PA 19440 215-822-2171
§† Takeda Riken Co., Ltd., NS Bldg. 14th,4-1,Nishi-Shinjuku 2-Chome,Shinjuku-ku, Tokyo 160, Tokyo 176, JAPAN 03-342-7500
§ Yokogawa Corp. of America, 2 Dart Rd., Shenandoah, GA 30265 404-253-7000

Meters, EMC — See Meters, RFI (Vol. D)

Meters, FM Deviation-2900

Boonton Elctrns. Corp., 791 Route 10, Randolph, NJ 07869 201-584-1077
† Cushman Elctrns., 2450 N. 1st St., San Jose, CA 95131 408-263-8100
§ Heath Co., Benton Harbor, MI 49022 616-982-3886
MARCONI INSTRUMENTS, 3 Pearl Court, Allendale, NJ 07401 201-934-9050
† Racal-Dana Instrs. Inc., 4 Goodyear St., Irvine, CA 92715 714-859-8999
RE Instruments Corp., 31029 Center Ridge Rd., Westlake, OH 44145 216-871-7617
§ Tucker Elctrns., Box 461966, Garland, TX 75046 .... 214-348-8800;800-527-4642

Meters, Field Strength-2900

Amplifier Research, 160 School House Rd., Souderton, PA 18964-9990, 215-723-8181 .... D◦1003
Instruments for Industry, Inc., 151 Toledo St., Farmingdale, NY 11735, 516-694-1414 .... D◦1010
§ Bell, F. W., Inc., 6120 Hanging Moss Rd., Orlando, FL 32807 305-678-6900
Electric Field Measurements, Box 326, W. Stockbridge, MA 01266 413-637-1929
§† Electro-Metrics, Penril Corp., 100 Church St., Amsterdam, NY 12010 518-843-2600
† General Microwave Corp., 155 Marine St., Farmingdale, NY 11735 516-694-3600
Holaday Industries, Inc., 14825 Martin Drive, Eden Prairie, MN 55344 612-934-4920
LDJ Incorporated, 2200 Stephenson Hwy., P.O. Box 219, Troy, MI 48099-0219 313-528-2202
§ Leader Instrs. Corp., 380 Oser Ave., Hauppauge, NY 11788-3694 516-231-6900
§ Pathcom, Inc., Pace Two-Way Radio Prods., 24105 S. Frampton Ave., Harbor City, CA 90710 213-325-1290
Peca, Inc., 592 Winks Lane, Bensalem, PA 19020 215-245-1550
Schaffner EMC, Inc., Instr. Div., 825 Lehigh Avenue, Union, NJ 07083 201-851-0644
† Shokai Far East, Ltd., 280 North Central Ave., Hartsdale, NY 10530 914-681-0700
§ Simco Co., 2257 North Penn Rd., Hatfield, PA 19440 215-822-2171
§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 215-673-5600
Texscan Instruments, 3169 N. Shadeland, Indianapolis, IN 46226 317-545-4196
§ Tucker Elctrns., Box 461966, Garland, TX 75046 .... 214-348-8800;800-527-4642
Walker Scientific, Rockdale St., Worcester, MA 01606 617-852-3674

Meters, Fluid Flow-2200

Kurz Instruments, Inc., P.O. Box 849, Carmel Valley, CA 93924, 800-424-7356 .... B◦1800
Validyne Engrg. Corp., 8626 Wilbur Ave., Northridge, CA 91324, 818-886-2057 .... D◦1164
§ Analogic Corp., 8 Centennial Dr., Peabody, MA 01961 .... 617-532-5660;617-777-4500; 617-246-0300;800-451-1
† Astro Dynamics, Inc., 2 Gill St., Woburn, MA 01801 617-935-4944
§† Bailey Controls Co., 29801 Euclid Ave., Wickliffe, OH 44092 216-585-5800
Brooks Instr. Div., Emerson Elec. Co., 407 W. Vine St., Hatfield, PA 19440 215-362-3500
Digitec Corp., 918 Woodley Rd., P.O. Box 458, Dayton, OH 45401 513-254-6251
† Dresser Inds., 1505 Elm St., Dallas, TX 75201 214-746-6000
§ Dynamics, Div. of Waugh Controls Corp., 9001 Fullbright Ave., Chatsworth, CA 91311 818-998-8281
† Eldec Corp., Monitor & Control Div., 16700 13th Ave. W., P.O. Box 100, Lynnwood, WA 98046-0100 206-743-1313
† Electrac, Inc., 1614 Orangethrope Way, Anaheim, CA 92801 714-879-6021
§ Electro-Numerics, 1811 Reynolds, Irvine, CA 92714 714-250-1501
Extech International Corp., 150 Bear Hill Rd., Waltham, MA 02154 617-890-7440
† Flow Technology, Inc., Box 21346, Phoenix, AZ 85036 602-437-1315
§ Harwil, 1548 17th St., Santa Monica, CA 90404 213-829-2310
† Instruments and Controls Div., Technology Inc., P.O. Box 3036, Overlook Branch, Dayton, OH 45431 513-426-2405
Kontes, Kimble Div. of Owens/IL, 1001 Spruce St., Vineland, NJ 08360 609-692-8500
§† MKS Instrs., Inc., 22 Third Ave., Burlington, MA 01803 617-272-9255
§ NES, Inc. (Nationwide Electronic Systems), 3003 Wakefield, Carpentersville, IL 60110 312-426-5900
Ocean Resch. Equip., Inc., Box 709, Falmouth, MA 02541 617-548-5800
Omega Engrg., Box 4047, Stamford, CT 06907 203-359-1660
Panametrics, 221 Cresent St., Waltham, MA 02254 617-899-2740

§ Plant Specialties, Inc., PO Box 1097, Carrollton, TX 75006 214-245-9673
Teledyne Gurley, 514 Fulton St. P.O. Box 88, Troy, NY 12181 518-272-6300

Meters, Flux-2900

LDJ Incorporated, 2200 Stephenson Hwy., P.O. Box 219, Troy, MI 48099-0219, 313-528-2202 .... D•1260
Magnetic Instrumentation, 8350 E. 48TH ST., Indianapolis, IN 46226, 317-545-2102 .... D•1261
EG&G Gamma Scientific, Div. of EG&G Inc., 3777 Ruffin Rd., San Diego, CA 92123 619-279-8034
Electrical Instr. Svc., 25 Dock St., Mt. Vernon, NY 10550 914-699-9717
Electric Field Measurements, Box 326, W. Stockbridge, MA 01266 413-637-1929
High Voltage Engrg. Corp., S. Bedford St., Burlington, MA 01803 617-272-1313
§ Magnos, Old School House Rd., Harvard, MA 01451 617-456-8880
RFL Inds., A Dowty Grp. Co./Instr. Div., Powerville Rd., Boonton, NJ 07005 201-334-3100
Sensitive Research Instrs., 25 Dock St., Mt. Vernon, NY 10550 914-699-9717
Walker Scientific, Rockdale St., Worcester, MA 01606 617-852-3674
Yokogawa Corp. of America, 2 Dart Rd., Shenandoah, GA 30265 404-253-7000

Meters, Frequency-2900

§ Electro Industries, Div. E.I. Elctrns., Inc., 1800 Shames Drive, Westbury, NY 11590, 516-334-0870 .... D•1350-1351
EMICO Inc., Box 368, Dublin, PA 18917, 215-249-9330 .... D•1352
IET Labs, Inc., 534 Main St., Westbury, NY 11590, 516-334-5959 .... D•1242
§† J-B-T Instrs., Box 1818, New Haven, CT 06508, 203-776-1111 .... D•1358
§ Modutec, 18 Marshall St., Norwalk, CT 06354, 203-853-3636 .... D•1362
§ NES, Inc. (Nationwide Electronic Systems), 3003 Wakefield, Carpentersville, IL 60110, 312-426-5900 .... D•1367
Shogyo Intl. Corp., 287 Northern Blvd., Great Neck, NY 11021, 516-466-0911 .... D•1376
§ AEMC, 99 Chauncy, Boston, MA 02111 .... 617-451-0227;800-343-1391
Alpha Inds., Inc. - TRG Millimeter Comp., 20 Sylvan Rd., Woburn, MA 01801 617-935-5150
§ Analogic Corp., 8 Centennial Dr., Peabody, MA 01961 ..... 617-532-5660;617-777-4500; 617-246-0300;800-451-1
§ API Instrs., 1601 Trapelo Rd., Waltham, MA 02254 617-890-2000
§ AQ Sys., 1736 Front St., Yorktown Hgts., NY 10598 800-431-2104
ARGA Controls, 35 E. Glenarm St., Pasadena, CA 91105 213-682-3314
§ Beckman Industrial Corp., Emerson Electric Co., 630 Puente Street, Brea, CA 92621 714-773-8111
Beede Electrical Instr. Co., S. Main St., Penacook, NH 03303 603-753-6362
§ Biddle Instruments, A Thorn EMI Co., 510 Township Line Rd., Blue Bell, PA 19422 215-646-9200
Bluffton Products, Inc., Tegam, Inc., 7230 North Ridge Road, Madison, OH 44057 216-946-3572
Coaxial Dynamics, 15210 Industrial Parkway, Cleveland, OH 44135 216-267-2233
Crompton Instrs., 2763 Higgins Road, Elk Grove Village, IL 60007 714-841-2901
Crompton Instrs., Hawker Siddley, 2763 Old Higgins Rd., Elk Grove Village, IL 60007 312-593-1107
† Cushman Elctrns., 2450 N. 1st St., San Jose, CA 95131 408-263-8100
§† Data Precision Corp., Electronics Ave., Danvers, MA 01923 617-246-1600
Datel, General Electric Co., 11 Cabot Blvd., Mansfield, MA 02048 617-339-9341
D-B-Developments, 7709 Kilbourne Rd., Rome, NY 13440 315-339-1265
DCI Inc., 14812 W. 117th Street, P.O. Box 215, Olathe, KS 66061 913-782-5672
Eitel Mfg., 2835 Laguna Canyon Rd., Laguna Beach, CA 92652 714-494-2012
Electrical Instr. Svc., 25 Dock St., Mt. Vernon, NY 10550 914-699-9717
§ Electromatic Controls Corp., 2495 Pembroke Road, Hoffman Estates, IL 60195-2010 312-882-5757
Electronic Wattmeter Co., 2275 Sixth St., Sarasota, FL 33577 813-953-5355
§ Electro-Numerics, 1811 Reynolds, Irvine, CA 92714 714-250-1501
Esterline Angus Instr. Corp., Box 24000, Indianapolis, IN 46224 317-244-7611
Extech International Corp., 150 Bear Hill Rd., Waltham, MA 02154 617-890-7440
Fluke, John, Mfg. Co., Box C9090, MS 250C, Everett, WA 98206 206-356-5400
† Frequency Elctrns., 55 Charles Lindbergh Blvd., Mitchel Field, NY 11553 516-794-4500
Genstar Rental Elctrns., 2445 Faber Pl., Palo Alto, CA 94303 415-856-7600
§† Harris Circuits Mfg., 2706 Colley Ave., Norfolk, VA 23517 804-467-1116
§† Harris Corp., PRD Elctrns. Div., 6801 Jericho Tpke., Syosset, NY 11791 516-364-0400
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
§ Hickok Elec. Instr., 10514 DuPont Ave., Cleveland, OH 44108 216-541-8060
International Crystal Mfg., 10 N. Lee, P.O. Box 26330, Oklahoma City, OK 73126 405-236-3741
M/A-Com Millimeter Products, M/A-Com, Inc., Second Avenue, Burlington, MA 01803 617-272-3000
Martel Elctrns. Corp., 13 Heritage Hill Rd., Windham, NH 03087 .... 800-821-0023; 617-275-5970
† Microlab/FXR, 10 Microlab Rd., Livingston, NJ 07039 201-992-7700
Multi-Amp Corp., TBG, 4271 Bronze Way, Dallas, TX 75237 214-333-3201
† Narda Microwave Corp., 435 Moreland Rd., Hauppauge, NY 11788 516-231-1700
§ Newport Electronics, 630 E. Young St., Santa Ana, CA 92705 714-540-4914
§ Non-Linear Systems/Div. of Kaypro Corp., 533 Stevens Ave., Solana Bch., CA 92075 619-481-3900
Ohio Semitronics, Inc., 1205 Chesapeake Ave., Columbus, OH 43212 ... 614-486-9561
§ Optoelectronics, Inc., 5821 N.E. 14th Ave., Ft. Lauderdale, FL 33334 305-771-2050
† Premier Microwave, 35 New Broad St., Port Chester, NY 10573 914-939-8900
† Q.V.S., Inc., 20 North 15th St., East Orange, NJ 07017 201-673-3996
† Racal-Dana Instrs. Inc., 4 Goodyear St., Irvine, CA 92715 714-859-8999
§ Richard-Lee Co., Box 724, New Providence, NJ 07974 201-276-0710
Sensitive Research Instrs., 25 Dock St., Mt. Vernon, NY 10550 914-699-9717
† Shokai Far East, Ltd., 280 North Central Ave., Hartsdale, NY 10530 914-681-0700
† Sigma Electronics Inc., 10830 Kinghurst Dr., Houston, TX 77099 713-933-4700
§ Simpson Elec. Co., 853 Dundee Ave., Elgin, IL 60120 312-697-2260
Sivers IMA, 5669 Selmaraine Drive, Culver City, CA 90230 213-390-7477
§ Square D Co., Executive Plaza, Palatine, IL 60067 312-397-2600
§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 215-673-5600
§† Takeda Riken Co., Ltd., NS Bldg. 14th,4-1,Nishi-Shinjuku 2-Chome,Shinjuku-ku, Tokyo 160, Tokyo 176, JAPAN 03-342-7500
Tempo Instrument, Inc., 87 Modular Ave., Commack, NY 11725 516-864-3700
Texmate, Inc., 348 S. Cedros Ave., P.O. Box 2000, Solana Beach, CA 92075 619-481-7177
§ TRW, Dynalco Controls Div., 5200 NW 37th, P.O. Box 8187, Ft. Lauderdale, FL 33310 305-739-4300
§ Tucker Elctrns., Box 461966, Garland, TX 75046 .... 214-348-8800;800-527-4642
Valhalla Scientific, 9955 Mesa Rim Rd., San Diego, CA 92126 619-457-5576
§† Waveline, Box 718, W. Caldwell, NJ 07006 201-226-9100
§ Westberg Mfg., Inc., 3400 Westach Way, Sonoma, CA 95476 707-938-2121
§ Yokogawa Corp. of America, 2 Dart Rd., Shenandoah, GA 30265 404-253-7000

Meters, Frequency Deviation-2900

§ Analogic Corp., 8 Centennial Dr., Peabody, MA 01961 ..... 617-532-5660;617-777-4500; 617-246-0300;800-451-1
§ API Instrs., 1601 Trapelo Rd., Waltham, MA 02254 617-890-2000
ARGA Controls, 35 E. Glenarm St., Pasadena, CA 91105 213-682-3314
Boonton Elctrns. Corp., 791 Route 10, Randolph, NJ 07869 201-584-1077
† Cushman Elctrns., 2450 N. 1st St., San Jose, CA 95131 408-263-8100
† Frequency Elctrns., 55 Charles Lindbergh Blvd., Mitchel Field, NY 11553 516-794-4500
MARCONI INSTRUMENTS, 3 Pearl Court, Allendale, NJ 07401 201-934-9050
§ NES, Inc. (Nationwide Electronic Systems), 3003 Wakefield, Carpentersville, IL 60110 312-426-5900
North Hills Elctrns., 1 Alexander Pl., Glen Cove, NY 11542 516-671-5700
† Racal-Dana Instrs. Inc., 4 Goodyear St., Irvine, CA 92715 714-859-8999
† Sigma Electronics Inc., 10830 Kinghurst Dr., Houston, TX 77099 713-933-4700
§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 215-673-5600
† Tracor Instruments, 6500 Tracor La., Bldg. 27, Austin, TX 78725 512-929-2051
§ TRW, Dynalco Controls Div., 5200 NW 37th, P.O. Box 8187, Ft. Lauderdale, FL 33310 305-739-4300
§ Tucker Elctrns., Box 461966, Garland, TX 75046 .... 214-348-8800;800-527-4642

Meters, Galvanometer-2900

Shalltronix Corp., Preston St., P.O. Box 235, Selma, NC 27576, 919-965-6346 .... D•1307
A & D Elec. Instrs., 73-07 88th St., Glendale, NY 11385 718-275-6516
§ AEMC, 99 Chauncy, Boston, MA 02111 .... 617-451-0227;800-343-1391
§ Bartlett Instrument Co., 14th & Ave. "M", P.O. Box 445, Ft. Madison, IA 52627 319-372-8366
Beede Electrical Instr. Co., S. Main St., Penacook, NH 03303 603-753-6362
ECO Instrs. Div., Sea Data Corp., 1 Bridge St., Newton, MA 02158 617-964-8360
† Electronic Dev. Corp., 11 Hamlin St., Boston, MA 02127-4198 617-268-9696
Esterline Angus Instr. Corp., Box 24000, Indianapolis, IN 46224 317-244-7611
§ Greibach Instrs. Div., 25 Dock St., Mt. Vernon, NY 10550 914-699-9717
§ Guildline Instrs., 4403 Vineland Rd, Suite B-10, Orlando, FL 32811-9998 305-423-8215
Larson Instr., Greenbush Rd., Orangeburg, NY 10962 914-359-3800
Leeds & Northrup Instrs., A Unit of General Signal Corp., Sumneytown Pike, North Wales, PA 19454 215-643-2000
Millivac Instrs., Box 997, Curry Rd. Ext., Schenectady, NY 12301 518-355-8300
Penn Airborne Prods., Industrial Hwy., Southampton, PA 18966 215-355-3400
† Q.V.S., Inc., 20 North 15th St., East Orange, NJ 07017 201-673-3996
Sensitive Research Instrs., 25 Dock St., Mt. Vernon, NY 10550 914-699-9717
Shogyo Intl. Corp., 287 Northern Blvd., Great Neck, NY 11021 516-466-0911
§ Shokai Far East, Ltd., 280 North Central Ave., Hartsdale, NY 10530 914-681-0700
§ Simpson Elec. Co., 853 Dundee Ave., Elgin, IL 60120 312-697-2260
§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 215-673-5600
Tettex Instruments, Inc., P.O. Box 281, Fairview Village, PA 19409-0281 215-539-6050
Wide Range Elctrns. Corp., 2119 Schultz Rd., St. Louis, MO 63146 314-567-5366
§ Yokogawa Corp. of America, 2 Dart Rd., Shenandoah, GA 30265 404-253-7000

Meters, Gauss-2900

§ Bell, F. W., Inc., 6120 Hanging Moss Rd., Orlando, FL 32807, 305-678-6900 .... D•1194
§ Jobmaster Corp., 9008 Liberty Rd., Randallstown, MD 21133, 301-655-1400 .... A•1303
LDJ Incorporated, 2200 Stephenson Hwy., P.O. Box 219, Troy, MI 48099-0219, 313-528-2202 .... D•1260
Magnetic Instrumentation, 8350 E. 48TH ST., Indianapolis, IN 46226, 317-545-2102 .... D•1261
§ AEMC, 99 Chauncy, Boston, MA 02111 .... 617-451-0227;800-343-1391
Bluffton Products, Inc., Tegam, Inc., 7230 North Ridge Road, Madison, OH 44057 216-946-3572
Continental Resources, Inc., 175 Middlesex Tpke., Bedford, MA 01730 .. 617-275-0850
Electric Field Measurements, Box 326, W. Stockbridge, MA 01266 413-637-1929
§ Magnos, Old School House Rd., Harvard, MA 01451 617-456-8880
§ Micro-Now Instr. Co., Inc., 8260 N. Elmwood St., P.O. Box 856, Skokie, IL 60077 312-677-4700
RFL Inds., A Dowty Grp. Co./Instr. Div., Powerville Rd., Boonton, NJ 07005 201-334-3100
Varian Assocs., Instr. Grp., 611 Hansen Way, Palo Alto, CA 94303 415-493-4000
Walker Scientific, Rockdale St., Worcester, MA 01606 617-852-3674
§ Yokogawa Corp. of America, 2 Dart Rd., Shenandoah, GA 30265 404-253-7000

Meters, Hand Held-2900

§† Ballantine Labs., 90 Fanny Rd., Boonton, NJ 07005, 201-335-0900 ...... D•1185
§ BBC-Metrawatt/Goerz, 2150 W. 6th Ave., Broomfield, CO 80020, 303-469-5231;800-821-6327 .... D•1192
Bell, F. W., Inc., 6120 Hanging Moss Rd., Orlando, FL 32807, 305-678-6900 .... D•1195
IET Labs, Inc., 534 Main St., Westbury, NY 11590, 516-334-5959 .... D•1245

Jobmaster Corp., 9008 Liberty Rd., Randallstown, MD 21133, 301-655-1400 .... A•1303
§ North American Soar Corp., 11126 Cornell Ave., Cherry Hill, NJ 08002, 609-488-1060 .... D•1269-1272,1275,1280-1281
Photodyne, 1175 Tourmaline Dr., Newbury Park, CA 91320, 818-889-8770 .... B•1122
Sensitive Research Instrs., 25 Dock St., Mt. Vernon, NY 10550, 914-699-9717 .... D•1304,1306
§ Simpson Elec. Co., 853 Dundee Ave., Elgin, IL 60120, 312-697-2260 ..... D•1308
Triplett Corp.-A Penril Co., One Triplett Dr., Bluffton, OH 45817-9987, 419-358-5015 .... D•1318-1321
§ AEMC, 99 Chauncy, Boston, MA 02111 .... 617-451-0227;800-343-1391
§ Atkins Tech., 3321 S.W. 40th Blvd., Gainesville, FL 32608 904-378-5555
§ Beckman Industrial Corp., Emerson Electric Co., 630 Puente Street, Brea, CA 92621 714-773-8111
§ Biddle Instruments, A Thorn EMI Co., 510 Township Line Rd., Blue Bell, PA 19422 215-646-9200
Bluffton Products, Inc., Tegam, Inc., 7230 North Ridge Road, Madison, OH 44057 216-946-3572
Bruel & Kjaer Instrs. Inc., 185 Forest St., Marlboro, MA 01752 617-481-7000
§ Data Tech, Div. of Penril Corp., 3110 W. Segerstrom, Santa Ana, CA 92704 714-546-7160
Electrical Instr. Svc., 25 Dock St., Mt. Vernon, NY 10550 914-699-9717
§ Electrodata, Inc., 23020 Miles Rd., Bedford Heights, OH 44128 216-663-3333
Extech International Corp., 150 Bear Hill Rd., Waltham, MA 02154 617-890-7440
Information Technolgoy A.D.S.C., P.O. Box 470, College Park, MD 20740 301-779-5110
§ Jumbo Process Control, Inc., 410 Garibaldi Ave., Lodi, NJ 07644 201-779-7744
§ Non-Linear Systems/Div. of Kaypro Corp., 533 Stevens Ave., Solana Bch., CA 92075 619-481-3900
Omega Engrg., Box 4047, Stamford, CT 06907 203-359-1660
§ Pacer Industries, Inc., 1450 First Ave., Chippewa Falls, WI 54729 715-723-1141
§ Semtronics Corp., 310 Hwy 7 74 S, P.O. Box 2248, Peachtree City, GA 30269 404-487-6681
§ Spanta, Inc., Box 193, Franklin Lakes, NJ 07417 201-337-0044
§ SPECO Div., Components Specialties, Inc., P.O. Box 624, 1172 Rte. 109, Lindenhurst, NY 11757 .... 516-957-8700;800-645-5516
§ Square D Co., Executive Plaza, Palatine, IL 60067 312-397-2600
§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 215-673-5600
United States Testing Co., Inc., 1415 Park Ave., Hoboken, NJ 07030 ..... 800-631-3096; 201-792-2400

Meters, Humidity-2900

EWC, Inc., 725 Federal Ave., Kenilworth, NJ 07033, 201-245-3200;800-526-4048 .... A•2139
Ohmite Mfg. Co., 3601 W. Howard St., Skokie, IL 60076, 312-675-2600 ... A•1917
§ AEMC, 99 Chauncy, Boston, MA 02111 .... 617-451-0227;800-343-1391
§ Atkins Tech., 3321 S.W. 40th Blvd., Gainesville, FL 32608 904-378-5555
Beckman Industrial Corp., Cedar Grove Div., 89 Commerce Rd., Cedar Grove, NJ 07009 201-239-6200
Bluffton Products, Inc., Tegam, Inc., 7230 North Ridge Road, Madison, OH 44057 216-946-3572
Extech International Corp., 150 Bear Hill Rd., Waltham, MA 02154 617-890-7440
§ Jumbo Process Control, Inc., 410 Garibaldi Ave., Lodi, NJ 07644 201-779-7744
NTK Technical Ceramics, NGK Spark Plugs (U.S.A.), Inc., 1701 N. Greenville Ave. #205, Richardson, TX 75081 214-235-8332
Omega Engrg., Box 4047, Stamford, CT 06907 203-359-1660
§ Pacer Industries, Inc., 1450 First Ave., Chippewa Falls, WI 54729 715-723-1141
Panametrics, 221 Cresent St., Waltham, MA 02254 617-899-2740
Schneider Instr., 8115 Camargo Rd., Cincinnati, OH 45243 513-561-6803
§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 215-673-5600
Testoterm, P.O. Box 111509, Nashville, TN 37211 615-834-5082
† Thunder Sci. Corp., 623 Wyoming S.E., Albuquerque, NM 87123 505-265-8701
Yellow Springs Instr., Box 279, Yellow Springs, OH 45387 513-767-7241

Meters, Illuminated Scale-2950

Dixson, Inc., Instrument Div., Box 1449, Grand Junction, CO 81502, 303-242-8863 .... D•1349
§ Gralex Inds., 295 Community Dr., Great Neck, NY 11021, 516-487-7289;800-645-6535 .... D•1354-1356
§ International Instruments, General Resistance, Inc., Twin Lakes Rd, P.O. Box 185, N. Branford, CT 06471, 203-481-3450 .... D•1357
§ Triplett Corp.-A Penril Co., One Triplett Dr., Bluffton, OH 45817-9987, 419-358-5015 .... D•1381
§ AEMC, 99 Chauncy, Boston, MA 02111 .... 617-451-0227;800-343-1391
§ API Instrs., 1601 Trapelo Rd., Waltham, MA 02254 617-890-2000
Ballantine Labs., 90 Fanny Rd., Boonton, NJ 07005 201-335-0900
Bartlett Instrument Co., 14th & Ave. "M", P.O. Box 445, Ft. Madison, IA 52627 319-372-8366
§ Beede Electrical Instr. Co., S. Main St., Penacook, NH 03303 603-753-6362
§ Bell, F. W., Inc., 6120 Hanging Moss Rd., Orlando, FL 32807 305-678-6900
Bird Elctrn., 30303 Aurora Rd., Cleveland, OH 44139 216-248-1200
Cord Electronics, Inc., 177 Cantiague Rock Rd., Westbury, NY 11590 ... 516-935-3640
Crompton Instrs., 2763 Higgins Road, Elk Grove Village, IL 60007 714-841-2901
Crompton Instrs., Hawker Siddley, 2763 Old Higgins Rd., Elk Grove Village, IL 60007 312-593-1107
Datel, General Electric Co., 11 Cabot Blvd., Mansfield, MA 02048 617-339-9341
§ Electro Industries, Div. E.I. Elctrns., Inc., 1800 Shames Drive, Westbury, NY 11590 516-334-0870
EMICO Inc., Box 368, Dublin, PA 18917 215-249-9330
† Ideal Precision Meter, 214 Franklin St., Brooklyn, NY 11222 212-383-6904
§ Jewell Electrical Instrs., Grenier Field, Manchester, NH 03108 603-669-6400
LFE, Process Control Div., 55 Green St., Clinton, MA 01510 617-835-1000
§ Modutec, 18 Marshall St., Norwalk, CT 06854 203-853-3636
§ Newport Electronics, 630 E. Young St., Santa Ana, CA 92705 714-540-4914
Omega Engrg., Box 4047, Stamford, CT 06907 203-359-1660
† Q.V.S., Inc., 20 North 15th St., East Orange, NJ 07017 201-673-3996
§ Shokai Far East, Ltd., 280 North Central Ave., Hartsdale, NY 10530 914-681-0700
Sigma Instrs., Intl. Instr. Div., 88 Marsh Hill Rd., Orange, CT 06477 203-795-4711
§ Simpson Elec. Co., 853 Dundee Ave., Elgin, IL 60120 312-697-2260
§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 215-673-5600

Meters, Impedance-2900

IET Labs, Inc., 534 Main St., Westbury, NY 11590, 516-334-5959 .... D•1242
§ AEMC, 99 Chauncy, Boston, MA 02111 .... 617-451-0227;800-343-1391
Clarke-Hess Comm. Resch. Corp., 17 West 17th St., New York, NY 10011 212-255-2940
Continental Resources, Inc., 175 Middlesex Tpke., Bedford, MA 01730 .. 617-275-0850
Cord Electronics, Inc., 177 Cantiague Rock Rd., Westbury, NY 11590 ... 516-935-3640
Datron Instrs., Inc., 3401 SW 42nd Ave., Stuart, FL 33497 305-283-0935
Electro-Dynamics Dev. Co., 475 Mt. Hood Dr. S.W., Issaquah, WA 98027 206-392-2493
Electro Scientific Inds., 13900 N.W. Science Pk. Dr., Portland, OR 97229 503-641-4141
§† Harris Corp., PRD Elctrns. Div., 6801 Jericho Tpke., Syosset, NY 11791 516-364-0400
§ Heath Co., Benton Harbor, MI 49022 616-982-3886
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
§ Leader Instrs. Corp., 380 Oser Ave., Hauppauge, NY 11788-3694 516-231-6900
MARCONI INSTRUMENTS, 3 Pearl Court, Allendale, NJ 07401 201-934-9050
† Microlab/FXR, 10 Microlab Rd., Livingston, NJ 07039 201-992-7700
§ NES, Inc. (Nationwide Electronic Systems), 3003 Wakefield, Carpentersville, IL 60110 312-426-5900
RE Instruments Corp., 31029 Center Ridge Rd., Westlake, OH 44145 ... 216-871-7617
§ Shokai Far East, Ltd., 280 North Central Ave., Hartsdale, NY 10530 914-681-0700
§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 215-673-5600
§ Triplett Corp.-A Penril Co., One Triplett Dr., Bluffton, OH 45817-9987 419-358-5015
§ Tucker Elctrns., Box 461966, Garland, TX 75046 .... 214-348-8800;800-527-4642

Meters, Kilovolt-2900

† Hipotronics, P.O. Drawer A, Brewster, NY 10509, 914-279-8091 .... D•1239
† Jennings, 970 McLaughlin Ave., San Jose, CA 95122, 408-292-4025 ..... D•1251
† Ross Engrg. Corp., 540 Westchester Dr., Campbell, CA 95008, 408-377-4621 .... B•1443
Sensitive Research Instrs., 25 Dock St., Mt. Vernon, NY 10550, 914-699-9717 .... D•1306
A & D Elec. Instrs., 73-07 88th St., Glendale, NY 11385 718-275-6516
American HV Test Systems Inc., Central Garrett Ind'l. Pk., Accident, MD 21520 301-826-8651
ARGA Controls, 35 E. Glenarm St., Pasadena, CA 91105 213-682-3314
§ Ballantine Labs., 90 Fanny Rd., Boonton, NJ 07005 201-335-0900
§ Bartlett Instrument Co., 14th & Ave. "M", P.O. Box 445, Ft. Madison, IA 52627 319-372-8366
Beckman Industrial Corp., Cedar Grove Div., 89 Commerce Rd., Cedar Grove, NJ 07009 201-239-6200
§ Beede Electrical Instr. Co., S. Main St., Penacook, NH 03303 603-753-6362
Blanck, A. R., Co., Box 249, Rutherford, NJ 07070 201-933-2091
Bluffton Products, Inc., Tegam, Inc., 7230 North Ridge Road, Madison, OH 44057 216-946-3572
Crompton Instrs., 2763 Higgins Road, Elk Grove Village, IL 60007 714-841-2901
Crompton Instrs., Hawker Siddley, 2763 Old Higgins Rd., Elk Grove Village, IL 60007 312-593-1107
§† Data Precision Corp., Electronics Ave., Danvers, MA 01923 617-246-1600
§ Data Tech, Div. of Penril Corp., 3110 W. Segerstrom, Santa Ana, CA 92704 714-546-7160
Datron Instrs., Inc., 3401 SW 42nd Ave., Stuart, FL 33497 305-283-0935
Electrical Instr. Svc., 25 Dock St., Mt. Vernon, NY 10550 914-699-9717
Electrical Standards Div., E.S.R.S., Inc., 7337 Greenbush, N. Hollywood, CA 91605 818-765-4224
Electric Field Measurements, Box 326, W. Stockbridge, MA 01266 413-637-1929
§ Electro Industries, Div. E.I. Elctrns., Inc., 1800 Shames Drive, Westbury, NY 11590 516-334-0870
§ Epoch Enterprises, Ltd., 3541 N. Olive Rd., Tucson, AZ 85719 .... 602-887-1970; 888-5167
§ Fluke, John, Mfg. Co., Box C9090, MS 250C, Everett, WA 98206 206-356-5400
§ Greibach Instrs. Div., 25 Dock St., Mt. Vernon, NY 10550 914-699-9717
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
† Ideal Precision Meter, 214 Franklin St., Brooklyn, NY 11222 212-383-6904
Larson Instr., Greenbush Rd., Orangeburg, NY 10962 914-359-3800
§ Modutec, 18 Marshall St., Norwalk, CT 06854 203-853-3636
§ Non-Linear Systems/Div. of Kaypro Corp., 533 Stevens Ave., Solana Bch., CA 92075 619-481-3900
† Q.V.S., Inc., 20 North 15th St., East Orange, NJ 07017 201-673-3996
† Racal-Dana Instrs. Inc., 4 Goodyear St., Irvine, CA 92715 714-859-8999
Rutherford Resch. Prods., Box 249, Rutherford, NJ 07070 201-933-2091
§ Shokai Far East, Ltd., 280 North Central Ave., Hartsdale, NY 10530 914-681-0700
§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 215-673-5600
Tettex Instruments, Inc., P.O. Box 281, Fairview Village, PA 19409-0281 215-539-6050
§ Triplett Corp.-A Penril Co., One Triplett Dr., Bluffton, OH 45817-9987 419-358-5015
Valhalla Scientific, 9955 Mesa Rim Rd., San Diego, CA 92126 619-457-5576
Velonex, 560 Robert Ave., Santa Clara, CA 95050 408-727-7370
Yokogawa Corp. of America, 2 Dart Rd., Shenandoah, GA 30265 404-253-7000
ZI-TECH Instr. Corp., 2151 Park Blvd., Box 60490, Palo Alto, CA 94306 415-326-2151

Meters, Laser Energy — See Monitors, Laser Energy (Vol. D)

Meters, Light (Nonphotographic)-2900

Photodyne, 1175 Tourmaline Dr., Newbury Park, CA 91320, 818-889-8770 .... B•1122-1123

§ AEMC, 99 Chauncy, Boston, MA 02111 .... 617-451-0227;800-343-1391
§ Apollo Lasers, Inc., 9201 Independence Ave., Chatsworth, CA 91311 213-709-1111
ARGA Controls, 35 E. Glenarm St., Pasadena, CA 91105 213-682-3314
§ BEA electro-optics, Inc., 690 First Ave., Des Plaines, IL 60016 312-298-1420
Biospherical Instrs., Inc., 4901 Morena Blvd. #1003, San Diego, CA 92117 619-270-1315
Bluffton Products, Inc., Tegam, Inc., 7230 North Ridge Road, Madison, OH 44057 216-946-3572
Bruel & Kjaer Instrs. Inc., 185 Forest St., Marlboro, MA 01752 617-481-7000
EG&G Gamma Scientific, Div. of EG&G Inc., 3777 Ruffin Rd., San Diego, CA 92123 619-279-8034
† Electro-Optical Inds., Box 3770, Santa Barbara, CA 93130 805-964-6701
Gamma Scientific Inc., 3777 Ruffin Rd., San Diego, CA 92123 619-279-8034
† Hoffman Engineering Corp., P.O. Box 300, Old Greenwich, CT 06870 ... 203-325-8933
§ Pacer Industries, Inc., 1450 First Ave., Chippewa Falls, WI 54729 715-723-1141
Pacific Instrs. Inc., 215 Mason Circle, Concord, CA 94518 415-827-9010
Photon, Inc., 14125 Capri Dr. #4, Los Gatos, CA 95030 408-866-0566
§† Photo Resch., Kollmorgen Corp., 3000 N. Hollywood Way, Burbank, CA 91505 818-843-6100
§ Simpson Elec. Co., 853 Dundee Ave., Elgin, IL 60120 312-697-2260
§† Spectronics Corp., 956 Brush Hollow Rd., Westbury, NY 11590 516-333-4840
§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 215-673-5600
United Detector Tech., 12525 Chadron Ave., Hawthorne, CA 90250 213-978-0516
§ UVP, Inc., 5100 Walnut Grove Ave., P.O. Box 1501, San Gabriel, CA 91778 818-285-3123
Yokogawa Corp. of America, 2 Dart Rd., Shenandoah, GA 30265 404-253-7000

Meters, Megohm-2900

Freed Transformer, 1718 Weirfield St., Ridgewood, NY 11385, 212-386-1300 .... D•1229
† Hipotronics, P.O. Drawer A, Brewster, NY 10509, 914-279-8091 .... D•1238
Omega Engrg., Box 4047, Stamford, CT 06907, 203-359-1660 .... D•1374
RE Instruments Corp., 31029 Center Ridge Rd., Westlake, OH 44145, 216-871-7617 .... D•1295
Tettex Instruments, Inc., P.O. Box 281, Fairview Village, PA 19409-0281, 215-539-6050 .... D•1312
§† AEMC, 99 Chauncy, Boston, MA 02111 .... 617-451-0227;800-343-1391
American HV Test Systems Inc., Central Garrett Ind'l. Pk., Accident, MD 21520 301-826-8651
† Amprobe Instr., 630 Merrick Rd., Lynbrook, NY 11563 .... 516-LY3-5600
Andeen-Hagerling, Inc., 31899 Miles Road, Chagrin Falls, OH 44022 216-349-0370
§† Associated Research, Inc., 8221 N. Kimball Ave., Skokie, IL 60076 312-647-7850
Beckman Industrial Corp., Cedar Grove Div., 89 Commerce Rd., Cedar Grove, NJ 07009 201-239-6200
§ Beede Electrical Instr. Co., S. Main St., Penacook, NH 03303 603-753-6362
§ Biddle Instruments, A Thorn EMI Co., 510 Township Line Rd., Blue Bell, PA 19422 215-646-9200
Bluffton Products, Inc., Tegam, Inc., 7230 North Ridge Road, Madison, OH 44057 216-946-3572
Continental Resources, Inc., 175 Middlesex Tpke., Bedford, MA 01730 .. 617-275-0850
§† Data Precision Corp., Electronics Ave., Danvers, MA 01923 617-246-1600
Data Tech, Div. of Penril Corp., 3110 W. Segerstrom, Santa Ana, CA 92704 714-546-7160
Datron Instrs., Inc., 3401 SW 42nd Ave., Stuart, FL 33497 305-283-0935
Del Elctrns. Corp., 250 E. Sandford Blvd., Mt. Vernon, NY 10550 914-699-2000
Electrical Instr. Svc., 25 Dock St., Mt. Vernon, NY 10550 914-699-9717
§ Fluke, John, Mfg. Co., Box C9090, MS 250C, Everett, WA 98206 206-356-5400
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
Hickok Elec. Instr., 10514 DuPont Ave., Cleveland, OH 44108 216-541-8060
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§† Intersil, 10710 N. Tantau Ave., Cupertino, CA 95014 408-996-5000
Keithley Instrs., 28775 Aurora Rd., Cleveland, OH 44139 216-248-0400
† Millivac Instrs., Box 997, Curry Rd. Ext., Schenectady, NY 12301 518-355-8300
Multi-Amp Corp., TBG, 4271 Bronze Way, Dallas, TX 75237 214-333-3201
§ Non-Linear Systems/Div. of Kaypro Corp., 533 Stevens Ave., Solana Bch., CA 92075 619-481-3900
§ Pacer Industries, Inc., 1450 First Ave., Chippewa Falls, WI 54729 715-723-1141
Penn Airborne Prods., Industrial Hwy., Southampton, PA 18966 215-355-3400
† Q.V.S., Inc., 20 North 15th St., East Orange, NJ 07017 201-673-3996
† Racal-Dana Instrs. Inc., 4 Goodyear St., Irvine, CA 92715 714-859-8999
§ Shokai Far East, Ltd., 280 North Central Ave., Hartsdale, NY 10530 914-681-0700
§ Simpson Elec. Co., 853 Dundee Ave., Elgin, IL 60120 312-697-2260
§ Slaughter Co., Moore & Hailey Sts., P.O. Box 1805, Ardmore, OK 73402 405-223-4773
§ SPECO Div., Components Specialties, Inc., P.O. Box 624, 1172 Rte. 109, Lindenhurst, NY 11757 .... 516-957-8700;800-645-5516
§ Sperry, A. W., Instrs., P.O. Box 9300, Smithtown, NY 11787 516-231-7050
§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 215-673-5600
§† Takeda Riken Co., Ltd., NS Bldg. 14th,4-1,Nishi-Shinjuku 2-Chome,Shinjuku-ku, Tokyo 160, Tokyo 176, JAPAN 03-342-7500
Torotron Corp., 519 South Fifth Ave., Mt. Vernon, NY 10550 914-664-2050
§ Triplett Corp.-A Penril Co., One Triplett Dr., Bluffton, OH 45817-9987 ... 419-358-5015
Valhalla Scientific, 9955 Mesa Rim Rd., San Diego, CA 92126 619-457-5576
Velonex, 560 Robert Ave., Santa Clara, CA 95050 408-727-7370
§ Yokogawa Corp. of America, 2 Dart Rd., Shenandoah, GA 30265 404-253-7000

Meters, Microampere — See Meters, Ampere (Vol. D)

Meters, Microwave-2900

Boonton Elctrns. Corp., 791 Route 10, Randolph, NJ 07869, 201-584-1077 .... D•1197
† General Microwave Corp., 155 Marine St., Farmingdale, NY 11735, 516-694-3600 .... D•1232
MARCONI INSTRUMENTS, 3 Pearl Court, Allendale, NJ 07401, 201-934-9050 .... D•1263
Bird Elctrn., 30303 Aurora Rd., Cleveland, OH 44139 216-248-1200
Bluffton Products, Inc., Tegam, Inc., 7230 North Ridge Road, Madison, OH 44057 216-946-3572
Coaxial Dynamics, 15210 Industrial Parkway, Cleveland, OH 44135 216-267-2233
§† Harris Corp., PRD Elctrns. Div., 6801 Jericho Tpke., Syosset, NY 11791 516-364-0400
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
Holaday Industries, Inc., 14825 Martin Drive, Eden Prairie, MN 55344 ... 612-934-4920
M/A-Com Millimeter Products, M/A-Com, Inc., Second Avenue, Burlington, MA 01803 617-272-3000
† Microlab/FXR, 10 Microlab Rd., Livingston, NJ 07039 201-992-7700
† Millivac Instrs., Box 997, Curry Rd. Ext., Schenectady, NY 12301 518-355-8300
Narda Microwave Corp., 435 Moreland Rd., Hauppauge, NY 11788 516-231-1700
§ Pacific Meas., Inc., 488 Tasman Drive, Sunnyvale, CA 94086 408-734-5780
† Premier Microwave, 35 New Broad St., Port Chester, NY 10573 914-939-8900
† Racal-Dana Instrs. Inc., 4 Goodyear St., Irvine, CA 92715 714-859-8999
Republic Electronics Co., 575 Broad Hollow Rd., Melville, NY 11747 516-249-1414
Sivers IMA, 5669 Selmaraine Drive, Culver City, CA 90230 213-390-7477
§ Techni-Tool, 5 Apollo Rd., Box 368, Plymouth Meeting, PA 19462 215-825-4990
§ Tucker Elctrns., Box 461966, Garland, TX 75046 .... 214-348-8800;800-527-4642
§ Waveline, Box 718, W. Caldwell, NJ 07006 201-226-9100
Weinschel Engrg., One Weinschel La., Gaithersburg, MD 20877 .... 301-948-3434; 800-638-2048

Meters, Modulation-2900

Boonton Elctrns. Corp., 791 Route 10, Randolph, NJ 07869, 201-584-1077 .... D•1197
MARCONI INSTRUMENTS, 3 Pearl Court, Allendale, NJ 07401, 201-934-9050 .... D•1263
ARGA Controls, 35 E. Glenarm St., Pasadena, CA 91105 213-682-3314
Continental Resources, Inc., 175 Middlesex Tpke., Bedford, MA 01730 .. 617-275-0850
Cord Electronics, Inc., 177 Cantiague Rock Rd., Westbury, NY 11590 ... 516-935-3640
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
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Polarad Elctrns., Inc., 5 Delaware Dr., Lake Success, NY 11042 516-328-1100
† Racal-Dana Instrs. Inc., 4 Goodyear St., Irvine, CA 92715 714-859-8999
RE Instruments Corp., 31029 Center Ridge Rd., Westlake, OH 44145 ... 216-871-7617
§ Shokai Far East, Ltd., 280 North Central Ave., Hartsdale, NY 10530 914-681-0700
§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 215-673-5600
§ Tucker Elctrns., Box 461966, Garland, TX 75046 .... 214-348-8800;800-527-4642
Wavetek Indiana, Inc., 5808 Churchman, Beech Grove, IN 46107 317-787-3332

Meters, Moving Coil-2950

Dixson, Inc., Instrument Div., Box 1449, Grand Junction, CO 81502, 303-242-8863 .... D•1349
EMCO Inc., Box 368, Dublin, PA 18917, 215-249-9330 .... D•1352
International Instruments, General Resistance, Inc., Twin Lakes Rd, P.O. Box 185, N. Branford, CT 06471, 203-481-3450 .... D•1357
§ Modutec, 18 Marshall St., Norwalk, CT 06854, 203-853-3636 .... D•1362
Simpson Elec. Co., 853 Dundee Ave., Elgin, IL 60120, 312-697-2260 ..... D•1377
Triplett Corp.-A Penril Co., One Triplett Dr., Bluffton, OH 45817-9987, 419-358-5015 .... D•1321,1380
Cord Electronics, Inc., 177 Cantiague Rock Rd., Westbury, NY 11590 ... 516-935-3640
Crompton Instrs., 2763 Higgins Road, Elk Grove Village, IL 60007 714-841-2901
Crompton Instrs., Hawker Siddley, 2763 Old Higgins Rd., Elk Grove Village, IL 60007 312-593-1107
§ LFE, Process Control Div., 55 Green St., Clinton, MA 01510 617-835-1000
§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 215-673-5600

Meters, Moving Iron-2950

§ Modutec, 18 Marshall St., Norwalk, CT 06854, 203-853-3636 .... D•1362
Triplett Corp.-A Penril Co., One Triplett Dr., Bluffton, OH 45817-9987, 419-358-5015 .... D•1321,1380
Cord Electronics, Inc., 177 Cantiague Rock Rd., Westbury, NY 11590 ... 516-935-3640
Crompton Instrs., 2763 Higgins Road, Elk Grove Village, IL 60007 714-841-2901
Crompton Instrs., Hawker Siddley, 2763 Old Higgins Rd., Elk Grove Village, IL 60007 312-593-1107
§ Simpson Elec. Co., 853 Dundee Ave., Elgin, IL 60120 312-697-2260
§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 215-673-5600

Meters, Moving Scale-2950

Jewell Electrical Instrs., Grenier Field, Manchester, NH 03108, 603-669-6400 .... D•1359
† Q.V.S., Inc., 20 North 15th St., East Orange, NJ 07017 201-673-3996
§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 215-673-5600

Meters, Multifunction (Analog)-2900

§ BBC-Metrawatt/Goerz, 2150 W. 6th Ave., Broomfield, CO 80020, 303-469-5231;800-821-6327 .... D•1192
IET Labs, Inc., 534 Main St., Westbury, NY 11590, 516-334-5959 .... D•1245
† Millivac Instrs., Box 997, Curry Rd. Ext., Schenectady, NY 12301, 518-355-8300 .... D•1266
§ North American Soar Corp., 11126 Cornell Ave., Cherry Hill, NJ 08002, 609-488-1060 .... D•1278,1280
§ Simpson Elec. Co., 853 Dundee Ave., Elgin, IL 60120, 312-697-2260 ..... D•1308
§ Triplett Corp.-A Penril Co., One Triplett Dr., Bluffton, OH 45817-9987, 419-358-5015 .... D•1318-1319,1321
§ AEMC, 99 Chauncy, Boston, MA 02111 .... 617-451-0227;800-343-1391
† Amprobe Instr., 630 Merrick Rd., Lynbrook, NY 11563 .... 516-LY3-5600
§ B & K Precision, Industrial Electronics Product Group, Dynascan Corporation, 6460 W. Cortland, Chicago, IL 60635 312-889-9087
Calibron Instrs., Burton-Rogers Co., 220 Grove St., Waltham, MA 02154 617-894-6440
Colorado Data Systems, Inc., 3301 W. Hampden Ave., Unit C, Englewood, CO 80110 303-762-1640
Electronic Wattmeter Co., 2275 Sixth St., Sarasota, FL 33577 813-953-5355

§ Epoch Enterprises, Ltd., 3541 N. Olive Rd., Tucson, AZ 85719 .... 602-887-1970; 888-5167

§ Imtronics Inds., 11930 31st Ct., St. Petersburg, FL 33715 813-577-9010

Keithley Instrs., 28775 Aurora Rd., Cleveland, OH 44139 216-248-0400

§ Leader Instrs. Corp., 380 Oser Ave., Hauppauge, NY 11788-3694 516-231-6900

Modutec, 18 Marshall St., Norwalk, CT 06854 203-853-3636

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† Racal-Dana Instrs. Inc., 4 Goodyear St., Irvine, CA 92715 714-859-8999

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Sensitive Research Instrs., 25 Dock St., Mt. Vernon, NY 10550 914-699-9717

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§ Sperry, A. W., Instrs., P.O. Box 9300, Smithtown, NY 11787 516-231-7050

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Texmate, Inc., 348 S. Cedros Ave., P.O. Box 2000, Solana Beach, CA 92075 619-481-7177

§ TRW, Dynalco Controls Div., 5200 NW 37th, P.O. Box 8187, Ft. Lauderdale, FL 33310 305-739-4300

† Vertox Co., 9252 Garden Grove Blvd. #22, Garden Grove, CA 92644 .. 714-530-4541

§ VIZ Test Equipment, Div. VIZ Mfg., 335 E. Price St., Philadelphia, PA 19144 215-844-2626

§ Wiltron, 805 E. Middlefield Rd., P.O. Box 7290, Mountain View, CA 94042-7290 415-969-6500

Meters, Multifunction (Digital)-2900

§† Ballantine Labs., 90 Fanny Rd., Boonton, NJ 07005, 201-335-0900 ...... D∘1185

§ B & K Precision, Industrial Electronics Product Group, Dynascan Corporation, 6460 W. Cortland, Chicago, IL 60635, 312-889-9087 .... D∘1186-1187

§ BBC-Metrawatt/Goerz, 2150 W. 6th Ave., Broomfield, CO 80020, 303-469-5231;800-821-6327 .... D∘1192-1193

Clarke-Hess Comm. Resch. Corp., 17 West 17th St., New York, NY 10011, 212-255-2940 .... D∘1201

IET Labs, Inc., 534 Main St., Westbury, NY 11590, 516-334-5959 .... D∘1242

Julie Resch. Labs., 211 West 61st St., New York, NY 10023, 212-245-2727 .... D∘1253

§ North American Soar Corp., 11126 Cornell Ave., Cherry Hill, NJ 08002, 609-488-1060 .... D∘1268-1272,1274,1395

Ohio Semitronics, Inc., 1205 Chesapeake Ave., Columbus, OH 43212, 614-486-9561 .... D∘1288

Ross Engrg. Corp., 540 Westchester Dr., Campbell, CA 95008, 408-377-4621 .... B∘1443

§ Simpson Elec. Co., 853 Dundee Ave., Elgin, IL 60120, 312-697-2260 ..... D∘1308

§ Triplett Corp.-A Penril Co., One Triplett Dr., Bluffton, OH 45817-9987, 419-358-5015 .... D∘1319-1320

§ AEMC, 99 Chauncy, Boston, MA 02111 .... 617-451-0227;800-343-1391

† Amprobe Instr., 630 Merrick Rd., Lynbrook, NY 11563 .... 516-LY3-5600

§ Beckman Industrial Corp., Emerson Electric Co., 630 Puente Street, Brea, CA 92621 714-773-8111

Beckman Instrs., 2500 Harbor Blvd., Fullerton, CA 92634 714-871-4848

Calibron Instrs., Burton-Rogers Co., 220 Grove St., Waltham, MA 02154 617-894-6440

CDS - Colorado Data Sys., 3301 W. Hampden, Unit C, Englewood, CO 80110 303-762-1640

Colorado Data Systems, Inc., 3301 W. Hampden Ave., Unit C, Englewood, CO 80110 303-762-1640

§† Data Precision Corp., Electronics Ave., Danvers, MA 01923 617-246-1600

Data Tech, Div. of Penril Corp., 3110 W. Segerstrom, Santa Ana, CA 92704 714-546-7160

Datron Instrs., Inc., 3401 SW 42nd Ave., Stuart, FL 33497 305-283-0935

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§ Hameg, Inc., 88-90 Harbor Rd., Port Washington, NY 11050 516-883-3837

§ Hickok Elec. Instr., 10514 DuPont Ave., Cleveland, OH 44108 216-541-8060

§ Hitachi Denshi America Ltd., Test & Meas. Div., 175 Crossways Pkwy. W., Woodbury, NY 11797 516-921-7200

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§ Modutec, 18 Marshall St., Norwalk, CT 06854 203-853-3636

§ Non-Linear Systems/Div. of Kaypro Corp., 533 Stevens Ave., Solana Bch., CA 92075 619-481-3900

Omega Engrg., Box 4047, Stamford, CT 06907 203-359-1660

§ Pacer Industries, Inc., 1450 First Ave., Chippewa Falls, WI 54729 715-723-1141

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Polarad Elctrns., Inc., 5 Delaware Dr., Lake Success, NY 11042 516-328-1100

§ PrimeLine-Soltec Distbn., Soltec Corp., P.O. Box 818, Sun Valley, CA 91353-0818 .... 800-525-5554;818-764-5400

† Racal-Dana Instrs. Inc., 4 Goodyear St., Irvine, CA 92715 714-859-8999

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Scientific Columbus, Inc., Esterline Corp., 1900 Arlingate La., Columbus, OH 43228 614-274-7160

Solartron Instruments, Sangamo Weston, Inc., 2 Westchester Plaza, Elmsford, NY 10523 914-592-9168

§ Spanta, Inc., Box 193, Franklin Lakes, NJ 07417 201-337-0044

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§ Sperry, A. W., Instrs., P.O. Box 9300, Smithtown, NY 11787 516-231-7050

§ Square D Co., Executive Plaza, Palatine, IL 60067 312-397-2600

† Takeda Riken Co., Ltd., NS Bldg. 14th,4-1,Nishi-Shinjuku 2-Chome,Shinjuku-ku, Tokyo 160, Tokyo 176, JAPAN 03-342-7500

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Tektronix, Inc., P. O. Box 500, Y3-314, Beaverton, OR 97077 ..... 800-547-1512;Oregon only 800-452-1877

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Valhalla Scientific, 9955 Mesa Rim Rd., San Diego, CA 92126 619-457-5576

Vistar Corp., 13740 McCormick Dr., Tampa, FL 33625 813-855-6611

VIZ Test Equipment, Div. VIZ Mfg., 335 E. Price St., Philadelphia, PA 19144 215-844-2626

Yokogawa Corp. of America, 2 Dart Rd., Shenandoah, GA 30265 404-253-7000

Meters, Noise & Sound Level-2900

IET Labs, Inc., 534 Main St., Westbury, NY 11590, 516-334-5959 .... D∘1245

API Instrs., 1601 Trapelo Rd., Waltham, MA 02254 617-890-2000

Bluffton Products, Inc., Tegam, Inc., 7230 North Ridge Road, Madison, OH 44057 216-946-3572

Bruel & Kjaer Instrs. Inc., 185 Forest St., Marlboro, MA 01752 617-481-7000

Crompton Instrs., Hawker Siddley, 2763 Old Higgins Rd., Elk Grove Village, IL 60007 312-593-1107

Dai-Ichi Shoji of Amer., Inc., 150 Fifth Ave., New York, NY 10011 212-691-9050

DuPont de Nemours, E. I., & Co., 1007 Market St., Wilmington, DE 19898 302-773-3218

Esterline Angus Instr. Corp., Box 24000, Indianapolis, IN 46224 317-244-7611

§ Lenco Elctrns., Inc., 300 N. Maryland St., Jackson, MO 63755 314-243-3147

§ Metrosonics, Inc., Box 23075, Rochester, NY 14692-3075 716-334-7300

§ Pacer Industries, Inc., 1450 First Ave., Chippewa Falls, WI 54729 715-723-1141

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§ Simpson Elec. Co., 853 Dundee Ave., Elgin, IL 60120 312-697-2260

§ Spanta, Inc., Box 193, Franklin Lakes, NJ 07417 201-337-0044

§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 215-673-5600

§ Techni-Tool, 5 Apollo Rd., Box 368, Plymouth Meeting, PA 19462 215-825-4990

§ Tucker Elctrns., Box 461966, Garland, TX 75046 .... 214-348-8800;800-527-4642

Meters, Null-2950

Freed Transformer, 1718 Weirfield St., Ridgewood, NY 11385, 212-386-1300 .... D∘1229

Tettex Instruments, Inc., P.O. Box 281, Fairview Village, PA 19409-0281, 215-539-6050 .... D∘1312

§ Triplett Corp.-A Penril Co., One Triplett Dr., Bluffton, OH 45817-9987, 419-358-5015 .... D∘1380

A & D Elec. Instrs., 73-07 88th St., Glendale, NY 11385 718-275-6516

§ AEMC, 99 Chauncy, Boston, MA 02111 .... 617-451-0227;800-343-1391

§ API Instrs., 1601 Trapelo Rd., Waltham, MA 02254 617-890-2000

Ballantine Labs., 90 Fanny Rd., Boonton, NJ 07005 201-335-0900

§ Bartlett Instrument Co., 14th & Ave. "M', P.O. Box 445, Ft. Madison, IA 52627 319-372-8366

Beede Electrical Instr. Co., S. Main St., Penacook, NH 03303 603-753-6362

Biddle Instruments, A Thorn EMI Co., 510 Township Line Rd., Blue Bell, PA 19422 215-646-9200

Cord Electronics, Inc., 177 Cantiague Rock Rd., Westbury, NY 11590 ... 516-935-3640

Dixson, Inc., Instrument Div., Box 1449, Grand Junction, CO 81502 303-242-8863

† Electronic Dev. Corp., 11 Hamlin St., Boston, MA 02127-4198 617-268-9696

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§ Greibach Instrs. Div., 25 Dock St., Mt. Vernon, NY 10550 914-699-9717

Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.

§ International Instruments, General Resistance, Inc., Twin Lakes Rd, P.O. Box 185, N. Branford, CT 06471 203-481-3450

§ Jewell Electrical Instrs., Grenier Field, Manchester, NH 03108 603-669-6400

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Keithley Instrs., 28775 Aurora Rd., Cleveland, OH 44139 216-248-0400

Larson Instr., Greenbush Rd., Orangeburg, NY 10962 914-359-3800

Leeds & Northrup Instrs., A Unit of General Signal Corp., Sumneytown Pike, North Wales, PA 19454 215-643-2000

† Millivac Instrs., Box 997, Curry Rd. Ext., Schenectady, NY 12301 518-355-8300

§ Modutec, 18 Marshall St., Norwalk, CT 06854 203-853-3636

† North Atlantic Inds., Instrument Div., 60 Plant Ave., Hauppauge, NY 11788 516-582-6500

† Q.V.S., Inc., 20 North 15th St., East Orange, NJ 07017 201-673-3996

† Racal-Dana Instrs. Inc., 4 Goodyear St., Irvine, CA 92715 714-859-8999

Sensitive Research Instrs., 25 Dock St., Mt. Vernon, NY 10550 914-699-9717

† Shokai Far East, Ltd., 280 North Central Ave., Hartsdale, NY 10530 914-681-0700

Sigma Instrs., Intl. Instr. Div., 88 Marsh Hill Rd., Orange, CT 06477 203-795-4711

§ Simpson Elec. Co., 853 Dundee Ave., Elgin, IL 60120 312-697-2260

§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 215-673-5600

§ Tucker Elctrns., Box 461966, Garland, TX 75046 .... 214-348-8800;800-527-4642

ZI-TECH Instr. Corp., 2151 Park Blvd., Box 60490, Palo Alto, CA 94306 415-326-2151

Meters, Ohm-2900

§ Associated Research, Inc., 8221 N. Kimball Ave., Skokie, IL 60076, 312-647-7850 .... D∘1181-1182

§ B & K Precision, Industrial Electronics Product Group, Dynascan Corporation, 6460 W. Cortland, Chicago, IL 60635, 312-889-9087 .... D∘1186-1187

IET Labs, Inc., 534 Main St., Westbury, NY 11590, 516-334-5959 .... D∘1242

§ NES, Inc. (Nationwide Electronic Systems), 3003 Wakefield, Carpentersville, IL 60110, 312-426-5900 ... D◦1367
RE Instruments Corp., 31029 Center Ridge Rd., Westlake, OH 44145, 216-871-7617 ... D◦1295
Tech Labs., Inc., Bergen & Edsall Blvds., Palisades Pk., NJ 07650, 201-944-2221 ... B◦1701
Tettex Instruments, Inc., P.O. Box 281, Fairview Village, PA 19409-0281, 215-539-6050 ... D◦1312
§ AEMC, 99 Chauncy, Boston, MA 02111 ... 617-451-0227;800-343-1391
Airpax Corp., Ft. Lauderdale Div., 6801 W. Sunrise Blvd., Ft. Lauderdale, FL 33313 ... 305-587-1100
Alpha Comps., 115 Eucalyptus Dr., El Segundo, CA 90245 ... 213-322-7780
† Amprobe Instr., 630 Merrick Rd., Lynbrook, NY 11563 ... 516-LY3-5600
§ API Instrs., 1601 Trapelo Rd., Waltham, MA 02254 ... 617-890-2000
§ BBC-Metrawatt/Goerz, 2150 W. 6th Ave., Broomfield, CO 80020 ... 303-469-5231; 800-821-6327
Beckman Industrial Corp., Cedar Grove Div., 89 Commerce Rd., Cedar Grove, NJ 07009 ... 201-239-6200
§ Beckman Industrial Corp., Emerson Electric Co., 630 Puente Street, Brea, CA 92621 ... 714-773-8111
§ Beede Electrical Instr. Co., S. Main St., Penacook, NH 03303 ... 603-753-6362
Biddle Instruments, A Thorn EMI Co., 510 Township Line Rd., Blue Bell, PA 19422 ... 215-646-9200
Bluffton Products, Inc., Tegam, Inc., 7230 North Ridge Road, Madison, OH 44057 ... 216-946-3572
CDS - Colorado Data Sys., 3301 W. Hampden, Unit C, Englewood, CO 80110 ... 303-762-1640
Colorado Data Systems, Inc., 3301 W. Hampden Ave., Unit C, Englewood, CO 80110 ... 303-762-1640
Cord Electronics, Inc., 177 Cantiague Rock Rd., Westbury, NY 11590 ... 516-935-3640
§† Data Precision Corp., Electronics Ave., Danvers, MA 01923 ... 617-246-1600
Data Tech, Div. of Penril Corp., 3110 W. Segerstrom, Santa Ana, CA 92704 ... 714-546-7160
Datel, General Electric Co., 11 Cabot Blvd., Mansfield, MA 02048 ... 617-339-9341
Datron Instrs., Inc., 3401 SW 42nd Ave., Stuart, FL 33497 ... 305-283-0935
DCI Inc., 14812 W. 117th Street, P.O. Box 215, Olathe, KS 66061 ... 913-782-5672
§† Digitech Industries, Inc., 66 Grove St., Ridgefield, CT 06877 ... 203-438-3731
Electro Scientific Inds., 13900 N.W. Science Pk. Dr., Portland, OR 97229 ... 503-641-4141
§ Epoch Enterprises, Ltd., 3541 N. Olive Rd., Tucson, AZ 85719 ... 602-887-1970; 888-5167
§ Fluke, John, Mfg. Co., Box C9090, MS 250C, Everett, WA 98206 ... 206-356-5400
§ Guildline Instrs., 4403 Vineland Rd, Suite B-10, Orlando, FL 32811-9998 ... 305-423-8215
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
Hickok Elec. Instr., 10514 DuPont Ave., Cleveland, OH 44108 ... 216-541-8060
Instrumentation Services, Inc., 957 Winnetka Ave. N., Minneapolis, MN 55427 ... 612-544-8916
§ Keithley Instrs., 28775 Aurora Rd., Cleveland, OH 44139 ... 216-248-0400
§ Leader Instrs. Corp., 380 Oser Ave., Hauppauge, NY 11788-3694 ... 516-231-6900
† Millivac Instrs., Box 997, Curry Rd. Ext., Schenectady, NY 12301 ... 518-355-8300
§ Non-Linear Systems/Div. of Kaypro Corp., 533 Stevens Ave., Solana Bch., CA 92075 ... 619-481-3900
§ PrimeLine-Soltec Distbn., Soltec Corp., P.O. Box 818, Sun Valley, CA 91353-0818 ... 800-525-5554;818-764-5400
† Q.V.S., Inc., 20 North 15th St., East Orange, NJ 07017 ... 201-673-3996
† Racal-Dana Instrs. Inc., 4 Goodyear St., Irvine, CA 92715 ... 714-859-8999
Shalltronix Corp., Preston St., P.O. Box 235, Selma, NC 27576 ... 919-965-6346
§ Shokai Far East, Ltd., 280 North Central Ave., Hartsdale, NY 10530 ... 914-681-0700
§ Shurite Meters, Inc., 577 Grand Ave., P.O. Box 1848, New Haven, CT 06508 ... 203-624-1188
§ Simpson Elec. Co., 853 Dundee Ave., Elgin, IL 60120 ... 312-697-2260
Slaughter Co., Moore & Hailey Sts., P.O. Box 1805, Ardmore, OK 73402 ... 405-223-4773
§ Spanta, Inc., Box 193, Franklin Lakes, NJ 07417 ... 201-337-0044
§ SPECO Div., Components Specialties, Inc., P.O. Box 624, 1172 Rte. 109, Lindenhurst, NY 11757 ... 516-957-8700;800-645-5516
§ Sperry, A. W., Instrs., P.O. Box 9300, Smithtown, NY 11787 ... 516-231-7050
§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 ... 215-673-5600
§ Techni-Tool, 5 Apollo Rd., Box 368, Plymouth Meeting, PA 19462 ... 215-825-4990
Texmate, Inc., 348 S. Cedros Ave., P.O. Box 2000, Solana Beach, CA 92075 ... 619-481-7177
TIF Instrs., Inc., 9101 N.W. 7th Ave., Miami, FL 33150 ... 305-757-8811
§ Triplett Corp.-A Penril Co., One Triplett Dr., Bluffton, OH 45817-9987 ... 419-358-5015
§ Tucker Elctrns., Box 461966, Garland, TX 75046 ... 214-348-8800;800-527-4642
United States Testing Co., Inc., 1415 Park Ave., Hoboken, NJ 07030 ... 800-631-3096; 201-792-2400
Valhalla Scientific, 9955 Mesa Rim Rd., San Diego, CA 92126 ... 619-457-5576
§ Vector Electronic Co., Inc., 12460 Gladstone Ave., Dept. EP, Box 4336, Sylmar, CA 91342 ... 818-365-9661
§ Yokogawa Corp. of America, 2 Dart Rd., Shenandoah, GA 30265 ... 404-253-7000

Meters, Panel (Analog)-2950

Dixson, Inc., Instrument Div., Box 1449, Grand Junction, CO 81502, 303-242-8863 ... D◦1349
EMICO Inc., Box 383, Dublin, PA 18917, 215-249-9330 ... D◦1352-1353
International Instruments, General Resistance, Inc., Twin Lakes Rd, P.O. Box 185, N. Branford, CT 06471, 203-481-3450 ... D◦1357
§ Jewell Electrical Instrs., Grenier Field, Manchester, NH 03108, 603-669-6400 ... D◦1359
† Millivac Instrs., Box 997, Curry Rd. Ext., Schenectady, NY 12301, 518-355-8300 ... D◦1266
§† Modutec, 18 Marshall St., Norwalk, CT 06854, 203-853-3636 ... D◦1362
North Atlantic Inds., Instrument Div., 60 Plant Ave., Hauppauge, NY 11788, 516-582-6500 ... D◦1373
Omega Engrg., Box 4047, Stamford, CT 06907, 203-359-1660 ... D◦1374
Shogyo Intl. Corp., 287 Northern Blvd., Great Neck, NY 11021, 516-466-0911 ... D◦1376
§ Shokai Far East, Ltd., 280 North Central Ave., Hartsdale, NY 10530, 914-681-0700 ... D◦1039
§ Simpson Elec. Co., 853 Dundee Ave., Elgin, IL 60120, 312-697-2260 ... D◦1377
Texmate, Inc., 348 S. Cedros Ave., P.O. Box 2000, Solana Beach, CA 92075, 619-481-7177 ... D◦1378
§ Triplett Corp.-A Penril Co., One Triplett Dr., Bluffton, OH 45817-9987, 419-358-5015 ... D◦1321,1380-1381
Airpax Corp., Ft. Lauderdale Div., 6801 W. Sunrise Blvd., Ft. Lauderdale, FL 33313 ... 305-587-1100
§ API Instrs., 1601 Trapelo Rd., Waltham, MA 02254 ... 617-890-2000
§† Bailey Controls Co., 29801 Euclid Ave., Wickliffe, OH 44092 ... 216-585-5800
Bartlett Instrument Co., 14th & Ave. "M', P.O. Box 445, Ft. Madison, IA 52627 ... 319-372-8366
§ BBC-Metrawatt/Goerz, 2150 W. 6th Ave., Broomfield, CO 80020 ... 303-469-5231; 800-821-6327
§ Beede Electrical Instr. Co., S. Main St., Penacook, NH 03303 ... 603-753-6362
† Bowmar/ALI, Bowmar Instr. Corp., 531 Main St., Acton, MA 01720 ... 617-263-8365
§ Calibron Instrs., Burton-Rogers Co., 220 Grove St., Waltham, MA 02154 ... 617-894-6440
Cord Electronics, Inc., 177 Cantiague Rock Rd., Westbury, NY 11590 ... 516-935-3640
Crompton Instrs., 2763 Higgins Road, Elk Grove Village, IL 60007 ... 714-841-2901
Crompton Instrs., Hawker Siddley, 2763 Old Higgins Rd., Elk Grove Village, IL 60007 ... 312-593-1107
Curtis Instrs., Inc., 200 Kisco Ave., Mt. Kisco, NY 10549 ... 914-666-2971
Dai-Ichi Shoji of Amer., Inc., 150 Fifth Ave., New York, NY 10011 ... 212-691-9050
§ Electrol Co., 321 Dewey St., P.O. Box 29, York, PA 17405 ... 717-848-1722
† Faria, Thomas G., Corp., P.O. Box 0983, Uncasville, CT 06382 ... 203-848-9271
Hickok Elec. Instr., 10514 DuPont Ave., Cleveland, OH 44108 ... 216-541-8060
† Ideal Precision Meter, 214 Franklin St., Brooklyn, NY 11222 ... 212-383-6904
† Imtronics Inds., 11930 31st Ct., St. Petersburg, FL 33715 ... 813-577-9010
ISL Products Int'l, Ltd., 235 P Robbins Lane, Syosset, NY 11791-6093 .. 516-822-9601
§ LFE, Process Control Div., 55 Green St., Clinton, MA 01510 ... 617-835-1000
Selco Products Co., SEL Sales, Inc., 7580 Stage Rd., Buena Park, CA 90621 ... 714-521-8673
§ Shurite Meters, Inc., 577 Grand Ave., P.O. Box 1848, New Haven, CT 06508 ... 203-624-1188
Sigma Instrs., Intl. Instr. Div., 88 Marsh Hill Rd., Orange, CT 06477 ... 203-795-4711
§ Square D Co., Executive Plaza, Palatine, IL 60067 ... 312-397-2600
§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 ... 215-673-5600
§ Techni-Tool, 5 Apollo Rd., Box 368, Plymouth Meeting, PA 19462 ... 215-825-4990
TIF Instrs., Inc., 9101 N.W. 7th Ave., Miami, FL 33150 ... 305-757-8811
§ TRW, Dynalco Controls Div., 5200 NW 37th, P.O. Box 8187, Ft. Lauderdale, FL 33310 ... 305-739-4300

Meters, Panel, Bargraph — See Meters, Bargraph (Vol. D)

Meters, Panel (Digital)-2950

§ C-Tek Inc., 4 Railroad Ave., Wakefield, MA 01880, 617-246-1720 ... D◦1114-1115
§ Data Tech, Div. of Penril Corp., 3110 W. Segerstrom, Santa Ana, CA 92704, 714-546-7160 ... D◦1334-1345
Datel, General Electric Co., 11 Cabot Blvd., Mansfield, MA 02048, 617-339-9341 ... D◦1346
DCI Inc., 14812 W. 117th Street, P.O. Box 215, Olathe, KS 66061, 913-782-5672 ... D◦1347
§ Digitec Corp., 918 Woodley Rd., P.O. Box 458, Dayton, OH 45401, 513-254-6251 ... D◦1348
Dio-Rey, Div. of Info-Lite, 422 Cliff St., Fairview, NJ 07022, 201-941-4455 ... B◦1044
§ Electro Industries, Div. E.I. Elctrns., Inc., 1800 Shames Drive, Westbury, NY 11590, 516-334-0870 ... D◦1350-1351
§ Gralex Inds., 295 Community Dr., Great Neck, NY 11021, 516-487-7289;800-645-6535 ... D◦1354-1356
Lincoln Instrs., 456 W. Montana St., Pasadena, CA 91103, 818-798-0733 ... D◦1361
§ Modutec, 18 Marshall St., Norwalk, CT 06854, 203-853-3636 ... D◦1363
§ NES, Inc. (Nationwide Electronic Systems), 3003 Wakefield, Carpentersville, IL 60110, 312-426-5900 ... B◦1089, D◦1069,1127,1159,1366-1367
§ Newport Electronics, 630 E. Young St., Santa Ana, CA 92705, 714-540-4914 ... D◦1370
† North Atlantic Inds., Instrument Div., 60 Plant Ave., Hauppauge, NY 11788, 516-582-6500 ... D◦1373
Omega Engrg., Box 4047, Stamford, CT 06907, 203-359-1660 ... D◦1374
§ Simpson Elec. Co., 853 Dundee Ave., Elgin, IL 60120, 312-697-2260 ... D◦1377
Texmate, Inc., 348 S. Cedros Ave., P.O. Box 2000, Solana Beach, CA 92075, 619-481-7177 ... D◦1378-1379
§ Velonex, 560 Robert Ave., Santa Clara, CA 95050, 408-727-7370 ... D◦1324,1383
§ Action Instrs., 8601 Aero Dr., San Diego, CA 92123 ... 619-279-5726
§ Ametek, 2 Station Square, Paoli, PA 19301 ... 215-355-6900
Anadex, 1001 Flynn Rd., Camarillo, CA 93010 ... 805-987-9660
† Analog Devices, P.O. Box 280, Norwood, MA 02062 ... 617-329-4700
§ Analogic Corp., 8 Centennial Dr., Peabody, MA 01961 ... 617-532-5660;617-777-4500; 617-246-0300;800-451-1
§ API Instrs., 1601 Trapelo Rd., Waltham, MA 02254 ... 617-890-2000
ARGA Controls, 35 E. Glenarm St., Pasadena, CA 91105 ... 213-682-3314
§† Bailey Controls Co., 29801 Euclid Ave., Wickliffe, OH 44092 ... 216-585-5800
Bartlett Instrument Co., 14th & Ave. "M', P.O. Box 445, Ft. Madison, IA 52627 ... 319-372-8366
† Bowmar/ALI, Bowmar Instr. Corp., 531 Main St., Acton, MA 01720 ... 617-263-8365
† BTU Engrg. Corp., Bruce Sys., Esquire Rd., N. Billerica, MA 01862 ... 617-667-4111
§ Calibron Instrs., Burton-Rogers Co., 220 Grove St., Waltham, MA 02154 ... 617-894-6440
§ Cincinnati Electrosys., 469 Wards Corner Rd., Loveland, OH 45140 ... 513-831-4347
Consolidated Controls, 15 Durant Ave., Bethel, CT 06801 ... 203-743-6721
Crompton Instrs., 2763 Higgins Road, Elk Grove Village, IL 60007 ... 714-841-2901

Meters, Panel (Digital)-2950 (Cont'd)

§† Data Precision Corp., Electronics Ave., Danvers, MA 01923 617-246-1600
§ Electrol Co., 321 Dewey St., P.O. Box 29, York, PA 17405 717-848-1722
§ Electromatic Controls Corp., 2495 Pembroke Road, Hoffman Estates, IL 60195-2010 312-882-5757
§ Electro-Numerics, 1811 Reynolds, Irvine, CA 92714 714-250-1501
Entran Devices, 10 Washington Ave., Fairfield, NJ 07006 201-227-1002
§ Extech International Corp., 150 Bear Hill Rd., Waltham, MA 02154 617-890-7440
§ Fluke, John, Mfg. Co., Box C9090, MS 250C, Everett, WA 98206 206-356-5400
IET Labs, Inc., 534 Main St., Westbury, NY 11590 516-334-5959
§† International Microtronics Corp., 4016 E. Tennessee St., Tucson, AZ 85714 602-748-7900
ISL Products Int'l, Ltd., 235 P Robbins Lane, Syosset, NY 11791-6093 .. 516-822-9601
† Jay Control Co., 21 Sequin Dr., Glastonbury, CT 06033 203-633-5294
§ Jumbo Process Control, Inc., 410 Garibaldi Ave., Lodi, NJ 07644 201-779-7744
§ Kessler-Ellis Prods., 120 1st Ave., Atlantic Highlands, NJ 07716 .... 201-291-0500; 800-631-2165
LFE, Process Control Div., 55 Green St., Clinton, MA 01510 617-835-1000
Martel Elctrns. Corp., 13 Heritage Hill Rd., Windham, NH 03087 .... 800-821-0023; 617-275-5970
Meterex Corp., 25 Industrial Park Rd., Hingham, MA 02043 617-749-8100
† Millivac Instrs., Box 997, Curry Rd. Ext., Schenectady, NY 12301 518-355-8300
§ Non-Linear Systems/Div. of Kaypro Corp., 533 Stevens Ave., Solana Bch., CA 92075 619-481-3900
Ohio Semitronics, Inc., 1205 Chesapeake Ave., Columbus, OH 43212 ... 614-486-9561
Pho-Tronics, 8701 W. Bradley Rd., Milwaukee, WI 53224 414-355-6704
§ Rye Inds., Inc., 125 Spencer Pl., P.O. Box M, Mamaroneck, NY 10543 ... 914-698-0080
Siltran Digital, 2250 Monterey Rd., Atascadero, CA 93422 805-466-3209
§ Spanta, Inc., Box 193, Franklin Lakes, NJ 07417 201-337-0044
§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 215-673-5600
§† Syntel Div., Tegam, Inc., 7230 North Ridge Rd., Madison, OH 44057 216-428-7505
§ Techni-Tool, 5 Apollo Rd., Box 368, Plymouth Meeting, PA 19462 215-825-4990
† Tegam, 7230 N. Ridge Rd., Madison, OH 44057 216-428-7505
Transistor Devices, 274 S. Salem St., Randolph, NJ 07869 201-361-6622
§ TRW, Dynalco Controls Div., 5200 NW 37th, P.O. Box 8187, Ft. Lauderdale, FL 33310 305-739-4300
Velonex, 560 Robert Ave., Santa Clara, CA 95050 408-727-7370

Meters, Peak Power-2900

Electro Impulse, Box 870, Red Bank, NJ 07701-0870, 201-741-0404 ..... D•1211
† General Microwave Corp., 155 Marine St., Farmingdale, NY 11735, 516-694-3600 .... D•1232
Bird Elctrn., 30303 Aurora Rd., Cleveland, OH 44139 216-248-1200
Bluffton Products, Inc., Tegam, Inc., 7230 North Ridge Road, Madison, OH 44057 216-946-3572
Coaxial Dynamics, 15210 Industrial Parkway, Cleveland, OH 44135 216-267-2233
Crompton Instrs., Hawker Siddley, 2763 Old Higgins Rd., Elk Grove Village, IL 60007 312-593-1107
§ Fluke, John, Mfg. Co., Box C9090, MS 250C, Everett, WA 98206 206-356-5400
§† Harris Corp., PRD Elctrns. Div., 6801 Jericho Tpke., Syosset, NY 11791 516-364-0400
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
Modular Audio Prods., Modular Devices Inc., 50 Orville Dr., Bohemia, NY 11716 516-567-9620
† Narda Microwave Corp., 435 Moreland Rd., Hauppauge, NY 11788 516-231-1700
§ Pacific Meas., Inc., 488 Tasman Drive, Sunnyvale, CA 94086 408-734-5780
Racal-Dana Instrs. Inc., 4 Goodyear St., Irvine, CA 92715 714-859-8999
Republic Electronics Co., 575 Broad Hollow Rd., Melville, NY 11747 516-249-1414
Scientific Columbus, Inc., Esterline Corp., 1900 Arlingate La., Columbus, OH 43228 614-274-7160
§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 215-673-5600
TIF Instrs., Inc., 9101 N.W. 7th Ave., Miami, FL 33150 305-757-8811
§ Tucker Elctrns., Box 461966, Garland, TX 75046 .... 214-348-8800;800-527-4642
Weinschel Engrg., One Weinschel La., Gaithersburg, MD 20877 .... 301-948-3434; 800-638-2048

Meters, PH-2900

§ Alpha-M Corp., 3009 Wildflower Dr., Dallas, TX 75229 214-620-0021
§ Analytical Meas., 31 Willow St., Chatham, NJ 07928 201-273-7500
Beckman Industrial Corp., Cedar Grove Div., 89 Commerce Rd., Cedar Grove, NJ 07009 201-239-6200
Corning Glass Works, Telecomm Prods Dept, BH-5, Corning, NY 14830 607-974-9000
Eitel Mfg., 2835 Laguna Canyon Rd., Laguna Beach, CA 92652 714-494-2012
Extech International Corp., 150 Bear Hill Rd., Waltham, MA 02154 617-890-7440
§ Jumbo Process Control, Inc., 410 Garibaldi Ave., Lodi, NJ 07644 201-779-7744
Leeds & Northrup Instrs., A Unit of General Signal Corp., Sumneytown Pike, North Wales, PA 19454 215-643-2000
Princo Instrs., Inc., 1020 Industrial Hwy., Southampton, PA 18966 215-355-1500
United States Testing Co., Inc., 1415 Park Ave., Hoboken, NJ 07030 ..... 800-631-3096; 201-792-2400

Meters, Phase-2900

Bell, F. W., Inc., 6120 Hanging Moss Rd., Orlando, FL 32807, 305-678-6900 .... D•1195
Deak Technology, Inc., Sainte Claire Plaza, 1121 Boyce Rd., Pittsburgh, PA 15241, 412-941-9520 .... D•1210
Krohn-Hite Corp., Avon Indl. Pk., Bodwell St., Avon, MA 02322, 617-580-1660 .... D•1259
† North Atlantic Inds., Instrument Div., 60 Plant Ave., Hauppauge, NY 11788, 516-582-6500 .... D•1283
† Ryan Intl. Corp., 4800 Evanswood Dr., Columbus, OH 43229, 614-885-3303 .... D•1303
§ AEMC, 99 Chauncy, Boston, MA 02111 .... 617-451-0227;800-343-1391
ARGA Controls, 35 E. Glenarm St., Pasadena, CA 91105 213-682-3314
§ Biddle Instruments, A Thorn EMI Co., 510 Township Line Rd., Blue Bell, PA 19422 215-646-9200
Bluffton Products, Inc., Tegam, Inc., 7230 North Ridge Road, Madison, OH 44057 216-946-3572
Bruel & Kjaer Instrs. Inc., 185 Forest St., Marlboro, MA 01752 617-481-7000
† Computer Conversions Corp., 6 Dunton Ct., E. Northport, NY 11731 516-261-3300
Comstron Corp., 200 E. Sunrise Hwy., Freeport, NY 11520 516-546-9700
Continental Resources, Inc., 175 Middlesex Tpke., Bedford, MA 01730 .. 617-275-0850
† Control Elctrns. Co., Inc., 107-B Allen Blvd., Farmingdale, NY 11735 516-694-0125
Crompton Instrs., 2763 Higgins Road, Elk Grove Village, IL 60007 714-841-2901
Crompton Instrs., Hawker Siddley, 2763 Old Higgins Rd., Elk Grove Village, IL 60007 312-593-1107
† Dranetz Technologies, Inc, Computer Products Division, 1000 New Durham Rd., P.O. Box 4019, Edison, NJ 08818-4019 201-287-3680
Dranetz Technologies, Inc., Industrial Products Division, 1000 New Durham Rd., P.O. Box 4019, Edison, NJ 08818-4019 201-287-3680
Esterline Angus Instr. Corp., Box 24000, Indianapolis, IN 46224 317-244-7611
Evans Electronics, Box 5055, Berkeley, CA 94705 415-653-3083
§ Feedback, 620 Springfield Ave., Berkeley Hghts., NJ 07922 201-464-5181
Genstar Rental Elctrns., 2445 Faber Pl., Palo Alto, CA 94303 415-856-7600
† Gorman-Redlich Mfg. Co., 6 Curtis St., Athens, OH 45701 614-593-3150
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
† Microwave/Sys., 1 Adler Dr., E. Syracuse, NY 13057 315-437-9951
Multi-Amp Corp., TBG, 4271 Bronze Way, Dallas, TX 75237 214-333-3201
Ohio Semitronics, Inc., 1205 Chesapeake Ave., Columbus, OH 43212 ... 614-486-9561
Racal-Dana Instrs. Inc., 4 Goodyear St., Irvine, CA 92715 714-859-8999
RE Instruments Corp., 31029 Center Ridge Rd., Westlake, OH 44145 ... 216-871-7617
§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 215-673-5600
§ Syntel Div., Tegam, Inc., 7230 North Ridge Rd., Madison, OH 44057 216-428-7505
Tegam, 7230 N. Ridge Rd., Madison, OH 44057 216-428-7505
§ Tucker Elctrns., Box 461966, Garland, TX 75046 .... 214-348-8800;800-527-4642
Universal Ad-Yu Elctrns., Inc., 2517 E. Norwich St., Milwaukee, WI 53207 414-482-4100
† Vibration Instrs. Co., 1614 Orangethorpe Way, Anaheim, CA 92801 714-879-6085
§ Wiltron, 805 E. Middlefield Rd., P.O. Box 7290, Mountain View, CA 94042-7290 415-969-6500

Meters, Power — See Meters, Watt

Meters, Power Factor-2900

Bell, F. W., Inc., 6120 Hanging Moss Rd., Orlando, FL 32807, 305-678-6900 .... D•1195
† Clarke-Hess Comm. Resch. Corp., 17 West 17th St., New York, NY 10011, 212-255-2940 .... D•1200
§ Electro Industries, Div. E.I. Elctrns., Inc., 1800 Shames Drive, Westbury, NY 11590, 516-334-0870 .... D•1350
§ North American Soar Corp., 11126 Cornell Ave., Cherry Hill, NJ 08002, 609-488-1060 .... D•1268-1269
PPM, Inc., 4521 Emery Ind. Pkwy., Cleveland, OH 44128, 216-292-6006 .. D•1291
§ AEMC, 99 Chauncy, Boston, MA 02111 .... 617-451-0227;800-343-1391
† Amprobe Instr., 630 Merrick Rd., Lynbrook, NY 11563 .... 516-LY3-5600
ARGA Controls, 35 E. Glenarm St., Pasadena, CA 91105 213-682-3314
Bluffton Products, Inc., Tegam, Inc., 7230 North Ridge Road, Madison, OH 44057 216-946-3572
Crompton Instrs., 2763 Higgins Road, Elk Grove Village, IL 60007 714-841-2901
Crompton Instrs., Hawker Siddley, 2763 Old Higgins Rd., Elk Grove Village, IL 60007 312-593-1107
† Dranetz Technologies, Inc, Computer Products Division, 1000 New Durham Rd., P.O. Box 4019, Edison, NJ 08818-4019 201-287-3680
Dranetz Technologies, Inc., Industrial Products Division, 1000 New Durham Rd., P.O. Box 4019, Edison, NJ 08818-4019 201-287-3680
Electrical Instr. Svc., 25 Dock St., Mt. Vernon, NY 10550 914-699-9717
Electronic Wattmeter Co., 2275 Sixth St., Sarasota, FL 33577 813-953-5355
§ Epoch Enterprises, Ltd., 3541 N. Olive Rd., Tucson, AZ 85719 .... 602-887-1970; 888-5167
Esterline Angus Instr. Corp., Box 24000, Indianapolis, IN 46224 317-244-7611
Highland Technology, Inc., 320 Judah Street, San Francisco, CA 94122 415-753-5814
Industrial Test Equip., 21 Yennicock Ave., Port Washington, NY 11050 .. 516-883-1700
§ NES, Inc. (Nationwide Electronic Systems), 3003 Wakefield, Carpentersville, IL 60110 312-426-5900
Ohio Semitronics, Inc., 1205 Chesapeake Ave., Columbus, OH 43212 ... 614-486-9561
† Q.V.S., Inc., 20 North 15th St., East Orange, NJ 07017 201-673-3996
RFL Inds., A Dowty Grp. Co./Instr. Div., Powerville Rd., Boonton, NJ 07005 201-334-3100
Scientific Columbus, Inc., Esterline Corp., 1900 Arlingate La., Columbus, OH 43228 614-274-7160
Sensitive Research Instrs., 25 Dock St., Mt. Vernon, NY 10550 914-699-9717
§ Square D Co., Executive Plaza, Palatine, IL 60067 312-397-2600
§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 215-673-5600
TIF Instrs., Inc., 9101 N.W. 7th Ave., Miami, FL 33150 305-757-8811
Valhalla Scientific, 9955 Mesa Rim Rd., San Diego, CA 92126 619-457-5576
§ Yokogawa Corp. of America, 2 Dart Rd., Shenandoah, GA 30265 404-253-7000

Meters, Q-2900

Blanck, A. R., Co., Box 249, Rutherford, NJ 07070 201-933-2091
Electro Scientific Inds., 13900 N.W. Science Pk. Dr., Portland, OR 97229 503-641-4141
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
IET Labs, Inc., 534 Main St., Westbury, NY 11590 516-334-5959
Rutherford Resch. Prods., Box 249, Rutherford, NJ 07070 201-933-2091
Scientific Columbus, Inc., Esterline Corp., 1900 Arlingate La., Columbus, OH 43228 614-274-7160
§ Tucker Elctrns., Box 461966, Garland, TX 75046 .... 214-348-8800;800-527-4642

Meters, Rate (Pulsed)-2900

NES, Inc. (Nationwide Electronic Systems), 3003 Wakefield, Carpentersville, IL 60110 312-426-5900

Meters, Ratio-2900

† North Atlantic Inds., Instrument Div., 60 Plant Ave., Hauppauge, NY 11788, 516-582-6500 ..... D•1283
Tettex Instruments, Inc., P.O. Box 281, Fairview Village, PA 19409-0281, 215-539-6050 ..... D•1312
§† Bailey Controls Co., 29801 Euclid Ave., Wickliffe, OH 44092 216-585-5800
§† Data Precision Corp., Electronics Ave., Danvers, MA 01923 617-246-1600
§ Data Tech, Div. of Penril Corp., 3110 W. Segerstrom, Santa Ana, CA 92704 714-546-7160
Datron Instrs., Inc., 3401 SW 42nd Ave., Stuart, FL 33497 305-283-0935
§ Digitec Corp., 918 Woodley Rd., P.O. Box 458, Dayton, OH 45401 513-254-6251
§ Dynapar, 1675 Delany Rd., Gurnee, IL 60031 312-662-2666
Electro Scientific Inds., 13900 N.W. Science Pk. Dr., Portland, OR 97229 503-641-4141
Esterline Angus Instr. Corp., Box 24000, Indianapolis, IN 46224 317-244-7611
Evans Electronics, Box 5055, Berkeley, CA 94705 415-653-3083
§ Guildline Instrs., 4403 Vineland Rd, Suite B-10, Orlando, FL 32811-9998 305-423-8215
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
§ NES, Inc. (Nationwide Electronic Systems), 3003 Wakefield, Carpentersville, IL 60110 312-426-5900
§ Newport Electronics, 630 E. Young St., Santa Ana, CA 92705 714-540-4914
§ Non-Linear Systems/Div. of Kaypro Corp., 533 Stevens Ave., Solana Bch., CA 92075 619-481-3900
Pacific Meas., Inc., 488 Tasman Drive, Sunnyvale, CA 94086 408-734-5780
† Racal-Dana Instrs. Inc., 4 Goodyear St., Irvine, CA 92715 714-859-8999
Sensitive Research Instrs., 25 Dock St., Mt. Vernon, NY 10550 914-699-9717
§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 215-673-5600
§ Tucker Elctrns., Box 461966, Garland, TX 75046 ..... 214-348-8800;800-527-4642
Weinschel Engrg., One Weinschel La., Gaithersburg, MD 20877 ..... 301-948-3434; 800-638-2048

Meters, Reflectometer-2900

Photodyne, 1175 Tourmaline Dr., Newbury Park, CA 91320, 818-889-8770 ..... B•1122-1123
TRW Optoelectronics Div., 1207 Tappan Circle, Carrollton, TX 75006, 214-323-2200 ..... B•1223
§ BEA electro-optics, Inc., 690 First Ave., Des Plaines, IL 60016 312-298-1420
Beckman Instrs., 2500 Harbor Blvd., Fullerton, CA 92634 714-871-4848
† Bird Elctrn., 30303 Aurora Rd., Cleveland, OH 44139 216-248-1200
Coaxial Dynamics, 15210 Industrial Parkway, Cleveland, OH 44135 216-267-2233
EG&G Gamma Scientific, Div. of EG&G Inc., 3777 Ruffin Rd., San Diego, CA 92123 619-279-8034
Foundation Instruments Inc., 24 Colonnade Rd., Nepean, ON, CANADA K2E 7J6 613-226-4000
Gamma Scientific Inc., 3777 Ruffin Rd., San Diego, CA 92123 619-279-8034
† Narda Microwave Corp., 435 Moreland Rd., Hauppauge, NY 11788 516-231-1700
Pacific Meas., Inc., 488 Tasman Drive, Sunnyvale, CA 94086 408-734-5780
United Detector Tech., 12525 Chadron Ave., Hawthorne, CA 90250 213-978-0516
§ Waveline, Box 718, W. Caldwell, NJ 07006 201-226-9100

Meters, Relay — See Relays, Meter (Vol. B)

Meters, Resistance-2900

§ Beckman Industrial Corp., Emerson Electric Co., 630 Puente Street, Brea, CA 92621 714-773-8111
Electro Scientific Inds., 13900 N.W. Science Pk. Dr., Portland, OR 97229 503-641-4141
§ Pacer Industries, Inc., 1450 First Ave., Chippewa Falls, WI 54729 715-723-1141

Meters, RFI-2900

† Applied Communications, 9125 Gaither Rd., Gaithersburg, MD 20877 301-948-5210
Brady Co., 574A Somerset St., N. Plainfield, NJ 07060 201-753-7988
Continental Resources, Inc., 175 Middlesex Tpke., Bedford, MA 01730 617-275-0850
§† Electro-Metrics, Penril Corp., 100 Church St., Amsterdam, NY 12010 518-843-2600
§ Fluke, John, Mfg. Co., Box C9090, MS 250C, Everett, WA 98206 206-356-5400
Instruments for Industry, Inc., 151 Toledo St., Farmingdale, NY 11735 516-694-1414
Schaffner EMC, Inc., Instr. Div., 825 Lehigh Avenue, Union, NJ 07083 201-851-0644
Transmet Corp., 4290 Perimeter Dr., Columbus, OH 43228 ..... 614-276-5522; 800-245-5253
§ Tucker Elctrns., Box 461966, Garland, TX 75046 ..... 214-348-8800;800-527-4642

Meters, S Unit-2900

A & D Elec. Instrs., 73-07 88th St., Glendale, NY 11385 718-275-6516
§ Bartlett Instrument Co., 14th & Ave. "M", P.O. Box 445, Ft. Madison, IA 52627 319-372-8366
Beede Electrical Instr. Co., S. Main St., Penacook, NH 03303 603-753-6362
ECO Instrs. Div., Sea Data Corp., 1 Bridge St., Newton, MA 02158 617-964-8360
§ Jewell Electrical Instrs., Grenier Field, Manchester, NH 03108 603-669-6400
Shogyo Intl. Corp., 287 Northern Blvd., Great Neck, NY 11021 516-466-0911
† Shokai Far East, Ltd., 280 North Central Ave., Hartsdale, NY 10530 914-681-0700

Meters, Slope — See Inclinometer

Meters, Snap-around — See Meters, Clamp-on (Vol. D)

Meters, Standing Wave Ratio-2900

§ Bell Inds., J. W. Miller Div., 19070 Reyes Ave., P.O. Box 5825, Rancho Dominguez, CA 90224 213-537-5200
§† Bird Elctrn., 30303 Aurora Rd., Cleveland, OH 44139 216-248-1200
Continental Resources, Inc., 175 Middlesex Tpke., Bedford, MA 01730 617-275-0850
§ GC Elctrns., 400 S. Wyman St., Rockford, IL 61101 815-968-9661
§† Harris Corp., PRD Elctrns. Div., 6801 Jericho Tpke., Syosset, NY 11791 516-364-0400
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
§ Jewell Electrical Instrs., Grenier Field, Manchester, NH 03108 603-669-6400
† Narda Microwave Corp., 435 Moreland Rd., Hauppauge, NY 11788 516-231-1700
† Shokai Far East, Ltd., 280 North Central Ave., Hartsdale, NY 10530 914-681-0700
§ Sinclair Radio Labs., 122 Rayette Rd., Concord, ONT, CANADA L9W2Y8 416-669-1244
Sivers IMA, 5669 Selmaraine Drive, Culver City, CA 90230 213-390-7477
§ Techni-Tool, 5 Apollo Rd., Box 368, Plymouth Meeting, PA 19462 215-825-4990
Telco Products Co., 44 Sea Cliff, Glen Cove, NY 11542 516-759-0300
§ Tucker Elctrns., Box 461966, Garland, TX 75046 ..... 214-348-8800;800-527-4642
Weinschel Engrg., One Weinschel La., Gaithersburg, MD 20877 ..... 301-948-3434; 800-638-2048
§ Wiltron, 805 E. Middlefield Rd., P.O. Box 7290, Mountain View, CA 94042-7290 415-969-6500
§† Workman Elctrn. Prods., Box 3828, Sarasota, FL 33578 813-371-4242

Meters, Static Decay-2900

§ NRD, Mark IV Ind., Inc., 2937 Alt Blvd. N., Grand Island, NY 14072, 716-773-7634 ..... D•1983
Brady Co., 574A Somerset St., N. Plainfield, NJ 07060 201-753-7988
Electro-Tech Sys., Inc., 115 E. Glenside Ave., Glenside, PA 19038 215-887-2196
§ Simco Co., 2257 North Penn Rd., Hatfield, PA 19440 215-822-2171
Voyager Technologies, Inc., 2250 Cabot Blvd. W. Bldg. 40M, Langhorne, PA 19047 215-750-0270

Meters, Taut Band-2950

EMICO Inc., Box 368, Dublin, PA 18917, 215-249-9330 ..... D•1352
International Instruments, General Resistance, Inc., Twin Lakes Rd, P.O. Box 185, N. Branford, CT 06471, 203-481-3450 ..... D•1357
Kurz Instruments, Inc., P.O. Box 849, Carmel Valley, CA 93924, 800-424-7356 ..... B•1800
§† Modutec, 18 Marshall St., Norwalk, CT 06854, 203-853-3636 ..... D•1362
§ Simpson Elec. Co., 853 Dundee Ave., Elgin, IL 60120, 312-697-2260 ..... D•1377
§ Triplett Corp.-A Penril Co., One Triplett Dr., Bluffton, OH 45817-9987, 419-358-5015 ..... D•1321,1380
Bluffton Products, Inc., Tegam, Inc., 7230 North Ridge Road, Madison, OH 44057 216-946-3572
Crompton Instrs., 2763 Higgins Road, Elk Grove Village, IL 60007 714-841-2901
Crompton Instrs., Hawker Siddley, 2763 Old Higgins Rd., Elk Grove Village, IL 60007 312-593-1107
† Faria, Thomas G., Corp., P.O. Box 0983, Uncasville, CT 06382 203-848-9271
† Hickok Elec. Instr., 10514 DuPont Ave., Cleveland, OH 44108 216-541-8060
§ Jewell Electrical Instrs., Grenier Field, Manchester, NH 03108 603-669-6400
Selco Products Co., SEL Sales, Inc., 7580 Stage Rd., Buena Park, CA 90621 714-521-8673
§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 215-673-5600

Meters, Temperature (Contacting)-2900

DCI Inc., 14812 W. 117th Street, P.O. Box 215, Olathe, KS 66061, 913-782-5672 ..... D•1347
Digitec Corp., 918 Woodley Rd., P.O. Box 458, Dayton, OH 45401, 513-254-6251 ..... D•1348
Harrel, Inc., 16 Fitch St., E. Norwalk, CT 06855, 203-866-2573 ..... D•1122
Jewell Electrical Instrs., Grenier Field, Manchester, NH 03108, 603-669-6400 ..... D•1359
Kurz Instruments, Inc., P.O. Box 849, Carmel Valley, CA 93924, 800-424-7356 ..... B•1800
§ NES, Inc. (Nationwide Electronic Systems), 3003 Wakefield, Carpentersville, IL 60110, 312-426-5900 ..... D•1366,1368
§ Newport Electronics, 630 E. Young St., Santa Ana, CA 92705, 714-540-4914 ..... D•1370
§ North American Soar Corp., 11126 Cornell Ave., Cherry Hill, NJ 08002, 609-488-1060 ..... D•1269,1273-1276
Omega Engrg., Box 4047, Stamford, CT 06907, 203-359-1660 ..... B•1683, D•1290,1374
§ Simpson Elec. Co., 853 Dundee Ave., Elgin, IL 60120, 312-697-2260 ..... D•1308
Texmate, Inc., 348 S. Cedros Ave., P.O. Box 2000, Solana Beach, CA 92075, 619-481-7177 ..... D•1379
§ Triplett Corp.-A Penril Co., One Triplett Dr., Bluffton, OH 45817-9987, 419-358-5015 ..... D•1380
A & D Elec. Instrs., 73-07 88th St., Glendale, NY 11385 718-275-6516
† Acromag, 30765 Wixom Rd., Wixom, MI 48096 313-624-1541
Advanced Techn. Research Labs., 5645 K General Washington Dr., Alexandria, VA 22312 703-750-2920
Alpha Comps., 115 Eucalyptus Dr., El Segundo, CA 90245 213-322-7780
† Amprobe Instr., 630 Merrick Rd., Lynbrook, NY 11563 ..... 516-LY3-5600
† Analog Devices, P.O. Box 280, Norwood, MA 02062 617-329-4700
§ Analogic Corp., 8 Centennial Dr., Peabody, MA 01961 ..... 617-532-5660;617-777-4500; 617-246-0300;800-451-1
§ API Instrs., 1601 Trapelo Rd., Waltham, MA 02254 617-890-2000
ARGA Controls, 35 E. Glenarm St., Pasadena, CA 91105 213-682-3314
§ Atkins Tech., 3321 S.W. 40th Blvd., Gainesville, FL 32608 904-378-5555
§† Bailey Controls Co., 29801 Euclid Ave., Wickliffe, OH 44092 216-585-5800
Barber-Colman Co., Indl. Instrs. Div., P.O. Box 2940, 1354 Clifford Ave., Loves Park, IL 61132 815-877-0241
Bartlett Instrument Co., 14th & Ave. "M", P.O. Box 445, Ft. Madison, IA 52627 319-372-8366
§ Beckman Industrial Corp., Emerson Electric Co., 630 Puente Street, Brea, CA 92621 714-773-8111
§ Beede Electrical Instr. Co., S. Main St., Penacook, NH 03303 603-753-6362
Biddle Instruments, A Thorn EMI Co., 510 Township Line Rd., Blue Bell, PA 19422 215-646-9200
Bluffton Products, Inc., Tegam, Inc., 7230 North Ridge Road, Madison, OH 44057 216-946-3572
† BTU Engrg. Corp., Bruce Sys., Esquire Rd., N. Billerica, MA 01862 617-667-4111
Continental Resources, Inc., 175 Middlesex Tpke., Bedford, MA 01730 617-275-0850
Crompton Instrs., 2763 Higgins Road, Elk Grove Village, IL 60007 714-841-2901
Crompton Instrs., Hawker Siddley, 2763 Old Higgins Rd., Elk Grove Village, IL 60007 312-593-1107

§† Data Precision Corp., Electronics Ave., Danvers, MA 01923 617-246-1600
Dio-Rey, Div. of Info-Lite, 422 Cliff St., Fairview, NJ 07022 201-941-4455
† Dresser Inds., 1505 Elm St, Dallas, TX 75201 214-746-6000
ECO Instrs. Div., Sea Data Corp., 1 Bridge St, Newton, MA 02158 617-964-8360
§ EDL, Inc., 385 Oser Ave., Hauppauge, NY 11788 ..... 516-435-2808;1-800-DIAL EDL
Electric Tachometer, 68th & Upland Sts., Philadelphia, PA 19142 ..... 215-SA6-7723
§ Electromatic Controls Corp., 2495 Pembroke Road, Hoffman Estates, IL 60195-2010 312-882-5757
§ Electronic Controls Design, 13626 S. Freeman Rd., Mulino, OR 97042 503-829-9108
§ Electro-Numerics, 1811 Reynolds, Irvine, CA 92714 714-250-1501
EMICO Inc., Box 368, Dublin, PA 18917 215-249-9330
§ E^2 Technology Corp., 4475 Dupont Ct #9, Ventura, CA 93003 805-644-9544
Extech International Corp., 150 Bear Hill Rd., Waltham, MA 02154 617-890-7440
† Faria, Thomas G., Corp., P.O. Box 0983, Uncasville, CT 06382 203-848-9271
§ Fenwal, Inc., 400 Main St, Ashland, MA 01721 617-881-2000
§ Fluke, John, Mfg. Co., Box C9090, MS 250C, Everett, WA 98206 206-356-5400
Gordon, Claud S., Co., 5710 Kenosha St, Richmond, IL 60071 815-678-2211
§ Hades Mfg. Corp., 151-A Verdi St, Farmingdale, NY 11735 516-249-4244
§ Hickok Elec. Instr., 10514 DuPont Ave., Cleveland, OH 44108 216-541-8060
Hy-Cal Engrg., 9650 Telstar Ave., El Monte, CA 91731 213-444-4000
† Instrulab, P.O. B. 98, Dayton, OH 45404 513-223-2241
§ J-B-T Instrs., Box 1818, New Haven, CT 06508 203-776-1111
§ Jensen Tools, Inc., Axia, Inc., 7815 S. 46th St, Phoenix, AZ 85040 602-968-6241
§ Jumbo Process Control, Inc., 410 Garibaldi Ave., Lodi, NJ 07644 201-779-7744
§ Keithley Instrs., 28775 Aurora Rd., Cleveland, OH 44139 216-248-0400
Larson Instr., Greenbush Rd., Orangeburg, NY 10962 914-359-3800
LFE, Process Control Div., 55 Green St, Clinton, MA 01510 617-835-1000
§ Love Controls, 1475 S. Wheeling Rd., Wheeling, IL 60090 312-541-3232
Mag-Con, 1626 Terrace Dr., St. Paul, MN 55113 612-633-8820
§ Mann, Henry, Inc., 3983 Mann Road, Huntingdon Valley, PA 19006 215-355-7200
Martel Elctrns. Corp., 13 Heritage Hill Rd., Windham, NH 03087 ..... 800-821-0023; 617-275-5970
§ Metrosonics, Inc., Box 23075, Rochester, NY 14692-3075 716-334-7300
Modutec, 18 Marshall St., Norwalk, CT 06854 203-853-3636
§ Non-Linear Systems/Div. of Kaypro Corp., 533 Stevens Ave., Solana Bch., CA 92075 619-481-3900
Pace Inc., 9893 Brewers Ct, Laurel, MD 20707 301-490-9860
§ Pacer Industries, Inc., 1450 First Ave., Chippewa Falls, WI 54729 715-723-1141
§ Pacific Transducer, 2301 Federal, Los Angeles, CA 90064 213-478-1134
Princo Instrs., Inc., 1020 Industrial Hwy., Southampton, PA 18966 215-355-1500
Racal-Dana Instrs. Inc., 4 Goodyear St, Irvine, CA 92715 714-859-8999
† Sensortek, Inc., 154 Em Huron Ave., Clifton, NJ 07013 201-779-5577
§ Solder Absorbing Technology (SAT), South End Bridge Circle, Agawam, MA 01001 800-628-8862
Stow Labs., Inc., Kane Ind'l. Dr., Hudson, MA 01749 617-562-9347
§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 215-673-5600
§ Syscon Intl., Inc., 1108 So. High St., So. Bend, IN 46618-1096 ..... 219-232-3900; 800-348-2993
§ Techni-Tool, 5 Apollo Rd., Box 368, Plymouth Meeting, PA 19462 215-825-4990
§ Testoterm, P.O. Box 111509, Nashville, TN 37211 615-834-5082
Thermo Electric, 109 Fifth St., Saddle Brook, NJ 07662 201-843-5800
TIF Instrs., Inc., 9101 N.W. 7th Ave., Miami, FL 33150 305-757-8811
Tracor Paktronics, 2441 Northeast Pkwy., Ft. Worth, TX 76106 817-625-2311
Trans-Met Engrg., 601 S. Palm St., La Habra, CA 90631 213-691-2266
§ TRW, Dynalco Controls Div., 5200 NW 37th, P.O. Box 8187, Ft. Lauderdale, FL 33310 305-739-4300
VirTis Co., Rte. 208, Gardiner, NY 12525 914-255-5000
§ Wahl Instruments, Inc., 5750 Hannum Ave., Culver City, CA 90230 213-822-6144
§ Westberg Mfg., Inc., 3400 Westach Way, Sonoma, CA 95476 707-938-2121
§ West Division, Gulton Industries, Inc., 3860 N. River Rd., Schiller Park, IL 60176 312-678-6400
Westemp Corp., Box 767, Cardiff, CA 92007 619-942-9800
§ Yellow Springs Instr., Box 279, Yellow Springs, OH 45387 513-767-7241
§† Yokogawa Corp. of America, 2 Dart Rd., Shenandoah, GA 30265 404-253-7000

Meters, Temperature, Dial type (Noncontacting) — See Pyrometers (Vol. D)

Meters, Temperature, Infrared-2900

Blufíton Products, Inc., Tegam, Inc., 7230 North Ridge Road, Madison, OH 44057 216-946-3572
EG&G Gamma Scientific, Div. of EG&G Inc., 3777 Ruffin Rd., San Diego, CA 92123 619-279-8034
§ Everest Interscience, Inc., P.O. Box 345, Tustin, CA 92681 ..... 714-992-4461; 714-730-0747
Extech International Corp., 150 Bear Hill Rd., Waltham, MA 02154 617-890-7440
§ Jumbo Process Control, Inc., 410 Garibaldi Ave., Lodi, NJ 07644 201-779-7744
Omega Engrg., Box 4047, Stamford, CT 06907 203-359-1660
§ Pacer Industries, Inc., 1450 First Ave., Chippewa Falls, WI 54729 715-723-1141

Meters, Thermal Transfer-2900

Ballantine Labs., 90 Fanny Rd., Boonton, NJ 07005, 201-335-0900 ..... D•1105
Sensitive Research Instrs., 25 Dock St., Mt. Vernon, NY 10550, 914-699-9717 ..... D•1304
Analogic Corp., 8 Centennial Dr., Peabody, MA 01961 ..... 617-532-5660;617-777-4500; 617-246-0300;800-451-1
† BTU Engrg. Corp., Bruce Sys., Esquire Rd., N. Billerica, MA 01862 617-667-4111
Electrical Instr. Svc., 25 Dock St., Mt. Vernon, NY 10550 914-699-9717
Fluke, John, Mfg. Co., Box C9090, MS 250C, Everett, WA 98206 206-356-5400
Hy-Cal Engrg., 9650 Telstar Ave., El Monte, CA 91731 213-444-4000
Maury Microwave, 8610 Helms Ave., Cucamonga, CA 91730 714-987-4715
Tracor Paktronics, 2441 Northeast Pkwy., Ft. Worth, TX 76106 817-625-2311

Meters, Time Interval — See Timers, Interval (Vol. D)

Meters, Vacuum Tube Volt (VTVM)-2900

ARGA Controls, 35 E. Glenarm St., Pasadena, CA 91105 213-682-3314
Ballantine Labs., 90 Fanny Rd., Boonton, NJ 07005 201-335-0900
§ B & K Precision, Industrial Electronics Product Group, Dynascan Corporation, 6460 W. Cortland, Chicago, IL 60635 312-889-9087
Continental Resources, Inc., 175 Middlesex Tpke., Bedford, MA 01730 617-275-0850
§ Heath Co., Benton Harbor, MI 49022 616-982-3886
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 ..... Call Local Sls. Off.
Ross Engrg. Corp., 540 Westchester Dr., Campbell, CA 95008 408-377-4621
† Shokai Far East, Ltd., 280 North Central Ave., Hartsdale, NY 10530 914-681-0700
§ Simpson Elec. Co., 853 Dundee Ave., Elgin, IL 60120 312-697-2260
§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 215-673-5600
§ Triplett Corp.-A Penril Co., One Triplett Dr., Bluffton, OH 45817-9987 419-358-5015
§ Tucker Elctrns., Box 461966, Garland, TX 75046 ..... 214-348-8800;800-527-4642

Meters, VAR-2900

Clarke-Hess Comm. Resch. Corp., 17 West 17th St., New York, NY 10011, 212-255-2940 ..... D•1201
§ AEMC, 99 Chauncy, Boston, MA 02111 ..... 617-451-0227;800-343-1391
† Amprobe Instr., 630 Merrick Rd., Lynbrook, NY 11563 ..... 516-LY3-5600
§ BBC-Metrawatt/Goerz, 2150 W. 6th Ave., Broomfield, CO 80020 ..... 303-469-5231; 800-821-6327
Bluffton Products, Inc., Tegam, Inc., 7230 North Ridge Road, Madison, OH 44057 216-946-3572
Continental Resources, Inc., 175 Middlesex Tpke., Bedford, MA 01730 617-275-0850
Crompton Instrs., 2763 Higgins Road, Elk Grove Village, IL 60007 714-841-2901
Crompton Instrs., Hawker Siddley, 2763 Old Higgins Rd., Elk Grove Village, IL 60007 312-593-1107
† Dranetz Technologies, Inc, Computer Products Division, 1000 New Durham Rd., P.O. Box 4019, Edison, NJ 08818-4019 201-287-3680
Dranetz Technologies, Inc., Industrial Products Division, 1000 New Durham Rd., P.O. Box 4019, Edison, NJ 08818-4019 201-287-3680
§ Electro Industries, Div. E.I. Elctrns., Inc., 1800 Shames Drive, Westbury, NY 11590 516-334-0870
Electronic Wattmeter Co., 2275 Sixth St., Sarasota, FL 33577 813-953-5355
Esterline Angus Instr. Corp., Box 24000, Indianapolis, IN 46224 317-244-7611
Ohio Semitronics, Inc., 1205 Chesapeake Ave., Columbus, OH 43212 614-486-9561
PPM, Inc., 4521 Emery Ind. Pkwy., Cleveland, OH 44128 216-292-6006
RFL Inds., A Dowty Grp. Co./Instr. Div., Powerville Rd., Boonton, NJ 07005 201-334-3100
Scientific Columbus, Inc., Esterline Corp., 1900 Arlingate La., Columbus, OH 43228 614-274-7160
§ Square D Co., Executive Plaza, Palatine, IL 60067 312-397-2600
§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 215-673-5600
Yokogawa Corp. of America, 2 Dart Rd., Shenandoah, GA 30265 404-253-7000

Meters, Vibration-2900

Chatsworth Data Corp, Cablemaster Div., 20710 Lassen St., Chatsworth, CA 91311, 818-341-9200 ..... D•1199
§ Vibra-Metrics, 1014 Sherman Ave., Hamden, CT 06514, 203-288-6158;1-800-352-2001 ..... B•1832
Alpha-M Corp., 3009 Wildflower Dr., Dallas, TX 75229 214-620-0021
Bell & Howell/CEC Div., 360 Sierra Madre Villa, Pasadena, CA 91109 213-796-9381
Bently Nevada Corp., P.O. Box 157, Minden, NV 89423 702-782-3611
Bluffton Products, Inc., Tegam, Inc., 7230 North Ridge Road, Madison, OH 44057 216-946-3572
Bruel & Kjaer Instrs. Inc., 185 Forest St., Marlboro, MA 01752 617-481-7000
Chatsworth Data Corp, Impact-o-Graph Div., 20710 Lassen St., Chatsworth, CA 91311 213-341-3000
† Columbia Resch. Labs., Macdade Blvd. & Bullens La., Woodlyn, PA 19094 215-532-9464
Continental Resources, Inc., 175 Middlesex Tpke., Bedford, MA 01730 617-275-0850
§ Endevco, 30700 Rancho Viejo Rd., San Juan Capistrano, CA 92675 714-493-8181
§ Epic, Inc., 150 Nassau St., New York, NY 10038 212-349-2470
§ Metrix Instrument Co., 1711 Townhurst, Houston, TX 77043 713-461-2131
† PCB Piezotronics, 3425 Walden Ave., Depew, NY 14043-2495 716-684-0001
§ Spanta, Inc., Box 193, Franklin Lakes, NJ 07417 201-337-0044
§ Tucker Elctrns., Box 461966, Garland, TX 75046 ..... 214-348-8800;800-527-4642
Unholtz-Dickie Corp., 6 Brookside Dr., Wallingford, CT 06492 203-265-3929
† Vibration Instrs. Co., 1614 Orangethorpe Way, Anaheim, CA 92801 714-879-6085
§ Vibro-Meter Corp., 1 Progress Rd., Billerica, MA 01822-5058 617-663-7600

Meters, Volt, AC-2900

Clarke-Hess Comm. Resch. Corp., 17 West 17th St., New York, NY 10011, 212-255-2940 ..... D•1200
Diego Power, 5350 Eastgate Mall, San Diego, CA 92121, 587-1925 ..... D•1916
§ Digitec Corp., 918 Woodley Rd., P.O. Box 458, Dayton, OH 45401, 513-254-6251 ..... D•1348
§ Electro Industries, Div. E.I. Elctrns., Inc., 1800 Shames Drive, Westbury, NY 11590, 516-334-0870 ..... D•1350-1351
EMICO Inc., Box 368, Dublin, PA 18917, 215-249-9330 ..... D•1352
Hipotronics, P.O. Drawer A, Brewster, NY 10509, 914-279-8091 ..... D•1239
IET Labs, Inc., 534 Main St., Westbury, NY 11590, 516-334-5959 ..... D•1242,1245
Jennings, 970 McLaughlin Ave., San Jose, CA 95122, 408-292-4025 ..... D•1251
† Millivac Instrs., Box 997, Curry Rd. Ext., Schenectady, NY 12301, 518-355-8300 ..... D•1266
§† Modutec, 18 Marshall St., Norwalk, CT 06854, 203-853-3636 ..... D•1362-1363
§ North American Soar Corp., 11126 Cornell Ave., Cherry Hill, NJ 08002, 609-488-1060 ..... D•1268,1274
Ross Engrg. Corp., 540 Westchester Dr., Campbell, CA 95008, 408-377-4621 ..... B•1443
† Sensitive Research Instrs., 25 Dock St., Mt. Vernon, NY 10550, 914-699-9717 ..... D•1304,1306
† Shogyo Intl. Corp., 287 Northern Blvd., Great Neck, NY 11021, 516-466-0911 ..... D•1376

Texmate, Inc., 348 S. Cedros Ave., P.O. Box 2000, Solana Beach, CA 92075, 619-481-7177 ... D•1378
§ **Triplett Corp.-A Penril Co., One Triplett Dr., Bluffton, OH 45817-9987, 419-358-5015 ... D•1320,1380**
§ AEMC, 99 Chauncy, Boston, MA 02111 ... 617-451-0227;800-343-1391
Amber Electro Design Inc., 4810 Jean Talon Blvd. W Ste 321, Montreal, Quebec, CANADA H4P2N5 ... 514-735-4105
American HV Test Systems Inc., Central Garrett Ind'l. Pk., Accident, MD 21520 ... 301-826-8651
§ Analogic Corp., 8 Centennial Dr., Peabody, MA 01961 ... 617-532-5660;617-777-4500; 617-246-0300;800-451-1
† Ballantine Labs., 90 Fanny Rd., Boonton, NJ 07005 ... 201-335-0900
Bartlett Instrument Co., 14th & Ave. "M', P.O. Box 445, Ft. Madison, IA 52627 ... 319-372-8366
§ BBC-Metrawatt/Goerz, 2150 W. 6th Ave., Broomfield, CO 80020 ... 303-469-5231; 800-821-6327
§ Beckman Industrial Corp., Emerson Electric Co., 630 Puente Street, Brea, CA 92621 ... 714-773-8111
Beede Electrical Instr. Co., S. Main St., Penacook, NH 03303 ... 603-753-6362
Bluffton Products, Inc., Tegam, Inc., 7230 North Ridge Road, Madison, OH 44057 ... 216-946-3572
Boonton Elctrns. Corp., 791 Route 10, Randolph, NJ 07869 ... 201-584-1077
† Bowmar/ALI, Bowmar Instr. Corp., 531 Main St., Acton, MA 01720 ... 617-263-8365
§ Calibron Instrs., Burton-Rogers Co., 220 Grove St., Waltham, MA 02154 ... 617-894-6440
CDS - Colorado Data Sys., 3301 W. Hampden, Unit C, Englewood, CO 80110 ... 303-762-1640
Cord Electronics, Inc., 177 Cantiague Rock Rd., Westbury, NY 11590 ... 516-935-3640
Crompton Instrs., 2763 Higgins Road, Elk Grove Village, IL 60007 ... 714-841-2901
Crompton Instrs., Hawker Siddley, 2763 Old Higgins Rd., Elk Grove Village, IL 60007 ... 312-593-1107
§† Data Precision Corp., Electronics Ave., Danvers, MA 01923 ... 617-246-1600
§ Data Tech, Div. of Penril Corp., 3110 W. Segerstrom, Santa Ana, CA 92704 ... 714-546-7160
Datel, General Electric Co., 11 Cabot Blvd., Mansfield, MA 02048 ... 617-339-9341
Datron Instrs., Inc., 3401 SW 42nd Ave., Stuart, FL 33497 ... 305-283-0935
DCI Inc., 14812 W. 117th Street, P.O. Box 215, Olathe, KS 66061 ... 913-782-5672
§† Digitech Industries, Inc., 66 Grove St., Ridgefield, CT 06877 ... 203-438-3731
Dixson, Inc., Instrument Div., Box 1449, Grand Junction, CO 81502 ... 303-242-8863
Dranetz Technologies, Inc, Computer Products Division, 1000 New Durham Rd., P.O. Box 4019, Edison, NJ 08818-4019 ... 201-287-3680
Dranetz Technologies, Inc., Industrial Products Division, 1000 New Durham Rd., P.O. Box 4019, Edison, NJ 08818-4019 ... 201-287-3680
ECO Instrs. Div., Sea Data Corp., 1 Bridge St., Newton, MA 02158 ... 617-964-8360
§ EDL, Inc., 385 Oser Ave., Hauppauge, NY 11788 ... 516-435-2808;1-800-DIAL EDL
† Electrical Instr. Svc., 25 Dock St., Mt. Vernon, NY 10550 ... 914-699-9717
Electronic Wattmeter Co., 2275 Sixth St., Sarasota, FL 33577 ... 813-953-5355
§ Electro-Numerics, 1811 Reynolds, Irvine, CA 92714 ... 714-250-1501
§ Epoch Enterprises, Ltd., 3541 N. Olive Rd., Tucson, AZ 85719 ... 602-887-1970; 888-5167
§ Extech International Corp., 150 Bear Hill Rd., Waltham, MA 02154 ... 617-890-7440
§ Fluke, John, Mfg. Co., Box C9090, MS 250C, Everett, WA 98206 ... 206-356-5400
Guildline Instrs., 4403 Vineland Rd, Suite B-10, Orlando, FL 32811-9998 ... 305-423-8215
§ Heath Co., Benton Harbor, MI 49022 ... 616-982-3886
§ Hickok Elec. Instr., 10514 DuPont Ave., Cleveland, OH 44108 ... 216-541-8060
§ Holub Industries, 1701 W. Bethany Rd., Sycamore, IL 60178 ... 815-895-6501
† Imtronics Inds., 11930 31st Ct., St. Petersburg, FL 33715 ... 813-577-9010
§ Jensen Tools, Inc., Axia, Inc., 7815 S. 46th St., Phoenix, AZ 85040 ... 602-968-6241
§ Jewell Electrical Instrs., Grenier Field, Manchester, NH 03108 ... 603-669-6400
Julie Resch. Labs., 211 West 61st St., New York, NY 10023 ... 212-245-2727
§ Leader Instrs. Corp., 380 Oser Ave., Hauppauge, NY 11788-3694 ... 516-231-6900
Martel Elctrns. Corp., 13 Heritage Hill Rd., Windham, NH 03087 ... 800-821-0023; 617-275-5970
Multi-Amp Corp., TBG, 4271 Bronze Way, Dallas, TX 75237 ... 214-333-3201
§ NES, Inc. (Nationwide Electronic Systems), 3003 Wakefield, Carpentersville, IL 60110 ... 312-426-5900
§ Newport Electronics, 630 E. Young St., Santa Ana, CA 92705 ... 714-540-4914
Non-Linear Systems/Div. of Kaypro Corp., 533 Stevens Ave., Solana Bch., CA 92075 ... 619-481-3900
North Atlantic Inds., Instrument Div., 60 Plant Ave., Hauppauge, NY 11788 ... 516-582-6500
Ohio Semitronics, Inc., 1205 Chesapeake Ave., Columbus, OH 43212 ... 614-486-9561
Omega Engrg., Box 4047, Stamford, CT 06907 ... 203-359-1660
§ Pacer Industries, Inc., 1450 First Ave., Chippewa Falls, WI 54729 ... 715-723-1141
§ PrimeLine-Soltec Distbn., Soltec Corp., P.O. Box 818, Sun Valley, CA 91353-0818 ... 800-525-5554;818-764-5400
† Racal-Dana Instrs. Inc., 4 Goodyear St., Irvine, CA 92715 ... 714-859-8999
RFL Inds., A Dowty Grp. Co./Instr. Div., Powerville Rd., Boonton, NJ 07005 ... 201-334-3100
Scientific Columbus, Inc., Esterline Corp., 1900 Arlingate La., Columbus, OH 43228 ... 614-274-7160
§ Shokai Far East, Ltd., 280 North Central Ave., Hartsdale, NY 10530 ... 914-681-0700
§ Shurite Meters, Inc., 577 Grand Ave., P.O. Box 1848, New Haven, CT 06508 ... 203-624-1188
Sigma Instrs., Intl. Instr. Div., 88 Marsh Hill Rd., Orange, CT 06477 ... 203-795-4711
§ Simpson Elec. Co., 853 Dundee Ave., Elgin, IL 60120 ... 312-697-2260
§ SPECO Div., Components Specialties, Inc., P.O. Box 624, 1172 Rte. 109, Lindenhurst, NY 11757 ... 516-957-8700;800-645-5516
§ Sperry, A. W., Instrs., P.O. Box 9300, Smithtown, NY 11787 ... 516-231-7050
§ Square D Co., Executive Plaza, Palatine, IL 60067 ... 312-397-2600
§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 ... 215-673-5600
TIF Instrs., Inc., 9101 N.W. 7th Ave., Miami, FL 33150 ... 305-757-8811
Valhalla Scientific, 9955 Mesa Rim Rd., San Diego, CA 92126 ... 619-457-5576
Velonex, 560 Robert Ave., Santa Clara, CA 95050 ... 408-727-7370
§ Westberg Mfg., Inc., 3400 Westach Way, Sonoma, CA 95476 ... 707-938-2121
§ Yokogawa Corp. of America, 2 Dart Rd., Shenandoah, GA 30265 ... 404-253-7000

Meters, Volt/Ampere – See Meters, Watt

Meters, Volt, DC-2900

Diego Power, 5350 Eastgate Mall, San Diego, CA 92121, 587-1925 ... D•1916
§ **Digitec Corp., 918 Woodley Rd., P.O. Box 458, Dayton, OH 45401, 513-254-6251 ... D•1348**
§ **Electro Industries, Div. E.I. Elctrns., Inc., 1800 Shames Drive, Westbury, NY 11590, 516-334-0870 ... D•1350-1351**
† **Electronic Dev. Corp., 11 Hamlin St., Boston, MA 02127-4198, 617-268-9696 ... D•1214**
EMICO Inc., Box 368, Dublin, PA 18917, 215-249-9330 ... D•1352-1353
IET Labs, Inc., 534 Main St., Westbury, NY 11590, 516-334-5959 ... D•1242,1245
Lincoln Instrs., 456 W. Montana St., Pasadena, CA 91103, 818-798-0733 ... D•1361
† **Millivac Instrs., Box 997, Curry Rd. Ext., Schenectady, NY 12301, 518-355-8300 ... D•1266**
§† **Modutec, 18 Marshall St., Norwalk, CT 06854, 203-853-3636 ... D•1362-1363**
Ross Engrg. Corp., 540 Westchester Dr., Campbell, CA 95008, 408-377-4621 ... B•1443
† **Sensitive Research Instrs., 25 Dock St., Mt. Vernon, NY 10550, 914-699-9717 ... D•1304,1306**
† **Shogyo Intl. Corp., 287 Northern Blvd., Great Neck, NY 11021, 516-466-0911 ... D•1376**
§ **Simpson Elec. Co., 853 Dundee Ave., Elgin, IL 60120, 312-697-2260 ... D•1308**
Texmate, Inc., 348 S. Cedros Ave., P.O. Box 2000, Solana Beach, CA 92075, 619-481-7177 ... D•1378
§ **Triplett Corp.-A Penril Co., One Triplett Dr., Bluffton, OH 45817-9987, 419-358-5015 ... D•1320,1380**
§ AEMC, 99 Chauncy, Boston, MA 02111 ... 617-451-0227;800-343-1391
§ Analogic Corp., 8 Centennial Dr., Peabody, MA 01961 ... 617-532-5660;617-777-4500; 617-246-0300;800-451-1
† Ballantine Labs., 90 Fanny Rd., Boonton, NJ 07005 ... 201-335-0900
Bartlett Instrument Co., 14th & Ave. "M', P.O. Box 445, Ft. Madison, IA 52627 ... 319-372-8366
§ BBC-Metrawatt/Goerz, 2150 W. 6th Ave., Broomfield, CO 80020 ... 303-469-5231; 800-821-6327
§ Beckman Industrial Corp., Emerson Electric Co., 630 Puente Street, Brea, CA 92621 ... 714-773-8111
Beede Electrical Instr. Co., S. Main St., Penacook, NH 03303 ... 603-753-6362
Bluffton Products, Inc., Tegam, Inc., 7230 North Ridge Road, Madison, OH 44057 ... 216-946-3572
† Bowmar/ALI, Bowmar Instr. Corp., 531 Main St., Acton, MA 01720 ... 617-263-8365
§ Calibron Instrs., Burton-Rogers Co., 220 Grove St., Waltham, MA 02154 ... 617-894-6440
CDS - Colorado Data Sys., 3301 W. Hampden, Unit C, Englewood, CO 80110 ... 303-762-1640
Clarke-Hess Comm. Resch. Corp., 17 West 17th St., New York, NY 10011 ... 212-255-2940
§† Columbia Elec. Mfg., 4519 Hamilton Ave. N.W., Cleveland, OH 44114 ... 216-361-8060
Cord Electronics, Inc., 177 Cantiague Rock Rd., Westbury, NY 11590 ... 516-935-3640
Crompton Instrs., 2763 Higgins Road, Elk Grove Village, IL 60007 ... 714-841-2901
Crompton Instrs., Hawker Siddley, 2763 Old Higgins Rd., Elk Grove Village, IL 60007 ... 312-593-1107
§† Data Precision Corp., Electronics Ave., Danvers, MA 01923 ... 617-246-1600
§ Data Tech, Div. of Penril Corp., 3110 W. Segerstrom, Santa Ana, CA 92704 ... 714-546-7160
Datel, General Electric Co., 11 Cabot Blvd., Mansfield, MA 02048 ... 617-339-9341
Datron Instrs., Inc., 3401 SW 42nd Ave., Stuart, FL 33497 ... 305-283-0935
DCI Inc., 14812 W. 117th Street, P.O. Box 215, Olathe, KS 66061 ... 913-782-5672
§† Digitech Industries, Inc., 66 Grove St., Ridgefield, CT 06877 ... 203-438-3731
Dixson, Inc., Instrument Div., Box 1449, Grand Junction, CO 81502 ... 303-242-8863
ECO Instrs. Div., Sea Data Corp., 1 Bridge St., Newton, MA 02158 ... 617-964-8360
§ EDL, Inc., 385 Oser Ave., Hauppauge, NY 11788 ... 516-435-2808;1-800-DIAL EDL
† Electrical Instr. Svc., 25 Dock St., Mt. Vernon, NY 10550 ... 914-699-9717
§ Epoch Enterprises, Ltd., 3541 N. Olive Rd., Tucson, AZ 85719 ... 602-887-1970; 888-5167
§ Extech International Corp., 150 Bear Hill Rd., Waltham, MA 02154 ... 617-890-7440
† Faria, Thomas G., Corp., P.O. Box 0983, Uncasville, CT 06382 ... 203-848-9271
§ Fluke, John, Mfg. Co., Box C9090, MS 250C, Everett, WA 98206 ... 206-356-5400
Guildline Instrs., 4403 Vineland Rd, Suite B-10, Orlando, FL 32811-9998 ... 305-423-8215
§ Heath Co., Benton Harbor, MI 49022 ... 616-982-3886
§ Hickok Elec. Instr., 10514 DuPont Ave., Cleveland, OH 44108 ... 216-541-8060
Hipotronics, P.O. Drawer A, Brewster, NY 10509 ... 914-279-8091
§ Holub Industries, 1701 W. Bethany Rd., Sycamore, IL 60178 ... 815-895-6501
† Ideal Precision Meter, 214 Franklin St., Brooklyn, NY 11222 ... 212-383-6904
† Imtronics Inds., 11930 31st Ct., St. Petersburg, FL 33715 ... 813-577-9010
§ Jensen Tools, Inc., Axia, Inc., 7815 S. 46th St., Phoenix, AZ 85040 ... 602-968-6241
§ Jewell Electrical Instrs., Grenier Field, Manchester, NH 03108 ... 603-669-6400
Julie Resch. Labs., 211 West 61st St., New York, NY 10023 ... 212-245-2727
§ Keithley Instrs., 28775 Aurora Rd., Cleveland, OH 44139 ... 216-248-0400
§ Leader Instrs. Corp., 380 Oser Ave., Hauppauge, NY 11788-3694 ... 516-231-6900
Martel Elctrns. Corp., 13 Heritage Hill Rd., Windham, NH 03087 ... 800-821-0023; 617-275-5970
Multi-Amp Corp., TBG, 4271 Bronze Way, Dallas, TX 75237 ... 214-333-3201
§ NES, Inc. (Nationwide Electronic Systems), 3003 Wakefield, Carpentersville, IL 60110 ... 312-426-5900
§ Newport Electronics, 630 E. Young St., Santa Ana, CA 92705 ... 714-540-4914
Non-Linear Systems/Div. of Kaypro Corp., 533 Stevens Ave., Solana Bch., CA 92075 ... 619-481-3900
Ohio Semitronics, Inc., 1205 Chesapeake Ave., Columbus, OH 43212 ... 614-486-9561
Omega Engrg., Box 4047, Stamford, CT 06907 ... 203-359-1660
§ Pacer Industries, Inc., 1450 First Ave., Chippewa Falls, WI 54729 ... 715-723-1141

§ PrimeLine-Soltec Distbn., Soltec Corp., P.O. Box 818, Sun Valley, CA 91353-0818 .... 800-525-5554;818-764-5400
† Racal-Dana Instrs. Inc., 4 Goodyear St., Irvine, CA 92715 714-859-8999
§ Shokai Far East, Ltd., 280 North Central Ave., Hartsdale, NY 10530 914-681-0700
§ Shurite Meters, Inc., 577 Grand Ave., P.O. Box 1848, New Haven, CT 06508 203-624-1188
Sigma Instrs., Intl. Instr. Div., 88 Marsh Hill Rd., Orange, CT 06477 203-795-4711
§ SPECO Div., Components Specialties, Inc., P.O. Box 624, 1172 Rte. 109, Lindenhurst, NY 11757 .... 516-957-8700;800-645-5516
§ Sperry, A. W., Instrs., P.O. Box 9300, Smithtown, NY 11787 516-231-7050
§ Square D Co., Executive Plaza, Palatine, IL 60067 312-397-2600
§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 215-673-5600
TIF Instrs., Inc., 9101 N.W. 7th Ave., Miami, FL 33150 305-757-8811
Velonex, 560 Robert Ave., Santa Clara, CA 95050 408-727-7370
§ VIZ Test Equipment, Div. VIZ Mfg., 335 E. Price St., Philadelphia, PA 19144 215-844-2626
§ Westberg Mfg., Inc., 3400 Westach Way, Sonoma, CA 95476 707-938-2121
Yokogawa Corp. of America, 2 Dart Rd., Shenandoah, GA 30265 404-253-7000

Meters, Volt, Differential – See Meters, Volt (Vol. D)

Meters, Volt, Digital-2900

§ B & K Precision, Industrial Electronics Product Group, Dynascan Corporation, 6460 W. Cortland, Chicago, IL 60635, 312-889-9087 .... D•1186-1187
Datel, General Electric Co., 11 Cabot Blvd., Mansfield, MA 02048, 617-339-9341 .... D•1346
DCI Inc., 14812 W. 117th Street, P.O. Box 215, Olathe, KS 66061, 913-782-5672 .... D•1347
Diego Power, 5350 Eastgate Mall, San Diego, CA 92121, 587-1925 .... D•1916
§ Digitec Corp., 918 Woodley Rd., P.O. Box 458, Dayton, OH 45401, 513-254-6251 .... D•1348
§ Electro Industries, Div. E.I. Elctrns., Inc., 1800 Shames Drive, Westbury, NY 11590, 516-334-0870 .... D•1351
§ Gralex Inds., 295 Community Dr., Great Neck, NY 11021, 516-487-7289;800-645-6535 .... D•1354-1356
IET Labs, Inc., 534 Main St., Westbury, NY 11590, 516-334-5959 .... D•1242
§ Modutec, 18 Marshall St., Norwalk, CT 06854, 203-853-3636 .... D•1363
§ North American Soar Corp., 11126 Cornell Ave., Cherry Hill, NJ 08002, 609-488-1060 .... D•1268,1274
§ Simpson Elec. Co., 853 Dundee Ave., Elgin, IL 60120, 312-697-2260 .... D•1377
Texmate, Inc., 348 S. Cedros Ave., P.O. Box 2000, Solana Beach, CA 92075, 619-481-7177 .... D•1378
§ Triplett Corp.-A Penril Co., One Triplett Dr., Bluffton, OH 45817-9987, 419-358-5015 .... D•1320
§ AEMC, 99 Chauncy, Boston, MA 02111 .... 617-451-0227;800-343-1391
† Analog Devices, P.O. Box 280, Norwood, MA 02062 617-329-4700
§ Analogic Corp., 8 Centennial Dr., Peabody, MA 01961 .... 617-532-5660;617-777-4500; 617-246-0300;800-451-1
§† Ballantine Labs., 90 Fanny Rd., Boonton, NJ 07005 201-335-0900
Bartlett Instrument Co., 14th & Ave. "M', P.O. Box 445, Ft. Madison, IA 52627 319-372-8366
§ BBC-Metrawatt/Goerz, 2150 W. 6th Ave., Broomfield, CO 80020 .... 303-469-5231; 800-821-6327
§ Beckman Industrial Corp., Emerson Electric Co., 630 Puente Street, Brea, CA 92621 714-773-8111
Beckman Instrs., 2500 Harbor Blvd., Fullerton, CA 92634 714-871-4848
Bluffton Products, Inc., Tegam, Inc., 7230 North Ridge Road, Madison, OH 44057 216-946-3572
Boonton Elctrns. Corp., 791 Route 10, Randolph, NJ 07869 201-584-1077
Bruel & Kjaer Instrs. Inc., 185 Forest St., Marlboro, MA 01752 617-481-7000
§ Calibron Instrs., Burton-Rogers Co., 220 Grove St., Waltham, MA 02154 617-894-6440
CDS - Colorado Data Sys., 3301 W. Hampden, Unit C, Englewood, CO 80110 303-762-1640
† Clarke-Hess Comm. Resch. Corp., 17 West 17th St., New York, NY 10011 212-255-2940
Cord Electronics, Inc., 177 Cantiague Rock Rd., Westbury, NY 11590 516-935-3640
Crompton Instrs., 2763 Higgins Road, Elk Grove Village, IL 60007 714-841-2901
§† Data Precision Corp., Electronics Ave., Danvers, MA 01923 617-246-1600
§ Data Tech, Div. of Penril Corp., 3110 W. Segerstrom, Santa Ana, CA 92704 714-546-7160
Datron Instrs., Inc., 3401 SW 42nd Ave., Stuart, FL 33497 305-283-0935
Dio-Rey, Div. of Info-Lite, 422 Cliff St., Fairview, NJ 07022 201-941-4455
Dranetz Technologies, Inc, Computer Products Division, 1000 New Durham Rd., P.O. Box 4019, Edison, NJ 08818-4019 201-287-3680
Dranetz Technologies, Inc., Industrial Products Division, 1000 New Durham Rd., P.O. Box 4019, Edison, NJ 08818-4019 201-287-3680
ECO Instrs. Div., Sea Data Corp., 1 Bridge St., Newton, MA 02158 617-964-8360
§ EDL, Inc., 385 Oser Ave., Hauppauge, NY 11788 .... 516-435-2808;1-800-DIAL EDL
§ Electromatic Controls Corp., 2495 Pembroke Road, Hoffman Estates, IL 60195-2010 312-882-5757
Electronic Wattmeter Co., 2275 Sixth St., Sarasota, FL 33577 813-953-5355
§ Electro-Numerics, 1811 Reynolds, Irvine, CA 92714 714-250-1501
§ Epoch Enterprises, Ltd., 3541 N. Olive Rd., Tucson, AZ 85719 .... 602-887-1970; 888-5167
§ Extech International Corp., 150 Bear Hill Rd., Waltham, MA 02154 617-890-7440
§ Fluke, John, Mfg. Co., Box C9090, MS 250C, Everett, WA 98206 206-356-5400
§ GC Elctrns., 400 S. Wyman St., Rockford, IL 61101 815-968-9661
§ Guildline Instrs., 4403 Vineland Rd, Suite B-10, Orlando, FL 32811-9998 305-423-8215
§ Heath Co., Benton Harbor, MI 49022 616-982-3886
§ Hickok Elec. Instr., 10514 DuPont Ave., Cleveland, OH 44108 216-541-8060
Hipotronics, P.O. Drawer A, Brewster, NY 10509 914-279-8091
§ Jensen Tools, Inc., Axia, Inc., 7815 S. 46th St., Phoenix, AZ 85040 602-968-6241
Julie Resch. Labs., 211 West 61st St., New York, NY 10023 212-245-2727
Keithley Instrs., 28775 Aurora Rd., Cleveland, OH 44139 216-248-0400
§ Leader Instrs. Corp., 380 Oser Ave., Hauppauge, NY 11788-3694 516-231-6900
† Millivac Instrs., Box 997, Curry Rd. Ext., Schenectady, NY 12301 518-355-8300
§ NES, Inc. (Nationwide Electronic Systems), 3003 Wakefield, Carpentersville, IL 60110 312-426-5900
§ Newport Electronics, 630 E. Young St., Santa Ana, CA 92705 714-540-4914
§ Non-Linear Systems/Div. of Kaypro Corp., 533 Stevens Ave., Solana Bch., CA 92075 619-481-3900
North Atlantic Inds., Instrument Div., 60 Plant Ave., Hauppauge, NY 11788 516-582-6500
Ohio Semitronics, Inc., 1205 Chesapeake Ave., Columbus, OH 43212 614-486-9561
Omega Engrg., Box 4047, Stamford, CT 06907 203-359-1660
§ Pacer Industries, Inc., 1450 First Ave., Chippewa Falls, WI 54729 715-723-1141
Pho-Tronics, 8701 W. Bradley Rd., Milwaukee, WI 53224 414-355-6704
Polarad Elctrns., Inc., 5 Delaware Dr., Lake Success, NY 11042 516-328-1100
§ PrimeLine-Soltec Distbn., Soltec Corp., P.O. Box 818, Sun Valley, CA 91353-0818 .... 800-525-5554;818-764-5400
† Racal-Dana Instrs. Inc., 4 Goodyear St., Irvine, CA 92715 714-859-8999
Ross Engrg. Corp., 540 Westchester Dr., Campbell, CA 95008 408-377-4621
† Shogyo Intl. Corp., 287 Northern Blvd., Great Neck, NY 11021 516-466-0911
Solartron Instruments, Sangamo Weston, Inc., 2 Westchester Plaza, Elmsford, NY 10523 914-592-9168
§ SPECO Div., Components Specialties, Inc., P.O. Box 624, 1172 Rte. 109, Lindenhurst, NY 11757 .... 516-957-8700;800-645-5516
§ Sperry, A. W., Instrs., P.O. Box 9300, Smithtown, NY 11787 516-231-7050
§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 215-673-5600
† Takeda Riken Co., Ltd., NS Bldg. 14th,4-1,Nishi-Shinjuku 2-Chome,Shinjuku-ku, Tokyo 160, Tokyo 176, JAPAN 03-342-7500
§ Techni-Tool, 5 Apollo Rd., Box 368, Plymouth Meeting, PA 19462 215-825-4990
TIF Instrs., Inc., 9101 N.W. 7th Ave., Miami, FL 33150 305-757-8811
Valhalla Scientific, 9955 Mesa Rim Rd., San Diego, CA 92126 619-457-5576
Velonex, 560 Robert Ave., Santa Clara, CA 95050 408-727-7370
Vistar Corp., 13740 McCormick Dr., Tampa, FL 33625 813-855-6611
Yokogawa Corp. of America, 2 Dart Rd., Shenandoah, GA 30265 404-253-7000

Meters, Volt, Potentiometric-2900

Tettex Instruments, Inc., P.O. Box 281, Fairview Village, PA 19409-0281, 215-539-6050 .... D•1312
Barber-Colman Co., Indl. Instrs. Div., P.O. Box 2940, 1354 Clifford Ave., Loves Park, IL 61132 815-877-0241
Bristol Babcock Inc., 40 Bristol St., Waterbury, CT 06708 203-575-3000
Data Tech, Div. of Penril Corp., 3110 W. Segerstrom, Santa Ana, CA 92704 714-546-7160
ECO Instrs. Div., Sea Data Corp., 1 Bridge St., Newton, MA 02158 617-964-8360
Electrical Instr. Svc., 25 Dock St., Mt. Vernon, NY 10550 914-699-9717
† Electronic Dev. Corp., 11 Hamlin St., Boston, MA 02127-4198 617-268-9696
Esterline Angus Instr. Corp., Box 24000, Indianapolis, IN 46224 317-244-7611
Fluke, John, Mfg. Co., Box C9090, MS 250C, Everett, WA 98206 206-356-5400
§ Guildline Instrs., 4403 Vineland Rd, Suite B-10, Orlando, FL 32811-9998 305-423-8215
§ Heath Co., Benton Harbor, MI 49022 616-982-3886
Leeds & Northrup Instrs., A Unit of General Signal Corp., Sumneytown Pike, North Wales, PA 19454 215-643-2000
† Racal-Dana Instrs. Inc., 4 Goodyear St., Irvine, CA 92715 714-859-8999
Sensitive Research Instrs., 25 Dock St., Mt. Vernon, NY 10550 914-699-9717
§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 215-673-5600

Meters, Volt, RF-2900

§† Ballantine Labs., 90 Fanny Rd., Boonton, NJ 07005, 201-335-0900 .... D•1185
Boonton Elctrns. Corp., 791 Route 10, Randolph, NJ 07869, 201-584-1077 .... D•1197
† Jennings, 970 McLaughlin Ave., San Jose, CA 95122, 408-292-4025 .... D•1251
† Millivac Instrs., Box 997, Curry Rd. Ext., Schenectady, NY 12301, 518-355-8300 .... D•1266
Sensitive Research Instrs., 25 Dock St., Mt. Vernon, NY 10550, 914-699-9717 .... D•1304
Simpson Elec. Co., 853 Dundee Ave., Elgin, IL 60120, 312-697-2260 .... D•1377
Technitrol, 1952 E. Allegheny, Philadelphia, PA 19134, 215-426-9105 .... B•1010
§ Bartlett Instrument Co., 14th & Ave. "M', P.O. Box 445, Ft. Madison, IA 52627 319-372-8366
Electrical Instr. Svc., 25 Dock St., Mt. Vernon, NY 10550 914-699-9717
§ Fluke, John, Mfg. Co., Box C9090, MS 250C, Everett, WA 98206 206-356-5400
† Gorman-Redlich Mfg. Co., 6 Curtis St., Athens, OH 45701 614-593-3150
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
Leader Instrs. Corp., 380 Oser Ave., Hauppauge, NY 11788-3694 516-231-6900
MARCONI INSTRUMENTS, 3 Pearl Court, Allendale, NJ 07401 201-934-9050
† Q.V.S., Inc., 20 North 15th St., East Orange, NJ 07017 201-673-3996
† Racal-Dana Instrs. Inc., 4 Goodyear St., Irvine, CA 92715 714-859-8999
§ Shokai Far East, Ltd., 280 North Central Ave., Hartsdale, NY 10530 914-681-0700
§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 215-673-5600
Telco Products Co., 44 Sea Cliff, Glen Cove, NY 11542 516-759-0300
Texscan Instruments, 3169 N. Shadeland, Indianapolis, IN 46226 317-545-4196
§ Triplett Corp.-A Penril Co., One Triplett Dr., Bluffton, OH 45817-9987 419-358-5015
§ Tucker Elctrns., Box 461966, Garland, TX 75046 .... 214-348-8800;800-527-4642

Meters, Volt, Sampling-2900

§ BBC-Metrawatt/Goerz, 2150 W. 6th Ave., Broomfield, CO 80020 .... 303-469-5231; 800-821-6327
† Data Tech, Div. of Penril Corp., 3110 W. Segerstrom, Santa Ana, CA 92704 714-546-7160
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
Micro Instr., 2250 Micro Pl, Escondido, CA 92025 619-746-2010
§ NES, Inc. (Nationwide Electronic Systems), 3003 Wakefield, Carpentersville, IL 60110 312-426-5900
† Racal-Dana Instrs. Inc., 4 Goodyear St., Irvine, CA 92715 714-859-8999

Meters, Volt, True RMS-2900

Clarke-Hess Comm. Resch. Corp., 17 West 17th St., New York, NY 10011, 212-255-2940 ...... D◦1200-1201
Diego Power, 5350 Eastgate Mall, San Diego, CA 92121, 587-1925 ...... D◦1916
§ Digitec Corp., 918 Woodley Rd., P.O. Box 450, Dayton, OH 45401, 513-254-6251 ...... D◦1348
Electro Industries, Div. E.I. Elctrns., Inc., 1800 Shames Drive, Westbury, NY 11590, 516-334-0870 ...... D◦1350
IET Labs, Inc., 534 Main St., Westbury, NY 11590, 516-334-5959 ...... D◦1242,1245
† Millivac Instrs., Box 997, Curry Rd. Ext., Schenectady, NY 12301, 518-355-8300 ...... D◦1266
§ North American Soar Corp., 11126 Cornell Ave., Cherry Hill, NJ 08002, 609-488-1060 ...... D◦1274
Omega Engrg., Box 4047, Stamford, CT 06907, 203-359-1660 ...... D◦1374
PPM, Inc., 4521 Emery Ind. Pkwy., Cleveland, OH 44128, 216-292-6006 ...... D◦1291
Texmate, Inc., 348 S. Cedros Ave., P.O. Box 2000, Solana Beach, CA 92075, 619-481-7177 ...... D◦1378
§ Triplett Corp.-A Penril Co., One Triplett Dr., Bluffton, OH 45817-9987, 419-358-5015 ...... D◦1320
§ AEMC, 99 Chauncy, Boston, MA 02111 ...... 617-451-0227;800-343-1391
Amber Electro Design Inc., 4810 Jean Talon Blvd. W Ste 321, Montreal, Quebec, CANADA H4P2N5 514-735-4105
§ BBC-Metrawatt/Goerz, 2150 W. 6th Ave., Broomfield, CO 80020 ...... 303-469-5231; 800-821-6327
§ Biddle Instruments, A Thorn EMI Co., 510 Township Line Rd., Blue Bell, PA 19422 215-646-9200
Bluffton Products, Inc., Tegam, Inc., 7230 North Ridge Road, Madison, OH 44057 216-946-3572
Boonton Elctrns. Corp., 791 Route 10, Randolph, NJ 07869 201-584-1077
Bruel & Kjaer Instrs. Inc., 185 Forest St., Marlboro, MA 01752 617-481-7000
Crompton Instrs., 2763 Higgins Road, Elk Grove Village, IL 60007 714-841-2901
Crompton Instrs., Hawker Siddley, 2763 Old Higgins Rd., Elk Grove Village, IL 60007 312-593-1107
Datron Instrs., Inc., 3401 SW 42nd Ave., Stuart, FL 33497 305-283-0935
DCI Inc., 14812 W. 117th Street, P.O. Box 215, Olathe, KS 66061 913-782-5672
Dranetz Technologies, Inc, Computer Products Division, 1000 New Durham Rd., P.O. Box 4019, Edison, NJ 08818-4019 201-287-3680
Dranetz Technologies, Inc., Industrial Products Division, 1000 New Durham Rd., P.O. Box 4019, Edison, NJ 08818-4019 201-287-3680
§ Epoch Enterprises, Ltd., 3541 N. Olive Rd., Tucson, AZ 85719 ...... 602-887-1970; 888-5167
Julie Resch. Labs., 211 West 61st St., New York, NY 10023 212-245-2727
§ NES, Inc. (Nationwide Electronic Systems), 3003 Wakefield, Carpentersville, IL 60110 312-426-5900
§ Newport Electronics, 630 E. Young St., Santa Ana, CA 92705 714-540-4914
Polarad Elctrns., Inc., 5 Delaware Dr., Lake Success, NY 11042 516-328-1100
Precision Filters, 240 Cherry St., Ithaca, NY 14850 607-277-3550
Racal-Dana Instrs. Inc., 4 Goodyear St., Irvine, CA 92715 714-859-8999
Ross Engrg. Corp., 540 Westchester Dr., Campbell, CA 95008 408-377-4621
Scientific Columbus, Inc., Esterline Corp., 1900 Arlingate La., Columbus, OH 43228 614-274-7160
§ Spanta, Inc., Box 193, Franklin Lakes, NJ 07417 201-337-0044
§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 215-673-5600
Valhalla Scientific, 9955 Mesa Rim Rd., San Diego, CA 92126 619-457-5576
Vistar Corp., 13740 McCormick Dr., Tampa, FL 33625 813-855-6611

Meters, VU-2900

† Shogyo Intl. Corp., 287 Northern Blvd., Great Neck, NY 11021, 516-466-0911 ...... D◦1376
§ Simpson Elec. Co., 853 Dundee Ave., Elgin, IL 60120, 312-697-2260 ...... D◦1377
§ Triplett Corp.-A Penril Co., One Triplett Dr., Bluffton, OH 45817-9987, 419-358-5015 ...... D◦1380
A & D Elec. Instrs., 73-07 88th St., Glendale, NY 11385 718-275-6516
§ API Instrs., 1601 Trapelo Rd., Waltham, MA 02254 617-890-2000
Bartlett Instrument Co., 14th & Ave. "M', P.O. Box 445, Ft. Madison, IA 52627 319-372-8366
§ Beede Electrical Instr. Co., S. Main St., Penacook, NH 03303 603-753-6362
Cord Electronics, Inc., 177 Cantiague Rock Rd., Westbury, NY 11590 516-935-3640
Crompton Instrs., 2763 Higgins Road, Elk Grove Village, IL 60007 714-841-2901
Crompton Instrs., Hawker Siddley, 2763 Old Higgins Rd., Elk Grove Village, IL 60007 312-593-1107
Data Check Corp., 10070 Willow Creek Rd., San Diego, CA 92131 619-578-0101
Dixson, Inc., Instrument Div., Box 1449, Grand Junction, CO 81502 303-242-8863
EMICO Inc., Box 368, Dublin, PA 18917 215-249-9330
§ GC Elctrns., 400 S. Wyman St., Rockford, IL 61101 815-968-9661
† Ideal Precision Meter, 214 Franklin St., Brooklyn, NY 11222 212-383-6904
† Imtronics Inds., 11930 31st Ct., St. Petersburg, FL 33715 813-577-9010
§ International Instruments, General Resistance, Inc., Twin Lakes Rd, P.O. Box 185, N. Branford, CT 06471 203-481-3450
§ Jewell Electrical Instrs., Grenier Field, Manchester, NH 03108 603-669-6400
LFE, Process Control Div., 55 Green St., Clinton, MA 01510 617-835-1000
§ Modutec, 18 Marshall St., Norwalk, CT 06854 203-853-3636
† Q.V.S., Inc., 20 North 15th St., East Orange, NJ 07017 201-673-3996
§ Ramko Resch., Inc., 11355A Folsom Blvd., Rancho Cordova, CA 95670 800-821-2545
Selco Products Co., SEL Sales, Inc., 7580 Stage Rd., Buena Park, CA 90621 714-521-8673
§ Shokai Far East, Ltd., 280 North Central Ave., Hartsdale, NY 10530 914-681-0700
§ Shurite Meters, Inc., 577 Grand Ave., P.O. Box 1848, New Haven, CT 06508 203-624-1188
Sigma Instrs., Intl. Instr. Div., 88 Marsh Hill Rd., Orange, CT 06477 203-795-4711
§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 215-673-5600

Meters, Watt-2900

† Clarke-Hess Comm. Resch. Corp., 17 West 17th St., New York, NY 10011, 212-255-2940 ...... D◦1200-1201
Diego Power, 5350 Eastgate Mall, San Diego, CA 92121, 587-1925 ...... D◦1916
Industrial Test Equip., 21 Vennicock Ave., Port Washington, NY 11050, 516-883-1700 ...... D◦1247
§ NES, Inc. (Nationwide Electronic Systems), 3003 Wakefield, Carpentersville, IL 60110, 312-426-5900 ...... D◦1367
§ North American Soar Corp., 11126 Cornell Ave., Cherry Hill, NJ 08002, 609-488-1060 ...... D◦1269
Ohio Semitronics, Inc., 1205 Chesapeake Ave., Columbus, OH 43212, 614-486-9561 ...... D◦1286,1288-1289
Sensitive Research Instrs., 25 Dock St., Mt. Vernon, NY 10550, 914-699-9717 ...... D◦1304-1305
§ Simpson Elec. Co., 853 Dundee Ave., Elgin, IL 60120, 312-697-2260 ...... D◦1377
§ Triplett Corp.-A Penril Co., One Triplett Dr., Bluffton, OH 45817-9987, 419-358-5015 ...... D◦1380
A & D Elec. Instrs., 73-07 88th St., Glendale, NY 11385 718-275-6516
§ AEMC, 99 Chauncy, Boston, MA 02111 ...... 617-451-0227;800-343-1391
† Amprobe Instr., 630 Merrick Rd., Lynbrook, NY 11563 ...... 516-LY3-5600
§ Analogic Corp., 8 Centennial Dr., Peabody, MA 01961 ...... 617-532-5660;617-777-4500; 617-246-0300;800-451-1
ARGA Controls, 35 E. Glenarm St., Pasadena, CA 91105 213-682-3314
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Crompton Instrs., 2763 Higgins Road, Elk Grove Village, IL 60007 714-841-2901
Crompton Instrs., Hawker Siddley, 2763 Old Higgins Rd., Elk Grove Village, IL 60007 312-593-1107
Dixson, Inc., Instrument Div., Box 1449, Grand Junction, CO 81502 303-242-8863
† Dranetz Technologies, Inc, Computer Products Division, 1000 New Durham Rd., P.O. Box 4019, Edison, NJ 08818-4019 201-287-3680
Dranetz Technologies, Inc., Industrial Products Division, 1000 New Durham Rd., P.O. Box 4019, Edison, NJ 08818-4019 201-287-3680
Electrical Instr. Svc., 25 Dock St., Mt. Vernon, NY 10550 914-699-9717
Electro-Dynamics Dev. Co., 475 Mt. Hood Dr. S.W., Issaquah, WA 98027 206-392-2493
Electro-Impulse, Box 870, Red Bank, NJ 07701-0870 201-741-0404
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§ Electronic Navigation Inds, Emerson Electric Co., 100 Highpower Road, Rochester, NY 14623 716-427-8300
Electronic Wattmeter Co., 2275 Sixth St., Sarasota, FL 33577 813-953-5355
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Esterline Angus Instr. Corp., Box 24000, Indianapolis, IN 46224 317-244-7611
§ Feedback, 620 Springfield Ave., Berkeley Hghts., NJ 07922 201-464-5181
§ GC Elctrns., 400 S. Wyman St., Rockford, IL 61101 815-968-9661
† General Microwave Corp., 155 Marine St., Farmingdale, NY 11735 516-694-3600
Genstar Rental Elctrns., 2445 Faber Pl., Palo Alto, CA 94303 415-856-7600
§ Greibach Instrs. Div., 25 Dock St., Mt. Vernon, NY 10550 914-699-9717
Highland Technology, Inc., 320 Judah Street, San Francisco, CA 94122 415-753-5814
§ Larson Instr., Greenbush Rd., Orangeburg, NY 10962 914-359-3800
MARCONI INSTRUMENTS, 3 Pearl Court, Allendale, NJ 07401 201-934-9050
Multi-Amp Corp., TBG, 4271 Bronze Way, Dallas, TX 75237 214-333-3201
† Narda Microwave Corp., 435 Moreland Rd., Hauppauge, NY 11788 516-231-1700
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PPM, Inc., 4521 Emery Ind. Pkwy., Cleveland, OH 44128 216-292-6006
§ PrimeLine-Soltec Distbn., Soltec Corp., P.O. Box 818, Sun Valley, CA 91353-0818 ...... 800-525-5554;818-764-5400
† Racal-Dana Instrs. Inc., 4 Goodyear St., Irvine, CA 92715 714-859-8999
RE Instruments Corp., 31029 Center Ridge Rd., Westlake, OH 44145 216-871-7617
RFL Inds., A Dowty Grp. Co./Instr. Div., Powerville Rd., Boonton, NJ 07005 201-334-3100
† Scientech, Inc., 5649 Arapahoe Ave., Boulder, CO 80303 ...... 303-444-1361;800-525-0522
Scientific Columbus, Inc., Esterline Corp., 1900 Arlingate La., Columbus, OH 43228 614-274-7160
§ Shokai Far East, Ltd., 280 North Central Ave., Hartsdale, NY 10530 914-681-0700
§ Slaughter Co., Moore & Hailey Sts., P.O. Box 1805, Ardmore, OK 73402 405-223-4773
§ Sperry, A. W., Instrs., P.O. Box 9300, Smithtown, NY 11787 516-231-7050
§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 215-673-5600
Telco Products Co., 44 Sea Cliff, Glen Cove, NY 11542 516-759-0300
TIF Instrs., Inc., 9101 N.W. 7th Ave., Miami, FL 33150 305-757-8811
Valhalla Scientific, 9955 Mesa Rim Rd., San Diego, CA 92126 619-457-5576
§ VIZ Test Equipment, Div. VIZ Mfg., 335 E. Price St., Philadelphia, PA 19144 215-844-2626
§ Yokogawa Corp. of America, 2 Dart Rd., Shenandoah, GA 30265 404-253-7000

Meters, Watt Hour-2900

§ Electro Industries, Div. E.I. Elctrns., Inc., 1800 Shames Drive, Westbury, NY 11590, 516-334-0870 ...... D◦1350
Ohio Semitronics, Inc., 1205 Chesapeake Ave., Columbus, OH 43212, 614-486-9561 ...... D◦1284-1286,1288
Bluffton Products, Inc., Tegam, Inc., 7230 North Ridge Road, Madison, OH 44057 216-946-3572
Clarke-Hess Comm. Resch. Corp., 17 West 17th St., New York, NY 10011 212-255-2940
† Dranetz Technologies, Inc, Computer Products Division, 1000 New Durham Rd., P.O. Box 4019, Edison, NJ 08818-4019 201-287-3680

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† Electronic Dev. Corp., 11 Hamlin St., Boston, MA 02127-4198 617-268-9696
§ Epoch Enterprises, Ltd., 3541 N. Olive Rd., Tucson, AZ 85719 .... 602-887-1970; 888-5167
Highland Technology, Inc., 320 Judah Street, San Francisco, CA 94122 415-753-5814
§ NES, Inc. (Nationwide Electronic Systems), 3003 Wakefield, Carpentersville, IL 60110 312-426-5900
§ North American Soar Corp., 11126 Cornell Ave., Cherry Hill, NJ 08002 609-488-1060
North Hills Elctrns., 1 Alexander Pl., Glen Cove, NY 11542 516-671-5700
RFL Inds., A Dowty Grp. Co./Instr. Div., Powerville Rd., Boonton, NJ 07005 201-334-3100
Scientific Columbus, Inc., Esterline Corp., 1900 Arlingate La., Columbus, OH 43228 614-274-7160
TIF Instrs., Inc., 9101 N.W. 7th Ave., Miami, FL 33150 305-757-8811
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§ Watt-Clock Corp., P.O. Box 697, Stratford, CT 06497 203-378-2500
Yokogawa Corp. of America, 2 Dart Rd., Shenandoah, GA 30265 404-253-7000

Meters, Watt, RF-2900

Coaxial Dynamics, 15210 Industrial Parkway, Cleveland, OH 44135, 216-267-2233 .... D•1203
§† Bird Elctrn., 30303 Aurora Rd., Cleveland, OH 44139 216-248-1200
Electronic Wattmeter Co., 2275 Sixth St., Sarasota, FL 33577 813-953-5355
† General Microwave Corp., 155 Marine St., Farmingdale, NY 11735 516-694-3600
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† Racal-Dana Instrs. Inc., 4 Goodyear St., Irvine, CA 92715 714-859-8999

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Burleigh Instrs., Burleigh Pk., Fishers, NY 14453 716-924-9355
† General Microwave Corp., 155 Marine St., Farmingdale, NY 11735 516-694-3600
§† Harris Corp., PRD Elctrns. Div., 6801 Jericho Tpke., Syosset, NY 11791 516-364-0400
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M/A-Com Millimeter Products, M/A-Com, Inc., Second Avenue, Burlington, MA 01803 617-272-3000
† Waveline, Box 718, W. Caldwell, NJ 07006 201-226-9100

Meters, Waveguide – See Meters, Microwave (Vol. D)

Meters (MIL)-2440 – *See Vol. B*

Microcircuit Production Equip.-4100

§ CVC Prods., 525 Lee Rd., Rochester, NY 14603 716-458-2550
Electro Scientific Inds., 13900 N.W. Science Pk. Dr., Portland, OR 97229 503-641-4141
§ Eraser Co., Box 4961, Syracuse, NY 13221 315-454-3237
Fancort Industries, Inc., 31 Fairfield Place, W. Caldwell, NJ 07006 201-575-0610
§ Hull Corp., Davisville Rd., Hatboro, PA 19040 215-672-7800
I.C. Inds., Box 104, Altamonte Springs, FL 32701 305-339-8298
Mann, Henry, Inc., 3983 Mann Road, Huntingdon Valley, PA 19006 215-355-7200
Materials Resch., Route 303, Orangeburg, NY 10962 914-359-4200
Plasma-Therm, Inc., Rt. 73, Kresson, NJ 08053 609-767-6120
Universal Instrs., P.O. Box 825, Binghamton, NY 13902 607-775-1102

Microcircuits – See Integrated Circuits (Specific Types) (Vol. A)

Microcircuits, Thick Film – See Circuits, Hybrid, Thick Film (Vol. A)

Microcircuits (MIL)-2440 – *See Vol. B*

Microcircuits (MIL), Linear-2440 – *See Vol. B*

Microcircuits (MIL), Low Power Schottky-2440 – *See Vol. B*

Microcircuits (MIL), Memories, CMOS, Hybrids-2440 – *See Vol. B*

Microcircuits (MIL), TTL, Schottky, Microprocessor-2440 – *See Vol. B*

Microcomputer Boards-3130 – *See Vol. A*

Microfilm, Computer Output (COM) Equipment-2000

Creative Micro Systems, 3822 Cerritos Ave., Los Alamitos, CA 90720 213-493-2484
† Keyan Inds., Inc., P.O. Box 1228, Middleboro, MA 02346 617-947-7719

Micrometers – See Testers, Thickness (All Types) (Vol. D)

Microphone Accessories (Incl. Stands, Holders, Booms)-1300

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§ AKG Acoustics, Inc., 77 Selleck St., Stamford, CT 06902 203-348-2121
Alan Gordon Entprs., Inc., P.O. Box 3914, 5362 Cahuenga Blvd., N. Hollywood, CA 91605 818-985-5500
§ Atlas Sound Div., 10 Pomeroy Rd., Parsippany, NJ 07054 201-887-7800
† Audiosears, South St., Stamford, NY 12167 607-652-7305
§ Dukane Corp., Communications Sys. Div., 2900 Dukane Dr., St. Charles, IL 60174 312-584-2300
§ GC Elctrns., 400 S. Wyman St., Rockford, IL 61101 815-968-9661
§ Microtran Co. Inc., 145 E. Mineola Ave., Valley Stream, NY 11580 516-561-6050
§ Paso Sound Prods., 14 First St, Pelham, NY 10803 914-738-4800
§ Philmore Mfg., 40 Inip Dr., Inwood, NY 11696 516-239-6161
§ Precision Elctrns., 9101 King Ave., Franklin Park, IL 60131 312-678-5350
§† Primo, 25-1, 6-Chome, Mure, Mitakashi, Tokyo, JAPAN 0422-43-3121
§ R-Columbia Prods. Co., Inc., 2008 St. Johns Ave., Highland Park, IL 60035 312-432-7915
† Roanwell, 180 Varick St., New York, NY 10014 212-989-1090
§ Shokai Far East, Ltd., 280 North Central Ave., Hartsdale, NY 10530 914-681-0700
§ Shure Bros., 222 Hartrey Ave., Evanston, IL 60204 312-866-2200
Trimm, Inc., Div. of Newton Instr. Co., 400 W. Lake St., Box 489, Libertyville, IL 60048 312-362-3700

Microphones, Bone Conduction-1300

Bruel & Kjaer Instrs. Inc., 185 Forest St., Marlboro, MA 01752 617-481-7000
§ Rye Inds., Inc., 125 Spencer Pl., P.O. Box M, Mamaroneck, NY 10543 914-698-0080

Microphones, Carbon-1300

Cord Electronics, Inc., 177 Cantiague Rock Rd., Westbury, NY 11590, 516-935-3640 .... D•1024
Alan Gordon Entprs., Inc., P.O. Box 3914, 5362 Cahuenga Blvd., N. Hollywood, CA 91605 818-985-5500
† Audiosears, South St., Stamford, NY 12167 607-652-7305
GTE Switching & Telephone Products, 400 N. Wolf Rd., Northlake, IL 60164 312-681-7100
Panasonic, Ind'l. Elctrn. Comps., Panasonic, Elctrn. Comps. Div., Box 1503, Secaucus, NJ 07094 201-348-7000
§ R-Columbia Prods. Co., Inc., 2008 St. Johns Ave., Highland Park, IL 60035 312-432-7915
† Roanwell, 180 Varick St., New York, NY 10014 212-989-1090
Shogyo Intl. Corp., 287 Northern Blvd., Great Neck, NY 11021 516-466-0911
§ Shokai Far East, Ltd., 280 North Central Ave., Hartsdale, NY 10530 914-681-0700
§ Shure Bros., 222 Hartrey Ave., Evanston, IL 60204 312-866-2200
§† Telephonics, 770 Park Ave., Huntington, NY 11743 516-549-6000

Microphones, Cardioid-1300

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§ Audiotronics Corp., 7428 Bellaire Ave., N. Hollywood, CA 91605 818-765-2645
Cord Electronics, Inc., 177 Cantiague Rock Rd., Westbury, NY 11590 516-935-3640
§ Dai-Ichi Shoji of Amer., Inc., 150 Fifth Ave., New York, NY 10011 212-691-9050
§ Dukane Corp., Communications Sys. Div., 2900 Dukane Dr., St. Charles, IL 60174 312-584-2300
§ GC Elctrns., 400 S. Wyman St., Rockford, IL 61101 815-968-9661
Knowles Elctrns., Inc., 3100 N. Mannheim Rd., Franklin Park, IL 60131 312-455-3600
Panasonic, Ind'l. Elctrn. Comps., Panasonic, Elctrn. Comps. Div., Box 1503, Secaucus, NJ 07094 201-348-7000
§ Paso Sound Prods., 14 First St, Pelham, NY 10803 914-738-4800
§ Philmore Mfg., 40 Inip Dr., Inwood, NY 11696 516-239-6161
§† Primo, 25-1, 6-Chome, Mure, Mitakashi, Tokyo, JAPAN 0422-43-3121
§ R-Columbia Prods. Co., Inc., 2008 St. Johns Ave., Highland Park, IL 60035 312-432-7915
§ Recoton Corp., 46-23 Crane St., Long Island City, NY 11101 718-392-6442
§ RMS Electronics Inc., 50 Antin Pl., Bronx, NY 10462 212-892-6700
† Roanwell, 180 Varick St., New York, NY 10014 212-989-1090
§ Shokai Far East, Ltd., 280 North Central Ave., Hartsdale, NY 10530 914-681-0700
§ Shure Bros., 222 Hartrey Ave., Evanston, IL 60204 312-866-2200
§ Vidaire Electronics Mfg. Corp., P. O. Box 788, Freeport, NY 11520 516-623-6696

Microphones, Ceramic-1300

Cord Electronics, Inc., 177 Cantiague Rock Rd., Westbury, NY 11590, 516-935-3640 .... D•1024
Alan Gordon Entprs., Inc., P.O. Box 3914, 5362 Cahuenga Blvd., N. Hollywood, CA 91605 818-985-5500
§ Dai-Ichi Shoji of Amer., Inc., 150 Fifth Ave., New York, NY 10011 212-691-9050
§ GC Elctrns., 400 S. Wyman St., Rockford, IL 61101 815-968-9661
Knowles Elctrns., Inc., 3100 N. Mannheim Rd., Franklin Park, IL 60131 312-455-3600
§ Murata Mfg. Co., Ltd., 26-10-2-chome-Tenjin, Nagaoka-Kyo-Shi, Kyoto, Japan, JAPAN 075-951-9111
Panasonic, Ind'l. Elctrn. Comps., Panasonic, Elctrn. Comps. Div., Box 1503, Secaucus, NJ 07094 201-348-7000
§ Pathcom, Inc., Pace Two-Way Radio Prods., 24105 S. Frampton Ave., Harbor City, CA 90710 213-325-1290
§ Shokai Far East, Ltd., 280 North Central Ave., Hartsdale, NY 10530 914-681-0700
§ Shure Bros., 222 Hartrey Ave., Evanston, IL 60204 312-866-2200
§ Superex Electronics Corp., 151 Ludlow St., Yonkers, NY 10705 914-965-6906
Sylvania Electronic Components, Philips ECG Inc., A North American Philips Co., 100 First Ave., Waltham, MA 02254 617-890-6107

Microphones, Condenser (Incl. Electret)-1300

Cord Electronics, Inc., 177 Cantiague Rock Rd., Westbury, NY 11590, 516-935-3640 .... D•1024
§ AKG Acoustics, Inc., 77 Selleck St., Stamford, CT 06902 203-348-2121
Alan Gordon Entprs., Inc., P.O. Box 3914, 5362 Cahuenga Blvd., N. Hollywood, CA 91605 818-985-5500
Bruel & Kjaer Instrs. Inc., 185 Forest St., Marlboro, MA 01752 617-481-7000
§ Dai-Ichi Shoji of Amer., Inc., 150 Fifth Ave., New York, NY 10011 212-691-9050
§ GC Elctrns., 400 S. Wyman St., Rockford, IL 61101 815-968-9661
† Gentex, Box 315, Carbondale, PA 18407 603-434-0311
§ Heath Co., Benton Harbor, MI 49022 616-982-3886
ISL Products Int'l, Ltd., 235 P Robbins Lane, Syosset, NY 11791-6093 516-822-9601
Knowles Elctrns., Inc., 3100 N. Mannheim Rd., Franklin Park, IL 60131 312-455-3600
Panasonic, Ind'l. Elctrn. Comps., Panasonic, Elctrn. Comps. Div., Box 1503, Secaucus, NJ 07094 201-348-7000
§ Philmore Mfg., 40 Inip Dr., Inwood, NY 11696 516-239-6161
§† Primo, 25-1, 6-Chome, Mure, Mitakashi, Tokyo, JAPAN 0422-43-3121
§ R-Columbia Prods. Co., Inc., 2008 St. Johns Ave., Highland Park, IL 60035 312-432-7915

Shogyo Intl. Corp., 287 Northern Blvd., Great Neck, NY 11021 516-466-0911
§ Shokai Far East, Ltd., 280 North Central Ave., Hartsdale, NY 10530 914-681-0700
§ Shure Bros., 222 Hartrey Ave., Evanston, IL 60204 312-866-2200
§ Ten-Tec, Inc., Industrial Park, Sevierville, TN 37862 615-453-7172

Microphones, Crystal-1300

Alan Gordon Entprs., Inc., P.O. Box 3914, 5362 Cahuenga Blvd., N. Hollywood, CA 91605 818-985-5500
† Columbia Resch. Labs., Macdade Blvd. & Bullens La., Woodlyn, PA 19094 215-532-9464
Cord Electronics, Inc., 177 Cantiague Rock Rd., Westbury, NY 11590 ... 516-935-3640
§ Dai-Ichi Shoji of Amer., Inc., 150 Fifth Ave., New York, NY 10011 212-691-9050
§ GC Elctrns., 400 S. Wyman St., Rockford, IL 61101 815-968-9661
† PCB Piezotronics, 3425 Walden Ave., Depew, NY 14043-2495 716-684-0001
§ Philmore Mfg., 40 Inip Dr., Inwood, NY 11696 516-239-6161
§ R-Columbia Prods. Co., Inc., 2008 St. Johns Ave., Highland Park, IL 60035 312-432-7915
Shogyo Intl. Corp., 287 Northern Blvd., Great Neck, NY 11021 516-466-0911
§ Shokai Far East, Ltd., 280 North Central Ave., Hartsdale, NY 10530 914-681-0700

Microphones, Dynamic-1300

Cord Electronics, Inc., 177 Cantiague Rock Rd., Westbury, NY 11590, 516-935-3640 .... D-1024
† Accusonic Systems Corp., 12 Kulick Rd., Fairfield, NJ 07006 201-575-1570
§ AKG Acoustics, Inc., 77 Selleck St., Stamford, CT 06902 203-348-2121
Alan Gordon Entprs., Inc., P.O. Box 3914, 5362 Cahuenga Blvd., N. Hollywood, CA 91605 818-985-5500
§ Altec Lansing, Altec Corp., 1250 N. Red Gum St., Anaheim, CA 92806 ... 714-632-7117
† Audiosears, South St., Stamford, NY 12167 607-652-7305
§† Audiosone, Inc., 617 Fan Hill Rd., Monroe, CT 06468 ..... 203-268-4372;203-268-6703
§ Audiotronics Corp., 7428 Bellaire Ave., N. Hollywood, CA 91605 818-765-2645
§ Dai-Ichi Shoji of Amer., Inc., 150 Fifth Ave., New York, NY 10011 212-691-9050
§ Dyma Engrg., Box 1535, Los Lunas, NM 87031 505-865-6700
§ GC Elctrns., 400 S. Wyman St., Rockford, IL 61101 815-968-9661
† Gulton Inds., Inc., Servonic Div., 1644 Whittier Ave., Costa Mesa, CA 92627 .... 714-642-2400;800-854-4066
§ Heath Co., Benton Harbor, MI 49022 616-982-3886
† Kulite Semiconductor Prods., Inc., 1039 Hoyt Ave., Ridgefield, NJ 07657 201-945-3000
§ MG Electronics, 32 Ranick Rd., Hauppauge, NY 11788 516-582-3400
Panasonic, Ind'l. Elctrn. Comps., Panasonic, Elctrn. Comps. Div., Box 1503, Secaucus, NJ 07094 201-348-7000
§ Paso Sound Prods., 14 First St, Pelham, NY 10803 914-738-4800
Pathcom, Inc., Pace Two-Way Radio Prods., 24105 S. Frampton Ave., Harbor City, CA 90710 213-325-1290
§ Philmore Mfg., 40 Inip Dr., Inwood, NY 11696 516-239-6161
§† Primo, 25-1, 6-Chome, Mure, Mitakashi, Tokyo, JAPAN 0422-43-3121
§ R-Columbia Prods. Co., Inc., 2008 St. Johns Ave., Highland Park, IL 60035 312-432-7915
§ Recoton Corp., 46-23 Crane St., Long Island City, NY 11101 718-392-6442
† Roanwell, 180 Varick St., New York, NY 10014 212-989-1090
§ Rye Inds., Inc., 125 Spencer Pl., P.O. Box M, Mamaroneck, NY 10543 ... 914-698-0080
Shogyo Intl. Corp., 287 Northern Blvd., Great Neck, NY 11021 516-466-0911
§ Shokai Far East, Ltd., 280 North Central Ave., Hartsdale, NY 10530 914-681-0700
§ Shure Bros., 222 Hartrey Ave., Evanston, IL 60204 312-866-2200
§ SPECO Div., Components Specialties, Inc., P.O. Box 624, 1172 Rte. 109, Lindenhurst, NY 11757 .... 516-957-8700;800-645-5516
§ Superex Electronics Corp., 151 Ludlow St., Yonkers, NY 10705 914-965-6906
§† Telephonics, 770 Park Ave., Huntington, NY 11743 516-549-6000
§ Television Equip. Assocs., Box 393, So. Salem, NY 10590-0393 914-763-8893
§ Vidaire Electronics Mfg. Corp., P. O. Box 788, Freeport, NY 11520 516-623-6696
§† Workman Elctrn. Prods., Box 3828, Sarasota, FL 33578 813-371-4242

Microphones, Lavalier-1300

§ AKG Acoustics, Inc., 77 Selleck St., Stamford, CT 06902 203-348-2121
Alan Gordon Entprs., Inc., P.O. Box 3914, 5362 Cahuenga Blvd., N. Hollywood, CA 91605 818-985-5500
§ Dukane Corp., Communications Sys. Div., 2900 Dukane Dr., St. Charles, IL 60174 312-584-2300
§ GC Elctrns., 400 S. Wyman St., Rockford, IL 61101 815-968-9661
§ Paso Sound Prods., 14 First St, Pelham, NY 10803 914-738-4800
§ Primo, 25-1, 6-Chome, Mure, Mitakashi, Tokyo, JAPAN 0422-43-3121
§ R-Columbia Prods. Co., Inc., 2008 St. Johns Ave., Highland Park, IL 60035 312-432-7915
§ Shokai Far East, Ltd., 280 North Central Ave., Hartsdale, NY 10530 914-681-0700
§ Shure Bros., 222 Hartrey Ave., Evanston, IL 60204 312-866-2200
§† Workman Elctrn. Prods., Box 3828, Sarasota, FL 33578 813-371-4242

Microphones, Magnetic-1300

Audiosears, South St., Stamford, NY 12167 607-652-7305
Knowles Elctrns., Inc., 3100 N. Mannheim Rd., Franklin Park, IL 60131 ... 312-455-3600
§ Primo, 25-1, 6-Chome, Mure, Mitakashi, Tokyo, JAPAN 0422-43-3121
§ R-Columbia Prods. Co., Inc., 2008 St. Johns Ave., Highland Park, IL 60035 312-432-7915
† Roanwell, 180 Varick St., New York, NY 10014 212-989-1090
§ Rye Inds., Inc., 125 Spencer Pl., P.O. Box M, Mamaroneck, NY 10543 ... 914-698-0080
§ Shokai Far East, Ltd., 280 North Central Ave., Hartsdale, NY 10530 914-681-0700
§ Shure Bros., 222 Hartrey Ave., Evanston, IL 60204 312-866-2200
§ SPECO Div., Components Specialties, Inc., P.O. Box 624, 1172 Rte. 109, Lindenhurst, NY 11757 .... 516-957-8700;800-645-5516
§† Workman Elctrn. Prods., Box 3828, Sarasota, FL 33578 813-371-4242

Microphones, Omnidirectional-1300

§ AKG Acoustics, Inc., 77 Selleck St., Stamford, CT 06902 203-348-2121
Alan Gordon Entprs., Inc., P.O. Box 3914, 5362 Cahuenga Blvd., N. Hollywood, CA 91605 818-985-5500
Bruel & Kjaer Instrs. Inc., 185 Forest St., Marlboro, MA 01752 617-481-7000
§ Columbia Resch. Labs., Macdade Blvd. & Bullens La., Woodlyn, PA 19094 215-532-9464
Cord Electronics, Inc., 177 Cantiague Rock Rd., Westbury, NY 11590 ... 516-935-3640
§ Dai-Ichi Shoji of Amer., Inc., 150 Fifth Ave., New York, NY 10011 212-691-9050
§ GC Elctrns., 400 S. Wyman St., Rockford, IL 61101 815-968-9661
† Gentex, Box 315, Carbondale, PA 18407 603-434-0311
Knowles Elctrns., Inc., 3100 N. Mannheim Rd., Franklin Park, IL 60131 ... 312-455-3600
§ Metrosonics, Inc., Box 23075, Rochester, NY 14692-3075 716-334-7300
Panasonic, Ind'l. Elctrn. Comps., Panasonic, Elctrn. Comps. Div., Box 1503, Secaucus, NJ 07094 201-348-7000
§ Paso Sound Prods., 14 First St, Pelham, NY 10803 914-738-4800
§ Philmore Mfg., 40 Inip Dr., Inwood, NY 11696 516-239-6161
§† Primo, 25-1, 6-Chome, Mure, Mitakashi, Tokyo, JAPAN 0422-43-3121
§ R-Columbia Prods. Co., Inc., 2008 St. Johns Ave., Highland Park, IL 60035 312-432-7915
§ RMS Electronics Inc., 50 Antin Pl., Bronx, NY 10462 212-892-6700
† Roanwell, 180 Varick St., New York, NY 10014 212-989-1090
§ Shokai Far East, Ltd., 280 North Central Ave., Hartsdale, NY 10530 914-681-0700
§ Shure Bros., 222 Hartrey Ave., Evanston, IL 60204 312-866-2200
§ SPECO Div., Components Specialties, Inc., P.O. Box 624, 1172 Rte. 109, Lindenhurst, NY 11757 .... 516-957-8700;800-645-5516
Trimm, Inc., Div. of Newton Instr. Co., 400 W. Lake St., Box 489, Libertyville, IL 60048 312-362-3700
§† Workman Elctrn. Prods., Box 3828, Sarasota, FL 33578 813-371-4242

Microphones, Subminiature-1300

§ AKG Acoustics, Inc., 77 Selleck St., Stamford, CT 06902 203-348-2121
Alan Gordon Entprs., Inc., P.O. Box 3914, 5362 Cahuenga Blvd., N. Hollywood, CA 91605 818-985-5500
Bruel & Kjaer Instrs. Inc., 185 Forest St., Marlboro, MA 01752 617-481-7000
Cord Electronics, Inc., 177 Cantiague Rock Rd., Westbury, NY 11590 ... 516-935-3640
§ Dai-Ichi Shoji of Amer., Inc., 150 Fifth Ave., New York, NY 10011 212-691-9050
† Gentex, Box 315, Carbondale, PA 18407 603-434-0311
Knowles Elctrns., Inc., 3100 N. Mannheim Rd., Franklin Park, IL 60131 ... 312-455-3600
§ Shure Bros., 222 Hartrey Ave., Evanston, IL 60204 312-866-2200

Microphones, Velocity-1300

Panasonic, Ind'l. Elctrn. Comps., Panasonic, Elctrn. Comps. Div., Box 1503, Secaucus, NJ 07094 201-348-7000

Microphones, Wireless-1300

Alan Gordon Entprs., Inc., P.O. Box 3914, 5362 Cahuenga Blvd., N. Hollywood, CA 91605 818-985-5500
Cord Electronics, Inc., 177 Cantiague Rock Rd., Westbury, NY 11590 ... 516-935-3640
Dai-Ichi Shoji of Amer., Inc., 150 Fifth Ave., New York, NY 10011 212-691-9050
§ Dukane Corp., Communications Sys. Div., 2900 Dukane Dr., St. Charles, IL 60174 312-584-2300
§ HM Elctrns., 6151 Fairmount Ave., San Diego, CA 92120 619-280-6050
§ Paso Sound Prods., 14 First St, Pelham, NY 10803 914-738-4800
§ Philmore Mfg., 40 Inip Dr., Inwood, NY 11696 516-239-6161
§† Primo, 25-1, 6-Chome, Mure, Mitakashi, Tokyo, JAPAN 0422-43-3121
§ Shokai Far East, Ltd., 280 North Central Ave., Hartsdale, NY 10530 914-681-0700
§† TransKinetic Sys., 110 Shawmut Rd., Canton, MA 02021 617-828-3000

Microphones (MIL)-2440 — *See Vol. B*

Microprocessor — See Integrated Circuits, Microprocessor (Vol. A)

Microprocessor Development Systems-3130 — *See Vol. A*

Microscopes-3700 — *See Vol. B*

Microscopes, Measuring-2900

§ BEA electro-optics, Inc., 690 First Ave., Des Plaines, IL 60016 312-298-1420
† CELCO, 70 Constantine Dr., Mahwah, NJ 07430 201-327-1123
Ealing Optics Co., Ealing Corp., 22 Pleasant St., S. Natick, MA 01760 617-655-7000
EG&G Gamma Scientific, Div. of EG&G Inc., 3777 Ruffin Rd., San Diego, CA 92123 619-279-8034
ElectroPhysics Corp., 48 Spruce St., Nutley, NJ 07110 201-667-2262
§ Hacker Instrs., Box 657, Fairfield, NJ 07007 201-226-8450
† Keyan Inds., Inc., P.O. Box 1228, Middleboro, MA 02346 617-947-7719
† Lenox Instr., 265 Andrews Rd., Trevose, PA 19047 215-322-9990
3D Optics, Box 224, 4 Strathmore Cir., Braintree, MA 02184 617-848-8002
Vickers Inst., Inc., Vickers Instruments, P.O. Box 99, Malden, MA 02148 .. 617-324-0350
§ Vision Engrg., Inc., 570 Danbury Rd., New Milford, CT 06776 203-355-3776
§ Carl Zeiss, Inc., One Zeiss Drive, Thornwood, NY 10594 914-681-7670

Microwave Comb Generator — See Generators, Microwave (Vol. D)

Microwave Integrated Circuits (MICs)-3450 — *See Vol. A*

Microwave Receivers — See Receivers, Microwave

Mirrors, Cold-3700 — *See Vol. B*

Mirrors, Front Surface-3700 — *See Vol. B*

Mirrors, Hot-3700 — *See Vol. B*

Mixers, Audio-1300

§ RTS Systems, Inc., Compact Video, Inc., 1100 W. Chestnut St., Burbank, CA 91506, 818-840-7119 .... D-1055
§ Altec Lansing, Altec Corp., 1250 N. Red Gum St., Anaheim, CA 92806 ... 714-632-7117
† Ampex Corp., 401 Broadway, Redwood City, CA 94063 415-367-2011

§ Davis, J. W., & Co., P.O. Box 26177, Dallas, TX 75226 214-651-7341
† Dukane Corp., Communications Sys. Div., 2900 Dukane Dr., St. Charles, IL 60174 312-584-2300
§ Dyma Engrg., Box 1535, Los Lunas, NM 87031 505-865-6700
§ Frazier, 1930 Valley View La., Dallas, TX 75234 214-241-3441
§ Furman Sound, Inc., 30 Rich St., Greenbrae, CA 94904 415-927-1225
† Lear Siegler, Inc., 2850 Ocean Park Blvd., P.O. Box 2158, Santa Monica, CA 90406 213-452-5444
Modular Audio Prods., Modular Devices Inc., 50 Orville Dr., Bohemia, NY 11716 516-567-9620
§ Paso Sound Prods., 14 First St, Pelham, NY 10803 914-738-4800
§ Plessey Semiconductors, 1641 Kaiser Ave., Irvine, CA 92714 714-540-9979
§ Precision Elctrns., 9101 King Ave., Franklin Park, IL 60131 312-678-5350
§ Ramko Resch., Inc., 11355A Folsom Blvd., Rancho Cordova, CA 95670 800-821-2545
§ Shure Bros., 222 Hartrey Ave., Evanston, IL 60204 312-866-2200
† Solid State Elctrns. Corp., 18646 Parthenia St., Northridge, CA 91324 818-993-8257
§ Spectra Sonics, 3750 Airport Rd., Ogden, UT 84403 801-392-7531
§ Superex Electronics Corp., 151 Ludlow St., Yonkers, NY 10705 914-965-6906
§ Vidaire Electronics Mfg. Corp., P. O. Box 788, Freeport, NY 11520 516-623-6696

Mixers, Microwave-3450 — *See Vol. A*

Mixers, RF-3450 — *See Vol. A*

Modems — See Modulator/Demodulators, Data (Vol. D)

Modems, Broadband RF-1900

§ C-COR Elctrns., 60 Decibel Rd., State College, PA 16801 814-238-2461
Computrol Div. Kidde Automated Sys., Inc., 15 Ethan Allen Hwy., Ridgefield, CT 06877-6297 203-544-9371
General Datacomm, Inc., Rt. 63, Middlebury, CT 06762-1299 203-574-1118
GTE SUPPLY, GTE Communications Systems, 5225 Wiley Post Way, Salt Lake City, UT 84116 801-537-5237
IDE Associates, Inc., 35 Dunham Rd., Billerica, MA 01821 617-663-6878
Muirhead, 1101 Briston Rd., Mountainside, NJ 07092 201-233-6010
† Zeta Labs., 3265 Scott Blvd., Santa Clara, CA 95054 408-727-6001

Modems, Communications, Eliminator/Line Driver-1900

Datec, Inc., 200 Eastowne Dr., Ste. 116, Chapel Hill, NC 27514, 919-929-2135 .... D•1049
Amdahl Communications Sys. Div., Amdahl Corp., 2500 Walnut Ave., Marina del Rey, CA 90291 213-822-3202
American Photonics Inc., 71 Commerce Dr., Brookfield Center, CT 06805 203-775-8950
BLACK BOX Corp., Micom Sys., P.O. Box 12800, Pittsburgh, PA 15241 412-746-5500
§ Cermetek Microelectronics Inc., 1308 Borregas Ave., Sunnyvale, CA 94088 408-752-5000
Coherent Communications Sys. Corp., 60 Commerce Dr., Hauppauge, NY 11788 516-231-1550
§ Comdata Corp., 7900 N. Nagle Ave., Morton Grove, IL 60053 312-470-9600
Com/Tech Systems, 505 Eighth Ave., New York, NY 10018 212-594-5377
§ Dataprobe, 110 Palisades Blvd., Palisades Park, NJ 07650 201-947-9500
§ Data Rentals/Sls., Inc, P. O. Box 3257, Culver City, CA 90230 213-559-3822
Del-Teleproducts, 230 N. Market Pl., Escondido, CA 92025 619-743-8344
§ Electrodata, Inc., 23020 Miles Rd., Bedford Heights, OH 44128 216-663-3333
§ Electro Standards Lab., Inc., P.O. Box 9144, Providence, RI 02940 401-943-1164
† Fibronics Intl. Inc., 325 Stevens St., Hyannis, MA 02601 617-778-0700
§ Frequency Selective Networks, Inc., 69-20 Garfield Ave., Woodside, NY 11377 718-424-7500
Gandalf Data, Inc., 1019 S. Noel Ave., Wheeling, IL 60090 312-541-6060
Gandalf Technologies, Inc., 350 E Dundee Rd., Suite 301, Wheeling, IL 60090 312-459-6630
General Datacomm, Inc., Rt. 63, Middlebury, CT 06762-1299 203-574-1118
§ Glasgal Communications, Inc., 207 Washington St., Northvale, NJ 07647 201-768-8082
Global Specialties, Interplex Electronics, Inc., 70 Fulton Terrace, P.O. Box 1942, New Haven, CT 06509 203-624-3103
§ Gra-Mar Inc., 3165 McCrory Pl., Ste. 265, Orlando, FL 32803 305-894-3351
GTE SUPPLY, GTE Communications Systems, 5225 Wiley Post Way, Salt Lake City, UT 84116 801-537-5237
Inmac, 2465 Augustine Dr., Santa Clara, CA 95054 408-727-1970
Interactive Micro Sys., Inc., 644 Davisville Rd., Willow Grove, PA 19090
§ Kinex Corp., Sub. of the Nokia Corp. - Helsinki, 6950 Bryan Dairy Rd., Largo, FL 33543 813-541-6404
§ Micom Systems, Inc., 4100 Los Angeles Ave, P.O. Box 8100, Simi Valley, CA 93062-8100 805-583-8600
Muirhead, 1101 Briston Rd., Mountainside, NJ 07092 201-233-6010
§ Quam Corporation, 900 W. 128th St. Ste 208, Burnsville, MN 55337 612-894-2360
RCI/Data, 1992 Lakewood Rd., Toms River, NJ 08753 201-341-8361
§ Tek-Com Corporation, 1887 O'Toole Avenue, C103, San Jose, CA 95131 408-263-7400
§ Telebyte Technology, Inc., Remark Datacom Div., 270 East Pulaski Road, Greenlawn, NY 11740 516-423-3232
Texas Instrs., Data Sys. Group, P. O. Box 809063, Dallas, TX 75380-9063 1-800-527-3500
Timeplex, Inc., 400 Chestnut Ridge Rd., Woodcliff Lake, NJ 07675 201-930-4600
Toyo Comm. Equip. Co., Ltd., No. 8 Mori Bldg., 20-4, Nichi-Shimbashi, 3-Chome Minato-Ku, TOKYO, JAPAN 105 .... 03-459-7320/03-459-7310

Modems, Communications, Line Receivers-1900

Datec, Inc., 200 Eastowne Dr., Ste. 116, Chapel Hill, NC 27514, 919-929-2135 .... D•1049
BLACK BOX Corp., Micom Sys., P.O. Box 12800, Pittsburgh, PA 15241 412-746-5500
§ Comdata Corp., 7900 N. Nagle Ave., Morton Grove, IL 60053 312-470-9600
§ Dataprobe, 110 Palisades Blvd., Palisades Park, NJ 07650 201-947-9500
§ Data Rentals/Sls., Inc, P. O. Box 3257, Culver City, CA 90230 213-559-3822
§ Frequency Selective Networks, Inc., 69-20 Garfield Ave., Woodside, NY 11377 718-424-7500
Gandalf Technologies, Inc., 350 E Dundee Rd., Suite 301, Wheeling, IL 60090 312-459-6630
General Datacomm, Inc., Rt. 63, Middlebury, CT 06762-1299 203-574-1118
§ Glasgal Communications, Inc., 207 Washington St., Northvale, NJ 07647 201-768-8082
GTE SUPPLY, GTE Communications Systems, 5225 Wiley Post Way, Salt Lake City, UT 84116 801-537-5237
Inmac, 2465 Augustine Dr., Santa Clara, CA 95054 408-727-1970
Interface Technology, 10500 Kahlmeyer Dr., St. Louis, MO 63132 314-426-6880
§ Kinex Corp., Sub. of the Nokia Corp. - Helsinki, 6950 Bryan Dairy Rd., Largo, FL 33543 813-541-6404
MERET, Inc., 1815 24th St., Santa Monica, CA 90404-4998 213-828-7496
Microplex, Inc., 1977 State College Blvd., Anaheim, CA 92806 .... 714-979-8833; 714-634-1535
Muirhead, 1101 Briston Rd., Mountainside, NJ 07092 201-233-6010
§ Quam Corporation, 900 W. 128th St. Ste 208, Burnsville, MN 55337 612-894-2360
RCI/Data, 1992 Lakewood Rd., Toms River, NJ 08753 201-341-8361
§ Tek-Com Corporation, 1887 O'Toole Avenue, C103, San Jose, CA 95131 408-263-7400
Texas Instrs., Data Sys. Group, P. O. Box 809063, Dallas, TX 75380-9063 1-800-527-3500
Toyo Comm. Equip. Co., Ltd., No. 8 Mori Bldg., 20-4, Nichi-Shimbashi, 3-Chome Minato-Ku, TOKYO, JAPAN 105 .... 03-459-7320/03-459-7310
Visionary Electronics, 141 Parker Avenue, San Francisco, CA 94118 415-751-8811

Modems, Communications, Long Haul-1900

Astec USA, Ltd., A BSR Intl. Co., 2880 San Tomas Expwy., # 200, Santa Clara, CA 95051, 408-748-1200 .... D•1514
§† Datec, Inc., 200 Eastowne Dr., Ste. 116, Chapel Hill, NC 27514, 919-929-2135 .... D•1049
Aydin Corp., 700 Dresher Rd., Horsham, PA 19044 215-657-7510
BLACK BOX Corp., Micom Sys., P.O. Box 12800, Pittsburgh, PA 15241 412-746-5500
† CATEL Telecommunications, United Scientific Corp., 4800 Patrick Henry Dr., Santa Clara, CA 95054 408-988-7722
§ Cermetek Microelectronics Inc., 1308 Borregas Ave., Sunnyvale, CA 94088 408-752-5000
† Cincinnati Elctrns., 2630 Glendale Milford Rd., Cincinnati, OH 45241 513-733-6100
Coherent Communications Sys. Corp., 60 Commerce Dr., Hauppauge, NY 11788 516-231-1550
§ Comdata Corp., 7900 N. Nagle Ave., Morton Grove, IL 60053 312-470-9600
Computer Cable & Prods. Inc., Affil. Vertex Elctrns., 147 Gazza Blvd., Farmingdale, NY 11735 516-293-1610
§ Comspec Inc., 10700 Hammerly 5120, Houston, TX 77043 713-461-4487
§ Concord Data Systems, 303 Bear Hill Rd., Waltham, MA 02154 617-890-1394
§ CTS Fabri-Tek, Inc., CTS Corporation, 6900 Shady Oak Rd., Eden Prairie, MN 55344 612-941-9100
§ Data Rentals/Sls., Inc, P. O. Box 3257, Culver City, CA 90230 213-559-3822
Digital Communications Assocs., Inc., 303 Technology Pk., Norcross, GA 30092 404-448-1400
Digital Radio Corp., 8901 La Cienega Blvd., Inglewood, CA 90301 213-670-8611
† Electrocom Inds., 1105 N. Ironwood Dr., S. Bend, IN 46615 219-232-2743
§ Frequency Selective Networks, Inc., 69-20 Garfield Ave., Woodside, NY 11377 718-424-7500
Gandalf Data, Inc., 1019 S. Noel Ave., Wheeling, IL 60090 312-541-6060
Gandalf Technologies, Inc., 350 E Dundee Rd., Suite 301, Wheeling, IL 60090 312-459-6630
General Datacomm, Inc., Rt. 63, Middlebury, CT 06762-1299 203-574-1118
§ Glasgal Communications, Inc., 207 Washington St., Northvale, NJ 07647 201-768-8082
GTE SUPPLY, GTE Communications Systems, 5225 Wiley Post Way, Salt Lake City, UT 84116 801-537-5237
Highland Technology, Inc., 320 Judah Street, San Francisco, CA 94122 415-753-5814
Inmac, 2465 Augustine Dr., Santa Clara, CA 95054 408-727-1970
Interactive Micro Sys., Inc., 644 Davisville Rd., Willow Grove, PA 19090
Karkar Electronics, Inc., 245 Eleventh St., San Francisco, CA 94103 415-552-1247
§ Kinex Corp., Sub. of the Nokia Corp. - Helsinki, 6950 Bryan Dairy Rd., Largo, FL 33543 813-541-6404
† Magnavox Advanced Prods. & Sys. Co., Magnavox Govt. Indl. Elctrns. Co., 2829 Maricopa St., Torrance, CA 90503 213-618-1200
MERET, Inc., 1815 24th St., Santa Monica, CA 90404-4998 213-828-7496
§ Micom Systems, Inc., 4100 Los Angeles Ave, P.O. Box 8100, Simi Valley, CA 93062-8100 805-583-8600
Muirhead, 1101 Briston Rd., Mountainside, NJ 07092 201-233-6010
§ Multi-Tech Systems, Inc., 82 Second Ave. S.E., New Brighton, MN 55112 612-631-3550
NCR Comten, Inc., NCR Corp., 2700 Snelling Avenue N., St. Paul, MN 55113 612-638-7777
§ Omnitec Data Inc., 2405 S. 20th St., Phoenix, AZ 85034 .... 602-258-8244;800-528-8423
RFL Inds., A Dowty Grp. Co./Comms. Div., Powerville Rd., Boonton, NJ 07005 201-334-3100
Stanford Telecommunications, Inc., 2421 Mission College Blvd., Santa Clara, CA 95054 408-748-1010
§ Tek-Com Corporation, 1887 O'Toole Avenue, C103, San Jose, CA 95131 408-263-7400
§ Teltone, 10801-120 Ave. NE, Kirkland, WA 98033 206-827-9626
§ Terminal Data Corp., 15733 Crabbs Branch Way, Rockville, MD 20855 301-921-8282
§ Tetragenics, Box 1338, Butte, MT 59701 406-782-8606
Toyo Comm. Equip. Co., Ltd., No. 8 Mori Bldg., 20-4, Nichi-Shimbashi, 3-Chome Minato-Ku, TOKYO, JAPAN 105 .... 03-459-7320/03-459-7310
Visionary Electronics, 141 Parker Avenue, San Francisco, CA 94118 415-751-8811
† Western DataCom, 5083 Market St., Youngstown, OH 44512 216-788-6583

Modems, Communications, Short Haul (Limited Distance)-1900

Astec USA, Ltd., A BSR Intl. Co., 2880 San Tomas Expwy., #200, Santa Clara, CA 95051, 408-748-1200 .... D•1514
Motorola Semiconductor Prods. Sector, Adv. 72, Box 20912, Phoenix, AZ 85036, 602-244-6900 .... A•1689-1690
Amdahl Communications Sys. Div., Amdahl Corp., 2500 Walnut Ave., Marina del Rey, CA 90291 213-822-3202
Artel Communications Corp., 93 Grand St., Worcester, MA 01602 617-752-5690
BLACK BOX Corp., Micom Sys., P.O. Box 12800, Pittsburgh, PA 15241 412-746-5500
Burr-Brown Corp., P.O. Box 11400, Tucson, AZ 85734 602-746-1111
† CATEL Telecommunications, United Scientific Corp., 4800 Patrick Henry Dr., Santa Clara, CA 95054 408-988-7722
Coherent Communications Sys. Corp., 60 Commerce Dr., Hauppauge, NY 11788 516-231-1550
§ Comdata Corp., 7900 N. Nagle Ave., Morton Grove, IL 60053 312-470-9600
§ Complexx Systems Inc., 4930 Research Dr., Huntsville, AL 35805 205-830-4310
Computer Cable & Prods. Inc., Affil. Vertex Elctrns., 147 Gazza Blvd., Farmingdale, NY 11735 516-293-1610
§ Data Rentals/Sls., Inc, P. O. Box 3257, Culver City, CA 90230 213-559-3822
EDA Instruments, Inc., 4 Thorncliffe Park Dr., Toronto, ON, CANADA M4HIHI 416-425-7800
† Fibronics Intl. Inc., 325 Stevens St., Hyannis, MA 02601 617-778-0700
Foundation Instruments Inc., 24 Colonnade Rd., Nepean, ON, CANADA K2E 7J6 613-226-4000
§ Frequency Selective Networks, Inc., 69-20 Garfield Ave., Woodside, NY 11377 718-424-7500
Gandalf Data, Inc., 1019 S. Noel Ave., Wheeling, IL 60090 312-541-6060
Gandalf Technologies, Inc., 350 E Dundee Rd., Suite 301, Wheeling, IL 60090 312-459-6630
General Datacomm, Inc., Rt. 63, Middlebury, CT 06762-1299 203-574-1118
§ Glasgal Communications, Inc., 207 Washington St., Northvale, NJ 07647 201-768-8082
GTE SUPPLY, GTE Communications Systems, 5225 Wiley Post Way, Salt Lake City, UT 84116 801-537-5237
Inmac, 2465 Augustine Dr., Santa Clara, CA 95054 408-727-1970
Interactive Micro Sys., Inc., 644 Davisville Rd., Willow Grove, PA 19090
§ Kinex Corp., Sub. of the Nokia Corp. - Helsinki, 6950 Bryan Dairy Rd., Largo, FL 33543 813-541-6404
MERET, Inc., 1815 24th St., Santa Monica, CA 90404-4998 213-828-7496
§ Micom Systems, Inc., 4100 Los Angeles Ave, P.O. Box 8100, Simi Valley, CA 93062-8100 805-583-8600
Muirhead, 1101 Briston Rd., Mountainside, NJ 07092 201-233-6010
Nu Data, 32 Fairview Ave., Little Silver, NJ 07739 201-842-5757
RCI/Data, 1992 Lakewood Rd., Toms River, NJ 08753 201-341-8361
§ Tek-Com Corporation, 1887 O'Toole Avenue, C103, San Jose, CA 95131 408-263-7400
§ Telebyte Technology, Inc., Remark Datacom Div., 270 East Pulaski Road, Greenlawn, NY 11740 516-423-3232
Timeplex, Inc., 400 Chestnut Ridge Rd., Woodcliff Lake, NJ 07675 201-930-4600
Toyo Comm. Equip. Co., Ltd., No. 8 Mori Bldg., 20-4, Nichi-Shimbashi, 3-Chome Minato-Ku, TOKYO, JAPAN 105 .... 03-459-7320/03-459-7310
Visionary Electronics, 141 Parker Avenue, San Francisco, CA 94118 415-751-8811
† Western DataCom, 5083 Market St., Youngstown, OH 44512 216-788-6583

Modular Telephone Cords — See Cable, Telephone (Vol. D)

Modulation Transfer Analyzers — See Analyzers, Transfer Function (Vol. D)

Modulator/Demodulators, Data-2000

Astec USA, Ltd., A BSR Intl. Co., 2880 San Tomas Expwy., #200, Santa Clara, CA 95051, 408-748-1200 .... D•1514
† Computer Conversions Corp., 6 Dunton Ct., E. Northport, NY 11731, 516-261-3300 .... D•1141
§† Datec, Inc., 200 Eastowne Dr., Ste. 116, Chapel Hill, NC 27514, 919-929-2135 .... D•1049
Exar Corp., P. O. Box 62229, 750 Palomar Ave., Sunnyvale, CA 94086, 408-732-7970 .... A•1668
† GRIM Corporation, Box 67, Medford, NJ 08055, 609-267-7950 .... D•1051
A & B Technical Services, 11300 Hartland St., N. Hollywood, CA 91605 213-769-6772
§† Advanced Micro Devices, P.O. Box 3453, 901 Thompson Pl., Sunnyvale, CA 94088 408-732-2400
§† Anaren Microwave, P.O. Box 178, 6635 Kirkville Rd., E. Syracuse, NY 13057 315-432-8909
Applied Micro Technlg., A Burr Brown Co., 3669 E. 44th Street, Tucson, AZ 85713 602-622-8605
Aydin Corp., 700 Dresher Rd., Horsham, PA 19044 215-657-7510
Canoga Data Sys., 6740 Eton Ave., Canoga Park, CA 91303 213-888-2003
† CATEL Telecommunications, United Scientific Corp., 4800 Patrick Henry Dr., Santa Clara, CA 95054 408-988-7722
Cermetek Microelectronics Inc., 1308 Borregas Ave., Sunnyvale, CA 94088 408-752-5000
† Climatronics, 140 Wilbur Pl., Bohemia, NY 11716 516-567-7300
Coherent Communications Sys. Corp., 60 Commerce Dr., Hauppauge, NY 11788 516-231-1550
§ Comdata Corp., 7900 N. Nagle Ave., Morton Grove, IL 60053 312-470-9600
ComDesign, 751 S. Kellogg Ave., Goleta, CA 93117 805-964-9852
Computrol Div. Kidde Automated Sys., Inc., 15 Ethan Allen Hwy., Ridgefield, CT 06877-6297 203-544-9371
† Control Technology Co., 41-16 29th St., Long Island City, NY 11101 718-361-2133
Dantel, 2991 N. Argyle Ave., Fresno, CA 93727 209-292-1111
§† Data-Control Sys., Commerce Dr., Box 860, Danbury, CT 06810 203-743-9241
Data-Design Labs., P.O. Box 711, 7925 Center Ave., Cucamonga, CA 91730 714-987-2511
† Dataproducts, 6200 Canoga Ave., Woodland Hills, CA 91365 213-887-8000
§† Data Prods. New England, Barnes Park N. Caller Box 30, Wallingford, CT 06492 203-265-7151
§ Data Rentals/Sls., Inc, P. O. Box 3257, Culver City, CA 90230 213-559-3822
Decom Sys., 340 Rancheros Dr., San Marcos, CA 92069 619-744-1002
Dymec, 8 Lowell Ave., Winchester, MA 01890 617-729-7870
† Electrocom Inds., 1105 N. Ironwood Dr., S. Bend, IN 46615 219-232-2743
Enterprise Sys. Corp., P.O. Box 698, Dover, NH 03820 603-742-7363
† Fibronics Intl. Inc., 325 Stevens St., Hyannis, MA 02601 617-778-0700
Frederick Elctrns. Corp., 7630 Hayward Rd., P.O. Box 502, Frederick, MD 21701-0502 301-662-5901
Gandalf Data, Inc., 1019 S. Noel Ave., Wheeling, IL 60090 312-541-6060
Gandalf Technologies, Inc., 350 E Dundee Rd., Suite 301, Wheeling, IL 60090 312-459-6630
General Datacomm, Inc., Rt. 63, Middlebury, CT 06762-1299 203-574-1118
† General Magnetics, 211 Grove St., Bloomfield, NJ 07003 201-743-2700
§ Glasgal Communications, Inc., 207 Washington St., Northvale, NJ 07647 201-768-8082
Hughes Aircraft Co, Aerospace Grps./Support Sys., P.O. Box 90515, Los Angeles, CA 90009 213-670-1515
Hughes Aircraft Co., Microelctrn. Sys. Div., 2601 Campus Dr., Irvine, CA 92715 714-752-3800
§ International Data Sciences, 7 Wellington Rd., Lincoln, RI 02865 401-333-6200
§ Intra-computer, 101 W. 31st St., New York, NY 10001 212-947-5533
§ Kinex Corp., Sub. of the Nokia Corp. - Helsinki, 6950 Bryan Dairy Rd., Largo, FL 33543 813-541-6404
§ Lexicon Corp. of Miami, 1541 N. W. 65th Ave., Ft. Lauderdale, FL 33313 305-792-4400
† Magnavox Advanced Prods. & Sys. Co., Magnavox Govt. Indl. Elctrns. Co., 2829 Maricopa St., Torrance, CA 90503 213-618-1200
§ Micom Systems, Inc., 4100 Los Angeles Ave, P.O. Box 8100, Simi Valley, CA 93062-8100 805-583-8600
Microplex, Inc., 1977 State College Blvd., Anaheim, CA 92806 .... 714-979-8833; 714-634-1535
§ Multi-Tech Systems, Inc., 82 Second Ave. S.E., New Brighton, MN 55112 612-631-3550
§ NES, Inc. (Nationwide Electronic Systems), 3003 Wakefield, Carpentersville, IL 60110 312-426-5900
Nu Data, 32 Fairview Ave., Little Silver, NJ 07739 201-842-5757
§ Omnitec Data Inc., 2405 S. 20th St., Phoenix, AZ 85034 .... 602-258-8244;800-528-8423
† Optelecom, 15940 Luanne Dr., Gaithersburg, MD 20877 301-840-2121
† OPT Inds. Inc., 300 Red School La., Phillipsburg, NJ 08865 201-454-2600
§† Penril Datacomm, Penril Corp., 207 Perry Parkway, Gaithersburg, MD 20877 301-921-8600
Racal-Milgo, 1601 N. Harrison Parkway, Sunrise, FL 33324 305-475-1601
RCI/Data, 1992 Lakewood Rd., Toms River, NJ 08753 201-341-8361
RE Instruments Corp., 31029 Center Ridge Rd., Westlake, OH 44145 216-871-7617
RFL Inds., A Dowty Grp. Co./Comms. Div., Powerville Rd., Boonton, NJ 07005 201-334-3100
§ Richard-Lee Co., Box 724, New Providence, NJ 07974 201-276-0710
† Rockwell Int'l., 4311 Jamboree Rd., Newport Beach, CA 92660 800-854-8099
† Signatron, A Unit of Sundstrand Corp., 12 Hartwell Ave., Lexington, MA 02173 617-861-1500
§† Silicon General, 11861 Western Ave., Garden Grove, CA 92641 714-898-8121
† Solid State Elctrns. Corp., 18646 Parthenia St., Northridge, CA 91324 818-993-8257
§† G.T.E. Gov't Sys. Corp., Comm. Sys. Div., 77 A St., Needham Hgts., MA 02194 617-449-2000
§ Tek-Com Corporation, 1887 O'Toole Avenue, C103, San Jose, CA 95131 408-263-7400
Timeplex, Inc., 400 Chestnut Ridge Rd., Woodcliff Lake, NJ 07675 201-930-4600
Tri-Com, Inc., 7304 Grove Rd., Frederick, MD 21701 301-694-6666
† Zeta Labs., 3265 Scott Blvd., Santa Clara, CA 95054 408-727-6001

Modulator/Demodulators, Laser-3700 — *See Vol. B*

Modulators, AM-1900

Alpha Inds., Inc.-MSD Div., 20 Sylvan Rd., Woburn, MA 01801 617-935-5150
§† Anaren Microwave, P.O. Box 178, 6635 Kirkville Rd., E. Syracuse, NY 13057 315-432-8909
† CATEL Telecommunications, United Scientific Corp., 4800 Patrick Henry Dr., Santa Clara, CA 95054 408-988-7722
† Computer Conversions Corp., 6 Dunton Ct., E. Northport, NY 11731 516-261-3300
Continental Electronics Mfg. Co., P.O. Box 270879, Dallas, TX 75227 214-381-7161
† Control Technology Co., 41-16 29th St., Long Island City, NY 11101 718-361-2133
§ Data-Design Labs., P.O. Box 711, 7925 Center Ave., Cucamonga, CA 91730 714-987-2511
§ Feedback, 620 Springfield Ave., Berkeley Hghts., NJ 07922 201-464-5181
FG Engrg., Box 476, Fredonia, AZ 86022 602-643-7375
§ General Magnetics, 211 Grove St., Bloomfield, NJ 07003 201-743-2700
† General Microwave Corp., 155 Marine St., Farmingdale, NY 11735 516-694-3600
Genstar Rental Elctrns., 2445 Faber Pl., Palo Alto, CA 94303 415-856-7600
Industrial Test Equip., 21 Yennicock Ave., Port Washington, NY 11050 516-883-1700
† Lorch Elctrns., 105 Cedar La., Englewood, NJ 07631 201-569-8282
† Mini-Circuits Lab., 2625 E. 14th St., P.O. Box 166, Brooklyn, NY 11235 718-934-4500
§† Plessey Semiconductors, 1641 Kaiser Ave., Irvine, CA 92714 714-540-9979
RHG Electronics Lab., Inc., 161 E. Industry Ct., Deer Park, NY 11729 516-242-1100
SGS Semiconductor Corporation, 1000 E. Bell Road, Phoenix, AZ 85022 602-867-6100
† Solid State Elctrns. Corp., 18646 Parthenia St., Northridge, CA 91324 818-993-8257
§ Telebyte Technology, Inc., Remark Datacom Div., 270 East Pulaski Road, Greenlawn, NY 11740 516-423-3232
† TRW Microwave, 825 Stewart Dr., Sunnyvale, CA 94086 408-732-0880
Weinschel Engrg., One Weinschel La., Gaithersburg, MD 20877 .... 301-948-3434; 800-638-2048

Modulators, FM-1900

†Adams-Russell, Anzac Div., 80 Cambridge St., Burlington, MA 01803 671-273-3333
Alpha Inds., Inc.-MSD Div., 20 Sylvan Rd., Woburn, MA 01801 617-935-5150
§†Anaren Microwave, P.O. Box 178, 6635 Kirkville Rd., E. Syracuse, NY 13057 315-432-8909
†CATEL Telecommunications, United Scientific Corp., 4800 Patrick Henry Dr., Santa Clara, CA 95054 408-988-7722
Coastcom, P.O. Box 27068, Concord, CA 94527 415-825-7500
Continental Electronics Mfg. Co., P.O. Box 270879, Dallas, TX 75227 214-381-7161
Dantel, 2991 N. Argyle Ave., Fresno, CA 93727 209-292-1111
§†Data-Control Sys., Commerce Dr., Box 860, Danbury, CT 06810 203-743-9241
§Data-Design Labs., P.O. Box 711, 7925 Center Ave., Cucamonga, CA 91730 714-987-2511
Fairchild - Weston - Telemetry, P.O. Box 3041, Sarasota, FL 33578 813-377-5566
FG Engrg., Box 476, Fredonia, AZ 86022 602-643-7375
Genstar Rental Elctrns., 2445 Faber Pl., Palo Alto, CA 94303 415-856-7600
†LNR Communications, Inc., 180 Marcus Blvd., Hauppauge, NY 11788 516-273-7111
§†Plessey Semiconductors, 1641 Kaiser Ave., Irvine, CA 92714 714-540-9979
RE Instruments Corp., 31029 Center Ridge Rd., Westlake, OH 44145 216-871-7617
RHG Electronics Lab., Inc., 161 E. Industry Ct., Deer Park, NY 11729 516-242-1100
SGS Semiconductor Corporation, 1000 E. Bell Road, Phoenix, AZ 85022 602-867-6100
†Solid State Elctrns. Corp., 18646 Parthenia St., Northridge, CA 91324 818-993-8257
Tri-Com, Inc., 7304 Grove Rd., Frederick, MD 21701 301-694-6666
†TRW Microwave, 825 Stewart Dr., Sunnyvale, CA 94086 408-732-0880

Modulators, Light-3700 – *See Vol. B*

Modulators, Magnetic-2200

†Computer Conversions Corp., 6 Dunton Ct., E. Northport, NY 11731 516-261-3300
§†General Magnetics, 211 Grove St., Bloomfield, NJ 07003 201-743-2700
Maxwell Labs., 8835 Balboa Ave., San Diego, CA 92123 619-279-5100
Tasker Systems, 20131 Sunburst St., Chatsworth, CA 91311 213-341-3010
†Transmagnetics, 210 Adams Blvd., Farmingdale, NY 11735 516-293-3100
Varian Associates, Inc., Microwave Tube Div., 611 Hansen Way, Palo Alto, CA 94303 415-493-4000

Modulators, Microwave-3400

†Arra Inc., 15 Harold Ct., Bay Shore, NY 11706, 516-231-8400 .... A•1705
ETM Electromatic, 470 San Antonio Ave., Palo Alto, CA 94306, 415-494-1505 .... D•1227,1638
†General Microwave Corp., 155 Marine St., Farmingdale, NY 11735, 516-694-3600 .... A•1712
†Adams-Russell, Anzac Div., 80 Cambridge St., Burlington, MA 01803 671-273-3333
Alpha Inds., Inc., Microwave Comp. Div., 90 Glenn St., Lawrence, MA 01843 617-681-8520
Alpha Inds., Inc.-MSD Div., 20 Sylvan Rd., Woburn, MA 01801 617-935-5150
§†Anaren Microwave, P.O. Box 178, 6635 Kirkville Rd., E. Syracuse, NY 13057 315-432-8909
Aydin Microwave, 75 East Trimble Rd., San Jose, CA 95131 408-946-5600
Cober Elctrns., 102 Hamilton Ave., Stamford, CT 06902 203-327-0003
Control Technology Co., 41-16 29th St., Long Island City, NY 11101 718-361-2133
†EPSCO Microwave, 411 Providence Hwy., Westwood, MA 02090 617-329-1500
FG Engrg., Box 476, Fredonia, AZ 86022 602-643-7375
HDS Inc., 12310 Pinecrest Rd., Reston, VA 22091 703-620-6200
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
Hughes Aircraft Co, Aerospace Grps./Support Sys., P.O. Box 90515, Los Angeles, CA 90009 213-670-1515
Hughes Aircraft Co., Microelctrn. Sys. Div., 2601 Campus Dr., Irvine, CA 92715 714-752-3800
KDI Electronics, Inc., Engelmann & Pyrofilm Divisions, 60 S. Jefferson Rd., Whippany, NJ 07981 201-887-8100
M/A-Com Microwave Components, Inc., M/A-Com, South Avenue, Burlington, MA 01803 617-272-3000
M/A-Com Millimeter Products, M/A-Com, Inc., Second Avenue, Burlington, MA 01803 617-272-3000
†MCL, Inc., 10 North Beach Ave., La Grange, IL 60525-2092 312-354-4350
†Microlab/FXR, 10 Microlab Rd., Livingston, NJ 07039 201-992-7700
Microphase, 587 Connecticut Ave., Norwalk, CT 06856 203-866-8000
†Microwave/Sys., 1 Adler Dr., E. Syracuse, NY 13057 315-437-9951
†Narda Microwave Corp., 435 Moreland Rd., Hauppauge, NY 11788 516-231-1700
†Norsal Inds., 85 D Hoffman Lane So., Central Islip, NY 11722 516-234-1200
†Premier Microwave, 35 New Broad St., Port Chester, NY 10573 914-939-8900
†Radio Resch. Instr. Co., Inc., Two Lake Ave. Extension, Danbury, CT 06811-5295 203-792-6666
†Raytheon Co., Microwave & Power Tube Div., 190 Willow St., Waltham, MA 02154 617-899-8400
RHG Electronics Lab., Inc., 161 E. Industry Ct., Deer Park, NY 11729 516-242-1100
Sivers IMA, 5669 Selmaraine Drive, Culver City, CA 90230 213-390-7477
†TRW Microwave, 825 Stewart Dr., Sunnyvale, CA 94086 408-732-0880
Varian Associates, Inc., Microwave Tube Div., 611 Hansen Way, Palo Alto, CA 94303 415-493-4000
†Vectronics Microwave Corp., 276 Lincoln Blvd., Middlesex, NJ 08846 201-356-2377
†Watkins-Johnson Co., 3333 Hillview Ave., Palo Alto, CA 94304 415-493-4141
Weinschel Engrg., One Weinschel La., Gaithersburg, MD 20877 .... 301-948-3434; 800-638-2048

Modulators, Phase-1900

†Daico Inds., Inc., Box 5225, Compton, CA 90224, 213-631-1143 .... A•1708-1709
†Adams-Russell, Anzac Div., 80 Cambridge St., Burlington, MA 01803 671-273-3333
Alpha Inds., Inc.-MSD Div., 20 Sylvan Rd., Woburn, MA 01801 617-935-5150
§†Anaren Microwave, P.O. Box 178, 6635 Kirkville Rd., E. Syracuse, NY 13057 315-432-8909
Aydin Microwave, 75 East Trimble Rd., San Jose, CA 95131 408-946-5600
†Computer Conversions Corp., 6 Dunton Ct., E. Northport, NY 11731 516-261-3300
Decom Sys., 340 Rancheros Dr., San Marcos, CA 92069 619-744-1002
†Electrac, Inc., 1614 Orangethrope Way, Anaheim, CA 92801 714-879-6021
†General Microwave Corp., 155 Marine St., Farmingdale, NY 11735 516-694-3600
M/A-COM Microwave Circuits, Inc., South Ave., Burlington, MA 01803 617-272-3000
M/A-Com Microwave Components, Inc., M/A-Com, South Avenue, Burlington, MA 01803 617-272-3000
†Merrimac Inds., 41 Fairfield Pl., West Caldwell, NJ 07006 201-575-1300
†Microwave Applications Grp., 3030 Industrial Pkwy., Santa Maria, CA 93455 805-928-5711
†Microwave/Sys., 1 Adler Dr., E. Syracuse, NY 13057 315-437-9951
RHG Electronics Lab., Inc., 161 E. Industry Ct., Deer Park, NY 11729 516-242-1100
Technology Prods., Inc., 8900 Eton Ave., Canoga Park, CA 91304 213-998-8555
†Vectronics Microwave Corp., 276 Lincoln Blvd., Middlesex, NJ 08846 201-356-2377

Modulators, Pulse-3400

ETM Electromatic, 470 San Antonio Ave., Palo Alto, CA 94306, 415-494-1505 .... D•1227,1638
Unitrode Corp., 5 Forbes Rd., Lexington, MA 02173, 617-861-6540 .... A•1697
Advanced Kinetics, 1231 Victoria St., Costa Mesa, CA 92627 714-646-7165
Alpha Inds., Inc.-MSD Div., 20 Sylvan Rd., Woburn, MA 01801 617-935-5150
Axel Elctrns., General Signal Corp., 134-20 Jamaica Ave., Jamaica, NY 11418 718-291-3900
†Brandt Elctrns., Inc., 1220 Alderwood Ave., Sunnyvale, CA 94086 408-734-8310
Cober Elctrns., 102 Hamilton Ave., Stamford, CT 06902 203-327-0003
Continental Electronics Mfg. Co., P.O. Box 270879, Dallas, TX 75227 214-381-7161
†Del Elctrns. Corp., 250 E. Sandford Blvd., Mt. Vernon, NY 10550 914-699-2000
†EPSCO Microwave, 411 Providence Hwy., Westwood, MA 02090 617-329-1500
†General Microwave Corp., 155 Marine St., Farmingdale, NY 11735 516-694-3600
Instrument Research Co., Box 40207, Santa Barbara, CA 93103 805-962-8336
M/A-COM Microwave Circuits, Inc., South Ave., Burlington, MA 01803 617-272-3000
Maxwell Labs., 8835 Balboa Ave., San Diego, CA 92123 619-279-5100
†MCL, Inc., 10 North Beach Ave., La Grange, IL 60525-2092 312-354-4350
†Microwave/Sys., 1 Adler Dr., E. Syracuse, NY 13057 315-437-9951
Novatronics, Box 878, Pompano Beach, FL 33061 305-942-5200
†Power Sys. Grp., Rantec Div., Emerson Elec., 9401 Oso Ave., Chatsworth, CA 91311 818-885-8223
†Radio Resch. Instr. Co., Inc., Two Lake Ave. Extension, Danbury, CT 06811-5295 203-792-6666
†Raytheon Co., Microwave & Power Tube Div., 190 Willow St., Waltham, MA 02154 617-899-8400
RE Instruments Corp., 31029 Center Ridge Rd., Westlake, OH 44145 216-871-7617
§†Silicon General, 11861 Western Ave., Garden Grove, CA 92641 714-898-8121
Tasker Systems, 20131 Sunburst St., Chatsworth, CA 91311 213-341-3010
†Tobe Deutschmann Labs., Inc., 550 Turnpike St., Canton, MA 02021 617-828-3366
Varian Associates, Inc., Microwave Tube Div., 611 Hansen Way, Palo Alto, CA 94303 415-493-4000
†Vectronics Microwave Corp., 276 Lincoln Blvd., Middlesex, NJ 08846 201-356-2377

Modulators, RF-1900

Astec USA, Ltd., A BSR Intl. Co., 2880 San Tomas Expwy., #200, Santa Clara, CA 95051, 408-748-1200 .... D•1513
†Adams-Russell, Anzac Div., 80 Cambridge St., Burlington, MA 01803 671-273-3333
Alpha Inds., Inc.-MSD Div., 20 Sylvan Rd., Woburn, MA 01801 617-935-5150
§Alps Electric (USA), Inc., 3553 N. First St., San Jose, CA 95134 408-946-6000
§†Anaren Microwave, P.O. Box 178, 6635 Kirkville Rd., E. Syracuse, NY 13057 315-432-8909
†Arra Inc., 15 Harold Ct., Bay Shore, NY 11706 516-231-8400
ATV Research, Inc., 1301 Broadway, Dakota City, NE 68731 402-987-3771
Aydin Microwave, 75 East Trimble Rd., San Jose, CA 95131 408-946-5600
†CATEL Telecommunications, United Scientific Corp., 4800 Patrick Henry Dr., Santa Clara, CA 95054 408-988-7722
Continental Electronics Mfg. Co., P.O. Box 270879, Dallas, TX 75227 214-381-7161
§Data-Design Labs., P.O. Box 711, 7925 Center Ave., Cucamonga, CA 91730 714-987-2511
†Del Elctrns. Corp., 250 E. Sandford Blvd., Mt. Vernon, NY 10550 914-699-2000
ETM Electromatic, 470 San Antonio Ave., Palo Alto, CA 94306 415-494-1505
FG Engrg., Box 476, Fredonia, AZ 86022 602-643-7375
†General Microwave Corp., 155 Marine St., Farmingdale, NY 11735 516-694-3600
†Hughes Solid State Products, 500 Superior Ave., Dept. E8, Newport Bch., CA 92658-8903 714-759-2411
†Lorch Elctrns., 105 Cedar La., Englewood, NJ 07631 201-569-8282
M/A-COM Microwave Circuits, Inc., South Ave., Burlington, MA 01803 617-272-3000
M/A-Com Microwave Components, Inc., M/A-Com, South Avenue, Burlington, MA 01803 617-272-3000
†Merrimac Inds., 41 Fairfield Pl., West Caldwell, NJ 07006 201-575-1300
†Microlab/FXR, 10 Microlab Rd., Livingston, NJ 07039 201-992-7700
†Microwave/Sys., 1 Adler Dr., E. Syracuse, NY 13057 315-437-9951
Peca, Inc., 592 Winks Lane, Bensalem, PA 19020 215-245-1550
§†Plessey Semiconductors, 1641 Kaiser Ave., Irvine, CA 92714 714-540-9979
†Premier Microwave, 35 New Broad St., Port Chester, NY 10573 914-939-8900
†Radio Resch. Instr. Co., Inc., Two Lake Ave. Extension, Danbury, CT 06811-5295 203-792-6666
REPCO, 2421 N. Orange Blossom Trail, Box 7065, Orlando, FL 32854 305-843-8484
†Spectrum Technology, Inc., 300 Lopez Rd., Goleta, CA 93116 805-964-7791
Summit Engineering Corp., Box 938, Bozeman, MT 59715 406-587-4511
Telemet, 185 Dixon Ave., Amityville, NY 11701 516-842-2300
Varian Associates, Inc., Microwave Tube Div., 611 Hansen Way, Palo Alto, CA 94303 415-493-4000
Watkins-Johnson Co., 3333 Hillview Ave., Palo Alto, CA 94304 415-493-4141
Weinschel Engrg., One Weinschel La., Gaithersburg, MD 20877 .... 301-948-3434; 800-638-2048

Modulators, Video-2200

California Microwave, 990 Almanor Ave., Sunnyvale, CA 94086 408-732-4000
Telemet, 185 Dixon Ave., Amityville, NY 11701 516-842-2300

Modules, Amplifier-Also See Amplifiers, Specific Types-3130 — See *Vol. A*

Modules, Analog Multiplier-3130 — See *Vol. A*

Modules, Analog-to-Digital Conversion-3130 — See *Vol. A*

Modules, Arithmetic (Binary)-3130 — See *Vol. A*

Modules, Control & Switching-2260

Advanced Sys. Concepts, 435 N. Lake Ave., Pasadena, CA 91101, 818-793-8971 .... D•1137
CYTEC Corp., 107 N. Washington St., E. Rochester, NY 14445, 716-381-4740 .... D•1207
§ Gordos Arkansas, Gordos International Corp., 1000 N. Second St., Rogers, AR 72756, 501-636-5000 .... B•1382
§ Newport Electronics, 630 E. Young St., Santa Ana, CA 92705, 714-540-4914 .... D•1370-1371
§ Opto 22, 15461 Springdale St., Huntington Bch., CA 92649, 714-891-5861 .... B•1440
Phoenix Contact, 1500 Greenwood St., Harrisburg, PA 17104, 717-232-0500 .... C•1487-1488
† Acromag, 30765 Wixom Rd., Wixom, MI 48096 313-624-1541
† Analog Devices, P.O. Box 280, Norwood, MA 02062 617-329-4700
§ Antex Electronics Corp., 16100 S. Figueroa St., Gardena, CA 90248 213-532-3092
† Antona Corp., 2100 S. Sawtelle Blvd., Suite 205, Los Angeles, CA 90025 213-473-8995
Applied Micro Technlg., A Burr Brown Co., 3669 E. 44th Street, Tucson, AZ 85713 602-622-8605
Burr-Brown Corp., P.O. Box 11400, Tucson, AZ 85734 602-746-1111
§† Catalyst Research, Mine Safety Appliances Co., 1421 Clarkview Rd., Baltimore, MD 21209 .... 301-296-7000, Ext. 304
† CATEL Telecommunications, United Scientific Corp., 4800 Patrick Henry Dr., Santa Clara, CA 95054 408-988-7722
Centent Co., 3879 S. Main St., Santa Ana, CA 92707 714-979-6491
† Computer Conversions Corp., 6 Dunton Ct., E. Northport, NY 11731 516-261-3300
§ Control Prods., Devar, Inc., P.O. Box 589, Bridgeport, CT 06601 203-368-6751
Crosspoint, Div. of Info-Lite, 422 Cliff St., Fairview, NJ 07022 201-941-4455
§ Crydom Division, Int'l. Rectifier, 1521 Grand Ave., El Segundo, CA 90245 213-322-4987
Cybersystems, Inc., 7540 South Memorial Pkwy., Huntsville, AL 35802 205-883-4410
Data Translation, 100 Locke Dr., Marlboro, MA 01752 617-481-3700
Douglas Randall, 6 Pawcatuck Ave., Pawcatuck, CT 06379 203-599-2075
Dynage/Controls, Inc., 2 Willowbrook Rd., Cromwell, CT 06416 203-635-6257
§ Eaton Corp./Cutler-Hammer Prods, Aerospace & Commercial Controls Div., 4201 N. 27th St., Milwaukee, WI 53216 414-449-7487
EH Electronics, Inc., Sub. EH Intl., Inc., 48507 Milmont Drive, Fremont, CA 94538 415-651-2340
Electronic Prods. Corp., Interstate Indl. Plaza, R. D. #5, York, PA 17402 717-767-6517
§ Electro Standards Lab., Inc., P.O. Box 9144, Providence, RI 02940 401-943-1164
§ General Electric Co., Power Elctrns. Semiconductor Dept., W. Genesee St., Auburn, NY 13021 315-253-7321
§ GIC Systems, 2324 A Ridgepoint Dr., Austin, TX 78754 512-926-8840
§ Gordos Corporation, Gordos International Corp., 250 Glenwood Ave., Bloomfield, NJ 07003 201-743-6800
§ Gunther, W., GmbH, Virnsberger Strasse 51, D 8500 Nurnberg 82, WEST GERMANY .... (0)911/65521 or 65520
Heinemann Elec. Co., Brunswick Pike, Alt. Rte. #1, P.O.Box 6800, Lawrenceville, NJ 08648-0800 609-882-4800
§ Industrial Computer Designs, Inc., 31264 La Baya Drive, Westlake Village, CA 91362 818-889-3179
Information Control Corp., Abacus Div. Dept. EM7, 9610 Bellanca Ave., Los Angeles, CA 90045 213-641-8520
Information Transfer Indl., Box 357, Holcomb, NY 14469 716-657-7074
† Interface Engrg., 386 Lindelof Ave., Stoughton, MA 02072 617-344-7383
§ International Data Sciences, 7 Wellington Rd., Lincoln, RI 02865 401-333-6200
IXYS Corp., 142 Charcot Ave., San Jose, CA 95131 408-262-8800
Kinetic Sys., 11 Maryknoll Dr., Lockport, IL 60441 815-838-0005
Matrix Sys. Corp., 5177 N. Douglas Fir Rd., Calabasas, CA 91302 818-992-6776
† Mel Tec, Div. Epsco, Inc., 411 Providence Hwy., Westwood, MA 02090 617-329-1508
Modular Devices, 50 Orville Dr., Bohemia, NY 11716 516-567-9620
Monolithic Sys., 84 Inverness Circle E., Englewood, CO 80112 303-790-7400
§ NES, Inc. (Nationwide Electronic Systems), 3003 Wakefield, Carpentersville, IL 60110 312-426-5900
Northern Precision Labs., 11 Madison Rd., Fairfield, NJ 07006 201-227-4800
§ Potter & Brumfield, AMF Incorporated, 200 S. Richland Creek Dr., Princeton, IN 47671-0001 812-386-1000
Preferred Elctrns., Inc., Main Line Dr, P.O. Box 954, Westfield, MA 01086 413-568-2301
Preston Scientific, 805 E. Cerritos Ave., Anaheim, CA 92805 714-776-6400
Racal-Dana Instrs. Inc., 4 Goodyear St., Irvine, CA 92715 714-859-8999
RCI/Data, 1992 Lakewood Rd., Toms River, NJ 08753 201-341-8361
Reliance Electric Co., Marketing Info Center, P.O. Box 99502, Cleveland, OH 44199 .... 800-245-4501;800-245-4497 In Ohio
Rockwell Int'l., 4311 Jamboree Rd., Newport Beach, CA 92660 800-854-8099
§ Scientific Technlg., 1201 San Antonio Rd., Mountain View, CA 94043 .... CA 415-965-0910;800-221-7060
§ Semikron, Inc., 11 Executive Dr., P.O. Box 66, Hudson, NH 03051 .... 603-883-8102; 1-800-258-1308
Serial Lab Prods., Inc., 162 Cook Lane, P.O. Box 766, Marlboro, MA 01752 617-481-1684
Skan-A-Matic, Box S, Elbridge, NY 13060 315-689-3961
§ S S A C, Box 395, Liverpool, NY 13088 315-622-1000
§ Struthers-Dunn, Inc., Lamb's Rd., Pitman, NJ 08071 609-589-7500
Sylvania Electronic Components, Philips ECG Inc., A North American Philips Co., 100 First Ave., Waltham, MA 02254 617-890-6107
§ Teledyne Relays, 12525 Daphne Ave., Hawthorne, CA 90250 213-777-0077
§ Teledyne Solid State Products, 12525 Daphne Ave., Hawthorne, CA 90250 213-777-0077
† Transmagnetics, 210 Adams Blvd., Farmingdale, NY 11735 516-293-3100
Tri-Tronics Co. Inc., 13420 Wright Cir., Tampa, FL 33624 813-855-4453
§ Westinghouse Elec. Corp., Semiconductor Div., Armbrust Rd., Youngwood, PA 15697 412-925-7272
Xycom, 750 N. Maple Rd., Saline, MI 48176 313-429-4971

Modules, Data Acquisition-2325

Data Instruments, Inc., 4 Hartwell Pl., Lexington, MA 02173, 617-861-7450 .... B•1790
ILC Data Device Corp., 105 Wilbur Pl., Bohemia, NY 11716, 516-567-5600 .... D•1150-1151
§† Intech, Microcircuits Div., 2270 Martin Ave., Santa Clara, CA 95050, 408-988-4930 .... A•1672
† Interface Engrg., 386 Lindelof Ave., Stoughton, MA 02072, 617-344-7383 .... D•1156
Mizar, Inc., 302 Chester St., St. Paul, MN 55107, 612-224-8941 .... D•1095-1096,1106
Omega Engrg., Box 4047, Stamford, CT 06907, 203-359-1660 .... D•1160
Validyne Engrg. Corp., 8626 Wilbur Ave., Northridge, CA 91324, 818-886-2057 .... D•1164
† Acromag, 30765 Wixom Rd., Wixom, MI 48096 313-624-1541
ADAC Corp., 70 Tower Office Pk., Woburn, MA 01801 617-935-6668
Amilon Corp., 49-12 30th Ave., Woodside, NY 11377 718-274-1794
† Analog Devices, P.O. Box 280, Norwood, MA 02062 617-329-4700
§ Analogic Corp., 8 Centennial Dr., Peabody, MA 01961 .... 617-532-5660;617-777-4500; 617-246-0300;800-451-1
Analogic Corp., Data Conversion Prods. Grp., Audubon Rd., Wakefield, MA 01880 617-246-0300
Applied Micro Technlg., A Burr Brown Co., 3669 E. 44th Street, Tucson, AZ 85713 602-622-8605
Aydin Corp., 700 Dresher Rd., Horsham, PA 19044 215-657-7510
Burr-Brown Corp., P.O. Box 11400, Tucson, AZ 85734 602-746-1111
§ CmC Instr. Div., Connecticut microComputer Inc., 568 Danbury Road, New Milford, CT 06776 203-354-9395
† Computer Conversions Corp., 6 Dunton Ct., E. Northport, NY 11731 516-261-3300
Control Module, 380 Enfield St., Enfield, CT 06082 203-745-2433
Control Sciences, Inc., 9509 Vassar Ave., Chatsworth, CA 91311 818-709-5510
Cybernetic Micro Sys., P.O. Box 3000, 3000 Hwy. 84, San Gregorio, CA 94074 415-726-3000
Cybersystems, Inc., 7540 South Memorial Pkwy., Huntsville, AL 35802 205-883-4410
§ Data Translation, 100 Locke Dr., Marlboro, MA 01752 617-481-3700
† Datel, General Electric Co., 11 Cabot Blvd., Mansfield, MA 02048 617-339-9341
Daytronic Corp., 2589 Corporate Pl., Miamisburg, OH 45342 513-866-3300
§ Dymec, 8 Lowell Ave., Winchester, MA 01890 617-729-7870
Erbtec Engineering, Inc., 5680 Valmont Rd., Boulder, CO 80301 303-447-8750
General Scanning, 500 Arsenal St., Watertown, MA 02272 617-924-1010
§ Giddings & Lewis Elctrns., A Unit of AMCA Intl., 666 S. Military Rd., P.O. Box 1658, Fond du Lac, WI 54935 414-921-7100
§ Grant Technology Sys. Corp., Computer Products, 11 Summer St., Chelmsford, MA 01824 617-256-8881
† Hybrid Systems Corp., 22 Linnell Circle, Billerica, MA 01821 617-667-8700
§ Industrial Computer Designs, Inc., 31264 La Baya Drive, Westlake Village, CA 91362 818-889-3179
Information Control Corp., Abacus Div. Dept. EM7, 9610 Bellanca Ave., Los Angeles, CA 90045 213-641-8520
Kinetic Sys., 11 Maryknoll Dr., Lockport, IL 60441 815-838-0005
LeCroy Resch. Sys. Corp., 700 S. Main St., Spring Vly., NY 10977 914-425-2000
LeCroy Resch. Sys. Corp. (Cal.), 1806 Embarcadero Rd., Palo Alto, CA 94303 415-856-1800
Matrix Sys. Corp., 5177 N. Douglas Fir Rd., Calabasas, CA 91302 818-992-6776
Mega Logic, 9659 Natl. Rd., Brookville, OH 45309 513-833-5222
MERET, Inc., 1815 24th St., Santa Monica, CA 90404-4998 213-828-7496
† Micro Networks, 324 Clark St., Worcester, MA 01606 617-852-5400
§ NES, Inc. (Nationwide Electronic Systems), 3003 Wakefield, Carpentersville, IL 60110 312-426-5900
§ Opto 22, 15461 Springdale St., Huntington Bch., CA 92649 714-891-5861
Phoenix Data, Inc., 3384 W. Osborn Rd., Phoenix, AZ 85017 602-278-8528
Preston Scientific, 805 E. Cerritos Ave., Anaheim, CA 92805 714-776-6400
§ PrimeLine-Soltec Distbn., Soltec Corp., P.O. Box 818, Sun Valley, CA 91353-0818 .... 800-525-5554;818-764-5400
† R. C. Elctrns. Inc., 5386 Hollister Ave., Santa Barbara, CA 93111 805-964-6708
RCI/Data, 1992 Lakewood Rd., Toms River, NJ 08753 201-341-8361
Sea Data Corp., One Bridge St., Newton, MA 02158 617-244-3216
Serial Lab Prods., Inc., 162 Cook Lane, P.O. Box 766, Marlboro, MA 01752 617-481-1684
Solartron Instruments, Sangamo Weston, Inc., 2 Westchester Plaza, Elmsford, NY 10523 914-592-9168
Standard Engrg., 44800 Industrial Dr., Fremont, CA 94538 415-657-7555
Strawberry Tree Computers, 949 Cascade Dr., Sunnyvale, CA 94087 408-736-3083
Taurus Computer Products, Inc., 1755 Woodward Dr., Ottawa, ON, CANADA K2C0P9 613-226-5361
Xico, Inc., 120 Ocean Way, Santa Monica, CA 90402 213-454-0302

Modules, Data Retention-2325

Mizar, Inc., 302 Chester St., St. Paul, MN 55107, 612-224-8941 .... D•1095-1096
§ BASF Sys., Crosby Dr., Bedford, MA 01730 .... 617-271-4000;800-343-4600

Modules Delay Line-2350 — See *Vol. A*

Modules, Digital-to-Analog Conversion-3130 – *See Vol. A*

Modules, Display – See Display Modules

Modules, Encoding/Decoding-3130 – *See Vol. A*

Modules, Filter-3130 – *See Vol. A*

Modules, I/O Relay-3130 – *See Vol. A*

Modules, Logic-Also See Cards; Circuits; Networks-3130 – *See Vol. A*

Modules, Oscillator-2300 – *See Vol. A*

Modules, RMS-to-DC Conversion-3130 – *See Vol. A*

Modules, Sample & Hold-3130 – *See Vol. A*

Modules, Switching-5100 – *See Vol. B*

Modules (MIL), Electronic-2440 – *See Vol. B*

Modules (MIL), Standard Electronic-2440 – *See Vol. B*

Molding Services – See Services, Molding (Vol. D)

Monitors, Current-2200

Active Control Instrmn., P.O. Box 243-Wildwood Circle, Key Largo, FL 33037, 305-451-1000 ... D•1109
† American Aerospace Controls, 570 Smith St., Farmingdale, NY 11735, 516-694-5100 ... B•1780
§ Electro Industries, Div. E.I. Elctrns., Inc., 1800 Shames Drive, Westbury, NY 11590, 516-334-0870 ... D•1351
EMICO Inc., Box 368, Dublin, PA 18917, 215-249-9330 ... D•1352
Ion Physics Co., 323 Andover St., Wilmington, MA 01887, 617-658-6030 ... D•1123
§† Leach Corp., Control Prods. Div., 6900 Orangethorpe Ave., Buena Pk., CA 90620, 714-739-0770 ... B•1428-1429
† Logitek, Inc., 101 Christopher St., Ronkonkoma, NY 11779, 516-467-4200 ... B•1436
North American Soar Corp., 11126 Cornell Ave., Cherry Hill, NJ 08002, 609-488-1060 ... D•1277
Pearson Elctrns., 1860 Embarcadero Rd., Palo Alto, CA 94303, 415-494-6444 ... A•2230
† Acromag, 30765 Wixom Rd., Wixom, MI 48096 ... 313-624-1541
§ Acurex-Autodata, 555 Clyde, Mountain View, CA 94039 ... 415-964-3200
ARGA Controls, 35 E. Glenarm St., Pasadena, CA 91105 ... 213-682-3314
† Autronics, 314 E. Live Oak, Ste. A, Arcadia, CA 91006 ... 818-445-5470
Bluffton Products, Inc., Tegam, Inc., 7230 North Ridge Road, Madison, OH 44057 ... 216-946-3572
Crompton Instrs., Hawker Siddley, 2763 Old Higgins Rd., Elk Grove Village, IL 60007 ... 312-593-1107
Cybernetic Micro Sys., P.O. Box 3000, 3000 Hwy. 84, San Gregorio, CA 94074 ... 415-726-3000
Dearborn Wire & Cable Co., 9299 Evenhouse Ave., Rosemont, IL 60018 ... 312-696-1000
§ Deltron, Inc., P.O. Box 1369, Wissahickon Ave., N. Wales, PA 19454-9990 ... 215-699-9261
§ Diversified Elctrns., Inc., Indl. Controls Div., 119 N. Morton Ave., Evansville, IN 47711 ... 812-426-2806
Dranetz Technologies, Inc, Computer Products Division, 1000 New Durham Rd., P.O. Box 4019, Edison, NJ 08818-4019 ... 201-287-3680
Dranetz Technologies, Inc., Industrial Products Division, 1000 New Durham Rd., P.O. Box 4019, Edison, NJ 08818-4019 ... 201-287-3680
§ Electromatic Controls Corp., 2495 Pembroke Road, Hoffman Estates, IL 60195-2010 ... 312-882-5757
Gould Inc., Recording Systems Div., 3631 Perkins Ave., Cleveland, OH 44114 ... 216-361-3315
§ Gulton Inds., Inc., Graphic Instruments Div., Gulton Ind'l. Pk., E. Greenwich, RI 02818 ... 401-884-6800
Halmar Electronics, Inc., 900 N. Hague Ave., Columbus, OH 43204 ... 614-275-0131
International Instruments, General Resistance, Inc., Twin Lakes Rd, P.O. Box 185, N. Branford, CT 06471 ... 203-481-3450
MARCONI INSTRUMENTS, 3 Pearl Court, Allendale, NJ 07401 ... 201-934-9050
§ NES, Inc. (Nationwide Electronic Systems), 3003 Wakefield, Carpentersville, IL 60110 ... 312-426-5900
§ Newport Electronics, 630 E. Young St., Santa Ana, CA 92705 ... 714-540-4914
§ Non-Linear Systems/Div. of Kaypro Corp., 533 Stevens Ave., Solana Bch., CA 92075 ... 619-481-3900
North Hills Elctrns., 1 Alexander Pl., Glen Cove, NY 11542 ... 516-671-5700
Ohio Semitronics, Inc., 1205 Chesapeake Ave., Columbus, OH 43212 ... 614-486-9561
Omega Engrg., Box 4047, Stamford, CT 06907 ... 203-359-1660
Potter & Brumfield, AMF Incorporated, 200 S. Richland Creek Dr., Princeton, IN 47671-0001 ... 812-386-1000
RFL Inds., A Dowty Grp. Co./Instr. Div., Powerville Rd., Boonton, NJ 07005 ... 201-334-3100
§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 ... 215-673-5600
Texmate, Inc., 348 S. Cedros Ave., P.O. Box 2000, Solana Beach, CA 92075 ... 619-481-7177
† Wilmar Elctrns., Inc., 2430 Amsler St., Torrance, CA 90505 ... 213-326-6668

Monitors, Data Link-1900

Omega Engrg., Box 4047, Stamford, CT 06907, 203-359-1660 ... D•1374
Atlantic Research, 5390 Cherokee Ave., Alexandria, VA 22312 ... 703-642-4000
Com/Tech Systems, 505 Eighth Ave., New York, NY 10018 ... 212-594-5377
§† Digitech Industries, Inc., 66 Grove St., Ridgefield, CT 06877 ... 203-438-3731
§ Electrodata, Inc., 23020 Miles Rd., Bedford Heights, OH 44128 ... 216-663-3333
§ Electro Standards Lab., Inc., P.O. Box 9144, Providence, RI 02940 ... 401-943-1164
Epicom, Inc., 411 Josiane Court, Altamonte Springs, FL 32701 ... 305-331-1640
§ Glasgal Communications, Inc., 207 Washington St., Northvale, NJ 07647 ... 201-768-8082
§ Metatek Inc., 410 93rd Ave. NW, P.O. Box 33129, Minneapolis, MN 55433 ... 612-786-8253
§ Telebyte Technology, Inc., Remark Datacom Div., 270 East Pulaski Road, Greenlawn, NY 11740 ... 516-423-3232
† Telecommunications Techniques Corp., 444 N. Frederick Ave., Gaithersburg, MD 20877 ... 301-258-5011

Monitors, Error Rate-1900

BEI Motion Sys. Co., Digital Prods. Div., P.O. Box 3838, Little Rock, AR 72203, 501-851-4000 ... B•1782
Atlantic Research, 5390 Cherokee Ave., Alexandria, VA 22312 ... 703-642-4000
§† Digitech Industries, Inc., 66 Grove St., Ridgefield, CT 06877 ... 203-438-3731
§ Electrodata, Inc., 23020 Miles Rd., Bedford Heights, OH 44128 ... 216-663-3333
§ Electro Standards Lab., Inc., P.O. Box 9144, Providence, RI 02940 ... 401-943-1164
Epicom, Inc., 411 Josiane Court, Altamonte Springs, FL 32701 ... 305-331-1640
Gandalf Data, Inc., 1019 S. Noel Ave., Wheeling, IL 60090 ... 312-541-6060
§ Glasgal Communications, Inc., 207 Washington St., Northvale, NJ 07647 ... 201-768-8082
MARCONI INSTRUMENTS, 3 Pearl Court, Allendale, NJ 07401 ... 201-934-9050
† Telecommunications Techniques Corp., 444 N. Frederick Ave., Gaithersburg, MD 20877 ... 301-258-5011

Monitors, Frequency-2900

Active Control Instrmn., P.O. Box 243-Wildwood Circle, Key Largo, FL 33037, 305-451-1000 ... D•1109
§ Electro Industries, Div. E.I. Elctrns., Inc., 1800 Shames Drive, Westbury, NY 11590, 516-334-0870 ... D•1350-1351
§† Leach Corp., Control Prods. Div., 6900 Orangethorpe Ave., Buena Pk., CA 90620, 714-739-0770 ... B•1428-1429
† Logitek, Inc., 101 Christopher St., Ronkonkoma, NY 11779, 516-467-4200 ... B•1436
† Acromag, 30765 Wixom Rd., Wixom, MI 48096 ... 313-624-1541
ARGA Controls, 35 E. Glenarm St., Pasadena, CA 91105 ... 213-682-3314
† Austron, Inc., P.O. Box 14766, Exit 248 N. IH 35, Austin, TX 78761 ... 512-251-2341
† Autronics, 314 E. Live Oak, Ste. A, Arcadia, CA 91006 ... 818-445-5470
Basler Elec., Rte. 143, Highland, IL 62249 ... 618-654-2341
Crompton Instrs., Hawker Siddley, 2763 Old Higgins Rd., Elk Grove Village, IL 60007 ... 312-593-1107
D-B-Developments, 7709 Kilbourne Rd., Rome, NY 13440 ... 315-339-1265
DCI Inc., 14812 W. 117th Street, P.O. Box 215, Olathe, KS 66061 ... 913-782-5672
§ Digitec Corp., 918 Woodley Rd., P.O. Box 458, Dayton, OH 45401 ... 513-254-6251
§ Diversified Elctrns., Inc., Indl. Controls Div., 119 N. Morton Ave., Evansville, IN 47711 ... 812-426-2806
Douglas Randall, 6 Pawcatuck Ave., Pawcatuck, CT 06379 ... 203-599-2075
Dranetz Technologies, Inc, Computer Products Division, 1000 New Durham Rd., P.O. Box 4019, Edison, NJ 08818-4019 ... 201-287-3680
Dranetz Technologies, Inc., Industrial Products Division, 1000 New Durham Rd., P.O. Box 4019, Edison, NJ 08818-4019 ... 201-287-3680
Eitel Mfg., 2835 Laguna Canyon Rd., Laguna Beach, CA 92652 ... 714-494-2012
§ Electromatic Controls Corp., 2495 Pembroke Road, Hoffman Estates, IL 60195-2010 ... 312-882-5757
Frequency Control Prods., Inc., American Time Prods. Div., 61-20 Woodside Ave., Woodside, NY 11377 ... 212-458-5811
Hi-G Company, A Subsidiary of Nytronics Inc., 101 Locust St., Hartford, CT 06114 ... 203-522-8600
International Instruments, General Resistance, Inc., Twin Lakes Rd, P.O. Box 185, N. Branford, CT 06471 ... 203-481-3450
§ Kinemetrics/Truetime, 3243 Santa Rose Ave, Santa Rosa, CA 95407 ... 707-528-1230
§ Metrix Instrument Co., 1711 Townhurst, Houston, TX 77043 ... 713-461-2131
§ NES, Inc. (Nationwide Electronic Systems), 3003 Wakefield, Carpentersville, IL 60110 ... 312-426-5900
§ Newport Electronics, 630 E. Young St., Santa Ana, CA 92705 ... 714-540-4914
§ Non-Linear Systems/Div. of Kaypro Corp., 533 Stevens Ave., Solana Bch., CA 92075 ... 619-481-3900
North Hills Elctrns., 1 Alexander Pl, Glen Cove, NY 11542 ... 516-671-5700
§ Richard-Lee Co., Box 724, New Providence, NJ 07974 ... 201-276-0710
Sensor Corp., Box 140, Scottdale, PA 15683 ... 412-887-4080
† Solid State Elctrns. Corp., 18646 Parthenia St., Northridge, CA 91324 ... 818-993-8257
§ Spanta, Inc., Box 193, Franklin Lakes, NJ 07417 ... 201-337-0044
Tempo Instrument, Inc., 87 Modular Ave., Commack, NY 11725 ... 516-864-3700
§ TRW, Dynalco Controls Div., 5200 NW 37th, P.O. Box 8187, Ft. Lauderdale, FL 33310 ... 305-739-4300
† Watkins-Johnson Co., 3333 Hillview Ave., Palo Alto, CA 94304 ... 415-493-4141
Wavetek Indiana, Inc., 5808 Churchman, Beech Grove, IN 46107 ... 317-787-3332
† Wilmar Elctrns., Inc., 2430 Amsler St., Torrance, CA 90505 ... 213-326-6668

Monitors, Laser Energy-2200

Photodyne, 1175 Tourmaline Dr., Newbury Park, CA 91320, 818-889-8770 ... B•1123
Advanced Kinetics, 1231 Victoria St., Costa Mesa, CA 92627 ... 714-646-7165
§ Apollo Lasers, Inc., 9201 Independence Ave., Chatsworth, CA 91311 ... 213-709-1111
† Electro-Optical Inds., Box 3770, Santa Barbara, CA 93130 ... 805-964-6701
Hughes Aircraft Co, Aerospace Grps./Support Sys., P.O. Box 90515, Los Angeles, CA 90009 ... 213-670-1515
Hughes Aircraft Co., Microelctrn. Sys. Div., 2601 Campus Dr., Irvine, CA 92715 ... 714-752-3800
† Laser Inc., Laser Lane, Box 537, Sturbridge, MA 01566 ... 617-347-7314
§ Leader Instrs. Corp., 380 Oser Ave., Hauppauge, NY 11788-3694 ... 516-231-6900
§ Photon Sources, Inc., 12163 Globe Rd., Livonia, MI 48150 ... 313-591-0101

Penn Resch. Corp. (PRC), 2652 South Main St., P.O. Box 3357, Kennesaw, GA 30144 404-429-9061
Photon, Inc., 14125 Capri Dr. #4, Los Gatos, CA 95030 408-866-0566
Quantronix, 225 Engineers Rd., Smithtown, NY 11787 516-273-6900
† Radiometrics, Inc., 12021 South Memorial Pkwy., Huntsville, AL 35803 .. 205-881-1272
† Scientech, Inc., 5649 Arapahoe Ave., Boulder, CO 80303 .. 303-444-1361;800-525-0522
United Detector Tech., 12525 Chadron Ave., Hawthorne, CA 90250 213-978-0516

Monitors, Line & Program-1900

Dranetz Technologies, Inc, Computer Products Division, 1000 New Durham Rd., P.O. Box 4019, Edison, NJ 08818-4019, 201-287-3680 ...... D•1167
§ **Electro Industries, Div. E.I. Elctrns., Inc., 1800 Shames Drive, Westbury, NY 11590, 516-334-0870 ...... D•1351**
§ **Gralex Inds., 295 Community Dr., Great Neck, NY 11021, 516-487-7289;800-645-6535 ...... D•1354-1356**
† **Logitek, Inc., 101 Christopher St., Ronkonkoma, NY 11779, 516-467-4200 ...... B•1436**
Unitrode Corp., 5 Forbes Rd., Lexington, MA 02173, 617-861-6540 ...... A•1698
Active Control Instrmn., P.O. Box 243-Wildwood Circle, Key Largo, FL 33037 305-451-1000
§ Deltron, Inc., P.O. Box 1369, Wissahickon Ave., N. Wales, PA 19454-9990 215-699-9261
Eitel Mfg., 2835 Laguna Canyon Rd., Laguna Beach, CA 92652 714-494-2012
Micro Instr., 2250 Micro Pl., Escondido, CA 92025 619-746-2010
§† Superior Elec. Co., 383 Middle St., Bristol, CT 06010 203-582-9561

Monitors, Modulation-2900

ARGA Controls, 35 E. Glenarm St., Pasadena, CA 91105 213-682-3314
Hughes Aircraft Co, Aerospace Grps./Support Sys., P.O. Box 90515, Los Angeles, CA 90009 213-670-1515
Hughes Aircraft Co., Microelctrn. Sys. Div., 2601 Campus Dr., Irvine, CA 92715 714-752-3800
MARCONI INSTRUMENTS, 3 Pearl Court, Allendale, NJ 07401 201-934-9050
Racal-Dana Instrs. Inc., 4 Goodyear St., Irvine, CA 92715 714-859-8999
RE Instruments Corp., 31029 Center Ridge Rd., Westlake, OH 44145 ... 216-871-7617
§ Tucker Elctrns., Box 461966, Garland, TX 75046 ...... 214-348-8800;800-527-4642

Monitors, Phase & Phase Angle-2900

Active Control Instrmn., P.O. Box 243-Wildwood Circle, Key Largo, FL 33037, 305-451-1000 ...... D•1109
† **Logitek, Inc., 101 Christopher St., Ronkonkoma, NY 11779, 516-467-4200 ...... B•1436**
North Atlantic Inds., Instrument Div., 60 Plant Ave., Hauppauge, NY 11788, 516-582-6500 ...... D•1283
ARGA Controls, 35 E. Glenarm St., Pasadena, CA 91105 213-682-3314
Bently Nevada Corp., P.O. Box 157, Minden, NV 89423 702-782-3611
Bluffton Products, Inc., Tegam, Inc., 7230 North Ridge Road, Madison, OH 44057 216-946-3572
Continental Resources, Inc., 175 Middlesex Tpke., Bedford, MA 01730 .. 617-275-0850
Crompton Instrs., Hawker Siddley, 2763 Old Higgins Rd., Elk Grove Village, IL 60007 312-593-1107
§ Diversified Elctrns., Inc., Indl. Controls Div., 119 N. Morton Ave., Evansville, IN 47711 812-426-2806
† Dranetz Technologies, Inc, Computer Products Division, 1000 New Durham Rd., P.O. Box 4019, Edison, NJ 08818-4019 201-287-3680
Dranetz Technologies, Inc., Industrial Products Division, 1000 New Durham Rd., P.O. Box 4019, Edison, NJ 08818-4019 201-287-3680
§ Electromatic Controls Corp., 2495 Pembroke Road, Hoffman Estates, IL 60195-2010 312-882-5757
Esterline Angus Instr. Corp., Box 24000, Indianapolis, IN 46224 317-244-7611
† Gorman-Redlich Mfg. Co., 6 Curtis St., Athens, OH 45701 614-593-3150
§† Hi-G Company, A Subsidiary of Nytronics Inc., 101 Locust St., Hartford, CT 06114 203-522-8600
Multi-Amp Corp., TBG, 4271 Bronze Way, Dallas, TX 75237 214-333-3201
Ohio Semitronics, Inc., 1205 Chesapeake Ave., Columbus, OH 43212 ... 614-486-9561
RFL Inds., A Dowty Grp. Co./Instr. Div., Powerville Rd., Boonton, NJ 07005 201-334-3100
Rochester Instr. Sys., 255 N. Union St., Rochester, NY 14605 716-263-7700
† Solid State Elctrns. Corp., 18646 Parthenia St., Northridge, CA 91324 ... 818-993-8257
Tempo Instrument, Inc., 87 Modular Ave., Commack, NY 11725 516-864-3700
§ Tucker Elctrns., Box 461966, Garland, TX 75046 ...... 214-348-8800;800-527-4642
† Vibration Instrs. Co., 1614 Orangethorpe Way, Anaheim, CA 92801 714-879-6085

Monitors, Phase Sequence & Loss-2200

Active Control Instrmn., P.O. Box 243-Wildwood Circle, Key Largo, FL 33037, 305-451-1000 ...... D•1109
§† **Leach Corp., Control Prods. Div., 6900 Orangethorpe Ave., Buena Pk., CA 90620, 714-739-0770 ...... B•1428-1429**
† **Logitek, Inc., 101 Christopher St., Ronkonkoma, NY 11779, 516-467-4200 ...... B•1436**
ARGA Controls, 35 E. Glenarm St., Pasadena, CA 91105 213-682-3314
† Autronics, 314 E. Live Oak, Ste. A, Arcadia, CA 91006 818-445-5470
Basler Elec., Rte. 143, Highland, IL 62249 618-654-2341
Bluffton Products, Inc., Tegam, Inc., 7230 North Ridge Road, Madison, OH 44057 216-946-3572
Crompton Instrs., 2763 Higgins Road, Elk Grove Village, IL 60007 714-841-2901
Crompton Instrs., Hawker Siddley, 2763 Old Higgins Rd., Elk Grove Village, IL 60007 312-593-1107
§ Diversified Elctrns., Inc., Indl. Controls Div., 119 N. Morton Ave., Evansville, IN 47711 812-426-2806
§ Electromatic Controls Corp., 2495 Pembroke Road, Hoffman Estates, IL 60195-2010 312-882-5757
§ Ericson Mfg. Co., 4215 Hamann Pkwy., Willoughby, OH 44094 216-951-8000
§† Hi-G Company, A Subsidiary of Nytronics Inc., 101 Locust St., Hartford, CT 06114 203-522-8600
§ Lark Electronics, Inc., Box 390, New York, NY 10040 212-569-0430
Multi-Amp Corp., TBG, 4271 Bronze Way, Dallas, TX 75237 214-333-3201
§ Syntel Div., Tegam, Inc., 7230 North Ridge Rd., Madison, OH 44057 216-428-7505
† Transmagnetics, 210 Adams Blvd., Farmingdale, NY 11735 516-293-3100
† Wilmar Elctrns., Inc., 2430 Amsler St., Torrance, CA 90505 213-326-6668

Monitors, Power, AC & DC-2200

Active Control Instrmn., P.O. Box 243-Wildwood Circle, Key Largo, FL 33037, 305-451-1000 ...... D•1109
† **Calex Mfg. Co., Inc., 3355 Vincent Rd., Pleasant Hill, CA 94523, 415-932-3911 ...... D•1006**
Diego Power, 5350 Eastgate Mall, San Diego, CA 92121, 587-1925 ...... D•1916
Dranetz Technologies, Inc, Computer Products Division, 1000 New Durham Rd., P.O. Box 4019, Edison, NJ 08818-4019, 201-287-3680 ...... D•1167
§ **Electro Industries, Div. E.I. Elctrns., Inc., 1800 Shames Drive, Westbury, NY 11590, 516-334-0870 ...... D•1350-1351**
§ **Gralex Inds., 295 Community Dr., Great Neck, NY 11021, 516-487-7289;800-645-6535 ...... D•1354-1356**
§† **Leach Corp., Control Prods. Div., 6900 Orangethorpe Ave., Buena Pk., CA 90620, 714-739-0770 ...... B•1428-1429**
† **Logitek, Inc., 101 Christopher St., Ronkonkoma, NY 11779, 516-467-4200 ...... B•1436**
§ **North American Soar Corp., 11126 Cornell Ave., Cherry Hill, NJ 08002, 609-488-1060 ...... D•1277**
Ohio Semitronics, Inc., 1205 Chesapeake Ave., Columbus, OH 43212, 614-486-9561 ...... D•1289
Unitrode Corp., 5 Forbes Rd., Lexington, MA 02173, 617-861-6540 ...... A•1698
† Acromag, 30765 Wixom Rd., Wixom, MI 48096 313-624-1541
§ Acurex-Autodata, 555 Clyde, Mountain View, CA 94039 415-964-3200
Advance Conversion Devices Co., 274 S. Salem St., Randolph, NJ 07869 201-989-0095
† American Aerospace Controls, 570 Smith St., Farmingdale, NY 11735 .. 516-694-5100
Analogic Corp., 8 Centennial Dr., Peabody, MA 01961 ..... 617-532-5660;617-777-4500; 617-246-0300;800-451-1
Applied Control, 1275 Bloomfield Ave., Fairfield, NJ 07006-2828 201-227-5454
† Applied Electro Technlg., Int, STI Company, 2220 So. Anne St., Santa Ana, CA 92704 714-556-6570
Applied Sys., 26401 Harper Ave., St. Clair Shores, MI 48081 313-779-8700
ARGA Controls, 35 E. Glenarm St., Pasadena, CA 91105 213-682-3314
Basic Measuring Insts., 402 Lincoln Centre Dr., Foster City, CA 94404 ... 415-570-5355
Basler Elec., Rte. 143, Highland, IL 62249 618-654-2341
Bermar Corp., P.O. Box 12844, Research Triangle Park, NC 27709 919-489-4316
Bluffton Products, Inc., Tegam, Inc., 7230 North Ridge Road, Madison, OH 44057 216-946-3572
† Cal-Power Corp., 140 Kansas St., El Segundo, CA 90245 213-772-2171
§ Computer Power, 124E W. Main St., High Bridge, NJ 08829 201-735-8000
Continental Resources, Inc., 175 Middlesex Tpke., Bedford, MA 01730 .. 617-275-0850
Dearborn Wire & Cable Co., 9299 Evenhouse Ave., Rosemont, IL 60018 312-696-1000
§ Deltron, Inc., P.O. Box 1369, Wissahickon Ave., N. Wales, PA 19454-9990 215-699-9261
Dranetz Technologies, Inc., Industrial Products Division, 1000 New Durham Rd., P.O. Box 4019, Edison, NJ 08818-4019 201-287-3680
§ Electromatic Controls Corp., 2495 Pembroke Road, Hoffman Estates, IL 60195-2010 312-882-5757
§ Electronic Specialists, 171 South Main St., Natick, MA 01760 ...... 617-655-1532; 800-225-4876
Energy, Ltd., 4714 Upshur Street, Bladensburg, MD 20710 301-699-1144
§ Epoch Enterprises, Ltd., 3541 N. Olive Rd., Tucson, AZ 85719 ...... 602-887-1970; 888-5167
§ Ericson Mfg. Co., 4215 Hamann Pkwy., Willoughby, OH 44094 216-951-8000
Esterline Angus Instr. Corp., Box 24000, Indianapolis, IN 46224 317-244-7611
Genstar Rental Elctrns., 2445 Faber Pl., Palo Alto, CA 94303 415-856-7600
Gould Inc., Recording Systems Div., 3631 Perkins Ave., Cleveland, OH 44114 216-361-3315
§ Gulton Inds., Inc., Graphic Instruments Div., Gulton Ind'l. Pk., E. Greenwich, RI 02818 401-884-6800
Halmar Electronics, Inc., 900 N. Hague Ave., Columbus, OH 43204 614-275-0131
§ Heath Co., Benton Harbor, MI 49022 616-982-3886
§† Hi-G Company, A Subsidiary of Nytronics Inc., 101 Locust St., Hartford, CT 06114 203-522-8600
International Instruments, General Resistance, Inc., Twin Lakes Rd, P.O. Box 185, N. Branford, CT 06471 203-481-3450
Lark Electronics, Inc., Box 390, New York, NY 10040 212-569-0430
§ Liebert Corp., Programmed Power Div., 995 Benicia Ave., Sunnyvale, CA 94086 408-245-8900
Micro Instr., 2250 Micro Pl., Escondido, CA 92025 619-746-2010
§ NES, Inc. (Nationwide Electronic Systems), 3003 Wakefield, Carpentersville, IL 60110 312-426-5900
North Hills Elctrns., 1 Alexander Pl., Glen Cove, NY 11542 516-671-5700
Omega Engrg., Box 4047, Stamford, CT 06907 203-359-1660
PPM, Inc., 4521 Emery Ind. Pkwy., Cleveland, OH 44128 216-292-6006
§† Superior Elec. Co., 383 Middle St., Bristol, CT 06010 203-582-9561
† Tempo Instrument, Inc., 87 Modular Ave., Commack, NY 11725 516-864-3700
Valhalla Scientific, 9955 Mesa Rim Rd., San Diego, CA 92126 619-457-5576
§ VIZ Test Equipment, Div. VIZ Mfg., 335 E. Price St., Philadelphia, PA 19144 215-844-2626
§ West Division, Gulton Industries, Inc., 3860 N. River Rd., Schiller Park, IL 60176 312-678-6400
† Wilmar Elctrns., Inc., 2430 Amsler St., Torrance, CA 90505 213-326-6668

Monitors, Power, AF-1300

Active Control Instrmn., P.O. Box 243-Wildwood Circle, Key Largo, FL 33037, 305-451-1000 ...... D•1109
Electro-Dynamics Dev. Co., 475 Mt. Hood Dr. S.W., Issaquah, WA 98027 206-392-2493

§ Electro Industries, Div. E.I. Elctrns., Inc., 1800 Shames Drive, Westbury, NY 11590 516-334-0870
Modular Audio Prods., Modular Devices Inc., 50 Orville Dr., Bohemia, NY 11716 516-567-9620
Modular Devices, 50 Orville Dr., Bohemia, NY 11716 516-567-9620
§ Precision Elctrns., 9101 King Ave., Franklin Park, IL 60131 312-678-5350
RFL Inds., A Dowty Grp. Co./Instr. Div., Powerville Rd., Boonton, NJ 07005 201-334-3100

Monitors, Power Failure-2200

Calex Mfg. Co., Inc., 3355 Vincent Rd., Pleasant Hill, CA 94523, 415-932-3911 D•1006
Dranetz Technologies, Inc, Computer Products Division, 1000 New Durham Rd., P.O. Box 4019, Edison, NJ 08818-4019, 201-287-3680 D•1167
† Logitek, Inc., 101 Christopher St., Ronkonkoma, NY 11779, 516-467-4200 B•1436
Active Control Instrmn., P.O. Box 243-Wildwood Circle, Key Largo, FL 33037 305-451-1000
Basic Measuring Insts., 402 Lincoln Centre Dr., Foster City, CA 94404 415-570-5355
Bermar Corp., P.O. Box 12844, Research Triangle Park, NC 27709 919-489-4316
Bluffton Products, Inc., Tegam, Inc., 7230 North Ridge Road, Madison, OH 44057 216-946-3572
§ Codar Technology, Inc., 1428 Florida Avenue, Longmont, CO 80501 303-776-0472
§ Computer Power, 124E W. Main St., High Bridge, NJ 08829 201-735-8000
Continental Resources, Inc., 175 Middlesex Tpke., Bedford, MA 01730 617-275-0850
§ Ericson Mfg. Co., 4215 Hamann Pkwy., Willoughby, OH 44094 216-951-8000
Lark Electronics, Inc., Box 390, New York, NY 10040 212-569-0430
§ Liebert Corp., Programmed Power Div., 995 Benicia Ave., Sunnyvale, CA 94086 408-245-8900
Serial Lab Prods., Inc., 162 Cook Lane, P.O. Box 766, Marlboro, MA 01752 617-481-1684
Wilmar Elctrns., Inc., 2430 Amsler St., Torrance, CA 90505 213-326-6668

Monitors, Power, Microwave-2900

† General Microwave Corp., 155 Marine St., Farmingdale, NY 11735 516-694-3600
MARCONI INSTRUMENTS, 3 Pearl Court, Allendale, NJ 07401 201-934-9050

Monitors, Power, RF-2900

Bird Elctrn., 30303 Aurora Rd., Cleveland, OH 44139 216-248-1200
Coaxial Dynamics, 15210 Industrial Parkway, Cleveland, OH 44135 216-267-2233
† Dranetz Technologies, Inc, Computer Products Division, 1000 New Durham Rd., P.O. Box 4019, Edison, NJ 08818-4019 201-287-3680
† Electro Impulse, Box 870, Red Bank, NJ 07701-0870 201-741-0404
§ Electromatic Controls Corp., 2495 Pembroke Road, Hoffman Estates, IL 60195-2010 312-882-5757
† General Microwave Corp., 155 Marine St., Farmingdale, NY 11735 516-694-3600
§† Harris Corp., PRD Elctrns. Div., 6801 Jericho Tpke., Syosset, NY 11791 516-364-0400
MARCONI INSTRUMENTS, 3 Pearl Court, Allendale, NJ 07401 201-934-9050
Maury Microwave, 8610 Helms Ave., Cucamonga, CA 91730 714-987-4715
† Narda Microwave Corp., 435 Moreland Rd., Hauppauge, NY 11788 516-231-1700
Pacific Meas., Inc., 488 Tasman Drive, Sunnyvale, CA 94086 408-734-5780
§ Pathcom, Inc., Pace Two-Way Radio Prods., 24105 S. Frampton Ave., Harbor City, CA 90710 213-325-1290
Racal-Dana Instrs. Inc., 4 Goodyear St., Irvine, CA 92715 714-859-8999
REPCO, 2421 N. Orange Blossom Trail, Box 7065, Orlando, FL 32854 305-843-8484
§ Sinclair Radio Labs., 122 Rayette Rd., Concord, ONT, CANADA L9W2Y8 416-669-1244

Monitors, Response Time-2900

Ion Physics Co., 323 Andover St., Wilmington, MA 01887, 617-658-6030 D•1123
Atlantic Research, 5390 Cherokee Ave., Alexandria, VA 22312 703-642-4000
Macrotronix, Inc., 4016 N. Home St., Mishawaka, IN 46545 219-256-5503
§ Metatek Inc., 410 93rd Ave. NW, P.O. Box 33129, Minneapolis, MN 55433 612-786-8253
§ NES, Inc. (Nationwide Electronic Systems), 3003 Wakefield, Carpentersville, IL 60110 312-426-5900

Monitors, Television, Fiberoptic-2475 — *See Vol. B*

Monitors, Temperature-Also See Controls, Temperature-5300 — *See Vol. B*

Monitors, Touch — See Touch Monitors

Monitors, Video-1900

ACI Data Products, 17921 Sampson Ln., Huntington Beach, CA 92647 714-842-2945
§ A E G Telefunken, Semiconductor Grp., Rte. 22, Somerville, NJ 08876 201-722-9800
Applied Sys., 26401 Harper Ave., St. Clair Shores, MI 48081 313-779-8700
§ Asaca Shibasku Corp. of Amer., 12509 Beatrice St., Los Angeles, CA 90066 827-7144
Astec USA, Ltd., A BSR Intl. Co., 2880 San Tomas Expwy., # 200, Santa Clara, CA 95051 408-748-1200
† Astronautics Corporation of America, P.O. Box 523, Milwaukee, WI 53201-0523 414-447-8200
ATV Research, Inc., 1301 Broadway, Dakota City, NE 68731 402-987-3771
§ Audiotronics Corp., 7428 Bellaire Ave., N. Hollywood, CA 91605 818-765-2645
Aydin Corp., 700 Dresher Rd., Horsham, PA 19044 215-657-7510
Ball Elctrn. Sys. Div., Ball Corp., P. O. Box 64376, St Paul, MN 55164 612-786-8900
Ball Electronic, Systems Div., 9300 W. 108th Circle, Broomfield, CO 80020 303-460-5256
§ Colorado Video, Inc., Box 928, Boulder, CO 80306 303-444-3972
Colorgraphic Communications Corp., 2379 John Glenn Dr. Ste. 105, P.O. Box 80448, Atlanta, GA 30366 404-455-3921
§ Conrac Div., Conrac Corp., 600 N. Rimsdale Ave., Covina, CA 91722 213-966-3511
Control Systems, 2855 Anthony Lane, Minneapolis, MN 55418 612-789-2421
§ Dai-Ichi Shoji of Amer., Inc., 150 Fifth Ave., New York, NY 10011 212-691-9050
Data Ray Corp., 452 Burbank Street, Broomfield, CO 80020 303-469-5173
Daytronic Corp., 2589 Corporate Pl., Miamisburg, OH 45342 513-866-3300
§† Digitech Industries, Inc., 66 Grove St., Ridgefield, CT 06877 203-438-3731
§ Dotronix, 160 First St. SE, New Brighton, MN 55112 612-633-1742
Dumont Oscilloscope Labs., 40 Fairfield Pl., W. Caldwell, NJ 07006 201-575-8666
Engelmann Microwave Co., KDI Pyrofilm, 60 S. Jefferson Rd., Whippany, NJ 07981 201-887-5700
Genstar Rental Elctrns., 2445 Faber Pl., Palo Alto, CA 94303 415-856-7600
Hamamatsu Photonics K.K., 325-6 Sunayama-Cho, Hamamatsu City, Shizuoka Pref, JAPAN 0534-52-2141
† Hartman Systems, Figgie Intl., 360 Wolf Hill Rd., Huntington Sta., NY 11746 516-427-7500
§ Heath Co., Benton Harbor, MI 49022 616-982-3886
† Infodex, Inc., 395 W. Main St., Waterbury, CT 06702 203-757-9291
§† Lenco Elctrns., Inc., 300 N. Maryland St., Jackson, MO 63755 314-243-3147
† LNR Communications, Inc., 180 Marcus Blvd., Hauppauge, NY 11788 516-273-7111
Microsystems Dev. Corp. Inc., 1560 Teaneck Rd., Teaneck, NJ 07666 201-837-0051
§ Mitsubishi Elctrns., Industrial Electronics Div., 991 Knox Street, Torrance, CA 90502 213-515-3993
Philips Television Sys., Inc., P.O. Box 618, 900 Corporate Dr., Mahway, NJ 07430 201-529-1550
§ Ramtek, 2211 Lawson Lane, Santa Clara, CA 95050 408-988-2211
RCA Solid State Div., Route 202, Somerville, NJ 08876 201-685-6000
† SEKAI Elctrns. of Amer., Inc., 14700 E. Firestone Blvd., Suite 122, La Mirada, CA 90638 714-670-1854
Stenning Instrments, Inc., 671 Enchanted Way, Pacific Palisades, CA 90272 213-459-2930
§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 215-673-5600
Techland Systems, Inc., 25 Waterside Plaza, New York, NY 10010 212-684-7788
Tektronix, Inc., P. O. Box 500, Y3-314, Beaverton, OR 97077 800-547-1512;Oregon only 800-452-1877
Video Logic Corp., 597 No. Mathilda Ave., Sunnyvale, CA 94086 408-245-8622
Video Monitors, Inc., 3833 N. White Ave., Eau Claire, WI 54703 715-834-7785
Zenith Systems & Components Group, Zenith Electronics Corp., 1000 Milwaukee Ave., Glenview, IL 60025 312-391-7733

Monitors, Voltage — See Meters, Volt (Vol. D)

Monitors, Waveform — See Oscilloscopes (Vol. D)

Monitors (MIL), Data-3475

† Infodex, Inc., 395 W. Main St., Waterbury, CT 06702 203-757-9291
Information Technolgoy A.D.S.C., P.O. Box 470, College Park, MD 20740 301-779-5110
§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 215-673-5600

Motor & Generator Armatures, Rotors, Stators-3500 — *See Vol. B*

Motor Assemblies with Integral Tachometer/Encoder-3500 — *See Vol. B*

Motor Generator Sets-4000

† Georator Corp., Box 70, Manassas, VA 22110, 703-368-2101 D•1930
Portescap U.S., 1547 Trooper Rd., P.O. Box 780, Worcester, PA 19490, 215-277-0433 B•1181
Servo-Tek Prods. Co., 1086 Goffle Rd., Hawthorne, NJ 07506, 201-427-3100 B•1185
† Ajax Magnethermic Corp., 1745 Overland Ave., N.E., Warren, OH 44482 216-372-8511
† American Elctrns., 1600 E. Valencia Dr., Fullerton, CA 92631 714-871-3020
† AMETEK, Dynamics Division, AMETEK, Inc., 5649 Peck Rd., Arcadia, CA 91006 818-442-5981
Arc Systems, Inc., 400 Oser Ave., Hauppauge, NY 11788 516-231-9261
Atlas Energy Sys., 9457 Rush St., S. El Monte, CA 91733 213-575-0755
† Avtel Div., Unitron Inc., 10925 Miller Rd., Dallas, TX 75238 214-340-8600
† CML MACARR Div., Marine Electric RPD, Inc., 666 Pacific St., Brooklyn, NY 11217 718-857-2400
§ Computer Power, 124E W. Main St., High Bridge, NJ 08829 201-735-8000
† Dresser Inds., 1505 Elm St., Dallas, TX 75201 214-746-6000
† EEMCO Div., 4585 Electronics Pl., Los Angeles, CA 90039 213-247-7060
§ Electro-Craft, 1600 2nd St. S., Hopkins, MN 55343 612-931-2700
Electro-Pacific, 5782 Thornwood Dr., Goleta, CA 93017 805-964-0751
§ Franek, John, Co., Inc., P.O. Box 11752, Santa Ana, CA 92711-1752 714-832-0290; 800-854-9420
§† Hertner Div., 12690 Elmwood Ave., Cleveland, OH 44111 216-252-4242
† HTL Electro Kinetics, 402 E. Gutierrez St., Santa Barbara, CA 93101 805-963-2055
† Inland Motor, Kollmorgen Corp., 501 First St., Radford, VA 24141 703-639-9045
† Lear Siegler, Inc., 2850 Ocean Park Blvd., P.O. Box 2158, Santa Monica, CA 90406 213-452-5444
† Magnetic Technology, 21001 Kittridge St., Canoga Pk., CA 91303 818-887-7700
§ Pacific Scientific Co., 4301 Kishwaukee, Rockford, IL 61105 815-966-3600
Power Systems & Controls, Inc., 3206 Lanvale Ave., Richmond, VA 23230 804-355-2803
Reliance Electric Co., Marketing Info Center, P.O. Box 99502, Cleveland, OH 44199 800-245-4501;800-245-4497 In Ohio
Teledyne Inet, 2750 W. Lomita Blvd., Torrance, CA 90509 213-325-5040
† Transicoil, Inc., Trooper Rd., P.O. Box 99, Worcester, PA 19490-9990 215-277-1300
† Unitron Inc., 10925 Miller Rd., Dept. EE, Dallas, TX 75238 214-340-8600
† Vernitech, 300 Marcus Blvd., Deer Pk., NY 11729 516-586-5100

Motor Speed Drives — See Controls, Motor Speed (Vol. D)

Motors, Brush, DC-3500 — *See Vol. B*

Motors, Brushless, DC-3500 — *See Vol. B*

Motors, Clock & Timing-3500 — *See Vol. B*

Motors, Control-3500 — *See Vol. B*

Motors, DC Timing-3500 — *See Vol. B*

Motors, Drag Cup-3500 — *See Vol. B*

Motors, Fractional Horsepower-3500 — *See Vol. B*

Motors, Gearhead-3500 — *See Vol. B*

Motors, Gyro-3500 — *See Vol. B*

Motors, Hysteresis-3500 — *See Vol. B*

Motors, Incremental, Stepping — See Motors, Stepping (Vol. B)

Motors, Induction-3500 — *See Vol. B*

Motors, Linear-3500 — *See Vol. B*

Motors, Miniature — See Motors, Fractional HP (Vol. B)

Motors, Permanent Magnet-3500 — *See Vol. B*

Motors, Selsyn — See Motors, Synchronous (Vol. B)

Motors, Servo-4900

Airpax Corp., Cheshire Div., Cheshire Indl. Pk., Box E, Cheshire, CT 06410, 203-272-0301 .... B•1138
Axial Magnetics, 15922 Strathern, Van Nuys, CA 91406, 818-994-3346 .... B•1139
† BEI Motion System Company, Kimco Division, 150 Vallecitos de Oro, San Marcos, CA 92069, 619-744-5671 .... B•1783
§ Bodine Elec. Co., 2500 W. Bradley Pl., Chicago, IL 60618, 312-478-3515 .... B•1140
Buehler Products, Inc., P. O. Box 33400, Raleigh, NC 27606, 919-469-8522 .... B•1142
† Clifton Precision, Litton Systems, Inc., Marple at Broadway, Clifton Hgts., PA 19018, 215-622-1000 .... B•1144
§ Electro-Craft, 1600 2nd St. S., Hopkins, MN 55343, 612-931-2700 .... B•1147-1148
† IMC Magnetics Corp., Eastern Div., 570 Main St., Westbury, NY 11590, 516-334-7070 .... B•1161
Kollmorgen Corp., Industrial Drives Div., 201 Rock Rd., Radford, VA 24141, 703-639-2495 .... B•1163-1165
† Magnetic Technology, 21001 Kittridge St., Canoga Pk., CA 91303, 818-887-7700 .... B•1168-1169
† Maxon Precision Motors, Inc., 838 Mitten Rd., Burlingame, CA 94010, 415-697-9614 .... B•1171
† Micro Mo Electronics, Inc., 742 2nd Ave. S., St. Petersburg, FL 33701, 813-822-2529 .... B•1172,1175
Motor-Tronics, Inc., 2142 Industrial Ct., Bldg. "F", Vista, CA 92083, 619-727-7430 .... B•1176
PITTMAN, Penn Engrg. & Mfg. Corp., 343 Godshall Dr., Harleysville, PA 19438, 215-256-6601 .... B•1179
Portescap U.S., 1547 Trooper Rd., P.O. Box 780, Worcester, PA 19490, 215-277-0433 .... B•1181
Servo-Tek Prods. Co., 1086 Goffle Rd., Hawthorne, NJ 07506, 201-427-3100 .... B•1185
Shinano Kenshi Corp. (SKC), 7525 Ethel Ave., Ste. 1, N. Hollywood, CA 91605, 818-764-4266 .... B•1187
† Sierracin/Magnedyne, 2258 Rutherford Rd., P.O. Box 458, Carlsbad, CA 92008, 619-438-3321 .... B•1189
TS Products, Inc., 12455 Branford St., Bldg. 22, Arleta, CA 91331, 818-896-6676 .... D•1990
† Vernitech, 300 Marcus Blvd., Deer Pk., NY 11729, 516-586-5100 .... B•1011,1196, D•1991
† Aeroflex Labs., Magnetic Prods. Div.,, 35 South Service Road, Plainview, NY 11803 516-694-6700
† American Elctrns., 1600 E. Valencia Dr., Fullerton, CA 92631 714-871-3020
† AMETEK, Dynamics Division, AMETEK, Inc., 5649 Peck Rd., Arcadia, CA 91006 818-442-5981
Anorad Corp., 110 Oser Ave., Hauppauge, NY 11788 516-231-1990
Arc Systems, Inc., 400 Oser Ave., Hauppauge, NY 11788 516-231-9261
† Astro Instrument Corp., 2501 NW 17th Ln., Pompano Beach, FL 33064 305-973-8900
Baldor Electric Company, P.O. Box 2400, Fort Smith, AR 72901 501-646-4711
§ B & B Motor & Control Corp., Apple Hill Commons, Burlington, CT 06013 203-673-7151
Bertsch U.S., Sycamore Resch. Ctr., 2142F Industrial Ct., Vista, CA 92083 619-727-7420
§ Colman Motor Products, Inc., A Barber-Colman Co., P. O. Box 1240, Rockford, IL 61105-1240 815-968-0660
Computer Optical Prods., Inc., Sub. of Hathaway Corp., 9353 Eton Ave., Chatsworth, CA 91311-5866 818-882-0424
§ Crouzet Controls, Inc., 1083 State Pkwy., Schaumburg, IL 60195 312-843-2200
General Numeric Corporation, 390 Kent Avenue, Elk Grove Village, IL 60007 312-640-1595
Eastern Air Devices Motor Div., 1 Progress Dr., Dover, NH 03820 603-742-3330
† EDO Corp./Elinco Div., 272 Main Ave., Norwalk, CT 06851 203-847-5861
EG & G Torque Systems, 36 Arlington St., Watertown, MA 02172 617-924-6000
§† Hertner Div., 12690 Elmwood Ave., Cleveland, OH 44111 216-252-4242
HHK Ind., Telan Int., Rte. 611, P. O. Box 690, Plumsteadville, PA 18949 215-766-0990
Hitachi America, Ltd., 59 Route 17 South, Allendale, NJ 07401 201-825-8000
† Honeywell, Process Control Div., 1100 Virginia Dr., Ft. Washington, PA 19034 .... 800-321-5111, Ext. 596
† HTL Electro Kinetics, 402 E. Gutierrez St., Santa Barbara, CA 93101 805-963-2055
§† Inertial Motors, 280 N. Broad St., Doylestown, PA 18901 215-345-1010
† Inland Motor Division, Kollmorgen Corp., 4020 E. Inland Rd., Sierra Vista, AZ 85635 602-459-1150
† Inland Motor, Kollmorgen Corp., 501 First St., Radford, VA 24141 703-639-9045
§ Japanese Prods. Corp., 31368 Via Colinas, Ste. 103-104, West Lake Village, CA 91362 818-991-6111
† Lear Siegler, Inc., 2850 Ocean Park Blvd., P.O. Box 2158, Santa Monica, CA 90406 213-452-5444
Micronel U.S., 2142F Industrial Ct., Sycamore Research Center, Vista, CA 92083 619-727-7400
§ Mitsumi Elec. Co., Ltd., 8-2, 8-Chome, Kokuryo, Chofu-City, Tokyo, JAPAN 489-5333
Muirhead, 1101 Briston Rd., Mountainside, NJ 07092 201-233-6010
Pacific Scientific Co., 4301 Kishwaukee, Rockford, IL 61105 815-966-3600
Papst Mechatronic Corp., Aquidneck Indl. Pk., Newport, RI 02840 401-849-5930
PMI Motors, Kollmorgen Corp., 5 Aerial Way, Syosset, NY 11791 516-938-8000
§ Powertron, Contraves Goerz Corp., 3821 Barranger Dr., Charlotte, NC 28210 704-525-8962
Reliance Electric Co., Marketing Info Center, P.O. Box 99502, Cleveland, OH 44199 .... 800-245-4501;800-245-4497 In Ohio
Sequential Info. Sys., 249 N. Saw Mill River Rd., Elmsford, NY 10523 914-592-5930
Singer Co., Kearfott Div., 1150 McBride Ave., Little Falls, NJ 07424 201-785-6000
† Stock Drive Prods., Div. of Designatronics, Inc., 2101 Jericho Turnpike, New Hyde Pk., NY 11040 .... 516-328-0200;328-3300
Synektron Corporation, 12000 S. W. Garden Place, Portland, OR 97223 503-684-3090
† Transicoil, Inc., Trooper Rd., P.O. Box 99, Worcester, PA 19490-9990 215-277-1300
† TRW Motor Div. (Military), 2275 Stanley Ave., Dayton, OH 45404 513-228-3171
Unico, 3725 Nicholson Rd., Franksville, WI 53126-0505 414-886-5678
† Valley Electromagnetics Corp., P.O. Box 557, Crystal Lake, IL 60014 815-459-3080
† Valley Electromagnetics, P.O. Box 131, Spring Valley, IL 61362 815-664-2348
§ Westamp, 1542 15th St., Santa Monica, CA 90404 213-393-0401

Motors, Squirrel Cage-3500 — *See Vol. B*

Motors, Stepping-3500 — *See Vol. B*

Motors, Synchronous-3500 — *See Vol. B*

Motors, Synchronous, Polarized — See Motors, Synchronous (Vol. B)

Motors, Timing — See Motors, Clock & Timing (Vol. B)

Motors, Torque (Incl. Torquers)-3500 — *See Vol. B*

Motors, Universal, AC or DC Operation-3500 — *See Vol. B*

Motors, (MIL)-2440 — *See Vol. B*

Mounts, Antenna-1900

† Aeroflex Labs., Magnetic Prods. Div.,, 35 South Service Road, Plainview, NY 11803 516-694-6700
American Electronic Labs., Box 552, Lansdale, PA 19446 215-822-2929
† Ametek, Inc, Hunter Spring Division, 1 Spring Ave., Hatfield, PA 19440 215-822-2971
Antennacraft, Box 1005, Burlington, IA 52601 319-754-7575
† Barry Controls, Barry Wright Corp., 700 Pleasant St., Watertown, MA 02172 617-923-1150
§ CGTI, 2 Windward Ave., White Plains, NY 10605 914-949-3719
† Craig Systems Corp., 10 Industrial Way, Amesbury, MA 01913-4848 617-388-5662
Datron Systems, Inc., 200 West Los Angeles Ave., Simi Valley, CA 93065-1650 805-584-1717
† Electro-Magnetic Processes, Inc., 9616 Owensmouth Ave., Chatsworth, CA 91311 818-882-6333
† Electrospace Sys., Inc., P. O. Box 831359, Richardson, TX 75083-1359 214-783-2004
† Gabriel Elctrns., Box 70, Scarborough Indl. Pk., Scarborough, ME 04074 207-883-5161
§ GC Elctrns., 400 S. Wyman St., Rockford, IL 61101 815-968-9661
† Industrial Control Co., 3100 Pineda Ave., Rockledge, FL 32955 305-259-7105
M/A-Com Cable/Home Communication Prodelin Satellite Antenna Systems, M/A-Com, Inc., P.O. Box 468, Newton, NC 28658 .... 800-222-1195;704-464-4141
Microflect, 3575 25th S.E., Salem, OR 97302-0985 503-363-9267
§ Premax Prods. Div., Highland & College Aves., Niagara Falls, NY 14305 716-285-9186
§ RMS Electronics Inc., 50 Antin Pl., Bronx, NY 10462 212-892-6700
Scientific-Atlanta, Inc., P.O. Box 105600, Atlanta, GA 30348 404-441-4000
§ Sinclair Radio Labs., 122 Rayette Rd., Concord, ONT, CANADA L9W2Y8 416-669-1244
§† Sitco Antennas, 10330 N.E. Marx St., Portland, OR 97220 503-253-2000
Telco Products Co., 44 Sea Cliff, Glen Cove, NY 11542 516-759-0300

Mounts, CRT & Accessories-2500 — *See Vol. C*

Mounts, Crystal-2300 — *See Vol. A*

Mounts, Integrated Circuit — See Sockets, Integrated Circuit (Vol. C), Boards, Plug-In (Vol. C)

Mounts, Microwave-3450 — *See Vol. A*

Mounts, Mobile Antenna — See Mounts, Antenna (Vol. D)

Mounts, Satellite Antennas-1900

Electrospace Sys., Inc., P. O. Box 831359, Richardson, TX 75083-1359 214-783-2004

Mounts, Shock & Vibration-2825 – *See Vol. C*

Mounts, Thermistor-5300 – *See Vol. B*

Mounts, Transistor (Incl. Kits) – See Pads, Transistor Mounting (Vol. C)

Mouse Devices – See Controls, Computer Input (Vol. D)

Multibus – See Board Computers & Subassemblies, Multibus (Vol. D)

Multiplexers, Analog-2325

CYTEC Corp., 107 N. Washington St., E. Rochester, NY 14445, 716-381-4740 .... D•1207
§ Digitec Corp., 918 Woodley Rd., P.O. Box 458, Dayton, OH 45401, 513-254-6251 .... D•1348
Information Transfer Indl., Box 357, Holcomb, NY 14469, 716-657-7074 .. D•1152
Matrix Corp., 2260 Distributors Dr., Indianapolis, IN 46241, 317-248-2036 .... D•1158
† Acromag, 30765 Wixom Rd., Wixom, MI 48096 313-624-1541
A.D. Data Sys., Techtran Industries, 200 Commerce Dr., Rochester, NY 14623 716-334-9649
† Analog Devices, P.O. Box 280, Norwood, MA 02062 617-329-4700
Analogic Corp., Data Conversion Prods. Grp., Audubon Rd., Wakefield, MA 01880 617-246-0300
Applied Sys., 26401 Harper Ave., St. Clair Shores, MI 48081 313-779-8700
Artel Communications Corp., 93 Grand St., Worcester, MA 01602 617-752-5690
Aydin Monitor Sys., 502 Office Center Dr., Ft. Washington, PA 19034 215-646-8100
Burr-Brown Corp., P.O. Box 11400, Tucson, AZ 85734 602-746-1111
CDS - Colorado Data Sys., 3301 W. Hampden, Unit C, Englewood, CO 80110 303-762-1640
Coastcom, P.O. Box 27068, Concord, CA 94527 415-825-7500
Coherent Communications Sys. Corp., 60 Commerce Dr., Hauppauge, NY 11788 516-231-1550
§ Comdata Corp., 7900 N. Nagle Ave., Morton Grove, IL 60053 312-470-9600
Computrol Div. Kidde Automated Sys., Inc., 15 Ethan Allen Hwy., Ridgefield, CT 06877-6297 203-544-9371
† Consolidated Controls, 15 Durant Ave., Bethel, CT 06801 203-743-6721
§† Data Precision Corp., Electronics Ave., Danvers, MA 01923 617-246-1600
Data Tech, Div. of Penril Corp., 3110 W. Segerstrom, Santa Ana, CA 92704 714-546-7160
Datawest, 7333 E. Helm Dr., Scottsdale, AZ 85260 602-948-3280
† Datel, General Electric Co., 11 Cabot Blvd., Mansfield, MA 02048 617-339-9341
§ Dynamics, Div. of Waugh Controls Corp., 9001 Fullbright Ave., Chatsworth, CA 91311 818-998-8281
§ EMR Data Systems, Div. Sangamo- Weston, Box 3041, Sarasota, FL 33578 813-371-0811
Fairchild Weston, Data Recorders, P.O. Box 3041, Sarasota, FL 33578 .. 813-371-0811
Fairchild - Weston - Telemetry, P.O. Box 3041, Sarasota, FL 33578 813-377-5566
† Farinon Div., Harris Corp., 1691 Bayport, San Carlos, CA 94070 415-594-3000
† Fibronics Intl. Inc., 325 Stevens St., Hyannis, MA 02601 617-778-0700
Gandalf Technologies, Inc., 350 E Dundee Rd., Suite 301, Wheeling, IL 60090 312-459-6630
General Datacomm, Inc., Rt. 63, Middlebury, CT 06762-1299 203-574-1118
Gould Inc., Recording Systems Div., 3631 Perkins Ave., Cleveland, OH 44114 216-361-3315
Granger Assocs., 3101 Scott Blvd., Santa Clara, CA 95051 408-727-3101
GTE SUPPLY, GTE Communications Systems, 5225 Wiley Post Way, Salt Lake City, UT 84116 801-537-5237
† Hughes Aircraft Co., Microelctrn. Sys. Div., 2601 Campus Dr., Irvine, CA 92715 714-752-3800
§ Intech, Microcircuits Div., 2270 Martin Ave., Santa Clara, CA 95050 408-988-4930
† Interface Engrg., 386 Lindelof Ave., Stoughton, MA 02072 617-344-7383
IPAC Grp., 3047 Indl. Blvd., Bethel Pk., PA 15102 412-831-9200
Karkar Electronics, Inc., 245 Eleventh St., San Francisco, CA 94103 415-552-1247
Kaye Instruments, 15 De Angelo Dr., Bedford, MA 01730 617-275-0300
Keithley Instrs., 28775 Aurora Rd., Cleveland, OH 44139 216-248-0400
Kinetic Sys., 11 Maryknoll Dr., Lockport, IL 60441 815-838-0005
MERET, Inc., 1815 24th St., Santa Monica, CA 90404-4998 213-828-7496
Metra Instrs., 2056 Bering Dr., San Jose, CA 95131 408-297-8530
MICRA Corp., 120 Ricefield Lane, Hauppauge, NY 11788 516-231-8600
§† Micro Power Sys. Inc., 3100 Alfred St., Santa Clara, CA 95050 408-727-5350
§ MVP Elctrns., 1161 N. Tustin, Orange, CA 92667 714-639-9246
Neff Instr., 700 S. Myrtle Ave., Monrovia, CA 91016 818-357-2281
Omega Engrg., Box 4047, Stamford, CT 06907 203-359-1660
† Omnitek, Inc., P.O. Box 102, 820 Pennsylvania Blvd., Feasterville, PA 19047 215-355-4443
§ Opto 22, 15461 Springdale St., Huntington Bch., CA 92649 714-891-5861
Philips ECG, Inc., 100 First Ave., Waltham, MA 02254 617-890-6107
§† Phoenix Data, Inc., 3384 W. Osborn Rd., Phoenix, AZ 85017 602-278-8528
§† Precision Monolithics, Inc., 1500 Space Dr., Santa Clara, CA 95054 408-727-9222
Preston Scientific, 805 E. Cerritos Ave., Anaheim, CA 92805 714-776-6400
Racal-Dana Instrs. Inc., 4 Goodyear St., Irvine, CA 92715 714-859-8999
§† Raytheon Semiconductor, 350 Ellis St., Mountain View, CA 94043 415-968-9211
§ Research, Inc., Box 24064, Minneapolis, MN 55424 612-941-3300
Rochester Instr. Sys., 255 N. Union St., Rochester, NY 14605 716-263-7700
§† Solid State Scientific, 3900 Welsh Rd., Willow Grove, PA 19090 215-657-8400
† G.T.E. Gov't Sys. Corp., Comm. Sys. Div., 77 A St., Needham Hgts., MA 02194 617-449-2000
TANO Corp., 4301 Poche Ct., New Orleans, LA 70129 504-254-3500
Teledyne/Geotech, 3401 Shiloh Rd., Garland, TX 75041 214-271-2561
§ Tennelec, 601 Turnpike, Oak Ridge, TN 37830 615-483-8405
Toyo Comm. Equip. Co., Ltd., No. 8 Mori Bldg., 20-4, Nichi-Shimbashi, 3-Chome Minato-Ku, TOKYO, JAPAN 105 .... 03-459-7320/03-459-7310
Tustin Elctrns. Co., 1431 E. Saint Andrews Pl., Santa Ana, CA 92705 714-549-0391
Vistar Corp., 13740 McCormick Dr., Tampa, FL 33625 813-855-6611

Multiplexers, Digital-2325

Information Transfer Indl., Box 357, Holcomb, NY 14469, 716-657-7074 .. D•1152
Matrix Corp., 2260 Distributors Dr., Indianapolis, IN 46241, 317-248-2036 .... D•1158
† Acromag, 30765 Wixom Rd., Wixom, MI 48096 313-624-1541
§ Adatek, Inc., P.O. Box 1339, Sandpoint, ID 83864 .... 208-263-1471;800-323-3343
A.D. Data Sys., Techtran Industries, 200 Commerce Dr., Rochester, NY 14623 716-334-9649
§† Advanced Microcomputers, 3340 Scott Blvd., Santa Clara, CA 95051 408-732-2400
§† Advanced Micro Devices, P.O. Box 3453, 901 Thompson Pl., Sunnyvale, CA 94088 408-732-2400
§ Algo, Inc., 9198-C Red Branch Rd., Columbia, MD 21045 301-730-7442
Amdahl Communications Sys. Div., Amdahl Corp., 2500 Walnut Ave., Marina del Rey, CA 90291 213-822-3202
Applied Sys., 26401 Harper Ave., St. Clair Shores, MI 48081 313-779-8700
Atlantic Scientific Corp., 2711 S. Harbour City Blvd., Melbourne, FL 32901 305-725-8000
Automation Displays Inc., 3833 N. White Ave., Eau Claire, WI 54703 715-834-9595
Aydin Corp., 700 Dresher Rd., Horsham, PA 19044 215-657-7510
Aydin Microwave, 75 East Trimble Rd., San Jose, CA 95131 408-946-5600
Aydin Monitor Sys., 502 Office Center Dr., Ft. Washington, PA 19034 215-646-8100
† Aydin Vector Div., Box 328, Newtown, PA 18940 215-968-4271
§ Caere Corp., 100 Cooper St., Los Gatos, CA 95030 408-395-7000
Canoga Data Sys., 6740 Eton Ave., Canoga Park, CA 91303 213-888-2003
§ Cincinnati Electrosys., 469 Wards Corner Rd., Loveland, OH 45140 513-831-4347
Coastcom, P.O. Box 27068, Concord, CA 94527 415-825-7500
Coherent Communications Sys. Corp., 60 Commerce Dr., Hauppauge, NY 11788 516-231-1550
§ Comdata Corp., 7900 N. Nagle Ave., Morton Grove, IL 60053 312-470-9600
† Computer Conversions Corp., 6 Dunton Ct., E. Northport, NY 11731 516-261-3300
Control Module, 380 Enfield St., Enfield, CT 06082 203-745-2433
C-Tek Inc., 4 Railroad Ave., Wakefield, MA 01880 617-246-1720
Dantel, 2991 N. Argyle Ave., Fresno, CA 93727 209-292-1111
§ Data General, 4400 Computer Dr., Westboro, MA 01581 617-366-8911
† Dataproducts, 6200 Canoga Ave., Woodland Hills, CA 91365 213-887-8000
† Data Prods. New England, Barnes Park N. Caller Box 30, Wallingford, CT 06492 203-265-7151
§ Data Rentals/Sls., Inc, P. O. Box 3257, Culver City, CA 90230 213-559-3822
Decom Sys., 340 Rancheros Dr., San Marcos, CA 92069 619-744-1002
§ Eaton Corp./Cutler-Hammer Prods, Aerospace & Commercial Controls Div., 4201 N. 27th St., Milwaukee, WI 53216 414-449-7487
§ Electromatic Controls Corp., 2495 Pembroke Road, Hoffman Estates, IL 60195-2010 312-882-5757
§ EMR Data Systems, Div. Sangamo- Weston, Box 3041, Sarasota, FL 33578 813-371-0811
Engelmann Microwave Co., KDI Pyrofilm, 60 S. Jefferson Rd., Whippany, NJ 07981 201-887-5700
Fairchild Weston, Data Recorders, P.O. Box 3041, Sarasota, FL 33578 .. 813-371-0811
Fairchild - Weston - Telemetry, P.O. Box 3041, Sarasota, FL 33578 813-377-5566
† Farinon Div., Harris Corp., 1691 Bayport, San Carlos, CA 94070 415-594-3000
† Fibronics Intl. Inc., 325 Stevens St., Hyannis, MA 02601 617-778-0700
Gandalf Technologies, Inc., 350 E Dundee Rd., Suite 301, Wheeling, IL 60090 312-459-6630
G B Instruments Inc., 2030 Coolidge St., Hollywood, FL 33020 305-920-0225
GEN/COMP Inc., 6 Algonquin Rd., Canton, MA 02021 617-828-2008
General Datacomm, Inc., Rt. 63, Middlebury, CT 06762-1299 203-574-1118
§ Giltronix, 3780 Fabian Way, Palo Alto, CA 94303 415-493-1300
Granger Assocs., 3101 Scott Blvd., Santa Clara, CA 95051 408-727-3101
GTE SUPPLY, GTE Communications Systems, 5225 Wiley Post Way, Salt Lake City, UT 84116 801-537-5237
† Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
† Hughes Aircraft Co., Microelctrn. Sys. Div., 2601 Campus Dr., Irvine, CA 92715 714-752-3800
Hybrid Systems Corp., 22 Linnell Circle, Billerica, MA 01821 617-667-8700
† Interface Engrg., 386 Lindelof Ave., Stoughton, MA 02072 617-344-7383
IPAC Grp., 3047 Indl. Blvd., Bethel Pk., PA 15102 412-831-9200
Karkar Electronics, Inc., 245 Eleventh St., San Francisco, CA 94103 415-552-1247
Kinetic Sys., 11 Maryknoll Dr., Lockport, IL 60441 815-838-0005
Loral TerraCom, Div. of Loral Corp., 9020 Balboa Ave., San Diego, CA 92123 619-278-4100
MERET, Inc., 1815 24th St., Santa Monica, CA 90404-4998 213-828-7496
Metra Instrs., 2056 Bering Dr., San Jose, CA 95131 408-297-8530
§ Micom Systems, Inc., 4100 Los Angeles Ave, P.O. Box 8100, Simi Valley, CA 93062-8100 805-583-8600
MICRA Corp., 120 Ricefield Lane, Hauppauge, NY 11788 516-231-8600
Minntronics Corporation, 2599 White Bear Ave., St. Paul, MN 55109 612-770-5247
Neff Instr., 700 S. Myrtle Ave., Monrovia, CA 91016 818-357-2281
§ NES, Inc. (Nationwide Electronic Systems), 3003 Wakefield, Carpentersville, IL 60110 312-426-5900
Omega Engrg., Box 4047, Stamford, CT 06907 203-359-1660
† Omnitek, Inc., P.O. Box 102, 820 Pennsylvania Blvd., Feasterville, PA 19047 215-355-4443
† Optelecom, 15940 Luanne Dr., Gaithersburg, MD 20877 301-840-2121
§ Opto 22, 15461 Springdale St., Huntington Bch., CA 92649 714-891-5861
Philips ECG, Inc., 100 First Ave., Waltham, MA 02254 617-890-6107
§ Phoenix Data, Inc., 3384 W. Osborn Rd., Phoenix, AZ 85017 602-278-8528
§ Point 4 Data Corp., 2569 McCabe Way, Irvine, CA 92714 714-863-1111
Racal-Milgo, 1601 N. Harrison Parkway, Sunrise, FL 33324 305-475-1601
Ramcom Systems, 4141-C Glencoe Ave., Marina Del Rey, CA 90292 213-827-4432
RCI/Data, 1992 Lakewood Rd., Toms River, NJ 08753 201-341-8361
† Singer Co., Kearfott Div., 1150 McBride Ave., Little Falls, NJ 07424 201-785-6000
§† Solid State Scientific, 3900 Welsh Rd., Willow Grove, PA 19090 215-657-8400
Standard Engrg., 44800 Industrial Dr., Fremont, CA 94538 415-657-7555

G.T.E. Gov't Sys. Corp., Comm. Sys. Div., 77 A St., Needham Hgts., MA 02194 617-449-2000
TANO Corp., 4301 Poche Ct., New Orleans, LA 70129 504-254-3500
§† Tau-Tron, Inc., A Unit of General Signal, 10 Lyberty Way, Westford, MA 01886 617-692-5100
Texas Instrs., Inc., Box 225012-MS-84, Dallas, TX 75265 214-995-6611
§† Timeplex, Inc., 400 Chestnut Ridge Rd., Woodcliff Lake, NJ 07675 201-930-4600
Toyo Comm. Equip. Co., Ltd., No. 8 Mori Bldg., 20-4, Nichi-Shimbashi, 3-Chome Minato-Ku, TOKYO, JAPAN 105 ...... 03-459-7320/03-459-7310
Vistar Corp., 13740 McCormick Dr., Tampa, FL 33625 813-855-6611
§ Xycom, 750 N. Maple Rd., Saline, MI 48176 313-429-4971

Multiplexers, Fiber Optic-2475 – See Vol. B

Multiplexers, Frequency Division-1900

Applied Research, Inc., 160 Dupont St., Plainview, NY 11803, 516-349-9200 ...... A•1702-1703
† Acromag, 30765 Wixom Rd., Wixom, MI 48096 313-624-1541
† Airtron, Litton Industries, Inc., 200 E. Hanover Ave., Morris Plains, NJ 07950 201-539-5500
† Applied Electro Technlg., Int., STI Company, 2220 So. Anne St., Santa Ana, CA 92704 714-556-6570
Applied Sys., 26401 Harper Ave., St. Clair Shores, MI 48081 313-779-8700
Coherent Communications Sys. Corp., 60 Commerce Dr., Hauppauge, NY 11788 516-231-1550
§ Comdata Corp., 7900 N. Nagle Ave., Morton Grove, IL 60053 312-470-9600
§ Data Rentals/Sls., Inc, P. O. Box 3257, Culver City, CA 90230 213-559-3822
Fairchild Weston, Data Recorders, P.O. Box 3041, Sarasota, FL 33578 813-371-0811
Gandalf Data, Inc., 1019 S. Noel Ave., Wheeling, IL 60090 312-541-6060
Gandalf Technologies, Inc., 350 E Dundee Rd., Suite 301, Wheeling, IL 60090 312-459-6630
GTE SUPPLY, GTE Communications Systems, 5225 Wiley Post Way, Salt Lake City, UT 84116 801-537-5237
† Integrated Microwave, 11526 Sorrento Valley Rd., San Diego, CA 92121 619-457-0277
Karkar Electronics, Inc., 245 Eleventh St., San Francisco, CA 94103 415-552-1247
† Metraplex Corp., Berkshire Indl. Park, Bethel, CT 06801 203-748-0606
† Metropole Products Inc., P.O. Box 10275, Alexandria, VA 22310 ...... 703-971-8606; 703-971-7082
§ Micom Systems, Inc., 4100 Los Angeles Ave, P.O. Box 8100, Simi Valley, CA 93062-8100 805-583-8600
Mu-Del Electronics, Inc., 2426 Linden Lane, Silver Spring, MD 20910-1288 301-587-6087
Reliance Electric Co., Marketing Info Center, P.O. Box 99502, Cleveland, OH 44199 ...... 800-245-4501;800-245-4497 In Ohio
† Sage Laboratories, Inc., 3 Huron Dr., Natick, MA 01778 617-653-0844
§ Tek-Com Corporation, 1887 O'Toole Avenue, C103, San Jose, CA 95131 408-263-7400
Toyo Comm. Equip. Co., Ltd., No. 8 Mori Bldg., 20-4, Nichi-Shimbashi, 3-Chome Minato-Ku, TOKYO, JAPAN 105 ...... 03-459-7320/03-459-7310
† Transco Products, Inc., 4241 Glencoe Ave., Marina del Rey, CA 90295 213-822-0800

Multiplexers, Statistical-1900

§ Datec, Inc., 200 Eastowne Dr., Ste. 116, Chapel Hill, NC 27514, 919-929-2135 ...... D•1049
Applied Sys., 26401 Harper Ave., St. Clair Shores, MI 48081 313-779-8700
Aydin Corp., 700 Dresher Rd., Horsham, PA 19044 215-657-7510
BLACK BOX Corp., Micom Sys., P.O. Box 12800, Pittsburgh, PA 15241 412-746-5500
§ Comdata Corp., 7900 N. Nagle Ave., Morton Grove, IL 60053 312-470-9600
§ Complexx Systems Inc., 4930 Research Dr., Huntsville, AL 35805 205-830-4310
§ Concord Data Systems, 303 Bear Hill Rd., Waltham, MA 02154 617-890-1394
§ Data Rentals/Sls., Inc, P. O. Box 3257, Culver City, CA 90230 213-559-3822
Digital Communications Assocs., Inc., 303 Technology Pk., Norcross, GA 30092 404-448-1400
EDA Instruments, Inc., 4 Thorncliffe Park Dr., Toronto, ON, CANADA M4HIHI 416-425-7800
Gandalf Data, Inc., 1019 S. Noel Ave., Wheeling, IL 60090 312-541-6060
Gandalf Technologies, Inc., 350 E Dundee Rd., Suite 301, Wheeling, IL 60090 312-459-6630
General Datacomm, Inc., Rt. 63, Middlebury, CT 06762-1299 203-574-1118
§ Glasgal Communications, Inc., 207 Washington St., Northvale, NJ 07647 201-768-8082
GTE SUPPLY, GTE Communications Systems, 5225 Wiley Post Way, Salt Lake City, UT 84116 801-537-5237
§ Micom Systems, Inc., 4100 Los Angeles Ave, P.O. Box 8100, Simi Valley, CA 93062-8100 805-583-8600
§ Multi-Tech Systems, Inc., 82 Second Ave. S.E., New Brighton, MN 55112 612-631-3550
§† Penril Datacomm, Penril Corp., 207 Perry Parkway, Gaithersburg, MD 20877 301-921-8600
§† Timeplex, Inc., 400 Chestnut Ridge Rd., Woodcliff Lake, NJ 07675 201-930-4600
Toyo Comm. Equip. Co., Ltd., No. 8 Mori Bldg., 20-4, Nichi-Shimbashi, 3-Chome Minato-Ku, TOKYO, JAPAN 105 ...... 03-459-7320/03-459-7310
† Western DataCom, 5083 Market St., Youngstown, OH 44512 216-788-6583

Multiplexers, Time Division-1900

Amdahl Communications Sys. Div., Amdahl Corp., 2500 Walnut Ave., Marina del Rey, CA 90291 213-822-3202
Aydin Corp., 700 Dresher Rd., Horsham, PA 19044 215-657-7510
BLACK BOX Corp., Micom Sys., P.O. Box 12800, Pittsburgh, PA 15241 412-746-5500
§ Coastcom, P.O. Box 27068, Concord, CA 94527 415-825-7500
Coherent Communications Sys. Corp., 60 Commerce Dr., Hauppauge, NY 11788 516-231-1550
§ Comdata Corp., 7900 N. Nagle Ave., Morton Grove, IL 60053 312-470-9600
§ Data Rentals/Sls., Inc, P. O. Box 3257, Culver City, CA 90230 213-559-3822
Digital Communications Assocs., Inc., 303 Technology Pk., Norcross, GA 30092 404-448-1400
† Fibronics Intl. Inc., 325 Stevens St., Hyannis, MA 02601 617-778-0700
Gandalf Data, Inc., 1019 S. Noel Ave., Wheeling, IL 60090 312-541-6060
Gandalf Technologies, Inc., 350 E Dundee Rd., Suite 301, Wheeling, IL 60090 312-459-6630
GEN/COMP Inc., 6 Algonquin Rd., Canton, MA 02021 617-828-2008
General Datacomm, Inc., Rt. 63, Middlebury, CT 06762-1299 203-574-1118
§ Glasgal Communications, Inc., 207 Washington St., Northvale, NJ 07647 201-768-8082
GTE SUPPLY, GTE Communications Systems, 5225 Wiley Post Way, Salt Lake City, UT 84116 801-537-5237
Karkar Electronics, Inc., 245 Eleventh St., San Francisco, CA 94103 415-552-1247
† Metraplex Corp., Berkshire Indl. Park, Bethel, CT 06801 203-748-0606
§ Micom Systems, Inc., 4100 Los Angeles Ave, P.O. Box 8100, Simi Valley, CA 93062-8100 805-583-8600
Minntronics Corporation, 2599 White Bear Ave., St. Paul, MN 55109 612-770-5247
RFL Inds., A Dowty Grp. Co./Comms. Div., Powerville Rd., Boonton, NJ 07005 201-334-3100
§† Tau-Tron, Inc., A Unit of General Signal, 10 Lyberty Way, Westford, MA 01886 617-692-5100
Timeplex, Inc., 400 Chestnut Ridge Rd., Woodcliff Lake, NJ 07675 201-930-4600
Toyo Comm. Equip. Co., Ltd., No. 8 Mori Bldg., 20-4, Nichi-Shimbashi, 3-Chome Minato-Ku, TOKYO, JAPAN 105 ...... 03-459-7320/03-459-7310

Multiplexers, Transmission-1900

A.D. Data Sys., Techtran Industries, 200 Commerce Dr., Rochester, NY 14623 716-334-9649
Amdahl Communications Sys. Div., Amdahl Corp., 2500 Walnut Ave., Marina del Rey, CA 90291 213-822-3202
§† Anaren Microwave, P.O. Box 178, 6635 Kirkville Rd., E. Syracuse, NY 13057 315-432-8909
Applied Sys., 26401 Harper Ave., St. Clair Shores, MI 48081 313-779-8700
Aydin Corp., 700 Dresher Rd., Horsham, PA 19044 215-657-7510
§ Comdata Corp., 7900 N. Nagle Ave., Morton Grove, IL 60053 312-470-9600
† Farinon Div., Harris Corp., 1691 Bayport, San Carlos, CA 94070 415-594-3000
General Datacomm, Inc., Rt. 63, Middlebury, CT 06762-1299 203-574-1118
GTE SUPPLY, GTE Communications Systems, 5225 Wiley Post Way, Salt Lake City, UT 84116 801-537-5237
† Hughes Aircraft Co., Microelctrn. Sys. Div., 2601 Campus Dr., Irvine, CA 92715 714-752-3800
IPAC Grp., 3047 Indl. Blvd., Bethel Pk., PA 15102 412-831-9200
MARCONI INSTRUMENTS, 3 Pearl Court, Allendale, NJ 07401 201-934-9050
Microphase, 587 Connecticut Ave., Norwalk, CT 06856 203-866-8000
RCI/Data, 1992 Lakewood Rd., Toms River, NJ 08753 201-341-8361
† Solid State Elctrns. Corp., 18646 Parthenia St., Northridge, CA 91324 818-993-8257
Teledyne/Geotech, 3401 Shiloh Rd., Garland, TX 75041 214-271-2561
Toyo Comm. Equip. Co., Ltd., No. 8 Mori Bldg., 20-4, Nichi-Shimbashi, 3-Chome Minato-Ku, TOKYO, JAPAN 105 ...... 03-459-7320/03-459-7310

Multiplexers, Video-1900

Artel Communications Corp., 93 Grand St., Worcester, MA 01602 617-752-5690
§ Coastcom, P.O. Box 27068, Concord, CA 94527 415-825-7500
† Colorado Video, Inc., Box 928, Boulder, CO 80306 303-444-3972
General Datacomm, Inc., Rt. 63, Middlebury, CT 06762-1299 203-574-1118
Hughes Aircraft Co, Aerospace Grps./Support Sys., P.O. Box 90515, Los Angeles, CA 90009 213-670-1515
Hughes Aircraft Co., Microelctrn. Sys. Div., 2601 Campus Dr., Irvine, CA 92715 714-752-3800
Image Technology Methods Corp., 103 Moody St., Waltham, MA 02154 617-894-1720
MERET, Inc., 1815 24th St., Santa Monica, CA 90404-4998 213-828-7496
RCA Solid State Div., Route 202, Somerville, NJ 08876 201-685-6000
§† RCA Solid State Div., CMOS IC Mktg., Rte. 202, Somerville, NJ 08876 201-685-6000

Multipliers, Analog-2325

† Acromag, 30765 Wixom Rd., Wixom, MI 48096 313-624-1541
Action Instrs., 8601 Aero Dr., San Diego, CA 92123 619-279-5726
§† Advanced Micro Devices, P.O. Box 3453, 901 Thompson Pl., Sunnyvale, CA 94088 408-732-2400
† Analog Devices, P.O. Box 280, Norwood, MA 02062 617-329-4700
Analog Systems, P.O. Box 35879, Tucson, AZ 85740-5879 602-293-4923
† Burr-Brown Corp., P.O. Box 11400, Tucson, AZ 85734 602-746-1111
Clarke-Hess Comm. Resch. Corp., 17 West 17th St., New York, NY 10011 212-255-2940
Control Prods., Devar, Inc., P.O. Box 589, Bridgeport, CT 06601 203-368-6751
§† General Magnetics, 211 Grove St., Bloomfield, NJ 07003 201-743-2700
† Hybrid Systems Corp., 22 Linnell Circle, Billerica, MA 01821 617-667-8700
Industrial Test Equip., 21 Yennicock Ave., Port Washington, NY 11050 516-883-1700
§ Intech, Microcircuits Div., 2270 Martin Ave., Santa Clara, CA 95050 408-988-4930
† Interface Engrg., 386 Lindelof Ave., Stoughton, MA 02072 617-344-7383
Intronics, Inc., 57 Chapel St., Newton, MA 02158 617-964-4000
IPAC Grp., 3047 Indl. Blvd., Bethel Pk., PA 15102 412-831-9200
MICRA Corp., 120 Ricefield Lane, Hauppauge, NY 11788 516-231-8600
§† Raytheon Semiconductor, 350 Ellis St., Mountain View, CA 94043 415-968-9211
Reliance Comm/Tec, Reliance Electric, P. O. Box 99502, Cleveland, OH 44199 ...... 800-245-4501;in OH 800-245-4497
Rochester Instr. Sys., 255 N. Union St., Rochester, NY 14605 716-263-7700
Signatron, A Unit of Sundstrand Corp., 12 Hartwell Ave., Lexington, MA 02173 617-861-1500
§† Silicon General, 11861 Western Ave., Garden Grove, CA 92641 714-898-8121
† G.T.E. Gov't Sys. Corp., Comm. Sys. Div., 77 A St., Needham Hgts., MA 02194 617-449-2000
† Techtrol Cyclonetics, Inc., 815 Market St., New Cumberland, PA 17070 717-774-2746
† Transmagnetics, 210 Adams Blvd., Farmingdale, NY 11735 516-293-3100

Multipliers, Channel Electron-2325

Murata Erie North America, Inc., 1148 Franklin Rd., S.E., Marietta, GA 30067, 404-952-9777 .... A•2205
§ Murata Mfg. Co., Ltd., 26-10-2-chome-Tenjin, Nagaoka-Kyo-Shi, Kyoto, Japan, JAPAN 075-951-9111

Multipliers, Crystal-1900

† Applied Research, Inc., 160 Dupont St., Plainview, NY 11803 516-349-9200
† Lorch Elctrns., 105 Cedar La., Englewood, NJ 07631 201-569-8282
M/A-Com Millimeter Products, M/A-Com, Inc., Second Avenue, Burlington, MA 01803 617-272-3000
† Microlab/FXR, 10 Microlab Rd., Livingston, NJ 07039 201-992-7700
Techtrol Cyclonetics, Inc., 815 Market St., New Cumberland, PA 17070 .. 717-774-2746
† TRAK Microwave Corp., 4726 Eisenhower Blvd., Dept. E5, Tampa, FL 33614 813-884-1411

Multipliers, Diode-1900

† Voltage Multipliers, Inc., 8711 W. Roosevelt Ave., Visalia, CA 93291, 209-651-1402 .... A•2097
Alpha Inds., Inc.-MSD Div., 20 Sylvan Rd., Woburn, MA 01801 617-935-5150
Collmer Semiconductor, Inc., 14368 Proton Rd., Dallas, TX 75234-3335 214-233-1589
§† Elctrn. Devices, 21 Gray Oaks Ave., Yonkers, NY 10710 914-965-4400
M/A-Com Millimeter Products, M/A-Com, Inc., Second Avenue, Burlington, MA 01803 617-272-3000
† Microwave Assocs. Ltd., Humphrey Rd., Dunstable, Bedfordshire, ENGLAND LU5 4SX, England .... 44-(582) 60-14-41
† Semtech, 652 Mitchell Rd., Newbury Park, CA 91320 213-628-5392
† TRAK Microwave Corp., 4726 Eisenhower Blvd., Dept. E5, Tampa, FL 33614 813-884-1411
§† Varo Semiconductor, Inc., 2800 W. Kingsley Dr., Garland, TX 75046 214-271-8511
Watkins-Johnson Co., 3333 Hillview Ave., Palo Alto, CA 94304 415-493-4141

Multipliers, Frequency-3450 — *See Vol. A*

Multipliers, Hall-4800 — *See Vol. A*

Multipliers, Magnetic Analog-2200

† American Aerospace Controls, 570 Smith St., Farmingdale, NY 11735 .. 516-694-5100
§† General Magnetics, 211 Grove St., Bloomfield, NJ 07003 201-743-2700
† Transmagnetics, 210 Adams Blvd., Farmingdale, NY 11735 516-293-3100

Multipliers, Meter-2900

North American Soar Corp., 11126 Cornell Ave., Cherry Hill, NJ 08002, 609-488-1060 .... D•1273
Assembly Specialists, 914 Main St., Box 965, Acton, MA 01720 617-263-9100
Electrical Instr. Svc., 25 Dock St., Mt. Vernon, NY 10550 914-699-9717
† Ross Engrg. Corp., 540 Westchester Dr., Campbell, CA 95008 408-377-4621
Sensitive Research Instrs., 25 Dock St., Mt. Vernon, NY 10550 914-699-9717

Multipliers, Servo-4900

† Control Technology Co., 41-16 29th St., Long Island City, NY 11101 718-361-2133
† GAP Instr., 40 Oser Ave., Hauppauge, NY 11787 516-273-0909
§† General Magnetics, 211 Grove St., Bloomfield, NJ 07003 201-743-2700
† Industrial Control Co., 3100 Pineda Ave., Rockledge, FL 32955 305-259-7105
Techtrol Cyclonetics, Inc., 815 Market St., New Cumberland, PA 17070 .. 717-774-2746
† Transmagnetics, 210 Adams Blvd., Farmingdale, NY 11735 516-293-3100

Nameplates-2450 — *See Vol. B*

Networks, Computer, Local Area-2000

Advanced Sys. Concepts, 435 N. Lake Ave., Pasadena, CA 91101, 818-793-8971 .... D•1137
Beal Communications, Beneficial Properties, 11020 Audelia Rd. Ste. C 101, Dallas, TX 75243 .... 214-340-2044;214-340-2045
§ Caere Corp., 100 Cooper St., Los Gatos, CA 95030 408-395-7000
Codenoll Technology Corp., 1086 N. Bwy., Yonkers, NY 10701 914-965-6300
Coherent Communications Sys. Corp., 60 Commerce Dr., Hauppauge, NY 11788 516-231-1550
§ Comdata Corp., 7900 N. Nagle Ave., Morton Grove, IL 60053 312-470-9600
§† Communication Machinery Corp., 1421 State St., Santa Barbara, CA 93101 805-963-9471
Computrol Div. Kidde Automated Sys., Inc., 15 Ethan Allen Hwy., Ridgefield, CT 06877-6297 203-544-9371
Concord Data Systems, 303 Bear Hill Rd., Waltham, MA 02154 617-890-1394
§ Davong Systems, Inc., 217 Humboldt Ct., Sunnyvale, CA 94089 408-734-4900
Digital Products, Inc., 600 Pleasant St., Watertown, MA 02172 617-924-1680
EDA Instruments, Inc., 4 Thorncliffe Park Dr., Toronto, ON, CANADA M4HIHI 416-425-7800
Fast Feedback Technologies, 1505 Aviation Blvd., Redoudo Beach, CA 90278 213-379-6100
Gandalf Technologies, Inc., 350 E Dundee Rd., Suite 301, Wheeling, IL 60090 312-459-6630
§ Gateway Communications Inc., 16782 Redhill Ave., Irvine, CA 92714 714-261-0762
General Datacomm, Inc., Rt. 63, Middlebury, CT 06762-1299 203-574-1118
Giltronix, 3780 Fabian Way, Palo Alto, CA 94303 415-493-1300
IDE Associates, Inc., 35 Dunham Rd., Billerica, MA 01821 617-663-6878
Lancore Technologies, Inc., 31324 Via Colinas, Westlake Village, CA 91362 818-991-5100
§ Micom Systems, Inc., 4100 Los Angeles Ave, P.O. Box 8100, Simi Valley, CA 93062-8100 805-583-8600
Proteon, Inc., 4 Tech Circle, Natick, MA 01760 617-655-3340
† Racal-Milgo, 1601 N. Harrison Parkway, Sunrise, FL 33324 305-475-1601
§ RACET Computes, Ltd., 1855 W Katella Ste. 255, Orange, CA 92667 714-997-4950
§ Square D Co., Executive Plaza, Palatine, IL 60067 312-397-2600
Strawberry Tree Computers, 949 Cascade Dr., Sunnyvale, CA 94087 ... 408-736-3083
Sytek, Inc., 1225 Charleston Rd., Mountain View, CA 94043 415-966-7300
TCL Incorporated, 41829 Albrae Street, Fremont, CA 94538 415-657-3800
§ Teleterminal Corp., Greenland, NH 03840 603-431-1200
TL Industries, Inc., 2541 Tracy Road, Toledo, OH 43619 1-419-666-8144

Networks, Crossover, Attenuator (Audio)-1300

Mills Resistor Co., 3840 Catalina St., Los Alamitos, CA 90720, 213-598-2454 .... A•1899
§ Allen-Bradley Co., Electronics Group, Rockwell Corporation, 1201 S. Second St., Milwaukee, WI 53204 414-671-2000
Allen-Bradley Co., Electronics Group, Div.of Rockwell Corp., Microelectronic Products Div., Highway 29 N. Bryan Pk. Exit, Greensboro, NC 27410 919-621-9010
§ Altec Lansing, Altec Corp., 1250 N. Red Gum St., Anaheim, CA 92806 ... 714-632-7117
† BG Elctrns., 30 South St., Mt. Vernon, NY 10550 914-664-5591
De Coursey Engrg. Lab., 11828 W. Jefferson, Culver City, CA 90230 .... 213-EX7-9668
† Dietz Design, Inc., 100 Electronics Pkwy., Belton, MO 64012 816-331-4911
§ Dyma Engrg., Box 1535, Los Lunas, NM 87031 505-865-6700
Elect. Prec. Comp. Corp., 11 W. Sandford Blvd., Mt. Vernon, NY 10550 .. 914-664-2333
El-Rad Mfg., 2800 W. Cullom Ave., Chicago, IL 60618 312-478-7300
§ Frazier, 1930 Valley View La., Dallas, TX 75234 214-241-3441
† Frequency Selective Networks, Inc., 69-20 Garfield Ave., Woodside, NY 11377 718-424-7500
† Genisco Technlg. Corp., Filters Div., 18435 Susana Rd., Rancho Dominguez, CA 90221 213-537-4750
§ Hartley Prods., 620 Island Rd., Ramsey, NJ 07446 201-327-4443
International Comps. Corp., 105 Maxess Rd., Melville, NY 11747 516-293-1500
† International Sensor Systems, Inc., Aurora Industrial Pk., Box 345, Aurora, NE 68818 402-694-6111
§ Martin Sound Prods., 28 Alpha Park, Cleveland, OH 44143-2297 216-442-2286
† Mel Tec, Div. Epsco, Inc., 411 Providence Hwy., Westwood, MA 02090 .. 617-329-1508
Northwest Microcircuits, Inc., 2115 N. College, Newberg, OR 97132 503-538-7081
§ Shure Bros., 222 Hartrey Ave., Evanston, IL 60204 312-866-2200
§ SPECO Div., Components Specialties, Inc., P.O. Box 624, 1172 Rte. 109, Lindenhurst, NY 11757 .... 516-957-8700;800-645-5516
§ Spectra Sonics, 3750 Airport Rd., Ogden, UT 84403 801-392-7531
TTE, Inc., 11650 W. Olympic Blvd., Los Angeles, CA 90064 213-478-8224
Vishay Resistive Sys. Grp., 63 Lincoln Hwy., Malvern, PA 19355 215-644-1300
§† Workman Elctrn. Prods., Box 3828, Sarasota, FL 33578 813-371-4242

Networks, Directional Antenna Phasing-1900

American Electronic Labs., Box 552, Lansdale, PA 19446 215-822-2929
§† Anaren Microwave, P.O. Box 178, 6635 Kirkville Rd., E. Syracuse, NY 13057 315-432-8909
Continental Electronics Mfg. Co., P.O. Box 270879, Dallas, TX 75227 214-381-7161
† Electro-Magnetic Processes, Inc., 9616 Owensmouth Ave., Chatsworth, CA 91311 818-882-6333
Elect. Prec. Comp. Corp., 11 W. Sandford Blvd., Mt. Vernon, NY 10550 .. 914-664-2333
Hughes Aircraft Co, Aerospace Grps./Support Sys., P.O. Box 90515, Los Angeles, CA 90009 213-670-1515
Hughes Aircraft Co., Microelctrn. Sys. Div., 2601 Campus Dr., Irvine, CA 92715 714-752-3800
M/A-Com Microwave Components, Inc., M/A-Com, South Avenue, Burlington, MA 01803 617-272-3000
† Merrimac Inds., 41 Fairfield Pl., West Caldwell, NJ 07006 201-575-1300
† Microwave Applications Grp., 3030 Industrial Pkwy., Santa Maria, CA 93455 805-928-5711
† Narda Microwave Corp., 435 Moreland Rd., Hauppauge, NY 11788 516-231-1700
† Premier Microwave, 35 New Broad St., Port Chester, NY 10573 914-939-8900
† G.T.E. Gov't Sys. Corp., Comm. Sys. Div., 77 A St., Needham Hgts., MA 02194 617-449-2000
† Transco Products, Inc., 4241 Glencoe Ave., Marina del Rey, CA 90295 .. 213-822-0800
Vishay Resistive Sys. Grp., 63 Lincoln Hwy., Malvern, PA 19355 215-644-1300

Networks, Hybrid-2000

ACC Electronics, 1300 W. Oak, Independence, KS 67301, 316-331-1000 .... A•1659
† Aeroflex Labs., Microelctrns. Div., 35 S. Service Rd., Plainview, NY 11803, 516-694-6700 .... A•1660
Cal-R, Inc., P.O. Box 1397, Santa Monica, CA 90406, 213-450-1761 ...... A•1829
§† Dale Electronics, Inc., El Paso Div., P.O. Box 26728, El Paso, TX 79926, 915-592-3253 .... A•1853
HyComp Inc., 75 Union Ave., Box 377, Sudbury, MA 01776, 617-443-4631 .... A•1872
† International Sensor Systems, Inc., Aurora Industrial Pk., Box 345, Aurora, NE 68818, 402-694-6111 .... A•1677
KDI Electronics, Inc., Engelmann & Pyrofilm Divisions, 60 S. Jefferson Rd., Whippany, NJ 07981, 201-887-8100 .... A•1881
Piconics, 26 Cummings Road, Tyngsboro, MA 01879, 617-649-7501 ..... A•1696
Allen-Bradley Co., Electronics Group, Rockwell Corporation, 1201 S. Second St., Milwaukee, WI 53204 414-671-2000
Allen-Bradley Co., Electronics Group, Div.of Rockwell Corp., Microelectronic Products Div., Highway 29 N. Bryan Pk. Exit, Greensboro, NC 27410 919-621-9010
† Alpha Inds., Inc.-Microelectronic Div., 2800 Crystal Drive, Hatfield, PA 19440 215-822-1311
Amdahl Communications Sys. Div., Amdahl Corp., 2500 Walnut Ave., Marina del Rey, CA 90291 213-822-3202
† Andrich Sys., Inc., 1699 Roosevelt Ave., Bohemia, NY 11716 516-589-5656
A. P. Circuit Corp., 513 East 86th St., P.O. Box 1350, New York, NY 10028 212-737-1348
† Armtec Industries, Inc., Daven Components Grp., Manchester Airport, Manchester, NH 03103 603-669-0940
Assembly Specialists, 914 Main St., Box 965, Acton, MA 01720 617-263-9100
§† Beckman Industrial Corp., Electronic Technologies Div., 2500 Harbor Blvd., Fullerton, CA 92634 714-871-4848
Beckman Instrs., 2500 Harbor Blvd., Fullerton, CA 92634 714-871-4848
§ Contel Info. Sys., Inc., Continental Tel. Corp., 130 Steamboat Rd., Great Neck, NY 11024 516-829-5900

CTS Electronics Corp., Knights Division, 400 Reimann Ave., Sandwich, IL 60548 815-786-8411
§ Dale Electronics, Inc., Norfolk Div., 2300 Riverside Blvd., Norfolk, NE 68701 402-371-0080
† Electro-Films, Inc., 111 Gilbane St., Warwick Central Indl. Pk., Warwick, RI 02886 401-738-9150
Environmental Comm., 3150 Pullman St., Costa Mesa, CA 92627 714-557-7800
Hughes Aircraft Co, Aerospace Grps./Support Sys., P.O. Box 90515, Los Angeles, CA 90009 213-670-1515
Hughes Aircraft Co., Microelctrn. Sys. Div., 2601 Campus Dr., Irvine, CA 92715 714-752-3800
Hybrid Svcs. Inc., 38 Main St., North Reading, MA 01864 617-664-5500
† Hybrid Systems Corp., 22 Linnell Circle, Billerica, MA 01821 617-667-8700
† Hy-Tec Industries, Div. of Topo Industries, Inc., P.O. Box 91, Shoreham, NY 11786 516-744-5062
† Hytek Microsystems, 980 University Ave., Los Gatos, CA 95030 408-395-2300
§† Integrated Circuits, Inc., 10301 Willows Road, Redmond, WA 98052 206-882-3100
† Magnetico Inc., 182 Morris Ave., Holtsville, NY 11742 516-654-1166
Maury Microwave, 8610 Helms Ave., Cucamonga, CA 91730 714-987-4715
† Mel Tec, Div. Epsco, Inc., 411 Providence Hwy., Westwood, MA 02090 .. 617-329-1508
Microplex, Inc., 1977 State College Blvd., Anaheim, CA 92806 .... 714-979-8833; 714-634-1535
† Mitec Elctrns., 15 Commerce St., Williston, VT 05495 802-864-0064
† Narda Microwave Corp., 435 Moreland Rd., Hauppauge, NY 11788 516-231-1700
† Natel Engrg. Co., Inc., 4550 Runway St., Simi Valley, CA 93063 805-581-3950
† Northwest Microcircuits, Inc., 2115 N. College, Newberg, OR 97132 503-538-7081
§† RCD Components, Inc., 330 Bedford St., Manchester, NH 03101 603-669-0054
Solitron/Microwave, Box 278, Port Salerno, FL 33492 305-287-5000
† G.T.E. Gov't Sys. Corp., Comm. Sys. Div., 77 A St., Needham Hgts., MA 02194 617-449-2000
Techno-Components Corp., 7803 Lemona, Van Nuys, CA 91405 818-781-1642
Thickfilm Int'l., Rt. 1-Box 85-0, Indian Head, MD 20640 301-375-8666
Victoreen, Inc., Component Div., 10101 Woodland Ave., Cleveland, OH 44104 216-795-8200
Vishay Resistive Sys. Grp., 63 Lincoln Hwy., Malvern, PA 19355 215-644-1300
† Zenith CRT & Components Operations, 1000 Milwaukee Ave., Glenview, IL 60025 312-391-7733

Networks, Hybrid Substrates-3130 — See *Vol. A*

Networks, Ladder-4700 — See *Vol. A*

Networks, LC-2700 — See *Vol. A*

Networks, Line Impedance Stabilization-1900

Elcom Systems, Inc., 932 Clint Moore Rd., Boca Raton, FL 33431, 305-994-1774 .... A•1711
§† Dale Electronics, Inc., El Paso Div., P.O. Box 26728, El Paso, TX 79926 915-592-3253
Velonex, 560 Robert Ave., Santa Clara, CA 95050 408-727-7370

Networks, Matching-1900

§† Dale Electronics, Inc., El Paso Div., P.O. Box 26728, El Paso, TX 79926, 915-592-3253 .... A•1853
Elcom Systems, Inc., 932 Clint Moore Rd., Boca Raton, FL 33431, 305-994-1774 .... A•1711
† Frequency Selective Networks, Inc., 69-20 Garfield Ave., Woodside, NY 11377, 718-424-7500 .... A•1369
Mills Resistor Co., 3840 Catalina St., Los Alamitos, CA 90720, 213-598-2454 .... A•1899
RCL Electronics, Inc., 195 McGregor St., Manchester, NH 03102, 603-627-3831 .... A•1941
Shallcross, Inc., U.S. 70 East, Smithfield, NC 27577, 919-934-5181 .... A•1941
§ Ultronix, Inc., P.O. Box 1090, Grand Junction, CO 81502, 303-242-0810 .... A•1963
Vishay Resistive Sys. Grp., 63 Lincoln Hwy., Malvern, PA 19355, 215-644-1300 .... A•1976
Allen-Bradley Co., Electronics Group, Rockwell Corporation, 1201 S. Second St., Milwaukee, WI 53204 414-671-2000
Allen-Bradley Co., Electronics Group, Div.of Rockwell Corp., Microelectronic Products Div., Highway 29 N. Bryan Pk. Exit, Greensboro, NC 27410 919-621-9010
† Armtec Industries, Inc., Daven Components Grp., Manchester Airport, Manchester, NH 03103 603-669-0940
§ Beckman Industrial Corp., Electronic Technologies Div., 2500 Harbor Blvd., Fullerton, CA 92634 714-871-4848
† BG Elctrns., 30 South St., Mt. Vernon, NY 10550 914-664-5591
§ Caddock Electronics, Inc., 1717 Chicago Ave., Riverside, CA 92507 714-788-1700
Design Automation, Inc., 809 Massachusetts Ave., Lexington, MA 02173-3992 617-862-8998
Elect. Prec. Comp. Corp., 11 W. Sandford Blvd., Mt. Vernon, NY 10550 .. 914-664-2333
† ESC Elctrns. Corp., 534 Bergen Blvd., Palisades Pk., NJ 07650 201-947-0400
§ Gamble, Charles T., Inds., 605 Perkins La., Delanco, NJ 08075 609-461-1900
General Resistance, Inc., A Prime Technology Company, Twin Lakes Rd., P.O. Box 185, N. Branford, CT 06471 203-481-5721
† Genisco Technlg. Corp., Filters Div., 18435 Susana Rd., Rancho Dominguez, CA 90221 213-537-4750
Hughes Aircraft Co, Aerospace Grps./Support Sys., P.O. Box 90515, Los Angeles, CA 90009 213-670-1515
Hughes Aircraft Co., Microelctrn. Sys. Div., 2601 Campus Dr., Irvine, CA 92715 714-752-3800
† Hybrid Systems Corp., 22 Linnell Circle, Billerica, MA 01821 617-667-8700
† International Sensor Systems, Inc., Aurora Industrial Pk., Box 345, Aurora, NE 68818 402-694-6111
§ KDI Electronics, Inc., Engelmann & Pyrofilm Divisions, 60 S. Jefferson Rd., Whippany, NJ 07981 201-887-8100
Kelvin, 5919 Noble Ave., Van Nuys, CA 91411 818-782-6662
† KRL Elctrns., 160 Bouchard St., Manchester, NH 03103 ... 603-668-3210;800-257-3300
Materials Resch., Route 303, Orangeburg, NY 10962 914-359-4200
Mepco//Electra, Inc., North American Philips Corp., Columbia Rd., Morristown, NJ 07960 201-539-2000
Microplex, Inc., 1977 State College Blvd., Anaheim, CA 92806 .... 714-979-8833; 714-634-1535
† Narda Microwave Corp., 435 Moreland Rd., Hauppauge, NY 11788 516-231-1700
North Hills Elctrns., 1 Alexander Pl., Glen Cove, NY 11542 516-671-5700
† Premier Microwave, 35 New Broad St., Port Chester, NY 10573 914-939-8900
§† RCD Components, Inc., 330 Bedford St., Manchester, NH 03101 603-669-0054
† Res-Net, 110 Route 10, Whippany, NJ 07981 .... 201-887-2260;out of state 800-526-0704
Solitron/Microwave, Box 278, Port Salerno, FL 33492 305-287-5000
Sprague Elec. Co., 481 Marshall St., No. Adams, MA 01247 413-664-4411
§ Sprague Electric Company, Distribution Division, 481 Marshall St., No. Adams, MA 01247 413-664-4481
Tel Labs, Inc., 154 Harvey Rd., PO Box 375, Londonderry, NH 03053 ... 603-625-8994
TTE, Inc., 11650 W. Olympic Blvd., Los Angeles, CA 90064 213-478-8224
Vishay Angstrohm, 1 Precision Pl., Hagerstown, MD 21740 301-739-8722
Western Multiplex Corp., 1320 Bayport Avenue, San Carlos, CA 94070 .. 415-592-8832

Networks, Phase-2700 — See *Vol. A*

Networks, Pulse Forming-2700 — See *Vol. A*

Networks, Rejection — See Filters (Vol. A)

Networks, RC-2000

Cal-R, Inc., P.O. Box 1397, Santa Monica, CA 90406, 213-450-1761 .... A•1829
Corning Glass Works, Corning Elctrns., Houghton Pk., Bldg. A-2, Corning, NY 14830, 607-974-8725 .... A•1835
§ CTS Corporation, Berne Division, 406 Parr Rd., Berne, IN 46711, 219-589-3111 .... A•1836
§ Dale Electronics, Inc., El Paso Div., P.O. Box 26728, El Paso, TX 79926, 915-592-3253 .... A•1848
† Electro-Films, Inc., 111 Gilbane St., Warwick Central Indl. Pk., Warwick, RI 02886, 401-738-9150 .... A•1867
† Elect. Prec. Comp. Corp., 11 W. Sandford Blvd., Mt. Vernon, NY 10550, 914-664-2333 .... A•1868
KDI Electronics, Inc., Engelmann & Pyrofilm Divisions, 60 S. Jefferson Rd., Whippany, NJ 07981, 201-887-8100 .... A•1881
Mills Resistor Co., 3840 Catalina St., Los Alamitos, CA 90720, 213-598-2454 .... A•1899
Ohmtek, Inc., 2160 Liberty Dr., Niagara Falls, NY 14304, 716-283-4025 .... A•1923-1924
TRW Capacitor Div., 301 West "O" St., Ogallala, NE 69153, 308-284-3611 .... A•1183
ACC Electronics, 1300 W. Oak, Independence, KS 67301 316-331-1000
§ Acushnet Capacitor Co., Inc., 720 Belleville, New Bedford, MA 02741 617-999-3291
† Andrich Sys., Inc., 1699 Roosevelt Ave., Bohemia, NY 11716 516-589-5656
† Armtec Industries, Inc., Daven Components Grp., Manchester Airport, Manchester, NH 03103 603-669-0940
§ Beckman Industrial Corp., Electronic Technologies Div., 2500 Harbor Blvd., Fullerton, CA 92634 714-871-4848
† BG Elctrns., 30 South St., Mt. Vernon, NY 10550 914-664-5591
Bourns, Inc., Resistive Components Group, 1200 Columbia Ave., Riverside, CA 92507 714-781-5050
Centralab, Inc., A North American Philips Co., 2566 Northwestern Ave., McClure Pk., West Lafayette, IN 47906 317-463-2536
† Circle Electronics, A Division of F-Dyne Elctrns., 3501 Electronics Way, W. Palm Beach, FL 33407 305-844-1310
CTS Corporation, 905 North West Blvd., Elkart, IN 46514 219-293-7511
† CTS Corporation, Microelectronics Div., 1201 Cumberland Ave., W. Lafayette, IN 47906 317-463-2565
§ Custom Elctrns., Browne St., Oneonta, NY 13820 607-432-3880
Del Elctrns. Corp., 250 E. Sandford Blvd., Mt. Vernon, NY 10550 914-699-2000
§ Electrocube, 1710 So. Del Mar Ave., San Gabriel, CA 91776 818-573-3300
Engineered Comps. Co., P. O. Box 8121, San Luis Obispo, CA 93403-8121 805-544-3800
† Environmental Comm., 3150 Pullman St., Costa Mesa, CA 92627 714-557-7800
† ESC Elctrns. Corp., 534 Bergen Blvd., Palisades Pk., NJ 07650 201-947-0400
† F-Dyne Elctrns., 449 Howard Ave., Bridgeport, CT 06605 203-367-6431
† Frequency Selective Networks, Inc., 69-20 Garfield Ave., Woodside, NY 11377 718-424-7500
Gamble, Charles T., Inds., 605 Perkins La., Delanco, NJ 08075 609-461-1900
† Genisco Technlg. Corp., Filters Div., 18435 Susana Rd., Rancho Dominguez, CA 90221 213-537-4750
Hybrid Svcs. Inc., 38 Main St., North Reading, MA 01864 617-664-5500
† Hy-Tec Industries, Div. of Topo Industries, Inc., P.O. Box 91, Shoreham, NY 11786 516-744-5062
Industrial Midwec Capacitors, 4902 Tollview Dr., Rolling Meadows, IL 60008 312-577-0120
† International Sensor Systems, Inc., Aurora Industrial Pk., Box 345, Aurora, NE 68818 402-694-6111
Kelvin, 5919 Noble Ave., Van Nuys, CA 91411 818-782-6662
† KRL Elctrns., 160 Bouchard St., Manchester, NH 03103 ... 603-668-3210;800-257-3300
Maxwell Labs., 8835 Balboa Ave., San Diego, CA 92123 619-279-5100
Meissner Inds., 551 Rte. 10, Dover, NJ 07801 201-366-1700
† Mel Tec, Div. Epsco, Inc., 411 Providence Hwy., Westwood, MA 02090 .. 617-329-1508
Mepco//Electra, Inc., North American Philips Corp., Columbia Rd., Morristown, NJ 07960 201-539-2000
Microplex, Inc., 1977 State College Blvd., Anaheim, CA 92806 .... 714-979-8833; 714-634-1535
§ Murata Mfg. Co., Ltd., 26-10-2-chome-Tenjin, Nagaoka-Kyo-Shi, Kyoto, Japan, JAPAN 075-951-9111
† Northwest Microcircuits, Inc., 2115 N. College, Newberg, OR 97132 503-538-7081
† Piconics, 26 Cummings Road, Tyngsboro, MA 01879 617-649-7501

§† RCD Components, Inc., 330 Bedford St, Manchester, NH 03101 603-669-0054
Reeves-Hoffman Div., 400 W. North St, Carlisle, PA 17013 717-243-5929
Rtron Corp., 7324 Lawndale, Skokie, IL 60076 312-679-7180
† Shokai Far East, Ltd., 280 North Central Ave., Hartsdale, NY 10530 914-681-0700
† Southern Electronics, F-Dyne, 726 So. Flower St., Burbank, CA 91502 ... 213-845-2458
§ Sprague Elec. Co., 481 Marshall St., No. Adams, MA 01247 413-664-4411
§ Sprague Electric Company, Distribution Division, 481 Marshall St., No. Adams, MA 01247 413-664-4481
Tel Labs, Inc., 154 Harvey Rd., PO Box 375, Londonderry, NH 03053 ... 603-625-8994
Thickfilm Int'l., Rt. 1-Box 85-0, Indian Head, MD 20640 301-375-8666
† Thinco Div., Hull Corp., Davisville Rd., Hatboro, PA 19040 215-672-7800
TTE, Inc., 11650 W. Olympic Blvd., Los Angeles, CA 90064 213-478-8224
Ultronix, Inc., P.O. Box 1090, Grand Junction, CO 81502 303-242-0810
Vishay Resistive Sys. Grp., 63 Lincoln Hwy., Malvern, PA 19355 215-644-1300
† Zenith CRT & Components Operations, 1000 Milwaukee Ave., Glenview, IL 60025 312-391-7733

Networks, Resistance-4700 — *See Vol. A*

Networks, Resistance, Trimmer-4700 — *See Vol. A*

Networks, Resistance, Voltage Divider-4700 — *See Vol. A*

Networks, Video-2700 — *See Vol. A*

Networks, (MIL), Resistance-2440 — *See Vol. B*

Null Detectors — See Indicators, Null (Vol. D)

Nuts, Metal-2825 — *See Vol. C*

Nuts, Plastic — See Fasteners, Nonmetallic (Vol. C)

Oils — See Lubricants (Vol. C)

Optical Breadboards-4200 — *See Vol. C*

Optical Component Mounts & Accessories-3700 — *See Vol. B*

Optical-Coupler Isolators — See Isolators, Opto (Vol. B)

Optical Design Service — See Services, Optical Design

Optical Radiation Measuring-2900

EG&G Gamma Scientific, Div. of EG&G Inc., 3777 Ruffin Rd., San Diego, CA 92123 619-279-8034

Optical Signal Sources — See Generators, Light Pulse (Vol. D)

Oscillators, Audio (Module)-2300 — *See Vol. A*

Oscillators, Audio (Test) — See Generators, Audio (Vol. D)

Oscillators, Beat Frequency (BFO)-2300 — *See Vol. A*

Oscillators, Bias-2300 — *See Vol. A*

Oscillators, Cavity-2300 — *See Vol. A*

Oscillators, Clock-2300 — *See Vol. A*

Oscillators, Crystal Controlled (Module)-2300 — *See Vol. A*

Oscillators, Digitally Compensated Crystal (DCXO)-2300 — *See Vol. A*

Oscillators, Decade (Test)-2900

Elgar Corp, An Onan McGraw Edison Co., 9250 Brown Deer Rd., San Diego, CA 92121, 619-450-0085 .... D•1922
IET Labs, Inc., 534 Main St., Westbury, NY 11590, 516-334-5959 .... D•1245
§ Statek Corp., 512 N. Main St., Orange, CA 92668, 714-639-7810 .... A•1441
Behlman Div., California Instrs., Div. of Norlin Inds., 5150 Convoy St, San Diego, CA 92111 619-279-8620
California Instruments, A Div. of Amstar Tech. Prods. Co., Inc., 5150-Convoy St., San Diego, CA 92111 .... 619-279-8620;800-356-2244;800-821-1634
† Connor-Winfield Corp., 109 Turner Ct, POB L, W. Chicago, IL 60185 312-231-5270
Elin Div., California Instrs. Co., Div. of Norlin Ind., 5150 Convoy St, San Diego, CA 92111 619-279-8620
† Fork Standards, Inc., 666 Western Ave., Lombard, IL 60148 312-932-9380
Industrial Test Equip., 21 Yennicock Ave., Port Washington, NY 11050 .. 516-883-1700
† Solid State Elctrns. Corp., 18646 Parthenia St, Northridge, CA 91324 ... 818-993-8257

Oscillators, LC-2300 — *See Vol. A*

Oscillators, Low Frequency (Module)-2300 — *See Vol. A*

Oscillators, Microwave-3450 — *See Vol. A*

Oscillators, Oven-2300 — *See Vol. A*

Oscillators, Power (Module)-2300 — *See Vol. A*

Oscillators, Programmable-2300 — *See Vol. A*

Oscillators, Pulse (Module)-2300 — *See Vol. A*

Oscillators, Pulse (Test) — See Generators, Pulse (Vol. D)

Oscillators, RC (Module)-2300 — *See Vol. A*

Oscillators, Reed-2300 — *See Vol. A*

Oscillators, RF (Module)-2300 — *See Vol. A*

Oscillators, RF (Test) — See Generators, RF (Vol. D)

Oscillators, Sinusoidal (Module)-2300 — *See Vol. A*

Oscillators, Sinusoidal (Test) — See Generators, Function (Vol. D)

Oscillators, Square Wave (Module)-2300 — *See Vol. A*

Oscillators, Square Wave (Test) — See Generators, Function (Vol. D)

Oscillators, Sweep — See Generators, Sweep (Vol. D)

Oscillators, Telemetry-1900

† Frequency Elctrns., 55 Charles Lindbergh Blvd., Mitchel Field, NY 11553, 516-794-4500 .... A•1367
Aydin Corp., 700 Dresher Rd., Horsham, PA 19044 215-657-7510
† Aydin Vector Div., Box 328, Newtown, PA 18940 215-968-4271
Comstron Corp., 200 E. Sunrise Hwy., Freeport, NY 11520 516-546-9700
† Connor-Winfield Corp., 109 Turner Ct., POB L, W. Chicago, IL 60185 312-231-5270
CTS Electronics Corp.,, Knights Division, 400 Reimann Ave., Sandwich, IL 60548 815-786-8411
† Damon/Elctrns. Div., 80 Wilson Way, Westwood, MA 02090 617-329-2460
Dantel, 2991 N. Argyle Ave., Fresno, CA 93727 209-292-1111
§† Data-Control Sys., Commerce Dr., Box 860, Danbury, CT 06810 203-743-9241
† Fork Standards, Inc., 666 Western Ave., Lombard, IL 60148 312-932-9380
† Frequency West, Inc., 3140 Alfred St, Santa Clara, CA 95054 408-727-8500
† Greenray Inds., Inc., 840 W. Church Rd., Mechanicsburg, PA 17055 717-766-0223
Isotemp Research, Inc, Box 3389, Charlottesville, VA 22901 804-295-3101
K&L Microwave, Inc., 408 Coles Circle, Salisbury, MD 21801 301-749-2424
McCoy Electronics Co., Sub. Oak Technology Inc., 100 Watts St., P.O. Box B, Mt. Holly Springs, PA 17065 717-486-3411
Motorola, Inc., Compt. Divs. Clock Oscillator Dept., 2553 N. Edgington, Franklin Park, IL 60131 312-451-1000
† Narda Microwave Corp., 435 Moreland Rd., Hauppauge, NY 11788 516-231-1700
§† Omni Spectra, Inc., Microwave Subsystems Div., 2626 So. Hardy Dr., Tempe, AZ 85282 602-966-1471
† Omnitek, Inc., P.O. Box 102, 820 Pennsylvania Blvd., Feasterville, PA 19047 215-355-4443
Ovenaire, Electronic Technologies Inc., 706 Forrest St., Charlottesville, VA 22901 804-977-8050
† Q-Tech Corp., 2201 Carmelina Ave., Los Angeles, CA 90064 213-820-4921
Reeves-Hoffman Div., 400 W. North St., Carlisle, PA 17013 717-243-5929
† Solid State Elctrns. Corp., 18646 Parthenia St., Northridge, CA 91324 ... 818-993-8257
§ Syntest Corp., 40 Locke Dr., Marlboro, MA 01752 617-481-7827
† Techtrol Cyclonetics, Inc., 815 Market St., New Cumberland, PA 17070 .. 717-774-2746
† TRAK Microwave Corp., 4726 Eisenhower Blvd., Dept. E5, Tampa, FL 33614 813-884-1411
Tri-Com, Inc., 7304 Grove Rd., Frederick, MD 21701 301-694-6666
† Zeta Labs., 3265 Scott Blvd., Santa Clara, CA 95054 408-727-6001

Oscillators, Temperature Compensated-2300 — *See Vol. A*

Oscillators, Test Equipment — See Generators (Specific Types) (Vol. D)

Oscillators, Tuning Fork Controlled - Also see Resonators-2300 — *See Vol. A*

Oscillators, UHF/VHF (Module)-2300 — *See Vol. A*

Oscillators, UHF/VHF (Test) — See Generators, UHF/VHF (Vol. D)

Oscillators, Ultrasonic (Module)-2300 — *See Vol. A*

Oscillators, Ultrasonic (Test) — See Generators, Ultrasonic (Vol. D)

Oscillators, Voltage Controlled Crystal (VCXO)-2300 — *See Vol. A*

Oscillators (MIL), Crystal & Ovens-2440 — *See Vol. B*

Oscillators (MIL), VCO, Solid State, RF-2440 — *See Vol. B*

Oscillographs, Direct Writing-3000

Gould Inc., Recording Systems Div., 3631 Perkins Ave., Cleveland, OH 44114, 216-361-3315 .... D•1404
THORN EMI Technology Inc., 8601 Dunwoody Pl., Atlanta, GA 30338, 404-587-0017;800-243-2572 .... D•1313
† Astro-Med, Inc., 600 East Greenwich Avenue, W. Warwick, RI 02893 401-828-4000

Bell & Howell/CEC Div., 360 Sierra Madre Villa, Pasadena, CA 91109 ... 213-796-9381
Continental Resources, Inc., 175 Middlesex Tpke., Bedford, MA 01730 .. 617-275-0850
† Data Capture Technology, Hathaway Instruments, 5436-F South Mingo Rd., Tulsa, OK 74146 918-627-7521
Genstar Rental Elctrns., 2445 Faber Pl., Palo Alto, CA 94303 415-856-7600
† Gulton Inds., Inc., Graphic Instruments Div., Gulton Ind'l. Pk., E. Greenwich, RI 02818 401-884-6800
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
Honeywell, Test Instrs. Div., P.O. Box 5227, Denver, CO 80217 303-773-4700
Marel Instr. Co., 907 South East 13th Pl., Cape Coral, FL 33904 813-574-8788
MFE Corp., Instr. Div., Keewaydin Dr., Bldg. #1, Salem, NH 03079 603-893-1921
§ Soltec Corp., 11684 Pendelton St., Sun Valley, CA 91352 .... 818-767-0044; 800-423-2344
§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 215-673-5600
§ Tucker Elctrns., Box 461966, Garland, TX 75046 .... 214-348-8800;800-527-4642
Yokogawa Corp. of America, 2 Dart Rd., Shenandoah, GA 30265 404-253-7000

Oscilloscope Plug-ins-2975

Continental Resources, Inc., 175 Middlesex Tpke., Bedford, MA 01730 .. 617-275-0850
† Dumont Oscilloscope Labs., 40 Fairfield Pl., W. Caldwell, NJ 07006 201-575-8666
Genstar Rental Elctrns., 2445 Faber Pl., Palo Alto, CA 94303 415-856-7600
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
† Iwatsu Instruments, Inc., 430 Commerce Blvd., Carlstadt, NJ 07072 201-935-5220
Nicolet Instr. Corp., Oscilloscope Div., 5225 Verona Rd., Madison, WI 53711 608-271-3333
Tektronix, Inc., P. O. Box 500, Y3-314, Beaverton, OR 97077 .... 800-547-1512;Oregon only 800-452-1877
Test & Measurement Systems, Inc., 349 Cobalt Way, Ste. 301, Sunnyvale, CA 94086 408-720-8877
§ Tucker Elctrns., Box 461966, Garland, TX 75046 .... 214-348-8800;800-527-4642

Oscilloscopes, Digital-2975

§ **BBC-Metrawatt/Goerz, 2150 W. 6th Ave., Broomfield, CO 80020, 303-469-5231;800-821-6327 .... D•1193**
§ **Gould Inc., Design & Test Sys. Div., 4650 Old Ironsides Dr., Santa Clara, CA 95054-1279, 408-988-6800 .... D•1237**
§ **North American Soar Corp., 11126 Cornell Ave., Cherry Hill, NJ 08002, 609-488-1060 .... D•1267,1396**
Sencore, 3200 Sencore Dr., Sioux Falls, SD 57107, 605-339-0100 .... D•1399
Branden, T. G., Corp., 5565 S.E. Intl. Way, Portland, OR 97222 503-659-9366
† Data Precision Corp., Electronics Ave., Danvers, MA 01923 617-246-1600
† Gould Inc., Recording Systems Div., 3631 Perkins Ave., Cleveland, OH 44114 216-361-3315
§ Iwatsu Instruments, Inc., 430 Commerce Blvd., Carlstadt, NJ 07072 201-935-5220
§ Jensen Tools, Inc., Axia, Inc., 7815 S. 46th St., Phoenix, AZ 85040 602-968-6241
Kikusui Intl. Corp., 17819 S. Figueroa St., Gardena, CA 90248 .... 213-515-6432; 800-421-5334
§ Leader Instrs. Corp., 380 Oser Ave., Hauppauge, NY 11788-3694 516-231-6900
LeCroy Resch. Sys. Corp., 700 S. Main St., Spring Vly., NY 10977 914-425-2000
§ Macrodyne, 1004 Princetown Rd., Schenectady, NY 12301 518-356-3500
§ Nicolet Instr. Corp., Oscilloscope Div., 5225 Verona Rd., Madison, WI 53711 608-271-3333
Philips Test & Measuring Instrs., 85 McKee Dr., Mahwah, NJ 07430 201-529-3800
§ PrimeLine-Soltec Distbn., Soltec Corp., P.O. Box 818, Sun Valley, CA 91353-0818 .... 800-525-5554;818-764-5400
† R. C. Elctrns. Inc., 5386 Hollister Ave., Santa Barbara, CA 93111 805-964-6708
† Tektronix, Inc., P. O. Box 500, Y3-314, Beaverton, OR 97077 .... 800-547-1512;Oregon only 800-452-1877
Test & Measurement Systems, Inc., 349 Cobalt Way, Ste. 301, Sunnyvale, CA 94086 408-720-8877

Oscilloscopes, General Purpose-2975

§ **Ballantine Labs., 90 Fanny Rd., Boonton, NJ 07005, 201-335-0900 .... D•1185**
§ **B & K Precision, Industrial Electronics Product Group, Dynascan Corporation, 6460 W. Cortland, Chicago, IL 60635, 312-889-9087 .... D•1386-1388**
§ **Iwatsu Instruments, Inc., 430 Commerce Blvd., Carlstadt, NJ 07072, 201-935-5220 .... D•1390,1392**
† **Kikusui Intl. Corp., 17819 S. Figueroa St., Gardena, CA 90248, 213-515-6432;800-421-5334 .... D•1393**
§ **North American Soar Corp., 11126 Cornell Ave., Cherry Hill, NJ 08002, 609-488-1060 .... D•1267,1394-1396**
Sencore, 3200 Sencore Dr., Sioux Falls, SD 57107, 605-339-0100 .... D•1399
§ BBC-Metrawatt/Goerz, 2150 W. 6th Ave., Broomfield, CO 80020 .... 303-469-5231; 800-821-6327
Bluffton Products, Inc., Tegam, Inc., 7230 North Ridge Road, Madison, OH 44057 216-946-3572
§ Calibron Instrs., Burton-Rogers Co., 220 Grove St., Waltham, MA 02154 617-894-6440
Continental Resources, Inc., 175 Middlesex Tpke., Bedford, MA 01730 .. 617-275-0850
† Dumont Oscilloscope Labs., 40 Fairfield Pl., W. Caldwell, NJ 07006 201-575-8666
Electro Rent Corp., 4209 Van Owen Place, Burbank, CA 91505 818-843-1221
Genstar Rental Elctrns., 2445 Faber Pl., Palo Alto, CA 94303 415-856-7600
§ Hameg, Inc., 88-90 Harbor Rd., Port Washington, NY 11050 516-883-3837
§ Heath Co., Benton Harbor, MI 49022 616-982-3886
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
§ Hickok Elec. Instr., 10514 DuPont Ave., Cleveland, OH 44108 216-541-8060
§ Hitachi Denshi America Ltd., Test & Meas. Div., 175 Crossways Pkwy. W., Woodbury, NY 11797 516-921-7200
§ Leader Instrs. Corp., 380 Oser Ave., Hauppauge, NY 11788-3694 516-231-6900
§ Lectrotech, Inc., 5810 N. Western Ave., Chicago, IL 60659 312-769-6262
§ Nicolet Instr. Corp., Oscilloscope Div., 5225 Verona Rd., Madison, WI 53711 608-271-3333
§ Non-Linear Systems/Div. of Kaypro Corp., 533 Stevens Ave., Solana Bch., CA 92075 619-481-3900
Philips Test & Measuring Instrs., 85 McKee Dr., Mahwah, NJ 07430 201-529-3800
§ PrimeLine-Soltec Distbn., Soltec Corp., P.O. Box 818, Sun Valley, CA 91353-0818 .... 800-525-5554;818-764-5400
§ Simpson Elec. Co., 853 Dundee Ave., Elgin, IL 60120 312-697-2260
§ SPECO Div., Components Specialties, Inc., P.O. Box 624, 1172 Rte. 109, Lindenhurst, NY 11757 .... 516-957-8700;800-645-5516
§ Sperry, A. W., Instrs., P.O. Box 9300, Smithtown, NY 11787 516-231-7050
§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 215-673-5600
§ Techni-Tool, 5 Apollo Rd., Box 368, Plymouth Meeting, PA 19462 215-825-4990
† Tektronix, Inc., P. O. Box 500, Y3-314, Beaverton, OR 97077 .... 800-547-1512;Oregon only 800-452-1877
Telonic/Berkeley, 2825 Laguna Canyon Rd., Laguna Beach, CA 92652 714-494-9401
§ Tucker Elctrns., Box 461966, Garland, TX 75046 .... 214-348-8800;800-527-4642
§ VIZ Test Equipment, Div. VIZ Mfg., 335 E. Price St., Philadelphia, PA 19144 215-844-2626
§ Vu-Data, 7122 Convoy Ct., San Diego, CA 92111 619-279-6572
Wavetek Indiana, Inc., 5808 Churchman, Beech Grove, IN 46107 317-787-3332

Oscilloscopes, High Frequency (Above 200 MHz)-2975

Continental Resources, Inc., 175 Middlesex Tpke., Bedford, MA 01730 .. 617-275-0850
Dumont Oscilloscope Labs., 40 Fairfield Pl., W. Caldwell, NJ 07006 201-575-8666
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
§ Iwatsu Instruments, Inc., 430 Commerce Blvd., Carlstadt, NJ 07072 201-935-5220
LeCroy Resch. Sys. Corp., 700 S. Main St., Spring Vly., NY 10977 914-425-2000
Nicolet Instr. Corp., Oscilloscope Div., 5225 Verona Rd., Madison, WI 53711 608-271-3333
Philips Test & Measuring Instrs., 85 McKee Dr., Mahwah, NJ 07430 201-529-3800
§ REI Sls., 19525 Business Centre Dr., Northridge, CA 91324 617-938-0900
† Tektronix, Inc., P. O. Box 500, Y3-314, Beaverton, OR 97077 .... 800-547-1512;Oregon only 800-452-1877

Oscilloscopes, Low Frequency (DC to 3 MHz)-2975

§ **Gould Inc., Design & Test Sys. Div., 4650 Old Ironsides Dr., Santa Clara, CA 95054-1279, 408-988-6800 .... D•1237**
§ B & K Precision, Industrial Electronics Product Group, Dynascan Corporation, 6460 W. Cortland, Chicago, IL 60635 312-889-9087
§ BBC-Metrawatt/Goerz, 2150 W. 6th Ave., Broomfield, CO 80020 .... 303-469-5231; 800-821-6327
Continental Resources, Inc., 175 Middlesex Tpke., Bedford, MA 01730 .. 617-275-0850
Dumont Oscilloscope Labs., 40 Fairfield Pl., W. Caldwell, NJ 07006 201-575-8666
† Gould Inc., Recording Systems Div., 3631 Perkins Ave., Cleveland, OH 44114 216-361-3315
§ Hameg, Inc., 88-90 Harbor Rd., Port Washington, NY 11050 516-883-3837
§ Heath Co., Benton Harbor, MI 49022 616-982-3886
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
§ Hickok Elec. Instr., 10514 DuPont Ave., Cleveland, OH 44108 216-541-8060
Kikusui Intl. Corp., 17819 S. Figueroa St., Gardena, CA 90248 .... 213-515-6432; 800-421-5334
§ Leader Instrs. Corp., 380 Oser Ave., Hauppauge, NY 11788-3694 516-231-6900
§ Lectrotech, Inc., 5810 N. Western Ave., Chicago, IL 60659 312-769-6262
§ Nicolet Instr. Corp., Oscilloscope Div., 5225 Verona Rd., Madison, WI 53711 608-271-3333
† Norland Corp., Norland Dr., Ft. Atkinson, WI 53538 414-563-8456
Philips Test & Measuring Instrs., 85 McKee Dr., Mahwah, NJ 07430 201-529-3800
§ PrimeLine-Soltec Distbn., Soltec Corp., P.O. Box 818, Sun Valley, CA 91353-0818 .... 800-525-5554;818-764-5400
Tektronix, Inc., P. O. Box 500, Y3-314, Beaverton, OR 97077 .... 800-547-1512;Oregon only 800-452-1877
Telonic/Berkeley, 2825 Laguna Canyon Rd., Laguna Beach, CA 92652 714-494-9401
Texscan Instruments, 3169 N. Shadeland, Indianapolis, IN 46226 317-545-4196
§ Tucker Elctrns., Box 461966, Garland, TX 75046 .... 214-348-8800;800-527-4642
§ Vu-Data, 7122 Convoy Ct., San Diego, CA 92111 619-279-6572
† Wavetek Indiana, Inc., 5808 Churchman, Beech Grove, IN 46107 317-787-3332

Oscilloscopes, Mid Frequency (DC to 200 MHz)-2975

Ballantine Labs., 90 Fanny Rd., Boonton, NJ 07005, 201-335-0900 .... D•1185
§ **B & K Precision, Industrial Electronics Product Group, Dynascan Corporation, 6460 W. Cortland, Chicago, IL 60635, 312-889-9087 .... D•1386-1388**
§ **Gould Inc., Design & Test Sys. Div., 4650 Old Ironsides Dr., Santa Clara, CA 95054-1279, 408-988-6800 .... D•1237**
§ **Iwatsu Instruments, Inc., 430 Commerce Blvd., Carlstadt, NJ 07072, 201-935-5220 .... D•1390,1392**
† **Kikusui Intl. Corp., 17819 S. Figueroa St., Gardena, CA 90248, 213-515-6432;800-421-5334 .... D•1393**
§ **North American Soar Corp., 11126 Cornell Ave., Cherry Hill, NJ 08002, 609-488-1060 .... D•1267,1394-1396**
§ **Sencore, 3200 Sencore Dr., Sioux Falls, SD 57107, 605-339-0100 .... D•1399**
Continental Resources, Inc., 175 Middlesex Tpke., Bedford, MA 01730 .. 617-275-0850
Data Precision Corp., Electronics Ave., Danvers, MA 01923 617-246-1600
Dumont Oscilloscope Labs., 40 Fairfield Pl., W. Caldwell, NJ 07006 201-575-8666
† Gould Inc., Recording Systems Div., 3631 Perkins Ave., Cleveland, OH 44114 216-361-3315
§ Hameg, Inc., 88-90 Harbor Rd., Port Washington, NY 11050 516-883-3837
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
Hickok Elec. Instr., 10514 DuPont Ave., Cleveland, OH 44108 216-541-8060
§ Hitachi Denshi America Ltd., Test & Meas. Div., 175 Crossways Pkwy. W., Woodbury, NY 11797 516-921-7200
§ Leader Instrs. Corp., 380 Oser Ave., Hauppauge, NY 11788-3694 516-231-6900
Mann, Henry, Inc., 3983 Mann Road, Huntingdon Valley, PA 19006 215-355-7200
Nicolet Instr. Corp., Oscilloscope Div., 5225 Verona Rd., Madison, WI 53711 608-271-3333
§ Non-Linear Systems/Div. of Kaypro Corp., 533 Stevens Ave., Solana Bch., CA 92075 619-481-3900
Philips Test & Measuring Instrs., 85 McKee Dr., Mahwah, NJ 07430 201-529-3800
§ REI Sls., 19525 Business Centre Dr., Northridge, CA 91324 617-938-0900

Oscilloscopes, Mid Frequency-2975 (Cont'd)

§ Simpson Elec. Co., 853 Dundee Ave., Elgin, IL 60120 312-697-2260
§ SPECO Div., Components Specialties, Inc., P.O. Box 624, 1172 Rte. 109, Lindenhurst, NY 11757 .... 516-957-8700;800-645-5516
§ Sperry, A. W., Instrs., P.O. Box 9300, Smithtown, NY 11787 516-231-7050
§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 215-673-5600
† Tektronix, Inc., P. O. Box 500, Y3-314, Beaverton, OR 97077 .... 800-547-1512; .... Oregon only 800-452-1877
§ Tucker Elctrns., Box 461966, Garland, TX 75046 .... 214-348-8800;800-527-4642
§ VIZ Test Equipment, Div. VIZ Mfg., 335 E. Price St., Philadelphia, PA 19144 215-844-2626
§ Vu-Data, 7122 Convoy Ct., San Diego, CA 92111 619-279-6572

Oscilloscopes, Multibeam-2975

Iwatsu Instruments, Inc., 430 Commerce Blvd., Carlstadt, NJ 07072, 201-935-5220 .... D•1390-1392
Kikusui Intl. Corp., 17819 S. Figueroa St., Gardena, CA 90248, 213-515-6432;800-421-5334 .... D•1393
North American Soar Corp., 11126 Cornell Ave., Cherry Hill, NJ 08002, 609-488-1060 .... D•1394-1396
Continental Resources, Inc., 175 Middlesex Tpke., Bedford, MA 01730 .. 617-275-0850
Dumont Oscilloscope Labs., 40 Fairfield Pl., W. Caldwell, NJ 07006 201-575-8666
† Gould Inc., Recording Systems Div., 3631 Perkins Ave., Cleveland, OH 44114 216-361-3315
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
§ Hitachi Denshi America Ltd., Test & Meas. Div., 175 Crossways Pkwy. W., Woodbury, NY 11797 516-921-7200
Philips Test & Measuring Instrs., 85 McKee Dr., Mahwah, NJ 07430 201-529-3800
§ REI Sls., 19525 Business Centre Dr., Northridge, CA 91324 617-938-0900
Sperry, A. W., Instrs., P.O. Box 9300, Smithtown, NY 11787 516-231-7050
Tektronix, Inc., P. O. Box 500, Y3-314, Beaverton, OR 97077 .... 800-547-1512; .... Oregon only 800-452-1877
§ Tucker Elctrns., Box 461966, Garland, TX 75046 .... 214-348-8800;800-527-4642
§ VIZ Test Equipment, Div. VIZ Mfg., 335 E. Price St., Philadelphia, PA 19144 215-844-2626
Vu-Data, 7122 Convoy Ct., San Diego, CA 92111 619-279-6572
Wavetek Indiana, Inc., 5808 Churchman, Beech Grove, IN 46107 317-787-3332

Oscilloscopes, Multiple Channel-2975

§ **B & K Precision, Industrial Electronics Product Group, Dynascan Corporation, 6460 W. Cortland, Chicago, IL 60635, 312-889-9087 .... D•1386-1388**
§ **Gould Inc., Design & Test Sys. Div., 4650 Old Ironsides Dr., Santa Clara, CA 95054-1279, 408-988-6800 .... D•1237**
§ **Iwatsu Instruments, Inc., 430 Commerce Blvd., Carlstadt, NJ 07072, 201-935-5220 .... D•1390-1392**
† **Kikusui Intl. Corp., 17819 S. Figueroa St., Gardena, CA 90248, 213-515-6432;800-421-5334 .... D•1393**
§ **North American Soar Corp., 11126 Cornell Ave., Cherry Hill, NJ 08002, 609-488-1060 .... D•1267,1394-1396**
Sencore, 3200 Sencore Dr., Sioux Falls, SD 57107, 605-339-0100 .... D•1399
§ Ballantine Labs., 90 Fanny Rd., Boonton, NJ 07005 201-335-0900
Continental Resources, Inc., 175 Middlesex Tpke., Bedford, MA 01730 .. 617-275-0850
Data Check Corp., 10070 Willow Creek Rd., San Diego, CA 92131 619-578-0101
† Dumont Oscilloscope Labs., 40 Fairfield Pl., W. Caldwell, NJ 07006 201-575-8666
† Gould Inc., Recording Systems Div., 3631 Perkins Ave., Cleveland, OH 44114 216-361-3315
§ Hameg, Inc., 88-90 Harbor Rd., Port Washington, NY 11050 516-883-3837
§ Heath Co., Benton Harbor, MI 49022 616-982-3886
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
§ Hitachi Denshi America Ltd., Test & Meas. Div., 175 Crossways Pkwy. W., Woodbury, NY 11797 516-921-7200
§ Leader Instrs. Corp., 380 Oser Ave., Hauppauge, NY 11788-3694 516-231-6900
LeCroy Resch. Sys. Corp., 700 S. Main St., Spring Vly., NY 10977 914-425-2000
§ Lectrotech, Inc., 5810 N. Western Ave., Chicago, IL 60659 312-769-6262
MARCONI INSTRUMENTS, 3 Pearl Court, Allendale, NJ 07401 201-934-9050
§ Nicolet Instr. Corp., Oscilloscope Div., 5225 Verona Rd., Madison, WI 53711 608-271-3333
§ Non-Linear Systems/Div. of Kaypro Corp., 533 Stevens Ave., Solana Bch., CA 92075 619-481-3900
† Norland Corp., Norland Dr., Ft. Atkinson, WI 53538 414-563-8456
Philips Test & Measuring Instrs., 85 McKee Dr., Mahwah, NJ 07430 201-529-3800
§ PrimeLine-Soltec Distbn., Soltec Corp., P.O. Box 818, Sun Valley, CA 91353-0818 .... 800-525-5554;818-764-5400
§ REI Sls., 19525 Business Centre Dr., Northridge, CA 91324 617-938-0900
§ Simpson Elec. Co., 853 Dundee Ave., Elgin, IL 60120 312-697-2260
§ SPECO Div., Components Specialties, Inc., P.O. Box 624, 1172 Rte. 109, Lindenhurst, NY 11757 .... 516-957-8700;800-645-5516
§ Sperry, A. W., Instrs., P.O. Box 9300, Smithtown, NY 11787 516-231-7050
§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 215-673-5600
† Tektronix, Inc., P. O. Box 500, Y3-314, Beaverton, OR 97077 .... 800-547-1512; .... Oregon only 800-452-1877
Telonic/Berkeley, 2825 Laguna Canyon Rd., Laguna Beach, CA 92652 714-494-9401
§ Tucker Elctrns., Box 461966, Garland, TX 75046 .... 214-348-8800;800-527-4642
§ VIZ Test Equipment, Div. VIZ Mfg., 335 E. Price St., Philadelphia, PA 19144 215-844-2626
Voltex, 3460 Great Neck Rd., Amityville, NY 11701 516-842-2772
§ Vu-Data, 7122 Convoy Ct., San Diego, CA 92111 619-279-6572
† Wavetek Indiana, Inc., 5808 Churchman, Beech Grove, IN 46107 317-787-3332

Oscilloscopes, Portable, Battery Operated-2975

§† **Ballantine Labs., 90 Fanny Rd., Boonton, NJ 07005, 201-335-0900 .... D•1185**
§ **BBC-Metrawatt/Goerz, 2150 W. 6th Ave., Broomfield, CO 80020, 303-469-5231;800-821-6327 .... D•1193**
§ **Iwatsu Instruments, Inc., 430 Commerce Blvd., Carlstadt, NJ 07072, 201-935-5220 .... D•1390,1392**
§ **North American Soar Corp., 11126 Cornell Ave., Cherry Hill, NJ 08002, 609-488-1060 .... D•1267,1396**
Avex Elctrns., 1683 Winchester Rd., P.O. Box 1026, Bensalem, PA 19020 215-638-1515
§ B & K Precision, Industrial Electronics Product Group, Dynascan Corporation, 6460 W. Cortland, Chicago, IL 60635 312-889-9087
Bluffton Products, Inc., Tegam, Inc., 7230 North Ridge Road, Madison, OH 44057 216-946-3572
Continental Resources, Inc., 175 Middlesex Tpke., Bedford, MA 01730 .. 617-275-0850
Genstar Rental Elctrns., 2445 Faber Pl., Palo Alto, CA 94303 415-856-7600
† Gould Inc., Recording Systems Div., 3631 Perkins Ave., Cleveland, OH 44114 216-361-3315
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
§ Hitachi Denshi America Ltd., Test & Meas. Div., 175 Crossways Pkwy. W., Woodbury, NY 11797 516-921-7200
§ Jensen Tools, Inc., Axia, Inc., 7815 S. 46th St., Phoenix, AZ 85040 602-968-6241
Kikusui Intl. Corp., 17819 S. Figueroa St., Gardena, CA 90248 .... 213-515-6432; 800-421-5334
§ Leader Instrs. Corp., 380 Oser Ave., Hauppauge, NY 11788-3694 516-231-6900
§ Non-Linear Systems/Div. of Kaypro Corp., 533 Stevens Ave., Solana Bch., CA 92075 619-481-3900
Philips Test & Measuring Instrs., 85 McKee Dr., Mahwah, NJ 07430 201-529-3800
§ REI Sls., 19525 Business Centre Dr., Northridge, CA 91324 617-938-0900
§ Sperry, A. W., Instrs., P.O. Box 9300, Smithtown, NY 11787 516-231-7050
§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 215-673-5600
§ Techni-Tool, 5 Apollo Rd., Box 368, Plymouth Meeting, PA 19462 215-825-4990
† Tektronix, Inc., P. O. Box 500, Y3-314, Beaverton, OR 97077 .... 800-547-1512; .... Oregon only 800-452-1877
§ Tucker Elctrns., Box 461966, Garland, TX 75046 .... 214-348-8800;800-527-4642
§ Vu-Data, 7122 Convoy Ct., San Diego, CA 92111 619-279-6572

Oscilloscopes, Programmable-2975

§ **Gould Inc., Design & Test Sys. Div., 4650 Old Ironsides Dr., Santa Clara, CA 95054-1279, 408-988-6800 .... D•1237**
Sencore, 3200 Sencore Dr., Sioux Falls, SD 57107, 605-339-0100 .... D•1399
Branden, T. G., Corp., 5565 S.E. Intl. Way, Portland, OR 97222 503-659-9366
Dumont Oscilloscope Labs., 40 Fairfield Pl., W. Caldwell, NJ 07006 201-575-8666
EH Electronics, Inc., Sub. EH Intl., Inc., 48507 Milmont Drive, Fremont, CA 94538 415-651-2340
† Gould Inc., Recording Systems Div., 3631 Perkins Ave., Cleveland, OH 44114 216-361-3315
Kikusui Intl. Corp., 17819 S. Figueroa St., Gardena, CA 90248 .... 213-515-6432; 800-421-5334
LeCroy Resch. Sys. Corp., 700 S. Main St., Spring Vly., NY 10977 914-425-2000
Nicolet Instr. Corp., Oscilloscope Div., 5225 Verona Rd., Madison, WI 53711 608-271-3333
† Norland Corp., Norland Dr., Ft. Atkinson, WI 53538 414-563-8456
§ PrimeLine-Soltec Distbn., Soltec Corp., P.O. Box 818, Sun Valley, CA 91353-0818 .... 800-525-5554;818-764-5400
† R. C. Elctrns. Inc., 5386 Hollister Ave., Santa Barbara, CA 93111 805-964-6708
† Tektronix, Inc., P. O. Box 500, Y3-314, Beaverton, OR 97077 .... 800-547-1512; .... Oregon only 800-452-1877
Test & Measurement Systems, Inc., 349 Cobalt Way, Ste. 301, Sunnyvale, CA 94086 408-720-8877

Oscilloscopes, Sampling-2975

§ **Gould Inc., Design & Test Sys. Div., 4650 Old Ironsides Dr., Santa Clara, CA 95054-1279, 408-988-6800 .... D•1237**
American HV Test Systems Inc., Central Garrett Ind'l. Pk., Accident, MD 21520 301-826-8651
§ BBC-Metrawatt/Goerz, 2150 W. 6th Ave., Broomfield, CO 80020 .... 303-469-5231; 800-821-6327
Continental Resources, Inc., 175 Middlesex Tpke., Bedford, MA 01730 .. 617-275-0850
† Data Precision Corp., Electronics Ave., Danvers, MA 01923 617-246-1600
EH Electronics, Inc., Sub. EH Intl., Inc., 48507 Milmont Drive, Fremont, CA 94538 415-651-2340
Genstar Rental Elctrns., 2445 Faber Pl., Palo Alto, CA 94303 415-856-7600
† Gould Inc., Recording Systems Div., 3631 Perkins Ave., Cleveland, OH 44114 216-361-3315
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
§ Nicolet Instr. Corp., Oscilloscope Div., 5225 Verona Rd., Madison, WI 53711 608-271-3333
Tektronix, Inc., P. O. Box 500, Y3-314, Beaverton, OR 97077 .... 800-547-1512; .... Oregon only 800-452-1877
§ Tucker Elctrns., Box 461966, Garland, TX 75046 .... 214-348-8800;800-527-4642

Oscilloscopes, Storage-2975

§ **BBC-Metrawatt/Goerz, 2150 W. 6th Ave., Broomfield, CO 80020, 303-469-5231;800-821-6327 .... D•1193**
§ **Gould Inc., Design & Test Sys. Div., 4650 Old Ironsides Dr., Santa Clara, CA 95054-1279, 408-988-6800 .... D•1237**
§ **Iwatsu Instruments, Inc., 430 Commerce Blvd., Carlstadt, NJ 07072, 201-935-5220 .... D•1391**
Kikusui Intl. Corp., 17819 S. Figueroa St., Gardena, CA 90248, 213-515-6432;800-421-5334 .... D•1393
§ **North American Soar Corp., 11126 Cornell Ave., Cherry Hill, NJ 08002, 609-488-1060 .... D•1396**
Branden, T. G., Corp., 5565 S.E. Intl. Way, Portland, OR 97222 503-659-9366
Continental Resources, Inc., 175 Middlesex Tpke., Bedford, MA 01730 .. 617-275-0850
† Data Precision Corp., Electronics Ave., Danvers, MA 01923 617-246-1600
ECO Instrs. Div., Sea Data Corp., 1 Bridge St., Newton, MA 02158 617-964-8360
Genstar Rental Elctrns., 2445 Faber Pl., Palo Alto, CA 94303 415-856-7600
† Gould Inc., Recording Systems Div., 3631 Perkins Ave., Cleveland, OH 44114 216-361-3315
§ Hameg, Inc., 88-90 Harbor Rd., Port Washington, NY 11050 516-883-3837
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.

§ Hitachi Denshi America Ltd., Test & Meas. Div., 175 Crossways Pkwy. W., Woodbury, NY 11797 516-921-7200
§ Leader Instrs. Corp., 380 Oser Ave., Hauppauge, NY 11788-3694 516-231-6900
§ Nicolet Instr. Corp., Oscilloscope Div., 5225 Verona Rd., Madison, WI 53711 608-271-3333
† Norland Corp., Norland Dr., Ft. Atkinson, WI 53538 414-563-8456
Philips Test & Measuring Instrs., 85 McKee Dr., Mahwah, NJ 07430 201-529-3800
§ PrimeLine-Soltec Distbn., Soltec Corp., P.O. Box 818, Sun Valley, CA 91353-0818 .... 800-525-5554;818-764-5400
† R. C. Elctrns. Inc., 5386 Hollister Ave., Santa Barbara, CA 93111 805-964-6708
§ REI Sls., 19525 Business Centre Dr., Northridge, CA 91324 617-938-0900
§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 215-673-5600
Tektronix, Inc., P. O. Box 500, Y3-314, Beaverton, OR 97077 .... 800-547-1512;Oregon only 800-452-1877
Test & Measurement Systems, Inc., 349 Cobalt Way, Ste. 301, Sunnyvale, CA 94086 408-720-8877
§ Tucker Elctrns., Box 461966, Garland, TX 75046 .... 214-348-8800;800-527-4642

Oscilloscopes, Triggered Sweep-2975

§ Gould Inc., Design & Test Sys. Div., 4650 Old Ironsides Dr., Santa Clara, CA 95054-1279, 408-988-6800 .... D•1237
§ Iwatsu Instruments, Inc., 430 Commerce Blvd., Carlstadt, NJ 07072, 201-935-5220 .... D•1390
Kikusui Intl. Corp., 17819 S. Figueroa St., Gardena, CA 90248, 213-515-6432;800-421-5334 .... D•1393
§ North American Soar Corp., 11126 Cornell Ave., Cherry Hill, NJ 08002, 609-488-1060 .... D•1267,1394-1396
§ B & K Precision, Industrial Electronics Product Group, Dynascan Corporation, 6460 W. Cortland, Chicago, IL 60635 312-889-9087
§ BBC-Metrawatt/Goerz, 2150 W. 6th Ave., Broomfield, CO 80020 .... 303-469-5231; 800-821-6327
Gould Inc., Recording Systems Div., 3631 Perkins Ave., Cleveland, OH 44114 216-361-3315
Hameg, Inc., 88-90 Harbor Rd., Port Washington, NY 11050 516-883-3837
§ Hitachi Denshi America Ltd., Test & Meas. Div., 175 Crossways Pkwy. W., Woodbury, NY 11797 516-921-7200
§ Leader Instrs. Corp., 380 Oser Ave., Hauppauge, NY 11788-3694 516-231-6900
Nicolet Instr. Corp., Oscilloscope Div., 5225 Verona Rd., Madison, WI 53711 608-271-3333
§ Non-Linear Systems/Div. of Kaypro Corp., 533 Stevens Ave., Solana Bch., CA 92075 619-481-3900
† Norland Corp., Norland Dr., Ft. Atkinson, WI 53538 414-563-8456
† R. C. Elctrns. Inc., 5386 Hollister Ave., Santa Barbara, CA 93111 805-964-6708
§ Sperry, A. W., Instrs., P.O. Box 9300, Smithtown, NY 11787 516-231-7050
§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 215-673-5600
† Tektronix, Inc., P. O. Box 500, Y3-314, Beaverton, OR 97077 .... 800-547-1512;Oregon only 800-452-1877
§ Vu-Data, 7122 Convoy Ct., San Diego, CA 92111 619-279-6572

Outlets, Electrical — See Boxes, Junction, Outlets & Wall Plates (Vol. C)

Outlets, Power, International-2100 — *See Vol. C*

Ovens, Aging, Burn-in, Life Test-2550

† Blue M, A Unit of General Signal, 138th & Chatham Sts., Blue Island, IL 60406, 312-385-9000 .... D•1165
† Cincinnati Sub-Zero Prods., 12011 Mosteller Rd., Cincinnati, OH 45241, 513-772-8810 .... D•1166
† Tenney Engrg., 109 Springfield Rd., Union, NJ 07083, 201-686-7870 .... D•1173
§† Aerotronic Assocs., Inc., Riverside Dr., Contoocook, NH 03229 603-746-4631
† Alpha-M Corp., 3009 Wildflower Dr., Dallas, TX 75229 214-620-0021
† Artronics Corporation, 3 Electronic Avenue, Danvers, MA 01923 617-777-2880
† Associated Environmental Systems, 10 Industrial Way, Amesbury, MA 01913-4848 617-388-5662
§† Bemco, 9908 San Fernando Rd., Pacoima, CA 91331 818-899-5296
† BTU Engrg. Corp., Bruce Sys., Esquire Rd., N. Billerica, MA 01862 617-667-4111
§ Delta Design, 5775 Kearny Villa Rd., San Diego, CA 92123 619-292-5000
§† Despatch Inds., P.O. Box 1320, Minneapolis, MN 55440 612-331-1873
Forma Scientific, Div. of Mallinckrodt Inc., Box 649, Marietta, OH 45750 614-373-4763
† FTS Sys., POB 158, Stone Ridge, NY 12484 800-824-0400
Gruenberg Oven Co., Inc., P.O. Box 3246, 2121 Reach Rd., Williamsport, PA 17701 717-326-1755
Hotpack Corp., Heinicke Instrs., 10940 Dutton Rd., Philadelphia, PA 19154 .... 215-824-1700;800-523-3608
Lab-Line Instrs., 15th & Bloomingdale, Melrose Park, IL 60160 312-450-2600
Lehighton Elctrns., Inc., Box 328, Dept M, Lehighton, PA 18235 .... 717-386-4156; 215-377-5990
Loranger Mfg., Box 948, Warren, PA 16365 814-723-2250
Micro Instr., 2250 Micro Pl., Escondido, CA 92025 619-746-2010
† Milton Ross Co., 511 Second St. Pike, Southampton, PA 18966 215-355-0200
OAL Assocs., P.O. Box J, Escondido, CA 92025 619-743-7143
Ransco Inds., Inc., Sub. Despatch Ind., Inc., 2201 Statham Blvd., Oxnard, CA 93033 805-487-7777
§ Reliability, Inc., 16400 Park Row, P.O. Box 218370, Houston, TX 77218 713-492-0550
S. F. Products Corporation, P. O. Box 369, Southport, CT 06490 203-929-6180
Sigma Systems Corp., 3163 Adams Ave., San Diego, CA 92116 619-283-3193
† Solid State Testing, Inc., 56 Middlesex Tpke., Burlington, MA 01803 617-272-0972
† Standard Environmental Systems, Inc., 383 Minnisink Rd., Totowa, NJ 07512 201-256-2200
† Trent, Inc., 201 Leverington Ave., Philadelphia, PA 19127 215-482-5000
† Trio-Tech Intl., 2040 N. Lincoln St., Burbank, CA 91504 818-846-9200
United States Testing Co., Inc., 1415 Park Ave., Hoboken, NJ 07030 .... 800-631-3096; 201-792-2400

Varian Assocs., Indl. Equip. Grp., 611 Hansen Way, Palo Alto, CA 94303 415-493-4000

Ovens, Drying (for Electronic Instruments)-4100

§† Casso-Solar, P.O. Box 163, U.S. Route 202, Pomona, NY 10970 914-354-2500

Ovens, Crystal & Component-2300 — *See Vol. A*

Ovens, Electric — See Furnaces, Electric (Vol. D)

Ovens, Vacuum-4100

† Blue M, A Unit of General Signal, 138th & Chatham Sts., Blue Island, IL 60406, 312-385-9000 .... D•1165
† Tenney Engrg., 109 Springfield Rd., Union, NJ 07083, 201-686-7870 .... D•1173
† Bemco, 9908 San Fernando Rd., Pacoima, CA 91331 818-899-5296
§† Cincinnati Sub-Zero Prods., 12011 Mosteller Rd., Cincinnati, OH 45241 513-772-8810
Forma Scientific, Div. of Mallinckrodt Inc., Box 649, Marietta, OH 45750 614-373-4763
Hotpack Corp., Heinicke Instrs., 10940 Dutton Rd., Philadelphia, PA 19154 .... 215-824-1700;800-523-3608
§ Hull Corp., Davisville Rd., Hatboro, PA 19040 215-672-7800
Kahle Engrg., Div. Joule Machinery Grp., 3344 Hudson Ave., P.O. Box 877, Union City, NJ 07087 201-867-6500
Lab-Line Instrs., 15th & Bloomingdale, Melrose Park, IL 60160 312-450-2600
Materials Resch., Route 303, Orangeburg, NY 10962 914-359-4200
S. F. Products Corporation, P. O. Box 369, Southport, CT 06490 203-929-6180
Standard Environmental Systems, Inc., 383 Minnisink Rd., Totowa, NJ 07512 201-256-2200
§† ULVAC North America, P.O. Box 799, 105 York Street, Kennebunk, ME 04043 207-985-2973
Varian Assocs., Indl. Equip. Grp., 611 Hansen Way, Palo Alto, CA 94303 415-493-4000

Packages, Integrated Circuit-3130 — *See Vol. A*

Packaging Materials, Antistatic-3800 — *See Vol. C*

Packaging Materials, Foam & Plastic-3800 — *See Vol. C*

Packaging Panels, Integrated Circuits — See Boards, Plug-in (Vol. C)

Packaging Services — See Services, Packaging (Vol. D)

Pads, L, T, & H — See Attenuators, Audio (Vol. D)

Pads, Transistor Mounting-2100 — *See Vol. C*

Paints, Conductive, Electric — See Coatings, Conductive, Electric (Vol. C)

Paints, Finishing-1600 — *See Vol. C*

Paints, Metallic, Conductive-1600 — *See Vol. C*

Paints, Radioactive — See Coatings, Radioactive (Vol. C)

Paints, Resistive-Also See Inks for Thick Film Microcircuits-1600 — *See Vol. C*

Panel Equipment — See Dials (Vol. C), Connectors (Vol. C), Jacks (Vol. C), Lights, Indicator (Vol. B), etc.

Panel Marking Kits — See Kits, Marking (Vol. C)

Panels, Back Lighted & Edge Lighted-2450 — *See Vol. B*

Panels, Electroluminescent-2450 — *See Vol. B*

Panels, Fuse-4300 — *See Vol. B*

Panels, IC Packaging — See Boards, Plug-in (Vol. C)

Panels, Jack-2100 — *See Vol. C*

Panels, Metal — See Enclosures, Circuit Board, Module & Relay Mounting (Vol. C)

Panels, Meter — See Enclosures, Circuit Board, Module, & Relay Mounting (Vol. C)

Panels, Patch — See Panels, Jack (Vol. C)

Panels, Power BUS for ICs-3200 — *See Vol. C*

Panels, Relay Rack — See Enclosures, Circuit Board, Module, & Relay Mounting (Vol. C)

Panels, Touch — See Touch Panels

Paper Tape Equipment, Punch-2000

Addmaster Corp., 416 Junipero Serra Dr., San Gabriel, CA 91776 818-285-1121
† Astronautics Corporation of America, P.O. Box 523, Milwaukee, WI 53201-0523 414-447-8200
§ Chalco Engrg., 15126 S. Broadway, Gardena, CA 90248 .... 213-FA1-0121
† Comtec Infor. Sys., Inc., 53 John St., Cumberland, RI 02864 401-724-8500

§ Dataproducts, 6200 Canoga Ave., Woodland Hills, CA 91365 213-887-8000
§† Data Specialties, Inc., 3455 Commercial Ave., Northbrook, IL 60062 312-564-1800
§ GNT Automatic, 1560 Trapelo Rd., Waltham, MA 02154 617-890-3305
§ Remex Cam Operations, Ex-Cell-O Corporation, 1230 S. Lewis Street, Anaheim, CA 92805 714-535-4160
Unitronix Corp., 197 Meister Ave., Somerville, NJ 08876 201-231-9400
Wire Graphics, Inc., 215 B. Central Ave., Farmingdale, NY 11735 516-293-1525

Paper Tape Equipment, Reader-2000

Addmaster Corp., 416 Junipero Serra Dr., San Gabriel, CA 91776 818-285-1121
† Astronautics Corporation of America, P.O. Box 523, Milwaukee, WI 53201-0523 414-447-8200
§ Chalco Engrg., 15126 S. Broadway, Gardena, CA 90248 .... 213-FA1-0121
† Comtec Infor. Sys., Inc., 53 John St., Cumberland, RI 02864 401-724-8500
§ GNT Automatic, 1560 Trapelo Rd., Waltham, MA 02154 617-890-3305
Oliver Advanced Engrg., 676 W. Wilson Ave., Glendale, CA 91203 818-240-0080
§ Remex Cam Operations, Ex-Cell-O Corporation, 1230 S. Lewis Street, Anaheim, CA 92805 714-535-4160
TRW Optoelectronics Div., 1207 Tappan Circle, Carrollton, TX 75006 214-323-2200
Unitronix Corp., 197 Meister Ave., Somerville, NJ 08876 201-231-9400
Wire Graphics, Inc., 215 B. Central Ave., Farmingdale, NY 11735 516-293-1525

Paper Tape Equipment, Reader/Punch-2000

Addmaster Corp., 416 Junipero Serra Dr., San Gabriel, CA 91776 818-285-1121
† Astronautics Corporation of America, P.O. Box 523, Milwaukee, WI 53201-0523 414-447-8200
§ Chalco Engrg., 15126 S. Broadway, Gardena, CA 90248 .... 213-FA1-0121
† Comtec Infor. Sys., Inc., 53 John St., Cumberland, RI 02864 401-724-8500
Facit, Inc., 9 Executive Park Dr., Merrimack, NH 03054 603-424-8000
§ GNT Automatic, 1560 Trapelo Rd., Waltham, MA 02154 617-890-3305
Opto Technology, Inc., 1674 S. Wolf Rd., Wheeling, IL 60090 312-537-4277
§ Remex Cam Operations, Ex-Cell-O Corporation, 1230 S. Lewis Street, Anaheim, CA 92805 714-535-4160
Unitronix Corp., 197 Meister Ave., Somerville, NJ 08876 201-231-9400
Wire Graphics, Inc., 215 B. Central Ave., Farmingdale, NY 11735 516-293-1525

Paper, Graphic Recording-3000

AGFA-Gevaert, Inc., 275 North St., Teterboro, NJ 07608 201-288-4100
† Alden Electronics, Inc., 40 Washington Street, Westboro, MA 01581 617-366-8851
§ Astro-Med, Inc., 600 East Greenwich Avenue, W. Warwick, RI 02893 401-828-4000
Beckman Instrs., 2500 Harbor Blvd., Fullerton, CA 92634 714-871-4848
Computer Instrs., 100 Madison Ave., Hempstead, NY 11550 516-483-8200
§ Dietzgen Corp., 250 Wille Rd., Des Plaines, IL 60018 312-635-5200
† Fitchburg Coated Prods., Technographics, Inc., P.O. Box 1106, Scranton, PA 18501 717-347-2035
Gould Inc., Recording Systems Div., 3631 Perkins Ave., Cleveland, OH 44114 216-361-3315
Gulton Inds., Inc., Graphic Instruments Div., Gulton Ind'l. Pk., E. Greenwich, RI 02818 401-884-6800
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
† Honeywell, Process Control Div., 1100 Virginia Dr., Ft. Washington, PA 19034 .... 800-321-5111, Ext. 596
§† Keuffel & Esser Co., 900 Lanidex Plaza, Parsippany, NJ 07054 201-428-7000
Leeds & Northrup Instrs., A Unit of General Signal Corp., Sumneytown Pike, North Wales, PA 19454 215-643-2000
§ Linear Instrs., 500 Edison Way, Reno, NV 89502 702-786-3636
MFE Corp., Instr. Div., Keewaydin Dr., Bldg. #1, Salem, NH 03079 603-893-1921
Omega Engrg., Box 4047, Stamford, CT 06907 203-359-1660
§ PrimeLine-Soltec Distbn., Soltec Corp., P.O. Box 818, Sun Valley, CA 91353-0818 .... 800-525-5554;818-764-5400
§† Raytheon Ocean Sys. Co., Submarine Signal Div., Risho Ave., Westminster Pk., E. Providence, RI 02914 401-438-1780
Telautograph, 8700 Bellanca Ave., Los Angeles, CA 90045 213-641-3690
Texas Instrs., Data Sys. Group, P. O. Box 809063, Dallas, TX 75380-9063 1-800-527-3500
Varian Assocs., Instr. Grp., 611 Hansen Way, Palo Alto, CA 94303 415-493-4000

Paper, Thermal-2000

Appleton Papers Inc., P.O. Box 359, Appleton, WI 54912, 414-734-9841 .... D•1059

Patch Boards — See Boards, Programming (Vol. C)

Peak Sense & Hold Amplifiers — See Amplifiers, Peak Sense & Hold

Peltier (Thermoelectric) Heat Pumps — See Cooling/Heating Modules, Thermoelectric (Vol. B)

Perforators, Paper Tape (Electrically Powered)-2000

§ Chalco Engrg., 15126 S. Broadway, Gardena, CA 90248 .... 213-FA1-0121
§ GNT Automatic, 1560 Trapelo Rd., Waltham, MA 02154 617-890-3305
Teleterminal Corp., Greenland, NH 03840 603-431-1200
§† Westrex, 1140 Bloomfield Ave., W. Caldwell, NJ 07006 201-227-7290

Phones — See Handsets, Chestsets, Headphones, Headsets, etc. (Vol. D)

Photocells & Phototubes — See Cells, Photoconductive (Vol. B)

Photodetectors, GaAs-3700 — ***See Vol. B***

Photoelectric Equipment — See Alarms, Controls, Photoelectric (Vol. B)

Photoelectric Tubes — See Cells, Photoconductive (Vol. B)

Photoemissive Detectors — See Cells, Photoemissive (Vol. B)

Photographic Services — See Services, Photographic (Vol. D)

Photometers — See Meters, Light (Vol. D)

Photomultiplier Tube Housings-5700 — ***See Vol. A***

Photoresistors-3700 — ***See Vol. B***

Pickups, Magnetic, Proximity, Torque, Vibration, etc. — See Transducers, Specific Type (Vol. B)

Pickups, Telephone (For Recording)-1300

§ GC Elctrns., 400 S. Wyman St., Rockford, IL 61101 815-968-9661
International Comps. Corp., 105 Maxess Rd., Melville, NY 11747 516-293-1500
§ Philmore Mfg., 40 Inip Dr., Inwood, NY 11696 516-239-6161
§ Rye Inds., Inc., 125 Spencer Pl., P.O. Box M, Mamaroneck, NY 10543 914-698-0080
§ Shokai Far East, Ltd., 280 North Central Ave., Hartsdale, NY 10530 914-681-0700
§† Workman Elctrn. Prods., Box 3828, Sarasota, FL 33578 813-371-4242

Piezoelectric Ceramics-2300 — ***See Vol. A***

Pilot Lights — See Lights, Indicator (Vol. B)

Pin Grid Arrays — See Sockets, Pin Grid Array

Pin Straighteners, Tube-5700 — ***See Vol. A***

Pins, Cotter, Dowel, Taper, etc.-2825 — ***See Vol. C***

Pins, Electrically Conductive-2100 — ***See Vol. C***

Pins, Mechanical-2825 — ***See Vol. C***

Plastic Raw Materials, Liquids, Pellets, Powders, Resins-1600 — ***See Vol. C***

Plastics, Encapsulating — See Compounds, Encapsulating, Molding, Potting (Vol. C)

Plastics Fabrication — See Services, Plastics Fabrication (Vol. D)

Plastics, Heat Shrinkable — See Caps, Forms & Tapes, Heat Shrinkable (Vol. C), Tubing, Heat Shrinkable (Vol. C)

Plastics, Custom Molding — See Services, Custom Molding, Plastic (Vol. D)

Plated Wire Memory Systems — See Memory Systems (Vol. D)

Plates, Instructional, Name, Silk Screen — See Nameplates (Vol. B)

Platforms, Thermal — See Thermal Platforms (Vol. D)

Plating Services — See Services, Plating (Vol. D)

Players, Magnetic Tape — See Recorders, Magnetic Tape (Vol. D)

Pliers-5400 — ***See Vol. C***

Plotters/Hard-Copy Devices-2000

Gould Inc., Recording Systems Div., 3631 Perkins Ave., Cleveland, OH 44114, 216-361-3315 .... D•1404
Bascom-Turner Instrs., 111 Downey St., Norwood, MA 02062 617-769-9660
B-G Instruments, P.O. Box 67, Alta Loma, CA 91701 .... 714-989-4802;980-2826
Bruel & Kjaer Instrs. Inc., 185 Forest St., Marlboro, MA 01752 617-481-7000
† Datametrics Corp., Defense Products Div., 7630 Gloria Ave., Van Nuys, CA 91406 818-989-3840
§ Enter Computer, Inc., 6867 Nancy Ridge Drive, San Diego, CA 92121 619-450-0601
Gulton Inds., Inc., Graphic Instruments Div., Gulton Ind'l. Pk., E. Greenwich, RI 02818 401-884-6800
§ Heath Co., Benton Harbor, MI 49022 616-982-3886
Hitachi America, Ltd., 59 Route 17 South, Allendale, NJ 07401 201-825-8000
§ Houston Instrument, 8500 Cameron Rd., Austin, TX 78753 512-835-0900
Image Graphics, Inc., 107 Ardmore Street, Fairfield, CT 06430 203-259-1394
§ Kipp & Zonen, 390 Central Ave., Bohemia, NY 11716 516-589-2885
Linseis, Inc., P.O. Box 666, Princeton Junction, NJ 08550 .... 609-799-6282 (in N.J.);Toll Free 1-800-RECORDER
Spectral Dynamics, Scientific-Atlanta, Inc., 4255 Ruffin Rd., San Diego, CA 92123-0575 619-268-7100
Tegal Scientific, Inc., Box 5905, Concord, CA 94524 415-827-1054
§ Western Graphtec, 12 Chrysler St., Irvine, CA 92718 .... 714-770-6010;800-854-8385

Plotters, X-Y, & Accessories-3000

Gould Inc., Recording Systems Div., 3631 Perkins Ave., Cleveland, OH 44114, 216-361-3315 .... D•1404

Linseis, Inc., P.O. Box 666, Princeton Junction, NJ 08550, 609-799-6282 (in N.J.);Toll Free 1-800-RECORDER .... D◦1405
§ AEMC, 99 Chauncy, Boston, MA 02111 .... 617-451-0227;800-343-1391
Allen Datagraph, Inc., 24 Keewaydin Dr., Salem, NH 03079 603-893-1983
BBC-Metrawatt/Goerz, 2150 W. 6th Ave., Broomfield, CO 80020 ....303-469-5231; 800-821-6327
Bruel & Kjaer Instrs. Inc., 185 Forest St., Marlboro, MA 01752 617-481-7000
† Calcomp, 2411 W. La Palma Ave., Anaheim, CA 92801 714-821-2011
Computer Talk, Inc., Box 148, Morrison, CO 80465 303-697-5485
Continental Resources, Inc., 175 Middlesex Tpke., Bedford, MA 01730 .. 617-275-0850
§ Data Rentals/Sls., Inc, P. O. Box 3257, Culver City, CA 90230 213-559-3822
Data Technology, Inc., 4 Gill St., Woburn, MA 01811 617-935-8820
ECO Instrs. Div., Sea Data Corp., 1 Bridge St., Newton, MA 02158 617-964-8360
§ Enter Computer, Inc., 6867 Nancy Ridge Drive, San Diego, CA 92121 ... 619-450-0601
Esterline Angus Instr. Corp., Box 24000, Indianapolis, IN 46224 317-244-7611
Gulton Inds., Inc., Graphic Instruments Div., Gulton Ind'l. Pk., E. Greenwich, RI 02818 401-884-6800
† Hartman Systems, Figgie Intl., 360 Wolf Hill Rd., Huntington Sta., NY 11746 516-427-7500
§ Heath Co., Benton Harbor, MI 49022 616-982-3886
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
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§ Houston Instrument, 8500 Cameron Rd., Austin, TX 78753 512-835-0900
Image Graphics, Inc., 107 Ardmore Street, Fairfield, CT 06430 203-259-1394
§ Kipp & Zonen, 390 Central Ave., Bohemia, NY 11716 516-589-2885
§ Leader Instrs. Corp., 380 Oser Ave., Hauppauge, NY 11788-3694 516-231-6900
Linear Instrs., 500 Edison Way, Reno, NV 89502 702-786-3636
Nicolet's Computer Graphics Division, P.O. Box 3020, 777 Arnold Dr., Martinez, CA 94553 415-372-7568
Omega Engrg., Box 4047, Stamford, CT 06907 203-359-1660
§ PrimeLine-Soltec Distbn., Soltec Corp., P.O. Box 818, Sun Valley, CA 91353-0818 .... 800-525-5554;818-764-5400
§† R. C. Elctrns. Inc., 5386 Hollister Ave., Santa Barbara, CA 93111 805-964-6708
Soltec Corp., 11684 Pendelton St., Sun Valley, CA 91352 ....818-767-0044; 800-423-2344
§ Strobe, Inc., 897 Independence Ave., Mountain View, CA 94043 415-969-5130
Summit CAD Corp., 5222 FM 1960 W100, Houston, TX 77069 713-440-1468
§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 215-673-5600
Tegal Scientific, Inc., Box 5905, Concord, CA 94524 415-827-1054
§ Tucker Elctrns., Box 461966, Garland, TX 75046 .... 214-348-8800;800-527-4642
Venable Industries, Inc., 3555 Lomita Blvd., Torrance, CA 90505 213-539-2522
§ Western Graphtec, 12 Chrysler St., Irvine, CA 92718 ..... 714-770-6010;800-854-8385
Yokogawa Corp. of America, 2 Dart Rd., Shenandoah, GA 30265 404-253-7000

Plug & Jack Sets-2100 — *See Vol. C*

Plug Adapters-2100 — *See Vol. C*

Plug Buttons-2825 — *See Vol. C*

Plug Caps & Shells-2100 — *See Vol. C*

Plugboard Programming Systems — See Boards, Programming (Vol. C)

Plugs, Electrical (All Types)-2100 — *See Vol. C*

Plugs, Fused-2100 — *See Vol. C*

Plugs, Power, International-2100 — *See Vol. C*

Plugs (MIL)-2440 — *See Vol. B*

Pointers, Dial-2400 — *See Vol. C*

Position Control Systems, Servo — See Controls, Servo Systems (Vol. D)

Positioning Systems, Multiple Axis, Computer Guided-4100

TS Products, Inc., 12455 Branford St., Bldg. 22, Arleta, CA 91331, 818-896-6676 .... D◦1990
Anorad Corp., 110 Oser Ave., Hauppauge, NY 11788 516-231-1990
§† B & B Motor & Control Corp., Apple Hill Commons, Burlington, CT 06013 203-673-7151
Berkeley Process Control, Inc., 5327-K Jacuzzi St., Richmond, CA 94804 415-526-3333
Burleigh Instrs., Burleigh Pk., Fishers, NY 14453 716-924-9355
Centent Co., 3879 S. Main St., Santa Ana, CA 92707 714-979-6491
Ealing Optics Co., Ealing Corp., 22 Pleasant St., S. Natick, MA 01760 617-655-7000
† EDO Western Corp., EDO Corp., 2645 South 300 W., Salt Lake City, UT 84115 .... 801-486-7481/3846
§ Industrial Computer Designs, Inc., 31264 La Baya Drive, Westlake Village, CA 91362 818-889-3179
† McFadden Sys., Inc., 8953 S. Atlantic Ave., South Gate, CA 90280-9990 213-564-5958
Penn Resch. Corp. (PRC), 2652 South Main St., P.O. Box 3357, Kennesaw, GA 30144 404-429-9061
Universal Instrs., P.O. Box 825, Binghamton, NY 13902 607-775-1102

Posts, Binding-2100 — *See Vol. C*

Posts, Harness Board-6000 — *See Vol. C*

Potentiometer Elements-4750 — *See Vol. A*

Potentiometers, Air Operated-4750 — *See Vol. A*

Potentiometers, Carbon Ceramic-4750 — *See Vol. A*

Potentiometers, Carbon Film-4750 — *See Vol. A*

Potentiometers, Ceramic Metal (CERMET)-4750 — *See Vol. A*

Potentiometers, Composition, Carbon-4750 — *See Vol. A*

Potentiometers, Conductive Plastic-4750 — *See Vol. A*

Potentiometers, Hot Molded-4750 — *See Vol. A*

Potentiometers, Hybrid-4750 — *See Vol. A*

Potentiometers, Lab Type-4750 — *See Vol. A*

Potentiometers, Linear-4750 — *See Vol. A*

Potentiometers, Metal Film-4750 — *See Vol. A*

Potentiometers, Metal, Glazed — See Potentiometers, Ceramic Metal (Vol. A)

Potentiometers, Motorized-4750 — *See Vol. A*

Potentiometers, Multiturn-4750 — *See Vol. A*

Potentiometers, Nonlinear-4750 — *See Vol. A*

Potentiometers, Power — See Rheostats

Potentiometers, Rectilinear-4750 — *See Vol. A*

Potentiometers, Servo Mount-4750 — *See Vol. A*

Potentiometers, Sliding-4750 — *See Vol. A*

Potentiometers, Trimmer-4750 — *See Vol. A*

Potentiometers, Trimmer, Carbon Composition — See Potentiometers, Trimmer (Vol. A)

Potentiometers, Trimmer, Carbon Film — See Potentiometers, Trimmer (Vol. A)

Potentiometers, Trimmer, Ceramic Metal (CERMET) — See Potentiometers, Trimmer (Vol. A)

Potentiometers, Trimmer, Conductive Plastic — See Potentiometers, Trimmer (Vol. A)

Potentiometers, Trimmer, Hot Molded — See Potentiometers, Trimmer (Vol. A)

Potentiometers, Trimmer, Metal Film — See Potentiometers, Trimmer (Vol. A)

Potentiometers, Trimmer, Wirewound — See Potentiometers, Trimmer (Vol. A)

Potentiometers, Wirewound-4750 — *See Vol. A*

Potentiometers (MIL)-2440 — *See Vol. B*

Power Amplifiers — See Amplifiers, Power

Power Entry Module — See Adaptors, US to European Power

Power Line Monitor Printers — See Printers, Event (Vol. D)

Power Distribution Modules-4000

Power Dynamics, 59 Lakeside Ave., West Orange, NJ 07052, 201-762-6986 .... A◦1628
Automatic Switch Co., 50-60 Hanover Road, Florham Park, NJ 07932 1-201-966-2000
Brooks Mktg. Corp., 3569 Bristol Pike Bldg. 2 Ste 102, Bensalem, PA 19020 .... 215-244-0264;1-800-523-1551
Controlled Power Co., 1955 Stephenson Hwy., Troy, MI 48083 1-800-521-4792
† Eldre Corporation, 1500 Jefferson Rd., Rochester, NY 14623 716-427-7280
Emergency Power Engineering Inc., 3580 Cadillac Ave., Costa Mesa, CA 92606 714-557-1636

Power Modules-4000

Compower Div., Computer Prods., Inc., 2220 Lundy Ave., San Jose, CA 95131, 408-942-1600 .... D◦1553
Computer Prods. Inc., Power Conversion Grp., 2981 Gateway Dr., Pompano Bch., FL 33069-4803, 305-974-5500 .... D◦1553
† Ferrotran Elctrns. Co., Inc., 11 W. 25th St., New York, NY 10010, 212-691-3610 .... D◦1640-1641
Power Dynamics, 59 Lakeside Ave., West Orange, NJ 07052, 201-762-6986 .... A◦1628

Mitsubishi Elctrns. America, Inc., Semiconductor Div., 1050 East Arques Ave., Sunnyvale, CA 94086 408-730-5900
§ Underwriters Safety Device, Allied Amphenol Prods., 7300 W. Wilson Ave., Chicago, IL 60656 312-867-4600

Power Receptacles – See Sockets, Power

Power Supplies, AC to DC Adapter-4000

Arstan Products Intl. Ltd., 99 Jericho Tpke., Jericho, NY 11753, 516-333-8100 .... A•2119
D & B Power, Inc., 204 N. Fehr Way, P.O. Box 40M, Bayshore, NY 11706, 516-586-5955 .... D•1610-1611
Delta Electronic Ind. USA, Delta Elctrn. Ind. Co. Ltd., 3401 Investment Blvd., Ste. 5, Hayward, CA 94545, 415-785-5231;415-785-5235 .... D•1616-1617
Jerome Industries Corp., B 730 Division St., Elizabeth, NJ 07201, 201-353-5700 .... D•1678-1679
LZR Electronics, Inc., 8174 Beechcraft Ave., Gaithersburg, MD 20879, 301-921-9440 .... D•1716-1718
Multi Prods. Intl., 218 Little Falls Rd., P.O. Box 238, Cedar Grove, NJ 07009, 201-239-8183 .... A•2202
Pan-Magnetics Intl., Inc., 455-A Carson Plaza Dr., Carson, CA 90746, 213-532-1790 .... A•2217, D•1742-1743
Shogyo Intl. Corp., 287 Northern Blvd., Great Neck, NY 11021, 516-466-0911 .... A•2271
§ Able Power and Engineering Inc., 335 S. New Ave., # H, Monterey Park, CA 91754 714-891-3568
† Arnold Magnetics, 11520 W. Jefferson Blvd., Culver City, CA 90230 .... 213-390-3537/8837
§ ATR Elctrns., Inc., P.O. BOX 7008, St. Paul, MN 55107 ... 612-738-6520;414-297-7374
§ Ault, Incorporated, 1600 Freeway Blvd., Minneapolis, MN 55430 612-560-9300
Behlman Engineering, 1142 Mark Ave., Carpinteria, CA 93013 805-684-8311
† CEA Division of Berkleonics, Inc., A Subsidiary of EG & G, 1 Aerovista Pk., San Luis Obispo, CA 93401 805-544-5454
Conversion Equip. Corp., 330 W. Taft Avenue, Orange, CA 92665 714-637-2970
Datel, General Electric Co., 11 Cabot Blvd., Mansfield, MA 02048 617-339-9341
Del Elctrns. Corp., 250 E. Sandford Blvd., Mt. Vernon, NY 10550 914-699-2000
§† Electromech, Inc., 528 Elm Street, Kearny, NJ 07032 201-997-0950
Elgin Electronics, Combustion Engineering, 5533 New Perry Hwy., Erie, PA 16509-3570 814-864-4921
Energetec Systems, Inc., 130 E. St. Charles Rd., Carol Stream, IL 60188 312-653-1920
Engineering Design & Sls., Rt. 2, Box 305, Danville, VA 24540 804-685-7073
† Ferrotran Elctrns. Co., Inc., 11 W. 25th St., New York, NY 10010 212-691-3610
Golden Pacific Elctrns., Inc., 1020 N. Batavia St., Ste. Q, Orange, CA 92667 .... 714-538-9752/9753
§† Gra-Mar Inc., 3165 McCrory Pl., Ste. 265, Orlando, FL 32803 305-894-3351
† Gulton Industries, Inc., Engineered Magnetics Division, 13041 Cerise Ave., Hawthorne, CA 90250 213-679-0111
§ Heath Co., Benton Harbor, MI 49022 616-982-3886
International Instrumentation, 31131-602 Via Colinas, Westlake Vlg., CA 91362 213-991-9614
ISL Products Int'l, Ltd., 235 P Robbins Lane, Syosset, NY 11791-6093 .. 516-822-9601
James Electronics, 4050 N. Rockwell, Chicago, IL 60618 312-463-6500
MIL Electronics, Inc., 1 Mill st., Dracut, MA 01826 617-453-8000
† Modular Power Sys. Inc., P.O. Box 180579, Austin, TX 78718-0579 512-834-9262
† Pacific Electro Dynamics, Inc., 11465 Willows Rd. N.E., Redmond, WA 98052 206-881-1700
§ Philmore Mfg., 40 Inip Dr., Inwood, NY 11696 516-239-6161
Power Elctrns., 96 Milton Rd., Rochester, NH 03867 603-332-3334
Power Pac, 32 Meadow St., S. Norwalk, CT 06856 203-866-4484
† Powertec, Inc., 20550 Nordhoff St., Chatsworth, CA 91311 818-882-0004
Reliance Comm/Tec, Reliance Electric, P. O. Box 99502, Cleveland, OH 44199 .... 800-245-4501;in OH 800-245-4497
Reliance Electric Co., Marketing Info Center, P.O. Box 99502, Cleveland, OH 44199 .... 800-245-4501;800-245-4497 In Ohio
§ Shokai Far East, Ltd., 280 North Central Ave., Hartsdale, NY 10530 914-681-0700
Sorensen Co., 676 E. Island Pond Rd., Manchester, NH 03103 603-668-4500
§† Tauber Elctrns. Inc., 4901 Morena Blvd., Bldg. 314, San Diego, CA 92117 619-274-7242
§ Techni-Tool, 5 Apollo Rd., Box 368, Plymouth Meeting, PA 19462 215-825-4990
Transformation Elctrns. Corp., 170 Wilbur Pl., Bohemia, NY 11716 516-563-1117
TTE, Inc., 11650 W. Olympic Blvd., Los Angeles, CA 90064 213-478-8224

Power Supplies, AC Input, Up to 30 VDC Output-4000

Abbott Transistor Labs., Industrial Products Div., 8203 Vineland Ave., Sun Valley, CA 91352, 818-504-0644 .... D•1449
† Abbott Transistor Labs., Power Supply Div., 5200 W. Jefferson Blvd., Los Angeles, CA 90016, 213-936-8185 .... D•1449-1454,1460-1461
† Acopian, Box 638, Easton, PA 18044, 215-258-5441 .... D•1464-1469,1472-1491,1494-1497
§† Adtech Power Inc., 1620 S. Sunkist St., Anaheim, CA 92806, 714-634-9211 .... D•1499
Applied Power Conversion, Technology Dynamics, Inc., 100 School St., Bergenfield, NJ 07621, 201-664-7636 .... D•1500-1504
† Arnold Magnetics, 11520 W. Jefferson Blvd., Culver City, CA 90230, 213-390-3537/8837 .... D•1508-1511
Arstan Products Intl. Ltd., 99 Jericho Tpke., Jericho, NY 11753, 516-333-8100 .... A•2119
Astec USA, Ltd., A BSR Intl. Co., 2880 San Tomas Expwy., # 200, Santa Clara, CA 95051, 408-748-1200 .... D•1512-1513
§ Astron Corp., 2852 Walnut # E, Tustin, CA 92680, 714-832-7770 .... D•1515
Astrosystems, 6 Nevada Dr., Lake Success, NY 11042, 516-328-1600 .... D•1183,1517
§† Ault, Incorporated, 1600 Freeway Blvd., Minneapolis, MN 55430, 612-560-9300 .... D•1518-1519
§ B & K Precision, Industrial Electronics Product Group, Dynascan Corporation, 6460 W. Cortland, Chicago, IL 60635, 312-889-9087 .... D•1521
§ Boschert Inc., 384 Santa Trinita Ave., Sunnyvale, CA 94086, 408-732-2440 .... D•1539-1540
§† Calex Mfg. Co., Inc., 3355 Vincent Rd., Pleasant Hill, CA 94523, 415-932-3911 .... D•1542
California DC, 2150 Anchor Ct., Newbury Park, CA 91320, 805-499-3621;213-706-8221 .... D•1546
CES Elctrns., 2968 Avenue Z, Brooklyn, NY 11235 .... D•1606
Christie Elec. Corp., 20665 Manhattan Pl., Torrance, CA 90501, 213-320-0808 .... D•1548-1549
§ Compower Div., Computer Prods., Inc., 2220 Lundy Ave., San Jose, CA 95131, 408-942-1600 .... D•1554-1558
§ Computer Prods. Inc., Power Conversion Grp., 2981 Gateway Dr., Pompano Bch., FL 33069-4803, 305-974-5500 .... D•1551,1554-1567,1573
§ Condor D.C. Power Supplies, Inc., 201 Flynn Rd., Camarillo, CA 93010, 805-484-2851;800-235-5929 .... D•1588-1594,1597-1598
§ Converter Concepts, Inc., Industrial Pkwy., Pardeeville, WI 53954, 608-429-2144 .... D•1600-1603
Cord Electronics, Inc., 177 Cantiague Rock Rd., Westbury, NY 11590, 516-935-3640 .... D•1605
CPS Inc., 110 Wolfe Rd., Sunnyvale, CA 94086, 408-738-0530 .... D•1607
§ C-Tek Inc., 4 Railroad Ave., Wakefield, MA 01880, 617-246-1720 .... D•1115
D & B Power, Inc., 204 N. Fehr Way, P.O. Box 40M, Bayshore, NY 11706, 516-586-5955 .... D•1610-1611
Del Elctrns. Corp., 250 E. Sandford Blvd., Mt. Vernon, NY 10550, 914-699-2000 .... D•1615
Delta Electronic Ind. USA, Delta Elctrn. Ind. Co. Ltd., 3401 Investment Blvd., Ste. 5, Hayward, CA 94545, 415-785-5231;415-785-5235 .... D•1616-1617
Displex, Inc., Alexander Place, Glen Cove, NY 11542, 516-671-4400 .... D•1619
DVE/Caltronic Co., Ltd., A Sub. of Dee Van Entrp. Co., Ltd., 407 S. Palm Ave., Alhambra, CA 91803, 818-289-0310 .... D•1613
† EG & G Almond Instruments, 1330 E. Cypress St., Covina, CA 91724, 818-967-9521 .... D•1620-1621
Electronic Measurements, 405 Essex Rd., Neptune, NJ 07753, 201-922-9300 .... D•1622-1625
Elgenco, Inc., Box 460, Hurricane, UT 84737, 801-635-4954 .... D•1218
§ Elpac Power Sys., 3131 S. Standard Ave., Santa Ana, CA 92705, 714-979-4440 .... D•1627-1630
EMCO High Voltage Co., 11126 Ridge Road, Sutter Creek, CA 95685, 209-223-3626 .... D•1632
§ Epsco, 920 Westwood Ave., Addison, IL 60101, 312-543-0410 .... D•1634
† ERA Transpac Div., Sub. Elctrn. Research Assocs., 50 Graphic Place, Moonachie, NJ 07074, 201-641-3650 .... D•1635-1637
ETI Systems, Polaris Indl. Entprs., 215 Via Del Norte, Oceanside, CA 92054, 619-757-7770 .... D•1121
EVI, Inc., 8970 F Route 108, Columbia, MD 21045, 301-964-1660 .... D•1639
† Ferrotran Elctrns. Co., Inc., 11 W. 25th St., New York, NY 10010, 212-691-3610 .... D•1640-1641
§ Frederick Components Intl., 20806 Plummer St., Chatsworth, CA 91311, 818-882-0868;800-354-0660 .... D•1643
GFC/Hammond Elctrns., Inc., 1690 Walden Ave., Buffalo, NY 14225, 716-835-5742 .... D•1647
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303, Call Local Sls. Off. .... D•1653-1656
Hitran Corp., Agex, Rte. 31, RD 5-65, Flemington, NJ 08822, 201-782-5525 .... D•1660
International Power, 350 N. Lantana, Ste. 710, Camarillo, CA 93010, 805-987-7900 .... D•1670-1675
Jerome Industries Corp., B 730 Division St., Elizabeth, NJ 07201, 201-353-5700 .... D•1678-1679
KEC Elctrns., Inc., 20817 Western Ave., Torrance, CA 90501, 213-320-3902 .... D•1685-1687
† Keltec Florida, P.O. Box 2917, Ft. Walton Bch., FL 32549, 904-651-9749 .... D•1688
Kepco, Inc., 131-38 Sanford Ave., Flushing, NY 11352, 718-461-7000 .... D•1689-1700,1702-1709
Kikusui Intl. Corp., 17819 S. Figueroa St., Gardena, CA 90248, 213-515-6432;800-421-5334 .... D•1652
LaserSonics Power Supply Operation, 177 N. Wolfe Rd., Sunnyvale, CA 94086, 408-732-9880 .... D•1719
LZR Electronics, Inc., 8174 Beechcraft Ave., Gaithersburg, MD 20879, 301-921-9440 .... D•1717-1718
Marway Prods. Inc., 311 N. Clara St., Santa Ana, CA 92703, 714-973-1800 .... D•1944
Microcomputer Power, 15875 Concord Circle, Morgan Hill, CA 95037, 408-779-5700 .... D•1721-1723
Mid-Eastern Industries, 100 Campus Dr., RD 1, Mt. Holly, NJ 08060, 609-267-3811 .... D•1726
Modular Devices, 50 Orville Dr., Bohemia, NY 11716, 516-567-9620 .... D•1727
Multi Prods. Intl., 218 Little Falls Rd., P.O. Box 238, Cedar Grove, NJ 07009, 201-239-8183 .... A•2202, D•1728
National Power Technlg., 2111 Howell Ave., Anaheim, CA 92806, 714-937-1301 .... D•1730-1732
NJE Corporation, 329 Culver Rd, P.O. Box 669, Dayton, NJ 08810-0669, 201-329-4611 .... D•1733
§ North American Soar Corp., 11126 Cornell Ave., Cherry Hill, NJ 08002, 609-488-1060 .... D•1276
North Hills Elctrns., 1 Alexander Pl., Glen Cove, NY 11542, 516-671-5700 .... D•1734
† NWL Transformers, Rising Sun Rd., P.O. Box 358, Bordentown, NJ 08505, 609-298-7300 .... D•1735
§ Opamp Labs, Inc., 1033 N. Sycamore Ave., Los Angeles, CA 90038, 213-934-3566 .... D•1014
† OPT Inds. Inc., 300 Red School La., Phillipsburg, NJ 08865, 201-454-2600 .... D•1736,1738

Pan-Magnetics Intl., Inc., 455-A Carson Plaza Dr., Carson, CA 90746, 213-532-1790 ..... A•2217, D•1742-1743
Pioneer Magnetics, 1745 Berkeley St., Santa Monica, CA 90404, 213-829-6751 ..... D•1752-1753
Power Designs, Inc., 1700 Shames Dr., Westbury, NY 11590, 516-333-6200 ..... D•1755-1759
Power General, Unitrode, 152 Will Dr., Canton, MA 02021, 617-828-6216 ..... D•1760-1763,1766
§ Power-One, Inc., Power-One Linear Products, 740 Calle Plano, Camarillo, CA 93010, 805-987-8741 ..... D•1768-1773
§ Power Pac, 32 Meadow St., S. Norwalk, CT 06856, 203-866-4484 ..... D•1774-1778
§ Power Products Div., Computer Products, Inc., 2981 Gateway Drive, Pompano Beach, FL 33069, 305-974-2442 ..... D•1559-1567
Power Systems, 12 Tobey Rd., Bloomfield, CT 06002, 203-243-0357 ..... D•1780-1781
Powertec, Inc., 20550 Nordhoff St., Chatsworth, CA 91311, 818-882-0004 ..... D•1782-1789,1793-1799
† Power Ten, Inc., 486 Mercury Dr., Sunnyvale, CA 94086, 408-738-5959 ..... D•1779
Prime Power, Inc., Prime Technology Co., Twin Lakes Rd., P.O. Box 185, N. Branford, CT 06471, 203-481-5721 ..... D•1801
Qualidyne Sys., Unitech Ltd., 3055 Del Sol Blvd., San Diego, CA 92154, 619-429-7440;619-575-4400 ..... D•1804-1809
† RO Assocs., 246 Caspian Dr., Box 61419, Sunnyvale, CA 94088, 408-744-1450 ..... D•1812
§† RTE, Power/Mate Co., 514 S. River St., Hackensack, NJ 07601, 201-440-3100 ..... D•1816-1827
§ Secoinsa/Digi Power, 686 E. Gish Rd., San Jose, CA 95112, 408-288-5600 ..... D•1830-1832
Shogyo Intl. Corp., 287 Northern Blvd., Great Neck, NY 11021, 516-466-0911 ..... A•2271
§ Sierracin/Power Systems, 20500 Plummer St., Chatsworth, CA 91311, 818-998-9873 ..... D•1834-1836
§ Sola, A Unit of General Sign., 1717 Busse Rd., Elk Grove Village, IL 60007, 312-439-2800 ..... D•1838-1839
Stevens-Arnold Div., Computer Prods., Inc., 7 Elkins St., So. Boston, MA 02127, 617-268-1170 ..... D•1573
† Summit Elctrns., 750 S. Sherman, Richardson, TX 75081, 214-231-1456 ..... D•1846-1847
Taylor Electronics, Inc., 401 West Orion, Tempe, AZ 85283, 602-838-4523 ..... D•1848
§ TDK Corporation of America, 4711 Golf Rd., Skokie, IL 60076, 312-679-8200 ..... D•1849
† Technipower, A Penril Co., P.O. Box 222, Commerce Pk., Danbury, CT 06810, 203-748-7001 ..... D•1850
† Technology Dynamics, 91 E. Carver Ave., Westwood, NJ 07675, 201-664-7636 ..... D•1851
Texmate, Inc., 348 S. Cedros Ave., P.O. Box 2000, Solana Beach, CA 92075, 619-481-7177 ..... D•1379
TII Electronics, Inc., Div. TII Industries, 226 Terminal Rd., E. Setauket, NY 11733, 516-789-5004 ..... D•1852-1853
Todd Prods. Corp., 50 Emjay Blvd., Brentwood, NY 11717, 516-231-3366 ..... D•1854-1855
Toko America, Inc., 1250 Feehanville Dr., Mt. Prospect,, IL 60056, 312-297-0070 ..... D•1856
Transformation Elctrns. Corp., 170 Wilbur Pl., Bohemia, NY 11716, 516-563-1117 ..... D•1857
§ VIZ Test Equipment, Div. VIZ Mfg., 335 E. Price St., Philadelphia, PA 19144, 215-844-2626 ..... D•1864
Voltex, 3460 Great Neck Rd., Amityville, NY 11701, 516-842-2772 ..... D•1865
§† Xentek, Inc., 279 S. Pacific St., San Marcos, CA 92069, 619-744-3346 ..... D•1870-1873
Xylog Corp., 150 Tillman St., Westwood, NJ 07675, 201-664-7997 ..... D•1875
§ AAK Corp, 747 River St., Haverhill, MA 01830 617-373-3769
§ Able Power and Engineering Inc., 335 S. New Ave., # H, Monterey Park, CA 91754 714-891-3568
§ ACDC Electronics, 401 Jones Rd., Oceanside, CA 92054 619-757-1880
§† ACD-Elcor Products, P.O. Box 244, Bethel, CT 06801 203-743-3510
§ Action Instrs., 8601 Aero Dr., San Diego, CA 92123 619-279-5726
§† Adapter/Charger Prdts., Box 3218, Peoria, IL 61614 309-691-0810
Advance Conversion Devices Co., 274 S. Salem St., Randolph, NJ 07869 201-989-0095
AES Corp., 285 Newbury St., P.O. Box 2093, Peabody, MA 01960 617-535-7310
† Alarm Controls, 19 Brandywine Dr., Deer Park, NY 11729 516-586-4220
Albar, Inc., 19013 36th Ave. W., Lynnwood, WA 98036 206-771-4006
† AMETEK, Dynamics Division, AMETEK, Inc., 5649 Peck Rd., Arcadia, CA 91006 818-442-5981
† Anadyne Power Supply Division, 721 W. Whittier Blvd., La Habra, CA 90631 213-697-3116
† Analog Devices, P.O. Box 280, Norwood, MA 02062 617-329-4700
Analogic Corp., 8 Centennial Dr., Peabody, MA 01961 ..... 617-532-5660;617-777-4500; 617-246-0300;800-451-1
† Argent Elctrns., 3245 S. County Rd., 25A, Troy, OH 45373 513-335-0031
Astro-Geo-Marine, Inc., 202 E. Cota St., Santa Barbara, CA 93101 805-965-7005
† ATC Power Systems, Inc., 472 Amherst Street, Nashua, NH 03063 603-882-1366
§ ATR Elctrns., Inc., P.O. BOX 7008, St. Paul, MN 55107 ..... 612-738-6520;414-297-7374
† Autronics, 314 E. Live Oak, Ste. A, Arcadia, CA 91006 818-445-5470
† Babcock, Inc., 1717 West Collins Ave., Orange, CA 92667 714-633-3700
Basler Elec., Rte. 143, Highland, IL 62249 618-654-2341
Bertsch U.S., Sycamore Resch. Ctr., 2142F Industrial Ct., Vista, CA 92083 619-727-7420
§ B.H. Inds., Inc., 5784 Venice Blvd., Los Angeles, CA 90019 213-937-4763
BICC-Vero Elctrns., Inc., 40 Lindeman Drive, Trumbull, CT 06611 203-372-0038
† Bikor, 1504 W. 228th St., Torrance, CA 92718 213-539-6320
† Brandt Elctrns., Inc., 1220 Alderwood Ave., Sunnyvale, CA 94086 408-734-8310
Burr-Brown Corp., P.O. Box 11400, Tucson, AZ 85734 602-746-1111
† Cal-Power Corp., 140 Kansas St., El Segundo, CA 90245 213-772-2171
† CEA Division of Berkleonics, Inc., A Subsidiary of EG & G, 1 Aerovista Pk., San Luis Obispo, CA 93401 805-544-5454
† CEAG Elec. Corp., Power Supp. Div., 1324 Motor Pkwy., Hauppauge, NY 11788 516-582-4422
CEC, 330 W. Taft Ave., Orange, CA 92665 714-637-2970
Centent Co., 3879 S. Main St., Santa Ana, CA 92707 714-979-6491
† Chloride Power Electronics, 10931 Pellicano Drive, El Paso, TX 79935 915-592-9985
§ Cincinnati Electrosys., 469 Wards Corner Rd., Loveland, OH 45140 513-831-4347
CML MACARR Div., Marine Electric RPD, Inc., 666 Pacific St., Brooklyn, NY 11217 718-857-2400
Connect-Air International, Inc., 50 37th St. N.E., Auburn, WA 98002 206-939-4880
§ Conver Corp., 10629 Bandley Dr., Cupertino, CA 95014 408-255-0151
Conversion Equip. Corp., 330 W. Taft Avenue, Orange, CA 92665 714-637-2970
Cost Effective Systems, Inc., Two LeMans Pl., Pine Brook, NJ 07058 201-575-5514
Cross Elctrns., 100 Commonwealth Dr., Warrendale, PA 15086 412-776-1591
Datadyne, Box 247, King of Prussia, PA 19406 215-666-5751
† Datametrics Corp., Defense Products Div., 7630 Gloria Ave., Van Nuys, CA 91406 818-989-3840
Datapower, Inc., 3328 West First St., Santa Ana, CA 92703 714-775-2000
Datel, General Electric Co., 11 Cabot Blvd., Mansfield, MA 02048 617-339-9341
§ Deltron, Inc., P.O. Box 1369, Wissahickon Ave., N. Wales, PA 19454-9990 215-699-9261
Dial Prods. Co., 19-21 Cottage St., Bayonne, NJ 07002 ..... 201-HE7-0720
Digital Equip., One Iron Way, Marlborough, MA 01752
Digital Power Corp., 686 East Gish Rd., San Jose, CA 95112 408-288-5600
Dio-Rey, Div. of Info-Lite, 422 Cliff St., Fairview, NJ 07022 201-941-4455
§† Dormeyer Inds., 3418 N. Milwaukee, Chicago, IL 60641 312-283-4000
Dotronix, 160 First St. SE, New Brighton, MN 55112 612-633-1742
§† Dressen-Barnes Elctrns., 1600 E. Valencia Dr., Fullerton, CA 92631 714-871-3020
§ Dyma Engrg., Box 1535, Los Lunas, NM 87031 505-865-6700
§ Dynatronix, Inc., 105 Power St., Amery, WI 54001 ..... 715-268-8118;800-826-7172
† Eldec Corp., Power Conversion Div., 16700 13th Ave. W., P.O. Box 100, Lynnwood, WA 98036 206-743-1313
§† Electromech, Inc., 528 Elm Street, Kearny, NJ 07032 201-997-0950
§ Electronic Solutions, 9255 Chesapeake Drive, San Diego, CA 92123 ..... 619-292-0242; 800-854-7086
Electro-Pacific, 5782 Thornwood Dr., Goleta, CA 93017 805-964-0751
Electro Physics, 1910 West Birchwood Ave., Chicago, IL 60626 312-274-9669
Electrostatics, 7718 Clairemont Mesa Blvd., San Diego, CA 92111 619-279-1414
Electro Vector, Inc., 6555 Covey Rd., Forestville, CA 95436 707-887-2292
Elgin Electronics, Combustion Engineering, 5533 New Perry Hwy., Erie, PA 16509-3570 814-864-4921
Elma Engrg., 1066 E. Meadow Circle, Palo Alto, CA 94303 415-494-7303
Energetec Systems, Inc., 130 E. St. Charles Rd., Carol Stream, IL 60188 312-653-1920
Engd. Prod., Div. of Acme Elec. Corp., 40 Water St., Cuba, NY 14727 716-968-2400
Engineering Design & Sls., Rt. 2, Box 305, Danville, VA 24540 804-685-7073
§† E-Tronics, 16774 Schoenborn, Sepulveda, CA 91343 213-892-7279
§ Facet Enterprises, Inc., Elmira, NY 14903 607-737-8011
Fluke, John, Mfg. Co., Box C9090, MS 250C, Everett, WA 98206 206-356-5400
§† Franek, John, Co., Inc., P.O. Box 11752, Santa Ana, CA 92711-1752 ..... 714-832-0290; 800-854-9420
Frequency Control Prods., Inc., American Time Prods. Div., 61-20 Woodside Ave., Woodside, NY 11377 212-458-5811
Frequency Devices, Inc., 25 Locust St., Haverhill, MA 01830 617-374-0761
General Resistance, Inc., A Prime Technology Company, Twin Lakes Rd., P.O. Box 185, N. Branford, CT 06471 203-481-5721
† Georator Corp., Box 70, Manassas, VA 22110 703-368-2101
§ Global Specialties, Interplex Electronics, Inc., 70 Fulton Terrace, P.O. Box 1942, New Haven, CT 06509 203-624-3103
§ GMR Co., 8801 Sepulveda Blvd., Los Angeles, CA 90045 213-216-9516
Golden Pacific Elctrns., Inc., 1020 N. Batavia St., Ste. Q, Orange, CA 92667 ..... 714-538-9752/9753
† Good-All Electric, Inc., 3725 Canal Drive, Fort Collins, CO 80524 303-484-3080
§† Gra-Mar Inc., 3165 McCrory Pl., Ste. 265, Orlando, FL 32803 305-894-3351
† Gulton Industries, Inc., Engineered Magnetics Division, 13041 Cerise Ave., Hawthorne, CA 90250 213-679-0111
Halmar Electronics, Inc., 900 N. Hague Ave., Columbus, OH 43204 614-275-0131
Hameg, Inc., 88-90 Harbor Rd., Port Washington, NY 11050 516-883-3837
§ Harris Corp., Dracon Div., 809 Calle Plano, Camarillo, CA 93010 805-987-9511
§ Heath Co., Benton Harbor, MI 49022 616-982-3886
† Helionetics, Inc., DECC Div., 17312 Eastman St., Irvine, CA 92714 ..... 714-546-4731; 800-421-7915
† Hoffman Engineering Corp., P.O. Box 300, Old Greenwich, CT 06870 203-325-8933
Hybrid Systems Corp., 22 Linnell Circle, Billerica, MA 01821 617-667-8700
Interelectronics Corp., Interelectronics Park, 550 U.S. Rte. 303, Congers, NY 10920 ..... 914-EL8-8000
International Instrumentation, 31131-602 Via Colinas, Westlake Vlg., CA 91362 213-991-9614
Intronics, Inc., 57 Chapel St., Newton, MA 02158 617-964-4000
ISL Products Int'l, Ltd., 235 P Robbins Lane, Syosset, NY 11791-6093 516-822-9601
ITT Power Systems Corp., Box 688, Galion, OH 44833-0688 419-468-8100
James Electronics, 4050 N. Rockwell, Chicago, IL 60618 312-463-6500
Julie Resch. Labs., 211 West 61st St., New York, NY 10023 212-245-2727
Keltlon Corp., Viking Modules Div., 225 Crescent St., Waltham, MA 02154 617-894-8700
KGS Electronics, Inc., GAR Entprs., 2029 N. Lincoln Ave., Pasadena, CA 91103 818-798-0786
Kode, 1515 S. Manchester Ave., Anaheim, CA 92802 714-758-0400
Lambda Electronics, Veeco Instr., Inc., 515 Broad Hollow Rd., Melville, NY 11747 516-694-4200
L-Com Inc., 1755 Osgood St., Unit 11EM, N. Andover, MA 01845 617-682-6936
§ Leader Instrs. Corp., 380 Oser Ave., Hauppauge, NY 11788-3694 516-231-6900
§ Lectrotech, Inc., 5810 N. Western Ave., Chicago, IL 60659 312-769-6262
LH Research, Inc., 14402 Franklin Ave., Tustin, CA 92680 714-730-0162
Lorain Prods., 1122 F St., Lorain, OH 44052 216-288-1122

LuTechnology, Inc., 3516 Breakwater Ct., Hayward, CA 94545 415-887-1955
† M/A-COM Microwave Power Dvcs., 330 Oser Ave., Hauppauge, NY 11788 516-231-1400
MacPower, 9115 26th Ave., Kenosha, WI 53140 414-694-8866
Mag-Con, 1626 Terrace Dr., St. Paul, MN 55113 612-633-8820
† Magnetek, 7315 Red Deer Dr., Boulder, CO 80301-4696 303-442-6700
† Magnetico Inc., 182 Morris Ave., Holtsville, NY 11742 516-654-1166
Magnetran Corp., 5701 Savoy Lane, Houston, TX 77036 713-785-4202
Magnum Opus Custom Elctrn. Engrg., 284 Kennedy St., Iselin, NJ 08830 201-283-4925
† Megatran Electronic Power, Rising Sun Rd., Bordentown, NJ 08505 609-298-7300
Melcher, Inc., 6290 Sunset Blvd., #1126, Los Angeles, CA 90028 213-463-5617
Micro Power Intl., Inc., 9420 Activity Rd., San Diego, CA 92126 619-271-0831
MIL Electronics, Inc., 1 Mill st., Dracut, MA 01826 617-453-8000
† Milwaukee Transformer Co., MTE Corporation, 7901 W. Clinton Avenue, Milwaukee, WI 53223 414-358-5300
Modular Audio Prods., Modular Devices Inc., 50 Orville Dr., Bohemia, NY 11716 516-567-9620
† Modular Power Sys. Inc., P.O. Box 180579, Austin, TX 78718-0579 512-834-9262
Monolithic Sys., 84 Inverness Circle E., Englewood, CO 80112 303-790-7400
MPC Sys., Div. of Consulting Systems, RFD Box 441, Fremont, NH 03044 603-642-5913
§ Murata Mfg. Co., Ltd., 26-10-2-chome-Tenjin, Nagaoka-Kyo-Shi, Kyoto, Japan, JAPAN 075-951-9111
† Novatronics, Box 878, Pompano Beach, FL 33061 305-942-5200
† NWL Transformers, Rising Sun Rd., P.O. Box 358, Bordentown, NJ 08505 609-298-7300
Omega Engrg., Box 4047, Stamford, CT 06907 203-359-1660
§ Paccom, 3928 148th NE, Redmond, WA 98052 .... 206-883-9200;800-426-6254
† Pacific Electro Dynamics, Inc., 11465 Willows Rd. N.E., Redmond, WA 98052 206-881-1700
Pacific Instrs. Inc., 215 Mason Circle, Concord, CA 94518 415-827-9010
Pathcom, Inc., Pace Two-Way Radio Prods., 24105 S. Frampton Ave., Harbor City, CA 90710 213-325-1290
§ Payne Engrg., Box 70, Scott Depot, WV 25560 304-757-7353
Polytron Devices, Box 398 - River St. Sta., Paterson, NJ 07544 201-345-5885
§ Potter & Brumfield, AMF Incorporated, 200 S. Richland Creek Dr., Princeton, IN 47671-0001 812-386-1000
Powerbox, Inc., 1860 Broadway, New York, NY 10023 212-586-1992
Power Comps. Co., Vanguard Elctrns. Co., 1480 W. 178th St., Gardena, CA 90248 213-323-8120
† Powercube Corp., Sub. Unitrode Corp., 8 Suburban Pk. Dr., Billerica, MA 01821 617-667-9500
Power Elctrns., 96 Milton Rd., Rochester, NH 03867 603-332-3334
§† Power Labs, Inc., 5 Towle Ave., Dover, NH 03820 603-742-4613
§ Power-One, Inc., Power-One Switching Products, 833 Flynn Rd., Camarillo, CA 93010 805-482-0757
† Power Sys. Grp., Rantec Div., Emerson Elec., 9401 Oso Ave., Chatsworth, CA 91311 818-885-8223
Precision Components, Inc., 1110 W. National Ave., Addison, IL 60101 312-543-6400
§† PTS Electronics Inc., Box 272, Bloomington, IN 47401 812-824-9331
Pulse Instrs. Co., 1234 Francisco, Torrance, CA 90502 213-515-5330
§ Pylon Elex Development Co. Ltd., 2300 Victoria, Lachine, PQ, CANADA H8S 1Z3 514-637-1186
§ Ratelco, 1260 Mercer, Dept. EEM, Seattle, WA 98109 206-624-7770
Reich Assocs., Rt. 4, Box 4620, Lakehills, TX 78063 512-751-3220
§ REI Sls., 19525 Business Centre Dr., Northridge, CA 91324 617-938-0900
Reliance Electric Co., Marketing Info Center, P.O. Box 99502, Cleveland, OH 44199 .... 800-245-4501;800-245-4497 In Ohio
RIFA, Inc., Greenwich Off. Pk. 3, P.O. Box 3110, Greenwich, CT 06836-3110 203-625-7300
S & H Inds., 119 Glen Cove Dr., Glen Head, NY 11545 516-671-5600
Sanford-Miller Corp., 8 John St., Lynbrook, NY 11563 .... 516-593-2025;Outside NY 800-645-5900
§ Semiconductor Circuits, 49 Range Rd., Windham, NH 03087 603-893-2330
† Sigmapower, Inc., 20790 Leapwood Ave., Carson, CA 90746 .... 213-32-Sigma
§ Sinclair Radio Labs., 122 Rayette Rd., Concord, ONT, CANADA L9W2Y8 416-669-1244
§† Sorensen Co., 676 E. Island Pond Rd., Manchester, NH 03103 603-668-4500
§ Spectra Sonics, 3750 Airport Rd., Ogden, UT 84403 801-392-7531
§ Standard Power, Inc., 1400 S. Village Way, Santa Ana, CA 92705 714-558-8512
Struthers-Dunn, Inc., Lamb's Rd., Pitman, NJ 08071 609-589-7500
§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 215-673-5600
† Superior Mfg. & Instr., 19-36 38th St., Long Island City, NY 11105 212-932-1800
Switching Systems Intl., 1827 No. Case St., Orange, CA 92665 714-921-1153
Systron-Donner Instr. Div., 2727 Systron Dr., Concord, CA 94518 415-676-5000
Tauber Elctrns. Inc., 4901 Morena Blvd., Bldg. 314, San Diego, CA 92117 619-274-7242
Technical Research & Mfg., Inc., R.F.D. #10, Manchester, NH 03103 603-627-6000
Tecnetics, Box 910, Boulder, CO 80306 303-442-3837
Teco Corp., Bay Rd., P. O. Box A, Winnisquam, NH 03289 603-524-1998
Tecron Industrial Prods., Crown Intl., Inc., 1718 W. Mishawaka Rd., Elkhart, IN 46517 219-294-8300
Telco Products Co., 44 Sea Cliff, Glen Cove, NY 11542 516-759-0300
Teledyne Philbrick, Allied Dr. Rte 128, Dedham, MA 02026 617-329-1600
Telesis Laboratory, Box 1972, Chillocothe, OH 45601 614-642-5000
§ Tennelec, 601 Turnpike, Oak Ridge, TN 37830 615-483-8405
§ Ten-Tec, Inc., Industrial Park, Sevierville, TN 37862 615-453-7172
§ Tidewater Technological, Inc., 611 Industrial Pk. Dr., Newport News, VA 23602 804-874-2800
† Transistor Devices, 274 S. Salem St., Randolph, NJ 07869 201-361-6622
§ TransKinetic Sys., 110 Shawmut Rd., Canton, MA 02021 617-828-3000
† Trio Labs., 80 Dupont St., Plainview, NY 11803 516-349-0400
§ Tripp-Lite, 500 No. Orleans, Chicago, IL 60610 312-329-1777
TTE, Inc., 11650 W. Olympic Blvd., Los Angeles, CA 90064 213-478-8224
§ Tucker Elctrns., Box 461966, Garland, TX 75046 .... 214-348-8800;800-527-4642
Ulveco, Inc., 323 Vintage Park Drive, Foster City, CA 94404 415-574-1100
Universal Voltronics, 27 Radio Circle Dr., Mt. Kisco, NY 10549 914-241-1300
§ Urban Elctrns., P. O. Box 456, Dover, MA 02030 617-329-4068
§ Vidaire Electronics Mfg. Corp., P. O. Box 788, Freeport, NY 11520 516-623-6696
Vistar Corp., 13740 McCormick Dr., Tampa, FL 33625 813-855-6611
† Voltampere Corp., 146 Horton Ave., Lynbrook, NY 11563 516-887-9443
Walker Scientific, Rockdale St., Worcester, MA 01606 617-852-3674
Wall Inds., 2 Franklin, Lawrence, MA 01840 617-688-1287
Wilmore Elctrns. Co., Box 1329, Hillsborough, NC 27278 919-732-9351
† Workman Elctrn. Prods., Box 3828, Sarasota, FL 33578 813-371-4242
Zenith CRT & Components Operations, 1000 Milwaukee Ave., Glenview, IL 60025 312-391-7733

Power Supplies, AC Input, 31 to 300 VDC Output-4000

† Acopian, Box 638, Easton, PA 18044, 215-258-5441 .... D•1464-1465,1468-1469,1472-1479,1481-1483,1486-1491,1495-1497
§† Adtech Power Inc., 1620 S. Sunkist St., Anaheim, CA 92806, 714-634-9211 .... D•1499
Applied Power Conversion, Technology Dynamics, Inc., 100 School St., Bergenfield, NJ 07621, 201-664-7636 .... D•1500
† Arnold Magnetics, 11520 W. Jefferson Blvd., Culver City, CA 90230, 213-390-3537/8837 .... D•1508-1511
§ Ault, Incorporated, 1600 Freeway Blvd., Minneapolis, MN 55430, 612-560-9300 .... D•1518-1519
† Bikor, 1504 W. 228th St., Torrance, CA 92718, 213-539-6320 .... D•1536
§ Boschert Inc., 384 Santa Trinita Ave., Sunnyvale, CA 94086, 408-732-2440 .... D•1539
CES Elctrns., 2968 Avenue Z, Brooklyn, NY 11235 .... D•1606
Christie Elec. Corp., 20665 Manhattan Pl., Torrance, CA 90501, 213-320-0808 .... D•1548-1549
§ Computer Prods. Inc., Power Conversion Grp., 2981 Gateway Dr., Pompano Bch., FL 33069-4803, 305-974-5500 .... D•1551,1559
§ Converter Concepts, Inc., Industrial Pkwy., Pardeeville, WI 53954, 608-429-2144 .... D•1600
Cord Electronics, Inc., 177 Cantiague Rock Rd., Westbury, NY 11590, 516-935-3640 .... D•1605
CPS Inc., 110 Wolfe Rd., Sunnyvale, CA 94086, 408-738-0530 .... D•1607
† Del Elctrns. Corp., 250 E. Sandford Blvd., Mt. Vernon, NY 10550, 914-699-2000 .... D•1614-1615
Delta Electronic Ind. USA, Delta Elctrn. Ind. Co. Ltd., 3401 Investment Blvd., Ste. 5, Hayward, CA 94545, 415-785-5231;415-785-5235 .... D•1616-1617
Displex, Inc., Alexander Place, Glen Cove, NY 11542, 516-671-4400 .... D•1619
† EG & G Almond Instruments, 1330 E. Cypress St., Covina, CA 91724, 818-967-9521 .... D•1620-1621
Electronic Measurements, 405 Essex Rd., Neptune, NJ 07753, 201-922-9300 .... D•1622-1625
§ Elpac Power Sys., 3131 S. Standard Ave., Santa Ana, CA 92705, 714-979-4440 .... D•1627
EMCO High Voltage Co., 11126 Ridge Road, Sutter Creek, CA 95685, 209-223-3626 .... D•1632
§ Epsco, 920 Westwood Ave., Addison, IL 60101, 312-543-0410 .... D•1634
† ERA Transpac Div., Sub. Elctrn. Research Assocs., 50 Graphic Place, Moonachie, NJ 07074, 201-641-3650 .... D•1636
† Ferrotran Elctrns. Co., Inc., 11 W. 25th St., New York, NY 10010, 212-691-3610 .... D•1640-1641
Glassman High Voltage Inc., P.O. Box 551, Salem Indl. Pk., Whitehouse Sta., NJ 08889, 201-534-9007 .... D•1234-1235
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303, Call Local Sls. Off. .... D•1653-1656
Hitran Corp., Agex, Rte. 31, RD 5-65, Flemington, NJ 08822, 201-782-5525 .... D•1660
International Power, 350 N. Lantana, Ste. 710, Camarillo, CA 93010, 805-987-7900 .... D•1670-1675
Kepco, Inc., 131-38 Sanford Ave., Flushing, NY 11352, 718-461-7000 .... D•1689-1691,1702,1704-1709
Kikusui Intl. Corp., 17819 S. Figueroa St., Gardena, CA 90248, 213-515-6432;800-421-5334 .... D•1652
LaserSonics Power Supply Operation, 177 N. Wolfe Rd., Sunnyvale, CA 94086, 408-732-9880 .... D•1719
Microcomputer Power, 15875 Concord Circle, Morgan Hill, CA 95037, 408-779-5700 .... D•1721-1723
Mid-Eastern Industries, 100 Campus Dr., RD 1, Mt. Holly, NJ 08060, 609-267-3811 .... D•1724-1726
Modular Devices, 50 Orville Dr., Bohemia, NY 11716, 516-567-9620 .... D•1727
NJE Corporation, 329 Culver Rd, P.O. Box 669, Dayton, NJ 08810-0669, 201-329-4611 .... D•1733
North Hills Elctrns., 1 Alexander Pl., Glen Cove, NY 11542, 516-671-5700 .... D•1734
† NWL Transformers, Rising Sun Rd., P.O. Box 358, Bordentown, NJ 08505, 609-298-7300 .... D•1735
† NWL Transformers, Rising Sun Rd., P.O. Box 358, Bordentown, NJ 08505, 609-298-7300 .... D•1735
§ Opamp Labs, Inc., 1033 N. Sycamore Ave., Los Angeles, CA 90038, 213-934-3566 .... D•1014
Pioneer Magnetics, 1745 Berkeley St., Santa Monica, CA 90404, 213-829-6751 .... D•1752-1753
Power Designs, Inc., 1700 Shames Dr., Westbury, NY 11590, 516-333-6200 .... D•1755-1759
Power General, Unitrode, 152 Will Dr., Canton, MA 02021, 617-828-6216 .... D•1760
§ Power-One, Inc., Power-One Linear Products, 740 Calle Plano, Camarillo, CA 93010, 805-987-8741 .... D•1768-1770
§ Power Pac, 32 Meadow St., S. Norwalk, CT 06856, 203-866-4484 .... D•1778
Power Products Div., Computer Products, Inc., 2981 Gateway Drive, Pompano Beach, FL 33069, 305-974-2442 .... D•1559

Power Systems, 12 Tobey Rd., Bloomfield, CT 06002, 203-243-0357	**D•1780-1781**
Powertec, Inc., 20550 Nordhoff St., Chatsworth, CA 91311, 818-882-0004	**D•1782,1785-1786,1793-1794,1797-1799**
§ Power Technology, Inc., P.O. Box 9769, Little Rock, AR 72219, 501-568-1995	**B•1125**
† Power Ten, Inc., 486 Mercury Dr., Sunnyvale, CA 94086, 408-738-5959	**D•1779**
Prime Power, Inc., Prime Technology Co., Twin Lakes Rd., P.O. Box 185, N. Branford, CT 06471, 203-481-5721	**D•1801**
Qualidyne Sys., Unitech Ltd., 3055 Del Sol Blvd., San Diego, CA 92154, 619-429-7440;619-575-4400	**D•1804,1806-1808**
Taylor Electronics, Inc., 401 West Orion, Tempe, AZ 85283, 602-838-4523	**D•1848**
† Technipower, A Penril Co., P.O. Box 222, Commerce Pk., Danbury, CT 06810, 203-748-7001	**D•1850**
† Technology Dynamics, 91 E. Carver Ave., Westwood, NJ 07675, 201-664-7636	**D•1851**
Tecron Industrial Prods., Crown Intl., Inc., 1718 W. Mishawaka Rd., Elkhart, IN 46517, 219-294-8300	**D•1019-1020**
§ VIZ Test Equipment, Div. VIZ Mfg., 335 E. Price St., Philadelphia, PA 19144, 215-844-2626	**D•1864**
Voltex, 3460 Great Neck Rd., Amityville, NY 11701, 516-842-2772	**D•1865**
§ Xentek, Inc., 279 S. Pacific St., San Marcos, CA 92069, 619-744-3346	**D•1872-1873**
§ AAK Corp, 747 River St., Haverhill, MA 01830	617-373-3769
Abbott Transistor Labs., Industrial Products Div., 8203 Vineland Ave., Sun Valley, CA 91352	818-504-0644
† Abbott Transistor Labs., Power Supply Div., 5200 W. Jefferson Blvd., Los Angeles, CA 90016	213-936-8185
§ Able Power and Engineering Inc., 335 S. New Ave., #H, Monterey Park, CA 91754	714-891-3568
ACDC Electronics, 401 Jones Rd., Oceanside, CA 92054	619-757-1880
§ ACD-Elcor Products, P.O. Box 244, Bethel, CT 06801	203-743-3510
Advance Conversion Devices Co., 274 S. Salem St., Randolph, NJ 07869	201-989-0095
Advanced High Voltage Co., Inc., P.O. Box 2136, Lancaster, CA 93539-2136	213-997-7222
Albar, Inc., 19013 36th Ave. W., Lynnwood, WA 98036	206-771-4006
† American Monarch, 2801-37th Ave., N.E., Minneapolis, MN 55421	612-788-9161
† AMETEK, Dynamics Division, AMETEK, Inc., 5649 Peck Rd., Arcadia, CA 91006	818-442-5981
Analogic Corp., 8 Centennial Dr., Peabody, MA 01961	617-532-5660;617-777-4500; 617-246-0300
† Argent Elctrns., 3245 S. County Rd., 25A, Troy, OH 45373	513-335-0031
Associated Specialties, 1751 Main St., Orefield, PA 18069	215-395-9172
Astec USA, Ltd., A BSR Intl. Co., 2880 San Tomas Expwy., #200, Santa Clara, CA 95051	408-748-1200
Astro-Geo-Marine, Inc., 202 E. Cota St., Santa Barbara, CA 93101	805-965-7005
Astrosystems, 6 Nevada Dr., Lake Success, NY 11042	516-328-1600
† Autronics, 314 E. Live Oak, Ste. A, Arcadia, CA 91006	818-445-5470
† Babcock, Inc., 1717 West Collins Ave., Orange, CA 92667	714-633-3700
§ B & K Precision, Industrial Electronics Product Group, Dynascan Corporation, 6460 W. Cortland, Chicago, IL 60635	312-889-9087
Basler Elec., Rte. 143, Highland, IL 62249	618-654-2341
Bertan Assocs., 121 New South Rd., Hicksville, NY 11801	516-433-3110
Bertsch U.S., Sycamore Resch. Ctr., 2142F Industrial Ct., Vista, CA 92083	619-727-7420
† Brandt Elctrns., Inc., 1220 Alderwood Ave., Sunnyvale, CA 94086	408-734-8310
Burr-Brown Corp., P.O. Box 11400, Tucson, AZ 85734	602-746-1111
Calex Mfg. Co., Inc., 3355 Vincent Rd., Pleasant Hill, CA 94523	415-932-3911
California DC, 2150 Anchor Ct., Newbury Park, CA 91320	805-499-3621; 213-706-8221
† Cal-Power Corp., 140 Kansas St., El Segundo, CA 90245	213-772-2171
† CEA Division of Berkleonics, Inc., A Subsidiary of EG & G, 1 Aerovista Pk., San Luis Obispo, CA 93401	805-544-5454
† CEAG Elec. Corp., Power Supp. Div., 1324 Motor Pkwy., Hauppauge, NY 11788	516-582-4422
† Chloride Power Electronics, 10931 Pellicano Drive, El Paso, TX 79935	915-592-9985
† CML MACARR Div., Marine Electric RPD, Inc., 666 Pacific St., Brooklyn, NY 11217	718-857-2400
Computer Power, 124E W. Main St., High Bridge, NJ 08829	201-735-8000
§ Condor D.C. Power Supplies, Inc., 201 Flynn Rd., Camarillo, CA 93010	805-484-2851; 800-235-5929
Connect-Air International, Inc., 50 37th St. N.E., Auburn, WA 98002	206-939-4880
Continental Resources, Inc., 175 Middlesex Tpke., Bedford, MA 01730	617-275-0850
Conversion Equip. Corp., 330 W. Taft Avenue, Orange, CA 92665	714-637-2970
Cross Elctrns., 100 Commonwealth Dr., Warrendale, PA 15086	412-776-1591
Datadyne, Box 247, King of Prussia, PA 19406	215-666-5751
† Datametrics Corp., Defense Products Div., 7630 Gloria Ave., Van Nuys, CA 91406	818-989-3840
Datapower, Inc., 3328 West First St., Santa Ana, CA 92703	714-775-2000
Datel, General Electric Co., 11 Cabot Blvd., Mansfield, MA 02048	617-339-9341
§ Deltron, Inc., P.O. Box 1369, Wissahickon Ave., N. Wales, PA 19454-9990	215-699-9261
Dial Prods. Co., 19-21 Cottage St., Bayonne, NJ 07002	201-HE7-0720
§ Digiac Corp., 175 Engineers Rd., Hauppauge, NY 11788	516-273-8600
Digital Power Corp., 686 East Gish Rd., San Jose, CA 95112	408-288-5600
Dotronix, 160 First St. SE, New Brighton, MN 55112	612-633-1742
§† Dressen-Barnes Elctrns., 1600 E. Valencia Dr., Fullerton, CA 92631	714-871-3020
Dynage/Power & Magnetics, Division Of Oakleaf, Inc., 2 Willowbrook Road, Cromwell, CT 06416	203-635-3510
§ Dynatronix, Inc., 105 Power St., Amery, WI 54001	715-268-8118;800-826-7172
§† Eldec Corp., Power Conversion Div., 16700 13th Ave. W., P.O. Box 100, Lynnwood, WA 98036	206-743-1313
§† Electromech, Inc., 528 Elm Street, Kearny, NJ 07032	201-997-0950
† Electronic Dev. Corp., 11 Hamlin St., Boston, MA 02127-4198	617-268-9696
Electro-Pacific, 5782 Thornwood Dr., Goleta, CA 93017	805-964-0751
Electro Physics, 1910 West Birchwood Ave., Chicago, IL 60626	312-274-9669
Electrostatics, 7718 Clairemont Mesa Blvd., San Diego, CA 92111	619-279-1414
Electro Vector, Inc., 6555 Covey Rd., Forestville, CA 95436	707-887-2292
Elgin Electronics, Combustion Engineering, 5533 New Perry Hwy., Erie, PA 16509-3570	814-864-4921
Elma Engrg., 1066 E. Meadow Circle, Palo Alto, CA 94303	415-494-7303
† E M S Development Corp., 200 Allen Blvd., Farmingdale, NY 11735	516-694-2886
Energetec Systems, Inc., 130 E. St. Charles Rd., Carol Stream, IL 60188	312-653-1920
Engd. Prod., Div. of Acme Elec. Corp., 40 Water St., Cuba, NY 14727	716-968-2400
Engineering Design & Sls., Rt. 2, Box 305, Danville, VA 24540	804-685-7073
§† E-Tronics, 16774 Schoenborn, Sepulveda, CA 91343	213-892-7279
EWC, Inc., 725 Federal Ave., Kenilworth, NJ 07033	201-245-3200;800-526-4048
§ Facet Enterprises, Inc., Elmira, NY 14903	607-737-8011
Fluke, John, Mfg. Co., Box C9090, MS 250C, Everett, WA 98206	206-356-5400
§† Franek, John, Co., Inc., P.O. Box 11752, Santa Ana, CA 92711-1752	714-832-0290; 800-854-9420
Freed Transformer, 1718 Weirfield St., Ridgewood, NY 11385	212-386-1300
Frequency Control Prods., Inc., American Time Prods. Div., 61-20 Woodside Ave., Woodside, NY 11377	212-458-5811
† Georator Corp., Box 70, Manassas, VA 22110	703-368-2101
Golden Pacific Elctrns., Inc., 1020 N. Batavia St., Ste. Q, Orange, CA 92667	714-538-9752/9753
† Good-All Electric, Inc., 3725 Canal Drive, Fort Collins, CO 80524	303-484-3080
Gow-Mac Instr. Co., P.O. Box 32, Bound Brook, NJ 08805	201-560-0600
§† Gra-Mar Inc., 3165 McCrory Pl., Ste. 265, Orlando, FL 32803	305-894-3351
† Gulton Industries, Inc., Engineered Magnetics Division, 13041 Cerise Ave., Hawthorne, CA 90250	213-679-0111
Halmar Electronics, Inc., 900 N. Hague Ave., Columbus, OH 43204	614-275-0131
§ Heath Co., Benton Harbor, MI 49022	616-982-3886
† Helionetics, Inc., DECC Div., 17312 Eastman St., Irvine, CA 92714	714-546-4731; 800-421-7915
§ Intech, Microcircuits Div., 2270 Martin Ave., Santa Clara, CA 95050	408-988-4930
Interelectronics Corp., Interelectronics Park, 550 U.S. Rte. 303, Congers, NY 10920	914-EL8-8000
International High Voltage Elctrns., Inc., 98 Mill Plain Rd., Danbury, CT 06811	203-792-7820
International Instrumentation, 31131-602 Via Colinas, Westlake Vlg., CA 91362	213-991-9614
ITT Power Systems Corp., Box 688, Galion, OH 44833-0688	419-468-8100
Jerome Industries Corp., B 730 Division St., Elizabeth, NJ 07201	201-353-5700
Julie Resch. Labs., 211 West 61st St., New York, NY 10023	212-245-2727
§ Kaiser Systems, Inc., 126 Sohier Road, Beverly, MA 01915	617-922-9300
KEC Elctrns., Inc., 20817 Western Ave., Torrance, CA 90501	213-320-3902
† Keltec Florida, P.O. Box 2917, Ft. Walton Bch., FL 32549	904-651-9749
Keltron Corp., Walden Div., 225 Crescent St., Waltham, MA 02154	617-894-8700
KGS Electronics, Inc., GAR Entprs., 2029 N. Lincoln Ave., Pasadena, CA 91103	818-798-0786
Kode, 1515 S. Manchester Ave., Anaheim, CA 92802	714-758-0400
§ La Marche Mfg., 106 Bradrock Dr., Des Plaines, IL 60018	312-299-1188
Lambda Electronics, Veeco Instr., Inc., 515 Broad Hollow Rd., Melville, NY 11747	516-694-4200
Lestronics, Inc., 1840 Industrial Circle, Longmont, CO 80501	303-443-6250; 800-525-6478
LH Research, Inc., 14402 Franklin Ave., Tustin, CA 92680	714-730-0162
Lorain Prods., 1122 F St., Lorain, OH 44052	216-288-1122
Mag-Con, 1626 Terrace Dr., St. Paul, MN 55113	612-633-8820
† Magnetek, 7315 Red Deer Dr., Boulder, CO 80301-4696	303-442-6700
† Magnetico Inc., 182 Morris Ave., Holtsville, NY 11742	516-654-1166
† Megatran Electronic Power, Rising Sun Rd., Bordentown, NJ 08505	609-298-7300
Melcher, Inc., 6290 Sunset Blvd., #1126, Los Angeles, CA 90028	213-463-5617
Micro Power Intl., Inc., 9420 Activity Rd., San Diego, CA 92126	619-271-0831
MIL Electronics, Inc., 1 Mill st., Dracut, MA 01826	617-453-8000
† Milwaukee Transformer Co., MTE Corporation, 7901 W. Clinton Avenue, Milwaukee, WI 53223	414-358-5300
† Modular Power Sys. Inc., P.O. Box 180579, Austin, TX 78718-0579	512-834-9262
Multi Prods. Intl., 218 Little Falls Rd., P.O. Box 238, Cedar Grove, NJ 07009	201-239-8183
National Power Technlg., 2111 Howell Ave., Anaheim, CA 92806	714-937-1301
NCR Power Systems, 584 S. Lake Emma Rd., Lake Mary, FL 32746	305-323-9250; 800-327-7612
§ North American Soar Corp., 11126 Cornell Ave., Cherry Hill, NJ 08002	609-488-1060
§† Northeast Scientific Corp., 30 Wetherbee St., Acton, MA 01720	617-263-2711
Novatronics, Box 878, Pompano Beach, FL 33061	305-942-5200
Oeco Corp., 712 S.E. Hawthorne Blvd., Portland, OR 97214	503-238-2440
† OPT Inds. Inc., 300 Red School La., Phillipsburg, NJ 08865	201-454-2600
† Pacific Electro Dynamics, Inc., 11465 Willows Rd. N.E., Redmond, WA 98052	206-881-1700
Pan-Magnetics Intl., Inc., 455-A Carson Plaza Dr., Carson, CA 90746	213-532-1790
§ Payne Engrg., Box 70, Scott Depot, WV 25560	304-757-7353
Polytron Devices, Box 398 - River St. Sta., Paterson, NJ 07544	201-345-5885
Powerbox, Inc., 1860 Broadway, New York, NY 10023	212-586-1992
Power Control, 122 Gamma Dr., Pittsburgh, PA 15238	412-782-3120
† Powercube Corp., Sub. Unitrode Corp., 8 Suburban Pk. Dr., Billerica, MA 01821	617-667-9500
Power Elctrns., 96 Milton Rd., Rochester, NH 03867	603-332-3334
§† Power Labs, Inc., 5 Towle Ave., Dover, NH 03820	603-742-4613
† Power Sys. Grp., Rantec Div., Emerson Elec., 9401 Oso Ave., Chatsworth, CA 91311	818-885-8223
Precision Components, Inc., 1110 W. National Ave., Addison, IL 60101	312-543-6400
§ Pylon Elex Development Co. Ltd., 2300 Victoria, Lachine, PQ, CANADA H8S 1Z3	514-637-1186
§ Ragen Data Systems, Inc., 3 Oval Dr., Central Islip, NY 11722	516-234-3800
§ Ratelco, 1260 Mercer, Dept. EEM, Seattle, WA 98109	206-624-7770
Reich Assocs., Rt. 4, Box 4620, Lakehills, TX 78063	512-751-3220

§ REI Sls., 19525 Business Centre Dr., Northridge, CA 91324 617-938-0900

Reliance Comm/Tec, Reliance Electric, P. O. Box 99502, Cleveland, OH 44199 .... 800-245-4501;in OH 800-245-4497

Reliance Electric Co., Marketing Info Center, P.O. Box 99502, Cleveland, OH 44199 .... 800-245-4501;800-245-4497 In Ohio

RIFA, Inc., Greenwich Off. Pk. 3, P.O. Box 3110, Greenwich, CT 06836-3110 203-625-7300

§† RTE, Power/Mate Co., 514 S. River St., Hackensack, NJ 07601 201-440-3100

Sanford-Miller Corp., 8 John St., Lynbrook, NY 11563 516-593-2025; .... Outside NY 800-645-5900

§ Schulz Controls, Inc., P.O. Box 9555, New Haven, CT 06511 203-562-2555

§ Semiconductor Circuits, 49 Range Rd., Windham, NH 03087 603-893-2330

Seven Mountains Sci. Inc., P.O. Box 650, Boalsburg, PA 16827 814-466-6559

† Sigmapower, Inc., 20790 Leapwood Ave., Carson, CA 90746 .... 213-32-Sigma

§ Sola, A Unit of General Sign., 1717 Busse Rd., Elk Grove Village, IL 60007 312-439-2800

§† Sorensen Co., 676 E. Island Pond Rd., Manchester, NH 03103 603-668-4500

† Staco Energy Prods. Co., 301 Gaddis Blvd., Dayton, OH 45403 513-253-1191

§ Standard Power, Inc., 1400 S. Village Way, Santa Ana, CA 92705 714-558-8512

Summit Elctrns., 750 S. Sherman, Richardson, TX 75081 214-231-1456

§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 215-673-5600

† Superior Mfg. & Instr., 19-36 38th St., Long Island City, NY 11105 212-932-1800

Systron-Donner Instr. Div., 2727 Systron Dr., Concord, CA 94518 415-676-5000

Technical Research & Mfg., Inc., R.F.D. #10, Manchester, NH 03103 ... 603-627-6000

Tecnetics, Box 910, Boulder, CO 80306 303-442-3837

§ Tennelec, 601 Turnpike, Oak Ridge, TN 37830 615-483-8405

Todd Prods. Corp., 50 Emjay Blvd., Brentwood, NY 11717 516-231-3366

Toko America, Inc., 1250 Feehanville Dr., Mt. Prospect, IL 60056 312-297-0070

† Transistor Devices, 274 S. Salem St., Randolph, NJ 07869 201-361-6622

† Trio Labs., 80 Dupont St., Plainview, NY 11803 516-349-0400

§ Tripp-Lite, 500 No. Orleans, Chicago, IL 60610 312-329-1777

§ Tucker Elctrns., Box 461966, Garland, TX 75046 .... 214-348-8800;800-527-4642

Ulveco, Inc., 323 Vintage Park Drive, Foster City, CA 94404 415-574-1100

Universal Voltronics, 27 Radio Circle Dr., Mt. Kisco, NY 10549 914-241-1300

Vectrol, Division of Westinghouse Elec. Corp., 110 Douglas Rd, Oldsmar, FL 33557 813-855-4621

† Voltampere Corp., 146 Horton Ave., Lynbrook, NY 11563 516-887-9443

Walker Scientific, Rockdale St., Worcester, MA 01606 617-852-3674

Wilmore Elctrns. Co., Box 1329, Hillsborough, NC 27278 919-732-9351

§ Wilson, H. M., Co., 11501 Chimney Rock Rd., Houston, TX 77035 713-729-1183

Xylog Corp., 150 Tillman St., Westwood, NJ 07675 201-664-7997

Zenith CRT & Components Operations, 1000 Milwaukee Ave., Glenview, IL 60025 312-391-7733

Power Supplies, AC Input, 301 to 1,000 VDC Output-4000

† Acopian, Box 638, Easton, PA 18044, 215-258-5441 .... D•1486-1487,1491,1497

† Arnold Magnetics, 11520 W. Jefferson Blvd., Culver City, CA 90230, 213-390-3537/8837 .... D•1511

Bertan Assocs., 121 New South Rd., Hicksville, NY 11801, 516-433-3110 .... D•1535

CPS Inc., 110 Wolfe Rd., Sunnyvale, CA 94086, 408-738-0530 .... D•1607

† Del Elctrns. Corp., 250 E. Sandford Blvd., Mt. Vernon, NY 10550, 914-699-2000 .... D•1614-1615

Electronic Measurements, 405 Essex Rd., Neptune, NJ 07753, 201-922-9300 .... D•1622-1623

EMCO High Voltage Co., 11126 Ridge Road, Sutter Creek, CA 95685, 209-223-3626 .... D•1632

ERA Transpac Div., Sub. Elctrn. Research Assocs., 50 Graphic Place, Moonachie, NJ 07074, 201-641-3650 .... D•1636

† Ferrotran Elctrns. Co., Inc., 11 W. 25th St., New York, NY 10010, 212-691-3610 .... D•1640-1641

Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303, Call Local Sls. Off. .... D•1653-1656

Hitran Corp., Agex, Rte. 31, RD 5-65, Flemington, NJ 08822, 201-782-5525 .... D•1660

Kepco, Inc., 131-38 Sanford Ave., Flushing, NY 11352, 718-461-7000 .... D•1689-1691,1707-1709

Kikusui Intl. Corp., 17819 S. Figueroa St., Gardena, CA 90248, 213-515-6432;800-421-5334 .... D•1652

LaserSonics Power Supply Operation, 177 N. Wolfe Rd., Sunnyvale, CA 94086, 408-732-9880 .... D•1719

Mid-Eastern Industries, 100 Campus Dr., RD 1, Mt. Holly, NJ 08060, 609-267-3811 .... D•1724-1726

Modular Devices, 50 Orville Dr., Bohemia, NY 11716, 516-567-9620 ..... D•1727

Murata Erie North America, Inc., 1148 Franklin Rd., S.E., Marietta, GA 30067, 404-952-9777 .... D•1729

NJE Corporation, 329 Culver Rd, P.O. Box 669, Dayton, NJ 08810-0669, 201-329-4611 .... D•1733

North Hills Elctrns., 1 Alexander Pl., Glen Cove, NY 11542, 516-671-5700 .... D•1734

† NWL Transformers, Rising Sun Rd., P.O. Box 358, Bordentown, NJ 08505, 609-298-7300 .... D•1735

† NWL Transformers, Rising Sun Rd., P.O. Box 358, Bordentown, NJ 08505, 609-298-7300 .... D•1735

Penn-Tran Corp., Box 1321, Rte. 144N, Wingate, PA 16880, 814-355-1521 .... D•1741

Power Designs, Inc., 1700 Shames Dr., Westbury, NY 11590, 516-333-6200 .... D•1759

Powertec, Inc., 20550 Nordhoff St., Chatsworth, CA 91311, 818-882-0004 .... D•1782

§ Power Technology, Inc., P.O. Box 9769, Little Rock, AR 72219, 501-568-1995 .... B•1125

† Technipower, A Penril Co., P.O. Box 222, Commerce Pk., Danbury, CT 06810, 203-748-7001 .... D•1850

Technology Dynamics, 91 E. Carver Ave., Westwood, NJ 07675, 201-664-7636 .... D•1851

Voltex, 3460 Great Neck Rd., Amityville, NY 11701, 516-842-2772 .... D•1865

† Abbott Transistor Labs., Power Supply Div., 5200 W. Jefferson Blvd., Los Angeles, CA 90016 213-936-8185

§ Able Power and Engineering Inc., 335 S. New Ave., #H, Monterey Park, CA 91754 714-891-3568

Advanced High Voltage Co., Inc., P.O. Box 2136, Lancaster, CA 93539-2136 213-997-7222

Albar, Inc., 19013 36th Ave. W., Lynnwood, WA 98036 206-771-4006

† AMETEK, Dynamics Division, AMETEK, Inc., 5649 Peck Rd., Arcadia, CA 91006 818-442-5981

Applied Power Conversion, Technology Dynamics, Inc., 100 School St., Bergenfield, NJ 07621 201-664-7636

Astro-Geo-Marine, Inc., 202 E. Cota St., Santa Barbara, CA 93101 805-965-7005

† Autronics, 314 E. Live Oak, Ste. A, Arcadia, CA 91006 818-445-5470

† Babcock, Inc., 1717 West Collins Ave., Orange, CA 92667 714-633-3700

Bikor, 1504 W. 228th St., Torrance, CA 92718 213-539-6320

† Brandt Elctrns., Inc., 1220 Alderwood Ave., Sunnyvale, CA 94086 408-734-8310

Burleigh Instrs., Burleigh Pk., Fishers, NY 14453 716-924-9355

† Cal-Power Corp., 140 Kansas St., El Segundo, CA 90245 213-772-2171

Canberra Ind., One State St., Meriden, CT 06450 203-238-2351

† CEA Division of Berkleonics, Inc., A Subsidiary of EG & G, 1 Aerovista Pk., San Luis Obispo, CA 93401 805-544-5454

† Chloride Power Electronics, 10931 Pellicano Drive, El Paso, TX 79935 .. 915-592-9985

CML MACARR Div., Marine Electric RPD, Inc., 666 Pacific St., Brooklyn, NY 11217 718-857-2400

Computer Power, 124E W. Main St., High Bridge, NJ 08829 201-735-8000

Continental Resources, Inc., 175 Middlesex Tpke., Bedford, MA 01730 .. 617-275-0850

Cross Elctrns., 100 Commonwealth Dr., Warrendale, PA 15086 412-776-1591

Davidson Elctrn. Dev. Co., 113 E. 13th St., Erie, PA 16512 814-453-7547

Deltron, Inc., P.O. Box 1369, Wissahickon Ave., N. Wales, PA 19454-9990 215-699-9261

Dial Prods. Co., 19-21 Cottage St., Bayonne, NJ 07002 .... 201-HE7-0720

Dynage/Power & Magnetics, Division Of Oakleaf, Inc., 2 Willowbrook Road, Cromwell, CT 06416 203-635-3510

EG & G Almond Instruments, 1330 E. Cypress St., Covina, CA 91724 ... 818-967-9521

§† Eldec Corp., Power Conversion Div., 16700 13th Ave. W., P.O. Box 100, Lynnwood, WA 98036 206-743-1313

† Electronic Dev. Corp., 11 Hamlin St., Boston, MA 02127-4198 617-268-9696

Electro-Pacific, 5782 Thornwood Dr., Goleta, CA 93017 805-964-0751

Elma Engrg., 1066 E. Meadow Circle, Palo Alto, CA 94303 415-494-7303

Engd. Prod., Div. of Acme Elec. Corp., 40 Water St., Cuba, NY 14727 716-968-2400

Fluke, John, Mfg. Co., Box C9090, MS 250C, Everett, WA 98206 206-356-5400

† Georator Corp., Box 70, Manassas, VA 22110 703-368-2101

Glassman High Voltage Inc., P.O. Box 551, Salem Indl. Pk., Whitehouse Sta., NJ 08889 201-534-9007

§† Gra-Mar Inc., 3165 McCrory Pl., Ste. 265, Orlando, FL 32803 305-894-3351

† Gulton Industries, Inc., Engineered Magnetics Division, 13041 Cerise Ave., Hawthorne, CA 90250 213-679-0111

Halmar Electronics, Inc., 900 N. Hague Ave., Columbus, OH 43204 614-275-0131

Hipotronics, P.O. Drawer A, Brewster, NY 10509 914-279-8091

Industrial Test Equip., 21 Yennicock Ave., Port Washington, NY 11050 .. 516-883-1700

Interelectronics Corp., Interelectronics Park, 550 U.S. Rte. 303, Congers, NY 10920 .... 914-EL8-8000

International High Voltage Elctrns., Inc., 98 Mill Plain Rd., Danbury, CT 06811 203-792-7820

ITT Power Systems Corp., Box 688, Galion, OH 44833-0688 419-468-8100

Julie Resch. Labs., 211 West 61st St., New York, NY 10023 212-245-2727

Kaiser Systems, Inc., 126 Sohier Road, Beverly, MA 01915 617-922-9300

Keithley Instrs., 28775 Aurora Rd., Cleveland, OH 44139 216-248-0400

† Keltec Florida, P.O. Box 2917, Ft. Walton Bch., FL 32549 904-651-9749

Keltron Corp., Walden Div., 225 Crescent St., Waltham, MA 02154 617-894-8700

§ La Marche Mfg., 106 Bradrock Dr., Des Plaines, IL 60018 312-299-1188

Lambda Electronics, Veeco Instr., Inc., 515 Broad Hollow Rd., Melville, NY 11747 516-694-4200

Lestronics, Inc., 1840 Industrial Circle, Longmont, CO 80501 .... 303-443-6250; 800-525-6478

Mag-Con, 1626 Terrace Dr., St. Paul, MN 55113 612-633-8820

† Magnetico Inc., 182 Morris Ave., Holtsville, NY 11742 516-654-1166

† Megatran Electronic Power, Rising Sun Rd., Bordentown, NJ 08505 609-298-7300

§† Micron Inds., 1830 N. 32nd Ave., Stone Park, IL 60165 312-345-0788

† Milwaukee Transformer Co., MTE Corporation, 7901 W. Clinton Avenue, Milwaukee, WI 53223 414-358-5300

§† Northeast Scientific Corp., 30 Wetherbee St., Acton, MA 01720 617-263-2711

Oeco Corp., 712 S.E. Hawthorne Blvd., Portland, OR 97214 503-238-2440

† OPT Inds. Inc., 300 Red School La., Phillipsburg, NJ 08865 201-454-2600

§ Payne Engrg., Box 70, Scott Depot, WV 25560 304-757-7353

§ Plastic Capacitors, Inc., 2623 N. Pulaski Rd., Chicago, IL 60639 312-489-2229

Power Control, 122 Gamma Dr., Pittsburgh, PA 15238 412-782-3120

Power Elctrns., 96 Milton Rd., Rochester, NH 03867 603-332-3334

§ Power Pac, 32 Meadow St., S. Norwalk, CT 06856 203-866-4484

Power Ten, Inc., 486 Mercury Dr., Sunnyvale, CA 94086 408-738-5959

§ Ragen Data Systems, Inc., 3 Oval Dr., Central Islip, NY 11722 516-234-3800

Reich Assocs., Rt. 4, Box 4620, Lakehills, TX 78063 512-751-3220

Reliance Comm/Tec, Reliance Electric, P. O. Box 99502, Cleveland, OH 44199 .... 800-245-4501;in OH 800-245-4497

Reliance Electric Co., Marketing Info Center, P.O. Box 99502, Cleveland, OH 44199 .... 800-245-4501;800-245-4497 In Ohio

§ Schulz Controls, Inc., P.O. Box 9555, New Haven, CT 06511 203-562-2555

† Sigmapower, Inc., 20790 Leapwood Ave., Carson, CA 90746 .... 213-32-Sigma

§† Sorensen Co., 676 E. Island Pond Rd., Manchester, NH 03103 603-668-4500

† Spellman High Voltage Elctrns. Corp., 7 Fairchild Ave., Plainview, NY 11803 516-349-8686

Summit Elctrns., 750 S. Sherman, Richardson, TX 75081 214-231-1456

§† Systron-Donner Instr. Div., 2727 Systron Dr., Concord, CA 94518 415-676-5000

§ Tennelec, 601 Turnpike, Oak Ridge, TN 37830 615-483-8405
† Torotron Corp., 519 South Fifth Ave., Mt. Vernon, NY 10550 914-664-2050
† Transistor Devices, 274 S. Salem St., Randolph, NJ 07869 201-361-6622
§ Tucker Elctrns., Box 461966, Garland, TX 75046 .... 214-348-8800;800-527-4642
Universal Voltronics, 27 Radio Circle Dr., Mt. Kisco, NY 10549 914-241-1300
Vectrol, Division of Westinghouse Elec. Corp., 110 Douglas Rd, Oldsmar, FL 33557 813-855-4621
† Voltampere Corp., 146 Horton Ave., Lynbrook, NY 11563 516-887-9443
Wall Inds., 2 Franklin, Lawrence, MA 01840 617-688-1287
Wilmore Elctrns. Co., Box 1329, Hillsborough, NC 27278 919-732-9351
Xylog Corp., 150 Tillman St., Westwood, NJ 07675 201-664-7997
Zenith CRT & Components Operations, 1000 Milwaukee Ave., Glenview, IL 60025 312-391-7733

Power Supplies, AC Input, Greater than 1,000 VDC Output-4000

† Arnold Magnetics, 11520 W. Jefferson Blvd., Culver City, CA 90230, 213-390-3537/8837 .... D◦1511
Bertan Assocs., 121 New South Rd., Hicksville, NY 11801, 516-433-3110 .... D◦1522-1523,1526,1528,1530-1532,1534-1535
§ CPS Inc., 110 Wolfe Rd., Sunnyvale, CA 94086, 408-738-0530 .... D◦1607
† Del Elctrns. Corp., 250 E. Sandford Blvd., Mt. Vernon, NY 10550, 914-699-2000 .... D◦1614-1615
† EMCO High Voltage Co., 11126 Ridge Road, Sutter Creek, CA 95685, 209-223-3626 .... D◦1632
ETM Electromatic, 470 San Antonio Ave., Palo Alto, CA 94306, 415-494-1505 .... D◦1226-1227,1638
† Ferrotran Elctrns. Co., Inc., 11 W. 25th St., New York, NY 10010, 212-691-3610 .... D◦1641
Gamma High Voltage Resch. Inc., 152 S. MacQuesten Pkwy., Mt. Vernon, NY 10550, 914-667-5050 .... D◦1644-1645
Glassman High Voltage Inc., P.O. Box 551, Salem Indl. Pk., Whitehouse Sta., NJ 08889, 201-534-9007 .... D◦1234-1235,1648-1651
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303, Call Local Sls. Off. .... D◦1653,1656
† Hipotronics, P.O. Drawer A, Brewster, NY 10509, 914-279-8091 .... D◦1658-1659
Hitran Corp., Agex, Rte. 31, RD 5-65, Flemington, NJ 08822, 201-782-5525 .... D◦1660
International High Voltage Elctrns., Inc., 98 Mill Plain Rd., Danbury, CT 06811, 203-792-7820 .... D◦1668-1669
Kaiser Systems, Inc., 126 Sohier Road, Beverly, MA 01915, 617-922-9300 .... D◦1680-1683
Kepco, Inc., 131-38 Sanford Ave., Flushing, NY 11352, 718-461-7000 .... D◦1689-1691,1708-1709
LaserSonics Power Supply Operation, 177 N. Wolfe Rd., Sunnyvale, CA 94086, 408-732-9880 .... D◦1719
Murata Erie North America, Inc., 1148 Franklin Rd., S.E., Marietta, GA 30067, 404-952-9777 .... A◦2205, D◦1729
North Hills Elctrns., 1 Alexander Pl., Glen Cove, NY 11542, 516-671-5700 .... D◦1734
† NWL Transformers, Rising Sun Rd., P.O. Box 358, Bordentown, NJ 08505, 609-298-7300 .... D◦1735
† NWL Transformers, Rising Sun Rd., P.O. Box 358, Bordentown, NJ 08505, 609-298-7300 .... D◦1735
Oram Electronics, 12 Cranston Rd., Pittsford, NY 14534, 716-381-4673 .... D◦1740
Penn-Tran Corp., Box 1321, Rte. 144N, Wingate, PA 16880, 814-355-1521 .... A◦2231
Power Designs, Inc., 1700 Shames Dr., Westbury, NY 11590, 516-333-6200 .... D◦1759
§ Power Technology, Inc., P.O. Box 9769, Little Rock, AR 72219, 501-568-1995 .... B◦1125
S & H Inds., 119 Glen Cove Dr., Glen Head, NY 11545, 516-671-5600 .... D◦1829,1984
† Spellman High Voltage Elctrns. Corp., 7 Fairchild Ave., Plainview, NY 11803, 516-349-8686 .... D◦1840-1842
Standard Energy, Div. WBH Scientific, Inc., Rte. 32, Greenville, NY 12083, 518-966-4197 .... D◦1844-1845
† Technology Dynamics, 91 E. Carver Ave., Westwood, NJ 07675, 201-664-7636 .... D◦1851
Universal Voltronics, 27 Radio Circle Dr., Mt. Kisco, NY 10549, 914-241-1300 .... D◦1858
Varian Canada, Inc., Microwave Div., 45 River Drive, Georgetown, ON, CANADA L7G2J4, 416-877-0161 .... D◦1859-1861
Voltex, 3460 Great Neck Rd., Amityville, NY 11701, 516-842-2772 .... D◦1865
Wilmore Elctrns. Co., Box 1329, Hillsborough, NC 27278, 919-732-9351 .... D◦1869

Advanced High Voltage Co., Inc., P.O. Box 2136, Lancaster, CA 93539-2136 213-997-7222
Advanced Kinetics, 1231 Victoria St., Costa Mesa, CA 92627 714-646-7165
American HV Test Systems Inc., Central Garrett Ind'l. Pk., Accident, MD 21520 301-826-8651
† Analog Modules, Inc., 126 Baywood Avenue, Longwood, FL 32750 .... 305-339-4356/4355
Applied Power Conversion, Technology Dynamics, Inc., 100 School St., Bergenfield, NJ 07621 201-664-7636
Astro-Geo-Marine, Inc., 202 E. Cota St., Santa Barbara, CA 93101 805-965-7005
† Axel Elctrns., General Signal Corp., 134-20 Jamaica Ave., Jamaica, NY 11418 718-291-3900
Beckman Industrial Corp., Cedar Grove Div., 89 Commerce Rd., Cedar Grove, NJ 07009 201-239-6200
Biddle Instruments, A Thorn EMI Co., 510 Township Line Rd., Blue Bell, PA 19422 215-646-9200
Bikor, 1504 W. 228th St., Torrance, CA 92718 213-539-6320
† Brandt Elctrns., Inc., 1220 Alderwood Ave., Sunnyvale, CA 94086 408-734-8310
† Cal-Power Corp., 140 Kansas St., El Segundo, CA 90245 213-772-2171
Canberra Ind., One State St., Meriden, CT 06450 203-238-2351
† Chapman Corp., P.O. Box 10700, Portland, ME 04104 207-773-4726
† Chloride Power Electronics, 10931 Pellicano Drive, El Paso, TX 79935 915-592-9985
CML MACARR Div., Marine Electric RPD, Inc., 666 Pacific St., Brooklyn, NY 11217 718-857-2400
Collmer Semiconductor, Inc., 14368 Proton Rd., Dallas, TX 75234-3335 214-233-1589
† Condenser Prods., P.O. Box 997, Brooksville, FL 33512 904-796-3561
Continental Resources, Inc., 175 Middlesex Tpke., Bedford, MA 01730 617-275-0850
Controlled Power Co., 1955 Stephenson Hwy., Troy, MI 48083 1-800-521-4792
§ CSI Capacitors, CSI Technlgs., 810 Rancheros Dr., San Marcos, CA 92069 619-747-4000
§ CVC Prods., 525 Lee Rd., Rochester, NY 14603 716-458-2550
Datametrics Corp., Defense Products Div., 7630 Gloria Ave., Van Nuys, CA 91406 818-989-3840
Davidson Elctrn. Dev. Co., 113 E. 13th St., Erie, PA 16512 814-453-7547
§† Eldec Corp., Power Conversion Div., 16700 13th Ave. W., P.O. Box 100, Lynnwood, WA 98036 206-743-1313
† Electronic Dev. Corp., 11 Hamlin St., Boston, MA 02127-4198 617-268-9696
Electronic Measurements, 405 Essex Rd., Neptune, NJ 07753 201-922-9300
Electro-Pacific, 5782 Thornwood Dr., Goleta, CA 93017 805-964-0751
Electro Vector, Inc., 6555 Covey Rd., Forestville, CA 95436 707-887-2292
Elma Engrg., 1066 E. Meadow Circle, Palo Alto, CA 94303 415-494-7303
Engd. Prod., Div. of Acme Elec. Corp., 40 Water St., Cuba, NY 14727 716-968-2400
Fluke, John, Mfg. Co., Box C9090, MS 250C, Everett, WA 98206 206-356-5400
Halmar Electronics, Inc., 900 N. Hague Ave., Columbus, OH 43204 614-275-0131
Instrument Research Co., Box 40207, Santa Barbara, CA 93103 805-962-8336
Interelectronics Corp., Interelectronics Park, 550 U.S. Rte. 303, Congers, NY 10920 .... 914-EL8-8000
ITT Power Systems Corp., Box 688, Galion, OH 44833-0688 419-468-8100
† K & M Elctrns., 123 Interstate Dr., W. Springfield, MA 01089 413-781-1350
Keithley Instrs., 28775 Aurora Rd., Cleveland, OH 44139 216-248-0400
† Keltec Florida, P.O. Box 2917, Ft. Walton Bch., FL 32549 904-651-9749
Keltron Corp., Walden Div., 225 Crescent St., Waltham, MA 02154 617-894-8700
KGS Electronics, Inc., GAR Entprs., 2029 N. Lincoln Ave., Pasadena, CA 91103 818-798-0786
§ Laboratory Products, Inc., 57 Cornwall St., P. O. Box 1750, Jamaica Plain, MA 02130 617-522-7800
† Lehighton Elctrns., Inc., Box 328, Dept M, Lehighton, PA 18235 .... 717-386-4156; 215-377-5990
† LogiMetrics, 121-03 Dupont St., Plainview, NY 11803 516-349-1700
† Magnetico Inc., 182 Morris Ave., Holtsville, NY 11742 516-654-1166
Maxwell Labs., 8835 Balboa Ave., San Diego, CA 92123 619-279-5100
† Megatran Electronic Power, Rising Sun Rd., Bordentown, NJ 08505 609-298-7300
§† Micron Inds., 1830 N. 32nd Ave., Stone Park, IL 60165 312-345-0788
§ Micro-Now Instr. Co., Inc., 8260 N. Elmwood St., P.O. Box 856, Skokie, IL 60077 312-677-4700
Modular Devices, 50 Orville Dr., Bohemia, NY 11716 516-567-9620
† Narda Microwave Corp., 435 Moreland Rd., Hauppauge, NY 11788 516-231-1700
§† Northeast Scientific Corp., 30 Wetherbee St., Acton, MA 01720 617-263-2711
Oeco Corp., 712 S.E. Hawthorne Blvd., Portland, OR 97214 503-238-2440
† OPT Inds. Inc., 300 Red School La., Phillipsburg, NJ 08865 201-454-2600
Oram Elctrns., Rte. 22, Putnam Business Park, Brewster, NY 10509-9587 914-279-2966
Pacific Instrs. Inc., 215 Mason Circle, Concord, CA 94518 415-827-9010
† Penn Resch. Corp. (PRC), 2652 South Main St., P.O. Box 3357, Kennesaw, GA 30144 404-429-9061
Plasma Research Corp., 2900 Main St., Alameda, CA 94501 415-521-5532
§ Plastic Capacitors, Inc., 2623 N. Pulaski Rd., Chicago, IL 60639 312-489-2229
§ Power Pac, 32 Meadow St., S. Norwalk, CT 06856 203-866-4484
Power Ten, Inc., 486 Mercury Dr., Sunnyvale, CA 94086 408-738-5959
Products for Resch., 88 Holten St., Danvers, MA 01923 617-774-3250
Reich Assocs., Rt. 4, Box 4620, Lakehills, TX 78063 512-751-3220
† Sigmapower, Inc., 20790 Leapwood Ave., Carson, CA 90746 .... 213-32-Sigma
† Simco Co., 2257 North Penn Rd., Hatfield, PA 19440 215-822-2171
Standard Wire & Cable Co., 2345 Alaska Ave., El Segundo, CA 90245 213-536-0006
Technipower, A Penril Co., P.O. Box 222, Commerce Pk., Danbury, CT 06810 203-748-7001
Temescal, 2850 Seventh St., Berkeley, CA 94710 415-841-5720
§ Tennelec, 601 Turnpike, Oak Ridge, TN 37830 615-483-8405
† Torotron Corp., 519 South Fifth Ave., Mt. Vernon, NY 10550 914-664-2050
Triad-Utrad, 1124 E. Franklin St., Huntington, IN 46750 219-356-6500
§ Tucker Elctrns., Box 461966, Garland, TX 75046 .... 214-348-8800;800-527-4642
Varian Associates, Inc., Microwave Tube Div., 611 Hansen Way, Palo Alto, CA 94303 415-493-4000
Voltampere Corp., 146 Horton Ave., Lynbrook, NY 11563 516-887-9443
Wasatch High Voltage, P.O. Box 9027, Salt Lake City, UT 84109 801-265-9561
Xylog Corp., 150 Tillman St., Westwood, NJ 07675 201-664-7997
Zeco, Inc., 2075 H Bering Dr., San Jose, CA 95131 408-286-8856
§ Zambre Co., Inc., 2134 Old Middlefield Way, Mountain View, CA 94043 415-968-9176
Zenith CRT & Components Operations, 1000 Milwaukee Ave., Glenview, IL 60025 312-391-7733

Power Supplies, AC Output-4050

Abacus Controls Inc., 89 Readington Rd., Somerville, NJ 08876, 201-526-6010 .... D◦1880-1882
Abbott Transistor Labs., Industrial Products Div., 8203 Vineland Ave., Sun Valley, CA 91352, 818-504-0644 .... D◦1884-1885
† Abbott Transistor Labs., Power Supply Div., 5200 W. Jefferson Blvd., Los Angeles, CA 90016, 213-936-8185 .... D◦1459
† Advance Conversion Devices Co., 274 S. Salem St., Randolph, NJ 07869, 201-989-0095 .... D◦1886-1887
Astrosystems, 6 Nevada Dr., Lake Success, NY 11042, 516-328-1600 .... D◦1183,1888
ATR Elctrns., Inc., P.O. BOX 7008, St. Paul, MN 55107, 612-738-6520;414-297-7374 .... D◦1889

Power Supplies, AC Output-4050 (Cont'd)

§ Ault, Incorporated, 1600 Freeway Blvd., Minneapolis, MN 55430, 612-560-9300 .... D•1519
Avionic Instrs., 943 E. Hazelwood Ave., Rahway, NJ 07065, 201-388-3500 .... D•1890-1893
† Avtel Div., Unitron Inc., 10925 Miller Rd., Dallas, TX 75238; 214-340-8600 .... D•1895-1897
Behlman Engineering, 1142 Mark Ave., Carpinteria, CA 93013, 805-684-8311 .... D•1898-1905
† California Instruments, A Div. of Amstar Tech. Prods. Co., Inc., 5150-Convoy St., San Diego, CA 92111, 619-279-8620;800-356-2244;800-821-1634 ...... D•1907
Clarke-Hess Comm. Resch. Corp., 17 West 17th St., New York, NY 10011, 212-255-2940 .... D•1200
† CML MACARR Div., Marine Electric RPD, Inc., 666 Pacific St., Brooklyn, NY 11217, 718-857-2400 .... D•1908-1909
Controlled Power Co., 1955 Stephenson Hwy., Troy, MI 48083, 1-800-521-4792 .... D•1911,1913-1915
D & B Power, Inc., 204 N. Fehr Way, P.O. Box 40M, Bayshore, NY 11706, 516-586-5955 .... D•1610-1611
Diego Power, 5350 Eastgate Mall, San Diego, CA 92121, 587-1925 ...... D•1916
§ Displex, Inc., Alexander Place, Glen Cove, NY 11542, 516-671-4400 ..... D•1917
Elgar Corp, An Onan McGraw Edison Co., 9250 Brown Deer Rd., San Diego, CA 92121, 619-450-0085 .... D•1918-1921
† Endicott Resch. Grp., Inc., 2601 Wayne St., P.O. Box 269, Endicott, NY 13760, 607-754-9187 .... B•1047
Energy, Ltd., 4714 Upshur Street, Bladensburg, MD 20710, 301-699-1144 .... D•1923
§ Epsco, 920 Westwood Ave., Addison, IL 60101, 312-543-0410 .... D•1634
§† Franek, John, Co., Inc., P.O. Box 11752, Santa Ana, CA 92711-1752, 714-832-0290;800-854-9420 .... D•1924-1927
§† General Power Sys., 1400 N. Baxter St., Anaheim, CA 92806-1201, 714-956-9321 .... D•1929
Harrel, Inc., 16 Fitch St., E. Norwalk, CT 06855, 203-866-2573 .... D•1122
Hipotronics, P.O. Drawer A, Brewster, NY 10509, 914-279-8091 .... D•1934-1935
Hitran Corp., Agex, Rte. 31, RD 5-65, Flemington, NJ 08822, 201-782-5525 .... D•1660,1936-1937
Industrial Test Equip., 21 Yennicock Ave., Port Washington, NY 11050, 516-883-1700 .... D•1247,1938
Instrumentation & Control Sys., 520 Interstate Rd, Addison, IL 60101, 312-543-6200 .... D•1933
Interelectronics Corp., Interelectronics Park, 550 U.S. Rte. 303, Congers, NY 10920, 914-EL8-8000 .... D•1667
Jerome Industries Corp., B 730 Division St., Elizabeth, NJ 07201, 201-353-5700 .... D•1678
KGS Electronics, Inc., GAR Entprs., 2029 N. Lincoln Ave., Pasadena, CA 91103, 818-798-0786 .... D•1715,1942-1943
LZR Electronics, Inc., 8174 Beechcraft Ave., Gaithersburg, MD 20879, 301-921-9440 .... D•1717
Marway Prods. Inc., 311 N. Clara St., Santa Ana, CA 92703, 714-973-1800 .... D•1945
Mid-Eastern Industries, 100 Campus Dr., RD 1, Mt. Holly, NJ 08060, 609-267-3811 .... D•1726
Multi Prods. Intl., 218 Little Falls Rd., P.O. Box 238, Cedar Grove, NJ 07009, 201-239-8183 .... A•2202
Nova Elec., Hobart Bros. Co., 263 Hillside Ave., Nutley, NJ 07110, 201-661-3434 .... D•1946
† NWL Transformers, Rising Sun Rd., P.O. Box 358, Bordentown, NJ 08505, 609-298-7300 .... D•1735
† NWL Transformers, Rising Sun Rd., P.O. Box 358, Bordentown, NJ 08505, 609-298-7300 .... D•1735
Ocean Marine Instrument, 629 Terminal Way # 15, Costa Mesa, CA 92627, 714-548-9569 .... D•1947
Pacific Power Source Corp., 15122 Bolsa Chica St., Huntington Bch., CA 92649, 714-898-2691;800-854-2433 .... D•1949-1952
Pan-Magnetics Intl., Inc., 455-A Carson Plaza Dr., Carson, CA 90746, 213-532-1790 .... A•2217
§† Powermark, 3855 Ruffin Rd., San Diego, CA 92123, 619-565-8363 .... D•1955
† RTE Deltec Corp., 2727 Kurtz St., San Diego, CA 92110, 619-291-4211;800-854-2658 .... D•1959
S & H Inds., 119 Glen Cove Dr., Glen Head, NY 11545, 516-671-5600 .... D•1984
Shape Magnetronics, Inc., 901 DuPage Ave., Lombard, IL 60148, 312-620-8394 .... D•1960-1961
Shogyo Intl. Corp., 287 Northern Blvd., Great Neck, NY 11021, 516-466-0911 .... A•2271
Sola, A Unit of General Sign., 1717 Busse Rd., Elk Grove Village, IL 60007, 312-439-2800 .... D•1964-1967
§† Superior Elec. Co., 383 Middle St., Bristol, CT 06010, 203-582-9561 ..... B•1193
† Tech Labs., Inc., Bergen & Edsall Blvds., Palisades Pk., NJ 07650, 201-944-2221 .... B•1701
† Technipower, A Penril Co., P.O. Box 222, Commerce Pk., Danbury, CT 06810, 203-748-7001 .... D•1850
† Technology Dynamics, 91 E. Carver Ave., Westwood, NJ 07675, 201-664-7636 .... D•1851
Tecron Industrial Prods., Crown Intl., Inc., 1718 W. Mishawaka Rd., Elkhart, IN 46517, 219-294-8300 .... D•1019-1020
Tettex Instruments, Inc., P.O. Box 281, Fairview Village, PA 19409-0281, 215-539-6050 .... D•1312
Triad-Utrad, 1124 E. Franklin St., Huntington, IN 46750, 219-356-6500 ... D•1971
† Unitron Inc., 10925 Miller Rd., Dept. EE, Dallas, TX 75238, 214-340-8600 .... D•1895-1897
UPSystems, Inc., 7801 E. Compton Blvd., Paramount, CA 90723, 213-634-0621 .... D•1973
Voltex, 3460 Great Neck Rd., Amityville, NY 11701, 516-842-2772 .... D•1865
Wilmore Elctrns. Co., Box 1329, Hillsborough, NC 27278, 919-732-9351 .... D•1974-1975
Xylog Corp., 150 Tillman St., Westwood, NJ 07675, 201-664-7997 .... D•1976

§ Able Power and Engineering Inc., 335 S. New Ave., # H, Monterey Park, CA 91754 714-891-3568
Albar, Inc., 19013 36th Ave. W., Lynnwood, WA 98036 206-771-4006
American HV Test Systems Inc., Central Garrett Ind'l. Pk., Accident, MD 21520 301-826-8651
American Monarch, 2801-37th Ave., N.E., Minneapolis, MN 55421 612-788-9161
† AMETEK, Dynamics Division, AMETEK, Inc., 5649 Peck Rd., Arcadia, CA 91006 818-442-5981
Applied Power Conversion, Technology Dynamics, Inc., 100 School St., Bergenfield, NJ 07621 201-664-7636
† Arnold Magnetics, 11520 W. Jefferson Blvd., Culver City, CA 90230 .... 213-390-3537/8837
Astro-Geo-Marine, Inc., 202 E. Cota St., Santa Barbara, CA 93101 805-965-7005
§ Astron Corp., 2852 Walnut # E, Tustin, CA 92680 714-832-7770
§ Athena Controls, Inc., 5145 Campus Dr., Whitemarsh Ind. Campus, Plymouth Meeting, PA 19462 215-828-2490
Atlas Energy Sys., 9457 Rush St., S. El Monte, CA 91733 213-575-0755
† Autronics, 314 E. Live Oak, Ste. A, Arcadia, CA 91006 818-445-5470
Basler Elec., Rte. 143, Highland, IL 62249 618-654-2341
Behlman Div., California Instrs., Div. of Norlin Inds., 5150 Convoy St., San Diego, CA 92111 619-279-8620
§† Bendix Corp., Electric Power Div., Hwy. 35, Eatontown, NJ 07724 201-542-2000
Biddle Instruments, A Thorn EMI Co., 510 Township Line Rd., Blue Bell, PA 19422 215-646-9200
Bikor, 1504 W. 228th St., Torrance, CA 92718 213-539-6320
§ C-COR Elctrns., 60 Decibel Rd., State College, PA 16801 814-238-2461
† CEA Division of Berkleonics, Inc., A Subsidiary of EG & G, 1 Aerovista Pk., San Luis Obispo, CA 93401 805-544-5454
† Chloride Power Electronics, 10931 Pellicano Drive, El Paso, TX 79935 .. 915-592-9985
Clary Corp., Precision Instrs. Div., 320 W. Clary Ave., San Gabriel, CA 91776 818-287-6111
§ Computer Power, 124E W. Main St., High Bridge, NJ 08829 201-735-8000
Crestronics Div., Applied Electro Technlg., Int., 2220 S. Anne St., Santa Ana, CA 92704 714-556-6570
Cross Elctrns., 100 Commonwealth Dr., Warrendale, PA 15086 412-776-1591
Cuesta Systems, Inc., 3440 Roberto Ct., San Luis Obispo, CA 93401 805-541-4160
Davidson Elctrn. Dev. Co., 113 E. 13th St., Erie, PA 16512 814-453-7547
† Del Elctrns. Corp., 250 E. Sandford Blvd., Mt. Vernon, NY 10550 914-699-2000
Dial Prods. Co., 19-21 Cottage St., Bayonne, NJ 07002 .... 201-HE7-0720
Dormeyer Inds., 3418 N. Milwaukee, Chicago, IL 60641 312-283-4000
† EG & G Rotron, Custom Div., Hasbrouck La., Woodstock, NY 12498 914-679-5201
Electronic Wattmeter Co., 2275 Sixth St., Sarasota, FL 33577 813-953-5355
Electro Vector, Inc., 6555 Covey Rd., Forestville, CA 95436 707-887-2292
Elgin Electronics, Combustion Engineering, 5533 New Perry Hwy., Erie, PA 16509-3570 814-864-4921
Elin Div., California Instrs. Co., Div. of Norlin Ind., 5150 Convoy St., San Diego, CA 92111 619-279-8620
Elma Engrg., 1066 E. Meadow Circle, Palo Alto, CA 94303 415-494-7303
Engd. Prod., Div. of Acme Elec. Corp., 40 Water St., Cuba, NY 14727 716-968-2400
Engineering Design & Sls., Rt. 2, Box 305, Danville, VA 24540 804-685-7073
† ERA Transpac Div., Sub. Elctrn. Research Assocs., 50 Graphic Place, Moonachie, NJ 07074 201-641-3650
§ Ericson Mfg. Co., 4215 Hamann Pkwy., Willoughby, OH 44094 216-951-8000
§ E-Tronics, 16774 Schoenborn, Sepulveda, CA 91343 213-892-7279
EWC, Inc., 725 Federal Ave., Kenilworth, NJ 07033 .... 201-245-3200;800-526-4048
† Ferrotran Elctrns. Co., Inc., 11 W. 25th St., New York, NY 10010 212-691-3610
Frequency Control Prods., Inc., American Time Prods. Div., 61-20 Woodside Ave., Woodside, NY 11377 212-458-5811
Gamma High Voltage Resch. Inc., 152 S. MacQuesten Pkwy., Mt. Vernon, NY 10550 914-667-5050
§ GC Elctrns., 400 S. Wyman St., Rockford, IL 61101 815-968-9661
† Georator Corp., Box 70, Manassas, VA 22110 703-368-2101
GMR Co., 8801 Sepulveda Blvd., Los Angeles, CA 90045 213-216-9516
§† Gra-Mar Inc., 3165 McCrory Pl., Ste. 265, Orlando, FL 32803 305-894-3351
† Gulton Industries, Inc., Engineered Magnetics Division, 13041 Cerise Ave., Hawthorne, CA 90250 213-679-0111
Halmar Electronics, Inc., 900 N. Hague Ave., Columbus, OH 43204 614-275-0131
§ Harris Corp., Dracon Div., 809 Calle Plano, Camarillo, CA 93010 805-987-9511
† Helionetics, Inc., DECC Div., 17312 Eastman St., Irvine, CA 92714 .... 714-546-4731; 800-421-7915
Hisonic, Inc., 249 N. Troost, P.O. Box 1130, Olathe, KS 66061-1130 913-782-0012
Interface Engrg., 386 Lindelof Ave., Stoughton, MA 02072 617-344-7383
ITT Power Systems Corp., Box 688, Galion, OH 44833-0688 419-468-8100
James Electronics, 4050 N. Rockwell, Chicago, IL 60618 312-463-6500
Jefferson Elec., MagneTek, Inc., 1400 Center Circle Drive, Downers Grove, IL 60515-1021 312-691-2400
§ La Marche Mfg., 106 Bradrock Dr., Des Plaines, IL 60018 312-299-1188
Lestronics, Inc., 1840 Industrial Circle, Longmont, CO 80501 .... 303-443-6250; 800-525-6478
Lorain Prods., 1122 F St., Lorain, OH 44052 216-288-1122
Mag-Con, 1626 Terrace Dr., St. Paul, MN 55113 612-633-8820
Magnetran Corp., 5701 Savoy Lane, Houston, TX 77036 713-785-4202
Magnum Opus Custom Elctrn. Engrg., 284 Kennedy St., Iselin, NJ 08830 201-283-4925
§ Marathon Flite-Tronics Company, A Marathon Power Technologies Co., 2525 N. Naomi St., Burbank, CA 91504 818-841-3210
McGuirk Electronics Co. Inc., 212 So. Main St, P. O. Box 853, Middleton, MA 01949 617-933-3500
† Megatran Electronic Power, Rising Sun Rd., Bordentown, NJ 08505 609-298-7300
Mitsubishi Elctrns. America, Inc., Semiconductor Div., 1050 East Arques Ave., Sunnyvale, CA 94086 408-730-5900
† Modular Power Sys. Inc., P.O. Box 180579, Austin, TX 78718-0579 512-834-9262
† Murata Erie North America, Inc., 1148 Franklin Rd., S.E., Marietta, GA 30067 404-952-9777
NJE Corporation, 329 Culver Rd, P.O. Box 669, Dayton, NJ 08810-0669 201-329-4611

† Optima Enclosures, 2166 Mountain Indl. Blvd., Tucker, GA 30084 ... 404-939-6340
† OPT Inds. Inc., 300 Red School La., Phillipsburg, NJ 08865 ... 201-454-2600
Oram Elctrns., Rte. 22, Putnam Business Park, Brewster, NY 10509-9587 ... 914-279-2966
† Pacific Electro Dynamics, Inc., 11465 Willows Rd. N.E., Redmond, WA 98052 ... 206-881-1700
§ Payne Engrg., Box 70, Scott Depot, WV 25560 ... 304-757-7353
§ Power Control, 122 Gamma Dr., Pittsburgh, PA 15238 ... 412-782-3120
Power Sys. Grp., Rantec Div., Emerson Elec., 9401 Oso Ave., Chatsworth, CA 91311 ... 818-885-8223
§ Power Technology, Inc., P.O. Box 9769, Little Rock, AR 72219 ... 501-568-1995
§ Pylon Elex Development Co. Ltd., 2300 Victoria, Lachine, PQ, CANADA H8S 1Z3 ... 514-637-1186
§ Ragen Data Systems, Inc., 3 Oval Dr., Central Islip, NY 11722 ... 516-234-3800
Ratelco, 1260 Mercer, Dept. EEM, Seattle, WA 98109 ... 206-624-7770
Reich Assocs., Rt. 4, Box 4620, Lakehills, TX 78063 ... 512-751-3220
§ Research, Inc., Box 24064, Minneapolis, MN 55424 ... 612-941-3300
Sanford-Miller Corp., 8 John St., Lynbrook, NY 11563 ... 516-593-2025;Outside NY 800-645-5900
† Sigmapower, Inc., 20790 Leapwood Ave., Carson, CA 90746 ... 213-32-Sigma
§† Sorensen Co., 676 E. Island Pond Rd., Manchester, NH 03103 ... 603-668-4500
† Staco Energy Prods. Co., 301 Gaddis Blvd., Dayton, OH 45403 ... 513-253-1191
Struthers-Dunn, Inc., Lamb's Rd., Pitman, NJ 08071 ... 609-589-7500
Summit Elctrns., 750 S. Sherman, Richardson, TX 75081 ... 214-231-1456
† Superior Mfg. & Instr., 19-36 38th St., Long Island City, NY 11105 ... 212-932-1800
Teledyne Inet, 2750 W. Lomita Blvd., Torrance, CA 90509 ... 213-325-5040
Telesis Laboratory, Box 1972, Chillocothe, OH 45601 ... 614-642-5000
Terado, 1068 Raymond Ave., St. Paul, MN 55108 ... 612-646-2868
§† Topaz Electronics, 9192 Topaz Way, San Diego, CA 92123-1164 ... 619-279-0831
Transducer Systems, Inc., 1510 Delp Dr., Kulpsville, PA 19443 ... 215-256-4611
Transformation Elctrns. Corp., 170 Wilbur Pl., Bohemia, NY 11716 ... 516-563-1117
† Transistor Devices, 274 S. Salem St., Randolph, NJ 07869 ... 201-361-6622
† Trio Labs., 80 Dupont St., Plainview, NY 11803 ... 516-349-0400
§† Tripp-Lite, 500 No. Orleans, Chicago, IL 60610 ... 312-329-1777
§ Tucker Elctrns., Box 461966, Garland, TX 75046 ... 214-348-8800;800-527-4642
Ulveco, Inc., 323 Vintage Park Drive, Foster City, CA 94404 ... 415-574-1100
† Voltampere Corp., 146 Horton Ave., Lynbrook, NY 11563 ... 516-887-9443
§ Wilson, H. M., Co., 11501 Chimney Rock Rd., Houston, TX 77035 ... 713-729-1183

Power Supplies, Bipolar-4000

† **Abbott Transistor Labs., Power Supply Div., 5200 W. Jefferson Blvd., Los Angeles, CA 90016, 213-936-8185 ... D•1456-1457,1460-1461**
Acopian, Box 638, Easton, PA 18044, 215-258-5441 ... D•1466-1471,1480-1483,1491,1495
Applied Power Conversion, Technology Dynamics, Inc., 100 School St., Bergenfield, NJ 07621, 201-664-7636 ... D•1500-1504
† **Arnold Magnetics, 11520 W. Jefferson Blvd., Culver City, CA 90230, 213-390-3537/8837 ... D•1508-1511**
Astrosystems, 6 Nevada Dr., Lake Success, NY 11042, 516-328-1600 ... D•1517
Ault, Incorporated, 1600 Freeway Blvd., Minneapolis, MN 55430, 612-560-9300 ... D•1519
Bertan Assocs., 121 New South Rd., Hicksville, NY 11801, 516-433-3110 ... D•1522-1523,1529
§† **Calex Mfg. Co., Inc., 3355 Vincent Rd., Pleasant Hill, CA 94523, 415-932-3911 ... D•1542-1545**
California DC, 2150 Anchor Ct., Newbury Park, CA 91320, 805-499-3621;213-706-8221 ... D•1546
Compower Div., Computer Prods., Inc., 2220 Lundy Ave., San Jose, CA 95131, 408-942-1600 ... D•1554-1558
§ **Computer Prods. Inc., Power Conversion Grp., 2981 Gateway Dr., Pompano Bch., FL 33069-4803, 305-974-5500 ... D•1551,1554-1573**
§ **Condor D.C. Power Supplies, Inc., 201 Flynn Rd., Camarillo, CA 93010, 805-484-2851;800-235-5929 ... D•1588,1591-1594,1597-1598**
§ **Converter Concepts, Inc., Industrial Pkwy., Pardeeville, WI 53954, 608-429-2144 ... D•1602-1603**
§ **Elpac Power Sys., 3131 S. Standard Ave., Santa Ana, CA 92705, 714-979-4440 ... D•1627**
† **Ferrotran Elctrns. Co., Inc., 11 W. 25th St., New York, NY 10010, 212-691-3610 ... D•1641**
Gamma High Voltage Resch. Inc., 152 S. MacQuesten Pkwy., Mt. Vernon, NY 10550, 914-667-5050 ... D•1645
GFC/Hammond Elctrns., Inc., 1690 Walden Ave., Buffalo, NY 14225, 716-835-5742 ... D•1647
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303, Call Local Sls. Off. ... D•1653-1655
Integrated Circuits, Inc., 10301 Willows Road, Redmond, WA 98052, 206-882-3100 ... D•1662-1665
Intronics, Inc., 57 Chapel St., Newton, MA 02158, 617-964-4000 ... D•1676-1677
Kaiser Systems, Inc., 126 Sohier Road, Beverly, MA 01915, 617-922-9300 ... D•1680-1683
KEC Elctrns., Inc., 20817 Western Ave., Torrance, CA 90501, 213-320-3902 ... D•1685-1686
Keltec Florida, P.O. Box 2917, Ft. Walton Bch., FL 32549, 904-651-9749 ... D•1688
Kepco, Inc., 131-38 Sanford Ave., Flushing, NY 11352, 718-461-7000 ... D•1689,1692,1694-1695,1699-1700,1704
Modular Devices, 50 Orville Dr., Bohemia, NY 11716, 516-567-9620 ... D•1011
Multi Prods. Intl., 218 Little Falls Rd., P.O. Box 238, Cedar Grove, NJ 07009, 201-239-8183 ... D•1728
National Power Technlg., 2111 Howell Ave., Anaheim, CA 92806, 714-937-1301 ... D•1730-1732
North American Soar Corp., 11126 Cornell Ave., Cherry Hill, NJ 08002, 609-488-1060 ... D•1276
North Hills Elctrns., 1 Alexander Pl., Glen Cove, NY 11542, 516-671-5700 ... D•1734
§ **Opamp Labs, Inc., 1033 N. Sycamore Ave., Los Angeles, CA 90038, 213-934-3566 ... D•1014**
† **OPT Inds. Inc., 300 Red School La., Phillipsburg, NJ 08865, 201-454-2600 ... D•1736,1738**
Pioneer Magnetics, 1745 Berkeley St., Santa Monica, CA 90404, 213-829-6751 ... D•1752-1753
§ **Power-One, Inc., Power-One Linear Products, 740 Calle Plano, Camarillo, CA 93010, 805-987-8741 ... D•1768-1769,1771-1773**
§ **Power Products Div., Computer Products, Inc., 2981 Gateway Drive, Pompano Beach, FL 33069, 305-974-2442 ... D•1559-1572**
Power Systems, 12 Tobey Rd., Bloomfield, CT 06002, 203-243-0357 ... D•1780-1781
Powertec, Inc., 20550 Nordhoff St., Chatsworth, CA 91311, 818-882-0004 ... D•1782-1784,1795-1799
Prime Power, Inc., Prime Technology Co., Twin Lakes Rd., P.O. Box 185, N. Branford, CT 06471, 203-481-5721 ... D•1801
† **RO Assocs., 246 Caspian Dr., Box 61419, Sunnyvale, CA 94088, 408-744-1450 ... D•1812-1814**
Secoinsa/Digi Power, 686 E. Gish Rd., San Jose, CA 95112, 408-288-5600 ... D•1830
§ **Sierracin/Power Systems, 20500 Plummer St., Chatsworth, CA 91311, 818-998-9873 ... D•1834-1836**
Sola, A Unit of General Sign., 1717 Busse Rd., Elk Grove Village, IL 60007, 312-439-2800 ... D•1838-1839
Stevens-Arnold Div., Computer Prods., Inc., 7 Elkins St., So. Boston, MA 02127, 617-268-1170 ... D•1573
Summit Elctrns., 750 S. Sherman, Richardson, TX 75081, 214-231-1456 ... D•1846-1847
Taylor Electronics, Inc., 401 West Orion, Tempe, AZ 85283, 602-838-4523 ... D•1848
§ **TDK Corporation of America, 4711 Golf Rd., Skokie, IL 60076, 312-679-8200 ... D•1849**
Technology Dynamics, 91 E. Carver Ave., Westwood, NJ 07675, 201-664-7636 ... D•1851
Todd Prods. Corp., 50 Emjay Blvd., Brentwood, NY 11717, 516-231-3366 ... D•1854-1855
† **Xentek, Inc., 279 S. Pacific St., San Marcos, CA 92069, 619-744-3346 ... D•1872-1873**
§ AAK Corp, 747 River St., Haverhill, MA 01830 ... 617-373-3769
Abbott Transistor Labs., Industrial Products Div., 8203 Vineland Ave., Sun Valley, CA 91352 ... 818-504-0644
§ ACDC Electronics, 401 Jones Rd., Oceanside, CA 92054 ... 619-757-1880
† Anadyne Power Supply Division, 721 W. Whittier Blvd., La Habra, CA 90631 ... 213-697-3116
† Analog Devices, P.O. Box 280, Norwood, MA 02062 ... 617-329-4700
Analogic Corp., 8 Centennial Dr., Peabody, MA 01961 ... 617-532-5660;617-777-4500; 617-246-0300;800-451-1
Astro-Geo-Marine, Inc., 202 E. Cota St., Santa Barbara, CA 93101 ... 805-965-7005
Bikor, 1504 W. 228th St., Torrance, CA 92718 ... 213-539-6320
† CEA Division of Berkleonics, Inc., A Subsidiary of EG & G, 1 Aerovista Pk., San Luis Obispo, CA 93401 ... 805-544-5454
† CEAG Elec. Corp., Power Supp. Div., 1324 Motor Pkwy., Hauppauge, NY 11788 ... 516-582-4422
† Chloride Power Electronics, 10931 Pellicano Drive, El Paso, TX 79935 ... 915-592-9985
Computer Power, 124E W. Main St., High Bridge, NJ 08829 ... 201-735-8000
§ C-Tek Inc., 4 Railroad Ave., Wakefield, MA 01880 ... 617-246-1720
D & B Power, Inc., 204 N. Fehr Way, P.O. Box 40M, Bayshore, NY 11706 ... 516-586-5955
Datel, General Electric Co., 11 Cabot Blvd., Mansfield, MA 02048 ... 617-339-9341
† Del Elctrns. Corp., 250 E. Sandford Blvd., Mt. Vernon, NY 10550 ... 914-699-2000
Digital Power Corp., 686 East Gish Rd., San Jose, CA 95112 ... 408-288-5600
§† Dressen-Barnes Elctrns., 1600 E. Valencia Dr., Fullerton, CA 92631 ... 714-871-3020
§ Dynatronix, Inc., 105 Power St., Amery, WI 54001 ... 715-268-8118;800-826-7172
Electronic Measurements, 405 Essex Rd., Neptune, NJ 07753 ... 201-922-9300
Electrostatics, 7718 Clairemont Mesa Blvd., San Diego, CA 92111 ... 619-279-1414
† E M S Development Corp., 200 Allen Blvd., Farmingdale, NY 11735 ... 516-694-2886
Endicott Resch. Grp., Inc., 2601 Wayne St., P.O. Box 269, Endicott, NY 13760 ... 607-754-9187
Engd. Prod., Div. of Acme Elec. Corp., 40 Water St., Cuba, NY 14727 ... 716-968-2400
ERA Transpac Div., Sub. Elctrn. Research Assocs., 50 Graphic Place, Moonachie, NJ 07074 ... 201-641-3650
§ E-Tronics, 16774 Schoenborn, Sepulveda, CA 91343 ... 213-892-7279
† Gulton Industries, Inc., Engineered Magnetics Division, 13041 Cerise Ave., Hawthorne, CA 90250 ... 213-679-0111
Hipotronics, P.O. Drawer A, Brewster, NY 10509 ... 914-279-8091
Hybrid Systems Corp., 22 Linnell Circle, Billerica, MA 01821 ... 617-667-8700
International Instrumentation, 31131-602 Via Colinas, Westlake Vlg., CA 91362 ... 213-991-9614
Kikusui Intl. Corp., 17819 S. Figueroa St., Gardena, CA 90248 ... 213-515-6432; 800-421-5334
Kode, 1515 S. Manchester Ave., Anaheim, CA 92802 ... 714-758-0400
Lorain Prods., 1122 F St., Lorain, OH 44052 ... 216-288-1122
Mag-Con, 1626 Terrace Dr., St. Paul, MN 55113 ... 612-633-8820
Magnum Opus Custom Elctrn. Engrg., 284 Kennedy St., Iselin, NJ 08830 ... 201-283-4925
Micro Power Intl., Inc., 9420 Activity Rd., San Diego, CA 92126 ... 619-271-0831
MIL Electronics, Inc., 1 Mill st., Dracut, MA 01826 ... 617-453-8000
Modular Audio Prods., Modular Devices Inc., 50 Orville Dr., Bohemia, NY 11716 ... 516-567-9620
MPC Sys., Div. of Consulting Systems, RFD Box 441, Fremont, NH 03044 ... 603-642-5913
Oram Elctrns., Rte. 22, Putnam Business Park, Brewster, NY 10509-9587 ... 914-279-2966
Pacific Instrs. Inc., 215 Mason Circle, Concord, CA 94518 ... 415-827-9010
Polytron Devices, Box 398 - River St. Sta., Paterson, NJ 07544 ... 201-345-5885
Power Designs, Inc., 1700 Shames Dr., Westbury, NY 11590 ... 516-333-6200

Power Elctrns., 96 Milton Rd., Rochester, NH 03867 603-332-3334
§ Power Labs, Inc., 5 Towle Ave., Dover, NH 03820 603-742-4613
§ Power-One, Inc., Power-One Switching Products, 833 Flynn Rd., Camarillo, CA 93010 805-482-0757
§ Power Pac, 32 Meadow St., S. Norwalk, CT 06856 203-866-4484
Pulse Instrs. Co., 1234 Francisco, Torrance, CA 90502 213-515-5330
Qualidyne Sys., Unitech Ltd., 3055 Del Sol Blvd., San Diego, CA 92154 ..... 619-429-7440;619-575-4400
Reich Assocs., Rt. 4, Box 4620, Lakehills, TX 78063 512-751-3220
§ Reliability, Inc., 16400 Park Row, P.O. Box 218370, Houston, TX 77218 713-492-0550
§ RTE, Power/Mate Co., 514 S. River St., Hackensack, NJ 07601 201-440-3100
S & H Inds., 119 Glen Cove Dr., Glen Head, NY 11545 516-671-5600
Sanford-Miller Corp., 8 John St., Lynbrook, NY 11563 ..... 516-593-2025;Outside NY 800-645-5900
§ Semiconductor Circuits, 49 Range Rd., Windham, NH 03087 603-893-2330
SGS Semiconductor Corporation, 1000 E. Bell Road, Phoenix, AZ 85022 602-867-6100
† Sigmapower, Inc., 20790 Leapwood Ave., Carson, CA 90746 ..... 213-32-Sigma
Sorensen Co., 676 E. Island Pond Rd., Manchester, NH 03103 603-668-4500
Spellman High Voltage Elctrns. Corp., 7 Fairchild Ave., Plainview, NY 11803 516-349-8686
Standard Power, Inc., 1400 S. Village Way, Santa Ana, CA 92705 714-558-8512
† Superior Mfg. & Instr., 19-36 38th St., Long Island City, NY 11105 212-932-1800
† Technipower, A Penril Co., P.O. Box 222, Commerce Pk., Danbury, CT 06810 203-748-7001
Tecnetics, Box 910, Boulder, CO 80306 303-442-3837
Tecron Industrial Prods., Crown Intl., Inc., 1718 W. Mishawaka Rd., Elkhart, IN 46517 219-294-8300
Teledyne Philbrick, Allied Dr. Rte 128, Dedham, MA 02026 617-329-1600
§ Tidewater Technological, Inc., 611 Industrial Pk. Dr., Newport News, VA 23602 804-874-2800
† Trio Labs., 80 Dupont St., Plainview, NY 11803 516-349-0400
Universal Voltronics, 27 Radio Circle Dr., Mt. Kisco, NY 10549 914-241-1300
Walker Scientific, Rockdale St., Worcester, MA 01606 617-852-3674
Wall Inds., 2 Franklin, Lawrence, MA 01840 617-688-1287
Xylog Corp., 150 Tillman St., Westwood, NJ 07675 201-664-7997

Power Supplies, Constant Current-4000

Acopian, Box 638, Easton, PA 18044, 215-258-5441 ..... D•1478-1479
§ **Adtech Power Inc., 1620 S. Sunkist St., Anaheim, CA 92806, 714-634-9211 ..... D•1499**
Advance Conversion Devices Co., 274 S. Salem St., Randolph, NJ 07869, 201-989-0095 ..... D•1886
Avionic Instrs., 943 E. Hazelwood Ave., Rahway, NJ 07065, 201-388-3500 ..... D•1890
§ **B & K Precision, Industrial Electronics Product Group, Dynascan Corporation, 6460 W. Cortland, Chicago, IL 60635, 312-889-9087 ..... D•1521**
Behlman Engineering, 1142 Mark Ave., Carpinteria, CA 93013, 805-684-8311 ..... D•1898-1905
Bell, F. W., Inc., 6120 Hanging Moss Rd., Orlando, FL 32807, 305-678-6900 ..... D•1977
† **California Instruments, A Div. of Amstar Tech. Prods. Co., Inc., 5150-Convoy St., San Diego, CA 92111, 619-279-8620;800-356-2244;800-821-1634 ..... D•1907**
CES Elctrns., 2968 Avenue Z, Brooklyn, NY 11235 ..... D•1606
Clarke-Hess Comm. Resch. Corp., 17 West 17th St., New York, NY 10011, 212-255-2940 ..... D•1200
§ **Computer Prods. Inc., Power Conversion Grp., 2981 Gateway Dr., Pompano Bch., FL 33069-4803, 305-974-5500 ..... D•1551,1559**
Cord Electronics, Inc., 177 Cantiague Rock Rd., Westbury, NY 11590, 516-935-3640 ..... D•1605
CPS Inc., 110 Wolfe Rd., Sunnyvale, CA 94086, 408-738-0530 ..... D•1607
Displex, Inc., Alexander Place, Glen Cove, NY 11542, 516-671-4400 ..... D•1619
Elgar Corp, An Onan McGraw Edison Co., 9250 Brown Deer Rd., San Diego, CA 92121, 619-450-0085 ..... D•1918
§ **Elpac Power Sys., 3131 S. Standard Ave., Santa Ana, CA 92705, 714-979-4440 ..... D•1626**
† **EMCO High Voltage Co., 11126 Ridge Road, Sutter Creek, CA 95685, 209-223-3626 ..... D•1632**
EVI, Inc., 8970 F Route 108, Columbia, MD 21045, 301-964-1660 ..... D•1639
Gamma High Voltage Resch. Inc., 152 S. MacQuesten Pkwy., Mt. Vernon, NY 10550, 914-667-5050 ..... D•1645
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303, Call Local Sls. Off. ..... D•1654-1656
Hitran Corp., Agex, Rte. 31, RD 5-65, Flemington, NJ 08822, 201-782-5525 ..... D•1660
Industrial Test Equip., 21 Yennicock Ave., Port Washington, NY 11050, 516-883-1700 ..... D•1247,1938
Kepco, Inc., 131-38 Sanford Ave., Flushing, NY 11352, 718-461-7000 ..... D•1689-1691,1702-1704,1706-1707
Mid-Eastern Industries, 100 Campus Dr., RD 1, Mt. Holly, NJ 08060, 609-267-3811 ..... D•1724,1726
§ **North American Soar Corp., 11126 Cornell Ave., Cherry Hill, NJ 08002, 609-488-1060 ..... D•1276**
North Hills Elctrns., 1 Alexander Pl., Glen Cove, NY 11542, 516-671-5700 ..... D•1734
Pan-Magnetics Intl., Inc., 455-A Carson Plaza Dr., Carson, CA 90746, 213-532-1790 ..... D•1742-1743
Power Designs, Inc., 1700 Shames Dr., Westbury, NY 11590, 516-333-6200 ..... D•1755-1759
§ **Power Products Div., Computer Products, Inc., 2981 Gateway Drive, Pompano Beach, FL 33069, 305-974-2442 ..... D•1559**
† **Power Ten, Inc., 486 Mercury Dr., Sunnyvale, CA 94086, 408-738-5959 ..... D•1779**
§† **RTE, Power/Mate Co., 514 S. River St., Hackensack, NJ 07601, 201-440-3100 ..... D•1816-1821**
Shape Magnetronics, Inc., 901 DuPage Ave., Lombard, IL 60148, 312-620-8394 ..... D•1960-1961
Summit Elctrns., 750 S. Sherman, Richardson, TX 75081, 214-231-1456 ..... D•1846-1847
Todd Prods. Corp., 50 Emjay Blvd., Brentwood, NY 11717, 516-231-3366 ..... D•1854-1855
Triac Electronic Systems, Inc., 87-27 Myrtle Ave., Glendale, NY 11385, 718-441-4759 ..... D•1132
VIZ Test Equipment, Div. VIZ Mfg., 335 E. Price St., Philadelphia, PA 19144, 215-844-2626 ..... D•1864
§ AAK Corp, 747 River St., Haverhill, MA 01830 617-373-3769
Abacus Controls Inc., 89 Readington Rd., Somerville, NJ 08876 201-526-6010
Abbott Transistor Labs., Industrial Products Div., 8203 Vineland Ave., Sun Valley, CA 91352 818-504-0644
† Abbott Transistor Labs., Power Supply Div., 5200 W. Jefferson Blvd., Los Angeles, CA 90016 213-936-8185
Advanced High Voltage Co., Inc., P.O. Box 2136, Lancaster, CA 93539-2136 213-997-7222
Albar, Inc., 19013 36th Ave. W., Lynnwood, WA 98036 206-771-4006
American Monarch, 2801-37th Ave., N.E., Minneapolis, MN 55421 612-788-9161
† AMETEK, Dynamics Division, AMETEK, Inc., 5649 Peck Rd., Arcadia, CA 91006 818-442-5981
† Anadyne Power Supply Division, 721 W. Whittier Blvd., La Habra, CA 90631 213-697-3116
§ Anaheim Automation, 910 E. Orangefair La., Anaheim, CA 92801 714-992-6990
† Analog Devices, P.O. Box 280, Norwood, MA 02062 617-329-4700
† Arnold Magnetics, 11520 W. Jefferson Blvd., Culver City, CA 90230 ..... 213-390-3537/8837
Astro-Geo-Marine, Inc., 202 E. Cota St., Santa Barbara, CA 93101 805-965-7005
Astrosystems, 6 Nevada Dr., Lake Success, NY 11042 516-328-1600
AT&T, 1 Oak Way, Berkeley Heights, NJ 07922 1-800-372-2447
† ATC Power Systems, Inc., 472 Amherst Street, Nashua, NH 03063 603-882-1366
† Atlas Engrg. Corp., 10 Cheney St., Dorchester, MA 02121 617-445-7100
ATR Elctrns., Inc., P.O. BOX 7008, St. Paul, MN 55107 ..... 612-738-6520;414-297-7374
† Autronics, 314 E. Live Oak, Ste. A, Arcadia, CA 91006 818-445-5470
† Avtel Div., Unitron Inc., 10925 Miller Rd., Dallas, TX 75238 214-340-8600
Behlman Div., California Instrs., Div. of Norlin Inds., 5150 Convoy St., San Diego, CA 92111 619-279-8620
Bertan Assocs., 121 New South Rd., Hicksville, NY 11801 516-433-3110
† Brandt Elctrns., Inc., 1220 Alderwood Ave., Sunnyvale, CA 94086 408-734-8310
† Cal-Power Corp., 140 Kansas St., El Segundo, CA 90245 213-772-2171
Cardon Corp., P.O. Box 2371, Boston, MA 02107 617-357-5898
CEA Division of Berkleonics, Inc., A Subsidiary of EG & G, 1 Aerovista Pk., San Luis Obispo, CA 93401 805-544-5454
† CEAG Elec. Corp., Power Supp. Div., 1324 Motor Pkwy., Hauppauge, NY 11788 516-582-4422
† Chloride Power Electronics, 10931 Pellicano Drive, El Paso, TX 79935 915-592-9985
Christie Elec. Corp., 20665 Manhattan Pl., Torrance, CA 90501 213-320-0808
CML MACARR Div., Marine Electric RPD, Inc., 666 Pacific St., Brooklyn, NY 11217 718-857-2400
Continental Resources, Inc., 175 Middlesex Tpke., Bedford, MA 01730 617-275-0850
Controlled Power Co., 1955 Stephenson Hwy., Troy, MI 48083 1-800-521-4792
Crestronics Div., Applied Electro Technlg., Int., 2220 S. Anne St., Santa Ana, CA 92704 714-556-6570
Cross Elctrns., 100 Commonwealth Dr., Warrendale, PA 15086 412-776-1591
CSI Capacitors, CSI Technlgs., 810 Rancheros Dr., San Marcos, CA 92069 619-747-4000
D & B Power, Inc., 204 N. Fehr Way, P.O. Box 40M, Bayshore, NY 11706 516-586-5955
† Datametrics Corp., Defense Products Div., 7630 Gloria Ave., Van Nuys, CA 91406 818-989-3840
Datel, General Electric Co., 11 Cabot Blvd., Mansfield, MA 02048 617-339-9341
Davidson Elctrn. Dev. Co., 113 E. 13th St., Erie, PA 16512 814-453-7547
† Del Elctrns. Corp., 250 E. Sandford Blvd., Mt. Vernon, NY 10550 914-699-2000
§ Dynatronix, Inc., 105 Power St., Amery, WI 54001 ..... 715-268-8118;800-826-7172
† EG & G Almond Instruments, 1330 E. Cypress St., Covina, CA 91724 818-967-9521
Electronic Measurements, 405 Essex Rd., Neptune, NJ 07753 201-922-9300
Electro Vector, Inc., 6555 Covey Rd., Forestville, CA 95436 707-887-2292
Elin Div., California Instrs. Co., Div. of Norlin Ind., 5150 Convoy St., San Diego, CA 92111 619-279-8620
Elma Engrg., 1066 E. Meadow Circle, Palo Alto, CA 94303 415-494-7303
Endicott Resch. Grp., Inc., 2601 Wayne St., P.O. Box 269, Endicott, NY 13760 607-754-9187
Energy, Ltd., 4714 Upshur Street, Bladensburg, MD 20710 301-699-1144
Engd. Prod., Div. of Acme Elec. Corp., 40 Water St., Cuba, NY 14727 716-968-2400
§ Epsco, 920 Westwood Ave., Addison, IL 60101 312-543-0410
ERA Transpac Div., Sub. Elctrn. Research Assocs., 50 Graphic Place, Moonachie, NJ 07074 201-641-3650
† Ferrotran Elctrns. Co., Inc., 11 W. 25th St., New York, NY 10010 212-691-3610
Fluke, John, Mfg. Co., Box C9090, MS 250C, Everett, WA 98206 206-356-5400
Freed Transformer, 1718 Weirfield St., Ridgewood, NY 11385 212-386-1300
† Georator Corp., Box 70, Manassas, VA 22110 703-368-2101
Glassman High Voltage Inc., P.O. Box 551, Salem Indl. Pk., Whitehouse Sta., NJ 08889 201-534-9007
GMR Co., 8801 Sepulveda Blvd., Los Angeles, CA 90045 213-216-9516
† Good-All Electric, Inc., 3725 Canal Drive, Fort Collins, CO 80524 303-484-3080
† Gulton Industries, Inc., Engineered Magnetics Division, 13041 Cerise Ave., Hawthorne, CA 90250 213-679-0111
Halmar Electronics, Inc., 900 N. Hague Ave., Columbus, OH 43204 614-275-0131
† Helionetics, Inc., DECC Div., 17312 Eastman St., Irvine, CA 92714 ..... 714-546-4731; 800-421-7915
ILC Technology, Inc., 399 Java Dr., Sunnyvale, CA 94089 408-745-7900
Interelectronics Corp., Interelectronics Park, 550 U.S. Rte. 303, Congers, NY 10920 ..... 914-EL8-8000
ITT Power Systems Corp., Box 688, Galion, OH 44833-0688 419-468-8100
Jerome Industries Corp., B 730 Division St., Elizabeth, NJ 07201 201-353-5700

§ Kaiser Systems, Inc., 126 Sohier Road, Beverly, MA 01915 617-922-9300
Keithley Instrs., 28775 Aurora Rd., Cleveland, OH 44139 216-248-0400
† Keltec Florida, P.O. Box 2917, Ft. Walton Bch., FL 32549 904-651-9749
Keltron Corp., Walden Div., 225 Crescent St., Waltham, MA 02154 617-894-8700
KGS Electronics, Inc., GAR Entprs., 2029 N. Lincoln Ave., Pasadena, CA 91103 818-798-0786
Kikusui Intl. Corp., 17819 S. Figueroa St., Gardena, CA 90248 .... 213-515-6432; 800-421-5334
Kode, 1515 S. Manchester Ave., Anaheim, CA 92802 714-758-0400
§ La Marche Mfg., 106 Bradrock Dr., Des Plaines, IL 60018 312-299-1188
Lambda Electronics, Veeco Instr., Inc., 515 Broad Hollow Rd., Melville, NY 11747 516-694-4200
§ Leader Instrs. Corp., 380 Oser Ave., Hauppauge, NY 11788-3694 516-231-6900
Lestronics, Inc., 1840 Industrial Circle, Longmont, CO 80501 .... 303-443-6250; 800-525-6478
LH Research, Inc., 14402 Franklin Ave., Tustin, CA 92680 714-730-0162
Lorain Prods., 1122 F St., Lorain, OH 44052 216-288-1122
MacPower, 9115 26th Ave., Kenosha, WI 53140 414-694-8866
Marel Instr. Co., 907 South East 13th Pl., Cape Coral, FL 33904 813-574-8788
† Megatran Electronic Power, Rising Sun Rd., Bordentown, NJ 08505 609-298-7300
Melcher, Inc., 6290 Sunset Blvd., # 1126, Los Angeles, CA 90028 213-463-5617
Microcomputer Power, 15875 Concord Circle, Morgan Hill, CA 95037 408-779-5700
MIL Electronics, Inc., 1 Mill st., Dracut, MA 01826 617-453-8000
† Milwaukee Transformer Co., MTE Corporation, 7901 W. Clinton Avenue, Milwaukee, WI 53223 414-358-5300
Modular Devices, 50 Orville Dr., Bohemia, NY 11716 516-567-9620
† Modular Power Sys. Inc., P.O. Box 180579, Austin, TX 78718-0579 512-834-9262
§ Murata Erie North America, Inc., 1148 Franklin Rd., S.E., Marietta, GA 30067 404-952-9777
NJE Corporation, 329 Culver Rd, P.O. Box 669, Dayton, NJ 08810-0669 201-329-4611
§† Northeast Scientific Corp., 30 Wetherbee St., Acton, MA 01720 617-263-2711
† Novatronics, Box 878, Pompano Beach, FL 33061 305-942-5200
† NWL Transformers, Rising Sun Rd., P.O. Box 358, Bordentown, NJ 08505 609-298-7300
† OPT Inds. Inc., 300 Red School La., Phillipsburg, NJ 08865 201-454-2600
Oram Elctrns., Rte. 22, Putnam Business Park, Brewster, NY 10509-9587 914-279-2966
† Pacific Electro Dynamics, Inc., 11465 Willows Rd. N.E., Redmond, WA 98052 206-881-1700
Pacific Instrs. Inc., 215 Mason Circle, Concord, CA 94518 415-827-9010
Pacific Power Source Corp., 15122 Bolsa Chica St., Huntington Bch., CA 92649 .... 714-898-2691;800-854-2433
† PCB Piezotronics, 3425 Walden Ave., Depew, NY 14043-2495 716-684-0001
Pioneer Magnetics, 1745 Berkeley St., Santa Monica, CA 90404 213-829-6751
Polytron Devices, Box 398 - River St. Sta., Paterson, NJ 07544 201-345-5885
Powerbox, Inc., 1860 Broadway, New York, NY 10023 212-586-1992
† Powercube Corp., Sub. Unitrode Corp., 8 Suburban Pk. Dr., Billerica, MA 01821 617-667-9500
Power Elctrns., 96 Milton Rd., Rochester, NH 03867 603-332-3334
§ Power Pac, 32 Meadow St., S. Norwalk, CT 06856 203-866-4484
† Power Sys. Grp., Rantec Div., Emerson Elec., 9401 Oso Ave., Chatsworth, CA 91311 818-885-8223
§ Power Technology, Inc., P.O. Box 9769, Little Rock, AR 72219 501-568-1995
Reich Assocs., Rt. 4, Box 4620, Lakehills, TX 78063 512-751-3220
Sanford-Miller Corp., 8 John St., Lynbrook, NY 11563 .... 516-593-2025;Outside NY 800-645-5900
Seven Mountains Sci. Inc., P.O. Box 650, Boalsburg, PA 16827 814-466-6559
Shogyo Intl. Corp., 287 Northern Blvd., Great Neck, NY 11021 516-466-0911
† Sigmapower, Inc., 20790 Leapwood Ave., Carson, CA 90746 .... 213-32-Sigma
§† Sorensen Co., 676 E. Island Pond Rd., Manchester, NH 03103 603-668-4500
† Spellman High Voltage Elctrns. Corp., 7 Fairchild Ave., Plainview, NY 11803 516-349-8686
§ Standard Power, Inc., 1400 S. Village Way, Santa Ana, CA 92705 714-558-8512
† Superior Mfg. & Instr., 19-36 38th St., Long Island City, NY 11105 212-932-1800
Systron-Donner Instr. Div., 2727 Systron Dr., Concord, CA 94518 415-676-5000
§† Tauber Elctrns. Inc., 4901 Morena Blvd., Bldg. 314, San Diego, CA 92117 619-274-7242
† Technipower, A Penril Co., P.O. Box 222, Commerce Pk., Danbury, CT 06810 203-748-7001
Teco Corp., Bay Rd., P. O. Box A, Winnisquam, NH 03289 603-524-1998
Tecron Industrial Prods., Crown Intl., Inc., 1718 W. Mishawaka Rd., Elkhart, IN 46517 219-294-8300
Telco Products Co., 44 Sea Cliff, Glen Cove, NY 11542 516-759-0300
Temescal, 2850 Seventh St., Berkeley, CA 94710 415-841-5720
Torotron Corp., 519 South Fifth Ave., Mt. Vernon, NY 10550 914-664-2050
† Transistor Devices, 274 S. Salem St., Randolph, NJ 07869 201-361-6622
† Trio Labs., 80 Dupont St., Plainview, NY 11803 516-349-0400
§ Tucker Elctrns., Box 461966, Garland, TX 75046 .... 214-348-8800;800-527-4642
† Unitron Inc., 10925 Miller Rd., Dept. EE, Dallas, TX 75238 214-340-8600
Universal Voltronics, 27 Radio Circle Dr., Mt. Kisco, NY 10549 914-241-1300
Venable Industries, Inc., 3555 Lomita Blvd., Torrance, CA 90505 213-539-2522
† Venus Scientific, Inc., 399 Smith St., Farmingdale, NY 11735 516-293-4100
Wall Inds., 2 Franklin, Lawrence, MA 01840 617-688-1287
Wilmore Elctrns. Co., Box 1329, Hillsborough, NC 27278 919-732-9351
Xentek, Inc., 279 S. Pacific St., San Marcos, CA 92069 619-744-3346
Xylog Corp., 150 Tillman St., Westwood, NJ 07675 201-664-7997
§ Zambre Co., Inc., 2134 Old Middlefield Way, Mountain View, CA 94043 415-968-9176

Power Supplies, Constant Voltage — See Power Supplies, Linear (Vol. D)

Power Supplies, Constant Voltage/Constant Current-4000

CES Elctrns., 2968 Avenue Z, Brooklyn, NY 11235 .... D•1606
Cord Electronics, Inc., 177 Cantiague Rock Rd., Westbury, NY 11590, 516-935-3640 .... D•1605
Displex, Inc., Alexander Place, Glen Cove, NY 11542, 516-671-4400 .... D•1619
EVI, Inc., 8970 F Route 108, Columbia, MD 21045, 301-964-1660 .... D•1639
Gamma High Voltage Resch. Inc., 152 S. MacQuesten Pkwy., Mt. Vernon, NY 10550, 914-667-5050 .... D•1645
Industrial Test Equip., 21 Yennicock Ave., Port Washington, NY 11050, 516-883-1700 .... D•1938
Ocean Marine Instrument, 629 Terminal Way # 15, Costa Mesa, CA 92627, 714-548-9569 .... D•1947
Pan-Magnetics Intl., Inc., 455-A Carson Plaza Dr., Carson, CA 90746, 213-532-1790 .... D•1742-1743
Power Designs, Inc., 1700 Shames Dr., Westbury, NY 11590, 516-333-6200 .... D•1755-1759
Power Ten, Inc., 486 Mercury Dr., Sunnyvale, CA 94086, 408-738-5959 .... D•1779
RTE, Power/Mate Co., 514 S. River St., Hackensack, NJ 07601, 201-440-3100 .... D•1816-1827
Shape Magnetronics, Inc., 901 DuPage Ave., Lombard, IL 60148, 312-620-8394 .... D•1960-1961
Summit Elctrns., 750 S. Sherman, Richardson, TX 75081, 214-231-1456 .... D•1846-1847
Trio Electronic Systems, Inc., 87-27 Myrtle Ave., Glendale, NY 11385, 718-441-4759 .... D•1132
VIZ Test Equipment, Div. VIZ Mfg., 335 E. Price St., Philadelphia, PA 19144, 215-844-2626 .... D•1864
† Abbott Transistor Labs., Power Supply Div., 5200 W. Jefferson Blvd., Los Angeles, CA 90016 213-936-8185
† ATC Power Systems, Inc., 472 Amherst Street, Nashua, NH 03063 603-882-1366
Bay Components, Inc., 1806 Dreams Landing Way, Annapolis, MD 21401 301-266-6767
† EMCO High Voltage Co., 11126 Ridge Road, Sutter Creek, CA 95685 209-223-3626
Endicott Resch. Grp., Inc., 2601 Wayne St., P.O. Box 269, Endicott, NY 13760 607-754-9187
Energy, Ltd., 4714 Upshur Street, Bladensburg, MD 20710 301-699-1144
† Ferrotran Elctrns. Co., Inc., 11 W. 25th St., New York, NY 10010 212-691-3610
† Good-All Electric, Inc., 3725 Canal Drive, Fort Collins, CO 80524 303-484-3080
† Gulton Industries, Inc., Engineered Magnetics Division, 13041 Cerise Ave., Hawthorne, CA 90250 213-679-0111
Halmar Electronics, Inc., 900 N. Hague Ave., Columbus, OH 43204 614-275-0131
Jerome Industries Corp., B 730 Division St., Elizabeth, NJ 07201 201-353-5700
§ Kaiser Systems, Inc., 126 Sohier Road, Beverly, MA 01915 617-922-9300
Lambda Electronics, Veeco Instr., Inc., 515 Broad Hollow Rd., Melville, NY 11747 516-694-4200
LaserSonics Power Supply Operation, 177 N. Wolfe Rd., Sunnyvale, CA 94086 408-732-9880
Melcher, Inc., 6290 Sunset Blvd., # 1126, Los Angeles, CA 90028 213-463-5617
NJE Corporation, 329 Culver Rd, P.O. Box 669, Dayton, NJ 08810-0669 201-329-4611
North Hills Elctrns., 1 Alexander Pl., Glen Cove, NY 11542 516-671-5700
Reich Assocs., Rt. 4, Box 4620, Lakehills, TX 78063 512-751-3220
Teco Corp., Bay Rd., P. O. Box A, Winnisquam, NH 03289 603-524-1998
Ulveco, Inc., 323 Vintage Park Drive, Foster City, CA 94404 415-574-1100

Power Supplies, DC Input, AC Output — See Power Supplies, AC Output (Vol. D)

Power Supplies, DC Input, DC Output — See Converters, DC to DC (Vol. D)

Power Supplies, Encapsulated-4000

Abbott Transistor Labs., Industrial Products Div., 8203 Vineland Ave., Sun Valley, CA 91352, 818-504-0644 .... D•1449
† Abbott Transistor Labs., Power Supply Div., 5200 W. Jefferson Blvd., Los Angeles, CA 90016, 213-936-8185 .... D•1449,1451-1453,1456-1457
Acopian, Box 638, Easton, PA 18044, 215-258-5441 .... D•1464-1467,1470-1471
† Analog Modules, Inc., 126 Baywood Avenue, Longwood, FL 32750, 305-339-4356/4355 .... D•1004
† Arnold Magnetics, 11520 W. Jefferson Blvd., Culver City, CA 90230, 213-390-3537/8837 .... D•1508-1511
Calex Mfg. Co., Inc., 3355 Vincent Rd., Pleasant Hill, CA 94523, 415-932-3911 .... D•1542-1545
§ Computer Prods. Inc., Power Conversion Grp., 2981 Gateway Dr., Pompano Bch., FL 33069-4803, 305-974-5500 .... D•1551,1559-1562,1568-1573
CPS Inc., 110 Wolfe Rd., Sunnyvale, CA 94086, 408-738-0530 .... D•1607
Delta Electronic Ind. USA, Delta Elctrn. Ind. Co. Ltd., 3401 Investment Blvd., Ste. 5, Hayward, CA 94545, 415-785-5231;415-785-5235 .... D•1616-1617
† EMCO High Voltage Co., 11126 Ridge Road, Sutter Creek, CA 95685, 209-223-3626 .... D•1632
Endicott Resch. Grp., Inc., 2601 Wayne St., P.O. Box 269, Endicott, NY 13760, 607-754-9187 .... B•1047, D•1633
Gamma High Voltage Resch. Inc., 152 S. MacQuesten Pkwy., Mt. Vernon, NY 10550, 914-667-5050 .... D•1644
Integrated Circuits, Inc., 10301 Willows Road, Redmond, WA 98052, 206-882-3100 .... D•1662-1665
Interelectronics Corp., Interelectronics Park, 550 U.S. Rte. 303, Congers, NY 10920, 914-EL8-8000 .... D•1667
Intronics, Inc., 57 Chapel St., Newton, MA 02158, 617-964-4000 .... D•1676-1677
Jerome Industries Corp., B 730 Division St., Elizabeth, NJ 07201, 201-353-5700 .... D•1678-1679
LZR Electronics, Inc., 8174 Beechcraft Ave., Gaithersburg, MD 20879, 301-921-9440 .... D•1716-1718
Modular Devices, 50 Orville Dr., Bohemia, NY 11716, 516-567-9620 .... D•1011
§† Murata Erie North America, Inc., 1148 Franklin Rd., S.E., Marietta, GA 30067, 404-952-9777 .... D•1729

Power Supplies, Encapsulated-4000 (Cont'd)

Pan-Magnetics Intl., Inc., 455-A Carson Plaza Dr., Carson, CA 90746, 213-532-1790 ... D•1742-1743
Power General, Unitrode, 152 Will Dr., Canton, MA 02021, 617-828-6216 ... D•1761
Power Products Div., Computer Products, Inc., 2981 Gateway Drive, Pompano Beach, FL 33069, 305-974-2442 ... D•1559-1562,1568-1572
Power Technology, Inc., P.O. Box 9769, Little Rock, AR 72219, 501-568-1995 ... B•1125
RIFA, Inc., Greenwich Off. Pk. 3, P.O. Box 3110, Greenwich, CT 06836-3110, 203-625-7300 ... D•1810-1811
RO Assocs., 246 Caspian Dr., Box 61419, Sunnyvale, CA 94088, 408-744-1450 ... D•1813-1814
Stevens-Arnold Div., Computer Prods., Inc., 7 Elkins St., So. Boston, MA 02127, 617-268-1170 ... D•1573
§ TDK Corporation of America, 4711 Golf Rd., Skokie, IL 60076, 312-679-8200 ... D•1849
† Technipower, A Penril Co., P.O. Box 222, Commerce Pk., Danbury, CT 06810, 203-748-7001 ... D•1850
† Technology Dynamics, 91 E. Carver Ave., Westwood, NJ 07675, 201-664-7636 ... D•1851
Wilmore Elctrns. Co., Box 1329, Hillsborough, NC 27278, 919-732-9351 ... D•1869

§ AAK Corp, 747 River St., Haverhill, MA 01830 ... 617-373-3769
Advanced High Voltage Co., Inc., P.O. Box 2136, Lancaster, CA 93539-2136 ... 213-997-7222
† Analog Devices, P.O. Box 280, Norwood, MA 02062 ... 617-329-4700
Analogic Corp., Data Conversion Prods. Grp., Audubon Rd., Wakefield, MA 01880 ... 617-246-0300
Applied Power Conversion, Technology Dynamics, Inc., 100 School St., Bergenfield, NJ 07621 ... 201-664-7636
Astec USA, Ltd., A BSR Intl. Co., 2880 San Tomas Expwy., # 200, Santa Clara, CA 95051 ... 408-748-1200
† ATC Power Systems, Inc., 472 Amherst Street, Nashua, NH 03063 ... 603-882-1366
† Babcock, Inc., 1717 West Collins Ave., Orange, CA 92667 ... 714-633-3700
† Brandt Elctrns., Inc., 1220 Alderwood Ave., Sunnyvale, CA 94086 ... 408-734-8310
† Cal-Power Corp., 140 Kansas St., El Segundo, CA 90245 ... 213-772-2171
† CEA Division of Berkleonics, Inc., A Subsidiary of EG & G, 1 Aerovista Pk., San Luis Obispo, CA 93401 ... 805-544-5454
Centent Co., 3879 S. Main St., Santa Ana, CA 92707 ... 714-979-6491
Chloride Power Electronics, 10931 Pellicano Drive, El Paso, TX 79935 ... 915-592-9985
Collmer Semiconductor, Inc., 14368 Proton Rd., Dallas, TX 75234-3335 ... 214-233-1589
† D & B Power, Inc., 204 N. Fehr Way, P.O. Box 40M, Bayshore, NY 11706 ... 516-586-5955
† Del Elctrns. Corp., 250 E. Sandford Blvd., Mt. Vernon, NY 10550 ... 914-699-2000
Electromech, Inc., 528 Elm Street, Kearny, NJ 07032 ... 201-997-0950
Engineering Design & Sls., Rt. 2, Box 305, Danville, VA 24540 ... 804-685-7073
ERA Transpac Div., Sub. Elctrn. Research Assocs., 50 Graphic Place, Moonachie, NJ 07074 ... 201-641-3650
Ferrotran Elctrns. Co., Inc., 11 W. 25th St., New York, NY 10010 ... 212-691-3610
GFC/Hammond Elctrns., Inc., 1690 Walden Ave., Buffalo, NY 14225 ... 716-835-5742
Hitran Corp., Agex, Rte. 31, RD 5-65, Flemington, NJ 08822 ... 201-782-5525
§ Intech, Microcircuits Div., 2270 Martin Ave., Santa Clara, CA 95050 ... 408-988-4930
† K & M Elctrns., 123 Interstate Dr., W. Springfield, MA 01089 ... 413-781-1350
Lestronics, Inc., 1840 Industrial Circle, Longmont, CO 80501 ... 303-443-6250; 800-525-6478
† Magnetico Inc., 182 Morris Ave., Holtsville, NY 11742 ... 516-654-1166
Melcher, Inc., 6290 Sunset Blvd., # 1126, Los Angeles, CA 90028 ... 213-463-5617
MIL Electronics, Inc., 1 Mill st., Dracut, MA 01826 ... 617-453-8000
MPC Sys., Div. of Consulting Systems, RFD Box 441, Fremont, NH 03044 ... 603-642-5913
† Pacific Electro Dynamics, Inc., 11465 Willows Rd. N.E., Redmond, WA 98052 ... 206-881-1700
Polytron Devices, Box 398 - River St. Sta., Paterson, NJ 07544 ... 201-345-5885
† Powercube Corp., Sub. Unitrode Corp., 8 Suburban Pk. Dr., Billerica, MA 01821 ... 617-667-9500
† Power Sys. Grp., Rantec Div., Emerson Elec., 9401 Oso Ave., Chatsworth, CA 91311 ... 818-885-8223
† Reich Assocs., Rt. 4, Box 4620, Lakehills, TX 78063 ... 512-751-3220
§ Reliability, Inc., 16400 Park Row, P.O. Box 218370, Houston, TX 77218 ... 713-492-0550
RTE, Power/Mate Co., 514 S. River St., Hackensack, NJ 07601 ... 201-440-3100
§ Semiconductor Circuits, 49 Range Rd., Windham, NH 03087 ... 603-893-2330
§† Solarex Corp., 1335 Piccard Dr., Rockville, MD 20850 ... 301-948-0202
Sorensen Co., 676 E. Island Pond Rd., Manchester, NH 03103 ... 603-668-4500
Spellman High Voltage Elctrns. Corp., 7 Fairchild Ave., Plainview, NY 11803 ... 516-349-8686
§ Standard Power, Inc., 1400 S. Village Way, Santa Ana, CA 92705 ... 714-558-8512
Summit Elctrns., 750 S. Sherman, Richardson, TX 75081 ... 214-231-1456
† Superior Mfg. & Instr., 19-36 38th St., Long Island City, NY 11105 ... 212-932-1800
Teco Corp., Bay Rd., P. O. Box A, Winnisquam, NH 03289 ... 603-524-1998
Toko America, Inc., 1250 Feehanville Dr., Mt. Prospect,, IL 60056 ... 312-297-0070
Triad-Utrad, 1124 E. Franklin St., Huntington, IN 46750 ... 219-356-6500
Ulveco, Inc., 323 Vintage Park Drive, Foster City, CA 94404 ... 415-574-1100
Universal Voltronics, 27 Radio Circle Dr., Mt. Kisco, NY 10549 ... 914-241-1300
Varian Associates, Inc., Microwave Tube Div., 611 Hansen Way, Palo Alto, CA 94303 ... 415-493-4000
Voltampere Corp., 146 Horton Ave., Lynbrook, NY 11563 ... 516-887-9443
Wall Inds., 2 Franklin, Lawrence, MA 01840 ... 617-688-1287
Wasatch High Voltage, P.O. Box 9027, Salt Lake City, UT 84109 ... 801-265-9561
Xylog Corp., 150 Tillman St., Westwood, NJ 07675 ... 201-664-7997

Power Supplies, Enclosed-4000

Abbott Transistor Labs., Industrial Products Div., 8203 Vineland Ave., Sun Valley, CA 91352, 818-504-0644 ... D•1449,1884-1885
† Abbott Transistor Labs., Power Supply Div., 5200 W. Jefferson Blvd., Los Angeles, CA 90016, 213-936-8185 ... D•1449-1461
† Acopian, Box 638, Easton, PA 18044, 215-258-5441 ... D•1463,1468-1469,1472-1490,1492-1497
Advance Conversion Devices Co., 274 S. Salem St., Randolph, NJ 07869, 201-989-0095 ... D•1886-1887
Applied Power Conversion, Technology Dynamics, Inc., 100 School St., Bergenfield, NJ 07621, 201-664-7636 ... D•1500-1504
Astec USA, Ltd., A BSR Intl. Co., 2880 San Tomas Expwy., # 200, Santa Clara, CA 95051, 408-748-1200 ... D•1512-1513
§ Astron Corp., 2852 Walnut # E, Tustin, CA 92680, 714-832-7770 ... D•1515
Astrosystems, 6 Nevada Dr., Lake Success, NY 11042, 516-328-1600 ... D•1517,1888
§ Ault, Incorporated, 1600 Freeway Blvd., Minneapolis, MN 55430, 612-560-9300 ... D•1518-1519
Avionic Instrs., 943 E. Hazelwood Ave., Rahway, NJ 07065, 201-388-3500 ... D•1890
† Avtel Div., Unitron Inc., 10925 Miller Rd., Dallas, TX 75238, 214-340-8600 ... D•1895-1897
§ B & K Precision, Industrial Electronics Product Group, Dynascan Corporation, 6460 W. Cortland, Chicago, IL 60635, 312-889-9087 ... D•1521
Behlman Engineering, 1142 Mark Ave., Carpinteria, CA 93013, 805-684-8311 ... D•1898-1905
Bertan Assocs., 121 New South Rd., Hicksville, NY 11801, 516-433-3110 ... D•1522-1523,1527,1529,1531-1534
§ Boschert Inc., 384 Santa Trinita Ave., Sunnyvale, CA 94086, 408-732-2440 ... D•1537,1539-1540
CML MACARR Div., Marine Electric RPD, Inc., 666 Pacific St., Brooklyn, NY 11217, 718-857-2400 ... D•1908
Compower Div., Computer Prods., Inc., 2220 Lundy Ave., San Jose, CA 95131, 408-942-1600 ... D•1554-1558
§ Computer Prods. Inc., Power Conversion Grp., 2981 Gateway Dr., Pompano Bch., FL 33069-4803, 305-974-5500 ... D•1551,1554-1559,1563-1567,1573-1580,1582-1583
§ Converter Concepts, Inc., Industrial Pkwy., Pardeeville, WI 53954, 608-429-2144 ... D•1602-1603
CPS Inc., 110 Wolfe Rd., Sunnyvale, CA 94086, 408-738-0530 ... D•1607
† D & B Power, Inc., 204 N. Fehr Way, P.O. Box 40M, Bayshore, NY 11706, 516-586-5955 ... D•1611
† Del Elctrns. Corp., 250 E. Sandford Blvd., Mt. Vernon, NY 10550, 914-699-2000 ... D•1614-1615
Delta Electronic Ind. USA, Delta Elctrn. Ind. Co. Ltd., 3401 Investment Blvd., Ste. 5, Hayward, CA 94545, 415-785-5231;415-785-5235 ... D•1616-1617
Diego Power, 5350 Eastgate Mall, San Diego, CA 92121, 587-1925 ... D•1916
Displex, Inc., Alexander Place, Glen Cove, NY 11542, 516-671-4400 ... D•1619
DVE/Caltronic Co., Ltd., A Sub. of Dee Van Entrp. Co., Ltd., 407 S. Palm Ave., Alhambra, CA 91803, 818-289-0310 ... D•1613
† EG & G Almond Instruments, 1330 E. Cypress St., Covina, CA 91724, 818-967-9521 ... D•1620-1621
Electronic Measurements, 405 Essex Rd., Neptune, NJ 07753, 201-922-9300 ... D•1622-1625
Elgar Corp, An Onan McGraw Edison Co., 9250 Brown Deer Rd., San Diego, CA 92121, 619-450-0085 ... D•1918
§ Elpac Power Sys., 3131 S. Standard Ave., Santa Ana, CA 92705, 714-979-4440 ... D•1627-1630
† EMCO High Voltage Co., 11126 Ridge Road, Sutter Creek, CA 95685, 209-223-3626 ... D•1632
Energy, Ltd., 4714 Upshur Street, Bladensburg, MD 20710, 301-699-1144 ... D•1923
§ Epsco, 920 Westwood Ave., Addison, IL 60101, 312-543-0410 ... D•1634
† ERA Transpac Div., Sub. Elctrn. Research Assocs., 50 Graphic Place, Moonachie, NJ 07074, 201-641-3650 ... D•1635
EVI, Inc., 8970 F Route 108, Columbia, MD 21045, 301-964-1660 ... D•1639
§† Franek, John, Co., Inc., P.O. Box 11752, Santa Ana, CA 92711-1752, 714-832-0290;800-854-9420 ... D•1924-1927
§ Frederick Components Intl., 20806 Plummer St., Chatsworth, CA 91311, 818-882-0868;800-354-0660 ... D•1643
Gamma High Voltage Resch. Inc., 152 S. MacQuesten Pkwy., Mt. Vernon, NY 10550, 914-667-5050 ... D•1644-1645
General Power Sys., 1400 N. Baxter St., Anaheim, CA 92806-1201, 714-956-9321 ... D•1929
GFC/Hammond Elctrns., Inc., 1690 Walden Ave., Buffalo, NY 14225, 716-835-5742 ... D•1647
Glassman High Voltage Inc., P.O. Box 551, Salem Indl. Pk., Whitehouse Sta., NJ 08889, 201-534-9007 ... D•1649-1650
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303, Call Local Sls. Off. ... D•1654-1656
Hipotronics, P.O. Drawer A, Brewster, NY 10509, 914-279-8091 ... D•1658-1659
Hitran Corp., Agex, Rte. 31, RD 5-65, Flemington, NJ 08822, 201-782-5525 ... D•1660
Industrial Test Equip., 21 Yennicock Ave., Port Washington, NY 11050, 516-883-1700 ... D•1247,1938
Instrumentation & Control Sys., 520 Interstate Rd, Addison, IL 60101, 312-543-6200 ... D•1933
Interelectronics Corp., Interelectronics Park, 550 U.S. Rte. 303, Congers, NY 10920, 914-EL8-8000 ... D•1667
International High Voltage Elctrns., Inc., 98 Mill Plain Rd., Danbury, CT 06811, 203-792-7820 ... D•1668-1669
Jerome Industries Corp., B 730 Division St., Elizabeth, NJ 07201, 201-353-5700 ... D•1679
Kaiser Systems, Inc., 126 Sohier Road, Beverly, MA 01915, 617-922-9300 ... D•1680-1683
KEC Elctrns., Inc., 20817 Western Ave., Torrance, CA 90501, 213-320-3902 ... D•1686-1687
Keltec Florida, P.O. Box 2917, Ft. Walton Bch., FL 32549, 904-651-9749 ... D•1688

Kepco, Inc., 131-38 Sanford Ave., Flushing, NY 11352, 718-461-7000 ..... D•1689-1693,1695-1700,1703-1709
Kikusui Intl. Corp., 17819 S. Figueroa St., Gardena, CA 90248, 213-515-6432;800-421-5334 ..... D•1652
Marway Prods. Inc., 311 N. Clara St., Santa Ana, CA 92703, 714-973-1800 ..... D•1944
Mid-Eastern Industries, 100 Campus Dr., RD 1, Mt. Holly, NJ 08060, 609-267-3811 ..... D•1724-1726
Multi Prods. Intl., 218 Little Falls Rd., P.O. Box 238, Cedar Grove, NJ 07009, 201-239-8183 ..... A•2202, D•1728
§† Murata Erie North America, Inc., 1148 Franklin Rd., S.E., Marietta, GA 30067, 404-952-9777 ..... D•1729
NJE Corporation, 329 Culver Rd, P.O. Box 669, Dayton, NJ 08810-0669, 201-329-4611 ..... D•1733
North American Soar Corp., 11126 Cornell Ave., Cherry Hill, NJ 08002, 609-488-1060 ..... D•1276
North Hills Elctrns., 1 Alexander Pl., Glen Cove, NY 11542, 516-671-5700 ..... D•1734
† NWL Transformers, Rising Sun Rd., P.O. Box 358, Bordentown, NJ 08505, 609-298-7300 ..... D•1735
† NWL Transformers, Rising Sun Rd., P.O. Box 358, Bordentown, NJ 08505, 609-298-7300 ..... D•1735
Ocean Marine Instrument, 629 Terminal Way #15, Costa Mesa, CA 92627, 714-548-9569 ..... D•1947
OPT Inds. Inc., 300 Red School La., Phillipsburg, NJ 08865, 201-454-2600 ..... D•1736,1738
Pan-Magnetics Intl., Inc., 455-A Carson Plaza Dr., Carson, CA 90746, 213-532-1790 ..... A•2217, D•1742-1743
Penn-Tran Corp., Box 1321, Rte. 144N, Wingate, PA 16880, 814-355-1521 ..... D•1741
Pioneer Magnetics, 1745 Berkeley St., Santa Monica, CA 90404, 213-829-6751 ..... D•1752-1753
Power Designs, Inc., 1700 Shames Dr., Westbury, NY 11590, 516-333-6200 ..... D•1755-1759
§† Powermark, 3855 Ruffin Rd., San Diego, CA 92123, 619-565-8363 ..... D•1955
Power-One, Inc., Power-One Linear Products, 740 Calle Plano, Camarillo, CA 93010, 805-987-8741 ..... D•1770
§ Power Products Div., Computer Products, Inc., 2981 Gateway Drive, Pompano Beach, FL 33069, 305-974-2442 ..... D•1559,1563-1567
Power Systems, 12 Tobey Rd., Bloomfield, CT 06002, 203-243-0357 ..... D•1780-1781
Powertec, Inc., 20550 Nordhoff St., Chatsworth, CA 91311, 818-882-0004 ..... D•1782-1789,1793-1799
† Power Ten, Inc., 486 Mercury Dr., Sunnyvale, CA 94086, 408-738-5959 ..... D•1779
Prime Power, Inc., Prime Technology Co., Twin Lakes Rd., P.O. Box 185, N. Branford, CT 06471, 203-481-5721 ..... D•1801
Qualidyne Sys., Unitech Ltd., 3055 Del Sol Blvd., San Diego, CA 92154, 619-429-7440;619-575-4400 ..... D•1803-1807,1809
† RO Assocs., 246 Caspian Dr., Box 61419, Sunnyvale, CA 94088, 408-744-1450 ..... D•1812-1814
RTE Deltec Corp., 2727 Kurtz St., San Diego, CA 92110, 619-291-4211;800-854-2658 ..... D•1959
RTE, Power/Mate Co., 514 S. River St., Hackensack, NJ 07601, 201-440-3100 ..... D•1822-1827
S & H Inds., 119 Glen Cove Dr., Glen Head, NY 11545, 516-671-5600 ..... D•1829
§ Secoinsa/Digi Power, 686 E. Gish Rd., San Jose, CA 95112, 408-288-5600 ..... D•1830-1832
Shape Magnetronics, Inc., 901 DuPage Ave., Lombard, IL 60148, 312-620-8394 ..... D•1960-1961
Shogyo Intl. Corp., 287 Northern Blvd., Great Neck, NY 11021, 516-466-0911 ..... A•2271
Sola, A Unit of General Sign., 1717 Busse Rd., Elk Grove Village, IL 60007, 312-439-2800 ..... D•1838-1839,1964-1967
Spellman High Voltage Elctrns. Corp., 7 Fairchild Ave., Plainview, NY 11803, 516-349-8686 ..... D•1840-1842
Standard Energy, Div. WBH Scientific, Inc., Rte. 32, Greenville, NY 12083, 518-966-4197 ..... D•1844-1845
Stevens-Arnold Div., Computer Prods., Inc., 7 Elkins St., So. Boston, MA 02127, 617-268-1170 ..... D•1573-1580,1582-1583
Summit Elctrns., 750 S. Sherman, Richardson, TX 75081, 214-231-1456 ..... D•1846-1847
Taylor Electronics, Inc., 401 West Orion, Tempe, AZ 85283, 602-838-4523 ..... D•1848
§ TDK Corporation of America, 4711 Golf Rd., Skokie, IL 60076, 312-679-8200 ..... D•1849
† Technology Dynamics, 91 E. Carver Ave., Westwood, NJ 07675, 201-664-7636 ..... D•1851
TII Electronics, Inc., Div. TII Industries, 226 Terminal Rd., E. Setauket, NY 11733, 516-789-5004 ..... D•1852-1853
Transformation Elctrns. Corp., 170 Wilbur Pl., Bohemia, NY 11716, 516-563-1117 ..... D•1857
Triad-Utrad, 1124 E. Franklin St., Huntington, IN 46750, 219-356-6500 ..... D•1971
† Unitron Inc., 10925 Miller Rd., Dept. EE, Dallas, TX 75238, 214-340-8600 ..... D•1895-1897
Universal Voltronics, 27 Radio Circle Dr., Mt. Kisco, NY 10549, 914-241-1300 ..... D•1858
UPSystems, Inc., 7801 E. Compton Blvd., Paramount, CA 90723, 213-634-0621 ..... D•1973
† Venus Scientific, Inc., 399 Smith St., Farmingdale, NY 11735, 516-293-4100 ..... D•1863
VIZ Test Equipment, Div. VIZ Mfg., 335 E. Price St., Philadelphia, PA 19144, 215-844-2626 ..... D•1864
Voltex, 3460 Great Neck Rd., Amityville, NY 11701, 516-842-2772 ..... D•1865
Wilmore Elctrns. Co., Box 1329, Hillsborough, NC 27278, 919-732-9351 ..... D•1867-1869,1974-1975
§ AAK Corp, 747 River St., Haverhill, MA 01830 617-373-3769
ACDC Electronics, 401 Jones Rd., Oceanside, CA 92054 619-757-1880
§† Adtech Power Inc., 1620 S. Sunkist St., Anaheim, CA 92806 714-634-9211
Advanced High Voltage Co., Inc., P.O. Box 2136, Lancaster, CA 93539-2136 213-997-7222
† Arnold Magnetics, 11520 W. Jefferson Blvd., Culver City, CA 90230 ..... 213-390-3537/8837
Arstan Products Intl. Ltd., 99 Jericho Tpke., Jericho, NY 11753 516-333-8100
† ATC Power Systems, Inc., 472 Amherst Street, Nashua, NH 03063 603-882-1366
Atlas Energy Sys., 9457 Rush St., S. El Monte, CA 91733 213-575-0755
§ ATR Elctrns., Inc., P.O. BOX 7008, St. Paul, MN 55107 ..... 612-738-6520;414-297-7374
Bay Components, Inc., 1806 Dreams Landing Way, Annapolis, MD 21401 301-266-6767
BICC-Vero Elctrns., Inc., 40 Lindeman Drive, Trumbull, CT 06611 203-372-0038
Bikor, 1504 W. 228th St., Torrance, CA 92718 213-539-6320
† Brandt Elctrns., Inc., 1220 Alderwood Ave., Sunnyvale, CA 94086 408-734-8310
Calex Mfg. Co., Inc., 3355 Vincent Rd., Pleasant Hill, CA 94523 415-932-3911
California Instruments, A Div. of Amstar Tech. Prods. Co., Inc., 5150-Convoy St., San Diego, CA 92111 ..... 619-279-8620;800-356-2244;800-821-1634
† Cal-Power Corp., 140 Kansas St., El Segundo, CA 90245 213-772-2171
† CEA Division of Berkleonics, Inc., A Subsidiary of EG & G, 1 Aerovista Pk., San Luis Obispo, CA 93401 805-544-5454
† CEAG Elec. Corp., Power Supp. Div., 1324 Motor Pkwy., Hauppauge, NY 11788 516-582-4422
Chloride Power Electronics, 10931 Pellicano Drive, El Paso, TX 79935 915-592-9985
Christie Elec. Corp., 20665 Manhattan Pl., Torrance, CA 90501 213-320-0808
Clary Corp., Precision Instrs. Div., 320 W. Clary Ave., San Gabriel, CA 91776 818-287-6111
Computer Power, 124E W. Main St., High Bridge, NJ 08829 201-735-8000
Controlled Power Co., 1955 Stephenson Hwy., Troy, MI 48083 1-800-521-4792
Conversion Equip. Corp., 330 W. Taft Avenue, Orange, CA 92665 714-637-2970
Cost Effective Systems, Inc., Two LeMans Pl., Pine Brook, NJ 07058 201-575-5514
CSI Capacitors, CSI Technlgs., 810 Rancheros Dr., San Marcos, CA 92069 619-747-4000
§ C-Tek Inc., 4 Railroad Ave., Wakefield, MA 01880 617-246-1720
Datametrics Corp., Defense Products Div., 7630 Gloria Ave., Van Nuys, CA 91406 818-989-3840
§ Deltron, Inc., P.O. Box 1369, Wissahickon Ave., N. Wales, PA 19454-9990 215-699-9261
Digital Power Corp., 686 East Gish Rd., San Jose, CA 95112 408-288-5600
Dynage/Power & Magnetics, Division Of Oakleaf, Inc., 2 Willowbrook Road, Cromwell, CT 06416 203-635-3510
Electromech, Inc., 528 Elm Street, Kearny, NJ 07032 201-997-0950
Endicott Resch. Grp., Inc., 2601 Wayne St., P.O. Box 269, Endicott, NY 13760 607-754-9187
Energetec Systems, Inc., 130 E. St. Charles Rd., Carol Stream, IL 60188 312-653-1920
Engineering Design & Sls., Rt. 2, Box 305, Danville, VA 24540 804-685-7073
† Ferrotran Elctrns. Co., Inc., 11 W. 25th St., New York, NY 10010 212-691-3610
GMR Co., 8801 Sepulveda Blvd., Los Angeles, CA 90045 213-216-9516
† Gulton Industries, Inc., Engineered Magnetics Division, 13041 Cerise Ave., Hawthorne, CA 90250 213-679-0111
Integrated Circuits, Inc., 10301 Willows Road, Redmond, WA 98052 206-882-3100
International Instrumentation, 31131-602 Via Colinas, Westlake Vlg., CA 91362 213-991-9614
James Electronics, 4050 N. Rockwell, Chicago, IL 60618 312-463-6500
Keltlon Corp., Viking Modules Div., 225 Crescent St., Waltham, MA 02154 617-894-8700
KGS Electronics, Inc., GAR Entprs., 2029 N. Lincoln Ave., Pasadena, CA 91103 818-798-0786
Lambda Electronics, Veeco Instr., Inc., 515 Broad Hollow Rd., Melville, NY 11747 516-694-4200
L-Com Inc., 1755 Osgood St., Unit 11EM, N. Andover, MA 01845 617-682-6936
Lestronics, Inc., 1840 Industrial Circle, Longmont, CO 80501 ..... 303-443-6250; 800-525-6478
LH Research, Inc., 14402 Franklin Ave., Tustin, CA 92680 714-730-0162
Lorain Prods., 1122 F St., Lorain, OH 44052 216-288-1122
LuTechnology, Inc., 3516 Breakwater Ct., Hayward, CA 94545 415-887-1955
† Magnetico Inc., 182 Morris Ave., Holtsville, NY 11742 516-654-1166
Matrix Corp., 1639 Green St, Raleigh, NC 27603 919-833-2837
McGuirk Electronics Co. Inc., 212 So. Main St, P. O. Box 853, Middleton, MA 01949 617-933-3500
† Megatran Electronic Power, Rising Sun Rd., Bordentown, NJ 08505 609-298-7300
Melcher, Inc., 6290 Sunset Blvd., #1126, Los Angeles, CA 90028 213-463-5617
Microcomputer Power, 15875 Concord Circle, Morgan Hill, CA 95037 408-779-5700
MIL Electronics, Inc., 1 Mill st., Dracut, MA 01826 617-453-8000
Modular Devices, 50 Orville Dr., Bohemia, NY 11716 516-567-9620
† Modular Power Sys. Inc., P.O. Box 180579, Austin, TX 78718-0579 512-834-9262
National Power Technlg., 2111 Howell Ave., Anaheim, CA 92806 714-937-1301
NCR Power Systems, 584 S. Lake Emma Rd., Lake Mary, FL 32746 ..... 305-323-9250; 800-327-7612
Nova Elec., Hobart Bros. Co., 263 Hillside Ave., Nutley, NJ 07110 201-661-3434
† Novatronics, Box 878, Pompano Beach, FL 33061 305-942-5200
Oram Elctrns., Rte. 22, Putnam Business Park, Brewster, NY 10509-9587 914-279-2966
† Pacific Electro Dynamics, Inc., 11465 Willows Rd. N.E., Redmond, WA 98052 206-881-1700
Pacific Instrs. Inc., 215 Mason Circle, Concord, CA 94518 415-827-9010
Powerbox, Inc., 1860 Broadway, New York, NY 10023 212-586-1992
Power Comps. Co., Vanguard Elctrns. Co., 1480 W. 178th St., Gardena, CA 90248 213-323-8120
Power Elctrns., 96 Milton Rd., Rochester, NH 03867 603-332-3334
Power General, Unitrode, 152 Will Dr., Canton, MA 02021 617-828-6216
Power-One, Inc., Power-One Switching Products, 833 Flynn Rd., Camarillo, CA 93010 805-482-0757
§ Power Pac, 32 Meadow St., S. Norwalk, CT 06856 203-866-4484
Precision Components, Inc., 1110 W. National Ave., Addison, IL 60101 312-543-6400

Reich Assocs., Rt. 4, Box 4620, Lakehills, TX 78063	512-751-3220
RIFA, Inc., Greenwich Off. Pk. 3, P.O. Box 3110, Greenwich, CT 06836-3110	203-625-7300
§ Semiconductor Circuits, 49 Range Rd., Windham, NH 03087	603-893-2330
Sierracin/Power Systems, 20500 Plummer St., Chatsworth, CA 91311	818-998-9873
Sorensen Co., 676 E. Island Pond Rd., Manchester, NH 03103	603-668-4500
Staco Energy Prods. Co., 301 Gaddis Blvd., Dayton, OH 45403	513-253-1191
§ Standard Power, Inc., 1400 S. Village Way, Santa Ana, CA 92705	714-558-8512
† Superior Mfg. & Instr., 19-36 38th St., Long Island City, NY 11105	212-932-1800
Technical Research & Mfg., Inc., R.F.D. # 10, Manchester, NH 03103	603-627-6000
† Technipower, A Penril Co., P.O. Box 222, Commerce Pk., Danbury, CT 06810	203-748-7001
Todd Prods. Corp., 50 Emjay Blvd., Brentwood, NY 11717	516-231-3366
Toko America, Inc., 1250 Feehanville Dr., Mt. Prospect,, IL 60056	312-297-0070
§† Topaz Electronics, 9192 Topaz Way, San Diego, CA 92123-1164	619-279-0831
† Trio Labs., 80 Dupont St., Plainview, NY 11803	516-349-0400
TTE, Inc., 11650 W. Olympic Blvd., Los Angeles, CA 90064	213-478-8224
Ulveco, Inc., 323 Vintage Park Drive, Foster City, CA 94404	415-574-1100
Urban Elctrns., P. O. Box 456, Dover, MA 02030	617-329-4068
§† Xentek, Inc., 279 S. Pacific St., San Marcos, CA 92069	619-744-3346
Xylog Corp., 150 Tillman St., Westwood, NJ 07675	201-664-7997
† Zenith CRT & Components Operations, 1000 Milwaukee Ave., Glenview, IL 60025	312-391-7733

Power Supplies, Ferroresonant-4000

Computer Prods. Inc., Power Conversion Grp., 2981 Gateway Dr., Pompano Bch., FL 33069-4803, 305-974-5500	**D•1551**
† Del Elctrns. Corp., 250 E. Sandford Blvd., Mt. Vernon, NY 10550, 914-699-2000	**D•1615**
Kepco, Inc., 131-38 Sanford Ave., Flushing, NY 11352, 718-461-7000	**D•1689-1691,1702,1706**
MTE Corp., 7901 W. Clinton Ave., P.O. Box 23957, Milwaukee, WI 53223, 414-358-5300;800-558-4332	**A•2199**
NJE Corporation, 329 Culver Rd, P.O. Box 669, Dayton, NJ 08810-0669, 201-329-4611	**D•1733**
† OPT Inds. Inc., 300 Red School La., Phillipsburg, NJ 08865, 201-454-2600	**D•1739**
S & H Inds., 119 Glen Cove Dr., Glen Head, NY 11545, 516-671-5600	**D•1829**
Shape Magnetronics, Inc., 901 DuPage Ave., Lombard, IL 60148, 312-620-8394	**D•1960-1961**
Technology Dynamics, 91 E. Carver Ave., Westwood, NJ 07675, 201-664-7636	**D•1851**
Voltex, 3460 Great Neck Rd., Amityville, NY 11701, 516-842-2772	**D•1865**
Abbott Transistor Labs., Power Supply Div., 5200 W. Jefferson Blvd., Los Angeles, CA 90016	213-936-8185
§ Able Power and Engineering Inc., 335 S. New Ave., # H, Monterey Park, CA 91754	714-891-3568
Albar, Inc., 19013 36th Ave. W., Lynnwood, WA 98036	206-771-4006
Applied Power Conversion, Technology Dynamics, Inc., 100 School St., Bergenfield, NJ 07621	201-664-7636
† CEA Division of Berkleonics, Inc., A Subsidiary of EG & G, 1 Aerovista Pk., San Luis Obispo, CA 93401	805-544-5454
Chloride Power Electronics, 10931 Pellicano Drive, El Paso, TX 79935	915-592-9985
§ Computer Power, 124E W. Main St., High Bridge, NJ 08829	201-735-8000
Controlled Power Co., 1955 Stephenson Hwy., Troy, MI 48083	1-800-521-4792
Conversion Equip. Corp., 330 W. Taft Avenue, Orange, CA 92665	714-637-2970
Datapower, Inc., 3328 West First St., Santa Ana, CA 92703	714-775-2000
§ Deltron, Inc., P.O. Box 1369, Wissahickon Ave., N. Wales, PA 19454-9990	215-699-9261
Dynage/Power & Magnetics, Division Of Oakleaf, Inc., 2 Willowbrook Road, Cromwell, CT 06416	203-635-3510
Elgin Electronics, Combustion Engineering, 5533 New Perry Hwy., Erie, PA 16509-3570	814-864-4921
Hitran Corp., Agex, Rte. 31, RD 5-65, Flemington, NJ 08822	201-782-5525
Keltlon Corp., Viking Modules Div., 225 Crescent St., Waltham, MA 02154	617-894-8700
Lestronics, Inc., 1840 Industrial Circle, Longmont, CO 80501	303-443-6250; 800-525-6478
Lorain Prods., 1122 F St., Lorain, OH 44052	216-288-1122
† Magnetek, 7315 Red Deer Dr., Boulder, CO 80301-4696	303-442-6700
§ Micron Inds., 1830 N. 32nd Ave., Stone Park, IL 60165	312-345-0788
Mid-Eastern Industries, 100 Campus Dr., RD 1, Mt. Holly, NJ 08060	609-267-3811
† Milwaukee Transformer Co., MTE Corporation, 7901 W. Clinton Avenue, Milwaukee, WI 53223	414-358-5300
Modular Devices, 50 Orville Dr., Bohemia, NY 11716	516-567-9620
Power Comps. Co., Vanguard Elctrns. Co., 1480 W. 178th St., Gardena, CA 90248	213-323-8120
Power Elctrns., 96 Milton Rd., Rochester, NH 03867	603-332-3334
§† Powermark, 3855 Ruffin Rd., San Diego, CA 92123	619-565-8363
§ Power Pac, 32 Meadow St., S. Norwalk, CT 06856	203-866-4484
Preferred Elctrns., Inc., Main Line Dr, P.O. Box 954, Westfield, MA 01086	413-568-2301
§ Pylon Elex Development Co. Ltd., 2300 Victoria, Lachine, PQ, CANADA H8S 1Z3	514-637-1186
RTE, Power/Mate Co., 514 S. River St., Hackensack, NJ 07601	201-440-3100
Summit Elctrns., 750 S. Sherman, Richardson, TX 75081	214-231-1456
§ Sun Research, Inc.,, Box 210, Old Bay Rd., New Durham, NH 03855	603-859-7110
Triad-Utrad, 1124 E. Franklin St., Huntington, IN 46750	219-356-6500
Ulveco, Inc., 323 Vintage Park Drive, Foster City, CA 94404	415-574-1100
§ Xentek, Inc., 279 S. Pacific St., San Marcos, CA 92069	619-744-3346
Xylog Corp., 150 Tillman St., Westwood, NJ 07675	201-664-7997
§ Zambre Co., Inc., 2134 Old Middlefield Way, Mountain View, CA 94043	415-968-9176

Power Supplies, High Voltage — See Power Supplies, AC Input, Greater than 1,000 VDC Output (Vol. D)

Power Supplies, Isolated-4000

Abbott Transistor Labs., Industrial Products Div., 8203 Vineland Ave., Sun Valley, CA 91352, 818-504-0644	**D•1449**
† Abbott Transistor Labs., Power Supply Div., 5200 W. Jefferson Blvd., Los Angeles, CA 90016, 213-936-8185	**D•1449,1451-1453**
† Acopian, Box 638, Easton, PA 18044, 215-258-5441	**D•1463,1484-1485,1494**
† Arnold Magnetics, 11520 W. Jefferson Blvd., Culver City, CA 90230, 213-390-3537/8837	**D•1508-1511**
Behlman Engineering, 1142 Mark Ave., Carpinteria, CA 93013, 805-684-8311	**D•1898-1905**
California Instruments, A Div. of Amstar Tech. Prods. Co., Inc., 5150-Convoy St., San Diego, CA 92111, 619-279-8620;800-356-2244;800-821-1634	**D•1907**
§ Computer Prods. Inc., Power Conversion Grp., 2981 Gateway Dr., Pompano Bch., FL 33069-4803, 305-974-5500	**D•1551,1559,1568-1577,1579-1583**
§ Condor D.C. Power Supplies, Inc., 201 Flynn Rd., Camarillo, CA 93010, 805-484-2851;800-235-5929	**D•1598**
Diego Power, 5350 Eastgate Mall, San Diego, CA 92121, 587-1925	**D•1916**
§ Elpac Power Sys., 3131 S. Standard Ave., Santa Ana, CA 92705, 714-979-4440	**D•1626**
EMCO High Voltage Co., 11126 Ridge Road, Sutter Creek, CA 95685, 209-223-3626	**D•1632**
§† Franek, John, Co., Inc., P.O. Box 11752, Santa Ana, CA 92711-1752, 714-832-0290;800-854-9420	**D•1924-1927**
Industrial Test Equip., 21 Yennicock Ave., Port Washington, NY 11050, 516-883-1700	**D•1938**
Integrated Circuits, Inc., 10301 Willows Road, Redmond, WA 98052, 206-882-3100	**D•1663-1665**
Intronics, Inc., 57 Chapel St., Newton, MA 02158, 617-964-4000	**D•1676-1677**
§ Kepco, Inc., 131-38 Sanford Ave., Flushing, NY 11352, 718-461-7000	**D•1690-1691,1696,1699-1700**
Mid-Eastern Industries, 100 Campus Dr., RD 1, Mt. Holly, NJ 08060, 609-267-3811	**D•1726**
Multi Prods. Intl., 218 Little Falls Rd., P.O. Box 238, Cedar Grove, NJ 07009, 201-239-8183	**D•1728**
§ Murata Erie North America, Inc., 1148 Franklin Rd., S.E., Marietta, GA 30067, 404-952-9777	**D•1729**
National Power Technlg., 2111 Howell Ave., Anaheim, CA 92806, 714-937-1301	**D•1730-1732**
Ocean Marine Instrument, 629 Terminal Way # 15, Costa Mesa, CA 92627, 714-548-9569	**D•1947**
Pan-Magnetics Intl., Inc., 455-A Carson Plaza Dr., Carson, CA 90746, 213-532-1790	**D•1743**
Power Designs, Inc., 1700 Shames Dr., Westbury, NY 11590, 516-333-6200	**D•1755-1759**
§ Power Products Div., Computer Products, Inc., 2981 Gateway Drive, Pompano Beach, FL 33069, 305-974-2442	**D•1559,1568-1572**
Powertec, Inc., 20550 Nordhoff St., Chatsworth, CA 91311, 818-882-0004	**D•1785-1786,1793-1794,1797-1799**
† Power Ten, Inc., 486 Mercury Dr., Sunnyvale, CA 94086, 408-738-5959	**D•1779**
† RTE Deltec Corp., 2727 Kurtz St., San Diego, CA 92110, 619-291-4211;800-854-2658	**D•1959**
RTE, Power/Mate Co., 514 S. River St., Hackensack, NJ 07601, 201-440-3100	**D•1816-1827**
S & H Inds., 119 Glen Cove Dr., Glen Head, NY 11545, 516-671-5600	**D•1829**
Shape Magnetronics, Inc., 901 DuPage Ave., Lombard, IL 60148, 312-620-8394	**D•1960-1961**
Sola, A Unit of General Sign., 1717 Busse Rd., Elk Grove Village, IL 60007, 312-439-2800	**D•1964-1965**
Stevens-Arnold Div., Computer Prods., Inc., 7 Elkins St., So. Boston, MA 02127, 617-268-1170	**D•1573-1577,1579-1583**
Summit Elctrns., 750 S. Sherman, Richardson, TX 75081, 214-231-1456	**D•1846-1847**
Technology Dynamics, 91 E. Carver Ave., Westwood, NJ 07675, 201-664-7636	**D•1851**
§ VIZ Test Equipment, Div. VIZ Mfg., 335 E. Price St., Philadelphia, PA 19144, 215-844-2626	**D•1864**
Wilmore Elctrns. Co., Box 1329, Hillsborough, NC 27278, 919-732-9351	**D•1867-1868**
§ AAK Corp, 747 River St., Haverhill, MA 01830	617-373-3769
Abacus Controls Inc., 89 Readington Rd., Somerville, NJ 08876	201-526-6010
Action Instrs., 8601 Aero Dr., San Diego, CA 92123	619-279-5726
§† Adtech Power Inc., 1620 S. Sunkist St., Anaheim, CA 92806	714-634-9211
Advanced High Voltage Co., Inc., P.O. Box 2136, Lancaster, CA 93539-2136	213-997-7222
Albar, Inc., 19013 36th Ave. W., Lynnwood, WA 98036	206-771-4006
Applied Power Conversion, Technology Dynamics, Inc., 100 School St., Bergenfield, NJ 07621	201-664-7636
Astrosystems, 6 Nevada Dr., Lake Success, NY 11042	516-328-1600
† ATC Power Systems, Inc., 472 Amherst Street, Nashua, NH 03063	603-882-1366
Atlas Energy Sys., 9457 Rush St., S. El Monte, CA 91733	213-575-0755
§ B & K Precision, Industrial Electronics Product Group, Dynascan Corporation, 6460 W. Cortland, Chicago, IL 60635	312-889-9087
Behlman Div., California Instrs., Div. of Norlin Inds., 5150 Convoy St., San Diego, CA 92111	619-279-8620
Bertan Assocs., 121 New South Rd., Hicksville, NY 11801	516-433-3110
† Brandt Elctrns., Inc., 1220 Alderwood Ave., Sunnyvale, CA 94086	408-734-8310
Burr-Brown Corp., P.O. Box 11400, Tucson, AZ 85734	602-746-1111
† CEA Division of Berkleonics, Inc., A Subsidiary of EG & G, 1 Aerovista Pk., San Luis Obispo, CA 93401	805-544-5454
† CEAG Elec. Corp., Power Supp. Div., 1324 Motor Pkwy., Hauppauge, NY 11788	516-582-4422
Christie Elec. Corp., 20665 Manhattan Pl., Torrance, CA 90501	213-320-0808
Clary Corp., Precision Instrs. Div., 320 W. Clary Ave., San Gabriel, CA 91776	818-287-6111
CML MACARR Div., Marine Electric RPD, Inc., 666 Pacific St., Brooklyn, NY 11217	718-857-2400

Controlled Power Co., 1955 Stephenson Hwy., Troy, MI 48083 1-800-521-4792

† Datametrics Corp., Defense Products Div., 7630 Gloria Ave., Van Nuys, CA 91406 818-989-3840

† Del Elctrns. Corp., 250 E. Sandford Blvd., Mt. Vernon, NY 10550 914-699-2000

§ Deltron, Inc., P.O. Box 1369, Wissahickon Ave., N. Wales, PA 19454-9990 215-699-9261

Electrostatics, 7718 Clairemont Mesa Blvd., San Diego, CA 92111 619-279-1414

Electro Vector, Inc., 6555 Covey Rd., Forestville, CA 95436 707-887-2292

Elin Div., California Instrs. Co., Div. of Norlin Ind., 5150 Convoy St., San Diego, CA 92111 619-279-8620

ERA Transpac Div., Sub. Elctrn. Research Assocs., 50 Graphic Place, Moonachie, NJ 07074 201-641-3650

† Ferrotran Elctrns. Co., Inc., 11 W. 25th St., New York, NY 10010 212-691-3610

Gamma High Voltage Resch. Inc., 152 S. MacQuesten Pkwy., Mt. Vernon, NY 10550 914-667-5050

† Gulton Industries, Inc., Engineered Magnetics Division, 13041 Cerise Ave., Hawthorne, CA 90250 213-679-0111

Helionetics, Inc., DECC Div., 17312 Eastman St., Irvine, CA 92714 .... 714-546-4731; 800-421-7915

Hitran Corp., Agex, Rte. 31, RD 5-65, Flemington, NJ 08822 201-782-5525

§ Intech, Microcircuits Div., 2270 Martin Ave., Santa Clara, CA 95050 408-988-4930

International High Voltage Elctrns., Inc., 98 Mill Plain Rd., Danbury, CT 06811 203-792-7820

International Instrumentation, 31131-602 Via Colinas, Westlake Vlg., CA 91362 213-991-9614

Jerome Industries Corp., B 730 Division St., Elizabeth, NJ 07201 201-353-5700

Kaiser Systems, Inc., 126 Sohier Road, Beverly, MA 01915 617-922-9300

KEC Elctrns., Inc., 20817 Western Ave., Torrance, CA 90501 213-320-3902

Keltlon Corp., Viking Modules Div., 225 Crescent St., Waltham, MA 02154 617-894-8700

L-Com Inc., 1755 Osgood St., Unit 11EM, N. Andover, MA 01845 617-682-6936

Lorain Prods., 1122 F St., Lorain, OH 44052 216-288-1122

MacPower, 9115 26th Ave., Kenosha, WI 53140 414-694-8866

† Magnetek, 7315 Red Deer Dr., Boulder, CO 80301-4696 303-442-6700

Marel Instr. Co., 907 South East 13th Pl., Cape Coral, FL 33904 813-574-8788

† Megatran Electronic Power, Rising Sun Rd., Bordentown, NJ 08505 609-298-7300

Melcher, Inc., 6290 Sunset Blvd., # 1126, Los Angeles, CA 90028 213-463-5617

MIL Electronics, Inc., 1 Mill st., Dracut, MA 01826 617-453-8000

Modular Devices, 50 Orville Dr., Bohemia, NY 11716 516-567-9620

† Modular Power Sys. Inc., P.O. Box 180579, Austin, TX 78718-0579 512-834-9262

NJE Corporation, 329 Culver Rd, P.O. Box 669, Dayton, NJ 08810-0669 201-329-4611

† Novatronics, Box 878, Pompano Beach, FL 33061 305-942-5200

† NWL Transformers, Rising Sun Rd., P.O. Box 358, Bordentown, NJ 08505 609-298-7300

Oram Elctrns., Rte. 22, Putnam Business Park, Brewster, NY 10509-9587 914-279-2966

Pioneer Magnetics, 1745 Berkeley St., Santa Monica, CA 90404 213-829-6751

Powerbox, Inc., 1860 Broadway, New York, NY 10023 212-586-1992

Power Elctrns., 96 Milton Rd., Rochester, NH 03867 603-332-3334

Power General, Unitrode, 152 Will Dr., Canton, MA 02021 617-828-6216

§ Power-One, Inc., Power-One Linear Products, 740 Calle Plano, Camarillo, CA 93010 805-987-8741

§ Power-One, Inc., Power-One Switching Products, 833 Flynn Rd., Camarillo, CA 93010 805-482-0757

PPM, Inc., 4521 Emery Ind. Pkwy., Cleveland, OH 44128 216-292-6006

§ Pylon Elex Development Co. Ltd., 2300 Victoria, Lachine, PQ, CANADA H8S 1Z3 514-637-1186

Reich Assocs., Rt. 4, Box 4620, Lakehills, TX 78063 512-751-3220

RIFA, Inc., Greenwich Off. Pk. 3, P.O. Box 3110, Greenwich, CT 06836-3110 203-625-7300

§ Semiconductor Circuits, 49 Range Rd., Windham, NH 03087 603-893-2330

§ Sierracin/Power Systems, 20500 Plummer St., Chatsworth, CA 91311 818-998-9873

Sorensen Co., 676 E. Island Pond Rd., Manchester, NH 03103 603-668-4500

Staco Energy Prods. Co., 301 Gaddis Blvd., Dayton, OH 45403 513-253-1191

§ Standard Power, Inc., 1400 S. Village Way, Santa Ana, CA 92705 714-558-8512

† Superior Mfg. & Instr., 19-36 38th St., Long Island City, NY 11105 212-932-1800

Switching Systems Intl., 1827 No. Case St., Orange, CA 92665 714-921-1153

Texmate, Inc., 348 S. Cedros Ave., P.O. Box 2000, Solana Beach, CA 92075 619-481-7177

§† Topaz Electronics, 9192 Topaz Way, San Diego, CA 92123-1164 619-279-0831

Ulveco, Inc., 323 Vintage Park Drive, Foster City, CA 94404 415-574-1100

† Venus Scientific, Inc., 399 Smith St., Farmingdale, NY 11735 516-293-4100

Vistar Corp., 13740 McCormick Dr., Tampa, FL 33625 813-855-6611

Wall Inds., 2 Franklin, Lawrence, MA 01840 617-688-1287

§ Xentek, Inc., 279 S. Pacific St., San Marcos, CA 92069 619-744-3346

Xylog Corp., 150 Tillman St., Westwood, NJ 07675 201-664-7997

§ Zambre Co., Inc., 2134 Old Middlefield Way, Mountain View, CA 94043 415-968-9176

Power Supplies, Lab (Incl. Metered Units)-4000

Abacus Controls Inc., 89 Readington Rd., Somerville, NJ 08876, 201-526-6010 .... D•1880-1881

Acopian, Box 638, Easton, PA 18044, 215-258-5441 .... D•1463,1478-1479,1488-1491,1495-1496

§ Astron Corp., 2852 Walnut # E, Tustin, CA 92680, 714-832-7770 .... D•1515

Astrosystems, 6 Nevada Dr., Lake Success, NY 11042, 516-328-1600 .... D•1183,1517,1888

§ B & K Precision, Industrial Electronics Product Group, Dynascan Corporation, 6460 W. Cortland, Chicago, IL 60635, 312-889-9087 .... D•1521

Behlman Engineering, 1142 Mark Ave., Carpinteria, CA 93013, 805-684-8311 .... D•1898-1905

Bertan Assocs., 121 New South Rd., Hicksville, NY 11801, 516-433-3110 .... D•1522-1523,1530,1535

† CML MACARR Div., Marine Electric RPD, Inc., 666 Pacific St., Brooklyn, NY 11217, 718-857-2400 .... D•1908-1909

§ CPS Inc., 110 Wolfe Rd., Sunnyvale, CA 94086, 408-738-0530 .... D•1607

† Del Elctrns. Corp., 250 E. Sandford Blvd., Mt. Vernon, NY 10550, 914-699-2000 .... D•1614

Diego Power, 5350 Eastgate Mall, San Diego, CA 92121, 587-1925 .... D•1916

Electronic Measurements, 405 Essex Rd., Neptune, NJ 07753, 201-922-9300 .... D•1622-1625

Elgar Corp, An Onan McGraw Edison Co., 9250 Brown Deer Rd., San Diego, CA 92121, 619-450-0085 .... D•1918,1921

§ Epsco, 920 Westwood Ave., Addison, IL 60101, 312-543-0410 .... D•1634

EVI, Inc., 8970 F Route 108, Columbia, MD 21045, 301-964-1660 .... D•1639

§ Franek, John, Co., Inc., P.O. Box 11752, Santa Ana, CA 92711-1752, 714-832-0290;800-854-9420 .... D•1924-1927

Gamma High Voltage Resch. Inc., 152 S. MacQuesten Pkwy., Mt. Vernon, NY 10550, 914-667-5050 .... D•1644-1645

Glassman High Voltage Inc., P.O. Box 551, Salem Indl. Pk., Whitehouse Sta., NJ 08889, 201-534-9007 .... D•1234-1235,1648-1651

Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303, Call Local Sls. Off. .... D•1654-1656

† Hipotronics, P.O. Drawer A, Brewster, NY 10509, 914-279-8091 .... D•1658-1659

Hitran Corp., Agex, Rte. 31, RD 5-65, Flemington, NJ 08822, 201-782-5525 .... D•1660

Industrial Test Equip., 21 Yennicock Ave., Port Washington, NY 11050, 516-883-1700 .... D•1247,1938

§ Kepco, Inc., 131-38 Sanford Ave., Flushing, NY 11352, 718-461-7000 .... D•1689-1691,1693,1699-1700,1703-1709

Kikusui Intl. Corp., 17819 S. Figueroa St., Gardena, CA 90248, 213-515-6432;800-421-5334 .... D•1652

Mid-Eastern Industries, 100 Campus Dr., RD 1, Mt. Holly, NJ 08060, 609-267-3811 .... D•1724-1726

NJE Corporation, 329 Culver Rd, P.O. Box 669, Dayton, NJ 08810-0669, 201-329-4611 .... D•1733

§ North American Soar Corp., 11126 Cornell Ave., Cherry Hill, NJ 08002, 609-488-1060 .... D•1276

North Hills Elctrns., 1 Alexander Pl., Glen Cove, NY 11542, 516-671-5700 .... D•1734

Oram Electronics, 12 Cranston Rd., Pittsford, NY 14534, 716-381-4673 .... D•1740

Pacific Power Source Corp., 15122 Bolsa Chica St., Huntington Bch., CA 92649, 714-898-2691;800-854-2433 .... D•1949-1952

Power Designs, Inc., 1700 Shames Dr., Westbury, NY 11590, 516-333-6200 .... D•1755-1759

Power Systems, 12 Tobey Rd., Bloomfield, CT 06002, 203-243-0357 .... D•1780-1781

† Power Ten, Inc., 486 Mercury Dr., Sunnyvale, CA 94086, 408-738-5959 .... D•1779

Shape Magnetronics, Inc., 901 DuPage Ave., Lombard, IL 60148, 312-620-8394 .... D•1960-1961

Spellman High Voltage Elctrns. Corp., 7 Fairchild Ave., Plainview, NY 11803, 516-349-8686 .... D•1840-1842

Technology Dynamics, 91 E. Carver Ave., Westwood, NJ 07675, 201-664-7636 .... D•1851

Tecron Industrial Prods., Crown Intl., Inc., 1718 W. Mishawaka Rd., Elkhart, IN 46517, 219-294-8300 .... D•1018-1020

Universal Voltronics, 27 Radio Circle Dr., Mt. Kisco, NY 10549, 914-241-1300 .... D•1858

Varian Canada, Inc., Microwave Div., 45 River Drive, Georgetown, ON, CANADA L7G2J4, 416-877-0161 .... D•1861

§ VIZ Test Equipment, Div. VIZ Mfg., 335 E. Price St., Philadelphia, PA 19144, 215-844-2626 .... D•1864

Wilmore Elctrns. Co., Box 1329, Hillsborough, NC 27278, 919-732-9351 .... D•1867

§ AAK Corp, 747 River St., Haverhill, MA 01830 617-373-3769

§ Able Power and Engineering Inc., 335 S. New Ave., # H, Monterey Park, CA 91754 714-891-3568

§ ACDC Electronics, 401 Jones Rd., Oceanside, CA 92054 619-757-1880

Advance Conversion Devices Co., 274 S. Salem St., Randolph, NJ 07869 201-989-0095

Alpha Comps., 115 Eucalyptus Dr., El Segundo, CA 90245 213-322-7780

† AMETEK, Dynamics Division, AMETEK, Inc., 5649 Peck Rd., Arcadia, CA 91006 818-442-5981

Applied Power Conversion, Technology Dynamics, Inc., 100 School St., Bergenfield, NJ 07621 201-664-7636

† Arnold Magnetics, 11520 W. Jefferson Blvd., Culver City, CA 90230 .... 213-390-3537/8837

Astro-Geo-Marine, Inc., 202 E. Cota St., Santa Barbara, CA 93101 805-965-7005

Atlas Energy Sys., 9457 Rush St., S. El Monte, CA 91733 213-575-0755

† Avtel Div., Unitron Inc., 10925 Miller Rd., Dallas, TX 75238 214-340-8600

Bay Components, Inc., 1806 Dreams Landing Way, Annapolis, MD 21401 301-266-6767

Behlman Div., California Instrs., Div. of Norlin Inds., 5150 Convoy St., San Diego, CA 92111 619-279-8620

Burleigh Instrs., Burleigh Pk., Fishers, NY 14453 716-924-9355

California Instruments, A Div. of Amstar Tech. Prods. Co., Inc., 5150-Convoy St., San Diego, CA 92111 .... 619-279-8620;800-356-2244;800-821-1634

† CEA Division of Berkleonics, Inc., A Subsidiary of EG & G, 1 Aerovista Pk., San Luis Obispo, CA 93401 805-544-5454

Clary Corp., Precision Instrs. Div., 320 W. Clary Ave., San Gabriel, CA 91776 818-287-6111

Continental Resources, Inc., 175 Middlesex Tpke., Bedford, MA 01730 617-275-0850

Datadyne, Box 247, King of Prussia, PA 19406 215-666-5751

§ Digiac Corp., 175 Engineers Rd., Hauppauge, NY 11788 516-273-8600

EG & G Almond Instruments, 1330 E. Cypress St., Covina, CA 91724 818-967-9521

† Electronic Dev. Corp., 11 Hamlin St., Boston, MA 02127-4198 617-268-9696

Elma Engrg., 1066 E. Meadow Circle, Palo Alto, CA 94303 415-494-7303

ERA Transpac Div., Sub. Elctrn. Research Assocs., 50 Graphic Place, Moonachie, NJ 07074 201-641-3650

† General Power Sys., 1400 N. Baxter St., Anaheim, CA 92806-1201 714-956-9321

† Georator Corp., Box 70, Manassas, VA 22110 703-368-2101

§ Global Specialties, Interplex Electronics, Inc., 70 Fulton Terrace, P.O. Box 1942, New Haven, CT 06509 ... 203-624-3103
Hameg, Inc., 88-90 Harbor Rd., Port Washington, NY 11050 ... 516-883-3837
§ Heath Co., Benton Harbor, MI 49022 ... 616-982-3886
Hoffman Engineering Corp., P.O. Box 300, Old Greenwich, CT 06870 ... 203-325-8933
Interelectronics Corp., Interelectronics Park, 550 U.S. Rte. 303, Congers, NY 10920 ... 914-EL8-8000
International High Voltage Elctrns., Inc., 98 Mill Plain Rd., Danbury, CT 06811 ... 203-792-7820
International Instrumentation, 31131-602 Via Colinas, Westlake Vlg., CA 91362 ... 213-991-9614
Kode, 1515 S. Manchester Ave., Anaheim, CA 92802 ... 714-758-0400
Lambda Electronics, Veeco Instr., Inc., 515 Broad Hollow Rd., Melville, NY 11747 ... 516-694-4200
L-Com Inc., 1755 Osgood St., Unit 11EM, N. Andover, MA 01845 ... 617-682-6936
§ Leader Instrs. Corp., 380 Oser Ave., Hauppauge, NY 11788-3694 ... 516-231-6900
§ Lectrotech, Inc., 5810 N. Western Ave., Chicago, IL 60659 ... 312-769-6262
LuTechnology, Inc., 3516 Breakwater Ct., Hayward, CA 94545 ... 415-887-1955
M/A-COM Laser Diode, Inc., M/A-COM, Inc., 1130 Somerset St., New Brunswick, NJ 08901 ... 201-249-7000
† M/A-COM Microwave Power Dvcs., 330 Oser Ave., Hauppauge, NY 11788 ... 516-231-1400
Magnum Opus Custom Elctrn. Engrg., 284 Kennedy St., Iselin, NJ 08830 ... 201-283-4925
Maxwell Labs., 8835 Balboa Ave., San Diego, CA 92123 ... 619-279-5100
§ Murata Erie North America, Inc., 1148 Franklin Rd., S.E., Marietta, GA 30067 ... 404-952-9777
Novatronics, Box 878, Pompano Beach, FL 33061 ... 305-942-5200
† NWL Transformers, Rising Sun Rd., P.O. Box 358, Bordentown, NJ 08505 ... 609-298-7300
Oram Elctrns., Rte. 22, Putnam Business Park, Brewster, NY 10509-9587 ... 914-279-2966
§ Paccom, 3928 148th NE, Redmond, WA 98052 ... 206-883-9200;800-426-6254
† Pacific Electro Dynamics, Inc., 11465 Willows Rd. N.E., Redmond, WA 98052 ... 206-881-1700
Pacific Instrs. Inc., 215 Mason Circle, Concord, CA 94518 ... 415-827-9010
Plastic Capacitors, Inc., 2623 N. Pulaski Rd., Chicago, IL 60639 ... 312-489-2229
Polytron Devices, Box 398 - River St. Sta., Paterson, NJ 07544 ... 201-345-5885
Powerbox, Inc., 1860 Broadway, New York, NY 10023 ... 212-586-1992
§† PTS Electronics Inc., Box 272, Bloomington, IN 47401 ... 812-824-9331
Pulse Instrs. Co., 1234 Francisco, Torrance, CA 90502 ... 213-515-5330
Ratelco, 1260 Mercer, Dept. EEM, Seattle, WA 98109 ... 206-624-7770
RFL Inds., A Dowty Grp. Co./Instr. Div., Powerville Rd., Boonton, NJ 07005 ... 201-334-3100
§ RTE, Power/Mate Co., 514 S. River St., Hackensack, NJ 07601 ... 201-440-3100
S & H Inds., 119 Glen Cove Dr., Glen Head, NY 11545 ... 516-671-5600
Sanford-Miller Corp., 8 John St., Lynbrook, NY 11563 ... 516-593-2025;Outside NY 800-645-5900
§† Sorensen Co., 676 E. Island Pond Rd., Manchester, NH 03103 ... 603-668-4500
§ Staco Energy Prods. Co., 301 Gaddis Blvd., Dayton, OH 45403 ... 513-253-1191
§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 ... 215-673-5600
§† Systron-Donner Instr. Div., 2727 Systron Dr., Concord, CA 94518 ... 415-676-5000
† Technipower, A Penril Co., P.O. Box 222, Commerce Pk., Danbury, CT 06810 ... 203-748-7001
Telco Products Co., 44 Sea Cliff, Glen Cove, NY 11542 ... 516-759-0300
† Transistor Devices, 274 S. Salem St., Randolph, NJ 07869 ... 201-361-6622
TTE, Inc., 11650 W. Olympic Blvd., Los Angeles, CA 90064 ... 213-478-8224
§ Tucker Elctrns., Box 461966, Garland, TX 75046 ... 214-348-8800;800-527-4642
† Unitron Inc., 10925 Miller Rd., Dept. EE, Dallas, TX 75238 ... 214-340-8600
Vistar Corp., 13740 McCormick Dr., Tampa, FL 33625 ... 813-855-6611
Voltex, 3460 Great Neck Rd., Amityville, NY 11701 ... 516-842-2772
Walker Scientific, Rockdale St., Worcester, MA 01606 ... 617-852-3674
Xylog Corp., 150 Tillman St., Westwood, NJ 07675 ... 201-664-7997

Power Supplies, Laser — See Power Supplies, AC Input, Greater than 1,000 VDC Output (Vol. D)

Power Supplies, Linear-4000

Abbott Transistor Labs., Industrial Products Div., 8203 Vineland Ave., Sun Valley, CA 91352, 818-504-0644 ... D•1449
† Abbott Transistor Labs., Power Supply Div., 5200 W. Jefferson Blvd., Los Angeles, CA 90016, 213-936-8185 ... D•1449-1450,1454,1458,1461
† Acopian, Box 638, Easton, PA 18044, 215-258-5441 ... D•1463-1485,1488-1496
Applied Power Conversion, Technology Dynamics, Inc., 100 School St., Bergenfield, NJ 07621, 201-664-7636 ... D•1500
§ Astron Corp., 2852 Walnut # E, Tustin, CA 92680, 714-832-7770 ... D•1515
Astrosystems, 6 Nevada Dr., Lake Success, NY 11042, 516-328-1600 ... D•1517,1888
§ Ault, Incorporated, 1600 Freeway Blvd., Minneapolis, MN 55430, 612-560-9300 ... D•1518-1519
§ B & K Precision, Industrial Electronics Product Group, Dynascan Corporation, 6460 W. Cortland, Chicago, IL 60635, 312-889-9087 ... D•1521
Behlman Engineering, 1142 Mark Ave., Carpinteria, CA 93013, 805-684-8311 ... D•1898-1905
Bertan Assocs., 121 New South Rd., Hicksville, NY 11801, 516-433-3110 ... D•1522-1523
§ Bikor, 1504 W. 228th St., Torrance, CA 92718, 213-539-6320 ... D•1536
Calex Mfg. Co., Inc., 3355 Vincent Rd., Pleasant Hill, CA 94523, 415-932-3911 ... D•1542
Christie Elec. Corp., 20665 Manhattan Pl., Torrance, CA 90501, 213-320-0808 ... D•1548
Compower Div., Computer Prods., Inc., 2220 Lundy Ave., San Jose, CA 95131, 408-942-1600 ... D•1552
§ Computer Prods. Inc., Power Conversion Grp., 2981 Gateway Dr., Pompano Bch., FL 33069-4803, 305-974-5500 ... D•1551-1552,1559-1562,1573,1579-1583
§ Condor D.C. Power Supplies, Inc., 201 Flynn Rd., Camarillo, CA 93010, 805-484-2851;800-235-5929 ... D•1587-1594
CPS Inc., 110 Wolfe Rd., Sunnyvale, CA 94086, 408-738-0530 ... D•1607
§ C-Tek Inc., 4 Railroad Ave., Wakefield, MA 01880, 617-246-1720 ... D•1115
D & B Power, Inc., 204 N. Fehr Way, P.O. Box 40M, Bayshore, NY 11706, 516-586-5955 ... D•1610-1611
† Del Elctrns. Corp., 250 E. Sandford Blvd., Mt. Vernon, NY 10550, 914-699-2000 ... D•1614
Dio-Rey, Div. of Info-Lite, 422 Cliff St., Fairview, NJ 07022, 201-941-4455 ... B•1045
Electronic Measurements, 405 Essex Rd., Neptune, NJ 07753, 201-922-9300 ... D•1622-1625
§ Elpac Power Sys., 3131 S. Standard Ave., Santa Ana, CA 92705, 714-979-4440 ... D•1626-1630
† EMCO High Voltage Co., 11126 Ridge Road, Sutter Creek, CA 95685, 209-223-3626 ... D•1632
Epsco, 920 Westwood Ave., Addison, IL 60101, 312-543-0410 ... D•1634
† Ferrotran Elctrns. Co., Inc., 11 W. 25th St., New York, NY 10010, 212-691-3610 ... D•1640-1641
§† Franek, John, Co., Inc., P.O. Box 11752, Santa Ana, CA 92711-1752, 714-832-0290;800-854-9420 ... D•1924-1926
Gamma High Voltage Resch. Inc., 152 S. MacQuesten Pkwy., Mt. Vernon, NY 10550, 914-667-5050 ... D•1644-1645
GFC/Hammond Elctrns., Inc., 1690 Walden Ave., Buffalo, NY 14225, 716-835-5742 ... D•1647
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303, Call Local Sls. Off. ... D•1654-1656
Hitran Corp., Agex, Rte. 31, RD 5-65, Flemington, NJ 08822, 201-782-5525 ... D•1660
Integrated Circuits, Inc., 10301 Willows Road, Redmond, WA 98052, 206-882-3100 ... D•1662-1665
Interelectronics Corp., Interelectronics Park, 550 U.S. Rte. 303, Congers, NY 10920, 914-EL8-8000 ... D•1667
International High Voltage Elctrns., Inc., 98 Mill Plain Rd., Danbury, CT 06811, 203-792-7820 ... D•1668-1669
Intronics, Inc., 57 Chapel St., Newton, MA 02158, 617-964-4000 ... D•1676-1677
Jerome Industries Corp., B 730 Division St., Elizabeth, NJ 07201, 201-353-5700 ... D•1678-1679
Kaiser Systems, Inc., 126 Sohier Road, Beverly, MA 01915, 617-922-9300 ... D•1680-1683
Keltec Florida, P.O. Box 2917, Ft. Walton Bch., FL 32549, 904-651-9749 ... D•1688
§ Kepco, Inc., 131-38 Sanford Ave., Flushing, NY 11352, 718-461-7000 ... D•1689-1692,1703-1704
Kikusui Intl. Corp., 17819 S. Figueroa St., Gardena, CA 90248, 213-515-6432;800-421-5334 ... D•1652
LaserSonics Power Supply Operation, 177 N. Wolfe Rd., Sunnyvale, CA 94086, 408-732-9880 ... D•1719
Mepco//Electra, Inc., Airport Road, P.O. Box 760, Mineral Wells, TX 76067, 817-325-7871 ... A•1890
Mid-Eastern Industries, 100 Campus Dr., RD 1, Mt. Holly, NJ 08060, 609-267-3811 ... D•1724-1726
Multi Prods. Intl., 218 Little Falls Rd., P.O. Box 238, Cedar Grove, NJ 07009, 201-239-8183 ... D•1728
Murata Erie North America, Inc., 1148 Franklin Rd., S.E., Marietta, GA 30067, 404-952-9777 ... D•1729
NJE Corporation, 329 Culver Rd, P.O. Box 669, Dayton, NJ 08810-0669, 201-329-4611 ... D•1733
North American Soar Corp., 11126 Cornell Ave., Cherry Hill, NJ 08002, 609-488-1060 ... D•1276
North Hills Elctrns., 1 Alexander Pl., Glen Cove, NY 11542, 516-671-5700 ... D•1734
† OPT Inds. Inc., 300 Red School La., Phillipsburg, NJ 08865, 201-454-2600 ... D•1739
Pacific Power Source Corp., 15122 Bolsa Chica St., Huntington Bch., CA 92649, 714-898-2691;800-854-2433 ... D•1949-1950
Pan-Magnetics Intl., Inc., 455-A Carson Plaza Dr., Carson, CA 90746, 213-532-1790 ... A•2217, D•1742-1743
Penn-Tran Corp., Box 1321, Rte. 144N, Wingate, PA 16880, 814-355-1521 ... D•1741
§ Power-One, Inc., Power-One Linear Products, 740 Calle Plano, Camarillo, CA 93010, 805-987-8741 ... D•1768-1769
§ Power Pac, 32 Meadow St., S. Norwalk, CT 06856, 203-866-4484 ... D•1775-1777
§ Power Products Div., Computer Products, Inc., 2981 Gateway Drive, Pompano Beach, FL 33069, 305-974-2442 ... D•1552,1559-1562
Power Systems, 12 Tobey Rd., Bloomfield, CT 06002, 203-243-0357 ... D•1780-1781
† Power Ten, Inc., 486 Mercury Dr., Sunnyvale, CA 94086, 408-738-5959 ... D•1779
RTE, Power/Mate Co., 514 S. River St., Hackensack, NJ 07601, 201-440-3100 ... D•1822-1827
S & H Inds., 119 Glen Cove Dr., Glen Head, NY 11545, 516-671-5600 ... D•1829
Secoinsa/Digi Power, 686 E. Gish Rd., San Jose, CA 95112, 408-288-5600 ... D•1830
Shogyo Intl. Corp., 287 Northern Blvd., Great Neck, NY 11021, 516-466-0911 ... A•2271
§ Sierracin/Power Systems, 20500 Plummer St., Chatsworth, CA 91311, 818-998-9873 ... D•1835-1836
Standard Energy, Div. WBH Scientific, Inc., Rte. 32, Greenville, NY 12083, 518-966-4197 ... D•1844-1845
Stevens-Arnold Div., Computer Prods., Inc., 7 Elkins St., So. Boston, MA 02127, 617-268-1170 ... D•1552,1573,1579-1583
Taylor Electronics, Inc., 401 West Orion, Tempe, AZ 85283, 602-838-4523 ... D•1848
TDK Corporation of America, 4711 Golf Rd., Skokie, IL 60076, 312-679-8200 ... D•1849

† Technipower, A Penril Co., P.O. Box 222, Commerce Pk., Danbury, CT 06810, 203-748-7001 ..... D•1850
† Technology Dynamics, 91 E. Carver Ave., Westwood, NJ 07675, 201-664-7636 ..... D•1851
Transformation Elctrns. Corp., 170 Wilbur Pl., Bohemia, NY 11716, 516-563-1117 ..... D•1857
Universal Voltronics, 27 Radio Circle Dr., Mt. Kisco, NY 10549, 914-241-1300 ..... D•1858
Voltex, 3460 Great Neck Rd., Amityville, NY 11701, 516-842-2772 ..... D•1865
Wilmore Elctrns. Co., Box 1329, Hillsborough, NC 27278, 919-732-9351 ..... D•1867-1869
§† Xentek, Inc., 279 S. Pacific St., San Marcos, CA 92069, 619-744-3346 ..... D•1872-1873
§ AAK Corp, 747 River St., Haverhill, MA 01830 617-373-3769
§ Able Power and Engineering Inc., 335 S. New Ave., #H, Monterey Park, CA 91754 714-891-3568
ACDC Electronics, 401 Jones Rd., Oceanside, CA 92054 619-757-1880
§ Adtech Power Inc., 1620 S. Sunkist St., Anaheim, CA 92806 714-634-9211
Advanced Techn. Research Labs., 5645 K General Washington Dr., Alexandria, VA 22312 703-750-2920
Albar, Inc., 19013 36th Ave. W., Lynnwood, WA 98036 206-771-4006
† Analog Devices, P.O. Box 280, Norwood, MA 02062 617-329-4700
† Arnold Magnetics, 11520 W. Jefferson Blvd., Culver City, CA 90230 ..... 213-390-3537/8837
Arstan Products Intl. Ltd., 99 Jericho Tpke., Jericho, NY 11753 516-333-8100
† Cal-Power Corp., 140 Kansas St., El Segundo, CA 90245 213-772-2171
† CEA Division of Berkleonics, Inc., A Subsidiary of EG & G, 1 Aerovista Pk., San Luis Obispo, CA 93401 805-544-5454
CEAG Elec. Corp., Power Supp. Div., 1324 Motor Pkwy., Hauppauge, NY 11788 516-582-4422
Chloride Power Electronics, 10931 Pellicano Drive, El Paso, TX 79935 915-592-9985
Conversion Equip. Corp., 330 W. Taft Avenue, Orange, CA 92665 714-637-2970
CSI Capacitors, CSI Technlgs., 810 Rancheros Dr., San Marcos, CA 92069 619-747-4000
§ CurrenTechnology Corp., 135 Prestige Pk. Circle, E. Hartford, CT 06108 203-289-6831
† Datametrics Corp., Defense Products Div., 7630 Gloria Ave., Van Nuys, CA 91406 818-989-3840
Datapower, Inc., 3328 West First St., Santa Ana, CA 92703 714-775-2000
Datel, General Electric Co., 11 Cabot Blvd., Mansfield, MA 02048 617-339-9341
§ Deltron, Inc., P.O. Box 1369, Wissahickon Ave., N. Wales, PA 19454-9990 215-699-9261
Digital Power Corp., 686 East Gish Rd., San Jose, CA 95112 408-288-5600
Dressen-Barnes Elctrns., 1600 E. Valencia Dr., Fullerton, CA 92631 714-871-3020
§ Dynatronix, Inc., 105 Power St., Amery, WI 54001 ..... 715-268-8118;800-826-7172
Electromech, Inc., 528 Elm Street, Kearny, NJ 07032 201-997-0950
Electrostatics, 7718 Clairemont Mesa Blvd., San Diego, CA 92111 619-279-1414
Electro Vector, Inc., 6555 Covey Rd., Forestville, CA 95436 707-887-2292
Energy, Ltd., 4714 Upshur Street, Bladensburg, MD 20710 301-699-1144
† ERA Transpac Div., Sub. Elctrn. Research Assocs., 50 Graphic Place, Moonachie, NJ 07074 201-641-3650
EVI, Inc., 8970 F Route 108, Columbia, MD 21045 301-964-1660
Golden Pacific Elctrns., Inc., 1020 N. Batavia St., Ste. Q, Orange, CA 92667 ..... 714-538-9752/9753
† Gulton Industries, Inc., Engineered Magnetics Division, 13041 Cerise Ave., Hawthorne, CA 90250 213-679-0111
Halmar Electronics, Inc., 900 N. Hague Ave., Columbus, OH 43204 614-275-0131
§ Hammond Mfg. Co., 1690 Walden Ave., Buffalo, NY 14225 716-894-5710
§ Intech, Microcircuits Div., 2270 Martin Ave., Santa Clara, CA 95050 408-988-4930
International Instrumentation, 31131-602 Via Colinas, Westlake Vlg., CA 91362 213-991-9614
James Electronics, 4050 N. Rockwell, Chicago, IL 60618 312-463-6500
Keltlon Corp., Viking Modules Div., 225 Crescent St., Waltham, MA 02154 617-894-8700
Lambda Electronics, Veeco Instr., Inc., 515 Broad Hollow Rd., Melville, NY 11747 516-694-4200
Lestronics, Inc., 1840 Industrial Circle, Longmont, CO 80501 ..... 303-443-6250; 800-525-6478
Lorain Prods., 1122 F St., Lorain, OH 44052 216-288-1122
LuTechnology, Inc., 3516 Breakwater Ct., Hayward, CA 94545 415-887-1955
Magnum Opus Custom Elctrn. Engrg., 284 Kennedy St., Iselin, NJ 08830 201-283-4925
† Megatran Electronic Power, Rising Sun Rd., Bordentown, NJ 08505 609-298-7300
Microcomputer Power, 15875 Concord Circle, Morgan Hill, CA 95037 408-779-5700
MIL Electronics, Inc., 1 Mill st., Dracut, MA 01826 617-453-8000
† Milwaukee Transformer Co., MTE Corporation, 7901 W. Clinton Avenue, Milwaukee, WI 53223 414-358-5300
Modular Devices, 50 Orville Dr., Bohemia, NY 11716 516-567-9620
MPC Sys., Div. of Consulting Systems, RFD Box 441, Fremont, NH 03044 603-642-5913
† Novatronics, Box 878, Pompano Beach, FL 33061 305-942-5200
† NWL Transformers, Rising Sun Rd., P.O. Box 358, Bordentown, NJ 08505 609-298-7300
Polytron Devices, Box 398 - River St. Sta., Paterson, NJ 07544 201-345-5885
Powerbox, Inc., 1860 Broadway, New York, NY 10023 212-586-1992
Power Comps. Co., Vanguard Elctrns. Co., 1480 W. 178th St., Gardena, CA 90248 213-323-8120
Power Designs, Inc., 1700 Shames Dr., Westbury, NY 11590 516-333-6200
Power Elctrns., 96 Milton Rd., Rochester, NH 03867 603-332-3334
Power General, Unitrode, 152 Will Dr., Canton, MA 02021 617-828-6216
† Power Sys. Grp., Rantec Div., Emerson Elec., 9401 Oso Ave., Chatsworth, CA 91311 818-885-8223
† Powertec, Inc., 20550 Nordhoff St., Chatsworth, CA 91311 818-882-0004
Preferred Elctrns., Inc., Main Line Dr, P.O. Box 954, Westfield, MA 01086 413-568-2301
Pulse Instrs. Co., 1234 Francisco, Torrance, CA 90502 213-515-5330
§ Pylon Elex Development Co. Ltd., 2300 Victoria, Lachine, PQ, CANADA H8S 1Z3 514-637-1186
Reich Assocs., Rt. 4, Box 4620, Lakehills, TX 78063 512-751-3220
§ Semiconductor Circuits, 49 Range Rd., Windham, NH 03087 603-893-2330
Seven Mountains Sci. Inc., P.O. Box 650, Boalsburg, PA 16827 814-466-6559
Sorensen Co., 676 E. Island Pond Rd., Manchester, NH 03103 603-668-4500
§ Standard Power, Inc., 1400 S. Village Way, Santa Ana, CA 92705 714-558-8512
Summit Elctrns., 750 S. Sherman, Richardson, TX 75081 214-231-1456
§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 215-673-5600
† Superior Mfg. & Instr., 19-36 38th St., Long Island City, NY 11105 212-932-1800
Teco Corp., Bay Rd., P. O. Box A, Winnisquam, NH 03289 603-524-1998
Tecron Industrial Prods., Crown Intl., Inc., 1718 W. Mishawaka Rd., Elkhart, IN 46517 219-294-8300
Texmate, Inc., 348 S. Cedros Ave., P.O. Box 2000, Solana Beach, CA 92075 619-481-7177
† Trio Labs., 80 Dupont St., Plainview, NY 11803 516-349-0400
TTE, Inc., 11650 W. Olympic Blvd., Los Angeles, CA 90064 213-478-8224
Ulveco, Inc., 323 Vintage Park Drive, Foster City, CA 94404 415-574-1100
Universal Electronics Inc., 3475 A. Victor St., Santa Clara, CA 95050 408-970-0455
Varian Associates, Inc., Microwave Tube Div., 611 Hansen Way, Palo Alto, CA 94303 415-493-4000
Wall Inds., 2 Franklin, Lawrence, MA 01840 617-688-1287
Xylog Corp., 150 Tillman St., Westwood, NJ 07675 201-664-7997

Power Supplies, Logic Level (Incl. Microprocessor) – See Power Supplies, AC Input, Up to 30 VDC Output (Vol. D)

Power Supplies, Microwave – See Power Supplies, AC Input, Greater than 1,000 VDC Output (Vol. D)

Power Supplies, Multiple Output-4000

Abbott Transistor Labs., Industrial Products Div., 8203 Vineland Ave., Sun Valley, CA 91352, 818-504-0344 ..... D•1449
† Abbott Transistor Labs., Power Supply Div., 5200 W. Jefferson Blvd., Los Angeles, CA 90016, 213-933-8105 ..... D•1449-1450,1454,1456-1457,1460-1461
† Acopian, Box 638, Easton, PA 18044, 215-258-5441 ..... D•1463,1466-1471,1480-1485,1488-1489,1491,1495
§† Adtech Power Inc., 1620 S. Sunkist St., Anaheim, CA 92806, 714-634-9211 ..... D•1499
Applied Power Conversion, Technology Dynamics, Inc., 100 School St., Bergenfield, NJ 07621, 201-664-7636 ..... D•1500-1504
† Arnold Magnetics, 11520 W. Jefferson Blvd., Culver City, CA 90230, 213-390-3537/8837 ..... D•1508-1511
Astec USA, Ltd., A BSR Intl. Co., 2880 San Tomas Expwy., #200, Santa Clara, CA 95051, 408-748-1200 ..... D•1512
Astrosystems, 6 Nevada Dr., Lake Success, NY 11042, 516-328-1600 ..... D•1517,1888
ATR Elctrns., Inc., P.O. BOX 7008, St. Paul, MN 55107, 612-738-6520;414-297-7374 ..... D•1889
§ Ault, Incorporated, 1600 Freeway Blvd., Minneapolis, MN 55430, 612-560-9300 ..... D•1519
§ B & K Precision, Industrial Electronics Product Group, Dynascan Corporation, 6460 W. Cortland, Chicago, IL 60635, 312-889-9087 ..... D•1521
Behlman Engineering, 1142 Mark Ave., Carpinteria, CA 93013, 805-684-8311 ..... D•1898-1905
Bertan Assocs., 121 New South Rd., Hicksville, NY 11801, 516-433-3110 ..... D•1529-1531,1533
Bikor, 1504 W. 228th St., Torrance, CA 92718, 213-539-6320 ..... D•1536
§ Boschert Inc., 384 Santa Trinita Ave., Sunnyvale, CA 94086, 408-732-2440 ..... D•1537-1540
Calex Mfg. Co., Inc., 3355 Vincent Rd., Pleasant Hill, CA 94523, 415-932-3911 ..... D•1542-1545
California DC, 2150 Anchor Ct., Newbury Park, CA 91320, 805-499-3621;213-706-8221 ..... D•1546
CES Elctrns., 2968 Avenue Z, Brooklyn, NY 11235 ..... D•1606
§ Compower Div., Computer Prods., Inc., 2220 Lundy Ave., San Jose, CA 95131, 408-942-1600 ..... D•1554-1558
§ Computer Prods. Inc., Power Conversion Grp., 2981 Gateway Dr., Pompano Bch., FL 33069-4803, 305-974-5500 ..... D•1551,1554-1573,1577,1581-1583
§ Condor D.C. Power Supplies, Inc., 201 Flynn Rd., Camarillo, CA 93010, 805-484-2851;800-235-5929 ..... D•1588-1594,1597-1598
§ Converter Concepts, Inc., Industrial Pkwy., Pardeeville, WI 53954, 608-429-2144 ..... D•1600-1603
Cord Electronics, Inc., 177 Cantiague Rock Rd., Westbury, NY 11590, 516-935-3640 ..... D•1605
CPS Inc., 110 Wolfe Rd., Sunnyvale, CA 94086, 408-738-0530 ..... D•1607
Displex, Inc., Alexander Place, Glen Cove, NY 11542, 516-671-4400 ..... D•1619
DVE/Caltronic Co., Ltd., A Sub. of Dee Van Entrp. Co., Ltd., 407 S. Palm Ave., Alhambra, CA 91803, 818-289-0310 ..... D•1613
† EG & G Almond Instruments, 1330 E. Cypress St., Covina, CA 91724, 818-967-9521 ..... D•1620-1621
Electronic Measurements, 405 Essex Rd., Neptune, NJ 07753, 201-922-9300 ..... D•1624-1625
§ Elpac Power Sys., 3131 S. Standard Ave., Santa Ana, CA 92705, 714-979-4440 ..... D•1626-1630
† EMCO High Voltage Co., 11126 Ridge Road, Sutter Creek, CA 95685, 209-223-3626 ..... D•1632
Endicott Resch. Grp., Inc., 2601 Wayne St., P.O. Box 269, Endicott, NY 13760, 607-754-9187 ..... B•1047-1049
§ Epsco, 920 Westwood Ave., Addison, IL 60101, 312-543-0410 ..... D•1634
ERA Transpac Div., Sub. Elctrn. Research Assocs., 50 Graphic Place, Moonachie, NJ 07074, 201-641-3650 ..... D•1635-1637
ETI Systems, Polaris Indl. Entprs., 215 Via Del Norte, Oceanside, CA 92054, 619-757-7770 ..... D•1121

† Ferrotran Elctrns. Co., Inc., 11 W. 25th St., New York, NY 10010, 212-691-3610 ... D•1641
§† Franek, John, Co., Inc., P.O. Box 11752, Santa Ana, CA 92711-1752, 714-832-0290;800-854-9420 ... D•1924-1927
§ Frederick Components Intl., 20806 Plummer St., Chatsworth, CA 91311, 818-882-0868;800-354-0660 ... D•1643
GFC/Hammond Elctrns., Inc., 1690 Walden Ave., Buffalo, NY 14225, 716-835-5742 ... D•1647
Glassman High Voltage Inc., P.O. Box 551, Salem Indl. Pk., Whitehouse Sta., NJ 08889, 201-534-9007 ... D•1234-1235
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303, Call Local Sls. Off. ... D•1654-1656
Hitran Corp., Agex, Rte. 31, RD 5-65, Flemington, NJ 08822, 201-782-5525 ... D•1660
Integrated Circuits, Inc., 10301 Willows Road, Redmond, WA 98052, 206-882-3100 ... D•1662-1665
International Power, 350 N. Lantana, Ste. 710, Camarillo, CA 93010, 805-987-7900 ... D•1670-1675
Intronics, Inc., 57 Chapel St., Newton, MA 02158, 617-964-4000 ... D•1676-1677
Jerome Industries Corp., B 730 Division St., Elizabeth, NJ 07201, 201-353-5700 ... D•1679
Kaiser Systems, Inc., 126 Sohier Road, Beverly, MA 01915, 617-922-9300 ... D•1680-1683
KEC Elctrns., Inc., 20817 Western Ave., Torrance, CA 90501, 213-320-3902 ... D•1685-1686
Keltec Florida, P.O. Box 2917, Ft. Walton Bch., FL 32549, 904-651-9749 ... D•1688
§ Kepco, Inc., 131-38 Sanford Ave., Flushing, NY 11352, 718-461-7000 ... D•1689,1692,1694-1695,1698-1701,1704,1706
Kikusui Intl. Corp., 17819 S. Figueroa St., Gardena, CA 90248, 213-515-6432;800-421-5334 ... D•1652
LaserSonics Power Supply Operation, 177 N. Wolfe Rd., Sunnyvale, CA 94086, 408-732-9880 ... D•1719
LZR Electronics, Inc., 8174 Beechcraft Ave., Gaithersburg, MD 20879, 301-921-9440 ... D•1717
Microcomputer Power, 15875 Concord Circle, Morgan Hill, CA 95037, 408-779-5700 ... D•1721-1723
Mid-Eastern Industries, 100 Campus Dr., RD 1, Mt. Holly, NJ 08060, 609-267-3811 ... D•1726
Modular Devices, 50 Orville Dr., Bohemia, NY 11716, 516-567-9620 ... D•1727
Multi Prods. Intl., 218 Little Falls Rd., P.O. Box 238, Cedar Grove, NJ 07009, 201-239-8183 ... D•1728
§ Murata Erie North America, Inc., 1148 Franklin Rd., S.E., Marietta, GA 30067, 404-952-9777 ... D•1729
National Power Technlg., 2111 Howell Ave., Anaheim, CA 92806, 714-937-1301 ... D•1730-1732
NJE Corporation, 329 Culver Rd, P.O. Box 669, Dayton, NJ 08810-0669, 201-329-4611 ... D•1733
§ North American Soar Corp., 11126 Cornell Ave., Cherry Hill, NJ 08002, 609-488-1060 ... D•1276
OPT Inds. Inc., 300 Red School La., Phillipsburg, NJ 08865, 201-454-2600 ... D•1736,1738
Pan-Magnetics Intl., Inc., 455-A Carson Plaza Dr., Carson, CA 90746, 213-532-1790 ... D•1743
Pioneer Magnetics, 1745 Berkeley St., Santa Monica, CA 90404, 213-829-6751 ... D•1752-1753
Power Designs, Inc., 1700 Shames Dr., Westbury, NY 11590, 516-333-6200 ... D•1758
Power General, Unitrode, 152 Will Dr., Canton, MA 02021, 617-828-6216 ... D•1761-1763,1766
§ Power-One, Inc., Power-One Linear Products, 740 Calle Plano, Camarillo, CA 93010, 805-987-8741 ... D•1768-1769,1771-1773
§ Power Pac, 32 Meadow St., S. Norwalk, CT 06856, 203-866-4484 ... D•1774-1775,1777
§ Power Products Div., Computer Products, Inc., 2981 Gateway Drive, Pompano Beach, FL 33069, 305-974-2442 ... D•1559-1572
Power Systems, 12 Tobey Rd., Bloomfield, CT 06002, 203-243-0357 ... D•1780-1781
† Powertec, Inc., 20550 Nordhoff St., Chatsworth, CA 91311, 818-882-0004 ... D•1782-1789,1793-1799
Power Ten, Inc., 486 Mercury Dr., Sunnyvale, CA 94086, 408-738-5959 ... D•1779
Prime Power, Inc., Prime Technology Co., Twin Lakes Rd., P.O. Box 185, N. Branford, CT 06471, 203-481-5721 ... D•1801
Qualidyne Sys., Unitech Ltd., 3055 Del Sol Blvd., San Diego, CA 92154, 619-429-7440;619-575-4400 ... D•1803-1809
RIFA, Inc., Greenwich Off. Pk. 3, P.O. Box 3110, Greenwich, CT 06836-3110, 203-625-7300 ... D•1810-1811
† RO Assocs., 246 Caspian Dr., Box 61419, Sunnyvale, CA 94088, 408-744-1450 ... D•1812-1814
RTE, Power/Mate Co., 514 S. River St., Hackensack, NJ 07601, 201-440-3100 ... D•1818-1821
S & H Inds., 119 Glen Cove Dr., Glen Head, NY 11545, 516-671-5600 ... D•1829
§ Secoinsa/Digi Power, 686 E. Gish Rd., San Jose, CA 95112, 408-288-5600 ... D•1830
§ Sierracin/Power Systems, 20500 Plummer St., Chatsworth, CA 91311, 818-998-9873 ... D•1834-1836
Sola, A Unit of General Sign., 1717 Busse Rd., Elk Grove Village, IL 60007, 312-439-2800 ... D•1838-1839
Stevens-Arnold Div., Computer Prods., Inc., 7 Elkins St., So. Boston, MA 02127, 617-268-1170 ... D•1573,1577,1581-1583
Summit Elctrns., 750 S. Sherman, Richardson, TX 75081, 214-231-1456 ... D•1846-1847
Taylor Electronics, Inc., 401 West Orion, Tempe, AZ 85283, 602-838-4523 ... D•1848
§ TDK Corporation of America, 4711 Golf Rd., Skokie, IL 60076, 312-679-8200 ... D•1849
† Technipower, A Penril Co., P.O. Box 222, Commerce Pk., Danbury, CT 06810, 203-748-7001 ... D•1850
† Technology Dynamics, 91 E. Carver Ave., Westwood, NJ 07675, 201-664-7636 ... D•1851
TII Electronics, Inc., Div. TII Industries, 226 Terminal Rd., E. Setauket, NY 11733, 516-789-5004 ... D•1852-1853
Todd Prods. Corp., 50 Emjay Blvd., Brentwood, NY 11717, 516-231-3366 ... D•1854-1855
Toko America, Inc., 1250 Feehanville Dr., Mt. Prospect,, IL 60056, 312-297-0070 ... D•1856
Transformation Elctrns. Corp., 170 Wilbur Pl., Bohemia, NY 11716, 516-563-1117 ... D•1857
Varian Canada, Inc., Microwave Div., 45 River Drive, Georgetown, ON, CANADA L7G2J4, 416-877-0161 ... D•1861
† Venus Scientific, Inc., 399 Smith St., Farmingdale, NY 11735, 516-293-4100 ... D•1863
VIZ Test Equipment, Div. VIZ Mfg., 335 E. Price St., Philadelphia, PA 19144, 215-844-2626 ... D•1864
§† Xentek, Inc., 279 S. Pacific St., San Marcos, CA 92069, 619-744-3346 ... D•1870-1873
Xylog Corp., 150 Tillman St., Westwood, NJ 07675, 201-664-7997 ... D•1875
§ AAK Corp, 747 River St., Haverhill, MA 01830 ... 617-373-3769
§ Able Power and Engineering Inc., 335 S. New Ave., #H, Monterey Park, CA 91754 ... 714-891-3568
ACDC Electronics, 401 Jones Rd., Oceanside, CA 92054 ... 619-757-1880
Albar, Inc., 19013 36th Ave. W., Lynnwood, WA 98036 ... 206-771-4006
† Analog Devices, P.O. Box 280, Norwood, MA 02062 ... 617-329-4700
† ATC Power Systems, Inc., 472 Amherst Street, Nashua, NH 03063 ... 603-882-1366
† Babcock, Inc., 1717 West Collins Ave., Orange, CA 92667 ... 714-633-3700
Bay Components, Inc., 1806 Dreams Landing Way, Annapolis, MD 21401 ... 301-266-6767
† Brandt Elctrns., Inc., 1220 Alderwood Ave., Sunnyvale, CA 94086 ... 408-734-8310
† Cal-Power Corp., 140 Kansas St., El Segundo, CA 90245 ... 213-772-2171
CEA Division of Berkleonics, Inc., A Subsidiary of EG & G, 1 Aerovista Pk., San Luis Obispo, CA 93401 ... 805-544-5454
† CEAG Elec. Corp., Power Supp. Div., 1324 Motor Pkwy., Hauppauge, NY 11788 ... 516-582-4422
CEC, 330 W. Taft Ave., Orange, CA 92665 ... 714-637-2970
Chloride Power Electronics, 10931 Pellicano Drive, El Paso, TX 79935 ... 915-592-9985
Christie Elec. Corp., 20665 Manhattan Pl., Torrance, CA 90501 ... 213-320-0808
Controlled Power Co., 1955 Stephenson Hwy., Troy, MI 48083 ... 1-800-521-4792
§ Conver Corp., 10629 Bandley Dr., Cupertino, CA 95014 ... 408-255-0151
Conversion Equip. Corp., 330 W. Taft Avenue, Orange, CA 92665 ... 714-637-2970
Cost Effective Systems, Inc., Two LeMans Pl., Pine Brook, NJ 07058 ... 201-575-5514
§ C-Tek Inc., 4 Railroad Ave., Wakefield, MA 01880 ... 617-246-1720
§ CurrenTechnology Corp., 135 Prestige Pk. Circle, E. Hartford, CT 06108 ... 203-289-6831
D & B Power, Inc., 204 N. Fehr Way, P.O. Box 40M, Bayshore, NY 11706 ... 516-586-5955
† Datametrics Corp., Defense Products Div., 7630 Gloria Ave., Van Nuys, CA 91406 ... 818-989-3840
Datapower, Inc., 3328 West First St., Santa Ana, CA 92703 ... 714-775-2000
Datel, General Electric Co., 11 Cabot Blvd., Mansfield, MA 02048 ... 617-339-9341
† Del Elctrns. Corp., 250 E. Sandford Blvd., Mt. Vernon, NY 10550 ... 914-699-2000
§ Deltron, Inc., P.O. Box 1369, Wissahickon Ave., N. Wales, PA 19454-9990 ... 215-699-9261
Digital Power Corp., 686 East Gish Rd., San Jose, CA 95112 ... 408-288-5600
Dressen-Barnes Elctrns., 1600 E. Valencia Dr., Fullerton, CA 92631 ... 714-871-3020
§ Dynatronix, Inc., 105 Power St., Amery, WI 54001 ... 715-268-8118;800-826-7172
Electromech, Inc., 528 Elm Street, Kearny, NJ 07032 ... 201-997-0950
§ Electronic Solutions, 9255 Chesapeake Drive, San Diego, CA 92123 ... 619-292-0242; 800-854-7086
Electrostatics, 7718 Clairemont Mesa Blvd., San Diego, CA 92111 ... 619-279-1414
Electro Vector, Inc., 6555 Covey Rd., Forestville, CA 95436 ... 707-887-2292
Elgin Electronics, Combustion Engineering, 5533 New Perry Hwy., Erie, PA 16509-3570 ... 814-864-4921
Energetec Systems, Inc., 130 E. St. Charles Rd., Carol Stream, IL 60188 ... 312-653-1920
Engineering Design & Sls., Rt. 2, Box 305, Danville, VA 24540 ... 804-685-7073
GMR Co., 8801 Sepulveda Blvd., Los Angeles, CA 90045 ... 213-216-9516
† Gulton Industries, Inc., Engineered Magnetics Division, 13041 Cerise Ave., Hawthorne, CA 90250 ... 213-679-0111
§ Hammond Mfg. Co., 1690 Walden Ave., Buffalo, NY 14225 ... 716-894-5710
International Instrumentation, 31131-602 Via Colinas, Westlake Vlg., CA 91362 ... 213-991-9614
James Electronics, 4050 N. Rockwell, Chicago, IL 60618 ... 312-463-6500
Keltlon Corp., Viking Modules Div., 225 Crescent St., Waltham, MA 02154 ... 617-894-8700
Lambda Electronics, Veeco Instr., Inc., 515 Broad Hollow Rd., Melville, NY 11747 ... 516-694-4200
L-Com Inc., 1755 Osgood St., Unit 11EM, N. Andover, MA 01845 ... 617-682-6936
§ Leader Instrs. Corp., 380 Oser Ave., Hauppauge, NY 11788-3694 ... 516-231-6900
Lestronics, Inc., 1840 Industrial Circle, Longmont, CO 80501 ... 303-443-6250; 800-525-6478
LH Research, Inc., 14402 Franklin Ave., Tustin, CA 92680 ... 714-730-0162
Lorain Prods., 1122 F St., Lorain, OH 44052 ... 216-288-1122
LuTechnology, Inc., 3516 Breakwater Ct., Hayward, CA 94545 ... 415-887-1955
MacPower, 9115 26th Ave., Kenosha, WI 53140 ... 414-694-8866
Magnum Opus Custom Elctrn. Engrg., 284 Kennedy St., Iselin, NJ 08830 ... 201-283-4925
§ Marathon Flite-Tronics Company, A Marathon Power Technologies Co., 2525 N. Naomi St., Burbank, CA 91504 ... 818-841-3210
† Megatran Electronic Power, Rising Sun Rd., Bordentown, NJ 08505 ... 609-298-7300
Micro Power Intl., Inc., 9420 Activity Rd., San Diego, CA 92126 ... 619-271-0831
MIL Electronics, Inc., 1 Mill st., Dracut, MA 01826 ... 617-453-8000

† Milwaukee Transformer Co., MTE Corporation, 7901 W. Clinton Avenue, Milwaukee, WI 53223 414-358-5300
† Modular Power Sys. Inc., P.O. Box 180579, Austin, TX 78718-0579 512-834-9262
MPC Sys., Div. of Consulting Systems, RFD Box 441, Fremont, NH 03044 603-642-5913
NCR Power Systems, 584 S. Lake Emma Rd., Lake Mary, FL 32746 .... 305-323-9250; 800-327-7612
† North Hills Elctrns., 1 Alexander Pl., Glen Cove, NY 11542 516-671-5700
† Novatronics, Box 878, Pompano Beach, FL 33061 305-942-5200
† NWL Transformers, Rising Sun Rd., P.O. Box 358, Bordentown, NJ 08505 609-298-7300
† NWL Transformers, Rising Sun Rd., P.O. Box 358, Bordentown, NJ 08505 609-298-7300
† Optima Enclosures, 2166 Mountain Indl. Blvd., Tucker, GA 30084 404-939-6340
Oram Elctrns., Rte. 22, Putnam Business Park, Brewster, NY 10509-9587 914-279-2966
† Pacific Electro Dynamics, Inc., 11465 Willows Rd. N.E., Redmond, WA 98052 206-881-1700
Pacific Power Source Corp., 15122 Bolsa Chica St., Huntington Bch., CA 92649 .... 714-898-2691;800-854-2433
Polytron Devices, Box 398 - River St. Sta., Paterson, NJ 07544 201-345-5885
§ Potter & Brumfield, AMF Incorporated, 200 S. Richland Creek Dr., Princeton, IN 47671-0001 812-386-1000
Powerbox, Inc., 1860 Broadway, New York, NY 10023 212-586-1992
Power Comps. Co., Vanguard Elctrns. Co., 1480 W. 178th St., Gardena, CA 90248 213-323-8120
Power Conversion Prods., 42 East St., Box 380, Crystal Lake, IL 60014 815-459-9100
† Powercube Corp., Sub. Unitrode Corp., 8 Suburban Pk. Dr., Billerica, MA 01821 617-667-9500
Power Elctrns., 96 Milton Rd., Rochester, NH 03867 603-332-3334
§ Power-One, Inc., Power-One Switching Products, 833 Flynn Rd., Camarillo, CA 93010 805-482-0757
† Power Sys. Grp., Rantec Div., Emerson Elec., 9401 Oso Ave., Chatsworth, CA 91311 818-885-8223
Precision Components, Inc., 1110 W. National Ave., Addison, IL 60101 312-543-6400
Preferred Elctrns., Inc., Main Line Dr, P.O. Box 954, Westfield, MA 01086 413-568-2301
† PTK Division, Emerson Electric Co., 1173 Los Olivos Ave., Los Osos, CA 93402 805-528-5858
Pulse Instrs. Co., 1234 Francisco, Torrance, CA 90502 213-515-5330
Reich Assocs., Rt. 4, Box 4620, Lakehills, TX 78063 512-751-3220
Reliability, Inc., 16400 Park Row, P.O. Box 218370, Houston, TX 77218 713-492-0550
§ Semiconductor Circuits, 49 Range Rd., Windham, NH 03087 603-893-2330
Seven Mountains Sci. Inc., P.O. Box 650, Boalsburg, PA 16827 814-466-6559
Sorensen Co., 676 E. Island Pond Rd., Manchester, NH 03103 603-668-4500
Spellman High Voltage Elctrns. Corp., 7 Fairchild Ave., Plainview, NY 11803 516-349-8686
Staco Energy Prods. Co., 301 Gaddis Blvd., Dayton, OH 45403 513-253-1191
Standard Energy, Div. WBH Scientific, Inc., Rte. 32, Greenville, NY 12083 518-966-4197
§ Standard Power, Inc., 1400 S. Village Way, Santa Ana, CA 92705 714-558-8512
§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 215-673-5600
† Superior Mfg. & Instr., 19-36 38th St., Long Island City, NY 11105 212-932-1800
Switching Systems Intl., 1827 No. Case St., Orange, CA 92665 714-921-1153
Texmate, Inc., 348 S. Cedros Ave., P.O. Box 2000, Solana Beach, CA 92075 619-481-7177
§† Topaz Electronics, 9192 Topaz Way, San Diego, CA 92123-1164 619-279-0831
† Trio Labs., 80 Dupont St., Plainview, NY 11803 516-349-0400
TTE, Inc., 11650 W. Olympic Blvd., Los Angeles, CA 90064 213-478-8224
Ulveco, Inc., 323 Vintage Park Drive, Foster City, CA 94404 415-574-1100
Universal Electronics Inc., 3475 A. Victor St., Santa Clara, CA 95050 408-970-0455
Universal Voltronics, 27 Radio Circle Dr., Mt. Kisco, NY 10549 914-241-1300
Urban Elctrns., P. O. Box 456, Dover, MA 02030 617-329-4068
Varian Associates, Inc., Microwave Tube Div., 611 Hansen Way, Palo Alto, CA 94303 415-493-4000
Vistar Corp., 13740 McCormick Dr., Tampa, FL 33625 813-855-6611
Voltex, 3460 Great Neck Rd., Amityville, NY 11701 516-842-2772
Wall Inds., 2 Franklin, Lawrence, MA 01840 617-688-1287
Wilmore Elctrns. Co., Box 1329, Hillsborough, NC 27278 919-732-9351
† Zenith CRT & Components Operations, 1000 Milwaukee Ave., Glenview, IL 60025 312-391-7733

Power Supplies, Open Frame-4000

§ Adtech Power Inc., 1620 S. Sunkist St., Anaheim, CA 92806, 714-634-9211 .... D•1499
Applied Power Conversion, Technology Dynamics, Inc., 100 School St., Bergenfield, NJ 07621, 201-664-7636 .... D•1500
Astec USA, Ltd., A BSR Intl. Co., 2880 San Tomas Expwy., #200, Santa Clara, CA 95051, 408-748-1200 .... D•1512-1513
§ Bikor, 1504 W. 228th St., Torrance, CA 92718, 213-539-6320 .... D•1536
§ Boschert Inc., 384 Santa Trinita Ave., Sunnyvale, CA 94086, 408-732-2440 .... D•1537-1540
California DC, 2150 Anchor Ct., Newbury Park, CA 91320, 805-499-3621;213-706-8221 .... D•1546
CES Elctrns., 2968 Avenue Z, Brooklyn, NY 11235 .... D•1606
§ Compower Div., Computer Prods., Inc., 2220 Lundy Ave., San Jose, CA 95131, 408-942-1600 .... D•1554
§ Computer Prods. Inc., Power Conversion Grp., 2981 Gateway Dr., Pompano Bch., FL 33069-4803, 305-974-5500 .... D•1551,1554,1559,1573
§ Condor D.C. Power Supplies, Inc., 201 Flynn Rd., Camarillo, CA 93010, 805-484-2851;800-235-5929 .... D•1587-1594,1597-1598
§ Converter Concepts, Inc., Industrial Pkwy., Pardeeville, WI 53954, 608-429-2144 .... D•1600-1602
Cord Electronics, Inc., 177 Cantiague Rock Rd., Westbury, NY 11590, 516-935-3640 .... D•1605
C-Tek Inc., 4 Railroad Ave., Wakefield, MA 01880, 617-246-1720 .... D•1115
Displex, Inc., Alexander Place, Glen Cove, NY 11542, 516-671-4400 .... D•1619
DVE/Caltronic Co., Ltd., A Sub. of Dee Van Entrp. Co., Ltd., 407 S. Palm Ave., Alhambra, CA 91803, 818-289-0310 .... D•1613
§ Elpac Power Sys., 3131 S. Standard Ave., Santa Ana, CA 92705, 714-979-4440 .... D•1627-1630
ERA Transpac Div., Sub. Elctrn. Research Assocs., 50 Graphic Place, Moonachie, NJ 07074, 201-641-3650 .... D•1635-1637
§ Frederick Components Intl., 20806 Plummer St., Chatsworth, CA 91311, 818-882-0868;800-354-0660 .... D•1643
Glassman High Voltage Inc., P.O. Box 551, Salem Indl. Pk., Whitehouse Sta., NJ 08889, 201-534-9007 .... D•1650-1651
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303, Call Local Sls. Off. .... D•1656
Hitran Corp., Agex, Rte. 31, RD 5-65, Flemington, NJ 08822, 201-782-5525 .... D•1660
International Power, 350 N. Lantana, Ste. 710, Camarillo, CA 93010, 805-987-7900 .... D•1670-1675
ITT Pomona Electronics, 1500 E. 9th St., P.O. Box 2767, Pomona, CA 91766, 714-623-3463 .... C•1295
KEC Elctrns., Inc., 20817 Western Ave., Torrance, CA 90501, 213-320-3902 .... D•1685-1686
Keltec Florida, P.O. Box 2917, Ft. Walton Bch., FL 32549, 904-651-9749 .... D•1688
§ Kepco, Inc., 131-38 Sanford Ave., Flushing, NY 11352, 718-461-7000 .... D•1689-1694,1699-1700,1706
Marway Prods. Inc., 311 N. Clara St., Santa Ana, CA 92703, 714-973-1800 .... D•1944
Microcomputer Power, 15875 Concord Circle, Morgan Hill, CA 95037, 408-779-5700 .... D•1721-1723
Mid-Eastern Industries, 100 Campus Dr., RD 1, Mt. Holly, NJ 08060, 609-267-3811 .... D•1726
Modular Devices, 50 Orville Dr., Bohemia, NY 11716, 516-567-9620 .... D•1727
National Power Technlg., 2111 Howell Ave., Anaheim, CA 92806, 714-937-1301 .... D•1730-1732
NJE Corporation, 329 Culver Rd, P.O. Box 669, Dayton, NJ 08810-0669, 201-329-4611 .... D•1733
Pan-Magnetics Intl., Inc., 455-A Carson Plaza Dr., Carson, CA 90746, 213-532-1790 .... D•1743
Power General, Unitrode, 152 Will Dr., Canton, MA 02021, 617-828-6216 .... D•1760
§ Power-One, Inc., Power-One Linear Products, 740 Calle Plano, Camarillo, CA 93010, 805-987-8741 .... D•1768-1773
§ Power Pac, 32 Meadow St., S. Norwalk, CT 06856, 203-866-4484 .... D•1774-1775,1777
§ Power Products Div., Computer Products, Inc., 2981 Gateway Drive, Pompano Beach, FL 33069, 305-974-2442 .... D•1559
Power Systems, 12 Tobey Rd., Bloomfield, CT 06002, 203-243-0357 .... D•1780-1781
† Powertec, Inc., 20550 Nordhoff St., Chatsworth, CA 91311, 818-882-0004 .... D•1782-1786,1793-1796,1798-1799
Prime Power, Inc., Prime Technology Co., Twin Lakes Rd., P.O. Box 185, N. Branford, CT 06471, 203-481-5721 .... D•1801
Qualidyne Sys., Unitech Ltd., 3055 Del Sol Blvd., San Diego, CA 92154, 619-429-7440;619-575-4400 .... D•1803,1808
RO Assocs., 246 Caspian Dr., Box 61419, Sunnyvale, CA 94088, 408-744-1450 .... D•1812
RTE, Power/Mate Co., 514 S. River St., Hackensack, NJ 07601, 201-440-3100 .... D•1816-1821
§ Secoinsa/Digi Power, 686 E. Gish Rd., San Jose, CA 95112, 408-288-5600 .... D•1830-1832
§ Sierracin/Power Systems, 20500 Plummer St., Chatsworth, CA 91311, 818-998-9873 .... D•1834-1836
§ Sola, A Unit of General Sign., 1717 Busse Rd., Elk Grove Village, IL 60007, 312-439-2800 .... D•1838-1839
Stevens-Arnold Div., Computer Prods., Inc., 7 Elkins St., So. Boston, MA 02127, 617-268-1170 .... D•1573
† Technipower, A Penril Co., P.O. Box 222, Commerce Pk., Danbury, CT 06810, 203-748-7001 .... D•1850
† Technology Dynamics, 91 E. Carver Ave., Westwood, NJ 07675, 201-664-7636 .... D•1851
TII Electronics, Inc., Div. TII Industries, 226 Terminal Rd., E. Setauket, NY 11733, 516-789-5004 .... D•1852-1853
Todd Prods. Corp., 50 Emjay Blvd., Brentwood, NY 11717, 516-231-3366 .... D•1854-1855
Voltex, 3460 Great Neck Rd., Amityville, NY 11701, 516-842-2772 .... D•1865
Wilmore Elctrns. Co., Box 1329, Hillsborough, NC 27278, 919-732-9351 .... D•1869
§ Xentek, Inc., 279 S. Pacific St., San Marcos, CA 92069, 619-744-3346 .... D•1870-1873
Xylog Corp., 150 Tillman St., Westwood, NJ 07675, 201-664-7997 .... D•1875
Abbott Transistor Labs., Industrial Products Div., 8203 Vineland Ave., Sun Valley, CA 91352 818-504-0644
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§ Ault, Incorporated, 1600 Freeway Blvd., Minneapolis, MN 55430, 612-560-9300 .... D•1518-1519
Bertan Assocs., 121 New South Rd., Hicksville, NY 11801, 516-433-3110 .... D•1522-1523,1529
§ Compower Div., Computer Prods., Inc., 2220 Lundy Ave., San Jose, CA 95131, 408-942-1600 .... D•1554
§ Computer Prods. Inc., Power Conversion Grp., 2981 Gateway Dr., Pompano Bch., FL 33069-4803, 305-974-5500 .... D•1551,1554,1559,1573-1583
D & B Power, Inc., 204 N. Fehr Way, P.O. Box 40M, Bayshore, NY 11706, 516-586-5955 .... D•1610-1611
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Jerome Industries Corp., B 730 Division St., Elizabeth, NJ 07201, 201-353-5700 .... D•1678-1679
LZR Electronics, Inc., 8174 Beechcraft Ave., Gaithersburg, MD 20879, 301-921-9440 .... D•1716-1718
Microcomputer Power, 15875 Concord Circle, Morgan Hill, CA 95037, 408-779-5700 .... D•1723
Multi Prods. Intl., 218 Little Falls Rd., P.O. Box 238, Cedar Grove, NJ 07009, 201-239-8183 .... A•2202
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Pan-Magnetics Intl., Inc., 455-A Carson Plaza Dr., Carson, CA 90746, 213-532-1790 .... A•2217, D•1742-1743
Power Products Div., Computer Products, Inc., 2981 Gateway Drive, Pompano Beach, FL 33069, 305-974-2442 .... D•1559
Shogyo Intl. Corp., 287 Northern Blvd., Great Neck, NY 11021, 516-466-0911 .... A•2271
Stevens-Arnold Div., Computer Prods., Inc., 7 Elkins St., So. Boston, MA 02127, 617-268-1170 .... D•1573-1583
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Transformation Elctrns. Corp., 170 Wilbur Pl., Bohemia, NY 11716, 516-563-1117 .... D•1857
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Astec USA, Ltd., A BSR Intl. Co., 2880 San Tomas Expwy., # 200, Santa Clara, CA 95051, 408-748-1200 .... D◦1512-1513
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MacPower, 9115 26th Ave., Kenosha, WI 53140 414-694-8866
† Magnetico Inc., 182 Morris Ave., Holtsville, NY 11742 516-654-1166
† Megatran Electronic Power, Rising Sun Rd., Bordentown, NJ 08505 609-298-7300
MIL Electronics, Inc., 1 Mill st., Dracut, MA 01826 617-453-8000
Modular Audio Prods., Modular Devices Inc., 50 Orville Dr., Bohemia, NY 11716 516-567-9620
MPC Sys., Div. of Consulting Systems, RFD Box 441, Fremont, NH 03044 603-642-5913
Murata Erie North America, Inc., 1148 Franklin Rd., S.E., Marietta, GA 30067 404-952-9777
† OPT Inds. Inc., 300 Red School La., Phillipsburg, NJ 08865 201-454-2600
Pacific Instrs. Inc., 215 Mason Circle, Concord, CA 94518 415-827-9010
Pan-Magnetics Intl., Inc., 455-A Carson Plaza Dr., Carson, CA 90746 213-532-1790
Polytron Devices, Box 398 - River St. Sta., Paterson, NJ 07544 201-345-5885
Power Designs, Inc., 1700 Shames Dr., Westbury, NY 11590 516-333-6200
Power Elctrns., 96 Milton Rd., Rochester, NH 03867 603-332-3334
§ Power Pac, 32 Meadow St., S. Norwalk, CT 06856 203-866-4484
Power Systems, 12 Tobey Rd., Bloomfield, CT 06002 203-243-0357
Q-Systems, PO Box 35879, Tucson, AZ 85740 602-293-4923
Reich Assocs., Rt. 4, Box 4620, Lakehills, TX 78063 512-751-3220
RIFA, Inc., Greenwich Off. Pk. 3, P.O. Box 3110, Greenwich, CT 06836-3110 203-625-7300
§ RTE, Power/Mate Co., 514 S. River St., Hackensack, NJ 07601 201-440-3100
§ Semiconductor Circuits, 49 Range Rd., Windham, NH 03087 603-893-2330
§ Shokai Far East, Ltd., 280 North Central Ave., Hartsdale, NY 10530 914-681-0700
§ Sierracin/Power Systems, 20500 Plummer St., Chatsworth, CA 91311 818-998-9873
Summit Elctrns., 750 S. Sherman, Richardson, TX 75081 214-231-1456
† Superior Mfg. & Instr., 19-36 38th St., Long Island City, NY 11105 212-932-1800
Taylor Electronics, Inc., 401 West Orion, Tempe, AZ 85283 602-838-4523
Technipower, A Penril Co., P.O. Box 222, Commerce Pk., Danbury, CT 06810 203-748-7001
Tecnetics, Box 910, Boulder, CO 80306 303-442-3837
Todd Prods. Corp., 50 Emjay Blvd., Brentwood, NY 11717 516-231-3366
† Transistor Devices, 274 S. Salem St., Randolph, NJ 07869 201-361-6622
TTE, Inc., 11650 W. Olympic Blvd., Los Angeles, CA 90064 213-478-8224
Universal Electronics Inc., 3475 A. Victor St., Santa Clara, CA 95050 408-970-0455
Universal Voltronics, 27 Radio Circle Dr., Mt. Kisco, NY 10549 914-241-1300
Varian Associates, Inc., Microwave Tube Div., 611 Hansen Way, Palo Alto, CA 94303 415-493-4000
† Xentek, Inc., 279 S. Pacific St., San Marcos, CA 92069 619-744-3346
Xylog Corp., 150 Tillman St., Westwood, NJ 07675 201-664-7997

Power Supplies, Programmable-4000

Abbott Transistor Labs., Industrial Products Div., 8203 Vineland Ave., Sun Valley, CA 91352, 818-504-0644 .... D◦1449
† **Abbott Transistor Labs., Power Supply Div., 5200 W. Jefferson Blvd., Los Angeles, CA 90016, 213-936-8185 .... D◦1449,1451-1452**
Acopian, Box 638, Easton, PA 18044, 215-258-5441 .... D◦1463,1478-1479,1490-1491
† **Analog Modules, Inc., 126 Baywood Avenue, Longwood, FL 32750, 305-339-4356/4355 .... D◦1004**
Astrosystems, 6 Nevada Dr., Lake Success, NY 11042, 516-328-1600 .... D◦1183,1517,1888
Behlman Engineering, 1142 Mark Ave., Carpinteria, CA 93013, 805-684-8311 .... D◦1898-1905
Bertan Assocs., 121 New South Rd., Hicksville, NY 11801, 516-433-3110 .... D◦1522-1523,1526-1528,1530,1532-1535

† California Instruments, A Div. of Amstar Tech. Prods. Co., Inc., 5150-Convoy St., San Diego, CA 92111, 619-279-8620;800-356-2244;800-821-1634 ...... D•1907
CPS Inc., 110 Wolfe Rd., Sunnyvale, CA 94086, 408-738-0530 .... D•1607
† Del Elctrns. Corp., 250 E. Sandford Blvd., Mt. Vernon, NY 10550, 914-699-2000 .... D•1615
Electronic Measurements, 405 Essex Rd., Neptune, NJ 07753, 201-922-9300 .... D•1624-1625
Elgar Corp, An Onan McGraw Edison Co., 9250 Brown Deer Rd., San Diego, CA 92121, 619-450-0085 .... D•1918
EMCO High Voltage Co., 11126 Ridge Road, Sutter Creek, CA 95685, 209-223-3626 .... D•1632
Gamma High Voltage Resch. Inc., 152 S. MacQuesten Pkwy., Mt. Vernon, NY 10550, 914-667-5050 .... D•1645
Glassman High Voltage Inc., P.O. Box 551, Salem Indl. Pk., Whitehouse Sta., NJ 08889, 201-534-9007 .... D•1234-1235,1651
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303, Call Local Sls. Off. .... D•1653-1656
Hitran Corp., Agex, Rte. 31, RD 5-65, Flemington, NJ 08822, 201-782-5525 .... D•1660
Industrial Test Equip., 21 Yennicock Ave., Port Washington, NY 11050, 516-883-1700 .... D•1938
§ Kepco, Inc., 131-38 Sanford Ave., Flushing, NY 11352, 718-461-7000 .... D•1689-1691,1701-1709
Kikusui Intl. Corp., 17819 S. Figueroa St., Gardena, CA 90248, 213-515-6432;800-421-5334 .... D•1652
LaserSonics Power Supply Operation, 177 N. Wolfe Rd., Sunnyvale, CA 94086, 408-732-9880 .... D•1719
Mid-Eastern Industries, 100 Campus Dr., RD 1, Mt. Holly, NJ 08060, 609-267-3811 .... D•1724-1725
North Hills Elctrns., 1 Alexander Pl., Glen Cove, NY 11542, 516-671-5700 .... D•1734
Pioneer Magnetics, 1745 Berkeley St., Santa Monica, CA 90404, 213-829-6751 .... D•1752-1753
Power Designs, Inc., 1700 Shames Dr., Westbury, NY 11590, 516-333-6200 .... D•1759
† Spellman High Voltage Elctrns. Corp., 7 Fairchild Ave., Plainview, NY 11803, 516-349-8686 .... D•1842
Standard Energy, Div. WBH Scientific, Inc., Rte. 32, Greenville, NY 12083, 518-966-4197 .... D•1845
Summit Elctrns., 750 S. Sherman, Richardson, TX 75081, 214-231-1456 ...... D•1847
Technology Dynamics, 91 E. Carver Ave., Westwood, NJ 07675, 201-664-7636 .... D•1851
AAK Corp, 747 River St., Haverhill, MA 01830 617-373-3769
Abacus Controls Inc., 89 Readington Rd., Somerville, NJ 08876 201-526-6010
Advance Conversion Devices Co., 274 S. Salem St., Randolph, NJ 07869 201-989-0095
Advanced High Voltage Co., Inc., P.O. Box 2136, Lancaster, CA 93539-2136 213-997-7222
Advanced Kinetics, 1231 Victoria St., Costa Mesa, CA 92627 714-646-7165
AES Corp., 285 Newbury St., P.O. Box 2093, Peabody, MA 01960 617-535-7310
† Anadyne Power Supply Division, 721 W. Whittier Blvd., La Habra, CA 90631 213-697-3116
Applied Power Conversion, Technology Dynamics, Inc., 100 School St., Bergenfield, NJ 07621 201-664-7636
† Arnold Magnetics, 11520 W. Jefferson Blvd., Culver City, CA 90230 .... 213-390-3537/8837
Astro-Geo-Marine, Inc., 202 E. Cota St., Santa Barbara, CA 93101 805-965-7005
AT&T, 1 Oak Way, Berkeley Heights, NJ 07922 1-800-372-2447
† Autronics, 314 E. Live Oak, Ste. A, Arcadia, CA 91006 818-445-5470
† Babcock, Inc., 1717 West Collins Ave., Orange, CA 92667 714-633-3700
Basler Elec., Rte. 143, Highland, IL 62249 618-654-2341
Behlman Div., California Instrs., Div. of Norlin Inds., 5150 Convoy St., San Diego, CA 92111 619-279-8620
† CEA Division of Berkleonics, Inc., A Subsidiary of EG & G, 1 Aerovista Pk., San Luis Obispo, CA 93401 805-544-5454
† CEAG Elec. Corp., Power Supp. Div., 1324 Motor Pkwy., Hauppauge, NY 11788 516-582-4422
Christie Elec. Corp., 20665 Manhattan Pl., Torrance, CA 90501 213-320-0808
CML MACARR Div., Marine Electric RPD, Inc., 666 Pacific St., Brooklyn, NY 11217 718-857-2400
§ Condor D.C. Power Supplies, Inc., 201 Flynn Rd., Camarillo, CA 93010 ... 805-484-2851; 800-235-5929
Crestronics Div., Applied Electro Technlg., Int., 2220 S. Anne St., Santa Ana, CA 92704 714-556-6570
CSI Capacitors, CSI Technlgs., 810 Rancheros Dr., San Marcos, CA 92069 619-747-4000
§ CurrenTechnology Corp., 135 Prestige Pk. Circle, E. Hartford, CT 06108 203-289-6831
† Datametrics Corp., Defense Products Div., 7630 Gloria Ave., Van Nuys, CA 91406 818-989-3840
§ Digitec Corp., 918 Woodley Rd., P.O. Box 458, Dayton, OH 45401 513-254-6251
§ Dressen-Barnes Elctrns., 1600 E. Valencia Dr., Fullerton, CA 92631 714-871-3020
† EG & G Almond Instruments, 1330 E. Cypress St., Covina, CA 91724 ... 818-967-9521
† Electronic Dev. Corp., 11 Hamlin St., Boston, MA 02127-4198 617-268-9696
Electro Vector, Inc., 6555 Covey Rd., Forestville, CA 95436 707-887-2292
Elin Div., California Instrs. Co., Div. of Norlin Ind., 5150 Convoy St., San Diego, CA 92111 619-279-8620
ERA Transpac Div., Sub. Elctrn. Research Assocs., 50 Graphic Place, Moonachie, NJ 07074 201-641-3650
§ E-Tronics, 16774 Schoenborn, Sepulveda, CA 91343 213-892-7279
Fluke, John, Mfg. Co., Box C9090, MS 250C, Everett, WA 98206 206-356-5400
§† Gra-Mar Inc., 3165 McCrory Pl., Ste. 265, Orlando, FL 32803 305-894-3351
† Gulton Industries, Inc., Engineered Magnetics Division, 13041 Cerise Ave., Hawthorne, CA 90250 213-679-0111
Interelectronics Corp., Interelectronics Park, 550 U.S. Rte. 303, Congers, NY 10920 .... 914-EL8-8000
ITT Power Systems Corp., Box 688, Galion, OH 44833-0688 419-468-8100
Kaiser Systems, Inc., 126 Sohier Road, Beverly, MA 01915 617-922-9300
† Keltec Florida, P.O. Box 2917, Ft. Walton Bch., FL 32549 904-651-9749
KGS Electronics, Inc., GAR Entprs., 2029 N. Lincoln Ave., Pasadena, CA 91103 818-798-0786
Lambda Electronics, Veeco Instr., Inc., 515 Broad Hollow Rd., Melville, NY 11747 516-694-4200
LeCroy Resch. Sys. Corp., 700 S. Main St., Spring Vly., NY 10977 914-425-2000
LuTechnology, Inc., 3516 Breakwater Ct., Hayward, CA 94545 415-887-1955
† Megatran Electronic Power, Rising Sun Rd., Bordentown, NJ 08505 609-298-7300
Microcomputer Power, 15875 Concord Circle, Morgan Hill, CA 95037 ... 408-779-5700
Modular Devices, 50 Orville Dr., Bohemia, NY 11716 516-567-9620
† Modular Power Sys. Inc., P.O. Box 180579, Austin, TX 78718-0579 512-834-9262
§ Murata Erie North America, Inc., 1148 Franklin Rd., S.E., Marietta, GA 30067 404-952-9777
§ North American Soar Corp., 11126 Cornell Ave., Cherry Hill, NJ 08002 .. 609-488-1060
Novatronics, Box 878, Pompano Beach, FL 33061 305-942-5200
† NWL Transformers, Rising Sun Rd., P.O. Box 358, Bordentown, NJ 08505 609-298-7300
† NWL Transformers, Rising Sun Rd., P.O. Box 358, Bordentown, NJ 08505 609-298-7300
Oeco Corp., 712 S.E. Hawthorne Blvd., Portland, OR 97214 503-238-2440
Oram Elctrns., Rte. 22, Putnam Business Park, Brewster, NY 10509-9587 914-279-2966
Pacific Instrs. Inc., 215 Mason Circle, Concord, CA 94518 415-827-9010
Power Elctrns., 96 Milton Rd., Rochester, NH 03867 603-332-3334
Power General, Unitrode, 152 Will Dr., Canton, MA 02021 617-828-6216
§ Power Pac, 32 Meadow St., S. Norwalk, CT 06856 203-866-4484
† Power Sys. Grp., Rantec Div., Emerson Elec., 9401 Oso Ave., Chatsworth, CA 91311 818-885-8223
Powertec, Inc., 20550 Nordhoff St., Chatsworth, CA 91311 818-882-0004
Power Ten, Inc., 486 Mercury Dr., Sunnyvale, CA 94086 408-738-5959
Pulse Instrs. Co., 1234 Francisco, Torrance, CA 90502 213-515-5330
§ Ragen Data Systems, Inc., 3 Oval Dr., Central Islip, NY 11722 516-234-3800
RIFA, Inc., Greenwich Off. Pk. 3, P.O. Box 3110, Greenwich, CT 06836-3110 203-625-7300
§ RTE, Power/Mate Co., 514 S. River St., Hackensack, NJ 07601 201-440-3100
§† Sorensen Co., 676 E. Island Pond Rd., Manchester, NH 03103 603-668-4500
§ Standard Power, Inc., 1400 S. Village Way, Santa Ana, CA 92705 714-558-8512
† Superior Mfg. & Instr., 19-36 38th St., Long Island City, NY 11105 212-932-1800
§† Systron-Donner Instr. Div., 2727 Systron Dr., Concord, CA 94518 415-676-5000
† Technipower, A Penril Co., P.O. Box 222, Commerce Pk., Danbury, CT 06810 203-748-7001
§ THORN EMI Gencom Inc., 23 Madison Rd., Fairfield, NJ 07006 201-575-5586
Todd Prods. Corp., 50 Emjay Blvd., Brentwood, NY 11717 516-231-3366
§† Topaz Electronics, 9192 Topaz Way, San Diego, CA 92123-1164 619-279-0831
† Transistor Devices, 274 S. Salem St., Randolph, NJ 07869 201-361-6622
† Trio Labs., 80 Dupont St., Plainview, NY 11803 516-349-0400
Universal Voltronics, 27 Radio Circle Dr., Mt. Kisco, NY 10549 914-241-1300
Varian Associates, Inc., Microwave Tube Div., 611 Hansen Way, Palo Alto, CA 94303 415-493-4000
† Venus Scientific, Inc., 399 Smith St., Farmingdale, NY 11735 516-293-4100
Vistar Corp., 13740 McCormick Dr., Tampa, FL 33625 813-855-6611
Voltex, 3460 Great Neck Rd., Amityville, NY 11701 516-842-2772
† Watkins-Johnson Co., 3333 Hillview Ave., Palo Alto, CA 94304 415-493-4141
Xylog Corp., 150 Tillman St., Westwood, NJ 07675 201-664-7997

Power Supplies, Proportional (to Input) Output-4000

THORN EMI Gencom Inc., 23 Madison Rd., Fairfield, NJ 07006, 201-575-5586 .... A•2343
† ATC Power Systems, Inc., 472 Amherst Street, Nashua, NH 03063 603-882-1366
† EMCO High Voltage Co., 11126 Ridge Road, Sutter Creek, CA 95685 ... 209-223-3626
Endicott Resch. Grp., Inc., 2601 Wayne St., P.O. Box 269, Endicott, NY 13760 607-754-9187
EVI, Inc., 8970 F Route 108, Columbia, MD 21045 301-964-1660
† Gulton Industries, Inc., Engineered Magnetics Division, 13041 Cerise Ave., Hawthorne, CA 90250 213-679-0111
Halmar Electronics, Inc., 900 N. Hague Ave., Columbus, OH 43204 614-275-0131
Jerome Industries Corp., B 730 Division St., Elizabeth, NJ 07201 201-353-5700

Power Supplies, Redundant-4000

Acopian, Box 638, Easton, PA 18044, 215-258-5441 .... D•1463,1491-1493
Applied Power Conversion, Technology Dynamics, Inc., 100 School St., Bergenfield, NJ 07621, 201-664-7636 .... D•1500,1504-1505
§ Computer Prods. Inc., Power Conversion Grp., 2981 Gateway Dr., Pompano Bch., FL 33069-4803, 305-974-5500 .... D•1551,1559
Power Products Div., Computer Products, Inc., 2981 Gateway Drive, Pompano Beach, FL 33069, 305-974-2442 .... D•1559
Technology Dynamics, 91 E. Carver Ave., Westwood, NJ 07675, 201-664-7636 .... D•1851
CEAG Elec. Corp., Power Supp. Div., 1324 Motor Pkwy., Hauppauge, NY 11788 516-582-4422
† Gulton Industries, Inc., Engineered Magnetics Division, 13041 Cerise Ave., Hawthorne, CA 90250 213-679-0111
NJE Corporation, 329 Culver Rd, P.O. Box 669, Dayton, NJ 08810-0669 201-329-4611
Powertec, Inc., 20550 Nordhoff St., Chatsworth, CA 91311 818-882-0004
Sierracin/Power Systems, 20500 Plummer St., Chatsworth, CA 91311 .. 818-998-9873
Todd Prods. Corp., 50 Emjay Blvd., Brentwood, NY 11717 516-231-3366
Ulveco, Inc., 323 Vintage Park Drive, Foster City, CA 94404 415-574-1100

Power Supplies, Standby (Emergency)-4000

§ ATR Elctrns., Inc., P.O. BOX 7008, St. Paul, MN 55107, 612-738-6520;414-297-7374 .... D•1889

Behlman Engineering, 1142 Mark Ave., Carpinteria, CA 93013, 805-684-8311 ..... D•1898-1905
Computer Prods. Inc., Power Conversion Grp., 2981 Gateway Dr., Pompano Bch., FL 33069-4803, 305-974-5500 ..... D•1551,1573
§ Converter Concepts, Inc., Industrial Pkwy., Pardeeville, WI 53954, 608-429-2144 ..... D•1600,1603
§ Displex, Inc., Alexander Place, Glen Cove, NY 11542, 516-671-4400 ..... D•1619
Elgar Corp, An Onan McGraw Edison Co., 9250 Brown Deer Rd., San Diego, CA 92121, 619-450-0085 ..... D•1918
Pacific Power Source Corp., 15122 Bolsa Chica St., Huntington Bch., CA 92649, 714-898-2691;800-854-2433 ..... D•1949
Power Pac, 32 Meadow St., S. Norwalk, CT 06856, 203-866-4484 ..... D•1778
Sola, A Unit of General Sign., 1717 Busse Rd., Elk Grove Village, IL 60007, 312-439-2800 ..... D•1966-1967
Stevens-Arnold Div., Computer Prods., Inc., 7 Elkins St., So. Boston, MA 02127, 617-268-1170 ..... D•1573
Technology Dynamics, 91 E. Carver Ave., Westwood, NJ 07675, 201-664-7636 ..... D•1851
TRAK Systems, Div. TRAK Microwave Corp., 4722 Eisenhower Blvd., Dept. E-5, Tampa, FL 33614, 813-884-1411 ..... D•1081
Xylog Corp., 150 Tillman St., Westwood, NJ 07675, 201-664-7997 ..... D•1976
Abacus Controls Inc., 89 Readington Rd., Somerville, NJ 08876 201-526-6010
§ Able Power and Engineering Inc., 335 S. New Ave., #H, Monterey Park, CA 91754 714-891-3568
§† Adapter/Charger Prdts., Box 3218, Peoria, IL 61614 309-691-0810
Advance Conversion Devices Co., 274 S. Salem St., Randolph, NJ 07869 201-989-0095
AES Corp., 285 Newbury St., P.O. Box 2093, Peabody, MA 01960 617-535-7310
† Alarm Controls, 19 Brandywine Dr., Deer Park, NY 11729 516-586-4220
Albar, Inc., 19013 36th Ave. W., Lynnwood, WA 98036 206-771-4006
American Monarch, 2801-37th Ave., N.E., Minneapolis, MN 55421 612-788-9161
Applied Power Conversion, Technology Dynamics, Inc., 100 School St., Bergenfield, NJ 07621 201-664-7636
† Arnold Magnetics, 11520 W. Jefferson Blvd., Culver City, CA 90230 ..... 213-390-3537/8837
§ Arrow Hart Div., Cooper Inds., 103 Hawthorn St., Hartford, CT 06101 203-249-8471
Astro-Geo-Marine, Inc., 202 E. Cota St., Santa Barbara, CA 93101 805-965-7005
Atlas Energy Sys., 9457 Rush St., S. El Monte, CA 91733 213-575-0755
† Austron, Inc., P.O. Box 14766, Exit 248 N. IH 35, Austin, TX 78761 512-251-2341
Automatic Switch Co., 50-60 Hanover Road, Florham Park, NJ 07932 1-201-966-2000
Bikor, 1504 W. 228th St., Torrance, CA 92718 213-539-6320
† Cal-Power Corp., 140 Kansas St., El Segundo, CA 90245 213-772-2171
§ C-COR Elctrns., 60 Decibel Rd., State College, PA 16801 814-238-2461
† CEA Division of Berkleonics, Inc., A Subsidiary of EG & G, 1 Aerovista Pk., San Luis Obispo, CA 93401 805-544-5454
Chloride Power Electronics, 10931 Pellicano Drive, El Paso, TX 79935 915-592-9985
Clary Corp., Precision Instrs. Div., 320 W. Clary Ave., San Gabriel, CA 91776 818-287-6111
§ Computer Power, 124E W. Main St., High Bridge, NJ 08829 201-735-8000
§ Control Technology, Inc., 8200 N. Classen Blvd., Ste. 101, Oklahoma City, OK 73114 405-840-3163
Cuesta Systems, Inc., 3440 Roberto Ct., San Luis Obispo, CA 93401 805-541-4160
§ CurrenTechnology Corp., 135 Prestige Pk. Circle, E. Hartford, CT 06108 203-289-6831
† D & B Power, Inc., 204 N. Fehr Way, P.O. Box 40M, Bayshore, NY 11706 516-586-5955
EG & G Almond Instruments, 1330 E. Cypress St., Covina, CA 91724 818-967-9521
† Eldec Corp., Power Conversion Div., 16700 13th Ave. W., P.O. Box 100, Lynnwood, WA 98036 206-743-1313
Electro Vector, Inc., 6555 Covey Rd., Forestville, CA 95436 707-887-2292
ERA Transpac Div., Sub. Elctrn. Research Assocs., 50 Graphic Place, Moonachie, NJ 07074 201-641-3650
† Exide Elctrns., P.O. Box 58189, Raleigh, NC 27658 919-872-3020
§† Gates Energy Prods., 1050 S. Broadway, Denver, CO 80217 303-744-4806
GMR Co., 8801 Sepulveda Blvd., Los Angeles, CA 90045 213-216-9516
§ GNB Batteries Inc., Ind'l. Battery Div., 2010 Cabot Blvd. W., Langhorne, PA 19047 215-752-0555
† Gulton Industries, Inc., Engineered Magnetics Division, 13041 Cerise Ave., Hawthorne, CA 90250 213-679-0111
† Hitran Corp., Agex, Rte. 31, RD 5-65, Flemington, NJ 08822 201-782-5525
§ Instrumentation & Control Sys., 520 Interstate Rd, Addison, IL 60101 312-543-6200
ITT Power Systems Corp., Box 688, Galion, OH 44833-0688 419-468-8100
Lorain Prods., 1122 F St., Lorain, OH 44052 216-288-1122
† Megatran Electronic Power, Rising Sun Rd., Bordentown, NJ 08505 609-298-7300
Mid-Eastern Industries, 100 Campus Dr., RD 1, Mt. Holly, NJ 08060 609-267-3811
National Power Technlg., 2111 Howell Ave., Anaheim, CA 92806 714-937-1301
† N.C.E., Mail Station 331, 9925 Lyndale Ave. S., Bloomington, MN 55420 612-890-1360
NJE Corporation, 329 Culver Rd, P.O. Box 669, Dayton, NJ 08810-0669 201-329-4611
Nova Elec., Hobart Bros. Co., 263 Hillside Ave., Nutley, NJ 07110 201-661-3434
† NWL Transformers, Rising Sun Rd., P.O. Box 358, Bordentown, NJ 08505 609-298-7300
Power General, Unitrode, 152 Will Dr., Canton, MA 02021 617-828-6216
† Power Group International, Dept. 227, 2200 West 66th Street, Richfield, MN 55423 612-890-1360
§† Powermark, 3855 Ruffin Rd., San Diego, CA 92123 619-565-8363
§ Pylon Elex Development Co. Ltd., 2300 Victoria, Lachine, PQ, CANADA H8S 1Z3 514-637-1186
§ Ratelco, 1260 Mercer, Dept. EEM, Seattle, WA 98109 206-624-7770
Reliance Electric Co., Marketing Info Center, P.O. Box 99502, Cleveland, OH 44199 ..... 800-245-4501;800-245-4497 In Ohio
† RTE Deltec Corp., 2727 Kurtz St., San Diego, CA 92110 ..... 619-291-4211;800-854-2658
§ SAFT America, Inc., Elctrns. Sys. Div., 2414 W. 14th St., Tempe, AZ 85281 602-894-6864
Sanford-Miller Corp., 8 John St., Lynbrook, NY 11563 ..... 516-593-2025;Outside NY 800-645-5900
§ Semiconductor Circuits, 49 Range Rd., Windham, NH 03087 603-893-2330
§† Solarex Corp., 1335 Piccard Dr., Rockville, MD 20850 301-948-0202
Spectra Lux Corp., 12840 N.E. 21 St. Pl., Bellevue, WA 98005 206-747-0560
§ Strategic Sys. Div. Power Sys. Operations, GTE Prods. Corp. Sylvania Sys. Grp., 520 Winter St., Waltham, MA 02254 617-466-3000
Summit Elctrns., 750 S. Sherman, Richardson, TX 75081 214-231-1456
§ Sun Research, Inc.,, Box 210, Old Bay Rd., New Durham, NH 03855 603-859-7110
† Superior Mfg. & Instr., 19-36 38th St., Long Island City, NY 11105 212-932-1800
§† Tauber Elctrns. Inc., 4901 Morena Blvd., Bldg. 314, San Diego, CA 92117 619-274-7242
† Tech Labs., Inc., Bergen & Edsall Blvds., Palisades Pk., NJ 07650 201-944-2221
Technipower, A Penril Co., P.O. Box 222, Commerce Pk., Danbury, CT 06810 203-748-7001
Teledyne Inet, 2750 W. Lomita Blvd., Torrance, CA 90509 213-325-5040
§† Terado, 1068 Raymond Ave., St. Paul, MN 55108 612-646-2868
§† Topaz Electronics, 9192 Topaz Way, San Diego, CA 92123-1164 619-279-0831
† Transistor Devices, 274 S. Salem St., Randolph, NJ 07869 201-361-6622
† Trio Labs., 80 Dupont St., Plainview, NY 11803 516-349-0400
§ Tripp-Lite, 500 No. Orleans, Chicago, IL 60610 312-329-1777
† Tungstone Batteries, Inc., 18 Billings St., Sharon, MA 02067 617-784-2000
Ulveco, Inc., 323 Vintage Park Drive, Foster City, CA 94404 415-574-1100
UPSystems, Inc., 7801 E. Compton Blvd., Paramount, CA 90723 213-634-0621
Wilmore Elctrns. Co., Box 1329, Hillsborough, NC 27278 919-732-9351

Power Supplies, Submodular-4000

† Arnold Magnetics, 11520 W. Jefferson Blvd., Culver City, CA 90230, 213-390-3537/8837 ..... D•1508-1511
§† Calex Mfg. Co., Inc., 3355 Vincent Rd., Pleasant Hill, CA 94523, 415-932-3911 ..... D•1542-1545
§ Computer Prods. Inc., Power Conversion Grp., 2981 Gateway Dr., Pompano Bch., FL 33069-4803, 305-974-5500 ..... D•1551,1559,1573
CPS Inc., 110 Wolfe Rd., Sunnyvale, CA 94086, 408-738-0530 ..... D•1607
§ Elpac Power Sys., 3131 S. Standard Ave., Santa Ana, CA 92705, 714-979-4440 ..... D•1626
† EMCO High Voltage Co., 11126 Ridge Road, Sutter Creek, CA 95685, 209-223-3626 ..... D•1632
Endicott Resch. Grp., Inc., 2601 Wayne St., P.O. Box 269, Endicott, NY 13760, 607-754-9187 ..... B•1047-1049, D•1633
† Ferrotran Elctrns. Co., Inc., 11 W. 25th St., New York, NY 10010, 212-691-3610 ..... D•1640-1641
Integrated Circuits, Inc., 10301 Willows Road, Redmond, WA 98052, 206-882-3100 ..... D•1662-1665
Intronics, Inc., 57 Chapel St., Newton, MA 02158, 617-964-4000 ..... D•1676-1677
Marway Prods. Inc., 311 N. Clara St., Santa Ana, CA 92703, 714-973-1800 ..... D•1944
§ Opamp Labs, Inc., 1033 N. Sycamore Ave., Los Angeles, CA 90038, 213-934-3566 ..... D•1014
Pan-Magnetics Intl., Inc., 455-A Carson Plaza Dr., Carson, CA 90746, 213-532-1790 ..... D•1742-1743
§ Power Products Div., Computer Products, Inc., 2981 Gateway Drive, Pompano Beach, FL 33069, 305-974-2442 ..... D•1559
§ Power Technology, Inc., P.O. Box 9769, Little Rock, AR 72219, 501-568-1995 ..... B•1125
RIFA, Inc., Greenwich Off. Pk. 3, P.O. Box 3110, Greenwich, CT 06836-3110, 203-625-7300 ..... D•1810-1811
Stevens-Arnold Div., Computer Prods., Inc., 7 Elkins St., So. Boston, MA 02127, 617-268-1170 ..... D•1573
Technology Dynamics, 91 E. Carver Ave., Westwood, NJ 07675, 201-664-7636 ..... D•1851
Wilmore Elctrns. Co., Box 1329, Hillsborough, NC 27278, 919-732-9351 ..... D•1869
§ AAK Corp, 747 River St., Haverhill, MA 01830 617-373-3769
Abbott Transistor Labs., Industrial Products Div., 8203 Vineland Ave., Sun Valley, CA 91352 818-504-0644
† Abbott Transistor Labs., Power Supply Div., 5200 W. Jefferson Blvd., Los Angeles, CA 90016 213-936-8185
§ ACDC Electronics, 401 Jones Rd., Oceanside, CA 92054 619-757-1860
§† Adtech Power Inc., 1620 S. Sunkist St., Anaheim, CA 92806 714-634-9211
Advance Conversion Devices Co., 274 S. Salem St., Randolph, NJ 07869 201-989-0095
† AMETEK, Dynamics Division, AMETEK, Inc., 5649 Peck Rd., Arcadia, CA 91006 818-442-5981
† Anadyne Power Supply Division, 721 W. Whittier Blvd., La Habra, CA 90631 213-697-3116
§ Anaheim Automation, 910 E. Orangefair La., Anaheim, CA 92801 714-992-6990
† Analog Devices, P.O. Box 280, Norwood, MA 02062 617-329-4700
Analogic Corp., 8 Centennial Dr., Peabody, MA 01961 ..... 617-532-5660;617-777-4500; 617-246-0300;800-451-1
Applied Power Conversion, Technology Dynamics, Inc., 100 School St., Bergenfield, NJ 07621 201-664-7636
Astro-Geo-Marine, Inc., 202 E. Cota St., Santa Barbara, CA 93101 805-965-7005
† ATC Power Systems, Inc., 472 Amherst Street, Nashua, NH 03063 603-882-1366
† Babcock, Inc., 1717 West Collins Ave., Orange, CA 92667 714-633-3700
Bertan Assocs., 121 New South Rd., Hicksville, NY 11801 516-433-3110
Bikor, 1504 W. 228th St., Torrance, CA 92718 213-539-6320
Burr-Brown Corp., P.O. Box 11400, Tucson, AZ 85734 602-746-1111
† CEA Division of Berkleonics, Inc., A Subsidiary of EG & G, 1 Aerovista Pk., San Luis Obispo, CA 93401 805-544-5454
† Chloride Power Electronics, 10931 Pellicano Drive, El Paso, TX 79935 915-592-9985
CML MACARR Div., Marine Electric RPD, Inc., 666 Pacific St., Brooklyn, NY 11217 718-857-2400
Crestronics Div., Applied Electro Technlg., Int., 2220 S. Anne St., Santa Ana, CA 92704 714-556-6570

D & B Power, Inc., 204 N. Fehr Way, P.O. Box 40M, Bayshore, NY 11706 516-586-5955
Datel, General Electric Co., 11 Cabot Blvd., Mansfield, MA 02048 617-339-9341
† Del Elctrns. Corp., 250 E. Sandford Blvd., Mt. Vernon, NY 10550 914-699-2000
§† Dressen-Barnes Elctrns., 1600 E. Valencia Dr., Fullerton, CA 92631 714-871-3020
† Eldec Corp., Power Conversion Div., 16700 13th Ave. W., P.O. Box 100, Lynnwood, WA 98036 206-743-1313
Electronic Measurements, 405 Essex Rd., Neptune, NJ 07753 201-922-9300
Electro-Pacific, 5782 Thornwood Dr., Goleta, CA 93017 805-964-0751
Electrostatics, 7718 Clairemont Mesa Blvd., San Diego, CA 92111 619-279-1414
Elgar Corp, An Onan McGraw Edison Co., 9250 Brown Deer Rd., San Diego, CA 92121 619-450-0085
Elgin Electronics, Combustion Engineering, 5533 New Perry Hwy., Erie, PA 16509-3570 814-864-4921
Endicott Coil, 22 E. Charlotte St., Binghamton, NY 13905 607-797-1263
Engd. Prod., Div. of Acme Elec. Corp., 40 Water St., Cuba, NY 14727 716-968-2400
† ERA Transpac Div., Sub. Elctrn. Research Assocs., 50 Graphic Place, Moonachie, NJ 07074 201-641-3650
§† E-Tronics, 16774 Schoenborn, Sepulveda, CA 91343 213-892-7279
EVI, Inc., 8970 F Route 108, Columbia, MD 21045 301-964-1660
Harrel, Inc., 16 Fitch St., E. Norwalk, CT 06855 203-866-2573
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
† Hisonic, Inc., 249 N. Troost, P.O. Box 1130, Olathe, KS 66061-1130 913-782-0012
Hybrid Systems Corp., 22 Linnell Circle, Billerica, MA 01821 617-667-8700
Interelectronics Corp., Interelectronics Park, 550 U.S. Rte. 303, Congers, NY 10920 .... 914-EL8-8000
ITT Power Systems Corp., Box 688, Galion, OH 44833-0688 419-468-8100
KEC Elctrns., Inc., 20817 Western Ave., Torrance, CA 90501 213-320-3902
§ Kepco, Inc., 131-38 Sanford Ave., Flushing, NY 11352 718-461-7000
KGS Electronics, Inc., GAR Entprs., 2029 N. Lincoln Ave., Pasadena, CA 91103 818-798-0786
Lambda Electronics, Veeco Instr., Inc., 515 Broad Hollow Rd., Melville, NY 11747 516-694-4200
Lorain Prods., 1122 F St., Lorain, OH 44052 216-288-1122
† Magnetico Inc., 182 Morris Ave., Holtsville, NY 11742 516-654-1166
Melcher, Inc., 6290 Sunset Blvd., # 1126, Los Angeles, CA 90028 213-463-5617
Mid-Eastern Industries, 100 Campus Dr., RD 1, Mt. Holly, NJ 08060 609-267-3811
Modular Devices, 50 Orville Dr., Bohemia, NY 11716 516-567-9620
MPC Sys., Div. of Consulting Systems, RFD Box 441, Fremont, NH 03044 603-642-5913
NJE Corporation, 329 Culver Rd, P.O. Box 669, Dayton, NJ 08810-0669 201-329-4611
† Novatronics, Box 878, Pompano Beach, FL 33061 305-942-5200
† NWL Transformers, Rising Sun Rd., P.O. Box 358, Bordentown, NJ 08505 609-298-7300
† NWL Transformers, Rising Sun Rd., P.O. Box 358, Bordentown, NJ 08505 609-298-7300
Pacific Instrs. Inc., 215 Mason Circle, Concord, CA 94518 415-827-9010
Pacific Power Source Corp., 15122 Bolsa Chica St., Huntington Bch., CA 92649 .... 714-898-2691;800-854-2433
Pioneer Magnetics, 1745 Berkeley St., Santa Monica, CA 90404 213-829-6751
Polytron Devices, Box 398 - River St. Sta., Paterson, NJ 07544 201-345-5885
Power Designs, Inc., 1700 Shames Dr., Westbury, NY 11590 516-333-6200
§ Power Labs, Inc., 5 Towle Ave., Dover, NH 03820 603-742-4613
§ Power-One, Inc., Power-One Linear Products, 740 Calle Plano, Camarillo, CA 93010 805-987-8741
§ Power Pac, 32 Meadow St., S. Norwalk, CT 06856 203-866-4484
† Power Sys. Grp., Rantec Div., Emerson Elec., 9401 Oso Ave., Chatsworth, CA 91311 818-885-8223
† Powertec, Inc., 20550 Nordhoff St., Chatsworth, CA 91311 818-882-0004
§ Ragen Data Systems, Inc., 3 Oval Dr., Central Islip, NY 11722 516-234-3800
§ Reliability, Inc., 16400 Park Row, P.O. Box 218370, Houston, TX 77218 713-492-0550
† RO Assocs., 246 Caspian Dr., Box 61419, Sunnyvale, CA 94088 408-744-1450
§ RTE, Power/Mate Co., 514 S. River St., Hackensack, NJ 07601 201-440-3100
Sanford-Miller Corp., 8 John St., Lynbrook, NY 11563 .... 516-593-2025;Outside NY 800-645-5900
§ Semiconductor Circuits, 49 Range Rd., Windham, NH 03087 603-893-2330
SGS Semiconductor Corporation, 1000 E. Bell Road, Phoenix, AZ 85022 602-867-6100
† Sigmapower, Inc., 20790 Leapwood Ave., Carson, CA 90746 .... 213-32-Sigma
§† Solarex Corp., 1335 Piccard Dr., Rockville, MD 20850 301-948-0202
Sorensen Co., 676 E. Island Pond Rd., Manchester, NH 03103 603-668-4500
† Spellman High Voltage Elctrns. Corp., 7 Fairchild Ave., Plainview, NY 11803 516-349-8686
Standard Engrg., 44800 Industrial Dr., Fremont, CA 94538 415-657-7555
§ Standard Power, Inc., 1400 S. Village Way, Santa Ana, CA 92705 714-558-8512
Summit Elctrns., 750 S. Sherman, Richardson, TX 75081 214-231-1456
† Superior Mfg. & Instr., 19-36 38th St., Long Island City, NY 11105 212-932-1800
† Technipower, A Penril Co., P.O. Box 222, Commerce Pk., Danbury, CT 06810 203-748-7001
Tecnetics, Box 910, Boulder, CO 80306 303-442-3837
Tektronix, Inc., P. O. Box 500, Y3-314, Beaverton, OR 97077 ..... 800-547-1512;Oregon only 800-452-1877
Teledyne Philbrick, Allied Dr. Rte 128, Dedham, MA 02026 617-329-1600
§ Tennelec, 601 Turnpike, Oak Ridge, TN 37830 615-483-8405
§ THORN EMI Gencom Inc., 23 Madison Rd., Fairfield, NJ 07006 201-575-5586
Todd Prods. Corp., 50 Emjay Blvd., Brentwood, NY 11717 516-231-3366
† Transistor Devices, 274 S. Salem St., Randolph, NJ 07869 201-361-6622
Triad-Utrad, 1124 E. Franklin St., Huntington, IN 46750 219-356-6500
† Trio Labs., 80 Dupont St., Plainview, NY 11803 516-349-0400
Universal Voltronics, 27 Radio Circle Dr., Mt. Kisco, NY 10549 914-241-1300
Varian Associates, Inc., Microwave Tube Div., 611 Hansen Way, Palo Alto, CA 94303 415-493-4000
† Venus Scientific, Inc., 399 Smith St., Farmingdale, NY 11735 516-293-4100
Wall Inds., 2 Franklin, Lawrence, MA 01840 617-688-1287
† Xentek, Inc., 279 S. Pacific St., San Marcos, CA 92069 619-744-3346

Power Supplies, Switching-4000

Abbott Transistor Labs., Industrial Products Div., 8203 Vineland Ave., Sun Valley, CA 91352, 818-504-0644 .... D•1449
† Abbott Transistor Labs., Power Supply Div., 5200 W. Jefferson Blvd., Los Angeles, CA 90016, 213-936-8185 .... D•1449,1451-1453,1455-1457,1460
§† Adtech Power Inc., 1620 S. Sunkist St., Anaheim, CA 92806, 714-634-9211 .... D•1499
Applied Power Conversion, Technology Dynamics, Inc., 100 School St., Bergenfield, NJ 07621, 201-664-7636 .... D•1500-1504
† Arnold Magnetics, 11520 W. Jefferson Blvd., Culver City, CA 90230, 213-390-3537/8837 .... D•1508-1511
Astec USA, Ltd., A BSR Intl. Co., 2880 San Tomas Expwy., # 200, Santa Clara, CA 95051, 408-748-1200 .... D•1513
ATR Elctrns., Inc., P.O. BOX 7008, St. Paul, MN 55107, 612-738-6520;414-297-7374 .... D•1889
§ Ault, Incorporated, 1600 Freeway Blvd., Minneapolis, MN 55430, 612-560-9300 .... D•1518
Bertan Assocs., 121 New South Rd., Hicksville, NY 11801, 516-433-3110 .... D•1535
Bikor, 1504 W. 228th St., Torrance, CA 92718, 213-539-6320 .... D•1536
§ Boschert Inc., 384 Santa Trinita Ave., Sunnyvale, CA 94086, 408-732-2440 .... D•1537-1540
California DC, 2150 Anchor Ct., Newbury Park, CA 91320, 805-499-3621;213-706-8221 .... D•1546
CES Elctrns., 2968 Avenue Z, Brooklyn, NY 11235 .... D•1606
§ Compower Div., Computer Prods., Inc., 2220 Lundy Ave., San Jose, CA 95131, 408-942-1600 .... D•1553-1558
§ Computer Prods. Inc., Power Conversion Grp., 2981 Gateway Dr., Pompano Bch., FL 33069-4803, 305-974-5500 .... D•1551,1553-1559,1562-1567,1573-1578
§ Condor D.C. Power Supplies, Inc., 201 Flynn Rd., Camarillo, CA 93010, 805-484-2851;800-235-5929 .... D•1587,1597-1598
§ Converter Concepts, Inc., Industrial Pkwy., Pardeeville, WI 53954, 608-429-2144 .... D•1600-1602
Cord Electronics, Inc., 177 Cantiague Rock Rd., Westbury, NY 11590, 516-935-3640 .... D•1605
† Del Elctrns. Corp., 250 E. Sandford Blvd., Mt. Vernon, NY 10550, 914-699-2000 .... D•1615
Delta Electronic Ind. USA, Delta Elctrn. Ind. Co. Ltd., 3401 Investment Blvd., Ste. 5, Hayward, CA 94545, 415-785-5231;415-785-5235 .... D•1616-1617
Dio-Rey, Div. of Info-Lite, 422 Cliff St., Fairview, NJ 07022, 201-941-4455 .... B•1045
Displex, Inc., Alexander Place, Glen Cove, NY 11542, 516-671-4400 ..... D•1619
DVE/Caltronic Co., Ltd., A Sub. of Dee Van Entrp. Co., Ltd., 407 S. Palm Ave., Alhambra, CA 91803, 818-289-0310 .... D•1613
† EG & G Almond Instruments, 1330 E. Cypress St., Covina, CA 91724, 818-967-9521 .... D•1620-1621
§ Elpac Power Sys., 3131 S. Standard Ave., Santa Ana, CA 92705, 714-979-4440 .... D•1626-1630
EMCO High Voltage Co., 11126 Ridge Road, Sutter Creek, CA 95685, 209-223-3626 .... D•1632
† ERA Transpac Div., Sub. Elctrn. Research Assocs., 50 Graphic Place, Moonachie, NJ 07074, 201-641-3650 .... D•1635-1636
§ Frederick Components Intl., 20806 Plummer St., Chatsworth, CA 91311, 818-882-0868;800-354-0660 .... D•1643
GFC/Hammond Elctrns., Inc., 1690 Walden Ave., Buffalo, NY 14225, 716-835-5742 .... D•1647
Integrated Circuits, Inc., 10301 Willows Road, Redmond, WA 98052, 206-882-3100 .... D•1664-1665
Kaiser Systems, Inc., 126 Sohier Road, Beverly, MA 01915, 617-922-9300 .... D•1680-1683
KEC Elctrns., Inc., 20817 Western Ave., Torrance, CA 90501, 213-320-3902 .... D•1685-1687
Keltec Florida, P.O. Box 2917, Ft. Walton Bch., FL 32549, 904-651-9749 ...... D•1688
§ Kepco, Inc., 131-38 Sanford Ave., Flushing, NY 11352, 718-461-7000 .... D•1689-1701
LaserSonics Power Supply Operation, 177 N. Wolfe Rd., Sunnyvale, CA 94086, 408-732-9880 .... D•1719
Marway Prods. Inc., 311 N. Clara St., Santa Ana, CA 92703, 714-973-1800 .... D•1944
Microcomputer Power, 15875 Concord Circle, Morgan Hill, CA 95037, 408-779-5700 .... D•1721-1723
Modular Devices, 50 Orville Dr., Bohemia, NY 11716, 516-567-9620 ..... D•1727
Murata Erie North America, Inc., 1148 Franklin Rd., S.E., Marietta, GA 30067, 404-952-9777 .... A•2205
National Power Technlg., 2111 Howell Ave., Anaheim, CA 92806, 714-937-1301 .... D•1730-1732
NJE Corporation, 329 Culver Rd, P.O. Box 669, Dayton, NJ 08810-0669, 201-329-4611 .... D•1733
Opamp Labs, Inc., 1033 N. Sycamore Ave., Los Angeles, CA 90038, 213-934-3566 .... D•1014
† OPT Inds. Inc., 300 Red School La., Phillipsburg, NJ 08865, 201-454-2600 .... D•1736,1738
Pan-Magnetics Intl., Inc., 455-A Carson Plaza Dr., Carson, CA 90746, 213-532-1790 .... D•1742-1743
Pioneer Magnetics, 1745 Berkeley St., Santa Monica, CA 90404, 213-829-6751 .... D•1752-1753
Power General, Unitrode, 152 Will Dr., Canton, MA 02021, 617-828-6216 .... D•1760-1763,1766
Power-One, Inc., Power-One Linear Products, 740 Calle Plano, Camarillo, CA 93010, 805-987-8741 .... D•1771-1773
§ Power Pac, 32 Meadow St., S. Norwalk, CT 06856, 203-866-4484 .... D•1774
§ Power Products Div., Computer Products, Inc., 2981 Gateway Drive, Pompano Beach, FL 33069, 305-974-2442 .... D•1553,1559,1562-1567

† Powertec, Inc., 20550 Nordhoff St., Chatsworth, CA 91311, 818-882-0004 .... D∘1782-1786,1793-1799
Prime Power, Inc., Prime Technology Co., Twin Lakes Rd., P.O. Box 185, N. Branford, CT 06471, 203-481-5721 .... D∘1801
Qualidyne Sys., Unitech Ltd., 3055 Del Sol Blvd., San Diego, CA 92154, 619-429-7440;619-575-4400 .... D∘1803-1809
RIFA, Inc., Greenwich Off. Pk. 3, P.O. Box 3110, Greenwich, CT 06836-3110, 203-625-7300 .... D∘1810-1811
† RO Assocs., 246 Caspian Dr., Box 61419, Sunnyvale, CA 94088, 408-744-1450 .... D∘1812-1814
§† RTE, Power/Mate Co., 514 S. River St., Hackensack, NJ 07601, 201-440-3100 .... D∘1816-1821
§ Secoinsa/Digi Power, 686 E. Gish Rd., San Jose, CA 95112, 408-288-5600 .... D∘1831-1832
§ Sierracin/Power Systems, 20500 Plummer St., Chatsworth, CA 91311, 818-998-9873 .... D∘1834
Sola, A Unit of General Sign., 1717 Busse Rd., Elk Grove Village, IL 60007, 312-439-2800 .... D∘1838-1839
Standard Energy, Div. WBH Scientific, Inc., Rte. 32, Greenville, NY 12083, 518-966-4197 .... D∘1844
Stevens-Arnold Div., Computer Prods., Inc., 7 Elkins St., So. Boston, MA 02127, 617-268-1170 .... D∘1553,1573-1578
Summit Elctrns., 750 S. Sherman, Richardson, TX 75081, 214-231-1456 .... D∘1846-1847
Technipower, A Penril Co., P.O. Box 222, Commerce Pk., Danbury, CT 06810, 203-748-7001 .... D∘1850
† Technology Dynamics, 91 E. Carver Ave., Westwood, NJ 07675, 201-664-7636 .... D∘1851
TII Electronics, Inc., Div. TII Industries, 226 Terminal Rd., E. Setauket, NY 11733, 516-789-5004 .... D∘1852-1853
Todd Prods. Corp., 50 Emjay Blvd., Brentwood, NY 11717, 516-231-3366 .... D∘1854-1855
Toko America, Inc., 1250 Feehanville Dr., Mt. Prospect,, IL 60056, 312-297-0070 .... D∘1856
Transformation Elctrns. Corp., 170 Wilbur Pl., Bohemia, NY 11716, 516-563-1117 .... D∘1857
Ulveco, Inc., 323 Vintage Park Drive, Foster City, CA 94404, 415-574-1100 .... A∘2339
Varian Canada, Inc., Microwave Div., 45 River Drive, Georgetown, ON, CANADA L7G2J4, 416-877-0161 .... D∘1860,1862
Voltex, 3460 Great Neck Rd., Amityville, NY 11701, 516-842-2772 .... D∘1865
Wilmore Elctrns. Co., Box 1329, Hillsborough, NC 27278, 919-732-9351 .... D∘1869
Xentek, Inc., 279 S. Pacific St., San Marcos, CA 92069, 619-744-3346 .... D∘1870-1871
Xylog Corp., 150 Tillman St., Westwood, NJ 07675, 201-664-7997 .... D∘1875
§ Able Power and Engineering Inc., 335 S. New Ave., # H, Monterey Park, CA 91754 714-891-3568
§ ACDC Electronics, 401 Jones Rd., Oceanside, CA 92054 619-757-1880
Astrosystems, 6 Nevada Dr., Lake Success, NY 11042 516-328-1600
AT&T, 1 Oak Way, Berkeley Heights, NJ 07922 1-800-372-2447
† ATC Power Systems, Inc., 472 Amherst Street, Nashua, NH 03063 603-882-1366
Automatic Switch Co., 50-60 Hanover Road, Florham Park, NJ 07932 1-201-966-2000
† Autronics, 314 E. Live Oak, Ste. A, Arcadia, CA 91006 818-445-5470
† Babcock, Inc., 1717 West Collins Ave., Orange, CA 92667 714-633-3700
Bay Components, Inc., 1806 Dreams Landing Way, Annapolis, MD 21401 301-266-6767
Behlman Engineering, 1142 Mark Ave., Carpinteria, CA 93013 805-684-8311
BICC-Vero Elctrns., Inc., 40 Lindeman Drive, Trumbull, CT 06611 203-372-0038
Brandt Elctrns., Inc., 1220 Alderwood Ave., Sunnyvale, CA 94086 408-734-8310
§ Calex Mfg. Co., Inc., 3355 Vincent Rd., Pleasant Hill, CA 94523 415-932-3911
† Cal-Power Corp., 140 Kansas St., El Segundo, CA 90245 213-772-2171
† CEA Division of Berkleonics, Inc., A Subsidiary of EG & G, 1 Aerovista Pk., San Luis Obispo, CA 93401 805-544-5454
† CEAG Elec. Corp., Power Supp. Div., 1324 Motor Pkwy., Hauppauge, NY 11788 516-582-4422
CEC, 330 W. Taft Ave., Orange, CA 92665 714-637-2970
Chloride Power Electronics, 10931 Pellicano Drive, El Paso, TX 79935 915-592-9985
CML MACARR Div., Marine Electric RPD, Inc., 666 Pacific St., Brooklyn, NY 11217 718-857-2400
§ Conver Corp., 10629 Bandley Dr., Cupertino, CA 95014 408-255-0151
Conversion Equip. Corp., 330 W. Taft Avenue, Orange, CA 92665 714-637-2970
Cost Effective Systems, Inc., Two LeMans Pl., Pine Brook, NJ 07058 201-575-5514
Crestronics Div., Applied Electro Technlg., Int., 2220 S. Anne St., Santa Ana, CA 92704 714-556-6570
§ CurrenTechnology Corp., 135 Prestige Pk. Circle, E. Hartford, CT 06108 203-289-6831
† Datametrics Corp., Defense Products Div., 7630 Gloria Ave., Van Nuys, CA 91406 818-989-3840
Datapower, Inc., 3328 West First St., Santa Ana, CA 92703 714-775-2000
Data Ray Corp., 452 Burbank Street, Broomfield, CO 80020 303-469-5173
Datel, General Electric Co., 11 Cabot Blvd., Mansfield, MA 02048 617-339-9341
§ Deltron, Inc., P.O. Box 1369, Wissahickon Ave., N. Wales, PA 19454-9990 215-699-9261
Digital Power Corp., 686 East Gish Rd., San Jose, CA 95112 408-288-5600
Dotronix, 160 First St. SE, New Brighton, MN 55112 612-633-1742
Dynage/Power & Magnetics, Division Of Oakleaf, Inc., 2 Willowbrook Road, Cromwell, CT 06416 203-635-3510
§ Dynatronix, Inc., 105 Power St., Amery, WI 54001 .... 715-268-8118;800-826-7172
Electronic Measurements, 405 Essex Rd., Neptune, NJ 07753 201-922-9300
Electro Physics, 1910 West Birchwood Ave., Chicago, IL 60626 312-274-9669
Electro Vector, Inc., 6555 Covey Rd., Forestville, CA 95436 707-887-2292
Elgin Electronics, Combustion Engineering, 5533 New Perry Hwy., Erie, PA 16509-3570 814-864-4921
Energetec Systems, Inc., 130 E. St. Charles Rd., Carol Stream, IL 60188 312-653-1920
Engd. Prod., Div. of Acme Elec. Corp., 40 Water St., Cuba, NY 14727 716-968-2400
§† Franek, John, Co., Inc., P.O. Box 11752, Santa Ana, CA 92711-1752 .... 714-832-0290; 800-854-9420
Glassman High Voltage Inc., P.O. Box 551, Salem Indl. Pk., Whitehouse Sta., NJ 08889 201-534-9007
GMR Co., 8801 Sepulveda Blvd., Los Angeles, CA 90045 213-216-9516
§ Gra-Mar Inc., 3165 McCrory Pl., Ste. 265, Orlando, FL 32803 305-894-3351
† Gulton Industries, Inc., Engineered Magnetics Division, 13041 Cerise Ave., Hawthorne, CA 90250 213-679-0111
International Instrumentation, 31131-602 Via Colinas, Westlake Vlg., CA 91362 213-991-9614
ITT Power Systems Corp., Box 688, Galion, OH 44833-0688 419-468-8100
James Electronics, 4050 N. Rockwell, Chicago, IL 60618 312-463-6500
Jerome Industries Corp., B 730 Division St., Elizabeth, NJ 07201 201-353-5700
† K & M Elctrns., 123 Interstate Dr., W. Springfield, MA 01089 413-781-1350
Keltlon Corp., Viking Modules Div., 225 Crescent St., Waltham, MA 02154 617-894-8700
Lambda Electronics, Veeco Instr., Inc., 515 Broad Hollow Rd., Melville, NY 11747 516-694-4200
L-Com Inc., 1755 Osgood St., Unit 11EM, N. Andover, MA 01845 617-682-6936
Lestronics, Inc., 1840 Industrial Circle, Longmont, CO 80501 .... 303-443-6250; 800-525-6478
LH Research, Inc., 14402 Franklin Ave., Tustin, CA 92680 714-730-0162
Lorain Prods., 1122 F St., Lorain, OH 44052 216-288-1122
MacPower, 9115 26th Ave., Kenosha, WI 53140 414-694-8866
† Magnetico Inc., 182 Morris Ave., Holtsville, NY 11742 516-654-1166
† MCL, Inc., 10 North Beach Ave., La Grange, IL 60525-2092 312-354-4350
† Megatran Electronic Power, Rising Sun Rd., Bordentown, NJ 08505 609-298-7300
Melcher, Inc., 6290 Sunset Blvd., # 1126, Los Angeles, CA 90028 213-463-5617
Mid-Eastern Industries, 100 Campus Dr., RD 1, Mt. Holly, NJ 08060 609-267-3811
MIL Electronics, Inc., 1 Mill st., Dracut, MA 01826 617-453-8000
† Modular Power Sys. Inc., P.O. Box 180579, Austin, TX 78718-0579 512-834-9262
MPC Sys., Div. of Consulting Systems, RFD Box 441, Fremont, NH 03044 603-642-5913
NCR Power Systems, 584 S. Lake Emma Rd., Lake Mary, FL 32746 .... 305-323-9250; 800-327-7612
† Novatronics, Box 878, Pompano Beach, FL 33061 305-942-5200
† NWL Transformers, Rising Sun Rd., P.O. Box 358, Bordentown, NJ 08505 609-298-7300
† Optima Enclosures, 2166 Mountain Indl. Blvd., Tucker, GA 30084 404-939-6340
Oram Elctrns., Rte. 22, Putnam Business Park, Brewster, NY 10509-9587 914-279-2966
† Pacific Electro Dynamics, Inc., 11465 Willows Rd. N.E., Redmond, WA 98052 206-881-1700
§ Potter & Brumfield, AMF Incorporated, 200 S. Richland Creek Dr., Princeton, IN 47671-0001 812-386-1000
Power Comps. Co., Vanguard Elctrns. Co., 1480 W. 178th St., Gardena, CA 90248 213-323-8120
† Powercube Corp., Sub. Unitrode Corp., 8 Suburban Pk. Dr., Billerica, MA 01821 617-667-9500
Power Elctrns., 96 Milton Rd., Rochester, NH 03867 603-332-3334
§ Power-One, Inc., Power-One Switching Products, 833 Flynn Rd., Camarillo, CA 93010 805-482-0757
Power Systems, 12 Tobey Rd., Bloomfield, CT 06002 203-243-0357
† Power Sys. Grp., Rantec Div., Emerson Elec., 9401 Oso Ave., Chatsworth, CA 91311 818-885-8223
Power Ten, Inc., 486 Mercury Dr., Sunnyvale, CA 94086 408-738-5959
Precision Components, Inc., 1110 W. National Ave., Addison, IL 60101 312-543-6400
Preferred Elctrns., Inc., Main Line Dr, P.O. Box 954, Westfield, MA 01086 413-568-2301
† Reich Assocs., Rt. 4, Box 4620, Lakehills, TX 78063 512-751-3220
§ Reliability, Inc., 16400 Park Row, P.O. Box 218370, Houston, TX 77218 713-492-0550
† Rodale Elctrns. Corp., 603 Chestnut St., Garden City, NY 11530 516-222-0050
Sanken Elec. Co., 1-22-8 Nishi-Ikebukuro, Toshima-Ku, Tokyo, JAPAN 03-986-6151
§ Sanyo Semiconductor Corp., 7 Pearl Ct., Allendale, NJ 07401 201-825-8080
§ Semiconductor Circuits, 49 Range Rd., Windham, NH 03087 603-893-2330
SGS Semiconductor Corporation, 1000 E. Bell Road, Phoenix, AZ 85022 602-867-6100
† Sigmapower, Inc., 20790 Leapwood Ave., Carson, CA 90746 .... 213-32-Sigma
§† Solarex Corp., 1335 Piccard Dr., Rockville, MD 20850 301-948-0202
Sorensen Co., 676 E. Island Pond Rd., Manchester, NH 03103 603-668-4500
§ Standard Power, Inc., 1400 S. Village Way, Santa Ana, CA 92705 714-558-8512
§ Stanford Applied Engrg. Inc., 3520 De La Cruz Blvd., Santa Clara, CA 95050 400-988-0700
§ Sumitronics, Inc,, Sumitomo Corporation, 1270 Oakmead Pkwy. Ste. 201, Sunnyvale, CA 94086 408-737-7683
† Superior Mfg. & Instr., 19-36 38th St., Long Island City, NY 11105 212-932-1800
Switching Systems Intl., 1827 No. Case St., Orange, CA 92665 714-921-1153
§ Tauber Elctrns. Inc., 4901 Morena Blvd., Bldg. 314, San Diego, CA 92117 619-274-7242
Taylor Electronics, Inc., 401 West Orion, Tempe, AZ 85283 602-838-4523
§ TDK Corporation of America, 4711 Golf Rd., Skokie, IL 60076 312-679-8200
Texmate, Inc., 348 S. Cedros Ave., P.O. Box 2000, Solana Beach, CA 92075 619-481-7177
§ Tohoku Metal Inds., 5-8, 2-Chome, Kitaaoyama Minato-Ku, Tokyo, JAPAN .... Tokyo 03-402-6161
† Trio Labs., 80 Dupont St., Plainview, NY 11803 516-349-0400
Universal Electronics Inc., 3475 A. Victor St., Santa Clara, CA 95050 408-970-0455
Urban Elctrns., P. O. Box 456, Dover, MA 02030 617-329-4068
Varian Associates, Inc., Microwave Tube Div., 611 Hansen Way, Palo Alto, CA 94303 415-493-4000
Wall Inds., 2 Franklin, Lawrence, MA 01840 617-688-1287
§ Zambre Co., Inc., 2134 Old Middlefield Way, Mountain View, CA 94043 415-968-9176

Power Supplies, Switching-4000 (Cont'd)

† Zenith CRT & Components Operations, 1000 Milwaukee Ave., Glenview, IL 60025 312-391-7733
Zenith Systems & Components Group, Zenith Electronics Corp., 1000 Milwaukee Ave., Glenview, IL 60025 312-391-7733

Power Supplies, Switching, Battery Backup-4000

Applied Power Conversion, Technology Dynamics, Inc., 100 School St., Bergenfield, NJ 07621, 201-664-7636 .... D•1500,1504
ATR Elctrns., Inc., P.O. BOX 7008, St. Paul, MN 55107, 612-738-6520;414-297-7374 .... D•1889
Compower Div., Computer Prods., Inc., 2220 Lundy Ave., San Jose, CA 95131, 408-942-1600 .... D•1554
§ **Computer Prods. Inc., Power Conversion Grp., 2981 Gateway Dr., Pompano Bch., FL 33069-4803, 305-974-5500 .... D•1551,1554**
Converter Concepts, Inc., Industrial Pkwy., Pardeeville, WI 53954, 608-429-2144 .... D•1600,1603
Displex, Inc., Alexander Place, Glen Cove, NY 11542, 516-671-4400 .... D•1619,1917
OPT Inds. Inc., 300 Red School La., Phillipsburg, NJ 08865, 201-454-2600 .... D•1736,1738
Pan-Magnetics Intl., Inc., 455-A Carson Plaza Dr., Carson, CA 90746, 213-532-1790 .... D•1742-1743
§ **Power Pac, 32 Meadow St., S. Norwalk, CT 06856, 203-866-4484 .... D•1778**
§ **Secoinsa/Digi Power, 686 E. Gish Rd., San Jose, CA 95112, 408-288-5600 .... D•1831-1832**
Technology Dynamics, 91 E. Carver Ave., Westwood, NJ 07675, 201-664-7636 .... D•1851
TII Electronics, Inc., Div. TII Industries, 226 Terminal Rd., E. Setauket, NY 11733, 516-789-5004 .... D•1852-1853
§ Able Power and Engineering Inc., 335 S. New Ave., #H, Monterey Park, CA 91754 714-891-3568
† Adtech Power Inc., 1620 S. Sunkist St., Anaheim, CA 92806 714-634-9211
Astrosystems, 6 Nevada Dr., Lake Success, NY 11042 516-328-1600
AT&T, 1 Oak Way, Berkeley Heights, NJ 07922 1-800-372-2447
† ATC Power Systems, Inc., 472 Amherst Street, Nashua, NH 03063 603-882-1366
Automatic Switch Co., 50-60 Hanover Road, Florham Park, NJ 07932 1-201-966-2000
Chloride Power Electronics, 10931 Pellicano Drive, El Paso, TX 79935 915-592-9985
§ CurrenTechnology Corp., 135 Prestige Pk. Circle, E. Hartford, CT 06108 203-289-6831
Datapower, Inc., 3328 West First St., Santa Ana, CA 92703 714-775-2000
Electro Vector, Inc., 6555 Covey Rd., Forestville, CA 95436 707-887-2292
Energy, Ltd., 4714 Upshur Street, Bladensburg, MD 20710 301-699-1144
Golden Pacific Elctrns., Inc., 1020 N. Batavia St., Ste. Q, Orange, CA 92667 .... 714-538-9752/9753
† Gulton Industries, Inc., Engineered Magnetics Division, 13041 Cerise Ave., Hawthorne, CA 90250 213-679-0111
Jerome Industries Corp., B 730 Division St., Elizabeth, NJ 07201 201-353-5700
Lorain Prods., 1122 F St., Lorain, OH 44052 216-288-1122
Melcher, Inc., 6290 Sunset Blvd., #1126, Los Angeles, CA 90028 213-463-5617
Modular Devices, 50 Orville Dr., Bohemia, NY 11716 516-567-9620
Power Comps. Co., Vanguard Elctrns. Co., 1480 W. 178th St., Gardena, CA 90248 213-323-8120
Prime Power, Inc., Prime Technology Co., Twin Lakes Rd., P.O. Box 185, N. Branford, CT 06471 203-481-5721
Qualidyne Sys., Unitech Ltd., 3055 Del Sol Blvd., San Diego, CA 92154 .... 619-429-7440;619-575-4400
§† Solarex Corp., 1335 Piccard Dr., Rockville, MD 20850 301-948-0202
§ Sun Research, Inc.,, Box 210, Old Bay Rd., New Durham, NH 03855 603-859-7110
Todd Prods. Corp., 50 Emjay Blvd., Brentwood, NY 11717 516-231-3366
† Trio Labs., 80 Dupont St., Plainview, NY 11803 516-349-0400
Ulveco, Inc., 323 Vintage Park Drive, Foster City, CA 94404 415-574-1100
Universal Electronics Inc., 3475 A. Victor St., Santa Clara, CA 95050 408-970-0455

Power Supplies, Uninterruptable (UPS)-4050

Abacus Controls Inc., 89 Readington Rd., Somerville, NJ 08876, 201-526-6010 .... D•1880,1882
† **Advance Conversion Devices Co., 274 S. Salem St., Randolph, NJ 07869, 201-989-0095 .... D•1886-1887**
Applied Power Conversion, Technology Dynamics, Inc., 100 School St., Bergenfield, NJ 07621, 201-664-7636 .... D•1500-1504,1507
§ **ATR Elctrns., Inc., P.O. BOX 7008, St. Paul, MN 55107, 612-738-6520;414-297-7374 .... D•1889**
Avionic Instrs., 943 E. Hazelwood Ave., Rahway, NJ 07065, 201-388-3500 .... D•1890
Behlman Engineering, 1142 Mark Ave., Carpinteria, CA 93013, 805-684-8311 .... D•1898-1905
Bikor, 1504 W. 228th St., Torrance, CA 92718, 213-539-6320 .... D•1536
§ **Computer Prods. Inc., Power Conversion Grp., 2981 Gateway Dr., Pompano Bch., FL 33069-4803, 305-974-5500 .... D•1551,1559,1573**
§ **Converter Concepts, Inc., Industrial Pkwy., Pardeeville, WI 53954, 608-429-2144 .... D•1600,1603**
§ **Displex, Inc., Alexander Place, Glen Cove, NY 11542, 516-671-4400 .... D•1619,1917**
Elgar Corp, An Onan McGraw Edison Co., 9250 Brown Deer Rd., San Diego, CA 92121, 619-450-0085 .... D•1918-1919
Energy, Ltd., 4714 Upshur Street, Bladensburg, MD 20710, 301-699-1144 .... D•1923
§† **General Power Sys., 1400 N. Baxter St., Anaheim, CA 92806-1201, 714-956-9321 .... D•1929**
§ **Hitran Corp., Agex, Rte. 31, RD 5-65, Flemington, NJ 08822, 201-782-5525 .... D•1936**
§ **Instrumentation & Control Sys., 520 Interstate Rd, Addison, IL 60101, 312-543-6200 .... D•1933**
Mid-Eastern Industries, 100 Campus Dr., RD 1, Mt. Holly, NJ 08060, 609-267-3811 .... D•1725-1726
Nova Elec., Hobart Bros. Co., 263 Hillside Ave., Nutley, NJ 07110, 201-661-3434 .... D•1946
Ocean Marine Instrument, 629 Terminal Way #15, Costa Mesa, CA 92627, 714-548-9569 .... D•1947
Pacific Power Source Corp., 15122 Bolsa Chica St., Huntington Bch., CA 92649, 714-898-2691;800-854-2433 .... D•1949-1951
Power General, Unitrode, 152 Will Dr., Canton, MA 02021, 617-828-6216 .... D•1767
Power Pac, 32 Meadow St., S. Norwalk, CT 06856, 203-866-4484 .... D•1778
§ **Power Products Div., Computer Products, Inc., 2981 Gateway Drive, Pompano Beach, FL 33069, 305-974-2442 .... D•1559**
† **RTE Deltec Corp., 2727 Kurtz St., San Diego, CA 92110, 619-291-4211;800-854-2658 .... D•1959**
Shape Magnetronics, Inc., 901 DuPage Ave., Lombard, IL 60148, 312-620-8394 .... D•1960-1961
§ **Sola, A Unit of General Sign., 1717 Busse Rd., Elk Grove Village, IL 60007, 312-439-2800 .... D•1964-1965**
Stevens-Arnold Div., Computer Prods., Inc., 7 Elkins St., So. Boston, MA 02127, 617-268-1170 .... D•1573
Technipower, A Penril Co., P.O. Box 222, Commerce Pk., Danbury, CT 06810, 203-748-7001 .... D•1850
† **Technology Dynamics, 91 E. Carver Ave., Westwood, NJ 07675, 201-664-7636 .... D•1851**
TII Electronics, Inc., Div. TII Industries, 226 Terminal Rd., E. Setauket, NY 11733, 516-789-5004 .... D•1852-1853
TRAK Systems, Div. TRAK Microwave Corp., 4722 Eisenhower Blvd., Dept. E-5, Tampa, FL 33614, 813-884-1411 .... D•1081
§ **Triad-Utrad, 1124 E. Franklin St., Huntington, IN 46750, 219-356-6500 .... D•1971**
UPSystems, Inc., 7801 E. Compton Blvd., Paramount, CA 90723, 213-634-0621 .... D•1973
Wilmore Elctrns. Co., Box 1329, Hillsborough, NC 27278, 919-732-9351 .... D•1975
Xylog Corp., 150 Tillman St., Westwood, NJ 07675, 201-664-7997 .... D•1976
Abbott Transistor Labs., Industrial Products Div., 8203 Vineland Ave., Sun Valley, CA 91352 818-504-0644
§ Able Power and Engineering Inc., 335 S. New Ave., #H, Monterey Park, CA 91754 714-891-3568
Albar, Inc., 19013 36th Ave. W., Lynnwood, WA 98036 206-771-4006
American Monarch, 2801-37th Ave., N.E., Minneapolis, MN 55421 612-788-9161
† Arnold Magnetics, 11520 W. Jefferson Blvd., Culver City, CA 90230 .... 213-390-3537/8837
Astro-Geo-Marine, Inc., 202 E. Cota St., Santa Barbara, CA 93101 805-965-7005
Atlas Energy Sys., 9457 Rush St., S. El Monte, CA 91733 213-575-0755
Automatic Switch Co., 50-60 Hanover Road, Florham Park, NJ 07932 1-201-966-2000
Beaver Labs, P. O. Box 202, Kingston, MA 02364 617-585-5666
Best Power Technology, P.O. Box 280, Necedah, WI 54646 .... 608-565-7200; 800-356-5794
§ Brooks Mfg. Co., 2016/24 Amber St., Philadelphia, PA 19125 .... 215-425-3395; 800-523-0130
Brooks Mktg. Corp., 3569 Bristol Pike Bldg. 2 Ste 102, Bensalem, PA 19020 .... 215-244-0264;1-800-523-1551
§ C-COR Elctrns., 60 Decibel Rd., State College, PA 16801 814-238-2461
CEAG Elec. Corp., Power Supp. Div., 1324 Motor Pkwy., Hauppauge, NY 11788 516-582-4422
§† Clary Corp., Precision Instrs. Div., 320 W. Clary Ave., San Gabriel, CA 91776 818-287-6111
CML MACARR Div., Marine Electric RPD, Inc., 666 Pacific St., Brooklyn, NY 11217 718-857-2400
§ Computer Power, 124E W. Main St., High Bridge, NJ 08829 201-735-8000
§ Control Technology, Inc., 8200 N. Classen Blvd., Ste. 101, Oklahoma City, OK 73114 405-840-3163
Cuesta Systems, Inc., 3440 Roberto Ct., San Luis Obispo, CA 93401 805-541-4160
§ Data-Design Labs., P.O. Box 711, 7925 Center Ave., Cucamonga, CA 91730 714-987-2511
Digital Pathways, Inc., 1060 E. Meadow Cir., Palo Alto, CA 94303 415-493-5544
Dynage/Power & Magnetics, Division Of Oakleaf, Inc., 2 Willowbrook Road, Cromwell, CT 06416 203-635-3510
EG & G Almond Instruments, 1330 E. Cypress St., Covina, CA 91724 818-967-9521
† Eldec Corp., Power Conversion Div., 16700 13th Ave. W., P.O. Box 100, Lynnwood, WA 98036 206-743-1313
Electro Vector, Inc., 6555 Covey Rd., Forestville, CA 95436 707-887-2292
Emergency Power Engineering Inc., 3580 Cadillac Ave., Costa Mesa, CA 92606 714-557-1636
§ Emerson, Indl. Controls Div., 3300 Standard St., Santa Ana, CA 92702 714-545-5581
ERA Transpac Div., Sub. Elctrn. Research Assocs., 50 Graphic Place, Moonachie, NJ 07074 201-641-3650
† Exide Elctrns., P.O. Box 58189, Raleigh, NC 27658 919-872-3020
§† Franek, John, Co., Inc., P.O. Box 11752, Santa Ana, CA 92711-1752 .... 714-832-0290; 800-854-9420
§ GNB Batteries Inc., Ind'l. Battery Div., 2010 Cabot Blvd. W., Langhorne, PA 19047 215-752-0555
† Gulton Industries, Inc., Engineered Magnetics Division, 13041 Cerise Ave., Hawthorne, CA 90250 213-679-0111
§ HDR Power Sys., Inc., 600 Oakland Park Ave., Columbus, OH 43214 614-262-6832
† Helionetics, Inc., DECC Div., 17312 Eastman St., Irvine, CA 92714 .... 714-546-4731; 800-421-7915
Industrial Test Equip., 21 Yennicock Ave., Port Washington, NY 11050 516-883-1700
International Power Machines, 11534 Pagemill Rd., Dallas, TX 75243 214-343-6076
§ ISOREG Corp., 410 Great Rd., P.O. Box 486, Littleton, MA 01460 617-486-9483
ITT Power Systems Corp., Box 688, Galion, OH 44833-0688 419-468-8100
Jefferson Elec., MagneTek, Inc., 1400 Center Circle Drive, Downers Grove, IL 60515-1021 312-691-2400
Kalglo Elctrns. Co., Inc., 6584 Ruch Rd., E. Allen Twp., Bethlehem, PA 18017 215-837-0700
† Keltec Florida, P.O. Box 2917, Ft. Walton Bch., FL 32549 904-651-9749

KGS Electronics, Inc., GAR Entprs., 2029 N. Lincoln Ave., Pasadena, CA 91103 ... 818-798-0786
§ La Marche Mfg., 106 Bradrock Dr., Des Plaines, IL 60018 ... 312-299-1188
Lambda Electronics, Veeco Instr., Inc., 515 Broad Hollow Rd., Melville, NY 11747 ... 516-694-4200
§ Lea Dynatech, Inc., 12516 Lakeland Rd., Santa Fe Springs, CA 90670-9990 ... 213-944-0916
§ Liebert Corp., Programmed Power Div., 995 Benicia Ave., Sunnyvale, CA 94086 ... 408-245-8900
Lorain Prods., 1122 F St., Lorain, OH 44052 ... 216-288-1122
† Lortec Power Sys., Inc., 145 Keep Court, Elyria, OH 44035-2214 ... 216-327-5050
§ Marathon Flite-Tronics Company, A Marathon Power Technologies Co., 2525 N. Naomi St., Burbank, CA 91504 ... 818-841-3210
McGuirk Electronics Co. Inc., 212 So. Main St, P. O. Box 853, Middleton, MA 01949 ... 617-933-3500
† Megatran Electronic Power, Rising Sun Rd., Bordentown, NJ 08505 ... 609-298-7300
† NWL Transformers, Rising Sun Rd., P.O. Box 358, Bordentown, NJ 08505 ... 609-298-7300
Pioneer Magnetics, 1745 Berkeley St., Santa Monica, CA 90404 ... 213-829-6751
Power Elctrns., 96 Milton Rd., Rochester, NH 03867 ... 603-332-3334
Power Systems & Controls, Inc., 3206 Lanvale Ave., Richmond, VA 23230 ... 804-355-2803
Preferred Elctrns., Inc., Main Line Dr, P.O. Box 954, Westfield, MA 01086 ... 413-568-2301
Prime Power, Inc., Prime Technology Co., Twin Lakes Rd., P.O. Box 185, N. Branford, CT 06471 ... 203-481-5721
§ Pylon Elex Development Co. Ltd., 2300 Victoria, Lachine, PQ, CANADA H8S 1Z3 ... 514-637-1186
§ Ratelco, 1260 Mercer, Dept. EEM, Seattle, WA 98109 ... 206-624-7770
Reliance Comm/Tec, Reliance Electric, P. O. Box 99502, Cleveland, OH 44199 ... 800-245-4501;in OH 800-245-4497
Reliance Electric Co., Marketing Info Center, P.O. Box 99502, Cleveland, OH 44199 ... 800-245-4501;800-245-4497 In Ohio
§ Semiconductor Circuits, 49 Range Rd., Windham, NH 03087 ... 603-893-2330
§ SL Waber, 300 Harvard Ave., Westville, NJ 08093 ... 609-456-5400;800-257-8384
§† Solarex Corp., 1335 Piccard Dr., Rockville, MD 20850 ... 301-948-0202
§ Sumitronics, Inc., Sumitomo Corporation, 1270 Oakmead Pkwy. Ste. 201, Sunnyvale, CA 94086 ... 408-737-7683
Summit Elctrns., 750 S. Sherman, Richardson, TX 75081 ... 214-231-1456
§ Sun Research, Inc., Box 210, Old Bay Rd., New Durham, NH 03855 ... 603-859-7110
§ Superior Elec. Co., 383 Middle St., Bristol, CT 06010 ... 203-582-9561
† Superior Mfg. & Instr., 19-36 38th St., Long Island City, NY 11105 ... 212-932-1800
§† Surgeonics Ltd., 344 Main St., Mt. Kisco, NY 10549 ... 914-241-3203
§† Tauber Elctrns. Inc., 4901 Morena Blvd., Bldg. 314, San Diego, CA 92117 ... 619-274-7242
Tech Labs., Inc., Bergen & Edsall Blvds., Palisades Pk., NJ 07650 ... 201-944-2221
Teledyne Inet, 2750 W. Lomita Blvd., Torrance, CA 90509 ... 213-325-5040
§† Terado, 1068 Raymond Ave., St. Paul, MN 55108 ... 612-646-2868
§† Topaz Electronics, 9192 Topaz Way, San Diego, CA 92123-1164 ... 619-279-0831
† Transistor Devices, 274 S. Salem St., Randolph, NJ 07869 ... 201-361-6622
Triad Power Systems, 10362 Miller Road, Dallas, TX 75238 ... 214-341-8700
Trio Labs., 80 Dupont St., Plainview, NY 11803 ... 516-349-0400
§ Tripp-Lite, 500 No. Orleans, Chicago, IL 60610 ... 312-329-1777
† Tungstone Batteries, Inc., 18 Billings St., Sharon, MA 02067 ... 617-784-2000
Ulveco, Inc., 323 Vintage Park Drive, Foster City, CA 94404 ... 415-574-1100
Urban Elctrns., P. O. Box 456, Dover, MA 02030 ... 617-329-4068
Voltampere Corp., 146 Horton Ave., Lynbrook, NY 11563 ... 516-887-9443
Warren Comms., 101 Okner Pkwy., Livingston, NJ 07039 ... 201-992-6200

Power Supplies, Wall Plug-in – See Power Supplies, Plug-in (Vol. D)

Power Supplies, Welding, Electroplating – See Power Supplies, AC Input, Greater than 1,000 VDC Output (Vol. D)

Power Supplies (MIL), DC-3475

Abbott Transistor Labs., Industrial Products Div., 8203 Vineland Ave., Sun Valley, CA 91352, 818-504-0644 ... D•1449
† **Abbott Transistor Labs., Power Supply Div., 5200 W. Jefferson Blvd., Los Angeles, CA 90016, 213-936-8185 ... D•1449,1451-1453,1455-1458**
Applied Power Conversion, Technology Dynamics, Inc., 100 School St., Bergenfield, NJ 07621, 201-664-7636 ... D•1500-1504,1507
† **Arnold Magnetics, 11520 W. Jefferson Blvd., Culver City, CA 90230, 213-390-3537/0837 ... D•1508-1511**
Astrosystems, 6 Nevada Dr., Lake Success, NY 11042, 516-328-1600 ... D•1517
Bertan Assocs., 121 New South Rd., Hicksville, NY 11801, 516-433-3110 ... D•1524-1525
Condor D.C. Power Supplies, Inc., 201 Flynn Rd., Camarillo, CA 93010, 805-484-2851;800-235-5929 ... D•1588
CPS Inc., 110 Wolfe Rd., Sunnyvale, CA 94086, 408-738-0530 ... D•1607
D & B Power, Inc., 204 N. Fehr Way, P.O. Box 40M, Bayshore, NY 11706, 516-586-5955 ... D•1611
† **EG & G Almond Instruments, 1330 E. Cypress St., Covina, CA 91724, 818-967-9521 ... D•1620-1621**
† **EMCO High Voltage Co., 11126 Ridge Road, Sutter Creek, CA 95685, 209-223-3626 ... D•1632**
ERA Transpac Div., Sub. Elctrn. Research Assocs., 50 Graphic Place, Moonachie, NJ 07074, 201-641-3650 ... D•1635-1636
Ferrotran Elctrns. Co., Inc., 11 W. 25th St., New York, NY 10010, 212-691-3610 ... D•1640
Interelectronics Corp., Interelectronics Park, 550 U.S. Rte. 303, Congers, NY 10920, 914-EL8-8000 ... D•1667
International Power, 350 N. Lantana, Ste. 710, Camarillo, CA 93010, 805-987-7900 ... D•1670-1675
Mid-Eastern Industries, 100 Campus Dr., RD 1, Mt. Holly, NJ 08060, 609-267-3011 ... D•1726
Modular Devices, 50 Orville Dr., Bohemia, NY 11716, 516-567-9620 ... D•1727
OPT Inds. Inc., 300 Red School La., Phillipsburg, NJ 08865, 201-454-2600 ... D•1739
Power-One, Inc., Power-One Linear Products, 740 Calle Plano, Camarillo, CA 93010, 805-987-8741 ... D•1768-1769
Qualidyne Sys., Unitech Ltd., 3055 Del Sol Blvd., San Diego, CA 92154, 619-429-7440;619-575-4400 ... D•1808
† **RO Assocs., 246 Caspian Dr., Box 61419, Sunnyvale, CA 94088, 408-744-1450 ... D•1812-1814**
Secoinsa/Digi Power, 686 E. Gish Rd., San Jose, CA 95112, 408-288-5600 ... D•1831-1832
Spellman High Voltage Elctrns. Corp., 7 Fairchild Ave., Plainview, NY 11803, 516-349-8686 ... D•1842
Technipower, A Penril Co., P.O. Box 222, Commerce Pk., Danbury, CT 06810, 203-748-7001 ... D•1850
† **Technology Dynamics, 91 E. Carver Ave., Westwood, NJ 07675, 201-664-7636 ... D•1851**
† **Venus Scientific, Inc., 399 Smith St., Farmingdale, NY 11735, 516-293-4100 ... D•1863**
† Acopian, Box 638, Easton, PA 18044 ... 215-258-5441
† Adtech Power Inc., 1620 S. Sunkist St., Anaheim, CA 92806 ... 714-634-9211
† ATC Power Systems, Inc., 472 Amherst Street, Nashua, NH 03063 ... 603-882-1366
Avionic Instrs., 943 E. Hazelwood Ave., Rahway, NJ 07065 ... 201-388-3500
† Cal-Power Corp., 140 Kansas St., El Segundo, CA 90245 ... 213-772-2171
CEA Division of Berkleonics, Inc., A Subsidiary of EG & G, 1 Aerovista Pk., San Luis Obispo, CA 93401 ... 805-544-5454
† CEAG Elec. Corp., Power Supp. Div., 1324 Motor Pkwy., Hauppauge, NY 11788 ... 516-582-4422
Christie Elec. Corp., 20665 Manhattan Pl., Torrance, CA 90501 ... 213-320-0808
CML MACARR Div., Marine Electric RPD, Inc., 666 Pacific St., Brooklyn, NY 11217 ... 718-857-2400
† Del Elctrns. Corp., 250 E. Sandford Blvd., Mt. Vernon, NY 10550 ... 914-699-2000
Digital Power Corp., 686 East Gish Rd., San Jose, CA 95112 ... 408-288-5600
† Electro Vector, Inc., 6555 Covey Rd., Forestville, CA 95436 ... 707-887-2292
† E M S Development Corp., 200 Allen Blvd., Farmingdale, NY 11735 ... 516-694-2886
§ Franek, John, Co., Inc., P.O. Box 11752, Santa Ana, CA 92711-1752 ... 714-832-0290; 800-854-9420
† Good-All Electric, Inc., 3725 Canal Drive, Fort Collins, CO 80524 ... 303-484-3080
† Gulton Industries, Inc., Engineered Magnetics Division, 13041 Cerise Ave., Hawthorne, CA 90250 ... 213-679-0111
† Helionetics, Inc., DECC Div., 17312 Eastman St., Irvine, CA 92714 ... 714-546-4731; 800-421-7915
Keltec Florida, P.O. Box 2917, Ft. Walton Bch., FL 32549 ... 904-651-9749
† Megatran Electronic Power, Rising Sun Rd., Bordentown, NJ 08505 ... 609-298-7300
Melcher, Inc., 6290 Sunset Blvd., # 1126, Los Angeles, CA 90028 ... 213-463-5617
MIL Electronics, Inc., 1 Mill st., Dracut, MA 01826 ... 617-453-8000
† Milpower Source, Inc., 49 Range Rd., Windham, NH 03087 ... 603-893-2834
† Modular Power Sys. Inc., P.O. Box 180579, Austin, TX 78718-0579 ... 512-834-9262
† North Hills Elctrns., 1 Alexander Pl., Glen Cove, NY 11542 ... 516-671-5700
† NWL Transformers, Rising Sun Rd., P.O. Box 358, Bordentown, NJ 08505 ... 609-298-7300
† NWL Transformers, Rising Sun Rd., P.O. Box 358, Bordentown, NJ 08505 ... 609-298-7300
† Pacific Electro Dynamics, Inc., 11465 Willows Rd. N.E., Redmond, WA 98052 ... 206-881-1700
Penn-Tran Corp., Box 1321, Rte. 144N, Wingate, PA 16880 ... 814-355-1521
† Powercube Corp., Sub. Unitrode Corp., 8 Suburban Pk. Dr., Billerica, MA 01821 ... 617-667-9500
† Power Sys. Grp., Rantec Div., Emerson Elec., 9401 Oso Ave., Chatsworth, CA 91311 ... 818-885-8223
Powertec, Inc., 20550 Nordhoff St., Chatsworth, CA 91311 ... 818-882-0004
Power Ten, Inc., 486 Mercury Dr., Sunnyvale, CA 94086 ... 408-738-5959
† PTK Division, Emerson Electric Co., 1173 Los Olivos Ave., Los Osos, CA 93402 ... 805-528-5858
† Raytheon Co., Submarine Signal Div., 1847 W. Main Rd., P.O. Box 360, Portsmouth, RI 02871 ... 401-847-8000
§† Solarex Corp., 1335 Piccard Dr., Rockville, MD 20850 ... 301-948-0202
Summit Elctrns., 750 S. Sherman, Richardson, TX 75081 ... 214-231-1456
† Superior Mfg. & Instr., 19-36 38th St., Long Island City, NY 11105 ... 212-932-1800
Technical Research & Mfg., Inc., R.F.D. # 10, Manchester, NH 03103 ... 603-627-6000
† Trio Labs., 80 Dupont St., Plainview, NY 11803 ... 516-349-0400
Varian Associates, Inc., Microwave Tube Div., 611 Hansen Way, Palo Alto, CA 94303 ... 415-493-4000

Power Supplies for Displays – See Converters, DC to DC (Vol. D), Power Supplies, AC Output (Vol. D)

Power Supply Interfaces & Accessories-4000

Allen-Bradley Co., Electronics Group, Div.of Rockwell Corp., Microelectronic Products Div., Highway 29 N. Bryan Pk. Exit, Greensboro, NC 27410, 919-621-9010 ... A•2069
Behlman Engineering, 1142 Mark Ave., Carpinteria, CA 93013, 805-684-8311 ... D•1898-1905
Bertan Assocs., 121 New South Rd., Hicksville, NY 11801, 516-433-3110 ... D•1522,1529-1530,1532,1534
§ **Compower Div., Computer Prods., Inc., 2220 Lundy Ave., San Jose, CA 95131, 408-942-1600 ... D•1554**
§ **Computer Prods. Inc., Power Conversion Grp., 2981 Gateway Dr., Pompano Bch., FL 33069-4803, 305-974-5500 ... D•1551,1554,1559**
Condor D.C. Power Supplies, Inc., 201 Flynn Rd., Camarillo, CA 93010, 805-484-2851;800-235-5929 ... D•1599
Dio-Rey, Div. of Info-Lite, 422 Cliff St., Fairview, NJ 07022, 201-941-4455 ... B•1045

Elgar Corp, An Onan McGraw Edison Co., 9250 Brown Deer Rd., San Diego, CA 92121, 619-450-0085 ... D•1918
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303, Call Local Sls. Off. ... D•1656
§ Kepco, Inc., 131-38 Sanford Ave., Flushing, NY 11352, 718-461-7000 ... D•1689,1701,1710-1712
Kikusui Intl. Corp., 17819 S. Figueroa St., Gardena, CA 90248, 213-515-6432;800-421-5334 ... D•1652
Marway Prods. Inc., 311 N. Clara St., Santa Ana, CA 92703, 714-973-1800 ... D•1944-1945
§† MCG Elctrns., 12 Burt Dr., Deer Park, NY 11729, 516-586-5125 ... B•1248-1253
NJE Corporation, 329 Culver Rd, P.O. Box 669, Dayton, NJ 08810-0669, 201-329-4611 ... D•1733
Pacific Power Source Corp., 15122 Bolsa Chica St., Huntington Bch., CA 92649, 714-898-2691;800-854-2433 ... D•1953
Perma Power Elctrns., 5615 W. Howard Ave., Chicago, IL 60648, 312-647-9414 ... B•1256
§ Power Products Div., Computer Products, Inc., 2981 Gateway Drive, Pompano Beach, FL 33069, 305-974-2442 ... D•1559
SL Waber, 300 Harvard Ave., Westville, NJ 08093, 609-456-5400;800-257-8384 ... D•1963
Superior Elec. Co., 383 Middle St., Bristol, CT 06010, 203-582-9561 ... D•1968
Unitrode Corp., 5 Forbes Rd., Lexington, MA 02173, 617-861-6540 ... A•1698
AAK Corp, 747 River St., Haverhill, MA 01830 ... 617-373-3769
Abbott Transistor Labs., Industrial Products Div., 8203 Vineland Ave., Sun Valley, CA 91352 ... 818-504-0644
† Abbott Transistor Labs., Power Supply Div., 5200 W. Jefferson Blvd., Los Angeles, CA 90016 ... 213-936-8185
§ ACDC Electronics, 401 Jones Rd., Oceanside, CA 92054 ... 619-757-1880
Acopian, Box 638, Easton, PA 18044 ... 215-258-5441
Allen-Bradley Co., Industrial Control Div., 1201 S. Second St., Milwaukee, WI 53201 ... 414-671-2000
† Arnold Magnetics, 11520 W. Jefferson Blvd., Culver City, CA 90230 ... 213-390-3537/8837
Astro-Geo-Marine, Inc., 202 E. Cota St., Santa Barbara, CA 93101 ... 805-965-7005
Astrosystems, 6 Nevada Dr., Lake Success, NY 11042 ... 516-328-1600
§ Brooks Mfg. Co., 2016/24 Amber St., Philadelphia, PA 19125 ... 215-425-3395; 800-523-0130
† California Instruments, A Div. of Amstar Tech. Prods. Co., Inc., 5150-Convoy St., San Diego, CA 92111 ... 619-279-8620;800-356-2244;800-821-1634
† CEA Division of Berkleonics, Inc., A Subsidiary of EG & G, 1 Aerovista Pk., San Luis Obispo, CA 93401 ... 805-544-5454
CML MACARR Div., Marine Electric RPD, Inc., 666 Pacific St., Brooklyn, NY 11217 ... 718-857-2400
§ Deltron, Inc., P.O. Box 1369, Wissahickon Ave., N. Wales, PA 19454-9990 ... 215-699-9261
§ Electronic Solutions, 9255 Chesapeake Drive, San Diego, CA 92123 ... 619-292-0242; 800-854-7086
Electro Rent Corp., 4209 Van Owen Place, Burbank, CA 91505 ... 818-843-1221
Energetec Systems, Inc., 130 E. St. Charles Rd., Carol Stream, IL 60188 ... 312-653-1920
Engd. Prod., Div. of Acme Elec. Corp., 40 Water St., Cuba, NY 14727 ... 716-968-2400
§† General Power Sys., 1400 N. Baxter St., Anaheim, CA 92806-1201 ... 714-956-9321
† Gulton Industries, Inc., Engineered Magnetics Division, 13041 Cerise Ave., Hawthorne, CA 90250 ... 213-679-0111
Industrial Midwec Capacitors, 4902 Tollview Dr., Rolling Meadows, IL 60008 ... 312-577-0120
Industrial Test Equip., 21 Yennicock Ave., Port Washington, NY 11050 ... 516-883-1700
Innovatek Microsystems, Inc., Smithfield Rd., R1 Box 104, Millerton, NY 12546-9720 ... 914-373-9003
International Instrumentation, 31131-602 Via Colinas, Westlake Vlg., CA 91362 ... 213-991-9614
Keltec Florida, P.O. Box 2917, Ft. Walton Bch., FL 32549 ... 904-651-9749
Lambda Electronics, Veeco Instr., Inc., 515 Broad Hollow Rd., Melville, NY 11747 ... 516-694-4200
Lorain Prods., 1122 F St., Lorain, OH 44052 ... 216-288-1122
LuTechnology, Inc., 3516 Breakwater Ct., Hayward, CA 94545 ... 415-887-1955
Mid-Eastern Industries, 100 Campus Dr., RD 1, Mt. Holly, NJ 08060 ... 609-267-3811
MIL Electronics, Inc., 1 Mill st., Dracut, MA 01826 ... 617-453-8000
Novatronics; Box 878, Pompano Beach, FL 33061 ... 305-942-5200
† NWL Transformers, Rising Sun Rd., P.O. Box 358, Bordentown, NJ 08505 ... 609-298-7300
Oram Elctrns., Rte. 22, Putnam Business Park, Brewster, NY 10509-9587 ... 914-279-2966
† Perry Amplifier, 138 Fuller St., Brookline, MA 02146 ... 617-734-0844
Polytron Devices, Box 398 - River St. Sta., Paterson, NJ 07544 ... 201-345-5885
Power Designs, Inc., 1700 Shames Dr., Westbury, NY 11590 ... 516-333-6200
Powermark, 3855 Ruffin Rd., San Diego, CA 92123 ... 619-565-8363
§ RTE, Power/Mate Co., 514 S. River St., Hackensack, NJ 07601 ... 201-440-3100
§† Solarex Corp., 1335 Piccard Dr., Rockville, MD 20850 ... 301-948-0202
§† Sorensen Co., 676 E. Island Pond Rd., Manchester, NH 03103 ... 603-668-4500
§ Spectra Sonics, 3750 Airport Rd., Ogden, UT 84403 ... 801-392-7531
Systron-Donner Instr. Div., 2727 Systron Dr., Concord, CA 94518 ... 415-676-5000
† Technipower, A Penril Co., P.O. Box 222, Commerce Pk., Danbury, CT 06810 ... 203-748-7001
§† Topaz Electronics, 9192 Topaz Way, San Diego, CA 92123-1164 ... 619-279-0831
Universal Voltronics, 27 Radio Circle Dr., Mt. Kisco, NY 10549 ... 914-241-1300
† Venus Scientific, Inc., 399 Smith St., Farmingdale, NY 11735 ... 516-293-4100
Xentek, Inc., 279 S. Pacific St., San Marcos, CA 92069 ... 619-744-3346

Preamplifiers-1100

Amplifier Research, 160 School House Rd., Souderton, PA 18964-9990, 215-723-8181 ... D•1003
† Analog Modules, Inc., 126 Baywood Avenue, Longwood, FL 32750, 305-339-4356/4355 ... D•1004
Instruments for Industry, Inc., 151 Toledo St., Farmingdale, NY 11735, 516-694-1414 ... D•1010
North Hills Elctrns., 1 Alexander Pl., Glen Cove, NY 11542, 516-671-5700 ... A•1780
§ Opamp Labs, Inc., 1033 N. Sycamore Ave., Los Angeles, CA 90038, 213-934-3566 ... D•1014
§ RTS Systems, Inc., Compact Video, Inc., 1100 W. Chestnut St., Burbank, CA 91506, 818-840-7119 ... D•1055
† Adams-Russell, Anzac Div., 80 Cambridge St., Burlington, MA 01803 ... 671-273-3333
Advanced Kinetics, 1231 Victoria St., Costa Mesa, CA 92627 ... 714-646-7165
† Aiken Advanced Sys., Amstar Technical Products Company, Inc., 5901 Edsall Rd., Alexandria, VA 22304-4197 ... 703-370-0900
† Amptek, Inc., 6 De Angelo Dr., Bedford, MA 01730 ... 617-275-2242
Antennacraft, Box 1005, Burlington, IA 52601 ... 319-754-7575
§† Avantek, Inc., 3175 Bowers Ave., Santa Clara, CA 95054 ... 408-496-6710
Bruel & Kjaer Instrs. Inc., 185 Forest St., Marlboro, MA 01752 ... 617-481-7000
Canberra Ind., One State St., Meriden, CT 06450 ... 203-238-2351
§ Delta Elctrns., 145 Fayette St., Winston-Salem, NC 27101 ... 919-725-4122
§ Dyma Engrg., Box 1535, Los Lunas, NM 87031 ... 505-865-6700
§ Furman Sound, Inc., 30 Rich St., Greenbrae, CA 94904 ... 415-927-1225
Gould Inc., Recording Systems Div., 3631 Perkins Ave., Cleveland, OH 44114 ... 216-361-3315
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 ... Call Local Sls. Off.
Hughes Aircraft Co, Aerospace Grps./Support Sys., P.O. Box 90515, Los Angeles, CA 90009 ... 213-670-1515
Hughes Aircraft Co., Microelctrn. Sys. Div., 2601 Campus Dr., Irvine, CA 92715 ... 714-752-3800
ITHACO, Inc., Meas. & Control Instrs. Div., 735 W. Clinton St., P.O. Box 6437, Ithaca, NY 14851-6437 ... 607-272-7640
LeCroy Resch. Sys. Corp., 700 S. Main St., Spring Vly., NY 10977 ... 914-425-2000
† Locus, Box 740, State College, PA 16804 ... 814-466-6275
Modular Audio Prods., Modular Devices Inc., 50 Orville Dr., Bohemia, NY 11716 ... 516-567-9620
Modular Devices, 50 Orville Dr., Bohemia, NY 11716 ... 516-567-9620
§ MVP Elctrns., 1161 N. Tustin, Orange, CA 92667 ... 714-639-9246
† Optical Electronics, Inc., Box 11140, Tucson, AZ 85734 ... 602-624-8358
Pacific Instrs. Inc., 215 Mason Circle, Concord, CA 94518 ... 415-827-9010
§ Palomar Engrs., Box 455, Escondido, CA 92025 ... 619-747-3343
Panametrics, 221 Cresent St., Waltham, MA 02254 ... 617-899-2740
† PCB Piezotronics, 3425 Walden Ave., Depew, NY 14043-2495 ... 716-684-0001
§ Precision Elctrns., 9101 King Ave., Franklin Park, IL 60131 ... 312-678-5350
Precision Filters, 240 Cherry St., Ithaca, NY 14850 ... 607-277-3550
§ Ramko Resch., Inc., 11355A Folsom Blvd., Rancho Cordova, CA 95670 ... 800-821-2545
Telco Products Co., 44 Sea Cliff, Glen Cove, NY 11542 ... 516-759-0300
§ Tennelec, 601 Turnpike, Oak Ridge, TN 37830 ... 615-483-8405
† TRAK Microwave Corp., 4726 Eisenhower Blvd., Dept. E5, Tampa, FL 33614 ... 813-884-1411
TransKinetic Sys., 110 Shawmut Rd., Canton, MA 02021 ... 617-828-3000
Unholtz-Dickie Corp., 6 Brookside Dr., Wallingford, CT 06492 ... 203-265-3929

Prebonding Etchants — See Chemicals, Etching (Vol. C)

Preforms, Precious Metal-2825 — *See Vol. C*

Prescalers-2900

§ A E G Telefunken, Semiconductor Grp., Rte. 22, Somerville, NJ 08876 ... 201-722-9800
Assembly Specialists, 914 Main St., Box 965, Acton, MA 01720 ... 617-263-9100
Electronic Dev. Corp., 11 Hamlin St., Boston, MA 02127-4198 ... 617-268-9696
LeCroy Resch. Sys. Corp., 700 S. Main St., Spring Vly., NY 10977 ... 914-425-2000
§ NES, Inc. (Nationwide Electronic Systems), 3003 Wakefield, Carpentersville, IL 60110 ... 312-426-5900
§ Non-Linear Systems/Div. of Kaypro Corp., 533 Stevens Ave., Solana Bch., CA 92075 ... 619-481-3900
Plainview Elctrns., 28 Cain Dr., Plainview, NY 11803 ... 516-249-6677
RCA Solid State Div., Linear Integrated Circuits, Rte. 202, Somerville, NJ 08876 ... 201-685-6000
§ Tennelec, 601 Turnpike, Oak Ridge, TN 37830 ... 615-483-8405

Preselector-Mixers-3450 — *See Vol. A*

Preselectors-1900

§ Eaton Corp., Elctrn. Instrmn. Div., 5340 Alla Rd., Los Angeles, CA 90066
§ Jumbo Process Control, Inc., 410 Garibaldi Ave., Lodi, NJ 07644 ... 201-779-7744
Maury Microwave, 8610 Helms Ave., Cucamonga, CA 91730 ... 714-987-4715
† Microlab/FXR, 10 Microlab Rd., Livingston, NJ 07039 ... 201-992-7700
Microphase, 587 Connecticut Ave., Norwalk, CT 06856 ... 203-866-8000
§† Microwave Filter Inc., 6743 Kinne St., East Syracuse, NY 13057-0486 ... 315-437-3953; 800-448-1666
† Premier Microwave, 35 New Broad St., Port Chester, NY 10573 ... 914-939-8900
§ Techcon Systems Inc., 1059 E. Bedmar St., Carson, CA 90746 ... 213-603-8888
† Telectro Sys., 96-18 43rd Ave., Corona, NY 11368 ... 212-651-8900
† UTE Microwave, 3500 Sunset Ave., Asbury Park, NJ 07712 ... 201-922-1009

Pressure Vessels — See Chambers, Pressure (Vol. D)

Pressure Indicators — See Gauges, Pressure (Vol. D)

Pressurization Units — See Chambers, Pressure (Vol. D)

Printed Circuits & Printed Circuit Materials (MIL)-2440 — *See Vol. B*

Printer/Plotters-2000

§ Alps Electric (USA), Inc., 3553 N. First St., San Jose, CA 95134, 408-946-6000 ... D•1057

B-G Instruments, P.O. Box 67, Alta Loma, CA 91701, 714-989-4802;980-2826 ... D•1060
§ Advanced Color Technlg., 21 Alpha Rd., Chelmsford, MA 01824 ... 617-256-1222
§† Analog Technology Corp., 15859 E. Edna Pl., Irwindale, CA 91706 ... 213-960-4004
Benson, Inc., 2690 Orchard Parkway, P.O. Box 32059, San Jose, CA 95152-2059 ... 408-945-1000
§ Computer Maintenance Corp., 405 Murray Hill Pkwy, East Rutherford, NJ 07073 ... 201-866-6400
† Datametrics Corp., Defense Products Div., 7630 Gloria Ave., Van Nuys, CA 91406 ... 818-989-3840
Digitec Corp., 918 Woodley Rd., P.O. Box 458, Dayton, OH 45401 ... 513-254-6251
Electrostatic Consltg. Assocs., 556 Lowell Rd., Groton, MA 01450 ... 617-448-5485
General Business Tech., 1891 McGraw Avenue, Irvine, CA 92714 ... 714-261-1891
General Optronics, 3005 Hadley Rd., So. Plainfield, NJ 07080 ... 201-549-9000
Gulton Inds., Inc., Graphic Instruments Div., Gulton Ind'l. Pk., E. Greenwich, RI 02818 ... 401-884-6800
Hitachi America, Ltd., 59 Route 17 South, Allendale, NJ 07401 ... 201-825-8000
§ Kipp & Zonen, 390 Central Ave., Bohemia, NY 11716 ... 516-589-2885
§ NEC Information Systems, NEC Corporation, 1414 Massachusetts Ave., Boxborough, MA 01719 ... 617-264-8000
PPM, Inc., 4521 Emery Ind. Pkwy., Cleveland, OH 44128 ... 216-292-6006
§ Ramtek, 2211 Lawson Lane, Santa Clara, CA 95050 ... 408-988-2211
§ Sumitronics, Inc., Sumitomo Corporation, 1270 Oakmead Pkwy. Ste. 201, Sunnyvale, CA 94086 ... 408-737-7683
† Tektronix, Inc., P. O. Box 500, Y3-314, Beaverton, OR 97077 ... 800-547-1512;Oregon only 800-452-1877
Telpar, Inc., 4137 Billy Mitchell Rd., P.O. Box 796, Addison, TX 75001 ... 214-233-6631
Unitronix Corp., 197 Meister Ave., Somerville, NJ 08876 ... 201-231-9400
Western Graphtec, 12 Chrysler St., Irvine, CA 92718 ... 714-770-6010;800-854-8385

Printers, Daisywheel-2000

Burroughs Corp., Borroughs Place, Rm. 4C-51, Detroit, MI 48232 ... 313-972-7000
§† Compucorp, 2211 Michigan Ave., Santa Monica, CA 90404 ... 213-829-7453
§ Computers International, 3540 Wilshire Blvd., Los Angeles, CA 90010 ... 213-386-3111
§ Dataproducts, 6200 Canoga Ave., Woodland Hills, CA 91365 ... 213-887-8000
§ Datasouth Computer Corp., 4216 Stuart Andrew, P.O. Box 240947, Charlotte, NC 28224 ... 704-523-8500
§ Data Terminals & Communications, 590 Division St., Campbell, CA 95008 ... 408-378-1112
Delta Data Systems Corp., 2595 Metropolitan Dr., Trevose, PA 19047 ... 215-322-5400
§ Electric Switches, Inc., 2478 Fletcher Dr., Los Angeles, CA 90039 ... 213-660-1310
Electrocom Inds., 1105 N. Ironwood Dr., S. Bend, IN 46615 ... 219-232-2743
General Business Tech., 1891 McGraw Avenue, Irvine, CA 92714 ... 714-261-1891
Hitachi America, Ltd., 59 Route 17 South, Allendale, NJ 07401 ... 201-825-8000
§ RVS Electronics, Inc., 40 North St., Middletown, NY 10940 ... 914-342-3199
§ Sumitronics, Inc., Sumitomo Corporation, 1270 Oakmead Pkwy. Ste. 201, Sunnyvale, CA 94086 ... 408-737-7683
Venable Industries, Inc., 3555 Lomita Blvd., Torrance, CA 90505 ... 213-539-2522
§ Xerox Corporation, 800 Long Ridge Rd., P.O. Box 1600, Stamford, CT 06904 ... 203-329-8700

Printers, Digital-2000

§ Alps Electric (USA), Inc., 3553 N. First St., San Jose, CA 95134, 408-946-6000 ... D•1057
§ Digitec Corp., 918 Woodley Rd., P.O. Box 458, Dayton, OH 45401, 513-254-6251 ... D•1066
Kessler-Ellis Prods., 120 1st Ave., Atlantic Highlands, NJ 07716, 201-291-0500;800-631-2165 ... D•1124
† Memodyne, 220 Reservoir St., Needham Hgts., MA 02194, 617-444-7000 ... D•1068
§ Newport Electronics, 630 E. Young St., Santa Ana, CA 92705, 714-540-4914 ... D•1371
Star Micronics, Inc., Components Div., 70-D Ethel Rd. W., Piscataway, NJ 08854, 201-572-9512 ... D•1072
Syntest Corp., 40 Locke Dr., Marlboro, MA 01752, 617-481-7827 ... D•1073
Telpar, Inc., 4137 Billy Mitchell Rd., P.O. Box 796, Addison, TX 75001, 214-233-6631 ... D•1075
Addmaster Corp., 416 Junipero Serra Dr., San Gabriel, CA 91776 ... 818-285-1121
§ American Computer Hardware Corp., 2205 S. Wright St., Santa Ana, CA 92705 ... 714-549-2688
Anadex, 1001 Flynn Rd., Camarillo, CA 93010 ... 805-987-9660
§ Andromeda Sys., 9000 Eton Ave., Canoga Park, CA 91304 ... 818-709-7600
§ Axiom Corp., 1014 Griswold Ave., San Fernando, CA 91340 ... 213-365-9521
BDS Computer Corp., 800 Maude Ave., Mountain View, CA 94043 ... 415-964-2115
B-G Instruments, P.O. Box 67, Alta Loma, CA 91701 ... 714-989-4802;980-2826
§ Bowmar Instrument Corp., Commercial Products Div., 4640 126th Ave. N., Clearwater, FL 33520 ... 813-576-2525
Bridge Computer Co., Sea Data Corp., 1 Bridge St., Newton, MA 02158 ... 617-244-8190
Burroughs Corp., Borroughs Place, Rm. 4C-51, Detroit, MI 48232 ... 313-972-7000
Canberra Ind., One State St., Meriden, CT 06450 ... 203-238-2351
§ Computer Devices, 749 Middlesex Turnpike, Nutting Lake, MA 01865 ... 617-663-4980
Computer Terminal Sys., 89 Arkay Drive, Hauppauge, NY 11788 ... 516-435-2916
Continental Resources, Inc., 175 Middlesex Tpke., Bedford, MA 01730 ... 617-275-0850
§† Coosol, 3013 Harbor Blvd., Costa Mesa, CA 92626 ... 714-545-2216
C-Tek Inc., 4 Railroad Ave., Wakefield, MA 01880 ... 617-246-1720
Datadyne, Box 247, King of Prussia, PA 19406 ... 215-666-5751
§ Data General, 4400 Computer Dr., Westboro, MA 01581 ... 617-366-8911
† Datametrics Corp., Defense Products Div., 7630 Gloria Ave., Van Nuys, CA 91406 ... 818-989-3840
§ Dataprinter Corp., Printronix, 99 Middlesex St., Malden, MA 02148 ... 617-321-2400
§ Dataproducts, 6200 Canoga Ave., Woodland Hills, CA 91365 ... 213-887-8000
† Data Prods. New England, Barnes Park N. Caller Box 30, Wallingford, CT 06492 ... 203-265-7151
§ Data Rentals/Sls., Inc, P. O. Box 3257, Culver City, CA 90230 ... 213-559-3822
§ Dataroyal, 235 Main Dunstable Rd., Nashua, NH 03061 ... 603-883-4157
Datel, General Electric Co., 11 Cabot Blvd., Mansfield, MA 02048 ... 617-339-9341
Dianachart Inc., 129 Hibernia Ave., Rockaway, NJ 07866 ... 201-625-2299
§† Di/An Controls, Inc., 944 Dorchester Ave., Boston, MA 02125 ... 617-288-7700
Documation, Box 1240, Melbourne, FL 32901 ... 305-725-5500
§ Eaton Corp, Durant Products, 901 S. 12th St., Watertown, WI 53094 ... 414-261-4070
Eaton Corp., Printer Prods Oper., Technical Research Park, Riverton, WY 82501 ... 307-856-4821
§ Electro Rent Corp., 4209 Van Owen Place, Burbank, CA 91505 ... 818-843-1221
Florida Data, 600D John Rodes Blvd., Melbourne, FL 32935 ... 305-259-4700
Fluke, John, Mfg. Co., Box C9090, MS 250C, Everett, WA 98206 ... 206-356-5400
Genstar Rental Elctrns., 2445 Faber Pl., Palo Alto, CA 94303 ... 415-856-7600
§† Gra-Mar Inc., 3165 McCrory Pl., Ste. 265, Orlando, FL 32803 ... 305-894-3351
Gulton Inds., Inc., Graphic Instruments Div., Gulton Ind'l. Pk., E. Greenwich, RI 02818 ... 401-884-6800
§ Heath Co., Benton Harbor, MI 49022 ... 616-982-3886
Hecon Corp., 31 Park Rd., Tinton Falls, NJ 07724 ... 201-542-9200
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 ... Call Local Sls. Off.
Hitachi America, Ltd., 59 Route 17 South, Allendale, NJ 07401 ... 201-825-8000
Honeywell Info. Sys., 200 Smith St., MS 440, Waltham, MA 02154 ... 617-895-6000
§ Integral Data Sys., Inc., Rte. 13 S, Milford, NH 03055 ... 603-673-9100
§ International Data Sciences, 7 Wellington Rd., Lincoln, RI 02865 ... 401-333-6200
§ Itoh Electronics, Inc. (C.), 5301 Beethoven St., Los Angeles, CA 90066 ... 212-682-0420
§ IVO Inds., Inc., 201 Industrial Way W., P.O. Drawer 917, Eatontown, NJ 07724 ... 201-542-5151
Kogyosha, 179 Riveredge Rd., Tenafly, NJ 07670 ... 201-569-8769
Landis & Gyr, Inc., 4 Westchester Plaza, Elmsford, NY 10523 ... 914-592-4400
Mannesmann Tally Corp., 8301 S. 180th St., Kent, WA 98032 ... 206-251-5500
Metrosonics, Inc., Box 23075, Rochester, NY 14692-3075 ... 716-334-7300
Mitronics, 2908 Oregon Court - Bldg. I-2, Torrance, CA 90503 ... 213-320-7011
Mohawk Data Sciences, MDS Center, Herkimer, NY 13350 ... 315-866-5300
§ NEC Information Systems, NEC Corporation, 1414 Massachusetts Ave., Boxborough, MA 01719 ... 617-264-8000
§ Nu-Metrics, 947 Longdale Ave., Longwood, FL 32750 ... 305-331-7717
Philips Test & Measuring Instrs., 85 McKee Dr., Mahwah, NJ 07430 ... 201-529-3800
Potter Instr., 10 Main St., Gonic, NH 03867 ... 603-332-1991
PPM, Inc., 4521 Emery Ind. Pkwy., Cleveland, OH 44128 ... 216-292-6006
§ Practical Automation, Trap Falls Rd., Shelton, CT 06484 ... 203-929-5381
Qwint Systems, 3693 Commercial Ave., Northbrook, IL 60062 ... 312-498-5060
Racal-Dana Instrs. Inc., 4 Goodyear St., Irvine, CA 92715 ... 714-859-8999
Renaissance Marketing, Inc., 463 Union Ave., Westbury, NY 11590 ... 516-271-2389
§ RVS Electronics, Inc., 40 North St., Middletown, NY 10940 ... 914-342-3199
Sperry Univac, Mini-Computer Operations, Box C-19504, Irvine, CA 92713 ... 714-754-6900
Tegal Scientific, Inc., Box 5905, Concord, CA 94524 ... 415-827-1054
† Teletype, 5555 Touhy Ave., Skokie, IL 60076 ... 312-982-2000
§ Texas Instrs., Inc., Box 225012-MS-84, Dallas, TX 75265 ... 214-995-6611
§ Texas Instrs., Data Sys. Group, P. O. Box 809063, Dallas, TX 75380-9063 ... 1-800-527-3500
Thickfilm Int'l., Rt. 1-Box 85-0, Indian Head, MD 20640 ... 301-375-8666
§ Trilog, 17391 Murphy Ave., Irvine, CA 92714 ... 714-549-4079
Trivex, 3180 Redhill Ave., Costa Mesa, CA 92626 ... 714-546-7781
§ Tucker Elctrns., Box 461966, Garland, TX 75046 ... 214-348-8800;800-527-4642
§ Veeder-Root, 70 Sargeant St., Hartford, CT 06102 ... 203-527-7201
§† Westrex, 1140 Bloomfield Ave., W. Caldwell, NJ 07006 ... 201-227-7290

Printers, Dot Matrix Impact-2000

Digitec Corp., 918 Woodley Rd., P.O. Box 458, Dayton, OH 45401, 513-254-6251 ... D•1066
§ Star Micronics, Inc., Components Div., 70-D Ethel Rd. W., Piscataway, NJ 08854, 201-572-9512 ... D•1072
Syntest Corp., 40 Locke Dr., Marlboro, MA 01752, 617-481-7827 ... D•1073
Addmaster Corp., 416 Junipero Serra Dr., San Gabriel, CA 91776 ... 818-285-1121
§ American Computer Hardware Corp., 2205 S. Wright St., Santa Ana, CA 92705 ... 714-549-2688
§ Anadex, 1001 Flynn Rd., Camarillo, CA 93010 ... 805-987-9660
§† Analog Technology Corp., 15859 E. Edna Pl., Irwindale, CA 91706 ... 213-960-4004
§ Antona Corp., 2100 S. Sawtelle Blvd., Suite 205, Los Angeles, CA 90025 ... 213-473-8995
§ Computer Maintenance Corp., 405 Murray Hill Pkwy, East Rutherford, NJ 07073 ... 201-866-6400
§ Computers International, 3540 Wilshire Blvd., Los Angeles, CA 90010 ... 213-386-3111
§ Dataproducts, 6200 Canoga Ave., Woodland Hills, CA 91365 ... 213-887-8000
§ Datasouth Computer Corp., 4216 Stuart Andrew, P.O. Box 240947, Charlotte, NC 28224 ... 704-523-8500
§† Data Specialties, Inc., 3455 Commercial Ave., Northbrook, IL 60062 ... 312-564-1800
Delta Data Systems Corp., 2595 Metropolitan Dr., Trevose, PA 19047 ... 215-322-5400
Dianachart Inc., 129 Hibernia Ave., Rockaway, NJ 07866 ... 201-625-2299
Digiac Corp., 175 Engineers Rd., Hauppauge, NY 11788 ... 516-273-8600
Eaton Corp, Durant Products, 901 S. 12th St., Watertown, WI 53094 ... 414-261-4070
Eaton Corp., Printer Prods Oper., Technical Research Park, Riverton, WY 82501 ... 307-856-4821
§ EDL, Inc., 385 Oser Ave., Hauppauge, NY 11788 ... 516-435-2808;1-800-DIAL EDL
§ Electric Switches, Inc., 2478 Fletcher Dr., Los Angeles, CA 90039 ... 213-660-1310
Electrocom Inds., 1105 N. Ironwood Dr., S. Bend, IN 46615 ... 219-232-2743
† Facit, Inc., 9 Executive Park Dr., Merrimack, NH 03054 ... 603-424-8000
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General Business Tech., 1891 McGraw Avenue, Irvine, CA 92714 ... 714-261-1891
§† Genicom Corp., General Electric Dr., Waynesboro, VA 22980 ... 703-949-1471
§ Gra-Mar Inc., 3165 McCrory Pl., Ste. 265, Orlando, FL 32803 ... 305-894-3351
Lear Siegler, Inc., 2850 Ocean Park Blvd., P.O. Box 2158, Santa Monica, CA 90406 ... 213-452-5444
MPI, 4426 S. Century Dr., Salt Lake City, UT 84107 ... 800-821-8848
§ Personal Micro Computers, 275 Santa Ana Ct., Sunnyvale, CA 94086 ... 408-737-8441
PPM, Inc., 4521 Emery Ind. Pkwy., Cleveland, OH 44128 ... 216-292-6006
§ Practical Automation, Trap Falls Rd., Shelton, CT 06484 ... 203-929-5381
§ Printer Products, Capitol Circuits Corporation, 25 Denby Road, Boston, MA 02134 ... 617-254-1200

Qwint Systems, 3693 Commercial Ave., Northbrook, IL 60062 312-498-5060
§ Ramtek, 2211 Lawson Lane, Santa Clara, CA 95050 408-988-2211
§ RVS Electronics, Inc., 40 North St., Middletown, NY 10940 914-342-3199
Singer Data Products, Inc., 790 Maple Lane, Bensenville, IL 60106 312-860-6500
Sperry Univac, Mini-Computer Operations, Box C-19504, Irvine, CA 92713 714-754-6900
§ Sumitronics, Inc., Sumitomo Corporation, 1270 Oakmead Pkwy. Ste. 201, Sunnyvale, CA 94086 408-737-7683
† Tektronix, Inc., P. O. Box 500, Y3-314, Beaverton, OR 97077 ..... 800-547-1512;Oregon only 800-452-1877
§ Texas Instrs., Data Sys. Group, P. O. Box 809063, Dallas, TX 75380-9063 1-800-527-3500
Thickfilm Int'l., Rt. 1-Box 85-0, Indian Head, MD 20640 301-375-8666
Unitronix Corp., 197 Meister Ave., Somerville, NJ 08876 201-231-9400
§† Westrex, 1140 Bloomfield Ave., W. Caldwell, NJ 07006 201-227-7290
§ Westrex OEM Products, Litton Inds., 51 Penn St., Fall River, MA 02724 .. 617-676-1016
§ Xerox Corporation, 800 Long Ridge Rd., P.O. Box 1600, Stamford, CT 06904 203-329-8700

Printers, Event-3000

Syntest Corp., 40 Locke Dr., Marlboro, MA 01752, 617-481-7827 .... D•1073
AES Corp., 285 Newbury St., P.O. Box 2093, Peabody, MA 01960 617-535-7310
B-G Instruments, P.O. Box 67, Alta Loma, CA 91701 .... 714-989-4802;980-2826
§† Di/An Controls, Inc., 944 Dorchester Ave., Boston, MA 02125 617-288-7700
Lee Data Corporation, 7075 Flying Cloud Drive, Minneapolis, MN 55344 612-828-0300
PPM, Inc., 4521 Emery Ind. Pkwy., Cleveland, OH 44128 216-292-6006
Tegal Scientific, Inc., Box 5905, Concord, CA 94524 415-827-1054
Texas Instrs., Data Sys. Group, P. O. Box 809063, Dallas, TX 75380-9063 1-800-527-3500

Printers, Thermal-2000

B-G Instruments, P.O. Box 67, Alta Loma, CA 91701, 714-989-4802;980-2826 .... D•1069
C-Tek Inc., 4 Railroad Ave., Wakefield, MA 01880, 617-246-1720 .... D•1115
Datel, General Electric Co., 11 Cabot Blvd., Mansfield, MA 02048, 617-339-9341 .... D•1346
§ Digitec Corp., 918 Woodley Rd., P.O. Box 458, Dayton, OH 45401, 513-254-6251 .... D•1066
† Memodyne, 220 Reservoir St., Needham Hgts., MA 02194, 617-444-7000 ...... D•1068
§ Newport Electronics, 630 E. Young St., Santa Ana, CA 92705, 714-540-4914 .... D•1371
PPM, Inc., 4521 Emery Ind. Pkwy., Cleveland, OH 44128, 216-292-6006 .. D•1291
§ Seiko Instrs. U.S.A., Inc., 2990 W. Lomita Blvd., Torrance, CA 90505, 213-530-8777 .... D•1071
Syntest Corp., 40 Locke Dr., Marlboro, MA 01752, 617-481-7827 .... D•1073
Telpar, Inc., 4137 Billy Mitchell Rd., P.O. Box 796, Addison, TX 75001, 214-233-6631 .... D•1075
Bruel & Kjaer Instrs. Inc., 185 Forest St., Marlboro, MA 01752 617-481-7000
† Datametrics Corp., Defense Products Div., 7630 Gloria Ave., Van Nuys, CA 91406 818-989-3840
§ Dataproducts, 6200 Canoga Ave., Woodland Hills, CA 91365 213-887-8000
§ Data Rentals/Sls., Inc, P. O. Box 3257, Culver City, CA 90230 213-559-3822
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Fujitsu America, Inc., 918 Sherwood Dr., Lake Bluff, IL 60044 312-295-2610
Gulton Inds., Inc., Graphic Instruments Div., Gulton Ind'l. Pk., E. Greenwich, RI 02818 401-884-6800
Hitachi America, Ltd., 59 Route 17 South, Allendale, NJ 07401 201-825-8000
§ Kipp & Zonen, 390 Central Ave., Bohemia, NY 11716 516-589-2885
Mitsubishi Elctrns. America, Computer Peripheral Div., 991 Knox St., Torrance, CA 90502 213-515-3993
§ RACET Computes, Ltd., 1855 W Katella Ste. 255, Orange, CA 92667 714-997-4950
§† Raytheon Ocean Sys. Co., Submarine Signal Div., Risho Ave., Westminster Pk., E. Providence, RI 02914 401-438-1780
Research, Inc., Box 24064, Minneapolis, MN 55424 612-941-3300
Rohm Corp., 8 Whatney, Irvine, CA 92718 714-855-2131
§ RVS Electronics, Inc., 40 North St., Middletown, NY 10940 914-342-3199
Singer Data Products, Inc., 790 Maple Lane, Bensenville, IL 60106 312-860-6500
§ Sumitronics, Inc., Sumitomo Corporation, 1270 Oakmead Pkwy. Ste. 201, Sunnyvale, CA 94086 408-737-7683
Tegal Scientific, Inc., Box 5905, Concord, CA 94524 415-827-1054
Thickfilm Int'l., Rt. 1-Box 85-0, Indian Head, MD 20640 301-375-8666

Printers, Line – See Printers, Digital (Vol. D)

Printers, Page-2000

§ American Computer Hardware Corp., 2205 S. Wright St., Santa Ana, CA 92705 714-549-2688
Burroughs Corp., Borroughs Place, Rm. 4C-51, Detroit, MI 48232 313-972-7000
† Datametrics Corp., Defense Products Div., 7630 Gloria Ave., Van Nuys, CA 91406 818-989-3840
§ Dataproducts, 6200 Canoga Ave., Woodland Hills, CA 91365 213-887-8000
Electrostatic Consltg. Assocs., 556 Lowell Rd., Groton, MA 01450 617-448-5485
General Business Tech., 1891 McGraw Avenue, Irvine, CA 92714 714-261-1891
† General Optronics, 3005 Hadley Rd., So. Plainfield, NJ 07080 201-549-9000
§ NEC Information Systems, NEC Corporation, 1414 Massachusetts Ave., Boxborough, MA 01719 617-264-8000
Renaissance Marketing, Inc., 463 Union Ave., Westbury, NY 11590 516-271-2389
§ RVS Electronics, Inc., 40 North St., Middletown, NY 10940 914-342-3199
Sperry Univac, Mini-Computer Operations, Box C-19504, Irvine, CA 92713 714-754-6900
§ Sumitronics, Inc., Sumitomo Corporation, 1270 Oakmead Pkwy. Ste. 201, Sunnyvale, CA 94086 408-737-7683
Unitronix Corp., 197 Meister Ave., Somerville, NJ 08876 201-231-9400

Printers, Serial-2000

§ Digitec Corp., 918 Woodley Rd., P.O. Box 458, Dayton, OH 45401, 513-254-6251 .... D•1066
† Memodyne, 220 Reservoir St., Needham Hgts., MA 02194, 617-444-7000 ...... D•1068
§ Secoinsa/Digi Power, 686 E. Gish Rd., San Jose, CA 95112, 408-288-5600 .... D•1831-1832
Star Micronics, Inc., Components Div., 70-D Ethel Rd. W., Piscataway, NJ 08854, 201-572-9512 .... D•1072
Syntest Corp., 40 Locke Dr., Marlboro, MA 01752, 617-481-7827 .... D•1073
Telpar, Inc., 4137 Billy Mitchell Rd., P.O. Box 796, Addison, TX 75001, 214-233-6631 .... D•1075
§ Advanced Color Technlg., 21 Alpha Rd., Chelmsford, MA 01824 617-256-1222
§ American Computer Hardware Corp., 2205 S. Wright St., Santa Ana, CA 92705 714-549-2688
Anadex, 1001 Flynn Rd., Camarillo, CA 93010 805-987-9660
B-G Instruments, P.O. Box 67, Alta Loma, CA 91701 .... 714-989-4802;980-2826
Burroughs Corp., Borroughs Place, Rm. 4C-51, Detroit, MI 48232 313-972-7000
§ Computer Maintenance Corp., 405 Murray Hill Pkwy, East Rutherford, NJ 07073 201-866-6400
§ Dataproducts, 6200 Canoga Ave., Woodland Hills, CA 91365 213-887-8000
Datel, General Electric Co., 11 Cabot Blvd., Mansfield, MA 02048 617-339-9341
Digiac Corp., 175 Engineers Rd., Hauppauge, NY 11788 516-273-8600
Eaton Corp., Printer Prods Oper., Technical Research Park, Riverton, WY 82501 307-856-4821
Kensol Wire Marking, Kensol Olsenmark Inc., 40 Melville Park Road, Melville, NY 11747 516-694-7773
§ NEC Information Systems, NEC Corporation, 1414 Massachusetts Ave., Boxborough, MA 01719 617-264-8000
§ Practical Automation, Trap Falls Rd., Shelton, CT 06484 203-929-5381
Qwint Systems, 3693 Commercial Ave., Northbrook, IL 60062 312-498-5060
§ RVS Electronics, Inc., 40 North St., Middletown, NY 10940 914-342-3199
Sperry Univac, Mini-Computer Operations, Box C-19504, Irvine, CA 92713 714-754-6900
Westrex OEM Products, Litton Inds., 51 Penn St., Fall River, MA 02724 .. 617-676-1016

Printing, Dry Transfer – See Kits, Marking (Vol. C)

Probe Cards, Semiconductor Testing-4100

Accuprobe, Inc., 1 Harrison Ave, Box 1044, Salem, MA 01970 617-745-7878
Probe-Rite, Inc., 2725 Lafayette St., Santa Clara, CA 95050 408-727-0100

Probes, Hall-4800 – *See Vol. A*

Probes, High Voltage (1,000 Volts & Over)-2900

CPS Inc., 110 Wolfe Rd., Sunnyvale, CA 94086, 408-738-0530 .... D•1607
† Ross Engrg. Corp., 540 Westchester Dr., Campbell, CA 95008, 408-377-4621 .... B•1443
Alden Products Co., P.O. Box 860, 117 N. Main St., Brockton, MA 02403 617-583-0160
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§ BBC-Metrawatt/Goerz, 2150 W. 6th Ave., Broomfield, CO 80020 .... 303-469-5231; 800-821-6327
Beckman Industrial Corp., Cedar Grove Div., 89 Commerce Rd., Cedar Grove, NJ 07009 201-239-6200
Beckman Instrs., 2500 Harbor Blvd., Fullerton, CA 92634 714-871-4848
Blanck, A. R., Co., Box 249, Rutherford, NJ 07070 201-933-2091
Bluffton Products, Inc., Tegam, Inc., 7230 North Ridge Road, Madison, OH 44057 216-946-3572
§† Consolidated Electronic Wire & Cable, 11044 King St., Franklin Park, IL 60131 312-455-8830
§† Data Precision Corp., Electronics Ave., Danvers, MA 01923 617-246-1600
† Del Elctrns. Corp., 250 E. Sandford Blvd., Mt. Vernon, NY 10550 914-699-2000
§ Fluke, John, Mfg. Co., Box C9090, MS 250C, Everett, WA 98206 206-356-5400
§ Heath Co., Benton Harbor, MI 49022 616-982-3886
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Keithley Instrs., 28775 Aurora Rd., Cleveland, OH 44139 216-248-0400
§ Leader Instrs. Corp., 380 Oser Ave., Hauppauge, NY 11788-3694 516-231-6900
§ Lectrotech, Inc., 5810 N. Western Ave., Chicago, IL 60659 312-769-6262
Micro Instr., 2250 Micro Pl., Escondido, CA 92025 619-746-2010
† Millivac Instrs., Box 997, Curry Rd. Ext., Schenectady, NY 12301 518-355-8300
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§ Non-Linear Systems/Div. of Kaypro Corp., 533 Stevens Ave., Solana Bch., CA 92075 619-481-3900
Pearson Elctrns., 1860 Embarcadero Rd., Palo Alto, CA 94303 415-494-6444
§ Probe Master, Inc., 4898 Ronson Ct., San Diego, CA 92111 .... 619-560-9676; 800-854-1519;800-772-1519
Pulsar Products Div., 2700 Merced St., San Leandro, CA 94577 415-577-7236
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Rutherford Resch. Prods., Box 249, Rutherford, NJ 07070 201-933-2091
Sencore, 3200 Sencore Dr., Sioux Falls, SD 57107 605-339-0100
§ Kulka Smith, Inc., 1913 Atlantic Ave., Manasquan, NJ 08736 201-223-9400
§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 215-673-5600
§ Techni-Tool, 5 Apollo Rd., Box 368, Plymouth Meeting, PA 19462 215-825-4990
Tektronix, Inc., P. O. Box 500, Y3-314, Beaverton, OR 97077 ..... 800-547-1512;Oregon only 800-452-1877
§ Test Probes, Inc., Box 2113, La Jolla, CA 92038 619-459-4197
§ Triplett Corp.-A Penril Co., One Triplett Dr., Bluffton, OH 45817-9987 419-358-5015
ZI-TECH Instr. Corp., 2151 Park Blvd., Box 60490, Palo Alto, CA 94306 415-326-2151

Probes, IC-2900

GGB Industries, Inc., Picoprobe Division, P.O. Box 125, Gillette, NJ 07933 ... 201-464-1749
ITT Pomona Electronics, 1500 E. 9th St., P.O. Box 2767, Pomona, CA 91766 ... 714-623-3463

Probes, Logic Test-2900

Richard Hirschmann of America, Industrial Row, Riverdale, NJ 07451, 201-835-5002 ... C•1237
§ **Probe Master, Inc., 4898 Ronson Ct., San Diego, CA 92111, 619-560-9676;800-854-1519;800-772-1519 ... D•1397**
Alden Products Co., P.O. Box 860, 117 N. Main St., Brockton, MA 02403 ... 617-583-0160
§ Alpha Products, Inc., 5740 Corsa Ave. #104, Westlake Village, CA 91362 ... 818-889-9304
Augat Inc., 33 Perry Ave., Box 779, Attleboro, MA 02703 ... 617-222-2202
Avex Elctrns., 1683 Winchester Rd., P.O. Box 1026, Bensalem, PA 19020 ... 215-638-1515
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§ Beckman Industrial Corp., Emerson Electric Co., 630 Puente Street, Brea, CA 92621 ... 714-773-8111
E & L Instruments, Inc., 61 First St., Derby, CT 06418 ... 203-735-8774
§ Fluke, John, Mfg. Co., Box C9090, MS 250C, Everett, WA 98206 ... 206-356-5400
§ GC Elctrns., 400 S. Wyman St., Rockford, IL 61101 ... 815-968-9661
§ Global Specialties, Interplex Electronics, Inc., 70 Fulton Terrace, P.O. Box 1942, New Haven, CT 06509 ... 203-624-3103
§ Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
Kurz-Kasch, Knob Div., 711 Hunter Dr., Wilmington, OH 45177 ... 513-382-0966
§ Non-Linear Systems/Div. of Kaypro Corp., 533 Stevens Ave., Solana Bch., CA 92075 ... 619-481-3900
§ OK Industries, Inc., 3455 Conner St., Bronx, NY 10475 ... 212-994-6600
§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 ... 215-673-5600
§ Techni-Tool, 5 Apollo Rd., Box 368, Plymouth Meeting, PA 19462 ... 215-825-4990
§ Vaco Prods., 1510 Skokie Blvd., Northbrook, IL 60062 ... 312-564-3300

Probes, Microwave-3450 — See *Vol. A*

Probes, Oscilloscopes-2975

Concord Elctrns., 30 Great Jones St., Dept. JE, New York, NY 10012, 212-777-6571 ... C•1174
§ **ITT Pomona Electronics, 1500 E. 9th St., P.O. Box 2767, Pomona, CA 91766, 714-623-3463 ... C•1375**
KGS Electronics, Inc., GAR Entprs., 2029 N. Lincoln Ave., Pasadena, CA 91103, 818-798-0786 ... D•1715,1942-1943
§ **Mueller Elec. Co., 1583 E 31st St., Dept. 20, Cleveland, OH 44114, 216-771-5225 ... C•1470,1472**
§ **Probe Master, Inc., 4898 Ronson Ct., San Diego, CA 92111, 619-560-9676;800-854-1519;800-772-1519 ... D•1397**
Alden Products Co., P.O. Box 860, 117 N. Main St., Brockton, MA 02403 ... 617-583-0160
Avex Elctrns., 1683 Winchester Rd., P.O. Box 1026, Bensalem, PA 19020 ... 215-638-1515
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§ B & K Precision, Industrial Electronics Product Group, Dynascan Corporation, 6460 W. Cortland, Chicago, IL 60635 ... 312-889-9087
Bently Nevada Corp., P.O. Box 157, Minden, NV 89423 ... 702-782-3611
† Dumont Oscilloscope Labs., 40 Fairfield Pl., W. Caldwell, NJ 07006 ... 201-575-8666
GGB Industries, Inc., Picoprobe Division, P.O. Box 125, Gillette, NJ 07933 ... 201-464-1749
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§ Heath Co., Benton Harbor, MI 49022 ... 616-982-3886
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§ Lectrotech, Inc., 5810 N. Western Ave., Chicago, IL 60659 ... 312-769-6262
† Magnetek, 7315 Red Deer Dr., Boulder, CO 80301-4696 ... 303-442-6700
§ North American Soar Corp., 11126 Cornell Ave., Cherry Hill, NJ 08002 .. 609-488-1060
Philips Test & Measuring Instrs., 85 McKee Dr., Mahwah, NJ 07430 ... 201-529-3800
Sencore, 3200 Sencore Dr., Sioux Falls, SD 57107 ... 605-339-0100
SMK Elctrns. Corp., U.S.A., 1901 Nancita Cir., Placentia, CA 92670 ... 714-996-0960
§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 ... 215-673-5600
§ Test Probes, Inc., Box 2113, La Jolla, CA 92038 ... 619-459-4197
§ Tucker Elctrns., Box 461966, Garland, TX 75046 ... 214-348-8800;800-527-4642
§ VIZ Test Equipment, Div. VIZ Mfg., 335 E. Price St., Philadelphia, PA 19144 ... 215-844-2626
§ Vu-Data, 7122 Convoy Ct., San Diego, CA 92111 ... 619-279-6572

Probes, RF-2900

Ion Physics Co., 323 Andover St., Wilmington, MA 01887, 617-658-6030 ... D•1123
RCD Components, Inc., 330 Bedford St., Manchester, NH 03101, 603-669-0054 ... A•1935
Alden Products Co., P.O. Box 860, 117 N. Main St., Brockton, MA 02403 ... 617-583-0160
Alford Mfg. Co., P.O. Box 2116, 32 Sixth Rd., Woburn, MA 01888 ... 617-935-8610
Amplifier Research, 160 School House Rd., Souderton, PA 18964-9990 ... 215-723-8181
Atlantic Research, 5390 Cherokee Ave., Alexandria, VA 22312 ... 703-642-4000
§† Ballantine Labs., 90 Fanny Rd., Boonton, NJ 07005 ... 201-335-0900
§ B & K Precision, Industrial Electronics Product Group, Dynascan Corporation, 6460 W. Cortland, Chicago, IL 60635 ... 312-889-9087
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Boonton Elctrns. Corp., 791 Route 10, Randolph, NJ 07869 ... 201-584-1077
Coaxial Dynamics, 15210 Industrial Parkway, Cleveland, OH 44135 ... 216-267-2233
§† Dielectric Communications, General Signal, Tower Hill Rd., Raymond, ME 04071 ... 207-655-4555;800-341-9678
§† Electro-Metrics, Penril Corp., 100 Church St., Amsterdam, NY 12010 ... 518-843-2600
§ Fluke, John, Mfg. Co., Box C9090, MS 250C, Everett, WA 98206 ... 206-356-5400
† General Microwave Corp., 155 Marine St., Farmingdale, NY 11735 ... 516-694-3600
† Genisco Technlg. Corp., Filters Div., 18435 Susana Rd., Rancho Dominguez, CA 90221 ... 213-537-4750
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† Millivac Instrs., Box 997, Curry Rd. Ext., Schenectady, NY 12301 ... 518-355-8300
Philips Test & Measuring Instrs., 85 McKee Dr., Mahwah, NJ 07430 ... 201-529-3800
† Premier Microwave, 35 New Broad St., Port Chester, NY 10573 ... 914-939-8900
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§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 ... 215-673-5600
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§ Test Probes, Inc., Box 2113, La Jolla, CA 92038 ... 619-459-4197
§ Triplett Corp.-A Penril Co., One Triplett Dr., Bluffton, OH 45817-9987 ... 419-358-5015

Probes, Temperature-2900

Cal-R, Inc., P.O. Box 1397, Santa Monica, CA 90406, 213-450-1761 ... B•1745
Keystone Carbon, Thermistor Div., St. Marys, PA 15857, 814-781-1591 ... B•1753,1755
Micro Technical Inds., Micro-Ohm Corp., 23666 Birtcher Dr., #B, Lake Forest, CA 92630, 714-855-4326 ... D•1170-1171
§ **Midwest Comps., 1981 Port City Blvd., Muskegon, MI 49443, 616-777-2602 ... B•1759,1761,1765**
Omega Engrg., Box 4047, Stamford, CT 06907, 203-359-1660 ... B•1683, 1766-1767
Piezo Elec. Prods., Inc., 212 Durham Ave., CN-15, Metuchen, NJ 08840, 201-548-2800 ... B•1768
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Texmate, Inc., 348 S. Cedros Ave., P.O. Box 2000, Solana Beach, CA 92075, 619-481-7177 ... D•1379
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§ AEMC, 99 Chauncy, Boston, MA 02111 ... 617-451-0227;800-343-1391
§† Ametek/Rodan Div., 2905 Blue Star St., Anaheim, CA 92806 ... 714-630-0081
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§ API Instrs., 1601 Trapelo Rd., Waltham, MA 02254 ... 617-890-2000
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§ Atkins Tech., 3321 S.W. 40th Blvd., Gainesville, FL 32608 ... 904-378-5555
§ B & K Precision, Industrial Electronics Product Group, Dynascan Corporation, 6460 W. Cortland, Chicago, IL 60635 ... 312-889-9087
§ Bayley Instr. Co., Box 357, Kenwood, CA 95452 ... 707-833-6014
§ BBC-Metrawatt/Goerz, 2150 W. 6th Ave., Broomfield, CO 80020 ... 303-469-5231; 800-821-6327
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Cambridge Aero Instruments, Inc., 6A Dunham Rd., Billerica, MA 01821 ... 617-275-0889
† Climatronics, 140 Wilbur Pl., Bohemia, NY 11716 ... 516-567-7300
Dale Electronics, Inc., Norfolk Div., 2300 Riverside Blvd., Norfolk, NE 68701 ... 402-371-0080
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Mag-Con, 1626 Terrace Dr., St. Paul, MN 55113 ... 612-633-8820

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† Thermometrics, Inc., 808 U.S. Hwy. #1, Edison, NJ 08817-4695 201-287-2870
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Sealectro, 225 Hoyt St., Mamaroneck, NY 10543 914-698-5600
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§ Adatek, Inc., P.O. Box 1339, Sandpoint, ID 83864 ...... 208-263-1471; 800-323-3343
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Leeds & Northrup Instrs., A Unit of General Signal Corp., Sumneytown Pike, North Wales, PA 19454 215-643-2000
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Mega Logic, 9659 Natl. Rd., Brookville, OH 45309 513-833-5222
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Processors, Communications, Front End-1900

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Processors, Communications, Network Node-1900

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Cybernetic Micro Sys., P.O. Box 3000, 3000 Hwy. 84, San Gregorio, CA 94074 415-726-3000
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Stanford Telecommunications, Inc., 2421 Mission College Blvd., Santa Clara, CA 95054 408-748-1010
Timeplex, Inc., 400 Chestnut Ridge Rd., Woodcliff Lake, NJ 07675 201-930-4600
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Processors, Communications, Standalone-1900

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§† Compucorp, 2211 Michigan Ave., Santa Monica, CA 90404 213-829-7453
Information Technolgoy A.D.S.C., P.O. Box 470, College Park, MD 20740 301-779-5110
§ Micom Systems, Inc., 4100 Los Angeles Ave, P.O. Box 8100, Simi Valley, CA 93062-8100 805-583-8600
NCR Comten, Inc., NCR Corp., 2700 Snelling Avenue N., St. Paul, MN 55113 612-638-7777

Processors, Image-2000

§ Advanced Micro Devices, P.O. Box 3453, 901 Thompson Pl., Sunnyvale, CA 94088 408-732-2400
Applied Sys., 26401 Harper Ave., St. Clair Shores, MI 48081 313-779-8700
§ CCD Imaging, Fairchild Camera & Instr. Corp., 450 National Ave., Mountain View, CA 94043 415-493-8001
† Colorado Video, Inc., Box 928, Boulder, CO 80306 303-444-3972
Computer Design & Applications Inc., 411 Waverly Oaks Rd., Waltham, MA 02154 617-647-1900
Digital Graphic Sys., 2629 Terminal Blvd., Mountain View, CA 94043 415-962-0200
§ Eigen Video, P.O. Box 848, Nevada City, CA 95959 916-272-3461
ElectroPhysics Corp., 48 Spruce St., Nutley, NJ 07110 201-667-2262
Hamamatsu Photonics K.K., 325-6 Sunayama-Cho, Hamamatsu City, Shizuoka Pref, JAPAN 0534-52-2141
Imaging Technology, Inc., 600 W. Cummings Park, Woburn, MA 01801 .. 617-938-8444
Interpretation Sys., Inc., A DBA Systems Company, 420 S. Fairview Ave., Goleta, CA 93117 805-967-2383
Lexidata Corp., 755 Middlesex Tpke., Billerica, MA 01865 .... 617-663-8550; 800-472-4747
Mathematical Systems Design, Inc., 2850 Ocean Park Blvd., Ste. 300, Santa Monica, CA 90405 213-450-9851
Matrox Elctrn. Sys., 1055 St. Regis Blvd., Dorval, QU, CANADA H9P 2T4 514-685-2630
Penn Video Inc., 929 Sweitzer Ave., Akron, OH 44311 216-762-4840
SEKAI Elctrns. of Amer., Inc., 14700 E. Firestone Blvd., Suite 122, La Mirada, CA 90638 714-670-1854
Third Domain, P.O. Box 35400, Tucson, AZ 85740-5400 602-293-6310
Toko America, Inc., 1250 Feehanville Dr., Mt. Prospect, IL 60056 312-297-0070
Vicom Systems, Inc., 2520 Junction Avenue, San Jose, CA 95134 408-946-5660
§ Vidco, 8323 S.W. Cirrus Drive, Beaverton, OR 97005 503-641-1804

Program Board Connectors — See Connectors, Plug-in, Program Board (Vol. C)

Programmers, Cam & Drum-2200

Datametrics • Dresser Inds., Inc., 340 Fordham Road, Wilmington, MA 01887, 617-658-5410 .... B•1791
American Control Products, Div. of Precision Timer Co., Inc., 13 Westbrook Ind'l. Pk., Westbrook, CT 06498 203-399-6253
Automatic Timing & Controls Co., 201 So. Gulph Rd., King of Prussia, PA 19406 .... 215-337-5500;800-441-8245
Barber-Colman Co., Indl. Instrs. Div., P.O. Box 2940, 1354 Clifford Ave., Loves Park, IL 61132 815-877-0241
Bridge Computer Co., Sea Data Corp., 1 Bridge St., Newton, MA 02158 .. 617-244-8190
† Cole Instr., 2650 S. Croddy Way, Santa Ana, CA 92704 714-556-3100
† Computer Conversions Corp., 6 Dunton Ct., E. Northport, NY 11731 516-261-3300
§ Eagle Signal Controls, Mfg. Div. Gulf & Western Inds., Box 16100, Austin, TX 78761 512-837-8300
Elnik Instrs., 3 Edison Place, Fairfield, NJ 07006 201-882-8033
§ Love Controls, 1475 S. Wheeling Rd., Wheeling, IL 60090 312-541-3232
PPM, Inc., 4521 Emery Ind. Pkwy., Cleveland, OH 44128 216-292-6006
§ Research, Inc., Box 24064, Minneapolis, MN 55424 612-941-3300
§ Sealectro, 225 Hoyt St., Mamaroneck, NY 10543 914-698-5600
Sequential Info. Sys., 249 N. Saw Mill River Rd., Elmsford, NY 10523 914-592-5930
Techniques, Inc., 235 Jackson St., Englewood, NJ 07631 201-569-5900
§ Tenor, 17020 W. Rogers Dr., New Berlin, WI 53151 414-782-3800
ZI-TECH Instr. Corp., 2151 Park Blvd., Box 60490, Palo Alto, CA 94306 415-326-2151

Programmers, Matrix Boards — See Boards, Programming (Vol. C)

Programmers, Power-2200

Instrumentation & Control Sys., 520 Interstate Rd, Addison, IL 60101, 312-543-6200 .... B•1318

Programmers, Power Supply-4000

Electronic Measurements, 405 Essex Rd., Neptune, NJ 07753, 201-922-9300 .... D•1624-1625

Programmers, PROM & Logic Array-3130 — *See Vol. A*

Programmers, Punched Card-2000

Automatic Timing & Controls Co., 201 So. Gulph Rd., King of Prussia, PA 19406 .... 215-337-5500;800-441-8245
§ Sealectro, 225 Hoyt St., Mamaroneck, NY 10543 914-698-5600
† Taurus Corp., Academy Hill, P.O. Box 278, Lambertville, NJ 08530 609-397-2390

Programmers, Tape-2000

PPM, Inc., 4521 Emery Ind. Pkwy., Cleveland, OH 44128, 216-292-6006 .. D•1291
Amilon Corp., 49-12 30th Ave., Woodside, NY 11377 718-274-1794
General Numeric Corporation, 390 Kent Avenue, Elk Grove Village, IL 60007 312-640-1595
Elnik Instrs., 3 Edison Place, Fairfield, NJ 07006 201-882-8033
Harrel, Inc., 16 Fitch St., E. Norwalk, CT 06855 203-866-2573
§ Inmac, 2465 Augustine Dr., Santa Clara, CA 95054 408-727-1970
§ Jumbo Process Control, Inc., 410 Garibaldi Ave., Lodi, NJ 07644 201-779-7744

PROM Programmers — See Programmers, PROM & Logic Array (Vol. A)

Protectors, Brownout-4300 — *See Vol. B*

Protectors, Surge — See Suppressors, Transient Voltage

Proximity Transducers — See Current Sensors (Vol.), Transducers, Volt, etc.

Public Address Systems-1300

§ Altec Lansing, Altec Corp., 1250 N. Red Gum St., Anaheim, CA 92806 ... 714-632-7117
§ Argos Prods., 600 S. Sycamore St., Genoa, IL 60135 815-784-5118
Atlas Sound Div., 10 Pomeroy Rd., Parsippany, NJ 07054 201-887-7800
Audio Equip., Div. W. Kidde & Co., Inc., 706 Forrest St., Charlottesville, VA 22901 804-977-8050
§† Audiosone, Inc., 617 Fan Hill Rd., Monroe, CT 06468 ..... 203-268-4372;203-268-6703
§ Audiotronics Corp., 7428 Bellaire Ave., N. Hollywood, CA 91605 818-765-2645
CML MACARR Div., Marine Electric RPD, Inc., 666 Pacific St., Brooklyn, NY 11217 718-857-2400

§† Dukane Corp., Communications Sys. Div., 2900 Dukane Dr., St. Charles, IL 60174 312-584-2300
Enerco, Inc., 9615 W. Marginal Way S., Seattle, WA 98108 206-762-1422
§ Lear Siegler, Inc., 2850 Ocean Park Blvd., P.O. Box 2158, Santa Monica, CA 90406 213-452-5444
Magnum Opus Custom Elctrn. Engrg., 284 Kennedy St., Iselin, NJ 08830 201-283-4925
MG Electronics, 32 Ranick Rd., Hauppauge, NY 11788 516-582-3400
† Pacific Electro Dynamics, Inc., 11465 Willows Rd. N.E., Redmond, WA 98052 206-881-1700
§ Paso Sound Prods., 14 First St., Pelham, NY 10803 914-738-4800
§ Perma Power Elctrns., 5615 W. Howard Ave., Chicago, IL 60648 312-647-9414
§ Precision Elctrns., 9101 King Ave., Franklin Park, IL 60131 312-678-5350
† Shokai Far East, Ltd., 280 North Central Ave., Hartsdale, NY 10530 914-681-0700
§ Soundlier, American Trading & Prod. Corp., 9380 Watson Ind'l. Pk., St. Louis, MO 63126 314-962-9870
§ SPECO Div., Components Specialties, Inc., P.O. Box 624, 1172 Rte. 109, Lindenhurst, NY 11757 .... 516-957-8700;800-645-5516
§ Spectra Sonics, 3750 Airport Rd., Ogden, UT 84403 801-392-7531

Pullers, Circuit Board-5400 — *See Vol. C*

Pullers, Tube-5400 — *See Vol. C*

Pulleys-2500 — *See Vol. C*

Pulsers, Diode — See Power Supplies, AC Input, Greater than 1,000 VDC Output (Vol. D)

Pulsers, Logic Test-2900

§ Global Specialties, Interplex Electronics, Inc., 70 Fulton Terrace, P.O. Box 1942, New Haven, CT 06509 203-624-3103

Pumps, Vacuum-4100

† Air-Vac Engrg., 100 Gulf St., Milford, CT 06460 203-874-2541
† Automated Prod. Equip. Corp., 142 Peconic Ave., Medford, NY 11763 516-654-1197
Brailsford & Co., 670 Milton Rd., Rye, NY 10580 914-967-1820
CTI-Cryogenics, 266 Second Ave, Waltham, MA 02254 617-890-9400
§ CVC Prods., 525 Lee Rd., Rochester, NY 14603 716-458-2550
† Dresser Inds., 1505 Elm St., Dallas, TX 75201 214-746-6000
Everett/Charles Test Equip. Inc., 2887 N. Towne Ave., Pomona, CA 91767 714-621-9511
High Voltage Engrg. Corp., S. Bedford St., Burlington, MA 01803 617-272-1313
§ Hull Corp., Davisville Rd., Hatboro, PA 19040 215-672-7800
† Lear Siegler, Inc., 2850 Ocean Park Blvd., P.O. Box 2158, Santa Monica, CA 90406 213-452-5444
Materials Resch., Route 303, Orangeburg, NY 10962 914-359-4200
§ Techni-Tool, 5 Apollo Rd., Box 368, Plymouth Meeting, PA 19462 215-825-4990
§† ULVAC North America, P.O. Box 799, 105 York Street, Kennebunk, ME 04043 207-985-2973
Vactronic Lab. Equip., 65 Brightside Ave., E. Northport, NY 11731 .... 516-AN1-2660
Varian Assocs., Indl. Equip. Grp., 611 Hansen Way, Palo Alto, CA 94303 415-493-4000

Punches, Chassis-5400 — *See Vol. C*

Pyrometers, Infrared-2900

Barber-Colman Co., Indl. Instrs. Div., P.O. Box 2940, 1354 Clifford Ave., Loves Park, IL 61132 815-877-0241
† Barnes Engrg., 44 Commerce Rd., P.O. Box 53, Stamford, CT 06904 203-348-5381
Bluffton Products, Inc., Tegam, Inc., 7230 North Ridge Road, Madison, OH 44057 216-946-3572
Capintec Instrs., 6 Arrow Rd., Ramsey, NJ 07446 201-825-9500
† Electro-Optical Inds., Box 3770, Santa Barbara, CA 93130 805-964-6701
ElectroPhysics Corp., 48 Spruce St., Nutley, NJ 07110 201-667-2262
§ Epic, Inc., 150 Nassau St., New York, NY 10038 212-349-2470
§ E^2 Technology Corp., 4475 Dupont Ct #9, Ventura, CA 93003 805-644-9544
§ Everest Interscience, Inc., P.O. Box 345, Tustin, CA 92681 .... 714-992-4461; 714-730-0747
Harrel, Inc., 16 Fitch St., E. Norwalk, CT 06855 203-866-2573
Hughes Aircraft Co, Aerospace Grps./Support Sys., P.O. Box 90515, Los Angeles, CA 90009 213-670-1515
Hughes Aircraft Co., Microelctrn. Sys. Div., 2601 Campus Dr., Irvine, CA 92715 714-752-3800
§ Jumbo Process Control, Inc., 410 Garibaldi Ave., Lodi, NJ 07644 201-779-7744
Mikron Instr., Box 211, Ridgewood, NJ 07451 201-891-7330
Omega Engrg., Box 4047, Stamford, CT 06907 203-359-1660
§ Testoterm, P.O. Box 111509, Nashville, TN 37211 615-834-5082
§ Wahl Instruments, Inc., 5750 Hannum Ave., Culver City, CA 90230 213-822-6144

Pyrometers, Optical, Noninfrared-5300 — *See Vol. B*

Pyrometers, Recording-2900

§ Atkins Tech., 3321 S.W. 40th Blvd., Gainesville, FL 32608 904-378-5555
Barber-Colman Co., Indl. Instrs. Div., P.O. Box 2940, 1354 Clifford Ave., Loves Park, IL 61132 815-877-0241
Bluffton Products, Inc., Tegam, Inc., 7230 North Ridge Road, Madison, OH 44057 216-946-3572
Bristol Babcock Inc., 40 Bristol St., Waterbury, CT 06708 203-575-3000
Capintec Instrs., 6 Arrow Rd., Ramsey, NJ 07446 201-825-9500
Chessell Corp., Penns Trail, Newtown, PA 18940 215-968-0660
§ Everest Interscience, Inc., P.O. Box 345, Tustin, CA 92681 .... 714-992-4461; 714-730-0747
Gordon, Claud S., Co., 5710 Kenosha St., Richmond, IL 60071 815-678-2211
Gulton Inds., Inc., Graphic Instruments Div., Gulton Ind'l. Pk., E. Greenwich, RI 02818 401-884-6800
Harrel, Inc., 16 Fitch St., E. Norwalk, CT 06855 203-866-2573
† Honeywell, Process Control Div., 1100 Virginia Dr., Ft. Washington, PA 19034 .... 800-321-5111, Ext. 596
Kaye Instruments, 15 De Angelo Dr., Bedford, MA 01730 617-275-0300
Leeds & Northrup Instrs., A Unit of General Signal Corp., Sumneytown Pike, North Wales, PA 19454 215-643-2000
§ Love Controls, 1475 S. Wheeling Rd., Wheeling, IL 60090 312-541-3232
Mikron Instr., Box 211, Ridgewood, NJ 07451 201-891-7330
Modutec, 18 Marshall St., Norwalk, CT 06854 203-853-3636
† NANMAC Corp., 9 Mayhew St., Framingham, MA 01701 617-872-4811
Omega Engrg., Box 4047, Stamford, CT 06907 203-359-1660
Science/Elctrns., 1224-26 McCook Ave., Dayton, OH 45404 513-228-6011
S. F. Products Corporation, P. O. Box 369, Southport, CT 06490 203-929-6180
§ Simpson Elec. Co., 853 Dundee Ave., Elgin, IL 60120 312-697-2260
§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 215-673-5600
Syscon Intl., Inc., 1108 So. High St., So. Bend, IN 46618-1096 .... 219-232-3900; 800-348-2993
§ Testoterm, P.O. Box 111509, Nashville, TN 37211 615-834-5082
§ TRW, Dynalco Controls Div., 5200 NW 37th, P.O. Box 8187, Ft. Lauderdale, FL 33310 305-739-4300
§ Wahl Instruments, Inc., 5750 Hannum Ave., Culver City, CA 90230 213-822-6144
§ West Division, Gulton Industries, Inc., 3860 N. River Rd., Schiller Park, IL 60176 312-678-6400
§ Yokogawa Corp. of America, 2 Dart Rd., Shenandoah, GA 30265 404-253-7000

Q Bus — See Board Computers & Subassemblies (Vol. D)

Quartz, Fused-2500 — *See Vol. C*

Quartz, Raw — See Crystals, Quartz (Vol. A)

Racks, Aging — See Ovens, Aging, Burn-in, Life Test (Vol. D)

Racks, Cabinet — See Enclosures, Equipment & Panel Mounting (Vol. C)

Racks, Circuit Board — See Enclosures, Circuit Board, Module & Relay Mounting (Vol. C)

Racks, Desk & Console — See Enclosures, Equipment & Panel Mounting (Vol. C)

Racks, Module — See Enclosures, Circuit Board, Module & Relay Mounting (Vol. C)

Racks, Relay & Mounting — See Enclosures, Circuit Board, Module & Relay Mounting (Vol. C)

Radar Homing & Warning (RHAW) Systems (MIL)-3475

† General Instr., Govt. Sys., 600 W. John St., Hicksville, NY 11802-0709 516-933-3000
† Litton Applied Technology, 645 Almanor Ave., P.O. Box 3478, Sunnyvale, CA 94088-3478 408-773-0777

Radar Forward-Looking Infrared (FLIR) Sets (MIL)-3475

† Honeywell Inc., Aerospace & Defense Grp., Honeywell Plaza, Minneapolis, MN 55408 612-870-5186
Teledyne Camera Sys., 131 N. Fifth Ave., Arcadia, CA 91006 818-359-6691
Texas Instrs., Data Sys. Group, P. O. Box 809063, Dallas, TX 75380-9063 1-800-527-3500

Radar Intercept (MIL)-3475

† Cincinnati Elctrns., 2630 Glendale Milford Rd., Cincinnati, OH 45241 513-733-6100
† General Instr., Govt. Sys., 600 W. John St., Hicksville, NY 11802-0709 516-933-3000

Radar Systems (MIL), Elint-3475

Datron Systems, Inc., 200 West Los Angeles Ave., Simi Valley, CA 93065-1650 805-584-1717
† E-Systems, Greenville Div., P.O. Box 1056, Greenville, TX 75401 214-457-4694
† General Instr., Govt. Sys., 600 W. John St., Hicksville, NY 11802-0709 516-933-3000
† ITT Gilfillan, 7821 Orion Ave., Van Nuys, CA 91409 818-988-2600
† Litton Applied Technology, 645 Almanor Ave., P.O. Box 3478, Sunnyvale, CA 94088-3478 408-773-0777
† Radio Resch. Instr. Co., Inc., Two Lake Ave. Extension, Danbury, CT 06811-5295 203-792-6666

Radar System Components-3450 — *See Vol. A*

Radio Communications Systems — See Communications Systems (Vol. D)

Radiographic Equip. — See X-ray Inspection Equip. (Vol. D)

Radiometers-2900

General Microwave Corp., 155 Marine St., Farmingdale, NY 11735, 516-694-3600 .... D•1232
Photodyne, 1175 Tourmaline Dr., Newbury Park, CA 91320, 818-889-8770 .... B•1122-1123
Alpha Inds., Inc. - TRG Millimeter Comp., 20 Sylvan Rd., Woburn, MA 01801 617-935-5150
§ American Ultraviolet, 320 Commerce St., Chatham, NJ 07928 201-635-8355
† Barnes Engrg., 44 Commerce Rd., P.O. Box 53, Stamford, CT 06904 203-348-5381
§ BEA electro-optics, Inc., 690 First Ave., Des Plaines, IL 60016 312-298-1420
Beckman Instrs., 2500 Harbor Blvd., Fullerton, CA 92634 714-871-4848
Biospherical Instrs., Inc., 4901 Morena Blvd. #1003, San Diego, CA 92117 619-270-1315

† Eaton Corp., A.I.L. Div., Comac Rd., Deer Park, NY 11729 516-595-3094
EG&G Gamma Scientific, Div. of EG&G Inc., 3777 Ruffin Rd., San Diego, CA 92123 619-279-8034
Electron-Machine Corp., Box M, Umatilla, FL 32784 904-669-3101
† Electro-Optical Inds., Box 3770, Santa Barbara, CA 93130 805-964-6701
§ Everest Interscience, Inc., P.O. Box 345, Tustin, CA 92681 .... 714-992-4461; 714-730-0747
Gamma Scientific Inc., 3777 Ruffin Rd., San Diego, CA 92123 619-279-8034
Hy-Cal Engrg., 9650 Telstar Ave., El Monte, CA 91731 213-444-4000
† KLC/Karl Lambrecht Corp., 4204 N. Lincoln Ave., Chicago, IL 60618 312-472-5442
§ Laser Precision Corp., 1231 Hart St., Utica, NY 13502 315-797-4449
† LNR Communications, Inc., 180 Marcus Blvd., Hauppauge, NY 11788 516-273-7111
Mathematical Systems Design, Inc., 2850 Ocean Park Blvd., Ste. 300, Santa Monica, CA 90405 213-450-9851
Mikron Instr., Box 211, Ridgewood, NJ 07451 201-891-7330
§† Photo Resch., Kollmorgen Corp., 3000 N. Hollywood Way, Burbank, CA 91505 818-843-6100
† Radiometrics, Inc., 12021 South Memorial Pkwy., Huntsville, AL 35803 205-881-1272
† Santa Barbara Resch. Ctr., 75 Coromar Dr., Goleta, CA 93117 805-968-3511
Spectrolab, Inc., 12500 Gladstone Ave., Sylmar, CA 91342 213-365-4611
§† Spectronics Corp., 956 Brush Hollow Rd., Westbury, NY 11590 516-333-4840
Teledyne/Geotech, 3401 Shiloh Rd., Garland, TX 75041 214-271-2561
United Detector Tech., 12525 Chadron Ave., Hawthorne, CA 90250 213-978-0516
Yellow Springs Instr., Box 279, Yellow Springs, OH 45387 513-767-7241

Radomes & Windows, Microwave-3450 — See *Vol. A*

Reactors, Charging-5600 — See *Vol. A*

Reactors, Epitaxial — See Machines & Accessories, Semiconductor Manufacturing (Vol. D)

Reactors, Filter-5600 — See *Vol. A*

Reactors, Loading-5600 — See *Vol. A*

Reactors, Saturable-1800 — See *Vol. A*

Reactors (MIL)-2440 — See *Vol. B*

Readers, Badge-2000

† Taurus Corp., Academy Hill, P.O. Box 278, Lambertville, NJ 08530, 609-397-2390 .... D•1074
Xico, Inc., 120 Ocean Way, Santa Monica, CA 90402, 213-454-0302 .... D•1082
§ American Magnetics, 740 Watson Center Rd., Carson, CA 90745 213-775-8651
§ Caere Corp., 100 Cooper St., Los Gatos, CA 95030 408-395-7000
Control Module, 380 Enfield St., Enfield, CT 06082 203-745-2433
§ Corby Inds. Inc., P. O. Box 2838, Allentown, PA 18001 215-433-1412
Hickok Elec. Instr., 10514 DuPont Ave., Cleveland, OH 44108 216-541-8060
§ InfoCap, Inc., 31119 Via Colinas #502, Westlake Village, CA 91362 818-991-1410
Sealectro, 225 Hoyt St., Mamaroneck, NY 10543 914-698-5600
True Data, 17092 Pullman St. #B, Irvine, CA 92714 714-979-4842
Vertex Inds., Inc., Vertel Div., P.O. Box 1123, 23 Carol St., Clifton, NJ 07014 201-472-1331

Readers, Bar Code-2000

General Digital Corp., 700 Burnside Ave., E. Hartford, CT 06108, 203-528-9041 .... D•1067
§ Caere Corp., 100 Cooper St., Los Gatos, CA 95030 408-395-7000
Computerwise, 4006 E 137th Terr., Grandview, MO 64030 816-765-3330
Comtec Infor. Sys., Inc., 53 John St., Cumberland, RI 02864 401-724-8500
Control Module, 380 Enfield St., Enfield, CT 06082 203-745-2433
Dynamic Time Systems, Inc., 150 West 1230 North, Ste. 2, Provo, UT 84604 801-377-9154
Femco, Inc., P.O. Box 26710 Parkmoor Sta., San Jose, CA 95159 408-946-1188
Fork Standards, Inc., 666 Western Ave., Lombard, IL 60148 312-932-9380
FSI/Fork Standards Inc., 666 Western Ave., Lombard, IL 60148 .... 312-231-3511; 312-932-9380
† Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
Vertex Industries, Inc., Indenticon Div., 23 Carol St., P. O. Box 1123, Clifton, NJ 07014 201-472-2121
§ InfoCap, Inc., 31119 Via Colinas #502, Westlake Village, CA 91362 818-991-1410
† Lenox Laser, 504 Pittsfield Rd., Lenox, MA 01240 413-637-0444
Opto Technology, Inc., 1674 S. Wolf Rd., Wheeling, IL 60090 312-537-4277
§ Percon, 2190 W. 11th, Eugene, OR 97402 503-344-1189
Poulin Associates, Inc., 302 North Rd., Sudbury, MA 01776 617-443-7333
† Scope, Inc., 1860 Michael Faraday Dr., Reston, VA 22090 703-471-5600
Skan-A-Matic, Box S, Elbridge, NY 13060 315-689-3961

Readers, Character-2000

§ Caere Corp., 100 Cooper St., Los Gatos, CA 95030 408-395-7000
Cognitronics, 25 Crescent St., Stamford, CT 06906 203-327-5307
Comtec Infor. Sys., Inc., 53 John St., Cumberland, RI 02864 401-724-8500
§† Dest Corp., 2380 Bering Dr., San Jose, CA 95131 408-946-7100
§ Key Tronic, P.O. Box 14687, Spokane, WA 99214 509-928-8000
KLC Corp., 2234 East Colorado, Pasadena, CA 91107 818-796-0525
Lundy Elctrns. & Systems, Inc., 1 Robert La., Glen Head, NY 11545 516-671-9000
Sealectro, 225 Hoyt St., Mamaroneck, NY 10543 914-698-5600
Sensor Techn., 21012 Lassen St., Chatsworth, CA 91311 213-882-4100
United Detector Tech., 12525 Chadron Ave., Hawthorne, CA 90250 213-978-0516

Readers, Magnetic Card-2000

Xico, Inc., 120 Ocean Way, Santa Monica, CA 90402, 213-454-0302 .... D•1082
Control Module, 380 Enfield St., Enfield, CT 06082 203-745-2433
Honeywell Inc., Commercial Div., MN 27-7246, Honeywell Plaza, Minneapolis, MN 55408 612-870-5357
Omega Engrg., Box 4047, Stamford, CT 06907 203-359-1660
Thomson-CSF Comps. Corp., Passive Comp. Div., 5850 Canoga Ave., Suite 300, Woodland Hills, CA 91367 818-887-1010
† Vertex Inds., Inc., Vertel Div., P.O. Box 1123, 23 Carol St., Clifton, NJ 07014 201-472-1331

Readers, Magnetic Stripe Card-2000

Xico, Inc., 120 Ocean Way, Santa Monica, CA 90402, 213-454-0302 .... D•1082
Computerwise, 4006 E 137th Terr., Grandview, MO 64030 816-765-3330
Michigan Magnetics, 203 W. Third St., Vermontville, MI 49096 517-726-0590
TEC, 2727 N. Fairview, Box 5646, Tuscon, AZ 85703 602-792-2230
Vertex Inds., Inc., Vertel Div., P.O. Box 1123, 23 Carol St., Clifton, NJ 07014 201-472-1331

Readers, Punched Card-2000

HEI, Inc., 1495 Steiger Lake La., Victoria, MN 55386, 612-443-2500 .... B•1211
† Taurus Corp., Academy Hill, P.O. Box 278, Lambertville, NJ 08530, 609-397-2390 .... D•1074
† Astronautics Corporation of America, P.O. Box 523, Milwaukee, WI 53201-0523 414-447-8200
BMS Data Handling, Inc., 12155 Magnolia, Riverside, CA 92503 714-359-8824
Digital Equip., One Iron Way, Marlborough, MA 01752
Documation, Box 1240, Melbourne, FL 32901 305-725-5500
Opto Technology, Inc., 1674 S. Wolf Rd., Wheeling, IL 60090 312-537-4277
True Data, 17092 Pullman St. #B, Irvine, CA 92714 714-979-4842
Vertex Inds., Inc., Vertel Div., P.O. Box 1123, 23 Carol St., Clifton, NJ 07014 201-472-1331

Readers, Punched Tape-2000

Addmaster Corp., 416 Junipero Serra Dr., San Gabriel, CA 91776 818-285-1121
† Astronautics Corporation of America, P.O. Box 523, Milwaukee, WI 53201-0523 414-447-8200
§ Chalco Engrg., 15126 S. Broadway, Gardena, CA 90248 .... 213-FA1-0121
§† Data Specialties, Inc., 3455 Commercial Ave., Northbrook, IL 60062 312-564-1800
Digital Equip., One Iron Way, Marlborough, MA 01752
Facit, Inc., 9 Executive Park Dr., Merrimack, NH 03054 603-424-8000
§ GNT Automatic, 1560 Trapelo Rd., Waltham, MA 02154 617-890-3305
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
Opto Technology, Inc., 1674 S. Wolf Rd., Wheeling, IL 60090 312-537-4277
§ Remex Cam Operations, Ex-Cell-O Corporation, 1230 S. Lewis Street, Anaheim, CA 92805 714-535-4160
Sensor Techn., 21012 Lassen St., Chatsworth, CA 91311 213-882-4100
§† Superior Elec. Co., 383 Middle St., Bristol, CT 06010 203-582-9561
Systems Data, Inc., 2830 Copley Road, P.O. Box 4297, Akron, OH 44321 216-666-0085
§† Systron-Donner Instr. Div., 2727 Systron Dr., Concord, CA 94518 415-676-5000
Taurus Corp., Academy Hill, P.O. Box 278, Lambertville, NJ 08530 609-397-2390
Teleterminal Corp., Greenland, NH 03840 603-431-1200
TTS-Telecom Terminal Systems, 621 Hindry Ave, Inglewood, CA 90301 213-641-8111
§† Westrex, 1140 Bloomfield Ave., W. Caldwell, NJ 07006 201-227-7290
Wire Graphics, Inc., 215 B. Central Ave., Farmingdale, NY 11735 516-293-1525

Readers, Static Card-2000

† Taurus Corp., Academy Hill, P.O. Box 278, Lambertville, NJ 08530, 609-397-2390 .... D•1074
Vertex Inds., Inc., Vertel Div., P.O. Box 1123, 23 Carol St., Clifton, NJ 07014 201-472-1331

Readers, Time Code-2000

§ Chrono-log Corp., 2 W. Park Rd., Havertown, PA 19083, 215-853-1130 .. D•1061
† TRAK Systems, Div. TRAK Microwave Corp., 4722 Eisenhower Blvd., Dept. E-5, Tampa, FL 33614, 813-884-1411 .... D•1080
Austron, Inc., P.O. Box 14766, Exit 248 N. IH 35, Austin, TX 78761 512-251-2341
Datachron Inc., 3186 J Airway Ave., Costa Mesa, CA 92626 714-751-2211
† Datum Inc., Timing/Aacom Divisions, 1363 S. State College Blvd., Anaheim, CA 92806 714-533-6333
§ ESE, 142 Sierra St., El Segundo, CA 90245 213-322-2136
K-Systems, Inc., 3902 Lilac, Las Cruces, NM 88005 505-526-3209
Wide Range Elctrns. Corp., 2119 Schultz Rd., St. Louis, MO 63146 314-567-5366

Readouts — See Tubes, Readout (Vol. A)

Reamers-5400 — See *Vol. C*

Receivers, AM/FM (Incl. Precision Test)-2900

Datum Inc., Timing/Aacom Divisions, 1363 S. State College Blvd., Anaheim, CA 92806, 714-533-6333 .... D•1050
MARCONI INSTRUMENTS, 3 Pearl Court, Allendale, NJ 07401, 201-934-9050 .... D•1264
Aydin Vector Div., Box 328, Newtown, PA 18940 215-968-4271
§ Cetec Raymer, 7315 Fulton Ave., No. Hollywood, CA 91605 213-875-0423
† Collins Avionics Divisions, Rockwell Intl., 400 Collins Rd. NE, Cedar Rapids, IA 52498 319-395-1000
† Cushman Elctrns., 2450 N. 1st St., San Jose, CA 95131 408-263-8100
Eaton Corp., Elctrn. Instrmn. Div., 5340 Alla Rd., Los Angeles, CA 90066
FG Engrg., Box 476, Fredonia, AZ 86022 602-643-7375
† Hartman Systems, Figgie Intl., 360 Wolf Hill Rd., Huntington Sta., NY 11746 516-427-7500
HDS Inc., 12310 Pinecrest Rd., Reston, VA 22091 703-620-6200
§ Heath Co., Benton Harbor, MI 49022 616-982-3886
Paso Sound Prods., 14 First St, Pelham, NY 10803 914-738-4800
§ Precision Elctrns., 9101 King Ave., Franklin Park, IL 60131 312-678-5350
RHG Electronics Lab., Inc., 161 E. Industry Ct., Deer Park, NY 11729 516-242-1100
Schaffner EMC, Inc., Instr. Div., 825 Lehigh Avenue, Union, NJ 07083 201-851-0644
§ Shokai Far East, Ltd., 280 North Central Ave., Hartsdale, NY 10530 914-681-0700
Sparkomatic, Rte. 6 & 209, Milford, PA 18337 717-296-6444

§ SPECO Div., Components Specialties, Inc., P.O. Box 624, 1172 Rte. 109, Lindenhurst, NY 11757 ... 516-957-8700;800-645-5516
§ Tucker Elctrns., Box 461966, Garland, TX 75046 ... 214-348-8800;800-527-4642

Receivers, Communication-1900

MARCONI INSTRUMENTS, 3 Pearl Court, Allendale, NJ 07401, 201-934-9050 ... D•1264
MERET, Inc., 1815 24th St., Santa Monica, CA 90404-4998, 213-828-7496 ... B•1121
Motorola Semiconductor Prods. Sector, Adv. 72, Box 20912, Phoenix, AZ 85036, 602-244-6900 ... A•1690
† AEROCOM, 3090 S.W. 37th Ave., Miami, FL 33133 ... 305-448-6503
† Allied Corp. Aerospace Sector, Bendix Communications Div., East Joppa Rd., Towson, MD 21204 ... 301-583-4000
American Electronic Labs., Box 552, Lansdale, PA 19446 ... 215-822-2929
American Elctrn. Labs., Inc., Govt. Grp. Div., P.O. Box 552, Lansdale, PA 19446
† Applied Communications, Amstar Tech. Prods. Co., 5490 Spectrum Drive, Frederick, MD 21701 ... 301-694-5300
† Applied Communications, 9125 Gaither Rd., Gaithersburg, MD 20877 ... 301-948-5210
† Argent Elctrns., 3245 S. County Rd., 25A, Troy, OH 45373 ... 513-335-0031
† Aydin Vector Div., Box 328, Newtown, PA 18940 ... 215-968-4271
§ Brelonix, 106 No. 36th St., Seattle, WA 98103 ... 206-633-1964
† Cincinnati Elctrns., 2630 Glendale Milford Rd., Cincinnati, OH 45241 ... 513-733-6100
† Collins Avionics Divisions, Rockwell Intl., 400 Collins Rd. NE, Cedar Rapids, IA 52498 ... 319-395-1000
† Colorado Video, Inc., Box 928, Boulder, CO 80306 ... 303-444-3972
Communication Assocs., 200 McKay Rd., Huntington Sta., NY 11746 ... 516-271-0800
† Cushman Elctrns., 2450 N. 1st St., San Jose, CA 95131 ... 408-263-8100
† Dexcel, Div. of Gould, 2285C Martin Ave., Santa Clara, CA 95050 ... 408-727-9833
Digital Radio Corp., 8901 La Cienega Blvd., Inglewood, CA 90301 ... 213-670-8611
§ Drake, R. L., Co., 540 Richard St., Miamisburg, OH 45342 ... 513-866-2421
† Eaton Corp., A.I.L. Div., Comac Rd., Deer Park, NY 11729 ... 516-595-3094
Eaton Corp., Elctrn. Instrmn. Div., 5340 Alla Rd., Los Angeles, CA 90066
§ Emergency Beacon Corp., 15 River St., New Rochelle, NY 10801 ... 914-235-9400
† Hartman Systems, Figgie Intl., 360 Wolf Hill Rd., Huntington Sta., NY 11746 ... 516-427-7500
† Hazeltine Corp., 500 Commack Rd., Commack, NY 11725 ... 516-462-5100
HDS Inc., 12310 Pinecrest Rd., Reston, VA 22091 ... 703-620-6200
§ Heath Co., Benton Harbor, MI 49022 ... 616-982-3886
Hughes Aircraft Co, Aerospace Grps./Support Sys., P.O. Box 90515, Los Angeles, CA 90009 ... 213-670-1515
Hughes Aircraft Co., Microelctrn. Sys. Div., 2601 Campus Dr., Irvine, CA 92715 ... 714-752-3800
La Pointe Industries, Inc., Electronics Products Div., 155 W. Main St., Rockville, CT 06066 ... 203-872-8581
† LNR Communications, Inc., 180 Marcus Blvd., Hauppauge, NY 11788 ... 516-273-7111
Loral TerraCom, Div. of Loral Corp., 9020 Balboa Ave., San Diego, CA 92123 ... 619-278-4100
† Lorch Elctrns., 105 Cedar La., Englewood, NJ 07631 ... 201-569-8282
Pathcom, Inc., Pace Two-Way Radio Prods., 24105 S. Frampton Ave., Harbor City, CA 90710 ... 213-325-1290
Photodyne, 1175 Tourmaline Dr., Newbury Park, CA 91320 ... 818-889-8770
RHG Electronics Lab., Inc., 161 E. Industry Ct., Deer Park, NY 11729 ... 516-242-1100
Rockwell Intl., Commercial Elctrns. Opers., 1200 N. Alma Rd., Richardson, TX 75081 ... 214-996-5000
Schaffner EMC, Inc., Instr. Div., 825 Lehigh Avenue, Union, NJ 07083 ... 201-851-0644
Scientific-Atlanta, Inc., P.O. Box 105600, Atlanta, GA 30348 ... 404-441-4000
† Scientific Communications, Inc., 3425 Kingsley Rd., Garland, TX 75041 ... 214-271-3685
† Signatron, A Unit of Sundstrand Corp., 12 Hartwell Ave., Lexington, MA 02173 ... 617-861-1500
† TRW Microwave, 825 Stewart Dr., Sunnyvale, CA 94086 ... 408-732-0880
† Watkins-Johnson Co., 3333 Hillview Ave., Palo Alto, CA 94304 ... 415-493-4141

Receivers, Fiber Optic-2475 – *See Vol. B*

Receivers, Field Intensity, Microwave – See Receivers, Microwave (Vol. D)

Receivers, Fixed Frequency-2900

Datum Inc., Timing/Aacom Divisions, 1363 S. State College Blvd., Anaheim, CA 92806, 714-533-6333 ... D•1050
† AEROCOM, 3090 S.W. 37th Ave., Miami, FL 33133 ... 305-448-6503
American Electronic Labs., Box 552, Lansdale, PA 19446 ... 215-822-2929
§ Applied Communications, Amstar Tech. Prods. Co., 5490 Spectrum Drive, Frederick, MD 21701 ... 301-694-5300
§ Applied Communications, 9125 Gaither Rd., Gaithersburg, MD 20877 ... 301-948-5210
† Applied Research, Inc., 160 Dupont St., Plainview, NY 11803 ... 516-349-9200
† A.R.F. Prods., 2559 75th St., Boulder, CO 80301 ... 303-443-4844
† Austron, Inc., P.O. Box 14766, Exit 248 N. IH 35, Austin, TX 78761 ... 512-251-2341
† Aydin Vector Div., Box 328, Newtown, PA 18940 ... 215-968-4271
§ Brelonix, 106 No. 36th St., Seattle, WA 98103 ... 206-633-1964
§† Cal Count, 5407 Port Royal Rd., Springfield, VA 22151 ... 703-321-9625
† Cincinnati Elctrns., 2630 Glendale Milford Rd., Cincinnati, OH 45241 ... 513-733-6100
† Collins Avionics Divisions, Rockwell Intl., 400 Collins Rd. NE, Cedar Rapids, IA 52498 ... 319-395-1000
Communication Assocs., 200 McKay Rd., Huntington Sta., NY 11746 ... 516-271-0800
† Comstron Corp., 200 E. Sunrise Hwy., Freeport, NY 11520 ... 516-546-9700
† EDMAN Corp., Subsidiary of Rospatch, 7500 Main St., P.O. Box 750, Fishers, NY 14453-0750 ... 716-924-4000
§ Emergency Beacon Corp., 15 River St., New Rochelle, NY 10801 ... 914-235-9400
FG Engrg., Box 476, Fredonia, AZ 86022 ... 602-643-7375
† Gorman-Redlich Mfg. Co., 6 Curtis St., Athens, OH 45701 ... 614-593-3150
† Hartman Systems, Figgie Intl., 360 Wolf Hill Rd., Huntington Sta., NY 11746 ... 516-427-7500
§ Heath Co., Benton Harbor, MI 49022 ... 616-982-3886
Hughes Aircraft Co, Aerospace Grps./Support Sys., P.O. Box 90515, Los Angeles, CA 90009 ... 213-670-1515
§ Kinemetrics/Truetime, 3243 Santa Rose Ave, Santa Rosa, CA 95407 ... 707-528-1230
† Lorch Elctrns., 105 Cedar La., Englewood, NJ 07631 ... 201-569-8282
§ Pathcom, Inc., Pace Two-Way Radio Prods., 24105 S. Frampton Ave., Harbor City, CA 90710 ... 213-325-1290
Resdel Engrg., 300 E. Live Oak Ave., Arcadia, CA 91006 ... 213-684-2600
RHG Electronics Lab., Inc., 161 E. Industry Ct., Deer Park, NY 11729 ... 516-242-1100
Rockwell Intl., Commercial Elctrns. Opers., 1200 N. Alma Rd., Richardson, TX 75081 ... 214-996-5000
§ Shokai Far East, Ltd., 280 North Central Ave., Hartsdale, NY 10530 ... 914-681-0700
† Solid State Elctrns. Corp., 18646 Parthenia St., Northridge, CA 91324 ... 818-993-8257
Spectracom, 101 Despatch Drive, East Rochester, NY 14445 ... 716-381-4827
† TRAK Microwave Corp., 4726 Eisenhower Blvd., Dept. E5, Tampa, FL 33614 ... 813-884-1411
† Watkins-Johnson Co., 3333 Hillview Ave., Palo Alto, CA 94304 ... 415-493-4141

Receivers, Frequency Shift-1900

† AEROCOM, 3090 S.W. 37th Ave., Miami, FL 33133 ... 305-448-6503
Dantel, 2991 N. Argyle Ave., Fresno, CA 93727 ... 209-292-1111
† Electrocom Inds., 1105 N. Ironwood Dr., S. Bend, IN 46615 ... 219-232-2743
FG Engrg., Box 476, Fredonia, AZ 86022 ... 602-643-7375
† Hartman Systems, Figgie Intl., 360 Wolf Hill Rd., Huntington Sta., NY 11746 ... 516-427-7500
Resdel Engrg., 300 E. Live Oak Ave., Arcadia, CA 91006 ... 213-684-2600
RFL Inds., A Dowty Grp. Co./Comms. Div., Powerville Rd., Boonton, NJ 07005 ... 201-334-3100
Rockwell Intl., Commercial Elctrns. Opers., 1200 N. Alma Rd., Richardson, TX 75081 ... 214-996-5000

Receivers, Headphone – See Handsets, etc. (Vol. D)

Receivers, Loran & Omega-1900

† Austron, Inc., P.O. Box 14766, Exit 248 N. IH 35, Austin, TX 78761, 512-251-2341 ... A•1315
† Argent Elctrns., 3245 S. County Rd., 25A, Troy, OH 45373 ... 513-335-0031
§† Cal Count, 5407 Port Royal Rd., Springfield, VA 22151 ... 703-321-9625
† Collins Avionics Divisions, Rockwell Intl., 400 Collins Rd. NE, Cedar Rapids, IA 52498 ... 319-395-1000
† Tracor Instruments, 6500 Tracor La., Bldg. 27, Austin, TX 78725 ... 512-929-2051

Receivers, Microwave-3400

Applied Research, Inc., 160 Dupont St., Plainview, NY 11803, 516-349-9200 ... A•1703
Datum Inc., Timing/Aacom Divisions, 1363 S. State College Blvd., Anaheim, CA 92806, 714-533-6333 ... D•1050
† Frequency and Time Systems, Inc., DATUM, INC., 34 Tozer Rd., Beverly, MA 01915, 617-927-8220 ... A•1365
Hughes Solid State Products, 500 Superior Ave., Dept. E8, Newport Bch., CA 92658-8903, 714-759-2411 ... A•1372
Alpha Inds., Inc.-MSD Div., 20 Sylvan Rd., Woburn, MA 01801 ... 617-935-5150
American Electronic Labs., Box 552, Lansdale, PA 19446 ... 215-822-2929
† Applied Communications, 9125 Gaither Rd., Gaithersburg, MD 20877 ... 301-948-5210
† A.R.F. Prods., 2559 75th St., Boulder, CO 80301 ... 303-443-4844
Avantek, Inc., 3175 Bowers Ave., Santa Clara, CA 95054 ... 408-496-6710
Aydin Corp., 700 Dresher Rd., Horsham, PA 19044 ... 215-657-7510
† Aydin Microwave, 75 East Trimble Rd., San Jose, CA 95131 ... 408-946-5600
Aydin Vector Div., Box 328, Newtown, PA 18940 ... 215-968-4271
† Condor Systems, Inc., 2605 S. Winchester Blvd., Campbell, CA 95008 ... 408-866-5900
† Eaton Corp., A.I.L. Div., Comac Rd., Deer Park, NY 11729 ... 516-595-3094
Eaton Corp., Elctrn. Instrmn. Div., 5340 Alla Rd., Los Angeles, CA 90066
† Electrac, Inc., 1614 Orangethrope Way, Anaheim, CA 92801 ... 714-879-6021
§† Electro-Metrics, Penril Corp., 100 Church St., Amsterdam, NY 12010 ... 518-843-2600
§† E-Systems, Garland Div., Box 226118, Dallas, TX 75266 ... 214-272-0515
† Farinon Div., Harris Corp., 1691 Bayport, San Carlos, CA 94070 ... 415-594-3000
FG Engrg., Box 476, Fredonia, AZ 86022 ... 602-643-7375
General Instr., Govt. Sys., 600 W. John St., Hicksville, NY 11802-0709 ... 516-933-3000
HDS Inc., 12310 Pinecrest Rd., Reston, VA 22091 ... 703-620-6200
† Hughes Aircraft Co., Microelctrn. Sys. Div., 2601 Campus Dr., Irvine, CA 92715 ... 714-752-3800
§ Integra, Inc., 2368 Walsh Ave., Santa Clara, CA 95051 ... 408-727-9601
† LNR Communications, Inc., 180 Marcus Blvd., Hauppauge, NY 11788 ... 516-273-7111
M/A-Com Cable/Home Communication Prodelin Satellite Antenna Systems, M/A-Com, Inc., P.O. Box 468, Newton, NC 28658 ... 800-222-1195;704-464-4141
Maury Microwave, 8610 Helms Ave., Cucamonga, CA 91730 ... 714-987-4715
† Microlab/FXR, 10 Microlab Rd., Livingston, NJ 07039 ... 201-992-7700
§ Micro-Now Instr. Co., Inc., 8260 N. Elmwood St., P.O. Box 856, Skokie, IL 60077 ... 312-677-4700
Microphase, 587 Connecticut Ave., Norwalk, CT 06856 ... 203-866-8000
† Microwave Assocs. Ltd., Humphrey Rd., Dunstable, Bedfordshire, ENGLAND LU5 4SX, England ... 44-(582) 60-14-41
† Microwave/Sys., 1 Adler Dr., E. Syracuse, NY 13057 ... 315-437-9951
† Mitec Elctrns., 15 Commerce St., Williston, VT 05495 ... 802-864-0064
† Narda Microwave Corp., 435 Moreland Rd., Hauppauge, NY 11788 ... 516-231-1700
North Hills Elctrns., 1 Alexander Pl., Glen Cove, NY 11542 ... 516-671-5700
Ortel Corp., 2015 W. Chestnut St., Alhambra, CA 91803 ... 818-281-3636
† Premier Microwave, 35 New Broad St., Port Chester, NY 10573 ... 914-939-8900
Resdel Engrg., 300 E. Live Oak Ave., Arcadia, CA 91006 ... 213-684-2600
RHG Electronics Lab., Inc., 161 E. Industry Ct., Deer Park, NY 11729 ... 516-242-1100
Rockwell Intl., Commercial Elctrns. Opers., 1200 N. Alma Rd., Richardson, TX 75081 ... 214-996-5000
† Rodale Elctrns. Corp., 603 Chestnut St., Garden City, NY 11530 ... 516-222-0050
Sanders Assocs., Flexprint Prods. Div., Grenier Fld., Manchester, NH 03103 ... 603-669-4615
† Scientific Communications, Inc., 3425 Kingsley Rd., Garland, TX 75041 ... 214-271-3685

†Technical Research & Mfg., Inc., R.F.D. #10, Manchester, NH 03103 ... 603-627-6000
†TRAK Microwave Corp., 4726 Eisenhower Blvd., Dept. E5, Tampa, FL 33614 ... 813-884-1411
†TRW Microwave, 825 Stewart Dr., Sunnyvale, CA 94086 ... 408-732-0880
§Tucker Elctrns., Box 461966, Garland, TX 75046 ... 214-348-8800;800-527-4642
†Vega Precision Labs., 800 Follin La., Vienna, VA 22180 ... 703-938-6300
†Watkins-Johnson Co., 3333 Hillview Ave., Palo Alto, CA 94304 ... 415-493-4141
†Zeta Labs., 3265 Scott Blvd., Santa Clara, CA 95054 ... 408-727-6001

Receivers, Monitoring, Communications-1900

†Frequency and Time Systems, Inc., DATUM, INC., 34 Tozer Rd., Beverly, MA 01915, 617-927-8220 ... A•1365, D•1230
MARCONI INSTRUMENTS, 3 Pearl Court, Allendale, NJ 07401, 201-934-9050 ... D•1264
†AEROCOM, 3090 S.W. 37th Ave., Miami, FL 33133 ... 305-448-6503
American Electronic Labs., Box 552, Lansdale, PA 19446 ... 215-822-2929
American Elctrn. Labs., Inc., Govt. Grp. Div., P.O. Box 552, Lansdale, PA 19446
†Applied Communications, Amstar Tech. Prods. Co., 5490 Spectrum Drive, Frederick, MD 21701 ... 301-694-5300
†Applied Communications, 9125 Gaither Rd., Gaithersburg, MD 20877 ... 301-948-5210
§Brelonix, 106 No. 36th St., Seattle, WA 98103 ... 206-633-1964
†Cincinnati Elctrns., 2630 Glendale Milford Rd., Cincinnati, OH 45241 ... 513-733-6100
Communication Assocs., 200 McKay Rd., Huntington Sta., NY 11746 ... 516-271-0800
†Cushman Elctrns., 2450 N. 1st St., San Jose, CA 95131 ... 408-263-8100
Digital Radio Corp., 8901 La Cienega Blvd., Inglewood, CA 90301 ... 213-670-8611
§Drake, R. L., Co., 540 Richard St., Miamisburg, OH 45342 ... 513-866-2421
Eaton Corp., Elctrn. Instrmn. Div., 5340 Alla Rd., Los Angeles, CA 90066
†Electrac, Inc., 1614 Orangethrope Way, Anaheim, CA 92801 ... 714-879-6021
§†E-Systems, Garland Div., Box 226118, Dallas, TX 75266 ... 214-272-0515
†Gorman-Redlich Mfg. Co., 6 Curtis St., Athens, OH 45701 ... 614-593-3150
†Hartman Systems, Figgie Intl., 360 Wolf Hill Rd., Huntington Sta., NY 11746 ... 516-427-7500
Hughes Aircraft Co, Aerospace Grps./Support Sys., P.O. Box 90515, Los Angeles, CA 90009 ... 213-670-1515
Information Technolgoy A.D.S.C., P.O. Box 470, College Park, MD 20740 ... 301-779-5110
†LNR Communications, Inc., 180 Marcus Blvd., Hauppauge, NY 11788 ... 516-273-7111
†Lorch Elctrns., 105 Cedar La., Englewood, NJ 07631 ... 201-569-8282
Maury Microwave, 8610 Helms Ave., Cucamonga, CA 91730 ... 714-987-4715
§Pathcom, Inc., Pace Two-Way Radio Prods., 24105 S. Frampton Ave., Harbor City, CA 90710 ... 213-325-1290
Photodyne, 1175 Tourmaline Dr., Newbury Park, CA 91320 ... 818-889-8770
Resdel Engrg., 300 E. Live Oak Ave., Arcadia, CA 91006 ... 213-684-2600
Rockwell Intl., Commercial Elctrns. Opers., 1200 N. Alma Rd., Richardson, TX 75081 ... 214-996-5000
Schaffner EMC, Inc., Instr. Div., 825 Lehigh Avenue, Union, NJ 07083 ... 201-851-0644
†Scientific Communications, Inc., 3425 Kingsley Rd., Garland, TX 75041 ... 214-271-3685
Spectron Corp., 344 New Albany Rd., Moorestown, NJ 08057 ... 609-234-5700
Sprague Elec. Co., 481 Marshall St., No. Adams, MA 01247 ... 413-664-4411
§Vicon Industries, Inc., 525 Broad Hollow Rd., Melville, NY 11747 ... 516-293-2200
Watkins-Johnson Co., 3333 Hillview Ave., Palo Alto, CA 94304 ... 415-493-4141
†Zeta Labs., 3265 Scott Blvd., Santa Clara, CA 95054 ... 408-727-6001

Receivers, NBS-2900

§EFRATOM, a division of Ball Corp., 18851 Bardeen Ave, Irvine, CA 92715 ... 714-752-2891
Kinemetrics, Inc., 222 Vista Ave., Pasadena, CA 91107 ... 818-795-2220
§Kinemetrics/Truetime, 3243 Santa Rose Ave, Santa Rosa, CA 95407 ... 707-528-1230
†Tracor Instruments, 6500 Tracor La., Bldg. 27, Austin, TX 78725 ... 512-929-2051
§Tucker Elctrns., Box 461966, Garland, TX 75046 ... 214-348-8800;800-527-4642
†Watkins-Johnson Co., 3333 Hillview Ave., Palo Alto, CA 94304 ... 415-493-4141

Receivers, Telemetry-1900

Datum Inc., Timing/Aacom Divisions, 1363 S. State College Blvd., Anaheim, CA 92806, 714-533-6333 ... D•1050
†Aydin Corp., 700 Dresher Rd., Horsham, PA 19044 ... 215-657-7510
†Aydin Vector Div., Box 328, Newtown, PA 18940 ... 215-968-4271
Dio-Rey, Div. of Info-Lite, 422 Cliff St., Fairview, NJ 07022 ... 201-941-4455
Erbtec Engineering, Inc., 5680 Valmont Rd., Boulder, CO 80301 ... 303-447-8750
†Hartman Systems, Figgie Intl., 360 Wolf Hill Rd., Huntington Sta., NY 11746 ... 516-427-7500
HMW Enterprises, Inc., 604 Salem Road, Etters, PA 17319 ... 717-938-4691
Kinemetrics, Inc., 222 Vista Ave., Pasadena, CA 91107 ... 818-795-2220
NES, Inc. (Nationwide Electronic Systems), 3003 Wakefield, Carpentersville, IL 60110 ... 312-426-5900
†Rodale Elctrns. Corp., 603 Chestnut St., Garden City, NY 11530 ... 516-222-0050
Solid State Elctrns. Corp., 18646 Parthenia St., Northridge, CA 91324 ... 818-993-8257

Receivers, Tone-1900

§American Microsignal, 8431 Monroe Ave., Stanton, CA 90680 ... 714-761-1222
Aptek Microsystems, 700 N. W. 12th Ave., Deerfield Beach, FL 33441 ... 305-421-8450
†A.R.F. Prods., 2559 75th St., Boulder, CO 80301 ... 303-443-4844
†Beckman Industrial Corp., Electronic Technologies Div., 2500 Harbor Blvd., Fullerton, CA 92634 ... 714-871-4848
Bruel & Kjaer Instrs. Inc., 185 Forest St., Marlboro, MA 01752 ... 617-481-7000
Dantel, 2991 N. Argyle Ave., Fresno, CA 93727 ... 209-292-1111
Electrocom Inds., 1105 N. Ironwood Dr., S. Bend, IN 46615 ... 219-232-2743
†Gorman-Redlich Mfg. Co., 6 Curtis St., Athens, OH 45701 ... 614-593-3150
GTE SUPPLY, GTE Communications Systems, 5225 Wiley Post Way, Salt Lake City, UT 84116 ... 801-537-5237
GTE Switching & Telephone Products, 400 N. Wolf Rd., Northlake, IL 60164 ... 312-681-7100
†Hartman Systems, Figgie Intl., 360 Wolf Hill Rd., Huntington Sta., NY 11746 ... 516-427-7500
RCI/Data, 1992 Lakewood Rd., Toms River, NJ 08753 ... 201-341-8361

Resdel Engrg., 300 E. Live Oak Ave., Arcadia, CA 91006 ... 213-684-2600
RFL Inds., A Dowty Grp. Co./Comms. Div., Powerville Rd., Boonton, NJ 07005 ... 201-334-3100
Silicon Systems Inc., 14351 Myford Rd., Tustin, CA 92680 ... 714-979-0941
†Solid State Elctrns. Corp., 18646 Parthenia St., Northridge, CA 91324 ... 818-993-8257
§Teltone, 10801-120 Ave. NE, Kirkland, WA 98033 ... 206-827-9626

Receivers, TV — See Monitors, Video (Vol. D)

Receivers (MIL)-3475

†Datum Inc., Timing/Aacom Divisions, 1363 S. State College Blvd., Anaheim, CA 92806, 714-533-6333 ... D•1050
†Frequency and Time Systems, Inc., DATUM, INC., 34 Tozer Rd., Beverly, MA 01915, 617-927-8220 ... A•1365, D•1230
Hughes Solid State Products, 500 Superior Ave., Dept. E8, Newport Bch., CA 92658-8903, 714-759-2411 ... A•1372
†Applied Communications, Amstar Tech. Prods. Co., 5490 Spectrum Drive, Frederick, MD 21701 ... 301-694-5300
†Applied Communications, 9125 Gaither Rd., Gaithersburg, MD 20877 ... 301-948-5210
†California Microwave, 990 Almanor Ave., Sunnyvale, CA 94086 ... 408-732-4000
Digital Radio Corp., 8901 La Cienega Blvd., Inglewood, CA 90301 ... 213-670-8611
†EDMAN Corp., Subsidiary of Rospatch, 7500 Main St., P.O. Box 750, Fishers, NY 14453-0750 ... 716-924-4000
†Hartman Systems, Figgie Intl., 360 Wolf Hill Rd., Huntington Sta., NY 11746 ... 516-427-7500
†Microwave/Sys., 1 Adler Dr., E. Syracuse, NY 13057 ... 315-437-9951
†Rodale Elctrns. Corp., 603 Chestnut St., Garden City, NY 11530 ... 516-222-0050

Receivers (MIL), Acoustic Intercept-3475

†General Instr., Govt. Sys., 600 W. John St., Hicksville, NY 11802-0709 ... 516-933-3000

Receivers (MIL), Digital Warning-3475

Digital Radio Corp., 8901 La Cienega Blvd., Inglewood, CA 90301 ... 213-670-8611
†General Instr., Govt. Sys., 600 W. John St., Hicksville, NY 11802-0709 ... 516-933-3000
†Litton Applied Technology, 645 Almanor Ave., P.O. Box 3478, Sunnyvale, CA 94088-3478 ... 408-773-0777
†Microwave/Sys., 1 Adler Dr., E. Syracuse, NY 13057 ... 315-437-9951

Receivers, (MIL), ECM-3475

American Elctrn. Labs., Inc., Govt. Grp. Div., P.O. Box 552, Lansdale, PA 19446
†Cincinnati Elctrns., 2630 Glendale Milford Rd., Cincinnati, OH 45241 ... 513-733-6100
†Condor Systems, Inc., 2605 S. Winchester Blvd., Campbell, CA 95008 ... 408-866-5900
Digital Radio Corp., 8901 La Cienega Blvd., Inglewood, CA 90301 ... 213-670-8611
†General Instr., Govt. Sys., 600 W. John St., Hicksville, NY 11802-0709 ... 516-933-3000
†Litton Applied Technology, 645 Almanor Ave., P.O. Box 3478, Sunnyvale, CA 94088-3478 ... 408-773-0777
†Microwave/Sys., 1 Adler Dr., E. Syracuse, NY 13057 ... 315-437-9951
†Rodale Elctrns. Corp., 603 Chestnut St., Garden City, NY 11530 ... 516-222-0050
†Watkins-Johnson Co., 3333 Hillview Ave., Palo Alto, CA 94304 ... 415-493-4141

Receivers (MIL), Elint-3475

Andersen Labs., 1280 Blue Hills Ave., Bloomfield, CT 06002, 203-242-0761 ... A•1591
American Elctrn. Labs., Inc., Govt. Grp. Div., P.O. Box 552, Lansdale, PA 19446
†Applied Communications, Amstar Tech. Prods. Co., 5490 Spectrum Drive, Frederick, MD 21701 ... 301-694-5300
†Applied Communications, 9125 Gaither Rd., Gaithersburg, MD 20877 ... 301-948-5210
†Condor Systems, Inc., 2605 S. Winchester Blvd., Campbell, CA 95008 ... 408-866-5900
Digital Radio Corp., 8901 La Cienega Blvd., Inglewood, CA 90301 ... 213-670-8611
†General Instr., Govt. Sys., 600 W. John St., Hicksville, NY 11802-0709 ... 516-933-3000
†Litton Applied Technology, 645 Almanor Ave., P.O. Box 3478, Sunnyvale, CA 94088-3478 ... 408-773-0777
†Microwave/Sys., 1 Adler Dr., E. Syracuse, NY 13057 ... 315-437-9951
†Watkins-Johnson Co., 3333 Hillview Ave., Palo Alto, CA 94304 ... 415-493-4141

Receivers (MIL), ESM-3475

Andersen Labs., 1280 Blue Hills Ave., Bloomfield, CT 06002, 203-242-0761 ... A•1591
American Elctrn. Labs., Inc., Govt. Grp. Div., P.O. Box 552, Lansdale, PA 19446
†Applied Communications, Amstar Tech. Prods. Co., 5490 Spectrum Drive, Frederick, MD 21701 ... 301-694-5300
†Applied Communications, 9125 Gaither Rd., Gaithersburg, MD 20877 ... 301-948-5210
†Cincinnati Elctrns., 2630 Glendale Milford Rd., Cincinnati, OH 45241 ... 513-733-6100
†General Instr., Govt. Sys., 600 W. John St., Hicksville, NY 11802-0709 ... 516-933-3000
†Litton Applied Technology, 645 Almanor Ave., P.O. Box 3478, Sunnyvale, CA 94088-3478 ... 408-773-0777
†Microwave/Sys., 1 Adler Dr., E. Syracuse, NY 13057 ... 315-437-9951
†Watkins-Johnson Co., 3333 Hillview Ave., Palo Alto, CA 94304 ... 415-493-4141

Receivers (MIL), Handoff-3475

†Applied Communications, Amstar Tech. Prods. Co., 5490 Spectrum Drive, Frederick, MD 21701 ... 301-694-5300
†Applied Communications, 9125 Gaither Rd., Gaithersburg, MD 20877 ... 301-948-5210
†Microwave/Sys., 1 Adler Dr., E. Syracuse, NY 13057 ... 315-437-9951
†Watkins-Johnson Co., 3333 Hillview Ave., Palo Alto, CA 94304 ... 415-493-4141

Receivers (MIL), IFM-3475

†Litton Applied Technology, 645 Almanor Ave., P.O. Box 3478, Sunnyvale, CA 94088-3478 ... 408-773-0777
†Microwave/Sys., 1 Adler Dr., E. Syracuse, NY 13057 ... 315-437-9951
†TRW Microwave, 825 Stewart Dr., Sunnyvale, CA 94086 ... 408-732-0880

Receivers (MIL), IR Warning-3475

†Cincinnati Elctrns., 2630 Glendale Milford Rd., Cincinnati, OH 45241 ... 513-733-6100
†Litton Applied Technology, 645 Almanor Ave., P.O. Box 3478, Sunnyvale, CA 94088-3478 ... 408-773-0777

Receivers (MIL), Missile Launch Warning-3475

† Cincinnati Elctrns., 2630 Glendale Milford Rd., Cincinnati, OH 45241 513-733-6100
† Hartman Systems, Figgie Intl., 360 Wolf Hill Rd., Huntington Sta., NY 11746 516-427-7500
† Litton Applied Technology, 645 Almanor Ave., P.O. Box 3478, Sunnyvale, CA 94088-3478 408-773-0777

Receivers (MIL), Radar Warning-3475

American Elctrn. Labs., Inc., Govt. Grp. Div., P.O. Box 552, Lansdale, PA 19446
† General Instr., Govt. Sys., 600 W. John St., Hicksville, NY 11802-0709 ... 516-933-3000
† Litton Applied Technology, 645 Almanor Ave., P.O. Box 3478, Sunnyvale, CA 94088-3478 408-773-0777
† Microwave/Sys., 1 Adler Dr., E. Syracuse, NY 13057 315-437-9951
† Watkins-Johnson Co., 3333 Hillview Ave., Palo Alto, CA 94304 415-493-4141

Receivers (MIL), Radio-3475

† Frequency and Time Systems, Inc., DATUM, INC., 34 Tozer Rd., Beverly, MA 01915, 617-927-8220 .... A•1365
† Applied Communications, Amstar Tech. Prods. Co., 5490 Spectrum Drive, Frederick, MD 21701 301-694-5300
† Applied Communications, 9125 Gaither Rd., Gaithersburg, MD 20877 ... 301-948-5210
† Cincinnati Elctrns., 2630 Glendale Milford Rd., Cincinnati, OH 45241 ... 513-733-6100
† Collins Avionics Divisions, Rockwell Intl., 400 Collins Rd. NE, Cedar Rapids, IA 52498 319-395-1000
Digital Radio Corp., 8901 La Cienega Blvd., Inglewood, CA 90301 213-670-8611
† EDMAN Corp., Subsidiary of Rospatch, 7500 Main St., P.O. Box 750, Fishers, NY 14453-0750 716-924-4000
† Gorman-Redlich Mfg. Co., 6 Curtis St., Athens, OH 45701 614-593-3150
† Microwave/Sys., 1 Adler Dr., E. Syracuse, NY 13057 315-437-9951
† Rodale Elctrns. Corp., 603 Chestnut St., Garden City, NY 11530 516-222-0050
† Watkins-Johnson Co., 3333 Hillview Ave., Palo Alto, CA 94304 415-493-4141

Receivers (MIL), Recon-3475

† Applied Communications, Amstar Tech. Prods. Co., 5490 Spectrum Drive, Frederick, MD 21701 301-694-5300
† Applied Communications, 9125 Gaither Rd., Gaithersburg, MD 20877 ... 301-948-5210
† Condor Systems, Inc., 2605 S. Winchester Blvd., Campbell, CA 95008 ... 408-866-5900
† Litton Applied Technology, 645 Almanor Ave., P.O. Box 3478, Sunnyvale, CA 94088-3478 408-773-0777
† Microwave/Sys., 1 Adler Dr., E. Syracuse, NY 13057 315-437-9951
† Watkins-Johnson Co., 3333 Hillview Ave., Palo Alto, CA 94304 415-493-4141
† Zeta Labs., 3265 Scott Blvd., Santa Clara, CA 95054 408-727-6001

Receivers (MIL), Search-3475

† Applied Communications, Amstar Tech. Prods. Co., 5490 Spectrum Drive, Frederick, MD 21701 301-694-5300
† Applied Communications, 9125 Gaither Rd., Gaithersburg, MD 20877 ... 301-948-5210
† Condor Systems, Inc., 2605 S. Winchester Blvd., Campbell, CA 95008 ... 408-866-5900
† Hartman Systems, Figgie Intl., 360 Wolf Hill Rd., Huntington Sta., NY 11746 516-427-7500
† Microwave/Sys., 1 Adler Dr., E. Syracuse, NY 13057 315-437-9951
† Watkins-Johnson Co., 3333 Hillview Ave., Palo Alto, CA 94304 415-493-4141

Receivers (MIL), Shipboard-3475

† Applied Communications, Amstar Tech. Prods. Co., 5490 Spectrum Drive, Frederick, MD 21701 301-694-5300
† Applied Communications, 9125 Gaither Rd., Gaithersburg, MD 20877 ... 301-948-5210
† Hartman Systems, Figgie Intl., 360 Wolf Hill Rd., Huntington Sta., NY 11746 516-427-7500
† Microwave/Sys., 1 Adler Dr., E. Syracuse, NY 13057 315-437-9951
† Watkins-Johnson Co., 3333 Hillview Ave., Palo Alto, CA 94304 415-493-4141

Receivers (MIL), Submarine-3475

† Applied Communications, Amstar Tech. Prods. Co., 5490 Spectrum Drive, Frederick, MD 21701 301-694-5300
† Applied Communications, 9125 Gaither Rd., Gaithersburg, MD 20877 ... 301-948-5210
† Microwave/Sys., 1 Adler Dr., E. Syracuse, NY 13057 315-437-9951
† Watkins-Johnson Co., 3333 Hillview Ave., Palo Alto, CA 94304 415-493-4141

Receivers (MIL), Surveillance-3475

American Elctrn. Labs., Inc., Govt. Grp. Div., P.O. Box 552, Lansdale, PA 19446
† Applied Communications, Amstar Tech. Prods. Co., 5490 Spectrum Drive, Frederick, MD 21701 301-694-5300
† Applied Communications, 9125 Gaither Rd., Gaithersburg, MD 20877 ... 301-948-5210
Digital Radio Corp., 8901 La Cienega Blvd., Inglewood, CA 90301 213-670-8611
† General Instr., Govt. Sys., 600 W. John St., Hicksville, NY 11802-0709 ... 516-933-3000
† Hartman Systems, Figgie Intl., 360 Wolf Hill Rd., Huntington Sta., NY 11746 516-427-7500
† Litton Applied Technology, 645 Almanor Ave., P.O. Box 3478, Sunnyvale, CA 94088-3478 408-773-0777
† Microwave/Sys., 1 Adler Dr., E. Syracuse, NY 13057 315-437-9951
† Watkins-Johnson Co., 3333 Hillview Ave., Palo Alto, CA 94304 415-493-4141

Receivers (MIL), Warning-3475

American Elctrn. Labs., Inc., Govt. Grp. Div., P.O. Box 552, Lansdale, PA 19446
Digital Radio Corp., 8901 La Cienega Blvd., Inglewood, CA 90301 213-670-8611
† General Instr., Govt. Sys., 600 W. John St., Hicksville, NY 11802-0709 ... 516-933-3000
† Litton Applied Technology, 645 Almanor Ave., P.O. Box 3478, Sunnyvale, CA 94088-3478 408-773-0777
† Microwave/Sys., 1 Adler Dr., E. Syracuse, NY 13057 315-437-9951
† Watkins-Johnson Co., 3333 Hillview Ave., Palo Alto, CA 94304 415-493-4141

Receptacles — See Connectors (Vol. C), Jacks (Vol.), Sockets

Receptacles, Power — See Sockets, Power

Recognition Equipment, Speech-2000

Covox, Inc., 675 D Conger St., Eugene, OR 97402 503-342-1271
† Mimic, Inc., P.O. Box 921, Acton, MA 01720 617-263-2101
Voice Machine Comms., Inc., KTI, 1000 S. Grand Ave., Santa Ana, CA 92705 714-541-0454
† Votan, 4487 Technology Dr., Fremont, CA 94538 415-490-7600

Recorders, Computer Data-2000

Chessell Corp., Penns Trail, Newtown, PA 18940, 215-968-0660 .... D•1403
† Fairchild Weston, Data Recorders, P.O. Box 3041, Sarasota, FL 33578, 813-371-0811 .... D•1228
Gould Inc., Recording Systems Div., 3631 Perkins Ave., Cleveland, OH 44114, 216-361-3315 .... D•1404
† Linseis, Inc., P.O. Box 666, Princeton Junction, NJ 08550, 609-799-6282 (in N.J.);Toll Free 1-800-RECORDER .... D•1405
Memodyne, 220 Reservoir St., Needham Hgts., MA 02194, 617-444-7000 .... D•1068
Phi Technologies, Inc., 4605 North Stiles, Oklahoma City, OK 73105, 405-521-9000 .... D•1052-1053
THORN EMI Technology Inc., 8601 Dunwoody Pl., Atlanta, GA 30338, 404-587-0017;800-243-2572 .... D•1313
§ Algo, Inc., 9198-C Red Branch Rd., Columbia, MD 21045 301-730-7442
Amilon Corp., 49-12 30th Ave., Woodside, NY 11377 718-274-1794
† Ampex Corp., 401 Broadway, Redwood City, CA 94063 415-367-2011
Applied Sys., 26401 Harper Ave., St. Clair Shores, MI 48081 313-779-8700
Bascom-Turner Instrs., 111 Downey St., Norwood, MA 02062 617-769-9660
BBC-Metrawatt/Goerz, 2150 W. 6th Ave., Broomfield, CO 80020 .... 303-469-5231; 800-821-6327
B-G Instruments, P.O. Box 67, Alta Loma, CA 91701 .... 714-989-4802;980-2826
§ Braemar Corp., 11400 Rupp Drive, Burnsville, MN 55337 612-890-5135
† CELCO, 70 Constantine Dr., Mahwah, NJ 07430 201-327-1123
† Data Capture Technology, Hathaway Instruments, 5436-F South Mingo Rd., Tulsa, OK 74146 918-627-7521
† Datametrics Corp., Defense Products Div., 7630 Gloria Ave., Van Nuys, CA 91406 818-989-3840
§ Datum, Storage Prods. Div., 1363 State College Blvd., Anaheim, CA 92806 714-533-6333
§ Digi-Data Corp., 8580 Dorsey Run Rd., Jessup, MD 20794 301-498-0200
§† Digitech Industries, Inc., 66 Grove St., Ridgefield, CT 06877 203-438-3731
§ EDL, Inc., 385 Oser Ave., Hauppauge, NY 11788 .... 516-435-2808;1-800-DIAL EDL
§ Eigen Video, P.O. Box 848, Nevada City, CA 95959 916-272-3461
Electron, Inc., P.O. Box 28640, San Diego, CA 92128 216-681-4700
§† Engler Instruments Operation, Stemco Truck Products Division, 250 Culver Ave., Jersey City, NJ 07305 201-332-5353
Epicom, Inc., 411 Josiane Court, Altamonte Springs, FL 32701 305-331-1640
Esterline Angus Instr. Corp., Box 24000, Indianapolis, IN 46224 317-244-7611
† Genisco Memory Prods. Corp., 10874 Hope St., Cypress, CA 90630 714-220-0720
Gulton Inds., Inc., Graphic Instruments Div., Gulton Ind'l. Pk., E. Greenwich, RI 02818 401-884-6800
§ Heath Co., Benton Harbor, MI 49022 616-982-3886
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
Honeywell, Test Instrs. Div., P.O. Box 5227, Denver, CO 80217 303-773-4700
§ Houston Instrument, 8500 Cameron Rd., Austin, TX 78753 512-835-0900
Hughes Aircraft Co, Aerospace Grps./Support Sys., P.O. Box 90515, Los Angeles, CA 90009 213-670-1515
Hughes Aircraft Co., Microelctrn. Sys. Div., 2601 Campus Dr., Irvine, CA 92715 714-752-3800
Image Graphics, Inc., 107 Ardmore Street, Fairfield, CT 06430 203-259-1394
§ Instrumentation Prods., 3M Co., 300 S. Lewis Rd., Camarillo, CA 93010 .. 805-482-1911
Interdyne Co., 157 Topaz St., Milpitas, CA 95035 408-943-9133
§ International Data Sciences, 7 Wellington Rd., Lincoln, RI 02865 401-333-6200
MPH Elctrns., 2660 Loma Ave., S. El Monte, CA 91733 213-442-7818
Potter Instr., 10 Main St., Gonic, NH 03867 603-332-1991
§† Raytheon Ocean Sys. Co., Submarine Signal Div., Risho Ave., Westminster Pk., E. Providence, RI 02914 401-438-1780
† Reproduction Technologies Inc., Dept. EM, P.O. Box 815, Bristol, IN 46507-0518 .... 219-848-5233;219-848-5333
Tape Concepts, Inc., P. O. Box 815, 110 E. Vistula St., Bristol, IN 46507 219-848-5234
Targa Electronics, Systems Inc., 3101 Hawthorne Rd., P. O. Box 8485, Ottawa, ON, CANADA K1G 3H9 613-731-9941
Tri-Data Corp., 505 E Middlefield Rd., Mountain View, CA 94043 415-969-3700
Yokogawa Corp. of America, 2 Dart Rd., Shenandoah, GA 30265 404-253-7000

Recorders, Electrostatic-3000

Gould Inc., Recording Systems Div., 3631 Perkins Ave., Cleveland, OH 44114, 216-361-3315 .... D•1404
Bell & Howell/CEC Div., 360 Sierra Madre Villa, Pasadena, CA 91109 ... 213-796-9381
† Calcomp, 2411 W. La Palma Ave., Anaheim, CA 92801 714-821-2011
Chessell Corp., Penns Trail, Newtown, PA 18940 215-968-0660
§ Geophysical Survey Sys., Inc., 15 Flagstone Dr., Hudson, NH 03051 603-889-4841
Marel Instr. Co., 907 South East 13th Pl., Cape Coral, FL 33904 813-574-8788
§† Raytheon Ocean Sys. Co., Submarine Signal Div., Risho Ave., Westminster Pk., E. Providence, RI 02914 401-438-1780

Recorders, Event/Multievent-3000

§† Astro-Med, Inc., 600 East Greenwich Avenue, W. Warwick, RI 02893, 401-828-4000 .... D•1402
Chessell Corp., Penns Trail, Newtown, PA 18940, 215-968-0660 .... D•1403
† Fairchild Weston, Data Recorders, P.O. Box 3041, Sarasota, FL 33578, 813-371-0811 .... D•1228
Gould Inc., Recording Systems Div., 3631 Perkins Ave., Cleveland, OH 44114, 216-361-3315 .... D•1404
† Linseis, Inc., P.O. Box 666, Princeton Junction, NJ 08550, 609-799-6282 (in N.J.);Toll Free 1-800-RECORDER .... D•1405
Omega Engrg., Box 4047, Stamford, CT 06907, 203-359-1660 .... D•1407

AES Corp., 285 Newbury St., P.O. Box 2093, Peabody, MA 01960 617-535-7310
† Amprobe Instr., 630 Merrick Rd., Lynbrook, NY 11563 .... 516-LY3-5600
§† Bailey Controls Co., 29801 Euclid Ave., Wickliffe, OH 44092 216-585-5800
BBC-Metrawatt/Goerz, 2150 W. 6th Ave., Broomfield, CO 80020 .... 303-469-5231; 800-821-6327
Bruel & Kjaer Instrs. Inc., 185 Forest St., Marlboro, MA 01752 617-481-7000
Chatsworth Data Corp, Impact-o-Graph Div., 20710 Lassen St., Chatsworth, CA 91311 213-341-3000
Continental Resources, Inc., 175 Middlesex Tpke., Bedford, MA 01730 .. 617-275-0850
Data, Inc., 7702 Emerald Ave., Box 2071, Ft. Collins, CO 80525 303-493-1222
Digitus Corporation, 22 West 25th Street, Baltimore, MD 21218 301-467-3223
Dranetz Technologies, Inc, Computer Products Division, 1000 New Durham Rd., P.O. Box 4019, Edison, NJ 08818-4019 201-287-3680
Dranetz Technologies, Inc., Industrial Products Division, 1000 New Durham Rd., P.O. Box 4019, Edison, NJ 08818-4019 201-287-3680
Electric Tachometer, 68th & Upland Sts., Philadelphia, PA 19142 .... 215-SA6-7723
† EMM/SESCO, 20630 Plummer St., Chatsworth, CA 91311 213-998-9090
§ Esterline Angus Instr. Corp., Box 24000, Indianapolis, IN 46224 317-244-7611
Genstar Rental Elctrns., 2445 Faber Pl., Palo Alto, CA 94303 415-856-7600
§ Geophysical Survey Sys., Inc., 15 Flagstone Dr., Hudson, NH 03051 603-889-4841
§ Gulton Inds., Inc., Graphic Instruments Div., Gulton Ind'l. Pk., E. Greenwich, RI 02818 401-884-6800
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
Honeywell, Test Instrs. Div., P.O. Box 5227, Denver, CO 80217 303-773-4700
§ Instrumentation Prods., 3M Co., 300 S. Lewis Rd., Camarillo, CA 93010 .. 805-482-1911
International Electro Magnetics, Inc., 350 N. Eric Dr., Palatine, IL 60067 .. 312-358-4622
Larson Instr., Greenbush Rd., Orangeburg, NY 10962 914-359-3800
Leeds & Northrup Instrs., A Unit of General Signal Corp., Sumneytown Pike, North Wales, PA 19454 215-643-2000
§ Linear Instrs., 500 Edison Way, Reno, NV 89502 702-786-3636
Marel Instr. Co., 907 South East 13th Pl., Cape Coral, FL 33904 813-574-8788
Memodyne, 220 Reservoir St., Needham Hgts., MA 02194 617-444-7000
§ Pacer Industries, Inc., 1450 First Ave., Chippewa Falls, WI 54729 715-723-1141
PPM, Inc., 4521 Emery Ind. Pkwy., Cleveland, OH 44128 216-292-6006
§ PrimeLine-Soltec Distbn., Soltec Corp., P.O. Box 818, Sun Valley, CA 91353-0818 .... 800-525-5554;818-764-5400
§† Raytheon Ocean Sys. Co., Submarine Signal Div., Risho Ave., Westminster Pk., E. Providence, RI 02914 401-438-1780
† Reproduction Technologies Inc., Dept. EM, P.O. Box 815, Bristol, IN 46507-0518 .... 219-848-5233;219-848-5333
Rochester Instr. Sys., 255 N. Union St., Rochester, NY 14605 716-263-7700
Schaevitz Engrg., U.S. 130, Union Ave., Pennsauken, NJ 08110 609-662-8000
Science/Elctrns., 1224-26 McCook Ave., Dayton, OH 45404 513-228-6011
Sea Data Corp., One Bridge St., Newton, MA 02158 617-244-3216
§ Simpson Elec. Co., 853 Dundee Ave., Elgin, IL 60120 312-697-2260
§ Soltec Corp., 11684 Pendelton St., Sun Valley, CA 91352 .... 818-767-0044; 800-423-2344
§ Sperry, A. W., Instrs., P.O. Box 9300, Smithtown, NY 11787 516-231-7050
† Stoelting Co., 1350 S. Kostner Ave., Chicago, IL 60623 312-522-4500
§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 215-673-5600
Tape Concepts, Inc., P. O. Box 815, 110 E. Vistula St., Bristol, IN 46507 219-848-5234
† Telectro Sys., 96-18 43rd Ave., Corona, NY 11368 212-651-8900
§ Tucker Elctrns., Box 461966, Garland, TX 75046 .... 214-348-8800;800-527-4642
§† Veeder-Root, 70 Sargeant St., Hartford, CT 06102 203-527-7201
Video Logic Corp., 597 No. Mathilda Ave., Sunnyvale, CA 94086 408-245-8622
Westronics Inc. of Texas, 2441 Northeast Pkwy., Box 4619, Ft. Worth, TX 76106 817-625-2311
Wilmar Elctrns., Inc., 2430 Amsler St., Torrance, CA 90505 213-326-6668
Yokogawa Corp. of America, 2 Dart Rd., Shenandoah, GA 30265 404-253-7000

Recorders, FM — See Recorders, Magnetic Tape (Vol. D)

Recorders, Graphic — See Recorders, Specific Types (Vol. D)

Recorders, Magnetic Tape-2000

Digitec Corp., 918 Woodley Rd., P.O. Box 458, Dayton, OH 45401, 513-254-6251 .... D•1149
† Fairchild Weston, Data Recorders, P.O. Box 3041, Sarasota, FL 33578, 813-371-0811 .... D•1228
Gould Inc., Recording Systems Div., 3631 Perkins Ave., Cleveland, OH 44114, 216-361-3315 .... D•1404
† Memodyne, 220 Reservoir St., Needham Hgts., MA 02194, 617-444-7000 .... D•1068
Phi Technologies, Inc., 4605 North Stiles, Oklahoma City, OK 73105, 405-521-9000 .... D•1052-1053
† Reproduction Technologies Inc., Dept. EM, P.O. Box 815, Bristol, IN 46507-0518, 219-848-5233;219-848-5333 .... D•1034
Tape Concepts, Inc., P. O. Box 815, 110 E. Vistula St., Bristol, IN 46507, 219-848-5234 .... D•1035
THORN EMI Technology Inc., 8601 Dunwoody Pl., Atlanta, GA 30338, 404-587-0017;800-243-2572 .... D•1313
§ Algo, Inc., 9198-C Red Branch Rd., Columbia, MD 21045 301-730-7442
Amilon Corp., 49-12 30th Ave., Woodside, NY 11377 718-274-1794
† Ampex Corp., 401 Broadway, Redwood City, CA 94063 415-367-2011
§ Audiotronics Corp., 7428 Bellaire Ave., N. Hollywood, CA 91605 818-765-2645
§ Braemar Corp., 11400 Rupp Drive, Burnsville, MN 55337 612-890-5135
Bruel & Kjaer Instrs. Inc., 185 Forest St., Marlboro, MA 01752 617-481-7000
California Minicomputer Sys., 5534 Westlawn Ave., Los Angeles, CA 90066 213-640-2930
Cipher Data Prods., Inc., P.O. Box 85170, San Diego, CA 92138 619-578-9100
§ Comspec Inc., 10700 Hammerly 5120, Houston, TX 77043 713-461-4487
Continental Resources, Inc., 175 Middlesex Tpke., Bedford, MA 01730 .. 617-275-0850
Data, Inc., 7702 Emerald Ave., Box 2071, Ft. Collins, CO 80525 303-493-1222
† Data Capture Technology, Hathaway Instruments, 5436-F South Mingo Rd., Tulsa, OK 74146 918-627-7521
§ Datum, Storage Prods. Div., 1363 State College Blvd., Anaheim, CA 92806 714-533-6333
§ Digi-Data Corp., 8580 Dorsey Run Rd., Jessup, MD 20794 301-498-0200
§ Emerson, Indl. Controls Div., 3300 Standard St., Santa Ana, CA 92702 ... 714-545-5581
† EMM/SESCO, 20630 Plummer St., Chatsworth, CA 91311 213-998-9090
EMR Data Systems, Div. Sangamo- Weston, Box 3041, Sarasota, FL 33578 813-371-0811
Epicom, Inc., 411 Josiane Court, Altamonte Springs, FL 32701 305-331-1640
† Genisco Memory Prods. Corp., 10874 Hope St., Cypress, CA 90630 714-220-0720
Genstar Rental Elctrns., 2445 Faber Pl., Palo Alto, CA 94303 415-856-7600
§ Geophysical Survey Sys., Inc., 15 Flagstone Dr., Hudson, NH 03051 603-889-4841
§ Heath Co., Benton Harbor, MI 49022 616-982-3886
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
Honeywell, Test Instrs. Div., P.O. Box 5227, Denver, CO 80217 303-773-4700
§ Innovative Data Technology, 5340 Eastgate Mall, San Diego, CA 92121 619-587-0555
§ Instrumentation Prods., 3M Co., 300 S. Lewis Rd., Camarillo, CA 93010 .. 805-482-1911
International Electro Magnetics, Inc., 350 N. Eric Dr., Palatine, IL 60067 .. 312-358-4622
I² Interface, Inc., 21101 Osborne St., Canoga Park, CA 91304 818-341-7014
Mega Logic, 9659 Natl. Rd., Brookville, OH 45309 513-833-5222
Mohawk Data Sciences, MDS Center, Herkimer, NY 13350 315-866-5300
MPH Elctrns., 2660 Loma Ave., S. El Monte, CA 91733 213-442-7818
Multi Prods. Intl., 218 Little Falls Rd., P.O. Box 238, Cedar Grove, NJ 07009 201-239-8183
Potter Instr., 10 Main St., Gonic, NH 03867 603-332-1991
§ Ramko Resch., Inc., 11355A Folsom Blvd., Rancho Cordova, CA 95670 800-821-2545
† Raymond Engrg. Inc., Raycorder Prods. Div., 217 Smith St., Middletown, CT 06457 203-632-1000
§ REI Sls., 19525 Business Centre Dr., Northridge, CA 91324 617-938-0900
RIL Elctrns., Inc., 125 Titus Ave., P.O. Box H, Warrington, PA 18976 ..... 215-EL5-1361
§† Saylor Electronics Int'l, Inc., 1824 Calash Dr., Carson City, NV 89701 702-883-4184
Sea Data Corp., One Bridge St., Newton, MA 02158 617-244-3216
§ Telebyte Technology, Inc., Remark Datacom Div., 270 East Pulaski Road, Greenlawn, NY 11740 516-423-3232
† Telectro Sys., 96-18 43rd Ave., Corona, NY 11368 212-651-8900
Teledyne/Geotech, 3401 Shiloh Rd., Garland, TX 75041 214-271-2561
Tri-Com, Inc., 7304 Grove Rd., Frederick, MD 21701 301-694-6666
Tri-Data Corp., 505 E Middlefield Rd., Mountain View, CA 94043 415-969-3700

Recorders, Polar-3000

Astro-Med, Inc., 600 East Greenwich Avenue, W. Warwick, RI 02893, 401-828-4000 .... D•1402
Esterline Angus Instr. Corp., Box 24000, Indianapolis, IN 46224 317-244-7611
Interface Engrg., 386 Lindelof Ave., Stoughton, MA 02072 617-344-7383
Venable Industries, Inc., 3555 Lomita Blvd., Torrance, CA 90505 213-539-2522

Recorders, Program Loading-2000

† Fairchild Weston, Data Recorders, P.O. Box 3041, Sarasota, FL 33578, 813-371-0811 .... D•1228
Gould Inc., Recording Systems Div., 3631 Perkins Ave., Cleveland, OH 44114, 216-361-3315 .... D•1404
§ Alltech Assocs. Inc., Applied Science Labs., 2051 Waukegan Rd., Deerfield, IL 60015 312-948-8600
Amilon Corp., 49-12 30th Ave., Woodside, NY 11377 718-274-1794
§ EDL, Inc., 385 Oser Ave., Hauppauge, NY 11788 .... 516-435-2808;1-800-DIAL EDL
Gulton Inds., Inc., Graphic Instruments Div., Gulton Ind'l. Pk., E. Greenwich, RI 02818 401-884-6800
Targa Electronics, Systems Inc., 3101 Hawthorne Rd., P. O. Box 8485, Ottawa, ON, CANADA K1G 3H9 613-731-9941

Recorders, Pyrometer — See Pyrometers, Recording (Vol. D)

Recorders, Sound Level-1300

† Fairchild Weston, Data Recorders, P.O. Box 3041, Sarasota, FL 33578, 813-371-0811 .... D•1228
Gould Inc., Recording Systems Div., 3631 Perkins Ave., Cleveland, OH 44114, 216-361-3315 .... D•1404
Bruel & Kjaer Instrs. Inc., 185 Forest St., Marlboro, MA 01752 617-481-7000
§ Columbia Resch. Labs., Macdade Blvd. & Bullens La., Woodlyn, PA 19094 215-532-9464
Continental Resources, Inc., 175 Middlesex Tpke., Bedford, MA 01730 .. 617-275-0850
Dai-Ichi Shoji of Amer., Inc., 150 Fifth Ave., New York, NY 10011 212-691-9050
§ Emerson, Indl. Controls Div., 3300 Standard St., Santa Ana, CA 92702 ... 714-545-5581
Esterline Angus Instr. Corp., Box 24000, Indianapolis, IN 46224 317-244-7611
Metrosonics, Inc., Box 23075, Rochester, NY 14692-3075 716-334-7300
† Reproduction Technologies Inc., Dept. EM, P.O. Box 815, Bristol, IN 46507-0518 .... 219-848-5233;219-848-5333
§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 215-673-5600
Tape Concepts, Inc., P. O. Box 815, 110 E. Vistula St., Bristol, IN 46507 219-848-5234
Westronics Inc. of Texas, 2441 Northeast Pkwy., Box 4619, Ft. Worth, TX 76106 817-625-2311

Recorders, Strip Chart-3000

§† Astro-Med, Inc., 600 East Greenwich Avenue, W. Warwick, RI 02893, 401-828-4000 .... D•1402
Chessell Corp., Penns Trail, Newtown, PA 18940, 215-968-0660 .... D•1403
Gould Inc., Recording Systems Div., 3631 Perkins Ave., Cleveland, OH 44114, 216-361-3315 .... D•1404
† Linseis, Inc., P.O. Box 666, Princeton Junction, NJ 08550, 609-799-6282 (in N.J.);Toll Free 1-800-RECORDER .... D•1405

Recorders, Strip Chart-3000 (Cont'd)

Omega Engrg., Box 4047, Stamford, CT 06907, 203-359-1660 ...... D•1160,1290, 1407
THORN EMI Technology Inc., 8601 Dunwoody Pl., Atlanta, GA 30338, 404-587-0017;800-243-2572 ...... D•1313
Acurex-Autodata, 555 Clyde, Mountain View, CA 94039 415-964-3200
§ AEMC, 99 Chauncy, Boston, MA 02111 ...... 617-451-0227;800-343-1391
Allen Datagraph, Inc., 24 Keewaydin Dr., Salem, NH 03079 603-893-1983
§ Alltech Assocs. Inc., Applied Science Labs., 2051 Waukegan Rd., Deerfield, IL 60015 312-948-8600
† Amprobe Instr., 630 Merrick Rd., Lynbrook, NY 11563 ...... 516-LY3-5600
§† Analytical Meas., 31 Willow St., Chatham, NJ 07928 201-273-7500
§† Bailey Controls Co., 29801 Euclid Ave., Wickliffe, OH 44092 216-585-5800
Barber-Colman Co., Indl. Instrs. Div., P.O. Box 2940, 1354 Clifford Ave., Loves Park, IL 61132 815-877-0241
Bascom-Turner Instrs., 111 Downey St., Norwood, MA 02062 617-769-9660
† Bausch & Lomb, 820 Linden Ave., Rochester, NY 14625 716-338-6314
BBC-Metrawatt/Goerz, 2150 W. 6th Ave., Broomfield, CO 80020 ...... 303-469-5231; 800-821-6327
Beckman Industrial Corp., Cedar Grove Div., 89 Commerce Rd., Cedar Grove, NJ 07009 201-239-6200
Beckman Instrs., 2500 Harbor Blvd., Fullerton, CA 92634 714-871-4848
B-G Instruments, P.O. Box 67, Alta Loma, CA 91701 ...... 714-989-4802;980-2826
Bluffton Products, Inc., Tegam, Inc., 7230 North Ridge Road, Madison, OH 44057 216-946-3572
Bristol Babcock Inc., 40 Bristol St., Waterbury, CT 06708 203-575-3000
Bruel & Kjaer Instrs. Inc., 185 Forest St., Marlboro, MA 01752 617-481-7000
Chatsworth Data Corp, Impact-o-Graph Div., 20710 Lassen St., Chatsworth, CA 91311 213-341-3000
Continental Resources, Inc., 175 Middlesex Tpke., Bedford, MA 01730 617-275-0850
§ Control Prods., Devar, Inc., P.O. Box 589, Bridgeport, CT 06601 203-368-6751
Dianachart Inc., 129 Hibernia Ave., Rockaway, NJ 07866 201-625-2299
ECO Instrs. Div., Sea Data Corp., 1 Bridge St., Newton, MA 02158 617-964-8360
§ EDL, Inc., 385 Oser Ave., Hauppauge, NY 11788 ...... 516-435-2808;1-800-DIAL EDL
Electric Tachometer, 68th & Upland Sts., Philadelphia, PA 19142 ...... 215-SA6-7723
Elnik Instrs., 3 Edison Place, Fairfield, NJ 07006 201-882-8033
§ Esterline Angus Instr. Corp., Box 24000, Indianapolis, IN 46224 317-244-7611
Extech International Corp., 150 Bear Hill Rd., Waltham, MA 02154 617-890-7440
General Scanning, 500 Arsenal St., Watertown, MA 02272 617-924-1010
Genstar Rental Elctrns., 2445 Faber Pl., Palo Alto, CA 94303 415-856-7600
§ Geophysical Survey Sys., Inc., 15 Flagstone Dr., Hudson, NH 03051 603-889-4841
Gow-Mac Instr. Co., P.O. Box 32, Bound Brook, NJ 08805 201-560-0600
§ Gulton Inds., Inc., Graphic Instruments Div., Gulton Ind'l. Pk., E. Greenwich, RI 02818 401-884-6800
Harrel, Inc., 16 Fitch St., E. Norwalk, CT 06855 203-866-2573
§ Heath Co., Benton Harbor, MI 49022 616-982-3886
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
† Honeywell, Process Control Div., 1100 Virginia Dr., Ft. Washington, PA 19034 ...... 800-321-5111, Ext. 596
Honeywell, Test Instrs. Div., P.O. Box 5227, Denver, CO 80217 303-773-4700
§ Houston Instrument, 8500 Cameron Rd., Austin, TX 78753 512-835-0900
Hughes Aircraft Co, Aerospace Grps./Support Sys., P.O. Box 90515, Los Angeles, CA 90009 213-670-1515
§ Jumbo Process Control, Inc., 410 Garibaldi Ave., Lodi, NJ 07644 201-779-7744
§ Kipp & Zonen, 390 Central Ave., Bohemia, NY 11716 516-589-2885
Larson Instr., Greenbush Rd., Orangeburg, NY 10962 914-359-3800
Leeds & Northrup Instrs., A Unit of General Signal Corp., Sumneytown Pike, North Wales, PA 19454 215-643-2000
§ Linear Instrs., 500 Edison Way, Reno, NV 89502 702-786-3636
§ Love Controls, 1475 S. Wheeling Rd., Wheeling, IL 60090 312-541-3232
Marel Instr. Co., 907 South East 13th Pl., Cape Coral, FL 33904 813-574-8788
MFE Corp., Instr. Div., Keewaydin Dr., Bldg. # 1, Salem, NH 03079 603-893-1921
§ North American Soar Corp., 11126 Cornell Ave., Cherry Hill, NJ 08002 609-488-1060
§ Pacer Industries, Inc., 1450 First Ave., Chippewa Falls, WI 54729 715-723-1141
PPM, Inc., 4521 Emery Ind. Pkwy., Cleveland, OH 44128 216-292-6006
§ PrimeLine-Soltec Distbn., Soltec Corp., P.O. Box 818, Sun Valley, CA 91353-0818 ...... 800-525-5554;818-764-5400
§ REI Sls., 19525 Business Centre Dr., Northridge, CA 91324 617-938-0900
Science/Elctrns., 1224-26 McCook Ave., Dayton, OH 45404 513-228-6011
† Sensortek, Inc., 154 Em Huron Ave., Clifton, NJ 07013 201-779-5577
§ Simpson Elec. Co., 853 Dundee Ave., Elgin, IL 60120 312-697-2260
§ Soltec Corp., 11684 Pendelton St., Sun Valley, CA 91352 ...... 818-767-0044; 800-423-2344
§ Sperry, A. W., Instrs., P.O. Box 9300, Smithtown, NY 11787 516-231-7050
† Stoelting Co., 1350 S. Kostner Ave., Chicago, IL 60623 312-522-4500
§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 215-673-5600
Tegal Scientific, Inc., Box 5905, Concord, CA 94524 415-827-1054
Texas Instrs., Data Sys. Group, P. O. Box 809063, Dallas, TX 75380-9063 1-800-527-3500
† Tracor Instruments, 6500 Tracor La., Bldg. 27, Austin, TX 78725 512-929-2051
§ Tucker Elctrns., Box 461966, Garland, TX 75046 ...... 214-348-8800;800-527-4642
Varian Assocs., Instr. Grp., 611 Hansen Way, Palo Alto, CA 94303 415-493-4000
VirTis Co., Rte. 208, Gardiner, NY 12525 914-255-5000
§ Western Graphtec, 12 Chrysler St., Irvine, CA 92718 ...... 714-770-6010;800-854-8385
Westronics Inc. of Texas, 2441 Northeast Pkwy., Box 4619, Ft. Worth, TX 76106 817-625-2311
Yokogawa Corp. of America, 2 Dart Rd., Shenandoah, GA 30265 404-253-7000

Recorders, Transient-3000

† Astro-Med, Inc., 600 East Greenwich Avenue, W. Warwick, RI 02893, 401-828-4000 ...... D•1402
§ BBC-Metrawatt/Goerz, 2150 W. 6th Ave., Broomfield, CO 80020, 303-469-5231;800-821-6327 ...... D•1193
Chessell Corp., Penns Trail, Newtown, PA 18940, 215-968-0660 ...... D•1403
Dranetz Technologies, Inc, Computer Products Division, 1000 New Durham Rd., P.O. Box 4019, Edison, NJ 08818-4019, 201-287-3680 ...... D•1167
† Fairchild Weston, Data Recorders, P.O. Box 3041, Sarasota, FL 33578, 813-371-0811 ...... D•1228
Gould Inc., Recording Systems Div., 3631 Perkins Ave., Cleveland, OH 44114, 216-361-3315 ...... D•1404
THORN EMI Technology Inc., 8601 Dunwoody Pl., Atlanta, GA 30338, 404-587-0017;800-243-2572 ...... D•1313
Ballantine Labs., 90 Fanny Rd., Boonton, NJ 07005 201-335-0900
Bruel & Kjaer Instrs. Inc., 185 Forest St., Marlboro, MA 01752 617-481-7000
Comstron Corp., 200 E. Sunrise Hwy., Freeport, NY 11520 516-546-9700
Continental Resources, Inc., 175 Middlesex Tpke., Bedford, MA 01730 617-275-0850
† Data Capture Technology, Hathaway Instruments, 5436-F South Mingo Rd., Tulsa, OK 74146 918-627-7521
Dianachart Inc., 129 Hibernia Ave., Rockaway, NJ 07866 201-625-2299
§ Endevco, 30700 Rancho Viejo Rd., San Juan Capistrano, CA 92675 714-493-8181
Esterline Angus Instr. Corp., Box 24000, Indianapolis, IN 46224 317-244-7611
Gulton Inds., Inc., Graphic Instruments Div., Gulton Ind'l. Pk., E. Greenwich, RI 02818 401-884-6800
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
LeCroy Resch. Sys. Corp., 700 S. Main St., Spring Vly., NY 10977 914-425-2000
§ Macrodyne, 1004 Princetown Rd., Schenectady, NY 12301 518-356-3500
Micro Instr., 2250 Micro Pl., Escondido, CA 92025 619-746-2010
Nicolet Instr. Corp., Oscilloscope Div., 5225 Verona Rd., Madison, WI 53711 608-271-3333
§ PrimeLine-Soltec Distbn., Soltec Corp., P.O. Box 818, Sun Valley, CA 91353-0818 ...... 800-525-5554;818-764-5400
† R. C. Elctrns. Inc., 5386 Hollister Ave., Santa Barbara, CA 93111 805-964-6708
§ REI Sls., 19525 Business Centre Dr., Northridge, CA 91324 617-938-0900
Science/Elctrns., 1224-26 McCook Ave., Dayton, OH 45404 513-228-6011
Soltec Corp., 11684 Pendelton St., Sun Valley, CA 91352 ...... 818-767-0044; 800-423-2344
§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 215-673-5600
Westronics Inc. of Texas, 2441 Northeast Pkwy., Box 4619, Ft. Worth, TX 76106 817-625-2311

Recorders, Vibration-3000

§ Astro-Med, Inc., 600 East Greenwich Avenue, W. Warwick, RI 02893, 401-828-4000 ...... D•1402
Chatsworth Data Corp, Cablemaster Div., 20710 Lassen St., Chatsworth, CA 91311, 818-341-9200 ...... D•1199
† Fairchild Weston, Data Recorders, P.O. Box 3041, Sarasota, FL 33578, 813-371-0811 ...... D•1228
Gould Inc., Recording Systems Div., 3631 Perkins Ave., Cleveland, OH 44114, 216-361-3315 ...... D•1404
Bruel & Kjaer Instrs. Inc., 185 Forest St., Marlboro, MA 01752 617-481-7000
Chatsworth Data Corp, Impact-o-Graph Div., 20710 Lassen St., Chatsworth, CA 91311 213-341-3000
Chessell Corp., Penns Trail, Newtown, PA 18940 215-968-0660
§ Epic, Inc., 150 Nassau St., New York, NY 10038 212-349-2470
Kinemetrics, Inc., 222 Vista Ave., Pasadena, CA 91107 818-795-2220
§ Macrodyne, 1004 Princetown Rd., Schenectady, NY 12301 518-356-3500
Marel Instr. Co., 907 South East 13th Pl., Cape Coral, FL 33904 813-574-8788
Nicolet Instr. Corp., Oscilloscope Div., 5225 Verona Rd., Madison, WI 53711 608-271-3333
† R. C. Elctrns. Inc., 5386 Hollister Ave., Santa Barbara, CA 93111 805-964-6708
Westronics Inc. of Texas, 2441 Northeast Pkwy., Box 4619, Ft. Worth, TX 76106 817-625-2311

Recorders, Video-1900

† Fairchild Weston, Data Recorders, P.O. Box 3041, Sarasota, FL 33578, 813-371-0811 ...... D•1228
Gould Inc., Recording Systems Div., 3631 Perkins Ave., Cleveland, OH 44114, 216-361-3315 ...... D•1404
† Ampex Corp., 401 Broadway, Redwood City, CA 94063 415-367-2011
§ Eigen Video, P.O. Box 848, Nevada City, CA 95959 916-272-3461
Gulton Inds., Inc., Graphic Instruments Div., Gulton Ind'l. Pk., E. Greenwich, RI 02818 401-884-6800
Honeywell, Test Instrs. Div., P.O. Box 5227, Denver, CO 80217 303-773-4700
RCA Solid State Div., Route 202, Somerville, NJ 08876 201-685-6000
† SEKAI Elctrns. of Amer., Inc., 14700 E. Firestone Blvd., Suite 122, La Mirada, CA 90638 714-670-1854
† Telectro Sys., 96-18 43rd Ave., Corona, NY 11368 212-651-8900
† Teledyne Camera Sys., 131 N. Fifth Ave., Arcadia, CA 91006 818-359-6691
§ Vicon Industries, Inc., 525 Broad Hollow Rd., Melville, NY 11747 516-293-2200
† Video Automation Systems, Upper Shad Rd., Pound Ridge, NY 10576 914-764-4613
Video Logic Corp., 597 No. Mathilda Ave., Sunnyvale, CA 94086 408-245-8622

Recorders, X-Y — See Plotters X-Y (Vol. D)

Recorders (MIL), Magnetic Tape-3475

† Fairchild Weston, Data Recorders, P.O. Box 3041, Sarasota, FL 33578, 813-371-0811 ...... D•1228
Phi Technologies, Inc., 4605 North Stiles, Oklahoma City, OK 73105, 405-521-9000 ...... D•1052
Bruel & Kjaer Instrs. Inc., 185 Forest St., Marlboro, MA 01752 617-481-7000
† Genisco Memory Prods. Corp., 10874 Hope St., Cypress, CA 90630 714-220-0720
† Reproduction Technologies Inc., Dept. EM, P.O. Box 815, Bristol, IN 46507-0518 ...... 219-848-5233;219-848-5333
Tape Concepts, Inc., P. O. Box 815, 110 E. Vistula St., Bristol, IN 46507 219-848-5234

Recorders (MIL), RHAW-3475

† Reproduction Technologies Inc., Dept. EM, P.O. Box 815, Bristol, IN 46507-0518, 219-848-5233;219-848-5333 ...... D•1034
† Fairchild Weston, Data Recorders, P.O. Box 3041, Sarasota, FL 33578 813-371-0811
Tape Concepts, Inc., P. O. Box 815, 110 E. Vistula St., Bristol, IN 46507 219-848-5234

Recording Systems (MIL)-3475

† **Fairchild Weston, Data Recorders, P.O. Box 3041, Sarasota, FL 33578, 813-371-0811 .... D•1228**
Phi Technologies, Inc., 4605 North Stiles, Oklahoma City, OK 73105, 405-521-9000 .... D•1052-1053
† Astro-Med, Inc., 600 East Greenwich Avenue, W. Warwick, RI 02893 401-828-4000
† Reproduction Technologies Inc., Dept. EM, P.O. Box 815, Bristol, IN 46507-0518 .... 219-848-5233;219-848-5333
§† Saylor Electronics Int'l, Inc., 1824 Calash Dr., Carson City, NV 89701 702-883-4184
Tape Concepts, Inc., P. O. Box 815, 110 E. Vistula St., Bristol, IN 46507 219-848-5234
Video Logic Corp., 597 No. Mathilda Ave., Sunnyvale, CA 94086 408-245-8622

Rectifiers, Bridges & Assemblies-4800 — *See Vol. A*

Rectifiers, Copper Oxide-4800 — *See Vol. A*

Rectifiers, Copper Sulfide-4200 — *See Vol. A*

Rectifiers, Electron Tube — See Tubes, Rectifying (Vol. A)

Rectifiers, Germanium-4800 — *See Vol. A*

Rectifiers, Selenium-4800 — *See Vol. A*

Rectifiers, Silicon-4800 — *See Vol. A*

Rectifiers, Silicon Controlled — See Thyristors (Vol. A)

Rectifiers, Ultrafast-4800 — *See Vol. A*

Rectifiers (MIL), Semiconductor-2440 — *See Vol. B*

Reducers, Speed — See Gear Heads & Speed Reducers

Reels, Tape — See Tape Recording Accessories (Vol. D)

Reference Books — See Technical Books (Vol. D)

References, DC Voltage-2930

† **Electronic Dev. Corp., 11 Hamlin St., Boston, MA 02127-4198, 617-268-9696 .... D•1213-1215**
General Resistance, Inc., A Prime Technology Company, Twin Lakes Rd., P.O. Box 185, N. Branford, CT 06471, 203-481-5721 .... D•1233
HyComp Inc., 75 Union Ave., Box 377, Sudbury, MA 01776, 617-443-4631 .... A•1670
IET Labs, Inc., 534 Main St., Westbury, NY 11590, 516-334-5959 .... D•1242,1244
Julie Resch. Labs., 211 West 61st St., New York, NY 10023, 212-245-2727 .... D•1254
† **Koep Precision Standards, Inc., P. O. Box 191, So. Plainfield, NJ 07080, 201-549-9280 .... D•1257**
Sensitive Research Instrs., 25 Dock St., Mt. Vernon, NY 10550, 914-699-9717 .... D•1305
AMF/Electro Comps. Div., AMF, 2713 Gateway Dr., Pompano Beach, FL 33060 305-973-8620
† Analog Devices, P.O. Box 280, Norwood, MA 02062 617-329-4700
Analogic Corp., 8 Centennial Dr., Peabody, MA 01961 .... 617-532-5660;617-777-4500; 617-246-0300;800-451-1
Datel, General Electric Co., 11 Cabot Blvd., Mansfield, MA 02048 617-339-9341
Dymec, 8 Lowell Ave., Winchester, MA 01890 617-729-7870
Dynage/Power & Magnetics, Division Of Oakleaf, Inc., 2 Willowbrook Road, Cromwell, CT 06416 203-635-3510
Electrical Instr. Svc., 25 Dock St., Mt. Vernon, NY 10550 914-699-9717
Ferranti Elec., 87 Modula Ave., Commack, NY 11725 516-543-0200
§ Heath Co., Benton Harbor, MI 49022 616-982-3886
† Hybrid Systems Corp., 22 Linnell Circle, Billerica, MA 01821 617-667-8700
Leeds & Northrup Instrs., A Unit of General Signal Corp., Sumneytown Pike, North Wales, PA 19454 215-643-2000
† Micro Power Sys. Inc., 3100 Alfred St., Santa Clara, CA 95050 408-727-5350
§† Motorola Semiconductor Prods. Sector, Adv. 72, Box 20912, Phoenix, AZ 85036 602-244-6900
North Hills Elctrns., 1 Alexander Pl., Glen Cove, NY 11542 516-671-5700
Northwest Microcircuits, Inc., 2115 N. College, Newberg, OR 97132 503-538-7081
Power Designs, Inc., 1700 Shames Dr., Westbury, NY 11590 516-333-6200
§† Precision Monolithics, Inc., 1500 Space Dr., Santa Clara, CA 95054 408-727-9222
§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 215-673-5600
† Thaler Corp., 10940 N. Stallard Pl., Tucson, AZ 85704 602-742-5572
§ Tucker Elctrns., Box 461966, Garland, TX 75046 .... 214-348-8800;800-527-4642
ZI-TECH Instr. Corp., 2151 Park Blvd., Box 60490, Palo Alto, CA 94306 415-326-2151

Refrigerants, Spray-1600 — *See Vol. C*

Refrigerated Cooling Equipment — See Air Conditioners (Vol. C)

Refrigerators, Environmental Test-2550

† **Blue M, A Unit of General Signal, 138th & Chatham Sts., Blue Island, IL 60406, 312-385-9000 .... D•1165**
† **Cincinnati Sub-Zero Prods., 12011 Mosteller Rd., Cincinnati, OH 45241, 513-772-8810 .... D•1166**
† **Hafstrom Technical Products, Inc., P.O. Box 9829, San Diego, CA 92109, 619-274-8822 .... D•1169**
† **Tenney Engrg., 109 Springfield Rd., Union, NJ 07083, 201-686-7870 .... D•1173**
† Associated Environmental Systems, 10 Industrial Way, Amesbury, MA 01913-4848 617-388-5662
Forma Scientific, Div. of Mallinckrodt Inc., Box 649, Marietta, OH 45750 614-373-4763
† FTS Sys., POB 158, Stone Ridge, NY 12484 800-824-0400
Hotpack Corp., Heinicke Instrs., 10940 Dutton Rd., Philadelphia, PA 19154 .... 215-824-1700;800-523-3608
Lab-Line Instrs., 15th & Bloomingdale, Melrose Park, IL 60160 312-450-2600
Ransco Inds., Inc., Sub. Despatch Ind., Inc., 2201 Statham Blvd., Oxnard, CA 93033 805-487-7777
§ Temptronic, 55 Chapel St., Newton, MA 02158 617-969-2501
† Vactronic Lab. Equip., 65 Brightside Ave., E. Northport, NY 11731 .... 516-AN1-2660

Regulators, Current-4000

§ **Kepco, Inc., 131-38 Sanford Ave., Flushing, NY 11352, 718-461-7000 .... D•1689-1691,1702-1704,1706-1707**
† **NWL Transformers, Rising Sun Rd., P.O. Box 358, Bordentown, NJ 08505, 609-298-7300 .... D•1735**
† **NWL Transformers, Rising Sun Rd., P.O. Box 358, Bordentown, NJ 08505, 609-298-7300 .... D•1735**
Superior Elec. Co., 383 Middle St., Bristol, CT 06010, 203-582-9561 .... D•1968
Amperite Co., Inc., 600 Palisade Ave., Union City, NJ 07087 201-864-9503
Applied Control, 1275 Bloomfield Ave., Fairfield, NJ 07006-2828 201-227-5454
† Applied Electro Technlg., Int., STI Company, 2220 So. Anne St., Santa Ana, CA 92704 714-556-6570
† Autronics, 314 E. Live Oak, Ste. A, Arcadia, CA 91006 818-445-5470
Behlman Div., California Instrs., Div. of Norlin Inds., 5150 Convoy St., San Diego, CA 92111 619-279-8620
Behlman Engineering, 1142 Mark Ave., Carpinteria, CA 93013 805-684-8311
§† Bendix Corp., Electric Power Div., Hwy. 35, Eatontown, NJ 07724 201-542-2000
Bikor, 1504 W. 228th St., Torrance, CA 92718 213-539-6320
† CELCO, 70 Constantine Dr., Mahwah, NJ 07430 201-327-1123
Cross Elctrns., 100 Commonwealth Dr., Warrendale, PA 15086 412-776-1591
Elin Div., California Instrs. Co., Div. of Norlin Ind., 5150 Convoy St., San Diego, CA 92111 619-279-8620
ERA Transpac Div., Sub. Elctrn. Research Assocs., 50 Graphic Place, Moonachie, NJ 07074 201-641-3650
† General Magnetics, 211 Grove St., Bloomfield, NJ 07003 201-743-2700
Hipotronics, P.O. Drawer A, Brewster, NY 10509 914-279-8091
Hitran Corp., Agex, Rte. 31, RD 5-65, Flemington, NJ 08822 201-782-5525
Industrial Test Equip., 21 Yennicock Ave., Port Washington, NY 11050 516-883-1700
IXYS Corp., 142 Charcot Ave., San Jose, CA 95131 408-262-8800
Lambda Electronics, Veeco Instr., Inc., 515 Broad Hollow Rd., Melville, NY 11747 516-694-4200
† Lear Siegler, Inc., 2850 Ocean Park Blvd., P.O. Box 2158, Santa Monica, CA 90406 213-452-5444
Mag-Con, 1626 Terrace Dr., St. Paul, MN 55113 612-633-8820
§ Master Elctrn. Controls, P.O. Box 25905, Los Angeles, CA 90025 213-452-1336
† Megatran Electronic Power, Rising Sun Rd., Bordentown, NJ 08505 609-298-7300
Melcher, Inc., 6290 Sunset Blvd., #1126, Los Angeles, CA 90028 213-463-5617
MICRA Corp., 120 Ricefield Lane, Hauppauge, NY 11788 516-231-8600
§ Micron Inds., 1830 N. 32nd Ave., Stone Park, IL 60165 312-345-0788
Micropac Inds., Inc., General Sensors Div., 905 E. Walnut St., Garland, TX 75040 214-272-3571
Mid-Eastern Industries, 100 Campus Dr., RD 1, Mt. Holly, NJ 08060 609-267-3811
§ Motorola Semiconductor Prods. Sector, Adv. 72, Box 20912, Phoenix, AZ 85036 602-244-6900
Power Designs, Inc., 1700 Shames Dr., Westbury, NY 11590 516-333-6200
SGS Semiconductor Corporation, 1000 E. Bell Road, Phoenix, AZ 85022 602-867-6100
† Sigmapower, Inc., 20790 Leapwood Ave., Carson, CA 90746 .... 213-32-Sigma
§† Solitron Devices, Inc., Semiconductor Group, 1177 Blue Heron Rd., Riviera Beach, FL 33404 305-848-4311
§† Sorensen Co., 676 E. Island Pond Rd., Manchester, NH 03103 603-668-4500
Staco Energy Prods. Co., 301 Gaddis Blvd., Dayton, OH 45403 513-253-1191
Staco Transpower, 301 Gaddis Blvd., Dayton, OH 45403 513-253-1191
§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 215-673-5600
Todd Prods. Corp., 50 Emjay Blvd., Brentwood, NY 11717 516-231-3366
† Trio Labs., 80 Dupont St., Plainview, NY 11803 516-349-0400

Regulators, Frequency-4050

§ **Displex, Inc., Alexander Place, Glen Cove, NY 11542, 516-671-4400 .... D•1917**
Nova Elec., Hobart Bros. Co., 263 Hillside Ave., Nutley, NJ 07110, 201-661-3434 .... D•1946
Pacific Power Source Corp., 15122 Bolsa Chica St., Huntington Bch., CA 92649, 714-898-2691;800-854-2433 .... D•1949,1951-1952
§† **Powermark, 3855 Ruffin Rd., San Diego, CA 92123, 619-565-8363 .... D•1955**
Abacus Controls Inc., 89 Readington Rd., Somerville, NJ 08876 201-526-6010
† Applied Electro Technlg., Int., STI Company, 2220 So. Anne St., Santa Ana, CA 92704 714-556-6570
Basler Elec., Rte. 143, Highland, IL 62249 618-654-2341
Behlman Div., California Instrs., Div. of Norlin Inds., 5150 Convoy St., San Diego, CA 92111 619-279-8620
Behlman Engineering, 1142 Mark Ave., Carpinteria, CA 93013 805-684-8311
§† Bendix Corp., Electric Power Div., Hwy. 35, Eatontown, NJ 07724 201-542-2000
Elgar Corp, An Onan McGraw Edison Co., 9250 Brown Deer Rd., San Diego, CA 92121 619-450-0085
Elin Div., California Instrs. Co., Div. of Norlin Ind., 5150 Convoy St., San Diego, CA 92111 619-279-8620
ERA Transpac Div., Sub. Elctrn. Research Assocs., 50 Graphic Place, Moonachie, NJ 07074 201-641-3650
Frequency Control Prods., Inc., American Time Prods. Div., 61-20 Woodside Ave., Woodside, NY 11377 212-458-5811
† Georator Corp., Box 70, Manassas, VA 22110 703-368-2101
§ Master Elctrn. Controls, P.O. Box 25905, Los Angeles, CA 90025 213-452-1336
Power Designs, Inc., 1700 Shames Dr., Westbury, NY 11590 516-333-6200

Regulators & References, Silicon-Also See Diodes, Zener & Stabistors-4800 — *See Vol. A*

Regulators & Stabilizers, Voltage-Also See Transformers, Voltage Regulating-4000

† Controlled Power Co., 1955 Stephenson Hwy., Troy, MI 48083, 1-800-521-4792 ... D•1876,1911,1914-1915
§ Displex, Inc., Alexander Place, Glen Cove, NY 11542, 516-671-4400 ... D•1917
Elgar Corp, An Onan McGraw Edison Co., 9250 Brown Deer Rd., San Diego, CA 92121, 619-450-0085 ... D•1920
Exar Corp., P. O. Box 62229, 750 Palomar Ave., Sunnyvale, CA 94086, 408-732-7970 ... A•1668
§ Franek, John, Co., Inc., P.O. Box 11752, Santa Ana, CA 92711-1752, 714-832-0290;800-854-9420 ... D•1924-1927
† Georator Corp., Box 70, Manassas, VA 22110, 703-368-2101 ... D•1930
Hipotronics, P.O. Drawer A, Brewster, NY 10509, 914-279-8091 ... D•1934-1935
§ Hitran Corp., Agex, Rte. 31, RD 5-65, Flemington, NJ 08822, 201-782-5525 ... D•1937
§ Kepco, Inc., 131-38 Sanford Ave., Flushing, NY 11352, 718-461-7000 ... D•1689-1691,1696-1700,1702,1705-1707,1709
Marway Prods. Inc., 311 N. Clara St., Santa Ana, CA 92703, 714-973-1800 ... D•1944
§ Motorola Semiconductor Prods. Sector, Adv. 72, Box 20912, Phoenix, AZ 85036, 602-244-6900 ... A•1691-1692,2077
† NWL Transformers, Rising Sun Rd., P.O. Box 358, Bordentown, NJ 08505, 609-298-7300 ... D•1735
† NWL Transformers, Rising Sun Rd., P.O. Box 358, Bordentown, NJ 08505, 609-298-7300 ... D•1735
Pacific Power Source Corp., 15122 Bolsa Chica St., Huntington Bch., CA 92649, 714-898-2691;800-854-2433 ... D•1949,1951-1952
§† Powermark, 3855 Ruffin Rd., San Diego, CA 92123, 619-565-8363 ... D•1955
Pulizzi Engineering, Inc., 3260 S. Susan St., Santa Ana, CA 92704-6865, 714-540-4229 ... D•1956-1958
† RTE Deltec Corp., 2727 Kurtz St., San Diego, CA 92110, 619-291-4211;800-854-2658 ... D•1959
Shape Magnetronics, Inc., 901 DuPage Ave., Lombard, IL 60148, 312-620-8394 ... D•1960-1961
SL Waber, 300 Harvard Ave., Westville, NJ 08093, 609-456-5400;800-257-8384 ... D•1963
§ Sola, A Unit of General Sign., 1717 Busse Rd., Elk Grove Village, IL 60007, 312-439-2800 ... D•1964-1967
§† Superior Elec. Co., 383 Middle St., Bristol, CT 06010, 203-582-9561 ... D•1968
§† Technipower, A Penril Co., P.O. Box 222, Commerce Pk., Danbury, CT 06810, 203-748-7001 ... A•2306
Technology Dynamics, 91 E. Carver Ave., Westwood, NJ 07675, 201-664-7636 ... D•1851
§ Triad-Utrad, 1124 E. Franklin St., Huntington, IN 46750, 219-356-6500 ... D•1970
Unitrode Corp., 5 Forbes Rd., Lexington, MA 02173, 617-861-6540 ... A•1698-1699
Voltex, 3460 Great Neck Rd., Amityville, NY 11701, 516-842-2772 ... D•1865
§ ACD-Elcor Products, P.O. Box 244, Bethel, CT 06801 ... 203-743-3510
§ Adtech Power Inc., 1620 S. Sunkist St., Anaheim, CA 92806 ... 714-634-9211
Albar, Inc., 19013 36th Ave. W., Lynnwood, WA 98036 ... 206-771-4006
† American Plasticraft Co., 814 N. Sacramento Blvd., Chicago, IL 60622 ... 312-722-7727
Amperite Co., Inc., 600 Palisade Ave., Union City, NJ 07087 ... 201-864-9503
† Analog Devices, P.O. Box 280, Norwood, MA 02062 ... 617-329-4700
† Andrich Sys., Inc., 1699 Roosevelt Ave., Bohemia, NY 11716 ... 516-589-5656
Applied Power Conversion, Technology Dynamics, Inc., 100 School St., Bergenfield, NJ 07621 ... 201-664-7636
Assembly Specialists, 914 Main St., Box 965, Acton, MA 01720 ... 617-263-9100
Atlas Energy Sys., 9457 Rush St., S. El Monte, CA 91733 ... 213-575-0755
Automatic Switch Co., 50-60 Hanover Road, Florham Park, NJ 07932 ... 1-201-966-2000
† Autronics, 314 E. Live Oak, Ste. A, Arcadia, CA 91006 ... 818-445-5470
Basler Elec., Rte. 143, Highland, IL 62249 ... 618-654-2341
† Beckman Industrial Corp., Electronic Technologies Div., 2500 Harbor Blvd., Fullerton, CA 92634 ... 714-871-4848
Behlman Div., California Instrs., Div. of Norlin Inds., 5150 Convoy St., San Diego, CA 92111 ... 619-279-8620
Behlman Engineering, 1142 Mark Ave., Carpinteria, CA 93013 ... 805-684-8311
Berkshire Transformer Corp., Route 341, P.O. Box 129, Kent, CT 06757 ... 203-927-3541
Bikor, 1504 W. 228th St., Torrance, CA 92718 ... 213-539-6320
† California Instruments, A Div. of Amstar Tech. Prods. Co., Inc., 5150-Convoy St., San Diego, CA 92111 ... 619-279-8620;800-356-2244;800-821-1634
† Cal-Power Corp., 140 Kansas St., El Segundo, CA 90245 ... 213-772-2171
† Circuit Techn., 160 Smith St., Farmingdale, NY 11735 ... 516-293-8686
Clary Corp., Precision Instrs. Div., 320 W. Clary Ave., San Gabriel, CA 91776 ... 818-287-6111
§ Computer Power, 124E W. Main St., High Bridge, NJ 08829 ... 201-735-8000
† Control Concepts Corp., P.O. Box 1380, Binghamton, NY 13902-1380 ... 607-724-2484
CTS Corporation, 905 North West Blvd., Elkart, IN 46514 ... 219-293-7511
§ Current Technology, Inc., 1400 S. Sherman, #202, Richardson, TX 75081 ... 214-238-5300
Del Elctrns. Corp., 250 E. Sandford Blvd., Mt. Vernon, NY 10550 ... 914-699-2000
§ Deltron, Inc., P.O. Box 1369, Wissahickon Ave., N. Wales, PA 19454-9990 ... 215-699-9261
§ Electronic Specialists, 171 South Main St., Natick, MA 01760 ... 617-655-1532; 800-225-4876
Elin Div., California Instrs. Co., Div. of Norlin Ind., 5150 Convoy St., San Diego, CA 92111 ... 619-279-8620
Engd. Prod., Div. of Acme Elec. Corp., 40 Water St., Cuba, NY 14727 ... 716-968-2400
ERA Transpac Div., Sub. Elctrn. Research Assocs., 50 Graphic Place, Moonachie, NJ 07074 ... 201-641-3650
§ Fairchild Camera & Instr. Corp., 464 Ellis St., 20-2271, Mountain View, CA 94042 ... 415-962-5011
§† Film Microelectronics, 17 A St., Burlington, MA 01803 ... 617-272-5650
Freed Transformer, 1718 Weirfield St., Ridgewood, NY 11385 ... 212-386-1300
GAR Enterprises, 2029 N. Lincoln Ave., Pasadena, CA 91103 ... 818-798-0785
† General Magnetics, 211 Grove St., Bloomfield, NJ 07003 ... 201-743-2700
§ Gentron Corp., 6667 N. Sydney Pl., Milwaukee, WI 53209 ... 414-351-1660
§ Hammond Mfg. Co., 1690 Walden Ave., Buffalo, NY 14225 ... 716-894-5710
§† Integrated Circuits, Inc., 10301 Willows Road, Redmond, WA 98052 ... 206-882-3100
† International Sensor Systems, Inc., Aurora Industrial Pk., Box 345, Aurora, NE 68818 ... 402-694-6111
§ ISOREG Corp., 410 Great Rd., P.O. Box 486, Littleton, MA 01460 ... 617-486-9483
IXYS Corp., 142 Charcot Ave., San Jose, CA 95131 ... 408-262-8800
§ Jefferson Elec., MagneTek, Inc., 1400 Center Circle Drive, Downers Grove, IL 60515-1021 ... 312-691-2400
Kato Engineering, Reliance Electric, P. O. Box 99502, Cleveland, OH 44199 ... 800-245-4501;in OH 800-245-4497
Lambda Electronics, Veeco Instr., Inc., 515 Broad Hollow Rd., Melville, NY 11747 ... 516-694-4200
Lambda Semiconductors, Veeco Instr., 121 International Dr., Corpus Christi, TX 78410 ... 512-289-0403;800-255-9606
§ Lea Dynatech, Inc., 12516 Lakeland Rd., Santa Fe Springs, CA 90670-9990 ... 213-944-0916
Mag-Con, 1626 Terrace Dr., St. Paul, MN 55113 ... 612-633-8820
† Magnetico Inc., 182 Morris Ave., Holtsville, NY 11742 ... 516-654-1166
§ Master Elctrn. Controls, P.O. Box 25905, Los Angeles, CA 90025 ... 213-452-1336
MCG Elctrns., 12 Burt Dr., Deer Park, NY 11729 ... 516-586-5125
† Megatran Electronic Power, Rising Sun Rd., Bordentown, NJ 08505 ... 609-298-7300
Melcher, Inc., 6290 Sunset Blvd., #1126, Los Angeles, CA 90028 ... 213-463-5617
† Mel Tec, Div. Epsco, Inc., 411 Providence Hwy., Westwood, MA 02090 ... 617-329-1508
† Micro Networks, 324 Clark St., Worcester, MA 01606 ... 617-852-5400
§† Micron Inds., 1830 N. 32nd Ave., Stone Park, IL 60165 ... 312-345-0788
Micropac Inds., 905 E. Walnut St., Garland, TX 75040 ... 214-272-3571
Micropac Inds., Inc., General Sensors Div., 905 E. Walnut St., Garland, TX 75040 ... 214-272-3571
Microtran Co. Inc., 145 E. Mineola Ave., Valley Stream, NY 11580 ... 516-561-6050
Mid-Eastern Industries, 100 Campus Dr., RD 1, Mt. Holly, NJ 08060 ... 609-267-3811
Modular Devices, 50 Orville Dr., Bohemia, NY 11716 ... 516-567-9620
† Northwest Microcircuits, Inc., 2115 N. College, Newberg, OR 97132 ... 503-538-7081
Oeco Corp., 712 S.E. Hawthorne Blvd., Portland, OR 97214 ... 503-238-2440
† OPT Inds. Inc., 300 Red School La., Phillipsburg, NJ 08865 ... 201-454-2600
Pioneer Magnetics, 1745 Berkeley St., Santa Monica, CA 90404 ... 213-829-6751
Power Conversion Prods., 42 East St., Box 380, Crystal Lake, IL 60014 ... 815-459-9100
Power Designs, Inc., 1700 Shames Dr., Westbury, NY 11590 ... 516-333-6200
Power-One, Inc., Power-One Linear Products, 740 Calle Plano, Camarillo, CA 93010 ... 805-987-8741
Power-One, Inc., Power-One Switching Products, 833 Flynn Rd., Camarillo, CA 93010 ... 805-482-0757
§ Power-Science, 7667 Vickers St., San Diego, CA 92111 ... 619-292-4322
PTC Transformers, P.O. Box 397, Rising Sun Road, Bordentown, NJ 08505 ... 609-298-8200
§ RCA Solid State Div., Linear Integrated Circuits, Rte. 202, Somerville, NJ 08876 ... 201-685-6000
RCI/Data, 1992 Lakewood Rd., Toms River, NJ 08753 ... 201-341-8361
RTE, Power/Mate Co., 514 S. River St., Hackensack, NJ 07601 ... 201-440-3100
§ Sanken Elec. Co., 1-22-8 Nishi-Ikebukuro, Toshima-Ku, Tokyo, JAPAN ... 03-986-6151
Sanken Elec. U.S.A. Corp., 3848 Carson St., Ste. 105, Torrance, CA 90503 ... 213-540-2209
† Signal Transformer, 500 Bayview Ave., Inwood, NY 11696 ... 516-239-4510
§† Silicon General, 11861 Western Ave., Garden Grove, CA 92641 ... 714-898-8121
§† Solarex Corp., 1335 Piccard Dr., Rockville, MD 20850 ... 301-948-0202
Solid State, Inc., 46 Farrand St., Bloomfield, NJ 07003 ... 201-429-8700
§† Solitron Devices, Inc., Semiconductor Group, 1177 Blue Heron Rd., Riviera Beach, FL 33404 ... 305-848-4311
§† Sorensen Co., 676 E. Island Pond Rd., Manchester, NH 03103 ... 603-668-4500
§† Staco Energy Prods. Co., 301 Gaddis Blvd., Dayton, OH 45403 ... 513-253-1191
§ Sun Research, Inc.,, Box 210, Old Bay Rd., New Durham, NH 03855 ... 603-859-7110
§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 ... 215-673-5600
Sylvania Electronic Components, Philips ECG Inc., A North American Philips Co., 100 First Ave., Waltham, MA 02254 ... 617-890-6107
† Tempo Instrument, Inc., 87 Modular Ave., Commack, NY 11725 ... 516-864-3700
§ Terado, 1068 Raymond Ave., St. Paul, MN 55108 ... 612-646-2868
§ Tetragenics, Box 1338, Butte, MT 59701 ... 406-782-8606
§ Texet Semiconductors, 301 Texet Dr., Allen, TX 75002 ... 214-727-1111
Thickfilm Int'l., Rt. 1-Box 85-0, Indian Head, MD 20640 ... 301-375-8666
Todd Systems, Inc., 50 Ash St., Yonkers, NY 10701 ... 914-963-3400
§† Topaz Electronics, 9192 Topaz Way, San Diego, CA 92123-1164 ... 619-279-0831
† Trio Labs., 80 Dupont St., Plainview, NY 11803 ... 516-349-0400
§ Tripp-Lite, 500 No. Orleans, Chicago, IL 60610 ... 312-329-1777
Universal Voltronics, 27 Radio Circle Dr., Mt. Kisco, NY 10549 ... 914-241-1300
† Ward Leonard Elec., 31 South St., Mt. Vernon, NY 10550 ... 914-664-1000
† Wilmar Elctrns., Inc., 2430 Amsler St., Torrance, CA 90505 ... 213-326-6668
† Xentek, Inc., 279 S. Pacific St., San Marcos, CA 92069 ... 619-744-3346
† Zenith CRT & Components Operations, 1000 Milwaukee Ave., Glenview, IL 60025 ... 312-391-7733

Relays, Antenna — See Relays, RF (Incl. Antenna & Coaxial) (Vol. B)

Relays, Audio Operated — See Relays, Frequency Selective (Vol. B)

Relays, Coaxial — See Relays, RF (Vol. B)

Relays, Contact — See Relays, Power (Vol. B)

Relays, Cradle-4500 — ***See Vol. B***

Relays, Crystal Can, 1/2 Crystal Can-4500 — ***See Vol. B***

Relays, Current Sensing-4500 – *See Vol. B*

Relays, Differential-4500 – *See Vol. B*

Relays, Frequency Selective-4500 – *See Vol. B*

Relays, General Purpose-4500 – *See Vol. B*

Relays, High Voltage (500 Volts & Over)-4500 – *See Vol. B*

Relays, Hybrid-4500 – *See Vol. B*

Relays, Impulse – See Relays, Stepping (Vol. B)

Relays, I/O Modules – See Modules, I/O Relays (Vol. A)

Relays, Latching-4500 – *See Vol. B*

Relays, Mercury-Wetted Contacts-4500 – *See Vol. B*

Relays, Meter-4500 – *See Vol. B*

Relays, Motor Start-4500 – *See Vol. B*

Relays, Phase Sensing-4500 – *See Vol. B*

Relays, Plug-in-4500 – *See Vol. B*

Relays, Power-4500 – *See Vol. B*

Relays, Printed Circuit Mounting (Incl. Transistor & DIP Case Types)-4500 – *See Vol. B*

Relays, Programmable-4500 – *See Vol. B*

Relays, RF (Incl. Antenna & Coaxial)-4500 – *See Vol. B*

Relays, Reed-4500 – *See Vol. B*

Relays, Sealed-4500 – *See Vol. B*

Relay, Solid State-4500 – *See Vol. B*

Relays, Stepping-4500 – *See Vol. B*

Relays, Telephone-4500 – *See Vol. B*

Relays, Thermal-4500 – *See Vol. B*

Relays, Time Delay-4500 – *See Vol. B*

Relays, Transistor & DIP Case Types – See Relays, Printed Circuit Mounting (Vol. B)

Relays, Vacuum-4500 – *See Vol. B*

Relays, Voltage Sensitive-4500 – *See Vol. B*

Relays (MIL)-2440 – *See Vol. B*

Rental & Lease Equipment-2900

U.S. Instr. Rentals, 2988 Campus Dr., San Mateo, CA 94403, 415-572-6600 .... D∘1322

Repeaters, Pulse – See Transponders (Vol. D)

Repeaters, Servo-4900

† Industrial Control Co., 3100 Pineda Ave., Rockledge, FL 32955, 305-259-7105 .... D∘1988
† Clifton Precision, Litton Systems, Inc., Marple at Broadway, Clifton Hgts., PA 19018 215-622-1000
† Control Technology Co., 41-16 29th St., Long Island City, NY 11101 718-361-2133
† GAP Instr., 40 Oser Ave., Hauppauge, NY 11787 516-273-0909
North Atlantic Inds., Instrument Div., 60 Plant Ave., Hauppauge, NY 11788 516-582-6500
Singer Co., Kearfott Div., 1150 McBride Ave., Little Falls, NJ 07424 201-785-6000
† Transicoil, Inc., Trooper Rd., P.O. Box 99, Worcester, PA 19490-9990 215-277-1300
† Transmagnetics, 210 Adams Blvd., Farmingdale, NY 11735 516-293-3100
† Vernitron Corp., Control Comps. Div., 1601 Precision Park La., San Diego, CA 92073 619-428-5581

Resins, Encapsulating – See Compounds, Encapsulating, Molding & Potting (Vol. C)

Resins, Synthetic – See Plastic Raw Materials (Vol. C)

Resistance Comparators – See Bridges, Resistance (Vol. D)

Resistor Hardware-2800 – *See Vol. C*

Resistors, Adjustable-Also See Potentiometers; Rheostats-4700 – *See Vol. A*

Resistors, Ballast (Incl. Tube & Solid State Devices)-4700 – *See Vol. A*

Resistors, Beryllia Core – See Resistors, Integral Heat Dissipator (Vol. A)

Resistors, Bulk Ceramic-4700 – *See Vol. A*

Resistors, Carbon Film-4700 – *See Vol. A*

Resistors, Ceramic Core-4700 – *See Vol. A*

Resistors, Ceramic Metal (Cermet)-4700 – *See Vol. A*

Resistors, Chip (For Microcircuits)-4700 – *See Vol. A*

Resistors, Composition, Carbon-4700 – *See Vol. A*

Resistors, Decade-4700 – *See Vol. A*

Resistors, Deposited Carbon-4700 – *See Vol. A*

Resistors, Disk, Rod & Tube-4700 – *See Vol. A*

Resistors, Film, Metallized & Nonmetallized-4700 – *See Vol. A*

Resistors, Flame Retardant-4700 – *See Vol. A*

Resistors, Flux Sensitive-4700 – *See Vol. A*

Resistors, Foil, Ultraprecision-4700 – *See Vol. A*

Resistos, Four Terminal-4700 – *See Vol. A*

Resistors, Fuse-4300 – *See Vol. B*

Resistors, Glass-4700 – *See Vol. A*

Resistors, Heat Sink Encased – See Resistors, Integral Heat Dissipator (Vol. A)

Resistors, High Frequency-4700 – *See Vol. A*

Resistors, High Megohm (Over 22 Megohms)-4700 – *See Vol. A*

Resistors, High Temperature (Over 125°C)-4700 – *See Vol. A*

Resistors, High Voltage (1,000 Volts & Over)-4700 – *See Vol. A*

Resistors, Hot Molded-4700 – *See Vol. A*

Resistors, Integral Heat Dissipator-4700 – *See Vol. A*

Resistors, Low Temperature Coefficient-4700 – *See Vol. A*

Resistors, Metal Glazed-4700 – *See Vol. A*

Resistors, Metal Oxide-4700 – *See Vol. A*

Resistors, Microwave-4700 – *See Vol. A*

Resistors, Negative Temperature Coefficient-4700 – *See Vol. A*

Resistors, Noninductive-4700 – *See Vol. A*

Resistors, Oil Filled-4700 – *See Vol. A*

Resistors, Plug-in-4700 – *See Vol. A*

Resistors, Positive Temperature Coefficient-4700 – *See Vol. A*

Resistors, Power-4700 – *See Vol. A*

Resistors, Precision-4700 – *See Vol. A*

Resistors, Pressure Sensitive-4700 – *See Vol. A*

Resistors, Rectilinear-4700 – *See Vol. A*

Resistors, Standards – See Standards, Resistance (Vol. D)

Resistors, Strip-4700 – *See Vol. A*

Resistors, Suppressor-4700 – *See Vol. A*

Resistors, Surge-4700 – *See Vol. A*

Resistors, Tapped-4700 – *See Vol. A*

Resistors, Temperature Sensitive – See Thermistors (Vol. B)

Resistors, Tin Oxide-4700 – *See Vol. A*

Resistors, Variable — See Potentiometers (Vol. A), Rheostats (Vol. A), Resistors, Adjustable (Vol. A)

Resistors, Voltage Sensitive-4700 — *See Vol. A*

Resistors, Wirewound-4700 — *See Vol. A*

Resistors, Zero-Ohm-4700 — *See Vol. A*

Resistors (MIL)-2440 — *See Vol. B*

Resolvers, Synchro-4900

† Computer Conversions Corp., 6 Dunton Ct., E. Northport, NY 11731, 516-261-3300 .... D•1140
Kollmorgen Corp., Industrial Drives Div., 201 Rock Rd., Radford, VA 24141, 703-639-2495 .... B•1163-1165
† Analog Devices, P.O. Box 280, Norwood, MA 02062 617-329-4700
† Clifton Precision, Litton Systems, Inc., Marple at Broadway, Clifton Hgts., PA 19018 215-622-1000
† Harowe Servo Controls, Bowmar Inst. Corp., Westtown Rd. at West Chester Pike, W. Chester, PA 19380 215-692-2700
† ILC Data Device Corp., 105 Wilbur Pl., Bohemia, NY 11716 516-567-5600
Innovatek Microsystems, Inc., Smithfield Rd., R1 Box 104, Millerton, NY 12546-9720 914-373-9003
North Atlantic Inds., Instrument Div., 60 Plant Ave., Hauppauge, NY 11788 516-582-6500
† Singer Co., Kearfott Div., 1150 McBride Ave., Little Falls, NJ 07424 201-785-6000
† Transicoil, Inc., Trooper Rd., P.O. Box 99, Worcester, PA 19490-9990 215-277-1300
† Transmagnetics, 210 Adams Blvd., Farmingdale, NY 11735 516-293-3100
† Vernitron Corp., Control Comps. Div., 1601 Precision Park La., San Diego, CA 92073 619-428-5581

Resonators, Ceramic-2700 — *See Vol. A*

Resonators, SAW-2300 — *See Vol. A*

Retainers, Battery-2800 — *See Vol. C*

Retainers, Relay-4500 — *See Vol. B*

Retainers, Tube-5700 — *See Vol. A*

Retractors & Carriers — See Cable Retractors (Vol. C)

RFI Measuring Equipment-2900

Amplifier Research, 160 School House Rd., Souderton, PA 18964-9990 215-723-8181
† Applied Research, Inc., 160 Dupont St., Plainview, NY 11803 516-349-9200
Bird Elctrn., 30303 Aurora Rd., Cleveland, OH 44139 216-248-1200
Brady Co., 574A Somerset St., N. Plainfield, NJ 07060 201-753-7988
Compliance Design Inc., 593 Massachusetts Ave., Boxboro, MA 01719 .. 617-264-4668
Continental Resources, Inc., 175 Middlesex Tpke., Bedford, MA 01730 .. 617-275-0850
† Electro-Mechanics Co., Box 1546, Austin, TX 78767 512-835-4684
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
Instruments for Industry, Inc., 151 Toledo St., Farmingdale, NY 11735 ... 516-694-1414
Instrument Specialties Co., P.O. Box A, Delaware Water Gap, PA 18327 717-424-8510
† Narda Microwave Corp., 435 Moreland Rd., Hauppauge, NY 11788 516-231-1700
† Polarad Elctrns., Inc., 5 Delaware Dr., Lake Success, NY 11042 516-328-1100
Rockwell Intl., Commercial Elctrns. Opers., 1200 N. Alma Rd., Richardson, TX 75081 214-996-5000
Sprague Elec. Co., 481 Marshall St., No. Adams, MA 01247 413-664-4411
† Tensor, Box 14843, Austin, TX 78761 512-251-4131
Transmet Corp., 4290 Perimeter Dr., Columbus, OH 43228 .... 614-276-5522; 800-245-5253

RFI Shielding — See Shields, RF (Vol. C)

RFI Testing Services — See Services, Electrical Measurement & Test (Vol. D)

Rheostats-4750 — *See Vol. A*

Ribbons for Printers-2000

Aspen Ribbons Inc., 555 Aspen Ridge Dr., Lafayette, CO 80026 .... 303-666-5750; 800-525-0646;800-525-9966
§ Dataproducts, 6200 Canoga Ave., Woodland Hills, CA 91365 213-887-8000
§ Sercomp Corp., 20721 Superior St., Chatsworth, CA 91311 818-341-1680

Rings, Retaining-2500 — *See Vol. C*

Rivets-2825 — *See Vol. C*

Robotic Pick & Place — See Arms & Manipulators, Robotic

Robotics — See Arms & Manipulators, Robotic (Vol. D), Control Systems, Robotic (Vol. D)

Rods, Ground-2800 — *See Vol. C*

Rotators — See Antenna Rotators (Vol. D)

Rotors, Motor & Generator — See Motor & Generator Armatures, Rotors, Stators (Vol. B)

Rubber, Conductive-1600 — *See Vol. C*

Rubber Guards (For Equipment) — See Bumpers (Vol. C)

Rubber, Silicone-1600 — *See Vol. C*

Satellite Antennas — See Antennas, Satellite

Satellite Earth Stations, Transmit & Receive-1900

§ Basic Systems, 1919 S. 129 5. Ave., Tulsa, OK 74108 918-437-7066
California Microwave, 990 Almanor Ave., Sunnyvale, CA 94086 408-732-4000

Scale Expanders, Meter — See Multipliers, Meter (Vol. D)

Scalers, Binary, Decade-2325

Assembly Specialists, 914 Main St., Box 965, Acton, MA 01720 617-263-9100
† Computer Conversions Corp., 6 Dunton Ct., E. Northport, NY 11731 516-261-3300
† Control Sciences, Inc., 9509 Vassar Ave., Chatsworth, CA 91311 818-709-5510
Dynapar, 1675 Delany Rd., Gurnee, IL 60031 312-662-2666
Kinetic Sys., 11 Maryknoll Dr., Lockport, IL 60441 815-838-0005
LeCroy Resch. Sys. Corp., 700 S. Main St., Spring Vly., NY 10977 914-425-2000
LeCroy Resch. Sys. Corp. (Cal.), 1806 Embarcadero Rd., Palo Alto, CA 94303 415-856-1800
Metric Sys., 645 Anchors St., Ft. Walton Beach, FL 32548 904-244-9600
† Nuclear Resch. Corp., 125 Titus Ave., Warrington, PA 18976 215-343-5900
§ Tennelec, 601 Turnpike, Oak Ridge, TN 37830 615-483-8405

Scales, Dial-2400 — *See Vol. C*

Scanners, Bar Code — See Readers, Bar Code

Scanners, Crossbar-1900

A.D. Data Sys., Techtran Industries, 200 Commerce Dr., Rochester, NY 14623 716-334-9649
CYTEC Corp., 107 N. Washington St., E. Rochester, NY 14445 716-381-4740
Information Transfer Indl., Box 357, Holcomb, NY 14469 716-657-7074
Matrix Corp., 2260 Distributors Dr., Indianapolis, IN 46241 317-248-2036
Matrix Sys. Corp., 5177 N. Douglas Fir Rd., Calabasas, CA 91302 818-992-6776

Scanners, Fiber Optic-2475 — *See Vol. B*

Scanners, Flying Spot-1900

† CELCO, 70 Constantine Dr., Mahwah, NJ 07430 201-327-1123
Frequency Control Prods., Inc., American Time Prods. Div., 61-20 Woodside Ave., Woodside, NY 11377 212-458-5811
Infodex, Inc., 395 W. Main St., Waterbury, CT 06702 203-757-9291
Lincoln Laser Co., 234 East Mohave, Phoenix, AZ 85004 602-257-0407

Scanners, Infrared-2900

HEI, Inc., 1495 Steiger Lake La., Victoria, MN 55386, 612-443-2500 .... B•1211
† Aeroflex Labs., Magnetic Prods. Div.,, 35 South Service Road, Plainview, NY 11803 516-694-6700
§ Banner Engrg. Corp., 9714 - 10th Ave. N., Minneapolis, MN 55441 612-544-3164
† Barnes Engrg., 44 Commerce Rd., P.O. Box 53, Stamford, CT 06904 203-348-5381
Burleigh Instrs., Burleigh Pk., Fishers, NY 14453 716-924-9355
Capintec Instrs., 6 Arrow Rd., Ramsey, NJ 07446 201-825-9500
† Carroll Touch Technology, P.O. Box 1309, Round Rock, TX 78680 512-244-3500
† Cincinnati Elctrns., 2630 Glendale Milford Rd., Cincinnati, OH 45241 513-733-6100
Control Module, 380 Enfield St., Enfield, CT 06082 203-745-2433
§ Dolan-Jenner Inds., Box 1020, Woburn, MA 01801 617-935-7444
EG&G Gamma Scientific, Div. of EG&G Inc., 3777 Ruffin Rd., San Diego, CA 92123 619-279-8034
Fork Standards, Inc., 666 Western Ave., Lombard, IL 60148 312-932-9380
Frequency Control Prods., Inc., American Time Prods. Div., 61-20 Woodside Ave., Woodside, NY 11377 212-458-5811
† Honeywell Inc., Aerospace & Defense Grp., Honeywell Plaza, Minneapolis, MN 55408 612-870-5186
† Hughes Aircraft Co, Aerospace Grps./Support Sys., P.O. Box 90515, Los Angeles, CA 90009 213-670-1515
§ IVO Inds., Inc., 201 Industrial Way W., P.O. Drawer 917, Eatontown, NJ 07724 201-542-5151
Mikron Instr., Box 211, Ridgewood, NJ 07451 201-891-7330
Photobell, 26 Just Rd., Fairfield, NJ 07006 201-227-3613
† Santa Barbara Resch. Ctr., 75 Coromar Dr., Goleta, CA 93117 805-968-3511
Skan-A-Matic, Box S, Elbridge, NY 13060 315-689-3961
§ Xedar Corp., 2500 Central Ave., Boulder, CO 80301 303-443-6441

Scanners, Instrument, Input/Output-2900

Digitec Corp., 918 Woodley Rd., P.O. Box 458, Dayton, OH 45401, 513-254-6251 .... D•1149
Information Transfer Indl., Box 357, Holcomb, NY 14469, 716-657-7074 .. D•1152
Julie Resch. Labs., 211 West 61st St., New York, NY 10023, 212-245-2727 .... D•1255
Matrix Corp., 2260 Distributors Dr., Indianapolis, IN 46241, 317-248-2036 .... D•1158
Omega Engrg., Box 4047, Stamford, CT 06907, 203-359-1660 .... D•1160
PPM, Inc., 4521 Emery Ind. Pkwy., Cleveland, OH 44128, 216-292-6006 .. D•1291
† Acromag, 30765 Wixom Rd., Wixom, MI 48096 313-624-1541
§ Acurex-Autodata, 555 Clyde, Mountain View, CA 94039 415-964-3200
A.D. Data Sys., Techtran Industries, 200 Commerce Dr., Rochester, NY 14623 716-334-9649
† Aeroflex Labs., Magnetic Prods. Div.,, 35 South Service Road, Plainview, NY 11803 516-694-6700
† Atec, Inc., Box 19426, 8219 Kempwood Dr., Houston, TX 77055 713-468-7971
BMS Data Handling, Inc., 12155 Magnolia, Riverside, CA 92503 714-359-8824
CDS - Colorado Data Sys., 3301 W. Hampden, Unit C, Englewood, CO 80110 303-762-1640
CYTEC Corp., 107 N. Washington St., E. Rochester, NY 14445 716-381-4740
§† Data Precision Corp., Electronics Ave., Danvers, MA 01923 617-246-1600

§† Dest Corp., 2380 Bering Dr., San Jose, CA 95131 408-946-7100
Dolan-Jenner Inds., Box 1020, Woburn, MA 01801 617-935-7444
§ EDL, Inc., 385 Oser Ave., Hauppauge, NY 11788 .... 516-435-2808;1-800-DIAL EDL
§ Epoch Enterprises, Ltd., 3541 N. Olive Rd., Tucson, AZ 85719 .... 602-887-1970; 888-5167
Fast Feedback Technologies, 1505 Aviation Blvd., Redoudo Beach, CA 90278 213-379-6100
Fluke, John, Mfg. Co., Box C9090, MS 250C, Everett, WA 98206 206-356-5400
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
§ Hottinger Baldwin Measurements, 139 Newbury St., Framingham, MA 01701 617-875-8282
Hy-Cal Engrg., 9650 Telstar Ave., El Monte, CA 91731 213-444-4000
Inconix Corp., 10 Tech Circle, Natick, MA 01760 617-655-1170
IPAC Grp., 3047 Indl. Blvd., Bethel Pk., PA 15102 412-831-9200
§ IVO Inds., Inc., 201 Industrial Way W., P.O. Drawer 917, Eatontown, NJ 07724 201-542-5151
Kaye Instruments, 15 De Angelo Dr., Bedford, MA 01730 617-275-0300
Keithley Instrs., 28775 Aurora Rd., Cleveland, OH 44139 216-248-0400
Lincoln Laser Co., 234 East Mohave, Phoenix, AZ 85004 602-257-0407
Metra Instrs., 2056 Bering Dr., San Jose, CA 95131 408-297-8530
Photon, Inc., 14125 Capri Dr. #4, Los Gatos, CA 95030 408-866-0566
Precision Filters, 240 Cherry St., Ithaca, NY 14850 607-277-3550
§ PrimeLine-Soltec Distbn., Soltec Corp., P.O. Box 818, Sun Valley, CA 91353-0818 .... 800-525-5554;818-764-5400
Racal-Dana Instrs. Inc., 4 Goodyear St., Irvine, CA 92715 714-859-8999
Sensotec, Inc., 1200 Chesapeake Ave., Columbus, OH 43212 614-486-7723
Skan-A-Matic, Box S, Elbridge, NY 13060 315-689-3961
§ Syscon Intl., Inc., 1108 So. High St., So. Bend, IN 46618-1096 .... 219-232-3900; 800-348-2993
Taurus Computer Products, Inc., 1755 Woodward Dr., Ottawa, ON, CANADA K2COPQ 613-226-5361
§ TRW, Dynalco Controls Div., 5200 NW 37th, P.O. Box 8187, Ft. Lauderdale, FL 33310 305-739-4300
Vickers Inst., Inc., Vickers Instruments, P.O. Box 99, Malden, MA 02148 .. 617-324-0350

Scanners, Optical-2900

HEI, Inc., 1495 Steiger Lake La., Victoria, MN 55386, 612-443-2500 ...... B•1211
Micro Switch, A Honeywell Div., 11 W. Spring St., Freeport, IL 61032, 815-235-6600 .... B•1668
§ Adcotech, 1980 Tarob Ct., Milpitas, CA 95035 408-943-9430
† Aeroflex Labs., Magnetic Prods. Div.,, 35 South Service Road, Plainview, NY 11803 516-694-6700
Automatic Timing & Controls Co., 201 So. Gulph Rd., King of Prussia, PA 19406 .... 215-337-5500;800-441-8245
§ Banner Engrg. Corp., 9714 - 10th Ave. N., Minneapolis, MN 55441 612-544-3164
BMS Data Handling, Inc., 12155 Magnolia, Riverside, CA 92503 714-359-8824
Burleigh Instrs., Burleigh Pk., Fishers, NY 14453 716-924-9355
† CELCO, 70 Constantine Dr., Mahwah, NJ 07430 201-327-1123
Cognitronics, 25 Crescent St., Stamford, CT 06906 203-327-5307
Compuscan, Inc., 81 Two Bridges Rd. Bldg. No. 2, Fairfield, NJ 07006 ... 201-575-0500
Control Module, 380 Enfield St., Enfield, CT 06082 203-745-2433
Datacopy Corp., 1215 Terra Bella Ave., Mountain View, CA 94043 415-965-7900
§† Dest Corp., 2380 Bering Dr., San Jose, CA 95131 408-946-7100
§ Dolan-Jenner Inds., Box 1020, Woburn, MA 01801 617-935-7444
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Fork Standards, Inc., 666 Western Ave., Lombard, IL 60148 312-932-9380
Frequency Control Prods., Inc., American Time Prods. Div., 61-20 Woodside Ave., Woodside, NY 11377 212-458-5811
FSI/Fork Standards Inc., 666 Western Ave., Lombard, IL 60148 .... 312-231-3511; 312-932-9380
§ GC Elctrns., 400 S. Wyman St., Rockford, IL 61101 815-968-9661
† General Optronics, 3005 Hadley Rd., So. Plainfield, NJ 07080 201-549-9000
† General Scanning, 500 Arsenal St., Watertown, MA 02272 617-924-1010
Gould Inc., Industrial Controls Div., 901 Baltimore Blvd., Westminster, MD 21157 301-876-2214
Honeywell Inc., Aerospace & Defense Grp., Honeywell Plaza, Minneapolis, MN 55408 612-870-5186
§ IVO Inds., Inc., 201 Industrial Way W., P.O. Drawer 917, Eatontown, NJ 07724 201-542-5151
§ Key Tronic, P.O. Box 14687, Spokane, WA 99214 509-928-8000
Kontes, Kimble Div. of Owens/IL, 1001 Spruce St., Vineland, NJ 08360 609-692-8500
† Lenox Laser, 504 Pittsfield Rd., Lenox, MA 01240 413-637-0444
Lincoln Laser Co., 234 East Mohave, Phoenix, AZ 85004 602-257-0407
Lundy Elctrns. & Systems, Inc., 1 Robert La., Glen Head, NY 11545 516-671-9000
Metron Optics Inc., P.O. Box 690, Solana Beach, CA 92075-0690 619-755-4477
Optek Technology, Inc., 345 Industrial Blvd., McKinney, TX 75069 214-542-9461
Penn Video Inc., 929 Sweitzer Ave., Akron, OH 44311 216-762-4840
Photon, Inc., 14125 Capri Dr. #4, Los Gatos, CA 95030 408-866-0566
† Photo Resch., Kollmorgen Corp., 3000 N. Hollywood Way, Burbank, CA 91505 818-843-6100
Rehlander Assocs., 118A Bridge St., Beverly, MA 01915 617-922-5961
Scanning Devices, 108 Elm St., Waltham, MA 02154 617-891-8991
Skan-A-Matic, Box S, Elbridge, NY 13060 315-689-3961
§† Spatial Data Systems, A DBA Systems Co., 508 S. Fairview, Goleta, CA 93117 805-967-2383
Summit CAD Corp., 5222 FM 1960 W100, Houston, TX 77069 713-440-1468
Tri-Tronics Co. Inc., 13420 Wright Cir., Tampa, FL 33624 813-855-4453
Vickers Inst., Inc., Vickers Instruments, P.O. Box 99, Malden, MA 02148 .. 617-324-0350
Xyztek Corp., 8000 E. Prentice Ave. Ste. B7, Englewood, CO 80111 303-850-9400

Scanners, Reed-2900

Atec Sys., 107 N. Washington St., E. Rochester, NY 14445 716-381-4740
CDS - Colorado Data Sys., 3301 W. Hampden, Unit C, Englewood, CO 80110 303-762-1640
CYTEC Corp., 107 N. Washington St., E. Rochester, NY 14445 716-381-4740
Digitec Corp., 918 Woodley Rd., P.O. Box 458, Dayton, OH 45401 513-254-6251
Fluke, John, Mfg. Co., Box C9090, MS 250C, Everett, WA 98206 206-356-5400
Information Transfer Indl., Box 357, Holcomb, NY 14469 716-657-7074
Matrix Corp., 2260 Distributors Dr., Indianapolis, IN 46241 317-248-2036
Matrix Sys. Corp., 5177 N. Douglas Fir Rd., Calabasas, CA 91302 818-992-6776
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Omega Engrg., Box 4047, Stamford, CT 06907 203-359-1660
PPM, Inc., 4521 Emery Ind. Pkwy., Cleveland, OH 44128 216-292-6006
Precision Filters, 240 Cherry St., Ithaca, NY 14850 607-277-3550
Racal-Dana Instrs. Inc., 4 Goodyear St., Irvine, CA 92715 714-859-8999

Scintillometers-2900

§ EG&G Geometrics, Div. of EG&G Inc., 395 Java Dr., Sunnyvale, CA 94089 408-734-4616

Scissors-5400 — *See Vol. C*

Scope Dollies — See Carts & Dollies, Instrument & Equipment (Vol. C)

SCRs — See Thyristors (Vol. A)

SCR Firing Controls — See Controls, SCR (Vol. D)

Scramblers, Data-2325

Com/Tech Systems, 505 Eighth Ave., New York, NY 10018 212-594-5377
† Datotek, Inc., 13740 Midway Rd., Dallas, TX 75234 214-233-1030
Decom Sys., 340 Rancheros Dr., San Marcos, CA 92069 619-744-1002
§ Glasgal Communications, Inc., 207 Washington St., Northvale, NJ 07647 201-768-8082
Hughes Aircraft Co, Aerospace Grps./Support Sys., P.O. Box 90515, Los Angeles, CA 90009 213-670-1515
Hughes Aircraft Co., Microelctrn. Sys. Div., 2601 Campus Dr., Irvine, CA 92715 714-752-3800
New Wave Instruments, 3760 Masters Court, San Jose, CA 95111 408-629-3105
† Technical Communications Corporation, 100 Domino Drive, Concord, MA 01742 617-862-6035
† Terminal Data Corp., 15733 Crabbs Branch Way, Rockville, MD 20855 .. 301-921-8282

Scramblers, Speech-1900

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Hughes Aircraft Co, Aerospace Grps./Support Sys., P.O. Box 90515, Los Angeles, CA 90009 213-670-1515
Lear Siegler, Inc., 2850 Ocean Park Blvd., P.O. Box 2158, Santa Monica, CA 90406 213-452-5444
† Technical Communications Corporation, 100 Domino Drive, Concord, MA 01742 617-862-6035

Screens, Printed Circuit-1700 — *See Vol. C*

Screwdrivers-5400 — *See Vol. C*

Screws, Lead, Feed & Translatory — See Drives & Drives Mechanisms (Dial) (Vol. C)

Screws, Fastening-2825 — *See Vol. C*

Scribers-5400 — *See Vol. C*

Scribers, Wafer-Also See Machines & Accessories, Semiconductor Manufacturing-4100

§ Best Way Tools, 171 Brook Ave., Deer Park, NY 11729 516-586-4702
Materials Resch., Route 303, Orangeburg, NY 10962 914-359-4200
Penn Resch. Corp. (PRC), 2652 South Main St., P.O. Box 3357, Kennesaw, GA 30144 404-429-9061

Sealers — See Coatings (Vol. C)

Sealing Equipment, Metal to Glass/Ceramic-4100

Carpenter Techn., Box 662, Reading, PA 19603 215-371-2000
§ GC Elctrns., 400 S. Wyman St., Rockford, IL 61101 815-968-9661
Gra-Mar Inc., 3165 McCrory Pl., Ste. 265, Orlando, FL 32803 305-894-3351
Maxwell Labs., 8835 Balboa Ave., San Diego, CA 92123 619-279-5100
Norton, One New Bond St., Worcester, MA 01606 617-853-1000
Penn Resch. Corp. (PRC), 2652 South Main St., P.O. Box 3357, Kennesaw, GA 30144 404-429-9061

Seals & Feedthrus, Environmental — See Feedthrus & Seals, Environmental (Vol. C)

Seals, Ceramic To Metal-2500 — *See Vol. C*

Seals, Glass To Metal-2500 — *See Vol. C*

Seals, Hermetic-Also See Services, Hermetic Sealing-2500 — *See Vol. C*

Seals, Microwave — See Gaskets, Shielding, RF (Vol. C), Seals, Waveguide (Vol. A)

Seals, Pressure Sensitive-2500 — *See Vol. C*

Seals, Waveguide-3450 — *See Vol. A*

Search Unit, Magnetic Tape – See Tape Search Equipment (Vol. D)

Security Systems, Data-2325

AES Corp., 285 Newbury St., P.O. Box 2093, Peabody, MA 01960 617-535-7310
† Analytics Communications Sys., 1820 Michael Faraday Dr., Reston, VA 22090 703-471-0892
Atlantic Research, 5390 Cherokee Ave., Alexandria, VA 22312 703-642-4000
EDA Instruments, Inc., 4 Thorncliffe Park Dr., Toronto, ON, CANADA M4HIHI 416-425-7800
§ Identatronics, Inc., 425 Lively Blvd., Elk Grove, IL 60007 312-437-2654; 1-800-323-5403
§ Poly-Scientific, Litton Inds., 1213 N. Main St., Blacksburg, VA 24060 703-552-3014
Technical Communications Corporation, 100 Domino Drive, Concord, MA 01742 617-862-6035
§ Terminal Data Corp., 15733 Crabbs Branch Way, Rockville, MD 20855 301-921-8282
§ Time Lock, Inc., 87 Water Mill Lane, Great Neck, NY 11021 516-487-0690
† Western DataCom, 5083 Market St., Youngstown, OH 44512 216-788-6583

Seismographs-2900

§ EG&G Geometrics, Div. of EG&G Inc., 395 Java Dr., Sunnyvale, CA 94089 408-734-4616
† Racal-Milgo, 1601 N. Harrison Parkway, Sunrise, FL 33324 305-475-1601

Seizers-5400 – *See Vol. C*

Selsyns – See Motors, Synchronous (Vol. B)

Semiconductor Material – See Crystals, Semiconductor (Vol. A)

Semiconductor Wafer Fabrication, Assembling (Packaging)-4100

§† Advanced Micro Devices, P.O. Box 3453, 901 Thompson Pl., Sunnyvale, CA 94088 408-732-2400
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Linear Technlg., P.O. Box 489, Sta. "A", Burlington, ON, CANADA L7R 3Y3 416-632-2996
† LSI Computer Sys., 1235 Walt Whitman Rd., Melville, NY 11747 516-271-0400
§† Matra Design Systems, 2840-100 Sam Tomas Expressway, Santa Clara, CA 95051 408-986-9000
† Micrel, Inc., 1235 Midas Way, Sunnyvale, CA 94086 408-245-2500
§† Precision Monolithics, Inc., 1500 Space Dr., Santa Clara, CA 95054 408-727-9222
SGS Semiconductor Corporation, 1000 E. Bell Road, Phoenix, AZ 85022 602-867-6100
† Solid State Scientific, 3900 Welsh Rd., Willow Grove, PA 19090 215-657-8400
§† Solitron Devices, Inc., Semiconductor Group, 1177 Blue Heron Rd., Riviera Beach, FL 33404 305-848-4311
† Standard Microsystems, 35 Marcus Blvd., Hauppauge, NY 11788 516-273-3100
§ Sumitronics, Inc., Sumitomo Corporation, 1270 Oakmead Pkwy. Ste. 201, Sunnyvale, CA 94086 408-737-7683
Toko America, Inc., 1250 Feehanville Dr., Mt. Prospect., IL 60056 312-297-0070

Semiconductor Wafer Fabrication, Designing (Topological)-4100

Array Technology, 992 S. Saratoga-Sunnyvale Rd., San Jose, CA 95129 408-252-9900
Gould-AMI, Sub. Gould Inc., 3800 Homestead Rd., Santa Clara, CA 95051 408-554-2150
† Holt Inc., 9351 Jeronimo Rd., Irvine, CA 92718 714-859-8800
Integrated Circuit Engrg. Corp. (ICE), 15022 N. 75th St., Scottsdale, AZ 85260 602-998-9780
Linear Technlg., P.O. Box 489, Sta. "A", Burlington, ON, CANADA L7R 3Y3 416-632-2996
§ LSI Computer Sys., 1235 Walt Whitman Rd., Melville, NY 11747 516-271-0400
§† Matra Design Systems, 2840-100 Sam Tomas Expressway, Santa Clara, CA 95051 408-986-9000
§ Micro Power Sys. Inc., 3100 Alfred St., Santa Clara, CA 95050 408-727-5350
† Nitron, 10420 Bubb Rd., Cupertino, CA 95014 408-255-7550
Polycore Elctrns., 1107 Tourmaline Dr., Newbury Pk., CA 91320 805-499-6777
SGS Semiconductor Corporation, 1000 E. Bell Road, Phoenix, AZ 85022 602-867-6100
Silicon Systems Inc., 14351 Myford Rd., Tustin, CA 92680 714-979-0941
† Solid State Scientific, 3900 Welsh Rd., Willow Grove, PA 19090 215-657-8400
† Standard Microsystems, 35 Marcus Blvd., Hauppauge, NY 11788 516-273-3100
§ Sumitronics, Inc., Sumitomo Corporation, 1270 Oakmead Pkwy. Ste. 201, Sunnyvale, CA 94086 408-737-7683
§† Teledyne Semiconductor, 1300 Terra Bella Ave., PO Box 7267, Mountain View, CA 94039-7267 415-968-9241
Toko America, Inc., 1250 Feehanville Dr., Mt. Prospect., IL 60056 312-297-0070

Semiconductor Wafer Fabrication, Maskmaking (Tooling)-4100

Corning Glass Works, Materials Business, Main Plant, MP 21-3, Corning, NY 14831 607-974-4102
Electro Scientific Inds., 13900 N.W. Science Pk. Dr., Portland, OR 97229 503-641-4141
Linear Technlg., P.O. Box 489, Sta. "A", Burlington, ON, CANADA L7R 3Y3 416-632-2996
† LSI Computer Sys., 1235 Walt Whitman Rd., Melville, NY 11747 516-271-0400
§† Matra Design Systems, 2840-100 Sam Tomas Expressway, Santa Clara, CA 95051 408-986-9000
† Nitron, 10420 Bubb Rd., Cupertino, CA 95014 408-255-7550
Quantronix, 225 Engineers Rd., Smithtown, NY 11787 516-273-6900
SGS Semiconductor Corporation, 1000 E. Bell Road, Phoenix, AZ 85022 602-867-6100
† Solid State Scientific, 3900 Welsh Rd., Willow Grove, PA 19090 215-657-8400
† Standard Microsystems, 35 Marcus Blvd., Hauppauge, NY 11788 516-273-3100
§ Sumitronics, Inc., Sumitomo Corporation, 1270 Oakmead Pkwy. Ste. 201, Sunnyvale, CA 94086 408-737-7683
Toko America, Inc., 1250 Feehanville Dr., Mt. Prospect., IL 60056 312-297-0070

Semiconductor Wafer Fabrication, Processing-4100

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Analog Devices, P.O. Box 280, Norwood, MA 02062 617-329-4700
API Instrs., 1601 Trapelo Rd., Waltham, MA 02254 617-890-2000
† BTU Engrg. Corp., Bruce Sys., Esquire Rd., N. Billerica, MA 01862 617-667-4111
Cherry Semiconductor Corp, 2000 S. County Trail, East Greenwich, RI 02818 401-885-3600
† Dionics, 65 Rushmore St., Westbury, NY 11590 516-997-7474
DuPont de Nemours, E. I., & Co., 1007 Market St., Wilmington, DE 19898 302-773-3218
§ Frequency Sources, KSW Semiconductor Div., 16 Maple Rd., Chelmsford, MA 01824 617-256-8101
Gould-AMI, Sub. Gould Inc., 3800 Homestead Rd., Santa Clara, CA 95051 408-554-2150
§ GTE Microcircuits, 2000 W. 14th. St., Tempe, AZ 85281 602-968-4431
Headway Resch., Inc., 3713 Forest La., Garland, TX 75042 214-272-5431
§† Linear Technology Corp., 1630 McCarthy Blvd., Milpitas, CA 95035 408-942-0810
Linear Technlg., P.O. Box 489, Sta. "A", Burlington, ON, CANADA L7R 3Y3 416-632-2996
§ LSI Computer Sys., 1235 Walt Whitman Rd., Melville, NY 11747 516-271-0400
M/A-COM Laser Diode, Inc., M/A-COM, Inc., 1130 Somerset St., New Brunswick, NJ 08901 201-249-7000
Materials Resch., Route 303, Orangeburg, NY 10962 914-359-4200
§† Matra Design Systems, 2840-100 Sam Tomas Expressway, Santa Clara, CA 95051 408-986-9000
† Micrel, Inc., 1235 Midas Way, Sunnyvale, CA 94086 408-245-2500
Microscience, Inc., 182 Forbes Rd., Braintree, MA 02184 617-849-1952
§† MKS Instrs., Inc., 22 Third Ave., Burlington, MA 01803 617-272-9255
MSI Electronics, Inc., 34-32 57th St., Woodside, NY 11377 212-672-6500
† Nitron, 10420 Bubb Rd., Cupertino, CA 95014 408-255-7550
Plasma-Therm, Inc., Rt. 73, Kresson, NJ 08053 609-767-6120
Polycore Elctrns., 1107 Tourmaline Dr., Newbury Pk., CA 91320 805-499-6777
† Precision Monolithics, Inc., 1500 Space Dr., Santa Clara, CA 95054 408-727-9222
§ Research, Inc., Box 24064, Minneapolis, MN 55424 612-941-3300
† Sohio Engineered Materials Co., Unit of Sohio, P. O. Box 156, Niagara Falls, NY 14302 716-278-2000
† Solid State Scientific, 3900 Welsh Rd., Willow Grove, PA 19090 215-657-8400
† Standard Microsystems, 35 Marcus Blvd., Hauppauge, NY 11788 516-273-3100
§ Sumitronics, Inc., Sumitomo Corporation, 1270 Oakmead Pkwy. Ste. 201, Sunnyvale, CA 94086 408-737-7683
Supertex, Inc., 1225 Bordeaux Dr., P.O. Box 3607, Sunnyvale, CA 94088 408-744-0100
§† Teledyne Semiconductor, 1300 Terra Bella Ave., PO Box 7267, Mountain View, CA 94039-7267 415-968-9241
Toko America, Inc., 1250 Feehanville Dr., Mt. Prospect., IL 60056 312-297-0070
† Union Carbide Corporation, Elctrns. Div., Crystal Prods. Dept., 9320 Chesapeake Dr., Ste. 104, San Diego, CA 92123 619-279-4500
Veeco Instrs. Inc., 370 San Aleso Ave., Sunnyvale, CA 94086 408-733-3700
Veeco Instruments Inc., Terminal Dr., Plainview, NY 11803 516-349-8300
Xenon Corp., 66 Industrial Way, Wilmington, MA 01887 617-658-8940

Semiconductor Wafer Fabrication, Testing/Trimming-4100

§† Advanced Micro Devices, P.O. Box 3453, 901 Thompson Pl., Sunnyvale, CA 94088 408-732-2400
Alessi Inds., Inc., 3195-C Airport Loop Dr., Costa Mesa, CA 92626 714-979-8912
Bermar Corp., P.O. Box 12844, Research Triangle Park, NC 27709 919-489-4316
ElectroPhysics Corp., 48 Spruce St., Nutley, NJ 07110 201-667-2262
Electro Scientific Inds., 13900 N.W. Science Pk. Dr., Portland, OR 97229 503-641-4141
§ GC Elctrns., 400 S. Wyman St., Rockford, IL 61101 815-968-9661
§ Industrial Computer Designs, Inc., 31264 La Baya Drive, Westlake Village, CA 91362 818-889-3179
Lehighton Elctrns., Inc., Box 328, Dept M, Lehighton, PA 18235 717-386-4156; 215-377-5990
Linear Technlg., P.O. Box 489, Sta. "A", Burlington, ON, CANADA L7R 3Y3 416-632-2996
† LSI Computer Sys., 1235 Walt Whitman Rd., Melville, NY 11747 516-271-0400
M/A-Com Millimeter Products, M/A-Com, Inc., Second Avenue, Burlington, MA 01803 617-272-3000
§† Matra Design Systems, 2840-100 Sam Tomas Expressway, Santa Clara, CA 95051 408-986-9000
† Micrel, Inc., 1235 Midas Way, Sunnyvale, CA 94086 408-245-2500
MSI Electronics, Inc., 34-32 57th St., Woodside, NY 11377 212-672-6500
Polycore Elctrns., 1107 Tourmaline Dr., Newbury Pk., CA 91320 805-499-6777
† Precision Monolithics, Inc., 1500 Space Dr., Santa Clara, CA 95054 408-727-9222
Probe-Rite, Inc., 2725 Lafayette St., Santa Clara, CA 95050 408-727-0100
SGS Semiconductor Corporation, 1000 E. Bell Road, Phoenix, AZ 85022 602-867-6100
Silicon Systems Inc., 14351 Myford Rd., Tustin, CA 92680 714-979-0941
§† Sloan Technology, 602 E. Montecito St., Santa Barbara, CA 93103 805-963-4431
† Solid State Scientific, 3900 Welsh Rd., Willow Grove, PA 19090 215-657-8400
† Standard Microsystems, 35 Marcus Blvd., Hauppauge, NY 11788 516-273-3100
§ Sumitronics, Inc., Sumitomo Corporation, 1270 Oakmead Pkwy. Ste. 201, Sunnyvale, CA 94086 408-737-7683
Tektronix, Inc., P. O. Box 500, Y3-314, Beaverton, OR 97077 800-547-1512;Oregon only 800-452-1877

§ Temptronic, 55 Chapel St., Newton, MA 02158 617-969-2501
Tencor Instr., 2400 Charleston Road, Mountain View, CA 94043 415-969-6767
Toko America, Inc., 1250 Feehanville Dr., Mt. Prospect, IL 60056 312-297-0070
Veeco Instruments Inc., Terminal Dr., Plainview, NY 11803 516-349-8300

Semiconductors – See Diodes (Vol. A), Rectifiers (Vol. A), Transistors (Vol. A)

Sensors – See Transducer Listings (Vol. B)

Sensors, Acoustic-2200

§ Amerace Corporation, Newburgh Rd., Hackettstown, NJ 07840 201-852-1122
Bruel & Kjaer Instrs. Inc., 185 Forest St., Marlboro, MA 01752 617-481-7000
† Gulton Inds., Inc., Servonic Div., 1644 Whittier Ave., Costa Mesa, CA 92627 .... 714-642-2400;800-854-4066
Optimum Applied Systems, 145 Palisade St., Dobbs Ferry, NY 10522-1696 914-693-9001
† Raytheon Co., Submarine Signal Div., 1847 W. Main Rd., P.O. Box 360, Portsmouth, RI 02871 401-847-8000

Sensors, Fiber Optic-2475 – *See Vol. B*

Sensors, Light-3700 – *See Vol. B*

Sensors, Proximity – See Transducers, Proximity

Sensors, Temperature – See Bolometers (Vol. D), Thermistors (Vol. B), Transducers (Vol. A)

Sensors (MIL), Tactical Electronic Reconnaissance-3475

§ CCD Imaging, Fairchild Camera & Instr. Corp., 450 National Ave., Mountain View, CA 94043 415-493-8001
Epsilon-Lambda Elctrns. Corp., 427 Stevens St., Geneva, IL 60134 312-232-9611

Sequence Controllers – See Controllers, Programmable (Vol. D)

Services, Assembly & Fabrication (Incl. R&D) - Also see Services, Metal Parts Fabrication; Services, Printed Circuit Products-4100

ACC Electronics, 1300 W. Oak, Independence, KS 67301, 316-331-1000 .... A•1659
Aeroflex Labs., Microelctrns. Div., 35 S. Service Rd., Plainview, NY 11803, 516-694-6700 .... A•1660
Amuneal Mfg., 4737 Darrah St., Philadelphia, PA 19124, 215-535-3000 .... C•1721
Assembly Specialists, 914 Main St., Box 965, Acton, MA 01720, 617-263-9100 .... C•1700
† Automatic Coil Corp., Sub. Designatronics, Inc., 455 E. 10th Ave., Hialeah, FL 33010, 305-883-5311 .... A•1207
† Blatek Inds., Inc., Box 574, Bellefonte, PA 16823, 814-355-4910 .... B•1787
Connector Corp., 6025 N. Keystone Ave., Chicago, IL 60646, 312-539-3108 .... C•1176-1177
EG & G Birtcher, 4505 N. Arden Dr., El Monte, CA 91731, 818-442-2572 .... C•1052
† Hybricon Corp., 410 Great Rd., Littleton, MA 01460, 617-486-0311 .... C•1710
† International Sensor Systems, Inc., Aurora Industrial Pk., Box 345, Aurora, NE 68818, 402-694-6111 .... A•1677
† Jettron Prods., P.O. Box 337, E. Hanover, NJ 07936, 201-887-0571 .... C•1409
§† Lamtech Electronics, 620 Easy Street, Garland, TX 75042, 214-272-3504 .... C•1845
Mac Panel Co., Box 5027, 216 Pine St., High Point, NC 27262, 919-884-8111 .... C•1713
† Mechanized Electronic Assembly Div., Universal Instrs. Corp., P.O. Box 825, Binghamton, NY 13902, 607-772-7522 .... D•1982
Mueller Elec. Co., 1583 E 31st St., Dept. 20, Cleveland, OH 44114, 216-771-5225 .... C•1472
OPT Inds. Inc., 300 Red School La., Phillipsburg, NJ 08865, 201-454-2600 .... A•1401
Phi Technologies, Inc., 4605 North Stiles, Oklahoma City, OK 73105, 405-521-9000 .... D•1054
Technitrol, 1952 E. Allegheny, Philadelphia, PA 19134, 215-426-9105 .... B•1010
Transformation Elctrns. Corp., 170 Wilbur Pl., Bohemia, NY 11716, 516-563-1117 .... D•1857
† Aaba Components Corp., P.O. Box 171, Baldwin Place, NY 10505 914-628-6952
† ABA Electromechanical Sys. Inc., Box 500, Pinellas Pk., FL 34290-0500 813-541-6681
† Abrams Instr. Corp., P.O. Box 26007, Lansing, MI 48909 517-332-6405
† Accurassembly, 9525 Cozycroft Ave., Chatsworth, CA 91311 818-700-0708
Accurate Elctrns., 169 S. Abbe Rd., P.O. Box 1287, Elyria, OH 44036 216-365-1211
Advanced Techn. Research Labs., 5645 K General Washington Dr., Alexandria, VA 22312 703-750-2920
Alden Products Co., P.O. Box 860, 117 N. Main St., Brockton, MA 02403 617-583-0160
† Altek Co., P.O. Box 1128, Torrington, CT 06790 203-482-7626
† Amco Engrg., 3801 N. Rose St., Schiller Pk., IL 60176 312-671-6670
§ Amerex, P.O. Box 2815, Riverside, CA 92516 714-686-1400
American Electric Cable Co., 181 Appleton St., Holyoke, MA 01040 413-539-9893
American Electronic Labs., Box 552, Lansdale, PA 19446 215-822-2929
† Amphenol, An Allied Co., 43 Commerce Ct., Lisle, IL 60532 312-983-3500
Apahouser-Elcom, Inc., 101 Walnut St., Watertown, MA 02172 617-924-1500
Apollo Magnetics Corp., 2720 W. Beverly Blvd., Los Angeles, CA 90057 213-381-2500
Applied Control, 1275 Bloomfield Ave., Fairfield, NJ 07006-2828 201-227-5454
Applied Sys., 26401 Harper Ave., St. Clair Shores, MI 48081 313-779-8700
† Apsco, Inc., Sub. of The National Copper & Smelting Co., 5976 Heisley Road, Mentor, OH 44060 216-942-3871
† A.R.F. Prods., 2559 75th St., Boulder, CO 80301 303-443-4844
† Argent Elctrns., 3245 S. County Rd., 25A, Troy, OH 45373 513-335-0031
† Artronics Corporation, 3 Electronic Avenue, Danvers, MA 01923 617-777-2880
Assem-Pro Instrs., Div. of Overnight Engineering Inc., 1859 Andrews Ave., San Jose, CA 95124 408-267-1168
§† Associated Spring, Barnes Grp., 18 Main St., Bristol, CT 06010 203-583-1331
Astec USA, Ltd., A BSR Intl. Co., 2880 San Tomas Expwy., # 200, Santa Clara, CA 95051 408-748-1200
Astro-Geo-Marine, Inc., 202 E. Cota St., Santa Barbara, CA 93101 805-965-7005
A-Systems Inc., 1500 Avon St. Extd., Charlottesville, VA 22901 804-295-7200
Atlantic Magnetics, Inc., 1441 S.W. 30th Ave., Pompano Beach, FL 33061 305-979-7920
† Austin Electronics, The Austin Co., 17-01 Pollitt Drive, Fair Lawn, NJ 07410 201-794-0200
Automatic Connector, Inc., 400 Moreland Rd., Commack, NY 11725 516-543-5000
Autosplice, Inc., 59-12, 37th Ave., Woodside, NY 11377 718-429-0500
AVCO-Elctrns. Div., 4807 Bradford Dr., Huntsville, AL 35805 205-837-6500
Bally Electronics, Bally Mfg., 10750 W. Grand Ave., Franklin Park, IL 60131 312-451-7223
Ball Electronic, Systems Div., 9300 W. 108th Circle, Broomfield, CO 80020 303-460-5256
B & B Motor & Control Corp., Apple Hill Commons, Burlington, CT 06013 203-673-7151
B & G Precision Elctrns., 538 Maple Ave., Doylestown, PA 18901 215-348-4413
Barnes & Reinecke, Inc., 2375 Estes Ave., Elk Grove Village, IL 60007 312-640-7200
Beechwood Mfg., 310 S. Ohmer, Indianapolis, IN 46219 317-356-2493
§† Bud Inds., Inc., 4605 E. 355th St., Willoughby, OH 44094 216-946-3200
§† Bud Radio, 4605 E. 355th St., Willoughby, OH 44094 216-946-3200
Bulova Sys. & Instr., Green Acres Rd., W., Valley Stream, NY 11582 516-561-2600
† Cardinal Control Co., 110 Kensington Rd., Kensington, CT 06037 203-828-6379
CEA Division of Berkleonics, Inc., A Subsidiary of EG & G, 1 Aerovista Pk., San Luis Obispo, CA 93401 805-544-5454
Cherry Electrical Prods. Corp., 3623 Sunset Ave., Waukegan, IL 60087 312-578-3500
† Chomerics, Inc., 77 Dragon Ct., Woburn, MA 01888 617-935-4850
Com/Tech Systems, 505 Eighth Ave., New York, NY 10018 212-594-5377
† Contours, Inc., P.O. Box 1041, Middletown, CT 06457 203-347-5694
Corby Inds. Inc., P. O. Box 2838, Allentown, PA 18001 215-433-1412
Corlund Elctrns. Corp., 3543 Old Conejo Rd., Newbury Park, CA 91320 805-499-6947
Crestron Elec., 101 Broadway, Cresskill, NJ 07626 201-894-0660
† Danmar Inds., 9705 Lurline Ave., Chatsworth, CA 91311 .... 818-882-7979/5280
† Datacom, Inc., Box 278, Ft. Walton Beach, FL 32548 904-244-6121
† DataCon, Inc., 60 Blanchard Rd., Burlington, MA 01803 617-273-5800
Datatex Corp., 10935 S. Wilcrest Dr., Houston, TX 77099 713-495-3100
Da-Tech Corp., 92 Steamwhistle Dr., Ivyland, PA 18974 215-322-9410
Dattilo Electronics, 11621 Electron Dr., Louisville, KY 40299 502-267-4446
Davidson Elctrn. Dev. Co., 113 E. 13th St., Erie, PA 16512 814-453-7547
Design Automation, Inc., 809 Massachusetts Ave., Lexington, MA 02173-3992 617-862-8998
Detoronics Corporation, 10660 E. Rush St., S. El Monte, CA 91733 818-579-7130
Dielectric Instr. Corp., 761 Franklin Ave., Pittsburgh, PA 15221 412-731-6566
Digital Data Sys., 1551 N.W. 65 Ave., Plantation, FL 33313 305-792-3290
Digital Radio Corp., 8901 La Cienega Blvd., Inglewood, CA 90301 213-670-8611
§ Dyma Engrg., Box 1535, Los Lunas, NM 87031 505-865-6700
Dynatech Corp., 1225 E. Wakeham Ave., P.O. Box 1019, Dept. E, Santa Ana, CA 92702 714-558-8755
Easy Heat-Wirekraft, 555 North Michigan St., Lakeville, IN 46536 219-784-3011
Electro Mechanical Design Services, Inc., 16698 Oakmont Ave., Gaithersburg, MD 20877 301-840-5710
Electronic Component Assembly, Inc., 9500 Alto Drive, La Mesa, CA 92041 619-464-0910
§ Elctrn. Molding Corp., 96 Mill St., Woonsocket, RI 02895 401-769-3800
Electronic Prods. Corp., Interstate Indl. Plaza, R. D. # 5, York, PA 17402 717-767-6517
† Electro-Prep, Ltd., Rt 28A, P.O. Box 437, Cataumet, MA 02534 617-563-5559
Elgin Electronics, Combustion Engineering, 5533 New Perry Hwy., Erie, PA 16509-3570 814-864-4921
Enterprise Sys. Corp., P.O. Box 698, Dover, NH 03820 603-742-7363
† Environmental Comm., 3150 Pullman St., Costa Mesa, CA 92627 714-557-7800
Epsilon-Lambda Elctrns. Corp., 427 Stevens St., Geneva, IL 60134 312-232-9611
ESSCO Inds., P.O. Box 515, Sierra Madre, CA 91024-0515 818-355-8315
† Estes Engrg. Co., 930 Marine Dr., Port Angeles, WA 98362 206-457-0904
§† Excel Prods., 401 Joyce Kilmer Ave., New Brunswick, NJ 08903 201-249-6600
§† Excel Specialty Corp., 6335 N. Broadway, Chicago, IL 60660 312-262-4781
Fast Feedback Technologies, 1505 Aviation Blvd., Redoudo Beach, CA 90278 213-379-6100
Field-Fab, 43 School St., N. Springfield, VT 05150 802-886-8278
Galileo Electro-Optics Corp., Galileo Pk., Sturbridge, MA 01518 617-347-9191
† GCI, Inc., 14520 Lima Rd., Fort Wayne, IN 46818 219-637-5520
GECO, 145 Penn St., Millheim, PA 16854 814-349-5555
General Electric Co., 333 W. Seymour Ave., Cincinnati, OH 45216 513-948-5050
§† General Elec. Co., Electromaterials Bus. Dep., Coshocton, OH 43812 614-622-5310
General Electro-Mechanical Corp., 785 Hertel Ave., Buffalo, NY 14207 716-876-9685
Global Specialties, Interplex Electronics, Inc., 70 Fulton Terrace, P.O. Box 1942, New Haven, CT 06509 203-624-3103
Grand Transformers, Box 188, Grand Haven, MI 49417 616-842-5430
† Granite State Circuits, Power Elctrns. Corp., P.O. Box 2208, 96 Milton Rd., Rochester, NH 03867 603-332-3334
Green Engineering, 78 Stone Place, Melrose, MA 02176 617-665-8994
† GRIM Corporation, Box 67, Medford, NJ 08055 609-267-7950
† GSI Corp., 1917 Greenspring Dr., Timonium, MD 21093 301-252-1768
Hamlin, Lake & Grove Sts., Lake Mills, WI 53551 414-648-2361
H-A-Z Laboratories, Brass Castle Rd., P.O. Box 67-M, Washington, NJ 07882 201-689-0110

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§ Hobson Bros., 4940 W. Lawrence Ave., Chicago, IL 60630-3884 312-283-3600
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† Hughes Aircraft Co, Aerospace Grps./Support Sys., P.O. Box 90515, Los Angeles, CA 90009 213-670-1515
† Hughes Aircraft Co., Microelctrn. Sys. Div., 2601 Campus Dr., Irvine, CA 92715 714-752-3800
Hybrid Svcs. Inc., 38 Main St., North Reading, MA 01864 617-664-5500
Hytek Microsystems, 980 University Ave., Los Gatos, CA 95030 408-395-2300
† IEC Elctrns., 105 Norton St., Newark, NY 14513 315-331-7742
IMEC Corp., 2434 Southport Way, National City, CA 92050 619-474-8991
§ Industrial Computer Designs, Inc., 31264 La Baya Drive, Westlake Village, CA 91362 818-889-3179
Innovatek Microsystems, Inc., Smithfield Rd., R1 Box 104, Millerton, NY 12546-9720 914-373-9003
Instrumentation Meas. Lab., Div. of Lockheed Electronics Co., Inc., 1501 Rt. 22, Plainfield, NJ 07061 201-757-3730
† Instruments and Controls Div., Technology Inc., P.O. Box 3036, Overlook Branch, Dayton, OH 45431 513-426-2405
Interdyne Co., 157 Topaz St., Milpitas, CA 95035 408-943-9133
ITT Thermotech, Div. IT & T, 1203 S. 5th St., Hopkins, MN 55343 612-933-9400
Jonard Industries Corp., 134 Marbledale Rd., Tuckahoe, NY 10707 914-793-0700
Kalmus & Assocs., Inc., 2424 S. 25th Ave., Box 525, Broadview, IL 60153 312-343-7004
† Kantz Elctrn. Ind., 1804 Wall Church Rd., Wall Township, NJ 07719 201-974-0090
Ken-Tron Mfg., Inc., 1204 Industrial Dr., Owensboro, KY 42301 502-684-0431
Leach Corp., Control Prods. Div., 6900 Orangethorpe Ave., Buena Pk., CA 90620 714-739-0770
Ledex Inc., P.O. Box 427, Vandalia, OH 45377 513-898-3621
Leecraft Mfg., 21-02 44th Rd., Long Island City, NY 11101 718-392-8800
† Lehighton Elctrns., Inc., Box 328; Dept M, Lehighton, PA 18235 .... 717-386-4156; 215-377-5990
Lexicon Corp. of Miami, 1541 N. W. 65th Ave., Ft. Lauderdale, FL 33313 305-792-4400
† Line Elec. Prods., G. General Electro-Components, Inc., 122 Naubuc Ave., Glastonbury, CT 06033 203-659-3573
Mag-Con, 1626 Terrace Dr., St. Paul, MN 55113 612-633-8820
§† Magnetic Systems, 770 Linden Avenue, Rochester, NY 14625 716-385-9010
Magnum Opus Custom Elctrn. Engrg., 284 Kennedy St., Iselin, NJ 08830 201-283-4925
Matrix Engineering Corp., 17000 S. Western Ave. 19, Gardena, CA 90247 213-770-0521
Maxwell Labs., 8835 Balboa Ave., San Diego, CA 92123 619-279-5100
Meissner Inds., 551 Rte. 10, Dover, NJ 07801 201-366-1700
Micrologic, Inc., 108 Water St., Watertown, MA 02172 617-923-1700
† Micro Mo Electronics, Inc., 742 2nd Ave. S., St. Petersburg, FL 33701 ... 813-822-2529
† Microwave Filter Inc., 6743 Kinne St., East Syracuse, NY 13057-0486 .... 315-437-3953; 800-448-1666
§ Midland Standard, Inc., 603 E. Chicago St., Box 38, Elgin, IL 60120 312-741-6600
Midway Mfr. Co., 10750 W. Grand Ave., Franklin Park, IL 60131 312-451-1360
† Milton Ross Co., 511 Second St. Pike, Southampton, PA 18966 215-355-0200
Modular Devices, 50 Orville Dr., Bohemia, NY 11716 516-567-9620
Mohawk Data Sciences, MDS Center, Herkimer, NY 13350 315-866-5300
MoldCon Corp., 221 Interstate Dr., W. Springfield, MA 01089 413-736-0371
Monolithic Sys., 84 Inverness Circle E., Englewood, CO 80112 303-790-7400
MPH Elctrns., 2660 Loma Ave., S. El Monte, CA 91733 213-442-7818
Muirhead, 1101 Briston Rd., Mountainside, NJ 07092 201-233-6010
MWS Wire Inds., 31200 Cedar Valley Dr., Westlake Village, CA 91362 ... 818-991-8553
National Electric Cable, 16566 S.W. 72nd Ave., Portland, OR 97224 503-620-9400
† National Telephone & Elctrns. Inc., 2350 N.W. 96 Avenue, Miami, FL 33172 305-592-0551
† NKR Precision Mfg., Rte. 17M, Box 333, Harriman, NY 10926 914-782-8562
PCK Technology Div., Kollmorgen Corp., 322 South Service Rd., Melville, NY 11747 516-454-4400
Photo Chem. Prods. Cal., 18031 Susana Rd., Compton, CA 90224 213-603-0400
Ramcom Systems, 4141-C Glencoe Ave., Marina Del Rey, CA 90292 ... 213-827-4432
† Reactel, Inc., 687-D Lofstrand La., Rockville, MD 20850 301-279-5535
† Law, R. E. Instrument, Inc., 7735 W. 112th Pl., Palos Hills, IL 60465 312-974-4000
Resdel Engrg., 300 E. Live Oak Ave., Arcadia, CA 91006 213-684-2600
§† Risk, George, Inds., GRI Plaza, Kimball, NE 69145 308-235-4645
RMS Techn., 706 Industry Dr., Hampton, VA 23661 804-838-2458
† Ronor Systems, 145 N. Plains Ind. Pk. Rd., Wallingford, CT 06492 203-265-2110
Rowe Industries, Inc., 6225 Benore Rd., P.O. Box 6877, Toledo, OH 43612 419-729-9761
Rye Inds., Inc., 125 Spencer Pl., P.O. Box M, Mamaroneck, NY 10543 ... 914-698-0080
Schneider Instr., 8115 Camargo Rd., Cincinnati, OH 45243 513-561-6803
Seiko Instrs. U.S.A., Inc., 2990 W. Lomita Blvd., Torrance, CA 90505 213-530-8777
SFE Technologies, 1501 1st St., San Fernando, CA 91340 213-365-9411
Siltran Digital, 2250 Monterey Rd., Atascadero, CA 93422 805-466-3209
Siltronics Ltd., P.O. Box 456, Dover, MA 02030 617-329-4068
Spruce Pine Mica Co., Mtn. Laurel Dr., Spruce Pine, NC 28777 704-765-4241
Standard Wire & Cable Co., 2345 Alaska Ave., El Segundo, CA 90245 .. 213-536-0006
Stanford Applied Engrg. Inc., 3520 De La Cruz Blvd., Santa Clara, CA 95050 400-988-0700
Storm Products Co., 116 Shore Drive, Hinsdale, IL 60521 312-323-9121
Suckle Corp., 733 Davis St., Dept. EM, Scranton, PA 18505 717-346-3871
§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 215-673-5600
† G.T.E. Gov't Sys. Corp., Comm. Sys. Div., 77 A St., Needham Hgts., MA 02194 617-449-2000
Symtron Corp., 2415 E. Charleston Rd., Mountain View, CA 94043 415-965-4500
Systonics, Inc., Box 121, Winchester, MA 01890 617-729-4439
TEC, 2727 N. Fairview, Box 5646, Tuscon, AZ 85703 602-792-2230
Technical Aids to Independence, Inc., 12 Hyde Road, Bloomfield, NJ 07003 201-338-8826
§ Techni-Tool, 5 Apollo Rd., Box 368, Plymouth Meeting, PA 19462 215-825-4990
Tegam, 7230 N. Ridge Rd., Madison, OH 44057 216-428-7505
† Teledyne Aerospace Sys., 1007 E. 10th St., Fairmont, MN 56031 .... 507-235-3355; 507-235-9712
Teledyne Microelectronics, 12964 Panama St., Los Angeles, CA 90066 .... 213-822-8229;213-870-9831
T-F Elctrns., 9415 Neils Thompson Dr., Austin, TX 78759 512-836-7323
Thordarson Meissner, Components Corp. of Amer., Electronic Center, Mt. Carmel, IL 62863 618-262-5121
† Time Zero Corp., 103 Cental Ave., Clifton, NJ 07011 201-340-0400
TL Industries, Inc., 2541 Tracy Road, Toledo, OH 43619 1-419-666-8144
Transducer Systems, Inc., 1510 Delp Dr., Kulpsville, PA 19443 215-256-4611
† Transicoil, Inc., Trooper Rd., P.O. Box 99, Worcester, PA 19490-9990 215-277-1300
TRW Resistive Products Div., TRW Electronic Components Grp., 401 N. Broad St., Philadelphia, PA 19108 215-923-8230
Ultra Carbon, Box X-924, Bay City, MI 48707 517-894-2911
United Solder Wrap Inc., 2608 Electronic La., Ste 509, Dallas, TX 75220 214-350-4978
Universal Instrs., P.O. Box 825, Binghamton, NY 13902 607-775-1102
§ Veetronix, Inc., Sub. Reach Electronics, Box 480, Lexington, NE 68850 .. 308-324-4600
† Video Automation Systems, Upper Shad Rd., Pound Ridge, NY 10576 .. 914-764-4613
V.I.P. Inds., Inc., 246 Knickerbocker Ave., Paterson, NJ 07503 201-345-5800
V-Tron Elctrns. Corp., 10 Venus Way, P.O. Box 297-S, S. Attleboro, MA 02703 617-761-9100
† Western Reserve Elctrns., 2150 Highland Rd., Twinsburg, OH 44087 216-425-4951
West-Tronics, Inc., 215 Park St., Bensenville, IL 60106 312-860-3560
§ Wilson, H. M., Co., 11501 Chimney Rock Rd., Houston, TX 77035 713-729-1183
† Wire Graphics, Inc., 215 B. Central Ave., Farmingdale, NY 11735 516-293-1525
§† Workman Elctrn. Prods., Box 3828, Sarasota, FL 33578 813-371-4242
† Zero Corp., 777 Front St., Burbank, CA 91503 213-846-4191

Services, Backplane Wiring - Also see Services, Wire Wrapping; Services, Cable Assembly - Also see Services, Crimping; Services, Wire Cutting & Stripping-4100

† Assembly Specialists, 914 Main St., Box 965, Acton, MA 01720, 617-263-9100 .... C•1700
† DataCon, Inc., 60 Blanchard Rd., Burlington, MA 01803, 617-273-5800 ... C•1705
Datawrap, Inc., 13 Henshaw St., Woburn, MA 01801, 617-938-8911 ...... D•1979
Elctrn. Molding Corp., 96 Mill St., Woonsocket, RI 02895, 401-769-3800 .. C•1709
† Hybricon Corp., 410 Great Rd., Littleton, MA 01460, 617-486-0311 ...... C•1710
Mac Panel Co., Box 5027, 216 Pine St., High Point, NC 27262, 919-884-8111 .... C•1713
† Mechanized Electronic Assembly Div., Universal Instrs. Corp., P.O. Box 825, Binghamton, NY 13902, 607-772-7522 .... D•1982
† Accurassembly, 9525 Cozycroft Ave., Chatsworth, CA 91311 818-700-0708
Advanced Techn. Research Labs., 5645 K General Washington Dr., Alexandria, VA 22312 703-750-2920
Altek Co., P.O. Box 1128, Torrington, CT 06790 203-482-7626
Amphenol, An Allied Co., 43 Commerce Ct., Lisle, IL 60532 312-983-3500
† Apsco, Inc., Sub. of The National Copper & Smelting Co., 5976 Heisley Road, Mentor, OH 44060 216-942-3871
Augat Inc., 33 Perry Ave., Box 779, Attleboro, MA 02703 617-222-2202
† Austin Electronics, The Austin Co., 17-01 Pollitt Drive, Fair Lawn, NJ 07410 201-794-0200
B & G Precision Elctrns., 538 Maple Ave., Doylestown, PA 18901 215-348-4413
† Cardinal Control Co., 110 Kensington Rd., Kensington, CT 06037 203-828-6379
Datatex Corp., 10935 S. Wilcrest Dr., Houston, TX 77099 713-495-3100
Dynatech Corp., 1225 E. Wakeham Ave., P.O. Box 1019, Dept. E, Santa Ana, CA 92702 714-558-8755
Electronic Prods. Corp., Interstate Indl. Plaza, R. D. #5, York, PA 17402 717-767-6517
§† Excel Prods., 401 Joyce Kilmer Ave., New Brunswick, NJ 08903 201-249-6600
§† Garry Mfg. Co., Div. of Brand-Rex Co., 9 Queen Anne Ct., Laghorne, PA 19047 215-949-2300
G B Instruments Inc., 2030 Coolidge St., Hollywood, FL 33020 305-920-0225
H-A-Z Laboratories, Brass Castle Rd., P.O. Box 67-M, Washington, NJ 07882 201-689-0110
Hughes Aircraft Co, Aerospace Grps./Support Sys., P.O. Box 90515, Los Angeles, CA 90009 213-670-1515
Instrumentation Meas. Lab., Div. of Lockheed Electronics Co., Inc., 1501 Rt. 22, Plainfield, NJ 07061 201-757-3730
† Interconnection Technology, Inc., 5542 Buckingham Drive, Huntington Beach, CA 92649 714-891-5305
Kantz Elctrn. Ind., 1804 Wall Church Rd., Wall Township, NJ 07719 201-974-0090
§† Lamtech Electronics, 620 Easy Street, Garland, TX 75042 214-272-3504
† Lehighton Elctrns., Inc., Box 328, Dept M, Lehighton, PA 18235 .... 717-386-4156; 215-377-5990
† Methode Elctrns., Inc., 7444 W. Wilson Ave., Chicago, IL 60656 312-867-9600
Milton Ross Co., 511 Second St. Pike, Southampton, PA 18966 215-355-0200
Mohawk Data Sciences, MDS Center, Herkimer, NY 13350 315-866-5300
Muirhead, 1101 Briston Rd., Mountainside, NJ 07092 201-233-6010
Precicontact, Inc., 835 Wheeler Way, Langhorne, PA 19047 215-757-1202
† Reactel, Inc., 687-D Lofstrand La., Rockville, MD 20850 301-279-5535
Standard Logic, 2215 S. Standard Ave., Santa Ana, CA 92707 714-979-4770
Stanford Applied Engrg. Inc., 3520 De La Cruz Blvd., Santa Clara, CA 95050 400-988-0700
Symtron Corp., 2415 E. Charleston Rd., Mountain View, CA 94043 415-965-4500
Teradyne, Inc., 183 Essex St., Boston, MA 02111 617-482-2700
T-F Elctrns., 9415 Neils Thompson Dr., Austin, TX 78759 512-836-7323
† Time Zero Corp., 103 Cental Ave., Clifton, NJ 07011 201-340-0400
United Solder Wrap Inc., 2608 Electronic La., Ste 509, Dallas, TX 75220 214-350-4978
Universal Instrs., P.O. Box 825, Binghamton, NY 13902 607-775-1102
† Western Reserve Elctrns., 2150 Highland Rd., Twinsburg, OH 44087 216-425-4951
† Wire Graphics, Inc., 215 B. Central Ave., Farmingdale, NY 11735 516-293-1525

Services, Calibration & Instrument Repair-4100

Delevan Div., American Precision Inds. Inc., 270 Quaker Rd., E. Aurora, NY 14052, 716-652-3600 .... A•1238
Julie Resch. Labs., 211 West 61st St., New York, NY 10023, 212-245-2727 .... D•1253
American Electronic Labs., Box 552, Lansdale, PA 19446 215-822-2929
American Elctrn. Labs., Inc., Special Prods. Div., P.O. Box 552, Lansdale, PA 19446
B & G Precision Elctrns., 538 Maple Ave., Doylestown, PA 18901 215-348-4413
† BEC Inc., 2709 N. Broad St., Philadelphia, PA 19132 215-229-9800
Blanck, A. R., Co., Box 249, Rutherford, NJ 07070 201-933-2091
BLH Elctrns., 75 Shawmut Road, Canton, MA 02021 617-821-2000
† Bruel & Kjaer Instrs. Inc., 185 Forest St., Marlboro, MA 01752 617-481-7000
Columbia Resch. Labs., Macdade Blvd. & Bullens La., Woodlyn, PA 19094 215-532-9464
† Computer Field Services, Inc., 6 Federal Street, Danvers, MA 01923 617-774-2930
Dattilo Electronics, 11621 Electron Dr., Louisville, KY 40299 502-267-4446
Dillon, W. C., & Co., National Controls, Inc., 2320 Airport Blvd., Santa Rosa, CA 95401 707-527-5555
Electrical Instr. Svc., 25 Dock St., Mt. Vernon, NY 10550 914-699-9717
† Electrical Standards Div., E.S.R.S., Inc., 7337 Greenbush, N. Hollywood, CA 91605 818-765-4224
§ Everest Interscience, Inc., P.O. Box 345, Tustin, CA 92681 .... 714-992-4461; 714-730-0747
† Flow Technology, Inc., Box 21346, Phoenix, AZ 85036 602-437-1315
Fluke, John, Mfg. Co., Box C9090, MS 250C, Everett, WA 98206 206-356-5400
Guildline Instrs., 4403 Vineland Rd, Suite B-10, Orlando, FL 32811-9998 305-423-8215
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
† Hoffman Engineering Corp., P.O. Box 300, Old Greenwich, CT 06870 203-325-8933
† Honeywell Inc., Aerospace & Defense Grp., Honeywell Plaza, Minneapolis, MN 55408 612-870-5186
† Honeywell, Process Control Div., 1100 Virginia Dr., Ft. Washington, PA 19034 .... 800-321-5111, Ext. 596
† IEC Elctrns., 105 Norton St., Newark, NY 14513 315-331-7742
Information Technolgoy A.D.S.C., P.O. Box 470, College Park, MD 20740 301-779-5110
Instrumentation Meas. Lab., Div. of Lockheed Electronics Co., Inc., 1501 Rt. 22, Plainfield, NJ 07061 201-757-3730
Instrumentation Services, Inc., 957 Winnetka Ave. N., Minneapolis, MN 55427 612-544-8916
Koep Precision Standards, Inc., P. O. Box 191, So. Plainfield, NJ 07080 201-549-9280
Kurz Instruments, Inc., P.O. Box 849, Carmel Valley, CA 93924 800-424-7356
Lear Siegler, Inc., 2850 Ocean Park Blvd., P.O. Box 2158, Santa Monica, CA 90406 213-452-5444
Leeds & Northrup Instrs., A Unit of General Signal Corp., Sumneytown Pike, North Wales, PA 19454 215-643-2000
† Lehighton Elctrns., Inc., Box 328, Dept M, Lehighton, PA 18235 .... 717-386-4156; 215-377-5990
Maury Microwave, 8610 Helms Ave., Cucamonga, CA 91730 714-987-4715
N.Y. Testing Labs., Inc., 81 Urban Ave., Westbury, NY 11590 516-334-7770
† PCB Piezotronics, 3425 Walden Ave., Depew, NY 14043-2495 716-684-0001
§ PTS Electronics Inc., Box 272, Bloomington, IN 47401 812-824-9331
Racal-Dana Instrs. Inc., 4 Goodyear St., Irvine, CA 92715 714-859-8999
† Law, R. E. Instrument, Inc., 7735 W. 112th Pl., Palos Hills, IL 60465 312-974-4000
Reliance Electric Co., Marketing Info Center, P.O. Box 99502, Cleveland, OH 44199 .... 800-245-4501;800-245-4497 In Ohio
Rutherford Resch. Prods., Box 249, Rutherford, NJ 07070 201-933-2091
Schaffner EMC, Inc., Instr. Div., 825 Lehigh Avenue, Union, NJ 07083 201-851-0644
§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 215-673-5600
Viking Labs/Honeywell, Operation of Test Instruments Div. of Honeywell, Inc., 440 Bernardo Ave., Mountain View, CA 94043 415-969-5500

Services, Coating-4100

Assembly Specialists, 914 Main St., Box 965, Acton, MA 01720, 617-263-9100 .... C•1700
Alpha Metals, 600 Rte 440, Jersey City, NJ 07304 201-434-6778
Altek Co., P.O. Box 1128, Torrington, CT 06790 203-482-7626
Burleigh Instrs., Burleigh Pk., Fishers, NY 14453 716-924-9355
† Dresser Inds., 1505 Elm St., Dallas, TX 75201 214-746-6000
E/M Lubricants, Inc., Div. of Great Lakes Chemical Corp., Highway 52 NW, W. Lafayette, IN 47906 317-463-2511
† Evaporated Coatings, P.O. Box 160, Huntingdon Valley, PA 19006 215-947-1465
Gasket Intl. Inc., 49 Ackerman St., Bloomfield, NJ 07003 201-338-6814
High Voltage Engrg. Corp., S. Bedford St., Burlington, MA 01803 617-272-1313
Hughes Aircraft Co, Aerospace Grps./Support Sys., P.O. Box 90515, Los Angeles, CA 90009 213-670-1515
Intl. Elctrn. Resch., 135 W. Magnolia Blvd., Burbank, CA 91502 213-849-2481
Keene Laminates, Keene Corp., 199 Amaral St., E. Providence, RI 02914 800-556-7683
† KLC/Karl Lambrecht Corp., 4204 N. Lincoln Ave., Chicago, IL 60618 312-472-5442
Lebow Co., 5960 Mandarin Ave., Goleta, CA 93117 805-964-7117
Materials Resch., Route 303, Orangeburg, NY 10962 914-359-4200
† Melles Griot, 1770 Kettering St., Irvine, CA 92714 714-261-5600
Metavac, Inc., 45-68 162nd St., Flushing, NY 11358 .... 212-HI5-0400
Micro-Circuits Co., Inc., Route 1 - Box 518, New Buffalo, MI 49117 616-469-2727
† Norton Chemplast, 31-150 Dey Rd., Wayne, NJ 07470 201-696-4700
Panelgraphic Corp., 10 Henderson Dr., W. Caldwell, NJ 07006 201-227-1500
† Phoenix Wire, Inc., 100 Teflon Ave., S. Hero, VT 05486 802-372-4561
† Photo Chem. Prods. Cal., 18031 Susana Rd., Compton, CA 90224 213-603-0400
† Plumer Precision Optics, 601 Montgomery Ave., Pennsburg, PA 18073 215-679-6272
SermeTel, 155 Limerick Rd., Limerick, PA 19468 215-948-5100
Temescal, 2850 Seventh St., Berkeley, CA 94710 415-841-5720
† Union Carbide Corporation, Elctrns. Div., Crystal Prods. Dept., 9320 Chesapeake Dr., Ste. 104, San Diego, CA 92123 619-279-4500

§ Wescorp Antistatic Prods., 144 S. Whisman Rd., Mountain View, CA 94041 415-969-7717
† Zero Corp., 777 Front St., Burbank, CA 91503 213-846-4191

Services, Computer-Aided Design (CAD)-Also See Computers, CAD, CAM, & CAD/CAM-4200

Assembly Specialists, 914 Main St., Box 965, Acton, MA 01720, 617-263-9100 .... C•1700
Hybricon Corp., 410 Great Rd., Littleton, MA 01460, 617-486-0311 .... C•1710
Wintek Corp., 1801 South St., Lafayette, IN 47904-2993, 317-742-8428 .... D•1105
Array Technology, 992 S. Saratoga-Sunnyvale Rd., San Jose, CA 95129 408-252-9900
§ Autodesk, 2658 Bridgeway, Sausalito, CA 94965 415-331-0356
† Auto-trol Tech., 12500 N. Washington St., Denver, CO 80233 303-452-4919
Barnes & Reinecke, Inc., 2375 Estes Ave., Elk Grove Village, IL 60007 312-640-7200
Burroughs Corp., Borroughs Place, Rm. 4C-51, Detroit, MI 48232 313-972-7000
† Calcomp, 2411 W. La Palma Ave., Anaheim, CA 92801 714-821-2011
§ Catronix Corp., 620 P/T Stne, Suite 1802, Atlanta, GA 30308 404-881-1100
† CDRL Data, Inc., 320 West Lone Cactus Drive Ste. 6, Phoenix, AZ 85027 602-582-8844
CGIS, A COMSAT Co., 7701 N. Lamar Blvd., Austin, TX 78752 512-451-7938
Compact Software, Inc., Comsat Corp., 1131 San Antonia Rd., Palo Alto, CA 94303 415-966-8440
Comp-U-Staff, 1 Investment Pl., Towson, MD 21204 301-828-0788
§ Computer Field Services, Inc., 6 Federal Street, Danvers, MA 01923 617-774-2930
Computervision Corp., 201 Burlington Rd., Bedford, MA 01730 617-275-1800
Creare, Inc., Etna Rd., P.O. Box 71, Hanover, NH 03755 603-643-3800
DataCon, Inc., 60 Blanchard Rd., Burlington, MA 01803 617-273-5800
Design Automation, Inc., 809 Massachusetts Ave., Lexington, MA 02173-3992 617-862-8998
Electro Mechanical Design Services, Inc., 16698 Oakmont Ave., Gaithersburg, MD 20877 301-840-5710
Electro-Mechanisms, 2745 E. Huntington Dr., Duarte, CA 91010 818-359-2535
H-A-Z Laboratories, Brass Castle Rd., P.O. Box 67-M, Washington, NJ 07882 201-689-0110
† Honeywell, Process Control Div., 1100 Virginia Dr., Ft. Washington, PA 19034 .... 800-321-5111, Ext. 596
Hughes Aircraft Co, Aerospace Grps./Support Sys., P.O. Box 90515, Los Angeles, CA 90009 213-670-1515
Hughes Aircraft Co., Microelctrn. Sys. Div., 2601 Campus Dr., Irvine, CA 92715 714-752-3800
† Instruments and Controls Div., Technology Inc., P.O. Box 3036, Overlook Branch, Dayton, OH 45431 513-426-2405
§ Integrated Computer Systems, 6305 Arizona Pl., P.O. Box 45405, Los Angeles, CA 90045 213-417-8888
§ Matra Design Systems, 2840-100 Sam Tomas Expressway, Santa Clara, CA 95051 408-986-9000
Mini-Systems, Inc., 20 David Rd., North Attleboro, MA 02761 617-695-0203
† Multiwire Div., Kollmorgen Corp., 10 Andrews Rd., Hicksville, NY 11801 516-938-2000
National Telephone & Elctrns. Inc., 2350 N.W. 96 Avenue, Miami, FL 33172 305-592-0551
† Proto Systems of Atlanta, 625 Sims Industrial Blvd., Alpharetta, GA 30201 404-475-1330
SFE Technologies, 1501 1st St., San Fernando, CA 91340 213-365-9411
Silicon Systems Inc., 14351 Myford Rd., Tustin, CA 92680 714-979-0941
Siltran Digital, 2250 Monterey Rd., Atascadero, CA 93422 805-466-3209
§ Summagraphics Corp., 35 Brentwood Ave., Fairfield, CT 06430 203-384-1344
§ Summit CAD Corp., 5222 FM 1960 W100, Houston, TX 77069 713-440-1468
TL Industries, Inc., 2541 Tracy Road, Toledo, OH 43619 1-419-666-8144
UCCEL Corporation, UCCEL Tower Exchange Park, Dallas, TX 75235 214-353-7100
United Solder Wrap Inc., 2608 Electronic La., Ste 509, Dallas, TX 75220 214-350-4978
VLSI Technology, Inc., 1101 McKay Dr., San Jose, CA 95131 408-942-1810
† Wire Graphics, Inc., 215 B. Central Ave., Farmingdale, NY 11735 516-293-1525

Services, Computer Programming - Also see Services, Computer Systems, Specific Classification-2050

Advanced Sys. Concepts, 435 N. Lake Ave., Pasadena, CA 91101, 818-793-8971 .... D•1137
† Hybricon Corp., 410 Great Rd., Littleton, MA 01460, 617-486-0311 .... C•1710
Amtek Digital Systems, Inc., 12740 28th N.E., Seattle, WA 98125 206-363-0217
Bridge Computer Co., Sea Data Corp., 1 Bridge St., Newton, MA 02158 617-244-8190
† CDRL Data, Inc., 320 West Lone Cactus Drive Ste. 6, Phoenix, AZ 85027 602-582-8844
Comp-U-Staff, 1 Investment Pl., Towson, MD 21204 301-828-0788
Computer Detailing Corp., 301 York Rd., Warminster, PA 18974 215-675-4831
Computervision Corp., 201 Burlington Rd., Bedford, MA 01730 617-275-1800
Datatronic Systems Corp., Computer Sciences Div., P.O. Box 44128, Panorama City, CA 91412 818-988-5290
Delta Data Systems Corp., 2595 Metropolitan Dr., Trevose, PA 19047 215-322-5400
Design Automation, Inc., 809 Massachusetts Ave., Lexington, MA 02173-3992 617-862-8998
Fast Feedback Technologies, 1505 Aviation Blvd., Redoudo Beach, CA 90278 213-379-6100
§ Industrial Computer Designs, Inc., 31264 La Baya Drive, Westlake Village, CA 91362 818-889-3179
† Instruments and Controls Div., Technology Inc., P.O. Box 3036, Overlook Branch, Dayton, OH 45431 513-426-2405
§ Integrated Computer Systems, 6305 Arizona Pl., P.O. Box 45405, Los Angeles, CA 90045 213-417-8888
Interface Electronics Inc., 21134 Bridge St., Southfield, MI 48034 313-352-8820
MSS/Macintosh Software, 170 West 73rd St. Ste 12C, New York, NY 10023 212-799-8195

National Telephone & Elctrns. Inc., 2350 N.W. 96 Avenue, Miami, FL 33172 305-592-0551
† Signatron, A Unit of Sundstrand Corp., 12 Hartwell Ave., Lexington, MA 02173 617-861-1500
Siltran Digital, 2250 Monterey Rd., Atascadero, CA 93422 805-466-3209
§ Software Dynamics, 2111 W. Crescent Ave-G, Anaheim, CA 92801 714-635-4760
§ Summit CAD Corp., 5222 FM 1960 W100, Houston, TX 77069 713-440-1468
Unitronix Corp., 197 Meister Ave., Somerville, NJ 08876 201-231-9400

Services, Computer Systems, Builders-2050

Magnum Opus Custom Elctrn. Engrg., 284 Kennedy St., Iselin, NJ 08830, 201-283-4925 .... D•1093
Advanced Automation Concepts, Inc., 3760 Lower Roswell Rd., Marietta, GA 30067 404-973-0027
† Antona Corp., 2100 S. Sawtelle Blvd., Suite 205, Los Angeles, CA 90025 213-473-8995
Applied Micro Technlg., A Burr Brown Co., 3669 E. 44th Street, Tucson, AZ 85713 602-622-8605
Bridge Computer Co., Sea Data Corp., 1 Bridge St., Newton, MA 02158 617-244-8190
The Computer Place, D & D Financial Entprs. Inc., 4595 Van Epps Rd., Brooklyn Hts., OH 44131 216-351-7444
† Custom Prods. Grp., Sys. Dev. Corp.-A Burroughs Co., P.O. Box 517, Paoli, PA 19301 215-648-7660
† Datacom, Inc., Box 278, Ft. Walton Beach, FL 32548 904-244-6121
Da-Tech Corp., 92 Steamwhistle Dr., Ivyland, PA 18974 215-322-9410
Digiac Corp., 175 Engineers Rd., Hauppauge, NY 11788 516-273-8600
Enterprise Sys. Corp., P.O. Box 698, Dover, NH 03820 603-742-7363
Fast Feedback Technologies, 1505 Aviation Blvd., Redoudo Beach, CA 90278 213-379-6100
§ GMR Co., 8801 Sepulveda Blvd., Los Angeles, CA 90045 213-216-9516
§ Industrial Computer Designs, Inc., 31264 La Baya Drive, Westlake Village, CA 91362 818-889-3179
Lamtech Electronics, 620 Easy Street, Garland, TX 75042 214-272-3504
Siltran Digital, 2250 Monterey Rd., Atascadero, CA 93422 805-466-3209
Systems Data, Inc., 2830 Copley Road, P.O. Box 4297, Akron, OH 44321 216-666-0085
Texas Instrs., Data Sys. Group, P. O. Box 809063, Dallas, TX 75380-9063 1-800-527-3500
Unitronix Corp., 197 Meister Ave., Somerville, NJ 08876 201-231-9400

Services, Computer Systems, Consulting-2050

Advanced Automation Concepts, Inc., 3760 Lower Roswell Rd., Marietta, GA 30067 404-973-0027
† Antona Corp., 2100 S. Sawtelle Blvd., Suite 205, Los Angeles, CA 90025 213-473-8995
Bridge Computer Co., Sea Data Corp., 1 Bridge St., Newton, MA 02158 617-244-8190
Comp-U-Staff, 1 Investment Pl., Towson, MD 21204 301-828-0788
The Computer Place, D & D Financial Entprs. Inc., 4595 Van Epps Rd., Brooklyn Hts., OH 44131 216-351-7444
Computer System Assocs., 7564 Trade St., San Diego, CA 92121 619-566-3911
Datatronic Systems Corp., Computer Sciences Div., P.O. Box 44128, Panorama City, CA 91412 818-988-5290
Design Automation, Inc., 809 Massachusetts Ave., Lexington, MA 02173-3992 617-862-8998
Digital Data Sys., 1551 N.W. 65 Ave., Plantation, FL 33313 305-792-3290
Digital Transmission Techniques, Inc., P.O. Box 1847, Wayne, NJ 07470 201-831-1615
Fast Feedback Technologies, 1505 Aviation Blvd., Redoudo Beach, CA 90278 213-379-6100
§ GMR Co., 8801 Sepulveda Blvd., Los Angeles, CA 90045 213-216-9516
Haverly Systems, Inc., 78 Broadway, Denville, NJ 07834 201-627-1424
§ Industrial Computer Designs, Inc., 31264 La Baya Drive, Westlake Village, CA 91362 818-889-3179
Information Technolgoy A.D.S.C., P.O. Box 470, College Park, MD 20740 301-779-5110
Innovatek Microsystems, Inc., Smithfield Rd., R1 Box 104, Millerton, NY 12546-9720 914-373-9003
Integrated Circuit Engrg. Corp. (ICE), 15022 N. 75th St., Scottsdale, AZ 85260 602-998-9780
§ Integrated Computer Systems, 6305 Arizona Pl., P.O. Box 45405, Los Angeles, CA 90045 213-417-8888
† Metier Management Sys., Inc., 5884 Point West Dr., Houston, TX 77036 713-988-9100
Microcomputer Doctors, Computer Doctors, P.O. Box 470, College Park, MD 20740 301-779-5110
MSS/Macintosh Software, 170 West 73rd St. Ste 12C, New York, NY 10023 212-799-8195
Siltran Digital, 2250 Monterey Rd., Atascadero, CA 93422 805-466-3209
§ Software Dynamics, 2111 W. Crescent Ave-G, Anaheim, CA 92801 714-635-4760
Systems Data, Inc., 2830 Copley Road, P.O. Box 4297, Akron, OH 44321 216-666-0085
Systems Resch. Labs., Inc., 2800 Indian Ripple Rd., Dayton, OH 45440 513-426-6000
United States Software Corp., 5470 N.W. Innisbrook Place, Portland, OR 97229 503-645-5043
Unitronix Corp., 197 Meister Ave., Somerville, NJ 08876 201-231-9400

Services, Computer Systems, Integrators-2050

Advanced Sys. Concepts, 435 N. Lake Ave., Pasadena, CA 91101, 818-793-8971 .... D•1137
Magnum Opus Custom Elctrn. Engrg., 284 Kennedy St., Iselin, NJ 08830, 201-283-4925 .... D•1093
Advanced Automation Concepts, Inc., 3760 Lower Roswell Rd., Marietta, GA 30067 404-973-0027
† Antona Corp., 2100 S. Sawtelle Blvd., Suite 205, Los Angeles, CA 90025 213-473-8995
† Artronics Corporation, 3 Electronic Avenue, Danvers, MA 01923 617-777-2880
Bridge Computer Co., Sea Data Corp., 1 Bridge St., Newton, MA 02158 617-244-8190
Comp-U-Staff, 1 Investment Pl., Towson, MD 21204 301-828-0788
§† Computer Field Services, Inc., 6 Federal Street, Danvers, MA 01923 617-774-2930
Computer Maintenance Corp., 405 Murray Hill Pkwy, East Rutherford, NJ 07073 201-866-6400
The Computer Place, D & D Financial Entprs. Inc., 4595 Van Epps Rd., Brooklyn Hts., OH 44131 216-351-7444
Computervision Corp., 201 Burlington Rd., Bedford, MA 01730 617-275-1800
† Datacom, Inc., Box 278, Ft. Walton Beach, FL 32548 904-244-6121
Datatronic Systems Corp., Computer Sciences Div., P.O. Box 44128, Panorama City, CA 91412 818-988-5290
Digitus Corporation, 22 West 25th Street, Baltimore, MD 21218 301-467-3223
Enterprise Sys. Corp., P.O. Box 698, Dover, NH 03820 603-742-7363
Fast Feedback Technologies, 1505 Aviation Blvd., Redoudo Beach, CA 90278 213-379-6100
§ Industrial Computer Designs, Inc., 31264 La Baya Drive, Westlake Village, CA 91362 818-889-3179
Information Technolgoy A.D.S.C., P.O. Box 470, College Park, MD 20740 301-779-5110
§ Infosphere, Inc., 4730 S.W. Macadam Ave., Portland, OR 97201 503-226-3515
Innovatek Microsystems, Inc., Smithfield Rd., R1 Box 104, Millerton, NY 12546-9720 914-373-9003
Instrumentation Meas. Lab., Div. of Lockheed Electronics Co., Inc., 1501 Rt. 22, Plainfield, NJ 07061 201-757-3730
Interface Technology, 10500 Kahlmeyer Dr., St. Louis, MO 63132 314-426-6880
Kinetic Sys., 11 Maryknoll Dr., Lockport, IL 60441 815-838-0005
Microcomputer Doctors, Computer Doctors, P.O. Box 470, College Park, MD 20740 301-779-5110
Siltran Digital, 2250 Monterey Rd., Atascadero, CA 93422 805-466-3209
Systems Data, Inc., 2830 Copley Road, P.O. Box 4297, Akron, OH 44321 216-666-0085
Systems Resch. Labs., Inc., 2800 Indian Ripple Rd., Dayton, OH 45440 513-426-6000
Texas Instrs., Data Sys. Group, P. O. Box 809063, Dallas, TX 75380-9063 1-800-527-3500
Unitronix Corp., 197 Meister Ave., Somerville, NJ 08876 201-231-9400

Services, Computer Systems, Turnkey-2050

Amtek Digital Systems, Inc., 12740 28th N.E., Seattle, WA 98125 206-363-0217
† Antona Corp., 2100 S. Sawtelle Blvd., Suite 205, Los Angeles, CA 90025 213-473-8995
† Artronics Corporation, 3 Electronic Avenue, Danvers, MA 01923 617-777-2880
Bridge Computer Co., Sea Data Corp., 1 Bridge St., Newton, MA 02158 617-244-8190
† Computer Field Services, Inc., 6 Federal Street, Danvers, MA 01923 617-774-2930
Computervision Corp., 201 Burlington Rd., Bedford, MA 01730 617-275-1800
Creare, Inc., Etna Rd., P.O. Box 71, Hanover, NH 03755 603-643-3800
† Datacom, Inc., Box 278, Ft. Walton Beach, FL 32548 904-244-6121
Data-Design Labs., P.O. Box 711, 7925 Center Ave., Cucamonga, CA 91730 714-987-2511
Datatronic Systems Corp., Computer Sciences Div., P.O. Box 44128, Panorama City, CA 91412 818-988-5290
Datavoice Corp., 180 N. La Salle St. Ste 700, Chicago, IL 60601 312-831-4488
Fast Feedback Technologies, 1505 Aviation Blvd., Redoudo Beach, CA 90278 213-379-6100
Interface Electronics Inc., 21134 Bridge St., Southfield, MI 48034 313-352-8820
Interface Technology, 10500 Kahlmeyer Dr., St. Louis, MO 63132 314-426-6880
† Metier Management Sys., Inc., 5884 Point West Dr., Houston, TX 77036 713-988-9100
RACET Computes, Ltd., 1855 W Katella Ste. 255, Orange, CA 92667 714-997-4950
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Systems Data, Inc., 2830 Copley Road, P.O. Box 4297, Akron, OH 44321 216-666-0085
Systems Resch. Labs., Inc., 2800 Indian Ripple Rd., Dayton, OH 45440 513-426-6000
Texas Instrs., Data Sys. Group, P. O. Box 809063, Dallas, TX 75380-9063 1-800-527-3500
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Wire Graphics, Inc., 215 B. Central Ave., Farmingdale, NY 11735 516-293-1525

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Services, Consulting, Data Processing-4100

Bridge Computer Co., Sea Data Corp., 1 Bridge St., Newton, MA 02158 617-244-8190
CMV Software Specialists Inc., 2720 W. 12th Street, Sioux Falls, SD 57104 605-338-6645
Comp-U-Staff, 1 Investment Pl., Towson, MD 21204 301-828-0788
Datatronic Systems Corp., Computer Sciences Div., P.O. Box 44128, Panorama City, CA 91412 818-988-5290
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§ Integrated Computer Systems, 6305 Arizona Pl., P.O. Box 45405, Los Angeles, CA 90045 213-417-8888
Microcomputer Doctors, Computer Doctors, P.O. Box 470, College Park, MD 20740 301-779-5110
Siltran Digital, 2250 Monterey Rd., Atascadero, CA 93422 805-466-3209
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Unitronix Corp., 197 Meister Ave., Somerville, NJ 08876 201-231-9400

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† Austin Electronics, The Austin Co., 17-01 Pollitt Drive, Fair Lawn, NJ 07410 201-794-0200
† CDRL Data, Inc., 320 West Lone Cactus Drive Ste. 6, Phoenix, AZ 85027 602-582-8844
Computer Detailing Corp., 301 York Rd., Warminster, PA 18974 215-675-4831
† Time Zero Corp., 103 Cental Ave., Clifton, NJ 07011 201-340-0400

Services, Consulting, Engineering-4100

Advanced Sys. Concepts, 435 N. Lake Ave., Pasadena, CA 91101, 818-793-8971 .... D•1137
Lamtech Electronics, 620 Easy Street, Garland, TX 75042, 214-272-3504 .... C•1845
Viking Labs/Honeywell, Operation of Test Instruments Div. of Honeywell, Inc., 440 Bernardo Ave., Mountain View, CA 94043, 415-969-5500 .... B•1013
Atlantic Research, 5390 Cherokee Ave., Alexandria, VA 22312 703-642-4000
† Austin Electronics, The Austin Co., 17-01 Pollitt Drive, Fair Lawn, NJ 07410 201-794-0200
Bally Electronics, Bally Mfg., 10750 W. Grand Ave., Franklin Park, IL 60131 312-451-7223
† CDRL Data, Inc., 320 West Lone Cactus Drive Ste. 6, Phoenix, AZ 85027 602-582-8844
Computer System Assocs., 7564 Trade St., San Diego, CA 92121 619-566-3911
Creare, Inc., Etna Rd., P.O. Box 71, Hanover, NH 03755 603-643-3800
Datavoice Corp., 180 N. La Salle St. Ste 700, Chicago, IL 60601 312-831-4488
Design Automation, Inc., 809 Massachusetts Ave., Lexington, MA 02173-3992 617-862-8998
Electrospace Sys., Inc., P. O. Box 831359, Richardson, TX 75083-1359 214-783-2004
§ Hobart Engrg., 4143 Cheshire Dr., Cypress, CA 90630 714-827-2135
Information Technolgoy A.D.S.C., P.O. Box 470, College Park, MD 20740 301-779-5110
Magnum Opus Custom Elctrn. Engrg., 284 Kennedy St., Iselin, NJ 08830 201-283-4925
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Micrologic, Inc., 108 Water St., Watertown, MA 02172 617-923-1700
National Telephone & Elctrns. Inc., 2350 N.W. 96 Avenue, Miami, FL 33172 305-592-0551
Pulver Laboratories, Inc., 415 S. 8th. St., Boise, ID 83702 208-342-1000
Reliance Electric Co., Marketing Info Center, P.O. Box 99502, Cleveland, OH 44199 .... 800-245-4501;800-245-4497 In Ohio
† Sanders Assocs., Inc., Electromagnetic, EMC Dept., 95 Canal St., Nashua, NH 03061 603-885-3602
S. F. Products Corporation, P. O. Box 369, Southport, CT 06490 203-929-6180
Siltran Digital, 2250 Monterey Rd., Atascadero, CA 93422 805-466-3209
† Time Zero Corp., 103 Cental Ave., Clifton, NJ 07011 201-340-0400
§† Video Automation Systems, Upper Shad Rd., Pound Ridge, NY 10576 914-764-4613

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Services, Consulting, Patent Development-4100

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Services, Consulting, Production-4100

Lamtech Electronics, 620 Easy Street, Garland, TX 75042, 214-272-3504 .... C•1845
Phi Technologies, Inc., 4605 North Stiles, Oklahoma City, OK 73105, 405-521-9000 .... D•1054
Bally Electronics, Bally Mfg., 10750 W. Grand Ave., Franklin Park, IL 60131 312-451-7223
Siltran Digital, 2250 Monterey Rd., Atascadero, CA 93422 805-466-3209

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Viking Labs/Honeywell, Operation of Test Instruments Div. of Honeywell, Inc., 440 Bernardo Ave., Mountain View, CA 94043, 415-969-5500 .... B•1013
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Beckman Industrial Corp., Electronic Technologies Div., 2500 Harbor Blvd., Fullerton, CA 92634 714-871-4848
† CDRL Data, Inc., 320 West Lone Cactus Drive Ste. 6, Phoenix, AZ 85027 602-582-8844
Computer System Assocs., 7564 Trade St., San Diego, CA 92121 619-566-3911
Creare, Inc., Etna Rd., P.O. Box 71, Hanover, NH 03755 603-643-3800
Datavoice Corp., 180 N. La Salle St. Ste 700, Chicago, IL 60601 312-831-4488
Design Automation, Inc., 809 Massachusetts Ave., Lexington, MA 02173-3992 617-862-8998
§ Hobart Engrg., 4143 Cheshire Dr., Cypress, CA 90630 714-827-2135
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Magnum Opus Custom Elctrn. Engrg., 284 Kennedy St., Iselin, NJ 08830 201-283-4925
Microcomputer Doctors, Computer Doctors, P.O. Box 470, College Park, MD 20740 301-779-5110
Micrologic, Inc., 108 Water St., Watertown, MA 02172 617-923-1700
National Telephone & Elctrns. Inc., 2350 N.W. 96 Avenue, Miami, FL 33172 305-592-0551
S. F. Products Corporation, P. O. Box 369, Southport, CT 06490 203-929-6180
Siltran Digital, 2250 Monterey Rd., Atascadero, CA 93422 805-466-3209
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§† Video Automation Systems, Upper Shad Rd., Pound Ridge, NY 10576 914-764-4613

Services, Crimping - Also see Services, Wire Cutting & Stripping-4100

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Altek Co., P.O. Box 1128, Torrington, CT 06790 203-482-7626
American Electric Cable Co., 181 Appleton St., Holyoke, MA 01040 413-539-9893
Amphenol, An Allied Co., 43 Commerce Ct., Lisle, IL 60532 312-983-3500
† Apsco, Inc., Sub. of The National Copper & Smelting Co., 5976 Heisley Road, Mentor, OH 44060 216-942-3871
Assem-Pro Instrs., Div. of Overnight Engineering Inc., 1859 Andrews Ave., San Jose, CA 95124 408-267-1168
Autosplice, Inc., 59-12, 37th Ave, Woodside, NY 11377 718-429-0500
B & G Precision Elctrns., 538 Maple Ave., Doylestown, PA 18901 215-348-4413
§ Brim Elctrns., 120E Home Pl., Lodi, NJ 07644 201-796-2886
Cardinal Control Co., 110 Kensington Rd., Kensington, CT 06037 203-828-6379
Connector Corp., 6025 N. Keystone Ave., Chicago, IL 60646 312-539-3108
Corlund Elctrns. Corp., 3543 Old Conejo Rd., Newbury Park, CA 91320 805-499-6947
† Daniels Mfg. Corp., 6103 Anno Ave., Orlando, FL 32809 305-855-6161
Davidson Elctrn. Dev. Co., 113 E. 13th St., Erie, PA 16512 814-453-7547
Electronic Prods. Corp., Interstate Indl. Plaza, R. D. #5, York, PA 17402 717-767-6517
† Electro-Prep, Ltd., Rt 28A, P.O. Box 437, Cataumet, MA 02534 617-563-5559
† GSI Corp., 1917 Greenspring Dr., Timonium, MD 21093 301-252-1768
H-A-Z Laboratories, Brass Castle Rd., P.O. Box 67-M, Washington, NJ 07882 201-689-0110
Hughes Aircraft Co, Aerospace Grps./Support Sys., P.O. Box 90515, Los Angeles, CA 90009 213-670-1515
† IEC Elctrns., 105 Norton St., Newark, NY 14513 315-331-7742
Kantz Elctrn. Ind., 1804 Wall Church Rd., Wall Township, NJ 07719 201-974-0090
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† Manger Elec. Co., Inc., W. Henry St., Stamford, CT 06902 203-348-7761
§ Mann, Henry, Inc., 3983 Mann Road, Huntingdon Valley, PA 19006 215-355-7200
† Milton Ross Co., 511 Second St. Pike, Southampton, PA 18966 215-355-0200
† Reactel, Inc., 687-D Lofstrand La., Rockville, MD 20850 301-279-5535
† Rowe Industries, Inc., 6225 Benore Rd., P.O. Box 6877, Toledo, OH 43612 419-729-9761
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Technical Aids to Independence, Inc., 12 Hyde Road, Bloomfield, NJ 07003 201-338-8826
† V.I.P. Inds., Inc., 246 Knickerbocker Ave., Paterson, NJ 07503 201-345-5800
V-Tron Elctrns. Corp., 10 Venus Way, P.O. Box 297-S, S. Attleboro, MA 02703 617-761-9100
Won Tronics, Apollo Magnetics Corp., 2720 W. Beverly Blvd., Los Angeles, CA 90057 213-381-2500
Zierick Mfg. Corp., 44 Radio Circle, Mt. Kisco, NY 10549 914-666-2911

Services, Custom Cable Fabrication-6000 – *See Vol. C*

Services, Custom Molding, Plastics – See Services, Plastic Fabrication & Molding

Services, Data Processing, Consulting – See Services, Consulting, Data Processing

Services, Decapsulation/Encapsulation-4100

SIDAC Enclosures, Div. of Triac Electronic Systems, Inc., 87-27 Myrtle Ave., Glendale, NY 11385, 718-441-4728 .... C•1082
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American Electronic Labs., Box 552, Lansdale, PA 19446 215-822-2929
Amphenol, An Allied Co., 43 Commerce Ct., Lisle, IL 60532 312-983-3500
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† Bacon Inds., 192 Pleasant St., Watertown, MA 02172-2399 617-926-2550
† Danmar Inds., 9705 Lurline Ave., Chatsworth, CA 91311 .... 818-882-7979/5280
Eastern Delta Corp., 29-09 S. Broadway, Fair Lawn, NJ 07410 201-797-4200
Electrical Plastics Corp., 500 Long Branch Ave., Long Branch, NJ 07740 201-870-9500
Elctrn. Molding Corp., 96 Mill St., Woonsocket, RI 02895 401-769-3800
Endicott Coil, 22 E. Charlotte St., Binghamton, NY 13905 607-797-1263
† Estes Engrg. Co., 930 Marine Dr., Port Angeles, WA 98362 206-457-0904
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H-A-Z Laboratories, Brass Castle Rd., P.O. Box 67-M, Washington, NJ 07882 201-689-0110
Hightemp Resins, Inc., 225 Greenwich Ave., Stamford, CT 06902 203-357-7401
Hughes Aircraft Co, Aerospace Grps./Support Sys., P.O. Box 90515, Los Angeles, CA 90009 213-670-1515
Hughes Aircraft Co., Microelctrn. Sys. Div., 2601 Campus Dr., Irvine, CA 92715 714-752-3800
Integrated Circuit Engrg. Corp. (ICE), 15022 N. 75th St., Scottsdale, AZ 85260 602-998-9780
† International Sensor Systems, Inc., Aurora Industrial Pk., Box 345, Aurora, NE 68818 402-694-6111
Lear Siegler, Inc., 2850 Ocean Park Blvd., P.O. Box 2158, Santa Monica, CA 90406 213-452-5444
† Magnetek, 7315 Red Deer Dr., Boulder, CO 80301-4696 303-442-6700
Manger Elec. Co., Inc., W. Henry St., Stamford, CT 06902 203-348-7761
† Milton Ross Co., 511 Second St. Pike, Southampton, PA 18966 215-355-0200
National Telephone & Elctrns. Inc., 2350 N.W. 96 Avenue, Miami, FL 33172 305-592-0551
† Nova Tran, 100 Deposition Dr., Clear Lake, WI 54005 715-263-2333
Robison Elctrns., P.O. Box 8121, San Luis Obispo, CA 93403-8121 805-544-8000
† Ronor Systems, 145 N. Plains Ind. Pk. Rd., Wallingford, CT 06492 203-265-2110
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† Sigma Plastronics, P.O. Box 649, Whitmore Lake, MI 48189 313-426-3903
§ Techcon Systems Inc., 1059 E. Bedmar St., Carson, CA 90746 213-603-8888
† Teledyne Aerospace Sys., 1007 E. 10th St., Fairmont, MN 56031 .... 507-235-3355; 507-235-9712
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Triac Electronic Systems, Inc., 87-27 Myrtle Ave., Glendale, NY 11385 718-441-4759

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National Telephone & Elctrns. Inc., 2350 N.W. 96 Avenue, Miami, FL 33172 305-592-0551
Pulver Laboratories, Inc., 415 S. 8th. St., Boise, ID 83702 208-342-1000
Siltran Digital, 2250 Monterey Rd., Atascadero, CA 93422 805-466-3209

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§ Computer System Assocs., 7564 Trade St., San Diego, CA 92121 619-566-3911
General Numeric Corporation, 390 Kent Avenue, Elk Grove Village, IL 60007 312-640-1595
Global Specialties, Interplex Electronics, Inc., 70 Fulton Terrace, P.O. Box 1942, New Haven, CT 06509 203-624-3103
Pace Inc., 9893 Brewers Ct., Laurel, MD 20707 301-490-9860
Pulver Laboratories, Inc., 415 S. 8th. St., Boise, ID 83702 208-342-1000
Racal-Dana Instrs. Inc., 4 Goodyear St., Irvine, CA 92715 714-859-8999
Spectrum Control, Inc., 2185 W. 8th St., Erie, PA 16505 814-455-0966

Services, Electrical Measurement & Test-4100

Assembly Specialists, 914 Main St., Box 965, Acton, MA 01720, 617-263-9100 ..... C•1700
† Mechanized Electronic Assembly Div., Universal Instrs. Corp., P.O. Box 825, Binghamton, NY 13902, 607-772-7522 ..... D•1982
U.S. Instr. Rentals, 2988 Campus Dr., San Mateo, CA 94403, 415-572-6600 ..... D•1322-1323
Viking Labs/Honeywell, Operation of Test Instruments Div. of Honeywell, Inc., 440 Bernardo Ave., Mountain View, CA 94043, 415-969-5500 .... B•1013, D•1327
Active Control Instrmn., P.O. Box 243-Wildwood Circle, Key Largo, FL 33037 305-451-1000
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† Ark Elctrns. Corp., 1325 Industrial Hwy., Southampton, PA 18966 215-322-6510
† Associated Testing Labs., Div. of Kidde, Inc., 53 Second Ave., Burlington, MA 01803 617-272-9050
† Astrolab Inc., 4 Powder Horn Drive, Warren, NJ 07060 1-201-560-3800
Atlantic Research, 5390 Cherokee Ave., Alexandria, VA 22312 703-642-4000
Barnes & Reinecke, Inc., 2375 Estes Ave., Elk Grove Village, IL 60007 .. 312-640-7200
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† DataCon, Inc., 60 Blanchard Rd., Burlington, MA 01803 617-273-5800
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Dielectric Instr. Corp., 761 Franklin Ave., Pittsburgh, PA 15221 412-731-6566
Electrical Instr. Svc., 25 Dock St., Mt. Vernon, NY 10550 914-699-9717
Electrostatic Consltg. Assocs., 556 Lowell Rd., Groton, MA 01450 617-448-5485
ESSCO Inds., P.O. Box 515, Sierra Madre, CA 91024-0515 818-355-8315
Gabriel Elctrns., Box 70, Scarborough Indl. Pk., Scarborough, ME 04074 207-883-5161
† Genisco Technlg. Corp., Filters Div., 18435 Susana Rd., Rancho Dominguez, CA 90221 213-537-4750
Genstar Rental Elctrns., 2445 Faber Pl., Palo Alto, CA 94303 415-856-7600
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§† High Rel Burn-In, Riverside Assoc. Inc., 2326 Kruse Dr., San Jose, CA 95131 408-946-1300
Hipotronics, P.O. Drawer A, Brewster, NY 10509 914-279-8091
† Hopkins Engrg., 12900 Foothill Blvd., San Fernando, CA 91342 213-361-8691
† IEC Elctrns., 105 Norton St., Newark, NY 14513 315-331-7742
Instrumentation Meas. Lab., Div. of Lockheed Electronics Co., Inc., 1501 Rt. 22, Plainfield, NJ 07061 201-757-3730
† Instruments and Controls Div., Technology Inc., P.O. Box 3036, Overlook Branch, Dayton, OH 45431 513-426-2405
Integrated Circuit Engrg. Corp. (ICE), 15022 N. 75th St., Scottsdale, AZ 85260 602-998-9780
† Intergalactic Corp., Box 7025, Salt Lake City, UT 84107 801-262-0094
Koep Precision Standards, Inc., P. O. Box 191, So. Plainfield, NJ 07080 201-549-9280
† Lehighton Elctrns., Inc., Box 328, Dept M, Lehighton, PA 18235 ..... 717-386-4156; 215-377-5990
† Magnetek, 7315 Red Deer Dr., Boulder, CO 80301-4696 303-442-6700
† Micrel, Inc., 1235 Midas Way, Sunnyvale, CA 94086 408-245-2500
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Photon, Inc., 14125 Capri Dr. #4, Los Gatos, CA 95030 408-866-0566
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† Rowe Industries, Inc., 6225 Benore Rd., P.O. Box 6877, Toledo, OH 43612 419-729-9761
Rutherford Resch. Prods., Box 249, Rutherford, NJ 07070 201-933-2091
Sanders Assocs., Flexprint Prods. Div., Grenier Fld., Manchester, NH 03103 603-669-4615
Sensitive Research Instrs., 25 Dock St., Mt. Vernon, NY 10550 914-699-9717
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§† Sloan Technology, 602 E. Montecito St., Santa Barbara, CA 93103 805-963-4431
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† Spectrum Control, Inc., 2185 W. 8th St., Erie, PA 16505 814-455-0966
Stanford Applied Engrg. Inc., 3520 De La Cruz Blvd., Santa Clara, CA 95050 400-988-0700
† G.T.E. Gov't Sys. Corp., Comm. Sys. Div., 77 A St., Needham Hgts., MA 02194 617-449-2000
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† Technical Research & Mfg., Inc., R.F.D. #10, Manchester, NH 03103 603-627-6000
Telcom Inc., 8027 Leesburg Pike, Vienna, VA 22180 703-893-7700
† Time Zero Corp., 103 Cental Ave., Clifton, NJ 07011 201-340-0400
Transmet Corp., 4290 Perimeter Dr., Columbus, OH 43228 ..... 614-276-5522; 800-245-5253
United States Testing Co., Inc., 1415 Park Ave., Hoboken, NJ 07030 ..... 800-631-3096; 201-792-2400

Services, Electroplating — See Services, Plating

Services, EMI/RFI Testing-4100

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Spectrum Control, Inc., 2185 W. 8th St., Erie, PA 16505 814-455-0966

Services, Encapsulation — See Services, Decapsulation/Encapsulation

Services, Environmental Testing-4100

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Yardney Battery Div., Yardney Corp., 82 Mechanic St., Pawcatuck, CT 02891, 203-599-1100 ..... D•1443
† Abrams Instr. Corp., P.O. Box 26007, Lansing, MI 48909 517-332-6405
American Electronic Labs., Box 552, Lansdale, PA 19446 215-822-2929
American Elctrn. Labs., Inc., Special Prods. Div., P.O. Box 552, Lansdale, PA 19446
† A.R.F. Prods., 2559 75th St., Boulder, CO 80301 303-443-4844
† Artronics Corporation, 3 Electronic Avenue, Danvers, MA 01923 617-777-2880
† Associated Testing Labs., Div. of Kidde, Inc., 53 Second Ave., Burlington, MA 01803 617-272-9050
† Atmosphere Controls Prods., 295 Polaris, Mountain View, CA 94043 415-969-2640
Barnes & Reinecke, Inc., 2375 Estes Ave., Elk Grove Village, IL 60007 .. 312-640-7200
Beckman Industrial Corp., Cedar Grove Div., 89 Commerce Rd., Cedar Grove, NJ 07009 201-239-6200
Blanck, A. R., Co., Box 249, Rutherford, NJ 07070 201-933-2091
§† Catalyst Research, Mine Safety Appliances Co., 1421 Clarkview Rd., Baltimore, MD 21209 ..... 301-296-7000, Ext. 304
† Cincinnati Elctrns., 2630 Glendale Milford Rd., Cincinnati, OH 45241 513-733-6100
§† Despatch Inds., P.O. Box 1320, Minneapolis, MN 55440 612-331-1873
Detoronics Corporation, 10660 E. Rush St., S. El Monte, CA 91733 818-579-7130
DuPont de Nemours, E. I., & Co., 1007 Market St., Wilmington, DE 19898 302-773-3218
Eagle-Picher Inds., Inc., Elctrns. Div., Box 47, Joplin, MO 64801 417-623-8000
§† High Rel Burn-In, Riverside Assoc. Inc., 2326 Kruse Dr., San Jose, CA 95131 408-946-1300
Hughes Aircraft Co, Aerospace Grps./Support Sys., P.O. Box 90515, Los Angeles, CA 90009 213-670-1515
† IEC Elctrns., 105 Norton St., Newark, NY 14513 315-331-7742
Instrumentation Meas. Lab., Div. of Lockheed Electronics Co., Inc., 1501 Rt. 22, Plainfield, NJ 07061 201-757-3730
† Intergalactic Corp., Box 7025, Salt Lake City, UT 84107 801-262-0094
Micrel, Inc., 1235 Midas Way, Sunnyvale, CA 94086 408-245-2500
N.Y. Testing Labs., Inc., 81 Urban Ave., Westbury, NY 11590 516-334-7770
† Q.V.S., Inc., 20 North 15th St., East Orange, NJ 07017 201-673-3996
§ Reliability, Inc., 16400 Park Row, P.O. Box 218370, Houston, TX 77218 713-492-0550
† Rowe Industries, Inc., 6225 Benore Rd., P.O. Box 6877, Toledo, OH 43612 419-729-9761
Rutherford Resch. Prods., Box 249, Rutherford, NJ 07070 201-933-2091
Sanders Assocs., Flexprint Prods. Div., Grenier Fld., Manchester, NH 03103 603-669-4615
S. F. Products Corporation, P. O. Box 369, Southport, CT 06490 203-929-6180
Siltronics Ltd., P.O. Box 456, Dover, MA 02030 617-329-4068
§† Solid State Testing, Inc., 56 Middlesex Tpke., Burlington, MA 01803 617-272-0972
Spectrum Control, Inc., 2185 W. 8th St., Erie, PA 16505 814-455-0966
† G.T.E. Gov't Sys. Corp., Comm. Sys. Div., 77 A St., Needham Hgts., MA 02194 617-449-2000
Telcom Inc., 8027 Leesburg Pike, Vienna, VA 22180 703-893-7700
† Torwico Elctrns. Inc., 410 Oberlin Ave. South, Lakewood, NJ 08701 201-364-1800
† Trio-Tech Intl., 2040 N. Lincoln St., Burbank, CA 91504 818-846-9200

United States Testing Co., Inc., 1415 Park Ave., Hoboken, NJ 07030 ..... 800-631-3096; 201-792-2400
§† UTI Instruments Co., 325 N. Mathilda Ave., Sunnyvale, CA 94086 408-738-3301

Services, Equipment Leasing/Rental-4100

The Computer Place, D & D Financial Entprs. Inc., 4595 Van Epps Rd., Brooklyn Hts., OH 44131 216-351-7444

Services, Failure Analysis — See Services, Reliability

Services, Fiberoptics, Consulting-4100

Siltran Digital, 2250 Monterey Rd., Atascadero, CA 93422 805-466-3209

Services, Hermetic Sealing-4100

Alberox, New Bedford Ind'l. Pk., New Bedford, MA 02745, 617-995-1725 ..... C•1617
Mini-Systems, Inc., Electronic Package Div., 168 E. Bacon St., P.O. Box 1597, Plainville, MA 02762, 617-695-2000 ..... A•1681
Assembly Specialists, 914 Main St., Box 965, Acton, MA 01720 617-263-9100
† Centerflex Techn. Corp., 221 Seventh Ave., P.O. Box 21, Hawthorne, NJ 07507 201-423-0505
Ceramaseal, Box 25, New Lebanon Center, NY 12126 518-794-7800
† Connector Inds. of Amer. Div., Microdot Mfg., 639 N. Wayne, Cincinnati, OH 45215 513-733-3680
Detoronics Corporation, 10660 E. Rush St., S. El Monte, CA 91733 818-579-7130
§† Electrical Inds., 691 Central Ave., Murray Hill, NJ 07974 201-464-3200
† Environmental Comm., 3150 Pullman St., Costa Mesa, CA 92627 714-557-7800
Glasseal Products Inc., HCC Industries, 16311 Ventura Blvd., Encino, CA 91436 201-370-9100
Hermetic Seal, 4232 Temple City Blvd., Rosemead, CA 91770 818-283-0411
§† High Rel Burn-In, Riverside Assoc. Inc., 2326 Kruse Dr., San Jose, CA 95131 408-946-1300
Hughes Aircraft Co, Aerospace Grps./Support Sys., P.O. Box 90515, Los Angeles, CA 90009 213-670-1515
Hughes Aircraft Co., Microelctrn. Sys. Div., 2601 Campus Dr., Irvine, CA 92715 714-752-3800
† Laser Inc., Laser Lane, Box 537, Sturbridge, MA 01566 617-347-7314
† Line Elec. Prods., G. General Electro-Components, Inc., 122 Naubuc Ave., Glastonbury, CT 06033 203-659-3573
† Mel Tec, Div. Epsco, Inc., 411 Providence Hwy., Westwood, MA 02090 617-329-1508
Mini-Systems, Inc., 20 David Rd., North Attleboro, MA 02761 617-695-0203
Northwest Microcircuits, Inc., 2115 N. College, Newberg, OR 97132 503-538-7081
Reeves-Hoffman Div., 400 W. North St., Carlisle, PA 17013 717-243-5929
† Sealtron, Inc., 9705 Reading Road, Cincinnati, OH 45215 513-733-8400
Siltronics Ltd., P.O. Box 456, Dover, MA 02030 617-329-4068
§† Sloan Technology, 602 E. Montecito St., Santa Barbara, CA 93103 805-963-4431
† Solid State Testing, Inc., 56 Middlesex Tpke., Burlington, MA 01803 617-272-0972
† G.T.E. Gov't Sys. Corp., Comm. Sys. Div., 77 A St., Needham Hgts., MA 02194 617-449-2000
Wilbrecht Elctrns., 240 Plato Blvd., St. Paul, MN 55107 612-222-2791

Services, High Vacuum-4100

Alberox, New Bedford Ind'l. Pk., New Bedford, MA 02745, 617-995-1725 ..... C•1617
† Associated Testing Labs., Div. of Kidde, Inc., 53 Second Ave., Burlington, MA 01803 617-272-9050
† Bemco, 9908 San Fernando Rd., Pacoima, CA 91331 818-899-5296
§ CVC Prods., 525 Lee Rd., Rochester, NY 14603 716-458-2550
† Evaporated Coatings, P.O. Box 160, Huntingdon Valley, PA 19006 215-947-1465
High Voltage Engrg. Corp., S. Bedford St., Burlington, MA 01803 617-272-1313
Hughes Aircraft Co, Aerospace Grps./Support Sys., P.O. Box 90515, Los Angeles, CA 90009 213-670-1515
Lebow Co., 5960 Mandarin Ave., Goleta, CA 93117 805-964-7117
Materials Resch., Route 303, Orangeburg, NY 10962 914-359-4200
Metavac, Inc., 45-68 162nd St., Flushing, NY 11358 ..... 212-HI5-0400
N.Y. Testing Labs., Inc., 81 Urban Ave., Westbury, NY 11590 516-334-7770
† G.T.E. Gov't Sys. Corp., Comm. Sys. Div., 77 A St., Needham Hgts., MA 02194 617-449-2000
Temescal, 2850 Seventh St., Berkeley, CA 94710 415-841-5720

Services, Instrument Calibration — See Services, Calibration & Instrument Repair

Services, Instrument Design (Industrial)-4100

Lamtech Electronics, 620 Easy Street, Garland, TX 75042, 214-272-3504 ..... C•1845
Magnum Opus Custom Elctrn. Engrg., 284 Kennedy St., Iselin, NJ 08830, 201-283-4925 ..... D•1093
Triac Electronic Systems, Inc., 87-27 Myrtle Ave., Glendale, NY 11385, 718-441-4759 ..... D•1132
Active Control Instrmn., P.O. Box 243-Wildwood Circle, Key Largo, FL 33037 305-451-1000
Aetna Engrg., P.O. Box 7749, Van Nuys, CA 91409-7749 818-341-9409
Altek Co., P.O. Box 1128, Torrington, CT 06790 203-482-7626
Amtek Digital Systems, Inc., 12740 28th N.E., Seattle, WA 98125 206-363-0217
Astro-Geo-Marine, Inc., 202 E. Cota St., Santa Barbara, CA 93101 805-965-7005
A-Systems Inc., 1500 Avon St. Extd., Charlottesville, VA 22901 804-295-7200
Automation Assocs., 1212 Westheimer #120, Austin, TX 78752 512-458-4412
Ballantine Labs., 90 Fanny Rd., Boonton, NJ 07005 201-335-0900
B & G Precision Elctrns., 538 Maple Ave., Doylestown, PA 18901 215-348-4413
Barnes & Reinecke, Inc., 2375 Estes Ave., Elk Grove Village, IL 60007 312-640-7200
Beechwood Mfg., 310 S. Ohmer, Indianapolis, IN 46219 317-356-2493
Blanck, A. R., Co., Box 249, Rutherford, NJ 07070 201-933-2091
Computer System Assocs., 7564 Trade St., San Diego, CA 92121 619-566-3911
Crestron Elec., 101 Broadway, Cresskill, NJ 07626 201-894-0660
Da-Tech Corp., 92 Steamwhistle Dr., Ivyland, PA 18974 215-322-9410
Davidson Elctrn. Dev. Co., 113 E. 13th St., Erie, PA 16512 814-453-7547
Design Automation, Inc., 809 Massachusetts Ave., Lexington, MA 02173-3992 617-862-8998
Dielectric Instr. Corp., 761 Franklin Ave., Pittsburgh, PA 15221 412-731-6566
Digitus Corporation, 22 West 25th Street, Baltimore, MD 21218 301-467-3223
Electronic Wattmeter Co., 2275 Sixth St., Sarasota, FL 33577 813-953-5355
Electrostatic Consltg. Assocs., 556 Lowell Rd., Groton, MA 01450 617-448-5485
Epsilon-Lambda Elctrns. Corp., 427 Stevens St., Geneva, IL 60134 312-232-9611
Erbtec Engineering, Inc., 5680 Valmont Rd., Boulder, CO 80301 303-447-8750
ESSCO Inds., P.O. Box 515, Sierra Madre, CA 91024-0515 818-355-8315
Fast Feedback Technologies, 1505 Aviation Blvd., Redoudo Beach, CA 90278 213-379-6100
Green Engineering, 78 Stone Place, Melrose, MA 02176 617-665-8994
H-A-Z Laboratories, Brass Castle Rd., P.O. Box 67-M, Washington, NJ 07882 201-689-0110
§ Hobart Engrg., 4143 Cheshire Dr., Cypress, CA 90630 714-827-2135
Hughes Aircraft Co, Aerospace Grps./Support Sys., P.O. Box 90515, Los Angeles, CA 90009 213-670-1515
Hughes Aircraft Co., Microelctrn. Sys. Div., 2601 Campus Dr., Irvine, CA 92715 714-752-3800
Innovatek Microsystems, Inc., Smithfield Rd., R1 Box 104, Millerton, NY 12546-9720 914-373-9003
Instrumentation Services, Inc., 957 Winnetka Ave. N., Minneapolis, MN 55427 612-544-8916
† Intergalactic Corp., Box 7025, Salt Lake City, UT 84107 801-262-0094
Kinetic Sys., 11 Maryknoll Dr., Lockport, IL 60441 815-838-0005
§ Macrodyne, 1004 Princetown Rd., Schenectady, NY 12301 518-356-3500
Meissner Inds., 551 Rte. 10, Dover, NJ 07801 201-366-1700
Micrologic, Inc., 108 Water St., Watertown, MA 02172 617-923-1700
Optimum Applied Systems, 145 Palisade St., Dobbs Ferry, NY 10522-1696 914-693-9001
§ PacTec Div., LaFrance Corp., Enterprise & Executive Avenues, Philadelphia, PA 19153 215-365-8400
Photon, Inc., 14125 Capri Dr. #4, Los Gatos, CA 95030 408-866-0566
Ramcom Systems, 4141-C Glencoe Ave., Marina Del Rey, CA 90292 213-827-4432
RMS Techn., 706 Industry Dr., Hampton, VA 23661 804-838-2458
Rutherford Resch. Prods., Box 249, Rutherford, NJ 07070 201-933-2091
Schneider Instr., 8115 Camargo Rd., Cincinnati, OH 45243 513-561-6803
Sensor Corp., Box 140, Scottdale, PA 15683 412-887-4080
† Sensor Electronics, Inc., 105 Fairway Terrace, Mt. Laurel, NJ 08054 609-778-0850
Siltran Digital, 2250 Monterey Rd., Atascadero, CA 93422 805-466-3209
§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 215-673-5600
† G.T.E. Gov't Sys. Corp., Comm. Sys. Div., 77 A St., Needham Hgts., MA 02194 617-449-2000
West-Tronics, Inc., 215 Park St., Bensenville, IL 60106 312-860-3560
§ Wilson, H. M., Co., 11501 Chimney Rock Rd., Houston, TX 77035 713-729-1183

Services, Integration, Computer Systems — See Services, Computer Systems, Integrators

Services, Laser, Consulting-4100

Holiday-Hammond Corp., 220 S. 2nd Street, Waco, TX 76701 817-756-7401
§ Photon Sources, Inc., 12163 Globe Rd., Livonia, MI 48150 313-591-0101

Services, Measurement & Test, Electrical — See Services, Electrical Measurements & Test (Vol.), Services, Environmental Testing

Services, Measuring — See Services, Instrument Calibration (Vol.), Services, Testing & Measuring

Services, Metal Etching, Engraving-4100

American Etching & Mfg., 13730 Desmond St., Pacoima, CA 91331 213-896-1187
Apahouser-Elcom, Inc., 101 Walnut St., Watertown, MA 02172 617-924-1500
Bell Co., Inc., 106 Morrow Ave., Box 92E, Trussville, AL 35173 205-655-2135
§† Berg, W. M., Inc., 499 Ocean Ave., East Rockaway, NY 11518 516-599-5010
§† Excel Prods., 401 Joyce Kilmer Ave., New Brunswick, NJ 08903 201-249-6600
Hughes Aircraft Co, Aerospace Grps./Support Sys., P.O. Box 90515, Los Angeles, CA 90009 213-670-1515
† JRW Inds., Inc., 2312 N Second St., Harrisburg, PA 17110 717-236-1418
§ Materials Resch., Route 303, Orangeburg, NY 10962 914-359-4200
† Mechanical Engraving, 4500 Bullard Ave, Bronx, NY 10470 212-324-4455
Micro-Etch Products, Inc., 94 Dodge Ave., P.O. Box 9712, Stratford, CT 06497 203-378-8610
§† Miller Dial Corp., 4400 N. Temple City Blvd., El Monte, CA 91734 818-283-5111
† Photo Chem. Prods. Cal., 18031 Susana Rd., Compton, CA 90224 213-603-0400
Risk, George, Inds., GRI Plaza, Kimball, NE 69145 308-235-4645
† Tech-Etch, Inc., 45 Aldrin Rd., Plymouth, MA 02360 617-747-0300
Technar Inc., 205 N. 2nd Ave., Arcadia, CA 91006 818-445-1143
Won Tronics, Apollo Magnetics Corp., 2720 W. Beverly Blvd., Los Angeles, CA 90057 213-381-2500
Zero Corp., 777 Front St., Burbank, CA 91503 213-846-4191

Services, Metal Parts Fabrication-4100

Auto-Swage Prods., 726 River Rd., Shelton, CT 06484, 203-929-1401 ..... C•1685
Connector Corp., 6025 N. Keystone Ave., Chicago, IL 60646, 312-539-3108 ..... C•1176
EG & G Birtcher, 4505 N. Arden Dr., El Monte, CA 91731, 818-442-2572 ..... C•1052
§† Electronic Enclosures, Div. Wyle Labs, 225 South Aviation Blvd., El Segundo, CA 90245, 213-643-8181 ..... C•1056
Mueller Elec. Co., 1583 E 31st St., Dept. 20, Cleveland, OH 44114, 216-771-5225 ..... C•1472
Techmar Corp., 2232 S. Cotner Ave., Los Angeles, CA 90064, 213-478-0046;800-TECHMAR ..... C•1091

† Aaba Components Corp., P.O. Box 171, Baldwin Place, NY 10505 914-628-6952
§† Abalon Precision Mfg., 1040 Home Street, Bronx, NY 10459 212-589-5682
Accessories for Elctrns., Inc., 800 Merrick Rd., Baldwin, NY 11510-3593 516-546-1751
† Accumet Engrg., 518 Main St., Hudson, MA 01749 617-568-8311
Accurate Elctrns., 169 S. Abbe Rd., P.O. Box 1287, Elyria, OH 44036 216-365-1211
Acme Model Engrg. Co., 654 Bergen Blvd., Ridgefield, NJ 07657 201-943-7650
Alden Products Co., P.O. Box 860, 117 N. Main St., Brockton, MA 02403 617-583-0160
† American Aluminum, 230 Sheffield St., Dept. EEM, Mountainside, NJ 07092 201-233-3500
American Electronic Labs., Box 552, Lansdale, PA 19446 215-822-2929
American Etching & Mfg., 13730 Desmond St., Pacoima., CA 91331 213-896-1187
Apahouser-Elcom, Inc., 101 Walnut St., Watertown, MA 02172 617-924-1500
Art Wire/Doduco, 9 Wing Dr., Cedar Knolls, NJ 07927 201-428-4880
Assem-Pro Instrs., Div. of Overnight Engineering Inc., 1859 Andrews Ave., San Jose, CA 95124 408-267-1168
§† Associated Spring, Barnes Grp., 18 Main St., Bristol, CT 06010 203-583-1331
† Astro Dynamics, Inc., 2 Gill St., Woburn, MA 01801 617-935-4944
Beechwood Mfg., 310 S. Ohmer, Indianapolis, IN 46219 317-356-2493
§† Berg, W. M., Inc., 499 Ocean Ave., East Rockaway, NY 11518 516-599-5010
BICC-Vero Elctrns., Inc., 40 Lindeman Drive, Trumbull, CT 06611 203-372-0038
† Boker's, Inc., 3104 Snelling Ave., Minneapolis, MN 55406 612-729-9365
† Braxton Mfg., Echo Lake Rd. N., P.O. Box 429, Watertown, CT 06795 203-274-6781
§ Brooks Mfg. Co., 2016/24 Amber St., Philadelphia, PA 19125 ...... 215-425-3395; 800-523-0130
† BTU Engrg. Corp., Bruce Sys., Esquire Rd., N. Billerica, MA 01862 617-667-4111
§† Bud Inds., Inc., 4605 E. 355th St., Willoughby, OH 44094 216-946-3200
§† Bud Radio, 4605 E. 355th St., Willoughby, OH 44094 216-946-3200
Cabot Berylco, Div. Cabot Corp., PO Box 1296, Reading, PA 19603 215-921-5000
Cardinal Control Co., 110 Kensington Rd., Kensington, CT 06037 203-828-6379
Compac, 279 Skidmore Rd., Deer Park, NY 11729 516-667-3933
D-Cemco, Inc., 3200 N. San Fernando Blvd., Burbank, CA 91504 213-849-6341
Delbert Blinn Co., Box 2007, Pomona, CA 91766 714-629-3900
Dielectric Instr. Corp., 761 Franklin Ave., Pittsburgh, PA 15221 412-731-6566
Drawn Metal Products, 6143 W. Howard St., Niles, IL 60648 312-647-8941
§† Excel Prods., 401 Joyce Kilmer Ave., New Brunswick, NJ 08903 201-249-6600
Framar Metal Products Co., Inc., 345 Carnegie Avenue, Kenilworth, NJ 07033 201-241-0710
Gabriel Elctrns., Box 70, Scarborough Indl. Pk., Scarborough, ME 04074 207-883-5161
General Electric Co., Lamp Comps. & Technical Prods. Div. Sls. Oper., 21800 Tungsten Rd., Cleveland, OH 44117 216-266-2451
GM Nameplate, Inc., 2040 15th Ave. West, Seattle, WA 98119 206-284-2200
† GTI/Elctrns. Div., P.O. Box 96, Hadley, PA 16130 412-253-3161
† Handy & Harman Elctrn. Matls. Corp., 72 Elm St. N., Atteboro, MA 02760 617-695-1401
H-A-Z Laboratories, Brass Castle Rd., P.O. Box 67-M, Washington, NJ 07882 201-689-0110
§ Hobson Bros., 4940 W. Lawrence Ave., Chicago, IL 60630-3884 312-283-3600
Hughes Aircraft Co, Aerospace Grps./Support Sys., P.O. Box 90515, Los Angeles, CA 90009 213-670-1515
Hughes Aircraft Co., Microelctrn. Sys. Div., 2601 Campus Dr., Irvine, CA 92715 714-752-3800
IMEC Corp., 2434 Southport Way, National City, CA 92050 619-474-8991
Interconics, Bussing Sys. Oper., a unit of BMC Industries, Inc., 2525 E. Vista Industria, Compton, CA 90220 213-639-2535
Intl. Elctrn. Resch., 135 W. Magnolia Blvd., Burbank, CA 91502 213-849-2481
Jettron Prods., P.O. Box 337, E. Hanover, NJ 07936 201-887-0571
JMJ Technical Prods., 50 Wheeler Point Rd., Newark, NJ 07105 201-589-4257
Jonard Industries Corp., 134 Marbledale Rd., Tuckahoe, NY 10707 914-793-0700
Ken-Tron Mfg., Inc., 1204 Industrial Dr., Owensboro, KY 42301 502-684-0431
LaFrance Corp., Entprs & Exec Aves, Philadelphia, PA 19153 215-365-8000
Lehighton Elctrns., Inc., Box 328, Dept M, Lehighton, PA 18235 ...... 717-386-4156; 215-377-5990
Materials Resch., Route 303, Orangeburg, NY 10962 914-359-4200
Matrix Engineering Corp., 17000 S. Western Ave. 19, Gardena, CA 90247 213-770-0521
Maxwell Labs., 8835 Balboa Ave., San Diego, CA 92123 619-279-5100
† Mechanical Engraving, 4500 Bullard Ave, Bronx, NY 10470 212-324-4455
Micro-Etch Products, Inc., 94 Dodge Ave., P.O. Box 9712, Stratford, CT 06497 203-378-8610
§† Miller Dial Corp., 4400 N. Temple City Blvd., El Monte, CA 91734 818-283-5111
† Milton Ross Co., 511 Second St. Pike, Southampton, PA 18966 215-355-0200
Miniature Metal Forming Div., 4819 Emerald St., P.O. Box 2962, Torrance, CA 90509 213-370-3679
Mohawk Data Sciences, MDS Center, Herkimer, NY 13350 315-866-5300
† NKR Precision Mfg., Rte. 17M, Box 333, Harriman, NY 10926 914-782-8562
§ Norelcom Inds., 63 Marine St., Farmingdale, NY 11735 516-249-7245
§† Philips Elmet, 1560 Lisbon Rd., Lewiston, ME 04240 207-784-3591
† Photo Chem. Prods. Cal., 18031 Susana Rd., Compton, CA 90224 213-603-0400
Plastiglide Mfg., 2701 W. El Segundo Blvd., Hawthorne, CA 90250 213-777-8108
Precision Extrusions, Inc., Box 120, Bensenville, IL 60106 312-766-0340
§† PTS Electronics Inc., Box 272, Bloomington, IN 47401 812-824-9331
† Q.V.S., Inc., 20 North 15th St., East Orange, NJ 07017 201-673-3996
§ Schroff UK Ltd., Maylands Ave., Hemel Hempstead, Herts, ENGLAND HP2 4SG 0442-40471/6
Sjoberg, C., & Son, Inc., 415 Station St., Cranston, RI 02910 401-461-8220
South Shore Metal Prods., 88 E Allen Blvd., Farmingdale, NY 11735 516-249-3322
Staver Co., Inc., 47 Saxon Ave., Bay Shore, NY 11706 516-666-8000
Suckle Corp., 733 Davis St., Dept. EM, Scranton, PA 18505 717-346-3871
† G.T.E. Gov't Sys. Corp., Comm. Sys. Div., 77 A St., Needham Hgts., MA 02194 617-449-2000
§ Techni-Tool, 5 Apollo Rd., Box 368, Plymouth Meeting, PA 19462 215-825-4990
§ Ten-Tec, Inc., Industrial Park, Sevierville, TN 37862 615-453-7172
T-F Elctrns., 9415 Neils Thompson Dr., Austin, TX 78759 512-836-7323
† Titchener, E. H., & Co., 1 Titchener Pl., Binghamton, NY 13902 607-772-1161
† Wilkinson, P.O. Box 4558, Westlake Village, CA 91359 ...... 818-889-0050;800-822-4653
York Metal Products, Inc., 34-20 12th St., Long Island City, NY 11367 718-932-3660
§† Zenrad Circuits Co., 529 E. Gutierrez St., Santa Barbara, CA 93103 805-963-3527
† Zero Corp., 777 Front St., Burbank, CA 91503 213-846-4191
Zierick Mfg. Corp., 44 Radio Circle, Mt. Kisco, NY 10549 914-666-2911

Services, Metallizing (Incl. Electroforming)-4100

Alberox, New Bedford Ind'l. Pk., New Bedford, MA 02745, 617-995-1725 ...... C•1617
† International Sensor Systems, Inc., Aurora Industrial Pk., Box 345, Aurora, NE 68818, 402-694-6111 ...... A•1677
American Electronic Labs., Box 552, Lansdale, PA 19446 215-822-2929
Ceramaseal, Box 25, New Lebanon Center, NY 12126 518-794-7800
† Craig Systems Corp., 10 Industrial Way, Amesbury, MA 01913-4848 617-388-5662
Frequency Elctrns., 55 Charles Lindbergh Blvd., Mitchel Field, NY 11553 516-794-4500
Fresnel Optics, Div. of Alliance Tool Corp., 1300 Mt. Read Blvd., Rochester, NY 14606 716-647-1140
† Hermetic Seal, 4232 Temple City Blvd., Rosemead, CA 91770 818-283-0411
Hughes Aircraft Co, Aerospace Grps./Support Sys., P.O. Box 90515, Los Angeles, CA 90009 213-670-1515
Hybrid Svcs. Inc., 38 Main St., North Reading, MA 01864 617-664-5500
Keene Laminates, Keene Corp., 199 Amaral St., E. Providence, RI 02914 800-556-7683
Lebow Co., 5960 Mandarin Ave., Goleta, CA 93117 805-964-7117
Materials Resch., Route 303, Orangeburg, NY 10962 914-359-4200
Mini-Systems, Inc., 20 David Rd., North Attleboro, MA 02761 617-695-0203
Reeves-Hoffman Div., 400 W. North St., Carlisle, PA 17013 717-243-5929
Reliance Electric Co., Marketing Info Center, P.O. Box 99502, Cleveland, OH 44199 ...... 800-245-4501;800-245-4497 In Ohio
† Servometer Corp., 501 Little Falls Rd., Cedar Grove, NJ 07009 201-785-4630
Thickfilm Int'l., Rt. 1-Box 85-0, Indian Head, MD 20640 301-375-8666

Services, Microprocessor Development - Also see Services, PROM & Array Programming-4100

Advanced Sys. Concepts, 435 N. Lake Ave., Pasadena, CA 91101, 818-793-8971 ...... D•1137
Magnum Opus Custom Elctrn. Engrg., 284 Kennedy St., Iselin, NJ 08830, 201-283-4925 ...... D•1093
Wintek Corp., 1801 South St., Lafayette, IN 47904-2993, 317-742-8428 ...... D•1105
Amtek Digital Systems, Inc., 12740 28th N.E., Seattle, WA 98125 206-363-0217
Applied Sys., 26401 Harper Ave., St. Clair Shores, MI 48081 313-779-8700
A-Systems Inc., 1500 Avon St. Extd., Charlottesville, VA 22901 804-295-7200
Automation Assocs., 1212 Westheimer #120, Austin, TX 78752 512-458-4412
AVCO-Elctrns. Div., 4807 Bradford Dr., Huntsville, AL 35805 205-837-6500
Bally Electronics, Bally Mfg., 10750 W. Grand Ave., Franklin Park, IL 60131 312-451-7223
Barnes & Reinecke, Inc., 2375 Estes Ave., Elk Grove Village, IL 60007 312-640-7200
§ Boston Systems Office, 469 Moody St., Waltham, MA 02254-9164 617-894-7800
Bridge Computer Co., Sea Data Corp., 1 Bridge St., Newton, MA 02158 617-244-8190
Comp-U-Staff, 1 Investment Pl., Towson, MD 21204 301-828-0788
The Computer Place, D & D Financial Entprs. Inc., 4595 Van Epps Rd., Brooklyn Hts., OH 44131 216-351-7444
Corby Inds. Inc., P. O. Box 2838, Allentown, PA 18001 215-433-1412
Crestron Elec., 101 Broadway, Cresskill, NJ 07626 201-894-0660
Design Automation, Inc., 809 Massachusetts Ave., Lexington, MA 02173-3992 617-862-8998
Digital Radio Corp., 8901 La Cienega Blvd., Inglewood, CA 90301 213-670-8611
Digitus Corporation, 22 West 25th Street, Baltimore, MD 21218 301-467-3223
Electronic Prods. Corp., Interstate Indl. Plaza, R. D. #5, York, PA 17402 717-767-6517
Enterprise Sys. Corp., P.O. Box 698, Dover, NH 03820 603-742-7363
Fast Feedback Technologies, 1505 Aviation Blvd., Redoudo Beach, CA 90278 213-379-6100
GMR Co., 8801 Sepulveda Blvd., Los Angeles, CA 90045 213-216-9516
§ Hobart Engrg., 4143 Cheshire Dr., Cypress, CA 90630 714-827-2135
Hughes Aircraft Co, Aerospace Grps./Support Sys., P.O. Box 90515, Los Angeles, CA 90009 213-670-1515
Hughes Aircraft Co., Microelctrn. Sys. Div., 2601 Campus Dr., Irvine, CA 92715 714-752-3800
§ Industrial Computer Designs, Inc., 31264 La Baya Drive, Westlake Village, CA 91362 818-889-3179
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Monolithic Sys., 84 Inverness Circle E., Englewood, CO 80112 303-790-7400
National Telephone & Elctrns. Inc., 2350 N.W. 96 Avenue, Miami, FL 33172 305-592-0551
Qwint Systems, 3693 Commercial Ave., Northbrook, IL 60062 312-498-5060
Ramcom Systems, 4141-C Glencoe Ave., Marina Del Rey, CA 90292 213-827-4432
RMS Techn., 706 Industry Dr., Hampton, VA 23661 804-838-2458
Schneider Instr., 8115 Camargo Rd., Cincinnati, OH 45243 513-561-6803
Sensor Corp., Box 140, Scottdale, PA 15683 412-887-4080

Signatron, A Unit of Sundstrand Corp., 12 Hartwell Ave., Lexington, MA 02173 ... 617-861-1500
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† Time Zero Corp., 103 Cental Ave., Clifton, NJ 07011 ... 201-340-0400

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Bopla Enclosures, 1350 Beverly Rd., Ste. 115-338, McLean, VA 22101, 703-549-7242 ... C•1026
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Amphenol, An Allied Co., 43 Commerce Ct., Lisle, IL 60532 ... 312-983-3500
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§ Aura Mfg., 50 McDermott Rd., North Haven, CT 06473 ... 203-777-2541
† Cable Systems, Inc., 210 Broadway, Everett, MA 02149 ... 617-389-7080
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† Danmar Inds., 9705 Lurline Ave., Chatsworth, CA 91311 ... 818-882-7979/5280
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† Elctrn. Molding Corp., 96 Mill St., Woonsocket, RI 02895 ... 401-769-3800
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Hughes Aircraft Co., Microelctrn. Sys. Div., 2601 Campus Dr., Irvine, CA 92715 ... 714-752-3800
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§† Rose Enclosures Sys., Inc., 12140 Parklawn Dr., Rockville, MD 20852 ... 301-984-1783
Rostone Corp., P.O. Box 7497, Lafayette, IN 47903 ... 317-474-2421
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§† SL Plastics, Route 248, Nazareth, PA 18064 ... 215-759-0280
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† Teledyne Aerospace Sys., 1007 E. 10th St., Fairmont, MN 56031 ... 507-235-3355; 507-235-9712
Useco Div., Litton Inds, 13536 Saticoy St, Van Nuys, CA 91409 ... 818-786-9388
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Mini-Systems, Inc., Electronic Package Div., 168 E. Bacon St., P.O. Box 1597, Plainville, MA 02762, 617-695-2000 ... A•1681
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Hardigg Inds., Inc., North Main St., South Deerfield, MA 01373 ... 413-665-2163
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† IEC Elctrns., 105 Norton St., Newark, NY 14513 ... 315-331-7742
Integrated Circuit Engrg. Corp. (ICE), 15022 N. 75th St., Scottsdale, AZ 85260 ... 602-998-9780
† Isotronics, Industrial Park, New Bedford, MA 02745 ... 617-998-2000
† Mel Tec, Div. Epsco, Inc., 411 Providence Hwy., Westwood, MA 02090 ... 617-329-1508
† Mercury Plastics, A Unit of Zero Corp., 672 Fuller Rd., Chicopee, MA 01020 ... 413-267-5561
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† Milton Ross Co., 511 Second St. Pike, Southampton, PA 18966 ... 215-355-0200
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Parsons Mfg., 1055 O'Brien Dr., Menlo Park, CA 94025 ... 415-324-4726
Precicontact, Inc., 835 Wheeler Way, Langhorne, PA 19047 ... 215-757-1202
Reeves-Hoffman Div., 400 W. North St., Carlisle, PA 17013 ... 717-243-5929
§ Reliance Plastics & Packaging, 225 Belleville Ave., Bloomfield, NJ 07003 ... 201-748-2222
Republic Packaging Corp., 9160 S. Green St., Chicago, IL 60620 ... 312-233-6530
Siltronics Ltd., P.O. Box 456, Dover, MA 02030 ... 617-329-4068
Skydyne Division, AAR/Brooks & Perkins, River Rd., Port Jervis, NY 12771 ... 914-856-6655
Sylvania Electronic, Box 360, Muncy, PA 17756 ... 717-546-3191
Teledyne Microelectronics, 12964 Panama St., Los Angeles, CA 90066 ... 213-822-8229;213-870-9831
† Time Zero Corp., 103 Cental Ave., Clifton, NJ 07011 ... 201-340-0400
§ Tra-Con, Inc., 55 North St., Medford, MA 02155 ... 617-391-5550
United Foam Plastics, 172 E. Main St., Georgetown, MA 01833 ... 617-352-2200
United Solder Wrap Inc., 2608 Electronic La., Ste 509, Dallas, TX 75220 ... 214-350-4978
Universal Instrs., P.O. Box 825, Binghamton, NY 13902 ... 607-775-1102
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† Zero Corp., 777 Front St., Burbank, CA 91503 ... 213-846-4191

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Services, Photographic-4100

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H-A-Z Laboratories, Brass Castle Rd., P.O. Box 67-M, Washington, NJ 07882 ... 201-689-0110
Photronic Labs., Secor Rd., Brookfield Ctr., CT 06805 ... 203-775-0465
Precision Micro Images, Box 1330, Altamonte Springs, FL 32701 ... 305-830-7244

Services, Plastics Fabrication/Molding/Foaming/Finishing-4100

Connector Corp., 6025 N. Keystone Ave., Chicago, IL 60646, 312-539-3108 ... C•1176
† Aaba Components Corp., P.O. Box 171, Baldwin Place, NY 10505 ... 914-628-6952
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Amerex, P.O. Box 2815, Riverside, CA 92516 ... 714-686-1400
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American Electronic Labs., Box 552, Lansdale, PA 19446 ... 215-822-2929
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Amphenol, An Allied Co., 43 Commerce Ct., Lisle, IL 60532 ... 312-983-3500
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Apahouser-Elcom, Inc., 101 Walnut St., Watertown, MA 02172 ... 617-924-1500
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dek, inc., 3480 Swenson Ave., St. Charles, IL 60174 ... 312-377-2575

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† Dixon Inds., 386 Metacom Ave., Bristol, RI 02809	401-253-2000
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Eby Co., 2751 Southampton Rd., Philadelphia, PA 19154	215-969-4200
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Enerco, Inc., 9615 W. Marginal Way S., Seattle, WA 98108	206-762-1422
† Environmental Container Sys., Inc., 3560 Rogue River Hwy., Box 188, Grants Pass, OR 97526	503-476-8871
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Gasket Intl. Inc., 49 Ackerman St., Bloomfield, NJ 07003	201-338-6814
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Hardigg Inds., Inc., North Main St., South Deerfield, MA 01373	413-665-2163
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† Hoffman Engineering Corp., P.O. Box 300, Old Greenwich, CT 06870	203-325-8933
Hughes Aircraft Co, Aerospace Grps./Support Sys., P.O. Box 90515, Los Angeles, CA 90009	213-670-1515
Hughes Aircraft Co., Microelctrn. Sys. Div., 2601 Campus Dr., Irvine, CA 92715	714-752-3800
Industrial Elctrn. Engrs., Inc., 7740 Lemona Ave., Van Nuys, CA 91405	818-787-0311
ITT Thermotech, Div. IT & T, 1203 S. 5th St., Hopkins, MN 55343	612-933-9400
Jonard Industries Corp., 134 Marbledale Rd., Tuckahoe, NY 10707	914-793-0700
§† Keystone Elctrns. Corp., 49 Bleecker St., New York, NY 10012	212-475-4600
Kurz-Kasch, Knob Div., 711 Hunter Dr., Wilmington, OH 45177	513-382-0966
LaFrance Corp., Entprs & Exec Aves, Philadelphia, PA 19153	215-365-8000
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Lear Siegler, Inc., 2850 Ocean Park Blvd., P.O. Box 2158, Santa Monica, CA 90406	213-452-5444
Malco, Div. Microdot Electronic Components Group, 12 Progress Dr., Montgomeryville, PA 18936	215-699-5373
Manger Elec. Co., Inc., W. Henry St., Stamford, CT 06902	203-348-7761
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† Milton Ross Co., 511 Second St. Pike, Southampton, PA 18966	215-355-0200
† Moldtronics, Inc., 703 Rogers St., Downers Grove, IL 60515	312-968-7000
National Telephone & Elctrns. Inc., 2350 N.W. 96 Avenue, Miami, FL 33172	305-592-0551
§ Norelcom Inds., 63 Marine St., Farmingdale, NY 11735	516-249-7245
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Parsons Mfg., 1055 O'Brien Dr., Menlo Park, CA 94025	415-324-4726
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† Photo Chem. Prods. Cal., 18031 Susana Rd., Compton, CA 90224	213-603-0400
Plastic Forming Co., Inc., 5 Lunar Dr., P.O. Box N, Woodbridge, CT 06525	203-397-1338
† Plastiglide Mfg., 2701 W. El Segundo Blvd., Hawthorne, CA 90250	213-777-8108
Polymer Corp., P.O. Box 422, Reading, PA 19603	215-320-6600
§† PTS Electronics Inc., Box 272, Bloomington, IN 47401	812-824-9331
† Quantum, Barnes Indl. Pk., Wallingford, CT 06492	203-265-2811
† Quartzite Processing, Inc., 6 Holyoke St., Malden, MA 02148	617-322-1380
† Q.V.S., Inc., 20 North 15th St., East Orange, NJ 07017	201-673-3996
Republic Packaging Corp., 9160 S. Green St., Chicago, IL 60620	312-233-6530
§ Richco Plastic Co., 5825 N. Tripp Ave., Chicago, IL 60646	312-539-4060
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† Ronor Systems, 145 N. Plains Ind. Pk. Rd., Wallingford, CT 06492	203-265-2110
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† Rowe Industries, Inc., 6225 Benore Rd., P.O. Box 6877, Toledo, OH 43612	419-729-9761
Rutherford Resch. Prods., Box 249, Rutherford, NJ 07070	201-933-2091
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§† SL Plastics, Route 248, Nazareth, PA 18064	215-759-0280
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§ Shokai Far East, Ltd., 280 North Central Ave., Hartsdale, NY 10530	914-681-0700
Sinclair & Rush, 6900 S. Broadway, St. Louis, MO 63111	314-481-2450
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Skydyne Division, AAR/Brooks & Perkins, River Rd., Port Jervis, NY 12771	914-856-6655
SL Homalite, Div. of SL Inds., 11 Brookside Dr., Wilmington, DE 19804	302-652-3686
Spruce Pine Mica Co., Mtn. Laurel Dr., Spruce Pine, NC 28777	704-765-4241
Stanford Applied Engrg. Inc., 3520 De La Cruz Blvd., Santa Clara, CA 95050	400-988-0700
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† Teledyne Aerospace Sys., 1007 E. 10th St., Fairmont, MN 56031	507-235-3355; 507-235-9712
§ Teledyne Mecca, Box 36393, Houston, TX 77236	713-772-2811
United Foam Plastics, 172 E. Main St., Georgetown, MA 01833	617-352-2200
† Unit Inds., 1140 E. Valencia Dr., Fullerton, CA 92631	714-871-4161
Veeco Instrs. Inc., 370 San Aleso Ave., Sunnyvale, CA 94086	408-733-3700
Vernay Laboratories, Inc., S. College St., Yellow Springs, OH 45387	513-767-7261
V-Tron Elctrns. Corp., 10 Venus Way, P.O. Box 297-S, S. Attleboro, MA 02703	617-761-9100
Wells Elctrns., 1701 S. Main St., South Bend, IN 46613	219-287-5941
§ Wescorp Antistatic Prods., 144 S. Whisman Rd., Mountain View, CA 94041	415-969-7717
§† Whitso, 9326 Byron St., Schiller Pk., IL 60176	312-678-5200
Zero Corp., 777 Front St., Burbank, CA 91503	213-846-4191

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American Electronic Labs., Box 552, Lansdale, PA 19446	215-822-2929
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Gries/Dynacast, Div. Coats & Clark Inc., 162 Beechwood Ave., New Rochelle, NY 10801	914-633-8600
† Handy & Harman Elctrn. Matls. Corp., 72 Elm St. N., Atteboro, MA 02760	617-695-1401
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Hughes Aircraft Co., Microelctrn. Sys. Div., 2601 Campus Dr., Irvine, CA 92715	714-752-3800
† Lehighton Elctrns., Inc., Box 328, Dept M, Lehighton, PA 18235	717-386-4156; 215-377-5990
Milton Ross Co., 511 Second St. Pike, Southampton, PA 18966	215-355-0200
Mohawk Data Sciences, MDS Center, Herkimer, NY 13350	315-866-5300
Reeves-Hoffman Div., 400 W. North St., Carlisle, PA 17013	717-243-5929
Waldes Kohinoor, 47-16 Austel Pl., Long Island City, NY 11101-4478	718-392-3100
§ Zenrad Circuits Co., 529 E. Gutierrez St., Santa Barbara, CA 93103	805-963-3527

Services, Precious Metal Refining-4100

Eastern Smelting & Refining Corp., 37-39 Bubier St., Lynn, MA 01901	617-599-9000
† ERM, 27 Water St., Wakefield, MA 01880	617-246-3550
Handy & Harman, 850 Third Ave., New York, NY 10022	212-752-3400
† Technic, Inc., Box 965, Providence, RI 02901	401-781-6100

Services, Precious Metal Resmelting, Recovery, Recycling-4100

Eastern Smelting & Refining Corp., 37-39 Bubier St., Lynn, MA 01901	617-599-9000
† ERM, 27 Water St., Wakefield, MA 01880	617-246-3550
† Technic, Inc., Box 965, Providence, RI 02901	401-781-6100

Services, PC Design/Preparation/Production-4100

Assembly Specialists, 914 Main St., Box 965, Acton, MA 01720, 617-263-9100	**C•1700**
Lamtech Electronics, 620 Easy Street, Garland, TX 75042, 214-272-3504	**C•1845**
Triac Electronic Systems, Inc., 87-27 Myrtle Ave., Glendale, NY 11385, 718-441-4759	**D•1132**
A-Systems Inc., 1500 Avon St. Extd., Charlottesville, VA 22901	804-295-7200
Computer System Assocs., 7564 Trade St., San Diego, CA 92121	619-566-3911
Corlund Elctrns. Corp., 3543 Old Conejo Rd., Newbury Park, CA 91320	805-499-6947
General Numeric Corporation, 390 Kent Avenue, Elk Grove Village, IL 60007	312-640-1595
Digitus Corporation, 22 West 25th Street, Baltimore, MD 21218	301-467-3223
Innovatek Microsystems, Inc., Smithfield Rd., R1 Box 104, Millerton, NY 12546-9720	914-373-9003
† Interconics, BMC Industries, Inc., 245 E. 6th St., 3rd Flr., St. Paul, MN 55101	612-228-6512
Magnum Opus Custom Elctrn. Engrg., 284 Kennedy St., Iselin, NJ 08830	201-283-4925
National Telephone & Elctrns. Inc., 2350 N.W. 96 Avenue, Miami, FL 33172	305-592-0551
TEC, 2727 N. Fairview, Box 5646, Tuscon, AZ 85703	602-792-2230
Transducer Systems, Inc., 1510 Delp Dr., Kulpsville, PA 19443	215-256-4611
† Wire Graphics, Inc., 215 B. Central Ave., Farmingdale, NY 11735	516-293-1525

Services, PROM & Array Programming - Also see Services, Microprocessor Development-4100

Bally Electronics, Bally Mfg., 10750 W. Grand Ave., Franklin Park, IL 60131	312-451-7223
The Computer Place, D & D Financial Entprs. Inc., 4595 Van Epps Rd., Brooklyn Hts., OH 44131	216-351-7444
† Eastern Elctrns. Mfg. Corp., 180 Roberts St., East Hartford, CT 06108	203-528-9821
Information Technolgoy A.D.S.C., P.O. Box 470, College Park, MD 20740	301-779-5110
National Telephone & Elctrns. Inc., 2350 N.W. 96 Avenue, Miami, FL 33172	305-592-0551
Siltran Digital, 2250 Monterey Rd., Atascadero, CA 93422	805-466-3209

Services, Qualification Testing — See Services, Environmental Testing (Vol. D)

Services, Reliability-4100

Viking Labs/Honeywell, Operation of Test Instruments Div. of Honeywell, Inc., 440 Bernardo Ave., Mountain View, CA 94043, 415-969-5500	**B•1013**
† CDRL Data, Inc., 320 West Lone Cactus Drive Ste. 6, Phoenix, AZ 85027	602-582-8844
Design Automation, Inc., 809 Massachusetts Ave., Lexington, MA 02173-3992	617-862-8998
Instrumentation Meas. Lab., Div. of Lockheed Electronics Co., Inc., 1501 Rt. 22, Plainfield, NJ 07061	201-757-3730

Pace Inc., 9893 Brewers Ct., Laurel, MD 20707 ... 301-490-9860
Pulver Laboratories, Inc., 415 S. 8th. St., Boise, ID 83702 ... 208-342-1000
Siltran Digital, 2250 Monterey Rd., Atascadero, CA 93422 ... 805-466-3209

Services, Rental, Instruments & Equipment — See Test Equipment, Rental & Lease

Services, Repair, Maintenance — See Services, Calibration & Repair Instrument

Services, RFI Measuring — See Services, Electrical Measurement & Test (Vol. D)

Services, Silicon Foundry — See Silicon Foundry Services

Services, Silk Screening-4100

Assembly Specialists, 914 Main St., Box 965, Acton, MA 01720, 617-263-9100 ... C•1700
Bopla Enclosures, 1350 Beverly Rd., Ste. 115-338, McLean, VA 22101, 703-549-7242 ... C•1026
† International Sensor Systems, Inc., Aurora Industrial Pk., Box 345, Aurora, NE 68818, 402-694-6111 ... A•1677
Mac Panel Co., Box 5027, 216 Pine St., High Point, NC 27262, 919-884-8111 ... C•1713
Triac Electronic Systems, Inc., 87-27 Myrtle Ave., Glendale, NY 11385, 718-441-4759 ... D•1132
† Abrams Instr. Corp., P.O. Box 26007, Lansing, MI 48909 ... 517-332-6405
Accurate Elctrns., 169 S. Abbe Rd., P.O. Box 1287, Elyria, OH 44036 ... 216-365-1211
Allied Systems Corp., Box 18077, Greensboro, NC 27419 ... 919-299-2294
American Electronic Labs., Box 552, Lansdale, PA 19446 ... 215-822-2929
Apahouser-Elcom, Inc., 101 Walnut St., Watertown, MA 02172 ... 617-924-1500
Beechwood Mfg., 310 S. Ohmer, Indianapolis, IN 46219 ... 317-356-2493
Bell Co., Inc., 106 Morrow Ave., Box 92E, Trussville, AL 35173 ... 205-655-2135
Component General, Inc., 13620 Wright Cir., Tampa, FL 33625 ... 813-855-6655
† Devco Engrg., Control Sys. Div., 36 Pier Lane West, Fairfield, NJ 07006 ... 201-CA8-0321
EG & G Birtcher, 4505 N. Arden Dr., El Monte, CA 91731 ... 818-442-2572
E/M Lubricants, Inc., Div. of Great Lakes Chemical Corp., Highway 52 NW, W. Lafayette, IN 47906 ... 317-463-2511
GECO, 145 Penn St., Millheim, PA 16854 ... 814-349-5555
H-A-Z Laboratories, Brass Castle Rd., P.O. Box 67-M, Washington, NJ 07882 ... 201-689-0110
Hughes Aircraft Co, Aerospace Grps./Support Sys., P.O. Box 90515, Los Angeles, CA 90009 ... 213-670-1515
Hughes Aircraft Co., Microelctrn. Sys. Div., 2601 Campus Dr., Irvine, CA 92715 ... 714-752-3800
Hybrid Svcs. Inc., 38 Main St., North Reading, MA 01864 ... 617-664-5500
JMJ Technical Prods., 50 Wheeler Point Rd., Newark, NJ 07105 ... 201-589-4257
† Lehighton Elctrns., Inc., Box 328, Dept M, Lehighton, PA 18235 ... 717-386-4156; 215-377-5990
§† Mechanical Engraving, 4500 Bullard Ave, Bronx, NY 10470 ... 212-324-4455
§† Miller Dial Corp., 4400 N. Temple City Blvd., El Monte, CA 91734 ... 818-283-5111
† Milton Ross Co., 511 Second St. Pike, Southampton, PA 18966 ... 215-355-0200
Mini-Systems, Inc., 20 David Rd., North Attleboro, MA 02761 ... 617-695-0203
Mohawk Data Sciences, MDS Center, Herkimer, NY 13350 ... 315-866-5300
Pannier Corp., Graphics Div., John Fitch Industrial Park, Warminster, PA 18974 ... 215-672-3600
† Photo Chem. Prods. Cal., 18031 Susana Rd., Compton, CA 90224 ... 213-603-0400
Photronic Labs., Secor Rd., Brookfield Ctr., CT 06805 ... 203-775-0465
Precision Micro Images, Box 1330, Altamonte Springs, FL 32701 ... 305-830-7244
† PSG Inds., 1225 Tunnel Road, Perkasie, PA 18944 ... 215-257-3621
§† Rose Enclosures Sys., Inc., 12140 Parklawn Dr., Rockville, MD 20852 ... 301-984-1783
Thickfilm Int'l., Rt. 1-Box 85-0, Indian Head, MD 20640 ... 301-375-8666
† Virginia Panel, 1400 New Hope Rd., Waynesboro, VA 22980 ... 703-949-8376
§ Zenrad Circuits Co., 529 E. Gutierrez St., Santa Barbara, CA 93103 ... 805-963-3527
† Zero Corp., 777 Front St., Burbank, CA 91503 ... 213-846-4191

Services, Soldering-4100

Lamtech Electronics, 620 Easy Street, Garland, TX 75042, 214-272-3504 ... C•1845
Altek Co., P.O. Box 1128, Torrington, CT 06790 ... 203-482-7626
Automated Production Concepts, 8 E. Garden Pl., Pompton Plains, NJ 07444 ... 201-831-8300
§ Brim Elctrns., 120E Home Pl., Lodi, NJ 07644 ... 201-796-2886
Corlund Elctrns. Corp., 3543 Old Conejo Rd., Newbury Park, CA 91320 ... 805-499-6947
Electronic Component Assembly, Inc., 9500 Alto Drive, La Mesa, CA 92041 ... 619-464-0910
Instrumentation Meas. Lab., Div. of Lockheed Electronics Co., Inc., 1501 Rt. 22, Plainfield, NJ 07061 ... 201-757-3730
Lexicon Corp. of Miami, 1541 N. W. 65th Ave., Ft. Lauderdale, FL 33313 ... 305-792-4400
Muirhead, 1101 Briston Rd., Mountainside, NJ 07092 ... 201-233-6010
National Telephone & Elctrns. Inc., 2350 N.W. 96 Avenue, Miami, FL 33172 ... 305-592-0551
Technical Aids to Independence, Inc., 12 Hyde Road, Bloomfield, NJ 07003 ... 201-338-8826
† Time Zero Corp., 103 Cental Ave., Clifton, NJ 07011 ... 201-340-0400

Services, Technical Writing — See Services, Documentation

Services, Testing & Measuring — See Services, Electrical Measurement & Test (Vol.), Services, Environmental Testing

Services, Testing, Environmental — See Services, Environmental Testing

Services, Training/Education-4100

B & B Motor & Control Corp., Apple Hill Commons, Burlington, CT 06013 ... 203-673-7151
† CDRL Data, Inc., 320 West Lone Cactus Drive Ste. 6, Phoenix, AZ 85027 ... 602-582-8844
Comp-U-Staff, 1 Investment Pl., Towson, MD 21204 ... 301-828-0788
§ Computer System Assocs., 7564 Trade St., San Diego, CA 92121 ... 619-566-3911
General Numeric Corporation, 390 Kent Avenue, Elk Grove Village, IL 60007 ... 312-640-1595
Dash, Straus & Goodhue, Inc., 593 Massachusetts Ave., Boxboro, MA 01719 ... 617-263-2662
Data-Design Labs., P.O. Box 711, 7925 Center Ave., Cucamonga, CA 91730 ... 714-987-2511
Foundation Instruments Inc., 24 Colonnade Rd., Nepean, ON, CANADA K2E 7J6 ... 613-226-4000
Global Specialties, Interplex Electronics, Inc., 70 Fulton Terrace, P.O. Box 1942, New Haven, CT 06509 ... 203-624-3103
§ Industrial Computer Designs, Inc., 31264 La Baya Drive, Westlake Village, CA 91362 ... 818-889-3179
Instrumentation Meas. Lab., Div. of Lockheed Electronics Co., Inc., 1501 Rt. 22, Plainfield, NJ 07061 ... 201-757-3730
Integrated Circuit Engrg. Corp. (ICE), 15022 N. 75th St., Scottsdale, AZ 85260 ... 602-998-9780
§ Integrated Computer Systems, 6305 Arizona Pl., P.O. Box 45405, Los Angeles, CA 90045 ... 213-417-8888
† Microwave Filter Inc., 6743 Kinne St., East Syracuse, NY 13057-0486 ... 315-437-3953; 800-448-1666
Pace Inc., 9893 Brewers Ct., Laurel, MD 20707 ... 301-490-9860
Pro-Log, 2411 Garden Rd., Monterey, CA 93940 ... 408-372-4593
Pulver Laboratories, Inc., 415 S. 8th. St., Boise, ID 83702 ... 208-342-1000
Siltran Digital, 2250 Monterey Rd., Atascadero, CA 93422 ... 805-466-3209
Systems Resch. Labs., Inc., 2800 Indian Ripple Rd., Dayton, OH 45440 ... 513-426-6000

Services, Vibration Surveys-4100

Viking Labs/Honeywell, Operation of Test Instruments Div. of Honeywell, Inc., 440 Bernardo Ave., Mountain View, CA 94043, 415-969-5500 ... B•1013, D•1327
American Electronic Labs., Box 552, Lansdale, PA 19446 ... 215-822-2929
† Associated Testing Labs., Div. of Kidde, Inc., 53 Second Ave., Burlington, MA 01803 ... 617-272-9050
Bently Nevada Corp., P.O. Box 157, Minden, NV 89423 ... 702-782-3611
Hughes Aircraft Co, Aerospace Grps./Support Sys., P.O. Box 90515, Los Angeles, CA 90009 ... 213-670-1515
Hughes Aircraft Co., Microelctrn. Sys. Div., 2601 Campus Dr., Irvine, CA 92715 ... 714-752-3800
† Instruments and Controls Div., Technology Inc., P.O. Box 3036, Overlook Branch, Dayton, OH 45431 ... 513-426-2405
† Intergalactic Corp., Box 7025, Salt Lake City, UT 84107 ... 801-262-0094
Kinemetrics, Inc., 222 Vista Ave., Pasadena, CA 91107 ... 818-795-2220
N.Y. Testing Labs., Inc., 81 Urban Ave., Westbury, NY 11590 ... 516-334-7770
Reliance Electric Co., Marketing Info Center, P.O. Box 99502, Cleveland, OH 44199 ... 800-245-4501;800-245-4497 In Ohio
Rowe Industries, Inc., 6225 Benore Rd., P.O. Box 6877, Toledo, OH 43612 ... 419-729-9761
† Torwico Elctrns. Inc., 410 Oberlin Ave. South, Lakewood, NJ 08701 ... 201-364-1800

Services, Wire Cutting & Stripping - Also see Services, Crimping-4100

Assembly Specialists, 914 Main St., Box 965, Acton, MA 01720, 617-263-9100 ... C•1700
† GSI Corp., 1917 Greenspring Dr., Timonium, MD 21093, 301-252-1768 ... C•1840
Hybricon Corp., 410 Great Rd., Littleton, MA 01460, 617-486-0311 ... C•1710
† Accurassembly, 9525 Cozycroft Ave., Chatsworth, CA 91311 ... 818-700-0708
Acme Model Engrg. Co., 654 Bergen Blvd., Ridgefield, NJ 07657 ... 201-943-7650
Allied Systems Corp., Box 18077, Greensboro, NC 27419 ... 919-299-2294
Almor Co., Inc., PO Box 1790, 155 Crescent St., Brockton, MA 02403 ... 617-586-5406
Altek Co., P.O. Box 1128, Torrington, CT 06790 ... 203-482-7626
American Electric Cable Co., 181 Appleton St., Holyoke, MA 01040 ... 413-539-9893
† American Monarch, 2801-37th Ave., N.E., Minneapolis, MN 55421 ... 612-788-9161
Amphenol, An Allied Co., 43 Commerce Ct., Lisle, IL 60532 ... 312-983-3500
† Apsco, Inc., Sub. of The National Copper & Smelting Co., 5976 Heisley Road, Mentor, OH 44060 ... 216-942-3871
Arco Cable, 7361 Ethel Ave., North Hollywood, CA 91605 ... 818-982-2832
† Art Wire/Doduco, 9 Wing Dr., Cedar Knolls, NJ 07927 ... 201-428-4880
B & G Precision Elctrns., 538 Maple Ave., Doylestown, PA 18901 ... 215-348-4413
§† Brim Elctrns., 120E Home Pl., Lodi, NJ 07644 ... 201-796-2886
† Cardinal Control Co., 110 Kensington Rd., Kensington, CT 06037 ... 203-828-6379
Connector Corp., 6025 N. Keystone Ave., Chicago, IL 60646 ... 312-539-3108
Corlund Elctrns. Corp., 3543 Old Conejo Rd., Newbury Park, CA 91320 ... 805-499-6947
§† Daburn Elctrns. & Cable, 70 Oak St., Norwood, NJ 07648 ... 201-768-5400
† DataCon, Inc., 60 Blanchard Rd., Burlington, MA 01803 ... 617-273-5800
Datatex Corp., 10935 S. Wilcrest Dr., Houston, TX 77099 ... 713-495-3100
Davidson Elctrn. Dev. Co., 113 E. 13th St., Erie, PA 16512 ... 814-453-7547
Dearborn Wire & Cable Co., 9299 Evenhouse Ave., Rosemont, IL 60018 ... 312-696-1000
Easy Heat-Wirekraft, 555 North Michigan St., Lakeville, IN 46536 ... 219-784-3011

§† Electronic Coil Corp., Farmington Industrial Park, Farmington, CT 06032 ... 203-677-6731
Electronic Component Assembly, Inc., 9500 Alto Drive, La Mesa, CA 92041 ... 619-464-0910
Electronic Prods. Corp., Interstate Indl. Plaza, R. D. #5, York, PA 17402 ... 717-767-6517
† Electro-Prep, Ltd., Rt 28A, P.O. Box 437, Cataumet, MA 02534 ... 617-563-5559
† Electro Weave, 425 Shrewsbury St., Worcester, MA 01604 ... 617-752-8932
† Estes Engrg. Co., 930 Marine Dr., Port Angeles, WA 98362 ... 206-457-0904
Eubanks Engrg., 1307 So. Myrtle Ave., Monrovia, CA 91016 ... 818-357-7011
§† Excel Prods., 401 Joyce Kilmer Ave., New Brunswick, NJ 08903 ... 201-249-6600
§† Excel Specialty Corp., 6335 N. Broadway, Chicago, IL 60660 ... 312-262-4781
† Fema Elctrns. Corp., 12-6 Edgeboro Rd., E. Brunswick, NJ 08816 ... 201-238-1223
Field-Fab, 43 School St., N. Springfield, VT 05150 ... 802-886-8278
Framar Metal Products Co., Inc., 345 Carnegie Avenue, Kenilworth, NJ 07033 ... 201-241-0710
H-A-Z Laboratories, Brass Castle Rd., P.O. Box 67-M, Washington, NJ 07882 ... 201-689-0110
§ Hobson Bros., 4940 W. Lawrence Ave., Chicago, IL 60630-3884 ... 312-283-3600
Hughes Aircraft Co, Aerospace Grps./Support Sys., P.O. Box 90515, Los Angeles, CA 90009 ... 213-670-1515
Hughes Aircraft Co., Microelctrn. Sys. Div., 2601 Campus Dr., Irvine, CA 92715 ... 714-752-3800
† IEC Elctrns., 105 Norton St., Newark, NY 14513 ... 315-331-7742
Kantz Elctrn. Ind., 1804 Wall Church Rd., Wall Township, NJ 07719 ... 201-974-0090
Lamtech Electronics, 620 Easy Street, Garland, TX 75042 ... 214-272-3504
Leecraft Mfg., 21-02 44th Rd., Long Island City, NY 11101 ... 718-392-8800
† Line Elec. Prods., G. General Electro-Components, Inc., 122 Naubuc Ave., Glastonbury, CT 06033 ... 203-659-3573
† Manger Elec. Co., Inc., W. Henry St., Stamford, CT 06902 ... 203-348-7761
† Mann, Henry, Inc., 3983 Mann Road, Huntingdon Valley, PA 19006 ... 215-355-7200
Midway Mfr. Co., 10750 W. Grand Ave., Franklin Park, IL 60131 ... 312-451-1360
§ Photon Sources, Inc., 12163 Globe Rd., Livonia, MI 48150 ... 313-591-0101
Mohawk Data Sciences, MDS Center, Herkimer, NY 13350 ... 315-866-5300
Muirhead, 1101 Briston Rd., Mountainside, NJ 07092 ... 201-233-6010
MWS Wire Inds., 31200 Cedar Valley Dr., Westlake Village, CA 91362 ... 818-991-8553
† National Telephone & Elctrns. Inc., 2350 N.W. 96 Avenue, Miami, FL 33172 ... 305-592-0551
Penn Resch. Corp. (PRC), 2652 South Main St., P.O. Box 3357, Kennesaw, GA 30144 ... 404-429-9061
† Reactel, Inc., 687-D Lofstrand La., Rockville, MD 20850 ... 301-279-5535
§ Ripley, 46 Nooks Hill Rd., Cromwell, CT 06416 ... 203-635-2200
§ Spectra-Strip Operations, Ampheral Prods., 7100 Lampson Ave., Garden Grove, CA 92642-0415 ... 714-892-3361
Storm Products Co., 116 Shore Drive, Hinsdale, IL 60521 ... 312-323-9121
§ Support Systems Intl. Corp., 150 South Second St., Richmond, CA 94804 ... 415-234-9090
Technical Aids to Independence, Inc., 12 Hyde Road, Bloomfield, NJ 07003 ... 201-338-8826
Tegam, 7230 N. Ridge Rd., Madison, OH 44057 ... 216-428-7505
† Teledyne Aerospace Sys., 1007 E. 10th St., Fairmont, MN 56031 ... 507-235-3355; 507-235-9712
† Time Zero Corp., 103 Cental Ave., Clifton, NJ 07011 ... 201-340-0400
United Solder Wrap Inc., 2608 Electronic La., Ste 509, Dallas, TX 75220 ... 214-350-4978
† United Wire & Cable, 425 Shrewsbury St., Worcester, MA 01604 ... 617-757-3872
V.I.P. Inds., Inc., 246 Knickerbocker Ave., Paterson, NJ 07503 ... 201-345-5800
† Western Reserve Elctrns., 2150 Highland Rd., Twinsburg, OH 44087 ... 216-425-4951
§† Whitmor Wire & Cable, 13161 Sherman Way, Bldg. B, N. Hollywood, CA 91605 ... 818-764-6296

Services, Wirewrapping/Soldering/Welding/Brazing - Also See Services, Backplane Wiring-4100

† Assembly Specialists, 914 Main St., Box 965, Acton, MA 01720, 617-263-9100 ... C•1700
† DataCon, Inc., 60 Blanchard Rd., Burlington, MA 01803, 617-273-5800 ... C•1705
Datawrap, Inc., 13 Henshaw St., Woburn, MA 01801, 617-938-8911 ... D•1979
† Elctrn. Molding Corp., 96 Mill St., Woonsocket, RI 02895, 401-769-3800 ... C•1709
† Hybricon Corp., 410 Great Rd., Littleton, MA 01460, 617-486-0311 ... C•1710
† Mechanized Electronic Assembly Div., Universal Instrs. Corp., P.O. Box 825, Binghamton, NY 13902, 607-772-7522 ... D•1982
Altek Co., P.O. Box 1128, Torrington, CT 06790 ... 203-482-7626
† Amphenol, An Allied Co., 43 Commerce Ct., Lisle, IL 60532 ... 312-983-3500
† Apsco, Inc., Sub. of The National Copper & Smelting Co., 5976 Heisley Road, Mentor, OH 44060 ... 216-942-3871
Augat Inc., 33 Perry Ave., Box 779, Attleboro, MA 02703 ... 617-222-2202
B & G Precision Elctrns., 538 Maple Ave., Doylestown, PA 18901 ... 215-348-4413
BEC Inc., 2709 N. Broad St., Philadelphia, PA 19132 ... 215-229-9800
Datatex Corp., 10935 S. Wilcrest Dr., Houston, TX 77099 ... 713-495-3100
Dynatech Corp., 1225 E. Wakeham Ave., P.O. Box 1019, Dept. E, Santa Ana, CA 92702 ... 714-558-8755
Electronic Component Assembly, Inc., 9500 Alto Drive, La Mesa, CA 92041 ... 619-464-0910
Electronic Prods. Corp., Interstate Indl. Plaza, R. D. #5, York, PA 17402 ... 717-767-6517
§ Excel Prods., 401 Joyce Kilmer Ave., New Brunswick, NJ 08903 ... 201-249-6600
§† Garry Mfg. Co., Div. of Brand-Rex Co., 9 Queen Anne Ct., Laghorne, PA 19047 ... 215-949-2300
G B Instruments Inc., 2030 Coolidge St., Hollywood, FL 33020 ... 305-920-0225
H-A-Z Laboratories, Brass Castle Rd., P.O. Box 67-M, Washington, NJ 07882 ... 201-689-0110
Hughes Aircraft Co, Aerospace Grps./Support Sys., P.O. Box 90515, Los Angeles, CA 90009 ... 213-670-1515
Hughes Aircraft Co., Microelctrn. Sys. Div., 2601 Campus Dr., Irvine, CA 92715 ... 714-752-3800
Instrumentation Meas. Lab., Div. of Lockheed Electronics Co., Inc., 1501 Rt. 22, Plainfield, NJ 07061 ... 201-757-3730
† Interconnection Technology, Inc., 5542 Buckingham Drive, Huntington Beach, CA 92649 ... 714-891-5305
Kantz Elctrn. Ind., 1804 Wall Church Rd., Wall Township, NJ 07719 ... 201-974-0090
Lehighton Elctrns., Inc., Box 328, Dept M, Lehighton, PA 18235 ... 717-386-4156; 215-377-5990
Methode Elctrns., Inc., 7444 W. Wilson Ave., Chicago, IL 60656 ... 312-867-9600
Milton Ross Co., 511 Second St. Pike, Southampton, PA 18966 ... 215-355-0200
Mohawk Data Sciences, MDS Center, Herkimer, NY 13350 ... 315-866-5300
Muirhead, 1101 Briston Rd., Mountainside, NJ 07092 ... 201-233-6010
† National Telephone & Elctrns. Inc., 2350 N.W. 96 Avenue, Miami, FL 33172 ... 305-592-0551
† Reactel, Inc., 687-D Lofstrand La., Rockville, MD 20850 ... 301-279-5535
RMS Techn., 706 Industry Dr., Hampton, VA 23661 ... 804-838-2458
Standard Logic, 2215 S. Standard Ave., Santa Ana, CA 92707 ... 714-979-4770
† Stanford Applied Engrg. Inc., 3520 De La Cruz Blvd., Santa Clara, CA 95050 ... 400-988-0700
Teradyne, Inc., 183 Essex St., Boston, MA 02111 ... 617-482-2700
T-F Elctrns., 9415 Neils Thompson Dr., Austin, TX 78759 ... 512-836-7323
† Time Zero Corp., 103 Cental Ave., Clifton, NJ 07011 ... 201-340-0400
United Solder Wrap Inc., 2608 Electronic La., Ste 509, Dallas, TX 75220 ... 214-350-4978
Universal Instrs., P.O. Box 825, Binghamton, NY 13902 ... 607-775-1102
V.I.P. Inds., Inc., 246 Knickerbocker Ave., Paterson, NJ 07503 ... 201-345-5800
† Western Reserve Elctrns., 2150 Highland Rd., Twinsburg, OH 44087 ... 216-425-4951
† Wire Graphics, Inc., 215 B. Central Ave., Farmingdale, NY 11735 ... 516-293-1525

Servo Systems-4900

BEI Motion Sys. Co., General Control Systems Div., 564 Alpha Dr., Pittsburgh, PA 15238, 412-963-0515 ... B•1783
† Control Technology Co., 41-16 29th St., Long Island City, NY 11101, 718-361-2133 ... D•1986-1987
§ Electro-Craft, 1600 2nd St. S., Hopkins, MN 55343, 612-931-2700 ... B•1147,1149
† Industrial Control Co., 3100 Pineda Ave., Rockledge, FL 32955, 305-259-7105 ... D•1988
Kollmorgen Corp., Industrial Drives Div., 201 Rock Rd., Radford, VA 24141, 703-639-2495 ... B•1163-1165
Portescap U.S., 1547 Trooper Rd., P.O. Box 780, Worcester, PA 19490, 215-277-0433 ... B•1181
Vernitech, 300 Marcus Blvd., Deer Pk., NY 11729, 516-586-5100 ... D•1991
† Vernitron Corp., Control Comps. Div., 1601 Precision Park La., San Diego, CA 92073, 619-428-5581 ... B•1202
† ABA Electromechanical Sys. Inc., Box 500, Pinellas Pk., FL 34290-0500 ... 813-541-6681
† Aeroflex Labs., Magnetic Prods. Div.„ 35 South Service Road, Plainview, NY 11803 ... 516-694-6700
§ Aerotech, Inc., 101 Zeta Dr., Pittsburgh, PA 15238 ... 412-963-7470
Amtek Digital Systems, Inc., 12740 28th N.E., Seattle, WA 98125 ... 206-363-0217
Applied Control, 1275 Bloomfield Ave., Fairfield, NJ 07006-2828 ... 201-227-5454
B & B Motor & Control Corp., Apple Hill Commons, Burlington, CT 06013 ... 203-673-7151
BEI Motion Systems Co., Corporate Off., 166 Geary St., Ste. 1400, San Francisco, CA 94108 ... 415-788-6840
BEI Motion Sys. Co., Computer Prod. Div., 1755 B La Costa Meadows Dr., San Marcos, CA 92069 ... 619-471-2600
† BEI Motion Sys. Co., Digital Prods. Div., P.O. Box 3838, Little Rock, AR 72203 ... 501-851-4000
† Bendix Corp., Electrodynamics Div., 11600 Sherman Way, N. Hollywood, CA 91605 ... 818-765-1010
§† Berg, W. M., Inc., 499 Ocean Ave., East Rockaway, NY 11518 ... 516-599-5010
Berkeley Process Control, Inc., 5327-K Jacuzzi St., Richmond, CA 94804 ... 415-526-3333
Bertsch U.S., Sycamore Resch. Ctr., 2142F Industrial Ct., Vista, CA 92083 ... 619-727-7420
† Clifton Precision, Litton Systems, Inc., Marple at Broadway, Clifton Hgts., PA 19018 ... 215-622-1000
† Computer Conversions Corp., 6 Dunton Ct., E. Northport, NY 11731 ... 516-261-3300
Computer Optical Prods., Inc., Sub. of Hathaway Corp., 9353 Eton Ave., Chatsworth, CA 91311-5866 ... 818-882-0424
Contraves Goerz Corp., 610 Epsilon Dr., Pittsburgh, PA 15238 ... 412-967-7700
General Numeric Corporation, 390 Kent Avenue, Elk Grove Village, IL 60007 ... 312-640-1595
Data Technology, Inc., 4 Gill St., Woburn, MA 01811 ... 617-935-8820
Datron Systems, Inc., 200 West Los Angeles Ave., Simi Valley, CA 93065-1650 ... 805-584-1717
§ Digiac Corp., 175 Engineers Rd., Hauppauge, NY 11788 ... 516-273-8600
Distributed Computer Sys., 223 Crescent St., Waltham, MA 02154 ... 617-899-6619
Eldec Corp., Monitor & Control Div., 16700 13th Ave. W., P.O. Box 100, Lynnwood, WA 98046-0100 ... 206-743-1313
† Electro-Magnetic Processes, Inc., 9616 Owensmouth Ave., Chatsworth, CA 91311 ... 818-882-6333
† Electrospace Sys., Inc., P. O. Box 831359, Richardson, TX 75083-1359 ... 214-783-2004
Elm Systems, 1101 Brown St., Wauconda, IL 60084 ... 312-526-5003
† Evershed & Vignoles, Ltd., Acton Lane, Chiswick, London, ENGLAND W4 5HJ ... 01-994-3670
† GAP Instr., 40 Oser Ave., Hauppauge, NY 11787 ... 516-273-0909
† HH Controls Co., Inc., 16 Frost St., Arlington, MA 02174 ... 617-646-2626
§ Hobart Engrg., 4143 Cheshire Dr., Cypress, CA 90630 ... 714-827-2135
† HTL Electro Kinetics, 402 E. Gutierrez St., Santa Barbara, CA 93101 ... 805-963-2055
Hughes Aircraft Co, Aerospace Grps./Support Sys., P.O. Box 90515, Los Angeles, CA 90009 ... 213-670-1515
Hughes Aircraft Co., Microelctrn. Sys. Div., 2601 Campus Dr., Irvine, CA 92715 ... 714-752-3800
Industrial Elctrn. Engrs., Inc., 7740 Lemona Ave., Van Nuys, CA 91405 ... 818-787-0311

† Inland Motor, Kollmorgen Corp., 501 First St., Radford, VA 24141 703-639-9045
† Interface Engrg., 386 Lindelof Ave., Stoughton, MA 02072 617-344-7383
† Lear Siegler, Inc., 2850 Ocean Park Blvd., P.O. Box 2158, Santa Monica, CA 90406 213-452-5444
Ledex Inc., P.O. Box 427, Vandalia, OH 45377 513-898-3621
McFadden Sys., Inc., 8953 S. Atlantic Ave., South Gate, CA 90280-9990 213-564-5958
† Micro Mo Electronics, Inc., 742 2nd Ave. S., St. Petersburg, FL 33701 ... 813-822-2529
Modular Devices, 50 Orville Dr., Bohemia, NY 11716 516-567-9620
Muirhead, 1101 Briston Rd., Mountainside, NJ 07092 201-233-6010
North Atlantic Inds., Instrument Div., 60 Plant Ave., Hauppauge, NY 11788 516-582-6500
† Northern Precision Labs., 11 Madison Rd., Fairfield, NJ 07006 201-227-4800
† Parabam, Inc., 3017 E. Las Hermanas St., Rancho Dominguez, CA 90221 213-537-1771
† Perfect Gear & Instr., 2101 Jericho Tpk., New Hyde Park, NY 11040 516-328-3300
† Performance Controls Inc., 333-E Byberry Rd., Hatboro, PA 19040 215-675-6500
PMI Motors, Kollmorgen Corp., 5 Aerial Way, Syosset, NY 11791 516-938-8000
† Precision Mechanisms, 44 Brooklyn Ave., Westbury, NY 11590 .... 516-ED3-5955
§ Ragen Data Systems, Inc., 3 Oval Dr., Central Islip, NY 11722 516-234-3800
† Spectral Dynamics, Scientific-Atlanta, Inc., 4255 Ruffin Rd., San Diego, CA 92123-0575 619-268-7100
Servo-Tek Prods. Co., 1086 Goffle Rd., Hawthorne, NJ 07506 201-427-3100
Singer Co., Kearfott Div., 1150 McBride Ave., Little Falls, NJ 07424 201-785-6000
Sterling Instr., Div. Designatronics, Inc., 2101 Jericho Turnpike, New Hyde Pk., NY 11040 516-328-3300
† Stock Drive Prods., Div. of Designatronics, Inc., 2101 Jericho Turnpike, New Hyde Pk., NY 11040 .... 516-328-0200;328-3300
§† Superior Mfg. & Instr., 19-36 38th St., Long Island City, NY 11105 212-932-1800
† Transicoil, Inc., Trooper Rd., P.O. Box 99, Worcester, PA 19490-9990 215-277-1300
TS Products, Inc., 12455 Branford St., Bldg. 22, Arleta, CA 91331 818-896-6676
Unico, 3725 Nicholson Rd., Franksville, WI 53126-0505 414-886-5678
§† Westamp, 1542 15th St., Santa Monica, CA 90404 213-393-0401
Wide Range Elctrns. Corp., 2119 Schultz Rd., St. Louis, MO 63146 314-567-5366

Shaft Encoders, Shaft Position — See Encoders, Shaft Angle (Vol. B)

Shaft Locks — See Locks, Dial & Shaft (Vol. C)

Shafts & Adapters-Also See Couplings, Shaft, Rigid & Flexible-3500 — *See Vol. B*

Shake Tables — See Testers, Vibration (Vol. D)

Shells, Encapsulation — See Cups, Encapsulation (Vol. C)

Shielding, EMI/RFI-4525 — *See Vol. C*

Shielding Beads, Ferrite-4525 — *See Vol. C*

Shields, Cable — See Braid, Cable (Vol. C)

Shields, Cathode-Ray Tube-4525 — *See Vol. C*

Shields, Coil-4525 — *See Vol. C*

Shields, Corona-4525 — *See Vol. C*

Shields, Electrostatic — See Shields, Tube (Vol. C)

Shields, Indicator Light-4525 — *See Vol. C*

Shields, Magnetic-4525 — *See Vol. C*

Shields, Photomultiplier-4525 — *See Vol. C*

Shields, RF-Also See Gaskets, Shielding, RF-4525 — *See Vol. C*

Shields, Transformer-4525 — *See Vol. C*

Shields, Tube-4525 — *See Vol. C*

Shields, Wire — See Braid, Cable (Vol. C)

Shift Registers-2325

Centent Co., 3879 S. Main St., Santa Ana, CA 92707 714-979-6491
Meissner Inds., 551 Rte. 10, Dover, NJ 07801 201-366-1700
RCA Solid State Div., Route 202, Somerville, NJ 08876 201-685-6000
§† RCA Solid State Div., CMOS IC Mktg., Rte. 202, Somerville, NJ 08876 ... 201-685-6000
Sensor Corp., Box 140, Scottdale, PA 15683 412-887-4080
Tri-Tronics Co. Inc., 13420 Wright Cir., Tampa, FL 33624 813-855-4453
§† TRW LSI Products, PO Box 2472, La Jolla, CA 92038 619-457-1000

Shifters, Frequency — See Converters, Frequency to Frequency (Vol. D)

Shifters, Phase, Microwave-3450 — *See Vol. A*

Shifters, Phase, RF-3450 — *See Vol. A*

Shifters, Phase 60/400 Hz-4050

Industrial Test Equip., 21 Yennicock Ave., Port Washington, NY 11050, 516-883-1700 .... D•1247
KGS Electronics, Inc., GAR Entprs., 2029 N. Lincoln Ave., Pasadena, CA 91103, 818-798-0786 .... D•1943

† Ryan Intl. Corp., 4800 Evanswood Dr., Columbus, OH 43229, 614-885-3303 .... D•1303
Triac Electronic Systems, Inc., 87-27 Myrtle Ave., Glendale, NY 11385, 718-441-4759 .... D•1132
Abacus Controls Inc., 89 Readington Rd., Somerville, NJ 08876 201-526-6010
† California Instruments, A Div. of Amstar Tech. Prods. Co., Inc., 5150-Convoy St., San Diego, CA 92111 .... 619-279-8620;800-356-2244;800-821-1634
Continental Resources, Inc., 175 Middlesex Tpke., Bedford, MA 01730 .. 617-275-0850
Crompton Instrs., 2763 Higgins Road, Elk Grove Village, IL 60007 714-841-2901
Crompton Instrs., Hawker Siddley, 2763 Old Higgins Rd., Elk Grove Village, IL 60007 312-593-1107
Hughes Aircraft Co, Aerospace Grps./Support Sys., P.O. Box 90515, Los Angeles, CA 90009 213-670-1515
Hughes Aircraft Co., Microelctrn. Sys. Div., 2601 Campus Dr., Irvine, CA 92715 714-752-3800
Multi-Amp Corp., TBG, 4271 Bronze Way, Dallas, TX 75237 214-333-3201
Universal Ad-Yu Elctrns., Inc., 2517 E. Norwich St., Milwaukee, WI 53207 414-482-4100

Shrinkable Plastics & Elastomers — See Caps, Forms & Tapes, Heat Shrinkable (Vol. C), Tubing, Heat Shrinkable (Vol. C)

Shunts, Connector-2100 — *See Vol. C*

Shunts, Meter-2900

§† Bell, F. W., Inc., 6120 Hanging Moss Rd., Orlando, FL 32807, 305-678-6900 .... D•1113
Caddock Electronics, Inc., 1717 Chicago Ave., Riverside, CA 92507, 714-788-1700 .... A•1805,1822-1823,1825
† Elect. Prec. Comp. Corp., 11 W. Sandford Blvd., Mt. Vernon, NY 10550, 914-664-2333 .... D•1217
† Empro Mfg. Co., Inc., P.O. Box 26060, Indianapolis, IN 46226, 317-823-4478 .... D•1224
† Janco Corp., Box 3038-Glenoaks Sta., Burbank, CA 91504, 818-846-1800 .... B•1608
Julie Resch. Labs., 211 West 61st St., New York, NY 10023, 212-245-2727 .... D•1255
Sensitive Research Instrs., 25 Dock St., Mt. Vernon, NY 10550, 914-699-9717 .... D•1304
Ultronix, Inc., P.O. Box 1090, Grand Junction, CO 81502, 303-242-0810 .... A•1963
§ API Instrs., 1601 Trapelo Rd., Waltham, MA 02254 617-890-2000
§ Bartlett Instrument Co., 14th & Ave. "M", P.O. Box 445, Ft. Madison, IA 52627 319-372-8366
† Crompton Instrs., 2763 Higgins Road, Elk Grove Village, IL 60007 714-841-2901
Crompton Instrs., Hawker Siddley, 2763 Old Higgins Rd., Elk Grove Village, IL 60007 312-593-1107
Electrical Instr. Svc., 25 Dock St., Mt. Vernon, NY 10550 914-699-9717
§ Fluke, John, Mfg. Co., Box C9090, MS 250C, Everett, WA 98206 206-356-5400
§ Larson Instr., Greenbush Rd., Orangeburg, NY 10962 914-359-3800
Meissner Inds., 551 Rte. 10, Dover, NJ 07801 201-366-1700
Mills Resistor Co., 3840 Catalina St., Los Alamitos, CA 90720 213-598-2454
§ NES, Inc. (Nationwide Electronic Systems), 3003 Wakefield, Carpentersville, IL 60110 312-426-5900
† Precision Resistor Co., Inc., 10601 75 St. N., Largo, FL 33543 813-541-5771
† Shokai Far East, Ltd., 280 North Central Ave., Hartsdale, NY 10530 914-681-0700
§ Simpson Elec. Co., 853 Dundee Ave., Elgin, IL 60120 312-697-2260
§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 215-673-5600
Tepro of Florida, 2608 Enterprise Rd., Clearwater, FL 33575 813-796-1044
§ Triplett Corp.-A Penril Co., One Triplett Dr., Bluffton, OH 45817-9987 419-358-5015
Vishay Resistive Sys. Grp., 63 Lincoln Hwy., Malvern, PA 19355 215-644-1300

Shutters, Microwave-3450 — *See Vol. A*

SIDACs-4800 — *See Vol. A*

Signal Averagers-2900

Active Control Instrmn., P.O. Box 243-Wildwood Circle, Key Largo, FL 33037 305-451-1000
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
LeCroy Resch. Sys. Corp., 700 S. Main St., Spring Vly., NY 10977 914-425-2000
† Norland Corp., Norland Dr., Ft. Atkinson, WI 53538 414-563-8456
Rochester Instr. Sys., 255 N. Union St., Rochester, NY 14605 716-263-7700
Spectral Dynamics Div., Scientific-Atlanta, Box 671, San Diego, CA 92112 619-268-7100
† Tektronix, Inc., P. O. Box 500, Y3-314, Beaverton, OR 97077 ..... 800-547-1512;Oregon only 800-452-1877
Unholtz-Dickie Corp., 6 Brookside Dr., Wallingford, CT 06492 203-265-3929

Signal Conditioners & Equipment-1100

Calex Mfg. Co., Inc., 3355 Vincent Rd., Pleasant Hill, CA 94523, 415-932-3911 .... D•1006
Data Instruments, Inc., 4 Hartwell Pl., Lexington, MA 02173, 617-861-7450 .... B•1790
Ectron Corp., 8159 Engineer Rd., San Diego, CA 92111, 619-278-0600 ... D•1007
Harrel, Inc., 16 Fitch St., E. Norwalk, CT 06855, 203-866-2573 .... D•1122
Intech, Microcircuits Div., 2270 Martin Ave., Santa Clara, CA 95050, 408-988-4930 .... A•1672
§ Newport Electronics, 630 E. Young St., Santa Ana, CA 92705, 714-540-4914 .... D•1370
Ohio Semitronics, Inc., 1205 Chesapeake Ave., Columbus, OH 43212, 614-486-9561 .... B•1812,1817-1818
Omega Engrg., Box 4047, Stamford, CT 06907, 203-359-1660 .... D•1013,1070,1128,1290,1374-1375

Pacific Instrs. Inc., 215 Mason Circle, Concord, CA 94518, 415-827-9010 ...... D•1015
PPM, Inc., 4521 Emery Ind. Pkwy., Cleveland, OH 44128, 216-292-6006 .. D•1291
Precision Filters, 240 Cherry St., Ithaca, NY 14850, 607-277-3550 ...... A•1627, D•1017
Transducers and Systems Inc., A Prime Technology Company, Twin Lakes Rd., P.O. Box 185, N. Branford, CT 06471, 203-481-5721 ...... B•1828
Validyne Engrg. Corp., 8626 Wilbur Ave., Northridge, CA 91324, 818-886-2057 ...... D•1164
† Acromag, 30765 Wixom Rd., Wixom, MI 48096 313-624-1541
Amtek Digital Systems, Inc., 12740 28th N.E., Seattle, WA 98125 206-363-0217
† Analog Devices, P.O. Box 280, Norwood, MA 02062 617-329-4700
§ Analogic Corp., 8 Centennial Dr., Peabody, MA 01961 ...... 617-532-5660;617-777-4500; 617-246-0300;800-451-1
A. P. Circuit Corp., 513 East 86th St., P.O. Box 1350, New York, NY 10028 212-737-1348
§ API Instrs., 1601 Trapelo Rd., Waltham, MA 02254 617-890-2000
Applied Control, 1275 Bloomfield Ave., Fairfield, NJ 07006-2828 201-227-5454
ARGA Controls, 35 E. Glenarm St., Pasadena, CA 91105 213-682-3314
Astrosystems, 6 Nevada Dr., Lake Success, NY 11042 516-328-1600
§† Audiosone, Inc., 617 Fan Hill Rd., Monroe, CT 06468 ...... 203-268-4372;203-268-6703
Aydin Corp., 700 Dresher Rd., Horsham, PA 19044 215-657-7510
† Aydin Vector Div., Box 328, Newtown, PA 18940 215-968-4271
† Base Ten Sys., One Electronics Dr., Box 3151, Trenton, NJ 08619 609-586-7010
BLH Elctrns., 75 Shawmut Road, Canton, MA 02021 617-821-2000
Bristol Babcock Inc., 40 Bristol St., Waterbury, CT 06708 203-575-3000
Bruel & Kjaer Instrs. Inc., 185 Forest St., Marlboro, MA 01752 617-481-7000
† CML MACARR Div., Marine Electric RPD, Inc., 666 Pacific St., Brooklyn, NY 11217 718-857-2400
† Columbia Resch. Labs., Macdade Blvd. & Bullens La., Woodlyn, PA 19094 215-532-9464
† Computer Conversions Corp., 6 Dunton Ct., E. Northport, NY 11731 516-261-3300
Convex Corp., P.O. Box 17225, Dulles Intl. Airport, Washington, DC 20041 703-661-8900
§† Data-Control Sys., Commerce Dr., Box 860, Danbury, CT 06810 203-743-9241
§ Data Translation, 100 Locke Dr., Marlboro, MA 01752 617-481-3700
Datel, General Electric Co., 11 Cabot Blvd., Mansfield, MA 02048 617-339-9341
Daytronic Corp., 2589 Corporate Pl., Miamisburg, OH 45342 513-866-3300
Dunegan Corporation, P.O. Box 3238, Mission Viejo, CA 92690 714-831-9131
§ Dynamics, Div. of Waugh Controls Corp., 9001 Fullbright Ave., Chatsworth, CA 91311 818-998-8281
EMR Data Systems, Div. Sangamo- Weston, Box 3041, Sarasota, FL 33578 813-371-0811
§ Endevco, 30700 Rancho Viejo Rd., San Juan Capistrano, CA 92675 714-493-8181
ERA Transpac Div., Sub. Elctrn. Research Assocs., 50 Graphic Place, Moonachie, NJ 07074 201-641-3650
Gould Inc., Recording Systems Div., 3631 Perkins Ave., Cleveland, OH 44114 216-361-3315
Gulton Inds., Inc., Graphic Instruments Div., Gulton Ind'l. Pk., E. Greenwich, RI 02818 401-884-6800
† Hades Mfg. Corp., 151-A Verdi St., Farmingdale, NY 11735 516-249-4244
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
§ Hobart Engrg., 4143 Cheshire Dr., Cypress, CA 90630 714-827-2135
Honeywell, Test Instrs. Div., P.O. Box 5227, Denver, CO 80217 303-773-4700
Hughes Aircraft Co, Aerospace Grps./Support Sys., P.O. Box 90515, Los Angeles, CA 90009 213-670-1515
Hughes Aircraft Co., Microelctrn. Sys. Div., 2601 Campus Dr., Irvine, CA 92715 714-752-3800
ILC Data Device Corp., 105 Wilbur Pl., Bohemia, NY 11716 516-567-5600
Inconix Corp., 10 Tech Circle, Natick, MA 01760 617-655-1170
† Interface Engrg., 386 Lindelof Ave., Stoughton, MA 02072 617-344-7383
ITHACO, Inc., Meas. & Control Instrs. Div., 735 W. Clinton St., P.O. Box 6437, Ithaca, NY 14851-6437 607-272-7640
Kaye Instruments, 15 De Angelo Dr., Bedford, MA 01730 617-275-0300
Kinemetrics, Inc., 222 Vista Ave., Pasadena, CA 91107 818-795-2220
Kinetic Sys., 11 Maryknoll Dr., Lockport, IL 60441 815-838-0005
† Kode, 1515 S. Manchester Ave., Anaheim, CA 92802 714-758-0400
Lear Siegler, Inc., 2850 Ocean Park Blvd., P.O. Box 2158, Santa Monica, CA 90406 213-452-5444
§ MARCONI INSTRUMENTS, 3 Pearl Court, Allendale, NJ 07401 201-934-9050
Marel Instr. Co., 907 South East 13th Pl., Cape Coral, FL 33904 813-574-8788
Mathematical Systems Design, Inc., 2850 Ocean Park Blvd., Ste. 300, Santa Monica, CA 90405 213-450-9851
Measurements Group, Inc., Box 27777, Raleigh, NC 27611 919-365-3800
† Mel Tec, Div. Epsco, Inc., 411 Providence Hwy., Westwood, MA 02090 617-329-1508
MTS Sys., Box 24012, Minneapolis, MN 55424 612-937-4000
§ NES, Inc. (Nationwide Electronic Systems), 3003 Wakefield, Carpentersville, IL 60110 312-426-5900
North Hills Elctrns., 1 Alexander Pl., Glen Cove, NY 11542 516-671-5700
† PCB Piezotronics, 3425 Walden Ave., Depew, NY 14043-2495 716-684-0001
§ Preston Scientific, 805 E. Cerritos Ave., Anaheim, CA 92805 714-776-6400
Racal-Dana Instrs. Inc., 4 Goodyear St., Irvine, CA 92715 714-859-8999
Research, Inc., Box 24064, Minneapolis, MN 55424 612-941-3300
Rochester Instr. Sys., 255 N. Union St., Rochester, NY 14605 716-263-7700
Schaevitz Engrg., U.S. 130, Union Ave., Pennsauken, NJ 08110 609-662-8000
§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 215-673-5600
† Tektronix, Inc., P. O. Box 500, Y3-314, Beaverton, OR 97077 ...... 800-547-1512;Oregon only 800-452-1877
Telcom Inc., 8027 Leesburg Pike, Vienna, VA 22180 703-893-7700
Trans-Tek, P.O. Box 338, Rte. 83, Ellington, CT 06029 203-872-8351
Tri-Com, Inc., 7304 Grove Rd., Frederick, MD 21701 301-694-6666
Tri-Tronics Co. Inc., 13420 Wright Cir., Tampa, FL 33624 813-855-4453
Unholtz-Dickie Corp., 6 Brookside Dr., Wallingford, CT 06492 203-265-3929
† Vibration Instrs. Co., 1614 Orangethorpe Way, Anaheim, CA 92801 714-879-6085
† Wavetek Rockland Scientific, Inc., 10 Volvo Dr., Rockleigh Indl. Pk., Rockleigh, NJ 07647 201-767-7900
Wilcoxon Resch., P.O. Box 5798, Bethesda, MD 20814 301-770-3790

Signal Generators — See Generators, Specific Type (Vol. D)

Signal Systems, Fiber Optic-2325

BLACK BOX Corp., Micom Sys., P.O. Box 12800, Pittsburgh, PA 15241 412-746-5500
Foundation Instruments Inc., 24 Colonnade Rd., Nepean, ON, CANADA K2E 7J6 613-226-4000
Kinetic Sys., 11 Maryknoll Dr., Lockport, IL 60441 815-838-0005
Rehlander Assocs., 118A Bridge St., Beverly, MA 01915 617-922-5961

Signal Tracers — See Testers, Signal Tracing (Vol. D)

Silica, Fused-2500 — *See Vol. C*

Silk Screening Services — See Services, Silk Screening (Vol. D)

Simulation Systems, Electromagnetic Pulse-1100

Brady Co., 574A Somerset St., N. Plainfield, NJ 07060 201-753-7988
Velonex, 560 Robert Ave., Santa Clara, CA 95050 408-727-7370

Simulators, Data-2900

Atlantic Research, 5390 Cherokee Ave., Alexandria, VA 22312 703-642-4000
† Austin Electronics, The Austin Co., 17-01 Pollitt Drive, Fair Lawn, NJ 07410 201-794-0200
† Computer Conversions Corp., 6 Dunton Ct., E. Northport, NY 11731 516-261-3300
Comstron Corp., 200 E. Sunrise Hwy., Freeport, NY 11520 516-546-9700
§† Digitech Industries, Inc., 66 Grove St., Ridgefield, CT 06877 203-438-3731
§ Electrodata, Inc., 23020 Miles Rd., Bedford Heights, OH 44128 216-663-3333
† HEI Corporation, 290 S. Main Place, Carol Stream, IL 60188 312-665-5500
Magnum Opus Custom Elctrn. Engrg., 284 Kennedy St., Iselin, NJ 08830 201-283-4925
§ Metatek Inc., 410 93rd Ave. NW, P.O. Box 33129, Minneapolis, MN 55433 612-786-8253
New Wave Instruments, 3760 Masters Court, San Jose, CA 95111 408-629-3105
Southern Computer Corp., 3720 N. Stratford Rd. N.E., Atlanta, GA 30342 404-231-5363
† Systems Resch. Labs., Inc., 2800 Indian Ripple Rd., Dayton, OH 45440 513-426-6000
† Telecommunications Techniques Corp., 444 N. Frederick Ave., Gaithersburg, MD 20877 301-258-5011

Simulators, Motion-2550 — *See Vol. C*

Simulators, Optics-3700 — *See Vol. B*

Simulators, Power Failure-2900

Bermar Corp., P.O. Box 12844, Research Triangle Park, NC 27709 919-489-4316
§ Powertrend, Inc., 3139-G Los Feliz Dr., Thousand Oaks, CA 91362 805-496-2945
Schaffner EMC, Inc., Instr. Div., 825 Lehigh Avenue, Union, NJ 07083 201-851-0644

Simulators, Powerline Disturbance-2900

Bermar Corp., P.O. Box 12844, Research Triangle Park, NC 27709 919-489-4316
§ Powertrend, Inc., 3139-G Los Feliz Dr., Thousand Oaks, CA 91362 805-496-2945
Schaffner EMC, Inc., Instr. Div., 825 Lehigh Avenue, Union, NJ 07083 201-851-0644
Velonex, 560 Robert Ave., Santa Clara, CA 95050 408-727-7370

Simulators, Radar-3475

† Interface Engrg., 386 Lindelof Ave., Stoughton, MA 02072, 617-344-7383 ...... D•1157
American Electronic Labs., Box 552, Lansdale, PA 19446 215-822-2929
Austin Electronics, The Austin Co., 17-01 Pollitt Drive, Fair Lawn, NJ 07410 201-794-0200
Berkeley Nucleonics Corp., 1198 Tenth St., Berkeley, CA 94710 415-527-1121
California Microwave, 990 Almanor Ave., Sunnyvale, CA 94086 408-732-4000
† Cincinnati Elctrns., 2630 Glendale Milford Rd., Cincinnati, OH 45241 513-733-6100
Contraves Goerz Corp., 610 Epsilon Dr., Pittsburgh, PA 15238 412-967-7700
† Electro-Magnetic Processes, Inc., 9616 Owensmouth Ave., Chatsworth, CA 91311 818-882-6333
† E M S Development Corp., 200 Allen Blvd., Farmingdale, NY 11735 516-694-2886
† EPSCO Microwave, 411 Providence Hwy., Westwood, MA 02090 617-329-1500
Evershed & Vignoles, Ltd., Acton Lane, Chiswick, London, ENGLAND W4 5HJ 01-994-3670
† Flight Systems, Inc., Tracor, Inc., 1091 Dove St., Newport Beach, CA 92660 714-833-9661
† GAP Instr., 40 Oser Ave., Hauppauge, NY 11787 516-273-0909
† Litton Applied Technology, 645 Almanor Ave., P.O. Box 3478, Sunnyvale, CA 94088-3478 408-773-0777
† Metric Sys., 645 Anchors St., Ft. Walton Beach, FL 32548 904-244-9600
† Microwave/Sys., 1 Adler Dr., E. Syracuse, NY 13057 315-437-9951
† Republic Electronics Co., 575 Broad Hollow Rd., Melville, NY 11747 516-249-1414
† Signatron, A Unit of Sundstrand Corp., 12 Hartwell Ave., Lexington, MA 02173 617-861-1500
† G.T.E. Gov't Sys. Corp., Comm. Sys. Div., 77 A St., Needham Hgts., MA 02194 617-449-2000
§† Systron-Donner Microwave Div., 14844 Oxnard St., Van Nuys, CA 91409 818-786-1760
† Tasker Systems, 20131 Sunburst St., Chatsworth, CA 91311 213-341-3010
† Vega Precision Labs., 800 Follin La., Vienna, VA 22180 703-938-6300
† Whittaker Corp., 10880 Wilshire Blvd., Los Angeles, CA 90024 213-475-9411
† Zeta Labs., 3265 Scott Blvd., Santa Clara, CA 95054 408-727-6001

Simulators, Resolvers-2900

§ Computer Conversions Corp., 6 Dunton Ct., E. Northport, NY 11731 516-261-3300

Simulators, Solar-2900

ILC Data Device Corp., 105 Wilbur Pl., Bohemia, NY 11716 516-567-5600

Xenon Corp., 66 Industrial Way, Wilmington, MA 01887 617-658-8940

Simulators, Thermocouple-2900

Ectron Corp., 8159 Engineer Rd., San Diego, CA 92111 619-278-0600

Simulators (MIL), EW-3475

American Elctrn. Labs., Inc., Govt. Grp. Div., P.O. Box 552, Lansdale, PA 19446
† Cincinnati Elctrns., 2630 Glendale Milford Rd., Cincinnati, OH 45241 513-733-6100
† Control Technology Co., 41-16 29th St., Long Island City, NY 11101 718-361-2133
† E M S Development Corp., 200 Allen Blvd., Farmingdale, NY 11735 516-694-2886
† Litton Applied Technology, 645 Almanor Ave., P.O. Box 3478, Sunnyvale, CA 94088-3478 408-773-0777
† Locus, Box 740, State College, PA 16804 814-466-6275
† Microwave/Sys., 1 Adler Dr., E. Syracuse, NY 13057 315-437-9951
Republic Electronics Co., 575 Broad Hollow Rd., Melville, NY 11747 516-249-1414
† Signatron, A Unit of Sundstrand Corp., 12 Hartwell Ave., Lexington, MA 02173 617-861-1500
† Systems Resch. Labs., Inc., 2800 Indian Ripple Rd., Dayton, OH 45440 513-426-6000
Telcom Inc., 8027 Leesburg Pike, Vienna, VA 22180 703-893-7700

Simulators (MIL), EW Quick Reaction Capability-3475

American Elctrn. Labs., Inc., Govt. Grp. Div., P.O. Box 552, Lansdale, PA 19446
† Control Technology Co., 41-16 29th St., Long Island City, NY 11101 718-361-2133
† Flight Systems, Inc., Tracor, Inc., 1091 Dove St., Newport Beach, CA 92660 714-833-9661
† HEI Corporation, 290 S. Main Place, Carol Stream, IL 60188 312-665-5500
† Litton Applied Technology, 645 Almanor Ave., P.O. Box 3478, Sunnyvale, CA 94088-3478 408-773-0777
† Microwave/Sys., 1 Adler Dr., E. Syracuse, NY 13057 315-437-9951
† Signatron, A Unit of Sundstrand Corp., 12 Hartwell Ave., Lexington, MA 02173 617-861-1500

Simulators (MIL), RHAW-3475

† Control Technology Co., 41-16 29th St., Long Island City, NY 11101 718-361-2133
† Litton Applied Technology, 645 Almanor Ave., P.O. Box 3478, Sunnyvale, CA 94088-3478 408-773-0777
† Locus, Box 740, State College, PA 16804 814-466-6275
Telcom Inc., 8027 Leesburg Pike, Vienna, VA 22180 703-893-7700

Simulators (MIL), Weapon-3475

† Electro-Optical Inds., Box 3770, Santa Barbara, CA 93130 805-964-6701
† E M S Development Corp., 200 Allen Blvd., Farmingdale, NY 11735 516-694-2886
Fast Feedback Technologies, 1505 Aviation Blvd., Redoudo Beach, CA 90278 213-379-6100

Sinks, Heat — See Heat Sinks, Semiconductor (Vol. C), Heat Sinks, Soldering (Vol. C)

Sleeves — See Tubing (Vol. C)

Slides, Cabinet & Chassis-1400 — *See Vol. C*

Slip Clutch — See Knobs, Slip Clutch (Vol. C)

Slip Rings & Assemblies-3500 — *See Vol. B*

Slotted Lines, Microwave-3450 — *See Vol. A*

Socket Adapters-2100 — *See Vol. C*

Sockets, Array-2100 — *See Vol. C*

Sockets, Capacitor-2100 — *See Vol. C*

Sockets, CRT — See Sockets, Tube (Vol. C)

Sockets, Crystal-2100 — *See Vol. C*

Sockets, Diode-2100 — *See Vol. C*

Sockets, DIP and DIL-2100 — *See Vol. C*

Sockets, Integrated Circuit-2100 — *See Vol. C*

Sockets, International-2100 — *See Vol. C*

Sockets, Lamp & Lamp Assemblies-2450 — *See Vol. B*

Sockets, Leadless Carrier-2100 — *See Vol. C*

Sockets, LIF & ZIF-2100 — *See Vol. C*

Sockets, Miniature & Subminiature — See Sockets, Diode (Vol. C)

Sockets, Pin Grid Array-2100 — *See Vol. C*

Sockets, Power (Receptacles)-2100 — *See Vol. C*

Sockets, Relay-2100 — *See Vol. C*

Sockets, SIP-2100 — *See Vol. C*

Sockets, Test-2100 — *See Vol. C*

Sockets, Transistor-2100 — *See Vol. C*

Sockets, Tube-2100 — *See Vol. C*

Sockets (MIL)-2440 — *See Vol. B*

Software, Applications-2050

ADAC Corp., 70 Tower Office Pk., Woburn, MA 01801, 617-935-6668 .... D•1135
Mizar, Inc., 302 Chester St., St. Paul, MN 55107, 612-224-8941 .... D•1106
Wintek Corp., 1801 South St., Lafayette, IN 47904-2993, 317-742-8428 .... D•1105,1107
Action Instrs., 8601 Aero Dr., San Diego, CA 92123 619-279-5726
Adelie Corporation, 288 Walnut Street, Newtonville, MA 02160 617-965-8480
Amtek Digital Systems, Inc., 12740 28th N.E., Seattle, WA 98125 206-363-0217
§ Anderson-Bell Co., P.O. Box 191, Canon City, CO 81212 303-275-1661
† Antona Corp., 2100 S. Sawtelle Blvd., Suite 205, Los Angeles, CA 90025 213-473-8995
Applied Micro Technlg., A Burr Brown Co., 3669 E. 44th Street, Tucson, AZ 85713 602-622-8605
§ Autodesk, 2658 Bridgeway, Sausalito, CA 94965 415-331-0356
§ Boston Systems Office, 469 Moody St., Waltham, MA 02254-9164 617-894-7800
Bridge Computer Co., Sea Data Corp., 1 Bridge St., Newton, MA 02158 617-244-8190
Burroughs Corp., Borroughs Place, Rm. 4C-51, Detroit, MI 48232 313-972-7000
Cambridge Digital Sys., Compumart, P.O. Box 568, 65 Bent St., Cambridge, MA 02139 617-491-2700
CMV Software Specialists Inc., 2720 W. 12th Street, Sioux Falls, SD 57104 605-338-6645
Compact Software, Inc., Comsat Corp., 1131 San Antonia Rd., Palo Alto, CA 94303 415-966-8440
Computer Corp. of America, 675 Massachusetts Ave., Cambridge, MA 02139 617-492-8860
The Computer Place, D & D Financial Entprs. Inc., 4595 Van Epps Rd., Brooklyn Hts., OH 44131 216-351-7444
§ Comtek, Inc., 309 Breesport, San Antonio, TX 78216 512-340-8253
§ Consumertronics, 2011 Crescent Dr., Alamogordo, NM 88310 505-434-0234
Control-O-mation, Inc, 7300 W. Huron River Dr., Dexter, MI 48130 313-426-3935
§ Cromemco, 280 Bernardo Ave., Mountain View, CA 94043 415-964-7400
Cybernetic Micro Sys., P.O. Box 3000, 3000 Hwy. 84, San Gregorio, CA 94074 415-726-3000
Dasoft Design Systems, Inc., 2550 9th St. # 113, Berkeley, CA 94710 415-486-0822
† Datacom, Inc., Box 278, Ft. Walton Beach, FL 32548 904-244-6121
§ Data General, 4400 Computer Dr., Westboro, MA 01581 617-366-8911
Data Processing Design, 1400 N. Brasher St., Anaheim, CA 92807 714-970-2373
Datatronic Systems Corp., Computer Sciences Div., P.O. Box 44128, Panorama City, CA 91412 818-988-5290
Development Associates, 1520 S. Lyon, Santa Ana, CA 92705 714-835-9512
DGS Assocs., 1353 Sarita Way, Santa Clara, CA 95051 408-554-1469
Digital Radio Corp., 8901 La Cienega Blvd., Inglewood, CA 90301 213-670-8611
Eyring Research Inst., Inc., 1455 W. 820 N., Provo, UT 84601 801-375-2434
Fast Feedback Technologies, 1505 Aviation Blvd., Redoudo Beach, CA 90278 213-379-6100
Harris Corp., Computer Systems Div., 2101 W. Cypress Creek Rd., Ft. Lauderdale, FL 33309 305-974-1700
Haverly Systems, Inc., 78 Broadway, Denville, NJ 07834 201-627-1424
† Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
§ Industrial Computer Designs, Inc., 31264 La Baya Drive, Westlake Village, CA 91362 818-889-3179
Innovatek Microsystems, Inc., Smithfield Rd., R1 Box 104, Millerton, NY 12546-9720 914-373-9003
† Instruments and Controls Div., Technology Inc., P.O. Box 3036, Overlook Branch, Dayton, OH 45431 513-426-2405
Interface Electronics Inc., 21134 Bridge St., Southfield, MI 48034 313-352-8820
Kinetic Sys., 11 Maryknoll Dr., Lockport, IL 60441 815-838-0005
KLC Corp., 2234 East Colorado, Pasadena, CA 91107 818-796-0525
LWFW, Inc. Group, 12700 Park Central, Suite 1805, Dallas, TX 75251 214-233-5561
§ MacNeal-Schwendler Corp., 815 Colorado Blvd., Los Angeles, CA 90041 213-258-9111
§ Matra Design Systems, 2840-100 Sam Tomas Expressway, Santa Clara, CA 95051 408-986-9000
† Metier Management Sys., Inc., 5884 Point West Dr., Houston, TX 77036 713-988-9100
Micro Associates Inc., 2349 Memorial Blvd., Port Arthur, TX 77640 409-983-2051
MPI, 4426 S. Century Dr., Salt Lake City, UT 84107 800-821-8848
§ MPS Co., 8 N. Grant Dr., Addison, IL 60101 312-543-1748
National Information Sys., Inc., 20370 Town Center Lane, Cupertino, CA 95014 408-257-7700
National Telephone & Elctrns. Inc., 2350 N.W. 96 Avenue, Miami, FL 33172 305-592-0551
§ NEC Information Systems, NEC Corporation, 1414 Massachusetts Ave., Boxborough, MA 01719 617-264-8000
PC International, 4400 MacArthur Blvd., Newport Beach, CA 92660 714-476-1020
§ Percon, 2190 W. 11th, Eugene, OR 97402 503-344-1189
Signatron, A Unit of Sundstrand Corp., 12 Hartwell Ave., Lexington, MA 02173 617-861-1500
SMC Software Sys., Science Management Corp., P. O. Box 0600, Basking Ridge, NJ 07920 201-647-7000
§ Software Dynamics, 2111 W. Crescent Ave-G, Anaheim, CA 92801 714-635-4760
§ Systems Plus, 1120 San Antonio Rd., Palo Alto, CA 94303 415-969-7047
Taurus Computer Products, Inc., 1755 Woodward Dr., Ottawa, ON, CANADA K2COPQ 613-226-5361
§ Texas Instrs., Data Sys. Group, P. O. Box 809063, Dallas, TX 75380-9063 1-800-527-3500
† Uniq Digital Technologies, 28 S. Water Street, Batavia, IL 60510 312-879-1008
Unitronix Corp., 197 Meister Ave., Somerville, NJ 08876 201-231-9400
USUS, Inc., UCSD Pascal Sys. User's Society, P.O. Box 1148, La Jolla, CA 92038
§ Winchendon Group Inc., 3907 Lakota Rd, P.O. Box 10339, Alexandria, VA 22310 703-960-2587

Software, Communications-2050

Applied Sys., 26401 Harper Ave., St. Clair Shores, MI 48081 313-779-8700
§ Boston Systems Office, 469 Moody St., Waltham, MA 02254-9164 617-894-7800
Burroughs Corp., Borroughs Place, Rm. 4C-51, Detroit, MI 48232 313-972-7000

Cambridge Digital Sys., Compumart, P.O. Box 568, 65 Bent St., Cambridge, MA 02139 617-491-2700
§ Complexx Systems Inc., 4930 Research Dr., Huntsville, AL 35805 205-830-4310
Computer Terminal Sys., 89 Arkay Drive, Hauppauge, NY 11788 516-435-2916
§ Comtek, Inc., 309 Breesport, San Antonio, TX 78216 512-340-8253
Creare, Inc., Etna Rd., P.O. Box 71, Hanover, NH 03755 603-643-3800
§ Cromemco, 280 Bernardo Ave., Mountain View, CA 94043 415-964-7400
§ Data General, 4400 Computer Dr., Westboro, MA 01581 617-366-8911
§ Data Terminals & Communications, 590 Division St., Campbell, CA 95008 408-378-1112
Digital Radio Corp., 8901 La Cienega Blvd., Inglewood, CA 90301 213-670-8611
Fast Feedback Technologies, 1505 Aviation Blvd., Redoudo Beach, CA 90278 213-379-6100
§ Gateway Communications Inc., 16782 Redhill Ave., Irvine, CA 92714 714-261-0762
§ GMR Co., 8801 Sepulveda Blvd., Los Angeles, CA 90045 213-216-9516
Gould Compion, 1101 E. University, Urbana, IL 61081 217-384-8500
Harris Corp., Computer Systems Div., 2101 W. Cypress Creek Rd., Ft. Lauderdale, FL 33309 305-974-1700
IDE Associates, Inc., 35 Dunham Rd., Billerica, MA 01821 617-663-6878
Innovatek Microsystems, Inc., Smithfield Rd., R1 Box 104, Millerton, NY 12546-9720 914-373-9003
§ Micom Systems, Inc., 4100 Los Angeles Ave, P.O. Box 8100, Simi Valley, CA 93062-8100 805-583-8600
§ Micro Digital Assocs., Inc., 12791 Western Ave., Unit C, Garden Grove, CA 92641 714-891-2363
National Information Sys., Inc., 20370 Town Center Lane, Cupertino, CA 95014 408-257-7700
NCR Comten, Inc., NCR Corp., 2700 Snelling Avenue N., St. Paul, MN 55113 612-638-7777
§ NEC Information Systems, NEC Corporation, 1414 Massachusetts Ave., Boxborough, MA 01719 617-264-8000
Percon, 2190 W. 11th, Eugene, OR 97402 503-344-1189
† Signatron, A Unit of Sundstrand Corp., 12 Hartwell Ave., Lexington, MA 02173 617-861-1500
§ Software Dynamics, 2111 W. Crescent Ave-G, Anaheim, CA 92801 714-635-4760
§ Texas Instrs., Data Sys. Group, P. O. Box 809063, Dallas, TX 75380-9063 1-800-527-3500
† Uniq Digital Technologies, 28 S. Water Street, Batavia, IL 60510 312-879-1008
United States Software Corp., 5470 N.W. Innisbrook Place, Portland, OR 97229 503-645-5043
Unitronix Corp., 197 Meister Ave., Somerville, NJ 08876 201-231-9400
USUS, Inc., UCSD Pascal Sys. User's Society, P.O. Box 1148, La Jolla, CA 92038

Software, Compilers/Languages-2050

Wintek Corp., 1801 South St., Lafayette, IN 47904-2993, 317-742-8428 .... D•1105,1107
§ Advanced Micro Devices, P.O. Box 3453, 901 Thompson Pl., Sunnyvale, CA 94088 408-732-2400
† Antona Corp., 2100 S. Sawtelle Blvd., Suite 205, Los Angeles, CA 90025 213-473-8995
§ Boston Systems Office, 469 Moody St., Waltham, MA 02254-9164 617-894-7800
Bridge Computer Co., Sea Data Corp., 1 Bridge St., Newton, MA 02158 .. 617-244-8190
Burroughs Corp., Borroughs Place, Rm. 4C-51, Detroit, MI 48232 313-972-7000
Cambridge Digital Sys., Compumart, P.O. Box 568, 65 Bent St., Cambridge, MA 02139 617-491-2700
§† Compucorp, 2211 Michigan Ave., Santa Monica, CA 90404 213-829-7453
§ Comtek, Inc., 309 Breesport, San Antonio, TX 78216 512-340-8253
§ Cromemco, 280 Bernardo Ave., Mountain View, CA 94043 415-964-7400
§ Data General, 4400 Computer Dr., Westboro, MA 01581 617-366-8911
Data I/O Corp., 10525 Willows Rd. N.E., Redmond, WA 98073-9746 206-881-6444
§ Eyring Research Inst., Inc., 1455 W. 820 N., Provo, UT 84601 801-375-2434
§† Fairchild Microcontroller Div., Fairchild Camera & Instr. Corp., 450 National Ave., Mountain View, CA 94042 415-962-3838
Fast Feedback Technologies, 1505 Aviation Blvd., Redoudo Beach, CA 90278 213-379-6100
§ GMR Co., 8801 Sepulveda Blvd., Los Angeles, CA 90045 213-216-9516
GTEK, Inc., 307 Coleman Ave., Waveland, MS 39576 601-467-8048
Harris Corp., Computer Systems Div., 2101 W. Cypress Creek Rd., Ft. Lauderdale, FL 33309 305-974-1700
Haverly Systems, Inc., 78 Broadway, Denville, NJ 07834 201-627-1424
† Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
§ Infosphere, Inc., 4730 S.W. Macadam Ave., Portland, OR 97201 503-226-3515
Inmos Corp., P.O. Box 16000, Colorado Springs, CO 80935 ... 303-630-4000 Ext. 4454
§ Motorola Semiconductor Prods. Sector, Adv. 72, Box 20912, Phoenix, AZ 85036 602-244-6900
National Information Sys., Inc., 20370 Town Center Lane, Cupertino, CA 95014 408-257-7700
§ NEC Information Systems, NEC Corporation, 1414 Massachusetts Ave., Boxborough, MA 01719 617-264-8000
§ RCA Solid State Div., Micro Processors/Memories/Peripherals, Route 202, Somerville, NJ 08876 201-685-6000
† Rolm Mil-Spec Computers, Rolm Corp., 1 River Oaks Pl., San Jose, CA 95134 408-942-8000
SMC Software Sys., Science Management Corp., P. O. Box 0600, Basking Ridge, NJ 07920 201-647-7000
§ Software Dynamics, 2111 W. Crescent Ave-G, Anaheim, CA 92801 714-635-4760
§† SPS Software Products & Services, Inc., 14 E. 38th Street, 14th Fl., New York, NY 10016 212-686-3790
§ Texas Instrs., Data Sys. Group, P. O. Box 809063, Dallas, TX 75380-9063 1-800-527-3500
† Uniq Digital Technologies, 28 S. Water Street, Batavia, IL 60510 312-879-1008
Unitronix Corp., 197 Meister Ave., Somerville, NJ 08876 201-231-9400
USUS, Inc., UCSD Pascal Sys. User's Society, P.O. Box 1148, La Jolla, CA 92038
§ Volition Systems, P.O. Box 99628, San Diego, CA 92109 619-270-6800
§ Zax Corp., 2572 White Rd., Irvine, CA 92714 .... 714-474-1170;800-421-0982

Software, Computer Performance Measurement-2050

Compact Software, Inc., Comsat Corp., 1131 San Antonia Rd., Palo Alto, CA 94303 415-966-8440
§ Data General, 4400 Computer Dr., Westboro, MA 01581 617-366-8911
§ Dymek Corp., 1851 Zanker Road, San Jose, CA 95070 408-947-8700
† Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
Kontron Elctrns., 1230 Charleston Rd., Mountain View, CA 94039-7230 415-965-7020
NCR Comten, Inc., NCR Corp., 2700 Snelling Avenue N., St. Paul, MN 55113 612-638-7777
Siltran Digital, 2250 Monterey Rd., Atascadero, CA 93422 805-466-3209
Systems Data, Inc., 2830 Copley Road, P.O. Box 4297, Akron, OH 44321 216-666-0085
Unitronix Corp., 197 Meister Ave., Somerville, NJ 08876 201-231-9400

Software, Data Base Management-2050

§ Anderson-Bell Co., P.O. Box 191, Canon City, CO 81212 303-275-1661
Applied Sys., 26401 Harper Ave., St. Clair Shores, MI 48081 313-779-8700
Bridge Computer Co., Sea Data Corp., 1 Bridge St., Newton, MA 02158 .. 617-244-8190
BTU Engrg. Corp., Bruce Sys., Esquire Rd., N. Billerica, MA 01862 617-667-4111
Burroughs Corp., Borroughs Place, Rm. 4C-51, Detroit, MI 48232 313-972-7000
§† Compucorp, 2211 Michigan Ave., Santa Monica, CA 90404 213-829-7453
Computer Corp. of America, 675 Massachusetts Ave., Cambridge, MA 02139 617-492-8860
Consumertronics, 2011 Crescent Dr., Alamogordo, NM 88310 505-434-0234
§ Contel Info. Sys., Inc., Continental Tel. Corp., 130 Steamboat Rd., Great Neck, NY 11024 516-829-5900
Control Module, 380 Enfield St., Enfield, CT 06082 203-745-2433
Cosmos, Inc., 19530 Pacific Hwy. S. Suite 102, Seattle, WA 98188 206-824-9942
Data General, 4400 Computer Dr., Westboro, MA 01581 617-366-8911
Datatronic Systems Corp., Computer Sciences Div., P.O. Box 44128, Panorama City, CA 91412 818-988-5290
§ GMR Co., 8801 Sepulveda Blvd., Los Angeles, CA 90045 213-216-9516
Harris Corp., Computer Systems Div., 2101 W. Cypress Creek Rd., Ft. Lauderdale, FL 33309 305-974-1700
† Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
Info-Pros Inc., 2102 Business Center Dr., Irvine, CA 92715 714-851-8975
† Instruments and Controls Div., Technology Inc., P.O. Box 3036, Overlook Branch, Dayton, OH 45431 513-426-2405
Kinetic Sys., 11 Maryknoll Dr., Lockport, IL 60441 815-838-0005
LWFW, Inc. Group, 12700 Park Central, Suite 1805, Dallas, TX 75251 ... 214-233-5561
† Metier Management Sys., Inc., 5884 Point West Dr., Houston, TX 77036 713-988-9100
MSS/Macintosh Software, 170 West 73rd St. Ste 12C, New York, NY 10023 212-799-8195
National Information Sys., Inc., 20370 Town Center Lane, Cupertino, CA 95014 408-257-7700
§ NEC Information Systems, NEC Corporation, 1414 Massachusetts Ave., Boxborough, MA 01719 617-264-8000
Noumenon Corp., 512 Westline Dr., Alamdea, CA 94501 415-521-2145
O'Hanlon Computer Systems, Inc., 8383-158th Ave NE, Seattle, WA 98052 206-885-2502
PC International, 4400 MacArthur Blvd., Newport Beach, CA 92660 714-476-1020
SMC Software Sys., Science Management Corp., P. O. Box 0600, Basking Ridge, NJ 07920 201-647-7000
§ Systems Plus, 1120 San Antonio Rd., Palo Alto, CA 94303 415-969-7047
§ Texas Instrs., Data Sys. Group, P. O. Box 809063, Dallas, TX 75380-9063 1-800-527-3500
† Uniq Digital Technologies, 28 S. Water Street, Batavia, IL 60510 312-879-1008
USUS, Inc., UCSD Pascal Sys. User's Society, P.O. Box 1148, La Jolla, CA 92038

Software, Data Base Management Dictionaries-2050

BTU Engrg. Corp., Bruce Sys., Esquire Rd., N. Billerica, MA 01862 617-667-4111
Burroughs Corp., Borroughs Place, Rm. 4C-51, Detroit, MI 48232 313-972-7000
Computer Corp. of America, 675 Massachusetts Ave., Cambridge, MA 02139 617-492-8860
Consumertronics, 2011 Crescent Dr., Alamogordo, NM 88310 505-434-0234
§ Contel Info. Sys., Inc., Continental Tel. Corp., 130 Steamboat Rd., Great Neck, NY 11024 516-829-5900
Cosmos, Inc., 19530 Pacific Hwy. S. Suite 102, Seattle, WA 98188 206-824-9942
Datatronic Systems Corp., Computer Sciences Div., P.O. Box 44128, Panorama City, CA 91412 818-988-5290
Digiac Corp., 175 Engineers Rd., Hauppauge, NY 11788 516-273-8600
O'Hanlon Computer Systems, Inc., 8383-158th Ave NE, Seattle, WA 98052 206-885-2502
§ Systems Plus, 1120 San Antonio Rd., Palo Alto, CA 94303 415-969-7047
§ Texas Instrs., Data Sys. Group, P. O. Box 809063, Dallas, TX 75380-9063 1-800-527-3500

Software, Data Base Query Language-2050

§ Contel Info. Sys., Inc., Continental Tel. Corp., 130 Steamboat Rd., Great Neck, NY 11024 516-829-5900
Cosmos, Inc., 19530 Pacific Hwy. S. Suite 102, Seattle, WA 98188 206-824-9942
§ Data General, 4400 Computer Dr., Westboro, MA 01581 617-366-8911
Harris Corp., Computer Systems Div., 2101 W. Cypress Creek Rd., Ft. Lauderdale, FL 33309 305-974-1700
Haverly Systems, Inc., 78 Broadway, Denville, NJ 07834 201-627-1424
† Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
National Information Sys., Inc., 20370 Town Center Lane, Cupertino, CA 95014 408-257-7700
O'Hanlon Computer Systems, Inc., 8383-158th Ave NE, Seattle, WA 98052 206-885-2502
§ Texas Instrs., Data Sys. Group, P. O. Box 809063, Dallas, TX 75380-9063 1-800-527-3500
† Uniq Digital Technologies, 28 S. Water Street, Batavia, IL 60510 312-879-1008
Unitronix Corp., 197 Meister Ave., Somerville, NJ 08876 201-231-9400

Software, Data Communications Control-2050

† Acromag, 30765 Wixom Rd., Wixom, MI 48096 313-624-1541
Applied Sys., 26401 Harper Ave., St. Clair Shores, MI 48081 313-779-8700
Burroughs Corp., Borroughs Place, Rm. 4C-51, Detroit, MI 48232 313-972-7000
Computer Terminal Sys., 89 Arkay Drive, Hauppauge, NY 11788 516-435-2916
§ Comtek, Inc., 309 Breesport, San Antonio, TX 78216 512-340-8253
Contel Info. Sys., Inc., Continental Tel. Corp., 130 Steamboat Rd., Great Neck, NY 11024 516-829-5900
Cosmos, Inc., 19530 Pacific Hwy. S. Suite 102, Seattle, WA 98188 206-824-9942
§ Data General, 4400 Computer Dr., Westboro, MA 01581 617-366-8911
Digital Communications Assocs., Inc., 303 Technology Pk., Norcross, GA 30092 404-448-1400
Digital Radio Corp., 8901 La Cienega Blvd., Inglewood, CA 90301 213-670-8611
Fast Feedback Technologies, 1505 Aviation Blvd., Redoudo Beach, CA 90278 213-379-6100
§ Infosphere, Inc., 4730 S.W. Macadam Ave., Portland, OR 97201 503-226-3515
§ Micom Systems, Inc., 4100 Los Angeles Ave, P.O. Box 8100, Simi Valley, CA 93062-8100 805-583-8600
MSS/Macintosh Software, 170 West 73rd St. Ste 12C, New York, NY 10023 212-799-8195
NCR Comten, Inc., NCR Corp., 2700 Snelling Avenue N., St. Paul, MN 55113 612-638-7777
§ NEC Information Systems, NEC Corporation, 1414 Massachusetts Ave., Boxborough, MA 01719 617-264-8000
Systems Data, Inc., 2830 Copley Road, P.O. Box 4297, Akron, OH 44321 216-666-0085
Texas Instrs., Data Sys. Group, P. O. Box 809063, Dallas, TX 75380-9063 1-800-527-3500
† Uniq Digital Technologies, 28 S. Water Street, Batavia, IL 60510 312-879-1008
Unitronix Corp., 197 Meister Ave., Somerville, NJ 08876 201-231-9400

Software, Disk/Tape File Utilities-2050

† Antona Corp., 2100 S. Sawtelle Blvd., Suite 205, Los Angeles, CA 90025 213-473-8995
Burroughs Corp., Borroughs Place, Rm. 4C-51, Detroit, MI 48232 313-972-7000
Cambridge Digital Sys., Compumart, P.O. Box 568, 65 Bent St., Cambridge, MA 02139 617-491-2700
§ Comtek, Inc., 309 Breesport, San Antonio, TX 78216 512-340-8253
§ Consumertronics, 2011 Crescent Dr., Alamogordo, NM 88310 505-434-0234
§ Data General, 4400 Computer Dr., Westboro, MA 01581 617-366-8911
§ EDL, Inc., 385 Oser Ave., Hauppauge, NY 11788 .... 516-435-2808;1-800-DIAL EDL
GEN/COMP Inc., 6 Algonquin Rd., Canton, MA 02021 617-828-2008
Harris Corp., Computer Systems Div., 2101 W. Cypress Creek Rd., Ft. Lauderdale, FL 33309 305-974-1700
§ Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
IDE Associates, Inc., 35 Dunham Rd., Billerica, MA 01821 617-663-6878
MSS/Macintosh Software, 170 West 73rd St. Ste 12C, New York, NY 10023 212-799-8195
§ NEC Information Systems, NEC Corporation, 1414 Massachusetts Ave., Boxborough, MA 01719 617-264-8000
Peritek Corp., 5550 Redwood Rd., Oakland, CA 94619 415-531-6500
§ Software Dynamics, 2111 W. Crescent Ave-G, Anaheim, CA 92801 714-635-4760
Texas Instrs., Data Sys. Group, P. O. Box 809063, Dallas, TX 75380-9063 1-800-527-3500
† Uniq Digital Technologies, 28 S. Water Street, Batavia, IL 60510 312-879-1008
Unitronix Corp., 197 Meister Ave., Somerville, NJ 08876 201-231-9400

Software, Emulation/Simulation-2050

Magnum Opus Custom Elctrn. Engrg., 284 Kennedy St., Iselin, NJ 08830, 201-283-4925 .... D•1093
† Antona Corp., 2100 S. Sawtelle Blvd., Suite 205, Los Angeles, CA 90025 213-473-8995
§ Boston Systems Office, 469 Moody St., Waltham, MA 02254-9164 617-894-7800
Burroughs Corp., Borroughs Place, Rm. 4C-51, Detroit, MI 48232 313-972-7000
Compact Software, Inc., Comsat Corp., 1131 San Antonia Rd., Palo Alto, CA 94303 415-966-8440
§† Compucorp, 2211 Michigan Ave., Santa Monica, CA 90404 213-829-7453
Computalker, Compuvoice, Inc., 1730 21st Street, Santa Monica, CA 90404 213-828-6546
§ Comtek, Inc., 309 Breesport, San Antonio, TX 78216 512-340-8253
Creare, Inc., Etna Rd., P.O. Box 71, Hanover, NH 03755 603-643-3800
Data I/O Corp., 10525 Willows Rd. N.E., Redmond, WA 98073-9746 206-881-6444
§ Davidge Corp., 1951 Colony St., Mountain View, CA 94043 805-688-7707
Development Associates, 1520 S. Lyon, Santa Ana, CA 92705 714-835-9512
§ Evans & Sutherland Computer Corp., P.O. Box 8700, 580 Arapeen Dr., Salt Lake City, UT 84108 801-582-5847
§† Fairchild Microcontroller Div., Fairchild Camera & Instr. Corp., 450 National Ave., Mountain View, CA 94042 415-962-3838
§ General Instrument Corp., Microelectronics Div., 600 W. John St., Hicksville, NY 11802 516-733-3107
§ GMR Co., 8801 Sepulveda Blvd., Los Angeles, CA 90045 213-216-9516
Harris Corp., Computer Systems Div., 2101 W. Cypress Creek Rd., Ft. Lauderdale, FL 33309 305-974-1700
HEI Corporation, 290 S. Main Place, Carol Stream, IL 60188 312-665-5500
Inmos Corp., P.O. Box 16000, Colorado Springs, CO 80935 .... 303-630-4000 Ext. 4454
Innovatek Microsystems, Inc., Smithfield Rd., R1 Box 104, Millerton, NY 12546-9720 914-373-9003
† Instruments and Controls Div., Technology Inc., P.O. Box 3036, Overlook Branch, Dayton, OH 45431 513-426-2405
Kontron Elctrns., 1230 Charleston Rd., Mountain View, CA 94039-7230 415-965-7020
† Litton Applied Technology, 645 Almanor Ave., P.O. Box 3478, Sunnyvale, CA 94088-3478 408-773-0777
§ Matra Design Systems, 2840-100 Sam Tomas Expressway, Santa Clara, CA 95051 408-986-9000
§† Megatek Corp., 9645 Scranton Road, San Diego, CA 92121 619-455-5590
MSS/Macintosh Software, 170 West 73rd St. Ste 12C, New York, NY 10023 212-799-8195
Peritek Corp., 5550 Redwood Rd., Oakland, CA 94619 415-531-6500
† Regency Systems, Inc., 3200 Farber Drive, Champaign, IL 61820 217-398-8067
Rosen Grandon Associates Inc., 7807 Whittier St., Tampa, FL 33617 813-985-4911
† Signatron, A Unit of Sundstrand Corp., 12 Hartwell Ave., Lexington, MA 02173 617-861-1500
Systems Data, Inc., 2830 Copley Road, P.O. Box 4297, Akron, OH 44321 216-666-0085
Systems Resch. Labs., Inc., 2800 Indian Ripple Rd., Dayton, OH 45440 513-426-6000
§† Titan Technologies, Inc., 310 W. Ann, Ann Arbor, MI 48104 313-662-8542
Unitronix Corp., 197 Meister Ave., Somerville, NJ 08876 201-231-9400

Software, Information Storage & Retrieval-2050

† Acromag, 30765 Wixom Rd., Wixom, MI 48096 313-624-1541
Applied Sys., 26401 Harper Ave., St. Clair Shores, MI 48081 313-779-8700
BTU Engrg. Corp., Bruce Sys., Esquire Rd., N. Billerica, MA 01862 617-667-4111
Burroughs Corp., Borroughs Place, Rm. 4C-51, Detroit, MI 48232 313-972-7000
§† Compucorp, 2211 Michigan Ave., Santa Monica, CA 90404 213-829-7453
§ Contel Info. Sys., Inc., Continental Tel. Corp., 130 Steamboat Rd., Great Neck, NY 11024 516-829-5900
Cosmos, Inc., 19530 Pacific Hwy. S. Suite 102, Seattle, WA 98188 206-824-9942
§ Data General, 4400 Computer Dr., Westboro, MA 01581 617-366-8911
Datatronic Systems Corp., Computer Sciences Div., P.O. Box 44128, Panorama City, CA 91412 818-988-5290
Davidge Corp., 1951 Colony St., Mountain View, CA 94043 805-688-7707
§ EDL, Inc., 385 Oser Ave., Hauppauge, NY 11788 .... 516-435-2808;1-800-DIAL EDL
Harris Corp., Computer Systems Div., 2101 W. Cypress Creek Rd., Ft. Lauderdale, FL 33309 305-974-1700
Haverly Systems, Inc., 78 Broadway, Denville, NJ 07834 201-627-1424
§† Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
† Instruments and Controls Div., Technology Inc., P.O. Box 3036, Overlook Branch, Dayton, OH 45431 513-426-2405
LWFW, Inc. Group, 12700 Park Central, Suite 1805, Dallas, TX 75251 214-233-5561
† Metier Management Sys., Inc., 5884 Point West Dr., Houston, TX 77036 713-988-9100
MSS/Macintosh Software, 170 West 73rd St. Ste 12C, New York, NY 10023 212-799-8195
§ NEC Information Systems, NEC Corporation, 1414 Massachusetts Ave., Boxborough, MA 01719 617-264-8000
Noumenon Corp., 512 Westline Dr., Alamdea, CA 94501 415-521-2145
Systems Data, Inc., 2830 Copley Road, P.O. Box 4297, Akron, OH 44321 216-666-0085
§ Systems Plus, 1120 San Antonio Rd., Palo Alto, CA 94303 415-969-7047
Texas Instrs., Data Sys. Group, P. O. Box 809063, Dallas, TX 75380-9063 1-800-527-3500
† Uniq Digital Technologies, 28 S. Water Street, Batavia, IL 60510 312-879-1008
Unitronix Corp., 197 Meister Ave., Somerville, NJ 08876 201-231-9400
Zylab Corp., 233 E. Erie, Chicago, IL 60611 312-642-2201

Software, Job Scheduling/Accounting-2050

§ Boston Systems Office, 469 Moody St., Waltham, MA 02254-9164 617-894-7800
BTU Engrg. Corp., Bruce Sys., Esquire Rd., N. Billerica, MA 01862 617-667-4111
Burroughs Corp., Borroughs Place, Rm. 4C-51, Detroit, MI 48232 313-972-7000
Cambridge Digital Sys., Compumart, P.O. Box 568, 65 Bent St., Cambridge, MA 02139 617-491-2700
CMV Software Specialists Inc., 2720 W. 12th Street, Sioux Falls, SD 57104 605-338-6645
§ Comtek, Inc., 309 Breesport, San Antonio, TX 78216 512-340-8253
Data Processing Design, 1400 N. Brasher St., Anaheim, CA 92807 714-970-2373
Datatronic Systems Corp., Computer Sciences Div., P.O. Box 44128, Panorama City, CA 91412 818-988-5290
Digiac Corp., 175 Engineers Rd., Hauppauge, NY 11788 516-273-8600
Dynamic Time Systems, Inc., 150 West 1230 North, Ste. 2, Provo, UT 84604 801-377-9154
Elite Software Development, Inc., P.O. Drawer 1194, Bryan, TX 77806 409-846-2340
§ GMR Co., 8801 Sepulveda Blvd., Los Angeles, CA 90045 213-216-9516
Harris Corp., Computer Systems Div., 2101 W. Cypress Creek Rd., Ft. Lauderdale, FL 33309 305-974-1700
§ Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
§ InfoCap, Inc., 31119 Via Colinas #502, Westlake Village, CA 91362 818-991-1410
LWFW, Inc. Group, 12700 Park Central, Suite 1805, Dallas, TX 75251 214-233-5561
† Metier Management Sys., Inc., 5884 Point West Dr., Houston, TX 77036 713-988-9100
Micro Associates Inc., 2349 Memorial Blvd., Port Arthur, TX 77640 409-983-2051
MSS/Macintosh Software, 170 West 73rd St. Ste 12C, New York, NY 10023 212-799-8195
National Information Sys., Inc., 20370 Town Center Lane, Cupertino, CA 95014 408-257-7700
§ NEC Information Systems, NEC Corporation, 1414 Massachusetts Ave., Boxborough, MA 01719 617-264-8000
O'Hanlon Computer Systems, Inc., 8383-158th Ave NE, Seattle, WA 98052 206-885-2502
PC International, 4400 MacArthur Blvd., Newport Beach, CA 92660 714-476-1020
Richard Caldwell Software, 1617 Whitton Ave., San Jose, CA 95116-2455 408-251-3485
SMC Software Sys., Science Management Corp., P. O. Box 0600, Basking Ridge, NJ 07920 201-647-7000
§ Stolzberg Research, Inc., 3 Seabrook Court, Stony Brook, NY 11790 516-751-4277
§ Systems Plus, 1120 San Antonio Rd., Palo Alto, CA 94303 415-969-7047
Texas Instrs., Data Sys. Group, P. O. Box 809063, Dallas, TX 75380-9063 1-800-527-3500
† Uniq Digital Technologies, 28 S. Water Street, Batavia, IL 60510 312-879-1008
Unitronix Corp., 197 Meister Ave., Somerville, NJ 08876 201-231-9400

Software, Librarians-2050

ATV Research, Inc., 1301 Broadway, Dakota City, NE 68731 402-987-3771
§ Boston Systems Office, 469 Moody St., Waltham, MA 02254-9164 617-894-7800
Bridge Computer Co., Sea Data Corp., 1 Bridge St., Newton, MA 02158 .. 617-244-8190
Burroughs Corp., Borroughs Place, Rm. 4C-51, Detroit, MI 48232 313-972-7000
Cambridge Digital Sys., Compumart, P.O. Box 568, 65 Bent St., Cambridge, MA 02139 617-491-2700
§ GMR Co., 8801 Sepulveda Blvd., Los Angeles, CA 90045 213-216-9516
Unitronix Corp., 197 Meister Ave., Somerville, NJ 08876 201-231-9400

Software, Operating Systems-2050

ADAC Corp., 70 Tower Office Pk., Woburn, MA 01801, 617-935-6668 .... D•1135
Heurikon Corporation, 3201 Latham Dr., Madison, WI 53713, 800-356-9602;608-271-8700 .... D•1091
Mizar, Inc., 302 Chester St., St. Paul, MN 55107, 612-224-8941 .... D•1095-1096,1106
§ Motorola Semiconductor Prods. Sector, Adv. 72, Box 20912, Phoenix, AZ 85036, 602-244-6900 .... D•1098-1099
Wintek Corp., 1801 South St., Lafayette, IN 47904-2993, 317-742-8428 .... D•1105,1107
Action Instrs., 8601 Aero Dr., San Diego, CA 92123 619-279-5726
† Antona Corp., 2100 S. Sawtelle Blvd., Suite 205, Los Angeles, CA 90025 213-473-8995
Applied Micro Technlg., A Burr Brown Co., 3669 E. 44th Street, Tucson, AZ 85713 602-622-8605
Applied Sys., 26401 Harper Ave., St. Clair Shores, MI 48081 313-779-8700
Bridge Computer Co., Sea Data Corp., 1 Bridge St., Newton, MA 02158 .. 617-244-8190
BTU Engrg. Corp., Bruce Sys., Esquire Rd., N. Billerica, MA 01862 617-667-4111
Burroughs Corp., Borroughs Place, Rm. 4C-51, Detroit, MI 48232 313-972-7000
§† Compucorp, 2211 Michigan Ave., Santa Monica, CA 90404 213-829-7453
§ CompuPro, 3506 Breakwater Ct., Hayward, CA 94545 415-786-0909
§ Comtek, Inc., 309 Breesport, San Antonio, TX 78216 512-340-8253
§ Contel Info. Sys., Inc., Continental Tel. Corp., 130 Steamboat Rd., Great Neck, NY 11024 516-829-5900
Cosmos, Inc., 19530 Pacific Hwy. S. Suite 102, Seattle, WA 98188 206-824-9942
§ Cromemco, 280 Bernardo Ave., Mountain View, CA 94043 415-964-7400
Digiac Corp., 175 Engineers Rd., Hauppauge, NY 11788 516-273-8600
§ Eyring Research Inst., Inc., 1455 W. 820 N., Provo, UT 84601 801-375-2434
§† Fairchild Microcontroller Div., Fairchild Camera & Instr. Corp., 450 National Ave., Mountain View, CA 94042 415-962-3838
First Computer Corp., 645 Blackhawk Dr., Westmont, IL 60559 312-920-1050
§ GMR Co., 8801 Sepulveda Blvd., Los Angeles, CA 90045 213-216-9516
Harris Corp., Computer Systems Div., 2101 W. Cypress Creek Rd., Ft. Lauderdale, FL 33309 305-974-1700
Inmos Corp., P.O. Box 16000, Colorado Springs, CO 80935 ... 303-630-4000 Ext. 4454
§† Megatek Corp., 9645 Scranton Road, San Diego, CA 92121 619-455-5590
§ Micro Digital Assocs., Inc., 12791 Western Ave., Unit C, Garden Grove, CA 92641 714-891-2363
NCR Comten, Inc., NCR Corp., 2700 Snelling Avenue N., St. Paul, MN 55113 612-638-7777
§ NEC Information Systems, NEC Corporation, 1414 Massachusetts Ave., Boxborough, MA 01719 617-264-8000
§ Point 4 Data Corp., 2569 McCabe Way, Irvine, CA 92714 714-863-1111
† Raytheon Co., Submarine Signal Div., 1847 W. Main Rd., P.O. Box 360, Portsmouth, RI 02871 401-847-8000
§ RCA Solid State Div., Micro Processors/Memories/Peripherals, Route 202, Somerville, NJ 08876 201-685-6000
† Regency Systems, Inc., 3200 Farber Drive, Champaign, IL 61820 217-398-8067
SMC Software Sys., Science Management Corp., P. O. Box 0600, Basking Ridge, NJ 07920 201-647-7000
§ Software Dynamics, 2111 W. Crescent Ave-G, Anaheim, CA 92801 714-635-4760
§† SPS Software Products & Services, Inc., 14 E. 38th Street, 14th Fl., New York, NY 10016 212-686-3790
Star-Kits, P.O. Box 209, Mt. Kisco, NY 10549 914-241-0287
Systems Data, Inc., 2830 Copley Road, P.O. Box 4297, Akron, OH 44321 216-666-0085
Systems Resch. Labs., Inc., 2800 Indian Ripple Rd., Dayton, OH 45440 .. 513-426-6000
§ Texas Instrs., Data Sys. Group, P. O. Box 809063, Dallas, TX 75380-9063 1-800-527-3500
† Uniq Digital Technologies, 28 S. Water Street, Batavia, IL 60510 312-879-1008
United States Software Corp., 5470 N.W. Innisbrook Place, Portland, OR 97229 503-645-5043
Unitronix Corp., 197 Meister Ave., Somerville, NJ 08876 201-231-9400
USUS, Inc., UCSD Pascal Sys. User's Society, P.O. Box 1148, La Jolla, CA 92038
§ Volition Systems, P.O. Box 99628, San Diego, CA 92109 619-270-6800

Software, Operating Systems Enhancement-2050

ADAC Corp., 70 Tower Office Pk., Woburn, MA 01801, 617-935-6668 .... D•1135
† Acromag, 30765 Wixom Rd., Wixom, MI 48096 313-624-1541
† Antona Corp., 2100 S. Sawtelle Blvd., Suite 205, Los Angeles, CA 90025 213-473-8995
Bridge Computer Co., Sea Data Corp., 1 Bridge St., Newton, MA 02158 .. 617-244-8190
BTU Engrg. Corp., Bruce Sys., Esquire Rd., N. Billerica, MA 01862 617-667-4111
Burroughs Corp., Borroughs Place, Rm. 4C-51, Detroit, MI 48232 313-972-7000
Cambridge Digital Sys., Compumart, P.O. Box 568, 65 Bent St., Cambridge, MA 02139 617-491-2700
CompuPro, 3506 Breakwater Ct., Hayward, CA 94545 415-786-0909
Cosmos, Inc., 19530 Pacific Hwy. S. Suite 102, Seattle, WA 98188 206-824-9942
§ Data General, 4400 Computer Dr., Westboro, MA 01581 617-366-8911
Digiac Corp., 175 Engineers Rd., Hauppauge, NY 11788 516-273-8600
Harris Corp., Computer Systems Div., 2101 W. Cypress Creek Rd., Ft. Lauderdale, FL 33309 305-974-1700
† Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
KLC Corp., 2234 East Colorado, Pasadena, CA 91107 818-796-0525
Peritek Corp., 5550 Redwood Rd., Oakland, CA 94619 415-531-6500
† Raytheon Co., Submarine Signal Div., 1847 W. Main Rd., P.O. Box 360, Portsmouth, RI 02871 401-847-8000
§ RCA Solid State Div., Micro Processors/Memories/Peripherals, Route 202, Somerville, NJ 08876 201-685-6000
† Regency Systems, Inc., 3200 Farber Drive, Champaign, IL 61820 217-398-8067
Systems Data, Inc., 2830 Copley Road, P.O. Box 4297, Akron, OH 44321 216-666-0085
Systems Resch. Labs., Inc., 2800 Indian Ripple Rd., Dayton, OH 45440 .. 513-426-6000
§ Texas Instrs., Data Sys. Group, P. O. Box 809063, Dallas, TX 75380-9063 1-800-527-3500
† Uniq Digital Technologies, 28 S. Water Street, Batavia, IL 60510 312-879-1008
United States Software Corp., 5470 N.W. Innisbrook Place, Portland, OR 97229 503-645-5043
Unitronix Corp., 197 Meister Ave., Somerville, NJ 08876 201-231-9400
USUS, Inc., UCSD Pascal Sys. User's Society, P.O. Box 1148, La Jolla, CA 92038
Volition Systems, P.O. Box 99628, San Diego, CA 92109 619-270-6800

Software, Programming/Systems Development Aids-2050

Mizar, Inc., 302 Chester St., St. Paul, MN 55107, 612-224-8941 .... D•1106
Wintek Corp., 1801 South St., Lafayette, IN 47904-2993, 317-742-8428 .... D•1105,1107
§ Advanced Micro Devices, P.O. Box 3453, 901 Thompson Pl., Sunnyvale, CA 94088 408-732-2400
Alden Computer Systems, 27 Strathmore Rd., Natick, MA 01760 617-655-6610
† Antona Corp., 2100 S. Sawtelle Blvd., Suite 205, Los Angeles, CA 90025 213-473-8995
§ Boston Systems Office, 469 Moody St., Waltham, MA 02254-9164 617-894-7800
Bridge Computer Co., Sea Data Corp., 1 Bridge St., Newton, MA 02158 .. 617-244-8190
Burroughs Corp., Borroughs Place, Rm. 4C-51, Detroit, MI 48232 313-972-7000
Cambridge Digital Sys., Compumart, P.O. Box 568, 65 Bent St., Cambridge, MA 02139 617-491-2700
§ Colex, Incorporated, 15028 Beltway Dr., Dallas, TX 75234 214-458-2779
Commercial Sys. Labs., Commercial Sys. Grp., P.O. Box 2710, Auburn, AL 36831 205-821-1133
§† Compucorp, 2211 Michigan Ave., Santa Monica, CA 90404 213-829-7453
Computalker, Compuvoice, Inc., 1730 21st Street, Santa Monica, CA 90404 213-828-6546
§ Comtek, Inc., 309 Breesport, San Antonio, TX 78216 512-340-8253
§ Consumertronics, 2011 Crescent Dr., Alamogordo, NM 88310 505-434-0234
§ Contel Info. Sys., Inc., Continental Tel. Corp., 130 Steamboat Rd., Great Neck, NY 11024 516-829-5900
Control-O-mation, Inc, 7300 W. Huron River Dr., Dexter, MI 48130 313-426-3935
Cosmos, Inc., 19530 Pacific Hwy. S. Suite 102, Seattle, WA 98188 206-824-9942
§ Cromemco, 280 Bernardo Ave., Mountain View, CA 94043 415-964-7400
Cybernetic Micro Sys., P.O. Box 3000, 3000 Hwy. 84, San Gregorio, CA 94074 415-726-3000
§ Database Design Inc., 2020 Hogback Rd., Ann Arbor, MI 48104 313-971-5363
§ Data General, 4400 Computer Dr., Westboro, MA 01581 617-366-8911
Data I/O Corp., 10525 Willows Rd. N.E., Redmond, WA 98073-9746 206-881-6444
Development Associates, 1520 S. Lyon, Santa Ana, CA 92705 714-835-9512
§ EDL, Inc., 385 Oser Ave., Hauppauge, NY 11788 .... 516-435-2808;1-800-DIAL EDL
Elite Software Development, Inc., P.O. Drawer 1194, Bryan, TX 77806 ... 409-846-2340
† Exergetic Sys., Inc., 1499 Franklin St., Oakland, CA 94612 415-763-3460
§† Fairchild Microcontroller Div., Fairchild Camera & Instr. Corp., 450 National Ave., Mountain View, CA 94042 415-962-3838
§ General Instrument Corp., Microelectronics Div., 600 W. John St., Hicksville, NY 11802 516-733-3107
GTEK, Inc., 307 Coleman Ave., Waveland, MS 39576 601-467-8048
Harris Corp., Computer Systems Div., 2101 W. Cypress Creek Rd., Ft. Lauderdale, FL 33309 305-974-1700
† Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
§ Infosphere, Inc., 4730 S.W. Macadam Ave., Portland, OR 97201 503-226-3515
Inmos Corp., P.O. Box 16000, Colorado Springs, CO 80935 ... 303-630-4000 Ext. 4454
Innovatek Microsystems, Inc., Smithfield Rd., R1 Box 104, Millerton, NY 12546-9720 914-373-9003
† Instruments and Controls Div., Technology Inc., P.O. Box 3036, Overlook Branch, Dayton, OH 45431 513-426-2405
Kinetic Sys., 11 Maryknoll Dr., Lockport, IL 60441 815-838-0005
§† Megatek Corp., 9645 Scranton Road, San Diego, CA 92121 619-455-5590
§ Motorola Semiconductor Prods. Sector, Adv. 72, Box 20912, Phoenix, AZ 85036 602-244-6900
MSS/Macintosh Software, 170 West 73rd St. Ste 12C, New York, NY 10023 212-799-8195
National Information Sys., Inc., 20370 Town Center Lane, Cupertino, CA 95014 408-257-7700
O'Hanlon Computer Systems, Inc., 8383-158th Ave NE, Seattle, WA 98052 206-885-2502
§ Point 4 Data Corp., 2569 McCabe Way, Irvine, CA 92714 714-863-1111
§ RCA Solid State Div., Micro Processors/Memories/Peripherals, Route 202, Somerville, NJ 08876 201-685-6000
† Regency Systems, Inc., 3200 Farber Drive, Champaign, IL 61820 217-398-8067
SMC Software Sys., Science Management Corp., P. O. Box 0600, Basking Ridge, NJ 07920 201-647-7000
§† SPS Software Products & Services, Inc., 14 E. 38th Street, 14th Fl., New York, NY 10016 212-686-3790
Star-Kits, P.O. Box 209, Mt. Kisco, NY 10549 914-241-0287
Step Engineering, P.O. Box 61166, Sunnyvale, CA 94088 408-733-7837
§ Texas Instrs., Data Sys. Group, P. O. Box 809063, Dallas, TX 75380-9063 1-800-527-3500
Unidot, Inc., 602 Park Point Dr., Golden, CO 80401 303-526-9263
United States Software Corp., 5470 N.W. Innisbrook Place, Portland, OR 97229 503-645-5043
Unitronix Corp., 197 Meister Ave., Somerville, NJ 08876 201-231-9400
USUS, Inc., UCSD Pascal Sys. User's Society, P.O. Box 1148, La Jolla, CA 92038
§ Volition Systems, P.O. Box 99628, San Diego, CA 92109 619-270-6800

§ Zax Corp., 2572 White Rd., Irvine, CA 92714 .... 714-474-1170;800-421-0982

Software, Program Translators-2050

§ Antona Corp., 2100 S. Sawtelle Blvd., Suite 205, Los Angeles, CA 90025 213-473-8995
Data I/O Corp., 10525 Willows Rd. N.E., Redmond, WA 98073-9746 206-881-6444
§ Software Dynamics, 2111 W. Crescent Ave-G, Anaheim, CA 92801 714-635-4760
Unitronix Corp., 197 Meister Ave., Somerville, NJ 08876 201-231-9400

Software, Report Generators-2050

BTU Engrg. Corp., Bruce Sys., Esquire Rd., N. Billerica, MA 01862 617-667-4111
Burroughs Corp., Borroughs Place, Rm. 4C-51, Detroit, MI 48232 313-972-7000
Cambridge Digital Sys., Compumart, P.O. Box 568, 65 Bent St., Cambridge, MA 02139 617-491-2700
§† Compucorp, 2211 Michigan Ave., Santa Monica, CA 90404 213-829-7453
§ Contel Info. Sys., Inc., Continental Tel. Corp., 130 Steamboat Rd., Great Neck, NY 11024 516-829-5900
Cosmos, Inc., 19530 Pacific Hwy. S. Suite 102, Seattle, WA 98188 206-824-9942
§ Data General, 4400 Computer Dr., Westboro, MA 01581 617-366-8911
Digiac Corp., 175 Engineers Rd., Hauppauge, NY 11788 516-273-8600
§ Eyring Research Inst., Inc., 1455 W. 820 N., Provo, UT 84601 801-375-2434
§ GMR Co., 8801 Sepulveda Blvd., Los Angeles, CA 90045 213-216-9516
Harris Corp., Computer Systems Div., 2101 W. Cypress Creek Rd., Ft. Lauderdale, FL 33309 305-974-1700
Haverly Systems, Inc., 78 Broadway, Denville, NJ 07834 201-627-1424
§ InfoCap, Inc., 31119 Via Colinas #502, Westlake Village, CA 91362 818-991-1410
Info-Pros Inc., 2102 Business Center Dr., Irvine, CA 92715 714-851-8975
† Metier Management Sys., Inc., 5884 Point West Dr., Houston, TX 77036 713-988-9100
MSS/Macintosh Software, 170 West 73rd St. Ste 12C, New York, NY 10023 212-799-8195
National Information Sys., Inc., 20370 Town Center Lane, Cupertino, CA 95014 408-257-7700
Noumenon Corp., 512 Westline Dr., Alamdea, CA 94501 415-521-2145
§ SMC Software Sys., Science Management Corp., P. O. Box 0600, Basking Ridge, NJ 07920 201-647-7000
§ Texas Instrs., Data Sys. Group, P. O. Box 809063, Dallas, TX 75380-9063 1-800-527-3500
† Uniq Digital Technologies, 28 S. Water Street, Batavia, IL 60510 312-879-1008
Unitronix Corp., 197 Meister Ave., Somerville, NJ 08876 201-231-9400

Software, Security-2050

Commercial Sys. Labs., Commercial Sys. Grp., P.O. Box 2710, Auburn, AL 36831 205-821-1133
Cosmos, Inc., 19530 Pacific Hwy. S. Suite 102, Seattle, WA 98188 206-824-9942
Data General, 4400 Computer Dr., Westboro, MA 01581 617-366-8911
Datatronic Systems Corp., Computer Sciences Div., P.O. Box 44128, Panorama City, CA 91412 818-988-5290
Eyring Research Inst., Inc., 1455 W. 820 N., Provo, UT 84601 801-375-2434
Gould Compion, 1101 E. University, Urbana, IL 61081 217-384-8500
§ Software Dynamics, 2111 W. Crescent Ave-G, Anaheim, CA 92801 714-635-4760
Texas Instrs., Data Sys. Group, P. O. Box 809063, Dallas, TX 75380-9063 1-800-527-3500

Software, Sort/Merge-2050

Cambridge Digital Sys., Compumart, P.O. Box 568, 65 Bent St., Cambridge, MA 02139 617-491-2700
§ Contel Info. Sys., Inc., Continental Tel. Corp., 130 Steamboat Rd., Great Neck, NY 11024 516-829-5900
Cosmos, Inc., 19530 Pacific Hwy. S. Suite 102, Seattle, WA 98188 206-824-9942
§ Data General, 4400 Computer Dr., Westboro, MA 01581 617-366-8911
Digiac Corp., 175 Engineers Rd., Hauppauge, NY 11788 516-273-8600
§ GMR Co., 8801 Sepulveda Blvd., Los Angeles, CA 90045 213-216-9516
Harris Corp., Computer Systems Div., 2101 W. Cypress Creek Rd., Ft. Lauderdale, FL 33309 305-974-1700
Haverly Systems, Inc., 78 Broadway, Denville, NJ 07834 201-627-1424
Info-Pros Inc., 2102 Business Center Dr., Irvine, CA 92715 714-851-8975
Noumenon Corp., 512 Westline Dr., Alamdea, CA 94501 415-521-2145
§ Software Dynamics, 2111 W. Crescent Ave-G, Anaheim, CA 92801 714-635-4760
§ Texas Instrs., Data Sys. Group, P. O. Box 809063, Dallas, TX 75380-9063 1-800-527-3500
† Uniq Digital Technologies, 28 S. Water Street, Batavia, IL 60510 312-879-1008
Unitronix Corp., 197 Meister Ave., Somerville, NJ 08876 201-231-9400

Software, Spoolers-2050

§ Contel Info. Sys., Inc., Continental Tel. Corp., 130 Steamboat Rd., Great Neck, NY 11024 516-829-5900
Cosmos, Inc., 19530 Pacific Hwy. S. Suite 102, Seattle, WA 98188 206-824-9942
Elite Software Development, Inc., P.O. Drawer 1194, Bryan, TX 77806 409-846-2340
§ GMR Co., 8801 Sepulveda Blvd., Los Angeles, CA 90045 213-216-9516
IDE Associates, Inc., 35 Dunham Rd., Billerica, MA 01821 617-663-6878
† Metier Management Sys., Inc., 5884 Point West Dr., Houston, TX 77036 713-988-9100
§ Texas Instrs., Data Sys. Group, P. O. Box 809063, Dallas, TX 75380-9063 1-800-527-3500
† Uniq Digital Technologies, 28 S. Water Street, Batavia, IL 60510 312-879-1008
Unitronix Corp., 197 Meister Ave., Somerville, NJ 08876 201-231-9400

Software, Utilities-2050

Action Instrs., 8601 Aero Dr., San Diego, CA 92123 619-279-5726
Applied Micro Technlg., A Burr Brown Co., 3669 E. 44th Street, Tucson, AZ 85713 602-622-8605
Atlantic Research, 5390 Cherokee Ave., Alexandria, VA 22312 703-642-4000
§ Boston Systems Office, 469 Moody St., Waltham, MA 02254-9164 617-894-7800
Burroughs Corp., Borroughs Place, Rm. 4C-51, Detroit, MI 48232 313-972-7000
§ Comtek, Inc., 309 Breesport, San Antonio, TX 78216 512-340-8253
Cosmos, Inc., 19530 Pacific Hwy. S. Suite 102, Seattle, WA 98188 206-824-9942
Data General, 4400 Computer Dr., Westboro, MA 01581 617-366-8911
§ Data Translation, 100 Locke Dr., Marlboro, MA 01752 617-481-3700
Development Associates, 1520 S. Lyon, Santa Ana, CA 92705 714-835-9512
Digiac Corp., 175 Engineers Rd., Hauppauge, NY 11788 516-273-8600
§ Ecosoft, Inc., 6413 N. College Ave., Indianapolis, IN 46220 317-255-6476
Eyring Research Inst., Inc., 1455 W. 820 N., Provo, UT 84601 801-375-2434
GEN/COMP Inc., 6 Algonquin Rd., Canton, MA 02021 617-828-2008
§ GMR Co., 8801 Sepulveda Blvd., Los Angeles, CA 90045 213-216-9516
Harris Corp., Computer Systems Div., 2101 W. Cypress Creek Rd., Ft. Lauderdale, FL 33309 305-974-1700
IDE Associates, Inc., 35 Dunham Rd., Billerica, MA 01821 617-663-6878
MicroTech Exports, 467 Hamilton Ave., Ste. 2, Palo Alto, CA 94301 415-324-9114
MSS/Macintosh Software, 170 West 73rd St. Ste 12C, New York, NY 10023 212-799-8195
National Information Sys., Inc., 20370 Town Center Lane, Cupertino, CA 95014 408-257-7700
Peritek Corp., 5550 Redwood Rd., Oakland, CA 94619 415-531-6500
§ Software Dynamics, 2111 W. Crescent Ave-G, Anaheim, CA 92801 714-635-4760
† Uniq Digital Technologies, 28 S. Water Street, Batavia, IL 60510 312-879-1008
United States Software Corp., 5470 N.W. Innisbrook Place, Portland, OR 97229 503-645-5043
Unitronix Corp., 197 Meister Ave., Somerville, NJ 08876 201-231-9400
USUS, Inc., UCSD Pascal Sys. User's Society, P.O. Box 1148, La Jolla, CA 92038

Solar Cells — See Cells, Photovoltaic (Vol. B)

Solder (All Types)-4600 — *See Vol. C*

Solder Lugs — See Terminals, Lug (All Types) (Vol. C)

Solder Pots & Baths-4600 — *See Vol. C*

Soldering Accessories-4600 — *See Vol. C*

Soldering Equipment, Hot Gas-4100

Fusion Inc., 4658 E. 355th. St., Willoughby, OH 44094 216-946-3300
Pace Inc., 9893 Brewers Ct., Laurel, MD 20707 301-490-9860

Soldering Equipment, Induction Heating-4100

† BTU Engrg. Corp., Bruce Sys., Esquire Rd., N. Billerica, MA 01862 617-667-4111
§ Contact, Inc., 5 Elm Ave., Hudson, NH 03051 603-883-7708
† Electrovert USA Corp., 10969 Shady Trail, #101, Dallas, TX 75220 214-353-9950
Fusion Inc., 4658 E. 355th. St., Willoughby, OH 44094 216-946-3300
Hexacon Elec., 161 W. Clay Ave., Roselle Park, NJ 07204 201-245-6200
Hughes Aircraft Co, Aerospace Grps./Support Sys., P.O. Box 90515, Los Angeles, CA 90009 213-670-1515
Hughes Aircraft Co., Microelctrn. Sys. Div., 2601 Campus Dr., Irvine, CA 92715 714-752-3800
§ Jensen Tools, Inc., Axia, Inc., 7815 S. 46th St., Phoenix, AZ 85040 602-968-6241
† Lepel, 59-21 Queens-Midtown Expwy., Maspeth, NY 11378 718-426-4580
Mann, Henry, Inc., 3983 Mann Road, Huntingdon Valley, PA 19006 215-355-7200
† Miller, L.C., Co., 717 Monterey Pass Rd., Monterey Pk., CA 91754 213-268-3611
† Reeve Electronics, Mellish E. Murray, 1720 W. Fulton St., Chicago, IL 60612 312-670-0150
Solder Absorbing Technology (SAT), South End Bridge Circle, Agawam, MA 01001 800-628-8862
§ Techni-Tool, 5 Apollo Rd., Box 368, Plymouth Meeting, PA 19462 215-825-4990

Soldering Equipment, Infrared-4100

Automated Production Concepts, 8 E. Garden Pl., Pompton Plains, NJ 07444 201-831-8300
§ Eraser Co., Box 4961, Syracuse, NY 13221 315-454-3237
RI/Control Systems, Research, Inc., P.O. Box 24064, Minneapolis, MN 55424 612-941-3300

Soldering Equipment, Printed Circuit-4100

§ Gardiner Solder Co., Div. of Gardiner Metal Co., 4820 S. Campbell Ave., Chicago, IL 60632, 312-847-0100 .... C•1738
§ Hexacon Elec., 161 W. Clay Ave., Roselle Park, NJ 07204, 201-245-6200 .... C•1739
† Air-Vac Engrg., 100 Gulf St., Milford, CT 06460 203-874-2541
Amlan, Inc., 97 Thornwood Rd., Stamford, CT 06903 203-322-1913
§ APA Division, 399 Executive Blvd., Elmsford, NY 10523 914-592-7322
§ Apollo Lasers, Inc., 9201 Independence Ave., Chatsworth, CA 91311 213-709-1111
Automated Production Concepts, 8 E. Garden Pl., Pompton Plains, NJ 07444 201-831-8300
† Automated Prod. Equip. Corp., 142 Peconic Ave., Medford, NY 11763 516-654-1197
§ BEA electro-optics, Inc., 690 First Ave., Des Plaines, IL 60016 312-298-1420
§ Beau Tech, P.O. Box 598, Portland, ME 04122 207-775-6139
§ Caig Labs., 1175-0 Industrial Ave., Escondido, CA 92025 619-743-7143
§† Casso-Solar, P.O. Box 163, U.S. Route 202, Pomona, NY 10970 914-354-2500
§† Chemtronics Inc., 681 Old Willets Path, Hauppauge, NY 11788 516-582-3322
Christiansen Radio Inc., 1950 San Remo, Laguna Beach, CA 92651 714-497-1506
Cyclo-Tronics, Inc., 1345 N. Old Rand Rd., Wauconda, IL 60084 312-526-0800
Electronic Controls Design, 13626 S. Freeman Rd., Mulino, OR 97042 503-829-9108
† Electrovert USA Corp., 10969 Shady Trail, #101, Dallas, TX 75220 214-353-9950
§ ESICO, Inc., Box 247, Deep River, CT 06417 203-526-5361
Hollis Engrg., Inc., Charron Ave., Box 1189, Nashua, NH 03061 603-889-1121
§ Hollis Engrg./Wire-Wrap, 15 Charron Ave., Nashua, NH 03061 603-889-1121
§ Kenco Industries, Inc., Elctrn. Chemicals Div., P.O. Box 88500, Atlanta, GA 30338 404-475-6100
§ Mann, Henry, Inc., 3983 Mann Road, Huntingdon Valley, PA 19006 215-355-7200
Nu-Concept Computer Sys., Rte. 309 & Advance La., Colmar, PA 18915 215-822-8400
OAL Assocs., P.O. Box J, Escondido, CA 92025 619-743-7143
§ Pace Inc., 9893 Brewers Ct., Laurel, MD 20707 301-490-9860

Penn Resch. Corp. (PRC), 2652 South Main St., P.O. Box 3357, Kennesaw, GA 30144 404-429-9061
§ Plato Prods., 2120 E. Allen Ave., Glendora, CA 91740 800-423-4510
Solder Absorbing Technology (SAT), South End Bridge Circle, Agawam, MA 01001 800-628-8862
Technical Devices, 560 Alaska Ave., Torrance, CA 90503 213-618-8437
§ Techni-Tool, 5 Apollo Rd., Box 368, Plymouth Meeting, PA 19462 215-825-4990
§ Ungar, Div. Eldon Inds., Inc., 100 W. Manville St., Compton, CA 90224-6005 213-774-5950
United Solder Wrap Inc., 2608 Electronic La., Ste 509, Dallas, TX 75220 214-350-4978
Universal Instrs., P.O. Box 825, Binghamton, NY 13902 607-775-1102
§ Wilson, H.F., Engrg. Co., 475 Taft Ave., Glen Ellyn, IL 60137 312-469-8473

Soldering Equipment, Resistance-4100

† Automated Prod. Equip. Corp., 142 Peconic Ave., Medford, NY 11763 516-654-1197
† BTU Engrg. Corp., Bruce Sys., Esquire Rd., N. Billerica, MA 01862 617-667-4111
§ Contact, Inc., 5 Elm Ave., Hudson, NH 03051 603-883-7708
Hexacon Elec., 161 W. Clay Ave., Roselle Park, NJ 07204 201-245-6200
§† Hughes Aircraft Co., 6155 El Camino Real, Carlsbad, CA 92008 619-931-3000
Hughes Aircraft Co., Indl. Prods. Div. FACT Sys., 6155 El Camino Real, Carlsbad, CA 92008 619-931-3000
§ Jensen Tools, Inc., Axia, Inc., 7815 S. 46th St., Phoenix, AZ 85040 602-968-6241
Kahle Engrg., Div. Joule Machinery Grp., 3344 Hudson Ave., P.O. Box 877, Union City, NJ 07087 201-867-6500
§ Mann, Henry, Inc., 3983 Mann Road, Huntingdon Valley, PA 19006 215-355-7200
§ Pace Inc., 9893 Brewers Ct., Laurel, MD 20707 301-490-9860
Raychem Corp., Elctrns. Grp., 300 Constitution Dr., Menlo Park, CA 94025 415-361-3860
Solder Absorbing Technology (SAT), South End Bridge Circle, Agawam, MA 01001 800-628-8862
§ Techni-Tool, 5 Apollo Rd., Box 368, Plymouth Meeting, PA 19462 215-825-4990
§ Tech Spray, Inc., Box 949, Amarillo, TX 79105 806-372-8523
Trans American Transformer, 142 Peconic Ave., Medford, NY 11763 516-654-1880
§ Triton Mfg. Co., P.O. Box 361, East Haddam, CT 06423 203-838-4666
† Weltek Intl., Inc., 760 W. Cotter St., South Bend, IN 46613 219-232-5400

Soldering Systems, Temperature Controlled-4100

§ Gardiner Solder Co., Div. of Gardiner Metal Co., 4820 S. Campbell Ave., Chicago, IL 60632, 312-847-0100 .... C•1738
§ Hexacon Elec., 161 W. Clay Ave., Roselle Park, NJ 07204, 201-245-6200 .... C•1739
Air-Vac Engrg., 100 Gulf St., Milford, CT 06460 203-874-2541
† Apollo Lasers, Inc., 9201 Independence Ave., Chatsworth, CA 91311 213-709-1111
Aremco Prods., Box 429, Ossining, NY 10562 914-762-0685
Automated Production Concepts, 8 E. Garden Pl., Pompton Plains, NJ 07444 201-831-8300
† Automated Prod. Equip. Corp., 142 Peconic Ave., Medford, NY 11763 516-654-1197
† BTU Engrg. Corp., Bruce Sys., Esquire Rd., N. Billerica, MA 01862 617-667-4111
§ Caig Labs., 1175-0 Industrial Ave., Escondido, CA 92025 619-743-7143
§† Cooper Group, PO Box 30100, Raleigh, NC 27622 919-781-7200
† Electrovert USA Corp., 10969 Shady Trail, # 101, Dallas, TX 75220 214-353-9950
E.P.E. Corp., P.O. Box 5238, Manchester, NH 03108 603-669-9181
§ Hollis Engrg., Inc., Charron Ave., Box 1189, Nashua, NH 03061 603-889-1121
§† Hughes Aircraft Co., 6155 El Camino Real, Carlsbad, CA 92008 619-931-3000
Hughes Aircraft Co, Aerospace Grps./Support Sys., P.O. Box 90515, Los Angeles, CA 90009 213-670-1515
Hughes Aircraft Co., Indl. Prods. Div. FACT Sys., 6155 El Camino Real, Carlsbad, CA 92008 619-931-3000
Hughes Aircraft Co., Microelctrn. Sys. Div., 2601 Campus Dr., Irvine, CA 92715 714-752-3800
§ Jensen Tools, Inc., Axia, Inc., 7815 S. 46th St., Phoenix, AZ 85040 602-968-6241
Kahle Engrg., Div. Joule Machinery Grp., 3344 Hudson Ave., P.O. Box 877, Union City, NJ 07087 201-867-6500
§ Mann, Henry, Inc., 3983 Mann Road, Huntingdon Valley, PA 19006 215-355-7200
Newman, M. M., Corp., Heli-Tube Div., P.O. Box 615, Marblehead, MA 01945 617-631-7100
OAL Assocs., P.O. Box J, Escondido, CA 92025 619-743-7143
§ OK Industries, Inc., 3455 Conner St., Bronx, NY 10475 212-994-6600
Pace Inc., 9893 Brewers Ct., Laurel, MD 20707 301-490-9860
† Penn Resch. Corp. (PRC), 2652 South Main St., P.O. Box 3357, Kennesaw, GA 30144 404-429-9061
Plato Prods., 2120 E. Allen Ave., Glendora, CA 91740 800-423-4510
Raychem Corp., Elctrns. Grp., 300 Constitution Dr., Menlo Park, CA 94025 415-361-3860
Solder Absorbing Technology (SAT), South End Bridge Circle, Agawam, MA 01001 800-628-8862
Technical Devices, 560 Alaska Ave., Torrance, CA 90503 213-618-8437
§ Techni-Tool, 5 Apollo Rd., Box 368, Plymouth Meeting, PA 19462 215-825-4990
§ Ungar, Div. Eldon Inds., Inc., 100 W. Manville St., Compton, CA 90224-6005 213-774-5950
Universal Instrs., P.O. Box 825, Binghamton, NY 13902 607-775-1102
§ Wellman Thermal Sys., 1 Progress Rd, Shelbyville, IN 46176 317-398-4411
† Weltek Intl., Inc., 760 W. Cotter St., South Bend, IN 46613 219-232-5400

Soldering Equipment, Ultrasonic-4100

§ Sonobond, 200 E. Rosedale Ave., West Chester, PA 19380 215-696-4710
§ Techni-Tool, 5 Apollo Rd., Box 368, Plymouth Meeting, PA 19462 215-825-4990

Soldering Equipment, Vapor Phase-4100

Electrovert USA Corp., 10969 Shady Trail, # 101, Dallas, TX 75220 214-353-9950

Soldering Guns, Irons & Desoldering Tools-4600 — *See Vol. C*

Soldering (MIL)-2440 — *See Vol. B*

Solenoids, Linear-4550 — *See Vol. B*

Solenoids, Proportional-4550 — *See Vol. B*

Solenoids, Rotary-4550 — *See Vol. B*

Solenoids (MIL)-2440 — *See Vol. B*

Solvents — See Cleaners & Solvents (Vol. C)

Sonar Systems-3475

† Raytheon Co., Submarine Signal Div., 1847 W. Main Rd., P.O. Box 360, Portsmouth, RI 02871 401-847-8000

S100 Bus — See Board Computers & Subassemblies (Vol. D)

Sound Absorbing Materials-2825 — *See Vol. C*

Sound Level Indicators — See Meters, Audio Level (Vol. D)

Sound Recording Equip. — See Microphones (Vol. D), Recorders (Vol. D), etc.

Spacers-2825 — *See Vol. C*

Spaghetti — See Tubing, Spaghetti (Vol. C)

Spark Gaps-4300 — *See Vol. B*

Speakers, Explosion & Flame Proof-1300

† Oaktron Inds., 1000 30th St., Monroe, WI 53566, 608-328-5560 .... D•1030
† Accusonic Systems Corp., 12 Kulick Rd., Fairfield, NJ 07006 201-575-1570
§ Alpha Products, Inc., 5740 Corsa Ave. # 104, Westlake Village, CA 91362 818-889-9304
§ Atlas Sound Div., 10 Pomeroy Rd., Parsippany, NJ 07054 201-887-7800
§† Audiosone, Inc., 617 Fan Hill Rd., Monroe, CT 06468 .... 203-268-4372;203-268-6703
CML MACARR Div., Marine Electric RPD, Inc., 666 Pacific St., Brooklyn, NY 11217 718-857-2400
§ ERA Poly-Planar Div., 311 E. Park St., Moonachie, NJ 07074 201-641-3650
§ Panasonic, Ind'l. Elctrn. Comps., Panasonic, Elctrn. Comps. Div., Box 1503, Secaucus, NJ 07094 201-348-7000
§ Quam-Nichols Co., 234 E. Marquette Rd., Chicago, IL 60637 312-488-5800
§ University Sound, Altec Corp., 1250 N. Red Gum St., Anaheim, CA 92806 714-632-7117

Speakers, Horn-1300

International Comps. Corp., 105 Maxess Rd., Melville, NY 11747, 516-293-1500 .... D•1025
§ MG Electronics, 32 Ranick Rd., Hauppauge, NY 11788, 516-582-3400 .... D•1027
Shogyo Intl. Corp., 287 Northern Blvd., Great Neck, NY 11021, 516-466-0911 .... D•1038
AES Corp., 285 Newbury St., P.O. Box 2093, Peabody, MA 01960 617-535-7310
§ Aiphone, 1700 130th St. NE, Bellevue, WA 98005 206-455-0510
§ Atlas Sound Div., 10 Pomeroy Rd., Parsippany, NJ 07054 201-887-7800
§† Audiosone, Inc., 617 Fan Hill Rd., Monroe, CT 06468 .... 203-268-4372;203-268-6703
Cord Electronics, Inc., 177 Cantiague Rock Rd., Westbury, NY 11590 516-935-3640
§ Davis, J. W., & Co., P.O. Box 26177, Dallas, TX 75226 214-651-7341
§† Dukane Corp., Communications Sys. Div., 2900 Dukane Dr., St. Charles, IL 60174 312-584-2300
§ Fourjay Industries, Box 14617 Northridge Br., Dayton, OH 45414 513-278-9416
§ Frazier, 1930 Valley View La., Dallas, TX 75234 214-241-3441
§ GC Elctrns., 400 S. Wyman St., Rockford, IL 61101 815-968-9661
§ Harris Corp., Dracon Div., 809 Calle Plano, Camarillo, CA 93010 805-987-9511
ISL Products Int'l, Ltd., 235 P Robbins Lane, Syosset, NY 11791-6093 516-822-9601
† Kolin Inds., Box 300; Pound Ridge, NY 10576 914-764-5775
§ Martin Sound Prods., 28 Alpha Park, Cleveland, OH 44143-2297 216-442-2286
Multi Prods. Intl., 218 Little Falls Rd., P.O. Box 238, Cedar Grove, NJ 07009 201-239-8183
§ Panasonic, Ind'l. Elctrn. Comps., Panasonic, Elctrn. Comps. Div., Box 1503, Secaucus, NJ 07094 201-348-7000
§ Paso Sound Prods., 14 First St, Pelham, NY 10803 914-738-4800
§ Philmore Mfg., 40 Inip Dr., Inwood, NY 11696 516-239-6161
§ Projects Unltd., 3680 Wyse Rd., Dayton, OH 45414 513-890-1918
§ Pyle Industries, Inc., 501 Center St., P.O. Box 620, Huntington, IN 46750 219-356-1200
§ Recoton Corp., 46-23 Crane St., Long Island City, NY 11101 718-392-6442
§ RMS Electronics Inc., 50 Antin Pl., Bronx, NY 10462 212-892-6700
§ Shokai Far East, Ltd., 280 North Central Ave., Hartsdale, NY 10530 914-681-0700
§ SPECO Div., Components Specialties, Inc., P.O. Box 624, 1172 Rte. 109, Lindenhurst, NY 11757 .... 516-957-8700;800-645-5516
§ University Sound, Altec Corp., 1250 N. Red Gum St., Anaheim, CA 92806 714-632-7117
§ Vidaire Electronics Mfg. Corp., P. O. Box 788, Freeport, NY 11520 516-623-6696
§ Wheelock, Inc., 273 Branchport Ave., Long Branch, NJ 07740 201-222-6880
§† Workman Elctrn. Prods., Box 3828, Sarasota, FL 33578 813-371-4242

Speakers, Intercom-1300

International Comps. Corp., 105 Maxess Rd., Melville, NY 11747, 516-293-1500 .... D•1025
§ MG Electronics, 32 Ranick Rd., Hauppauge, NY 11788, 516-582-3400 .... D•1027
NTK Technical Ceramics, NGK Spark Plugs (U.S.A.), Inc., 1701 N. Greenville Ave. # 205, Richardson, TX 75081, 214-235-8332 .... D•1029
§† Oaktron Inds., 1000 30th St., Monroe, WI 53566, 608-328-5560 .... D•1030
§ Quam-Nichols Co., 234 E. Marquette Rd., Chicago, IL 60637, 312-488-5800 .... D•1032-1033

Shogyo Intl. Corp., 287 Northern Blvd., Great Neck, NY 11021, 516-466-0911 .... D•1038
† Accusonic Systems Corp., 12 Kulick Rd., Fairfield, NJ 07006 201-575-1570
§ Aiphone, 1700 130th St. NE, Bellevue, WA 98005 206-455-0510
§ Atlas Sound Div., 10 Pomeroy Rd., Parsippany, NJ 07054 201-887-7800
§† Audiosone, Inc., 617 Fan Hill Rd., Monroe, CT 06468 .... 203-268-4372;203-268-6703
CML MACARR Div., Marine Electric RPD, Inc., 666 Pacific St., Brooklyn, NY 11217 718-857-2400
CTS Corporation, 905 North West Blvd., Elkart, IN 46514 219-293-7511
§ Dai-Ichi Shoji of Amer., Inc., 150 Fifth Ave., New York, NY 10011 212-691-9050
§ Dukane Corp., Communications Sys. Div., 2900 Dukane Dr., St. Charles, IL 60174 312-584-2300
§ ERA Poly-Planar Div., 311 E. Park St., Moonachie, NJ 07074 201-641-3650
† ERA Transpac Div., Sub. Elctrn. Research Assocs., 50 Graphic Place, Moonachie, NJ 07074 201-641-3650
§ GC Elctrns., 400 S. Wyman St., Rockford, IL 61101 815-968-9661
§ Harris Corp., Dracon Div., 809 Calle Plano, Camarillo, CA 93010 805-987-9511
§ Martin Sound Prods., 28 Alpha Park, Cleveland, OH 44143-2297 216-442-2286
Multi Prods. Intl., 218 Little Falls Rd., P.O. Box 238, Cedar Grove, NJ 07009 201-239-8183
§ Panasonic, Ind'l. Elctrn. Comps., Panasonic, Elctrn. Comps. Div., Box 1503, Secaucus, NJ 07094 201-348-7000
§ Paso Sound Prods., 14 First St, Pelham, NY 10803 914-738-4800
§ Philmore Mfg., 40 Inip Dr., Inwood, NY 11696 516-239-6161
§ Pyle Industries, Inc., 501 Center St., P.O. Box 620, Huntington, IN 46750 219-356-1200
§ Recoton Corp., 46-23 Crane St., Long Island City, NY 11101 718-392-6442
§ Shokai Far East, Ltd., 280 North Central Ave., Hartsdale, NY 10530 914-681-0700
§ Soundlier, American Trading & Prod. Corp., 9380 Watson Ind'l. Pk., St. Louis, MO 63126 314-962-9870
§ SPECO Div., Components Specialties, Inc., P.O. Box 624, 1172 Rte. 109, Lindenhurst, NY 11757 .... 516-957-8700;800-645-5516
† Telephonics, 770 Park Ave., Huntington, NY 11743 516-549-6000
§ University Sound, Altec Corp., 1250 N. Red Gum St., Anaheim, CA 92806 714-632-7117
§ Wheelock, Inc., 273 Branchport Ave., Long Branch, NJ 07740 201-222-6880

Speakers, Midrange-1300

International Comps. Corp., 105 Maxess Rd., Melville, NY 11747, 516-293-1500 .... D•1025
§ MG Electronics, 32 Ranick Rd., Hauppauge, NY 11788, 516-582-3400 .... D•1027
§ Oaktron Inds., 1000 30th St., Monroe, WI 53566, 608-328-5560 .... D•1030
§ Quam-Nichols Co., 234 E. Marquette Rd., Chicago, IL 60637, 312-488-5800 .... D•1032-1033
Shogyo Intl. Corp., 287 Northern Blvd., Great Neck, NY 11021, 516-466-0911 .... D•1038
† Accusonic Systems Corp., 12 Kulick Rd., Fairfield, NJ 07006 201-575-1570
§ Altec Lansing, Altec Corp., 1250 N. Red Gum St., Anaheim, CA 92806 714-632-7117
§ Atlas Sound Div., 10 Pomeroy Rd., Parsippany, NJ 07054 201-887-7800
§† Audiosone, Inc., 617 Fan Hill Rd., Monroe, CT 06468 .... 203-268-4372;203-268-6703
Cord Electronics, Inc., 177 Cantiague Rock Rd., Westbury, NY 11590 516-935-3640
CTS Corporation, 905 North West Blvd., Elkart, IN 46514 219-293-7511
§ Dai-Ichi Shoji of Amer., Inc., 150 Fifth Ave., New York, NY 10011 212-691-9050
ERA Transpac Div., Sub. Elctrn. Research Assocs., 50 Graphic Place, Moonachie, NJ 07074 201-641-3650
§ Frazier, 1930 Valley View La., Dallas, TX 75234 214-241-3441
§ GC Elctrns., 400 S. Wyman St., Rockford, IL 61101 815-968-9661
Golden Pacific Elctrns., Inc., 1020 N. Batavia St., Ste. Q, Orange, CA 92667 .... 714-538-9752/9753
§† Hartley Prods., 620 Island Rd., Ramsey, NJ 07446 201-327-4443
§ Martin Sound Prods., 28 Alpha Park, Cleveland, OH 44143-2297 216-442-2286
Multi Prods. Intl., 218 Little Falls Rd., P.O. Box 238, Cedar Grove, NJ 07009 201-239-8183
§ Panasonic, Ind'l. Elctrn. Comps., Panasonic, Elctrn. Comps. Div., Box 1503, Secaucus, NJ 07094 201-348-7000
§ Pyle Industries, Inc., 501 Center St., P.O. Box 620, Huntington, IN 46750 219-356-1200
§ Shokai Far East, Ltd., 280 North Central Ave., Hartsdale, NY 10530 914-681-0700
§ Soundlier, American Trading & Prod. Corp., 9380 Watson Ind'l. Pk., St. Louis, MO 63126 314-962-9870
§ SPECO Div., Components Specialties, Inc., P.O. Box 624, 1172 Rte. 109, Lindenhurst, NY 11757 .... 516-957-8700;800-645-5516
§ Wheelock, Inc., 273 Branchport Ave., Long Branch, NJ 07740 201-222-6880

Speakers, Musical Instrument-1300

§† Oaktron Inds., 1000 30th St., Monroe, WI 53566, 608-328-5560 .... D•1030
Shogyo Intl. Corp., 287 Northern Blvd., Great Neck, NY 11021, 516-466-0911 .... D•1038
§ Altec Lansing, Altec Corp., 1250 N. Red Gum St., Anaheim, CA 92806 714-632-7117
§ Atlas Sound Div., 10 Pomeroy Rd., Parsippany, NJ 07054 201-887-7800
Celestion Inds., Inc., Kuniholm Dr., Box 521, Holliston, MA 01746 617-429-6706
CTS Corporation, 905 North West Blvd., Elkart, IN 46514 219-293-7511
§ Dai-Ichi Shoji of Amer., Inc., 150 Fifth Ave., New York, NY 10011 212-691-9050
§ Hartley Prods., 620 Island Rd., Ramsey, NJ 07446 201-327-4443
§ Heath Co., Benton Harbor, MI 49022 616-982-3886
International Comps. Corp., 105 Maxess Rd., Melville, NY 11747 516-293-1500
§ Martin Sound Prods., 28 Alpha Park, Cleveland, OH 44143-2297 216-442-2286
§ MG Electronics, 32 Ranick Rd., Hauppauge, NY 11788 516-582-3400
§ Panasonic, Ind'l. Elctrn. Comps., Panasonic, Elctrn. Comps. Div., Box 1503, Secaucus, NJ 07094 201-348-7000
§ Pyle Industries, Inc., 501 Center St., P.O. Box 620, Huntington, IN 46750 219-356-1200
§ Quam-Nichols Co., 234 E. Marquette Rd., Chicago, IL 60637 312-488-5800
§ Shokai Far East, Ltd., 280 North Central Ave., Hartsdale, NY 10530 914-681-0700
§ Soundlier, American Trading & Prod. Corp., 9380 Watson Ind'l. Pk., St. Louis, MO 63126 314-962-9870

Sparkomatic, Rte. 6 & 209, Milford, PA 18337 717-296-6444
§ SPECO Div., Components Specialties, Inc., P.O. Box 624, 1172 Rte. 109, Lindenhurst, NY 11757 .... 516-957-8700;800-645-5516

Speakers, Paging — See Speakers, Intercom (Vol. D)

Speakers, Pillow-1300

§† Dukane Corp., Communications Sys. Div., 2900 Dukane Dr., St. Charles, IL 60174 312-584-2300
§ GC Elctrns., 400 S. Wyman St., Rockford, IL 61101 815-968-9661
International Comps. Corp., 105 Maxess Rd., Melville, NY 11747 516-293-1500
§ Multi Prods. Intl., 218 Little Falls Rd., P.O. Box 238, Cedar Grove, NJ 07009 201-239-8183
§ Panasonic, Ind'l. Elctrn. Comps., Panasonic, Elctrn. Comps. Div., Box 1503, Secaucus, NJ 07094 201-348-7000
§ Philmore Mfg., 40 Inip Dr., Inwood, NY 11696 516-239-6161
§ Pyle Industries, Inc., 501 Center St., P.O. Box 620, Huntington, IN 46750 219-356-1200
§ Recoton Corp., 46-23 Crane St., Long Island City, NY 11101 718-392-6442
§ Rye Inds., Inc., 125 Spencer Pl., P.O. Box M, Mamaroneck, NY 10543 914-698-0080
§ Shokai Far East, Ltd., 280 North Central Ave., Hartsdale, NY 10530 914-681-0700
§ SPECO Div., Components Specialties, Inc., P.O. Box 624, 1172 Rte. 109, Lindenhurst, NY 11757 .... 516-957-8700;800-645-5516
§† Workman Elctrn. Prods., Box 3828, Sarasota, FL 33578 813-371-4242

Speakers, Public Address-1300

International Comps. Corp., 105 Maxess Rd., Melville, NY 11747, 516-293-1500 .... D•1025
§ MG Electronics, 32 Ranick Rd., Hauppauge, NY 11788, 516-582-3400 .... D•1027
§† Oaktron Inds., 1000 30th St., Monroe, WI 53566, 608-328-5560 .... D•1030
§ Quam-Nichols Co., 234 E. Marquette Rd., Chicago, IL 60637, 312-488-5800 .... D•1032-1033
Shogyo Intl. Corp., 287 Northern Blvd., Great Neck, NY 11021, 516-466-0911 .... D•1038
§ Altec Lansing, Altec Corp., 1250 N. Red Gum St., Anaheim, CA 92806 714-632-7117
§ Argos Prods., 600 S. Sycamore St., Genoa, IL 60135 815-784-5118
§ Atlas Sound Div., 10 Pomeroy Rd., Parsippany, NJ 07054 201-887-7800
§† Audiosone, Inc., 617 Fan Hill Rd., Monroe, CT 06468 .... 203-268-4372;203-268-6703
Celestion Inds., Inc., Kuniholm Dr., Box 521, Holliston, MA 01746 617-429-6706
CML MACARR Div., Marine Electric RPD, Inc., 666 Pacific St., Brooklyn, NY 11217 718-857-2400
Cord Electronics, Inc., 177 Cantiague Rock Rd., Westbury, NY 11590 516-935-3640
CTS Corporation, 905 North West Blvd., Elkart, IN 46514 219-293-7511
§ Dai-Ichi Shoji of Amer., Inc., 150 Fifth Ave., New York, NY 10011 212-691-9050
§ Dukane Corp., Communications Sys. Div., 2900 Dukane Dr., St. Charles, IL 60174 312-584-2300
§ ERA Poly-Planar Div., 311 E. Park St., Moonachie, NJ 07074 201-641-3650
† ERA Transpac Div., Sub. Elctrn. Research Assocs., 50 Graphic Place, Moonachie, NJ 07074 201-641-3650
§ Frazier, 1930 Valley View La., Dallas, TX 75234 214-241-3441
§ GC Elctrns., 400 S. Wyman St., Rockford, IL 61101 815-968-9661
§ Harris Corp., Dracon Div., 809 Calle Plano, Camarillo, CA 93010 805-987-9511
† Kolin Inds., Box 300, Pound Ridge, NY 10576 914-764-5775
§ Martin Sound Prods., 28 Alpha Park, Cleveland, OH 44143-2297 216-442-2286
§ Paso Sound Prods., 14 First St, Pelham, NY 10803 914-738-4800
§ Perma Power Elctrns., 5615 W. Howard Ave., Chicago, IL 60648 312-647-9414
§ Philmore Mfg., 40 Inip Dr., Inwood, NY 11696 516-239-6161
§ Precision Elctrns., 9101 King Ave., Franklin Park, IL 60131 312-678-5350
§ Pyle Industries, Inc., 501 Center St., P.O. Box 620, Huntington, IN 46750 219-356-1200
§ RMS Electronics Inc., 50 Antin Pl., Bronx, NY 10462 212-892-6700
§ Shokai Far East, Ltd., 280 North Central Ave., Hartsdale, NY 10530 914-681-0700
§ Soundlier, American Trading & Prod. Corp., 9380 Watson Ind'l. Pk., St. Louis, MO 63126 314-962-9870
§ SPECO Div., Components Specialties, Inc., P.O. Box 624, 1172 Rte. 109, Lindenhurst, NY 11757 .... 516-957-8700;800-645-5516
§ University Sound, Altec Corp., 1250 N. Red Gum St., Anaheim, CA 92806 714-632-7117
§ Vidaire Electronics Mfg. Corp., P. O. Box 788, Freeport, NY 11520 516-623-6696
Wheelock, Inc., 273 Branchport Ave., Long Branch, NJ 07740 201-222-6880

Speakers, Replacement (Incl. Aircraft, Automotive & TV)-1300

International Comps. Corp., 105 Maxess Rd., Melville, NY 11747, 516-293-1500 .... D•1025
§ MG Electronics, 32 Ranick Rd., Hauppauge, NY 11788, 516-582-3400 .... D•1027
§† Oaktron Inds., 1000 30th St., Monroe, WI 53566, 608-328-5560 .... D•1030
Shogyo Intl. Corp., 287 Northern Blvd., Great Neck, NY 11021, 516-466-0911 .... D•1038
§ Shokai Far East, Ltd., 280 North Central Ave., Hartsdale, NY 10530, 914-681-0700 .... D•1039
† Accusonic Systems Corp., 12 Kulick Rd., Fairfield, NJ 07006 201-575-1570
§ Altec Lansing, Altec Corp., 1250 N. Red Gum St., Anaheim, CA 92806 714-632-7117
§† Audiosone, Inc., 617 Fan Hill Rd., Monroe, CT 06468 .... 203-268-4372;203-268-6703
Bosch, Robert, Corp., 2800 S. 25th Ave., Broadview, IL 60153 312-865-5200
CTS Corporation, 905 North West Blvd., Elkart, IN 46514 219-293-7511
§ Dai-Ichi Shoji of Amer., Inc., 150 Fifth Ave., New York, NY 10011 212-691-9050
ERA Transpac Div., Sub. Elctrn. Research Assocs., 50 Graphic Place, Moonachie, NJ 07074 201-641-3650
§ GC Elctrns., 400 S. Wyman St., Rockford, IL 61101 815-968-9661
§ Martin Sound Prods., 28 Alpha Park, Cleveland, OH 44143-2297 216-442-2286
Multi Prods. Intl., 218 Little Falls Rd., P.O. Box 238, Cedar Grove, NJ 07009 201-239-8183
§ Philmore Mfg., 40 Inip Dr., Inwood, NY 11696 516-239-6161
§ Pyle Industries, Inc., 501 Center St., P.O. Box 620, Huntington, IN 46750 219-356-1200

§ Quam-Nichols Co., 234 E. Marquette Rd., Chicago, IL 60637 312-488-5800
§ Recoton Corp., 46-23 Crane St., Long Island City, NY 11101 718-392-6442
Sparkomatic, Rte. 6 & 209, Milford, PA 18337 717-296-6444
§ SPECO Div., Components Specialties, Inc., P.O. Box 624, 1172 Rte. 109, Lindenhurst, NY 11757 .... 516-957-8700;800-645-5516

Speakers, Submergence Proof-1300

§ Oaktron Inds., 1000 30th St., Monroe, WI 53566, 608-328-5560 .... D•1030
† Accusonic Systems Corp., 12 Kulick Rd., Fairfield, NJ 07006 201-575-1570
§ Alpha Products, Inc., 5740 Corsa Ave. #104, Westlake Village, CA 91362 818-889-9304
† ERA Transpac Div., Sub. Elctrn. Research Assocs., 50 Graphic Place, Moonachie, NJ 07074 201-641-3650
International Comps. Corp., 105 Maxess Rd., Melville, NY 11747 516-293-1500
Pyle Industries, Inc., 501 Center St., P.O. Box 620, Huntington, IN 46750 219-356-1200
† Shokai Far East, Ltd., 280 North Central Ave., Hartsdale, NY 10530 914-681-0700
† Telectro Sys., 96-18 43rd Ave., Corona, NY 11368 212-651-8900
§ University Sound, Altec Corp., 1250 N. Red Gum St., Anaheim, CA 92806 714-632-7117

Speakers, Subminiature-Also See Bells, Buzzers, Gongs, Sirens & Aural Warning Devices-1300

NTK Technical Ceramics, NGK Spark Plugs (U.S.A.), Inc., 1701 N. Greenville Ave. #205, Richardson, TX 75081, 214-235-8332 .... D•1029
Oaktron Inds., 1000 30th St., Monroe, WI 53566, 608-328-5560 .... D•1030
Shogyo Intl. Corp., 287 Northern Blvd., Great Neck, NY 11021, 516-466-0911 .... D•1038
§ TDK Corporation of America, 4711 Golf Rd., Skokie, IL 60076, 312-679-8200 .... D•1046-1047
Cord Electronics, Inc., 177 Cantiague Rock Rd., Westbury, NY 11590 ... 516-935-3640
§ Dai-Ichi Shoji of Amer., Inc., 150 Fifth Ave., New York, NY 10011 212-691-9050
Golden Pacific Elctrns., Inc., 1020 N. Batavia St., Ste. Q, Orange, CA 92667 .... 714-538-9752/9753
§ Heath Co., Benton Harbor, MI 49022 616-982-3886
† Imtronics Inds., 11930 31st Ct., St. Petersburg, FL 33715 813-577-9010
International Comps. Corp., 105 Maxess Rd., Melville, NY 11747 516-293-1500
§ MG Electronics, 32 Ranick Rd., Hauppauge, NY 11788 516-582-3400
§ Projects Unltd., 3680 Wyse Rd., Dayton, OH 45414 513-890-1918
§ Rye Inds., Inc., 125 Spencer Pl., P.O. Box M, Mamaroneck, NY 10543 ... 914-698-0080
§ SPECO Div., Components Specialties, Inc., P.O. Box 624, 1172 Rte. 109, Lindenhurst, NY 11757 .... 516-957-8700;800-645-5516
§ Star Micronics, Inc., Components Div., 70-D Ethel Rd. W., Piscataway, NJ 08854 201-572-9512

Speakers, Tweeter-1300

§ MG Electronics, 32 Ranick Rd., Hauppauge, NY 11788, 516-582-3400 ... D•1027
§† Oaktron Inds., 1000 30th St., Monroe, WI 53566, 608-328-5560 .... D•1030
Shogyo Intl. Corp., 287 Northern Blvd., Great Neck, NY 11021, 516-466-0911 .... D•1038
§ Atlas Sound Div., 10 Pomeroy Rd., Parsippany, NJ 07054 201-887-7800
CTS Corporation, 905 North West Blvd., Elkart, IN 46514 219-293-7511
§ Dai-Ichi Shoji of Amer., Inc., 150 Fifth Ave., New York, NY 10011 212-691-9050
§ Dukane Corp., Communications Sys. Div., 2900 Dukane Dr., St. Charles, IL 60174 312-584-2300
ERA Transpac Div., Sub. Elctrn. Research Assocs., 50 Graphic Place, Moonachie, NJ 07074 201-641-3650
§ Frazier, 1930 Valley View La., Dallas, TX 75234 214-241-3441
§ GC Elctrns., 400 S. Wyman St., Rockford, IL 61101 815-968-9661
§† Hartley Prods., 620 Island Rd., Ramsey, NJ 07446 201-327-4443
International Comps. Corp., 105 Maxess Rd., Melville, NY 11747 516-293-1500
§ Martin Sound Prods., 28 Alpha Park, Cleveland, OH 44143-2297 216-442-2286
§ Panasonic, Ind'l. Elctrn. Comps., Panasonic, Elctrn. Comps. Div., Box 1503, Secaucus, NJ 07094 201-348-7000
§ Pyle Industries, Inc., 501 Center St., P.O. Box 620, Huntington, IN 46750 219-356-1200
§ Quam-Nichols Co., 234 E. Marquette Rd., Chicago, IL 60637 312-488-5800
§ Shokai Far East, Ltd., 280 North Central Ave., Hartsdale, NY 10530 914-681-0700
§ Soundlier, American Trading & Prod. Corp., 9380 Watson Ind'l. Pk., St. Louis, MO 63126 314-962-9870
Sparkomatic, Rte. 6 & 209, Milford, PA 18337 717-296-6444
§ SPECO Div., Components Specialties, Inc., P.O. Box 624, 1172 Rte. 109, Lindenhurst, NY 11757 .... 516-957-8700;800-645-5516
§ Superex Electronics Corp., 151 Ludlow St., Yonkers, NY 10705 914-965-6906

Speakers, Weatherproof-1300

International Comps. Corp., 105 Maxess Rd., Melville, NY 11747, 516-293-1500 .... D•1025
§† Oaktron Inds., 1000 30th St., Monroe, WI 53566, 608-328-5560 .... D•1030
§ Quam-Nichols Co., 234 E. Marquette Rd., Chicago, IL 60637, 312-488-5800 .... D•1033
† Accusonic Systems Corp., 12 Kulick Rd., Fairfield, NJ 07006 201-575-1570
AES Corp., 285 Newbury St., P.O. Box 2093, Peabody, MA 01960 617-535-7310
§ Altec Lansing, Altec Corp., 1250 N. Red Gum St., Anaheim, CA 92806 ... 714-632-7117
§ Atlas Sound Div., 10 Pomeroy Rd., Parsippany, NJ 07054 201-887-7800
§† Audiosone, Inc., 617 Fan Hill Rd., Monroe, CT 06468 ..... 203-268-4372;203-268-6703
Cord Electronics, Inc., 177 Cantiague Rock Rd., Westbury, NY 11590 ... 516-935-3640
CTS Corporation, 905 North West Blvd., Elkart, IN 46514 219-293-7511
§ Dai-Ichi Shoji of Amer., Inc., 150 Fifth Ave., New York, NY 10011 212-691-9050
§ Dukane Corp., Communications Sys. Div., 2900 Dukane Dr., St. Charles, IL 60174 312-584-2300
§ ERA Poly-Planar Div., 311 E. Park St., Moonachie, NJ 07074 201-641-3650
§ GC Elctrns., 400 S. Wyman St., Rockford, IL 61101 815-968-9661
§ Harris Corp., Dracon Div., 809 Calle Plano, Camarillo, CA 93010 805-987-9511
§† Hartley Prods., 620 Island Rd., Ramsey, NJ 07446 201-327-4443
† Kolin Inds., Box 300, Pound Ridge, NY 10576 914-764-5775
§ Martin Sound Prods., 28 Alpha Park, Cleveland, OH 44143-2297 216-442-2286
§ MG Electronics, 32 Ranick Rd., Hauppauge, NY 11788 516-582-3400
§ Panasonic, Ind'l. Elctrn. Comps., Panasonic, Elctrn. Comps. Div., Box 1503, Secaucus, NJ 07094 201-348-7000
§ Paso Sound Prods., 14 First St., Pelham, NY 10803 914-738-4800
§ Pathcom, Inc., Pace Two-Way Radio Prods., 24105 S. Frampton Ave., Harbor City, CA 90710 213-325-1290
§ Philmore Mfg., 40 Inip Dr., Inwood, NY 11696 516-239-6161
Pyle Industries, Inc., 501 Center St., P.O. Box 620, Huntington, IN 46750 219-356-1200
§ Recoton Corp., 46-23 Crane St., Long Island City, NY 11101 718-392-6442
Shogyo Intl. Corp., 287 Northern Blvd., Great Neck, NY 11021 516-466-0911
§ Shokai Far East, Ltd., 280 North Central Ave., Hartsdale, NY 10530 914-681-0700
Sparkomatic, Rte. 6 & 209, Milford, PA 18337 717-296-6444
§ SPECO Div., Components Specialties, Inc., P.O. Box 624, 1172 Rte. 109, Lindenhurst, NY 11757 .... 516-957-8700;800-645-5516
† Telectro Sys., 96-18 43rd Ave., Corona, NY 11368 212-651-8900
§ University Sound, Altec Corp., 1250 N. Red Gum St., Anaheim, CA 92806 714-632-7117
§ Wheelock, Inc., 273 Branchport Ave., Long Branch, NJ 07740 201-222-6880

Speakers, Woofer-1300

§ MG Electronics, 32 Ranick Rd., Hauppauge, NY 11788, 516-582-3400 ... D•1027
§ Oaktron Inds., 1000 30th St., Monroe, WI 53566, 608-328-5560 .... D•1030
Shogyo Intl. Corp., 287 Northern Blvd., Great Neck, NY 11021, 516-466-0911 .... D•1038
§ Altec Lansing, Altec Corp., 1250 N. Red Gum St., Anaheim, CA 92806 ... 714-632-7117
CTS Corporation, 905 North West Blvd., Elkart, IN 46514 219-293-7511
§ Dukane Corp., Communications Sys. Div., 2900 Dukane Dr., St. Charles, IL 60174 312-584-2300
ERA Transpac Div., Sub. Elctrn. Research Assocs., 50 Graphic Place, Moonachie, NJ 07074 201-641-3650
§ Frazier, 1930 Valley View La., Dallas, TX 75234 214-241-3441
§† Hartley Prods., 620 Island Rd., Ramsey, NJ 07446 201-327-4443
§ Heath Co., Benton Harbor, MI 49022 616-982-3886
International Comps. Corp., 105 Maxess Rd., Melville, NY 11747 516-293-1500
§ Martin Sound Prods., 28 Alpha Park, Cleveland, OH 44143-2297 216-442-2286
§ Panasonic, Ind'l. Elctrn. Comps., Panasonic, Elctrn. Comps. Div., Box 1503, Secaucus, NJ 07094 201-348-7000
§ Pyle Industries, Inc., 501 Center St., P.O. Box 620, Huntington, IN 46750 219-356-1200
§ Quam-Nichols Co., 234 E. Marquette Rd., Chicago, IL 60637 312-488-5800
§ Shokai Far East, Ltd., 280 North Central Ave., Hartsdale, NY 10530 914-681-0700
§ Soundlier, American Trading & Prod. Corp., 9380 Watson Ind'l. Pk., St. Louis, MO 63126 314-962-9870
Sparkomatic, Rte. 6 & 209, Milford, PA 18337 717-296-6444
§ SPECO Div., Components Specialties, Inc., P.O. Box 624, 1172 Rte. 109, Lindenhurst, NY 11757 .... 516-957-8700;800-645-5516
University Sound, Altec Corp., 1250 N. Red Gum St., Anaheim, CA 92806 714-632-7117

Speakers (MIL)-2440

† Oaktron Inds., 1000 30th St., Monroe, WI 53566, 608-328-5560 .... D•1030
§ Alpha Products, Inc., 5740 Corsa Ave. #104, Westlake Village, CA 91362 818-889-9304
§† Audiosone, Inc., 617 Fan Hill Rd., Monroe, CT 06468 ..... 203-268-4372;203-268-6703
† ERA Poly-Planar Div., 311 E. Park St., Moonachie, NJ 07074 201-641-3650
§† MG Electronics, 32 Ranick Rd., Hauppauge, NY 11788 516-582-3400
† SPECO Div., Components Specialties, Inc., P.O. Box 624, 1172 Rte. 109, Lindenhurst, NY 11757 .... 516-957-8700;800-645-5516

Speaker Systems-1300

MG Electronics, 32 Ranick Rd., Hauppauge, NY 11788, 516-582-3400 ... D•1027
Quam-Nichols Co., 234 E. Marquette Rd., Chicago, IL 60637, 312-488-5800 .... D•1033
§ Altec Lansing, Altec Corp., 1250 N. Red Gum St., Anaheim, CA 92806 ... 714-632-7117
§ Amperex Electronic Corp., Hicksville Div., Box 418 - 230 Duffy Ave., Hicksville, NY 11802 516-931-6200
§ Argos Prods., 600 S. Sycamore St., Genoa, IL 60135 815-784-5118
§ Atlas Sound Div., 10 Pomeroy Rd., Parsippany, NJ 07054 201-887-7800
§† Audiosone, Inc., 617 Fan Hill Rd., Monroe, CT 06468 ..... 203-268-4372;203-268-6703
International Comps. Corp., 105 Maxess Rd., Melville, NY 11747 516-293-1500
§ Paso Sound Prods., 14 First St., Pelham, NY 10803 914-738-4800
Pyle Industries, Inc., 501 Center St., P.O. Box 620, Huntington, IN 46750 219-356-1200
§ Soundlier, American Trading & Prod. Corp., 9380 Watson Ind'l. Pk., St. Louis, MO 63126 314-962-9870
§ SPECO Div., Components Specialties, Inc., P.O. Box 624, 1172 Rte. 109, Lindenhurst, NY 11757 .... 516-957-8700;800-645-5516

Spectrometers-2900

Advanced Kinetics, 1231 Victoria St., Costa Mesa, CA 92627 714-646-7165
Applied Research Labs, 9545 Wentworth, P.O. Box 129, Sunland, CA 91040 818-352-6011
Beckman Instrs., 2500 Harbor Blvd., Fullerton, CA 92634 714-871-4848
Bosch, Robert, Corp., 2800 S. 25th Ave., Broadview, IL 60153 312-865-5200
EG&G Gamma Scientific, Div. of EG&G Inc., 3777 Ruffin Rd., San Diego, CA 92123 619-279-8034
§ EG&G Geometrics, Div. of EG&G Inc., 395 Java Dr., Sunnyvale, CA 94089 408-734-4616
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
§ Micro-Now Instr. Co., Inc., 8260 N. Elmwood St., P.O. Box 856, Skokie, IL 60077 312-677-4700
Spiricon, Inc., 2600 North Main, Logan, UT 84321 801-753-3729
Tennelec, 601 Turnpike, Oak Ridge, TN 37830 615-483-8405

§† ULVAC North America, P.O. Box 799, 105 York Street, Kennebunk, ME 04043 ... 207-985-2973
§† UTI Instruments Co., 325 N. Mathilda Ave., Sunnyvale, CA 94086 ... 408-738-3301
Varian Assocs., Instr. Grp., 611 Hansen Way, Palo Alto, CA 94303 ... 415-493-4000

Speech Compression & Synthesis Equipment-2325

Computalker, Compuvoice, Inc., 1730 21st Street, Santa Monica, CA 90404 ... 213-828-6546
Datavoice Corp., 180 N. La Salle St. Ste 700, Chicago, IL 60601 ... 312-831-4488
† Mimic, Inc., P.O. Box 921, Acton, MA 01720 ... 617-263-2101
§ Street Electronics Corp., 1140 Mark Ave., Carpinteria, CA 93013 ... 805-684-4593
SYMBICON, 89 Route 101A, Amherst, NH 03031 ... 603-673-8898
† Votan, 4487 Technology Dr., Fremont, CA 94538 ... 415-490-7600

Speed Drives, Motor — See Controls, Motor Speed (Vol. D)

Spiral Wrap — See Tubing, Spiral Wrap (Vol. C)

Splices, Fiberoptic-2475 — *See Vol. B*

Splicers, Coaxial Cable-5400 — *See Vol. C*

Splicers, Wire (Incl. Butt & Cap Types)-5400 — *See Vol. C*

Splicing Equipment, Magnetic Tape-1300

† Ampex Corp., 401 Broadway, Redwood City, CA 94063 ... 415-367-2011
§† Benjamin electroproducts, inc., Robins Div., 80 Smith St., Farmingdale, NY 11735 ... 516-293-7744
† Nitto Denko America, Inc., 27 Seaview Blvd., Port Washington, NY 11050 ... 516-484-9700

Splicing Equipment, Fiber Optic-5400 — *See Vol. C*

Splicers, Fiber Optic-2475 — *See Vol. B*

Splitters/Combiners, Power — See Dividers, Power (Vol. A)

Spoolers, Printer Buffers-2325

§ Algo, Inc., 9198-C Red Branch Rd., Columbia, MD 21045 ... 301-730-7442
BLACK BOX Corp., Micom Sys., P.O. Box 12800, Pittsburgh, PA 15241 ... 412-746-5500
§ Consolink Corp., 1275 S. Sherman Dr., Longmont, CO 80501 ... 303-651-2014
§ Data-Match Corp., 3810 Oakcliff Ind. Ct., Doraville, GA 30340 ... 404-441-0408
§ Digital Dynamics, Inc., 108 Water St., Watertown, MA 02172 ... 617-923-4315
Digital Products, Inc., 600 Pleasant St., Watertown, MA 02172 ... 617-924-1680
Eventide, Inc., One Alsan Way, Little Ferry, NJ 07643 ... 201-641-1200

Spoolers, Punched Tape — See Readers, Punched Tape (Vol. D)

Springs (All Types)-2500 — *See Vol. C*

Stabilizers, Current — See Current Sources (Vol. D), Regulators, Current (Vol. D)

Stabilizers, Line Impedance-4050

Behlman Div., California Instrs., Div. of Norlin Inds., 5150 Convoy St., San Diego, CA 92111 ... 619-279-8620
§ Computer Power, 124E W. Main St., High Bridge, NJ 08829 ... 201-735-8000
Elin Div., California Instrs. Co., Div. of Norlin Ind., 5150 Convoy St., San Diego, CA 92111 ... 619-279-8620
† Georator Corp., Box 70, Manassas, VA 22110 ... 703-368-2101
JMK, Inc., 15 Caldwell Dr., Amherst, NH 03060 ... 603-886-4100
Power Designs, Inc., 1700 Shames Dr., Westbury, NY 11590 ... 516-333-6200

Stabilizers, Voltage — See Regulators & Stabilizers, Voltage (Vol. D), Transformers, Voltage Regulating (Vol. A), Voltage Sources (Vol. D)

Stabilizers, Voltage/Current, Automatic — See Power Supplies, Constant Current (Vol. D)

Stalos (Stabilized Local Oscillators) — See Oscillators, Microwave (Vol. A)

Stampings, Precious Metal — See Preforms, Precious Metal (Vol. C)

Standards, Atomic Beam-2900

Datum Inc., Timing/Aacom Divisions, 1363 S. State College Blvd., Anaheim, CA 92806, 714-533-6333 ... D•1148
§† EFRATOM, a division of Ball Corp., 18851 Bardeen Ave, Irvine, CA 92715, 714-752-2891 ... A•1361
† Frequency and Time Systems, Inc., DATUM, INC., 34 Tozer Rd., Beverly, MA 01915, 617-927-8220 ... A•1365, D•1148
† Frequency Elctrns., 55 Charles Lindbergh Blvd., Mitchel Field, NY 11553, 516-794-4500 ... A•1366
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
† Tracor Instruments, 6500 Tracor La., Bldg. 27, Austin, TX 78725 ... 512-929-2051

Standards, Capacitance-2900

IET Labs, Inc., 534 Main St., Westbury, NY 11590, 516-334-5959 ... D•1243-1244
Tettex Instruments, Inc., P.O. Box 281, Fairview Village, PA 19409-0281, 215-539-6050 ... D•1312
Blanck, A. R., Co., Box 249, Rutherford, NJ 07070 ... 201-933-2091
GenRad, Inc., 300 Baker Ave., Concord, MA 01742 ... 617-369-4400
§ Guildline Instrs., 4403 Vineland Rd, Suite B-10, Orlando, FL 32811-9998 ... 305-423-8215
International Instrumentation, 31131-602 Via Colinas, Westlake Vlg., CA 91362 ... 213-991-9614
§ Tucker Elctrns., Box 461966, Garland, TX 75046 ... 214-348-8800;800-527-4642

Standards, Current-2900

§† Ballantine Labs., 90 Fanny Rd., Boonton, NJ 07005, 201-335-0900 ... D•1185
† Electronic Dev. Corp., 11 Hamlin St., Boston, MA 02127-4198, 617-268-9696 ... D•1213,1215
General Resistance, Inc., A Prime Technology Company, Twin Lakes Rd., P.O. Box 185, N. Branford, CT 06471, 203-481-5721 ... D•1233
Julie Resch. Labs., 211 West 61st St., New York, NY 10023, 212-245-2727 ... D•1253
† Koep Precision Standards, Inc., P. O. Box 191, So. Plainfield, NJ 07080, 201-549-9280 ... D•1257
Sensitive Research Instrs., 25 Dock St., Mt. Vernon, NY 10550, 914-699-9717 ... D•1305
Analogic Corp., 8 Centennial Dr., Peabody, MA 01961 ... 617-532-5660;617-777-4500; 617-246-0300;800-451-1
Behlman Div., California Instrs., Div. of Norlin Inds., 5150 Convoy St., San Diego, CA 92111 ... 619-279-8620
§ Digitec Corp., 918 Woodley Rd., P.O. Box 458, Dayton, OH 45401 ... 513-254-6251
Electrical Instr. Svc., 25 Dock St., Mt. Vernon, NY 10550 ... 914-699-9717
Elin Div., California Instrs. Co., Div. of Norlin Ind., 5150 Convoy St., San Diego, CA 92111 ... 619-279-8620
Fluke, John, Mfg. Co., Box C9090, MS 250C, Everett, WA 98206 ... 206-356-5400
§ Guildline Instrs., 4403 Vineland Rd, Suite B-10, Orlando, FL 32811-9998 ... 305-423-8215
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
IET Labs, Inc., 534 Main St., Westbury, NY 11590 ... 516-334-5959
North Hills Elctrns., 1 Alexander Pl., Glen Cove, NY 11542 ... 516-671-5700
† Precision Resistor Co., Inc., 10601 75 St. N., Largo, FL 33543 ... 813-541-5771
Rotek Instr. Corp., 390 Main St., Waltham, MA 02254 ... 617-899-4611
Scientific Columbus, Inc., Esterline Corp., 1900 Arlingate La., Columbus, OH 43228 ... 614-274-7160
Valhalla Scientific, 9955 Mesa Rim Rd., San Diego, CA 92126 ... 619-457-5576
Yokogawa Corp. of America, 2 Dart Rd., Shenandoah, GA 30265 ... 404-253-7000
ZI-TECH Instr. Corp., 2151 Park Blvd., Box 60490, Palo Alto, CA 94306 ... 415-326-2151

Standards, Delay Line-2350 — *See Vol. A*

Standards, Frequency-2900

† Austron, Inc., P.O. Box 14766, Exit 248 N. IH 35, Austin, TX 78761, 512-251-2341 ... A•1315
Datum Inc., Timing/Aacom Divisions, 1363 S. State College Blvd., Anaheim, CA 92806, 714-533-6333 ... D•1148
§† EFRATOM, a division of Ball Corp., 18851 Bardeen Ave, Irvine, CA 92715, 714-752-2891 ... A•1361
† Electronic Dev. Corp., 11 Hamlin St., Boston, MA 02127-4198, 617-268-9696 ... D•1213,1215
† Frequency and Time Systems, Inc., DATUM, INC., 34 Tozer Rd., Beverly, MA 01915, 617-927-8220 ... A•1365, D•1148,1230
† Frequency Elctrns., 55 Charles Lindbergh Blvd., Mitchel Field, NY 11553, 516-794-4500 ... A•1366
† Vectron Labs., 166 Glover Ave., Norwalk, CT 06850, 203-853-4433 ... A•1452
Behlman Div., California Instrs., Div. of Norlin Inds., 5150 Convoy St., San Diego, CA 92111 ... 619-279-8620
† Collins Avionics Divisions, Rockwell Intl., 400 Collins Rd. NE, Cedar Rapids, IA 52498 ... 319-395-1000
CTS Corporation, 905 North West Blvd., Elkart, IN 46514 ... 219-293-7511
Elin Div., California Instrs. Co., Div. of Norlin Ind., 5150 Convoy St., San Diego, CA 92111 ... 619-279-8620
Fluke, John, Mfg. Co., Box C9090, MS 250C, Everett, WA 98206 ... 206-356-5400
Frequency Control Prods., Inc., American Time Prods. Div., 61-20 Woodside Ave., Woodside, NY 11377 ... 212-458-5811
† FSI/Fork Standards Inc., 666 Western Ave., Lombard, IL 60148 ... 312-231-3511; 312-932-9380
† Greenray Inds., Inc., 840 W. Church Rd., Mechanicsburg, PA 17055 ... 717-766-0223
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
IET Labs, Inc., 534 Main St., Westbury, NY 11590 ... 516-334-5959
Julie Resch. Labs., 211 West 61st St., New York, NY 10023 ... 212-245-2727
† Microlab/FXR, 10 Microlab Rd., Livingston, NJ 07039 ... 201-992-7700
Monitor Prods. Co., Inc., Post Office Box 1966, Oceanside, CA 92054 ... 619-433-4510
Ovenaire, Electronic Technologies Inc., 706 Forrest St., Charlottesville, VA 22901 ... 804-977-8050
† Piezo Crystal, 100 "K" St., Box 619, Carlisle, PA 17013 ... 717-249-2151
PPM, Inc., 4521 Emery Ind. Pkwy., Cleveland, OH 44128 ... 216-292-6006
Racal-Dana Instrs. Inc., 4 Goodyear St., Irvine, CA 92715 ... 714-859-8999
† Ryan Intl. Corp., 4800 Evanswood Dr., Columbus, OH 43229 ... 614-885-3303
Sensitive Research Instrs., 25 Dock St., Mt. Vernon, NY 10550 ... 914-699-9717
Spectracom, 101 Despatch Drive, East Rochester, NY 14445 ... 716-381-4827
† Spectrum Technology, Inc., 300 Lopez Rd., Goleta, CA 93116 ... 805-964-7791
§† Takeda Riken Co., Ltd., NS Bldg. 14th,4-1,Nishi-Shinjuku 2-Chome,Shinjuku-ku, Tokyo 160, Tokyo 176, JAPAN ... 03-342-7500
T-F Elctrns., 9415 Neils Thompson Dr., Austin, TX 78759 ... 512-836-7323
Toyo Comm. Equip. Co., Ltd., No. 8 Mori Bldg., 20-4, Nichi-Shimbashi, 3-Chome Minato-Ku, TOKYO, JAPAN 105 ... 03-459-7320/03-459-7310
† Tracor Instruments, 6500 Tracor La., Bldg. 27, Austin, TX 78725 ... 512-929-2051
§ Tucker Elctrns., Box 461966, Garland, TX 75046 ... 214-348-8800;800-527-4642

Standards, Inductance-2900

IET Labs, Inc., 534 Main St., Westbury, NY 11590, 516-334-5959 ... D•1243-1244

Tettex Instruments, Inc., P.O. Box 281, Fairview Village, PA 19409-0281, 215-539-6050 .... D•1312
† Dietz Design, Inc., 100 Electronics Pkwy., Belton, MO 64012 816-331-4911
GenRad, Inc., 300 Baker Ave., Concord, MA 01742 617-369-4400
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
Rutherford Resch. Prods., Box 249, Rutherford, NJ 07070 201-933-2091
§ Tucker Elctrns., Box 461966, Garland, TX 75046 .... 214-348-8800;800-527-4642

Standards, Noise-2900

† Koep Precision Standards, Inc., P. O. Box 191, So. Plainfield, NJ 07080, 201-549-9280 .... D•1257
§ Eaton Corp., Elctrn. Instrmn. Div., 5340 Alla Rd., Los Angeles, CA 90066
GenRad, Inc., 300 Baker Ave., Concord, MA 01742 617-369-4400
† LNR Communications, Inc., 180 Marcus Blvd., Hauppauge, NY 11788 516-273-7111
Maury Microwave, 8610 Helms Ave., Cucamonga, CA 91730 714-987-4715

Standards, Phase-2900

Deak Technology, Inc., Sainte Claire Plaza, 1121 Boyce Rd., Pittsburgh, PA 15241, 412-941-9520 .... D•1208-1209
Electronic Dev. Corp., 11 Hamlin St., Boston, MA 02127-4198, 617-268-9696 .... D•1215
† Ryan Intl. Corp., 4800 Evanswood Dr., Columbus, OH 43229, 614-885-3303 .... D•1303
Industrial Test Equip., 21 Yennicock Ave., Port Washington, NY 11050 .. 516-883-1700
Scientific Columbus, Inc., Esterline Corp., 1900 Arlingate La., Columbus, OH 43228 614-274-7160
§ Tucker Elctrns., Box 461966, Garland, TX 75046 .... 214-348-8800;800-527-4642
Universal Ad-Yu Elctrns., Inc., 2517 E. Norwich St., Milwaukee, WI 53207 414-482-4100

Standards, Phase Angle-2900

Deak Technology, Inc., Sainte Claire Plaza, 1121 Boyce Rd., Pittsburgh, PA 15241, 412-941-9520 .... D•1208-1209

Standards, Resistance-2900

General Resistance, Inc., A Prime Technology Company, Twin Lakes Rd., P.O. Box 185, N. Branford, CT 06471, 203-481-5721 .... D•1233
IET Labs, Inc., 534 Main St., Westbury, NY 11590, 516-334-5959 ... D•1243-1244
Julie Resch. Labs., 211 West 61st St., New York, NY 10023, 212-245-2727 .... D•1255
Tettex Instruments, Inc., P.O. Box 281, Fairview Village, PA 19409-0281, 215-539-6050 .... D•1312
Biddle Instruments, A Thorn EMI Co., 510 Township Line Rd., Blue Bell, PA 19422 215-646-9200
Blanck, A. R., Co., Box 249, Rutherford, NJ 07070 201-933-2091
Elect. Prec. Comp. Corp., 11 W. Sandford Blvd., Mt. Vernon, NY 10550 .. 914-664-2333
Electro Scientific Inds., 13900 N.W. Science Pk. Dr., Portland, OR 97229 503-641-4141
Fluke, John, Mfg. Co., Box C9090, MS 250C, Everett, WA 98206 206-356-5400
GenRad, Inc., 300 Baker Ave., Concord, MA 01742 617-369-4400
§ Guildline Instrs., 4403 Vineland Rd, Suite B-10, Orlando, FL 32811-9998 305-423-8215
Leeds & Northrup Instrs., A Unit of General Signal Corp., Sumneytown Pike, North Wales, PA 19454 215-643-2000
Penn Airborne Prods., Industrial Hwy., Southampton, PA 18966 215-355-3400
† Precision Resistor Co., Inc., 10601 75 St. N., Largo, FL 33543 813-541-5771
Rotek Instr. Corp., 390 Main St., Waltham, MA 02254 617-899-4611
Rutherford Resch. Prods., Box 249, Rutherford, NJ 07070 201-933-2091
Sensitive Research Instrs., 25 Dock St., Mt. Vernon, NY 10550 914-699-9717
§ Takeda Riken Co., Ltd., NS Bldg. 14th,4-1,Nishi-Shinjuku 2-Chome,Shinjuku-ku, Tokyo 160, Tokyo 176, JAPAN 03-342-7500
§ Tucker Elctrns., Box 461966, Garland, TX 75046 .... 214-348-8800;800-527-4642
Valhalla Scientific, 9955 Mesa Rim Rd., San Diego, CA 92126 619-457-5576
Vishay Resistive Sys. Grp., 63 Lincoln Hwy., Malvern, PA 19355 215-644-1300
Yokogawa Corp. of America, 2 Dart Rd., Shenandoah, GA 30265 404-253-7000

Standards, Temperature-2900

Ectron Corp., 8159 Engineer Rd., San Diego, CA 92111, 619-278-0600 ... D•1007
Omega Engrg., Box 4047, Stamford, CT 06907, 203-359-1660 .... B•1683
Advanced Techn. Research Labs., 5645 K General Washington Dr., Alexandria, VA 22312 703-750-2920
§ Analogic Corp., 8 Centennial Dr., Peabody, MA 01961 .... 617-532-5660;617-777-4500; 617-246-0300;800-451-1
Capintec Instrs., 6 Arrow Rd., Ramsey, NJ 07446 201-825-9500
† Electro-Optical Inds., Box 3770, Santa Barbara, CA 93130 805-964-6701
Fluke, John, Mfg. Co., Box C9090, MS 250C, Everett, WA 98206 206-356-5400
§ Guildline Instrs., 4403 Vineland Rd, Suite B-10, Orlando, FL 32811-9998 305-423-8215
Harrel, Inc., 16 Fitch St., E. Norwalk, CT 06855 203-866-2573
Hy-Cal Engrg., 9650 Telstar Ave., El Monte, CA 91731 213-444-4000
Kaye Instruments, 15 De Angelo Dr., Bedford, MA 01730 617-275-0300
Leeds & Northrup Instrs., A Unit of General Signal Corp., Sumneytown Pike, North Wales, PA 19454 215-643-2000
Minco Prods., 7300 Commerce La., Minneapolis, MN 55432 612-571-3121
† Oven Inds., 191 Hempt Rd., P.O. Box 290, Mechanicsburg, PA 17055 717-766-0721
† Thermometrics, Inc., 808 U.S. Hwy. #1, Edison, NJ 08817-4695 201-287-2870
§ Yellow Springs Instr., Box 279, Yellow Springs, OH 45387 513-767-7241

Standards, Time-2900

† Austron, Inc., P.O. Box 14766, Exit 248 N. IH 35, Austin, TX 78761, 512-251-2341 .... A•1315
† Datum Inc., Timing/Aacom Divisions, 1363 S. State College Blvd., Anaheim, CA 92806, 714-533-6333 .... D•1148
§† EFRATOM, a division of Ball Corp., 18851 Bardeen Ave, Irvine, CA 92715, 714-752-2891 .... A•1361
Frequency and Time Systems, Inc., DATUM, INC., 34 Tozer Rd., Beverly, MA 01915, 617-927-8220 .... A•1365, D•1148,1230
† Frequency Elctrns., 55 Charles Lindbergh Blvd., Mitchel Field, NY 11553, 516-794-4500 .... A•1366
† TRAK Systems, Div. TRAK Microwave Corp., 4722 Eisenhower Blvd., Dept. E-5, Tampa, FL 33614, 813-884-1411 .... D•1076-1081
Fluke, John, Mfg. Co., Box C9090, MS 250C, Everett, WA 98206 206-356-5400
Frequency Control Prods., Inc., American Time Prods. Div., 61-20 Woodside Ave., Woodside, NY 11377 212-458-5811
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
§ Kinemetrics/Truetime, 3243 Santa Rose Ave, Santa Rosa, CA 95407 ... 707-528-1230
PPM, Inc., 4521 Emery Ind. Pkwy., Cleveland, OH 44128 216-292-6006
Spectracom, 101 Despatch Drive, East Rochester, NY 14445 716-381-4827
Toyo Comm. Equip. Co., Ltd., No. 8 Mori Bldg., 20-4, Nichi-Shimbashi, 3-Chome Minato-Ku, TOKYO, JAPAN 105 .... 03-459-7320/03-459-7310
§ Tucker Elctrns., Box 461966, Garland, TX 75046 .... 214-348-8800;800-527-4642

Standards, Voltage-2900

Ballantine Labs., 90 Fanny Rd., Boonton, NJ 07005, 201-335-0900 .... D•1185
† Electronic Dev. Corp., 11 Hamlin St., Boston, MA 02127-4198, 617-268-9696 .... D•1213-1215
General Resistance, Inc., A Prime Technology Company, Twin Lakes Rd., P.O. Box 185, N. Branford, CT 06471, 203-481-5721 .... D•1233
Julie Resch. Labs., 211 West 61st St., New York, NY 10023, 212-245-2727 .... D•1253-1254
† Koep Precision Standards, Inc., P. O. Box 191, So. Plainfield, NJ 07080, 201-549-9280 .... D•1257
Sensitive Research Instrs., 25 Dock St., Mt. Vernon, NY 10550, 914-699-9717 .... D•1305
§ Analogic Corp., 8 Centennial Dr., Peabody, MA 01961 .... 617-532-5660;617-777-4500; 617-246-0300;800-451-1
Beckman Instrs., 2500 Harbor Blvd., Fullerton, CA 92634 714-871-4848
Behlman Div., California Instrs., Div. of Norlin Inds., 5150 Convoy St., San Diego, CA 92111 619-279-8620
Continental Resources, Inc., 175 Middlesex Tpke., Bedford, MA 01730 .. 617-275-0850
§† Data Precision Corp., Electronics Ave., Danvers, MA 01923 617-246-1600
§ Digitec Corp., 918 Woodley Rd., P.O. Box 458, Dayton, OH 45401 513-254-6251
Dynage/Power & Magnetics, Division Of Oakleaf, Inc., 2 Willowbrook Road, Cromwell, CT 06416 203-635-3510
Ectron Corp., 8159 Engineer Rd., San Diego, CA 92111 619-278-0600
Electrical Instr. Svc., 25 Dock St., Mt. Vernon, NY 10550 914-699-9717
Elin Div., California Instrs. Co., Div. of Norlin Ind., 5150 Convoy St., San Diego, CA 92111 619-279-8620
Fluke, John, Mfg. Co., Box C9090, MS 250C, Everett, WA 98206 206-356-5400
Greenray Inds., Inc., 840 W. Church Rd., Mechanicsburg, PA 17055 717-766-0223
§ Guildline Instrs., 4403 Vineland Rd, Suite B-10, Orlando, FL 32811-9998 305-423-8215
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
IET Labs, Inc., 534 Main St., Westbury, NY 11590 516-334-5959
North Hills Elctrns., 1 Alexander Pl., Glen Cove, NY 11542 516-671-5700
Rotek Instr. Corp., 390 Main St., Waltham, MA 02254 617-899-4611
Scientific Columbus, Inc., Esterline Corp., 1900 Arlingate La., Columbus, OH 43228 614-274-7160
§† Takeda Riken Co., Ltd., NS Bldg. 14th,4-1,Nishi-Shinjuku 2-Chome,Shinjuku-ku, Tokyo 160, Tokyo 176, JAPAN 03-342-7500
Tettex Instruments, Inc., P.O. Box 281, Fairview Village, PA 19409-0281 215-539-6050
† Thaler Corp., 10940 N. Stallard Pl., Tucson, AZ 85704 602-742-5572
§ Tucker Elctrns., Box 461966, Garland, TX 75046 .... 214-348-8800;800-527-4642
Valhalla Scientific, 9955 Mesa Rim Rd., San Diego, CA 92126 619-457-5576
Yokogawa Corp. of America, 2 Dart Rd., Shenandoah, GA 30265 404-253-7000
ZI-TECH Instr. Corp., 2151 Park Blvd., Box 60490, Palo Alto, CA 94306 415-326-2151

Standards, Voltage Ratio-2900

General Resistance, Inc., A Prime Technology Company, Twin Lakes Rd., P.O. Box 185, N. Branford, CT 06471, 203-481-5721 .... D•1233
Julie Resch. Labs., 211 West 61st St., New York, NY 10023, 212-245-2727 .... D•1253-1254
Koep Precision Standards, Inc., P. O. Box 191, So. Plainfield, NJ 07080, 201-549-9280 .... D•1257
Ryan Intl. Corp., 4800 Evanswood Dr., Columbus, OH 43229, 614-885-3303 .... D•1303
Electro Scientific Inds., 13900 N.W. Science Pk. Dr., Portland, OR 97229 503-641-4141
Fluke, John, Mfg. Co., Box C9090, MS 250C, Everett, WA 98206 206-356-5400
§ Guildline Instrs., 4403 Vineland Rd, Suite B-10, Orlando, FL 32811-9998 305-423-8215
IET Labs, Inc., 534 Main St., Westbury, NY 11590 516-334-5959
Leeds & Northrup Instrs., A Unit of General Signal Corp., Sumneytown Pike, North Wales, PA 19454 215-643-2000
Sensitive Research Instrs., 25 Dock St., Mt. Vernon, NY 10550 914-699-9717
Tettex Instruments, Inc., P.O. Box 281, Fairview Village, PA 19409-0281 215-539-6050
§ Tucker Elctrns., Box 461966, Garland, TX 75046 .... 214-348-8800;800-527-4642

Standoffs — See Bushings, Glass, Plastic, Metal, etc. (Vol. C)

Stands, Instruments-1400 — *See Vol. C*

Stands, Printer/Terminal-1400 — *See Vol. C*

Static Eliminating Materials, Devices, & Equipment-4525 — *See Vol. C*

Stators, Motor & Generator — See Motor & Generator Armatures,Rotors, Stators (Vol. B)

STD Bus — See Board Computers & Subassemblies (Vol. D)

Steppers, Indexing, Motor-3500 — *See Vol. B*

Steppers, Indexing, Switch-5100 — *See Vol. B*

Storage Euipment, Cartridge/Cassette-3800 — *See Vol. C*

Storage Equipment, Disk-3800 — *See Vol. C*

Storage Equipment, Flexible Disk-3800 — *See Vol. C*

Storage Equipment, Magnetic Card-3800 — *See Vol. C*

Storage Equipment, Microform-3800 — *See Vol. C*

Storage Equipment, Multifunctional-3800 — *See Vol. C*

Storage Equipment, Paper Tape-3800 — *See Vol. C*

Storage Equipment, Printout-3800 — *See Vol. C*

Storage Equipment, Punched Card-3800 — *See Vol. C*

Storage Equipment, Reel-to-Reel Tape-3800 — *See Vol. C*

Strain Reliefs, Cable & Wire-2800 — *See Vol. C*

Strip-Line Components, Microwave-3450 — *See Vol. A*

Strips, Ground-1900

Instrument Specialties Co., P.O. Box A, Delaware Water Gap, PA 18327, 717-424-8510 .... C•1725
Wall-Able Manufacturing Corp., 1800 N. Clybourn Ave., Chicago, IL 60614, 312-440-1000 .... C•1571
American Electric Cable Co., 181 Appleton St., Holyoke, MA 01040 413-539-9893
† Chomerics, Inc., 77 Dragon Ct., Woburn, MA 01888 617-935-4850
§ Christiansen Radio Inc., 1950 San Remo, Laguna Beach, CA 92651 714-497-1506
Sjoberg, C., & Son, Inc., 415 Station St., Cranston, RI 02910 401-461-8220
§ Techni-Tool, 5 Apollo Rd., Box 368, Plymouth Meeting, PA 19462 215-825-4990
† Zippertubing Co., P.O. Box 61129, Los Angeles, CA 90061 213-321-3901

Strips, Marker & Fanning-6000 — *See Vol. C*

Stroboscopes — See Lamps, Stroboscopic Source (Vol. B)

Substrates, Ceramic-2800 — *See Vol. C*

Substrates, Flexible-2800 — *See Vol. C*

Substrates, Glass-2800 — *See Vol. C*

Substrates, Metallic-2800 — *See Vol. C*

Substrates, Sapphire-2800 — *See Vol. C*

Surface Acoustic Wave, Delay Line-2350 — *See Vol. A*

Surface Acoustic Wave, Filter-2700 — *See Vol. A*

Suppressors, Arc — See Protectors, Surge (Vol. B)

Suppressors, Noise-2700 — *See Vol. A*

Suppressors, Transient Voltage (All Types)-4300 — *See Vol. B*

Surface Mounted Assemblies — See Assembly type: Amplifiers, Rectifiers, etc.

Surveillance Sets (MIL)-3475

Digital Radio Corp., 8901 La Cienega Blvd., Inglewood, CA 90301 213-670-8611
† Litton Applied Technology, 645 Almanor Ave., P.O. Box 3478, Sunnyvale, CA 94088-3478 408-773-0777

Surveillance Systems (MIL), Optical-3475

† ABA Electromechanical Sys. Inc., Box 500, Pinellas Pk., FL 34290-0500 813-541-6681
§ American Laser Sys., Inc., 106 Fowler Rd., Goleta, CA 93117 805-967-0423
† E-Systems, Greenville Div., P.O. Box 1056, Greenville, TX 75401 214-457-4694
§ Heitz, Karl, Inc., P.O. Box 427, Woodside, NY 11377 718-565-0004
Honeywell Inc., Aerospace & Defense Grp., Honeywell Plaza, Minneapolis, MN 55408 612-870-5186
† Warren-Knight Instr. Co., Warren Inds., Inc., 2045 Bennett Rd., Philadelphia, PA 19116 215-464-9300

Surveillance Systems (MIL), Radio Frequency-3475

American Elctrn. Labs., Inc., Govt. Grp. Div., P.O. Box 552, Lansdale, PA 19446
† Applied Communications, Amstar Tech. Prods. Co., 5490 Spectrum Drive, Frederick, MD 21701 301-694-5300
† Applied Communications, 9125 Gaither Rd., Gaithersburg, MD 20877 ... 301-948-5210
† E-Systems, Greenville Div., P.O. Box 1056, Greenville, TX 75401 214-457-4694
† Litton Applied Technology, 645 Almanor Ave., P.O. Box 3478, Sunnyvale, CA 94088-3478 408-773-0777
Mathematical Systems Design, Inc., 2850 Ocean Park Blvd., Ste. 300, Santa Monica, CA 90405 213-450-9851
† Microwave/Sys., 1 Adler Dr., E. Syracuse, NY 13057 315-437-9951

Surveillance/Warning Systems (MIL), Control-3475

American Elctrn. Labs., Inc., Govt. Grp. Div., P.O. Box 552, Lansdale, PA 19446
† E-Systems, Greenville Div., P.O. Box 1056, Greenville, TX 75401 214-457-4694
† Litton Applied Technology, 645 Almanor Ave., P.O. Box 3478, Sunnyvale, CA 94088-3478 408-773-0777
† Microwave/Sys., 1 Adler Dr., E. Syracuse, NY 13057 315-437-9951

Surface Acoustic Wave Devices-2350 — *See Vol. A*

Switch Arrays-5100 — *See Vol. B*

Switches, Backup-5100 — *See Vol. B*

Switches, Cam-5100 — *See Vol. B*

Switches, Capacitive — See Switches, Touch Actuated (Vol. B)

Switches, Coaxial — See Switches, RF (Vol. B)

Switches, Coded-5100 — *See Vol. B*

Switches, Crossbar — See Switches, Matrix (Vol. B)

Switches, Data, Manual-2325

Advanced Sys. Concepts, 435 N. Lake Ave., Pasadena, CA 91101, 818-793-8971 .... D•1137
Cherry Electrical Prods. Corp., 3623 Sunset Ave., Waukegan, IL 60087, 312-578-3500 .... B•1527-1533
Cole Instr., 2650 S. Croddy Way, Santa Ana, CA 92704, 714-556-3100 ... B•1538
EECO Incorporated, 1601 E. Chestnut Ave., P.O. Box 659, Santa Ana, CA 92702-0659, 714-835-6000 .... B•1558-1559
Electronic Components Groupe, Stein Industries, Inc., 14143 21st Ave. No., Minneapolis, MN 55441, 612-559-0720 .... B•1566
IVO Inds., Inc., 201 Industrial Way W., P.O. Drawer 917, Eatontown, NJ 07724, 201-542-5151 .... B•1603
NKK Switches of America, Inc., 14415 N. Scottsdale Rd., Ste. 600, Scottsdale, AZ 85260, 602-991-0942 .... B•1680
Alco Elctrn. Prods., Inc., 1551 Osgood St., N. Andover, MA 01845 617-685-4371
AMP Incorporated, Box 3608, Harrisburg, PA 17105 717-564-0100
§ Armiger & Assocs., Inc., Daniel Woodhead, Inc., 2525 Ridgmar Blvd., Fort Worth, TX 76116 817-737-2900
BLACK BOX Corp., Micom Sys., P.O. Box 12800, Pittsburgh, PA 15241 .. 412-746-5500
Capitol Machine & Switch Co., Box 890, Danbury, CT 06810 203-744-3300
§ Communication Cables & Connectors, The Dutton Co., 8255 Black Run Rd., Nashport, OH 43830 614-828-2468
Computerware, Inc., 8480-I Tyco Rd., Vienna, VA 22180 703-821-8200
Crosspoint, Div. of Info-Lite, 422 Cliff St., Fairview, NJ 07022 201-941-4455
§ CTS Electronics Corp., Paso Robles Div., Electromechanical Gp., 500 Linne Rd., Paso Robles, CA 93446 805-238-0350
Digital Products, Inc., 600 Pleasant St., Watertown, MA 02172 617-924-1680
Digital Transmission Techniques, Inc., P.O. Box 1847, Wayne, NJ 07470 201-831-1615
§ Dreefs Switch, Inc., 3782 Hawthorn Ct., Waukegan, IL 60087 .... 312-662-7667; 800-323-9605
§ Electrodata, Inc., 23020 Miles Rd., Bedford Heights, OH 44128 216-663-3333
§ Front Panel Devices, Inc., 530 Burnside Ave., Inwood, NY 11696 212-471-9800
Gandalf Data, Inc., 1019 S. Noel Ave., Wheeling, IL 60090 312-541-6060
Gandalf Technologies, Inc., 350 E Dundee Rd., Suite 301, Wheeling, IL 60090 312-459-6630
§ Glasgal Communications, Inc., 207 Washington St., Northvale, NJ 07647 201-768-8082
Global Specialties, Interplex Electronics, Inc., 70 Fulton Terrace, P.O. Box 1942, New Haven, CT 06509 203-624-3103
Information Transfer Indl., Box 357, Holcomb, NY 14469 716-657-7074
L-Com Inc., 1755 Osgood St., Unit 11EM, N. Andover, MA 01845 617-682-6936
§ Support Systems Intl. Corp., 150 South Second St., Richmond, CA 94804 415-234-9090
United States Software Corp., 5470 N.W. Innisbrook Place, Portland, OR 97229 503-645-5043
Vann Instruments, 1200 Schofield La., Farmington, NM 87401 505-326-7557
§ Via West Inc., 534 N. Stone Ave., Tucson, AZ 85705 602-623-5716

Switches, Data, Programmable-2325

Advanced Sys. Concepts, 435 N. Lake Ave., Pasadena, CA 91101, 818-793-8971 .... D•1137
CTS Electronics Corp., Paso Robles Div., Electromechanical Gp., 500 Linne Rd., Paso Robles, CA 93446, 805-238-0350 .... B•1543-1544
Information Transfer Indl., Box 357, Holcomb, NY 14469, 716-657-7074 .... D•1153-1154
Standard Grigsby, Inc., Gordos International Corp., 920 Rathbone Ave., Aurora, IL 60507, 312-844-4300 .... B•1570
† Aiken Advanced Sys., Amstar Technical Products Company, Inc., 5901 Edsall Rd., Alexandria, VA 22304-4197 703-370-0900
Bytex Corp., 2 California Ave., Framingham, MA 01701 617-879-5050
Capitol Machine & Switch Co., Box 890, Danbury, CT 06810 203-744-3300
Computerware, Inc., 8480-I Tyco Rd., Vienna, VA 22180 703-821-8200
Crosspoint, Div. of Info-Lite, 422 Cliff St., Fairview, NJ 07022 201-941-4455
Digital Products, Inc., 600 Pleasant St., Watertown, MA 02172 617-924-1680
Digital Transmission Techniques, Inc., P.O. Box 1847, Wayne, NJ 07470 201-831-1615
§ Front Panel Devices, Inc., 530 Burnside Ave., Inwood, NY 11696 212-471-9800
Gandalf Data, Inc., 1019 S. Noel Ave., Wheeling, IL 60090 312-541-6060
Gandalf Technologies, Inc., 350 E Dundee Rd., Suite 301, Wheeling, IL 60090 312-459-6630

§ Glasgal Communications, Inc., 207 Washington St., Northvale, NJ 07647 201-768-8082
§ Support Systems Intl. Corp., 150 South Second St., Richmond, CA 94804 415-234-9090
Timeplex, Inc., 400 Chestnut Ridge Rd., Woodcliff Lake, NJ 07675 201-930-4600
§ Via West Inc., 534 N. Stone Ave., Tucson, AZ 85705 602-623-5716
Wavetek Corporation, 9191 Towne Centre Drive, San Diego, CA 92122 619-450-9971
† Western DataCom, 5083 Market St., Youngstown, OH 44512 216-788-6583

Switches, Decade-5100 — *See Vol. B*

Switches, Diode-3450 — *See Vol. A*

Switches, DIP-5100 — *See Vol. B*

Switches, Fiber Optic-2475 — *See Vol. B*

Switches, Float-5100 — *See Vol. B*

Switches, Foot Pedal, Mat, Ribbon, etc.-5100 — *See Vol. B*

Switches, Hall Effect-5100 — *See Vol. B*

Switches, High Voltage (Over 250 Volts)-5100 — *See Vol. B*

Switches, Interlock-5100 — *See Vol. B*

Switches, Keyboard-5150 — *See Vol. B*

Switches, Key Lock-5100 — *See Vol. B*

Switches, Lever-5100 — *See Vol. B*

Switches, Limit-5100 — *See Vol. B*

Switches, Lock — See Switches, Key Lock (Vol. B)

Switches, Matrix-5100 — *See Vol. B*

Switches, Membrane-5150 — *See Vol. B*

Switches, Mercury Displacement-5100 — *See Vol. B*

Switches, Microwave — See Switches, Diode (Vol. A)

Switches, Momentary Action-5100 — *See Vol. B*

Switches, Multiposition-5100 — *See Vol. B*

Switches, Optical-3700 — *See Vol. B*

Switches, Paddle Handle-5100 — *See Vol. B*

Switches, Peripheral-5100 — *See Vol. B*

Switches, Photoelectric-3700 — *See Vol. B*

Switches, Port Sharing-5100 — *See Vol. B*

Switches, Power-5100 — *See Vol. B*

Switches, Pressure-5100 — *See Vol. B*

Switches, Program-5100 — *See Vol. B*

Switches, Proximity-5100 — *See Vol. B*

Switches, Pushbutton, Illuminated-5100 — *See Vol. B*

Switches, Pushbutton, Nonilluminated-5100 — *See Vol. B*

Switches, Reed-5100 — *See Vol. B*

Switches, RF-5100 — *See Vol. B*

Switches, Rocker-5100 — *See Vol. B*

Switches, Rotary-5100 — *See Vol. B*

Switches, Sealed-5100 — *See Vol. B*

Switches, Slide-5100 — *See Vol. B*

Switches, Snap Action (All Types)-5100 — *See Vol. B*

Switches, Solid State-5100 — *See Vol. B*

Switches, Step Type-5100 — *See Vol. B*

Switches, Tap — See Switches, Rotary (Vol. B)

Switches, Thermally Actuated-5300 — *See Vol. B*

Switches, Thumbwheel-5100 — *See Vol. B*

Switches, Tilt — See Switches, Mercury Displacement (Vol. B)

Switches, Toggle-5100 — *See Vol. B*

Switches, Touch Actuated-5100 — *See Vol. B*

Switches, Vacuum — See Switches, Pressure

Switches (MIL), Non-RF-2440 — *See Vol. B*

Switches (MIL), RF-2440 — *See Vol. B*

Switch Hardware-2800 — *See Vol. C*

Switching Systems, Audio-1300

† Aiken Advanced Sys., Amstar Technical Products Company, Inc., 5901 Edsall Rd., Alexandria, VA 22304-4197 703-370-0900
§ Aiphone, 1700 130th St. NE, Bellevue, WA 98005 206-455-0510
§† Audiosone, Inc., 617 Fan Hill Rd., Monroe, CT 06468 ..... 203-268-4372;203-268-6703
Capitol Machine & Switch Co., Box 890, Danbury, CT 06810 203-744-3300
Electrospace Sys., Inc., P. O. Box 831359, Richardson, TX 75083-1359 214-783-2004
GRIM Corporation, Box 67, Medford, NJ 08055 609-267-7950
§ HM Elctrns., 6151 Fairmount Ave., San Diego, CA 92120 619-280-6050
§ Industrial Computer Designs, Inc., 31264 La Baya Drive, Westlake Village, CA 91362 818-889-3179
Information Transfer Indl., Box 357, Holcomb, NY 14469 716-657-7074
§† JFW Inds., Inc., 2719 E. Troy Ave., Indianapolis, IN 46203 317-783-9875
§ Ramko Resch., Inc., 11355A Folsom Blvd., Rancho Cordova, CA 95670 800-821-2545
§ SPECO Div., Components Specialties, Inc., P.O. Box 624, 1172 Rte. 109, Lindenhurst, NY 11757 .... 516-957-8700;800-645-5516
§ T-Bar Incorporated, Switching Components Div., P.O. Box T, 141 Danbury Rd., Wilton, CT 06897-0730 203-834-8227
Telemet, 185 Dixon Ave., Amityville, NY 11701 516-842-2300
Wavetek Corporation, 9191 Towne Centre Drive, San Diego, CA 92122 619-450-9971

Switching Systems, Test & Measurement-2900

Advanced Sys. Concepts, 435 N. Lake Ave., Pasadena, CA 91101, 818-793-8971 .... D•1137
Information Transfer Indl., Box 357, Holcomb, NY 14469, 716-657-7074 .... D•1153-1154,1248-1249
Electrospace Sys., Inc., P. O. Box 831359, Richardson, TX 75083-1359 214-783-2004
§ T-Bar Incorporated, Switching Components Div., P.O. Box T, 141 Danbury Rd., Wilton, CT 06897-0730 203-834-8227
United States Software Corp., 5470 N.W. Innisbrook Place, Portland, OR 97229 503-645-5043

Switch Seals, Environmental-2800 — *See Vol. C*

Swivel Units, Data Entry Terminals-1400 — *See Vol. C*

Synchronizers (MIL), Antenna-3475

† Watkins-Johnson Co., 3333 Hillview Ave., Palo Alto, CA 94304 415-493-4141

Synchro Transmitters, Solid State-4900

† Transmagnetics, 210 Adams Blvd., Farmingdale, NY 11735, 516-293-3100 .... D•1162
Astrosystems, 6 Nevada Dr., Lake Success, NY 11042 516-328-1600
Bertsch U.S., Sycamore Resch. Ctr., 2142F Industrial Ct., Vista, CA 92083 619-727-7420
† Computer Conversions Corp., 6 Dunton Ct., E. Northport, NY 11731 516-261-3300
† Control Sciences, Inc., 9509 Vassar Ave., Chatsworth, CA 91311 818-709-5510
† Control Technology Co., 41-16 29th St., Long Island City, NY 11101 718-361-2133
† Henschel, General Signal Corp., 9 Hoyt Drive, P.O. Box 30, Newburyport, MA 01950 617-462-2400
† ILC Data Device Corp., 105 Wilbur Pl., Bohemia, NY 11716 516-567-5600
† Innovatek Microsystems, Inc., Smithfield Rd., R1 Box 104, Millerton, NY 12546-9720 914-373-9003
† Interface Engrg., 386 Lindelof Ave., Stoughton, MA 02072 617-344-7383
† Microwave/Sys., 1 Adler Dr., E. Syracuse, NY 13057 315-437-9951
† Natel Engrg. Co., Inc., 4550 Runway St., Simi Valley, CA 93063 805-581-3950
† North Atlantic Inds., Instrument Div., 60 Plant Ave., Hauppauge, NY 11788 516-582-6500
Singer Co., Kearfott Div., 1150 McBride Ave., Little Falls, NJ 07424 201-785-6000

Synchros-4900

† Vernitron Corp., Control Comps. Div., 1601 Precision Park La., San Diego, CA 92073, 619-428-5581 .... B•1202
† Astro Instrument Corp., 2501 NW 17th Ln., Pompano Beach, FL 33064 305-973-8900
† Astrosyn America, 14349 Victory Blvd., Ste. 304, Van Nuys, CA 91401 .. 213-785-2197
Bertsch U.S., Sycamore Resch. Ctr., 2142F Industrial Ct., Vista, CA 92083 619-727-7420
† Computer Conversions Corp., 6 Dunton Ct., E. Northport, NY 11731 516-261-3300
Control Technology Co., 41-16 29th St., Long Island City, NY 11101 718-361-2133
† EDO Corp./Elinco Div., 272 Main Ave., Norwalk, CT 06851 203-847-5861
† Harowe Servo Controls, Bowmar Inst. Corp., Westtown Rd. at West Chester Pike, W. Chester, PA 19380 215-692-2700
Henschel, General Signal Corp., 9 Hoyt Drive, P.O. Box 30, Newburyport, MA 01950 617-462-2400
ILC Data Device Corp., 105 Wilbur Pl., Bohemia, NY 11716 516-567-5600
† IMC Magnetics Corp., Western Div., 12627 Hiddencreek Way, Cerritos, CA 90701 213-926-0927

† Microwave/Sys., 1 Adler Dr., E. Syracuse, NY 13057 315-437-9951
Muirhead, 1101 Briston Rd., Mountainside, NJ 07092 201-233-6010
† Natel Engrg. Co., Inc., 4550 Runway St., Simi Valley, CA 93063 805-581-3950
North Atlantic Inds., Instrument Div., 60 Plant Ave., Hauppauge, NY 11788 516-582-6500
† Singer Co., Kearfott Div., 1150 McBride Ave., Little Falls, NJ 07424 201-785-6000
† Transicoil, Inc., Trooper Rd., P.O. Box 99, Worcester, PA 19490-9990 215-277-1300
† Transmagnetics, 210 Adams Blvd., Farmingdale, NY 11735 516-293-3100

Synchros & Resolvers (MIL)-2440 – *See Vol. B*

Synthesizers, Delay Line-2350 – *See Vol. A*

Synthesizers, Frequency-2900

† Andersen Labs., 1280 Blue Hills Ave., Bloomfield, CT 06002, 203-242-0761 .... A•1591
Applied Research, Inc., 160 Dupont St., Plainview, NY 11803, 516-349-9200 .... A•1702
† Comstron Corp., 200 E. Sunrise Hwy., Freeport, NY 11520, 516-546-9700 .... D•1204
† Frequency Elctrns., 55 Charles Lindbergh Blvd., Mitchel Field, NY 11553, 516-794-4500 .... A•1367
Hughes Solid State Products, 500 Superior Ave., Dept. E8, Newport Bch., CA 92658-8903, 714-759-2411 .... A•1373
IET Labs, Inc., 534 Main St., Westbury, NY 11590, 516-334-5959 .... D•1245
Programmed Test Sources, Beaver Brook Rd., Littleton, MA 01460, 617-486-3008 .... D•1292
Abacus Controls Inc., 89 Readington Rd., Somerville, NJ 08876 201-526-6010
Applied Communications, 9125 Gaither Rd., Gaithersburg, MD 20877 301-948-5210
† A.R.F. Prods., 2559 75th St., Boulder, CO 80301 303-443-4844
California Microwave, 990 Almanor Ave., Sunnyvale, CA 94086 408-732-4000
† Communication Techniques Inc., 36 Route 10, East Hanover, NJ 07936 201-884-2580
Continental Resources, Inc., 175 Middlesex Tpke., Bedford, MA 01730 617-275-0850
§ Eaton Corp., Elctrn. Instrmn. Div., 5340 Alla Rd., Los Angeles, CA 90066
Engelmann Microwave Co., KDI Pyrofilm, 60 S. Jefferson Rd., Whippany, NJ 07981 201-887-5700
Exact Electronics, Div. of Dynatech Nevada Inc., Box 1925, 2000 Arrowhead Dr., Carson City, NV 89701 .... 702-883-3400;800-648-7952
Fluke, John, Mfg. Co., Box C9090, MS 250C, Everett, WA 98206 206-356-5400
Frederick Elctrns. Corp., 7630 Hayward Rd., P.O. Box 502, Frederick, MD 21701-0502 301-662-5901
† Frequency West, Inc., 3140 Alfred St., Santa Clara, CA 95054 408-727-8500
† Greenray Inds., Inc., 840 W. Church Rd., Mechanicsburg, PA 17055 717-766-0223
§† Harris Corp., PRD Elctrns. Div., 6801 Jericho Tpke., Syosset, NY 11791 516-364-0400
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
§ Interstate Electronics Corp., Box 3117, 1001 E. Ball Rd., Anaheim, CA 92803 714-635-7210
KDI Electronics, Inc., Engelmann & Pyrofilm Divisions, 60 S. Jefferson Rd., Whippany, NJ 07981 201-887-8100
Leigh Instrs. Ltd., Frequency Control Div., C. R. Snelgrove Co., 141 Bond Ave., Don Mills, ON, CANADA M3B 1M2 416-447-8531
§ Luff Research, Box 449, Jackson Hgts., NY 11372 718-429-5900
† M/A-COM OSW, Inc., 2626 S. Hardy Dr., Tempe, AZ 85282 602-966-1471
§ Micro Power Sys. Inc., 3100 Alfred St., Santa Clara, CA 95050 408-727-5350
† Microwave Assocs. Ltd., Humphrey Rd., Dunstable, Bedfordshire, ENGLAND LU5 4SX, England .... 44-(582) 60-14-41
† Microwave/Sys., 1 Adler Dr., E. Syracuse, NY 13057 315-437-9951
§† Nitron, 10420 Bubb Rd., Cupertino, CA 95014 408-255-7550
Proteon, Inc., 4 Tech Circle, Natick, MA 01760 617-655-3340
† Racal-Dana Instrs. Inc., 4 Goodyear St., Irvine, CA 92715 714-859-8999
RCA Solid State Div., Route 202, Somerville, NJ 08876 201-685-6000
Real Time Sys., 152 S. MacQuesten Pkwy., Mt. Vernon, NY 10550 914-667-0425
Resdel Engrg., 300 E. Live Oak Ave., Arcadia, CA 91006 213-684-2600
Rockwell Intl., Commercial Elctrns. Opers., 1200 N. Alma Rd., Richardson, TX 75081 214-996-5000
† SCITEQ Electronics, Inc., 7380 Clairemont Mesa Blvd., San Diego, CA 92111 619-292-0500
§ Syntest Corp., 40 Locke Dr., Marlboro, MA 01752 617-481-7827
§† Systron-Donner Instr. Div., 2727 Systron Dr., Concord, CA 94518 415-676-5000
† TRAK Microwave Corp., 4726 Eisenhower Blvd., Dept. E5, Tampa, FL 33614 813-884-1411
§ Tucker Elctrns., Box 461966, Garland, TX 75046 .... 214-348-8800;800-527-4642
† Watkins-Johnson Co., 3333 Hillview Ave., Palo Alto, CA 94304 415-493-4141
Wavetek Indiana, Inc., 5808 Churchman, Beech Grove, IN 46107 317-787-3332
† Wavetek Rockland Scientific, Inc., 10 Volvo Dr., Rockleigh Indl. Pk., Rockleigh, NJ 07647 201-767-7900
§ Wavetek Corporation, 9191 Towne Centre Drive, San Diego, CA 92122 619-450-9971
† Zeta Labs., 3265 Scott Blvd., Santa Clara, CA 95054 408-727-6001

Synthesizers, Speech-2325

Applied Micro Technlg., A Burr Brown Co., 3669 E. 44th Street, Tucson, AZ 85713 602-622-8605
Computalker, Compuvoice, Inc., 1730 21st Street, Santa Monica, CA 90404 213-828-6546
Covox, Inc., 675 D Conger St., Eugene, OR 97402 503-342-1271
Intex Micro Systems Corp., 725 S. Adams Rd., Suite L-8, Birmingham, MI 48011 313-540-7601
Kinetic Sys., 11 Maryknoll Dr., Lockport, IL 60441 815-838-0005
Mitsubishi Elctrns. America, Inc., Semiconductor Div., 1050 East Arques Ave., Sunnyvale, CA 94086 408-730-5900
† Pacific Electro Dynamics, Inc., 11465 Willows Rd. N.E., Redmond, WA 98052 206-881-1700

Synthesizers, Waveform-2900

† Comstron Corp., 200 E. Sunrise Hwy., Freeport, NY 11520 516-546-9700
Cybernetic Micro Sys., P.O. Box 3000, 3000 Hwy. 84, San Gregorio, CA 94074 415-726-3000
Exact Electronics, Div. of Dynatech Nevada Inc., Box 1925, 2000 Arrowhead Dr., Carson City, NV 89701 .... 702-883-3400;800-648-7952
† Racal-Dana Instrs. Inc., 4 Goodyear St., Irvine, CA 92715 714-859-8999
Real Time Sys., 152 S. MacQuesten Pkwy., Mt. Vernon, NY 10550 914-667-0425
§ Syntest Corp., 40 Locke Dr., Marlboro, MA 01752 617-481-7827
† Wavetek Rockland Scientific, Inc., 10 Volvo Dr., Rockleigh Indl. Pk., Rockleigh, NJ 07647 201-767-7900
§ Wavetek Corporation, 9191 Towne Centre Drive, San Diego, CA 92122 619-450-9971

Systems Integration – See Services, Systems Integration (Vol. D)

Tables, X-Y Axis – See Simulators, Motion (Vol. D)

Tachometers, Pulse-4900

BEI Motion Sys. Co., Computer Prod. Div., 1755 B La Costa Meadows Dr., San Marcos, CA 92069, 619-471-2600 .... B•1783
† BEI Motion Sys. Co., Digital Prods. Div., P.O. Box 3838, Little Rock, AR 72203, 501-851-4000 .... B•1782
BEI Motion Sys. Co., Position Controls Div., 819 Reddick Ave., Santa Barbara, CA 93103, 805-966-1538 .... B•1782
Datametrics • Dresser Inds., Inc., 340 Fordham Road, Wilmington, MA 01887, 617-658-5410 .... B•1791
DCI Inc., 14812 W. 117th Street, P.O. Box 215, Olathe, KS 66061, 913-782-5672 .... D•1347
Eastern Air Devices Motor Div., 1 Progress Dr., Dover, NH 03820, 603-742-3330 .... B•1146
Kollmorgen Corp., Industrial Drives Div., 201 Rock Rd., Radford, VA 24141, 703-639-2495 .... B•1163-1165
† Magnetic Technology, 21001 Kittridge St., Canoga Pk., CA 91303, 818-887-7700 .... B•1168-1169
§ NES, Inc. (Nationwide Electronic Systems), 3003 Wakefield, Carpentersville, IL 60110, 312-426-5900 .... D•1366
§ Newport Electronics, 630 E. Young St., Santa Ana, CA 92705, 714-540-4914 .... D•1371
Renco, 26 Coromar Dr., Goleta, CA 93017-3094, 805-968-1525 .... B•1824
Vernitech, 300 Marcus Blvd., Deer Pk., NY 11729, 516-586-5100 .... D•1991
Vernitron Corp., Control Comps. Div., 1601 Precision Park La., San Diego, CA 92073, 619-428-5581 .... B•1199
† Aeroflex Labs., Magnetic Prods. Div.,, 35 South Service Road, Plainview, NY 11803 516-694-6700
Aetna Engrg., P.O. Box 7749, Van Nuys, CA 91409-7749 818-341-9409
Airpax Corp., Ft. Lauderdale Div., 6801 W. Sunrise Blvd., Ft. Lauderdale, FL 33313 305-587-1100
Atec, Inc., Box 19426, 8219 Kempwood Dr., Houston, TX 77055 713-468-7971
Autronics, 314 E. Live Oak, Ste. A, Arcadia, CA 91006 818-445-5470
§ Beede Electrical Instr. Co., S. Main St., Penacook, NH 03303 603-753-6362
BEI Motion Systems Co., Corporate Off., 166 Geary St., Ste. 1400, San Francisco, CA 94108 415-788-6840
BEI Motion Sys. Co., Industrial Encoder Div., 7230 Hollister Ave., Goleta, CA 93117 805-968-0782
Bertsch U.S., Sycamore Resch. Ctr., 2142F Industrial Ct., Vista, CA 92083 619-727-7420
Crompton Instrs., 2763 Higgins Road, Elk Grove Village, IL 60007 714-841-2901
§ C-Tek Inc., 4 Railroad Ave., Wakefield, MA 01880 617-246-1720
§ Digitec Corp., 918 Woodley Rd., P.O. Box 458, Dayton, OH 45401 513-254-6251
Disc Instruments, Honeywell, 102 E. Baker St., Costa Mesa, CA 92626 714-979-5300
Durgin & Browne, 80 Allen Rd., So. Burlington, VT 05401 802-863-6873
§ Dynapar, 1675 Delany Rd., Gurnee, IL 60031 312-662-2666
EG & G Torque Systems, 36 Arlington St., Watertown, MA 02172 617-924-6000
† Electric Tachometer, 68th & Upland Sts., Philadelphia, PA 19142 .... 215-SA6-7723
Electro-Craft, 1600 2nd St. S., Hopkins, MN 55343 612-931-2700
§ Electromatic Controls Corp., 2495 Pembroke Road, Hoffman Estates, IL 60195-2010 312-882-5757
Elm Systems, 1101 Brown St., Wauconda, IL 60084 312-526-5003
§† Engler Instruments Operation, Stemco Truck Products Division, 250 Culver Ave., Jersey City, NJ 07305 201-332-5353
† Faria, Thomas G., Corp., P.O. Box 0983, Uncasville, CT 06382 203-848-9271
§† Harris Circuits Mfg., 2706 Colley Ave., Norfolk, VA. 23517 804-467-1116
† Howell Instrs., 3479 W. Vickery Blvd., Ft. Worth, TX 76107 817-336-7411
Industrial Elctrn. Engrs., Inc., 7740 Lemona Ave., Van Nuys, CA 91405 818-787-0311
§ International Microtronics Corp., 4016 E. Tennessee St., Tucson, AZ 85714 602-748-7900
§ IVO Inds., Inc., 201 Industrial Way W., P.O. Drawer 917, Eatontown, NJ 07724 201-542-5151
§ Kessler-Ellis Prods., 120 1st Ave., Atlantic Highlands, NJ 07716 .... 201-291-0500; 800-631-2165
Mag-Con, 1626 Terrace Dr., St. Paul, MN 55113 612-633-8820
† Micro Mo Electronics, Inc., 742 2nd Ave. S., St. Petersburg, FL 33701 813-822-2529
Motion Control Devices, Inc., 80 Stedman St., Lowell, MA 01851 617-454-3407
§† Power Instrs. Products, Amatek/Mansfield & Green Div., 8600 Somerset Dr., Largo, FL 33543 813-536-7831
§ Richard-Lee Co., Box 724, New Providence, NJ 07974 201-276-0710
Sensor Corp., Box 140, Scottdale, PA 15683 412-887-4080
† Sequential Info. Sys., 249 N. Saw Mill River Rd., Elmsford, NY 10523 914-592-5930
† Solid State Elctrns. Corp., 18646 Parthenia St., Northridge, CA 91324 818-993-8257
Stock Drive Prods., Div. of Designatronics, Inc., 2101 Jericho Turnpike, New Hyde Pk., NY 11040 .... 516-328-0200;328-3300
† Teledyne Gurley, 514 Fulton St. P.O. Box 88, Troy, NY 12181 518-272-6300
§ Testoterm, P.O. Box 111509, Nashville, TN 37211 615-834-5082
TIF Instrs., Inc., 9101 N.W. 7th Ave., Miami, FL 33150 305-757-8811

Transicoil, Inc., Trooper Rd., P.O. Box 99, Worcester, PA 19490-9990 215-277-1300
§ TRW, Dynalco Controls Div., 5200 NW 37th, P.O. Box 8187, Ft. Lauderdale, FL 33310 305-739-4300
§ Veeder-Root, 70 Sargeant St., Hartford, CT 06102 203-527-7201
§ Westberg Mfg., Inc., 3400 Westach Way, Sonoma, CA 95476 707-938-2121

Tachometers, Generator-4900

Eastern Air Devices Motor Div., 1 Progress Dr., Dover, NH 03820, 603-742-3330 .... B•1146
§ Electro-Craft, 1600 2nd St. S., Hopkins, MN 55343, 612-931-2700 .... B•1147
† Maxon Precision Motors, Inc., 838 Mitten Rd., Burlingame, CA 94010, 415-697-9614 .... B•1171
† Micro Mo Electronics, Inc., 742 2nd Ave. S., St. Petersburg, FL 33701, 813-822-2529 .... B•1172,1175
Motor-Tronics, Inc., 2142 Industrial Ct., Bldg. "F", Vista, CA 92083, 619-727-7430 .... B•1176
Portescap U.S., 1547 Trooper Rd., P.O. Box 780, Worcester, PA 19490, 215-277-0433 .... B•1181
Renco, 26 Coromar Dr., Goleta, CA 93017-3094, 805-968-1525 .... B•1824
Servo-Tek Prods. Co., 1086 Goffle Rd., Hawthorne, NJ 07506, 201-427-3100 .... B•1185
† Sierracin/Magnedyne, 2258 Rutherford Rd., P.O. Box 458, Carlsbad, CA 92008, 619-438-3321 .... B•1188
§† TRW Motor Div. (Military), 2275 Stanley Ave., Dayton, OH 45404, 513-228-3171 .... B•1195
† Vernitech, 300 Marcus Blvd., Deer Pk., NY 11729, 516-586-5100 .... B•1011, D•1991
Vernitron Corp., Control Comps. Div., 1601 Precision Park La., San Diego, CA 92073, 619-428-5581 .... B•1199
† Aeroflex Labs., Magnetic Prods. Div., 35 South Service Road, Plainview, NY 11803 516-694-6700
Airpax Corp., Ft. Lauderdale Div., 6801 W. Sunrise Blvd., Ft. Lauderdale, FL 33313 305-587-1100
§ API Instrs., 1601 Trapelo Rd., Waltham, MA 02254 617-890-2000
† Astro Instrument Corp., 2501 NW 17th Ln., Pompano Beach, FL 33064 305-973-8900
Beede Electrical Instr. Co., S. Main St., Penacook, NH 03303 603-753-6362
Behlman Engineering, 1142 Mark Ave., Carpinteria, CA 93013 805-684-8311
Bertsch U.S., Sycamore Resch. Ctr., 2142F Industrial Ct., Vista, CA 92083 619-727-7420
Canon U.S.A., Elctrn. Comps. Div., One Canon Plaza, Lake Success, NY 11042 516-488-6700
§ Carter Motor, 2707 W. George St., Chicago, IL 60618-7898 312-588-7700
Colman Motor Products, Inc., A Barber-Colman Co., P. O. Box 1240, Rockford, IL 61105-1240 815-968-0660
Crompton Instrs., 2763 Higgins Road, Elk Grove Village, IL 60007 714-841-2901
Crompton Instrs., Hawker Siddley, 2763 Old Higgins Rd., Elk Grove Village, IL 60007 312-593-1107
† EDO Corp./Elinco Div., 272 Main Ave., Norwalk, CT 06851 203-847-5861
Eitel Mfg., 2835 Laguna Canyon Rd., Laguna Beach, CA 92652 714-494-2012
† Electric Tachometer, 68th & Upland Sts., Philadelphia, PA 19142 .... 215-SA6-7723
§† Engler Instruments Operation, Stemco Truck Products Division, 250 Culver Ave., Jersey City, NJ 07305 201-332-5353
Esterline Angus Instr. Corp., Box 24000, Indianapolis, IN 46224 317-244-7611
† Evershed & Vignoles, Ltd., Acton Lane, Chiswick, London, ENGLAND W4 5HJ 01-994-3670
† Georator Corp., Box 70, Manassas, VA 22110 703-368-2101
† GIC Thermodynamics, 2611 Parmenter, Royal Oak, MI 48073 313-280-1648
† Harowe Servo Controls, Bowmar Inst. Corp., Westtown Rd. at West Chester Pike, W. Chester, PA 19380 215-692-2700
Howell Instrs., 3479 W. Vickery Blvd., Ft. Worth, TX 76107 817-336-7411
† HTL Electro Kinetics, 402 E. Gutierrez St., Santa Barbara, CA 93101 805-963-2055
† IMC Magnetics Corp., Eastern Div., 570 Main St., Westbury, NY 11590 516-334-7070
† Inland Motor, Kollmorgen Corp., 501 First St., Radford, VA 24141 703-639-9045
† Kollmorgen Corp., Industrial Drives Div., 201 Rock Rd., Radford, VA 24141 703-639-2495
† Magnetic Technology, 21001 Kittridge St., Canoga Pk., CA 91303 818-887-7700
Micronel U.S., 2142F Industrial Ct., Sycamore Research Center, Vista, CA 92083 619-727-7400
Muirhead, 1101 Briston Rd., Mountainside, NJ 07092 201-233-6010
PMI Motors, Kollmorgen Corp., 5 Aerial Way, Syosset, NY 11791 516-938-8000
§ Powertron, Contraves Goerz Corp., 3821 Barranger Dr., Charlotte, NC 28210 704-525-8962
Sequential Info. Sys., 249 N. Saw Mill River Rd., Elmsford, NY 10523 914-592-5930
Singer Co., Kearfott Div., 1150 McBride Ave., Little Falls, NJ 07424 201-785-6000
§ Testoterm, P.O. Box 111509, Nashville, TN 37211 615-834-5082
† Transicoil, Inc., Trooper Rd., P.O. Box 99, Worcester, PA 19490-9990 215-277-1300
Vibrac, 1 Columbia Dr., Amherst, NH 03031 603-882-6777
§ Westberg Mfg., Inc., 3400 Westach Way, Sonoma, CA 95476 707-938-2121
§ Yokogawa Corp. of America, 2 Dart Rd., Shenandoah, GA 30265 404-253-7000

Tachometers, Stroboscopic-4900

Alpha-M Corp., 3009 Wildflower Dr., Dallas, TX 75229 214-620-0021
§ Biddle Instruments, A Thorn EMI Co., 510 Township Line Rd., Blue Bell, PA 19422 215-646-9200
Bluffton Products, Inc., Tegam, Inc., 7230 North Ridge Road, Madison, OH 44057 216-946-3572
Bruel & Kjaer Instrs. Inc., 185 Forest St., Marlboro, MA 01752 617-481-7000
§† Harris Circuits Mfg., 2706 Colley Ave., Norfolk, VA 23517 804-467-1116
§ Pacer Industries, Inc., 1450 First Ave., Chippewa Falls, WI 54729 715-723-1141
† Power Instrs. Products, Amatek/Mansfield & Green Div., 8600 Somerset Dr., Largo, FL 33543 813-536-7831
Spectral Dynamics, Scientific-Atlanta, Inc., 4255 Ruffin Rd., San Diego, CA 92123-0575 619-268-7100
§ Simpson Elec. Co., 853 Dundee Ave., Elgin, IL 60120 312-697-2260
§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 215-673-5600

U.S. Scientific Instrs., 61 North Beacon St., Boston, MA 02134 617-787-2411

Tape Decks – See Recorders, Magnetic Tape (Vol. D), Transports, Tape (Vol. D)

Tape Duplicators – See Duplicators, Magnetic Tape (Vol. D), Perforators,Paper Tape (Vol. D)

Tape Recording Accessories-1300

Ciprico Inc., 2955 Xenium Lane, Plymouth, MN 55441, 612-559-2034 .... D•1062
† International Electro Magnetics, Inc., 350 N. Eric Dr., Palatine, IL 60067, 312-358-4622 .... D•1026
† Reproduction Technologies Inc., Dept. EM, P.O. Box 815, Bristol, IN 46507-0518, 219-848-5233;219-848-5333 .... D•1034
Tape Concepts, Inc., P. O. Box 815, 110 E. Vistula St., Bristol, IN 46507, 219-848-5234 .... D•1035
Accardi Laboratories, 66-45 69th St., Middle Village, NY 11379 212-326-0570
Alinabal, 28 Woodmont Rd., Milford, CT 06460 203-877-3241
† Ampex Corp., 401 Broadway, Redwood City, CA 94063 415-367-2011
§† Benjamin electroproducts, inc., Robins Div., 80 Smith St., Farmingdale, NY 11735 516-293-7744
Data Check Corp., 10070 Willow Creek Rd., San Diego, CA 92131 619-578-0101
§ Datum, Storage Prods. Div., 1363 State College Blvd., Anaheim, CA 92806 714-533-6333
§ Duotone, 6875 S.W. 81st St., S. Miami, FL 33143 305-665-1121
§ GC Elctrns., 400 S. Wyman St., Rockford, IL 61101 815-968-9661
† Genisco Memory Prods. Corp., 10874 Hope St., Cypress, CA 90630 714-220-0720
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
§ Instrumentation Prods., 3M Co., 300 S. Lewis Rd., Camarillo, CA 93010 .. 805-482-1911
Mac Panel Co., Box 5027, 216 Pine St., High Point, NC 27262 919-884-8111
§† Magnetic Audio/Video Products Div., 3M Co., 3M Center, Bldg. 223-5 South, St. Paul, MN 55101 612-733-1110
MPH Elctrns., 2660 Loma Ave., S. El Monte, CA 91733 213-442-7818
Potter Instr., 10 Main St., Gonic, NH 03867 603-332-1991
§ Recoton Corp., 46-23 Crane St., Long Island City, NY 11101 718-392-6442
§ Rye Inds., Inc., 125 Spencer Pl., P.O. Box M, Mamaroneck, NY 10543 914-698-0080
§ Superex Electronics Corp., 151 Ludlow St., Yonkers, NY 10705 914-965-6906
† Telectro Sys., 96-18 43rd Ave., Corona, NY 11368 212-651-8900
Television Equip. Assocs., Box 393, So. Salem, NY 10590-0393 914-763-8893
§† Workman Elctrn. Prods., Box 3828, Sarasota, FL 33578 813-371-4242

Tape Search Equipment-2000

Datum Inc., Timing/Aacom Divisions, 1363 S. State College Blvd., Anaheim, CA 92806, 714-533-6333 .... D•1148
Frequency and Time Systems, Inc., DATUM, INC., 34 Tozer Rd., Beverly, MA 01915, 617-927-8220 .... D•1148
Phi Technologies, Inc., 4605 North Stiles, Oklahoma City, OK 73105, 405-521-9000 .... D•1052-1053
† TRAK Systems, Div. TRAK Microwave Corp., 4722 Eisenhower Blvd., Dept. E-5, Tampa, FL 33614, 813-884-1411 .... D•1080
† Ampex Corp., 401 Broadway, Redwood City, CA 94063 415-367-2011
Datachron Inc., 3186 J Airway Ave., Costa Mesa, CA 92626 714-751-2211
§ Data General, 4400 Computer Dr., Westboro, MA 01581 617-366-8911
Kode, 1515 S. Manchester Ave., Anaheim, CA 92802 714-758-0400
Mega Logic, 9659 Natl. Rd., Brookville, OH 45309 513-833-5222
† Reproduction Technologies Inc., Dept. EM, P.O. Box 815, Bristol, IN 46507-0518 .... 219-848-5233;219-848-5333
Tape Concepts, Inc., P. O. Box 815, 110 E. Vistula St., Bristol, IN 46507 219-848-5234
† Telectro Sys., 96-18 43rd Ave., Corona, NY 11368 212-651-8900
Television Equip. Assocs., Box 393, So. Salem, NY 10590-0393 914-763-8893
Voice Identification, Box 714, Somerville, NJ 08876 201-526-3408

Tape Winders-2000

§ GC Elctrns., 400 S. Wyman St., Rockford, IL 61101 815-968-9661
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
MPH Elctrns., 2660 Loma Ave., S. El Monte, CA 91733 213-442-7818
† Reproduction Technologies Inc., Dept. EM, P.O. Box 815, Bristol, IN 46507-0518 .... 219-848-5233;219-848-5333
Tape Concepts, Inc., P. O. Box 815, 110 E. Vistula St., Bristol, IN 46507 219-848-5234
† Telectro Sys., 96-18 43rd Ave., Corona, NY 11368 212-651-8900
Television Equip. Assocs., Box 393, So. Salem, NY 10590-0393 914-763-8893

Tapes, Electrical Insulation-3100 – *See Vol. C*

Tapes, Films & Foils, Pressure Sensitive-4525 – *See Vol. C*

Tapes, Heat Shrinkable – See Caps, Forms & Tapes, Heat Shrinkable (Vol. C)

Tapes, Recording, Magnetic (All Types)-1300

AGFA-Gevaert, Inc., 275 North St., Teterboro, NJ 07608 201-288-4100
† Ampex Corp., 401 Broadway, Redwood City, CA 94063 415-367-2011
§ BASF Sys., Crosby Dr., Bedford, MA 01730 .... 617-271-4000;800-343-4600
§† Capitol Magnetic Prods., 6902 Sunset Blvd., Hollywood, CA 90028 213-461-2701
Computerware, Inc., 8480-I Tyco Rd., Vienna, VA 22180 703-821-8200
Dennison Kube, Div. Dennison Computer Supplies Inc., 132 Calvary St., Waltham, MA 02254-0472 617-899-0012
§ Duotone, 6875 S.W. 81st St., S. Miami, FL 33143 305-665-1121
DuPont de Nemours, E. I., & Co., 1007 Market St., Wilmington, DE 19898 302-773-3218
Gra-Mar Inc., 3165 McCrory Pl., Ste. 265, Orlando, FL 32803 305-894-3351
Inmac, 2465 Augustine Dr., Santa Clara, CA 95054 408-727-1970

Mac Panel Co., Box 5027, 216 Pine St., High Point, NC 27262 919-884-8111
§† Magnetic Audio/Video Products Div., 3M Co., 3M Center, Bldg. 223-5 South, St. Paul, MN 55101 612-733-1110
§† Memorex Corp., San Thomas at Central Expwy., Santa Clara, CA 95052 408-987-1000
§ Recoton Corp., 46-23 Crane St., Long Island City, NY 11101 718-392-6442
Teledyne Camera Sys., 131 N. Fifth Ave., Arcadia, CA 91006 818-359-6691
Tri-Data Corp., 505 E Middlefield Rd., Mountain View, CA 94043 415-969-3700

Tapes, Magnetic, ¼", 140' Cartridge-2000

Computerware, Inc., 8480-I Tyco Rd., Vienna, VA 22180 703-821-8200
Gra-Mar Inc., 3165 McCrory Pl., Ste. 265, Orlando, FL 32803 305-894-3351
† Interface, Inc., 21101 Osborne St., Canoga Park, CA 91304 818-341-7014

Tapes, Magnetic, ¼", 300' Cartridge-2000

§ Algo, Inc., 9198-C Red Branch Rd., Columbia, MD 21045 301-730-7442
Computerware, Inc., 8480-I Tyco Rd., Vienna, VA 22180 703-821-8200
Gra-Mar Inc., 3165 McCrory Pl., Ste. 265, Orlando, FL 32803 305-894-3351
† Interface, Inc., 21101 Osborne St., Canoga Park, CA 91304 818-341-7014

Tapes, Magnetic, ½", 2400' Reel-2000

Computerware, Inc., 8480-I Tyco Rd., Vienna, VA 22180 703-821-8200
Gra-Mar Inc., 3165 McCrory Pl., Ste. 265, Orlando, FL 32803 305-894-3351

Tapes, Magnetic, ½", 3600' Reel-2000

Computerware, Inc., 8480-I Tyco Rd., Vienna, VA 22180 703-821-8200
Gra-Mar Inc., 3165 McCrory Pl., Ste. 265, Orlando, FL 32803 305-894-3351

Tapes, Magnetic, Digital Cassette-2000

Computerware, Inc., 8480-I Tyco Rd., Vienna, VA 22180 703-821-8200
† Genisco Memory Prods. Corp., 10874 Hope St., Cypress, CA 90630 714-220-0720
Gra-Mar Inc., 3165 McCrory Pl., Ste. 265, Orlando, FL 32803 305-894-3351
§† Verbatim Corp., 323 Soquel Way, Sunnyvale, CA 94086 408-245-4400

Tapes, Numerical Control-2000

Wire Graphics, Inc., 215 B. Central Ave., Farmingdale, NY 11735 516-293-1525

Technical Books-4200 — *See Vol. C*

Telephone Cords & Cord Sets — See Cords & Cord Sets, Telephone

Tees, Coaxial-3450 — *See Vol. A*

Tees, Waveguide-3450 — *See Vol. A*

Telecommunication Systems & Equipment — See Communications Systems, Telephone (Vol. D)

Telemetering Systems, Electronic — See Communications Systems, Telemetering (Vol. D)

Telephone Handsets — See Handsets, etc. (Vol. D)

Telephone Ringing Generators — See Generators, Signal (Vol. D)

Telephone Sets, Exclusion Key-1900

GTE SUPPLY, GTE Communications Systems, 5225 Wiley Post Way, Salt Lake City, UT 84116 801-537-5237

Telephone Systems, Telephones Sound Powered — See Communications Systems, Telephone (Vol. D)

Teleprinters, Auto Send/Receive-1900

† Datametrics Corp., Defense Products Div., 7630 Gloria Ave., Van Nuys, CA 91406 818-989-3840
§ Data Rentals/Sls., Inc, P. O. Box 3257, Culver City, CA 90230 213-559-3822
§† Genicom Corp., General Electric Dr., Waynesboro, VA 22980 703-949-1471
GTE SUPPLY, GTE Communications Systems, 5225 Wiley Post Way, Salt Lake City, UT 84116 801-537-5237
Qwint Systems, 3693 Commercial Ave., Northbrook, IL 60062 312-498-5060
Sidereal Corp., 9600 S.W. Barnes Rd., Portland, OR 97225 503-297-5531
Texas Instrs., Data Sys. Group, P. O. Box 809063, Dallas, TX 75380-9063 1-800-527-3500
TTS-Telecom Terminal Systems, 621 Hindry Ave, Inglewood, CA 90301 213-641-8111

Teleprinters, Keyboard Send/Receive-1900

† Datametrics Corp., Defense Products Div., 7630 Gloria Ave., Van Nuys, CA 91406 818-989-3840
§ Data Rentals/Sls., Inc, P. O. Box 3257, Culver City, CA 90230 213-559-3822
§† Genicom Corp., General Electric Dr., Waynesboro, VA 22980 703-949-1471
GTE SUPPLY, GTE Communications Systems, 5225 Wiley Post Way, Salt Lake City, UT 84116 801-537-5237
Sidereal Corp., 9600 S.W. Barnes Rd., Portland, OR 97225 503-297-5531
Terminal Data Corp., 15733 Crabbs Branch Way, Rockville, MD 20855 301-921-8282
Texas Instrs., Data Sys. Group, P. O. Box 809063, Dallas, TX 75380-9063 1-800-527-3500
TTS-Telecom Terminal Systems, 621 Hindry Ave, Inglewood, CA 90301 213-641-8111

Teleprinters, Receive Only-1900

† Datametrics Corp., Defense Products Div., 7630 Gloria Ave., Van Nuys, CA 91406 818-989-3840
§ Data Rentals/Sls., Inc, P. O. Box 3257, Culver City, CA 90230 213-559-3822
§† Genicom Corp., General Electric Dr., Waynesboro, VA 22980 703-949-1471
GTE SUPPLY, GTE Communications Systems, 5225 Wiley Post Way, Salt Lake City, UT 84116 801-537-5237
Qwint Systems, 3693 Commercial Ave., Northbrook, IL 60062 312-498-5060
Singer Data Products, Inc., 790 Maple Lane, Bensenville, IL 60106 312-860-6500
Texas Instrs., Data Sys. Group, P. O. Box 809063, Dallas, TX 75380-9063 1-800-527-3500
§ TTS-Telecom Terminal Systems, 621 Hindry Ave, Inglewood, CA 90301 213-641-8111

Teletypewriters & Equipment-1900

§ Data Rentals/Sls., Inc, P. O. Box 3257, Culver City, CA 90230 213-559-3822
Digital Equip., One Iron Way, Marlborough, MA 01752
Electrocom Inds., 1105 N. Ironwood Dr., S. Bend, IN 46615 219-232-2743
GTE SUPPLY, GTE Communications Systems, 5225 Wiley Post Way, Salt Lake City, UT 84116 801-537-5237
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
Qwint Systems, 3693 Commercial Ave., Northbrook, IL 60062 312-498-5060
RCI/Data, 1992 Lakewood Rd., Toms River, NJ 08753 201-341-8361
† Teletype, 5555 Touhy Ave., Skokie, IL 60076 312-982-2000
TTS-Telecom Terminal Systems, 621 Hindry Ave, Inglewood, CA 90301 213-641-8111

Television Systems & Equipment, Cable (CATV) & Master Antenna (MATV) — See CATV Systems & Equipment (Vol. D)

Television Systems & Equipment Closed Circuit-1900

† Math Assocs., 2200 Shames Dr., Westbury, NY 11590, 516-334-6800 .... B•1124
§ American Laser Sys., Inc., 106 Fowler Rd., Goleta, CA 93117 805-967-0423
† Ampex Corp., 401 Broadway, Redwood City, CA 94063 415-367-2011
Angenieux Inc., 120 Derry Rd., Hudson, NH 02051 603-889-2116
Atlantic Research, 5390 Cherokee Ave., Alexandria, VA 22312 703-642-4000
ATV Research, Inc., 1301 Broadway, Dakota City, NE 68731 402-987-3771
† Cohu, Inc., Elctrns. Div., Box 85623, San Diego, CA 92138 619-277-6700
† Colorado Video, Inc., Box 928, Boulder, CO 80306 303-444-3972
Components Corp., 6 Kinsey Pl., Denville, NJ 07834 201-627-0290
§ Delta Elctrns., 145 Fayette St., Winston-Salem, NC 27101 919-725-4122
§ Dotronix, 160 First St. SE, New Brighton, MN 55112 612-633-1742
§ Dyma Engrg., Box 1535, Los Lunas, NM 87031 505-865-6700
† EDO Western Corp., EDO Corp., 2645 South 300 W., Salt Lake City, UT 84115 .... 801-486-7481/3846
ElectroPhysics Corp., 48 Spruce St., Nutley, NJ 07110 201-667-2262
Hamamatsu Photonics K.K., 325-6 Sunayama-Cho, Hamamatsu City, Shizuoka Pref, JAPAN 0534-52-2141
HDS Inc., 12310 Pinecrest Rd., Reston, VA 22091 703-620-6200
† Lear Siegler, Inc., 2850 Ocean Park Blvd., P.O. Box 2158, Santa Monica, CA 90406 213-452-5444
§† Lenco Elctrns., Inc., 300 N. Maryland St., Jackson, MO 63755 314-243-3147
§ MARCONI INSTRUMENTS, 3 Pearl Court, Allendale, NJ 07401 201-934-9050
† MERET, Inc., 1815 24th St., Santa Monica, CA 90404-4998 213-828-7496
RCA Solid State Div., Route 202, Somerville, NJ 08876 201-685-6000
Stenning Instrments, Inc., 671 Enchanted Way, Pacific Palisades, CA 90272 213-459-2930
§ Tektone Sound & Signal, 1331 S. Killian Dr., Lake Park, FL 33403 305-844-2383
Tektronix, Inc., P. O. Box 500, Y3-314, Beaverton, OR 97077 ..... 800-547-1512;Oregon only 800-452-1877
† Telectro Sys., 96-18 43rd Ave., Corona, NY 11368 212-651-8900
Telemet, 185 Dixon Ave., Amityville, NY 11701 516-842-2300
Television Equip. Assocs., Box 393, So. Salem, NY 10590-0393 914-763-8893
§ Television Microtime, Inc., 1280 Blue Hills Ave., Bloomfield, CT 06002 203-242-4242
Telpar, Inc., 4137 Billy Mitchell Rd., P.O. Box 796, Addison, TX 75001 214-233-6631
§ Venus Scientific, Inc., 399 Smith St., Farmingdale, NY 11735 516-293-4100
§ Vicon Industries, Inc., 525 Broad Hollow Rd., Melville, NY 11747 516-293-2200
§ Video Automation Systems, Upper Shad Rd., Pound Ridge, NY 10576 914-764-4613
Visual Info. Institute, Box 33, Xenia, OH 45385 513-376-4361

Temperature Compensators-5300 — *See Vol. B*

Temperature Indicators — See Meters, Temperature (Vol. D), Labels, Temperature Indicating (Vol. B)

Temperature Sensors — See Transducers, Temperature (Vol. B)

Tensile Testers — See Testers, Material (Vol. D)

Terminal Blocks (Incl. Barrier Types)-2100 — *See Vol. C*

Terminal Boards-2100 — *See Vol. C*

Terminal Boards, Blocks, Strips (MIL)-2440 — *See Vol. B*

Terminal Equipment, Digital-2000

Memodyne, 220 Reservoir St., Needham Hgts., MA 02194, 617-444-7000 ...... D•1068
AFI/DATATROL, Addressograph Farrington, Inc., Brent Dr., Hudson, MA 01749 617-568-1411
§ Ann Arbor Terminals, 6175 Jackson Rd., Ann Arbor, MI 48103 313-663-8000
§ Applied Digital Data Systems Inc., 100 Marcus Blvd., Hauppauge, NY 11787 516-231-5400
Applied Sys., 26401 Harper Ave., St. Clair Shores, MI 48081 313-779-8700
† Astronautics Corporation of America, P.O. Box 523, Milwaukee, WI 53201-0523 414-447-8200
BTU Engrg. Corp., Bruce Sys., Esquire Rd., N. Billerica, MA 01862 617-667-4111

† Clarke-Hess Comm. Resch. Corp., 17 West 17th St., New York, NY 10011 ... 212-255-2940
Computerwise, 4006 E 137th Terr., Grandview, MO 64030 ... 816-765-3330
§† Data General, 4400 Computer Dr., Westboro, MA 01581 ... 617-366-8911
§ Data Rentals/Sls., Inc, P. O. Box 3257, Culver City, CA 90230 ... 213-559-3822
§† Di/An Controls, Inc., 944 Dorchester Ave., Boston, MA 02125 ... 617-288-7700
Electrocom Inds., 1105 N. Ironwood Dr., S. Bend, IN 46615 ... 219-232-2743
Fluke, John, Mfg. Co., Box C9090, MS 250C, Everett, WA 98206 ... 206-356-5400
Frederick Elctrns. Corp., 7630 Hayward Rd., P.O. Box 502, Frederick, MD 21701-0502 ... 301-662-5901
§† Genicom Corp., General Electric Dr., Waynesboro, VA 22980 ... 703-949-1471
GTE SUPPLY, GTE Communications Systems, 5225 Wiley Post Way, Salt Lake City, UT 84116 ... 801-537-5237
Harris Corp., Computer Systems Div., 2101 W. Cypress Creek Rd., Ft. Lauderdale, FL 33309 ... 305-974-1700
Honeywell Inc., Aerospace & Defense Grp., Honeywell Plaza, Minneapolis, MN 55408 ... 612-870-5186
† Hughes Aircraft Co., Microelctrn. Sys. Div., 2601 Campus Dr., Irvine, CA 92715 ... 714-752-3800
§ InfoCap, Inc., 31119 Via Colinas #502, Westlake Village, CA 91362 ... 818-991-1410
† Metric Sys., 645 Anchors St., Ft. Walton Beach, FL 32548 ... 904-244-9600
§† MSI Data Corp., 340 Fischer Ave., Costa Mesa, CA 92626 ... 714-549-6000
§ NEC Information Systems, NEC Corporation, 1414 Massachusetts Ave., Boxborough, MA 01719 ... 617-264-8000
§ Qume, 2350 Qume Dr., San Jose, CA 95131 ... 408-942-4000
Qwint Systems, 3693 Commercial Ave., Northbrook, IL 60062 ... 312-498-5060
Ramcom Systems, 4141-C Glencoe Ave., Marina Del Rey, CA 90292 ... 213-827-4432
RCI/Data, 1992 Lakewood Rd., Toms River, NJ 08753 ... 201-341-8361
† SAI Technlg. Co., Science Applications Inc., 4060 Sorrento Valley Blvd., San Diego, CA 92121 ... 619-452-9150
Standard Logic, 2215 S. Standard Ave., Santa Ana, CA 92707 ... 714-979-4770
Tektronix, Inc., P. O. Box 500, Y3-314, Beaverton, OR 97077 ... 800-547-1512;Oregon only 800-452-1877
† Teleram Communications, 2 Corporate Park Dr., White Plains, NY 10604 ... 914-694-9270
§ Terminal Data Corp., 15733 Crabbs Branch Way, Rockville, MD 20855 ... 301-921-8282
Texas Instrs., Data Sys. Group, P. O. Box 809063, Dallas, TX 75380-9063 ... 1-800-527-3500
† TRAK Systems, Div. TRAK Microwave Corp., 4722 Eisenhower Blvd., Dept. E-5, Tampa, FL 33614 ... 813-884-1411
TTS-Telecom Terminal Systems, 621 Hindry Ave, Inglewood, CA 90301 ... 213-641-8111

Terminal Strips (Including Barrier Types)-2100 — *See Vol. C*

Terminals, Communications-2000

Computer Maintenance Corp., 405 Murray Hill Pkwy, East Rutherford, NJ 07073 ... 201-866-6400
The Computer Place, D & D Financial Entprs. Inc., 4595 Van Epps Rd., Brooklyn Hts., OH 44131 ... 216-351-7444
GTE SUPPLY, GTE Communications Systems, 5225 Wiley Post Way, Salt Lake City, UT 84116 ... 801-537-5237

Terminals, Credit Authorization-2000

Xico, Inc., 120 Ocean Way, Santa Monica, CA 90402, 213-454-0302 ... D•1082
AFI/DATATROL, Addressograph Farrington, Inc., Brent Dr., Hudson, MA 01749 ... 617-568-1411
Applied Sys., 26401 Harper Ave., St. Clair Shores, MI 48081 ... 313-779-8700
Elcom Industries, Inc., 10268 Bach Blvd., St. Louis, MO 63132 ... 314-429-3100
§ Lexicon Corp. of Miami, 1541 N. W. 65th Ave., Ft. Lauderdale, FL 33313 ... 305-792-4400
§ TEC, 2727 N. Fairview, Box 5646, Tuscon, AZ 85703 ... 602-792-2230
TTS-Telecom Terminal Systems, 621 Hindry Ave, Inglewood, CA 90301 ... 213-641-8111

Terminals, Crimp-2100 — *See Vol. C*

Terminals, Data Display (Incl. Alphanumeric & Graphic)-2000

Telpar, Inc., 4137 Billy Mitchell Rd., P.O. Box 796, Addison, TX 75001, 214-233-6631 ... D•1075
A & B Technical Services, 11300 Hartland St., N. Hollywood, CA 91605 ... 213-769-6772
ADAC Corp., 70 Tower Office Pk., Woburn, MA 01801 ... 617-935-6668
Advanced Elctrns. Design, Inc., 440 Potrero Ave., Sunnyvale, CA 94086 ... 408-733-3555;800-538-1730 (outside CA)
AFI/DATATROL, Addressograph Farrington, Inc., Brent Dr., Hudson, MA 01749 ... 617-568-1411
† Ampex Corp., 401 Broadway, Redwood City, CA 94063 ... 415-367-2011
§ Andromeda Sys., 9000 Eton Ave., Canoga Park, CA 91304 ... 818-709-7600
§ Ann Arbor Terminals, 6175 Jackson Rd., Ann Arbor, MI 48103 ... 313-663-8000
§ Applied Digital Data Systems Inc., 100 Marcus Blvd., Hauppauge, NY 11787 ... 516-231-5400
Applied Sys., 26401 Harper Ave., St. Clair Shores, MI 48081 ... 313-779-8700
Astec USA, Ltd., A BSR Intl. Co., 2880 San Tomas Expwy., #200, Santa Clara, CA 95051 ... 408-748-1200
† Astronautics Corporation of America, P.O. Box 523, Milwaukee, WI 53201-0523 ... 414-447-8200
Aydin Corp., 700 Dresher Rd., Horsham, PA 19044 ... 215-657-7510
§† Aydin Controls, 414 Commerce Dr., Ft. Washington, PA 19034 ... 215-542-7800
Bridge Computer Co., Sea Data Corp., 1 Bridge St., Newton, MA 02158 ... 617-244-8190
Burroughs Corp., Borroughs Place, Rm. 4C-51, Detroit, MI 48232 ... 313-972-7000
† Calcomp, 2411 W. La Palma Ave., Anaheim, CA 92801 ... 714-821-2011
Cambridge Digital Sys., Compumart, P.O. Box 568, 65 Bent St., Cambridge, MA 02139 ... 617-491-2700
Colorgraphic Communications Corp., 2379 John Glenn Dr. Ste. 105, P.O. Box 80448, Atlanta, GA 30366 ... 404-455-3921
§ Computer Devices, 749 Middlesex Turnpike, Nutting Lake, MA 01865 ... 617-663-4980
Computer Maintenance Corp., 405 Murray Hill Pkwy, East Rutherford, NJ 07073 ... 201-866-6400
The Computer Place, D & D Financial Entprs. Inc., 4595 Van Epps Rd., Brooklyn Hts., OH 44131 ... 216-351-7444
Computer Talk, Inc., Box 148, Morrison, CO 80465 ... 303-697-5485
Computerwise, 4006 E 137th Terr., Grandview, MO 64030 ... 816-765-3330
Continental Resources, Inc., 175 Middlesex Tpke., Bedford, MA 01730 ... 617-275-0850
Control Module, 380 Enfield St., Enfield, CT 06082 ... 203-745-2433
§ Coosol, 3013 Harbor Blvd., Costa Mesa, CA 92626 ... 714-545-2216
CPS Inc., 110 Wolfe Rd., Sunnyvale, CA 94086 ... 408-738-0530
§† Data General, 4400 Computer Dr., Westboro, MA 01581 ... 617-366-8911
§ Data Rentals/Sls., Inc, P. O. Box 3257, Culver City, CA 90230 ... 213-559-3822
Daytronic Corp., 2589 Corporate Pl., Miamisburg, OH 45342 ... 513-866-3300
Delta Data Systems Corp., 2595 Metropolitan Dr., Trevose, PA 19047 ... 215-322-5400
Dio-Rey, Div. of Info-Lite, 422 Cliff St., Fairview, NJ 07022 ... 201-941-4455
ECD Corp., 196 Broadway, Cambridge, MA 02139 ... 617-661-4400
Elec-tek, Inc., 10280 Alliance Rd., Cincinnati, OH 45242 ... 513-793-7937
Electro Rent Corp., 4209 Van Owen Place, Burbank, CA 91505 ... 818-843-1221
Enterprise Sys. Corp., P.O. Box 698, Dover, NH 03820 ... 603-742-7363
Evans & Sutherland Computer Corp., P.O. Box 8700, 580 Arapeen Dr., Salt Lake City, UT 84108 ... 801-582-5847
First Computer Corp., 645 Blackhawk Dr., Westmont, IL 60559 ... 312-920-1050
Fluke, John, Mfg. Co., Box C9090, MS 250C, Everett, WA 98206 ... 206-356-5400
G B Instruments Inc., 2030 Coolidge St., Hollywood, FL 33020 ... 305-920-0225
General Digital Corp., 700 Burnside Ave., E. Hartford, CT 06108 ... 203-528-9041
Genstar Rental Elctrns., 2445 Faber Pl., Palo Alto, CA 94303 ... 415-856-7600
GTE SUPPLY, GTE Communications Systems, 5225 Wiley Post Way, Salt Lake City, UT 84116 ... 801-537-5237
Harris Corp., Computer Systems Div., 2101 W. Cypress Creek Rd., Ft. Lauderdale, FL 33309 ... 305-974-1700
§ Heath Co., Benton Harbor, MI 49022 ... 616-982-3886
HMW Enterprises, Inc., 604 Salem Road, Etters, PA 17319 ... 717-938-4691
Honeywell Inc., Aerospace & Defense Grp., Honeywell Plaza, Minneapolis, MN 55408 ... 612-870-5186
Honeywell Info. Sys., 200 Smith St., MS 440, Waltham, MA 02154 ... 617-895-6000
Hughes Aircraft Co, Aerospace Grps./Support Sys., P.O. Box 90515, Los Angeles, CA 90009 ... 213-670-1515
Hughes Aircraft Co., Microelctrn. Sys. Div., 2601 Campus Dr., Irvine, CA 92715 ... 714-752-3800
† Industrial Elctrn. Engrs., Inc., 7740 Lemona Ave., Van Nuys, CA 91405 ... 818-787-0311
§† Interstate Electronics Corp., Box 3117, 1001 E. Ball Rd., Anaheim, CA 92803 ... 714-635-7210
Itoh Electronics, Inc. (C.), 5301 Beethoven St., Los Angeles, CA 90066 ... 212-682-0420
Jupiter Systems, 1100 Marina Village Parkway, Alameda, CA 94501 ... 415-523-9000
§ Lear Siegler, Inc., 2850 Ocean Park Blvd., P.O. Box 2158, Santa Monica, CA 90406 ... 213-452-5444
Lee Data Corporation, 7075 Flying Cloud Drive, Minneapolis, MN 55344 ... 612-828-0300
Matrox Elctrn. Sys., 1055 St. Regis Blvd., Dorval, QU, CANADA H9P 2T4 ... 514-685-2630
§ Megatek Corp., 9645 Scranton Road, San Diego, CA 92121 ... 619-455-5590
† Memorex Corp., San Thomas at Central Expwy., Santa Clara, CA 95052 ... 408-987-1000
Microsystems Dev. Corp. Inc., 1560 Teaneck Rd., Teaneck, NJ 07666 ... 201-837-0051
Mitronics, 2908 Oregon Court - Bldg. I-2, Torrance, CA 90503 ... 213-320-7011
§ Mitsubishi Elctrns., Industrial Electronics Div., 991 Knox Street, Torrance, CA 90502 ... 213-515-3993
§ Motorola Semiconductor Prods. Sector, Adv. 72, Box 20912, Phoenix, AZ 85036 ... 602-244-6900
Ontel Corp., 250 Crossways Park Dr., Woodbury, NY 11797 ... 516-364-2121
§ Princeton Elctrn. Prods., Box 101, North Brunswick, NJ 08902 ... 201-297-4448
Racal-Milgo, 1601 N. Harrison Parkway, Sunrise, FL 33324 ... 305-475-1601
Ramcom Systems, 4141-C Glencoe Ave., Marina Del Rey, CA 90292 ... 213-827-4432
§ Ramtek, 2211 Lawson Lane, Santa Clara, CA 95050 ... 408-988-2211
RCI/Data, 1992 Lakewood Rd., Toms River, NJ 08753 ... 201-341-8361
† SAI Technlg. Co., Science Applications Inc., 4060 Sorrento Valley Blvd., San Diego, CA 92121 ... 619-452-9150
Sanders Assocs., Flexprint Prods. Div., Grenier Fld., Manchester, NH 03103 ... 603-669-4615
Southwest Tech Prods Corp., 219 W. Rhapsody, San Antonio, TX 78216 ... 512-344-0242
Sperry Univac, Mini-Computer Operations, Box C-19504, Irvine, CA 92713 ... 714-754-6900
§ Sumitronics, Inc., Sumitomo Corporation, 1270 Oakmead Pkwy. Ste. 201, Sunnyvale, CA 94086 ... 408-737-7683
TEC, 2727 N. Fairview, Box 5646, Tuscon, AZ 85703 ... 602-792-2230
† Tektronix, Inc., P. O. Box 500, Y3-314, Beaverton, OR 97077 ... 800-547-1512;Oregon only 800-452-1877
Teledyne/Geotech, 3401 Shiloh Rd., Garland, TX 75041 ... 214-271-2561
† Teleram Communications, 2 Corporate Park Dr., White Plains, NY 10604 ... 914-694-9270
Telesis Laboratory, Box 1972, Chillocothe, OH 45601 ... 614-642-5000
† Teletype, 5555 Touhy Ave., Skokie, IL 60076 ... 312-982-2000
§† TeleVideo Sys., Inc., 1170 Morse Ave., Sunnyvale, CA 94086 ... 408-745-7760
Terminal Data Corp., 15733 Crabbs Branch Way, Rockville, MD 20855 ... 301-921-8282
§ Texas Instrs., Inc., Box 225012-MS-84, Dallas, TX 75265 ... 214-995-6611
§ Texas Instrs., Data Sys. Group, P. O. Box 809063, Dallas, TX 75380-9063 ... 1-800-527-3500
Trivex, 3180 Redhill Ave., Costa Mesa, CA 92626 ... 714-546-7781

Terminals, Data Entry, Multimedia-2000

Bowmar Instrument Corp., Aerospace Div., 8000 Bluffton Rd., Ft. Wayne, IN 46809, 219-747-3121 ... B•1707

Xico, Inc., 120 Ocean Way, Santa Monica, CA 90402, 213-454-0302 ..... D•1082
Applied Sys., 26401 Harper Ave., St. Clair Shores, MI 48081 313-779-8700
† Astronautics Corporation of America, P.O. Box 523, Milwaukee, WI 53201-0523 414-447-8200
BMS Data Handling, Inc., 12155 Magnolia, Riverside, CA 92503 714-359-8824
Computerwise, 4006 E 137th Terr., Grandview, MO 64030 816-765-3330
Comtec Infor. Sys., Inc., 53 John St., Cumberland, RI 02864 401-724-8500
Control Module, 380 Enfield St., Enfield, CT 06082 203-745-2433
§ Data General, 4400 Computer Dr., Westboro, MA 01581 617-366-8911
Dynamic Time Systems, Inc., 150 West 1230 North, Ste. 2, Provo, UT 84604 801-377-9154
Elcom Industries, Inc., 10268 Bach Blvd., St. Louis, MO 63132 314-429-3100
§† Genicom Corp., General Electric Dr., Waynesboro, VA 22980 703-949-1471
GTE SUPPLY, GTE Communications Systems, 5225 Wiley Post Way, Salt Lake City, UT 84116 801-537-5237
§ Industrial Computer Designs, Inc., 31264 La Baya Drive, Westlake Village, CA 91362 818-889-3179
§ InfoCap, Inc., 31119 Via Colinas # 502, Westlake Village, CA 91362 818-991-1410
Infolink Corp., 1925 Hoiste Rd., Northbrook, IL 60062 312-291-2900
Interface Technology, 10500 Kahlmeyer Dr., St. Louis, MO 63132 314-426-6880
Lee Data Corporation, 7075 Flying Cloud Drive, Minneapolis, MN 55344 612-828-0300
Microsystems Dev. Corp. Inc., 1560 Teaneck Rd., Teaneck, NJ 07666 201-837-0051
§† MSI Data Corp., 340 Fischer Ave., Costa Mesa, CA 92626 714-549-6000
Sperry Univac, Mini-Computer Operations, Box C-19504, Irvine, CA 92713 714-754-6900
§† TeleVideo Sys., Inc., 1170 Morse Ave., Sunnyvale, CA 94086 408-745-7760
Texas Instrs., Data Sys. Group, P. O. Box 809063, Dallas, TX 75380-9063 1-800-527-3500
TTS-Telecom Terminal Systems, 621 Hindry Ave, Inglewood, CA 90301 213-641-8111

Terminals, Display-2000

Information Transfer Indl., Box 357, Holcomb, NY 14469, 716-657-7074 .. D•1248
Telpar, Inc., 4137 Billy Mitchell Rd., P.O. Box 796, Addison, TX 75001, 214-233-6631 ..... D•1075
§ Ann Arbor Terminals, 6175 Jackson Rd., Ann Arbor, MI 48103 313-663-8000
§ Antona Corp., 2100 S. Sawtelle Blvd., Suite 205, Los Angeles, CA 90025 213-473-8995
Astec USA, Ltd., A BSR Intl. Co., 2880 San Tomas Expwy., # 200, Santa Clara, CA 95051 408-748-1200
† Astronautics Corporation of America, P.O. Box 523, Milwaukee, WI 53201-0523 414-447-8200
Aydin Corp., 700 Dresher Rd., Horsham, PA 19044 215-657-7510
§† Aydin Controls, 414 Commerce Dr., Ft. Washington, PA 19034 215-542-7800
Burroughs Corp., Borroughs Place, Rm. 4C-51, Detroit, MI 48232 313-972-7000
Cambridge Digital Sys., Compumart, P.O. Box 568, 65 Bent St., Cambridge, MA 02139 617-491-2700
Colorgraphic Communications Corp., 2379 John Glenn Dr. Ste. 105, P.O. Box 80448, Atlanta, GA 30366 404-455-3921
§† Compucorp, 2211 Michigan Ave., Santa Monica, CA 90404 213-829-7453
Computer Maintenance Corp., 405 Murray Hill Pkwy, East Rutherford, NJ 07073 201-866-6400
The Computer Place, D & D Financial Entprs. Inc., 4595 Van Epps Rd., Brooklyn Hts., OH 44131 216-351-7444
Control Module, 380 Enfield St., Enfield, CT 06082 203-745-2433
§ Data General, 4400 Computer Dr., Westboro, MA 01581 617-366-8911
Delta Data Systems Corp., 2595 Metropolitan Dr., Trevose, PA 19047 215-322-5400
Digiac Corp., 175 Engineers Rd., Hauppauge, NY 11788 516-273-8600
§† Digitech Industries, Inc., 66 Grove St., Ridgefield, CT 06877 203-438-3731
Dio-Rey, Div. of Info-Lite, 422 Cliff St., Fairview, NJ 07022 201-941-4455
Elec-tek, Inc., 10280 Alliance Rd., Cincinnati, OH 45242 513-793-7937
General Business Tech., 1891 McGraw Avenue, Irvine, CA 92714 714-261-1891
General Digital Corp., 700 Burnside Ave., E. Hartford, CT 06108 203-528-9041
§ GMR Co., 8801 Sepulveda Blvd., Los Angeles, CA 90045 213-216-9516
GTE SUPPLY, GTE Communications Systems, 5225 Wiley Post Way, Salt Lake City, UT 84116 801-537-5237
Harris Corp., Computer Systems Div., 2101 W. Cypress Creek Rd., Ft. Lauderdale, FL 33309 305-974-1700
Jupiter Systems, 1100 Marina Village Parkway, Alameda, CA 94501 415-523-9000
Lee Data Corporation, 7075 Flying Cloud Drive, Minneapolis, MN 55344 612-828-0300
Lundy Elctrns. & Systems, Inc., 1 Robert La., Glen Head, NY 11545 516-671-9000
Matrox Elctrn. Sys., 1055 St. Regis Blvd., Dorval, QU, CANADA H9P 2T4 514-685-2630
Microsystems Dev. Corp. Inc., 1560 Teaneck Rd., Teaneck, NJ 07666 201-837-0051
§ Ramtek, 2211 Lawson Lane, Santa Clara, CA 95050 408-988-2211
† SAI Technlg. Co., Science Applications Inc., 4060 Sorrento Valley Blvd., San Diego, CA 92121 619-452-9150
§ Sumitronics, Inc., Sumitomo Corporation, 1270 Oakmead Pkwy. Ste. 201, Sunnyvale, CA 94086 408-737-7683
§ TEC, 2727 N. Fairview, Box 5646, Tuscon, AZ 85703 602-792-2230
† Tektronix, Inc., P. O. Box 500, Y3-314, Beaverton, OR 97077 ..... 800-547-1512;Oregon only 800-452-1877
§† TeleVideo Sys., Inc., 1170 Morse Ave., Sunnyvale, CA 94086 408-745-7760
Texas Instrs., Data Sys. Group, P. O. Box 809063, Dallas, TX 75380-9063 1-800-527-3500
TTS-Telecom Terminal Systems, 621 Hindry Ave, Inglewood, CA 90301 213-641-8111
Zenith Systems & Components Group, Zenith Electronics Corp., 1000 Milwaukee Ave., Glenview, IL 60025 312-391-7733

Terminals, Feedthru-2800 – *See Vol. C*

Terminals, Financial-2000

AFI/DATATROL, Addressograph Farrington, Inc., Brent Dr., Hudson, MA 01749 617-568-1411
§ Lexicon Corp. of Miami, 1541 N. W. 65th Ave., Ft. Lauderdale, FL 33313 305-792-4400
Microsystems Dev. Corp. Inc., 1560 Teaneck Rd., Teaneck, NJ 07666 201-837-0051

Terminals, Ferrule, Cable-End-2100 – *See Vol. C*

Terminals, Intelligent/Programmable, Batch-2000

AFI/DATATROL, Addressograph Farrington, Inc., Brent Dr., Hudson, MA 01749 617-568-1411
§ Ann Arbor Terminals, 6175 Jackson Rd., Ann Arbor, MI 48103 313-663-8000
BMS Data Handling, Inc., 12155 Magnolia, Riverside, CA 92503 714-359-8824
The Computer Place, D & D Financial Entprs. Inc., 4595 Van Epps Rd., Brooklyn Hts., OH 44131 216-351-7444
Comtec Infor. Sys., Inc., 53 John St., Cumberland, RI 02864 401-724-8500
§ Data General, 4400 Computer Dr., Westboro, MA 01581 617-366-8911
Delta Data Systems Corp., 2595 Metropolitan Dr., Trevose, PA 19047 215-322-5400
Enterprise Sys. Corp., P.O. Box 698, Dover, NH 03820 603-742-7363
Microsystems Dev. Corp. Inc., 1560 Teaneck Rd., Teaneck, NJ 07666 201-837-0051
Research, Inc., Box 24064, Minneapolis, MN 55424 612-941-3300
Sperry Univac, Mini-Computer Operations, Box C-19504, Irvine, CA 92713 714-754-6900
§† TeleVideo Sys., Inc., 1170 Morse Ave., Sunnyvale, CA 94086 408-745-7760
Texas Instrs., Data Sys. Group, P. O. Box 809063, Dallas, TX 75380-9063 1-800-527-3500

Terminals, Intelligent/Programmable, Interactive-2000

AFI/DATATROL, Addressograph Farrington, Inc., Brent Dr., Hudson, MA 01749 617-568-1411
† Astronautics Corporation of America, P.O. Box 523, Milwaukee, WI 53201-0523 414-447-8200
§† Aydin Controls, 414 Commerce Dr., Ft. Washington, PA 19034 215-542-7800
Cambridge Digital Sys., Compumart, P.O. Box 568, 65 Bent St., Cambridge, MA 02139 617-491-2700
Colorgraphic Communications Corp., 2379 John Glenn Dr. Ste. 105, P.O. Box 80448, Atlanta, GA 30366 404-455-3921
The Computer Place, D & D Financial Entprs. Inc., 4595 Van Epps Rd., Brooklyn Hts., OH 44131 216-351-7444
Comtec Infor. Sys., Inc., 53 John St., Cumberland, RI 02864 401-724-8500
§ Data General, 4400 Computer Dr., Westboro, MA 01581 617-366-8911
Delta Data Systems Corp., 2595 Metropolitan Dr., Trevose, PA 19047 215-322-5400
Digiac Corp., 175 Engineers Rd., Hauppauge, NY 11788 516-273-8600
Enterprise Sys. Corp., P.O. Box 698, Dover, NH 03820 603-742-7363
GTE SUPPLY, GTE Communications Systems, 5225 Wiley Post Way, Salt Lake City, UT 84116 801-537-5237
Harris Corp., Computer Systems Div., 2101 W. Cypress Creek Rd., Ft. Lauderdale, FL 33309 305-974-1700
HMW Enterprises, Inc., 604 Salem Road, Etters, PA 17319 717-938-4691
Jupiter Systems, 1100 Marina Village Parkway, Alameda, CA 94501 415-523-9000
§ Lexicon Corp. of Miami, 1541 N. W. 65th Ave., Ft. Lauderdale, FL 33313 305-792-4400
Microsystems Dev. Corp. Inc., 1560 Teaneck Rd., Teaneck, NJ 07666 201-837-0051
† SAI Technlg. Co., Science Applications Inc., 4060 Sorrento Valley Blvd., San Diego, CA 92121 619-452-9150
Serial Lab Prods., Inc., 162 Cook Lane, P.O. Box 766, Marlboro, MA 01752 617-481-1684
Sperry Univac, Mini-Computer Operations, Box C-19504, Irvine, CA 92713 714-754-6900
† Tektronix, Inc., P. O. Box 500, Y3-314, Beaverton, OR 97077 ..... 800-547-1512;Oregon only 800-452-1877
§† TeleVideo Sys., Inc., 1170 Morse Ave., Sunnyvale, CA 94086 408-745-7760
Terminal Data Corp., 15733 Crabbs Branch Way, Rockville, MD 20855 301-921-8282
Texas Instrs., Data Sys. Group, P. O. Box 809063, Dallas, TX 75380-9063 1-800-527-3500
§ TTS-Telecom Terminal Systems, 621 Hindry Ave, Inglewood, CA 90301 213-641-8111

Terminals, Intelligent/Programmable, Multiprogramming-2000

AFI/DATATROL, Addressograph Farrington, Inc., Brent Dr., Hudson, MA 01749 617-568-1411
Applied Sys., 26401 Harper Ave., St. Clair Shores, MI 48081 313-779-8700
† Astronautics Corporation of America, P.O. Box 523, Milwaukee, WI 53201-0523 414-447-8200
§† Compucorp, 2211 Michigan Ave., Santa Monica, CA 90404 213-829-7453
The Computer Place, D & D Financial Entprs. Inc., 4595 Van Epps Rd., Brooklyn Hts., OH 44131 216-351-7444
§ Data General, 4400 Computer Dr., Westboro, MA 01581 617-366-8911
Delta Data Systems Corp., 2595 Metropolitan Dr., Trevose, PA 19047 215-322-5400
GTE SUPPLY, GTE Communications Systems, 5225 Wiley Post Way, Salt Lake City, UT 84116 801-537-5237
† SAI Technlg. Co., Science Applications Inc., 4060 Sorrento Valley Blvd., San Diego, CA 92121 619-452-9150
Sperry Univac, Mini-Computer Operations, Box C-19504, Irvine, CA 92713 714-754-6900
† Tektronix, Inc., P. O. Box 500, Y3-314, Beaverton, OR 97077 ..... 800-547-1512;Oregon only 800-452-1877
Texas Instrs., Data Sys. Group, P. O. Box 809063, Dallas, TX 75380-9063 1-800-527-3500

Terminals, Intelligent/Programmable, Multiuser-2000

AFI/DATATROL, Addressograph Farrington, Inc., Brent Dr., Hudson, MA 01749 617-568-1411

† Astronautics Corporation of America, P.O. Box 523, Milwaukee, WI 53201-0523 414-447-8200
Aydin Corp., 700 Dresher Rd., Horsham, PA 19044 215-657-7510
Cambridge Digital Sys., Compumart, P.O. Box 568, 65 Bent St., Cambridge, MA 02139 617-491-2700
§† Compucorp, 2211 Michigan Ave., Santa Monica, CA 90404 213-829-7453
The Computer Place, D & D Financial Entprs. Inc., 4595 Van Epps Rd., Brooklyn Hts., OH 44131 216-351-7444
§ Data General, 4400 Computer Dr., Westboro, MA 01581 617-366-8911
Delta Data Systems Corp., 2595 Metropolitan Dr., Trevose, PA 19047 ... 215-322-5400
Digiac Corp., 175 Engineers Rd., Hauppauge, NY 11788 516-273-8600
Enterprise Sys. Corp., P.O. Box 698, Dover, NH 03820 603-742-7363
GTE SUPPLY, GTE Communications Systems, 5225 Wiley Post Way, Salt Lake City, UT 84116 801-537-5237
Jupiter Systems, 1100 Marina Village Parkway, Alameda, CA 94501 415-523-9000
Microsystems Dev. Corp. Inc., 1560 Teaneck Rd., Teaneck, NJ 07666 ... 201-837-0051
† SAI Technlg. Co., Science Applications Inc., 4060 Sorrento Valley Blvd., San Diego, CA 92121 619-452-9150
Sperry Univac, Mini-Computer Operations, Box C-19504, Irvine, CA 92713 714-754-6900
† Tektronix, Inc., P. O. Box 500, Y3-314, Beaverton, OR 97077 ..... 800-547-1512;Oregon only 800-452-1877
Texas Instrs., Data Sys. Group, P. O. Box 809063, Dallas, TX 75380-9063 1-800-527-3500

Terminals, Intelligent/Programmable, Real Time-2000

AFI/DATATROL, Addressograph Farrington, Inc., Brent Dr., Hudson, MA 01749 617-568-1411
† Astronautics Corporation of America, P.O. Box 523, Milwaukee, WI 53201-0523 414-447-8200
Aydin Corp., 700 Dresher Rd., Horsham, PA 19044 215-657-7510
Cambridge Digital Sys., Compumart, P.O. Box 568, 65 Bent St., Cambridge, MA 02139 617-491-2700
The Computer Place, D & D Financial Entprs. Inc., 4595 Van Epps Rd., Brooklyn Hts., OH 44131 216-351-7444
Control Module, 380 Enfield St., Enfield, CT 06082 203-745-2433
§ Data General, 4400 Computer Dr., Westboro, MA 01581 617-366-8911
Delta Data Systems Corp., 2595 Metropolitan Dr., Trevose, PA 19047 ... 215-322-5400
Enterprise Sys. Corp., P.O. Box 698, Dover, NH 03820 603-742-7363
Jupiter Systems, 1100 Marina Village Parkway, Alameda, CA 94501 415-523-9000
Microsystems Dev. Corp. Inc., 1560 Teaneck Rd., Teaneck, NJ 07666 ... 201-837-0051
† SAI Technlg. Co., Science Applications Inc., 4060 Sorrento Valley Blvd., San Diego, CA 92121 619-452-9150
Sperry Univac, Mini-Computer Operations, Box C-19504, Irvine, CA 92713 714-754-6900
† Tektronix, Inc., P. O. Box 500, Y3-314, Beaverton, OR 97077 ..... 800-547-1512;Oregon only 800-452-1877
Texas Instrs., Data Sys. Group, P. O. Box 809063, Dallas, TX 75380-9063 1-800-527-3500

Terminals, Intelligent/Programmable, Transaction Processing-2000

AFI/DATATROL, Addressograph Farrington, Inc., Brent Dr., Hudson, MA 01749 617-568-1411
BMS Data Handling, Inc., 12155 Magnolia, Riverside, CA 92503 714-359-8824
The Computer Place, D & D Financial Entprs. Inc., 4595 Van Epps Rd., Brooklyn Hts., OH 44131 216-351-7444
† Custom Prods. Grp., Sys. Dev. Corp.-A Burroughs Co., P.O. Box 517, Paoli, PA 19301 215-648-7660
§ Data General, 4400 Computer Dr., Westboro, MA 01581 617-366-8911
Enterprise Sys. Corp., P.O. Box 698, Dover, NH 03820 603-742-7363
§ Lexicon Corp. of Miami, 1541 N. W. 65th Ave., Ft. Lauderdale, FL 33313 305-792-4400
Sperry Univac, Mini-Computer Operations, Box C-19504, Irvine, CA 92713 714-754-6900
Texas Instrs., Data Sys. Group, P. O. Box 809063, Dallas, TX 75380-9063 1-800-527-3500

Terminals, Lug (All Types)-2100 — *See Vol. C*

Terminals, Miniature & Subminiature-2100 — *See Vol. C*

Terminals, Printed Circuit Board-2100 — *See Vol. C*

Terminals, Point-of-Sale-2000

AFI/DATATROL, Addressograph Farrington, Inc., Brent Dr., Hudson, MA 01749 617-568-1411
Applied Sys., 26401 Harper Ave., St. Clair Shores, MI 48081 313-779-8700
§ Cole-Hersee Co., 20 Old Colony Ave., Boston, MA 02127-2467 617-268-2100
§† Di/An Controls, Inc., 944 Dorchester Ave., Boston, MA 02125 617-288-7700
Elcom Industries, Inc., 10268 Bach Blvd., St. Louis, MO 63132 314-429-3100
General Digital Corp., 700 Burnside Ave., E. Hartford, CT 06108 203-528-9041
§ Lexicon Corp. of Miami, 1541 N. W. 65th Ave., Ft. Lauderdale, FL 33313 305-792-4400

Terminals, Push-on, Quick Disconnect — See Connectors & Terminals, Push-on, Quick Disconnect (Vol. C)

Terminals, Solderless-2100 — *See Vol. C*

Terminals, Standoff-2100 — *See Vol. C*

Terminals, Threaded-2100 — *See Vol. C*

Terminals, Touch — See Touch Terminals

Terminals, Turret-2100 — *See Vol. C*

Terminals, Wirewrap-2100 — *See Vol. C*

Terminals (MIL), Ground Data-3475

† Aydin Corp., 700 Dresher Rd., Horsham, PA 19044 215-657-7510
† LVC Inds., Inc., CO-ORD Switch Div., 23 Hanse Ave., Freeport, NY 11520 516-868-1900
† SAI Technlg. Co., Science Applications Inc., 4060 Sorrento Valley Blvd., San Diego, CA 92121 619-452-9150

Terminations, Antenna-Also See Dummy Loads-2800 — *See Vol. C*

Terminations, Cable-2100 — *See Vol. C*

Terminations, Fiber Optic-2475 — *See Vol. B*

Terminations, Microwave-3450 — *See Vol. A*

Terminations, VHF, Video, Pulse-1900

† Applied Research, Inc., 160 Dupont St., Plainview, NY 11803, 516-349-9200 .... A•1703
Compac, 279 Skidmore Rd., Deer Park, NY 11729, 516-667-3933 .... A•1706
§ ITT Pomona Electronics, 1500 E. 9th St., P.O. Box 2767, Pomona, CA 91766, 714-623-3463 .... C•1326,1330
† Arra Inc., 15 Harold Ct., Bay Shore, NY 11706 516-231-8400
§ Bird Elctrn., 30303 Aurora Rd., Cleveland, OH 44139 216-248-1200
§† Dielectric Communications, General Signal, Tower Hill Rd., Raymond, ME 04071 .... 207-655-4555;800-341-9678
† Elcom Systems, Inc., 932 Clint Moore Rd., Boca Raton, FL 33431 305-994-1774
† Electro Impulse, Box 870, Red Bank, NJ 07701-0870 201-741-0404
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
§† JFW Inds., Inc., 2719 E. Troy Ave., Indianapolis, IN 46203 317-783-9875
§† Kings Elctrns., 40 Marbledale Rd., Tuckahoe, NY 10707 914-793-5000
Manger Elec. Co., Inc., W. Henry St., Stamford, CT 06902 203-348-7761
† Microlab/FXR, 10 Microlab Rd., Livingston, NJ 07039 201-992-7700
North Hills Elctrns., 1 Alexander Pl., Glen Cove, NY 11542 516-671-5700
§† Systron-Donner Microwave Div., 14844 Oxnard St., Van Nuys, CA 91409 818-786-1760
† Trompeter Electronics, Inc., 8936 Comanche, Chatsworth, CA 91311 818-882-1020
Universal Voltronics, 27 Radio Circle Dr., Mt. Kisco, NY 10549 914-241-1300
§ Waveline, Box 718, W. Caldwell, NJ 07006 201-226-9100
Weinschel Engrg., One Weinschel La., Gaithersburg, MD 20877 .... 301-948-3434; 800-638-2048
Wide Band Engrg. Co., Inc., Box 21652, Phoenix, AZ 85036 602-254-1570

Termination Systems, Wire-2100 — *See Vol. C*

Test Assemblies (MIL)-3475

† Cardinal Control Co., 110 Kensington Rd., Kensington, CT 06037 203-828-6379
Information Technolgoy A.D.S.C., P.O. Box 470, College Park, MD 20740 301-779-5110
Muirhead, 1101 Briston Rd., Mountainside, NJ 07092 201-233-6010
† Spectra-Strip Operations, Ampheral Prods., 7100 Lampson Ave., Garden Grove, CA 92642-0415 714-892-3361
§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 215-673-5600

Test Benches (MIL), ECM-3475

§† Production Industries, Inc., 12880-E Pierce Street, Pacoima, CA 91331, 818-896-0555;800-423-5618 .... C•1075-1077
† Manufacturing Sys., Div. LeDoux Inds., Inc., 2022-C S. Grand Ave., Santa Ana, CA 92705 714-540-6630

Test Benches (MIL), Shop-3475

§† Production Industries, Inc., 12880-E Pierce Street, Pacoima, CA 91331, 818-896-0555;800-423-5618 .... C•1075-1077
† Manufacturing Sys., Div. LeDoux Inds., Inc., 2022-C S. Grand Ave., Santa Ana, CA 92705 714-540-6630

Test Equipment — See Meters, Acceleration, Admittance, etc. (Vol. D)

Test Equipment, Closed Circuit TV-Also See Television Systems & Equipment, Closed-Circuit-2900

MARCONI INSTRUMENTS, 3 Pearl Court, Allendale, NJ 07401, 201-934-9050 .... D•1264
Alessi Inds., Inc., 3195-C Airport Loop Dr., Costa Mesa, CA 92626 714-979-8912
§ B & K Precision, Industrial Electronics Product Group, Dynascan Corporation, 6460 W. Cortland, Chicago, IL 60635 312-889-9087
§ Colorado Video, Inc., Box 928, Boulder, CO 80306 303-444-3972
Dotronix, 160 First St. SE, New Brighton, MN 55112 612-633-1742
ElectroPhysics Corp., 48 Spruce St., Nutley, NJ 07110 201-667-2262
Image Technology Methods Corp., 103 Moody St., Waltham, MA 02154 617-894-1720
Instrumentation Meas. Lab., Div. of Lockheed Electronics Co., Inc., 1501 Rt. 22, Plainfield, NJ 07061 201-757-3730
§ Leader Instrs. Corp., 380 Oser Ave., Hauppauge, NY 11788-3694 516-231-6900
§ Lectrotech, Inc., 5810 N. Western Ave., Chicago, IL 60659 312-769-6262
Penn Video Inc., 929 Sweitzer Ave., Akron, OH 44311 216-762-4840
Sencore, 3200 Sencore Dr., Sioux Falls, SD 57107 605-339-0100
§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 215-673-5600
Tektronix, Inc., P. O. Box 500, Y3-314, Beaverton, OR 97077 ..... 800-547-1512;Oregon only 800-452-1877
Telemet, 185 Dixon Ave., Amityville, NY 11701 516-842-2300
§ Television Equip. Assocs., Box 393, So. Salem, NY 10590-0393 914-763-8893
Texscan Instruments, 3169 N. Shadeland, Indianapolis, IN 46226 317-545-4196
Video Logic Corp., 597 No. Mathilda Ave., Sunnyvale, CA 94086 408-245-8622

Visual Info. Institute, Box 33, Xenia, OH 45385 ... 513-376-4361
Wavetek Indiana, Inc., 5808 Churchman, Beech Grove, IN 46107 ... 317-787-3332

Test Equipment, Color TV-2900

§ Quantum Data, Inc., 455 E. Kehoe, Carol Stream, IL 60188, 312-668-3301 ... D•1293
§ Asaca Shibasku Corp. of Amer., 12509 Beatrice St., Los Angeles, CA 90066 .. 827-7144
§ B & K Precision, Industrial Electronics Product Group, Dynascan Corporation, 6460 W. Cortland, Chicago, IL 60635 ... 312-889-9087
§ Colorado Video, Inc., Box 928, Boulder, CO 80306 ... 303-444-3972
EG&G Gamma Scientific, Div. of EG&G Inc., 3777 Ruffin Rd., San Diego, CA 92123 ... 619-279-8034
§ Heath Co., Benton Harbor, MI 49022 ... 616-982-3886
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
§ Leader Instrs. Corp., 380 Oser Ave., Hauppauge, NY 11788-3694 ... 516-231-6900
§ Lectrotech, Inc., 5810 N. Western Ave., Chicago, IL 60659 ... 312-769-6262
MARCONI INSTRUMENTS, 3 Pearl Court, Allendale, NJ 07401 ... 201-934-9050
Nuclear Resch. Corp., 125 Titus Ave., Warrington, PA 18976 ... 215-343-5900
Poulin Associates, Inc., 302 North Rd., Sudbury, MA 01776 ... 617-443-7333
§ REI Sls., 19525 Business Centre Dr., Northridge, CA 91324 ... 617-938-0900
RIL Elctrns., Inc., 125 Titus Ave., P.O. Box H, Warrington, PA 18976 ... 215-EL5-1361
Sencore, 3200 Sencore Dr., Sioux Falls, SD 57107 ... 605-339-0100
§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 ... 215-673-5600
§ Sylvania Electronic Components, Philips ECG Inc., A North American Philips Co., 100 First Ave., Waltham, MA 02254 ... 617-890-6107
Tektronix, Inc., P. O. Box 500, Y3-314, Beaverton, OR 97077 ... 800-547-1512;Oregon only 800-452-1877
† Telectro Sys., 96-18 43rd Ave., Corona, NY 11368 ... 212-651-8900
Telemet, 185 Dixon Ave., Amityville, NY 11701 ... 516-842-2300
Television Equip. Assocs., Box 393, So. Salem, NY 10590-0393 ... 914-763-8893
Visual Info. Institute, Box 33, Xenia, OH 45385 ... 513-376-4361
VIZ Test Equipment, Div. VIZ Mfg., 335 E. Price St., Philadelphia, PA 19144 ... 215-844-2626

Test Equipment, Fiber Optic-2475 — *See Vol. B*

Test Equipment, Mechanical Impedance-2900

Bruel & Kjaer Instrs. Inc., 185 Forest St., Marlboro, MA 01752 ... 617-481-7000
Burleigh Instrs., Burleigh Pk., Fishers, NY 14453 ... 716-924-9355
Continental Resources, Inc., 175 Middlesex Tpke., Bedford, MA 01730 .. 617-275-0850
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
† PCB Piezotronics, 3425 Walden Ave., Depew, NY 14043-2495 ... 716-684-0001
Solartron Instruments, Sangamo Weston, Inc., 2 Westchester Plaza, Elmsford, NY 10523 ... 914-592-9168
Spectral Dynamics Div., Scientific-Atlanta, Box 671, San Diego, CA 92112 ... 619-268-7100
Wilcoxon Resch., P.O. Box 5798, Bethesda, MD 20814 ... 301-770-3790

Test Equipment, Memory Systems, Disk-2900

Alpha Data, 20750 Marilla St., Chatsworth, CA 91311 ... 818-882-6500
Applied Circuit Technlg. (ACT), 2931 La Jolla St., Anaheim, CA 92806 ... 714-632-9230
AVA Instrmn., Inc., 8010 Highway 9, Ben Lomond, CA 95005 ... 408-336-2281
§ Brian Instruments, Inc., 626 S. State College Blvd., Fullerton, CA 92631 ... 714-992-5540
Dymek Corp., 1851 Zanker Road, San Jose, CA 95070 ... 408-947-8700
Information Technolgoy A.D.S.C., P.O. Box 470, College Park, MD 20740 ... 301-779-5110
Jaycor, P.O. Box 85154, San Diego, CA 92138 ... 619-453-6580
Peripherals, 3001 Red Hill, Bldg. 6, Ste. 107, Costa Mesa, CA 92626 ... 714-540-4925
Pioneer Magnetics, 1745 Berkeley St., Santa Monica, CA 90404 ... 213-829-6751
Scientific-Atlanta, Inc., P.O. Box 105600, Atlanta, GA 30348 ... 404-441-4000
Test & Measurement Systems, Inc., 349 Cobalt Way, Ste. 301, Sunnyvale, CA 94086 ... 408-720-8877

Test Equipment, Rental & Lease - Also See Services, Electrical Measurement & Test-2900

Julie Resch. Labs., 211 West 61st St., New York, NY 10023, 212-245-2727 ... D•1252
U.S. Instr. Rentals, 2988 Campus Dr., San Mateo, CA 94403, 415-572-6600 ... D•1322-1323
§ American HV Test Systems Inc., Central Garrett Ind'l. Pk., Accident, MD 21520 ... 301-826-8651
Atlas Energy Sys., 9457 Rush St., S. El Monte, CA 91733 ... 213-575-0755
† BEC Inc., 2709 N. Broad St., Philadelphia, PA 19132 ... 215-229-9800
Continental Resources, Inc., 175 Middlesex Tpke., Bedford, MA 01730 .. 617-275-0850
Dielectric Instr. Corp., 761 Franklin Ave., Pittsburgh, PA 15221 ... 412-731-6566
Instrumentation Meas. Lab., Div. of Lockheed Electronics Co., Inc., 1501 Rt. 22, Plainfield, NJ 07061 ... 201-757-3730
§ Integra, Inc., 2368 Walsh Ave., Santa Clara, CA 95051 ... 408-727-9601
§ Leader Instrs. Corp., 380 Oser Ave., Hauppauge, NY 11788-3694 ... 516-231-6900
Schaffner EMC, Inc., Instr. Div., 825 Lehigh Avenue, Union, NJ 07083 ... 201-851-0644
Spanta, Inc., Box 193, Franklin Lakes, NJ 07417 ... 201-337-0044
Step Engineering, P.O. Box 61166, Sunnyvale, CA 94088 ... 408-733-7837

Test Equipment (MIL)-3475

Blue M, A Unit of General Signal, 138th & Chatham Sts., Blue Island, IL 60406, 312-385-9000 ... D•1165
† Hafstrom Technical Products, Inc., P.O. Box 9829, San Diego, CA 92109, 619-274-8822 ... D•1169
Julie Resch. Labs., 211 West 61st St., New York, NY 10023, 212-245-2727 ... D•1252
Amdahl Communications Sys. Div., Amdahl Corp., 2500 Walnut Ave., Marina del Rey, CA 90291 ... 213-822-3202
American Elctrn. Labs., Inc., Govt. Grp. Div., P.O. Box 552, Lansdale, PA 19446
† Astronautics Corporation of America, P.O. Box 523, Milwaukee, WI 53201-0523 ... 414-447-8200
Astrosystems, 6 Nevada Dr., Lake Success, NY 11042 ... 516-328-1600
Atec, Inc., Box 19426, 8219 Kempwood Dr., Houston, TX 77055 ... 713-468-7971
Atlantic Research, 5390 Cherokee Ave., Alexandria, VA 22312 ... 703-642-4000
† Bird Elctrn., 30303 Aurora Rd., Cleveland, OH 44139 ... 216-248-1200
Cincinnati Sub-Zero Prods., 12011 Mosteller Rd., Cincinnati, OH 45241 ... 513-772-8810
† Collins Avionics Divisions, Rockwell Intl., 400 Collins Rd. NE, Cedar Rapids, IA 52498 ... 319-395-1000
Colorado Data Systems, Inc., 3301 W. Hampden Ave., Unit C, Englewood, CO 80110 ... 303-762-1640
Custom Sci. Instrs., 13 Wing Dr., Cedar Knolls, NJ 07927 ... 201-538-8500
† EDMAN Corp., Subsidiary of Rospatch, 7500 Main St., P.O. Box 750, Fishers, NY 14453-0750 ... 716-924-4000
§ EFRATOM, a division of Ball Corp., 18851 Bardeen Ave, Irvine, CA 92715 ... 714-752-2891
† Electro-Optical Inds., Box 3770, Santa Barbara, CA 93130 ... 805-964-6701
Everett/Charles Test Equip. Inc., 2887 N. Towne Ave., Pomona, CA 91767 ... 714-621-9511
Fast Feedback Technologies, 1505 Aviation Blvd., Redoudo Beach, CA 90278 ... 213-379-6100
GenRad, Inc., 300 Baker Ave., Concord, MA 01742 ... 617-369-4400
† Honeywell Inc., Aerospace & Defense Grp., Honeywell Plaza, Minneapolis, MN 55408 ... 612-870-5186
† Industrial Control Co., 3100 Pineda Ave., Rockledge, FL 32955 ... 305-259-7105
† Kay Elemetrics Corp., 12 Maple Ave., Pine Brook, NJ 07058-9797 ... 201-227-2000
† Kollsman Instr., 220 Daniel Webster Hwy., Merrimack, NH 03054 ... 603-889-2500
LTX, LTX Pk. @ University Ave., Westwood, MA 02090 ... 617-329-7550
Microtest Systems, Inc., 1188 Bordeaux Dr., Sunnyvale, CA 94089-1281 ... 408-745-7000
Modular Devices, 50 Orville Dr., Bohemia, NY 11716 ... 516-567-9620
† Natel Engrg. Co., Inc., 4550 Runway St., Simi Valley, CA 93063 ... 805-581-3950
† Pacific Electro Dynamics, Inc., 11465 Willows Rd. N.E., Redmond, WA 98052 ... 206-881-1700
† Photo Resch., Kollmorgen Corp., 3000 N. Hollywood Way, Burbank, CA 91505 ... 818-843-6100
Pulsar Products Div., 2700 Merced St., San Leandro, CA 94577 ... 415-577-7236
† Radio Resch. Instr. Co., Inc., Two Lake Ave. Extension, Danbury, CT 06811-5295 ... 203-792-6666
† Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 ... 215-673-5600
† Tektronix, Inc., P. O. Box 500, Y3-314, Beaverton, OR 97077 ... 800-547-1512;Oregon only 800-452-1877
† Watkins-Johnson Co., 3333 Hillview Ave., Palo Alto, CA 94304 ... 415-493-4141

Test Fixtures, ATC-2900

Behlman Engineering, 1142 Mark Ave., Carpinteria, CA 93013, 805-684-8311 ... D•1898-1905
California Instruments, A Div. of Amstar Tech. Prods. Co., Inc., 5150-Convoy St., San Diego, CA 92111, 619-279-8620;800-356-2244;800-821-1634 ... D•1907
† Artronics Corporation, 3 Electronic Avenue, Danvers, MA 01923 ... 617-777-2880
A-Systems Inc., 1500 Avon St. Extd., Charlottesville, VA 22901 ... 804-295-7200
§ Augat/Pylon Co., Inc., P.O. Box 2510, Attleboro Falls, MA 02763 ... 617-699-7646
Biddle Instruments, A Thorn EMI Co., 510 Township Line Rd., Blue Bell, PA 19422 ... 215-646-9200
Everett/Charles Test Equip. Inc., 2887 N. Towne Ave., Pomona, CA 91767 ... 714-621-9511
Green Engineering, 78 Stone Place, Melrose, MA 02176 ... 617-665-8994
Hollex, Inc., 81 W. Wyoming Ave., Melrose, MA 02176 ... 617-665-2413
Interconnect Devices, Inc., 5101 Richland Ave., Kansas City, KS 66106 .. 913-342-5544
LTX, LTX Pk. @ University Ave., Westwood, MA 02090 ... 617-329-7550
† Manufacturing Sys., Div. LeDoux Inds., Inc., 2022-C S. Grand Ave., Santa Ana, CA 92705 ... 714-540-6630
PCK Elastomerics, Inc., Kollmorgen Corporation, 333 Byberry Road, Hatboro, PA 19040 ... 215-672-0787;215-672-4741
Virginia Panel, 1400 New Hope Rd., Waynesboro, VA 22980 ... 703-949-8376
Wire Graphics, Inc., 215 B. Central Ave., Farmingdale, NY 11735 ... 516-293-1525

Test Methods (MIL)-2440

LTX, LTX Pk. @ University Ave., Westwood, MA 02090 ... 617-329-7550

Test Sets (MIL)-3475

Amdahl Communications Sys. Div., Amdahl Corp., 2500 Walnut Ave., Marina del Rey, CA 90291 ... 213-822-3202
Atec, Inc., Box 19426, 8219 Kempwood Dr., Houston, TX 77055 ... 713-468-7971
† Austin Electronics, The Austin Co., 17-01 Pollitt Drive, Fair Lawn, NJ 07410 ... 201-794-0200
CDS - Colorado Data Sys., 3301 W. Hampden, Unit C, Englewood, CO 80110 ... 303-762-1640
† Computer Conversions Corp., 6 Dunton Ct., E. Northport, NY 11731 ... 516-261-3300
† Comtech Microwave Corp., Comtech Corp., 63 Oser Ave., Hauppauge, NY 11788 ... 516-435-4646
† EDMAN Corp., Subsidiary of Rospatch, 7500 Main St., P.O. Box 750, Fishers, NY 14453-0750 ... 716-924-4000
† Electro-Optical Inds., Box 3770, Santa Barbara, CA 93130 ... 805-964-6701
ETM Electromatic, 470 San Antonio Ave., Palo Alto, CA 94306 ... 415-494-1505
Hollex, Inc., 81 W. Wyoming Ave., Melrose, MA 02176 ... 617-665-2413
† Honeywell Inc., Aerospace & Defense Grp., Honeywell Plaza, Minneapolis, MN 55408 ... 612-870-5186
Modular Devices, 50 Orville Dr., Bohemia, NY 11716 ... 516-567-9620
† Natel Engrg. Co., Inc., 4550 Runway St., Simi Valley, CA 93063 ... 805-581-3950
† Pacific Electro Dynamics, Inc., 11465 Willows Rd. N.E., Redmond, WA 98052 ... 206-881-1700

Test Sets (MIL), Airborne Radar-3475

† Austin Electronics, The Austin Co., 17-01 Pollitt Drive, Fair Lawn, NJ 07410 ... 201-794-0200
† Microwave/Sys., 1 Adler Dr., E. Syracuse, NY 13057 ... 315-437-9951

† Pacific Electro Dynamics, Inc., 11465 Willows Rd. N.E., Redmond, WA 98052 206-881-1700
† Radio Resch. Instr. Co., Inc., Two Lake Ave. Extension, Danbury, CT 06811-5295 203-792-6666

Test Sets (MIL), ECM-3475

ETM Electromatic, 470 San Antonio Ave., Palo Alto, CA 94306 415-494-1505
† Flight Systems, Inc., Tracor, Inc., 1091 Dove St., Newport Beach, CA 92660 714-833-9661
† Litton Applied Technology, 645 Almanor Ave., P.O. Box 3478, Sunnyvale, CA 94088-3478 408-773-0777
† Microwave/Sys., 1 Adler Dr., E. Syracuse, NY 13057 315-437-9951
Narda Microwave Corp., 435 Moreland Rd., Hauppauge, NY 11788 516-231-1700

Test Sets (MIL), EW-3475

ETM Electromatic, 470 San Antonio Ave., Palo Alto, CA 94306 415-494-1505
† Flight Systems, Inc., Tracor, Inc., 1091 Dove St., Newport Beach, CA 92660 714-833-9661
† Honeywell Inc., Aerospace & Defense Grp., Honeywell Plaza, Minneapolis, MN 55408 612-870-5186
† Litton Applied Technology, 645 Almanor Ave., P.O. Box 3478, Sunnyvale, CA 94088-3478 408-773-0777
† Microwave/Sys., 1 Adler Dr., E. Syracuse, NY 13057 315-437-9951
Republic Electronics Co., 575 Broad Hollow Rd., Melville, NY 11747 516-249-1414

Test Sets (MIL), Flight Line-3475

† Astronautics Corporation of America, P.O. Box 523, Milwaukee, WI 53201-0523 414-447-8200
Atec, Inc., Box 19426, 8219 Kempwood Dr., Houston, TX 77055 713-468-7971
† Austin Electronics, The Austin Co., 17-01 Pollitt Drive, Fair Lawn, NJ 07410 201-794-0200
CDS - Colorado Data Sys., 3301 W. Hampden, Unit C, Englewood, CO 80110 303-762-1640
† Collins Avionics Divisions, Rockwell Intl., 400 Collins Rd. NE, Cedar Rapids, IA 52498 319-395-1000
† EDMAN Corp., Subsidiary of Rospatch, 7500 Main St., P.O. Box 750, Fishers, NY 14453-0750 716-924-4000
† Microwave/Sys., 1 Adler Dr., E. Syracuse, NY 13057 315-437-9951
Modular Devices, 50 Orville Dr., Bohemia, NY 11716 516-567-9620
† Pacific Electro Dynamics, Inc., 11465 Willows Rd. N.E., Redmond, WA 98052 206-881-1700

Test Sets (MIL), IRCM-3475

† Electro-Optical Inds., Box 3770, Santa Barbara, CA 93130 805-964-6701

Test Systems, Automatic DC-2900

Behlman Engineering, 1142 Mark Ave., Carpinteria, CA 93013, 805-684-8311 .... D•1898-1905
California Instruments, A Div. of Amstar Tech. Prods. Co., Inc., 5150-Convoy St., San Diego, CA 92111, 619-279-8620;800-356-2244;800-821-1634 .... D•1907
Julie Resch. Labs., 211 West 61st St., New York, NY 10023, 212-245-2727 .... D•1252
Slaughter Co., Moore & Hailey Sts., P.O. Box 1805, Ardmore, OK 73402, 405-223-4773 .... D•1309
§ Aerotronic Assocs., Inc., Riverside Dr., Contoocook, NH 03229 603-746-4631
American HV Test Systems Inc., Central Garrett Ind'l. Pk., Accident, MD 21520 301-826-8651
Amphenol, An Allied Co., 43 Commerce Ct., Lisle, IL 60532 312-983-3500
Analogic Corp., 8 Centennial Dr., Peabody, MA 01961 .... 617-532-5660;617-777-4500; 617-246-0300;800-451-1
Augat/ES•P. Inc., /Augat, Inc., 12832 Chadron Ave., Hawthorne, CA 90250 213-973-0262
Biddle Instruments, A Thorn EMI Co., 510 Township Line Rd., Blue Bell, PA 19422 215-646-9200
CDS - Colorado Data Sys., 3301 W. Hampden, Unit C, Englewood, CO 80110 303-762-1640
Clarke-Hess Comm. Resch. Corp., 17 West 17th St., New York, NY 10011 212-255-2940
Colorado Data Systems, Inc., 3301 W. Hampden Ave., Unit C, Englewood, CO 80110 303-762-1640
Contraves Goerz Corp., 610 Epsilon Dr., Pittsburgh, PA 15238 412-967-7700
CYTEC Corp., 107 N. Washington St., E. Rochester, NY 14445 716-381-4740
Daytronic Corp., 2589 Corporate Pl., Miamisburg, OH 45342 513-866-3300
Eaton Corp., Test Sys. Div., Discrete Test, Precision Rd., Danbury, CT 06810 203-797-1281
Fast Feedback Technologies, 1505 Aviation Blvd., Redoudo Beach, CA 90278 213-379-6100
Fluke, John, Mfg. Co., Box C9090, MS 250C, Everett, WA 98206 206-356-5400
§ GC Elctrns., 400 S. Wyman St., Rockford, IL 61101 815-968-9661
Green Engineering, 78 Stone Place, Melrose, MA 02176 617-665-8994
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
Hipotronics, P.O. Drawer A, Brewster, NY 10509 914-279-8091
Hughes Aircraft Co., Indl. Prods. Div. FACT Sys., 6155 El Camino Real, Carlsbad, CA 92008 619-931-3000
Keithley Instrs., 28775 Aurora Rd., Cleveland, OH 44139 216-248-0400
LTX, LTX Pk. @ University Ave., Westwood, MA 02090 617-329-7550
Meissner Inds., 551 Rte. 10, Dover, NJ 07801 201-366-1700
Optimized Devices, Inc., 220 Marble Ave., Pleasantville, NY 10570 914-769-6100
Tektronix, Inc., P. O. Box 500, Y3-314, Beaverton, OR 97077 .... 800-547-1512;Oregon only 800-452-1877
Teradyne, Inc., 183 Essex St., Boston, MA 02111 617-482-2700
§ Tidewater Technological, Inc., 611 Industrial Pk. Dr., Newport News, VA 23602 804-874-2800
Virginia Panel, 1400 New Hope Rd., Waynesboro, VA 22980 703-949-8376
Vistar Corp., 13740 McCormick Dr., Tampa, FL 33625 813-855-6611
Zehntel, Inc., 2625 Shadelands Dr., Walnut Creek, CA 94598 415-932-6900

Test Systems, Board-2900

Information Transfer Indl., Box 357, Holcomb, NY 14469, 716-657-7074 .... D•1248-1249
Slaughter Co., Moore & Hailey Sts., P.O. Box 1805, Ardmore, OK 73402, 405-223-4773 .... D•1309
Atlantic Research, 5390 Cherokee Ave., Alexandria, VA 22312 703-642-4000
Biddle Instruments, A Thorn EMI Co., 510 Township Line Rd., Blue Bell, PA 19422 215-646-9200
CDS - Colorado Data Sys., 3301 W. Hampden, Unit C, Englewood, CO 80110 303-762-1640
Everett/Charles Test Equip. Inc., 2887 N. Towne Ave., Pomona, CA 91767 714-621-9511
Fluke, John, Mfg. Co., Box C9090, MS 250C, Everett, WA 98206 206-356-5400
GenRad, Inc., 300 Baker Ave., Concord, MA 01742 617-369-4400
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Magnum Opus Custom Elctrn. Engrg., 284 Kennedy St., Iselin, NJ 08830 201-283-4925
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Ostby & Barton, 487 Jefferson Blvd., Warwick, RI 02886 401-739-7310
Southern Computer Corp., 3720 N. Stratford Rd. N.E., Atlanta, GA 30342 404-231-5363
§ Temptronic, 55 Chapel St., Newton, MA 02158 617-969-2501
Teradyne, Inc., 183 Essex St., Boston, MA 02111 617-482-2700
Testronics, 1810-102 N. Glenville Dr., Richardson, TX 75081 214-238-8378
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Wayne Kerr, Inc., W.K.R. Ltd., 400 West Cummings Pk., Woburn, MA 01801 617-938-8390
Wire Graphics, Inc., 215 B. Central Ave., Farmingdale, NY 11735 516-293-1525
Xyteg Corporation, 103 Central Avenue, Clifton, NJ 07011 201-772-3444

Test Systems, Component-2900

† Hafstrom Technical Products, Inc., P.O. Box 9829, San Diego, CA 92109, 619-274-8822 .... D•1169
Slaughter Co., Moore & Hailey Sts., P.O. Box 1805, Ardmore, OK 73402, 405-223-4773 .... D•1309
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† Analog Devices, P.O. Box 280, Norwood, MA 02062 617-329-4700
A-Systems Inc., 1500 Avon St. Extd., Charlottesville, VA 22901 804-295-7200
Automated Production Concepts, 8 E. Garden Pl., Pompton Plains, NJ 07444 201-831-8300
Biddle Instruments, A Thorn EMI Co., 510 Township Line Rd., Blue Bell, PA 19422 215-646-9200
Electro-Tech Sys., Inc., 115 E. Glenside Ave., Glenside, PA 19038 215-887-2196
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Everett/Charles Test Equip. Inc., 2887 N. Towne Ave., Pomona, CA 91767 714-621-9511
Exatron Automatic Test Equip., 3513 Ryder St., Santa Clara, CA 95051 .... 408-737-7111;800-EXA-TRON
† FTS Sys., POB 158, Stone Ridge, NY 12484 800-824-0400
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Keithley Instrs., 28775 Aurora Rd., Cleveland, OH 44139 216-248-0400
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Ballantine Labs., 90 Fanny Rd., Boonton, NJ 07005, 201-335-0900 .... D•1185
Behlman Engineering, 1142 Mark Ave., Carpinteria, CA 93013, 805-684-8311 .... D•1898-1905
§ California Instruments, A Div. of Amstar Tech. Prods. Co., Inc., 5150-Convoy St., San Diego, CA 92111, 619-279-8620;800-356-2244;800-821-1634 .... D•1907
ETM Electromatic, 470 San Antonio Ave., Palo Alto, CA 94306, 415-494-1505 .... D•1227,1638
Julie Resch. Labs., 211 West 61st St., New York, NY 10023, 212-245-2727 .... D•1252
§ Quantum Data, Inc., 455 E. Kehoe, Carol Stream, IL 60188, 312-668-3301 .... D•1293
§ Slaughter Co., Moore & Hailey Sts., P.O. Box 1805, Ardmore, OK 73402, 405-223-4773 .... D•1309
† Accutest, 25 Industrial Ave., Chelmsford, MA 01824 617-256-8124
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Advanced Techn. Research Labs., 5645 K General Washington Dr., Alexandria, VA 22312 703-750-2920
§ Aerotronic Assocs., Inc., Riverside Dr., Contoocook, NH 03229 603-746-4631
§ American HV Test Systems Inc., Central Garrett Ind'l. Pk., Accident, MD 21520 301-826-8651
† Analog Devices, P.O. Box 280, Norwood, MA 02062 617-329-4700
Androtek/dmi, Box 29098, Columbus, OH 43229 614-882-7821
§ Applied Data Communications, 14272 Chambers Rd., Tustin, CA 92680 714-731-9000
Applied Micro Technlg., A Burr Brown Co., 3669 E. 44th Street, Tucson, AZ 85713 602-622-8605

Applied Sys., 26401 Harper Ave., St. Clair Shores, MI 48081 313-779-8700
† Artronics Corporation, 3 Electronic Avenue, Danvers, MA 01923 617-777-2880
Astrosystems, 6 Nevada Dr., Lake Success, NY 11042 516-328-1600
† Atec, Inc., Box 19426, 8219 Kempwood Dr., Houston, TX 77055 713-468-7971
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† AVCO-Elctrns. Div., 4807 Bradford Dr., Huntsville, AL 35805 205-837-6500
† Bendix Corp., Test Systems Div., Teterboro, NJ 07608 201-288-2000
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Cyber Sys., Inc., 2031 E. Cerritos Ave., Anaheim, CA 92806 714-722-2051
CYTEC Corp., 107 N. Washington St., E. Rochester, NY 14445 716-381-4740
Data Engineering, Inc., 2515 N. State Rd. 7 Ste. 207, Margate, FL 33063 974-7861
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Dynage/Controls, Inc., 2 Willowbrook Rd., Cromwell, CT 06416 203-635-6257
Eaton Corp., Test Sys. Div., Discrete Test, Precision Rd., Danbury, CT 06810 203-797-1281
Eaton Corp., Test Sys. Div., Memory Test Sys., 21135 Erwin St., Woodland Hills, CA 91365 213-887-5550
EG&G Gamma Scientific, Div. of EG&G Inc., 3777 Ruffin Rd., San Diego, CA 92123 619-279-8034
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GMR Co., 8801 Sepulveda Blvd., Los Angeles, CA 90045 213-216-9516
Green Engineering, 78 Stone Place, Melrose, MA 02176 617-665-8994
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Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
Howell Instrs., 3479 W. Vickery Blvd., Ft. Worth, TX 76107 817-336-7411
Hughes Aircraft Co., Indl. Prods. Div. FACT Sys., 6155 El Camino Real, Carlsbad, CA 92008 619-931-3000
† Hughes Aircraft Co., Microelctrn. Sys. Div., 2601 Campus Dr., Irvine, CA 92715 714-752-3800
§ Industrial Computer Designs, Inc., 31264 La Baya Drive, Westlake Village, CA 91362 818-889-3179
§ InfoCap, Inc., 31119 Via Colinas #502, Westlake Village, CA 91362 818-991-1410
Innovatek Microsystems, Inc., Smithfield Rd., R1 Box 104, Millerton, NY 12546-9720 914-373-9003
Instrumentation Services, Inc., 957 Winnetka Ave. N., Minneapolis, MN 55427 612-544-8916
† Instruments and Controls Div., Technology Inc., P.O. Box 3036, Overlook Branch, Dayton, OH 45431 513-426-2405
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Meissner Inds., 551 Rte. 10, Dover, NJ 07801 201-366-1700
Microtest Systems, Inc., 1188 Bordeaux Dr., Sunnyvale, CA 94089-1281 408-745-7000
Montek Microsystems, P.O. Box 1845, Huntsville, AL 35807 205-723-2927
MTS Sys., Box 24012, Minneapolis, MN 55424 612-937-4000
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Penn Video Inc., 929 Sweitzer Ave., Akron, OH 44311 216-762-4840
Photodyne, 1175 Tourmaline Dr., Newbury Park, CA 91320 818-889-8770
Pragmatic Designs, Inc., 950 Benicia Ave., Sunnyvale, CA 94086 408-736-8670
Pulse Instrs. Co., 1234 Francisco, Torrance, CA 90502 213-515-5330
Sensor Corp., Box 140, Scottdale, PA 15683 412-887-4080
Serial Lab Prods., Inc., 162 Cook Lane, P.O. Box 766, Marlboro, MA 01752 617-481-1684
S.I.R. Atlanta, 331 Luckie St., N.W., Atlanta, GA 30313 404-522-6317
Spectron Corp., 344 New Albany Rd., Moorestown, NJ 08057 609-234-5700
Tektronix, Inc., P. O. Box 500, Y3-314, Beaverton, OR 97077 .... 800-547-1512;Oregon only 800-452-1877
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Teradyne, Inc., 183 Essex St., Boston, MA 02111 617-482-2700
Texas Instrs., Data Sys. Group, P. O. Box 809063, Dallas, TX 75380-9063 1-800-527-3500
Thermonics, 3350 Scott Blvd., Bldg. 32, Santa Clara, CA 95054 408-496-6838
§ Tidewater Technological, Inc., 611 Industrial Pk. Dr., Newport News, VA 23602 804-874-2800
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Wayne Kerr, Inc., W.K.R. Ltd., 400 West Cummings Pk., Woburn, MA 01801 617-938-8390
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§ Wiltron, 805 E. Middlefield Rd., P.O. Box 7290, Mountain View, CA 94042-7290 415-969-6500
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§ "World" Enterprises, Inc., P. O. Drawer 1428, Waynesboro, VA 22980 703-949-6753
Zehntel, Inc., 2625 Shadelands Dr., Walnut Creek, CA 94598 415-932-6900

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A-Systems Inc., 1500 Avon St. Extd., Charlottesville, VA 22901 804-295-7200
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§ Brian Instruments, Inc., 626 S. State College Blvd., Fullerton, CA 92631 714-992-5540
CDS - Colorado Data Sys., 3301 W. Hampden, Unit C, Englewood, CO 80110 303-762-1640
Colorado Data Systems, Inc., 3301 W. Hampden Ave., Unit C, Englewood, CO 80110 303-762-1640
EG&G Gamma Scientific, Div. of EG&G Inc., 3777 Ruffin Rd., San Diego, CA 92123 619-279-8034
Everett/Charles Contact Prods. Inc., 700 E. Harrison Ave., Pomona, CA 91767 714-625-5551
Everett/Charles Test Equip. Inc., 2887 N. Towne Ave., Pomona, CA 91767 714-621-9511
GenRad, Inc., 300 Baker Ave., Concord, MA 01742 617-369-4400
Information Technolgoy A.D.S.C., P.O. Box 470, College Park, MD 20740 301-779-5110
Innovatek Microsystems, Inc., Smithfield Rd., R1 Box 104, Millerton, NY 12546-9720 914-373-9003
INTERFACE TECH. DYNATECH, 150 East Arrow Highway, San Dimas, CA 91773 714-592-2971
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† Natel Engrg. Co., Inc., 4550 Runway St., Simi Valley, CA 93063 805-581-3950
Telpar, Inc., 4137 Billy Mitchell Rd., P.O. Box 796, Addison, TX 75001 214-233-6631
Wayne Kerr, Inc., W.K.R. Ltd., 400 West Cummings Pk., Woburn, MA 01801 617-938-8390

Test Systems, Hall Effect-2900

Specialized Elctrn. Magnetic Prods., Inc., 272 Loudon Ridge Rd. Route 8, Loudon, NH 03301 .... (603) 267-6892

Test Systems, IC-2900

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Exatron Automatic Test Equip., 3513 Ryder St., Santa Clara, CA 95051 .... 408-737-7111;800-EXA-TRON
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Keithley Instrs., 28775 Aurora Rd., Cleveland, OH 44139 216-248-0400
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§ Reliability, Inc., 16400 Park Row, P.O. Box 218370, Houston, TX 77218 713-492-0550
Testronics, 1810-102 N. Glenville Dr., Richardson, TX 75081 214-238-8378
Thermonics, 3350 Scott Blvd., Bldg. 32, Santa Clara, CA 95054 408-496-6838

Testers, Accelerometer — See Calibrators, Accelerometer (Vol. D)

Testers, Armature-2900

Slaughter Co., Moore & Hailey Sts., P.O. Box 1805, Ardmore, OK 73402, 405-223-4773 .... D•1309
American HV Test Systems Inc., Central Garrett Ind'l. Pk., Accident, MD 21520 301-826-8651
Androtek/dmi, Box 29098, Columbus, OH 43229 614-882-7821
§ Associated Research, Inc., 8221 N. Kimball Ave., Skokie, IL 60076 312-647-7850

Testers, Battery-2900

EMICO Inc., Box 368, Dublin, PA 18917, 215-249-9330 .... D•1352
American Monarch, 2801-37th Ave., N.E., Minneapolis, MN 55421 612-788-9161
† Anchor Specialty Mfg. Inc., 300 Hollister Rd., Teterboro, NJ 07608 201-288-1939
Androtek/dmi, Box 29098, Columbus, OH 43229 614-882-7821
Austin Electronics, The Austin Co., 17-01 Pollitt Drive, Fair Lawn, NJ 07410 201-794-0200
Bluffton Products, Inc., Tegam, Inc., 7230 North Ridge Road, Madison, OH 44057 216-946-3572
Christie Elec. Corp., 20665 Manhattan Pl., Torrance, CA 90501 213-320-0808
Cord Electronics, Inc., 177 Cantiague Rock Rd., Westbury, NY 11590 516-935-3640
Curtis Instrs., Inc., 200 Kisco Ave., Mt. Kisco, NY 10549 914-666-2971
East Penn. Mfg. Co., Inc., Main Office, Lyon Station, PA 19536 215-682-6361
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§ GC Elctrns., 400 S. Wyman St., Rockford, IL 61101 815-968-9661
General Electric Co., 333 W. Seymour Ave., Cincinnati, OH 45216 513-948-5050
Hickok Elec. Instr., 10514 DuPont Ave., Cleveland, OH 44108 216-541-8060
Modutec, 18 Marshall St., Norwalk, CT 06854 203-853-3636
† N.C.E., Mail Station 331, 9925 Lyndale Ave. S., Bloomington, MN 55420 612-890-1360
Optimized Devices, Inc., 220 Marble Ave., Pleasantville, NY 10570 914-769-6100
Parker Hannifin Corp., 17325 Euclid Ave., Cleveland, OH 44112 216-531-3000

† Power Group International, Dept. 227, 2200 West 66th Street, Richfield, MN 55423 612-890-1360
† Q.V.S., Inc., 20 North 15th St., East Orange, NJ 07017 201-673-3996
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§ Shokai Far East, Ltd., 280 North Central Ave., Hartsdale, NY 10530 914-681-0700
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§ Simpson Elec. Co., 853 Dundee Ave., Elgin, IL 60120 312-697-2260
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Telco Products Co., 44 Sea Cliff, Glen Cove, NY 11542 516-759-0300
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§ VIZ Test Equipment, Div. VIZ Mfg., 335 E. Price St., Philadelphia, PA 19144 215-844-2626
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§ Electrodata, Inc., 23020 Miles Rd., Bedford Heights, OH 44128 216-663-3333
§ Electro Standards Lab., Inc., P.O. Box 9144, Providence, RI 02940 401-943-1164
Fairchild - Weston - Telemetry, P.O. Box 3041, Sarasota, FL 33578 813-377-5566
Nu Data, 32 Fairview Ave., Little Silver, NJ 07739 201-842-5757
§ Phoenix Microsystems, P.O. Box 4206, Huntsville, AL 35802 205-881-2173
§ Tau-Tron, Inc., A Unit of General Signal, 10 Lyberty Way, Westford, MA 01886 617-692-5100
† Telecommunications Techniques Corp., 444 N. Frederick Ave., Gaithersburg, MD 20877 301-258-5011

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§ Delta Design, 5775 Kearny Villa Rd., San Diego, CA 92123 619-292-5000
§† Despatch Inds., P.O. Box 1320, Minneapolis, MN 55440 612-331-1873
Hipotronics, P.O. Drawer A, Brewster, NY 10509 914-279-8091
† Jettron Prods., P.O. Box 337, E. Hanover, NJ 07936 201-887-0571
† Kantz Elctrn. Ind., 1804 Wall Church Rd., Wall Township, NJ 07719 201-974-0090
† Lehighton Elctrns., Inc., Box 328, Dept M, Lehighton, PA 18235 ...... 717-386-4156; 215-377-5990
Loranger Mfg., Box 948, Warren, PA 16365 814-723-2250
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Micro Technical Inds., Micro-Ohm Corp., 23666 Birtcher Dr., #B, Lake Forest, CA 92630 714-855-4326
§† Microtest Systems, Inc., 1188 Bordeaux Dr., Sunnyvale, CA 94089-1281 408-745-7000
† Milton Ross Co., 511 Second St. Pike, Southampton, PA 18966 215-355-0200
PCK Elastomerics, Inc., Kollmorgen Corporation, 333 Byberry Road, Hatboro, PA 19040 ...... 215-672-0787;215-672-4741
Rutherford Resch. Prods., Box 249, Rutherford, NJ 07070 201-933-2091
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Telepacific Electronics Co., Inc., 772 N. Twin Oaks Valley Road, San Marcos, CA 92069 619-744-4415
† Trio-Tech Intl., 2040 N. Lincoln St., Burbank, CA 91504 818-846-9200
Waldom Elctrns., 4301 W. 69th St., Dept. EEM, Chicago, IL 60629 312-585-1212

Testers, Cable-2900

Chatsworth Data Corp, Cablemaster Div., 20710 Lassen St., Chatsworth, CA 91311, 818-341-9200 ...... D•1199
Information Transfer Indl., Box 357, Holcomb, NY 14469, 716-657-7074 ...... D•1248-1249
§ North American Soar Corp., 11126 Cornell Ave., Cherry Hill, NJ 08002, 609-488-1060 ...... D•1279-1280
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Associated Research, Inc., 8221 N. Kimball Ave., Skokie, IL 60076 312-647-7850
A-Systems Inc., 1500 Avon St. Extd., Charlottesville, VA 22901 804-295-7200
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§ Datatran Corp., 1195 South Huron St., Denver, CO 80223 303-778-0870
Del Elctrns. Corp., 250 E. Sandford Blvd., Mt. Vernon, NY 10550 914-699-2000
§ Delta Elctrns., 145 Fayette St., Winston-Salem, NC 27101 919-725-4122
§ Dillon, W. C., & Co., National Controls, Inc., 2320 Airport Blvd., Santa Rosa, CA 95401 707-527-5555
§ Electrodata, Inc., 23020 Miles Rd., Bedford Heights, OH 44128 216-663-3333
Everett/Charles Test Equip. Inc., 2887 N. Towne Ave., Pomona, CA 91767 714-621-9511
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Guildline Instrs., 4403 Vineland Rd, Suite B-10, Orlando, FL 32811-9998 305-423-8215
§ Harris Corp., Dracon Div., 809 Calle Plano, Camarillo, CA 93010 805-987-9511
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Southern Computer Corp., 3720 N. Stratford Rd. N.E., Atlanta, GA 30342 404-231-5363
§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 215-673-5600
§ Tau-Tron, Inc., A Unit of General Signal, 10 Lyberty Way, Westford, MA 01886 617-692-5100
§ TEKTITE CORP., 4756 Platt Rd., Ann Arbor, MI 48104 313-971-9379
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Texscan Instruments, 3169 N. Shadeland, Indianapolis, IN 46226 317-545-4196
§ Thomas & Betts, Electronics Group Hdqtrs., 920 Route 202, Raritan, NJ 08869 201-469-4000
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§ Triplett Corp.-A Penril Co., One Triplett Dr., Bluffton, OH 45817-9987 419-358-5015
Universal Voltronics, 27 Radio Circle Dr., Mt. Kisco, NY 10549 914-241-1300
Vann Instruments, 1200 Schofield La., Farmington, NM 87401 505-326-7557
Xyteg Corporation, 103 Central Avenue, Clifton, NJ 07011 201-772-3444

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IET Labs, Inc., 534 Main St., Westbury, NY 11590, 516-334-5959 ...... D•1242
Tettex Instruments, Inc., P.O. Box 281, Fairview Village, PA 19409-0281, 215-539-6050 ...... D•1312
American HV Test Systems Inc., Central Garrett Ind'l. Pk., Accident, MD 21520 301-826-8651
Andeen-Hagerling, Inc., 31899 Miles Road, Chagrin Falls, OH 44022 216-349-0370
Automated Production Concepts, 8 E. Garden Pl., Pompton Plains, NJ 07444 201-831-8300
§ B & K Precision, Industrial Electronics Product Group, Dynascan Corporation, 6460 W. Cortland, Chicago, IL 60635 312-889-9087
§ BBC-Metrawatt/Goerz, 2150 W. 6th Ave., Broomfield, CO 80020 ...... 303-469-5231; 800-821-6327
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Electrostatic Consltg. Assocs., 556 Lowell Rd., Groton, MA 01450 617-448-5485
GenRad, Inc., 300 Baker Ave., Concord, MA 01742 617-369-4400
§ Global Specialties, Interplex Electronics, Inc., 70 Fulton Terrace, P.O. Box 1942, New Haven, CT 06509 203-624-3103
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§ Sprague Electric Company, Distribution Division, 481 Marshall St., No. Adams, MA 01247 413-664-4481
§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 215-673-5600
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† Collins Avionics Divisions, Rockwell Intl., 400 Collins Rd. NE, Cedar Rapids, IA 52498 319-395-1000
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§ Phoenix Microsystems, P.O. Box 4206, Huntsville, AL 35802 205-881-2173
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† Telecommunications Techniques Corp., 444 N. Frederick Ave., Gaithersburg, MD 20877 301-258-5011
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Solatron Enterprises, 421 E. Beach Ave., Inglewood, CA 90302 213-678-4981
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§† Ansonics, Inc., P.O. Box 910, Halfway, OR 97834 503-742-7475
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Glassman High Voltage Inc., P.O. Box 551, Salem Indl. Pk., Whitehouse Sta., NJ 08889, 201-534-9007 .... D•1234-1235
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§ Tucker Elctrns., Box 461966, Garland, TX 75046 .... 214-348-8800;800-527-4642
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Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
† Hughes Aircraft Co, Aerospace Grps./Support Sys., P.O. Box 90515, Los Angeles, CA 90009 213-670-1515
Hughes Aircraft Co., Microelctrn. Sys. Div., 2601 Campus Dr., Irvine, CA 92715 714-752-3800
Lode Systems, 3501 Ryder St., Santa Clara, CA 95051 408-732-5110
Megatest, 880 Fox La., San Jose, CA 95131 408-998-7110
Micro Component Technlg., Inc., P.O. Box 64013, St. Paul, MN 55164 ... 612-482-5100
† Milton Ross Co., 511 Second St. Pike, Southampton, PA 18966 215-355-0200
Pragmatic Designs, Inc., 950 Benicia Ave., Sunnyvale, CA 94086 408-736-8670
Reliability, Inc., 16400 Park Row, P.O. Box 218370, Houston, TX 77218 713-492-0550
† Takeda Riken Co., Ltd., NS Bldg. 14th,4-1,Nishi-Shinjuku 2-Chome,Shinjuku-ku, Tokyo 160, Tokyo 176, JAPAN 03-342-7500
Tektronix, Inc., P. O. Box 500, Y3-314, Beaverton, OR 97077 ..... 800-547-1512;Oregon only 800-452-1877
† Telectro Sys., 96-18 43rd Ave., Corona, NY 11368 212-651-8900
Teradyne, Inc., 183 Essex St., Boston, MA 02111 617-482-2700
Testronics, 1810-102 N. Glenville Dr., Richardson, TX 75081 214-238-8378
Thermonics, 3350 Scott Blvd., Bldg. 32, Santa Clara, CA 95054 408-496-6838
† Trio-Tech Intl., 2040 N. Lincoln St., Burbank, CA 91504 818-846-9200
Watkins-Johnson Co., 3333 Hillview Ave., Palo Alto, CA 94304 415-493-4141
Zehntel, Inc., 2625 Shadelands Dr., Walnut Creek, CA 94598 415-932-6900

Testers, Integrated Circuit (Manual)-2900

§ Alessi Inds., Inc., 3195-C Airport Loop Dr., Costa Mesa, CA 92626 714-979-8912
Applied Control, 1275 Bloomfield Ave., Fairfield, NJ 07006-2828 201-227-5454
Biddle Instruments, A Thorn EMI Co., 510 Township Line Rd., Blue Bell, PA 19422 215-646-9200
§ Bugtrap Instrumentation, 1209 Alderwood Avenue, Sunnyvale, CA 94089 408-734-1118
Eaton Corp., Test Sys. Div., Memory Test Sys., 21135 Erwin St., Woodland Hills, CA 91365 213-887-5550
Eitel Mfg., 2835 Laguna Canyon Rd., Laguna Beach, CA 92652 714-494-2012
† Electro-Tech Sys., Inc., 115 E. Glenside Ave., Glenside, PA 19038 215-887-2196
Everett/Charles Test Equip. Inc., 2887 N. Towne Ave., Pomona, CA 91767 714-621-9511
Exatron Automatic Test Equip., 3513 Ryder St., Santa Clara, CA 95051 .... 408-737-7111;800-EXA-TRON
§† E-Z-Hook, Div. Tektest Inc., Box 450 - 225 N. Second Ave., Arcadia, CA 91006 818-446-6175
Fairchild Camera & Instr. Corp., 464 Ellis St., 20-2271, Mountain View, CA 94042 415-962-5011
§† Factron/Schlumberger, Titusville, 1400 White Dr., Titusville, FL 32780 .. 305-267-7212
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
† Hughes Aircraft Co, Aerospace Grps./Support Sys., P.O. Box 90515, Los Angeles, CA 90009 213-670-1515
Hughes Aircraft Co., Microelctrn. Sys. Div., 2601 Campus Dr., Irvine, CA 92715 714-752-3800
Huntron Instrs., Inc., 15123 Highway 99, Lynnwood, WA 98036 .... 206-743-3171; 800-426-9265

I.C. Inds., Box 104, Altamonte Springs, FL 32701 305-339-8298
Kurz-Kasch, Knob Div., 711 Hunter Dr., Wilmington, OH 45177 513-382-0966
Micro Technical Inds., Micro-Ohm Corp., 23666 Birtcher Dr., #B, Lake Forest, CA 92630 714-855-4326
† Milton Ross Co., 511 Second St. Pike, Southampton, PA 18966 215-355-0200
§ OK Industries, Inc., 3455 Conner St., Bronx, NY 10475 212-994-6600
Pragmatic Designs, Inc., 950 Benicia Ave., Sunnyvale, CA 94086 408-736-8670
§ Techni-Tool, 5 Apollo Rd., Box 368, Plymouth Meeting, PA 19462 215-825-4990
† Telectro Sys., 96-18 43rd Ave., Corona, NY 11368 212-651-8900
Teradyne, Inc., 183 Essex St., Boston, MA 02111 617-482-2700
Testronics, 1810-102 N. Glenville Dr., Richardson, TX 75081 214-238-8378
Thermonics, 3350 Scott Blvd., Bldg. 32, Santa Clara, CA 95054 408-496-6838
§ Vu-Data, 7122 Convoy Ct., San Diego, CA 92111 619-279-6572
Woodward Measurement Instrs. Ltd., 236 Wineva Ave., Toronto, ON, CANADA M4E 2T4

Testers, Interface-2900

Atlantic Research, 5390 Cherokee Ave., Alexandria, VA 22312 703-642-4000
Biddle Instruments, A Thorn EMI Co., 510 Township Line Rd., Blue Bell, PA 19422 215-646-9200
§ Datatran Corp., 1195 South Huron St., Denver, CO 80223 303-778-0870
§ Electrodata, Inc., 23020 Miles Rd., Bedford Heights, OH 44128 216-663-3333
§ Electro Standards Lab., Inc., P.O. Box 9144, Providence, RI 02940 401-943-1164
Information Technolgoy A.D.S.C., P.O. Box 470, College Park, MD 20740 301-779-5110
§ Metatek Inc., 410 93rd Ave. NW, P.O. Box 33129, Minneapolis, MN 55433 612-786-8253
Methode Elctrns., Inc., 7444 W. Wilson Ave., Chicago, IL 60656 312-867-9600
§ Multi-Tech Systems, Inc., 82 Second Ave. S.E., New Brighton, MN 55112 612-631-3550
Nu Data, 32 Fairview Ave., Little Silver, NJ 07739 201-842-5757
§ RVS Electronics, Inc., 40 North St., Middletown, NY 10940 914-342-3199
† Telecommunications Techniques Corp., 444 N. Frederick Ave., Gaithersburg, MD 20877 301-258-5011
Vann Instruments, 1200 Schofield La., Farmington, NM 87401 505-326-7557

Testers, LED & LED Arrays-2900

EG&G Gamma Scientific, Div. of EG&G Inc., 3777 Ruffin Rd., San Diego, CA 92123 619-279-8034
Hoffman Engineering Corp., P.O. Box 300, Old Greenwich, CT 06870 203-325-8933
Photon, Inc., 14125 Capri Dr. #4, Los Gatos, CA 95030 408-866-0566
Testronics, 1810-102 N. Glenville Dr., Richardson, TX 75081 214-238-8378
TIF Instrs., Inc., 9101 N.W. 7th Ave., Miami, FL 33150 305-757-8811

Testers, Life, Component-2550

† Blue M, A Unit of General Signal, 138th & Chatham Sts., Blue Island, IL 60406, 312-385-9000 .... D•1165
† Tenney Engrg., 109 Springfield Rd., Union, NJ 07083, 201-686-7870 .... D•1173
§† Aerotronic Assocs., Inc., Riverside Dr., Contoocook, NH 03229 603-746-4631
Austin Electronics, The Austin Co., 17-01 Pollitt Drive, Fair Lawn, NJ 07410 201-794-0200
Blanck, A. R., Co., Box 249, Rutherford, NJ 07070 201-933-2091
† Cincinnati Sub-Zero Prods., 12011 Mosteller Rd., Cincinnati, OH 45241 513-772-8810
Coto Corporation, 55 DuPont Drive, Providence, RI 02907 401-943-2686
† Custom Sci. Instrs., 13 Wing Dr., Cedar Knolls, NJ 07927 201-538-8500
EG&G Wakefield Engrg., 60 Audubon Rd., Wakefield, MA 01880 617-245-5900
KeyTek Instr. Corp., 12 Cambridge St., Burlington, MA 01803 617-272-5170
Micro Instr., 2250 Micro Pl., Escondido, CA 92025 619-746-2010
Micro Technical Inds., Micro-Ohm Corp., 23666 Birtcher Dr., #B, Lake Forest, CA 92630 714-855-4326
RE Instruments Corp., 31029 Center Ridge Rd., Westlake, OH 44145 216-871-7617
Rutherford Resch. Prods., Box 249, Rutherford, NJ 07070 201-933-2091
Sigma Systems Corp., 3163 Adams Ave., San Diego, CA 92116 619-283-3193
Solatron Enterprises, 421 E. Beach Ave., Inglewood, CA 90302 213-678-4981
Teradyne, Inc., 183 Essex St., Boston, MA 02111 617-482-2700

Testers, Logic Card-2900

§ Gould Inc., Design & Test Sys. Div., 4650 Old Ironsides Dr., Santa Clara, CA 95054-1279, 408-988-6800 .... D•1237
Information Transfer Indl., Box 357, Holcomb, NY 14469, 716-657-7074 .... D•1249
§† Alco Elctrn. Prods., Inc., 1551 Osgood St., N. Andover, MA 01845 617-685-4371
Alessi Inds., Inc., 3195-C Airport Loop Dr., Costa Mesa, CA 92626 714-979-8912
Austin Electronics, The Austin Co., 17-01 Pollitt Drive, Fair Lawn, NJ 07410 201-794-0200
† Automation Dynamics, 77 Brookside Pl., Hillsdale, NJ 07642 201-666-2458
† Bendix Corp., Test Systems Div., Teterboro, NJ 07608 201-288-2000
Biddle Instruments, A Thorn EMI Co., 510 Township Line Rd., Blue Bell, PA 19422 215-646-9200
Electron, Inc., P.O. Box 28640, San Diego, CA 92128 216-681-4700
Fluke, John, Mfg. Co., Box C9090, MS 250C, Everett, WA 98206 206-356-5400
§† Harris Corp., PRD Elctrns. Div., 6801 Jericho Tpke., Syosset, NY 11791 516-364-0400
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
† Hughes Aircraft Co, Aerospace Grps./Support Sys., P.O. Box 90515, Los Angeles, CA 90009 213-670-1515
Hughes Aircraft Co., Microelctrn. Sys. Div., 2601 Campus Dr., Irvine, CA 92715 714-752-3800
Kurz-Kasch, Knob Div., 711 Hunter Dr., Wilmington, OH 45177 513-382-0966
S.I.R. Atlanta, 331 Luckie St., N.W., Atlanta, GA 30313 404-522-6317
§ Techno Vation, Inc., 14 Crandall Ave., Pompton Lakes, NJ 07442 201-839-0740
Teradyne, Inc., 183 Essex St., Boston, MA 02111 617-482-2700
Wire Graphics, Inc., 215 B. Central Ave., Farmingdale, NY 11735 516-293-1525
Zehntel, Inc., 2625 Shadelands Dr., Walnut Creek, CA 94598 415-932-6900

Testers, Loopback-2900

Atlantic Research, 5390 Cherokee Ave., Alexandria, VA 22312 703-642-4000
BLACK BOX Corp., Micom Sys., P.O. Box 12800, Pittsburgh, PA 15241 412-746-5500
Com/Tech Systems, 505 Eighth Ave., New York, NY 10018 212-594-5377
§† Digitech Industries, Inc., 66 Grove St., Ridgefield, CT 06877 203-438-3731
§ Phoenix Microsystems, P.O. Box 4206, Huntsville, AL 35802 205-881-2173
§ Telebyte Technology, Inc., Remark Datacom Div., 270 East Pulaski Road, Greenlawn, NY 11740 516-423-3232
† Telecommunications Techniques Corp., 444 N. Frederick Ave., Gaithersburg, MD 20877 301-258-5011

Testers, Magnetic Core-2900

Bell, F. W., Inc., 6120 Hanging Moss Rd., Orlando, FL 32807, 305-678-6900 .... D•1977
LDJ Incorporated, 2200 Stephenson Hwy., P.O. Box 219, Troy, MI 48099-0219, 313-528-2202 .... D•1260
Magnetic Instrumentation, 8350 E. 48TH ST., Indianapolis, IN 46226 317-545-2102
Magnetic Metals Co., Hayes Ave. at 21st St., Camden, NJ 08105 609-964-7842
§ Magnos, Old School House Rd., Harvard, MA 01451 617-456-8880
RFL Inds., A Dowty Grp. Co./Instr. Div., Powerville Rd., Boonton, NJ 07005 201-334-3100
Walker Scientific, Rockdale St., Worcester, MA 01606 617-852-3674
Yokogawa Corp. of America, 2 Dart Rd., Shenandoah, GA 30265 404-253-7000

Testers, Magnetic Medium-2900

Bell, F. W., Inc., 6120 Hanging Moss Rd., Orlando, FL 32807, 305-678-6900 .... D•1977
Brian Instruments, Inc., 626 S. State College Blvd., Fullerton, CA 92631 714-992-5540
Dymek Corp., 1851 Zanker Road, San Jose, CA 95070 408-947-8700
Femco, Inc., P.O. Box 26710 Parkmoor Sta., San Jose, CA 95159 408-946-1188
Magnetic Instrumentation, 8350 E. 48TH ST., Indianapolis, IN 46226 317-545-2102
§ Tau-Tron, Inc., A Unit of General Signal, 10 Lyberty Way, Westford, MA 01886 617-692-5100
Walker Scientific, Rockdale St., Worcester, MA 01606 617-852-3674

Testers, Magnetron-2900

Bell, F. W., Inc., 6120 Hanging Moss Rd., Orlando, FL 32807, 305-678-6900 .... D•1977
Cober Elctrns., 102 Hamilton Ave., Stamford, CT 06902 203-327-0003

Testers, Material-2550

LDJ Incorporated, 2200 Stephenson Hwy., P.O. Box 219, Troy, MI 48099-0219, 313-528-2202 .... D•1260
† Ametek, Inc, Hunter Spring Division, 1 Spring Ave., Hatfield, PA 19440 215-822-2971
† Custom Sci. Instrs., 13 Wing Dr., Cedar Knolls, NJ 07927 201-538-8500
§ Dillon, W. C., & Co., National Controls, Inc., 2320 Airport Blvd., Santa Rosa, CA 95401 707-527-5555
† Dresser Inds., 1505 Elm St., Dallas, TX 75201 214-746-6000
Exact Electronics, Div. of Dynatech Nevada Inc., Box 1925, 2000 Arrowhead Dr., Carson City, NV 89701 .... 702-883-3400;800-648-7952
Instron Corp., 100 Royall St., Canton, MA 02021 617-828-2500
Magnetic Instrumentation, 8350 E. 48TH ST., Indianapolis, IN 46226 317-545-2102
§ Magnos, Old School House Rd., Harvard, MA 01451 617-456-8880
MTS Sys., Box 24012, Minneapolis, MN 55424 612-937-4000
§ Pacific Transducer, 2301 Federal, Los Angeles, CA 90064 213-478-1134
Panametrics, 221 Cresent St., Waltham, MA 02254 617-899-2740
Walker Scientific, Rockdale St., Worcester, MA 01606 617-852-3674

Testers, Memory Board-2900

Information Transfer Indl., Box 357, Holcomb, NY 14469, 716-657-7074 .... D•1249
Biddle Instruments, A Thorn EMI Co., 510 Township Line Rd., Blue Bell, PA 19422 215-646-9200
GenRad, Inc., 300 Baker Ave., Concord, MA 01742 617-369-4400
Magnum Opus Custom Elctrn. Engrg., 284 Kennedy St., Iselin, NJ 08830 201-283-4925
§ Reliability, Inc., 16400 Park Row, P.O. Box 218370, Houston, TX 77218 713-492-0550

Testers, Meter-2900

IET Labs, Inc., 534 Main St., Westbury, NY 11590, 516-334-5959 .... D•1242,1245
Julie Resch. Labs., 211 West 61st St., New York, NY 10023, 212-245-2727 .... D•1252-1253
North American Soar Corp., 11126 Cornell Ave., Cherry Hill, NJ 08002, 609-488-1060 .... D•1277
Analogic Corp., 8 Centennial Dr., Peabody, MA 01961 .... 617-532-5660;617-777-4500; 617-246-0300;800-451-1
† Automation Dynamics, 77 Brookside Pl., Hillsdale, NJ 07642 201-666-2458
Ballantine Labs., 90 Fanny Rd., Boonton, NJ 07005 201-335-0900
Behlman Div., California Instrs., Div. of Norlin Inds., 5150 Convoy St., San Diego, CA 92111 619-279-8620
§ Digitec Corp., 918 Woodley Rd., P.O. Box 458, Dayton, OH 45401 513-254-6251
EDL, Inc., 385 Oser Ave., Hauppauge, NY 11788 .... 516-435-2808;1-800-DIAL EDL
† Electronic Dev. Corp., 11 Hamlin St., Boston, MA 02127-4198 617-268-9696
Elgar Corp, An Onan McGraw Edison Co., 9250 Brown Deer Rd., San Diego, CA 92121 619-450-0085
Elin Div., California Instrs. Co., Div. of Norlin Ind., 5150 Convoy St., San Diego, CA 92111 619-279-8620
† Flow Technology, Inc., Box 21346, Phoenix, AZ 85036 602-437-1315
Fluke, John, Mfg. Co., Box C9090, MS 250C, Everett, WA 98206 206-356-5400
§ Heath Co., Benton Harbor, MI 49022 616-982-3886
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
Jonard Industries Corp., 134 Marbledale Rd., Tuckahoe, NY 10707 914-793-0700
Kurz Instruments, Inc., P.O. Box 849, Carmel Valley, CA 93924 800-424-7356
Multi-Amp Corp., TBG, 4271 Bronze Way, Dallas, TX 75237 214-333-3201
Photodyne, 1175 Tourmaline Dr., Newbury Park, CA 91320 818-889-8770
RFL Inds., A Dowty Grp. Co./Instr. Div., Powerville Rd., Boonton, NJ 07005 201-334-3100
Rotek Instr. Corp., 390 Main St., Waltham, MA 02254 617-899-4611

§ SPECO Div., Components Specialties, Inc., P.O. Box 624, 1172 Rte. 109, Lindenhurst, NY 11757 .... 516-957-8700;800-645-5516
§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 215-673-5600
Telco Products Co., 44 Sea Cliff, Glen Cove, NY 11542 516-759-0300
Valhalla Scientific, 9955 Mesa Rim Rd., San Diego, CA 92126 619-457-5576
Weinschel Engrg., One Weinschel La., Gaithersburg, MD 20877 .... 301-948-3434; 800-638-2048
Yokogawa Corp. of America, 2 Dart Rd., Shenandoah, GA 30265 404-253-7000

Testers, Microwave-2900

ETM Electromatic, 470 San Antonio Ave., Palo Alto, CA 94306, 415-494-1505 .... D•1226
MARCONI INSTRUMENTS, 3 Pearl Court, Allendale, NJ 07401, 201-934-9050 .... D•1263-1264
Alford Mfg. Co., P.O. Box 2116, 32 Sixth Rd., Woburn, MA 01888 617-935-8610
† Bendix Corp., Test Systems Div., Teterboro, NJ 07608 201-288-2000
Coaxial Dynamics, 15210 Industrial Parkway, Cleveland, OH 44135 216-267-2233
§ Eaton Corp., Elctrn. Instrmn. Div., 5340 Alla Rd., Los Angeles, CA 90066
† General Microwave Corp., 155 Marine St., Farmingdale, NY 11735 516-694-3600
§† Harris Corp., PRD Elctrns. Div., 6801 Jericho Tpke., Syosset, NY 11791 516-364-0400
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
† Microlab/FXR, 10 Microlab Rd., Livingston, NJ 07039 201-992-7700
† Mitec Elctrns., 15 Commerce St., Williston, VT 05495 802-864-0064
Pacific Meas., Inc., 488 Tasman Drive, Sunnyvale, CA 94086 408-734-5780
† Radio Resch. Instr. Co., Inc., Two Lake Ave. Extension, Danbury, CT 06811-5295 203-792-6666
† Republic Electronics Co., 575 Broad Hollow Rd., Melville, NY 11747 516-249-1414
§ Simpson Elec. Co., 853 Dundee Ave., Elgin, IL 60120 312-697-2260
§† Vega Precision Labs., 800 Follin La., Vienna, VA 22180 703-938-6300
§ Waveline, Box 718, W. Caldwell, NJ 07006 201-226-9100
Weinschel Engrg., One Weinschel La., Gaithersburg, MD 20877 .... 301-948-3434; 800-638-2048
§ Wiltron, 805 E. Middlefield Rd., P.O. Box 7290, Mountain View, CA 94042-7290 415-969-6500

Testers, Modem-2900

Comstron Corp., 200 E. Sunrise Hwy., Freeport, NY 11520, 516-546-9700 .... D•1205
Telpar, Inc., 4137 Billy Mitchell Rd., P.O. Box 796, Addison, TX 75001, 214-233-6631 .... D•1075
§ AQ Sys., 1736 Front St., Yorktown Hgts., NY 10598 800-431-2104
Biddle Instruments, A Thorn EMI Co., 510 Township Line Rd., Blue Bell, PA 19422 215-646-9200
BLACK BOX Corp., Micom Sys., P.O. Box 12800, Pittsburgh, PA 15241 .. 412-746-5500
CDS - Colorado Data Sys., 3301 W. Hampden, Unit C, Englewood, CO 80110 303-762-1640
Com/Tech Systems, 505 Eighth Ave., New York, NY 10018 212-594-5377
Dai-Ichi Shoji of Amer., Inc., 150 Fifth Ave., New York, NY 10011 212-691-9050
§ Dataprobe, 110 Palisades Blvd., Palisades Park, NJ 07650 201-947-9500
§ Digital Transmission Techniques, Inc., P.O. Box 1847, Wayne, NJ 07470 201-831-1615
§† Digitech Industries, Inc., 66 Grove St., Ridgefield, CT 06877 203-438-3731
§ Electrodata, Inc., 23020 Miles Rd., Bedford Heights, OH 44128 216-663-3333
§ Glasgal Communications, Inc., 207 Washington St., Northvale, NJ 07647 201-768-8082
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
Information Technolgoy A.D.S.C., P.O. Box 470, College Park, MD 20740 301-779-5110
§† International Data Sciences, 7 Wellington Rd., Lincoln, RI 02865 401-333-6200
Lode Systems, 3501 Ryder St., Santa Clara, CA 95051 408-732-5110
Magnum Opus Custom Elctrn. Engrg., 284 Kennedy St., Iselin, NJ 08830 201-283-4925
§ MARCONI INSTRUMENTS, 3 Pearl Court, Allendale, NJ 07401 201-934-9050
§ Phoenix Microsystems, P.O. Box 4206, Huntsville, AL 35802 205-881-2173
Spectron Corp., 344 New Albany Rd., Moorestown, NJ 08057 609-234-5700
§ Tau-Tron, Inc., A Unit of General Signal, 10 Lyberty Way, Westford, MA 01886 617-692-5100
§ Techni-Tool, 5 Apollo Rd., Box 368, Plymouth Meeting, PA 19462 215-825-4990
† Telecommunications Techniques Corp., 444 N. Frederick Ave., Gaithersburg, MD 20877 301-258-5011

Testers, Motor-2900

American HV Test Systems Inc., Central Garrett Ind'l. Pk., Accident, MD 21520 301-826-8651
Androtek/dmi, Box 29098, Columbus, OH 43229 614-882-7821
§ Associated Research, Inc., 8221 N. Kimball Ave., Skokie, IL 60076 312-647-7850
§ Biddle Instruments, A Thorn EMI Co., 510 Township Line Rd., Blue Bell, PA 19422 215-646-9200
Bluffton Products, Inc., Tegam, Inc., 7230 North Ridge Road, Madison, OH 44057 216-946-3572
Hipotronics, P.O. Drawer A, Brewster, NY 10509 914-279-8091
Slaughter Co., Moore & Hailey Sts., P.O. Box 1805, Ardmore, OK 73402 405-223-4773
Staco Energy Prods. Co., 301 Gaddis Blvd., Dayton, OH 45403 513-253-1191
§ Syntel Div., Tegam, Inc., 7230 North Ridge Rd., Madison, OH 44057 216-428-7505
§ Vaco Prods., 1510 Skokie Blvd., Northbrook, IL 60062 312-564-3300
Valhalla Scientific, 9955 Mesa Rim Rd., San Diego, CA 92126 619-457-5576
Vibrac, 1 Columbia Dr., Amherst, NH 03031 603-882-6777

Testers, Potentiometer-2900

Bristol Babcock Inc., 40 Bristol St., Waterbury, CT 06708 203-575-3000
Electro Scientific Inds., 13900 N.W. Science Pk. Dr., Portland, OR 97229 503-641-4141
Julie Resch. Labs., 211 West 61st St., New York, NY 10023 212-245-2727
† Litton Potentiometer Div., 750 So. Fulton Ave., Mt. Vernon, NY 10551 ... 914-664-7733
Penn Airborne Prods., Industrial Hwy., Southampton, PA 18966 215-355-3400
Solatron Enterprises, 421 E. Beach Ave., Inglewood, CA 90302 213-678-4981

Testers, Power Supply-2900

Behlman Engineering, 1142 Mark Ave., Carpinteria, CA 93013, 805-684-8311 .... D•1898-1905
† California Instruments, A Div. of Amstar Tech. Prods. Co., Inc., 5150-Convoy St., San Diego, CA 92111, 619-279-8620;800-356-2244;800-821-1634 ...... D•1907
Julie Resch. Labs., 211 West 61st St., New York, NY 10023, 212-245-2727 .... D•1252
Kikusui Intl. Corp., 17819 S. Figueroa St., Gardena, CA 90248, 213-515-6432;800-421-5334 .... D•1652
† Transistor Devices, 274 S. Salem St., Randolph, NJ 07869, 201-361-6622 .... D•1316
§ ACDC Electronics, 401 Jones Rd., Oceanside, CA 92054 619-757-1880
Astrosystems, 6 Nevada Dr., Lake Success, NY 11042 516-328-1600
† Automation Dynamics, 77 Brookside Pl., Hillsdale, NJ 07642 201-666-2458
Bermar Corp., P.O. Box 12844, Research Triangle Park, NC 27709 919-489-4316
Biddle Instruments, A Thorn EMI Co., 510 Township Line Rd., Blue Bell, PA 19422 215-646-9200
Datapower, Inc., 3328 West First St., Santa Ana, CA 92703 714-775-2000
Del Elctrns. Corp., 250 E. Sandford Blvd., Mt. Vernon, NY 10550 914-699-2000
† Electronic Dev. Corp., 11 Hamlin St., Boston, MA 02127-4198 617-268-9696
Elgar Corp, An Onan McGraw Edison Co., 9250 Brown Deer Rd., San Diego, CA 92121 619-450-0085
Green Engineering, 78 Stone Place, Melrose, MA 02176 617-665-8994
§† Harris Corp., PRD Elctrns. Div., 6801 Jericho Tpke., Syosset, NY 11791 516-364-0400
Micro Instr., 2250 Micro Pl., Escondido, CA 92025 619-746-2010
§ NES, Inc. (Nationwide Electronic Systems), 3003 Wakefield, Carpentersville, IL 60110 312-426-5900
Optimized Devices, Inc., 220 Marble Ave., Pleasantville, NY 10570 914-769-6100
† Pacific Electro Dynamics, Inc., 11465 Willows Rd. N.E., Redmond, WA 98052 206-881-1700
§ Pass & Seymour, Inc., P.O. Box 4822, Syracuse, NY 13221 315-468-6211
RTE, Power/Mate Co., 514 S. River St., Hackensack, NJ 07601 201-440-3100
Schaffner EMC, Inc., Instr. Div., 825 Lehigh Avenue, Union, NJ 07083 201-851-0644
Standard Power, Inc., 1400 S. Village Way, Santa Ana, CA 92705 714-558-8512
Universal Voltronics, 27 Radio Circle Dr., Mt. Kisco, NY 10549 914-241-1300
Venable Industries, Inc., 3555 Lomita Blvd., Torrance, CA 90505 213-539-2522

Testers, Pulse Jitter-2900

Comstron Corp., 200 E. Sunrise Hwy., Freeport, NY 11520, 516-546-9700 .... D•1205
Brian Instruments, Inc., 626 S. State College Blvd., Fullerton, CA 92631 714-992-5540
† Telecommunications Techniques Corp., 444 N. Frederick Ave., Gaithersburg, MD 20877 301-258-5011

Testers, Relay-2900

Information Transfer Indl., Box 357, Holcomb, NY 14469, 716-657-7074 .... D•1248-1249
† Anchor Specialty Mfg. Inc., 300 Hollister Rd., Teterboro, NJ 07608 201-288-1939
† Babcock, Inc., 1717 West Collins Ave., Orange, CA 92667 714-633-3700
Biddle Instruments, A Thorn EMI Co., 510 Township Line Rd., Blue Bell, PA 19422 215-646-9200
Clarke-Hess Comm. Resch. Corp., 17 West 17th St., New York, NY 10011 212-255-2940
Coto Corporation, 55 DuPont Drive, Providence, RI 02907 401-943-2686
§ Jonard Industries Corp., 134 Marbledale Rd., Tuckahoe, NY 10707 914-793-0700
† Markenrich Corp., 14946-A Shoemaker Ave., Santa Fe Springs, CA 90670 213-921-0250
Multi-Amp Corp., TBG, 4271 Bronze Way, Dallas, TX 75237 214-333-3201
NOBEX Div., Griffith Plastics Corp., 1027 California Dr., Box 4365, Burlingame, CA 94010 415-342-8170
Optimized Devices, Inc., 220 Marble Ave., Pleasantville, NY 10570 914-769-6100
Schaffner EMC, Inc., Instr. Div., 825 Lehigh Avenue, Union, NJ 07083 201-851-0644
Sigma Instrs., 170 Pearl St., Braintree, MA 02184 617-843-5000
Solatron Enterprises, 421 E. Beach Ave., Inglewood, CA 90302 213-678-4981
Struthers-Dunn, Inc., Lamb's Rd., Pitman, NJ 08071 609-589-7500
Testronics, 1810-102 N. Glenville Dr., Richardson, TX 75081 214-238-8378
§ Tidewater Technological, Inc., 611 Industrial Pk. Dr., Newport News, VA 23602 804-874-2800
§ Tucker Elctrns., Box 461966, Garland, TX 75046 .... 214-348-8800;800-527-4642
Wilmar Elctrns., Inc., 2430 Amsler St., Torrance, CA 90505 213-326-6668

Testers, Resistivity-2900

Chatsworth Data Corp, Cablemaster Div., 20710 Lassen St., Chatsworth, CA 91311, 818-341-9200 .... D•1199
§ Alessi Inds., Inc., 3195-C Airport Loop Dr., Costa Mesa, CA 92626 714-979-8912
Andeen-Hagerling, Inc., 31899 Miles Road, Chagrin Falls, OH 44022 216-349-0370
§ Associated Research, Inc., 8221 N. Kimball Ave., Skokie, IL 60076 312-647-7850
Automated Production Concepts, 8 E. Garden Pl., Pompton Plains, NJ 07444 201-831-8300
† Automation Dynamics, 77 Brookside Pl., Hillsdale, NJ 07642 201-666-2458
Blanck, A. R., Co., Box 249, Rutherford, NJ 07070 201-933-2091
Bluffton Products, Inc., Tegam, Inc., 7230 North Ridge Road, Madison, OH 44057 216-946-3572
Chatsworth Data Corp, Impact-o-Graph Div., 20710 Lassen St., Chatsworth, CA 91311 213-341-3000
† Custom Sci. Instrs., 13 Wing Dr., Cedar Knolls, NJ 07927 201-538-8500
Electro Scientific Inds., 13900 N.W. Science Pk. Dr., Portland, OR 97229 503-641-4141
Electrostatic Consltg. Assocs., 556 Lowell Rd., Groton, MA 01450 617-448-5485
† Electro-Tech Sys., Inc., 115 E. Glenside Ave., Glenside, PA 19038 215-887-2196

Everett/Charles Test Equip. Inc., 2887 N. Towne Ave., Pomona, CA 91767 714-621-9511
Hipotronics, P.O. Drawer A, Brewster, NY 10509 914-279-8091
Julie Resch. Labs., 211 West 61st St., New York, NY 10023 212-245-2727
§† Kenco Industries, Inc., Elctrn. Chemicals Div., P.O. Box 88500, Atlanta, GA 30338 404-475-6100
Lehighton Elctrns., Inc., Box 328, Dept M, Lehighton, PA 18235 .... 717-386-4156; 215-377-5990
Penn Airborne Prods., Industrial Hwy., Southampton, PA 18966 215-355-3400
Rutherford Resch. Prods., Box 249, Rutherford, NJ 07070 201-933-2091
† Space Electronics, Inc., Box 2166, Meriden, CT 06450 203-235-7755
Transmet Corp., 4290 Perimeter Dr., Columbus, OH 43228 .... 614-276-5522; 800-245-5253
Valhalla Scientific, 9955 Mesa Rim Rd., San Diego, CA 92126 619-457-5576
Veeco Instruments Inc., Terminal Dr., Plainview, NY 11803 516-349-8300
Voyager Technologies, Inc., 2250 Cabot Blvd. W. Bldg. 40M, Langhorne, PA 19047 215-750-0270
Yokogawa Corp. of America, 2 Dart Rd., Shenandoah, GA 30265 404-253-7000

Testers, Resistor-2900

IET Labs, Inc., 534 Main St., Westbury, NY 11590, 516-334-5959 .... D•1242
Julie Resch. Labs., 211 West 61st St., New York, NY 10023, 212-245-2727 .... D•1255
Shalltronix Corp., Preston St., P.O. Box 235, Selma, NC 27576, 919-965-6346 .... D•1307
§ Alpha Comps., 115 Eucalyptus Dr., El Segundo, CA 90245 213-322-7780
† Anchor Specialty Mfg. Inc., 300 Hollister Rd., Teterboro, NJ 07608 201-288-1939
Automated Production Concepts, 8 E. Garden Pl., Pompton Plains, NJ 07444 201-831-8300
§ BBC-Metrawatt/Goerz, 2150 W. 6th Ave., Broomfield, CO 80020 .... 303-469-5231; 800-821-6327
Biddle Instruments, A Thorn EMI Co., 510 Township Line Rd., Blue Bell, PA 19422 215-646-9200
§ EDL, Inc., 385 Oser Ave., Hauppauge, NY 11788 .... 516-435-2808;1-800-DIAL EDL
Electro Scientific Inds., 13900 N.W. Science Pk. Dr., Portland, OR 97229 503-641-4141
Industrial Test Equip., 21 Yennicock Ave., Port Washington, NY 11050 516-883-1700
Meissner Inds., 551 Rte. 10, Dover, NJ 07801 201-366-1700
Micro Technical Inds., Micro-Ohm Corp., 23666 Birtcher Dr., # B, Lake Forest, CA 92630 714-855-4326
§ NES, Inc. (Nationwide Electronic Systems), 3003 Wakefield, Carpentersville, IL 60110 312-426-5900
Optimized Devices, Inc., 220 Marble Ave., Pleasantville, NY 10570 914-769-6100
Penn Airborne Prods., Industrial Hwy., Southampton, PA 18966 215-355-3400
RE Instruments Corp., 31029 Center Ridge Rd., Westlake, OH 44145 216-871-7617
Slaughter Co., Moore & Hailey Sts., P.O. Box 1805, Ardmore, OK 73402 405-223-4773
† Space Electronics, Inc., Box 2166, Meriden, CT 06450 203-235-7755
Tektronix, Inc., P. O. Box 500, Y3-314, Beaverton, OR 97077 .... 800-547-1512;Oregon only 800-452-1877
Valhalla Scientific, 9955 Mesa Rim Rd., San Diego, CA 92126 619-457-5576

Testers, Servo — See Analyzers, Servo (Vol. D)

Testers, Shock-2550

† Blue M, A Unit of General Signal, 138th & Chatham Sts., Blue Island, IL 60406, 312-385-9000 .... D•1165
Chatsworth Data Corp, Cablemaster Div., 20710 Lassen St., Chatsworth, CA 91311, 818-341-9200 .... D•1199
Jan Hardware Mfg. Co., 47-27 36th St., Long Island City, NY 11101, 212-361-0800 .... C•1597
Chatsworth Data Corp, Impact-o-Graph Div., 20710 Lassen St., Chatsworth, CA 91311 213-341-3000
§ CVC Prods., 525 Lee Rd., Rochester, NY 14603 716-458-2550
§ Endevco, 30700 Rancho Viejo Rd., San Juan Capistrano, CA 92675 714-493-8181
Instron Corp., 100 Royall St., Canton, MA 02021 617-828-2500
Media Recovery Inc., Box 1407, Graham, TX 76046 .... 800-527-9497;214-630-9625 (Texas)
MTS Sys., Box 24012, Minneapolis, MN 55424 612-937-4000
Slaughter Co., Moore & Hailey Sts., P.O. Box 1805, Ardmore, OK 73402 405-223-4773

Testers, Short Turn — See Testers, Coil (Vol. D)

Testers, Signal Tracing-2900

Chatsworth Data Corp, Cablemaster Div., 20710 Lassen St., Chatsworth, CA 91311, 818-341-9200 .... D•1199
Information Transfer Indl., Box 357, Holcomb, NY 14469, 716-657-7074 .... D•1249
Applied Sys., 26401 Harper Ave., St. Clair Shores, MI 48081 313-779-8700
Augat/ES•P. Inc., /Augat, Inc., 12832 Chadron Ave., Hawthorne, CA 90250 213-973-0262
† Automation Dynamics, 77 Brookside Pl., Hillsdale, NJ 07642 201-666-2458
§ B & K Precision, Industrial Electronics Product Group, Dynascan Corporation, 6460 W. Cortland, Chicago, IL 60635 312-889-9087
Biddle Instruments, A Thorn EMI Co., 510 Township Line Rd., Blue Bell, PA 19422 215-646-9200
Chatsworth Data Corp, Impact-o-Graph Div., 20710 Lassen St., Chatsworth, CA 91311 213-341-3000
Easco/K-D Tools, 3575 Hempland Rd., Lancaster, PA 17604 717-665-4557
Everett/Charles Test Equip. Inc., 2887 N. Towne Ave., Pomona, CA 91767 714-621-9511
Fluke, John, Mfg. Co., Box C9090, MS 250C, Everett, WA 98206 206-356-5400
§ Holub Industries, 1701 W. Bethany Rd., Sycamore, IL 60178 815-895-6501
§† Hughes Aircraft Co., 6155 El Camino Real, Carlsbad, CA 92008 619-931-3000
Information Technolgoy A.D.S.C., P.O. Box 470, College Park, MD 20740 301-779-5110
Kurz-Kasch, Knob Div., 711 Hunter Dr., Wilmington, OH 45177 513-382-0966
Mac Panel Co., Box 5027, 216 Pine St., High Point, NC 27262 919-884-8111
Methode Elctrns., Inc., 7444 W. Wilson Ave., Chicago, IL 60656 312-867-9600
Nicolet Instr. Corp., Oscilloscope Div., 5225 Verona Rd., Madison, WI 53711 608-271-3333
§ Non-Linear Systems/Div. of Kaypro Corp., 533 Stevens Ave., Solana Bch., CA 92075 619-481-3900
§ Paragon Elect., 606 Parkway Blvd., Two Rivers, WI 54241 414-793-1161
§† Projects Unltd., 3680 Wyse Rd., Dayton, OH 45414 513-890-1918
§ PTS Electronics Inc., Box 272, Bloomington, IN 47401 812-824-9331
§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 215-673-5600
§ Techni-Tool, 5 Apollo Rd., Box 368, Plymouth Meeting, PA 19462 215-825-4990
Tektronix, Inc., P. O. Box 500, Y3-314, Beaverton, OR 97077 .... 800-547-1512;Oregon only 800-452-1877
Telco Products Co., 44 Sea Cliff, Glen Cove, NY 11542 516-759-0300
Teradyne, Inc., 183 Essex St., Boston, MA 02111 617-482-2700
§ Vidaire Electronics Mfg. Corp., P. O. Box 788, Freeport, NY 11520 516-623-6696
† Virginia Panel, 1400 New Hope Rd., Waynesboro, VA 22980 703-949-8376
§† Workman Elctrn. Prods., Box 3828, Sarasota, FL 33578 813-371-4242

Testers, Solderability-4100

Hexacon Elec., 161 W. Clay Ave., Roselle Park, NJ 07204, 201-245-6200 .... C•1739
Hollis Engrg., Inc., Charron Ave., Box 1189, Nashua, NH 03061 603-889-1121

Testers, Synchro/Resolver-2900

Astrosystems, 6 Nevada Dr., Lake Success, NY 11042, 516-328-1600 .... D•1183
† North Atlantic Inds., Instrument Div., 60 Plant Ave., Hauppauge, NY 11788, 516-582-6500 .... D•1283
† Bendix Corp., Test Systems Div., Teterboro, NJ 07608 201-288-2000
Colorado Data Systems, Inc., 3301 W. Hampden Ave., Unit C, Englewood, CO 80110 303-762-1640
† Computer Conversions Corp., 6 Dunton Ct., E. Northport, NY 11731 516-261-3300
† Control Technology Co., 41-16 29th St., Long Island City, NY 11101 718-361-2133
† ILC Data Device Corp., 105 Wilbur Pl., Bohemia, NY 11716 516-567-5600
† Industrial Control Co., 3100 Pineda Ave., Rockledge, FL 32955 305-259-7105
† Natel Engrg. Co., Inc., 4550 Runway St., Simi Valley, CA 93063 805-581-3950
Northern Precision Labs., 11 Madison Rd., Fairfield, NJ 07006 201-227-4800

Testers, Thickness (all types)-2900

Alessi Inds., Inc., 3195-C Airport Loop Dr., Costa Mesa, CA 92626 714-979-8912
§ Biddle Instruments, A Thorn EMI Co., 510 Township Line Rd., Blue Bell, PA 19422 215-646-9200
† Custom Sci. Instrs., 13 Wing Dr., Cedar Knolls, NJ 07927 201-538-8500
† Electron-Machine Corp., Box M, Umatilla, FL 32784 904-669-3101
§ Hacker Instrs., Box 657, Fairfield, NJ 07007 201-226-8450
§ Hunter Tools, 6721 Baymeadow Dr., Glen Burnie, MD 21061 301-760-2200
Lehighton Elctrns., Inc., Box 328, Dept M, Lehighton, PA 18235 .... 717-386-4156; 215-377-5990
§ Lion Precision, 60 Bridge St., Newton, MA 02195 617-969-4710
§ Mechanical Techn., 968 Albany Shaker Rd., Latham, NY 12110 518-785-2353
Nuclear Resch. Corp., 125 Titus Ave., Warrington, PA 18976 215-343-5900
Panametrics, 221 Cresent St., Waltham, MA 02254 617-899-2740
Schaevitz Engrg., U.S. 130, Union Ave., Pennsauken, NJ 08110 609-662-8000
§ Sloan Technology, 602 E. Montecito St., Santa Barbara, CA 93103 805-963-4431
† Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 215-673-5600
§ Techni-Tool, 5 Apollo Rd., Box 368, Plymouth Meeting, PA 19462 215-825-4990
§ Carl Zeiss, Inc., One Zeiss Drive, Thornwood, NY 10594 914-681-7670

Testers, Thyristor-2900

Bermar Corp., P.O. Box 12844, Research Triangle Park, NC 27709 919-489-4316
Markenrich Corp., 14946-A Shoemaker Ave., Santa Fe Springs, CA 90670 213-921-0250
Micro Instr., 2250 Micro Pl., Escondido, CA 92025 619-746-2010
Teradyne, Inc., 183 Essex St., Boston, MA 02111 617-482-2700
Testronics, 1810-102 N. Glenville Dr., Richardson, TX 75081 214-238-8378

Testers, Tracking & Erosion Resistance (Insulation)-2900

§ Biddle Instruments, A Thorn EMI Co., 510 Township Line Rd., Blue Bell, PA 19422 215-646-9200
§ Guildline Instrs., 4403 Vineland Rd, Suite B-10, Orlando, FL 32811-9998 305-423-8215
Hipotronics, P.O. Drawer A, Brewster, NY 10509 914-279-8091

Testers, Transistor-2900

§ North American Soar Corp., 11126 Cornell Ave., Cherry Hill, NJ 08002, 609-488-1060 .... D•1280
§ Triplett Corp.-A Penril Co., One Triplett Dr., Bluffton, OH 45817-9987, 419-358-5015 .... D•1320
American Electronic Labs., Box 552, Lansdale, PA 19446 215-822-2929
§ B & K Precision, Industrial Electronics Product Group, Dynascan Corporation, 6460 W. Cortland, Chicago, IL 60635 312-889-9087
Beckman Instrs., 2500 Harbor Blvd., Fullerton, CA 92634 714-871-4848
Bluffton Products, Inc., Tegam, Inc., 7230 North Ridge Road, Madison, OH 44057 216-946-3572
Dantronics, Inc., 3175 Hafner Ct., St. Paul, MN 55112 612-484-2108
§ Delta Elctrns., 145 Fayette St., Winston-Salem, NC 27101 919-725-4122
Eaton Corp., Test Sys. Div., Discrete Test, Precision Rd., Danbury, CT 06810 203-797-1281
EG&G Wakefield Engrg., 60 Audubon Rd., Wakefield, MA 01880 617-245-5900
Eitel Mfg., 2835 Laguna Canyon Rd., Laguna Beach, CA 92652 714-494-2012
§† Factron/Schlumberger, Titusville, 1400 White Dr., Titusville, FL 32780 305-267-7212
§ Hickok Elec. Instr., 10514 DuPont Ave., Cleveland, OH 44108 216-541-8060
§ Leader Instrs. Corp., 380 Oser Ave., Hauppauge, NY 11788-3694 516-231-6900
§ Lectrotech, Inc., 5810 N. Western Ave., Chicago, IL 60659 312-769-6262
Micro Instr., 2250 Micro Pl., Escondido, CA 92025 619-746-2010

Micro Technical Inds., Micro-Ohm Corp., 23666 Birtcher Dr., # B, Lake Forest, CA 92630 714-855-4326
Optimized Devices, Inc., 220 Marble Ave., Pleasantville, NY 10570 914-769-6100
Sencore, 3200 Sencore Dr., Sioux Falls, SD 57107 605-339-0100
§ SPECO Div., Components Specialties, Inc., P.O. Box 624, 1172 Rte. 109, Lindenhurst, NY 11757 .... 516-957-8700;800-645-5516
§ Techni-Tool, 5 Apollo Rd., Box 368, Plymouth Meeting, PA 19462 215-825-4990
Tecron Industrial Prods., Crown Intl, Inc., 1718 W. Mishawaka Rd., Elkhart, IN 46517 219-294-8300
Tektronix, Inc., P. O. Box 500, Y3-314, Beaverton, OR 97077 .... 800-547-1512;Oregon only 800-452-1877
Telco Products Co., 44 Sea Cliff, Glen Cove, NY 11542 516-759-0300
Teradyne, Inc., 183 Essex St., Boston, MA 02111 617-482-2700
Testronics, 1810-102 N. Glenville Dr., Richardson, TX 75081 214-238-8378
† Trio-Tech Intl., 2040 N. Lincoln St., Burbank, CA 91504 818-846-9200
§† Workman Elctrn. Prods., Box 3828, Sarasota, FL 33578 813-371-4242

Testers, Transmission & Delay-2900

Comstron Corp., 200 E. Sunrise Hwy., Freeport, NY 11520, 516-546-9700 .... D•1205
Amber Electro Design Inc., 4810 Jean Talon Blvd. W Ste 321, Montreal, Quebec, CANADA H4P2N5 514-735-4105
Atlantic Research, 5390 Cherokee Ave., Alexandria, VA 22312 703-642-4000
CDS - Colorado Data Sys., 3301 W. Hampden, Unit C, Englewood, CO 80110 303-762-1640
Com/Tech Systems, 505 Eighth Ave., New York, NY 10018 212-594-5377
Convex Corp., P.O. Box 17225, Dulles Intl. Airport, Washington, DC 20041 703-661-8900
§† Data-Control Sys., Commerce Dr., Box 860, Danbury, CT 06810 203-743-9241
Decom Sys., 340 Rancheros Dr., San Marcos, CA 92069 619-744-1002
§ Digital Transmission Techniques, Inc., P.O. Box 1847, Wayne, NJ 07470 201-831-1615
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
§† International Data Sciences, 7 Wellington Rd., Lincoln, RI 02865 401-333-6200
MARCONI INSTRUMENTS, 3 Pearl Court, Allendale, NJ 07401 201-934-9050
Phoenix Microsystems, P.O. Box 4206, Huntsville, AL 35802 205-881-2173
Power Sys. Grp., Rantec Div., Emerson Elec., 9401 Oso Ave., Chatsworth, CA 91311 818-885-8223
Spectron Corp., 344 New Albany Rd., Moorestown, NJ 08057 609-234-5700
§ Tau-Tron, Inc., A Unit of General Signal, 10 Lyberty Way, Westford, MA 01886 617-692-5100
† Telecommunications Techniques Corp., 444 N. Frederick Ave., Gaithersburg, MD 20877 301-258-5011

Testers, Tube-2900

§ B & K Precision, Industrial Electronics Product Group, Dynascan Corporation, 6460 W. Cortland, Chicago, IL 60635 312-889-9087
§ Hickok Elec. Instr., 10514 DuPont Ave., Cleveland, OH 44108 216-541-8060
RIL Elctrns., Inc., 125 Titus Ave., P.O. Box H, Warrington, PA 18976 .... 215-EL5-1361
Sencore, 3200 Sencore Dr., Sioux Falls, SD 57107 605-339-0100
§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 215-673-5600
§ VIZ Test Equipment, Div. VIZ Mfg., 335 E. Price St., Philadelphia, PA 19144 215-844-2626

Testers, Vibration-Also See Services, Environmental Test-2900

Chatsworth Data Corp, Cablemaster Div., 20710 Lassen St., Chatsworth, CA 91311, 818-341-9200 .... D•1199
§ Vibra-Metrics, 1014 Sherman Ave., Hamden, CT 06514, 203-288-6158;1-800-352-2001 .... B•1832
Acoustic Power Sys., 2151 Las Palmas Dr., Ste. G, Carlsbad, CA 92008 619-438-4848
Alpha-M Corp., 3009 Wildflower Dr., Dallas, TX 75229 214-620-0021
Bently Nevada Corp., P.O. Box 157, Minden, NV 89423 702-782-3611
Bluffton Products, Inc., Tegam, Inc., 7230 North Ridge Road, Madison, OH 44057 216-946-3572
Bruel & Kjaer Instrs. Inc., 185 Forest St., Marlboro, MA 01752 617-481-7000
Chatsworth Data Corp, Impact-o-Graph Div., 20710 Lassen St., Chatsworth, CA 91311 213-341-3000
CML MACARR Div., Marine Electric RPD, Inc., 666 Pacific St., Brooklyn, NY 11217 718-857-2400
† Columbia Resch. Labs., Macdade Blvd. & Bullens La., Woodlyn, PA 19094 215-532-9464
Contraves Goerz Corp., 610 Epsilon Dr., Pittsburgh, PA 15238 412-967-7700
Cyber Sys., Inc., 2031 E. Cerritos Ave., Anaheim, CA 92806 714-722-2051
Endevco, 30700 Rancho Viejo Rd., San Juan Capistrano, CA 92675 714-493-8181
§ Epic, Inc., 150 Nassau St., New York, NY 10038 212-349-2470
GenRad, Inc., 300 Baker Ave., Concord, MA 01742 617-369-4400
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
Instron Corp., 100 Royall St., Canton, MA 02021 617-828-2500
Jan Hardware Mfg. Co., 47-27 36th St., Long Island City, NY 11101 212-361-0800
§† Mechanical Techn., 968 Albany Shaker Rd., Latham, NY 12110 518-785-2353
MTS Sys., Box 24012, Minneapolis, MN 55424 612-937-4000
Nicolet Instr. Corp., Oscilloscope Div., 5225 Verona Rd., Madison, WI 53711 608-271-3333
Scientific-Atlanta, Inc., P.O. Box 105600, Atlanta, GA 30348 404-441-4000
Spectral Dynamics Div., Scientific-Atlanta, Box 671, San Diego, CA 92112 619-268-7100
Unholtz-Dickie Corp., 6 Brookside Dr., Wallingford, CT 06492 203-265-3929
Wilcoxon Resch., P.O. Box 5798, Bethesda, MD 20814 301-770-3790

Testers, Voltage-2900

† Jennings, 970 McLaughlin Ave., San Jose, CA 95122, 408-292-4025 .... D•1251
§ AEMC, 99 Chauncy, Boston, MA 02111 .... 617-451-0227;800-343-1391
American HV Test Systems Inc., Central Garrett Ind'l. Pk., Accident, MD 21520 301-826-8651
† Amprobe Instr., 630 Merrick Rd., Lynbrook, NY 11563 .... 516-LY3-5600
Applied Sys., 26401 Harper Ave., St. Clair Shores, MI 48081 313-779-8700
§ Associated Research, Inc., 8221 N. Kimball Ave., Skokie, IL 60076 312-647-7850
§ B & K Precision, Industrial Electronics Product Group, Dynascan Corporation, 6460 W. Cortland, Chicago, IL 60635 312-889-9087
§ BBC-Metrawatt/Goerz, 2150 W. 6th Ave., Broomfield, CO 80020 .... 303-469-5231; 800-821-6327
Biddle Instruments, A Thorn EMI Co., 510 Township Line Rd., Blue Bell, PA 19422 215-646-9200
Bluffton Products, Inc., Tegam, Inc., 7230 North Ridge Road, Madison, OH 44057 216-946-3572
§† Calibron Instrs., Burton-Rogers Co., 220 Grove St., Waltham, MA 02154 617-894-6440
† California Instruments, A Div. of Amstar Tech. Prods. Co., Inc., 5150-Convoy St., San Diego, CA 92111 .... 619-279-8620;800-356-2244;800-821-1634
§† Data Precision Corp., Electronics Ave., Danvers, MA 01923 617-246-1600
§ EDL, Inc., 385 Oser Ave., Hauppauge, NY 11788 .... 516-435-2808;1-800-DIAL EDL
§ EMICO Inc., Box 368, Dublin, PA 18917 215-249-9330
§ Fluke, John, Mfg. Co., Box C9090, MS 250C, Everett, WA 98206 206-356-5400
Hipotronics, P.O. Drawer A, Brewster, NY 10509 914-279-8091
§ Holub Industries, 1701 W. Bethany Rd., Sycamore, IL 60178 815-895-6501
§ Ideal Industries, 4450 Becker Pl., Sycamore, IL 60178 815-895-5181
Julie Resch. Labs., 211 West 61st St., New York, NY 10023 212-245-2727
KeyTek Instr. Corp., 12 Cambridge St., Burlington, MA 01803 617-272-5170
Lark Electronics, Inc., Box 390, New York, NY 10040 212-569-0430
Leeds & Northrup Instrs., A Unit of General Signal Corp., Sumneytown Pike, North Wales, PA 19454 215-643-2000
Micro Instr., 2250 Micro Pl., Escondido, CA 92025 619-746-2010
§ NES, Inc. (Nationwide Electronic Systems), 3003 Wakefield, Carpentersville, IL 60110 312-426-5900
§ Pacer Industries, Inc., 1450 First Ave., Chippewa Falls, WI 54729 715-723-1141
Ross Engrg. Corp., 540 Westchester Dr., Campbell, CA 95008 408-377-4621
Schaffner EMC, Inc., Instr. Div., 825 Lehigh Avenue, Union, NJ 07083 201-851-0644
§ Simpson Elec. Co., 853 Dundee Ave., Elgin, IL 60120 312-697-2260
§ SPECO Div., Components Specialties, Inc., P.O. Box 624, 1172 Rte. 109, Lindenhurst, NY 11757 .... 516-957-8700;800-645-5516
§ Square D Co., Executive Plaza, Palatine, IL 60067 312-397-2600
§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 215-673-5600
Teradyne, Inc., 183 Essex St., Boston, MA 02111 617-482-2700
TIF Instrs., Inc., 9101 N.W. 7th Ave., Miami, FL 33150 305-757-8811
Torotron Corp., 519 South Fifth Ave., Mt. Vernon, NY 10550 914-664-2050
§ Triplett Corp.-A Penril Co., One Triplett Dr., Bluffton, OH 45817-9987 419-358-5015
§ Vaco Prods., 1510 Skokie Blvd., Northbrook, IL 60062 312-564-3300
§ Western Electro. Mech. Co. Inc., 300 Broadway, Oakland, CA 94607 415-452-1936
Yokogawa Corp. of America, 2 Dart Rd., Shenandoah, GA 30265 404-253-7000

Testers, Voltage Breakdown-2900

† Hipotronics, P.O. Drawer A, Brewster, NY 10509, 914-279-8091 .... D•1238-1240
† Jennings, 970 McLaughlin Ave., San Jose, CA 95122, 408-292-4025 .... D•1251
§ ROD-L Electronics, Inc., 1098 Hamilton Ct., Menlo Park, CA 94025, 415-322-0711 .... D•1296-1298,1300-1301
§ Slaughter Co., Moore & Hailey Sts., P.O. Box 1805, Ardmore, OK 73402, 405-223-4773 .... D•1309
† Torotron Corp., 519 South Fifth Ave., Mt. Vernon, NY 10550, 914-664-2050 .... D•1315
§ Aerotronic Assocs., Inc., Riverside Dr., Contoocook, NH 03229 603-746-4631
American HV Test Systems Inc., Central Garrett Ind'l. Pk., Accident, MD 21520 301-826-8651
§ Associated Research, Inc., 8221 N. Kimball Ave., Skokie, IL 60076 312-647-7850
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Thermonics, 3350 Scott Blvd., Bldg. 32, Santa Clara, CA 95054 408-496-6838

Testing, Environmental – See Services, Environmental Testing (Vol. D)

Thermal Converters – See Converters, Thermal (Vol. B)

Thermal Platforms-2900
Sigma Systems Corp., 3163 Adams Ave., San Diego, CA 92116, 619-283-3193 .... D•1172
Hughes Aircraft Co., Electron Dynamics Div., 3100 W. Lomita Blvd., P.O. Box 2999, Torrance, CA 90509-2999 213-517-6000
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Thermistors-5300 – *See Vol. B*

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Thermocouple Interfaces for Personal Computers-2000
† Acromag, 30765 Wixom Rd., Wixom, MI 48096 313-624-1541
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Strawberry Tree Computers, 949 Cascade Dr., Sunnyvale, CA 94087 408-736-3083
Thermo Electric, 109 Fifth St., Saddle Brook, NJ 07662 201-843-5800

Thermocouples, Elements & Accessories-5300 – *See Vol. B*

Thermoelectric, Modules – See Cooling/Heating Modules, Thermolectric (Vol. B)

Thermographs-2900
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Thermometers, Electronic (All Types) – See Meters, Temperature (Vol. D)

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Fenwal Elctrns., 63 Fountain St., Framingham, MA 01701, 617-872-8841 .... B•1751
General Resistance, Inc., A Prime Technology Company, Twin Lakes Rd., P.O. Box 185, N. Branford, CT 06471, 203-481-5721 .... D•1233
Keystone Carbon, Thermistor Div., St. Marys, PA 15857, 814-781-1591 .... B•1753-1755
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§ Atkins Tech., 3321 S.W. 40th Blvd., Gainesville, FL 32608 904-378-5555
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Thermostats-Also See Switches, Thermally Actuated; Controls, Temperature-5300 – *See Vol. B*

Thermowells-5300 – *See Vol. B*

Thin-Film Memory Systems, Planar – See Memory Systems (Vol. D)

Thyristors (Incl. Silicon Controlled Rectifiers) - Also see DIACs; TRIACs, SIDACs-4800 – *See Vol. A*

Thyristors (MIL)-2440 – *See Vol. B*

Ties, Wire & Cable – See Wire & Cable Ties (Vol. C)

Time Delays, Precision-2900
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§† **Leach Corp., Control Prods. Div., 6900 Orangethorpe Ave., Buena Pk., CA 90620, 714-739-0770 .... B•1428-1429**
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Timer/Counters – See Counter/Timers

Timers, Counting-2200

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§ Chrono-log Corp., 2 W. Park Rd., Havertown, PA 19083, 215-853-1130 .. D•1061
§ Crouzet Controls, Inc., 1083 State Pkwy., Schaumburg, IL 60195, 312-843-2200 .... B•1315
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DCI Inc., 14812 W. 117th Street, P.O. Box 215, Olathe, KS 66061, 913-782-5672 .... D•1347
Dio-Rey, Div. of Info-Lite, 422 Cliff St., Fairview, NJ 07022, 201-941-4455 .... B•1044-1045
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Struthers-Dunn, Inc., Lamb's Rd., Pitman, NJ 08071 609-589-7500
§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 215-673-5600
§† Syracuse Elctrns., P.O. Box 4770, Syracuse, NY 13221 315-488-4911
§† Systron-Donner Instr. Div., 2727 Systron Dr., Concord, CA 94518 415-676-5000
Techniques, Inc., 235 Jackson St., Englewood, NJ 07631 201-569-5900
§ Techno Vation, Inc., 14 Crandall Ave., Pompton Lakes, NJ 07442 201-839-0740
Tempo Instrument, Inc., 87 Modular Ave., Commack, NY 11725 516-864-3700
§ Tennelec, 601 Turnpike, Oak Ridge, TN 37830 615-483-8405
§ Tenor, 17020 W. Rogers Dr., New Berlin, WI 53151 414-782-3800
Timeco, Inc., 1035 - 26th St., P.O. Box 8036, Huntington, WV 25705 304-523-5149
Tri-Tronics Co. Inc., 13420 Wright Cir., Tampa, FL 33624 813-855-4453
Vanguard Relay Corp., 225 Cortland St., Lindenhurst, NY 11757 516-226-5000
Wilmar Elctrns., Inc., 2430 Amsler St., Torrance, CA 90505 213-326-6668
§† Workman Elctrn. Prods., Box 3828, Sarasota, FL 33578 813-371-4242
Xanadu Controls, Electroid Corp., 45 Fadem Rd., Springfield, NJ 07081-3189 201-467-8100
§ Zenith Controls, 830 West 40th St., Chicago, IL 60609 312-247-6400

Timers, Delay-2200

§ Crouzet Controls, Inc., 1083 State Pkwy., Schaumburg, IL 60195, 312-843-2200 .... B•1315-1316
Data Delay Devices, 385 Lakeview Ave., Clifton, NJ 07011, 201-772-1106 .... A•1489
§ Diversified Elctrns., Inc., Indl. Controls Div., 119 N. Morton Ave., Evansville, IN 47711, 812-426-2806 .... B•1322

§ IDEC Systems & Controls Corp., 1213 Elko Drive, Sunnyvale, CA 94089-2211, 408-747-0550 .... B•1412
† Logitek, Inc., 101 Christopher St., Ronkonkoma, NY 11779, 516-467-4200 .... B•1437
PPM, Inc., 4521 Emery Ind. Pkwy., Cleveland, OH 44128, 216-292-6006 .. D•1291
† Abrams Instr. Corp., P.O. Box 26007, Lansing, MI 48909 517-332-6405
AES Corp., 285 Newbury St., P.O. Box 2093, Peabody, MA 01960 617-535-7310
§ Air-O-Tronics Prods., Box K, Morrisville, NY 13408 315-684-3705
† Alarm Controls, 19 Brandywine Dr., Deer Park, NY 11729 516-586-4220
Allen-Bradley Co., Industrial Control Div., 1201 S. Second St., Milwaukee, WI 53201 414-671-2000
§ Amerace Corporation, Newburgh Rd., Hackettstown, NJ 07840 201-852-1122
§ American Control Products, Div. of Precision Timer Co., Inc., 13 Westbrook Ind'l. Pk., Westbrook, CT 06498 203-399-6253
§† Amperite Co., Inc., 600 Palisade Ave., Union City, NJ 07087 201-864-9503
† Applied Electro Technlg., Int., STI Company, 2220 So. Anne St., Santa Ana, CA 92704 714-556-6570
† Argent Elctrns., 3245 S. County Rd., 25A, Troy, OH 45373 513-335-0031
§ Artisan Elctrns., 5 Eastmans Rd., Parsippany, NJ 07054 201-887-7100
Automatic Timing & Controls Co., 201 So. Gulph Rd., King of Prussia, PA 19406 .... 215-337-5500;800-441-8245
§ Bristol Saybrook, 97 Coulter St., Old Saybrook, CT 06475 203-388-3414
CAL Controls Inc., 1155 Waukegan Rd., Glenview, IL 60025 312-998-5720
Cardinal Control Co., 110 Kensington Rd., Kensington, CT 06037 203-828-6379
Cramer Co., Mill Rock Rd., Old Saybrook, CT 06475 203-388-3574
§ C-Tek Inc., 4 Railroad Ave., Wakefield, MA 01880 617-246-1720
Dataprofits Corp., 2260 Distributors Dr., Indianapolis, IN 46241
Deltrol Controls, 2745 S. 19th St., Milwaukee, WI 53215 414-671-6800
EH Electronics, Inc., Sub. EH Intl., Inc., 48507 Milmont Drive, Fremont, CA 94538 415-651-2340
§ Electromatic Controls Corp., 2495 Pembroke Road, Hoffman Estates, IL 60195-2010 312-882-5757
Electronic Prods. Corp., Interstate Indl. Plaza, R. D. #5, York, PA 17402 717-767-6517
§ Fluke, John, Mfg. Co., Box C9090, MS 250C, Everett, WA 98206 206-356-5400
Fork Standards, Inc., 666 Western Ave., Lombard, IL 60148 312-932-9380
§† Furnas Elec., 1197 McKee St., Batavia, IL 60510 312-879-6000
§† Hi-G Company, A Subsidiary of Nytronics Inc., 101 Locust St., Hartford, CT 06114 203-522-8600
§ International Controls and Measurements Corp., P. O. Box 2578, Syracuse, NY 13220 315-699-5262
§ Instrumentation & Control Sys., 520 Interstate Rd, Addison, IL 60101 312-543-6200
§ Kessler-Ellis Prods., 120 1st Ave., Atlantic Highlands, NJ 07716 .... 201-291-0500; 800-631-2165
§ H. Kuhnke, Inc., 26 W. Highland Ave., Atlantic Highlands, NJ 07716 .... 201-291-3334; 800-221-0714
§ Landis & Gyr, Inc., 4 Westchester Plaza, Elmsford, NY 10523 914-592-4400
Magnum Opus Custom Elctrn. Engrg., 284 Kennedy St., Iselin, NJ 08830 201-283-4925
Mallory Timers, Emhart Elec./Elctrn. Grp., 3029 E. Washington St., Indianapolis, IN 46201 317-636-5353
§ Master Elctrn. Controls, P.O. Box 25905, Los Angeles, CA 90025 213-452-1336
§ Midland-Ross Corp., Midtex Div., P.O. Box 3328, No. Mankato, MN 56001 507-625-6521
§ Midwest Comps., 1981 Port City Blvd., Muskegon, MI 49443 616-777-2602
§ Mitsumi Elec. Co., Ltd., 8-2, 8-Chome, Kokuryo, Chofu-City, Tokyo, JAPAN 489-5333
§ National Controls Corp., 931 N. DuPage Ave., Lombard, IL 60148 312-932-6900
§ NES, Inc. (Nationwide Electronic Systems), 3003 Wakefield, Carpentersville, IL 60110 312-426-5900
§ Omron Elctrns., Inc., Control Comps. Div., One E. Commerce Dr., Schaumburg, IL 60195 312-843-7900
Pacific Timer Inc., 21739 N.E. 18th Way, Redmond, WA 98052 206-881-1785
§ Paragon Elect., 606 Parkway Blvd., Two Rivers, WI 54241 414-793-1161
† Plessey Electro-Products, 3860 Centinela Ave., Los Angeles, CA 90066 213-390-3585
Potter & Brumfield, AMF Incorporated, 200 S. Richland Creek Dr., Princeton, IN 47671-0001 812-386-1000
Power Sys. Grp., Rantec Div., Emerson Elec., 9401 Oso Ave., Chatsworth, CA 91311 818-885-8223
† Racal-Dana Instrs. Inc., 4 Goodyear St., Irvine, CA 92715 714-859-8999
Regent Controls, 39 Fanny St., P.O. Box 767, Shelton, CT 06484-0767 .. 203-736-2924
† Relay Specialties, 1300 Plaza Rd., Fair Lawn, NJ 07410 .. 201-797-3313;800-526-5376
Republic Electronics Co., 575 Broad Hollow Rd., Melville, NY 11747 516-249-1414
§ Ripley, 46 Nooks Hill Rd., Cromwell, CT 06416 203-635-2200
§ Sealectro, 225 Hoyt St., Mamaroneck, NY 10543 914-698-5600
Sensor Corp., Box 140, Scottdale, PA 15683 412-887-4080
† Sigmapower, Inc., 20790 Leapwood Ave., Carson, CA 90746 .... 213-32-Sigma
§ Square D Co., Executive Plaza, Palatine, IL 60067 312-397-2600
§ S S A C, Box 395, Liverpool, NY 13088 315-622-1000
† Statek Corp., 512 N. Main St., Orange, CA 92668 714-639-7810
§ Struthers-Dunn, Inc., Lamb's Rd., Pitman, NJ 08071 609-589-7500
Sylvania GTE Control Devices, Rte. 35, Standish, ME 04084 207-642-4535
§ Techno Vation, Inc., 14 Crandall Ave., Pompton Lakes, NJ 07442 201-839-0740
† Tempo Instrument, Inc., 87 Modular Ave., Commack, NY 11725 516-864-3700
§ Tenor, 17020 W. Rogers Dr., New Berlin, WI 53151 414-782-3800
Thordarson Meissner, Components Corp. of Amer., Electronic Center, Mt. Carmel, IL 62863 618-262-5121
Timeco, Inc., 1035 - 26th St., P.O. Box 8036, Huntington, WV 25705 304-523-5149
Tri-Tronics Co. Inc., 13420 Wright Cir., Tampa, FL 33624 813-855-4453
Vanguard Relay Corp., 225 Cortland St., Lindenhurst, NY 11757 516-226-5000
Warren Comms., 101 Okner Pkwy., Livingston, NJ 07039 201-992-6200
Xanadu Controls, Electroid Corp., 45 Fadem Rd., Springfield, NJ 07081-3189 201-467-8100
§ Zenith Controls, 830 West 40th St., Chicago, IL 60609 312-247-6400

Timers, Electrolytic Cell-2200

Curtis Instrs., Inc., 200 Kisco Ave., Mt. Kisco, NY 10549 914-666-2971
ECO Instrs. Div., Sea Data Corp., 1 Bridge St., Newton, MA 02158 617-964-8360
† Fredericks Co., Philmont & Anne Sts., Huntingdon Valley, PA 19006 215-947-2500
General Electric Co., Power Elctrns. Semiconductor Dept., W. Genesee St., Auburn, NY 13021 315-253-7321
§ Master Elctrn. Controls, P.O. Box 25905, Los Angeles, CA 90025 213-452-1336
† Plessey Electro-Products, 3860 Centinela Ave., Los Angeles, CA 90066 213-390-3585

Timers, Interval-2200

Automatic Timing & Controls Co., 201 So. Gulph Rd., King of Prussia, PA 19406, 215-337-5500;800-441-8245 .... D•1112
§ Chrono-log Corp., 2 W. Park Rd., Havertown, PA 19083, 215-853-1130 .. D•1061
§ Crouzet Controls, Inc., 1083 State Pkwy., Schaumburg, IL 60195, 312-843-2200 .... B•1315-1316
C-Tek Inc., 4 Railroad Ave., Wakefield, MA 01880, 617-246-1720 .... D•1114
DCI Inc., 14812 W. 117th Street, P.O. Box 215, Olathe, KS 66061, 913-782-5672 .... D•1347
§ Diversified Elctrns., Inc., Indl. Controls Div., 119 N. Morton Ave., Evansville, IN 47711, 812-426-2806 .... B•1322
Ledex Inc., P.O. Box 427, Vandalia, OH 45377, 513-898-3621 .... B•1614
† Logitek, Inc., 101 Christopher St., Ronkonkoma, NY 11779, 516-467-4200 .... B•1437
§ NES, Inc. (Nationwide Electronic Systems), 3003 Wakefield, Carpentersville, IL 60110, 312-426-5900 .... D•1368
PPM, Inc., 4521 Emery Ind. Pkwy., Cleveland, OH 44128, 216-292-6006 .. D•1291
† Abrams Instr. Corp., P.O. Box 26007, Lansing, MI 48909 517-332-6405
§ Air-O-Tronics Prods., Box K, Morrisville, NY 13408 315-684-3705
Allen-Bradley Co., Industrial Control Div., 1201 S. Second St., Milwaukee, WI 53201 414-671-2000
§ Amerace Corporation, Newburgh Rd., Hackettstown, NJ 07840 201-852-1122
§ American Control Products, Div. of Precision Timer Co., Inc., 13 Westbrook Ind'l. Pk., Westbrook, CT 06498 203-399-6253
Amperite Co., Inc., 600 Palisade Ave., Union City, NJ 07087 201-864-9503
§† Antex Electronics Corp., 16100 S. Figueroa St., Gardena, CA 90248 213-532-3092
† Argent Elctrns., 3245 S. County Rd., 25A, Troy, OH 45373 513-335-0031
§ Artisan Elctrns., 5 Eastmans Rd., Parsippany, NJ 07054 201-887-7100
§ Bristol Saybrook, 97 Coulter St., Old Saybrook, CT 06475 203-388-3414
Bulova Sys. & Instr., Green Acres Rd., W., Valley Stream, NY 11582 516-561-2600
CAL Controls Inc., 1155 Waukegan Rd., Glenview, IL 60025 312-998-5720
Canyon Elctrns., 2001 W. North Lane, Phoenix, AZ 85021 602-944-4421
Cardinal Control Co., 110 Kensington Rd., Kensington, CT 06037 203-828-6379
§† Cramer Co., Mill Rock Rd., Old Saybrook, CT 06475 203-388-3574
Cybernetic Micro Sys., P.O. Box 3000, 3000 Hwy. 84, San Gregorio, CA 94074 415-726-3000
§† Data Precision Corp., Electronics Ave., Danvers, MA 01923 617-246-1600
Datum Inc., Timing/Aacom Divisions, 1363 S. State College Blvd., Anaheim, CA 92806 714-533-6333
Dielectric Instr. Corp., 761 Franklin Ave., Pittsburgh, PA 15221 412-731-6566
§ Digitec Corp., 918 Woodley Rd., P.O. Box 458, Dayton, OH 45401 513-254-6251
§ Dimco-Gray, 8200 S. Suburban Rd., Dayton, OH 45459 513-433-7600
Durgin & Browne, 80 Allen Rd., So. Burlington, VT 05401 802-863-6873
§ Dynapar, 1675 Delany Rd., Gurnee, IL 60031 312-662-2666
§ Eagle Signal Controls, Mfg. Div. Gulf & Western Inds., Box 16100, Austin, TX 78761 512-837-8300
§ Eaton Corp./Cutler-Hammer Prods, Aerospace & Commercial Controls Div., 4201 N. 27th St., Milwaukee, WI 53216 414-449-7487
Eldorado Instrs., 7303 Edgewater Dr., Oakland, CA 94621 415-638-5656
† Electrodynamics, Inc., A Talley Inds. Co., 1200 Hicks Rd., Rolling Meadows, IL 60008 312-259-0740
§ Electromatic Controls Corp., 2495 Pembroke Road, Hoffman Estates, IL 60195-2010 312-882-5757
§ Electromech, Inc., 528 Elm Street, Kearny, NJ 07032 201-997-0950
Electronic Prods. Corp., Interstate Indl. Plaza, R. D. #5, York, PA 17402 717-767-6517
Electro Physics, 1910 West Birchwood Ave., Chicago, IL 60626 312-274-9669
§ ESE, 142 Sierra St., El Segundo, CA 90245 213-322-2136
§† Fairchild Microcontroller Div., Fairchild Camera & Instr. Corp., 450 National Ave., Mountain View, CA 94042 415-962-3838
§ Fluke, John, Mfg. Co., Box C9090, MS 250C, Everett, WA 98206 206-356-5400
Fork Standards, Inc., 666 Western Ave., Lombard, IL 60148 312-932-9380
Frequency Control Prods., Inc., American Time Prods. Div., 61-20 Woodside Ave., Woodside, NY 11377 212-458-5811
FSI/Fork Standards Inc., 666 Western Ave., Lombard, IL 60148 .... 312-231-3511; 312-932-9380
Gregg Elec., 608 W. Emporia, Ontario, CA 91761 714-983-1794
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
§† Hi-G Company, A Subsidiary of Nytronics Inc., 101 Locust St., Hartford, CT 06114 203-522-8600
§ International Controls and Measurements Corp., P. O. Box 2578, Syracuse, NY 13220 315-699-5262
§ Instrumentation & Control Sys., 520 Interstate Rd, Addison, IL 60101 312-543-6200
† International Sensor Systems, Inc., Aurora Industrial Pk., Box 345, Aurora, NE 68818 402-694-6111
§ Kessler-Ellis Prods., 120 1st Ave., Atlantic Highlands, NJ 07716 .... 201-291-0500; 800-631-2165
§ Landis & Gyr, Inc., 4 Westchester Plaza, Elmsford, NY 10523 914-592-4400
§† Leach Corp., Control Prods. Div., 6900 Orangethorpe Ave., Buena Pk., CA 90620 714-739-0770
§ Lektralab Technologies, Inc., 129-07 18th Ave., P.O. Box 222, College Point, NY 11356 718-939-7171
Magnum Opus Custom Elctrn. Engrg., 284 Kennedy St., Iselin, NJ 08830 201-283-4925
Mallory Timers, Emhart Elec./Elctrn. Grp., 3029 E. Washington St., Indianapolis, IN 46201 317-636-5353

MARCONI INSTRUMENTS, 3 Pearl Court, Allendale, NJ 07401 ... 201-934-9050
§ Master Elctrn. Controls, P.O. Box 25905, Los Angeles, CA 90025 ... 213-452-1336
Microavionics Corp., 3198-K Airport Loop Dr., Costa Mesa, CA 92626 ... 714-957-6904
§ Mitsumi Elec. Co., Ltd., 8-2, 8-Chome, Kokuryo, Chofu-City, Tokyo, JAPAN ... 489-5333
§ National Controls Corp., 931 N. DuPage Ave., Lombard, IL 60148 ... 312-932-6900
§ Newport Electronics, 630 E. Young St., Santa Ana, CA 92705 ... 714-540-4914
§ Non-Linear Systems/Div. of Kaypro Corp., 533 Stevens Ave., Solana Bch., CA 92075 ... 619-481-3900
Northwest Microcircuits, Inc., 2115 N. College, Newberg, OR 97132 ... 503-538-7081
§ Omron Elctrns., Inc., Control Comps. Div., One E. Commerce Dr., Schaumburg, IL 60195 ... 312-843-7900
Pacific Timer Inc., 21739 N.E. 18th Way, Redmond, WA 98052 ... 206-881-1785
§ Paragon Elect., 606 Parkway Blvd., Two Rivers, WI 54241 ... 414-793-1161
† Plessey Electro-Products, 3860 Centinela Ave., Los Angeles, CA 90066 ... 213-390-3585
§ Potter & Brumfield, AMF Incorporated, 200 S. Richland Creek Dr., Princeton, IN 47671-0001 ... 812-386-1000
† Racal-Dana Instrs. Inc., 4 Goodyear St., Irvine, CA 92715 ... 714-859-8999
§ Ragen Data Systems, Inc., 3 Oval Dr., Central Islip, NY 11722 ... 516-234-3800
† Raymond Engrg. Inc., Raycorder Prods. Div., 217 Smith St., Middletown, CT 06457 ... 203-632-1000
Regent Controls, 39 Fanny St., P.O. Box 767, Shelton, CT 06484-0767 ... 203-736-2924
§ Relay Specialties, 1300 Plaza Rd., Fair Lawn, NJ 07410 ... 201-797-3313;800-526-5376
Republic Electronics Co., 575 Broad Hollow Rd., Melville, NY 11747 ... 516-249-1414
§ Ripley, 46 Nooks Hill Rd., Cromwell, CT 06416 ... 203-635-2200
Sealectro, 225 Hoyt St., Mamaroneck, NY 10543 ... 914-698-5600
Sensor Corp., Box 140, Scottdale, PA 15683 ... 412-887-4080
† Sigmapower, Inc., 20790 Leapwood Ave., Carson, CA 90746 ... 213-32-Sigma
§ Square D Co., Executive Plaza, Palatine, IL 60067 ... 312-397-2600
§ S S A C, Box 395, Liverpool, NY 13088 ... 315-622-1000
† Stock Drive Prods., Div. of Designatronics, Inc., 2101 Jericho Turnpike, New Hyde Pk., NY 11040 ... 516-328-0200;328-3300
Struthers-Dunn, Inc., Lamb's Rd., Pitman, NJ 08071 ... 609-589-7500
§† Syracuse Elctrns., P.O. Box 4770, Syracuse, NY 13221 ... 315-488-4911
§ Technic, Inc., Box 965, Providence, RI 02901 ... 401-781-6100
§ Tecmar, Inc., 6225 Cochran Rd., Solon, OH 44139 ... 216-349-0600
Tempo Instrument, Inc., 87 Modular Ave., Commack, NY 11725 ... 516-864-3700
§ Tenor, 17020 W. Rogers Dr., New Berlin, WI 53151 ... 414-782-3800
Timeco, Inc., 1035 - 26th St., P.O. Box 8036, Huntington, WV 25705 ... 304-523-5149
Tri-Tronics Co. Inc., 13420 Wright Cir., Tampa, FL 33624 ... 813-855-4453
† Wahl Instruments, Inc., 5750 Hannum Ave., Culver City, CA 90230 ... 213-822-6144
Xanadu Controls, Electroid Corp., 45 Fadem Rd., Springfield, NJ 07081-3189 ... 201-467-8100
Xycom, 750 N. Maple Rd., Saline, MI 48176 ... 313-429-4971
§ Zenith Controls, 830 West 40th St., Chicago, IL 60609 ... 312-247-6400

Timers, Programmed-2200

§ Diversified Elctrns., Inc., Indl. Controls Div., 119 N. Morton Ave., Evansville, IN 47711, 812-426-2806 ... B•1322
† Logitek, Inc., 101 Christopher St., Ronkonkoma, NY 11779, 516-467-4200 ... B•1437
Phi Technologies, Inc., 4605 North Stiles, Oklahoma City, OK 73105, 405-521-9000 ... D•1054
PPM, Inc., 4521 Emery Ind. Pkwy., Cleveland, OH 44128, 216-292-6006 ... D•1291
§ Adatek, Inc., P.O. Box 1339, Sandpoint, ID 83864 ... 208-263-1471;800-323-3343
§† Advanced Micro Devices, P.O. Box 3453, 901 Thompson Pl., Sunnyvale, CA 94088 ... 408-732-2400
AES Corp., 285 Newbury St., P.O. Box 2093, Peabody, MA 01960 ... 617-535-7310
§ American Control Products, Div. of Precision Timer Co., Inc., 13 Westbrook Ind'l. Pk., Westbrook, CT 06498 ... 203-399-6253
§† Antex Electronics Corp., 16100 S. Figueroa St., Gardena, CA 90248 ... 213-532-3092
† Applied Electro Technlg., Int., STI Company, 2220 So. Anne St., Santa Ana, CA 92704 ... 714-556-6570
Applied Sys., 26401 Harper Ave., St. Clair Shores, MI 48081 ... 313-779-8700
† Argent Elctrns., 3245 S. County Rd., 25A, Troy, OH 45373 ... 513-335-0031
§ Artisan Elctrns., 5 Eastmans Rd., Parsippany, NJ 07054 ... 201-887-7100
ATR Elctrns., Inc., P.O. BOX 7008, St. Paul, MN 55107 ... 612-738-6520;414-297-7374
Automatic Timing & Controls Co., 201 So. Gulph Rd., King of Prussia, PA 19406 ... 215-337-5500;800-441-8245
† Autronics, 314 E. Live Oak, Ste. A, Arcadia, CA 91006 ... 818-445-5470
§ Bristol Saybrook, 97 Coulter St., Old Saybrook, CT 06475 ... 203-388-3414
Bulova Sys. & Instr., Green Acres Rd., W., Valley Stream, NY 11582 ... 516-561-2600
§† Cal Count, 5407 Port Royal Rd., Springfield, VA 22151 ... 703-321-9625
Canyon Elctrns., 2001 W. North Lane, Phoenix, AZ 85021 ... 602-944-4421
Cardinal Control Co., 110 Kensington Rd., Kensington, CT 06037 ... 203-828-6379
CDS - Colorado Data Sys., 3301 W. Hampden, Unit C, Englewood, CO 80110 ... 303-762-1640
Centent Co., 3879 S. Main St., Santa Ana, CA 92707 ... 714-979-6491
Cramer Co., Mill Rock Rd., Old Saybrook, CT 06475 ... 203-388-3574
§ Crouzet Controls, Inc., 1083 State Pkwy., Schaumburg, IL 60195 ... 312-843-2200
C-Tek Inc., 4 Railroad Ave., Wakefield, MA 01880 ... 617-246-1720
Custom Control Sys., 21 E. Canon Perdido St., Santa Barbara, CA 93101 ... 805-965-7577
Cybernetic Micro Sys., P.O. Box 3000, 3000 Hwy. 84, San Gregorio, CA 94074 ... 415-726-3000
Dantronics, Inc., 3175 Hafner Ct., St. Paul, MN 55112 ... 612-484-2108
Dataprofits Corp., 2260 Distributors Dr., Indianapolis, IN 46241
§ Digitec Corp., 918 Woodley Rd., P.O. Box 458, Dayton, OH 45401 ... 513-254-6251
Durgin & Browne, 80 Allen Rd., So. Burlington, VT 05401 ... 802-863-6873
§ Dynapar, 1675 Delany Rd., Gurnee, IL 60031 ... 312-662-2666
§ Eagle Signal Controls, Mfg. Div. Gulf & Western Inds., Box 16100, Austin, TX 78761 ... 512-837-8300
Eitel Mfg., 2835 Laguna Canyon Rd., Laguna Beach, CA 92652 ... 714-494-2012
Electronic Prods. Corp., Interstate Indl. Plaza, R. D. #5, York, PA 17402 ... 717-767-6517
Encoder Prods., 1601B Dover Rd., Sandpoint, ID 83864 ... 208-263-8541
§ ESE, 142 Sierra St., El Segundo, CA 90245 ... 213-322-2136
Extech International Corp., 150 Bear Hill Rd., Waltham, MA 02154 ... 617-890-7440
Fluke, John, Mfg. Co., Box C9090, MS 250C, Everett, WA 98206 ... 206-356-5400
Frequency Control Prods., Inc., American Time Prods. Div., 61-20 Woodside Ave., Woodside, NY 11377 ... 212-458-5811
§ Grasslin Controls Corp., Dieter Grasslin Feinwerktechnik, 45 Spear Rd., Ramsey, NJ 07446 ... 201-825-9696
Gregg Elec., 608 W. Emporia, Ontario, CA 91761 ... 714-983-1794
§ Heath Co., Benton Harbor, MI 49022 ... 616-982-3886
§ Hi-G Company, A Subsidiary of Nytronics Inc., 101 Locust St., Hartford, CT 06114 ... 203-522-8600
Innovatek Microsystems, Inc., Smithfield Rd., R1 Box 104, Millerton, NY 12546-9720 ... 914-373-9003
§ Intermatic, Intermatic Plaza, Spring Grove, IL 60081 ... 815-675-2321
§ International Microtronics Corp., 4016 E. Tennessee St., Tucson, AZ 85714 ... 602-748-7900
† International Sensor Systems, Inc., Aurora Industrial Pk., Box 345, Aurora, NE 68818 ... 402-694-6111
§ Kessler-Ellis Prods., 120 1st Ave., Atlantic Highlands, NJ 07716 ... 201-291-0500; 800-631-2165
Lab-Line Instrs., 15th & Bloomingdale, Melrose Park, IL 60160 ... 312-450-2600
§ Landis & Gyr, Inc., 4 Westchester Plaza, Elmsford, NY 10523 ... 914-592-4400
Magnum Opus Custom Elctrn. Engrg., 284 Kennedy St., Iselin, NJ 08830 ... 201-283-4925
Mallory Timers, Emhart Elec./Elctrn. Grp., 3029 E. Washington St., Indianapolis, IN 46201 ... 317-636-5353
§ Master Elctrn. Controls, P.O. Box 25905, Los Angeles, CA 90025 ... 213-452-1336
Microavionics Corp., 3198-K Airport Loop Dr., Costa Mesa, CA 92626 ... 714-957-6904
§ Midland-Ross Corp., Midtex Div., P.O. Box 3328, No. Mankato, MN 56001 ... 507-625-6521
§ Mitsumi Elec. Co., Ltd., 8-2, 8-Chome, Kokuryo, Chofu-City, Tokyo, JAPAN ... 489-5333
§ National Controls Corp., 931 N. DuPage Ave., Lombard, IL 60148 ... 312-932-6900
§ NES, Inc. (Nationwide Electronic Systems), 3003 Wakefield, Carpentersville, IL 60110 ... 312-426-5900
Northwest Microcircuits, Inc., 2115 N. College, Newberg, OR 97132 ... 503-538-7081
§ Omron Elctrns., Inc., Control Comps. Div., One E. Commerce Dr., Schaumburg, IL 60195 ... 312-843-7900
§ Paragon Elect., 606 Parkway Blvd., Two Rivers, WI 54241 ... 414-793-1161
§ Pass & Seymour, Inc., P.O. Box 4822, Syracuse, NY 13221 ... 315-468-6211
Phoenix Microsystems, P.O. Box 4206, Huntsville, AL 35802 ... 205-881-2173
§ Potter & Brumfield, AMF Incorporated, 200 S. Richland Creek Dr., Princeton, IN 47671-0001 ... 812-386-1000
† Racal-Dana Instrs. Inc., 4 Goodyear St., Irvine, CA 92715 ... 714-859-8999
§ Ragen Data Systems, Inc., 3 Oval Dr., Central Islip, NY 11722 ... 516-234-3800
† Raymond Engrg. Inc., Raycorder Prods. Div., 217 Smith St., Middletown, CT 06457 ... 203-632-1000
§ Relay Specialties, 1300 Plaza Rd., Fair Lawn, NJ 07410 ... 201-797-3313;800-526-5376
§ Ripley, 46 Nooks Hill Rd., Cromwell, CT 06416 ... 203-635-2200
§ Sealectro, 225 Hoyt St., Mamaroneck, NY 10543 ... 914-698-5600
Sensor Corp., Box 140, Scottdale, PA 15683 ... 412-887-4080
† Sigmapower, Inc., 20790 Leapwood Ave., Carson, CA 90746 ... 213-32-Sigma
§ Square D Co., Executive Plaza, Palatine, IL 60067 ... 312-397-2600
§† Syracuse Elctrns., P.O. Box 4770, Syracuse, NY 13221 ... 315-488-4911
Techniques, Inc., 235 Jackson St., Englewood, NJ 07631 ... 201-569-5900
§ Techno Vation, Inc., 14 Crandall Ave., Pompton Lakes, NJ 07442 ... 201-839-0740
Tempo Instrument, Inc., 87 Modular Ave., Commack, NY 11725 ... 516-864-3700
§ Tenor, 17020 W. Rogers Dr., New Berlin, WI 53151 ... 414-782-3800
Tri-Tronics Co. Inc., 13420 Wright Cir., Tampa, FL 33624 ... 813-855-4453
Vanguard Relay Corp., 225 Cortland St., Lindenhurst, NY 11757 ... 516-226-5000
§ Veeder-Root, 70 Sargeant St., Hartford, CT 06102 ... 203-527-7201
Xanadu Controls, Electroid Corp., 45 Fadem Rd., Springfield, NJ 07081-3189 ... 201-467-8100
§ Zenith Controls, 830 West 40th St., Chicago, IL 60609 ... 312-247-6400

Timers, Sequence-2200

Automatic Timing & Controls Co., 201 So. Gulph Rd., King of Prussia, PA 19406, 215-337-5500;800-441-8245 ... D•1112
§ Crouzet Controls, Inc., 1083 State Pkwy., Schaumburg, IL 60195, 312-843-2200 ... B•1315
C-Tek Inc., 4 Railroad Ave., Wakefield, MA 01880, 617-246-1720 ... D•1114
† Logitek, Inc., 101 Christopher St., Ronkonkoma, NY 11779, 516-467-4200 ... B•1437
Phi Technologies, Inc., 4605 North Stiles, Oklahoma City, OK 73105, 405-521-9000 ... D•1054
PPM, Inc., 4521 Emery Ind. Pkwy., Cleveland, OH 44128, 216-292-6006 ... D•1291
† Abrams Instr. Corp., P.O. Box 26007, Lansing, MI 48909 ... 517-332-6405
§ Adatek, Inc., P.O. Box 1339, Sandpoint, ID 83864 ... 208-263-1471;800-323-3343
§ American Control Products, Div. of Precision Timer Co., Inc., 13 Westbrook Ind'l. Pk., Westbrook, CT 06498 ... 203-399-6253
§† Antex Electronics Corp., 16100 S. Figueroa St., Gardena, CA 90248 ... 213-532-3092
Applied Sys., 26401 Harper Ave., St. Clair Shores, MI 48081 ... 313-779-8700
† Argent Elctrns., 3245 S. County Rd., 25A, Troy, OH 45373 ... 513-335-0031
§ Artisan Elctrns., 5 Eastmans Rd., Parsippany, NJ 07054 ... 201-887-7100
Bristol Babcock Inc., 40 Bristol St., Waterbury, CT 06708 ... 203-575-3000
§ Bristol Saybrook, 97 Coulter St., Old Saybrook, CT 06475 ... 203-388-3414
† BTU Engrg. Corp., Bruce Sys., Esquire Rd., N. Billerica, MA 01862 ... 617-667-4111
Bulova Sys. & Instr., Green Acres Rd., W., Valley Stream, NY 11582 ... 516-561-2600
Cardinal Control Co., 110 Kensington Rd., Kensington, CT 06037 ... 203-828-6379
§ Cramer Co., Mill Rock Rd., Old Saybrook, CT 06475 ... 203-388-3574
Cybernetic Micro Sys., P.O. Box 3000, 3000 Hwy. 84, San Gregorio, CA 94074 ... 415-726-3000
Durgin & Browne, 80 Allen Rd., So. Burlington, VT 05401 ... 802-863-6873
Dynapar, 1675 Delany Rd., Gurnee, IL 60031 ... 312-662-2666
§ Eagle Signal Controls, Mfg. Div. Gulf & Western Inds., Box 16100, Austin, TX 78761 ... 512-837-8300

† Electrodynamics, Inc., A Talley Inds. Co., 1200 Hicks Rd., Rolling Meadows, IL 60008 312-259-0740
§ Electromatic Controls Corp., 2495 Pembroke Road, Hoffman Estates, IL 60195-2010 312-882-5757
§† Electromech, Inc., 528 Elm Street, Kearny, NJ 07032 201-997-0950
Electronic Prods. Corp., Interstate Indl. Plaza, R. D. #5, York, PA 17402 717-767-6517
Encoder Prods., 1601B Dover Rd., Sandpoint, ID 83864 208-263-8541
§ ESE, 142 Sierra St., El Segundo, CA 90245 213-322-2136
Frequency Control Prods., Inc., American Time Prods. Div., 61-20 Woodside Ave., Woodside, NY 11377 212-458-5811
§† Furnas Elec., 1197 McKee St., Batavia, IL 60510 312-879-6000
§ Grasslin Controls Corp., Dieter Grasslin Feinwerktechnik, 45 Spear Rd., Ramsey, NJ 07446 201-825-9696
Gregg Elec., 608 W. Emporia, Ontario, CA 91761 714-983-1794
§ Hi-G Company, A Subsidiary of Nytronics Inc., 101 Locust St., Hartford, CT 06114 203-522-8600
§ International Controls and Measurements Corp., P. O. Box 2578, Syracuse, NY 13220 315-699-5262
Innovatek Microsystems, Inc., Smithfield Rd., R1 Box 104, Millerton, NY 12546-9720 914-373-9003
§ Instrumentation & Control Sys., 520 Interstate Rd, Addison, IL 60101 312-543-6200
† Ledex Inc., P.O. Box 427, Vandalia, OH 45377 513-898-3621
Magnum Opus Custom Elctrn. Engrg., 284 Kennedy St., Iselin, NJ 08830 201-283-4925
Mallory Timers, Emhart Elec./Elctrn. Grp., 3029 E. Washington St., Indianapolis, IN 46201 317-636-5353
§ Master Elctrn. Controls, P.O. Box 25905, Los Angeles, CA 90025 213-452-1336
Microavionics Corp., 3198-K Airport Loop Dr., Costa Mesa, CA 92626 714-957-6904
§ Mitsumi Elec. Co., Ltd., 8-2, 8-Chome, Kokuryo, Chofu-City, Tokyo, JAPAN 489-5333
§ National Controls Corp., 931 N. DuPage Ave., Lombard, IL 60148 312-932-6900
§ NES, Inc. (Nationwide Electronic Systems), 3003 Wakefield, Carpentersville, IL 60110 312-426-5900
§ Omron Elctrns., Inc., Control Comps. Div., One E. Commerce Dr., Schaumburg, IL 60195 312-843-7900
Paragon Elect., 606 Parkway Blvd., Two Rivers, WI 54241 414-793-1161
† Racal-Dana Instrs. Inc., 4 Goodyear St., Irvine, CA 92715 714-859-8999
† Raymond Engrg. Inc., Raycorder Prods. Div., 217 Smith St., Middletown, CT 06457 203-632-1000
Relay Specialties, 1300 Plaza Rd., Fair Lawn, NJ 07410 .. 201-797-3313;800-526-5376
§ Ripley, 46 Nooks Hill Rd., Cromwell, CT 06416 203-635-2200
§ Sealectro, 225 Hoyt St., Mamaroneck, NY 10543 914-698-5600
Sensor Corp., Box 140, Scottdale, PA 15683 412-887-4080
† Sigmapower, Inc., 20790 Leapwood Ave., Carson, CA 90746 .... 213-32-Sigma
§ Sloan Technology, 602 E. Montecito St., Santa Barbara, CA 93103 805-963-4431
§ Square D Co., Executive Plaza, Palatine, IL 60067 312-397-2600
§ S S A C, Box 395, Liverpool, NY 13088 315-622-1000
§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 215-673-5600
§† Syracuse Elctrns., P.O. Box 4770, Syracuse, NY 13221 315-488-4911
§ Techno Vation, Inc., 14 Crandall Ave., Pompton Lakes, NJ 07442 201-839-0740
Tempo Instrument, Inc., 87 Modular Ave., Commack, NY 11725 516-864-3700
§ Tenor, 17020 W. Rogers Dr., New Berlin, WI 53151 414-782-3800
Therm-O-Disc, Inc., Sub. Emerson Elec. Co., 1320 South Main St., P. O. Box 3538, Mansfield, OH 44907 419-756-5911
Thordarson Meissner, Components Corp. of Amer., Electronic Center, Mt. Carmel, IL 62863 618-262-5121
Timeco, Inc., 1035 - 26th St., P.O. Box 8036, Huntington, WV 25705 304-523-5149
TransKinetic Sys., 110 Shawmut Rd., Canton, MA 02021 617-828-3000
Tri-Tronics Co. Inc., 13420 Wright Cir., Tampa, FL 33624 813-855-4453
Vanguard Relay Corp., 225 Cortland St., Lindenhurst, NY 11757 516-226-5000
§ Veeder-Root, 70 Sargeant St., Hartford, CT 06102 203-527-7201
Xanadu Controls, Electroid Corp., 45 Fadem Rd., Springfield, NJ 07081-3189 201-467-8100
§ Zenith Controls, 830 West 40th St., Chicago, IL 60609 312-247-6400

Timers, Solid State-2200

ATR Elctrns., Inc., P.O. BOX 7008, St. Paul, MN 55107, 612-738-6520;414-297-7374 .... D•1889
§ Crouzet Controls, Inc., 1083 State Pkwy., Schaumburg, IL 60195, 312-843-2200 .... B•1316
Datum Inc., Timing/Aacom Divisions, 1363 S. State College Blvd., Anaheim, CA 92806, 714-533-6333 .... D•1148
DCI Inc., 14812 W. 117th Street, P.O. Box 215, Olathe, KS 66061, 913-782-5672 .... D•1347
§ Diversified Elctrns., Inc., Indl. Controls Div., 119 N. Morton Ave., Evansville, IN 47711, 812-426-2806 .... B•1322
§ Exar Corp., P. O. Box 62229, 750 Palomar Ave., Sunnyvale, CA 94086, 408-732-7970 .... A•1668
Frequency and Time Systems, Inc., DATUM, INC., 34 Tozer Rd., Beverly, MA 01915, 617-927-8220 .... D•1148
§ IDEC Systems & Controls Corp., 1213 Elko Drive, Sunnyvale, CA 94089-2211, 408-747-0550 .... B•1412
§ Kessler-Ellis Prods., 120 1st Ave., Atlantic Highlands, NJ 07716, 201-291-0500;800-631-2165 .... D•1124
§† Leach Corp., Control Prods. Div., 6900 Orangethorpe Ave., Buena Pk., CA 90620, 714-739-0770 .... A•1378
† Logitek, Inc., 101 Christopher St., Ronkonkoma, NY 11779, 516-467-4200 .... B•1437
Phi Technologies, Inc., 4605 North Stiles, Oklahoma City, OK 73105, 405-521-9000 .... D•1054
PPM, Inc., 4521 Emery Ind. Pkwy., Cleveland, OH 44128, 216-292-6006 .. D•1291
† Abrams Instr. Corp., P.O. Box 26007, Lansing, MI 48909 517-332-6405
§ Adatek, Inc., P.O. Box 1339, Sandpoint, ID 83864 .... 208-263-1471;800-323-3343
§† Advanced Micro Devices, P.O. Box 3453, 901 Thompson Pl., Sunnyvale, CA 94088 408-732-2400
AES Corp., 285 Newbury St., P.O. Box 2093, Peabody, MA 01960 617-535-7310
§ Air-O-Tronics Prods., Box K, Morrisville, NY 13408 315-684-3705
† Alarm Controls, 19 Brandywine Dr., Deer Park, NY 11729 516-586-4220
Allen-Bradley Co., Industrial Control Div., 1201 S. Second St., Milwaukee, WI 53201 414-671-2000
§ Amerace Corporation, Newburgh Rd., Hackettstown, NJ 07840 201-852-1122
§ American Control Products, Div. of Precision Timer Co., Inc., 13 Westbrook Ind'l. Pk., Westbrook, CT 06498 203-399-6253
Analog Systems, P.O. Box 35879, Tucson, AZ 85740-5879 602-293-4923
§† Antex Electronics Corp., 16100 S. Figueroa St., Gardena, CA 90248 213-532-3092
† Applied Electro Technlg., Int., STI Company, 2220 So. Anne St., Santa Ana, CA 92704 714-556-6570
† Argent Elctrns., 3245 S. County Rd., 25A, Troy, OH 45373 513-335-0031
§ Artisan Elctrns., 5 Eastmans Rd., Parsippany, NJ 07054 201-887-7100
Automatic Timing & Controls Co., 201 So. Gulph Rd., King of Prussia, PA 19406 .... 215-337-5500;800-441-8245
† Autronics, 314 E. Live Oak, Ste. A, Arcadia, CA 91006 818-445-5470
CAL Controls Inc., 1155 Waukegan Rd., Glenview, IL 60025 312-998-5720
Cardinal Control Co., 110 Kensington Rd., Kensington, CT 06037 203-828-6379
Centent Co., 3879 S. Main St., Santa Ana, CA 92707 714-979-6491
§ Cramer Co., Mill Rock Rd., Old Saybrook, CT 06475 203-388-3574
C-Tek Inc., 4 Railroad Ave., Wakefield, MA 01880 617-246-1720
Cybernetic Micro Sys., P.O. Box 3000, 3000 Hwy. 84, San Gregorio, CA 94074 415-726-3000
Dantronics, Inc., 3175 Hafner Ct., St. Paul, MN 55112 612-484-2108
Dataprofits Corp., 2260 Distributors Dr., Indianapolis, IN 46241
Durgin & Browne, 80 Allen Rd., So. Burlington, VT 05401 802-863-6873
§ Eagle Signal Controls, Mfg. Div. Gulf & Western Inds., Box 16100, Austin, TX 78761 512-837-8300
§ Eaton Corp./Cutler-Hammer Prods, Aerospace & Commercial Controls Div., 4201 N. 27th St., Milwaukee, WI 53216 414-449-7487
§ Electromatic Controls Corp., 2495 Pembroke Road, Hoffman Estates, IL 60195-2010 312-882-5757
Electronic Prods. Corp., Interstate Indl. Plaza, R. D. #5, York, PA 17402 717-767-6517
Electro Physics, 1910 West Birchwood Ave., Chicago, IL 60626 312-274-9669
§ ESE, 142 Sierra St., El Segundo, CA 90245 213-322-2136
§ Fairchild Camera & Instr. Corp., 464 Ellis St., 20-2271, Mountain View, CA 94042 415-962-5011
Fork Standards, Inc., 666 Western Ave., Lombard, IL 60148 312-932-9380
Frequency Control Prods., Inc., American Time Prods. Div., 61-20 Woodside Ave., Woodside, NY 11377 212-458-5811
FSI/Fork Standards Inc., 666 Western Ave., Lombard, IL 60148 .... 312-231-3511; 312-932-9380
§† Furnas Elec., 1197 McKee St., Batavia, IL 60510 312-879-6000
§ Grasslin Controls Corp., Dieter Grasslin Feinwerktechnik, 45 Spear Rd., Ramsey, NJ 07446 201-825-9696
Harrel, Inc., 16 Fitch St., E. Norwalk, CT 06855 203-866-2573
§† Hi-G Company, A Subsidiary of Nytronics Inc., 101 Locust St., Hartford, CT 06114 203-522-8600
† Holt Inc., 9351 Jeronimo Rd., Irvine, CA 92718 714-859-8800
§ International Controls and Measurements Corp., P. O. Box 2578, Syracuse, NY 13220 315-699-5262
Innovatek Microsystems, Inc., Smithfield Rd., R1 Box 104, Millerton, NY 12546-9720 914-373-9003
§ Instrumentation & Control Sys., 520 Interstate Rd, Addison, IL 60101 312-543-6200
† International Sensor Systems, Inc., Aurora Industrial Pk., Box 345, Aurora, NE 68818 402-694-6111
§ Klockner Moeller, 4 Strathmore Rd., Natick, MA 01760 617-655-1910
§ Lektralab Technologies, Inc., 129-07 18th Ave., P.O. Box 222, College Point, NY 11356 718-939-7171
Macrotronix, Inc., 4016 N. Home St., Mishawaka, IN 46545 219-256-5503
Magnum Opus Custom Elctrn. Engrg., 284 Kennedy St., Iselin, NJ 08830 201-283-4925
Mallory Timers, Emhart Elec./Elctrn. Grp., 3029 E. Washington St., Indianapolis, IN 46201 317-636-5353
§ Master Elctrn. Controls, P.O. Box 25905, Los Angeles, CA 90025 213-452-1336
Microavionics Corp., 3198-K Airport Loop Dr., Costa Mesa, CA 92626 714-957-6904
§ Midland-Ross Corp., Midtex Div., P.O. Box 3328, No. Mankato, MN 56001 507-625-6521
§ MKS Electronics Corp., 454 E. Donovan Rd., Kansas City, KS 66115 913-371-1351
Multi-Amp Corp., TBG, 4271 Bronze Way, Dallas, TX 75237 214-333-3201
§ National Controls Corp., 931 N. DuPage Ave., Lombard, IL 60148 312-932-6900
§ NES, Inc. (Nationwide Electronic Systems), 3003 Wakefield, Carpentersville, IL 60110 312-426-5900
§ Non-Linear Systems/Div. of Kaypro Corp., 533 Stevens Ave., Solana Bch., CA 92075 619-481-3900
Northwest Microcircuits, Inc., 2115 N. College, Newberg, OR 97132 503-538-7081
§ Omron Elctrns., Inc., Control Comps. Div., One E. Commerce Dr., Schaumburg, IL 60195 312-843-7900
Pacific Timer Inc., 21739 N.E. 18th Way, Redmond, WA 98052 206-881-1785
§ Paragon Elect., 606 Parkway Blvd., Two Rivers, WI 54241 414-793-1161
§ Potter & Brumfield, AMF Incorporated, 200 S. Richland Creek Dr., Princeton, IN 47671-0001 812-386-1000
† PTL Elctrns., 10211 Vinemont St., Dallas, TX 75218 214-327-3180
† Racal-Dana Instrs. Inc., 4 Goodyear St., Irvine, CA 92715 714-859-8999
§ Ragen Data Systems, Inc., 3 Oval Dr., Central Islip, NY 11722 516-234-3800
§† Raytheon Semiconductor, 350 Ellis St., Mountain View, CA 94043 415-968-9211
RCA Solid State Div., Linear Integrated Circuits, Rte. 202, Somerville, NJ 08876 201-685-6000
Regent Controls, 39 Fanny St., P.O. Box 767, Shelton, CT 06484-0767 .. 203-736-2924
† Relay Specialties, 1300 Plaza Rd., Fair Lawn, NJ 07410 .. 201-797-3313;800-526-5376
§ Ripley, 46 Nooks Hill Rd., Cromwell, CT 06416 203-635-2200
§ Roean Industries, Inc., 12970 Branford, Ste. C, Pacoima, CA 91331 818-767-7047
Sensor Corp., Box 140, Scottdale, PA 15683 412-887-4080
† Sigmapower, Inc., 20790 Leapwood Ave., Carson, CA 90746 .... 213-32-Sigma
§ Square D Co., Executive Plaza, Palatine, IL 60067 312-397-2600

§ S S A C, Box 395, Liverpool, NY 13088 315-622-1000
§† Statek Corp., 512 N. Main St., Orange, CA 92668 714-639-7810
§ Struthers-Dunn, Inc., Lamb's Rd., Pitman, NJ 08071 609-589-7500
§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 215-673-5600
§† Syracuse Elctrns., P.O. Box 4770, Syracuse, NY 13221 315-488-4911
§ Techno Vation, Inc., 14 Crandall Ave., Pompton Lakes, NJ 07442 201-839-0740
§† Tempo Instrument, Inc., 87 Modular Ave., Commack, NY 11725 516-864-3700
§ Tenor, 17020 W. Rogers Dr., New Berlin, WI 53151 414-782-3800
Timeco, Inc., 1035 - 26th St., P.O. Box 8036, Huntington, WV 25705 304-523-5149
Tri-Tronics Co. Inc., 13420 Wright Cir., Tampa, FL 33624 813-855-4453
Vanguard Relay Corp., 225 Cortland St., Lindenhurst, NY 11757 516-226-5000
§ Veeder-Root, 70 Sargeant St., Hartford, CT 06102 203-527-7201
Xanadu Controls, Electroid Corp., 45 Fadem Rd., Springfield, NJ 07081-3189 201-467-8100
§ Zenith Controls, 830 West 40th St., Chicago, IL 60609 312-247-6400

Timing Systems, Oscillators-2300 – *See Vol. A*

Tool Kits & Sets-5400 – *See Vol. C*

Tools & Assembly, Permanent Magnet-1850 – *See Vol. A*

Tools & Kits, Contact Insertion/Removal-5400 – *See Vol. C*

Tools, Alignment & Tuning-5400 – *See Vol. C*

Tools, Cable Tie-5400 – *See Vol. C*

Tools, Connector-5400 – *See Vol. C*

Tools, Crimping & Swaging-5400 – *See Vol. C*

Tools, Heat Sealing-5400 – *See Vol. C*

Tools, Lead Bending & Insertion-5400 – *See Vol. C*

Tools, Magnetic Pickup-5400 – *See Vol. C*

Tools, Marking, Numbering, Engraving-5400 – *See Vol. C*

Tools, Parts Handling, Vacuum Operated-5400 – *See Vol. C*

Tools, Relay Servicing-5400 – *See Vol. C*

Tools, Resistance Soldering – See Soldering Equip., Resistance (Vol. C)

Tools, Wire Wrapping-5400 – *See Vol. C*

Torches, Soldering, Welding & Accessories-4600 – *See Vol. C*

Toroids – See Coils, Toroidal (Vol. A)

Torque Control – See Knobs, Torque, Incremental, Ratio Drive (Vol. C)

Torquers, Gyro – See Motors, Torque (Vol. B)

Totalizers, Digital-2200

C-Tek Inc., 4 Railroad Ave., Wakefield, MA 01880, 617-246-1720 ... D•1114-1115
§ Kessler-Ellis Prods., 120 1st Ave., Atlantic Highlands, NJ 07716, 201-291-0500;800-631-2165 .... D•1124-1125
§ NES, Inc. (Nationwide Electronic Systems), 3003 Wakefield, Carpentersville, IL 60110, 312-426-5900 .... D•1366
Airpax Corp., Cheshire Div., Cheshire Indl. Pk., Box E, Cheshire, CT 06410 203-272-0301
Applied Control, 1275 Bloomfield Ave., Fairfield, NJ 07006-2828 201-227-5454
Applied Sys., 26401 Harper Ave., St. Clair Shores, MI 48081 313-779-8700
Ballantine Labs., 90 Fanny Rd., Boonton, NJ 07005 201-335-0900
Bristol Babcock Inc., 40 Bristol St., Waterbury, CT 06708 203-575-3000
CDS - Colorado Data Sys., 3301 W. Hampden, Unit C, Englewood, CO 80110 303-762-1640
§† Data Precision Corp., Electronics Ave., Danvers, MA 01923 617-246-1600
§ Digitec Corp., 918 Woodley Rd., P.O. Box 458, Dayton, OH 45401 513-254-6251
§ Dynamics, Div. of Waugh Controls Corp., 9001 Fullbright Ave., Chatsworth, CA 91311 818-998-8281
§ Dynapar, 1675 Delany Rd., Gurnee, IL 60031 312-662-2666
§ Eagle Signal Controls, Mfg. Div. Gulf & Western Inds., Box 16100, Austin, TX 78761 512-837-8300
§ Electromatic Controls Corp., 2495 Pembroke Road, Hoffman Estates, IL 60195-2010 312-882-5757
§ Electro-Numerics, 1811 Reynolds, Irvine, CA 92714 714-250-1501
† Flow Technology, Inc., Box 21346, Phoenix, AZ 85036 602-437-1315
Fluke, John, Mfg. Co., Box C9090, MS 250C, Everett, WA 98206 206-356-5400
FSI/Fork Standards Inc., 666 Western Ave., Lombard, IL 60148 .... 312-231-3511; 312-932-9380
Hecon Corp., 31 Park Rd., Tinton Falls, NJ 07724 201-542-9200
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
Innovatek Microsystems, Inc., Smithfield Rd., R1 Box 104, Millerton, NY 12546-9720 914-373-9003
IVO Inds., Inc., 201 Industrial Way W., P.O. Drawer 917, Eatontown, NJ 07724 201-542-5151
§ Landis & Gyr, Inc., 4 Westchester Plaza, Elmsford, NY 10523 914-592-4400
Leeds & Northrup Instrs., A Unit of General Signal Corp., Sumneytown Pike, North Wales, PA 19454 215-643-2000
§ Newport Electronics, 630 E. Young St., Santa Ana, CA 92705 714-540-4914
§ Non-Linear Systems/Div. of Kaypro Corp., 533 Stevens Ave., Solana Bch., CA 92075 619-481-3900
Racal-Dana Instrs. Inc., 4 Goodyear St., Irvine, CA 92715 714-859-8999
§ Richard-Lee Co., Box 724, New Providence, NJ 07974 201-276-0710
Scientific Columbus, Inc., Esterline Corp., 1900 Arlingate La., Columbus, OH 43228 614-274-7160
Sensor Corp., Box 140, Scottdale, PA 15683 412-887-4080
Texmate, Inc., 348 S. Cedros Ave., P.O. Box 2000, Solana Beach, CA 92075 619-481-7177
§† Veeder-Root, 70 Sargeant St., Hartford, CT 06102 203-527-7201

Touch Monitors-2000

AMP Incorporated, Box 3608, Harrisburg, PA 17105 717-564-0100
† Bowmar Instrument Corp., Aerospace Div., 8000 Bluffton Rd., Ft. Wayne, IN 46809 219-747-3121
† Carroll Touch Technology, P.O. Box 1309, Round Rock, TX 78680 512-244-3500
General Digital Corp., 700 Burnside Ave., E. Hartford, CT 06108 203-528-9041
General Digital Industries Inc., 7702 Governors Dr. W., Huntsville, AL 35805 205-837-8305
† Hallmark Nameplate, Inc./Electropanel Co., 1855 New Highway, Farmingdale, NY 11735 516-454-0700
Industrial Elctrn. Engrs., Inc., 7740 Lemona Ave., Van Nuys, CA 91405 818-787-0311
MSC Prods./Eaton Corp., 1640 Monrovia St., Costa Mesa, CA 92627 714-642-2427
† Orbit Instrument Corp., 80 Cabot Ct., Hauppauge, NY 11788 516-435-8300
§ Refac Elctrns. Corp., P.O. Box 809, Winsted, CT 06098 203-379-2731
§ Sun-Flex Co., Inc., 20 Pimentel Ct., Novato, CA 94947 415-883-1221
† Touch Technology, Inc., 107 Gibralter Street, Annapolis, MD 21401 301-269-6181
† Zenith CRT & Components Operations, 1000 Milwaukee Ave., Glenview, IL 60025 312-391-7733
Zenith Systems & Components Group, Zenith Electronics Corp., 1000 Milwaukee Ave., Glenview, IL 60025 312-391-7733

Touch Panels-2000

AMP Incorporated, Box 3608, Harrisburg, PA 17105 717-564-0100
† Bowmar Instrument Corp., Aerospace Div., 8000 Bluffton Rd., Ft. Wayne, IN 46809 219-747-3121
† Carroll Touch Technology, P.O. Box 1309, Round Rock, TX 78680 512-244-3500
† Elographics, 105 Randolph Rd., Oak Ridge, TN 37830 615-482-4100
General Digital Corp., 700 Burnside Ave., E. Hartford, CT 06108 203-528-9041
† Hallmark Nameplate, Inc./Electropanel Co., 1855 New Highway, Farmingdale, NY 11735 516-454-0700
† Industrial Elctrn. Engrs., Inc., 7740 Lemona Ave., Van Nuys, CA 91405 818-787-0311
Interaction Systems Inc., 24 Munroe St., Newtonville, MA 02160 617-964-5300
MSC Prods./Eaton Corp., 1640 Monrovia St., Costa Mesa, CA 92627 714-642-2427
† Orbit Instrument Corp., 80 Cabot Ct., Hauppauge, NY 11788 516-435-8300
§ Refac Elctrns. Corp., P.O. Box 809, Winsted, CT 06098 203-379-2731
§ Sun-Flex Co., Inc., 20 Pimentel Ct., Novato, CA 94947 415-883-1221
† Touch Technology, Inc., 107 Gibralter Street, Annapolis, MD 21401 301-269-6181
† Zenith CRT & Components Operations, 1000 Milwaukee Ave., Glenview, IL 60025 312-391-7733
Zenith Systems & Components Group, Zenith Electronics Corp., 1000 Milwaukee Ave., Glenview, IL 60025 312-391-7733

Touch Terminals-2000

AMP Incorporated, Box 3608, Harrisburg, PA 17105 717-564-0100
† Bowmar Instrument Corp., Aerospace Div., 8000 Bluffton Rd., Ft. Wayne, IN 46809 219-747-3121
† Carroll Touch Technology, P.O. Box 1309, Round Rock, TX 78680 512-244-3500
General Digital Corp., 700 Burnside Ave., E. Hartford, CT 06108 203-528-9041
General Digital Industries Inc., 7702 Governors Dr. W., Huntsville, AL 35805 205-837-8305
† Hallmark Nameplate, Inc./Electropanel Co., 1855 New Highway, Farmingdale, NY 11735 516-454-0700
Industrial Elctrn. Engrs., Inc., 7740 Lemona Ave., Van Nuys, CA 91405 818-787-0311
Interaction Systems Inc., 24 Munroe St., Newtonville, MA 02160 617-964-5300
MSC Prods./Eaton Corp., 1640 Monrovia St., Costa Mesa, CA 92627 714-642-2427
† Orbit Instrument Corp., 80 Cabot Ct., Hauppauge, NY 11788 516-435-8300
§ Refac Elctrns. Corp., P.O. Box 809, Winsted, CT 06098 203-379-2731
§ Sun-Flex Co., Inc., 20 Pimentel Ct., Novato, CA 94947 415-883-1221
† Touch Technology, Inc., 107 Gibralter Street, Annapolis, MD 21401 301-269-6181
† Zenith CRT & Components Operations, 1000 Milwaukee Ave., Glenview, IL 60025 312-391-7733
Zenith Systems & Components Group, Zenith Electronics Corp., 1000 Milwaukee Ave., Glenview, IL 60025 312-391-7733

Tracers, Curve-2900

Continental Resources, Inc., 175 Middlesex Tpke., Bedford, MA 01730 617-275-0850
§ Heath Co., Benton Harbor, MI 49022 616-982-3886
§ Leader Instrs. Corp., 380 Oser Ave., Hauppauge, NY 11788-3694 516-231-6900
§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 215-673-5600
Tektronix, Inc., P. O. Box 500, Y3-314, Beaverton, OR 97077 .... 800-547-1512;Oregon only 800-452-1877
§ Tucker Elctrns., Box 461966, Garland, TX 75046 .... 214-348-8800;800-527-4642

Tracers, Signal – See Testers, Signal Tracing (Vol. D)

Trackballs, XY Positioning-2200

Litton Encoder Div., 20745 Nordhoff St., Chatsworth, CA 91311, 818-341-6161 .... B•1801
† Measurement Sys., Inc., 121 Water St., Norwalk, CT 06854, 203-838-5561 .... D•1126

† Orbit Instrument Corp., 80 Cabot Ct., Hauppauge, NY 11788, 516-435-8300 ... B•1735, D•1129
† Clifton Precision, Litton Systems, Inc., Marple at Broadway, Clifton Hgts., PA 19018 ... 215-622-1000
Disc Instruments, Honeywell, 102 E. Baker St., Costa Mesa, CA 92626 .. 714-979-5300
§ Mouse Sys. Corp., 2336H Walsh Ave., Santa Clara, CA 95051 ... 408-988-0211
† Orbit Instrument of Cal., 6431 Global Dr., Cypress, CA 90630 ... 714-527-0561

Trackers (MIL), Laser-3475

GTE Sys.-Sylvania Sys. Grp., Western Div., P.O. Box 7188, Mountain View, CA 94039 ... 415-966-2000

Tracking Systems (MIL)-3475

† ABA Electromechanical Sys. Inc., Box 500, Pinellas Pk., FL 34290-0500 ... 813-541-6681
† Aeroflex Labs., Magnetic Prods. Div.,, 35 South Service Road, Plainview, NY 11803 ... 516-694-6700
† Control Technology Co., 41-16 29th St., Long Island City, NY 11101 718-361-2133
Datron Systems, Inc., 200 West Los Angeles Ave., Simi Valley, CA 93065-1650 ... 805-584-1717
† Electrac, Inc., 1614 Orangethrope Way, Anaheim, CA 92801 ... 714-879-6021
† Electro-Magnetic Processes, Inc., 9616 Owensmouth Ave., Chatsworth, CA 91311 ... 818-882-6333
† Electrospace Sys., Inc., P. O. Box 831359, Richardson, TX 75083-1359 ... 214-783-2004
† E-Systems, Greenville Div., P.O. Box 1056, Greenville, TX 75401 ... 214-457-4694
† Honeywell Inc., Aerospace & Defense Grp., Honeywell Plaza, Minneapolis, MN 55408 ... 612-870-5186
† Parabam, Inc., 3017 E. Las Hermanas St., Rancho Dominguez, CA 90221 ... 213-537-1771
† Power Sys. Grp., Rantec Div., Emerson Elec., 9401 Oso Ave., Chatsworth, CA 91311 ... 818-885-8223
† Radio Resch. Instr. Co., Inc., Two Lake Ave. Extension, Danbury, CT 06811-5295 ... 203-792-6666
Resdel Engrg., 300 E. Live Oak Ave., Arcadia, CA 91006 ... 213-684-2600
† Tasker Systems, 20131 Sunburst St., Chatsworth, CA 91311 ... 213-341-3010
Teledyne/Geotech, 3401 Shiloh Rd., Garland, TX 75041 ... 214-271-2561
† Vega Precision Labs., 800 Follin La., Vienna, VA 22180 ... 703-938-6300
† Whittaker Corp., 10880 Wilshire Blvd., Los Angeles, CA 90024 ... 213-475-9411

Trainers (MIL), ECM-3475

Digital Radio Corp., 8901 La Cienega Blvd., Inglewood, CA 90301 ... 213-670-8611
† E-Systems, Greenville Div., P.O. Box 1056, Greenville, TX 75401 ... 214-457-4694
† Radio Resch. Instr. Co., Inc., Two Lake Ave. Extension, Danbury, CT 06811-5295 ... 203-792-6666

Trainers (MIL), Elint-3475

Digital Radio Corp., 8901 La Cienega Blvd., Inglewood, CA 90301 ... 213-670-8611
† E-Systems, Greenville Div., P.O. Box 1056, Greenville, TX 75401 ... 214-457-4694
† Flight Systems, Inc., Tracor, Inc., 1091 Dove St., Newport Beach, CA 92660 ... 714-833-9661
† Locus, Box 740, State College, PA 16804 ... 814-466-6275

Trainers (MIL), EW-3475

† Control Technology Co., 41-16 29th St., Long Island City, NY 11101 718-361-2133
Digital Radio Corp., 8901 La Cienega Blvd., Inglewood, CA 90301 ... 213-670-8611
† E-Systems, Greenville Div., P.O. Box 1056, Greenville, TX 75401 ... 214-457-4694
† Flight Systems, Inc., Tracor, Inc., 1091 Dove St., Newport Beach, CA 92660 ... 714-833-9661
† Locus, Box 740, State College, PA 16804 ... 814-466-6275
† Radio Resch. Instr. Co., Inc., Two Lake Ave. Extension, Danbury, CT 06811-5295 ... 203-792-6666
Republic Electronics Co., 575 Broad Hollow Rd., Melville, NY 11747 516-249-1414

Trainers (MIL), Maritime-3475

† Control Technology Co., 41-16 29th St., Long Island City, NY 11101 718-361-2133
† Honeywell Inc., Aerospace & Defense Grp., Honeywell Plaza, Minneapolis, MN 55408 ... 612-870-5186

Training Systems (MIL)-3475

† ABA Electromechanical Sys. Inc., Box 500, Pinellas Pk., FL 34290-0500 ... 813-541-6681
† Austin Electronics, The Austin Co., 17-01 Pollitt Drive, Fair Lawn, NJ 07410 ... 201-794-0200
§ Computer System Assocs., 7564 Trade St., San Diego, CA 92121 ... 619-566-3911
† Control Technology Co., 41-16 29th St., Long Island City, NY 11101 718-361-2133
† Data-Design Labs., P.O. Box 711, 7925 Center Ave., Cucamonga, CA 91730 ... 714-987-2511
† E M S Development Corp., 200 Allen Blvd., Farmingdale, NY 11735 ... 516-694-2886
† E-Systems, Greenville Div., P.O. Box 1056, Greenville, TX 75401 ... 214-457-4694
† Hazeltine Corp., 500 Commack Rd., Commack, NY 11725 ... 516-462-5100
† Honeywell Inc., Aerospace & Defense Grp., Honeywell Plaza, Minneapolis, MN 55408 ... 612-870-5186
Image Makers of Pittsford, 6 Wood Gate, Pittsford, NY 14534 ... 716-385-4567
† Microwave/Sys., 1 Adler Dr., E. Syracuse, NY 13057 ... 315-437-9951
† Regency Systems, Inc., 3200 Farber Drive, Champaign, IL 61820 ... 217-398-8067
† Simulaser Corp., 15703 E. Valley Blvd., City of Industry, CA 91744 ... 818-369-1355
† Systems Resch. Labs., Inc., 2800 Indian Ripple Rd., Dayton, OH 45440 .. 513-426-6000

Transceivers-1900

Motorola Semiconductor Prods. Sector, Adv. 72, Box 20912, Phoenix, AZ 85036, 602-244-6900 ... A•1690
§ American Laser Sys., Inc., 106 Fowler Rd., Goleta, CA 93117 ... 805-967-0423
Communication Assocs., 200 McKay Rd., Huntington Sta., NY 11746 516-271-0800
Dymec, 8 Lowell Ave., Winchester, MA 01890 ... 617-729-7870
† Microwave/Sys., 1 Adler Dr., E. Syracuse, NY 13057 ... 315-437-9951
TCL Incorporated, 41829 Albrae Street, Fremont, CA 94538 ... 415-657-3800
§ Ten-Tec, Inc., Industrial Park, Sevierville, TN 37862 ... 615-453-7172
Toyo Comm. Equip. Co., Ltd., No. 8 Mori Bldg., 20-4, Nichi-Shimbashi, 3-Chome Minato-Ku, TOKYO, JAPAN 105 ... 03-459-7320/03-459-7310

Transceivers (MIL)-2440 — *See Vol. B*

Transducer Elements-5500 — *See Vol. B*

Transducers, Acceleration — See Accelerometers (Vol. B)

Transducers, Audio-5500 — *See Vol. B*

Transducers, Ceramic-5500 — *See Vol. B*

Transducers, Displacement-5500 — *See Vol. B*

Transducers, Flow-5500 — *See Vol. B*

Transducers, Force-5500 — *See Vol. B*

Transducers, Frequency — See Transducers, Volt, Watt, Current, etc. (Vol. B)

Transducers, Humidity-5500 — *See Vol. B*

Transducers, Tilt - Also see Inclinometers-5500 — *See Vol. B*

Transducers, Incremental Digital Position, Rotary — See Encoders, Shaft Angle (Vol. B)

Transducers, Magnetic Pickup-5500 — *See Vol. B*

Transducers, Piezoelectric-5500 — *See Vol. B*

Transducers, Position, Linear-5500 — *See Vol. B*

Transducers, Position, Rotary-5500 — *See Vol. B*

Transducers, Power — See Transducers, Volt, Watt, Currents, etc. (Vol. B)

Transducers, Pressure-5500 — *See Vol. B*

Transducers, Proximity-5500 — *See Vol. B*

Transducers, Sonic-5500 — *See Vol. B*

Transducers, Strain Gauge-5500 — *See Vol. B*

Transducers, Temperature-5500 — *See Vol. B*

Transducers, Thermoelectric — See Transducers, Temperature (Vol. B)

Transducers, Torque-5500 — *See Vol. B*

Transducers, Ultrasonic-5500 — *See Vol. B*

Transducers, Velocity-5500 — *See Vol. B*

Transducers, Vibration-5500 — *See Vol. B*

Transducers, Volt, Watt, Current VAR, Power Factor, Frequency-5500 — *See Vol. B*

Transformers, Audio-5600 — *See Vol. A*

Transformers, Autotransformer-5600 — *See Vol. A*

Transformers, Bias — See Transformers, Power (Vol. A)

Transformers, Bridging — See Transformers, Matching (Vol. A)

Transformers, Chip-5600 — *See Vol. A*

Transformers, Chopper-5600 — *See Vol. A*

Transformers, Constant Voltage-5600 — *See Vol. A*

Transformers, Control — See Transformers, Power (Vol. A), Transformers, Synchro, Control (Vol. A)

Transformers, Converter, DC To DC-5600 — *See Vol. A*

Transformers, Current — See Transformers, Instrument (Vol. A)

Transformers, Data — See Transformers, Telephone Coupling (Vol. A)

Transformers, Decade-5600 — *See Vol. A*

Transformers, Differential-5600 — *See Vol. A*

Transformers, Discriminator-5600 — *See Vol. A*

Transformers, Donut – See Transformers, Toroidal (Vol. A)

Transformers, Driver-5600 – *See Vol. A*

Transformers, Ferroresonant-5600 – *See Vol. A*

Transformers, Filament-5600 – *See Vol. A*

Transformers, Flyback-5600 – *See Vol. A*

Transformers, Foil Wound – See Coils, Foil Wound (Vol. A)

Transformers, 400 Hz-5600 – *See Vol. A*

Transformers, High Voltage (1,000 Volts & Over)-5600 – *See Vol. A*

Transformers, Horizontal Sweep-5600 – *See Vol. A*

Transformers, Hybrid-5600 – *See Vol. A*

Transformers, IF-5600 – *See Vol. A*

Transformers, Input-5600 – *See Vol. A*

Transformers, Instrument-5600 – *See Vol. A*

Transformers, Interstage-5600 – *See Vol. A*

Transformers, Inverter-5600 – *See Vol. A*

Transformers, Isolation-5600 – *See Vol. A*

Transformers, Line-5600 – *See Vol. A*

Transformers, Linear Variable-Differential – See Transformers, Differential (Vol. A)

Transformers, Magnetic Amplifier-5600 – *See Vol. A*

Transformers, Matching-5600 – *See Vol. A*

Transformers, Microminiature-5600 – *See Vol. A*

Transformers, Microphone-5600 – *See Vol. A*

Transformers, Mixing-5600 – *See Vol. A*

Transformers, Modulation-5600 – *See Vol. A*

Transformers, Output-5600 – *See Vol. A*

Transformers, Plate-5600 – *See Vol. A*

Transformers, Plug-in-5600 – *See Vol. A*

Transformers, Power-5600 – *See Vol. A*

Transformers, Power Distribution-5600 – *See Vol. A*

Transformers, Printed Circuit Mounting-5600 – *See Vol. A*

Transformers, Programmable Ratio-5600 – *See Vol. A*

Transformers, Pulse-5600 – *See Vol. A*

Transformers, Ratio-5600 – *See Vol. A*

Transformers, RF-5600 – *See Vol. A*

Transformers, Reactor – See Reactors, Filter (Vol. A)

Transformers, Rectifier-5600 – *See Vol. A*

Transformers, Reference-5600 – *See Vol. A*

Transformers, Rotary-5600 – *See Vol. A*

Transformers, Scott T-5600 – *See Vol. A*

Transformers, Servo-5600 – *See Vol. A*

Transformers, Split Bobbin-5600 – *See Vol. A*

Transformers, Step Down, Step Up – See Transformers, Power (Vol. A)

Transformers, Synchro Control-5600 – *See Vol. A*

Transformers, Telephone Coupling-5600 – *See Vol. A*

Transformers, Toroidal-5600 – *See Vol. A*

Transformers, Transistor-5600 – *See Vol. A*

Transformers, Trigger – See Transformers, Pulse (Vol. A)

Transformers, Variable-5600 – *See Vol. A*

Transformers, Voltage Dividing-5600 – *See Vol. A*

Transformers, Voltage Regulating-Also See Regulators & Stabilizers, Voltage-5600 – *See Vol. A*

Transformers, Wall Plug-in – See Power Supplies, Plug-in (Vol. D)

Transformers, Wideband-5600 – *See Vol. A*

Transformers (MIL), Audio, Power, RF-2440 – *See Vol. B*

Transformers (MIL), Pulse & Variable-2440 – *See Vol. B*

Transistor Arrays-4800 – *See Vol. A*

Transistor, Diode, Thyristor Heat Dissipators – See Heat Sinks, Transistor (Vol. C)

Transistors, Bipolar-Also See Transistors, Silicon-4800 – *See Vol. A*

Transistors, Chip, Unpackaged-4800 – *See Vol. A*

Transistors, Darlington-4800 – *See Vol. A*

Transistors, Dual-4800 – *See Vol. A*

Transistors, Field Effect-4800 – *See Vol. A*

Transistors, Germanium-4800 – *See Vol. A*

Transistors, Low Noise, GaAs, FETs - Also See Transistors, Microwave-4800 – *See Vol. A*

Transistors, Microwave-4800 – *See Vol. A*

Transistors, Photo (Incl. Arrays)-3700 – *See Vol. B*

Transistors, Power-4800 – *See Vol. A*

Transistors, Power, Bipolar-4800 – *See Vol. A*

Transistors, Power, FET-4800 – *See Vol. A*

Transistors, Pressure Sensitive-4800 – *See Vol. A*

Transistors, RF-4800 – *See Vol. A*

Transistors, Silicon-4800 – *See Vol. A*

Transistors, Switching-4800 – *See Vol. A*

Transistors, Unijunction-4800 – *See Vol. A*

Transistors (MIL)-2440 – *See Vol. B*

Translators, Data-2325

Interface Engrg., 386 Lindelof Ave., Stoughton, MA 02072, 617-344-7383 .... D•1156-1157

† TRAK Systems, Div. TRAK Microwave Corp., 4722 Eisenhower Blvd., Dept. E-5, Tampa, FL 33614, 813-884-1411 .... D•1080

Analogic Corp., 8 Centennial Dr., Peabody, MA 01961 ..... 617-532-5660;617-777-4500; 617-246-0300;800-451-1

† Control Technology Co., 41-16 29th St., Long Island City, NY 11101 718-361-2133

Data Translation, 100 Locke Dr., Marlboro, MA 01752 617-481-3700

Hughes Aircraft Co, Aerospace Grps./Support Sys., P.O. Box 90515, Los Angeles, CA 90009 213-670-1515

Hughes Aircraft Co., Microelctrn. Sys. Div., 2601 Campus Dr., Irvine, CA 92715 714-752-3800

ILC Data Device Corp., 105 Wilbur Pl., Bohemia, NY 11716 516-567-5600

† Metric Sys., 645 Anchors St., Ft. Walton Beach, FL 32548 904-244-9600

§ NES, Inc. (Nationwide Electronic Systems), 3003 Wakefield, Carpentersville, IL 60110 312-426-5900

Precision Filters, 240 Cherry St., Ithaca, NY 14850 607-277-3550

Scientific Columbus, Inc., Esterline Corp., 1900 Arlingate La., Columbus, OH 43228 614-274-7160

§† Superior Elec. Co., 383 Middle St., Bristol, CT 06010 203-582-9561

Translators, Frequency Band-2700 – *See Vol. A*

Translators, Time Code-2000

† Datum Inc., Timing/Aacom Divisions, 1363 S. State College Blvd., Anaheim, CA 92806, 714-533-6333 .... D•1148

Frequency and Time Systems, Inc., DATUM, INC., 34 Tozer Rd., Beverly, MA 01915, 617-927-8220 .... D•1148

† TRAK Systems, Div. TRAK Microwave Corp., 4722 Eisenhower Blvd., Dept. E-5, Tampa, FL 33614, 813-884-1411 .... D•1076-1081

Austron, Inc., P.O. Box 14766, Exit 248 N. IH 35, Austin, TX 78761 512-251-2341

§ Chrono-log Corp., 2 W. Park Rd., Havertown, PA 19083 215-853-1130

Datachron Inc., 3186 J Airway Ave., Costa Mesa, CA 92626 714-751-2211

§ ESE, 142 Sierra St., El Segundo, CA 90245 213-322-2136

Transmission Line, Wire & Cable – See Cable, Transmission Line (Vol. C)

Transmission Systems, Data-2000

† GRIM Corporation, Box 67, Medford, NJ 08055, 609-267-7950 .... D•1051
† MERET, Inc., 1815 24th St., Santa Monica, CA 90404-4998, 213-828-7496 .... B•1121
† Alden Electronics, Inc., 40 Washington Street, Westboro, MA 01581 617-366-8851
§ American Laser Sys., Inc., 106 Fowler Rd., Goleta, CA 93117 805-967-0423
§† Applied Data Communications, 14272 Chambers Rd., Tustin, CA 92680 714-731-9000
Applied Micro Technlg., A Burr Brown Co., 3669 E. 44th Street, Tucson, AZ 85713 602-622-8605
Applied Sys., 26401 Harper Ave., St. Clair Shores, MI 48081 313-779-8700
Artel Communications Corp., 93 Grand St., Worcester, MA 01602 617-752-5690
Austin Electronics, The Austin Co., 17-01 Pollitt Drive, Fair Lawn, NJ 07410 201-794-0200
† Aydin Corp., 700 Dresher Rd., Horsham, PA 19044 215-657-7510
Aydin Microwave, 75 East Trimble Rd., San Jose, CA 95131 408-946-5600
† Cardion Elctrns., Div. of Gen. Sig. Conts., Inc. Unit of Gen. Sig. Corp., Long Island Expwy., Woodbury, NY 11797 516-921-7300
§ Coastcom, P.O. Box 27068, Concord, CA 94527 415-825-7500
§ Comspec Inc., 10700 Hammerly 5120, Houston, TX 77043 713-461-4487
Continental Data Sys., 131 N. Ludlow St., Dayton, OH 45402 513-222-8626
Control Technology Co., 41-16 29th St., Long Island City, NY 11101 718-361-2133
Dantel, 2991 N. Argyle Ave., Fresno, CA 93727 209-292-1111
§† Data-Control Sys., Commerce Dr., Box 860, Danbury, CT 06810 203-743-9241
Data Signal Corp., 149 California St., Newton, MA 02158 617-926-5080
Datum Inc., Timing/Aacom Divisions, 1363 S. State College Blvd., Anaheim, CA 92806 714-533-6333
Digital Radio Corp., 8901 La Cienega Blvd., Inglewood, CA 90301 213-670-8611
Digital Transmission Techniques, Inc., P.O. Box 1847, Wayne, NJ 07470 201-831-1615
Dio-Rey, Div. of Info-Lite, 422 Cliff St., Fairview, NJ 07022 201-941-4455
EOTec Corp., 420 Frontage Road, W. Haven, CT 06516 203-934-7961
Fibronics Intl. Inc., 325 Stevens St., Hyannis, MA 02601 617-778-0700
† Foundation Instruments Inc., 24 Colonnade Rd., Nepean, ON, CANADA K2E 7J6 613-226-4000
G B Instruments Inc., 2030 Coolidge St., Hollywood, FL 33020 305-920-0225
† Honeywell, Process Control Div., 1100 Virginia Dr., Ft. Washington; PA 19034 .... 800-321-5111, Ext. 596
† Hughes Aircraft Co., Microelctrn. Sys. Div., 2601 Campus Dr., Irvine, CA 92715 714-752-3800
Hy-Cal Engrg., 9650 Telstar Ave., El Monte, CA 91731 213-444-4000
IPAC Grp., 3047 Indl. Blvd., Bethel Pk., PA 15102 412-831-9200
† LNR Communications, Inc., 180 Marcus Blvd., Hauppauge, NY 11788 ... 516-273-7111
Metric Sys., 645 Anchors St., Ft. Walton Beach, FL 32548 904-244-9600
§ NES, Inc. (Nationwide Electronic Systems), 3003 Wakefield, Carpentersville, IL 60110 312-426-5900
North Hills Elctrns., 1 Alexander Pl., Glen Cove, NY 11542 516-671-5700
† Optelecom, 15940 Luanne Dr., Gaithersburg, MD 20877 301-840-2121
Potter Instr., 10 Main St., Gonic, NH 03867 603-332-1991
Proteon, Inc., 4 Tech Circle, Natick, MA 01760 617-655-3340
Raychem Corp., Elctrns. Grp., 300 Constitution Dr., Menlo Park, CA 94025 415-361-3860
RCI/Data, 1992 Lakewood Rd., Toms River, NJ 08753 201-341-8361
Resdel Engrg., 300 E. Live Oak Ave., Arcadia, CA 91006 213-684-2600
RFL Inds., A Dowty Grp. Co./Comms. Div., Powerville Rd., Boonton, NJ 07005 201-334-3100
RHG Electronics Lab., Inc., 161 E. Industry Ct., Deer Park, NY 11729 516-242-1100
Rockwell Intl., Commercial Elctrns. Opers., 1200 N. Alma Rd., Richardson, TX 75081 214-996-5000
Schneider Instr., 8115 Camargo Rd., Cincinnati, OH 45243 513-561-6803
Telautograph, 8700 Bellanca Ave., Los Angeles, CA 90045 213-641-3690
Timeplex, Inc., 400 Chestnut Ridge Rd., Woodcliff Lake, NJ 07675 201-930-4600

Transmitters, Fiber Optic-3700 — *See Vol. B*

Transmitters, Fixed Frequency-1900

Datum Inc., Timing/Aacom Divisions, 1363 S. State College Blvd., Anaheim, CA 92806, 714-533-6333 .... D•1050
† AEROCOM, 3090 S.W. 37th Ave., Miami, FL 33133 305-448-6503
† Applied Research, Inc., 160 Dupont St., Plainview, NY 11803 516-349-9200
† A.R.F. Prods., 2559 75th St., Boulder, CO 80301 303-443-4844
† Argent Elctrns., 3245 S. County Rd., 25A, Troy, OH 45373 513-335-0031
† Aydin Microwave, 75 East Trimble Rd., San Jose, CA 95131 408-946-5600
† Aydin Vector Div., Box 328, Newtown, PA 18940 215-968-4271
§ Brelonix, 106 No. 36th St., Seattle, WA 98103 206-633-1964
† Cincinnati Elctrns., 2630 Glendale Milford Rd., Cincinnati, OH 45241 513-733-6100
† Collins Avionics Divisions, Rockwell Intl., 400 Collins Rd. NE, Cedar Rapids, IA 52498 319-395-1000
Communication Assocs., 200 McKay Rd., Huntington Sta., NY 11746 516-271-0800
Continental Electronics Mfg. Co., P.O. Box 270879, Dallas, TX 75227 214-381-7161
Electrocom Inds., 1105 N. Ironwood Dr., S. Bend, IN 46615 219-232-2743
† Farinon Div., Harris Corp., 1691 Bayport, San Carlos, CA 94070 415-594-3000
† M/A-COM Microwave Power Dvcs., 330 Oser Ave., Hauppauge, NY 11788 516-231-1400
† MCL, Inc., 10 North Beach Ave., La Grange, IL 60525-2092 312-354-4350
† Microwave/Sys., 1 Adler Dr., E. Syracuse, NY 13057 315-437-9951
§ Palomar Engrs., Box 455, Escondido, CA 92025 619-747-3343
§ Pathcom, Inc., Pace Two-Way Radio Prods., 24105 S. Frampton Ave., Harbor City, CA 90710 213-325-1290
§† REPCO, 2421 N. Orange Blossom Trail, Box 7065, Orlando, FL 32854 .. 305-843-8484
Resdel Engrg., 300 E. Live Oak Ave., Arcadia, CA 91006 213-684-2600
RHG Electronics Lab., Inc., 161 E. Industry Ct., Deer Park, NY 11729 516-242-1100
§ Seaboard Elctrns., 70 Church St., New Rochelle, NY 10805 914-235-8073
Solid State Elctrns. Corp., 18646 Parthenia St., Northridge, CA 91324 ... 818-993-8257
Telcom Inc., 8027 Leesburg Pike, Vienna, VA 22180 703-893-7700

Transmitters, Laser-3700 — *See Vol. B*

Transmitters, Position-1900

§ Computer Conversions Corp., 6 Dunton Ct., E. Northport, NY 11731 516-261-3300

Transmitters, Process Control (Temperature, Pressure, Flow, etc.)-5500 — *See Vol. B*

Transmitters, Radar — See Radar System Components (Vol. A)

Transmitters, Telemetry-1900

Applied Research, Inc., 160 Dupont St., Plainview, NY 11803, 516-349-9200 .... A•1703
Datum Inc., Timing/Aacom Divisions, 1363 S. State College Blvd., Anaheim, CA 92806, 714-533-6333 .... D•1050
NES, Inc. (Nationwide Electronic Systems), 3003 Wakefield, Carpentersville, IL 60110, 312-426-5900 .... D•1069,1127,1159
§ Newport Electronics, 630 E. Young St., Santa Ana, CA 92705, 714-540-4914 .... D•1371
American Electronic Labs., Box 552, Lansdale, PA 19446 215-822-2929
§ American Laser Sys., Inc., 106 Fowler Rd., Goleta, CA 93117 805-967-0423
Aydin Corp., 700 Dresher Rd., Horsham, PA 19044 215-657-7510
† Aydin Vector Div., Box 328, Newtown, PA 18940 215-968-4271
Bristol Babcock Inc., 40 Bristol St., Waterbury, CT 06708 203-575-3000
Continental Data Sys., 131 N. Ludlow St., Dayton, OH 45402 513-222-8626
Crompton Instrs., Hawker Siddley, 2763 Old Higgins Rd., Elk Grove Village, IL 60007 312-593-1107
Dantel, 2991 N. Argyle Ave., Fresno, CA 93727 209-292-1111
Dio-Rey, Div. of Info-Lite, 422 Cliff St., Fairview, NJ 07022 201-941-4455
† EDMAN Corp., Subsidiary of Rospatch, 7500 Main St., P.O. Box 750, Fishers, NY 14453-0750 716-924-4000
§ Emergency Beacon Corp., 15 River St., New Rochelle, NY 10801 914-235-9400
Erbtec Engineering, Inc., 5680 Valmont Rd., Boulder, CO 80301 303-447-8750
Hughes Aircraft Co, Aerospace Grps./Support Sys., P.O. Box 90515, Los Angeles, CA 90009 213-670-1515
Hughes Aircraft Co., Microelctrn. Sys. Div., 2601 Campus Dr., Irvine, CA 92715 714-752-3800
Kinemetrics, Inc., 222 Vista Ave., Pasadena, CA 91107 818-795-2220
M/A-COM Microwave Power Dvcs., 330 Oser Ave., Hauppauge, NY 11788 516-231-1400
† NSD, 10936 Portal Dr., Los Alamitos, CA 90720 714-527-4896
RCI/Data, 1992 Lakewood Rd., Toms River, NJ 08753 201-341-8361
§ REPCO, 2421 N. Orange Blossom Trail, Box 7065, Orlando, FL 32854 .. 305-843-8484
Resdel Engrg., 300 E. Live Oak Ave., Arcadia, CA 91006 213-684-2600
RFL Inds., A Dowty Grp. Co./Comms. Div., Powerville Rd., Boonton, NJ 07005 201-334-3100
RHG Electronics Lab., Inc., 161 E. Industry Ct., Deer Park, NY 11729 516-242-1100
Schneider Instr., 8115 Camargo Rd., Cincinnati, OH 45243 513-561-6803
§ Seaboard Elctrns., 70 Church St., New Rochelle, NY 10805 914-235-8073
Solid State Elctrns. Corp., 18646 Parthenia St., Northridge, CA 91324 ... 818-993-8257
† TRAK Microwave Corp., 4726 Eisenhower Blvd., Dept. E5, Tampa, FL 33614 813-884-1411
† TransKinetic Sys., 110 Shawmut Rd., Canton, MA 02021 617-828-3000
† TRW Microwave, 825 Stewart Dr., Sunnyvale, CA 94086 408-732-0880
† Vega Precision Labs., 800 Follin La., Vienna, VA 22180 703-938-6300
† Zeta Labs., 3265 Scott Blvd., Santa Clara, CA 95054 408-727-6001

Transmitters, Tone-1900

§ American Microsignal, 8431 Monroe Ave., Stanton, CA 90680 714-761-1222
Bristol Babcock Inc., 40 Bristol St., Waterbury, CT 06708 203-575-3000
Dantel, 2991 N. Argyle Ave., Fresno, CA 93727 209-292-1111
Digital Transmission Techniques, Inc., P.O. Box 1847, Wayne, NJ 07470 201-831-1615
Electrocom Inds., 1105 N. Ironwood Dr., S. Bend, IN 46615 219-232-2743
M/A-COM Microwave Power Dvcs., 330 Oser Ave., Hauppauge, NY 11788 516-231-1400
OAR Corp., A CompuDyne Co., 10447 Roselle St., San Diego, CA 92121 619-453-4013
RCI/Data, 1992 Lakewood Rd., Toms River, NJ 08753 201-341-8361
Resdel Engrg., 300 E. Live Oak Ave., Arcadia, CA 91006 213-684-2600
§ Seaboard Elctrns., 70 Church St., New Rochelle, NY 10805 914-235-8073

Transmitters (MIL), ECM-3475

† Microwave/Sys., 1 Adler Dr., E. Syracuse, NY 13057 315-437-9951
† Radio Resch. Instr. Co., Inc., Two Lake Ave. Extension, Danbury, CT 06811-5295 203-792-6666
† Varian Associates, Inc., Microwave Tube Div., 611 Hansen Way, Palo Alto, CA 94303 415-493-4000

Transmitters (MIL), Shipboard Jamming-3475

† Microwave/Sys., 1 Adler Dr., E. Syracuse, NY 13057 315-437-9951
† Varian Associates, Inc., Microwave Tube Div., 611 Hansen Way, Palo Alto, CA 94303 415-493-4000

Transmitters (MIL), TWTs-3475

ILC Data Device Corp., 105 Wilbur Pl., Bohemia, NY 11716 516-567-5600
† MCL, Inc., 10 North Beach Ave., La Grange, IL 60525-2092 312-354-4350
† Microwave/Sys., 1 Adler Dr., E. Syracuse, NY 13057 315-437-9951
Varian Associates, Inc., Microwave Tube Div., 611 Hansen Way, Palo Alto, CA 94303 415-493-4000

Transponders-1900

† Airtron, Litton Industries, Inc., 200 E. Hanover Ave., Morris Plains, NJ 07950 201-539-5500

† Allied Corp. Aerospace Sector, Bendix Communications Div., East Joppa Rd., Towson, MD 21204 ... 301-583-4000
† A.R.F. Prods., 2559 75th St., Boulder, CO 80301 ... 303-443-4844
Computer Instrs., 100 Madison Ave., Hempstead, NY 11550 ... 516-483-8200
† Hughes Aircraft Co., Microelctrn. Sys. Div., 2601 Campus Dr., Irvine, CA 92715 ... 714-752-3800
La Pointe Industries, Inc., Electronics Products Div., 155 W. Main St., Rockville, CT 06066 ... 203-872-8581
† Radio Resch. Instr. Co., Inc., Two Lake Ave. Extension, Danbury, CT 06811-5295 ... 203-792-6666
Resdel Engrg., 300 E. Live Oak Ave., Arcadia, CA 91006 ... 213-684-2600
§ Seaboard Elctrns., 70 Church St., New Rochelle, NY 10805 ... 914-235-8073
† Vega Precision Labs., 800 Follin La., Vienna, VA 22180 ... 703-938-6300

Transports, Tape (all kinds)-2000

Phi Technologies, Inc., 4605 North Stiles, Oklahoma City, OK 73105, 405-521-9000 ... D•1052-1054
† Reproduction Technologies Inc., Dept. EM, P.O. Box 815, Bristol, IN 46507-0518, 219-848-5233;219-848-5333 ... D•1034
Tape Concepts, Inc., P. O. Box 815, 110 E. Vistula St., Bristol, IN 46507, 219-848-5234 ... D•1035
Amilon Corp., 49-12 30th Ave., Woodside, NY 11377 ... 718-274-1794
California Minicomputer Sys., 5534 Westlawn Ave., Los Angeles, CA 90066 ... 213-640-2930
Cipher Data Prods., Inc., P.O. Box 85170, San Diego, CA 92138 ... 619-578-9100
Digital Equip., One Iron Way, Marlborough, MA 01752
† Genisco Memory Prods. Corp., 10874 Hope St., Cypress, CA 90630 ... 714-220-0720
§ Innovative Data Technology, 5340 Eastgate Mall, San Diego, CA 92121 ... 619-587-0555
International Electro Magnetics, Inc., 350 N. Eric Dr., Palatine, IL 60067 ... 312-358-4622
Multi Prods. Intl., 218 Little Falls Rd., P.O. Box 238, Cedar Grove, NJ 07009 ... 201-239-8183
Renaissance Marketing, Inc., 463 Union Ave., Westbury, NY 11590 ... 516-271-2389

TRIACs-4800 – *See Vol. A*

Triggers, SCR – See Controls, SCR (Vol. D)

Tube Heat Dissipators-5700 – *See Vol. A*

Tubes, Backward Wave-5700 – *See Vol. A*

Tubes, Ballast – See Resistors, Ballast (Vol. A)

Tubes, Cathode Ray, General Purpose-5700 – *See Vol. A*

Tubes, Cathode Ray, Special Purpose-5700 – *See Vol. A*

Tubes, Counting-5700 – *See Vol. A*

Tubes, Electron Multiplier-5700 – *See Vol. A*

Tubes, Flash-5700 – *See Vol. A*

Tubes, Gas-5700 – *See Vol. A*

Tubes, Ignitron-5700 – *See Vol. A*

Tubes, Image Converter-5700 – *See Vol. A*

Tubes, Indicator – See Tubes, Readout (Vol. A)

Tubes, Magnetron – See Tubes, Microwave (Vol. A)

Tubes, Microwave-5700 – *See Vol. A*

Tubes, Noise Source-5700 – *See Vol. A*

Tubes, Photomultiplier-5700 – *See Vol. A*

Tubes, Readout (CRT, Cold-Cathode, Vacuum Fluorescent, Incandescent, etc.)-5700 – *See Vol. A*

Tubes, Receiving-5700 – *See Vol. A*

Tubes, Rectifying-5700 – *See Vol. A*

Tubes, Strobe – See Lamps, Stroboscopic Source (Vol. B)

Tubes, Switching-5700 – *See Vol. A*

Tubes, TV Camera Pickup-5700 – *See Vol. A*

Tubes, Transmitting-5700 – *See Vol. A*

Tubes, Voltage Reference or Regulating-5700 – *See Vol. A*

Tubes, X-ray-5700 – *See Vol. A*

Tubes (MIL), Indicator & Pickup-2440 – *See Vol. B*

Tubes (MIL), Microwave-2440 – *See Vol. B*

Tubes (MIL), Power & Gas, Planar-2440 – *See Vol. B*

Tubes (MIL), Receiving, & Tube Shields-2440 – *See Vol. B*

Tubing, Ceramic-2500 – *See Vol. C*

Tubing, Fiberglass-2800 – *See Vol. C*

Tubing, Glass-2500 – *See Vol. C*

Tubing, Heat Shrinkable-Also See Caps, Forms & Tapes, Heat Shrinkable-2800 – *See Vol. C*

Tubing, Metal-2500 – *See Vol. C*

Tubing, Paper-2800 – *See Vol. C*

Tubing, Plastic-Also See Tubing, Spaghetti-2800 – *See Vol. C*

Tubing, Spaghetti-2800 – *See Vol. C*

Tubing, Spiral Wrap-2800 – *See Vol. C*

Tubing, Waveguide-3450 – *See Vol. A*

Tubing, Zipper-6000 – *See Vol. C*

Tuners, AM/FM-1300

§ Alps Electric (USA), Inc., 3553 N. First St., San Jose, CA 95134 ... 408-946-6000
§ Bell Audio Service Co., Magnetic Programming, Inc., 6740-G Huntley Road, Worthington, OH 43085 ... 614-846-2766
§ Cetec Raymer, 7315 Fulton Ave., No. Hollywood, CA 91605 ... 213-875-0423
§† Dukane Corp., Communications Sys. Div., 2900 Dukane Dr., St. Charles, IL 60174 ... 312-584-2300
HDS Inc., 12310 Pinecrest Rd., Reston, VA 22091 ... 703-620-6200
§ Heath Co., Benton Harbor, MI 49022 ... 616-982-3886
§ Mitsumi Elec. Co., Ltd., 8-2, 8-Chome, Kokuryo, Chofu-City, Tokyo, JAPAN ... 489-5333
§ Paso Sound Prods., 14 First St, Pelham, NY 10803 ... 914-738-4800
§ Precision Elctrns., 9101 King Ave., Franklin Park, IL 60131 ... 312-678-5350
§† PTS Electronics Inc., Box 272, Bloomington, IN 47401 ... 812-824-9331
§ Shokai Far East, Ltd., 280 North Central Ave., Hartsdale, NY 10530 ... 914-681-0700
Toko America, Inc., 1250 Feehanville Dr., Mt. Prospect,, IL 60056 ... 312-297-0070
† Watkins-Johnson Co., 3333 Hillview Ave., Palo Alto, CA 94304 ... 415-493-4141

Tuners, Microwave-3450 – *See Vol. A*

Tuning Forks-2300 – *See Vol. A*

Tweezers, Manual & Vacuum-5400 – *See Vol. C*

Ultraviolet Inspection Lighting-Also See Microscopes, Ultraviolet-4100

American Ultraviolet, 320 Commerce St., Chatham, NJ 07928 ... 201-635-8355
Aristo Grid Lamp Prods., 65 Harbor Rd., Port Washington, NY 11050 ... 516-944-3030
§ Clean Room Prods., 56 W. Penataquit Ave., Bay Shore, NY 11706 ... 516-968-8282
§ Gates, Geo. W., & Co., Inc., Hempstead Tpke. & Lucille Ave., Franklin Sq., NY 11010 ... 516-352-2904
Image Technology Methods Corp., 103 Moody St., Waltham, MA 02154 ... 617-894-1720
§ Mann, Henry, Inc., 3983 Mann Road, Huntingdon Valley, PA 19006 ... 215-355-7200
Plasmarc Technologies, Inc., 180 Passaic Avenue, Fairfield, NJ 07006 ... 201-575-0870
§† Spectronics Corp., 956 Brush Hollow Rd., Westbury, NY 11590 ... 516-333-4840
Stenning Instrments, Inc., 671 Enchanted Way, Pacific Palisades, CA 90272 ... 213-459-2930
§ Techni-Tool, 5 Apollo Rd., Box 368, Plymouth Meeting, PA 19462 ... 215-825-4990
§ UVP, Inc., 5100 Walnut Grove Ave., P.O. Box 1501, San Gabriel, CA 91778 ... 818-285-3123
Westinghouse Elec. Corp., Lamp Div., Parts Sls., 1 Westghse Plaza, Bloomfield, NJ 07003 ... 201-429-3325

Urea Formaldehyde – See Plastic Raw Materials (Vol. C)

Valve Position Indicators/Transmitters-5500 – *See Vol. B*

Valves, Solenoid-4550 – *See Vol. B*

Valves, Vacuum-4100

§ A E G Telefunken, Semiconductor Grp., Rte. 22, Somerville, NJ 08876 ... 201-722-9800
† Automatic Switch Co., 50-60 Hanover Road, Florham Park, NJ 07932 ... 1-201-966-2000
Barksdale Controls Div., Transamenca DeLaval, 3211 Fruitland Ave., P.O. Box 58843, Los Angeles, CA 90058 ... 213-589-6181
† Bemco, 9908 San Fernando Rd., Pacoima, CA 91331 ... 818-899-5296
§ CVC Prods., 525 Lee Rd., Rochester, NY 14603 ... 716-458-2550
Everett/Charles Test Equip. Inc., 2887 N. Towne Ave., Pomona, CA 91767 ... 714-621-9511
High Voltage Engrg. Corp., S. Bedford St., Burlington, MA 01803 ... 617-272-1313
§ Hoke, 1 Tenakill Pk., Cresskill, NJ 07626 ... 201-568-9100
† IMC Magnetics Corp., Arizona Div., 1900 East Fifth St., Tempe, AZ 85281 ... 602-968-4441
§ Jamesbury Corp., Div. of Combustion Engineering, Inc., 640 Lincoln St., Worcester, MA 01605 ... 617-852-0200
Materials Resch., Route 303, Orangeburg, NY 10962 ... 914-359-4200
§ Roean Industries, Inc., 12970 Branford, Ste. C, Pacoima, CA 91331 ... 818-767-7047
Temescal, 2850 Seventh St., Berkeley, CA 94710 ... 415-841-5720

§† ULVAC North America, P.O. Box 799, 105 York Street, Kennebunk, ME 04043 ... 207-985-2973
Vactronic Lab. Equip., 65 Brightside Ave., E. Northport, NY 11731 ... 516-AN1-2660
Varian Assocs., Indl. Equip. Grp., 611 Hansen Way, Palo Alto, CA 94303 ... 415-493-4000
Veeco Instruments Inc., Terminal Dr., Plainview, NY 11803 ... 516-349-8300

Varactors — See Diodes, Varactor (Vol. A)

Varistors — See Resistors, Voltage Sensitive (Vol. D)

VCXO — See Oscillators, Voltage Controlled Crystal

VHF Equipment — See Generators (Vol. D), Receivers (Vol. D), etc.

Vibration Surveys — See Services, Vibration Surveys (Vol. D)

Vibration Test Systems — See Testers, Vibration (Vol. D)

Vibrators-4050

ATR Elctrns., Inc., P.O. BOX 7008, St. Paul, MN 55107, 612-738-6520;414-297-7374 ... D•1889
Alpha-M Corp., 3009 Wildflower Dr., Dallas, TX 75229 ... 214-620-0021
§ Chorus Data Systems, P.O. Box 810, 27 Proctor Hill Rd., Hollis, NH 03049 ... 603-465-7100
Contraves Goerz Corp., 610 Epsilon Dr., Pittsburgh, PA 15238 ... 412-967-7700
Endicott Coil, 22 E. Charlotte St., Binghamton, NY 13905 ... 607-797-1263
† Harowe Servo Controls, Bowmar Inst. Corp., Westtown Rd. at West Chester Pike, W. Chester, PA 19380 ... 215-692-2700
Rhino Sales Corp., 620 Andrews Ave., P.O. Box 367, Kewanee, IL 61443 ... 309-853-4461
Unholtz-Dickie Corp., 6 Brookside Dr., Wallingford, CT 06492 ... 203-265-3929
Wilcoxon Resch., P.O. Box 5798, Bethesda, MD 20814 ... 301-770-3790
§ Wilson, H. M., Co., 11501 Chimney Rock Rd., Houston, TX 77035 ... 713-729-1183

Video Components & Equipment — See Specific Component: Amplifiers (Vol. D), Cameras (Vol. D), Networks (Vol. D), etc.

Viewers (MIL), Infrared-3475

ElectroPhysics Corp., 48 Spruce St., Nutley, NJ 07110 ... 201-667-2262
Image Technology Methods Corp., 103 Moody St., Waltham, MA 02154 ... 617-894-1720
† IR Scientific, Box 110, Carlisle, MA 01741 ... 617-369-7118
Mikron Instr., Box 211, Ridgewood, NJ 07451 ... 201-891-7330

Viewing Hoods, Cathode Ray Tube-2975

§ Jan Hardware Mfg. Co., 47-27 36th St., Long Island City, NY 11101, 212-361-0800 ... C•1603
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
§ PacTec Div., LaFrance Corp., Enterprise & Executive Avenues, Philadelphia, PA 19153 ... 215-365-8400
Tektronix, Inc., P. O. Box 500, Y3-314, Beaverton, OR 97077 ..... 800-547-1512;Oregon only 800-452-1877

Vinyl Compounds — See Plastic Raw Materials (Vol. C)

Vises-5400 — *See Vol. C*

VLF Equipment — See Receivers (Vol. D), Transmitters (Vol. D), etc.

VME Bus Cards-2025

† Acromag, 30765 Wixom Rd., Wixom, MI 48096 ... 313-624-1541
§ Colex, Incorporated, 15028 Beltway Dr., Dallas, TX 75234 ... 214-458-2779
§† Plessey Microsystems, The Plessey Co., Ltd., One Blue Hill Pla., Pearl River, NY 10965 ... 914-735-4661
TL Industries, Inc., 2541 Tracy Road, Toledo, OH 43619 ... 1-419-666-8144

Voice Recognition Equipment — See Recognition Equipment, Speech (Vol. D)

Voltage Selector — See Adaptors, US to European Power

Voltage Sources-4000

Clarke-Hess Comm. Resch. Corp., 17 West 17th St., New York, NY 10011, 212-255-2940 ... D•1200
† Electronic Dev. Corp., 11 Hamlin St., Boston, MA 02127-4198, 617-268-9696 ... D•1214
EVI, Inc., 8970 F Route 108, Columbia, MD 21045, 301-964-1660 ... D•1639
General Resistance, Inc., A Prime Technology Company, Twin Lakes Rd., P.O. Box 185, N. Branford, CT 06471, 203-481-5721 ... D•1233
Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303, Call Local Sls. Off. ... D•1653,1656
IET Labs, Inc., 534 Main St., Westbury, NY 11590, 516-334-5959 ... D•1242,1244
Julie Resch. Labs., 211 West 61st St., New York, NY 10023, 212-245-2727 ... D•1254,1256
† Koep Precision Standards, Inc., P. O. Box 191, So. Plainfield, NJ 07080, 201-549-9280 ... D•1257
North Hills Elctrns., 1 Alexander Pl., Glen Cove, NY 11542, 516-671-5700 ... D•1734
Todd Prods. Corp., 50 Emjay Blvd., Brentwood, NY 11717, 516-231-3366 ... D•1854-1855
Abacus Controls Inc., 89 Readington Rd., Somerville, NJ 08876 ... 201-526-6010
Analogic Corp., 8 Centennial Dr., Peabody, MA 01961 ..... 617-532-5660;617-777-4500; 617-246-0300;800-451-1
Behlman Div., California Instrs., Div. of Norlin Inds., 5150 Convoy St., San Diego, CA 92111 ... 619-279-8620
Burr-Brown Corp., P.O. Box 11400, Tucson, AZ 85734 ... 602-746-1111
† Calex Mfg. Co., Inc., 3355 Vincent Rd., Pleasant Hill, CA 94523 ... 415-932-3911
† California Instruments, A Div. of Amstar Tech. Prods. Co., Inc., 5150-Convoy St., San Diego, CA 92111 ... 619-279-8620;800-356-2244;800-821-1634
Continental Resources, Inc., 175 Middlesex Tpke., Bedford, MA 01730 .. 617-275-0850
§† Data Precision Corp., Electronics Ave., Danvers, MA 01923 ... 617-246-1600
Datel, General Electric Co., 11 Cabot Blvd., Mansfield, MA 02048 ... 617-339-9341
Fluke, John, Mfg. Co., Box C9090, MS 250C, Everett, WA 98206 ... 206-356-5400
Hipotronics, P.O. Drawer A, Brewster, NY 10509 ... 914-279-8091
§ Integra, Inc., 2368 Walsh Ave., Santa Clara, CA 95051 ... 408-727-9601
Keithley Instrs., 28775 Aurora Rd., Cleveland, OH 44139 ... 216-248-0400
Leeds & Northrup Instrs., A Unit of General Signal Corp., Sumneytown Pike, North Wales, PA 19454 ... 215-643-2000
Power Designs, Inc., 1700 Shames Dr., Westbury, NY 11590 ... 516-333-6200
Pulse Instrs. Co., 1234 Francisco, Torrance, CA 90502 ... 213-515-5330
RFL Inds., A Dowty Grp. Co./Instr. Div., Powerville Rd., Boonton, NJ 07005 ... 201-334-3100
Rotek Instr. Corp., 390 Main St., Waltham, MA 02254 ... 617-899-4611
Sensitive Research Instrs., 25 Dock St., Mt. Vernon, NY 10550 ... 914-699-9717
† Sigmapower, Inc., 20790 Leapwood Ave., Carson, CA 90746 ... 213-32-Sigma
§† Solarex Corp., 1335 Piccard Dr., Rockville, MD 20850 ... 301-948-0202
§ Sunshine Sci. Instr., 1810 Grant Ave., Philadelphia, PA 19115 ... 215-673-5600
§† Systron-Donner Instr. Div., 2727 Systron Dr., Concord, CA 94518 ... 415-676-5000
† Thaler Corp., 10940 N. Stallard Pl., Tucson, AZ 85704 ... 602-742-5572
† Trio Labs., 80 Dupont St., Plainview, NY 11803 ... 516-349-0400
§ Tucker Elctrns., Box 461966, Garland, TX 75046 ... 214-348-8800;800-527-4642
Valhalla Scientific, 9955 Mesa Rim Rd., San Diego, CA 92126 ... 619-457-5576
ZI-TECH Instr. Corp., 2151 Park Blvd., Box 60490, Palo Alto, CA 94306 ... 415-326-2151

Voltmeter, Electrostatic-2900

§ Semtronics Corp., 310 Hwy 7 74 S, P.O. Box 2248, Peachtree City, GA 30269 ... 404-487-6681
Voyager Technologies, Inc., 2250 Cabot Blvd. W. Bldg. 40M, Langhorne, PA 19047 ... 215-750-0270

Wafer Fabrication, Semiconductor — See Semiconductor Wafer Fabrication (Vol. D)

Wall Plates — See Boxes, Junction, Outlet & Wall Plates (Vol. C)

Warning Systems, Lightning-4300 — *See Vol. B*

Warning Systems (MIL), Computerized-3475

Digital Radio Corp., 8901 La Cienega Blvd., Inglewood, CA 90301 ... 213-670-8611
† E-Systems, Greenville Div., P.O. Box 1056, Greenville, TX 75401 ... 214-457-4694
† General Instr., Govt. Sys., 600 W. John St., Hicksville, NY 11802-0709 ... 516-933-3000
Litton Potentiometer Div., 750 So. Fulton Ave., Mt. Vernon, NY 10551 ... 914-664-7733
† Systems Resch. Labs., Inc., 2800 Indian Ripple Rd., Dayton, OH 45440 .. 513-426-6000

Warning Systems (MIL), EW-3475

NWL Transformers, Rising Sun Rd., P.O. Box 358, Bordentown, NJ 08505, 609-298-7300 ... A•2211
American Elctrn. Labs., Inc., Govt. Grp. Div., P.O. Box 552, Lansdale, PA 19446
Digital Radio Corp., 8901 La Cienega Blvd., Inglewood, CA 90301 ... 213-670-8611
§ Edwards Co., Signaling Prods. Div., P.O. Box 1188, Farmington, CT 06034 ... 203-678-0410
† E-Systems, Greenville Div., P.O. Box 1056, Greenville, TX 75401 ... 214-457-4694
† General Instr., Govt. Sys., 600 W. John St., Hicksville, NY 11802-0709 ... 516-933-3000
† Litton Applied Technology, 645 Almanor Ave., P.O. Box 3478, Sunnyvale, CA 94088-3478 ... 408-773-0777
† Systems Resch. Labs., Inc., 2800 Indian Ripple Rd., Dayton, OH 45440 .. 513-426-6000

Warning Systems (MIL), IR-3475

§ Edwards Co., Signaling Prods. Div., P.O. Box 1188, Farmington, CT 06034 ... 203-678-0410
† E-Systems, Greenville Div., P.O. Box 1056, Greenville, TX 75401 ... 214-457-4694
† Litton Applied Technology, 645 Almanor Ave., P.O. Box 3478, Sunnyvale, CA 94088-3478 ... 408-773-0777
† Santa Barbara Resch. Ctr., 75 Coromar Dr., Goleta, CA 93117 ... 805-968-3511

Warning Systems (MIL), Laser-3475

† E-Systems, Greenville Div., P.O. Box 1056, Greenville, TX 75401 ... 214-457-4694
† Litton Applied Technology, 645 Almanor Ave., P.O. Box 3478, Sunnyvale, CA 94088-3478 ... 408-773-0777
† Systems Resch. Labs., Inc., 2800 Indian Ripple Rd., Dayton, OH 45440 .. 513-426-6000

Warning Systems (MIL), SAM Launch-3475

† General Instr., Govt. Sys., 600 W. John St., Hicksville, NY 11802-0709 ... 516-933-3000

Washers, Lock-2825 — *See Vol. C*

Washers, Plain-2825 — *See Vol. C*

Wave Soldering Equipment — See Soldering Equip, Printed Circuit (Vol. C)

Waveguide-Coax Adapters-3450 — *See Vol. A*

Waveguides-3450 — *See Vol. A*

Waveguides (MIL)-2440 — *See Vol. B*

Wave Traps – See Filters, Antenna (Vol. A), Filters, Microwave (Vol. A), etc.

Welding Equipment & Accessories (Excl. Equipment for Semiconductor Devices)-5400 – *See Vol. C*

White Noise Generator Modules – See Generators, White Noise (Vol.), Diodes, Noise

Windows, Sapphire-2500 – *See Vol. C*

Windows, Shielded – See Shields, RF (Vol. C)

Wire & Cable Ties-2825 – *See Vol. C*

Wire, Airframe-2440 – *See Vol. B*

Wire, Antenna (All Types)-6000 – *See Vol. C*

Wire, Bare, Copper-6000 – *See Vol. C*

Wire, Bare, Nickel-6000 – *See Vol. C*

Wire, Bare, Nickel-Chrome-6000 – *See Vol. C*

Wire, Bonding-4600 – *See Vol. C*

Wire, Braid (Excluding Shielding)-6000 – *See Vol. C*

Wire, Braid (Shielding) – See Braid, Cable (Vol. C)

Wire, Ceramic Insulated-6000 – *See Vol. C*

Wire, Clad (All Types)-6000 – *See Vol. C*

Wire Cutting & Stripping – See Services, Wire Cutting & Stripping (Vol. D)

Wire, Enamel Insulated – See Wire, Hookup (All Types) (Vol. C)

Wire, Fiberglass Insulated – See Wire, Glass Insulated (Vol. C)

Wire, Flame Retardant-6000 – *See Vol. C*

Wire, Flat Strip – See Cable, Flat (Vol. C)

Wire, Glass Insulated-6000 – *See Vol. C*

Wire, Gold-2825 – *See Vol. C*

Wire, Guy-6000 – *See Vol. C*

Wire, Heater – See Cable, Heater (Vol. C)

Wire, High Temperature (Over 125°C)-6000 – *See Vol. C*

Wire, High Voltage (1000 Volts & Over)-6000 – *See Vol. C*

Wire, Hookup (All Types)-6000 – *See Vol. C*

Wire, Irradiated-6000 – *See Vol. C*

Wire, Lead-in & Ground-6000 – *See Vol. C*

Wire, Litz-6000 – *See Vol. C*

Wire, Magnet-6000 – *See Vol. C*

Wire Markers (All Types)-Also See Strips Marker & Fanning-6000 – *See Vol. C*

Wire, Multiconductor – See Cable, Multiconductor (Vol. C)

Wire Nuts-2800 – *See Vol. C*

Wire, Plastic Insulated – See Wire, Hookup (All Types) (Vol. C)

Wire, Plated (All Types)-6000 – *See Vol. C*

Wire, Radiation Resistant-6000 – *See Vol. C*

Wire, Resistance-6000 – *See Vol. C*

Wire, Ribbon-6000 – *See Vol. C*

Wire, Semiconductor Lead-6000 – *See Vol. C*

Wire, Shielded-6000 – *See Vol. C*

Wire Shielding-Also See Braid, Cable-4525 – *See Vol. C*

Wire, Stainless Steel-6000 – *See Vol. C*

Wire, Strain Gauge-6000 – *See Vol. C*

Wire Strippers, Automatic-4100

Amlan, Inc., 97 Thornwood Rd., Stamford, CT 06903 203-322-1913
§ Assem-Pro Instrs., Div. of Overnight Engineering Inc., 1859 Andrews Ave., San Jose, CA 95124 408-267-1168
Burndy Corporation, Richards Ave., Norwalk,, CT 06852 203-838-4444
† Carpenter Mfg. Co., Inc., Fairgrounds Dr., P.O. Box 188, Manlius, NY 13104-0188 315-682-9176
Coherent, Inc., 3210 Porter Dr., Palo Alto, CA 94304 415-493-2111
Du Pont Connector Systems, 30 Hunter La., Camp Hill, PA 17011 800-237-2374
§ Eraser Co., Box 4961, Syracuse, NY 13221 315-454-3237
Eubanks Engrg., 1307 So. Myrtle Ave., Monrovia, CA 91016 818-357-7011
† Ewald Instrs., Rte. 7R, Kent, CT 06757 203-927-3278
§ GC Elctrns., 400 S. Wyman St., Rockford, IL 61101 815-968-9661
§ Harris Corp., Dracon Div., 809 Calle Plano, Camarillo, CA 93010 805-987-9511
Hollis Engrg./Wire-Wrap, 15 Charron Ave., Nashua, NH 03061 603-889-1121
§ Ideal Industries, 4450 Becker Pl., Sycamore, IL 60178 815-895-5181
§ ITT Cannon, 666 E. Dyer Road, Santa Ana, CA 92705-5684 714-557-4700
§ Mann, Henry, Inc., 3983 Mann Road, Huntingdon Valley, PA 19006 215-355-7200
Penn Resch. Corp. (PRC), 2652 South Main St., P.O. Box 3357, Kennesaw, GA 30144 404-429-9061
§ Ripley, 46 Nooks Hill Rd., Cromwell, CT 06416 203-635-2200
Standard Logic, 2215 S. Standard Ave., Santa Ana, CA 92707 714-979-4770
Technical Devices, 560 Alaska Ave., Torrance, CA 90503 213-618-8437
† Trans American Transformer, 142 Peconic Ave., Medford, NY 11763 516-654-1880
§ Vaco Prods., 1510 Skokie Blvd., Northbrook, IL 60062 312-564-3300

Wire Strippers, Chemical – See Chemicals, Wire Stripping (Vol. C)

Wire Strippers, Manual-5400 – *See Vol. C*

Wire Strippers, Thermal-5400 – *See Vol. C*

Wire, Test Lead-6000 – *See Vol. C*

Wire, TFE Insulated-6000 – *See Vol. C*

Wire, Thermocouple-6000 – *See Vol. C*

Wire, Transmission – See Cable, Transmission Line (Vol. C)

Wire, Twisted Pair – See Cable, Twisted Pair (Vol. C)

Wire (MIL)-2440 – *See Vol. B*

Wire Twisters, Automatic-5400 – *See Vol. C*

Wire Twisters, Manual-5400 – *See Vol. C*

Wire Ways-6000 – *See Vol. C*

Wirewrapping Services – See Services, Wirewrapping (Vol. D)

Wiring Panels & Boards, Computer – See Boards, Programming (Vol. C)

Word Processors, Shared Logic Systems-2025

† Astronautics Corporation of America, P.O. Box 523, Milwaukee, WI 53201-0523 414-447-8200
§† Compucorp, 2211 Michigan Ave., Santa Monica, CA 90404 213-829-7453
§ Computer Field Services, Inc., 6 Federal Street, Danvers, MA 01923 617-774-2930
Digiac Corp., 175 Engineers Rd., Hauppauge, NY 11788 516-273-8600
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§ Point 4 Data Corp., 2569 McCabe Way, Irvine, CA 92714 714-863-1111
§ Software Dynamics, 2111 W. Crescent Ave-G, Anaheim, CA 92801 714-635-4760

Word Processors, Standalone Systems-2025

§ Antona Corp., 2100 S. Sawtelle Blvd., Suite 205, Los Angeles, CA 90025 213-473-8995
† Astronautics Corporation of America, P.O. Box 523, Milwaukee, WI 53201-0523 414-447-8200
§† Compucorp, 2211 Michigan Ave., Santa Monica, CA 90404 213-829-7453
§ Computer Field Services, Inc., 6 Federal Street, Danvers, MA 01923 617-774-2930
The Computer Place, D & D Financial Entprs. Inc., 4595 Van Epps Rd., Brooklyn Hts., OH 44131 216-351-7444
§ Computers International, 3540 Wilshire Blvd., Los Angeles, CA 90010 ... 213-386-3111
† Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303 .. Call Local Sls. Off.
Sidereal Corp., 9600 S.W. Barnes Rd., Portland, OR 97225 503-297-5531
§ Software Dynamics, 2111 W. Crescent Ave-G, Anaheim, CA 92801 714-635-4760

Work Positioners, Circuit Board & Chassis – See Holders, Circuit Board (Vol. D), Jigs (Vol. D)

Work Stations/Decks, Data Entry-1400 – *See Vol. C*

Work Room, Shielded-1400 – *See Vol. C*

Wrenches-5400 – *See Vol. C*

X-ray Detector Arrays (For Industrial Inspections)-4100

Microscience, Inc., 182 Forbes Rd., Braintree, MA 02184 617-849-1952

X-ray Inspection Equipment-4100

§† Addelco Corp., Advanced Dev. Elctrns. Div., 20 Freeman Pl., Needham, MA 02192 617-444-4754

Applied Research Labs, 9545 Wentworth, P.O. Box 129, Sunland, CA 91040 818-352-6011

X-Y Axis Tables – See Simulators, Motion (Vol. D)

Yokes, Deflection, Oscilloscope-1800 – *See Vol. A*

Yokes, Deflection, Radar PPI-1800 – *See Vol. A*

Yokes, Deflection, CRT-1800 – *See Vol. A*

Yokes, Deflection, TV Camera-1800 – *See Vol. A*

Zener Diodes – See Diodes, Zener

Zone Boxes, Thermocouple – See Thermocouples, Elements & Accessories (Vol. B)

COMMONLY USED ELECTRICAL/ELECTRONIC ABBREVIATIONS AND ACRONYMS

A

AC	alternating current
A/D	analog to digital
ADC	analog to digital converter
ADP	automatic data processing
AF	audio frequency
AFC	automatic frequency control
ALGOL	algorithmic language
AM	amplitude modulation
AND	a logical operator
AQL	acceptable quality level
ASCII	American national standard code for information interchange
AWG	American wire gauge

B

BALUN	balanced to unbalanced
BASIC	beginners' all-purpose symbolic instruction
BCD	binary-coded decimal
BNC	baby "N" connector
BUS	basic utility system

C

CAD	computer aided design
CAM	computer aided manufacture
CATV	cable television or community antenna television
CERMET	ceramic metal element
Comm.	communications
CMOS	complementary metal-oxide semiconductor
CPS	characters per second
CPU	central processing unit

D

D/A	digital to analog
DAC	digital to analog converter
DC	direct current
DIAC	bidirectional trigger diode
DIL	dual in-line
DIN	Deutsche Industrie Normenausschuss
DIP	dual in-line package
DPM	digital panel meter
DTL	diode transistor logic

E

EDP	electronic data processing
EBCDIC	extended binary coded decimal interchange code
EEPROM	electrically erasable PROM
EMC	electromagnetic compatibility
EMI	electromagnetic interference
EMP	electromagnetic pulse
EPROM	electrically programmable ROM
ESR	equivalent series resistance

F

FEP	fluorinated ethylene propylene Copolymar, 200° Teflon
FET	field-effect transistor
FM	frequency modulation
FORTRAN	formula translator

G

GaAsFET	gallium arsenide field effect transistor
GPIB	general purpose interface bus

H

HF	high frequency (3 to 30 MHz)
HIPOT	test, measurement and diagnostic equipment
HLL	high level language
HV	high voltage
Hz	Hertz

I

IC	integrated circuit
IDC	insulation displacement contact
IF	intermediate frequency
IO	input/output (devices)
IR	insulation resistance (or) infrared

J

JFET	junction field effect transistor
JMOS	junction metal oxide semiconductor

K

kHz	kilohertz (10^3 hertz)
KSR	keyboard send receive

L

LC	inductance capacitance
LCD	liquid crystal display
LED	light-emitting diode
LF	low frequency (30 to 300 kHz)
LIF	low insertion force
LNA	low noise amplifier
LNB	low noise band
LSI	large scale integration
LVDT	linear velocity displacement transformer

M

MASER	microwave amplification by stimulated emission of radiation
MATV	master antenna television
μF	microforad
MHz	megahertz
MIPS	million instructions per second
MIB	microcomputer interface board
MOS	metal oxide semiconductor
MOSFET	metal oxide semiconductor field effect transistor
MOSIGT	metal-oxide semiconductor insulated-gate transistor
MOV	metal oxide varistor
MPU	microprocessor unit
MSI	medium scale integration

N

NBS	National Bureau of Standards
NEMP	nuclear electromagnetic pulse
NIM	nuclear instrumentation module
NOR	not OR
NTC	negative temperature coefficient

O

OCR	optical character reader
OEM	original equipment manufacturer
OR	a logical operator

P

PC	printed circuit
PCB	printed circuit board
pF	picofarad
PGA	pin grid array
PIN	positive-intrinsic-negative (transistor)
PLA	programmable logic array
PLL	phased lock loop
PPI	plan position indicator
PROM	programmable read only memory
PTC	positive temperature coefficient
PUT	programmable unijunction transistor

Q

QAM	quadrature amplitude modulation
Q (meter)	quality-factor meter

R

RAM	random access memory
RC	resistance-capacitance
RFI	radio frequency interference
RMS	root mean square
ROM	read only memory
RF	radio frequency
RFC	radio-frequency choke
RFI	radio-frequency interference
RTD	resistance-temperature detector
RTL	resistor transistor logic
RTV	room temperature vulcanizing
RW	read/write

S

SAS	silicon asymmetrical switch
SBC	single board (micro) computer
SBS	silicon bilateral switch
SCR	silicon-controlled rectifier
SCS	silicon controlled switch
SDA	source & detector assemblies
SIDAC	bidirectional voltage-triggered switch
SIP	single in-line package
SSI	small scale integration
SSR	solid state relay
STL	Schottky transistor logic
SUS	silicon unilateral switch

T

TC	temperature coefficient
TCXO	temperature compensated crystal oscillator
TFE	tetrafluoride ethylene propylene Copolymer, 250° Teflon
TRIAC	bidirectional AC switch
TTL	transistor-transistor logic
TTY	teletypewriter

U

UHF	ultra high frequency (300 MHz to 3 GHz)
UJT	silicon unijunction transistor
UL	Underwriters Laboratory
UPS	uninterruptible power supply

V

VAC	volts (of) alternating current
VAR	volt-ampere reactive
VCR	video cassette recorder
VDC	volts (of) direct current
VHF	very high frequency
VHSIC	very high speed integrated circuit
VLF	very low frequency (3 to 30 kHz)
VLSI	very large scale integration
VME	virtual machine environment
VRM	voice recognition module
VTVM	vacuum tube volt meter
VU	volume unit
VSWR	voltage standing wave ratio

W

WPS	word processing software

Y

YIG	yttrium iron garnet

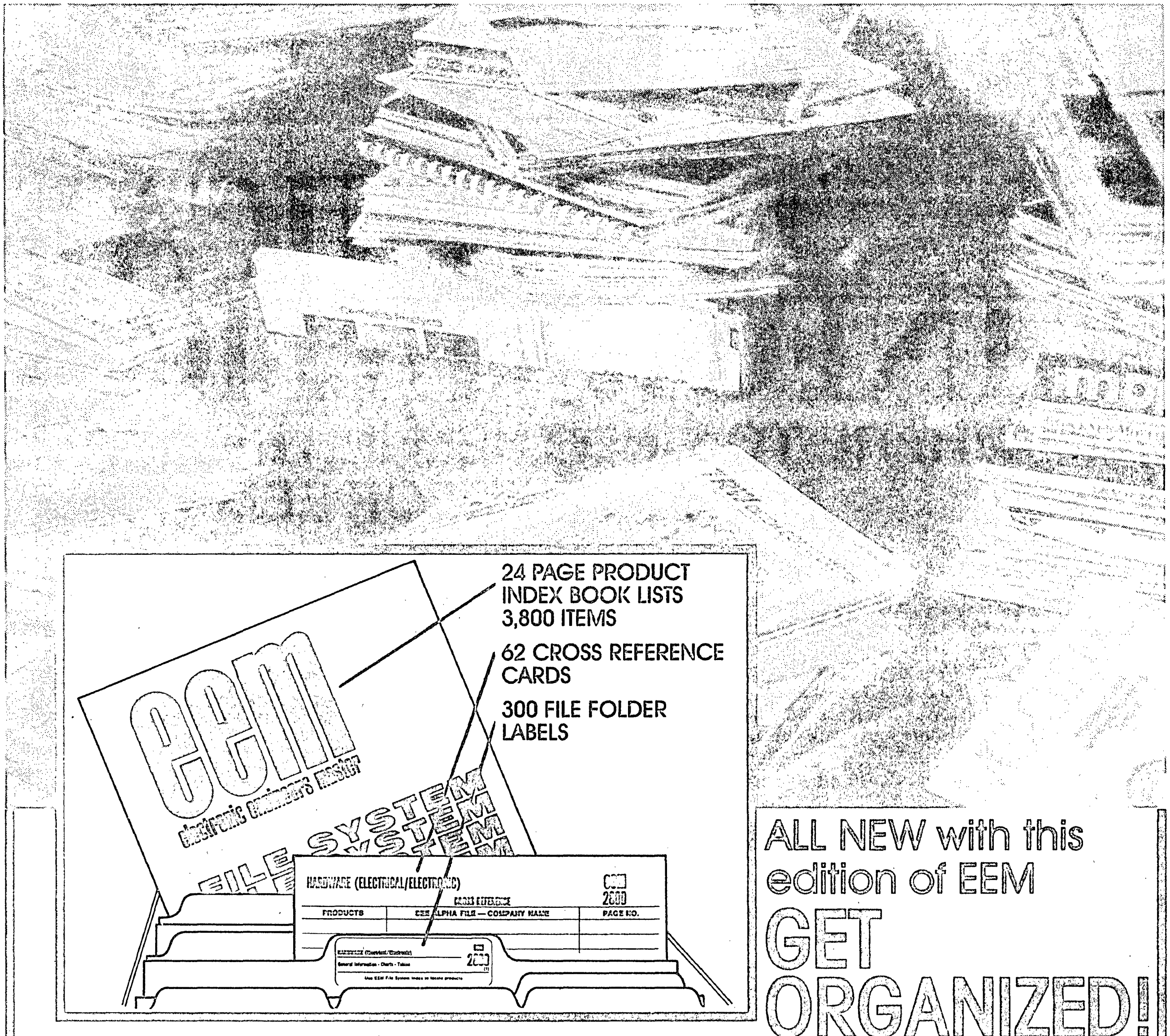
Z

ZIF	zero insertion force

TECHNICAL INFORMATION

WHERE TO FIND THEM IN THE 85/86 EDITION OF EEM

Abbreviations/Acronyms .... A°1166, B°1012, C°1028, D°1016
ASCII Code .... D°1087
Batteries, Product Selection Guide .... D°1413
Batteries & Fuel Cells, Characteristics .... D°1430
Cabinets, Enclosures, Racks, & Chassis, Product Selection Guide .... C°1003
Capacitors, Basic Formulas .... A°1093
Capacitors, Miniglossary .... A°1066
Capacitors, Product Selection Guide .... A°1003
Circuit Boards (Printed) Product Selection Guide .... C°1099
Coils, Chokes, Inductors, Product Selection Guide .... A°1205
Conductors, Maximum Current Capacity of Copper & Aluminum .... C°1863
Connectors, Miniglossary .... C°1129
Connectors, Terminals, & Sockets, Product Selection Guide .... C°1105
Crystals, Oscillators, Crystal & Piezoelectric Filters, Product Selection Gude .... A°1309
Delay Lines, Product Selection Guide .... A°1459
Discrete Semiconductors, Product Selection Guide .... A°2067
Displays, Readouts, Lamps, & Lights, Product Selection Guide .... B°1015
EBCDIC Code .... D°1092
Encapsulation, Miniglossary .... C°1086
Fans, Blowers, Cooling Equipment, & Heat Exchangers, Product Selection Guide .. C°1623
Filters, Product Selection Guide .... A°1583
Instruments, Graphic Recording Product Selection Guide .... D°1401
Instruments, Panel Meters, Product Selection Guide .... D°1329
Instruments, Test & Measuring Product Selection Guide .... D°1175
Interconnection Systems, Product Selection Guide .... C°1699
Keyboards & Keypads, Product Selection Guide .... B°1705
Logofinder & Trademark Directories .... B°901
Microwave Components, Product Selection Guide .... A°1701
Military Qualified Products Lists .... B°1003
Motors, Drives, & Rotating Components, Product Selection Guide .... B°1129
Opto Semiconductors, Miniglossary .... B°1214
Oscilloscopes, Product Selection Guide .... D°1385
Panel Hardware, Product Selection Guide .... C°1589
Potentiometers, Trimmers, Controls, & Rheostats, Product Selection Guide .... A°1991
Power Supplies, Miniglossary .... D°1462
Power Supplies, AC, Product Selection Guide .... D°1877
Power Supplies, DC, Product Selection Guide .... D°1447
Protective Components (Fuses, Circuit Breakers, etc.), Product Selection Guide .... B°1225
Relay Contact Forms .... B°1317
Relays, Electromechanical, Miniglossary .... B°1308
Relays, Product Selection Guide .... B°1261
Resistor Color Codes .... A°1828
Resistors, Product Selection Guide .... A°1785
Servo Components, Miniglossary .... D°1985
Solenoids, Product Selection Guide .... B°1463
Switches, Product Selection Guide .... B°1477
Thermal Components, Product Selection Guide .... B°1741
Thermal Conductivity of Dielectrics at Room Temperature .... B°1744
Thyristors/High Power Diodes, Miniglossary .... A°2076
Transducers & Encoders, Product Selection Guide .... B°1777
Transformers, Product Selection Guide .... A°2099
Wire & Cable, Product Selection Guide .... C°1743
Wire Gauges—Diameter, Area, Copper Weight .... C°1844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85
86 Manufacturers and Sales Offices Directory

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Many manufacturers also show TWX and Telex numbers, FSC (Federal Supply Code), other pertinent company data, their sales and/or local distributor offices and phones. The page numbers of their data pages in this edition are shown in all volumes.

AABA COMPONENTS CORP., P.O. Box 171, Baldwin Place, NY 10505, Tel: 914-628-6952; Empl.: 15; *Sls. Mgr.:* D. McVey; *Dist. Mgr.:* D. McVey

AAK CORP, 747 River St., Haverhill, MA 01830, Tel: 617-373-3769; FSC No.: 04 26 3109-1; Empl.: 10; *Sls. Mgr.:* S. Musumeci

A & B TECHNICAL SERVICES, 11300 Hartland St., N. Hollywood, CA 91605, Tel: 213-769-6772, Telex: 66-2497, TWX: 910-499-2675; Empl.: 40; *Sls. Mgr.:* V. A. Littlefield; *Dist. Mgr.:* C. Cloud

A & D ELEC. INSTRS., 73-07 88th St., Glendale, NY 11385, Tel: 718-275-6516; Empl.: 7

A&M INSTRUMENT, INC., 5 Nassau St., Rockville Centre, NY 11571, Tel: 516-678-6960

AAVID ENGRG., One Kool Path, Laconia, NH 03246, Tel: 603-524-4443, TWX: 510-298-1127; FSC No.: 30161; Empl.: 300; *Sls. Mgr.:* Philip Johnson; *Dist. Mgr.:* Philip Johnson

abacus controls inc.

ABACUS CONTROLS INC., 89 Readington Rd., Somerville, NJ 08876, Tel: 201-526-6010, Telex: 888186 ABACUS CONT UD; FSC No.: 54241; Empl.: 45; *Sls. Mgr.:* L. Albrecht .... **D•1880-1882**

Local Sales Offices & Reps

AL	Huntsville, Scientific Dvcs.	205-536-1969
CA	Los Angeles, Power Partners	800-468-5400
CA	San Diego, Power Partners	800-468-5400
CT	New London, Elctrn. Sls. of New England	203-443-2646
FL	Ft. Walton Beach, Scientific Dvcs.	904-651-4407
FL	Orlando, Scientific Dvcs.	305-841-8180
GA	Atlanta, Scientific Dvcs.	205-536-1969
GA	Savannah, Scientific Dvcs.	904-651-4407
MA	Wareham, Elctrn. Sls. of New England	617-295-7634
NC	Raleigh, Scientific Dvcs.	919-846-7319
NC	Winston-Salem, Scientific Dvcs.	919-765-5776
TX	Dallas, True Techn.	214-691-7870

ABA ELECTROMECHANICAL SYS. INC., Box 500, Pinellas Pk., FL 34290-0500, Tel: 813-541-6681, TWX: 810-866-0433; FSC No.: 26795; Empl.: 485; *Sls. Mgr.:* Bruce W. Harting

ABALON PRECISION MFG., 1040 Home Street, Bronx, NY 10459, Tel: 212-589-5682; Empl.: 25; *Sls. Mgr.:* Norman C. Orent

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Local Sales Offices & Reps

CT	Stamford, Dynamic Sls.	203-693-6567
MA	Burlington, Dynamic Sls. of New England	617-272-5676
NJ	Fort Lee, Abbott Transistor Labs.	201-461-4411
TX	Richardson, Abbott Transistor Labs.	214-437-0697
VT	S. Burlington, Dynamic Sls.	802-863-3928
Can	North Vancouver, BC, Jerome & Francis Co.	604-986-1286

ABBOTT TRANSISTOR LABS., Power Supply Div., 5200 W. Jefferson Blvd., Los Angeles, CA 90016, Tel: 213-936-8185, Telex: 69-1398; FSC No.: 15755; Empl.: 500 .... **D•1449-1461**

Local Sales Offices & Reps

FL	Altamonte Springs, Gugel-Tuttle Assocs. Inc.	305-788-0845
NJ	Ft. Lee, Abbott Transistor Labs.	201-461-4411
TX	Richardson, Abbott Transistor Labs.	214-437-0697

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Local Sales Offices & Reps

AL	Huntsville, The Novus Grp.	205-881-2207
CT	Stamford, Dynamic Sls.	203-693-6567
FL	Altamonte Springs, Gugel-Tuttle Assocs. Inc.	305-788-0845
GA	Norcross, The Novus Grp.	404-939-1135
IL	Hinsdale, Palatine Engrg. & Sls. (CKC)	312-655-0668
IA	Cedar Rapids, Palatine Engrg. & Sls., Inc.	319-365-8071
KS	Mission, Palatine Engrg. & Sls., Inc.	913-831-0555
MA	Burlington, Dynamic Sls.	617-272-5676
MN	Spring Lake Park, Holmgren Assocs., Inc.	612-786-7641
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TX	Richardson, Abbott Transistor Labs.	214-437-0697
VT	S. Burlington, Dynamic Sls.	802-863-3928
Can	Rexdale, Ontario, Source Elctrns., Ltd.	416-675-6235

ABLE POWER AND ENGINEERING INC., 335 S. New Ave., #H, Monterey Park, CA 91754, Tel: 714-891-3568; *Sls. Mgr.:* Joe Chou; *Dist. Mgr.:* Bob Barrio

ABLESTIK LABORATORIES, 833 W. 182nd St., Gardena, CA 90248, Tel: 213-532-9341, TWX: 910-346-7606; FSC No.: 21109; Empl.: 100; *Sls. Mgr.:* D. W. Lefever

ABRAMS INSTR. CORP., P.O. Box 26007, Lansing, MI 48909, Tel: 517-332-6405, TWX: 810-251-0785; FSC No.: 00048; *Sls. Mgr.:* Merlyn Gates

ACCARDI LABORATORIES, 66-45 69th St., Middle Village, NY 11379, Tel: 212-326-0570; *Sls. Mgr.:* Leonard Carney

ACC ELECTRONICS, 1300 W. Oak, Independence, KS 67301, Tel: 316-331-1000, Telex: 436483; FSC No.: 316-331-0660; Empl.: 1000; *Sls. Mgr.:* Leon Allen .... **A•1659**

Local Sales Offices & Reps

MI	Troy, C. B. Jensen & Assoc.	313-643-0506

ACCESSORIES FOR ELCTRNS., INC., 800 Merrick Rd., Baldwin, NY 11510-3593, Tel: 516-546-1751; FSC No.: 54355; Empl.: 20; *Sls. Mgr.:* Angela Calabro

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ACCUGRAPH CORP., 50 Gervais Drive, Suite 204, Don Mills, ONT, Canada M3C 1Z3, Tel: 416-441-2211, TWX: 06 986 766 TOR; Empl.: 23; *Sls. Mgr.:* Mr. David V. McDonald

ACCUMET ENGRG., 518 Main St., Hudson, MA 01749, Tel: 617-568-8311; *Sls. Mgr.:* J. B. Snook

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CA	Los Altos, Stout Inds.	415-949-0440
CA	Malibu, R. L. Comps.	213-456-9021
MD	Pasadena, Spectro-Lambda	301-437-7633
NJ	East Windsor, Micro-Lambda	609-443-3113
NY	Chappaqua, Micrel	914-238-4961

ACCUPROBE, INC., 1 Harrison Ave, Box 1044, Salem, MA 01970, Tel: 617-745-7878, Telex: 882194 Accuprobe UD; Empl.: 26; *Sls. Mgr.:* Dana B. Lee; *Dist. Mgr.:* T. H. Murphy

ACCURASSEMBLY, 9525 Cozycroft Ave., Chatsworth, CA 91311, Tel: 818-700-0708

ACCURATE ELCTRNS., 169 S. Abbe Rd., P.O. Box 1287, Elyria, OH 44036, Tel: 216-365-1211, Telex: 469705; FSC No.: 11375;13625; Empl.: 35

ACCURIDE, 12311 S. Shoemaker, Santa Fe Springs, CA 90670, Tel: 213-944-0921; *Sls. Mgr.:* Mike Hart; *Dist. Mgr.:* Bill Kniegge

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ACCUTEST, 25 Industrial Ave., Chelmsford, MA 01824, Tel: 617-256-8124, TWX: 710-347-0620; Empl.: 300; *Sls. Mgr.:* Tom Emery

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ACDC ELECTRONICS, 401 Jones Rd., Oceanside, CA 92054, Tel: 619-757-1880, TWX: 910-322-1470; Empl.: 750; *Sls. Mgr.:* Larry Slagal; *Dist. Mgr.:* Ray Brown

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ACL INC., 1960 E. Devon Ave., Elk Grove, IL 60007, Tel: 312-981-9212; Empl.: 8

ACME CHEMICALS & INSULATION CO., Div. of Allied Products Corp., 166 Chapel St., New Haven, CT 06513, Tel: 203-562-2171, Telex: 295503 Acme UR; Empl.: 75; *Sls. Mgr.:* Marvin Leonard

ACME ELEC. HEATING CORP., 4685 E. 11th, Hialeah, FL 33013, Tel: 305-685-8326; Empl.: 12

ACME MODEL ENGRG. CO., 654 Bergen Blvd., Ridgefield, NJ 07657, Tel: 201-943-7650; Empl.: 29

ACOPIAN, Box 638, Easton, PA 18044, Tel: 215-258-5441, TWX: 510-651-4919; FSC No.: 14749; *Sls. Mgr.:* T. Skopal **D•1463-1497**

Local Sales Offices & Reps

FL	Melbourne, Acopian	305-727-1172
MD	Ellicott City, Doss Elctrns.	301-465-1336

ACOUSTIC POWER SYS., 2151 Las Palmas Dr., Ste. G, Carlsbad, CA 92008, Tel: 619-438-4848, Telex: 67-8401; Empl.: 5

ACQUIS COMMUNICATIONS, 17192 Gillette Ave., Irvine, CA 92714, Tel: 714-250-4964; *Sls. Mgr.:* Patrice Garner

ACRODYNE CONTROLS, See Accudyne Corp.

ACROMAG, 30765 Wixom Rd., Wixom, MI 48096, Tel: 313-624-1541, Telex: 247354; Empl.: 110; *Sls. Mgr.:* Bill Carey

Local Sales Offices & Reps

AZ	Tempe, Aldrich Indl. Controls, Ltd.	602-945-8598
CA	Costa Mesa, FLW, Inc.	714-751-7512
CA	Walnut Creek, Sharman, Inc.	415-947-5757
CO	Lakewood, Technical Mktg. Mfg.	303-232-1516
FL	Ruskin, Leroy E. Rogers	813-645-1453
GA	Atlanta, R. Freeman Assocs.	404-938-1227
IL	Hoffman Estates, Carvel Engrg. & Sls. Co.	312-885-8800
IN	Indianapolis, Process Controls Corp.	317-259-1316
IA	Cedar Rapids, Dy-Tronix	319-377-8275
KS	Shawnee Mission, D. Allert Co.	913-831-4244
LA	Baton Rouge, Devitt Pancoast Controls Co.	504-291-0074
MD	Cockeysville, Koch/Assoc.	301-666-7400
MA	Norwell, Bordewieck Engrg. & Sls. Co.	617-659-4915
MI	Negaunee, The Shertron Co.	906-475-5234
MI	Troy, George R. Peters & Assocs.	313-362-1200
MN	Cedar, Bican Co.	612-434-7733
MO	Bridgeton, Dy-Tronix	314-291-4777
NJ	Blackwood, J. Koch/Assocs.	609-227-5000
NY	Buffalo, Chippewa Instrs., Inc.	716-838-5050
NY	E. Syracuse, Analog Instrs., Inc.	315-437-8413
NY	New York, Flowmaster Controls Co.	212-741-9675
NC	Matthews, W.K. Hile Co.	704-847-9125
OH	Cincinnati, George Drysdale & Assocs.	513-528-2200
OH	Cleveland, Jay Indl. Sls. Co.	216-831-9393
OK	Tulsa, Dave Allert Co.	918-743-7705
OR	Portland, McLaren, Inc.	503-297-2248
PA	Bridgeville, Instr. Svcs.	412-221-3601
PA	Erie, Instrument Svcs.	814-455-1969
TN	Knoxville, Hile Controls of Tenn.	615-584-0208
TN	Memphis, Mel Watson Co.	901-345-0890
TX	Corpus Christi, Collier Equip. Co.	512-289-6181
TX	Irving, DACO/Dave Allert Co.	214-986-1506
TX	Sugar Land, Pan-Tech Engrg. Co.	713-240-1220
UT	West Jordan, Specialty Sls. Co.	801-561-0222
VA	Chester, Hile Controls of Virginia	804-796-3001
WA	Bellevue, McLaren, Inc.	206-454-3400
WV	Charleston, Instr. Svcs.	304-345-0348
WI	New Berlin, Carvel Engrg. & Sls. Co.	414-784-7007

ACROMARK, 60 Locust/Dept. 397, Berkeley Hgts., NJ 07922, Tel: 201-464-6474; Empl.: 50

ACTION INSTRS., 8601 Aero Dr., San Diego, CA 92123, Tel: 619-279-5726, TWX: 910-335-2030; Empl.: 230; *Sls. Mgr.:* Frank Williams

ACTIVAIR, Duracell, Inc., 2777 Eagandale Blvd., Eagan, MN 55121, Tel: 612-681-4200, Telex: 297-486; Empl.: 100; *Sls. Mgr.:* H. T. Ross; *Dist. Mgr.:* H. T. Ross

ACTIVE CONTROL INSTRMN., P.O. Box 243-Wildwood Circle, Key Largo, FL 33037, Tel: 305-451-1000; FSC No.: 55116; Empl.: 6 **D•1109**

AC TRANSFORMER, 89 Madison St., Newark, NJ 07105, Tel: 201-589-8574; Empl.: 13; *Sls. Mgr.:* George Giangrande

ACUREX-AUTODATA, 555 Clyde, Mountain View, CA 94039, Tel: 415-964-3200, Telex: 34-6391, TWX: 910-379-6593; Empl.: 1000; *Sls. Mgr.:* Don Willett

ACUSHNET CAPACITOR CO., INC., 720 Belleville, New Bedford, MA 02741, Tel: 617-999-3291, TWX: 710-344-6451; FSC No.: 61152; Empl.: 300

ACUSHNET ELCTRNS. CO., INC., 8700 E. Thomas Rd., Scottsdale, AZ 85252, Tel: 602-947-7474, TWX: 910-950-1320

ADAC CORP., 70 Tower Office Pk., Woburn, MA 01801, Tel: 617-935-6668, Telex: 951802; Empl.: 80; *Sls. Mgr.:* Les Silvern **D•1135**

Local Sales Offices & Reps

AZ	Phoenix, RML Assocs.	602-246-0321
CA	Los Angeles, ADAC Corp.	213-476-6535
CA	Redwood City, ADAC Corp.	415-366-4300
CO	Denver, RML Assocs.	303-757-6654
FL	Orlando, E. G. Holmes & Assocs.	305-894-8901
FL	Palm Bay, E. G. Holmes & Assocs.	305-723-7339
GA	Chamblee, E. G. Holmes & Assocs.	404-451-6161
IL	Bloomingdale, ADAC Corp.	312-980-3191
IL	Hoffman Estates, Carvel Engrg. & Sls. Co.	312-885-8800
KS	Overland Park, Ramsey Assocs.	913-649-6996
MI	Madison Hgts., WKM Assocs.	313-588-2300
MN	Edina, Carvel Engrg. & Sls. Co.	612-835-7929
MO	St. Louis, Ramsey Assocs.	314-878-5042
NJ	Pennsauken, Sci-Reps	609-662-5222
NM	Rio Ranch, RML Assocs.	505-892-2385
NY	DeWitt, DB Assocs.	315-446-0220
NY	White Plains, Cane Tech Sls.	914-694-9240
NC	Carey, E. G. Holmes & Assocs.	919-469-8850
OH	Dayton, WKM Assocs.	513-434-7500
OH	Independence, WKM Assocs.	216-524-5930
OR	Portland, Brett-Ross	503-256-9727
PA	Pittsburgh, WKM Assocs.	412-892-2953
TX	Houston, ADAC Corp.	713-771-9347
UT	Salt Lake City, RML Assocs.	801-942-4468
VA	Fairfax, Sci-Reps	703-385-0600
WA	Redmond, Brett-Ross	206-882-4822
WI	New Berlin, Carvel Engrg. & Sls. Co.	414-784-7007

ADALET-PLM DIV, Div. Scott & Fetzer Co., 4801 W. 150th St., Cleveland, OH 44135, Tel: 216-267-9000, Telex: 98-5349; FSC No.: 73389; Empl.: 177; *Sls. Mgr.:* J. L. Smelko

ADAMS-MAXWELL DIVISION, Coast Magnetics, 1207 North La Brea Ave., Inglewood, CA 90302, Tel: 213-673-3245, Telex: 686103; FSC No.: 22558; Empl.: 55; *Sls. Mgr.:* H. Adams

ADAMS RITE PRODS., INC., 540 W. Chevy Chase Dr., Glendale, CA 91204, Tel: 818-241-5121, TWX: 910-497-2276; Empl.: 130

ADAMS-RUSSELL, Antenna & Microwave Div., Haverhill Rd., Amesbury, MA 01913, Tel: 617-388-5210, TWX: 710-347-6360; FSC No.: 11556; Empl.: 350; *Sls. Mgr.:* David W. Ryan

ADAMS-RUSSELL, Anzac Div., 80 Cambridge St., Burlington, MA 01803, Tel: 671-273-3333, Telex: 200155, TWX: 710-332-0258; FSC No.: 21912; Empl.: 300; *Sls. Mgr.:* Julian D. Parker

ADAMS RUSSELL, Modpak Div., 80 Cambridge St., Burlington, MA 01803, Tel: 617-273-3333, TWX: 710-332-0258; FSC No.: 21912; Empl.: 1; *Sls. Mgr.:* Pat Corrigan

ADAMS-RUSSELL, Parisi Div., 280 Bear Hill Rd., Waltham, MA 02154, Tel: 617-890-0055, TWX: 710-324-6450; FSC No.: 27965; Empl.: 8; *Sls. Mgr.:* J. M. Caputo

ADAPTER/CHARGER PRDTS., Box 3218, Peoria, IL 61614, Tel: 309-691-0810; Empl.: 50

ADAPTIVE INTELLIGENCE, 1401 McCarthy Blvd., Milpitas, CA 95035, Tel: 408-262-7222; *Sls. Mgr.:* Jim Breen

ADAPTIVE SCIENCE, 4700 San Pablo Ave., Emeryville, CA 94608, Tel: 415-652-1805; FSC No.: 7379; Empl.: 26; *Sls. Mgr.:* Jesse Huffman

ADATEK, INC., P.O. Box 1339, Sandpoint, ID 83864, Tel: 208-263-1471, 800-323-3343; Empl.: 13; *Sls. Mgr.:* Kim Jones or Ray Pelland; *Dist. Mgr.:* Janis Chilton

ADC MAGNETIC CONTROLS CO., 4900 W. 78th St., Minneapolis, MN 55435, Tel: 612-835-6800, Telex: 290321; Empl.: 2000; *Sls. Mgr.:* Jack Brandmueller

ADCOTECH, 1980 Tarob Ct., Milpitas, CA 95035, Tel: 408-943-9430, TWX: 910-338-2333; Empl.: 125; *Sls. Mgr.:* Bill Sendell

ADC PRODS., 4900 W. 78th St., Minneapolis, MN 55435, Tel: 612-835-6800, TWX: 910-576-2832; Empl.: 1,435

ADDACON, INC., 3702-C Alliance Dr., Greensboro, NC 27407, Tel: 919-852-6200, TWX: 510-922-7361; *Sls. Mgr.:* Lynn Cummings

A.D. DATA SYS., Techtran Industries, 200 Commerce Dr., Rochester, NY 14623, Tel: 716-334-9649, TWX: 510-253-3246; Empl.: 35; *Sls. Mgr.:* Jack Petz

ADDELCO CORP., Advanced Dev. Elctrns. Div., 20 Freeman Pl., Needham, MA 02192, Tel: 617-444-4754, TWX: 710-325-0370; Empl.: 23; *Sls. Mgr.:* Alan LeMay; *Dist. Mgr.:* M. B. Polayes

ADDINGTON LABS. INC., SOLID STATE PRODS DIV., See Eaton Corp. Comm. Prods. Div.

ADDITIVE PRODUCTS DIV., Kollmorgen Corp., P.O. Box 700, West La., Aquebogue, NY 11931, Tel: 516-722-4100, TWX: 510-220-0022; Empl.: 450

ADDMASTER CORP., 416 Junipero Serra Dr., San Gabriel, CA 91776, Tel: 818-285-1121, Telex: 67-4770; Empl.: 200; *Sls. Mgr.:* Larry Wirtz

ADE, INC., 1560 E. 98th St., Chicago, IL 60628, Tel: 312-221-3400; FSC No.: 62049

ADELIE CORPORATION, 288 Walnut Street, Newtonville, MA 02160, Tel: 617-965-8480; Empl.: 35; *Sls. Mgr.:* Albert R. Vandam

ADI ELECTRONICS, INC., 160 Wilbur Place, Bohemia, NY 11716, Tel: 516-567-3555

ADHESIVE PRODS., 1660 Boone Ave., Bronx, NY 10460, Tel: 212-542-4600; *Sls. Mgr.:* M. S. Peters

ADIRONDACK WIRE & CABLE CO., INC., 1451 New Britain Ave., Farmington, CT 06032, Tel: 1-203-677-2657; Empl.: 150; *Sls. Mgr.:* Kenneth Stowell; *Dist. Mgr.:* Mary Anne Violette

ADRET/COMSTRON, See Comstron/Adret

ADTECH POWER INC., 1620 S. Sunkist St., Anaheim, CA 92806, Tel: 714-634-9211, Telex: 68-1498; FSC No.: 56410; Empl.: 70; *Sls. Mgr.:* C. C. O'Reilly; *Dist. Mgr.:* C. C. O'Reilly .... **D•1499**

Local Sales Offices & Reps

CA	Anaheim, Galaie Sls. Intl.	714-937-5622
CA	Brea, Synertech	714-691-6123
CA	Campbell, Sedillo Co.	408-374-5220
FL	Melbourne, Reynolds & Assocs.	305-259-7000
MA	Stoughton, Elctrn. Meas. Labs	617-341-0781
NY	New York, Elctrn. Meas. Labs	212-706-4059
TX	Garland, Carey, McMahill & Zerbe Co.	214-681-1414
TX	Houston, Carey, McMahill & Zerbe Co.	713-771-1500
TX	Round Rock, Carey McMahill & Zerbe Co.	512-255-1663
WA	Bellevue, Al Smith Co.	206-746-6770
WA	Vancouver, Al Smith Co.	206-892-9912

ADVANCE CONVERSION DEVICES CO., 274 S. Salem St., Randolph, NJ 07869, Tel: 201-989-0095; FSC No.: 52298; Empl.: 24; *Sls. Mgr.:* D. J. Fedderly .... **D•1886-1887**

ADVANCED AUTOMATION CONCEPTS, INC., 3760 Lower Roswell Rd., Marietta, GA 30067, Tel: 404-973-0027, Telex: 703452; Empl.: 12; *Sls. Mgr.:* Bob Pap

ADVANCED CIRCUITRY, Litton Inds., 4811 W. Kearney, Springfield, MO 65803, Tel: 417-862-0751, TWX: 910-775-4705; Empl.: 1000; *Sls. Mgr.:* Steve Fadler

ADVANCED CIRCUIT TECHNLG., 118 N. Eastern Blvd., Nashua, NH 03062, Tel: 603-880-6000, TWX: 710-228-8961; FSC No.: 57034; Empl.: 125

Local Sales Offices & Reps

CA	Mission Viejo, Advanced Circuit Technlg.	714-770-2637
FL	Crystal River, Advanced Circuit Technlg.	904-795-3200

ADVANCED COATINGS & CHEM., Philip A. Hunt Chemical Corp., 4343 Temple City Blvd., Temple City, CA 91780, Tel: 818-579-6270, Telex: 675594; *Sls. Mgr.:* Tim Hughes

ADVANCED COLOR TECHNLG., 21 Alpha Rd., Chelmsford, MA 01824, Tel: 617-256-1222, Telex: 951-419; *Sls. Mgr.:* Jack Flynn

ADVANCED COMPONENTS INDS., INC., 114 Center St., El Segundo, CA 90245, Tel: 213-322-4249; *Sls. Mgr.:* Irma Spreitzer

ADVANCED CONTROL SYS., 24 Teed Dr., Randolph, MA 02368, Tel: 617-963-4543; Empl.: 6; *Sls. Mgr.:* Kenneth Egan

ADVANCED DETECTOR CORP., Applied Solar Energy Corp., 15251 E. Don Julian Rd., Industry, CA 91746, Tel: 818-369-6886, TWX: 910-584-4890; *Sls. Mgr.:* T. Scott Thorpe .... **B•1203**

Local Sales Offices & Reps

AZ	Tempe, Piper Sls.	602-949-0048
CA	City of Industry, Advanced Detector Corp.	818-369-6886
CA	Mountain View, Weseloh/Swanson Assocs.	415-961-0565
CO	Longmont, Piper Sls.	303-651-2378
GA	Norcross, Hollingsworth & Still, Inc.	404-447-1700
IL	Buffalo Grove, Hill Sls. Corp.	312-541-0661
MA	Sudbury, Poulin Assocs., Inc.	617-443-7333
MI	Brooklyn, Engineered Comps., Inc.	517-592-3236
MN	Minneapolis, Furber Sls.	612-881-3620
NJ	Montclair, Controlyne, Inc.	201-746-8900
NC	Fayetteville, Zim-Tek	919-488-4101
OR	Portland, Component Technlg.	503-292-1518
PA	Pittsburgh, Covert & Newman	412-531-2002
TX	Richardson, Moore Assocs.	214-690-4929
UT	Salt Lake City, Piper Sls.	801-466-9336
VA	Fairfax, Beacon North, Inc.	703-591-1300

Local Distributors

AZ	Tempe, Piper Sls.	602-949-0048
CA	City of Industry, Advanced Detector Corp.	818-369-6886
CA	Mountain View, Weseloh/Swanson Assocs.	415-961-0565
CO	Longmont, Piper Sls.	303-651-2378
GA	Norcross, Hollingsworth & Still, Inc.	404-447-1700
IL	Buffalo Grove, Hill Sls. Corp.	312-541-0661
MA	Sudbury, Poulin Assocs., Inc.	617-443-7333
MI	Brooklyn, Engineered Comps., Inc.	517-592-3236
MN	Minneapolis, Furber Sls.	612-881-3620
NJ	Montclair, Controlyne, Inc.	201-746-8900
NC	Fayetteville, Zim-Tek	919-488-4101
OR	Portland, Component Technlg.	503-292-1518
PA	Pittsburgh, Covert & Newman	412-531-2002
TX	Richardson, Moore Assocs.	214-690-4929
UT	Salt Lake City, Piper Sls.	801-466-9336
VA	Fairfax, Beacon North, Inc.	703-591-1300

ADVANCED DEVICES, 1618 Camino Uva, Los Alamos, NM 87544, Tel: 505-662-7729

ADVANCED DIGITAL TECH, 13400 Northrup Wy Ste 27, Bellevue, WA 98005, Tel: 206-643-2382, TWX: 296 352 ADT UR; Empl.: 14; *Sls. Mgr.:* Brian T. Best; *Dist. Mgr.:* Matt Astengo

ADVANCED ELCTRNS. DESIGN, INC., 440 Potrero Ave., Sunnyvale, CA 94086, Tel: 408-733-3555, 800-538-1730 (outside CA), Telex: 357-498; *Sls. Mgr.:* Leon Drozdowski

ADVANCED ELECTRONIC PACKAGING, 2159 Bay St., Los Angeles, CA 90021, Tel: 213-622-9042; *Sls. Mgr.:* Douglas A. Hill

ADVANCED FILTER DEVICES, INC., 6241 Yarrow Dr., Ste. D, Carlsbad, CA 92008, Tel: 619-438-2074; FSC No.: 56620; Empl.: 45; *Sls. Mgr.:* Herbert Johnson

ADVANCED HIGH VOLTAGE CO., INC., P.O. Box 2136, Lancaster, CA 93539-2136, Tel: 213-997-7222; *Sls. Mgr.:* J. Richardson

ADVANCED INPUT DEVICES, W. 250 A.I.D. Dr., Coeur d'Alene, ID 83814, Tel: 208-765-8000, TWX: 510-776-0584; FSC No.: 95666; Empl.: 550; *Sls. Mgr.:* Larry May

ADVANCED INTERCONNECTIONS CORP., 5 Division St., Warwick, RI 02818, Tel: 401-885-0485, TWX: 710-382-0400; FSC No.: 05-0394638; *Sls. Mgr.:* Max E. Rice

ADVANCED KINETICS, 1231 Victoria St., Costa Mesa, CA 92627, Tel: 714-646-7165, Telex: 18-2714; Empl.: 32; *Sls. Mgr.:* R. L. Gradishar

ADVANCED MATERIALS SYSTEMS, See Handy & Harman Electronic Materials Corp.

ADVANCED MICROCOMPUTERS, 3340 Scott Blvd., Santa Clara, CA 95051, Tel: 408-732-2400, Telex: 34-6306, TWX: 910-339-9280; *Sls. Mgr.:* Steve Zelencik; *Dist. Mgr.:* Rick Marz

ADVANCED MICRO DEVICES, P.O. Box 3453, 901 Thompson Pl., Sunnyvale, CA 94088, Tel: 408-732-2400, Telex: 34-6306, TWX: 910-339-9280; Empl.: 11000; *Sls. Mgr.:* Steve Zelencik; *Dist. Mgr.:* Michael Furman

ADVANCED SYS. CONCEPTS, 435 N. Lake Ave., Pasadena, CA 91101, Tel: 818-793-8971, Telex: 701 215 ASCI; *Sls. Mgr.:* Wesley Ferris; *Dist. Mgr.:* B. Lee .... **D•1137**

Local Sales Offices & Reps

IA	Des Moines, Beams Co.	515-255-1148
MN	Edina, Integrated Peripheral Sys.	612-831-0349
OH	Dayton, Ashby Assocs.	513-252-5627
VA	Vienna, Advanced Technlg. Assocs.	703-556-0500

ADVANCED TECHN. RESEARCH LABS., 5645 K General Washington Dr., Alexandria, VA 22312, Tel: 703-750-2920; Empl.: 12; *Sls. Mgr.:* Bob Palma, Sr.; *Dist. Mgr.:* Bob Palma, Sr.

ADVANCED TOOL TECHNOLOGY, INC., Sub. of Alliance Resch. Corp., 18217 Parthenia St., Northridge, CA 91325, Tel: 213-993-1202, Telex: 181011; *Sls. Mgr.:* Lou Davis

ADVANCE ENGRG., 18225 So. Hoover St., Gardena, CA 90248, Tel: 213-321-3100

AD-VANCE MAGNETICS, INC., 625 Monroe St., Rochester, IN 46975, Tel: 219-223-3158, TWX: 810-290-0294; FSC No.: 50788; Empl.: 30; *Sls. Mgr.:* Kay Nixon .... **C•1720**

Local Sales Offices & Reps

AL	Huntsville, Remco	205-533-3763
CA	El Cajon, A-Tronics	619-444-1501
CA	Los Altos, Frauman Assoc.	415-941-0660
CA	Woodland Hills, A-Tronics	213-703-7212
CT	Meriden, A. Allison	203-481-0405
FL	Orlando, Gillum Sales	305-857-2110
GA	Atlanta, Remco	404-447-6937
IL	Westchester, Brouillette	312-345-6500
MN	Edina, J. H. Hanson	612-893-9960
NY	Commack, RC Engrg.	516-543-3325
NC	Raleigh, Remco	919-847-5079
OH	Cincinnati, Makin Assocs.	513-871-2424
PA	W. Conshohocken, Eastern Comps.	215-825-8610
TX	Houston, Space Elctns.	713-266-9245
TX	Irving, Space Elctns.	214-251-3636
VA	Herndon, Eastern Comps.	703-368-3936

ADVANCE WIRE & CABLE, 1661 Industrial Way, Belmont, CA 94002, Tel: 415-592-4550, Telex: 334475; FSC No.: 57775; Empl.: 158; *Sls. Mgr.:* Ed Mittelbusher; *Dist. Mgr.:* Ed Mittelbusher

Local Sales Offices & Reps

AL	Decatur, Tenn Tech, Inc.	205-350-0630
AZ	Phoenix, Advance Elctrl. Sls.	602-243-4326
CA	Belmont, Advance Elctrl. Sls.	415-592-4550
CO	Denver, Advance Elctrl. Sls.	303-388-0923
FL	Palm Bay, R-Rep Co.	305-725-6993
GA	Atlanta, Tenn Tech, Inc.	404-622-5784
IL	Arlington Heights, Brainard-Wilson Mktg.	312-437-2700
IN	Carmel, Brainard-Wilson Mktg.	317-844-2800
KY	Fort Mitchell, G. W. Thelen Co.	606-341-8181
MD	Hunt Valley, Phoenix Elctrn. Sls.	301-628-2066
MA	Sharon, Adcour, Inc.	617-784-8123
MI	Pontiac, Matrix Elec.	313-338-7770
MN	Minneapolis, Jos-Co/Melius, Inc.	612-861-3343
NJ	Parlin, JMR Sls.	201-727-5335
NJ	Sicklerville, Brown Assocs.	609-629-2240
NY	Camillus, Ontec	315-672-8409
NY	East Setauket, JMR Sls., Inc.	516-689-8871
NY	Rochester, Ontec	716-464-8636
NY	Wappingers Falls, Ontec	914-462-7374
NC	Raleigh, Tenn-Tech, Inc.	919-266-3610
OH	Medina, G. W. Thelen Co.	216-723-1293
TN	Nashville, Tenn-Tech, Inc.	615-646-9811
TX	Houston, Advance Elctrl. Sls.	713-956-5436
WA	Seattle, Advance Elctrl. Sls.	206-575-4323
WI	Waukesha, Brainard-Wilson Mktg.	414-797-7940

A E CORP., 65 Wellesley Ave., Needham, MA 02194, Tel: 617-449-3142; Empl.: 10; *Sls. Mgr.:* H. Harrison

A E G TELEFUNKEN, High Power Grp., Rte. 22, Orr Dr., Somerville, NJ 08876, Tel: 201-722-9800, Telex: 833409; *Sls. Mgr.:* John Szafranski

A E G TELEFUNKEN, Semiconductor Grp., Rte. 22, Somerville, NJ 08876, Tel: 201-722-9800, Telex: 833409; *Sls. Mgr.:* Carl Golasa; *Dist. Mgr.:* Thomas Carlisle

AEL, INC, See American Electronic Labs

AEMC, 99 Chauncy, Boston, MA 02111, Tel: 617-451-0227, 800-343-1391, Telex: 95-1073; *Sls. Mgr.:* Jon Henderson

AERCOM, 405 Tasman Dr., Sunnyvale, CA 94086, Tel: 408-744-1320, TWX: 910-339-9308; Empl.: 50; *Sls. Mgr.:* H. Putnam

AEROCOM, 3090 S.W. 37th Ave., Miami, FL 33133, Tel: 305-448-6503, Telex: 51-9209; FSC No.: 81535; Empl.: 100; *Sls. Mgr.:* Thomas A. Coleman

AEROFLEX LABS., INTEGRATED MICROSYSTEMS DIV., See Aeroflex Labs., Microelectronics Div.

AEROFLEX LABS., MAGNETIC PRODS. DIV., 35 South Service Road, Plainview, NY 11803, Tel: 516-694-6700, TWX: 510-224-6417; Empl.: 490; *Sls. Mgr.:* Robert M. Slatkin .... **B•1131, 1779**

Local Sales Offices & Reps

EXP	New York, Henley Overseas Sls., Inc.	212-687-9390

AEROFLEX LABS., MICROELCTRNS. DIV., 35 S. Service Rd., Plainview, NY 11803, Tel: 516-694-6700, TWX: 510-224-6417; FSC No.: 88379; Empl.: 100; *Sls. Mgr.:* Melvin D. Schwartz .... **A•1660**

Local Sales Offices & Reps

AZ	Phoenix, The Knight Co.	602-994-1311
CA	Los Altos Hills, HB Mktg.	415-941-4080
CA	Los Angeles, The Knight Co.	213-670-2833
CA	San Diego, The Knight Co.	714-451-0529
CO	Parker, Parker Webster Co.	303-841-4888
CT	Simsbury, Multitronics Sls. Co.	203-651-0140
FL	Altamonte Springs, R. W. Mitscher Co., Inc.	305-788-6844
FL	Boca Raton, R. W. Mitscher Co., Inc.	305-368-3841
IL	Northfield, Feller Assocs., Inc.	312-446-8065
IA	Cedar Rapids, Feller Assocs., Inc.	319-364-0566
MD	Baltimore, Micro Comp, Inc.	301-247-0400
MI	Detroit, Electro Sls.	313-474-7320
MI	Kalamazoo, Electro Sls.	616-323-2416
MN	Minneapolis, International Elctrns, Inc.	612-571-0000
NJ	Cherry Hill, Danco Elctrn. Sls. Corp.	609-424-5590
NJ	Teaneck, T.J. Squared	516-864-2263
NY	Albany, Nu-Tekneex Mktg.	518-355-1829
NY	Hartsdale, T.J. Squared	516-864-2263
OH	Dayton, Electro Sls.	513-426-5551
TX	Garland, Tesco Inc.	214-681-1376
UT	Salt Lake City, Parker Webster Co.	801-266-9939
EXP	New York City, New York, Henley & Co.	212-687-9390

AEROSPACE OPTICS, INC., 3201 Sandy La., Fort Worth, TX 76112, Tel: 817-451-1141, Telex: 75-8461; Empl.: 83; *Sls. Mgr.:* R. E. Borkowski

AEROTECH, INC., 101 Zeta Dr., Pittsburgh, PA 15238, Tel: 412-963-7470, TWX: 710-795-3125; Empl.: 150; *Sls. Mgr.:* Robert Mitchell

Local Sales Offices & Reps

CA	Hermosa Beach, Aerotech West	213-376-9698
CA	Sunnyvale, Aerotech Northwest	408-738-1220
CT	Farmington, Aerotech Northeast	203-673-3330
FL	Winter Park, McMahan Assocs.	305-645-0463
MD	Rockville, Spectro Assoc.	301-279-2010
NM	Albuquerque, G. Moore Assocs.	505-262-1416
NC	Raleigh, McMahan/Zellman Assoc.	919-848-1965
OH	Columbiana, Aerotech Midwest	216-482-9957
TX	Richardson, John Moore Assocs.	214-690-4929

AEROTRONIC ASSOCS., INC., Riverside Dr., Contoocook, NH 03229, Tel: 603-746-4631; FSC No.: 67272; Empl.: 225; *Sls. Mgr.:* Gary Moravchik

AERTECH INDS., See TRW Microwave

AES CORP., 285 Newbury St., P.O. Box 2093, Peabody, MA 01960, Tel: 617-535-7310, Telex: 387852 AES CORP INTL; *Sls. Mgr.:* James F. West

A.E.S INTERCONNECTS, Box 248, Plainfield, IN 46168, Tel: 317-272-2551; FSC No.: 00529; Empl.: 150; *Sls. Mgr.:* Jim Barnes

AETNA ENGRG., P.O. Box 7749, Van Nuys, CA 91409-7749, Tel: 818-341-9409; Empl.: 6; *Sls. Mgr.:* T. W. Collins

AETNA TELECOMMUNICATIONS LABS., P.O. Box 723, 131 Flanders Rd., Westborough, MA 01581, Tel: 617-366-0400, Telex: 951356; *Sls. Mgr.:* Marjorie Katz

AFI/DATATROL, Addressograph Farrington, Inc., Brent Dr., Hudson, MA 01749, Tel: 617-568-1411; Empl.: 350; *Sls. Mgr.:* Tom Galloway

AGFA-GEVAERT, INC., 275 North St., Teterboro, NJ 07608, Tel: 201-288-4100, TWX: 710-990-6137; Empl.: 750

AHAM TOR INC (ATI), 999, 27901 Front St., Rancho California, CA 92390, Tel: 714-676-4151

AIE MAGNETICS, Div. of Vernitron, 701 Murfreesboro Rd., Nashville, TN 37210, Tel: 615-244-9024, Telex: 554466; FSC No.: 06978; Empl.: 300; *Sls. Mgr.:* J. Holeman

AIKEN ADVANCED SYS., Amstar Technical Products Company, Inc., 5901 Edsall Rd., Alexandria, VA 22304-4197, Tel: 703-370-0900, TWX: 710-832-0612; FSC No.: 60590; Empl.: 250; *Sls. Mgr.:* C. G. Gilmer

Local Sales Offices & Reps

AZ	Tucson, Aiken Advanced Sys.	602-886-3219
CA	Saratoga, Interface Intl.	408-741-0265
CO	Colorado Springs, J. Smith & Assocs.	303-597-5343

FL	Melbourne, Barkman & Assocs. Mktg.	305-254-1863
EXP	MALexington, R.J. Sickles Assocs.	617-682-5100
NM	Albuquerque, J. Smith & Assocs.	505-265-3406
NY	Brooklyn, Pensky Assocs.	718-763-4936
TX	Austin, Data Mktg. Assocs.	512-451-5174
TX	Dallas, Data Mktg. Assocs.	214-661-0300
TX	Houston, Data Mktg. Assocs.	713-780-2511
TX	San Antonio, Data Mktg. Assocs.	512-342-3031
Can	Guelph, Ont., VALCOM	519-824-3220

AIL, DIV. CUTLER-HAMMER, See Eaton Corp. AIL Div.

AILTEC DIV. CUTLER-HAMMER, See Eaton Corp., Elctrn. Instrmn. Div.

AIMSCO INC., 4000-4024 22nd Ave. W., Seattle, WA 98199-0056, Tel: 206-284-5563, TWX: 910-444-1333; Empl.: 30; *Sls. Mgr.:* C. Ernst; *Dist. Mgr.:* E. Chadwick

AIPHONE, 1700 130th St. NE, Bellevue, WA 98005, Tel: 206-455-0510, Telex: 32-0288; Empl.: 42; *Sls. Mgr.:* Jim Morrison

AIRBORN, INC., 4321 AirBorn Dr., Addison, TX 75001, Tel: 214-931-3200, Telex: 79-4200, TWX: 910-860-5230; FSC No.: 10400;Multiple; Empl.: 350; *Sls. Mgr.:* J. L. Wolbrink .... **C•1111-1118**

Local Sales Offices & Reps

AZ	Tempe, Piper Sls. Co.	602-949-0048
CA	Los Angeles, Air Born	213-670-7983
CA	Mountain View, Serra Assocs.	415-964-4300
CA	No. Hollywood, R. A. Strassner	213-761-1231
CA	San Diego, Ohm Spun Elctrns.	619-695-8102
FL	Melbourne, Reynolds & Assoc.	305-259-7000
IL	Des Plaines, ESCO Assoc.	312-298-5310
IA	Cedar Rapids, Dytronix	319-377-8275
KS	Wichita, Dytronix	316-838-0884
MN	Bloomington, PWC	612-831-5999
MO	Bridgeton, Dytronics, Inc.	314-291-4777
NH	Nashua, Solla - Tronics	603-882-7146
NJ	Manville, Dynorep	201-685-0135
NM	Albuquerque, Piper Sls. Co.	505-883-9090
NY	Kingston, R.P. Kennedy Co.	914-876-2700
NY	Rochester, R.P. Kennedy Co.	716-271-6322
OH	Dayton, Electro-Com	513-898-5140
OR	Beaverton, Don Smith Sls. Co.	503-643-8020
WA	Seattle, Don Smith Sls. Co.	206-633-3160
Can	Montreal, Que., Willagen Elctrns.	514-331-4283
Can	Rexdale, Ont., Willagen Elctrns.	416-675-1821

Local Distributors

TX	Addison, AirBorn Distribution Service	214-931-3200

CONTINENTAL WIRT, 130 Jamesway, South Hampton, PA 18966, Tel: 215-355-7080

AIR ELECTRO SUPPLY, INC., 7700 Gloria Ave., Van Nuys, CA 91406, Tel: 213-873-6400, 818-988-4400, Telex: 66-2459, TWX: 910-495-1794

AIR/FLEX INDS. INC., 2422 Merced Ave., S. El Monte, CA 91733, Tel: 818-579-7060; FSC No.: 22782; *Sls. Mgr.:* Karl Thorp

airflyte ELECTRONICS CO.

AIRFLYTE ELCTRNS. CO., 56 New Hook Rd., Bayonne, NJ 07002, Tel: 201-436-2230, TWX: 710-729-4489; Empl.: 70; *Sls. Mgr.:* John Piret .... **B•1128, 1132-1137**

Local Sales Offices & Reps

CA	Culver City, Westaironics	213-641-4122
CA	Los Altos, Poltronics	415-941-3020
CT	No. Haven, Kitchen & Kutchin	203-239-0212
IL	Park Ridge, Probe Elctrns.	312-698-2044
MA	Lexington, Kitchen & Kutchin	617-862-8230
NJ	Kinnelon, Avionics Equip.	201-838-8105
NY	Rochester, R. P. Kennedy Co.	716-271-6322
PA	Philadelphia, R. P. Luce & Co.	215-884-8365
TX	Dallas, Jacobson Co.	214-363-7584

AIR LAND SYSTEMS CORPORATION, 2710 Prosperity Ave., Fairfax, VA 22031, Tel: 703-573-1100, Telex: 710-833-1174, TWX: Airland Frax; Empl.: 35; *Sls. Mgr.:* Frank Glaspell

AIRMATIC-ALLIED, 185 Park Dr., Wilmington, OH 45177, Tel: 513-382-1691; Empl.: 150

AIR MAZE CORP., 25000 Miles Rd., Cleveland, OH 44128, Tel: 216-292-6800, Telex: 98-5413; Empl.: 300; *Sls. Mgr.:* John Cummings; *Dist. Mgr.:* Bob Glasier

AIR-O-TRONICS PRODS., Box K, Morrisville, NY 13408, Tel: 315-684-3705; FSC No.: 16663; Empl.: 10; *Sls. Mgr.:* G. M. Trush

AIRPAX CORP., Woods Rd., Cambridge, MD 21613, Tel: 301-228-4600, Telex: 8-7715, TWX: 710-865-9655; FSC No.: 81541; Empl.: 550; *Sls. Mgr.:* D. Marshall ...**B•1226**

Local Sales Offices & Reps

AL	Huntsville, BCI	205-539-4411
AZ	Phoenix, Westrep	602-997-8899
CA	Pico Rivera, Westrep	213-949-2551
CA	San Diego, Westrep	714-276-0751
CO	Littleton, Lange Sls.	303-795-3600
CT	Wallingford, Selmark Assocs.	203-573-9088
FL	Ft. Lauderdale, ElectroComp	305-491-4141
GA	Chamblee, BCI	404-455-0405
IL	Palatine, Somers-Reagan, Inc.	312-991-1108
IN	Indianapolis, Leslie M. Devoe	317-842-3245
IA	Marion, Rep Assocs.	319-373-0152
MD	Baltimore, Pro-Rep, Inc.	301-653-3600
MA	Millis, Selmark	617-376-2914
MI	Troy, Pine Sls.	313-589-0350
MN	Hopkins, Peterson & Wolff	612-941-5400
MO	St. Louis, Delltron	314-869-4779
NY	Jericho, Airpax Corp.	516-822-2410
NY	Poughkeepsie, C. W. Floring	914-471-2973
NY	Rochester, Airpax Corp.	716-654-7470
NY	Syracuse, C.W. Floring & Assoc.	315-478-2144
NC	Winston-Salem, L.G. White	919-725-3612
OH	Cincinnatti, Baehr, Greenleaf	513-891-3826
OH	Cleveland, Baehr, Greenleaf	216-221-9030
OH	Columbus, Baehr, Greenleaf	614-486-4046
PA	Harleysville, T. Jackson	215-643-5560
PA	Pittsburgh, Russell F. Clark	412-242-9500
SC	Greenville, L.G. White	803-271-0630
TX	Dallas, Airpax Corp.	214-733-4377
UT	Salt Lake City, Lange Sls.	801-487-0843
VA	Richmond, L.G. White	804-740-7093
WA	Seattle, Don Smith	206-633-3160

AIRPAX CORP., Cheshire Div., Cheshire Indl. Pk., Box E, Cheshire, CT 06410, Tel: 203-272-0301, Telex: 962421, TWX: 710-455-4048; Empl.: 800; *Sls. Mgr.:* John Ricardi .... **B•1138; D•1110**

Local Sales Offices & Reps

AL	Huntsville, B.C.I.	205-539-4411
AZ	Phoenix, Westrep	602-997-8899
CA	Anaheim, Westrep	213-404-3881
CA	San Diego, Westrep	619-276-0751
CA	Santa Clara, Airpax Corp.	408-980-0410
CO	Littleton, Lange Sls.	303-795-3600
CT	Wallingford, Selmark Assocs.	203-573-9088
FL	Ft. Lauderdale, Electrocomp Assocs.	305-491-4141
GA	Chamblee, B.C.I.	404-455-0405
IL	Palatine, Somers-Reagan, Inc.	312-991-1108
IN	Indianapolis, Leslie M. Devoe	317-842-3245
IA	Marion, Rep Assocs.	319-373-0152
MD	Baltimore, Pro-Rep, Inc.	301-653-3600
MA	Millis, Selmark Assocs.	617-376-2914
MI	Madison Heights, Pine Sls, Inc.	313-589-0350
MN	Bloomington, PWC	612-831-5999
MO	St. Louis, Delltron	314-869-4779
NH	Hopkinton, Selmark Assocs.	603-746-3299
NY	Jericho, Airpax Corp.	516-822-2410
NY	Rochester, Airpax Corp.	716-654-7470
NY	Syracuse, C.W. Floring & Assocs.	315-478-2149
OH	Cleveland, Baehr, Greenleaf & Assocs.	216-221-9030
OH	Dayton, Baehr, Greenleaf & Assocs.	513-439-0724
PA	Harleysville, Thomas Jackson Assocs.	215-256-8877
PA	Pittsburgh, Russell F. Clark Co.	412-242-9500
SC	Greenville, L.G. White Southern, Inc.	803-271-0630
TX	Dallas, Airpax Corp.	214-733-4377
UT	Salt Lake City, Lange Sls.	801-487-0843
WA	Seattle, Don Smith Sls Co.	206-633-3160
WI	Wauwatosa, Larson Assocs.	414-258-0529

AIRPAX CORP., Ft. Lauderdale Div., 6801 W. Sunrise Blvd., Ft. Lauderdale, FL 33313, Tel: 305-587-1100, Telex: 51-4448, TWX: 510-955-9866; Empl.: 200

AIRPAX CORP., FREDERICK DIV., A North American Philips Co., Husky Park P.O. Box 500, Frederick, MD 21701, Tel: 301-663-5141, TWX: 710-862-0901; Empl.: 600; *Sls. Mgr.:* Al Knezevich; *Dist. Mgr.:* B. L. Reeder .... **B•1263, 1742**

Local Sales Offices & Reps

AL	Huntsville, B.C.I.	205-539-4411

AZ	Phoenix, Westrep	602-997-8899
CA	Anaheim, Westrep	213-404-3881
CA	San Diego, Westrep	619-566-6580
CA	Santa Clara, Airpax Corp.	408-980-0410
CO	Littleton, Lange Sls.	303-795-3600
CT	Clinton, Selmark Assocs.	203-573-9088
FL	Deerfield Beach, Electrocomp Assocs.	305-429-0802
GA	Chamblee, B.C.I.	404-455-0405
IL	Palatine, Somers-Reagan	312-991-1108
IN	Indianapolis, Leslie M. De Voe Co.	317-842-3245
IA	Marion, Rep Assocs., Inc.	319-373-0152
MD	Columbia, Pro-Rep, Inc.	301-992-7460
MA	Millis, Selmark Assocs.	617-376-2914
MI	Madison Heights, Pine Sls.	313-589-0350
MN	Edina, PWC, Inc.	612-831-5999
MO	St. Louis, Delltron Co.	314-869-4779
NH	Hopkinton, Selmark Assocs.	603-746-3299
NY	Jericho, Airpax Corp.	516-822-2410
NY	Poughkeepsie, C.W. Floring Assocs.	914-471-2973
NY	Rochester, Airpax Corp.	716-654-7470
NY	Syracuse, C.W. Floring Assocs.	315-478-2149
NC	Winston-Salem, L. G. White Southern	919-725-3612
OH	Cleveland, Baehr, Greenleaf & Assocs.	216-221-9030
OH	Columbus, Baehr, Greenleaf & Assocs.	614-486-4046
OH	Dayton, Baehr, Greenleaf & Assocs.	513-439-0724
PA	Harleysville, Thomas Jackson Assocs.	215-256-8877
PA	Pittsburgh, Russell F. Clark Co.	412-242-9500
TX	Dallas, Airpax Corp.	214-867-7741
UT	Salt Lake City, Lange Sls.	801-487-0843
WA	Seattle, Don Smith Sls.	206-633-3160
WI	Wauwatosa, Larson Assocs.	414-258-0529

Local Distributors

CA	Santa Ana, Norstan Elctrns.	714-540-4165
OK	Tulsa, Altair	918-665-0524
TX	Houston, Altair	713-462-3029
TX	Richardson, Altair	214-231-5166

AIRPOT, 27 Lois St., Norwalk, CT 06851, Tel: 203-846-2021, Telex: 643-688; *Sls. Mgr.:* Mark A. Gaberman

AIRTRON, Litton Industries, Inc., 200 E. Hanover Ave., Morris Plains, NJ 07950, Tel: 201-539-5500, TWX: 710-986-7473; FSC No.: 80006; Empl.: 350

AIR-VAC ENGRG., 100 Gulf St., Milford, CT 06460, Tel: 203-874-2541; Empl.: 30

AJAX MAGNETHERMIC CORP., 1745 Overland Ave., N.E., Warren, OH 44482, Tel: 216-372-8511, Telex: 098-2482; Empl.: 500

AKG ACOUSTICS, INC., 77 Selleck St., Stamford, CT 06902, Tel: 203-348-2121; Empl.: 40; *Sls. Mgr.:* Peter Wellikoff

AKRO-MILS, 1293 S. Main St., Akron, OH 44301, Tel: 216-253-5593, Telex: 98-6321; Empl.: 200; *Sls. Mgr.:* W. J. Tonachio; *Dist. Mgr.:* D. Martin

ALADDIN ELCTRNS., See AIE Div. of Vernitron

ALAN GORDON ENTPRS., INC., P.O. Box 3914, 5362 Cahuenga Blvd., N. Hollywood, CA 91605, Tel: 818-985-5500, Telex: 662532 A-GB FOTO. LSA, TWX: 910-321-4526 GORDON NT LSA; *Sls. Mgr.:* D. Sahlenn

ALAN INDS., P.O. Box 1203, Columbus, IN 47201, Tel: 812-372-8869; FSC No.: 52750; Empl.: 36

Local Sales Offices & Reps

AL	Huntsville, Saber Assocs.	800-327-0853
CA	Los Angeles, RF Assocs.	213-478-1586
CA	Palo Alto, RF Assocs.	415-494-3331
FL	Bradenton, Saber Assocs.	800-327-0853
FL	Longwood, Saber Assocs.	800-327-0853
FL	Melbourne, Saber Assoc.	800-327-0853
GA	Griffin, Saber Assocs.	800-327-0853
MD	Randallstown, C. L. Malinow & Co.	301-922-2092
MA	Needham, Addelco Corp.	617-444-4754
NY	Liverpool, R. & D. Assocs.	315-457-0100
NY	New Rochelle, Ascor Elctrns.	914-235-8838
NC	Clayton, Saber Assocs.	800-327-0853
OH	Dayton, Frederic L. Ohmer	513-434-1454
PA	Lafayette Hill, M. Lader Co.	215-825-3177
SC	Columbia, Saber Assoc.	800-327-0853
TX	Dallas, Airep Elctrns.	214-349-4360
TX	Houston, Airep Elctrns.	713-944-2055
EXP	CT, Stamford, Dage Corp.	203-324-3123

ALARM CONTROLS, 19 Brandywine Dr., Deer Park, NY 11729, Tel: 516-586-4220; FSC No.: 55042; Empl.: 50; *Sls. Mgr.:* Howard Berger

ALASCO RUBBER & PLASTICS CORP., 617 Mountain View Ave. # 7, Belmont, CA 94002, Tel: 415-595-4100; FSC No.: 13862; Empl.: 25; *Sls. Mgr.:* Philip K. Nordberg

ALBAR, INC., 19013 36th Ave. W., Lynnwood, WA 98036, Tel: 206-771-4006; Empl.: 20; *Sls. Mgr.:* Merv Eaton

ALBEROX, New Bedford Ind'l. Pk., New Bedford, MA 02745, Tel: 617-995-1725; Empl.: 140 .... **C•1617**

Local Sales Offices & Reps

CA	Los Gatos, Alberox Corp.	408-358-1714
IL	Chicago, Karl D. Engle Co.	312-539-1820
IN	Indianapolis, Butler Components	317-253-5143
MA	Weston, J. Goode Assocs.	617-235-3900
MI	Birmingham, Clifford Armstrong Co.	313-851-1404
MN	Minneapolis, Magner & Assocs.	612-483-0656
NY	Fayetteville, S. F. Foster Co.	315-637-5427
NY	Valley Stream, Levison Sls.	516-561-9696
OH	Cleveland, Greenleaf & Assocs.	216-333-5480
PA	Philadelphia, Shelton Sls. Corp.	215-248-0131
TX	Dallas, C. M. Farmer Co., Inc.	214-339-4970
WA	Seattle, Demarest Assocs.	206-523-3210

ALCO ELCTRN. PRODS., INC., 1551 Osgood St., N. Andover, MA 01845, Tel: 617-685-4371, TWX: 710-342-0552; Empl.: 300 .... **B•1481-1483**

Local Sales Offices & Reps

AL	Huntsville, Glen White Assocs. Inc.	205-883-7938
AZ	Phoenix, Knight Co.	602-582-8506
CA	Los Angeles, Knight Co.	213-670-2833
CA	Redwood City, J. Heaton Co.	415-367-9000
CA	San Diego, Knight Co.	619-571-7903
CO	Littleton, Simpson & Assocs.	303-794-8381
FL	Safety Harbor, Augat/ALCO	813-725-1037
FL	Tamarac, Augat/ALCO	305-721-6021
GA	Norcross, Glen White Assocs. Inc.	404-441-1447
IN	Indianapolis, Rockford Controls	317-248-2518
MA	Norwood, Augat Sls.	617-762-3164
MI	Livonia, Luebbe Sls. Co.	313-477-3131
MN	St. Paul, Countryman Assocs.	612-645-9151
NM	Albuquerque, C. T. Carlberg & Assoc.	505-888-3883
NY	E. Rochester, Tri-Tech Elctrns.	716-385-6500
NY	Endwell, Tri-Tech Elctrns.	607-754-1094
NY	Fayetteville, Tri-Tech Elctrns.	315-446-2881
NY	Fishkill, Tri-Tech Elctrns.	914-897-5611
NY	Great Neck, Cooper-Simon & Co. Inc.	516-487-1142
NC	Raleigh, Glen White Assocs. Inc.	919-787-7023
OH	Cincinnati, Luebbe Sls. Co.	513-891-5770
OH	Cleveland, Luebbe Sls. Co.	216-333-0425
OH	Columbus, Luebbe Sls. Co.	614-431-0474
OH	Dayton, Luebbe Sls. Co.	513-294-0426
OR	Beaverton, D. Smith Sls. Co.	503-643-8020
PA	Pittsburgh, Luebbe Sls. Co.	412-931-0414
PA	Trevose, P.S.A., Inc.	215-245-0513
TN	Gray, Glen White Assocs. Inc.	615-477-8850
TX	Dallas, Augat/ALCO	214-788-4211
TX	Georgetown, Augat/ALCO	512-479-9447
TX	Houston, Augat/ALCO	713-495-3100
UT	Midvale, Simpson Assocs. Inc.	801-566-3691
VA	Lynchburg, P.S.A. Inc.	800-233-4242
VA	McLean, P.S.A. Inc.	800-233-4242
WA	Seattle, D. Smith Sls. Co.	206-633-3160

Local Distributors

AL	Huntsville, Arrow Elctrns.	205-882-2730
AL	Huntsville, Hall-Mark Elexs.	205-837-8700
AZ	Phoenix, Hall-Mark Elexs.	602-437-1200
AZ	Phoenix, Kachina Elctrns.	602-269-6201
AZ	Tempe, Acacia Sls.	602-894-2874
AR	Little Rock, Carlton-Bates	501-562-9100
CA	Burbank, Switching Devices	213-849-3211
CA	Chatsworth, Arrow Elexs.	213-701-7500
CA	Gardena, CA Switch & Signal	213-770-2330
CA	Hollywood, Yale Radio Electric	213-465-3186
CA	Irvine, Acacia Sales	714-660-0834
CA	Los Angeles, Electric Switch	213-664-1141
CA	Mountain View, Abacus Elctrns.	415-961-1500
CA	Newport Beach, Arrow Elexs.	714-851-8961
CA	Palo Alto, Zack Elctrns.	415-326-5432
CA	Pasadena, Dow Radio	213-793-1195
CA	Riverside, Elctrn. Supp.	714-683-7300
CA	San Diego, Acacia Sls.	619-565-4365
CA	San Diego, Arrow Elexs.	619-565-4800
CA	San Diego, El-Com Inc.	619-578-0900
CA	San Diego, Hall-Mark Elexs.	619-268-1201
CA	San Francisco, Steven Engrg.	415-588-9200
CA	San Jose, Hall-Mark Elexs.	408-946-0900
CA	San Jose, Ratel Inc.	408-946-4300
CA	Santee, Mouser Elexs.	619-449-2300
CA	Sunnyvale, Acacia Sls.	408-745-7200
CA	Sunnyvale, Arrow Elexs.	408-745-6600
CA	Van Nuys, Pacific Switch Controls	213-873-4802
CO	Denver, Arrow Elexs.	303-758-2100
CO	Denver, Ragon Elexs.	303-744-1992
CO	Englewood, Hall-Mark Elexs.	303-694-1662
CO	Lakewood, Acacia Sls.	303-232-2882
CT	Greenwich, Wise Comps.	203-531-4880
CT	Hartford, Wes-Garde	203-525-6907
CT	Stratford, Utronics	203-378-4201
CT	W. Hartford, Atlantic Switch Controls	203-527-7705
CT	Wallingford, Arrow Elexs.	203-265-7741
FL	Ft. Lauderdale, Arrow Elexs.	305-776-7790
FL	Ft. Lauderdale, Hall-Mark Elexs.	305-971-9280
FL	Lakeland, Switch Controls	813-644-7564
FL	Miami, Elctrn. Equip.	305-871-3500
FL	Orlando, Hall-Mark Elexs.	305-855-4020
FL	Orlando, Hammond Elctrns.	305-849-6060
FL	Palm Bay, Arrow Elexs.	305-725-1480
FL	Pompano Beach, Components South	305-971-0350
GA	Norcross, Arrow Elexs.	404-449-8252
GA	Norcross, Hall-Mark Elexs.	404-447-8000
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IL	Bensenville, Diplomat/Illinois	312-595-1000
IL	Chicago, Newark Elctrns.	312-638-4411
IL	Glen Ellyn, Rockford Controls Co.	312-469-6016
IL	Itasca, Voyager Elexs. Corp.	312-773-4900
IL	Palatine, OHM Elexs.	312-359-5500
IL	Rockford, Midwest Assocs. Inc.	815-962-8036
IL	Rosemont, Advent Elctrns.	312-298-4210
IL	Schaumberg, Arrow Elexs.	312-397-3440
IL	Wheaton, Conectrix	312-653-1460
IN	Indianapolis, Arrow Elexs.	317-243-9353
IN	Indianapolis, Graham Elexs.	317-634-8202
IN	Indianapolis, Neunier Elex. Supply	317-635-3511
IN	South Bend, Genesis Elctrns.	219-287-2911
IA	Cedar Rapids, Arrow Elexs.	319-395-7230
IA	Cedar Rapids, Deeco Inc.	319-365-7551
KS	Lenexa, Hall-Mark Elexs Corp.	913-888-4747
KS	Witchita, Lee Products	316-264-2172
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MD	Baltimore, Arrow Elexs	301-247-5400
MD	Gaithersburg, Pioneer Wash.	301-921-0660
MD	Kensington, Marine Air Supp.	301-949-9560
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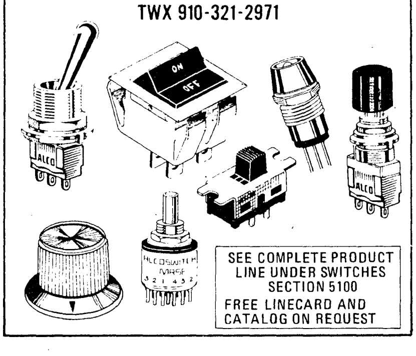
MA	Canton, Impact Sls.	617-821-1500
MA	Hingham, Sager Elec. Supp.	617-749-6700
MA	Lynn, Land Elctrns.	617-592-2220



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MN	Edina, Arrow Elexs	612-830-1800
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MN	St. Paul, Ragon	612-642-2828
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NH	Manchester, Arrow Elexs.	603-668-6968
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NJ	Camden, General Radio	609-961-8560
NJ	Clifton, J-Mar Elexs. Inc.	201-772-6400
NJ	E. Marlton, Arrow Elexs.	609-596-8000
NJ	Fairfield, Arrow Elctrns.	201-575-5300
NJ	Springfield, Federated Purchaser	201-272-0505
NM	Albuquerque, Arrow Elexs.	505-243-4566
NM	Albuquerque, Walker Elex. Sup.	505-242-2288
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NY	Farmingdale, Arrow Elctrns.	516-293-4020
NY	Hauppauge, Arrow Elexs.	516-231-1000
NY	Hauppauge, Broadline Elexs.	516-231-4100
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NY	Liverpool, Arrow Elexs.	315-652-1000
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PA	McKean, Advacom	814-476-7774
PA	Monroeville, Arrow Elexs.	412-856-7000
PA	Norristown, Century Elctrns.	215-631-5400
PA	Philadelphia, Almo Elctrns.	215-698-4000
PA	Philadelphia, Philadelphia Elexs.	215-568-7400
TN	Knoxville, Indl. Elctrns.	615-573-7135
TX	Austin, Arrow Elexs.	512-835-4180
TX	Austin, Hall-Mark Elex. Corp.	512-258-8848
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TX	Houston, Hall-Mark Elexs. Corp.	713-781-6100
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WI	Madison, Arrow Elexs.	608-273-4977
WI	Milwaukee, Marsh Elctrns.	414-475-6000
WI	Oak Creek, Arrow Elexs.	414-764-6600

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CA	Tarzana, High Voltage Sales	213-881-9194
NY	Babylon, Astrorep, Inc.	516-422-2500
WA	Mercer Island, Electronic Comp. Sls.	206-232-9301

ALDES SYS., Alden Products Co., 262 N. Main St., P.O. Box 860, Brockton, MA 02403, Tel: 617-583-0160, Telex: 287 793 ALDN UR DDD, TWX: 617-583-7618; Empl.: 150; *Sls. Mgr.:* G. Morrison

A. L. DESIGN, INC., 4232 Ridge Lea Rd., Amherst, NY 14226, Tel: 716-833-6272; Empl.: 9

ALESSI INDS., INC., 3195-C Airport Loop Dr., Costa Mesa, CA 92626, Tel: 714-979-8912, TWX: 910-595-1528; *Sls. Mgr.:* Tim McFadden

ALFORD MFG. CO., P.O. Box 2116, 32 Sixth Rd., Woburn, MA 01888, Tel: 617-935-8610, TWX: 710-348-1063; FSC No.: 07177; Empl.: 30; *Sls. Mgr.:* Fred Abel

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CA	Novato, Ed Driscoll Assoc.	415-883-0353
FL	Sarasota, Ram-Z Assoc.	813-951-9900
IL	Park Ridge, Adtech Inc.	312-692-7320
MA	Framingham, J.M. Lancaster Assoc.	617-875-8893
MO	Grandview, Digital Sys. Sls.	316-685-9725
NJ	Teaneck, Sci. Dvs. East	201-871-3916
OH	Chesterland, EQS, Sys. Inc.	216-729-2222
TX	Houston, Knox Mktg.	713-780-2516
VA	Alexandria, Dyna-Repco	703-354-1222
WA	Bellevue, Gerry Mara Assoc.	206-614-3535

ALINABAL, 28 Woodmont Rd., Milford, CT 06460, Tel: 203-877-3241, TWX: 710-462-1178; Empl.: 255

ALLACO PRODS. DIV., Bacon Industries, Inc., 192 Pleasant St., Watertown, MA 02172-2399, Tel: 617-926-2550, TWX: 710-327-6518; FSC No.: 99098; Empl.: 23; *Sls. Mgr.:* R.S. Cass

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AZ	Phoenix, J. F. Hurlbut Co.	602-952-2079
CA	Arcadia, Van Gott & Assocs.	818-445-9728
CA	Palo Alto, Adtek Assocs.	415-323-5414
CA	San Diego, Van Gott & Assocs.	619-286-3633
CO	Golden, J. F. Hurlbut Co.	303-279-7796
IL	Elmhurst, Utronix Sls., Inc.	312-834-1100
MA	Wayland, High-Tech Sls.	617-653-3838
MN	Anoka, Ken Haugen & Assocs.	612-421-3395
MO	Independence, Engrg. Svcs. Co.	816-254-3600
MO	St. Louis, Engrg. Svcs. Co.	314-997-1515
NY	Plainview, Eastern Metro Assocs.	516-931-1414
NY	Rochester, J. G. Welch Assocs.	716-244-1100
NY	Utica, J. G. Welch Assocs.	315-736-7821
OR	Portland, Blum & Assocs., Inc.	503-643-8430
PA	Huntingdon Valley, Rabal Assocs.	215-947-4825
TX	Dallas, Bradenco Corp.	214-243-7261
UT	Salt Lake City, J. F. Hurlbut Co.	801-973-4443
VA	Alexandria, Vanguard Engrg. Sls.	703-768-1660
WA	Lynnwood, Blum & Assocs., Inc.	206-775-6656
EXP	CT, Stamford, Dage Corp.	203-324-3123

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AL	Birmingham, A-B Co.	205-988-4280
AK	Anchorage, J. A. Tudor & Assocs.	907-344-5852
AZ	Phoenix, A-B Co.	602-944-3303
AR	Little Rock, C. H. Stout, Inc.	501-372-2555
CA	City of Commerce, A-B Co.	213-724-5713
CA	Hayward, A-B Co.	415-887-7888
CA	Sacramento, A-B Co.	916-446-4064
CA	San Diego, A-B Co.	619-292-4016
CO	Denver, A-B Co.	303-985-8787
CT	Stratford, A-B Co.	203-378-7364
FL	Ft. Lauderdale, A-B Co.	305-771-0400
FL	Jacksonville, A-B Co.	904-396-6010
FL	Orlando, A-B Co.	305-894-9715
FL	Tampa, Van & Smith Co.	813-877-8393
GA	Doraville, A-B Co.	404-455-7422
ID	Cedar Rapids, A-B Co.	319-377-3802
IL	Chicago, A-B Co.	312-325-6750
IL	Peoria, A-B Co.	309-697-8191
IL	Rockford, A-B Co.	815-229-0920
IN	Fort Wayne, A-B Co.	219-432-9538
IN	Indianapolis, A-B Co.	317-872-2620
IN	Merrillville, A-B Co.	219-769-7770
IA	Bettendorf, A-B Co.	319-355-5316
KS	Wichita, A-B Co.	316-267-1146
KY	Louisville, A-B Co.	502-893-2571
LA	Baton Rouge, A-B Co.	504-292-9028
LA	Metairie, A-B Co.	504-888-2281
LA	Shreveport, C. H. Stout	318-636-7777
ME	Portland, A-B Co.	207-781-5402
MD	Baltimore, A-B Co.	301-265-5600
MA	Framingham, A-B Co.	617-879-5900
MA	Holyoke, A-B Co.	413-533-3962
MI	Flint, A-B Co.	313-733-3560
MI	Grand Rapids, A-B Co.	616-455-2250
MI	Kalamazoo, A-B Co.	616-344-6163
MI	Lansing, A-B Co.	517-349-6903
MI	Madison Heights, A-B Co.	313-583-9400
MN	Minneapolis, A-B Co.	612-781-3406
MS	Jackson, A-B Co.	601-969-1811
KS	Kansas City, A-B Co.	913-371-5668
MO	Maryland Heights, A-B Co.	314-291-0083
NE	Omaha, A-B Co.	402-592-2010
NJ	Bloomfield, A-B Co.	201-338-4600
NM	Albuquerque, A-B Co.	504-881-7270
NY	Albany, A-B Co.	518-869-5373
NY	Buffalo, A-B Co.	716-634-2711
NY	Plainview, A-B Co.	516-349-1445
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NY	Syracuse, A-B Co.	315-463-4501
NC	Charlotte, A-B Co.	704-394-9341
NC	Greensboro, A-B Co.	919-852-4961
ND	Bismark, A-B Co.	701-222-3155
OH	Akron, A-B Co.	216-253-2106
OH	Cincinnati, A-B Co.	513-793-7580
OH	Cleveland, A-B Co.	216-442-0000
OH	Columbus, A-B Co.	614-882-7722
OH	Dayton, A-B Co.	513-435-7220
OH	Toledo, A-B Co.	419-841-7726
OK	Tulsa, A-B Co.	918-663-5120
OR	Eugene, J. A. Tudor & Assoc.	503-686-1252
OR	Portland, J. A. Tudor & Assoc.	503-288-5154
PA	Bethlehem, A-B Co.	215-868-3131
PA	Erie, A-B Co.	814-864-3066
PA	King of Prussia, A-B Co.	215-337-1990
PA	Pittsburgh, A-B Co.	412-923-1844
PA	York, A-B Co.	717-848-2239
SC	Charleston, A-B Co.	803-722-4073
SC	Greenville, A-B Co.	803-268-9200
TN	Knoxville, A-B Co.	615-588-0591
TN	Memphis, C. H. Stout Co.	901-362-1616
TN	Nashville, A-B Co.	615-366-7340
TX	Austin, A-B Co.	512-467-0569
TX	Dallas, A-B Co.	214-258-7767
TX	Houston, A-B Co.	713-590-8282
TX	San Antonio, A-B Co.	512-732-4362
UT	Salt Lake City, Stevens Sls. Co.	801-487-8971
VA	Richmond, A-B Co.	804-794-6900
WA	Seattle, J. A. Tudor & Assoc.	206-682-7444
WA	Spokane, J. A. Tudor & Assoc.	509-327-3328
WV	Nitro, A-B Co.	304-755-8193
WI	Appleton, A-B Co.	414-731-3202
WI	Milwaukee, A-B Co.	414-671-2000
WY	Casper, A-B Co.	307-266-4336

Local Distributors

AZ	Phoenix, Schweber Elctrns.	602-997-4874
AZ	Phoenix, Wyle Labs.	602-249-2232
CA	Canoga Park, Marshall Inds. Elctrns. Grp.	818-999-5001
CA	El Monte, Marshall Inds. Elctrns. Grp.	818-442-7204

CA	El Segundo, Wyle Labs.	213-322-8100
CA	Irvine, Marshall Inds. Elctrns. Grp.	714-556-6400
CA	Irvine, Schweber Elctrns.	714-863-0200
CA	Irvine, Wyle Labs.	714-863-9953
CA	Rancho Cordova, Wyle Labs.	916-638-5282
CA	San Diego, Wyle Labs.	619-565-9171
CA	Santa Clara, Schweber Elctrns.	408-748-4700
CA	Santa Clara, Wyle Labs.	408-727-2500
CA	Sunnyvale, Marshall Inds. Elctrns. Grp.	408-732-1100
CO	Thornton, Wyle Distbn. Grp.	303-457-9953
CT	Danbury, Schweber Elctrns.	203-748-7080
FL	Hollywood, Schweber Elctrns.	305-927-0511
FL	Orlando, Hammond Elctrns., Inc.	305-849-6060
GA	Atlanta, Schweber Elctrns.	404-449-9170
IL	Chicago, Newark Elctrns.	312-638-4411
IL	Palatine, Ohm Elctrns., Inc.	312-359-5500
IN	Ft. Wayne, Graham Elctrns. Supp., Inc.	219-423-3422
IN	Indianapolis, Graham Elctrns. Supp., Inc.	317-634-8202
MD	Gaithersburg, Schweber Elctrns.	301-840-5900
MA	Bedford, Schweber Elctrns.	617-275-5100
MA	Burlington, Marshall Elctrns. Grp.	617-272-8200
MI	Livonia, Schweber Elctrns.	313-525-8100
MN	St. Paul, Ragon Elctrns.	612-642-2828
MO	Independence, Ragon Elctrns.	816-254-3410
MO	St. Louis, Olive Elctrns., Inc.	314-426-4500
NJ	Fairfield, Marshall Inds. Elctrns. Grp.	201-882-0320
NJ	Fairfield, Schweber Elctrns.	201-227-7880
NY	Hauppauge, Fairmont Elctrns. Sls. Corp.	516-231-3313
NY	Rochester, Schweber Elctrns.	716-424-2222
NY	Westbury, Schweber Elctrns.	516-334-7474
NC	Greensboro, Hammond Elctrns., Inc.	919-275-6391
OH	Cleveland, Schweber Elctrns.	216-464-2970
OH	Columbus, Electronics Mktg. Corp.	614-229-4161
OR	Hillsboro, Wyle Labs.	503-640-6000
PA	Philadelphia, Almo Elctrns. Corp.	215-698-4000
TX	Fort Worth, TTI, Inc.	817-831-0441
TX	Houston, Harrison Equip. Co., Inc.	713-879-2600
TX	Richardson, Wyle Labs.	214-235-9953
UT	Salt Lake City, Wyle Labs.	801-974-9953
WA	Bellevue, Wyle Labs.	206-453-8300
WI	Milwaukee, Marsh Elctrns., Inc.	414-475-6000
Can	Montreal, Quebec, Cesco Elctrns. Ltd.	514-735-5511
Can	Quebec, Cesco Elctrns. Ltd.	418-524-4641
Can	Toronto, Ont., Cesco Elctrns. Ltd.	416-661-0220

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ALLEN-BRADLEY CO., ELECTRONICS GROUP, Div. of Rockwell Corp., Resistive Products Div., 1414 Allen-Bradley Dr., El Paso, TX 79935, Tel: 915-592-4888, Telex: 749-400; *Sls. Mgr.:* Jim Hadfield .... **A•1993-1995**

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ALLIED SYSTEMS CORP., Box 18077, Greensboro, NC 27419, Tel: 919-299-2294; Empl.: 25; *Sls. Mgr.:* E. V. Saude

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ALMOR CO., INC., PO Box 1790, 155 Crescent St., Brockton, MA 02403, Tel: 617-586-5406; *Sls. Mgr.:* Bill Wolfreys

ALPHA COMPS., 115 Eucalyptus Dr., El Segundo, CA 90245, Tel: 213-322-7780; Empl.: 12

ALPHA COMPS., 1106 E. Simpson Rd., Mechanicsburg, PA 17055, Tel: 717-697-8595, TWX: 510-650-4930; FSC No.: 52748

ALPHA DATA, 20750 Marilla St., Chatsworth, CA 91311, Tel: 818-882-6500, TWX: 910-494-4914; FSC No.: 7025; Empl.: 30; *Sls. Mgr.:* James S. Howard

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ALPHA DISTR. CORP., 550 E. Royalton Rd., Cleveland, OH 44147, Tel: 216-526-3716 .... pgs. **643, 713, 815**

ALPHA INDS., INC.-MICROELECTRONIC DIV., 2800 Crystal Drive, Hatfield, PA 19440, Tel: 215-822-1311, TWX: 510-661-7370; FSC No.: 17540; *Sls. Mgr.:* Joe Diesso

ALPHA INDS., INC., Microwave Comp. Div., 90 Glenn St., Lawrence, MA 01843, Tel: 617-681-8520, Telex: 949436, TWX: 710-342-8033; FSC No.: 17540; *Sls. Mgr.:* Frank Tarr

ALPHA INDS., INC.-MSD DIV., 20 Sylvan Rd., Woburn, MA 01801, Tel: 617-935-5150, Telex: 949436, TWX: 710-393-1236; FSC No.: 17540; *Sls. Mgr.:* Peter K. Butler; *Dist. Mgr.:* Nicholas Bishop

ALPHA INDS., INC., 20 Sylvan Rd., Woburn, MA 01801, Tel: 617-935-5150, Telex: 949436, TWX: 710-393-1236; FSC No.: 17540; Empl.: 1200

ALPHA INDS., INC. - TRG MILLIMETER COMP., 20 Sylvan Rd., Woburn, MA 01801, Tel: 617-935-5150, Telex: 949436, TWX: 710-393-1236; FSC No.: 17540; *Sls. Mgr.:* Peter K. Butler; *Dist. Mgr.:* Nicholas Bishop

ALPHA-M CORP., 3009 Wildflower Dr., Dallas, TX 75229, Tel: 214-620-0021; Empl.: 8; *Sls. Mgr.:* W. L. Cowley

Local Sales Offices & Reps

CA	Panarama City, Viking Sls.	213-997-3933
FL	Clearwater, Brennan Assocs.	313-446-5006
IN	Indianapolis, Sukop & Cox	317-253-5501
MN	Minneapolis, Heilites	612-861-6051
TX	Dallas, Merit Co.	214-620-0021
WA	Bellevue, Topp Engr. Sls.	206-747-5400

ALPHA MERICS CORP., 20931 Nordhoff St., Chatsworth, CA 91311, Tel: 818-709-1155, Telex: 182314, TWX: ALPHA-MER-CHCA 910-494-1931; *Sls. Mgr.:* Mark McGrew; *Dist. Mgr.:* Mark McGrew

ALPHA METALS, 600 Rte 440, Jersey City, NJ 07304, Tel: 201-434-6778, Telex: 12-5798; Empl.: 400; *Sls. Mgr.:* T. Marks

ALPHA PRODUCTS, INC., 5740 Corsa Ave. #104, Westlake Village, CA 91362, Tel: 818-889-9304

ALPHA-TEK, 7286 Murdy Circle, Huntington Beach, CA 92647, Tel: 714-847-7515

ALPHA WIRE CORP., 711 Lidgerwood Ave., P.O. Box 711, Elizabeth, NJ 07207, Tel: 201-925-8000, Telex: 6853017, TWX: 710-996-5895; Empl.: 575; *Sls. Mgr.:* Paul Dietlin

ALPS ELECTRIC (USA), INC., 3553 N. First St., San Jose, CA 95134, Tel: 408-946-6000, Telex: 157061; Empl.: 62 .... **D•1057**

Local Sales Offices & Reps

AL	Huntsville, Jack Harvey & Assocs.	205-536-4414
AZ	Phoenix, Eltron	602-266-2164
CA	Garden Grove, West Electronic Sls. Co.	714-829-0120
CA	San Diego, Harvey King, Inc.	619-566-5252
CA	Santa Clara, Nova-Tronix	408-727-9530
CO	Englewood, Nelligan Co.	303-761-2121
CT	Yalesville, Technology Sls.	203-269-8853
FL	Clearwater, Jack Harvey & Assocs.	813-725-1841
FL	Ft. Lauderdale, Jack Harvey & Assocs.	305-763-1945
GA	Norcross, Jack Harvey & Assocs.	404-449-4643
IL	Arlington Hgts., Micro Sls.	312-956-1000
IN	Indianapolis, Alps Elec. (USA)	317-248-2577
IN	Indianapolis, Jack Harvey & Assocs.	317-872-1031
IN	Kokomo, Jack Harvey & Assocs.	317-453-4260
KS	Kansas City, BC Electronic Sls.	913-342-1211
KS	Wichita, BC Elctrn. Sls.	316-942-9840
KY	Prospect, Jack Harvey & Assocs.	502-228-4100
MD	Baltimore, Burgin-Kreh Assocs., Inc.	301-265-8500
MA	Waltham, Technology Sls.	617-647-5700
MI	Oak Park, A. Blumenberg Assocs.	313-968-3230
MN	Minneapolis, PSI	612-944-8545
MO	St. Louis, BC Elec. Sls.	314-291-1101
NJ	Boonton, PAF Assocs.	201-335-0680
NY	Albany, Reagan/Compar Albany	518-489-4777
NY	Endwell, Reagan/Compar	607-723-8743
NY	Fairport, Reagan/Compar	716-271-2230
NY	New Hartford, Reagan/Compar	315-732-3775
NY	Rockville Centre, Alps Elec. (USA)	516-766-3636
NY	Smithtown, PAF Assocs.	516-360-0940
NC	Greensboro, Wallace Elctrn. Sls.	919-996-2742
OH	Rocky River, Norm Case Assocs.	216-333-0400
OK	Tulsa, Norcom	918-832-7747
OR	Aloha, Venture Elctrns.	503-642-9090
PA	Willow Grove, Harry Nash Assocs.	215-657-2213
TN	Johnson City, Jack Harvey & Assocs.	615-928-7588
TX	Austin, Norcom	512-451-2757
TX	Dallas, Norcom	214-386-4888
TX	Houston, Norcom	713-778-0392
UT	Salt Lake City, Nelligan Co.	802-261-1121
VA	Lynchburg, Burgin-Kreh Assocs., Inc.	804-239-2626
WA	Bellevue, Venture Elctrns.	206-454-4594
WI	Milwaukee, Micro Sls., Inc.	414-782-1171

ALTEC LANSING, Altec Corp., 1250 N. Red Gum St., Anaheim, CA 92806, Tel: 714-632-7117, Telex: 665415; Empl.: 200; *Sls. Mgr.:* Gayle Campbell

ALTEK CO., P.O. Box 1128, Torrington, CT 06790, Tel: 203-482-7626; FSC No.: 53939; Empl.: 34; *Sls. Mgr.:* Stephen Altschuler

ALTEK CORP., 2150E Indl. Pkwy., Silver Spring, MD 20904, Tel: 301-622-3906, TWX: 710-825-0422; Empl.: 55; *Sls. Mgr.:* Lowell Nerenberg; *Dist. Mgr.:* Lowell Nerenberg

ALTUS CORP., 1610 Crane, San Jose, CA 95112; *Sls. Mgr.:* Don Keil

ALUMA TOWER CO., 1639 Old Dixie Hwy., Box 2806, Vero Beach, FL 32960, Tel: 305-567-3423, Telex: 803405

ALUMINUM FILTER, P.O. Box 1311, Santa Barbara, CA 93102, Tel: 805-684-7651, Telex: 658325, TWX: 910-336-1113; FSC No.: 17504; Empl.: 120; *Sls. Mgr.:* B. L. Baker

Local Sales Offices & Reps

CA	Fremont, Vontek	415-651-7966
CA	Reseda, Jerry Budenz & Assocs.	818-342-4276
CO	Louisville, X-O Sales Inc.	303-666-7690
MA	Brookline, Harman & Assocs.	617-232-6687
MN	Edina, Peterson & Wolff	612-941-5400
OK	Tulsa, NTR/Data Comp., Inc.	918-664-2180

Local Distributors

AZ	Tucson, Air Filtration Prds.	800-528-1585

ALZBEAR CORP., 15411 Red Hill Ave., Unit F, Tustin, CA 92680, Tel: 714-557-0910; Empl.: 45; *Sls. Mgr.:* Al Robinson; *Dist. Mgr.:* Al Robinson

AMATOM ELCTRN. HARDWARE, 446 Blake St., New Haven, CT 06515, Tel: 203-397-3311, Telex: 963-419; FSC No.: 06540; Empl.: 55; *Sls. Mgr.:* Vince Maida

AMBER ELECTRO DESIGN INC., 4810 Jean Talon Blvd. W Ste 321, Montreal, Quebec, Canada H4P2N5, Tel: 514-735-4105, Telex: 05-827598; Empl.: 12; *Sls. Mgr.:* Wayne Jones

AMBI-TECH INDS., 319 Knickerbocker Ave., Hillsdale, NJ 07642, Tel: 201-666-0504; Empl.: 20; *Sls. Mgr.:* Al Nagler; *Dist. Mgr.:* Al Nagler

AMBROID CO., P.O. Box 1089, Taunton, MA 02780, Tel: 617-823-1726; Empl.: 10; *Sls. Mgr.:* J. F. Strauss

AMCO ENGRG., 3801 N. Rose St., Schiller Pk., IL 60176, Tel: 312-671-6670, TWX: 910-227-3152; Empl.: 350; *Sls. Mgr.:* F. A. Johnson .... **C•1006-1007, 1625**

Local Sales Offices & Reps

AL	Huntsville, Kemp Instrs.	205-837-4304
AZ	Phoenix, The Knight Co.	602-994-1311
CA	Burlingame, The Knight Co.	415-697-2525
CA	Escondido, The Knight Co.	619-743-5136
CA	Los Angeles, Knight Co.	213-670-2833
CA	Orange County, Knight Co.	714-833-8250
CA	San Diego, Knight Co.	619-743-5136
CO	Englewood, FG Mktg. Co.	303-795-9176
CT	Stratford, Instr. Dynamics	203-378-6019
FL	Clearwater, WMM Assocs.	813-461-7074
GA	Atlanta, Kemp Instrs.	404-452-8050
IL	Schiller Park, R. L. Lang & Assocs.	312-671-3228
IN	Ft. Wayne, Aktron Corp.	219-747-3650
IA	Davenport, Rush & West	319-326-3091
KS	Olathe, Rush & West	913-764-2700
LA	Lafayette, Kemp Engrg.	318-269-9452
MD	Silver Spring, L. G. White & Co.	301-434-1555
MA	Wakefield, Instr. Dynamics	617-245-5100
MI	Livonia, Electro Sls. Assocs.	313-474-7320
MN	St. Paul, Bonament Heyda Co.	612-484-8531
MO	Ballwin, Rush & West	314-394-7271
NJ	Woodcliff Lake, J. Freid & Assocs.	201-391-6792
NM	Albuquerque, C. T. Carlberg Assocs.	505-888-3883
NY	Fairport, Naco Elctrns.	716-223-4490
NY	Great Neck, F & F Metro, Inc.	516-482-4080
NY	Syracuse, NACO Elctrns.	315-699-2651
NY	Utica, Naco Elctrns.	315-732-1801
NC	Winston Salem, L. G. White & Co.	919-725-3612
OH	Cleveland, Electro Sls. Assocs.	216-261-5440
OH	Dayton, Electro Sls. Assocs.	513-426-5551
OK	Tulsa, Don Shuhart Co.	918-747-4136
OR	Beaverton, Eclipse Mktg. Grp.	503-642-1661
PA	Allison Park, Electro Sls. Assocs.	412-487-3801
PA	Edgemont, White/Whiddett Co.	215-353-6343
SC	Greenville, L. G. White & Co.	803-271-0630
TX	Dallas, Don Shuhart Co.	214-349-6000
TX	Houston, Kemp Engrg.	713-466-1465
VA	Richmond, L. G. White & Co.	804-740-7093
WA	Redmond, Eclipse Mktg. Grp.	206-885-6991
EXP	NJ, Mahwah, Intl. Sls. Div.	201-825-0473

AMDAHL COMMUNICATIONS SYS. DIV., Amdahl Corp., 2500 Walnut Ave., Marina del Rey, CA 90291, Tel: 213-822-3202; Empl.: 350

AMECON, INC., 1900 S. Chris La., Anaheim, CA 92805, Tel: 714-634-2220, 800-392-2292, TWX: 510-1000-364; *Sls. Mgr.:* Frank Carleone .... **A•2110-2117**

AME CORP., 101 E. Main St., Little Falls, NJ 07424, Tel: 201-256-3939; Empl.: 12; *Sls. Mgr.:* Edward Dimitry .... **B•1485**

Local Sales Offices & Reps

FL	Orlando, EAB,Inc.	305-898-7444
NJ	Wyckoff, Chanco, Inc.	201-891-7866
TX	Dallas, Control Comps. Corp.	214-458-8877
Can	Scarborough, Ont., Leecraft Inds.	416-439-6320

Local Distributors

Can	Scarborough, Ont., Leecraft Inds.	416-439-6320

AMERACE CORPORATION, Newburgh Rd., Hackettstown, NJ 07840, Tel: 201-852-1122, Telex: 6853377 AMERACE or 136435 HACK; FSC No.: 3L154;2270; Empl.: 275; *Sls. Mgr.:* J. Cooper

AMERACE CORP., Elastimold Div., Newburg Rd., P.O. Box 503, Hackettstown, NJ 07840, Tel: 201-852-1122 .... **D•1111**

AMEREX, P.O. Box 2815, Riverside, CA 92516, Tel: 714-686-1400; *Sls. Mgr.:* Roger D. Orton

AMERICAN AEROSPACE CONTROLS, 570 Smith St., Farmingdale, NY 11735, Tel: 516-694-5100; Empl.: 48; *Sls. Mgr.:* Gregory D'Abramo .... **B•1780-1781**

Local Sales Offices & Reps

CA	Los Angeles, Dyna Sls. Co.	213-268-1175

AMERICAN ALUMINUM, 230 Sheffield St., Dept. EEM, Mountainside, NJ 07092, Tel: 201-233-3500; Empl.: 125

american
automation

AMERICAN AUTOMATION, 14731 Franklin Avenue, Tustin, CA 92680, Tel: 714-731-1661, TWX: 910-595-2670 AMAUTO TSTN; *Sls. Mgr.:* Paul Niquette ...... **D•1179**

Local Sales Offices & Reps

CA	Garden Grove, Advanced Digital Grp.	714-897-0319
MA	Boston, Resolve Technlg.	617-527-8834

AMERICAN CAPACITOR, 2080 Central Ave, Duarte, CA 91010, Tel: 818-357-8806, Telex: 910 333 9810; FSC No.: 59366; Empl.: 65; *Sls. Mgr.:* John Williams; *Dist. Mgr.:* John Williams

AMERICAN CHEMICAL ETCHING, See American Etching & Mfg.

AMERICAN COMPUTER HARDWARE CORP., 2205 S. Wright St., Santa Ana, CA 92705, Tel: 714-549-2688, Telex: 330038; Empl.: 30; *Dist. Mgr.:* Thomas Allen

AMERICAN CONTROL PRODUCTS, Div. of Precision Timer Co., Inc., 13 Westbrook Ind'l. Pk., Westbrook, CT 06498, Tel: 203-399-6253; Empl.: 35; *Sls. Mgr.:* F. F. Coulom

AMERICAN CYANAMID CO., Metal Coated Fibers Dept., One Cyanamid Plaza, Wayne, NJ 07470, Tel: 201-831-3148, Telex: 219-136, TWX: 710-988-3045; *Sls. Mgr.:* James Tonges

AMERICAN ELECTRIC CABLE CO., 181 Appleton St., Holyoke, MA 01040, Tel: 413-539-9893; Empl.: 125; *Sls. Mgr.:* Michael A. Bousquet

AMERICAN ELECTRONIC LABS., Box 552, Lansdale, PA 19446, Tel: 215-822-2929, TWX: 510-661-4976; Empl.: 1300

AMERICAN ELCTRN. LABS., INC., Antenna Div., P.O. Box 552, Lansdale, PA 19446

AMERICAN ELCTRN. LABS., INC., Govt. Grp. Div., P.O. Box 552, Lansdale, PA 19446

AMERICAN ELCTRN. LABS., INC., Hybrid/MIC Div., P.O. Box 552, Lansdale, PA 19446

AMERICAN ELCTRN. LABS., INC., Special Prods. Div., P.O. Box 552, Lansdale, PA 19446

AMERICAN ELCTRNS., 1600 E. Valencia Dr., Fullerton, CA 92631, Tel: 714-871-3020, TWX: 910-592-1256; FSC No.: 89321; Empl.: 200; *Sls. Mgr.:* B. G. Guy

AMERICAN ETCHING & MFG., 13730 Desmond St., Pacoima,, CA 91331, Tel: 213-896-1187; Empl.: 90

AMERICAN HV TEST SYSTEMS INC., Central Garrett Ind'l. Pk., Accident, MD 21520, Tel: 301-826-8651, Telex: 86223; Empl.: 45; *Sls. Mgr.:* Rolf B. Persson

AMERICAN INSULATED WIRE CORP., Leviton Mfg. Co., 36 Freeman St., Pawtucket, RI 02862, Tel: 401-726-0700, TWX: 710-384-0150; Empl.: 1300; *Sls. Mgr.:* Al Beauvais; *Dist. Mgr.:* Michael Koshgarian ...... **C•1747**

Local Sales Offices & Reps

CA	Los Angeles, Leviton/American	213-949-6575
FL	Coral Springs, EPM Corp.	305-755-5387
GA	Atlanta, Leviton/American	404-691-9303
IL	Chicago, Leviton/American	312-766-4100
LA	New Orleans, Leviton/American	504-834-9415
MA	Andover, Richard Purinton, Inc.	617-475-7055
MA	Boston, Associated Agencies	617-423-9880
MI	Detroit, Jim Groff Sls. Co.	313-933-3100
NY	New York, Leviton Corp. Headquarters	212-229-4040
NY	West Hempstead, Schmitt Indl. Mktg. Corp.	516-486-3510
NC	Charlotte, Over & Over, Inc.	919-872-2262
OH	Cleveland, Leviton/American	216-831-0615
TX	Houston, Leviton/American	713-956-2816
UT	Salt Lake City, Chuck Fields & Assocs.	801-531-6177
WA	Seattle, Leviton/American	206-576-0242

AMERICAN LASER SYS., INC., 106 Fowler Rd., Goleta, CA 93117, Tel: 805-967-0423, Telex: 4941760ALS; Empl.: 14; *Sls. Mgr.:* L. Shallenberger

AMERICAN MAGNETICS, 740 Watson Center Rd., Carson, CA 90745, Tel: 213-775-8651, TWX: 910-345-6258; Empl.: 175; *Sls. Mgr.:* Robert Mos

AMERICAN MAGNETICS, P.O. Box 8, Carterville, IL 62918, Tel: 618-985-4838; Empl.: 120

AMERICAN MAGNETICS, P.O. Box 2509, Oak Ridge, TN 37831-2509, Tel: 615-482-1056, Telex: 557-592; Empl.: 16; *Sls. Mgr.:* E. T. Henson

AMERICAN MICROSEMICONDUCTOR, INC., 133 Kings Rd., Madison, NJ 07940, Tel: 201-377-9566, TWX: 710-986-8500; Empl.: 15; *Sls. Mgr.:* W. M. Foley; *Dist. Mgr.:* D. B. Wilson .... **A•1661, 2070-2071**

AMERICAN MICROSIGNAL, 8431 Monroe Ave., Stanton, CA 90680, Tel: 714-761-1222, TWX: 910-591-1202; Empl.: 80; *Sls. Mgr.:* Pat Nelson

AMERICAN MICROSYSTEMS, INC., See GOULD AMI

AMERICAN MONARCH, 2801-37th Ave., N.E., Minneapolis, MN 55421, Tel: 612-788-9161; Empl.: 300; *Sls. Mgr.:* B. Sutherland

AMERICAN PHOTONICS INC., 71 Commerce Dr., Brookfield Center, CT 06805, Tel: 203-775-8950; *Sls. Mgr.:* James A. Walyus

AMERICAN PLASTICRAFT CO., 814 N. Sacramento Blvd., Chicago, IL 60622, Tel: 312-722-7727, Telex: 910-221-6068; Empl.: 250; *Sls. Mgr.:* Larry J. Ferguson

AMERICAN POWER DEVICES, 7 Andover St., Andover, MA 01810, Tel: 617-475-4074, Telex: 951206; Empl.: 140; *Sls. Mgr.:* Robert Dimodana

AMERICAN RADIO RELAY LEAGUE, 225 Main St., Newington, CT 06111, Tel: 203-666-1541; Empl.: 120; *Sls. Mgr.:* Bobbie Chamalian

AMERICAN RESEARCH & ENGINEERING, 1500 Executive Dr., Elgin, IL 60120, Tel: 312-888-7245, TWX: 910-251-3008 .... **B•1486-1487**

ASC American
Switch
Corp.

AMERICAN SWITCH CORP., 134 Water St., Wakefield, MA 01880, Tel: 617-246-1007, TWX: 710-348-6756; FSC No.: 54659; Empl.: 40; *Sls. Mgr.:* Mike Palmerino; *Dist. Mgr.:* Mike Palmerino .... **B•1488-1491**

Local Sales Offices & Reps

MI	Grand Blanc, Intercomm	313-695-0665
AZ	Scottsdale, Bill Earl Assoc.	602-994-3813
CA	Arcadia, HMC, Inc.	818-447-0958
CA	Mountain View, Serra Assocs.	415-964-4300
CO	Lakewood, Andale	303-693-4331
FL	Orlando, OEM Mktg.	305-299-1000
GA	Lawrenceville, Tek-Rep Mktg.	404-963-1600
IL	Wheaton, Chadra-Schilke & Assoc.	312-653-8126
IN	Carmel, Nationwide Comps.	317-872-7207
IA	Marion, M-S-B Assocs.	319-377-6261
KS	Shawnee Mission, M-S-B Assocs.	913-432-2131
MA	Woburn, Boston Elctrn. Assocs.	617-938-3727
MN	Minneapolis, Hei-Lite Sls.	612-861-6051
MO	St. Charles, M-S-B Assocs.	314-946-5577
NJ	Manville, Dyno Rep.	201-685-0135
OH	Willoughby, Nationwide Comps.	216-946-3226
PA	Elkins Park, Arnold Assocs.	215-742-0600
TX	Arlington, Comptech	817-265-6007
UT	Salt Lake City, Sage Sls.	801-467-5451
WA	Bellevue, Comtec	206-453-1188
EXP	CT, Litchfield, Intrade	203-567-5901
Can	Nepean, Ont., Reptronics	613-828-9274

Local Distributors

IN	Terre Haute, Midwest Supp.	812-232-0187
AL	Birmington, Forbes Distr.	205-251-4104
AL	Huntsville, Contact Elec.	205-881-9321
AZ	Phoenix, Arizona Comps.	602-269-5655
AZ	Phoenix, Electro Comps.	602-258-2665

CA	Buena Park, RPS Elctrns.	213-744-0355
CA	Los Angeles, Elec. Switches	213-660-1310
CA	San Diego, Deco Elec.	619-693-1595
CA	San Jose, Rose Elctrns.	408-263-9700
CA	Santa Monica, Master Distrs.	213-452-1229
CA	Sunnyvale, Sierra West	408-747-1188
CA	Tustin, Western Switch & Controls	714-731-4333
CA	Van Nuys, Patane Avionics	818-988-4455
CO	Denver, Integrated Elctrns.	303-292-6121
CO	Englewood, Indl. Elctrns.	303-694-9444
CT	Greenwich, Wise Comps.	203-531-4880
CT	Norwalk, Park Distr.	203-853-2011
CT	Wallingford, Mid-State Elctrns.	203-265-9900
FL	Clearwater, Electronics Precepts	813-596-2742
FL	Longwood, Intertec Comps.	305-834-7777
FL	Oakland Pk., Zelcon	305-565-2555
GA	Atlanta, Specialty Distr.	404-873-2521
IL	Chicago, NEP Elctrns.	312-625-8400
IL	Wheeling, Hawk Elec.	312-459-4030
IN	Lafayette, CWY Elec.	317-448-1611
IA	Cedar Rapids, Iowa Radio Supply	319-393-4510
IA	W. Des Moines, Ramco Co.	515-225-6933
KS	Wichita, Radio Inc.	316-264-2798
MD	Beltsville, Petricko Sls.	301-937-4960
MD	Beltsville, Treeko Sls.	301-937-8260
MD	Kensington, Marine Air Supp.	301-949-9560
MI	Grand Rapids, Calder Elec.	616-698-7400
MI	St. Clair Shores, Spemco	313-771-2700
MN	Eden Prairie, Cassidy Elctrns.	612-944-0100
MN	Fridley, Voyager Elec.	612-571-7766
MN	Minneapolis, Tortec Corp.	612-866-3662
NH	Astrum Elctrns.	603-329-5656
NJ	E. Brunswick, Brothers Elctrns.	201-238-2200
NJ	Fair Lawn, Relay Specialties	201-797-3313
NM	Albuquerque, Intl. Elctrns.	505-345-8127
NY	Bohemia, Key Comps.	516-567-7500
NY	E. Syracuse, Add Elctrns.	315-437-0300
NY	Hempstead, Davis Elctrns.	516-483-9200
NY	Mt. Vernon, QAR	914-699-2224
NC	Winston-Salem, Kirkman Elect.	919-722-9131
OH	Columbus, Whitehead Elctrns.	614-224-1186
OH	Dayton, Stotts-Friedman	513-298-5555
OK	Tulsa, Radio Inc.	918-587-9123
PA	Erie, Duncombe Elctrn.	814-454-5278
PA	Norristown, Kimberly James Co.	215-666-7286
PA	Philadelphia, Shap Elctrns.	215-969-3300
RI	Pawtucket, MAJOR/Edwards	401-725-7400
TN	Chattanooga, Specialty Distr.	615-267-9531
TN	Knoxville, Curle Elctrn.	615-266-4727
TX	Arlington, Bell Comp. Sls.	817-461-5303
TX	Austin, Galtronics	512-837-7470
TX	Dallas, Force/Solid State	214-438-5700
TX	El Paso, Intl. Elctrns.	915-598-3406
TX	Ft. Worth, Industrial Elctrns.	817-731-7321
UT	Salt Lake City, Standard Supp. Co.	801-486-3371
WA	Kent, Pyramid Elctrn.	206-872-5800
WV	Huntington, Electronic Supp.	304-523-6443
WI	Mequon, Lakeview Elctrns.	414-377-8250
WI	New Berlin, Nep Elctrn.	414-785-9100
Can	Montreal, Prelco Elctrn.	514-389-8051

AMERICAN TECHNICAL CERAMICS CORPORATION, 1 Norden La., Huntington Sta., NY 11746, Tel: 516-271-9600, Telex: 221201, TWX: 510-226-6993; FSC No.: 29990;11272-868-73; Empl.: 497; *Sls. Mgr.:* R. Blumkin .... **A•1007-1009**

Local Sales Offices & Reps

AZ	Scottsdale, Faser Tech. Sls.	602-948-4404
CA	El Segundo, Fetty/Schoenduve	213-322-4991
CA	Mtn. View, Fetty/Schoenduve	415-962-8330
CA	San Diego, Fetty/Schoenduve	619-292-5136
CO	Englewood, FG Mktg.	303-795-9176
DC	Washington, M. Lader Co.	202-296-2497
FL	Lighthouse Point, R. C. Simon & Co.	305-941-2757
GA	Norcross, Mountain Electro Prods.	404-448-5594
IL	Chicago, Tech. Sls.	312-237-7210
MA	Topsfield, R.F. Assocs.	617-887-9762
MN	New Brighton, TWC Sls.	612-636-1770
MO	Grandview, Harris-Hanson Co.	816-763-6200
MO	St. Louis, Harris-Hanson Co.	314-432-3611
NY	Rochester, Sweetco Assocs.	716-225-2383
NY	Utica, Sweetco Assocs.	315-797-6721
PA	Lafayette Hill, M. Lader Co.	215-825-3177
TX	Richardson, Vector Sls. Co.	214-234-4291
WA	Bellevue, SD-R2	206-747-9424

AMERICAN TIME PRODS. DIV., See Frequency Control Prods., Inc.

AMERICAN ULTRAVIOLET, 320 Commerce St., Chatham, NJ 07928, Tel: 201-635-8355, Telex: 13-9266; Empl.: 14; *Sls. Mgr.:* M. C. Stines; *Dist. Mgr.:* M. C. Stines

AMERICAN VOLPI CORP., 26 Aurelius Ave., Auburn, NY 13021, Tel: 315-253-9707; Empl.: 18; *Sls. Mgr.:* Bill Meeks

AMERICAN ZETTLER, 16881 Hale Ave., Irvine, CA 92714, Tel: 714-660-1670, Telex: 67-8472; Empl.: 200; *Sls. Mgr.:* D. O. Barkhurst .... **B•1264-1274**

Local Sales Offices & Reps

AL	Huntsville, Electro-Wise, Inc.	205-830-4764
AL	Huntsville, MacKay, Smith & Assocs.	205-539-8000
AZ	Scottsdale, Thorson Desert States, Inc.	602-998-2444
CA	Fountain Valley, Components Ctr.	714-979-0433
CA	Fullerton, Groh Assocs.	714-738-7105
CA	Mountain View, G.C. Woempner	415-964-5454
CO	Englewood, Delta Sls. Assocs.	303-799-0646
FL	Boca Raton, Perrott Assocs.	305-792-2211
FL	Clearwater, Perrott Assocs.	813-443-5214
FL	Orlando, Perrott Assocs.	305-298-7748
GA	Norcross, McKay, Smith & Assocs.	404-449-7444
IL	Rolling Meadows, KMA Sls.	312-398-5300
IN	Carmel, Berndt Assocs.	317-844-0114
KS	Wichita, Baka Corp.	316-682-8411
MA	Brockton, Forsberg Sls.	617-522-6300
MN	Minneapolis, R.W. Marshall Co.	612-929-0457
MN	New Brighton, Chris Elctrns. Distr.	612-631-2647
MO	Ferguson, Baka Corp.	314-878-4224
NJ	Cherry Hill, Danco Elctrn. Sls.	609-424-5590
NM	Albuquerque, Thorson Desert States, Inc.	505-293-8555
NY	Alexander, B.H. Tollefson Assocs.	716-591-1219
NY	Auburn, B.H. Tollefson Assocs.	315-253-4109
NY	Rochester, B.H. Tollefson Assocs.	716-271-4141
NC	Raleigh, J & B Sls.	919-878-8600
NC	Raleigh, Resco/Raleigh	919-781-5700
OH	Cincinnati, Makin Assocs.	513-871-2424
OR	Beaverton, Thorson Co. N.W.	503-644-5900
PA	Montgomeryville, Pyttronics Inds.	215-643-2850
TX	Dallas, Cypress Elctrns.	214-869-1435
TX	Houston, AID Elctrns.	713-955-6204
TX	Irving, AID Elctrns.	214-790-4761
UT	Salt Lake City, Delta Sls. Assocs.	801-487-7571
WA	Bellevue, Thorson Co. N.W.	206-455-9180
WI	Milwaukee, KMA Sls. Co.	414-259-1771

Local Distributors

CA	Irvine, Acacia Sls.	714-660-0834
CA	Los Angeles, Master Distrs.	213-452-1229
CA	San Diego, Acacia Sls.	619-565-4365
CA	San Jose, Cypress Elctrns.	408-945-8400
CA	Santa Clara, Components Ctr.	408-988-3751
CA	Torrance, Cypress Elctrns.	213-533-6005
CO	Lakewood, Acacia Sls.	303-232-2882
CT	New Haven, The Green-Shaw Co.	203-397-0710
IL	Northbrook, Classic Comps.	312-272-9650
IN	Carmel, Altex Elctrns.	317-848-1323
MD	Savage, Pyttronic Inds.	301-953-9650
MA	Canton, Impact Sls. Co.	617-821-1500
MA	Woburn, Time Elctrns./New Eng.	617-935-8080
MI	Ypsilanti, Tamco, Inc.	313-572-1950
NJ	Fairlawn, Relay Spec.	201-797-3313
NJ	Rahway, R. E. Breuer Co., Inc.	201-388-5045
NY	Farmingdale, Pride Elctrns.	516-293-4020
NY	South Farmingdale, R. E. Breuer Co., Inc.	516-694-6597
OR	Beaverton, Acacia Sls.	503-646-3377
TX	Austin, AID Elctrns., Inc.	512-450-1938
TX	Dallas, Wallace Elctrns.	214-340-0400
Can	Richmond, B.C., Macom Agy.	604-271-2661
Can	Vancouver, B.C., Intek	604-324-6831
Can	Winnipeg, Man., L. A. Varah, Ltd.	204-633-6190

AMETEK, 2 Station Square, Paoli, PA 19301, Tel: 215-355-6900; Empl.: 100

AMETEK, DYNAMICS DIVISION, AMETEK, Inc., 5649 Peck Rd., Arcadia, CA 91006, Tel: 818-442-5981, TWX: 910-587-3534; FSC No.: 18098; Empl.: 105

AMETEK, INC, Hunter Spring Division, 1 Spring Ave., Hatfield, PA 19440, Tel: 215-822-2971, TWX: 510-661-4888; FSC No.: ;43560; Empl.: 270; *Sls. Mgr.:* F. J. York

AMETEK/RODAN DIV., 2905 Blue Star St., Anaheim, CA 92806, Tel: 714-630-0081, TWX: 910-591-1684; FSC No.: 15454;DESC-EQP-75-1387; Empl.: 100; *Sls. Mgr.:* Steve Iovin

Local Sales Offices & Reps

AL	Huntsville, Alpha Mktg.	205-533-0766
CA	Mountain View, Gene Woempner Co.	415-964-5454
CO	Westminster, Straube Assocs.	303-426-0890
FL	Coral Springs, H.A., Inc.	305-752-7520
IL	Downers Grove, Richmar Elctrns.	312-968-0118
IN	Ft. Wayne, Menze Sls. Co.	219-747-5616
IA	Cedar Rapids, Snider Sls.	319-362-4410
KS	Overland Park, S. W. Wollard Co.	913-898-6552
MI	Lathrup Village, R. C. Nordstrom Co.	313-559-7373
MI	Southfield, R. A. Casalou	313-559-0350
MN	Mendota Hgts., G-II Sls.	612-454-3086
MO	St. Louis, Abrams & Assocs.	314-569-0447
NJ	Cherry Hill, Danco Elctrn. Sls.	609-424-5590
NM	Albuquerque, Straube Assocs.	505-265-7759
NY	Melville, Comtronic Assocs.	516-249-0505
NY	Syracuse, Canavah-Scanlon Assocs.	315-437-1271
TX	Dallas, Cunningham Comps. Corp.	214-233-4303
TX	Houston, Cunningham Comps. Corp.	713-461-4197
UT	Salt Lake City, Straube Assocs.	801-486-5473
VA	Gladys, Ralley Entprs.	804-283-5656
WA	Vancouver, R. Over Sls.	206-695-6179
EXP	NY, Westbury, CPS Intl.	516-334-8500

AMF INC., AMF Cuno/General Filter Products Division, 400 Research Pkwy., Meriden, CT 06450, Tel: 203-237-5541, Telex: 962457; Empl.: 700; *Sls. Mgr.:* Gregg Samal

AMF/ELECTRO COMPS. DIV., AMF, 2713 Gateway Dr., Pompano Beach, FL 33060, Tel: 305-973-8620, TWX: 510-956-9400; Empl.: 900; *Sls. Mgr.:* C. Smith; *Dist. Mgr.:* C. Smith

AMF POTTER & BRUMFIELD, See Potter & Brumfield

AMGLO, 5265 Michigan Ave., Rosemont, IL 60018, Tel: 312-671-4321; Empl.: 21

AMICON CORP., 25 Hartwell Ave., Lexington, MA 02173, Tel: 617-861-9600; Empl.: 300; *Sls. Mgr.:* James Gilliland

AMILON CORP., 49-12 30th Ave., Woodside, NY 11377, Tel: 718-274-1794; Empl.: 50; *Sls. Mgr.:* L. Rosenblatt

AMKEY, INC., Sub. American Pwr. Dvs., Inc., 220 Ballardvale St., Wilmington, MA 01887, Tel: 617-658-7800; *Sls. Mgr.:* P. D. Prevett

AMLAN, INC., 97 Thornwood Rd., Stamford, CT 06903, Tel: 203-322-1913, Telex: 643647; *Sls. Mgr.:* Mark Landeweer; *Dist. Mgr.:* Mark Landeweer .... **C•1125-1128**

Local Sales Offices & Reps

AL	Huntsville, Interep Assocs., Inc.	205-533-1730
CA	Brea, Astralonics	213-691-6123
CA	Santa Cruz, Krippner & Assocs.	408-429-9798
CA	Westlake Village, Astralonics	818-706-0488
FL	Oakland Park, Zelcon, Inc.	305-565-2555
FL	Orlando, J-R Controls, Inc.	305-282-6920
FL	Tampa, J-R Controls	813-961-9478
GA	Norcross, Interep Assocs., Inc.	404-449-8680
IL	Chicago, Electro-Tech Mktg. Assocs.	312-676-3151
MA	Quincy, Marketing Svcs., Inc.	617-545-3031
MN	St. Paul, Complete Sls.	612-644-0484
MO	Grandview, R. R. Burton & Assocs.	816-763-5385
MO	Maryland Heights, R. R. Burton & Assocs.	314-434-1628
MO	St. Louis, R. R. Burton & Assocs.	314-647-6353
NJ	Parlin, JMR Sls., Inc.	201-254-8484
NY	E. Setauket, JMR Sales, Inc.	516-689-8871
NY	N. Syracuse, JMR Sales, Inc.	315-458-6576
PA	Phildelphia, Check Assocs.	205-487-3007
TN	Greeneville, Interep Assocs., Inc.	615-639-3491
VA	Reston, Tytronics Tech. Sls.	703-471-0440
WA	Mukilteo, Krippner & Assocs.	206-743-3579
WI	Brookfield, Electro-Tech Mktg. Assocs.	414-785-9554

Local Distributors

CA	Sacramento, The Supp. Sta.	916-920-2919
CA	San Jose, Sundown Sls.	408-995-6327
CA	Westlake Village, Bond Electro Sls.	818-706-0322
CT	New Haven, Greene-Shaw Co., Inc.	203-397-0710
CT	Torrington, Northeast Connectors	203-482-2817
FL	Oakland Park, Zelcon, Inc.	305-565-2555
FL	Orlando, Southeast Comp. Svc., Inc.	305-298-0321
GA	Atlanta, Trans-Southern Elctrns.	404-451-4425
MA	Chelmsford, Dynamic Engrg.	617-250-0200
MA	Melrose, Hollex, Inc.	617-665-2413
MA	Norwood, Emtel Elctrns.	617-769-9500
MA	Waltham, Vantage Elctrns. Corp.	617-894-8690

MA	Westford, ESI	617-486-8495
MA	Woburn, EPC	617-935-0400
MA	Woburn, The Supp. Stat.	617-935-0400
MN	New Brighton, Chris Elctrns.	612-631-2647
NY	Mt. Sinai, KC Elctrns.	516-473-3347
OR	Aloha, Pacific Elctrns.	503-642-3591
OR	Pendleton, Round-Up Elctrns.	503-276-3152
PA	Wayne, Peak Elctrns.	215-293-9000
RI	Warwick, Cal-Greg Comps., Inc.	401-738-6170
VT	South Burlington, Hooker Elctrns., Inc.	802-864-0885
WA	Auburn, West-Air Intl.	206-631-1000
WA	Kirkland, Priebe Elctrns., Inc.	206-821-4695
WA	Seattle, Pacific Elctrns.	206-575-1050
WA	Seattle, Signal Comm., Inc.	206-324-8400
Can	Montreal West, Que., Hooker Elctrns. Can., Ltd.	514-487-5151

AMP INCORPORATED, Box 3608, Harrisburg, PA 17105, Tel: 717-564-0100, TWX: 510-657-4110; Empl.: 19,650; *Dist. Mgr.:* Niel Spatz **A•1590; B•1118-1120, 1492-1493, 1706; C•1131-1152, 1748**

Local Sales Offices & Reps

CA	Compton, AMP, Inc.	213-537-4490
CA	Cupertino, AMP, Inc.	408-255-3830
CO	Englewood, AMP, Inc.	303-773-0422
CT	Windsor, AMP, Inc.	203-683-2715
FL	Altamonte Springs, AMP, Inc.	305-869-6766
FL	Boca Raton, AMP, Inc.	305-997-7005
GA	Atlanta, AMP, Inc.	404-934-6363
IL	Schaumburg, AMP, Inc.	312-351-5020
IN	Carmel, AMP, Inc.	317-848-1250
MA	Boston, AMP, Inc.	617-891-7500
MA	Framingham, AMP, Inc.	617-879-3255
MI	Southfield, AMP, Inc.	313-6[illegible]5-5590
MN	Minneapolis, AMP, Inc.	612-8[illegible]1-8242
NJ	Parsippany, AMP, Inc.	201-334-6664
NY	Holbrook, AMP, Inc.	516-588-4430
NY	Pittsford, AMP, Inc.	716-385-2860
NC	Winston- Salem, AMP, Inc.	919-725-8968
OH	Dublin, AMP, Inc.	614-764-8866
PA	Berwyn, AMP, Inc.	215-647-6060
PA	Malvern, AMP, Inc.	215-296-5303
TN	Knoxville, AMP, Inc.	615-691-5711
TX	Irving, AMP, Inc.	214-258-1114
VA	Alexandria, AMP, Inc.	703-683-5955
WA	Renton, AMP, Inc.	206-255-0064

Local Distributors

AL	Huntsville, Powell Elctrns.	205-539-2731
AZ	Phoenix, Dalis Elctrn. Supp.	602-275-2626
AZ	Phoenix, Sterling Elctrns. Corp.	602-258-4531
CA	Buena Park, RPS Elctrns.	213-744-0355
CA	Canoga Park, Marshall Elctrns. Grp.	213-999-5001
CA	El Monte, Marshall Ind.	213-422-6204
CA	Fullerton, Pyramid Elctrns.	714-773-0781
CA	Hawthorne, Electro-Sonic Comps.	213-679-9781
CA	Irvine, Marshall Elctrns. Grp.	714-556-6400
CA	San Diego, Marshall Elctrns. Grp.	619-578-9600
CA	San Diego, RPS Elctrns.	619-292-5611
CA	San Jose, Powell Elctrns.	408-943-9020
CA	Santa Clara, Pyramid Elctrns.	408-727-9810
CO	Denver, CSID, Inc.	303-292-9594
CT	Wallingford, Cronin Elctrns.	203-265-3134
FL	Orlando, Hammond Elctrns.	305-849-6060
GA	Norcross, Schweber Elctrns. Corp.	404-449-9170
IL	Elk Grove, Schweber Elctrns. Corp.	312-364-3750
IL	Elmhurst, Semiconductor Spec.	312-279-1000
IN	Indianapolis, Graham Elctrns.	317-634-8202
KS	Edwardsville, C. Tennant, Sons & Co.	913-441-1801
MD	Columbia, Powell Elctrns.	301-631-4070
MD	Gaithersburg, MS Elctrns.	301-921-0200
MA	Needham, Cronin Elctrns.	617-449-5000
MA	Winchester, Rush Industries, Inc.	617-729-5800
MI	Grand Rapids, RS Elctrns.	616-241-3483
MI	Livonia, RS Elctrns.	313-525-1155
MO	St. Charles, Lectronix	314-946-6424
NH	Hudson, C & H Elctrns.	603-882-1133
NJ	Buffalo, Summit Distrs.	716-884-3450
NJ	Fairfield, Marshall Elctrns.	201-882-0320
NJ	Kenilworth, Federated Purchaser	201-272-0505
NY	Farmingdale, Harrison Radio Corp.	516-293-7990
NY	Lynbrook, Peerless Elctrns.	516-593-2121
NY	Westbury, Schweber Elctrns. Corp.	516-334-7474
NC	Raleigh, Southeastern Elctrns.	919-828-2311
OH	Akron, Akron Elctrn. Supp. Co.	216-762-8818
OH	Columbus, Hughes-Peters Inc.	614-294-5351
PA	Philadelphia, Almo Elctrns. Corp.	215-698-4000
PA	Philadelphia, Powell Elctrns.	215-365-1900
TN	Nashville, Graham Elctrns.	615-242-2682
TX	Austin, Kent Elctrns. Corp.	512-834-1900
TX	Houston, Kent Elctrns.	713-780-7770
TX	Irving, Hamilton-Avent Elctrns.	214-659-4157
TX	Richardson, Kent Elctrns. Corp.	214-669-2600
UT	Salt Lake City, Kimball Elctrns.	801-328-2075
WA	Kent, Pyramid Elctrns. Supp., Inc.	206-872-5800

AMP DISTRIBUTOR MARKETING DIV, A Division of AMP Products Corporation, Harrisburg, PA 17105, Tel: 717-780-7025; Empl.: 24,500; *Sls. Mgr.:* Larry Backus **B•1495; C•1130, 1683, 1749**

Local Sales Offices & Reps

Northern Wire & Cable, Inc.

CA	Los Angeles	213-639-1691
CA	Sacramento, Zack Elctrns.	916-446-3131
CA	San Francisco	415-574-6006
IL	Chicago	312-439-7800
PA	Valley Forge	215-647-1000
TX	Dallas (Irving)	214-258-1911

Local Distributors

EMSCO

AL	Birmingham, Ack Radio Supp. Co.	205-322-0588
AL	Birmingham, Forbes Distrbg.	205-251-3941
AL	Decatur, Forbes Distrbg.	205-353-4546
AL	Huntsville, Forbes Distrbg.	205-533-4150
AL	Huntsville, Powell Elctrns., Inc.	205-539-2731
AL	Mobile, Forbes Distrbg.	205-479-4535
AL	Mobile, Specialty Distrs.	205-344-0450
AZ	Phoenix, Dalis Elctrn. Supp.	602-275-2626
AZ	Phoenix, Electronic Parts Co., Inc.	602-277-7281
AZ	Phoenix, Sterling Elctrns.	602-268-2121
AZ	Tempe, Hamilton/Avnet Elctrns.	602-231-5100
AR	Little Rock, Carlton-Bates Co.	501-562-9100
AR	Little Rock, Electro Entprs., Inc.	501-664-9207
AR	Little Rock, Inter-Conn Elctrns., Inc.	501-753-7264
AR	Pine Bluff, Carlton Bates Co.	501-535-1354
CA	Bakersfield, Jack C. Arbuckle Co.	805-325-5816
CA	Buena Park, RPS Elctrns., Inc.	213-744-0355, 714-521-5230
CA	Canoga Park, Marshall Inds.	819-999-5001
CA	Cerritos, El-Com, Inc.	213-404-2961
CA	Costa Mesa, Mar Vac Elctrns., Inc.	714-540-3280
CA	El Monte, Marshall Inds.	818-442-7204
CA	Fountain Valley, Components Ctr., Inc.	714-979-0433
CA	Fresno, Jack C. Arbuckle Co.	209-264-6554
CA	Fullerton, Pyramid Elctrns., Inc.	714-773-0781
CA	Gardena, California Switch & Signal	213-770-2300
CA	Hawthorne, Electro-Sonic Comps., Inc.	213-679-9781
CA	Irvine, Marshall Inds.	714-556-6400
CA	Manhattan Bch., Prime Electro Prods. Co.	213-379-3642
CA	Monrovia, Erik-A-Elctrn. Distr.	213-574-1020
CA	North Hollywood, Alatec Prods.	213-875-1790
CA	Northridge, Acort Inds., Inc.	213-993-6444
CA	Oakland, Brill Elctrns.	415-834-5888
CA	Palo Alto, Zack Elctrns.	415-326-5432
CA	Sacramento, Hamilton/Avnet Elctrns.	916-925-2216
CA	Sacramento, Sacramento Elctrns.	916-441-4821
CA	San Bernardino, Hurley Elctrns.	714-885-0721
CA	San Diego, El-Com, Inc.	619-578-0900
CA	San Diego, Marshall Inds.	619-578-9600
CA	San Diego, Ryno Elctrns.	619-543-8430
CA	San Diego, RPS Elctrns., Inc.	619-292-5611
CA	San Diego, Western Radio, Inc.	619-268-4400
CA	San Francisco, Zack Elctrns.	415-626-1444
CA	San Jose, Powell Elctrns., Inc.	408-943-9020
CA	San Jose, Quement Elctrns.	408-998-5900
CA	Santa Ana, C R Elctrns.	714-556-2040
CA	Santa Clara, Components Ctr., Inc.	408-988-3751
CA	Santa Clara, Cypress Elctrns., Inc.	408-945-8400
CA	Santa Clara, Pyramid Elctrns. Supp., Inc.	408-727-9810
CA	Sunnyvale, Hamilton/Avnet Elctrns.	408-743-3355
CO	Arvada, Denver Wintronics	303-431-7161
CO	Denver, CSID, Inc.	303-292-9594
CO	Denver, Marshall Inds.	303-427-1818
CT	Danbury, Pilgrim Elctrns.	203-792-7274
CT	E. Hartford, R & S Elctrn. Distrs.	203-528-9901
CT	Norwalk, Park Distrs.	203-853-2010
CT	Stratford, Electro/Comp, Inc.	203-375-5811
CT	Wallingford, Cronin Elctrns.	203-265-3134
CT	Wallingford, Marshall Inds.	203-265-3822
FL	Altamonte Springs, Schweber Elctrns.	305-331-7555
FL	Casselberry, AFCOM	305-831-6630
FL	Dania, Summit Elctrns. of Florida, Inc.	305-920-6263
FL	Ft. Lauderdale, EMSCO	305-973-7103
FL	Hollywood, Schweber Elctrns.	305-927-0511
FL	Jacksonville, EMSCO	904-356-4851
FL	Miami, Electro Std. Labs., Inc.	305-633-6973
FL	Miami, Electronic Equip., Inc.	305-871-3500
FL	Orlando, EMSCO	305-849-6362
FL	Orlando, Hammond Elctrns., Inc.	305-849-6060
FL	Pensacola, Pensacola Elctrns.	904-478-3771
FL	Tampa, EMSCO Div. Hammond Elctrns.	813-253-0104
FL	Tampa, Leader Elctrns.	813-870-3315
GA	Atlanta, Ack Radio Supp. Co.	404-351-6340
GA	Atlanta, Specialty Distrbg. Co.	404-873-2521
GA	Norcross, Schweber Elctrns.	404-449-9170
HI	Honolulu, Electrical Equip.	808-533-3884
HI	Honolulu, Technical Mktg. Corp.	808-841-4175
ID	Spirit Lake, A-I Elctrn. Supp.	208-623-3111
IL	Addison, LCOMP, Inc.	312-628-1400
IL	Chicago, Electronic Connector Corp.	312-767-2200
IL	Chicago, NEP Elctrns., Inc.	312-625-8400
IL	Elk Grove Village, Schweber Elctrns.	312-364-3750
IL	Elmhurst, Semiconductor Specialists, Inc.	312-279-1005
IL	Melrose Park, Belford Elctrns., Inc.	312-865-2400
IL	Mt. Prospect, Tri-State Elctrn. Corp.	312-255-0600
IL	Niles, Joseph Elctrns.	312-297-4200
IL	Northbrook, Classic Comps. Supp.	312-272-9650
IL	Palatine, Ohm Elctrns.	312-259-5500
IL	Peoria, Warren Radio Co.	309-674-5998
IL	Rosemont, Advent Elctrns., Inc.	312-297-6200
IL	Villa Park, Melvin Elctrns., Inc.	312-279-5015
IL	Wheeling, Hawk Elctrns.	312-459-4030
IN	Evansville, Hutch & Son, Inc.	812-425-7201
IN	Fort Wayne, Graham Elctrns.	219-423-3422
IN	Indianapolis, Advent Elctrns., Inc.	317-872-4910
IN	Indianapolis, Meunier Elctrns.	317-635-3511
IA	Cedar Rapids, Deeco, Inc.	319-365-7551
KS	Edwardsville, C. Tennant, Sons & Co.	913-441-1801
KY	Louisville, Peerless Elctrn. Equip. Co., Inc.	502-637-7674
LA	Baton Rouge, Industrial Elctrn. Supp.	504-357-4249
LA	Baton Rouge, Ralph's Elctrns. Supp.	318-344-3761
LA	Harvey, AFG Elctrn. Supp.	504-368-9696
LA	Lafayette, Ralph's Elctrns. Supp.	318-233-0105
LA	New Orleans, Southern Radio Supp. Co., Inc.	504-524-2343
LA	New Orleans, Wm. B. Allen Supp. Co., Inc.	504-525-8222
LA	Shreveport, Industrial Elctrn. Supp.	318-222-9459
MD	Aberdeen, Harco Elctrns., Inc.	301-838-7990
MD	Baltimore, Whitney Distrs., Inc.	301-944-8080
MD	Columbia, Hamilton/Avnet Elctrns.	301-995-3500
MD	Columbia, Powell Elctrns., Inc.	301-621-4070
MD	Hagerstown, Allegheny Elctrn.	301-739-6460
MD	Rockville, Capitol Radio Whlsrs., Inc.	301-881-2270
MD	Rockville, MS Elctrns., Inc.	301-340-6400
MA	Burlington, Heilind Elctrns.	617-272-5610
MA	Burlington, QPL Elctrn.	617-891-0460
MA	Canton, Impact Sls. Co., Inc.	617-821-1500
MA	Holliston, Add Elctrns.	617-478-4200
MA	Middleboro, Glynn Elctrns.	617-947-4262
MA	N. Chelmsford, Pilgrim Elctrns.	617-251-8746
MA	Needham, Cronin Elctrns.	617-449-0500
MA	Needham, You Do It Elctrns.	617-449-1005
MA	Newton, In-Stock Prods. Co.	617-964-6200
MA	Waltham, Vantage Elctrns. Corp.	617-894-8690
MA	Westborough, Future Elctrns. Corp.	617-366-2400
MA	Westborough, Powell Elctrns./NE	617-366-6100
MA	Wilmington, Aved Elctrns., Inc.	617-657-8310
MA	Wilmington, J. V. Elctrns.	617-273-4300
MA	Winchester, Rush Inds.	617-629-5800
MA	Woburn, ACI Elctrns.	617-935-7230
MA	Woburn, Hamilton/Avnet Elctrns.	617-273-7500
MI	Flint, Shand Elctrns., Inc.	313-743-8940
MI	Grand Rapids, RM Elctrns.	616-531-9300
MI	Grand Rapids, RS Elctrns.	616-241-3483
MI	Grand Rapids, S-F Elctrn. Supp., Inc.	616-459-0126
MI	Livonia, RS Elctrns.	313-525-1155
MI	Troy, Northern Wire & Cable	313-589-0510
MN	Edina, Schweber Elctrns.	612-941-5280
MN	Minneapolis, Electronic Ctr., Inc.	612-371-5200
MN	Minneapolis, Stark Elctrn. Supp., Inc.	612-332-1325
MN	St. Paul, Gopher Elctrns. Co.	612-483-3322
MO	Kansas City, Electronic Supp. Co., Inc.	816-931-0250
MO	St. Charles, Lectronix, Inc.	314-946-6424
MO	St. Louis, Franklin Elctrns.	314-993-5333
MO	St. Louis, Olive Elctrns., Inc.	314-426-4500
MO	St. Louis, Van Sickle Radio Elctrns., Inc.	314-621-5000
NE	Lincoln, Scott Elctrns. Supp. Corp.	402-466-8221
NV	Las Vegas, CRW, Inc.	702-384-1500
NH	Hudson, C & H Elctrns.	603-882-1133
NH	Manchester, Yankee Elctrn. Supp., Inc.	603-625-9746
NJ	Cherry Hill, Hamilton/Avnet Elctrns.	201-424-0110
NJ	East Hanover, State Elctrns.	201-887-2550
NJ	Edison, William Elctrns.	201-985-3700
NJ	Fairfield, Marshall Inds.	201-882-0320

NJ	Kenilworth, Federated Purchaser	201-272-0505
NJ	Pine Brook, Alatec Prods.	201-227-8140
NJ	Prospect Park, Kapp Inds., Inc.	201-790-1999
NJ	Springfield, Route Elctrns. 22, Inc.	201-379-7710
NM	Albuquerque, Connecting Comps.	505-345-8921
NM	Albuquerque, Electronic Parts Co.	505-293-6161
NY	Buffalo, Genesee Radio & Parts Co., Inc.	716-873-9661
NY	Buffalo, Summit Distrs., Inc.	716-884-3450
NY	Elmsford, Ancar Elctrns. Supp.	914-592-7100
NY	Farmingdale, Harrison Radio Corp.	516-293-7990
NY	Hempstead, Davis Elctrns. Corp.	516-483-9200
NY	Johnson City, Help Elctrns., Inc.	607-729-3528
NY	Lynbrook, Peerless Radio Corp.	516-593-2121
NY	Pleasantville, Wise Comps., Inc.	914-939-8600
NY	Poughkeepsie, Chief Elctrns.	914-471-1300
NY	Rochester, Masline Elctrns.	716-546-5373
NY	Rochester, Rochester Radio Supp. Co.	716-454-7800
NY	Rome, Rome Elctrns., Inc.	315-337-5400
NY	Schenectady, Grimmer's Elctrn. Supp.	518-374-8480
NY	West Babylon, Delmar Elctrns., Inc.	516-410-1234
NY	West Hempstead, March Elctrns.	516-486-6511
NY	Westbury, Schweber Elctrns.	516-334-7474
NC	Cary, Powell Elctrns.	919-467-1212
NC	Charlotte, Dixie Elctrns.	704-337-5413
NC	Greensboro, Hammond Elctrns.	919-275-6391
NC	Morrisville, Anixter-Raleigh	919-469-8303
NC	Raleigh, Schweber Elctrns.	919-876-0000
NC	Raleigh, Southeastern Elctrns.	919-828-2311
OH	Akron, Akron Elctrn. Supp. Co.	216-762-8818
OH	Cincinnati, Hughes-Peters, Inc.	513-351-2000
OH	Cincinnati, U.R.I. Elctrns.	513-761-4030
OH	Columbus, Hughes-Peters, Inc.	614-294-5351
OH	Columbus, Thompson Elctrns.	614-228-6191
OH	Columbus, Whitehead Elctrns.	614-224-1186
OH	Dayton, Stotts-Friedman Co., Inc.	513-298-5555
OH	Lima, LPR Elctrns., Inc.	419-228-1220
OH	Marion, Servex Elctrns. Distr., Inc.	614-383-3117
OH	Solon, Repco Elctrns.	216-248-8900
OH	Solon, Targetronix Corp.	216-248-7930
OH	Twinsburg, Schuster Elec. Co., Inc.	216-425-8134
OH	Warren, REM Elctrns. Supp. Co., Inc.	216-373-1300
OK	Oklahoma City, Electro-Enterprise	405-427-6591
OK	Oklahoma City, Radio Supp., Inc.	405-232-6127
OK	Tulsa, Carlton Bates	918-250-1626
OK	Tulsa, Radio, Inc.	918-587-9123
OR	Portland, Radar Elec. Co., Inc.	503-233-3691
PA	Allentown, P.A. Peters, Inc.	215-434-5237
PA	Altoona, Allegheny Elctrns.	814-946-0871
PA	Braddock, Leff Radio Parts Co.	412-351-5000
PA	Drexel Hill, Kass Elctrns. Distrs.	215-449-2300
PA	Erie, REM Elctrn. Supp.	814-453-5626
PA	Essington, Tri-Com, Inc.	215-521-3080
PA	Horsham, Schweber Elctrns.	215-441-0600
PA	Philadelphia, Almo Elctrns. Corp.	215-698-4000
PA	Philadelphia, Arch Elctrns. Co.	215-563-4660
PA	Philadelphia, Powell Elctrns., Inc.	215-365-1900
PA	Reading, Barbey Elctrns.	215-376-6116
PA	Wayne, Peak Elctrns. Corp.	215-293-9000
RI	Pawtucket, Jabbour Elctrns.	401-728-4600
RI	Pawtucket, Major Edward's Elctrn. Supp., Inc.	401-725-7400
SC	Charleston, Wholesale Indl. Elctrns.	803-722-2634
SC	Columbia, Dixie Elctrns., Inc.	803-779-5332
SC	Greenville, Hammond Elctrns.	803-233-4121
TN	Chattanooga, Curle Elctrns.	615-266-4727
TN	Knoxville, Dixie Elctrns.	615-938-4131
TN	Memphis, Carlton-Bates Co.	901-365-3539
TN	Nashville, Electra Distrib. Co.	615-329-3971
TN	Nashville, Graham Elctrns.	615-242-2682
TX	Addison, Connec/Tek, Inc.	214-733-4411
TX	Austin, Hamilton/Avnet Elctrns.	512-837-8911
TX	Austin, Kent Elctrns.	512-834-1900
TX	Beaumont, Ralph's Elctrns.	409-833-9443
TX	Corpus Christi, Douglas Elctrns.	512-883-5103
TX	Dallas, LBI Electro-Optics	214-358-4251
TX	Dallas, Wallace Elctrns. Co., Inc.	214-340-0400
TX	El Paso, Ideal Indl. Elctrn. Supp., Inc.	915-779-6647
TX	Fort Worth, Industrial Elctrns., Inc.	817-731-7321
TX	Fort Worth, Swieco, Inc.	817-335-6521
TX	Fort Worth, Texas Connector Corp.	817-246-0109
TX	Houston, Electronic Pkg. Comps., Inc.	713-447-5800
TX	Houston, Electrotex	713-526-3456
TX	Houston, Geophysical Supp. Co., Inc.	713-666-4100
TX	Houston, Hamilton/Avnet Elctrns.	713-780-1971
TX	Houston, Kent Elctrns.	713-780-7770
TX	Irving, Hamilton/Avnet Elctrns.	214-659-4100
TX	Midland, ESI Supp.	915-694-9657
TX	Richardson, Kent Elctrns.	214-669-2600
TX	San Antonio, Sherman Elctrns. Supp., Inc.	512-224-1001
TX	San Antonio, Texas Intl. Cable	512-366-3648
UT	Salt Lake City, Kimball Elctrns., Inc.	801-328-2075
VT	Rutland, S.A.I. Semispecialists of Amer.	802-775-7126
VA	Norfolk, Priest Elctrns., Inc.	804-855-0105
VA	Richmond, Avec Elctrns. Corp.	804-359-6071
VA	Richmond, Sterling Elctrns.	804-226-2190
VA	Roanoke, Mexitronics	703-342-4444
WA	Bellevue, Marshall Inds.	206-747-9100
WA	Kent, Pyramid Elctrns. Supp. Co., Inc.	206-872-5800
WA	Seattle, Connector World Supp.	206-767-6773
WA	Seattle, Pacific Elctrns.	206-575-1050
WA	Seattle, Radar Elctrn. Co., Inc.	206-282-2511
WA	Seattle, Radar Elec. Co., Inc.	206-282-2511
WV	Huntingdon, State Elec. Supp. Co.	304-523-7491
WV	Kenova, Burco Distrs.	304-453-6387
WV	Morgantown, State Elctrns. Co.	304-292-1641
WI	Fond du Lac, Fedco, Elctrns., Inc.	414-922-6490
WI	Madison, Superior Elctrn. Parts Co.	608-257-1477
WI	Milwaukee, Industrial Elctrns. Corp. of WI	414-276-1212
WI	Milwaukee, Marsh Elctrns.	414-475-6000
WI	Oshkosh, Electronics Inds.	414-235-8930

AMPEREX ELECTRONIC CORP., Ferroxcube Div., 5083 Kings Hwy., Saugerties, NY 12477, Tel: 914-246-2811, TWX: 510-247-5410; Empl.: 600; *Sls. Mgr.:* R. Denison; *Dist. Mgr.:* Ed Hellenschmidt

Refer to Amperex, Slatersville Div. for sales office information.

AMPEREX ELECTRONIC CORP., Hicksville Div., Box 418 - 230 Duffy Ave., Hicksville, NY 11802, Tel: 516-931-6200, TWX: 510-221-1839; Empl.: 270; *Sls. Mgr.:* Robert Carlin; *Dist. Mgr.:* Robert Carlin

AMPEREX ELCTRN. CORP., Slatersville Div., Providence Pike, Slatersville, RI 02876, Tel: 401-762-3800, Telex: 927584, TWX: 710-382-6332; FSC No.: 73445; Empl.: 565; *Sls. Mgr.:* Robert Carlin

AMPEREX ELECTRONIC INDS., Smithfield Div., George Washington Hwy., Smithfield, RI 02917, Tel: 401-232-0500, Telex: 92 76 43

Refer to Amperex, Slatersville Div. for sales office information.

AMPERITE CO., INC., 600 Palisade Ave., Union City, NJ 07087, Tel: 201-864-9503, TWX: 710-992-8834; FSC No.: 70563; Empl.: 76; *Sls. Mgr.:* T. Whalen; *Dist. Mgr.:* T. Whalen

AMPEX CORP., 401 Broadway, Redwood City, CA 94063, Tel: 415-367-2011, TWX: 910-364-9034; Empl.: 9,800

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AMPHENOL, An Allied Co., 43 Commerce Ct., Lisle, IL 60532, Tel: 312-983-3500, TWX: 910-651-0191

AMPHENOL R F OPERATIONS, 33 E. Franklin St., Danbury, CT 06810, Tel: 203-743-9272

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AMPLIFIER RESEARCH, 160 School House Rd., Souderton, PA 18964-9990, Tel: 215-723-8181, TWX: 510-661-6094; FSC No.: 30639; Empl.: 42; *Sls. Mgr.:* D.W. Roth ...... **D•1002-1003**

Local Sales Offices & Reps

AL	Huntsville, Beacon Elctrns.	205-881-5031
AZ	Tempe, Mar Tech Assocs.	602-968-4944
CA	N. Hollywood, O'Halloran Assoc.	213-877-0173
CA	Palo Alto, O'Halloran Assoc.	415-969-1600
CA	Santa Ana, Shoshin, U.S.A.	714-641-0417
CO	Boulder, H. Bass. Assoc.	303-530-7509
CT	Hamden, J.B.L. Assoc.	203-281-3161
FL	Boca Raton, Beacon Elctrns.	305-392-3500
FL	Clearwater, Beacon Elctrns.	813-796-2378
FL	Maitland, Beacon Elctrns.	305-647-3498
FL	Melbourne, Beacon Elctrns.	305-724-8010
GA	Atlanta, Beacon Elctrns.	404-256-9640
IL	Park Ridge, Elctrn. Instr. Assocs.	312-298-2290
IN	Indianapolis, Elctrn. Instr. Assocs.	317-257-7231
MD	Severna Park, Delmarva Eng. Assoc. Ltd.	301-647-8007
MA	Lexington, R.J. Sickles	617-862-5100
MN	Minneapolis, Elctrn. Instr. Assocs.	612-374-5628
NJ	Denville, Metro-Mics	201-625-5959
NJ	Westfield, Metro Mics	201-233-6116
NM	Albuquerque, Hewitt & Assocs.	505-299-7746
NY	Melville, Metro Mics	516-271-6677
NC	Raleigh, Beacon Elctrns.	919-787-0330
OH	Centerville, Micro Sls.	513-433-8171
OH	North Olmsted, Micro Sls.	216-734-3080
PA	Philadelphia, R. Meyers Assoc.	215-224-1663
TX	Austin, Airep Elctrns.	512-327-0778
TX	Dallas, Airep Elctrns.	214-349-4360
TX	Houston, Airep Elctrns.	713-944-2055
UT	Bountiful, Herb Bass Assoc.	801-295-0469
UT	Salt Lake City, Herb Bass Assoc.	801-268-0262
WA	Seattle, J. J. Assocs., Inc.	206-246-6619

AMPLIFONIX INC., 220 Rte. 13, Bristol, PA 19007, Tel: 215-788-2350, TWX: 510-667-0501; *Sls. Mgr.:* Jason A. Day; *Dist. Mgr.:* Jason A. Day

AMPROBE INSTR., 630 Merrick Rd., Lynbrook, NY 11563, Tel: 516-LY3-5600, TWX: 510-225-8403; Empl.: 230; *Sls. Mgr.:* W. Eagle

AMPTEK, INC., 6 De Angelo Dr., Bedford, MA 01730, Tel: 617-275-2242; Empl.: 11; *Sls. Mgr.:* George Kobaly, Jr.

Local Sales Offices & Reps

EXP	MÅ, Plainville, Teknis	617-695-3591

AMPTEX, INC., 11103 Dennis Rd., P.O. Box 59841, Dallas, TX 75229, Tel: 214-241-2511, Telex: 730338; *Sls. Mgr.:* Richard Sparks

AMPTRONIX, INC., P.O. Box 8146, Rowland Heights, CA 91748, Tel: 714-595-5814; *Dist. Mgr.:* Ching Lin

Local Sales Offices & Reps

CA	Los Angeles, Electric Switches, Inc.	213-660-1310

AMRAD & TRANSCON MFG. CO., Div. of D.J. Assocs., Inc., 8411 South Zero St., Fort Smith, AR 72903-7097, Tel: 501-452-3987; FSC No.: 55943; Empl.: 17

AMTEK DIGITAL SYSTEMS, INC., 12740 28th N.E., Seattle, WA 98125, Tel: 206-363-0217, Telex: 329473 (Burgess Sea); Empl.: 18; *Sls. Mgr.:* Fred Graham

AMUNEAL MFG., 4737 Darrah St., Philadelphia, PA 19124, Tel: 215-535-3000; FSC No.: 23740; Empl.: 120; *Sls. Mgr.:* S. M. Kamens; *Dist. Mgr.:* S. M. Kamens ...... **C•1721**

Local Sales Offices & Reps

AZ	Phoenix, Shefler-Kahn Co.	602-257-9015
CA	Fremont, William Parks Assoc., Inc.	415-796-0875
CA	San Diego, C.E.M., Inc.	619-692-3551
CA	Santa Ana, C.E.M., Inc.	714-835-2702
CO	Wheatridge, Waugaman Assocs., Inc.	303-423-1020
CT	New Britain, MPS Elctrns., Inc.	203-223-1006
GA	Stone Mountain, Mountain Electro Prods., Inc.	404-448-5594
IL	Chicago, Brock & Cushman, Inc.	312-622-4110
KS	De Soto, Midtec Assocs., Inc.	913-441-6565
MD	Baltimore, Muncy Sls.	301-484-6376
MA	Norwood, MPS Elctrns.	617-769-8700
MI	Ann Arbor, Metal-Tronics	313-437-7530
MI	Wyoming, Howard Assocs., Inc.	616-532-2161
MN	Hamel, Hedtke Mktg., Inc.	612-478-2120
MO	Florissant, Midtec Assocs., Inc.	314-837-5200
NE	Omaha, Hedtke Assocs., Inc.	402-895-6756
NM	Albuquerque, Shefler Kahn Co.	505-296-0749
NY	Bethpage, L. A. Buscaglia Co., Inc.	718-468-3666
NY	Mendon, Tech-Mark, Inc.	716-624-3840
OH	Akron, Imtech, Inc.	216-666-1185
OH	Dayton, Imtech, Inc.	513-278-6507
OR	Beaverton, Rep-West, Inc.	503-626-4279
TX	Houston, Barry Sls.	713-784-5860
TX	Richardson, Barry Sls.	214-234-0255
UT	Salt Lake City, Waugaman Assoc. Utah, Inc.	801-261-0802
UT	Salt Lake City, Waugaman Assocs. Utah, Inc.	801-261-0802
WA	Seattle, Rep-West	206-283-8351
WI	Waterford, Brock & Cushman, Inc.	414-662-3154
EXP	NJ, Oradell, Sylvan Ginsbury	201-261-3200
Can	Montreal, Que., Solid State Engrg.	514-481-3313

ANADEX, 1001 Flynn Rd., Camarillo, CA 93010, Tel: 805-987-9660, TWX: 910-494-2761; Empl.: 350

ANADYNE POWER SUPPLY DIVISION, 721 W. Whittier Blvd., La Habra, CA 90631, Tel: 213-697-3116, TWX: 910-583-4807; Empl.: 100

ANAHEIM AUTOMATION, 910 E. Orangefair La., Anaheim, CA 92801, Tel: 714-992-6990

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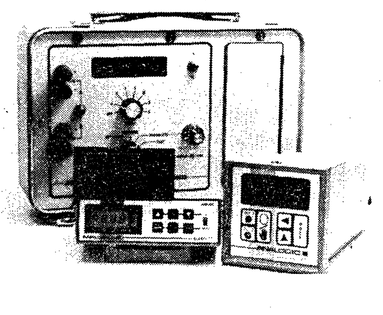

Offices
1810 Grant Avenue/Philadelphia, PA 19115
(215) 673-6500 in PA, NJ, DE
8019 Belair Road/Baltimore, MD 21236
(301) 661-5900 in MD, VA

Local Direct Dial Phones

(203) 563-9232 in Hartford, CT
(203) 773-3441 in New Haven, CT

(302) 652-8585 in Wilmington, DE
(301) 621-5077 in Wash., DC Area

(804) 627-4388 in Norfolk, VA
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Minneapolis	(612) 332-6117
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St. Louis	(314) 454-0241
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OHIO	
Cleveland	(216) 651-4100
OKLAHOMA	
Tulsa	(918) 582-1444
PENNSYLVANIA	
Pittsburgh	(412) 261-4548
TEXAS	
Austin	(512) 473-8876
Dallas	(214) 271-5671
Houston	(713) 733-9814
WISCONSIN	
Milwaukee	(414) 643-0554
ALL OTHER STATES	**(800) 962-8128**

ANALOG & DIGITAL PERIPHERALS, INC. (ADPI), 815 Diana Dr., Troy, OH 45373, Tel: 513-339-2241, TWX: 810-450-2685; FSC No.: 31-0949-745; Empl.: 19; *Sls. Mgr.:* Alan Kuebier

ANALOG DEVICES, P.O. Box 280, Norwood, MA 02062, Tel: 617-329-4700, TWX: 710-394-6577; FSC No.: 24355; Empl.: 4,000

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ANALOGIC CORP., 8 Centennial Dr., Peabody, MA 01961, Tel: 617-532-5660, 617-777-4500, 617-246-0300, 800-451-1, Telex: 94-9307, TWX: 681-7180; Empl.: 2000; *Sls. Mgr.:* M. E. Culverhouse; *Dist. Mgr.:* D. Vermilyea .... **D•1138-1139**

Local Sales Offices & Reps

Array Processors

AZ	Phoenix, Cherry Assocs.	602-242-1922
CA	Woodland Hills, Gordon Osborne & Assocs.	213-888-9916
CT	Avon, Power Mark, Inc.	203-678-0123
FL	Cape Canaveral, Analogic Corp	305-799-2300
GA	Lilburn, Micro-Spec	404-921-3840
IL	Elgin, Analogic	312-888-4242
IL	Rolling Meadows, Commodore I	312-394-5441
IN	Indianapolis, Sukup & Cox	317-253-5501
KS	Overland Pk., Ramsey Assocs.	913-649-6996
MD	Lanham, Data Sys. Mktg.	301-577-3700
MA	Hopkinton, Power Mark, Inc.	617-435-9200
MI	Livonia, Lowell-Wendt Mktg. Co.	313-464-2722
MN	Golden Valley, J. R. Assocs.	612-546-4110
MO	Maryland Heights, Ramsey Assocs.	314-878-5042
NJ	Boonton, PAF Assocs.	201-335-0680
NM	Albuquerque, Cleveland Entprs.	505-265-7893
NY	New Hartford, PDQ Assocs.	315-768-8167
NY	Smithtown, PAF Assocs.	516-360-0940
OH	Chagrin Falls, Midwest Mktg. Assocs.	216-247-6655
OH	Dayton, Midwest Mktg. Assocs.	513-433-2511
PA	Churchville, Dynamic Elec.	215-322-2611
PA	Pittsburgh, Staples	412-881-5990
TX	Houston, A.C.U. Data	713-580-2451
TX	Houston, Analogic Corp.	713-280-9048
Can	Mississauga, Ont., Tracan Elctrns.	416-625-7752
CA	Pasadena, RDX Corp.	213-681-3451
CA	San Diego, RDX Corp.	619-278-6863
CA	Sunnyvale, RDX Corp.	408-734-4500
CT	Portland, B.B.I.	203-342-0648
IL	Downers Grove, Physics Equip.	312-960-4054
MA	Holbrook, McLellan Assocs.	617-767-4771
MO	St. Louis, Engrg. Svcs. Co.	314-997-1515
NY	Frankfort, Kapitol Instr. Sls.	315-894-4245
NY	New York, Flowmaster	212-741-9675
NY	Rochester, C. V. Sls.	716-328-0680
NY	Williamsville, C. V. Sls.	716-759-2923
OK	Tulsa, Data Mktg. Assocs.	918-438-4911
PA	Pittsburg, R.D.P. Corp.	412-487-2217
TX	Austin, Data Mktg. Assocs.	512-451-5174
TX	Dallas, Data Mktg. Assocs.	214-661-0300
UT	Salt Lake City, Westek Data Prods.	801-261-0999
VA	Richmond, Commonwealth Controls	804-271-7700
WA	Seattle, Brett Assocs.	206-431-8090

Digital Panel Instrs., Load Cell Digitizing Sys. & Temperature Instr.

AL	Birmingham, Regal Controls	205-967-5770
CA	Pasadena, RDX Corp.	213-681-3451
CA	San Diego, RDX Corp.	619-278-6863
CA	Sunnyvale, RDX Corp.	408-734-4500
IL	Buffalo Grove, Laganowski & Assocs.	312-520-0130
IL	Downers Grove, Physics Equip.	312-960-4054
IL	Naperville, Synergy Sys.	312-369-2021
ME	Boothbay, Linekin	207-633-5363
MA	Belmont, Hi Tech Controls	617-489-0851
MA	Danvers, Analogic	617-777-4500
MN	Eden Prairie, Elctrn. Instr. Conslts.	612-937-9701
MO	St. Louis, Engineering Svcs. Co.	314-997-1515
NM	Albuquerque, Qualtech	505-243-5605
NY	Frankfort, Kapital Instrs.	315-894-4245
NY	NewYork, Flowmaster	212-741-9675
NC	Charlotte, Zelco	704-523-2961
OH	Dayton, P. J. Navin Co.	513-434-8940
OH	Dayton, RDP Corp	513-253-6175
OK	Tulsa, Data Mktg. Assocs.	918-741-4911
PA	Pitttsburg, RDP Corp.	412-487-2217
TN	Knoxville, Paris Co.	615-966-2141
TX	Austin, Data Mktg. Assocs.	512-451-5174
TX	Dallas, Data Mktg. Assocs.	214-661-0300
TX	Richmond, Commonwealth Controls	804-271-7700

ANALOGIC CORP., Data Conversion Prods. Grp., Audubon Rd., Wakefield, MA 01880, Tel: 617-246-0300, Telex: 94-9307, TWX: 710-348-0425; Empl.: 2000; *Sls. Mgr.:* Leonard D. Sacon .... **D•1138-1139**

Local Sales Offices & Reps

AL	Huntsville, Beacon Elctrns, Assocs., Inc.	205-881-5031
AZ	Scottsdale, Arcom Sls., Inc.	602-947-5745
CA	Carson, AMASCO	213-516-8561
CA	San Jose, Analogic Corp.	408-247-6401
CA	Sunnyvale, AMASCO	408-733-8690
CO	Wheat Ridge, Westek Data Prods., Inc.	303-431-9876
CT	Portland, BBI	203-342-0648
FL	Boca Raton, Beacon Elctrns. Assocs., Inc.	305-393-3500
FL	Clearwater, Beacon Elctrns. Assocs., Inc.	813-796-2378
FL	Maitland, Beacon Elctrns. Assocs., Inc.	305-647-3498
FL	Melbourne, Beacon Elctrns. Assocs., Inc.	305-724-8010
GA	Atlanta, Beacon Elctrns. Assocs.	404-256-9640
IL	Rosemont, Synmark Sls. Co.	312-825-3455
MA	Holbrook, McLellan Assocs.	617-767-4771
MI	Livonia, Lowell-Wendt Mktg. Co.	313-464-2722
MO	St. Louis, Engrg. Svcs. Co.	314-997-1515
NJ	Boonton, PAF Assocs.	201-335-0680
NY	Smithtown, PAF Assocs.	516-360-0940
NY	Syracuse, Labtronics	315-455-7314
NC	Raleigh, Beacon Elctrns. Assocs., Inc.	919-787-0330
OH	Chagrin Falls, Midwest Mktg. Assocs.	216-247-6655
OH	Cincinnati, Analogic Corp.	606-371-0064
OH	Dayton, Midwest Mktg. Assocs.	513-433-2511
OK	Tulsa, Norcom, Inc.	918-832-7747
PA	Norristown, Denco Data Equip. Corp.	215-630-8990
TX	Austin, Norcom, Inc.	512-451-2757
TX	Dallas, Norcom	214-386-4888
TX	Houston, Norcom, Inc.	713-778-0392
TX	San Antonio, Norcom, Inc.	512-680-4513
UT	Salt Lake City, Westek Data Prods., Inc.	801-261-0999
Can	Montreal, Tracan Elctrns. Corp.	514-636-8380
Can	Ottawa, Tracan Elctrns. Corp.	613-722-7667
Can	Toronto, Tracan Elctrns. Corp.	416-625-7752

ANALOG MODULES, INC., 126 Baywood Avenue, Longwood, FL 32750, Tel: 305-339-4356/4355, Telex: ANALOG MOD C1 467617; FSC No.: 61651; Empl.: 22; *Sls. Mgr.:* Ian D. Crawford .... **D•1004**

ANALOG SYSTEMS, P.O. Box 35879, Tucson, AZ 85740-5879, Tel: 602-293-4923, TWX: 910-952-1185; FSC No.: 58976; Empl.: 13; *Sls. Mgr.:* Sharon Raban; *Dist. Mgr.:* Sharon Raban

ANALOG TECHNOLOGY CORP., 15859 E. Edna Pl., Irwindale, CA 91706, Tel: 213-960-4004, TWX: 910-584-1855; *Sls. Mgr.:* James L. Lawrence, Jr.

ANALYTICAL MEAS., 31 Willow St., Chatham, NJ 07928, Tel: 201-273-7500; Empl.: 35

ANALYTICS COMMUNICATIONS SYS., 1820 Michael Faraday Dr., Reston, VA 22090, Tel: 703-471-0892, Telex: 710-833-0326; Empl.: 35; *Sls. Mgr.:* Paul G. Jones

ANAREN MICROWAVE, P.O. Box 178, 6635 Kirkville Rd., E. Syracuse, NY 13057, Tel: 315-432-8909, Telex: 937351, TWX: 710-541-1507; FSC No.: 31597; Empl.: 310

ANCHOR SPECIALTY MFG. INC., 300 Hollister Rd., Teterboro, NJ 07608, Tel: 201-288-1939; Empl.: 10

AN/COM INDUSTRIES, P.O. Box 530, 5521 Cleon Ave., N. Hollywood, CA 91603, Tel: 818-769-5518, TWX: 910-498-5713; *Sls. Mgr.:* E. J. Wubben; *Dist. Mgr.:* E. J. Wubben

AND, 770 Airport Blvd., Burlingame, CA 94010, Tel: 415-347-9916, TWX: 910-374-2353; Empl.: 30; *Sls. Mgr.:* Dean Ransom

ANDEEN-HAGERLING, INC., 31899 Miles Road, Chagrin Falls, OH 44022, Tel: 216-349-0370; Empl.: 14; *Sls. Mgr.:* Gwen Glazer

Local Sales Offices & Reps

OH	Cleveland, TIBY Co.	216-371-5335

ANDERS, INC., 77 Wolcott Rd., Simsbury, CT 06070, Tel: 203-658-7666; FSC No.: 52045; Empl.: 18; *Sls. Mgr.:* R. A. Grover

ANDERSEN LABS., 1280 Blue Hills Ave., Bloomfield, CT 06002, Tel: 203-242-0761, TWX: 710-425-2390; FSC No.: 03947; Empl.: 125 .... **A•1591**

Local Sales Offices & Reps

CA	Mountain View, Peninsula Tech. Sls. ..	415-965-3636
CA	San Marcos, Midwin & Olifson	619-571-0177
CA	Santa Ana, SSK USA, Inc.	714-250-4073
CA	Tarzana, Midwin & Olifson	213-996-9093
CA	Tustin, SC Cubed	714-731-9206
IL	Northfield, Feller Assocs.	312-446-8065
IA	Cedar Rapids, Feller Assocs.	319-364-0566
MD	Owings Mill, Neal Deoul Assocs., Inc.	301-795-5775
MA	Wayland, High-Tech Sls.	617-653-3838
NY	Melville, Carnes Assocs.	516-694-1600
PA	Huntingdon Valley, Rabal Assoc.	215-947-4825
TX	Dallas, McDonald Assocs.	214-238-1858
Intl	Japan, Tokyo, Japan Telescomm Corp.	403-5301
Can	Bolton, Ont., MacKay Assocs.	416-857-4302
Can	Quebec, R. F. Microwave, Ltd.	514-335-2335

ANDERSON-BELL CO., P.O. Box 191, Canon City, CO 81212, Tel: 303-275-1661, Telex: 499-4230; *Sls. Mgr.:* Carol Fontecchio; *Dist. Mgr.:* Carol Fontecchio

ANDERSON ELCTRNS., 310 Penn St., P.O. Box 89, Hollidaysburg, PA 16648, Tel: 814-695-4428, TWX: 510-691-2516; Empl.: 85; *Sls. Mgr.:* W. H. Anderson .... **A•1313**

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CA	Fullerton, GRU Assocs.	714-738-0903
CA	Santa Clara, Logan Sls	408-496-0660
CT	Branford, LJM Assocs.	203-488-7995
FL	New Port Richey, Lobo Mktg. Assocs., Inc.	813-848-8578
GA	Lawrenceville, B. T. Funderburk, Inc. ..	404-963-9495
IL	South Elgin, R.K. Elctrn.	312-695-8552
MA	Plymouth, Newby, Inc.	617-746-3869
MI	Lathrup Village, R. C. Nordstrom & Co.	313-559-7373
NY	Smithtown, L.I., PAF Assocs.	516-360-0940
NY	Syracuse, Murcan Sls. Corp.	315-437-0734
NC	Raleigh, B. T. Funderburk, Inc.	919-782-3493
OH	Dayton, Dynel Co.	513-434-6467
PA	Rydal, Espy Sls.	215-576-0780
TX	Plano, GW Prods.	214-422-1746
WA	Seattle, Harry Levinson Co.	206-382-1300
Can	Mississauga, Ontario, Gidden-Morton Assocs.	416-671-8111

ANDERSON POWER PRODS., Div. of High Voltage Engrg., 145 Newton St., Boston, MA 02135, Tel: 617-787-5880, Telex: 940453

ANDREW CORP., 10500 W. 153rd St., Orland Pk., IL 60462, Tel: 312-349-3300, Telex: 25-3897, TWX: 910-651-3340; *Sls. Mgr.:* Carl Van Hecke

ANDREWS BEARING CORP., MPB Corp., New Cut Road, Spartanburg, SC 29304, Tel: 803-583-4541, TWX: 810-282-2578; *Sls. Mgr.:* Michael S. Diblasi; *Dist. Mgr.:* Jack E. Barker

ANDRICH SYS., INC., 1699 Roosevelt Ave., Bohemia, NY 11716, Tel: 516-589-5656; *Sls. Mgr.:* Robert G. Andrews

ANDROMEDA SYS., 9000 Eton Ave., Canoga Park, CA 91304, Tel: 818-709-7600, TWX: 910-444-1248; Empl.: 23; *Sls. Mgr.:* Mike Morgan; *Dist. Mgr.:* Mike Morgan

ANDROTEK/DMI, Box 29098, Columbus, OH 43229, Tel: 614-882-7821; *Sls. Mgr.:* James M. Shively

ANGENIEUX INC., 120 Derry Rd., Hudson, NH 02051, Tel: 603-889-2116, Telex: 94-3469; *Sls. Mgr.:* Edward A. Wollensak

ANGO ELECTRONICS CORP., Post Office Box 112, Harrison, NJ 07029, Tel: 212-685-6336, 201-484-1115, Telex: 421531; *Sls. Mgr.:* Brian K. Yuen .... **C•1008**

ANN ARBOR TERMINALS, 6175 Jackson Rd., Ann Arbor, MI 48103, Tel: 313-663-8000, Telex: 706905; Empl.: 50; *Sls. Mgr.:* Gary DeLuca

ANORAD CORP., 110 Oser Ave., Hauppauge, NY 11788, Tel: 516-231-1990, TWX: 510-227-9894; Empl.: 235

ANRO ELCTRN. INDS., 300 Wildcat Rd., Downsview, ON, Canada, Tel: 416-661-2600; Empl.: 85; *Sls. Mgr.:* E.H. Jones

ANSCO, 1243 West 134th St., Gardena, CA 90247, Tel: 1-800-421-1270, 1-800-821-3308, 213-532-7780; Empl.: 25 + ; *Sls. Mgr.:* Melvin Preston

ANSLEY ELECTRONICS, DIVISION OF THOMAS & BETTS, See T & B/Ansley Corp.

ANSONICS, INC., P.O. Box 910, Halfway, OR 97834, Tel: 503-742-7475; Empl.: 6

ANTENNACRAFT, Box 1005, Burlington, IA 52601, Tel: 319-754-7575

ANTENNA RESCH. ASSOCS., 11317 Frederick Ave., Beltsville, MD 20705, Tel: 301-937-8888, Telex: 908754; FSC No.: 04190; Empl.: 25; *Sls. Mgr.:* H.W. Rapalus

ANTE[illegible]S, 12435 Euclid Ave., Cleveland, OH 44106, Tel: [illegible]-791-7878, Telex: 980-732; Empl.: 1000; *Sls. Mgr.:* Larry Kline

ANTEX DIV., 7 Hawkes St., Marblehead, MA 01945, Tel: 617-631-7100; *Sls. Mgr.:* C. Loutrel; *Dist. Mgr.:* C. Loutrel

ANTEX ELECTRONICS CORP., 16100 S. Figueroa St., Gardena, CA 90248, Tel: 213-532-3092, TWX: 910-344-7381; Empl.: 53; *Sls. Mgr.:* J. Antrim; *Dist. Mgr.:* K. Ross

ANTONA CORP., 2100 S. Sawtelle Blvd., Suite 205, Los Angeles, CA 90025, Tel: 213-473-8995; Empl.: 4

ANTRONIC CORP., 7755 E. Redfield Rd., Ste. 300, Scottsdale, AZ 85260, Tel: 312-287-5110

APAHOUSER-ELCOM, INC., 101 Walnut St., Watertown, MA 02172, Tel: 617-924-1500; FSC No.: 53721; Empl.: 90; *Sls. Mgr.:* Fred Gately

APA DIVISION, 399 Executive Blvd., Elmsford, NY 10523, Tel: 914-592-7322, Telex: 646186; *Sls. Mgr.:* Carl Gruenberg

A. P. CIRCUIT CORP., 513 East 86th St., P.O. Box 1350, New York, NY 10028, Tel: 212-737-1348, Telex: 428759 .... **A•1592**

Local Sales Offices & Reps

MI	Detroit, Comtel Instrs.	313-255-1970
OH	Cleveland, Comtel Instrs.	216-442-8080
OH	Dayton, Comtel Instrs.	513-298-7573

APEX MICROTECHNOLOGY CORP., 2895 W. Rudasil Road, Tucson, AZ 85741, Tel: 602-746-0849, TWX: 910-952-1176; Empl.: 65; *Sls. Mgr.:* Rita Olschewski; *Dist. Mgr.:* Rita Olschewski .... **D•1005**

Local Sales Offices & Reps

AZ	Tempe, Mar Tech. Assocs., Inc.	602-747-8098
CA	Los Altos, Kolm Mktg.	415-948-2635
CA	San Diego, California Elctrn. Mktg.	619-692-3551
CA	Santa Ana, California Elctrn. Mktg.	714-835-2702
CO	Denver, W. H. Howard Assocs.	303-426-3499
IL	Chicago, L.G.S. Sls.	312-456-0616
MD	Ellicott City, Nelson Elctrns.	301-747-7887
MA	Malden, J.K. Assocs.	617-321-2922
MN	Bloomington, Merril Franklin Co.	612-854-9446
NY	Smithtown, T & K Sls.	516-724-3456
OH	Fort Wayne, TX Sales	219-489-4447
TX	Dallas, Repmasters	214-247-6236
TX	Houston, Repmaster	713-692-8204

Local Distributors

Intl	Austria, Wien, Nano-80	0222-65-15-22
Intl	Finland, Helsinki, Turion Oy	90-372144
Intl	France, Orsay, Microel	907-08-24
Intl	Germany, Nauheim, Emtron Vertriebs GmbH	(06152) 6003
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Intl	Italy, Milanino, Servotecnia S.A.S. ...	39/02-619-53-27
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Intl	Netherlands, Oosterhout, Klaasing Elctrns.	01620-51400
Intl	Norway, Oslo, Eltron	02-462-870
Intl	South Africa, Johannesburg, Advanced Semiconductor	27/11802-4107
Intl	Sweden, Stockholm, Scancopter AB ..	046-828-9425
Intl	Switzerland, Zug, Anatech AG	042-315-477
Intl	Taiwan, Taipei, Hitek Co. Ltd.	536-1157
Intl	UK, Sunbury-on-Thames, Pascall Elctrns.	09327-87418

API INSTRS., 1601 Trapelo Rd., Waltham, MA 02254, Tel: 617-890-2000, Telex: 92-3445, TWX: 710-324-0681; FSC No.: 20905; Empl.: 350; *Sls. Mgr.:* R. Yates; *Dist. Mgr.:* G. Wood

APM-HEXSEAL, 44 Honeck St., Englewood, NJ 07631, Tel: 201-569-5700, Telex: 13-3403; Empl.: 65; *Sls. Mgr.:* Kenneth Schwinn; *Dist. Mgr.:* Kenneth Schwinn

APOLLO LASERS, INC., 9201 Independence Ave., Chatsworth, CA 91311, Tel: 213-709-1111, Telex: 66-2278; Empl.: 82; *Sls. Mgr.:* John Q. Adams

APOLLO MAGNETICS CORP., 2720 W. Beverly Blvd., Los Angeles, CA 90057, Tel: 213-381-2500, TWX: 910-321-4348; Empl.: 420 .... **D•1058**

Local Sales Offices & Reps

CT	Stratford, Gerald Rosen	203-375-5456
MA	Framingham, Gerald Rosen	617-879-5505
NH	Hollis, Gerald Rosen	603-465-7902
NY	Rochester, J. W. Welch	716-244-1100
NY	Utica, J. W. Welch	716-244-1100
OK	Oklahoma City, MGR Elctrns.	918-366-0125
TX	Dallas, MGR Elctrns.	214-349-9940

APPLETON PAPERS INC., P.O. Box 359, Appleton, WI 54912, Tel: 414-734-9841; Empl.: 3,500; *Sls. Mgr.:* Doug Adams .... **D•1059**

APPLIED CIRCUITS, INC., 36-06 43rd. Ave., Long Island City, NY 11101, Tel: 212-786-7200; Empl.: 20

APPLIED CIRCUIT TECHNLG. (ACT), 2931 La Jolla St., Anaheim, CA 92806, Tel: 714-632-9230; *Sls. Mgr.:* Hank Pselos

APPLIED COMMUNICATIONS, Amstar Tech. Prods. Co., 5490 Spectrum Drive, Frederick, MD 21701, Tel: 301-694-5300, TWX: 710-828-9706; Empl.: 150; *Sls. Mgr.:* Joseph Rock

APPLIED COMMUNICATIONS, 9125 Gaither Rd., Gaithersburg, MD 20877, Tel: 301-948-5210, TWX: 701-828-9706; Empl.: 200; *Sls. Mgr.:* Joseph Rock

APPLIED CONTROL, 1275 Bloomfield Ave., Fairfield, NJ 07006-2828, Tel: 201-227-5454; FSC No.: 4A725; Empl.: 26; *Sls. Mgr.:* Monica E. Merel

APPLIED DATA COMMUNICATIONS, 14272 Chambers Rd., Tustin, CA 92680, Tel: 714-731-9000; Empl.: 75

APPLIED DIGITAL DATA SYSTEMS INC., 100 Marcus Blvd., Hauppauge, NY 11787, Tel: 516-231-5400, TWX: 510-227-9886; Empl.: 760; *Sls. Mgr.:* Dennis O'Donnell

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AL	Odenville, Hubert Satterfield	205-629-5939
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CA	San Jose, Rick Schloss	408-274-3304
OR	Eugene, Dennis Ellingsen	503-484-5564
PA	King of Prussia, Joseph McCready	215-527-5921
TX	Richardson, Dwain Lawhon	214-231-2289

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APPLIED INSTRS., INC., 25 Will Place, Brooklyn, NY 11207, Tel: 212-257-0885; *Sls. Mgr.:* I. L. Litty

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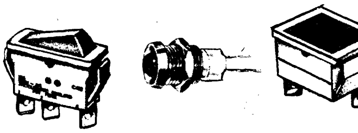

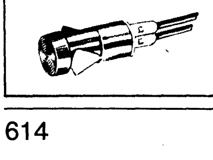

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APPLIED MICRO TECHNLG., A Burr Brown Co., 3669 E. 44th Street, Tucson, AZ 85713, Tel: 602-622-8605, TWX: 910-952-1164; Empl.: 15; *Sls. Mgr.:* Lee Davis

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CO	Aurora, Butler Tech. Sls.	303-343-3787
FL	Orlando, Gramar, Inc.	305-894-3351
MD	Hagerstown, Stinson Assocs., Inc.	301-790-1193
VA	Reston, Stinson Assocs., Inc.	703-620-0088

APPLIED RESEARCH, INC., 160 Dupont St., Plainview, NY 11803, Tel: 516-349-9200; Empl.: 50; *Sls. Mgr.:* S. Klipper .... **A•1702-1703**

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CA	Los Angeles, EBA Microwave	213-822-7510
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MA	Lowell, Russell Engrg.	617-458-7146
NY	Great Neck, Industron Assocs.	516-487-2620

APPLIED RESEARCH LABS, 9545 Wentworth, P.O. Box 129, Sunland, CA 91040, Tel: 818-352-6011, Telex: 673299; Empl.: 300 (USA); *Sls. Mgr.:* Brian Myerscough

APPLIED SOLAR ENERGY CORP., Photosensor Div., 15251 E. Don Julian Rd., City of Industry, CA 91749, Tel: 818-968-6581, TWX: 910-584-4890; Empl.: 160; *Sls. Mgr.:* T. Scott Thorpe

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A P PRODUCTS INCORPORATED, 9450 Pineneedle Dr., Box 540, Mentor, OH 44060, Tel: 216-354-2101, TWX: 810-425-2250; Empl.: 84; *Sls. Mgr.:* Kathy M. Dusa

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APTEK MICROSYSTEMS, 700 N. W. 12th Ave., Deerfield Beach, FL 33441, Tel: 305-421-8450, Telex: 441020; Empl.: 250; *Sls. Mgr.:* Joseph F. Centeno

APTRONICS CORPORATION, 9450 Pineneedle Dr., P.O. Box 270, Mentor, OH 44060, Tel: 216-354-9239, TWX: 810-425-2250; FSC No.: 30146; *Sls. Mgr.:* Phillip F. Fram; *Dist. Mgr.:* Debra L. Kardum

A.P.W. CO., INC., 72 W. Main, Rockaway, NJ 07866, Tel: 201-627-0643; Empl.: 18

AQ SYS., 1736 Front St., Yorktown Hgts., NY 10598, Tel: 800-431-2104; Empl.: 15; *Sls. Mgr.:* Charles E. Fitzsimmons; *Dist. Mgr.:* Charles E. Fitzsimmons

AQUALARM INC., 544 W. 182nd, Gardena, CA 90248, Tel: 213-321-5873

ARCO CABLE, 7361 Ethel Ave., North Hollywood, CA 91605, Tel: 818-982-2832; Empl.: 10; *Sls. Mgr.:* J. R. Parke

ARCO ELCTRNS., 400 Moreland Rd., Commack, NY 11725, Tel: 516-864-7000, TWX: 510-226-0241; FSC No.: 84171; Empl.: 40; *Sls. Mgr.:* Abe Kosakowsky

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CA	Riverside, Material Techniques	714-686-6186
CA	San Jose, Quement Elctrns.	408-998-5900
IL	Rockford, GC Elctrns.	815-968-9661
MA	Needham, YDI Elctrns.	617-449-1005
NJ	Denville, Lashen Elctrns.	201-627-3783
NJ	Springfield, Route Elctrns.	201-379-7710
NY	Bronx, CAM Elctrns.	212-893-8300
NY	New Hyde Park, Electronic City	516-352-7145
OH	Ashtabula, Sesco Sims Elctrns.	216-997-8391
OR	Eugene, Larsco	503-484-7491
PA	Willow Grove, Resco Elctrns.	215-659-4575
TX	Houston, City Elctrns.	713-621-1060

ARC SYSTEMS, INC., 400 Oser Ave., Hauppauge, NY 11788, Tel: 516-231-9261, Telex: 230199 SWIFT UR ARC; *Sls. Mgr.:* Robert Miller

AREMCO PRODS., Box 429, Ossining, NY 10562, Tel: 914-762-0685, Telex: 13-7442; Empl.: 30; *Sls. Mgr.:* Mark Wandzilak

A.R.F. PRODS., 2559 75th St., Boulder, CO 80301, Tel: 303-443-4844, TWX: 910-940-3446; Empl.: 65; *Sls. Mgr.:* R. C. Lloyd, Jr.

ARGA CONTROLS, 35 E. Glenarm St., Pasadena, CA 91105, Tel: 213-682-3314; FSC No.: 50290; Empl.: 20; *Sls. Mgr.:* Linda Galman

Local Sales Offices & Reps

AZ	Phoenix, P. T. L. Electrns., Inc.	602-892-9329
CA	Santa Ana, Brooks-Moore & Assocs.	714-544-8900
MN	Minneapolis, Marsh Sls.	612-729-9345
MO	St. Louis, Engineering Svcs. Co.	314-997-1515

ARGENT ELCTRNS., 3245 S. County Rd., 25A, Troy, OH 45373, Tel: 513-335-0031; FSC No.: 55901; Empl.: 20; *Sls. Mgr.:* W. Zickafoose

ARGOS PRODS., 600 S. Sycamore St., Genoa, IL 60135, Tel: 815-784-5118; Empl.: 50; *Sls. Mgr.:* Ron Evers

Local Sales Offices & Reps

CA	Burlingame, Meyer, Ross & Fleming	415-348-6800
CA	Culver City, W. Alderson	213-837-1398
FL	Ocala, Bencsik Assoc.	904-732-9775
GA	Atlanta, Murphy & Cota	404-875-2525
IL	Chicago, G. McI. Cole	312-774-3535
IN	Mulberry, Maish Sls.	317-296-2322
MA	North Scituate, W.A. Hendrickson	617-545-0652
MI	Pontiac, Ted Firaneck Sls.	313-373-9595
MN	Edina, Foster Tech. Sls.	612-941-9800
MO	Kansas City, Nevco	816-421-1751
NJ	Fort Lee, TMC Sls.	201-944-5665
NY	Syracuse, Lewis & Dunnigan	315-446-5522
OH	Dayton, Shamrock Elctrn	513-258-1227
PA	Wynnewood, Stinson Assocs.	215-896-7378
TX	Houston, Peregrine Southwest	713-772-6765
WA	Lynnwood, Pacnor Mktg.	206-284-8020
EXP	N.Y., New York, Roburn Agencies	212-989-5939

ARGO TRANSDATA CORP., Box 554, Clinton, CT 06413, Tel: 203-669-2233; Empl.: 15

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ARIES ELCTRNS., Box 130, Frenchtown, NJ 08825, Tel: 201-996-6841, TWX: 510-235-3391; FSC No.: 51167; Empl.: 110; *Sls. Mgr.:* Frank Folmsbee ... **C•1155-1158**

Local Sales Offices & Reps

AL	Huntsville, CSR	205-533-2444
AZ	Glendale, Adtek, Inc.	602-931-9289
CA	Los Angeles, Universal Comp.	213-641-4255
CA	Santa Clara, Nova-Tronix	408-727-9530
CO	Aurora, Mountain View Mktg.	303-360-9641
CT	Canton, Bell Controls	203-693-8926
FL	Altamonte Springs, APM Assocs.	305-869-6831
FL	Ft Lauderdale, APM Assocs.	305-565-0056
FL	Tampa, APM Assocs.	813-886-2457
GA	Atlanta, CSR	404-396-3720
IL	Elk Grove Village, Carlson Sls. Assocs.	312-956-8240
IN	Indianapolis, J and W Sls.	317-842-3740
IA	Cedar Rapids, Carlson Sls. Assocs.	319-377-6341
KS	Gladstone, Delltron Co.	816-436-6445
MD	Lutherville, J. A. Dougherty Sls.	301-321-7890
MI	Jenison, OBE, Inc.	616-457-9300

MI	St. Joseph, OBE, Inc.	616-429-7788
MI	W. Bloomfield, OBE, Inc.	313-332-4900
MN	Sweet Lake Park, Holmgren Assocs.	612-786-7641
MO	Gladstone, Delltron Co.	816-436-6445
MO	St. Louis, Delltron Co.	314-869-4779
NH	Nashua, Bell Controls	603-882-6984
NJ	Ho-Ho-Kus, DJ Fisher Co.	201-652-0090
NM	Albuquerque, Varigon Assocs.	505-344-5503
NY	Fairport, TAC Sls., Inc.	716-425-1070
NC	Matthews, CSR	704-847-1927
NC	Raleigh, CSR	919-878-9200
OH	Akron, Augnat Assocs.	216-273-1211
OH	Cincinnati, Augnat Assocs.	513-791-6720
OH	Dayton, Augnat Assocs.	513-298-1507
OH	Mansfield, Augnat Assocs.	419-526-1488
OK	Tulsa, Rem-Air Comps.	918-742-2559
OR	Forest Grove, Doran Sls. Assocs.	503-357-3333
PA	Harleysville, Thomas Jackson Assocs.	215-643-5560
PA	Harrison City, Augnat Assocs.	412-281-8283
SC	Matthews, CSR	704-847-1927
TX	Dallas, Rem-Air Comps.	214-234-1069
UT	Murray, Mountain View Mktg.	801-261-4867
WA	Greenacres, Doran Sls. Assocs.	509-922-2317
WA	Redmond, Doran Sls. Assocs.	206-885-1885
WI	Milwaukee, Carlson Sls. Assocs.	414-476-2790

Local Distributors

AL	Huntsville, Comp. Dist.	205-883-7501
AL	Huntsville, Resisticap	205-883-4270
AZ	Phoenix, Arizona Comps.	602-269-5655
AZ	Scottsdale, Com-Tech	602-948-3330
AZ	Tempe, Circuit Specialists	602-966-2878
AZ	Tucson, Southwest Sls.	602-628-1613
AR	Little Rock, Component Distrs.	501-227-6278
CA	Canoga Park, Tim-Co	818-992-5040
CA	Fullerton, Pyramid Elctrns.	213-691-0561
CA	Gardena, Cal. Switch & Signal	213-770-2330
CA	Santa Clara, Peters De-Laet	408-727-9440
CA	Santa Clara, Pyramid Elctrns.	408-727-9810
CA	Sunnyvale, Sierra West	408-946-6044
CO	Englewood, Industrial Elctrns.	303-694-9444
CT	Danbury, Pilgrim Elec.	203-792-7274
CT	Norwalk, Cobra Comps.	203-847-6442
CT	Wallingford, Cronin	203-265-3134
FL	Ft. Lauderdale, Comp. Distr.	305-971-4950
FL	Ft. Lauderdale, KSM	305-971-5900
GA	Atlanta, KSM Elec.	800-554-9227,404-458-2013
GA	Norcross, CDI	404-441-3320
IL	Elk Grove Village, Ragon	312-595-6633
IL	Northbrook, Classic Comps. Supp.	312-272-9650
IN	Indianapolis, Classic	317-872-4777
IN	Indianapolis, Meunier Elctrn. Supp.	317-635-3511
LA	Lafayette, Ralph's	318-234-4507
MD	Baltimore, A S I Elctrns.	301-265-5100
MA	Burlington, OPL Elctrns.	617-229-2424
MA	Middleboro, Glynn Elctrns.	617-947-4262
MA	Wilmington, Cronin Elctrns.	617-449-5000, 800-225-4501
MA	Woburn, Electronic Pkg. Comps.	617-935-0400
MI	Grand Rapids, Calder	616-698-7400
MI	Grand Rapids, T & W Elctrns.	616-241-3645
MN	Hopkins, The Joel Co.	612-935-6202
MO	Valley Park, Beckwith Computer Elctrns.	314-825-2237
NH	Salem, Cronin	603-898-4440
NH	Salem, Glynn	603-893-8313
NM	Albuquerque, Intl. Elctrns.	505-345-8120
NY	Rochester, Simcona Elctrns.	716-328-3230
NC	Cary, Powell Elctrns.	919-467-1212
NC	Raleigh, Comp. Distrs.	919-834-9465
OH	Columbus, Wedemeyer Elec. Supp.	614-436-9600
OH	Dayton, Stotts-Friedman	513-298-5555
OH	Middleburg Hts., Selectronics	216-243-9500
OH	Warren, REM Elctrns.	216-373-1300
OK	Tulsa, The Altair Co.	918-252-5781
OR	Corvallis, Electronic Superstore	503-757-1800
OR	Portland, Carlyle	503-244-1375
PA	Erie, REM Elctrns.	814-453-5626
PA	McKeesport, Barno Radio	412-751-5966
PA	Philadelphia, Shap Elctrns.	215-969-3300
TX	Addison, Connec-Tek	214-733-4411
TX	Arlington, Bell Comp. Sls.	817-461-5303
TX	Austin, Quality/Comps.	512-835-0220
TX	El Paso, Intl. Elctrns.	915-598-3406
TX	Fort Worth, Indl. Elctrns.	817-731-7321
TX	Houston, Ralph's	713-748-4902
TX	Richardson, Air Quip Sls.	214-234-3285
UT	Salt Lake City, Wintronics	801-483-1882
VA	Falls Church, Comp. Dist.	703-533-3500
WA	Kent, Pyramid Elctrns.	206-872-5800
WA	Seattle, Carlyle Wire & Cable	206-575-6750
WA	Seattle, Pacific Elctrns	206-575-1050
WI	Mequon, Taylor	414-241-4321
WI	New Berlin, Classic	414-786-5300
Can	Montreal, Tech-Rep	514-337-6046

ARISTO GRID LAMP PRODS., 65 Harbor Rd., Port Washington, NY 11050, Tel: 516-944-3030; Empl.: 21

ARK ELCTRNS. CORP., 1325 Industrial Hwy., Southampton, PA 18966, Tel: 215-322-6510; *Sls. Mgr.:* S. Kalos

Local Sales Offices & Reps

FL	St. Petersburg, Tech-Rep Assocs., Inc.	813-577-2779
WA	Monroe, Envirotest, Inc.	206-794-6640
Can	Ottawa, Giga-Tron Assocs., LTD	613-225-4090

ARMIGER & ASSOCS., INC., Daniel Woodhead, Inc., 2525 Ridgmar Blvd., Fort Worth, TX 76116, Tel: 817-737-2900; *Sls. Mgr.:* Dave Forcey; *Dist. Mgr.:* Dave Forcey

ARK-LES, 51 Water St., Watertown, MA 02172, Tel: 617-924-2330, Telex: 92-2441; Empl.: 700; *Sls. Mgr.:* Stephen Glorioso

ARMEL ELCTRNS., 1601 75th St., N. Bergen, NJ 07047, Tel: 201-869-4201, TWX: 710-992-8842; FSC No.: 91663; Empl.: 55; *Sls. Mgr.:* V. A. Pasqualino

ARMSTRONG WORLD INDS., W. Liberty St., Lancaster, PA 17604, Tel: 717-397-0611, TWX: 717-560-4405; Empl.: 24,000

ARMTEC INDUSTRIES, INC., Daven Components Grp., Manchester Airport, Manchester, NH 03103, Tel: 603-669-0940, TWX: 710-220-1747; FSC No.: 58880; Empl.: 400; *Sls. Mgr.:* Andy Walton **B•1502**

Local Sales Offices & Reps

AZ	Tempe, Trembly Assocs.	602-967-2058
CA	Fullerton, Groh Assocs.	714-738-7105
CA	Santa Clara, Fischer Assocs.	408-733-7350
CO	Lakewood, Trembly Assocs.	303-233-9544
FL	Melbourne, Reynolds & Assocs.	305-259-7000
IL	Northfield, Imex	312-446-8934
IN	Ft. Wayne, J&B Engrg. Sls.	219-483-2813
KS	Shawnee Mission, Technical Sls.	913-888-3330
MA	Norwood, MPS Elctrns.	617-769-8700
MN	Minneapolis, R-J, Inc.	612-866-3661
MO	St. Louis, Technical Sls.	314-725-5361
NV	Las Vegas, Trembly Assocs.	702-739-9770
NJ	New Providence, Al Robinson Assocs.	201-464-4812
NM	Albuquerque, Trembly Assocs.	505-266-8616
NY	Clarence Center, Nu-Tekneex, Inc.	716-741-9138
NY	Guilderland, Nu-Tekneex, Inc.	518-355-1829
NY	Lynbrook, HLJ Comp-Tech	516-599-2999
NC	Burlington, P. J. Nahser	919-226-8053
OH	Englewood, Allen Nace Co.	513-836-0931
OH	Richfield, Allen Nace Co.	216-659-7178
OR	Portland, Comp. Technlg., Inc.	503-292-1518
PA	King of Prussia, Freedman-Malta Assocs.	215-337-9211
TX	Dallas, Oeler & Menelaides	214-361-8876
TX	Houston, Oeler & Menelaides	713-772-0730
UT	Salt Lake City, Trembly Assocs.	801-486-5292
WA	Seattle, Comp. Technlg., Inc.	206-789-4555
EXP	NY, New York, Lothar Sanford Corp.	212-757-3881

ARNOLD ENGINEERING COMPANY, Subsidiary Allegheny International, 300 West Street, Marengo, IL 60152, Tel: 815-568-2000, Telex: 25-7448, TWX: 910-642-2790; Empl.: 600; *Sls. Mgr.:* M. C. Johnson

ARNOLD MAGNETICS

ARNOLD MAGNETICS, 11520 W. Jefferson Blvd., Culver City, CA 90230, Tel: 213-390-3537/8837, TWX: 910-343-6468; FSC No.: 04879; Empl.: 130; *Sls. Mgr.:* Joel Zillman; *Dist. Mgr.:* Joel Zillman **D•1508-1511**

Local Sales Offices & Reps

AZ	Pheonix, Arnold Magnetics Corp.	800-421-8181
CA	Los Altos, Kolm Mktg. Assocs.	415-948-2635
CO	Denvor, Arnold Magnetics Corp.	800-421-8181
CT	Danbury, Power Assocs.	203-354-6505
FL	Melborne, Reynolds & Assocs.	305-259-7000
GA	Atlanta, Arnold Magnetics Corp.	800-421-8181
MD	Silver Springs, Youth Assocs.	301-321-6623
MA	Chelmsford, Power Assocs.	617-251-8756
MN	Minneapolis, Arnold Magnetics Corp.	800-421-8181
NY	New Rochelle, Ascor Elctrns.	914-235-8838
OK	Tulsa, Spectra Sls. Corp.	218-663-7188
OR	Portland, Arnold Magnetics Corp.	800-421-8181
TX	Houston, Spectra Sls.	713-747-2798
TX	Richardson, Spectra Sls.	214-234-3600
WA	Seattle, Arnold Magnetics Corp.	800-421-8181
Can	Montreal, Que., Arnold Magnetics Corp.	800-421-8181

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Local Sales Offices & Reps

AL	Huntsville, Beacon Elctrns. Assoc.	205-881-5031
AZ	Tempe, Sys. Sls. of Arizona, Inc.	602-829-9338
AR	Little Rock, Beacon Elctrns. Assoc.	501-224-5449
CA	Cupertino, Aromat Corp.	408-446-5000
CA	Garden Grove, Aromat Corp.	714-895-7707
CA	Garden Grove, Elsco	213-533-1255
CA	Santa Clara, Westrep	408-988-8833
CO	Englewood, Omega Ltd.	303-762-1921
CT	Madison, United Comps.	203-245-4810
FL	Maitland, EIR, Inc.	305-660-9600
FL	Orlando, Aromat Corp.	305-855-1075
GA	Atlanta, Beacon Elctrns. Assoc.	404-256-9640
IL	Elk Grove Village, Aromat Corp.	312-593-8535
IL	Elk Grove Village, Carlson Elctrn. Sls.	312-956-8240
IN	Indianapolis, J & W Sls. Co.	317-842-3740
IA	Cedar Rapids, Carlson Elctrn. Sls.	319-377-6341
MD	Pikesville, Imagitron Sls.	301-521-2020
MA	Gilman, United Comps.	203-889-4050
MA	Norwood, United Comps.	617-226-0556
MI	Grand Rapids, R. P. Urban & Assocs.	616-245-0511
MI	Redford, R. P. Urban & Assocs.	313-535-2355
MN	Bloomington, Northport Engrg.	612-854-5556
NJ	Hackensack, Meg Elctrn. Sls.	201-489-7700
NJ	Mountainside, Aromat Corp.	201-232-4260
NM	Albuquerque, SSA Inc. of New Mexico	505-881-8877
NY	Binghamton, Rochester Comps.	607-772-9292
NY	W. Henrietta, Rochester Comp.	716-546-4766
NC	Raleigh, Beacon Elctrns. Assoc.	919-787-0330
OH	Cleveland, J. R. Thornberry Co.	216-321-3328
OH	Kettering, J. R. Thornberry Co.	513-258-1863
OK	Tulsa, Advanced Tech. Sls.	918-664-0482
PA	Pittsburgh, Covert & Newman Co.	412-531-2002
TX	Austin, C. R. Colvin & Assocs.	512-474-8698
TX	Dallas, Advanced Tech. Sls.	214-340-1300
TX	Houston, C. R. Colvin & Assocs.	713-961-1262
TX	Richardson, Aromat Corp.	214-235-0415
UT	Salt Lake City, Omega, Ltd.	801-277-8061
WA	Bellevue, Sls. & Engrg.	206-883-4999
WA	Vancouver, Sls. & Engrg.	206-573-5161
WI	Milwaukee, Carlson Elctrn. Sls.	414-476-2790
Can	Mississauga, Ont., Aromat Canada, Inc.	416-624-7777
Can	Mississauga, Ont., Tech-Rep Elctrns., Ltd.	416-890-2903
Can	Richmond, B.C., Deskin Sls. Corp.	604-922-5036
Can	St. Laurent, Que., Tech-Rep Elctrns., Ltd.	514-337-6046

Local Distributors

AL	Huntsville, Contact Elctrns.	205-881-9321
AZ	Phoenix, Acacia Sls., Inc.	602-882-9054
AZ	Tempe, Bell Inds.	602-966-7800
AZ	Tempe, J. C. Intl.	602-968-0893
CA	Chatsworth, Mil-Com Dist.	213-998-3111
CA	Mountain View, U.S.I.	415-969-5420
CA	San Diego, Acacia Sls., Inc.	619-565-4365
CA	Santa Clara, Patane Selectronics	408-496-6151
CA	Santa Monica, Master Distrs.	213-452-1229
CA	Sunnyvale, Acacia Sls., Inc.	408-745-7200
CA	Sunnyvale, Bell Inds.	408-734-8570
CA	Van Nuys, Patane Avionics	213-988-4455, 213-873-5541
CO	Englewood, Industrial Elctrns.	303-694-9444
CT	Naugatuck, SCR Elec. Co.	203-729-8274
CT	Wallingford, Cronin Elctrns.	203-265-3134
FL	Ft. Lauderdale, Dielco	304-973-8700
IL	Elk Grove, R. M. Elctrns.	312-364-6622
IL	Mt. Prospect, Magnuson Elctrns.	312-956-0700
IN	Indianapolis, Magnuson Elctrns.	317-247-5108
IN	Indianapolis, R. M. Elctrns.	317-291-7110
IA	Cedar Rapids, Ragon Elctrns.	319-393-4093
KS	Derby, Ragon Elctrns.	816-254-3410
MA	Canton, Impact Sls. Co.	617-821-1500
MA	Middleboro, Glynn Elctrns.	617-947-4262
MA	Needham, Cronin Elctrns.	617-449-5000
MI	Grand Rapids, R. M. Elctrns.	616-531-9300

MN	Hopkins, Joel Co.	612-935-6202
MN	St. Paul, Ragon Elctrns.	612-642-2828
MO	Hazelwood, Ragon Elctrns.	314-524-4138
MO	Independence, Ragon Elctrns.	816-254-3410
NJ	Bellmawr, Mid-Atlantic Elctrns. Corp.	609-931-5303, 215-923-6868
NJ	Fair Lawn, Relay Specialties	201-797-3313
NJ	Plainfield, Mars Elctrns.	201-757-4332
NM	Albuquerque, Bell Inds.	505-292-2700
NY	Buffalo, Summit Distrs.	716-884-3450
NY	Hauppauge, Jaco Elctrns.	516-273-5500
NY	Lynbrook, Peerless Radio Corp.	516-593-2121, 212-523-3456
NY	Millbrook, Villarreal Elctrns.	914-677-3447
NY	Mt. Vernon, QAR Indl. Elctrn. Sls.	914-699-2224
NY	Rochester, Masline Elctrns.	716-546-5373
NY	Rome, Rome Elctrns.	315-337-5400
NC	Charlotte, Dixie Elctrns.	704-377-5413
NC	Charlotte, Elctrns. Mktg. Corp.	704-394-6195
NC	Hickory, Dixie Elctrns.	704-328-2646
NC	Winston-Salem, Dixie Elctrns.	919-724-5961
OH	Columbus, Elctrns. Mktg. Corp. (EMC)	614-299-4161
OH	Highland Heights, Elctrns. Mktg. Corp. (EMC)	216-442-3441
OH	Kettering, Elctrns. Mktg. Corp. (EMC)	513-439-4711
OK	Tulsa, Norvell Elctrns.	918-254-8606
OR	Beaverton, Acacia Sls., Inc.	503-646-3377
OR	Portland, P&R Inds.	503-641-9525
PA	Harrisburg, Advacom	717-545-5674
PA	Horsham, Pioneer/Del. Vall.	215-674-4000
PA	McKean, Advacom	814-476-7774
PA	Wayne, Peak Elctrns.	215-293-9000
RI	Pawtucket, Major/Edwards	401-725-7400
SC	Charleston, Dixie Elctrns.	803-554-7515
SC	Columbia, Dixie Elctrns.	803-779-5332
SC	Greenville, Dixie Elctrns.	803-297-1437
TN	Gray, Dixie Elctrns.	615-477-3838
TN	Knoxville, Dixie Elctrns.	615-938-4131
TX	Austin, Norvell Elctrns.	512-458-8106
TX	Austin, Southwest Elctrns.	512-837-8971
TX	Dallas, Computer Comps. Corp.	214-239-0271
TX	Dallas, Norvell Elctrns.	214-233-0020
TX	Houston, Norvell Elctrns.	713-777-1666
TX	Richardson, Southwest Elctrns.	214-234-3050
TX	Stafford, Southwest Elctrns.	713-491-4900
UT	Salt Lake City, Bell Inds.	801-972-6969
VA	Roanoke, Mexitronics Corp.	703-342-4444
WA	Bellevue, Bell Inds.	206-747-1515
WA	Seattle, Pacific Elctrns.	206-575-1050
WI	Mequon, Taylor Elec.	414-241-4321
Can	Richmond, B.C., Deskin Sls. Corp.	604-273-4963
Can	St. Laurent, Que., Tech-Rep Elctrns., Ltd.	514-337-6046

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Local Sales Offices & Reps

AL	Huntsville, Redstone Military Svc.	205-837-6136
AZ	Chandler, Blackhart Assoc.	602-831-2566
CA	Los Angeles, McDougall/McLaughlin	213-477-8556
CA	Mountain View, Mark V Assocs.	415-964-6275
FL	Winter Park, Microwave Mktg.	305-678-2141
IL	Mt. Prospect, Cain & Co.	312-253-3578
IA	Cedar Rapids, Palatine Sls.	319-365-8071
KS	Mission, Palatine Sls.	913-831-0555
KS	Wichita, Palatine Sls.	316-776-0065
MD	Ellicott City, Doss Elctrns.	301-465-1336
MA	Chelmsford, BBC	617-256-6593
MO	Hazelwood, Palatine Sls.	314-839-0800
NY	Great Neck, EAC	516-466-9798
NY	Utica, B D Hummel Co.	315-736-7821
NC	Raleigh, Barker Assoc.	919-851-7841
OH	Dayton, Haacke Co.	513-254-1951
OH	Lancaster, Cain & Co.	614-654-4800
PA	Newtown, SWR Assocs. Corp.	215-356-8550
TX	Garland, TESCO	214-681-1376
WA	Seattle, Datacom Assocs.	206-285-2525

ARRAY TECHNOLOGY, 992 S. Saratoga-Sunnyvale Rd., San Jose, CA 95129, Tel: 408-252-9900; *Sls. Mgr.:* Jim Schenck

ARROW FASTENER, 271 Mayhill St., Saddlebrook, NJ 07662, Tel: 201-843-6900; Empl.: 600

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Local Sales Offices & Reps

AL	Mobile, Hollingsworth & Still	800-241-5712
AZ	Phoenix, Elec-Com	602-967-8643
CA	Fountain Valley, Arrow Hart Div.	714-964-2758
CA	Los Angeles, Arrow Hart Div.	213-588-5251
CA	Palo Alto, Abbot Engrg.	415-968-2265
CO	Englewood, Wescom Mktg.	303-773-0225
CT	Hartford, Arrow Hart Div.	203-249-8471
FL	Ft. Lauderdale, Hollingsworth & Still	305-753-3136
FL	Tampa, Hollingsworth & Still	800-241-5712
GA	Norcross, Hollingsworth & Still	800-241-5712
IL	Wood Dale, Arrow Hart Div.	312-595-7750
IA	Cedar Rapids, Lorenz Sls.	319-377-4666
KS	Overland Park, Lorenz Sls.	913-649-5556
MN	Burnsville, Arrow Hart	612-894-2099
NE	Lincoln, Lorenz Sls.	402-475-4660
NJ	Berlin, Arrow Hart	609-768-9520
NY	Syracuse, Osterman & Assocs.	315-437-7750
NC	Kernersville, Hollingsworth & Still	800-241-5712
OH	Mason, Arrow Hart	513-398-0156
OK	Tulsa, Genzel Sls. Assocs.	918-622-7744
PA	Willow Grove, Arrow Hart Div.	215-659-3728
TX	Richardson, Arrow Hart Div.	214-644-6210
UT	Salt Lake City, Wescom Mktg.	801-466-9594

Local Distributors

AL	Muscle Shoals, Jones Elctrns.	205-383-1241
AZ	Phoenix, Be Switched	602-275-4805
AZ	Tempe, Fisher/Brownell	602-967-1464
AR	Little Rock, Carlton-Bates Co.	501-562-9100
CA	Alhambra, Fisher/Brownell	213-289-0255
CA	Commerce, Electro Comps.	213-727-0200
CA	Covina, Selecta Switch	213-967-4123
CA	Gardena, California Switch & Signal	213-770-2330
CA	Hayward, Electro Comps.	
CA	Los Angeles, Electric Switches	213-660-1310
CA	Sacramento, Integrated Elctrns.	916-424-5297
CA	San Diego, Fisher/Brownell	714-560-8545
CA	San Francisco, Zack Elctrns.	408-626-1444
CA	San Jose, Consolidated Parts	408-263-9521
CA	San Jose, Cypress Elctrns.	408-945-8400
CA	San Leandro, Electro Comps.	415-352-5210
CA	Santa Clara, Fisher/Brownell	408-988-6041
CA	Santa Fe Springs, Eurton Elec.	213-946-4477
CA	Santa Monica, Master Distr.	213-452-1229
CA	Tustin, Western Switches & Control	714-731-4333
CO	Arvada, Denver Wintronics	303-934-2406
CO	Denver, Consolidated Parts	303-623-5313
CO	Denver, CISD	303-534-6121
CO	Denver, Fistells Elctrn. Supp.	303-244-4691
CO	Denver, Star for Parts	303-623-4224
CT	Shelton, Century Elec. Sys.	203-736-2684
CT	West Hartford, Gal Elec.	203-232-9880
FL	Ft. Lauderdale, Peerless Radio	305-973-4141
FL	Jacksonville, Ace Elec. Supp.	904-398-9857
FL	Miami, Electrn. Equip.	305-871-3500
FL	Ovieda, Dixie Sls.	
FL	Sarasota, Workman Elctrn.	813-371-4242
FL	Tampa, Dow Elctrns.	813-365-3393
GA	Atlanta, A-C Equip.	404-451-2747
GA	Atlanta, Ack Radio Supp.	404-351-6340
HI	Honolulu, Honolulu Elctrns.	808-949-5564
IL	Addison, LComp Chicago	312-628-1400
IL	Chicago, Newark Elctrns.	312-638-4411
IL	Chicago, Revere Elec. Supp.	312-738-3636
IL	Palatine, OHM Elctrns.	312-359-5500
IL	Rockford, G. C. Elctrns.	815-968-9661
IL	Wood Dale, Electro Kinetics	312-595-6700
IN	East Chicago, Acro Elctrns.	219-397-8681
IN	Evansville, Hutch & Son	812-425-7201
IN	Indianapolis, Graham Elctrns.	317-634-8202
LA	Lafayette, Ralph's Elctrns.	318-233-0105
LA	New Orleans, William B. Allen	504-525-8222
LA	Shreveport, Ind. Elctrns.	318-222-9459
MD	Bethesda, Empire Elec. Sys.	301-656-3300
MD	Rockville, Capital Radio Whlsrs.	301-881-2270
MA	Allston, Hilco Elec. Supp.	617-783-2600
MA	Billerica, A. W. Mayer Co.	617-229-2255
MA	Hingham, Sager Elctrl.	617-749-6700
MI	Grand Rapids, S-F Elctrn. Sys.	616-459-0216
MI	Livonia, Pioneer Michigan	313-525-1800
MI	Livonia, RS Elctrns.	313-525-1155
MI	St. Clair Shores, SPEMCO	313-771-2700
MN	Minneapolis, Sterling Elec.	612-332-4571
MN	St. Paul, Gopher Elctrns. Co.	612-483-4450
MS	Jackson, Ellington Elctrns.	601-355-0561
MO	Kansas City, LComp	816-221-2400
MO	Maryland Heights, LComp	314-291-6200
NE	Lincoln, Scott Elctrns.	402-466-8221
NH	Nashua, Brevan Elctrns.	
NJ	Camden, General Radio Sys. Co.	609-964-8560
NJ	East Hanover, State Elctrn. Parts	201-887-2550
NJ	Edison, Brownell Electro	
NJ	Manasquan, Heiman H. Smith	201-223-9400
NJ	Prospect Park, Kappe	201-790-1999
NM	Albuquerque, Walker Radio	505-247-2288
NY	Binghamton, Florance Elec. Sys.	607-724-2455
NY	Buffalo, Genesee Radio & Parts	716-873-9661
NY	Buffalo, Summit Distrs.	716-884-3450
NY	Farmingdale, S.A.I.	516-293-2710
NY	Hempstead, Electronic Equip.	516-538-5510
NY	Lynbrook, Peerless Radio Corp.	516-593-2121
NY	Rochester, Rochester Radio Sys.	716-454-7800
NY	Woodside, Switches Unltd.	212-478-5000
NC	Winston-Salem, Kirkman Elctrns.	919-722-9131
OH	Cincinnati, Hughes-Peters	513-351-2000
OH	Cleveland, Midland Elec.	216-248-3800
OH	Cleveland, Pioneer/Cleveland	216-587-3600
OH	Columbus, Hughes-Peters	614-294-5351
OH	Dayton, Esco	513-226-1133
OH	Dayton, Pioneer/Dayton	513-236-9900
OR	Portland, Johnstone Corp.	503-231-4833
PA	Philadelphia, Philadelphia Elctrns.	215-568-7444
RI	Providence, W. M. Dandreta	401-861-2800
TN	Memphis, Bluff City Elctrns.	901-345-9500
TN	Nashville, Carlton-Bates	615-244-3562
TN	Nashville, Randolph & Rice	615-255-5602
TX	Austin, Harrison Equip.	512-458-3555
TX	Dallas, Associated Aircraft	214-331-4381
TX	Dallas, Harrison Equip.	214-239-2750
TX	Dallas, Wilkinson Bros.	214-941-9963
TX	El Paso, Midland Specialty	915-533-9555
TX	Ft. Worth, Allied Elctrns.	817-336-5401
TX	Garland, Newark Elctrns.	214-494-5911
TX	Houston, Harrison Equip.	713-879-2600
TX	Lubbock, Texas Elctrn. Sys. Corp.	806-765-8456
TX	Richardson, Fisher/Brownell	214-235-3177
TX	San Antonio, Sherman Elctrns.	512-224-1004
UT	Salt Lake City, Standard Supp.	801-486-3371
VA	Charlottesville, Virginia Radio Sys.	804-296-4184
VA	Richmond, Sterling Elctrns.	804-226-2190
WA	Bellevue, Bell Ind.	206-747-1515
WA	Bellevue, Integrated/Jaco	206-455-2727
WA	Seattle, Radar Elec.	206-282-2511
WI	Mequon, Taylor Elec. Co.	414-241-4321

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Local Sales Offices & Reps

CA	Mountain View, Marguez & Assocs.	415-966-1012
CA	Orange, S & A Tech. Sls.	714-567-3270
CA	San Diego, S & A Tech. Sls.	619-560-1888
CO	Broomfield, Ramark Assccs.	303-466-6168
GA	Atlanta, Electro Sls.	404-394-1122
IL	Arlington Heights, M. J. Peterson & Assocs., Ltd.	312-577-8200
IN	Noblesville, KW Elctrn. Sls., Inc.	317-773-5536
KY	Louisville, KW Electronic Sales, Inc.	502-451-1860
MA	Advanced Design Grp.	617-279-0216
MI	Novi, Lektronics Sales	313-349-3304
MN	Minneapolis, Berndt Assoc.	612-546-2021
NY	Bayside, John Kavanagh	212-229-2731
NC	Greensboro, KZJ Component Sales	919-852-5990
OH	Dayton, KW Elctrn. Sls., Inc.	513-890-2150
OH	Shaker Heights, KW Elctrn. Sls., Inc.	216-491-9177
OH	Worthington, KW Elctrn. Sls., Inc.	614-888-0483
PA	Allison Park, KW Elctrns. Sls., Inc.	412-487-4300
PA	Philadelphia, Check Assocs., Inc.	215-487-3007
TN	Chattanooga, Electro Sls., Inc.	615-267-4260
TX	Arlington, Comptech Sls.	817-265-6007
TX	Austin, Comptech Sls.	512-331-8922
TX	Houston, Comptech Sls.	713-491-6695

Local Distributors

NC	Raleigh, Century Elctrns.	919-872-2203
PA	Norristown, Century Elctrns.	215-631-5400

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CA	Haywards, Allied Elctrns., Inc.	415-487-5250
IL	Elgin, Allied Elctrns., Inc.	312-697-8200
NJ	Fair Lawn, Relay Specialties	800-526-5376
NY	Rochester, Simcona Elctrns. Corp.	716-328-3230
OH	Euclid, Rockford Controls Ohio, Inc.	216-731-5250
PA	Washington Crossing, Riverside Comp. Supp. Co.	215-493-5228
TX	Fort Worth, Allied Elctrns.	817-336-5401

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ASHLAND ELEC. PRODS., 80 39th Street, Brooklyn, NY 11232, Tel: 718-965-0770; Empl.: 115; *Sls. Mgr.:* John J. Conlon

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AL	Huntsville, Raycom, Inc.	205-859-2017
AZ	Scottsdale, Harris and Croy	602-951-9121
AZ	Tucson, Harris & Croy	602-293-5393
CA	Chatsworth, WCV-Raltech, Inc.	818-700-0933
CA	Los Angeles, Wiley Co.	213-666-1611
CA	Palo Alto, Abbott Engrg.	415-968-2265
CA	San Diego, Cerco	619-450-1754
CA	San Diego, Wiley Co.	619-571-2881
CA	Santa Clara, Ross Mktg. Assocs.	408-988-8111
CO	Littleton, Simpson Assocs., Inc.	303-794-8381
CT	Clinton, Selmark Assocs.	203-573-9088
FL	Melbourne, Raycom, Inc.	305-259-7988
FL	Orlando, Raycom, Inc.	305-859-5504
FL	Plantation, Raycom, Inc.	305-741-6690
FL	Wellborn, Raycom, Inc.	904-963-5023
GA	Duluth, Raycom, Inc.	404-446-9015
IL	Schaumburg, Micro-Tex	312-885-1131
IN	Columbus, Technical Reps.	812-376-9226
IN	Indianapolis, Technical Reps., Inc.	317-882-4407
KS	Overland Park, Web Elec.	913-381-7986
MD	Columbia, Delta III Assocs.	301-730-4700
MA	Millis, Selmark Assocs.	617-376-2914
MI	Grand Rapids, Burcaw Co.	313-573-4605
MI	Warren, Burcaw Co.	313-573-4605
MN	St. Paul, Arkco Sls.	612-777-7454
MO	Florissant, WEB Elctrns.	314-921-5720
NH	Hopkinton, Selmark Assocs.	603-746-3299
NJ	Marlton, b.g.r. Assocs.	609-983-1020
NJ	Palmyra, RD Indl. Sls.	609-829-4741
NY	Buffalo, Rudell-Merrifield Assocs.	716-634-4300
NY	Skaneateles, ADN/Rudell-Merrifield	315-685-8991
NC	Raleigh, Raycom, Inc.	919-847-8276
OH	Cleveland, KT/DEPCO	216-442-6200
OH	West Chester, KT/Depco	513-874-0236
OK	Tulsa, Bonser-Philhower Sls.	918-744-9964
OR	Portland, Earl & Brown Co., Inc.	503-245-2283
PA	Harrison City, Rudell-Merrifield Assocs.	412-327-0858
TX	Austin, Bonser-Philhower Sls.	512-346-9186
TX	Houston, Bonser-Philhower Sls.	713-531-4144
TX	Richardson, Bonser-Philhower Sls.	214-234-8438
UT	Midvale, Simpson Assocs., Inc.	801-566-3691
WA	Seattle, Earland Brown Co., Inc.	206-284-1121
WI	Waukesha, Micro-Tex	414-542-5352

Local Distributors

AL	Huntsville, Powell Elctrns.	205-539-2731
AZ	Scottsdale, Hall Elctrns.	602-946-9977
AZ	Tempe, Powell Elctrns.	602-967-7538
CA	Anaheim, DECO Elctrns.	714-630-8252
CA	Chatsworth, Integrated Elctrns./JACO	213-998-2200
CA	Costa Mesa, Powell Elctrns.	714-754-1717
CA	Fullerton, Pyramid/Fullerton	714-773-0781
CA	Fullerton, Young Sls.	714-871-5355
CA	Hollywood, Yale Elctrns.	213-465-3186
CA	San Diego, DECO Elctrns.	619-693-1595
CA	San Jose, Integrated Elctrns.	408-263-1100
CA	San Jose, Powell Elctrns.	408-943-9020
CA	Santa Clara, Pyramid Elctrns.	408-727-9810
CA	Sunnyvale, Target Elctrns., Inc.	408-734-5611
CA	Tustin, Added Value Elec. Distr.	714-730-5848
CO	Denver, Integrated Elctrns., Inc.	303-292-6121
CO	Englewood, Industrial ELctrns., Inc.	303-694-9444
CT	Danbury, Pilgrim Elctrns.	203-792-7274
CT	New Canaan, Impact Sls. Co., Inc.	203-972-1458
CT	Wallingford, Cronin Elctrns., Inc.	203-265-3134
FL	Ft. Lauderdale, Powell Elctrns.	305-979-5606
FL	Melbourne, Eurick Corp.	305-254-8718
FL	Melbourne, Raycom, Inc.	305-259-7988
FL	Pompano Beach, Peerless Radio Corp.	305-973-4141
FL	Tampa, Reptron	813-855-4656
GA	Atlanta, ACK Radio Supp. Co.	404-351-6340
GA	Fayetteville, Frankland, Inc.	404-461-4026
IL	Chicago, Nep Elctrns.	312-625-8400
IL	Hoffman Estates, I.E.C. Intercomp	312-843-2040
IL	Rosemont, Advent Elctrns.	312-297-6200
IN	Indianapolis, Advent Elctrns.	317-872-4910
IA	Cedar Rapids, Advent Elctrns.	319-363-0221
IA	Cedar Rapids, Bergquist Elctrns.	319-366-8733
MD	Beltsville, RESCO/D.C.	301-937-9100
MD	Columbia, Powell Elctrns.	301-621-4070
MD	White Marsh, RESCO/Baltimore	301-529-0500
MA	Canton, Impact Sls. Co., Inc.	617-821-1500
MA	Middleboro, Glynn Elctrns.	617-947-4262
MA	Needham, Cronin Elctrns.	617-449-5000
MA	Westborough, Powell Elctrns.	617-366-6100
MA	Wilmington, J. V. Elctrns.	617-273-4300
MI	Farmington Hills, Advent Elctrns., Inc.	313-477-1650
MI	Grand Rapids, S. F. Elctrns.	616-459-0216
MI	Grand Rapids, T & W Elctrns.	616-241-3645
MI	Lansing, Fulton Radio Supp. Co.	517-394-5020
MI	Livonia, Reptron Elctrns., Inc.	313-525-2700
MI	Westland, Westcomp Elctrns.	313-728-0650
MI	Zealand, Tubergen & Assocs.	616-772-1548
MN	Bloomington, NWR Elctrns.	612-854-7329
MN	Minneapolis, Bergquist	612-835-2322
MN	Minneapolis, Control Design Supp., Inc.	612-721-1628
MO	Kansas City, L Comp	816-221-2400
NH	Salem, Glynn Elctrns.	603-893-8313
NJ	Atlantic Highlands, Freedom Elctrns.	201-872-2300
NJ	Englewood, Powell Elctrns.	201-894-0800
NJ	Rockaway, Tonar Ind.	201-586-9000
NJ	West Berlin, GCI Corp.	609-768-6767
NY	Central Islip, Domino Comp.	516-582-3050
NY	Farmingdale, Addem Sls., Inc.	516-882-0993
NY	Hauppauge, Broadline Elctrns. Distr.	516-231-4100
NY	Lynbrook, Peerless Radio	516-593-2121
NY	Poughkeepsie, Kabelton, Inc.	914-473-1222
NY	Rochester, Simcona	716-328-3230
NY	Suffern, Nobel Elctrns.	914-357-4500
NC	Cary, Powell Elctrns.	919-467-1212
NC	Raleigh, Century Elctrns.	919-872-2203
OH	Akron, Akron Elctrns. Supp. Co.	216-762-8818
OH	Dayton, Related Comps., Inc.	513-253-6116
OH	N. Royalton, Related Comps., Inc.	216-237-7271
OH	Worthington, Reptron Elctrns., Inc.	614-436-6675
OR	Beaverton, Norvac Elctrns.	503-644-1025
OR	Tigard, Integrated Elctrns.	503-639-9661
PA	Export, Advacom/Export	412-733-5400
PA	Harrisburg, Advacom	717-545-5674
PA	McKean, Advacom	814-476-7774
PA	Norristown, Central Elctrns. Comps. Co.	215-631-5400
PA	Philadelphia, Powell Elctrns.	215-365-1900
RI	Warwick, Cal-Greg Comps., Inc.	401-738-6170
TN	Hixson, Techni-Tronics, Inc.	615-842-0514
TX	Irving, Powell Elctrns.	214-258-6841
WA	Bellevue, Powell Elctrns.	206-641-4446
WA	Bellevue, Integrated Elctrns./Jaco	206-455-2727
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Local Sales Offices & Reps

CA	Palo Alto, Mollard Mktg.	415-961-0456
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CO	Lakewood, Technical Mktg.	303-232-1516

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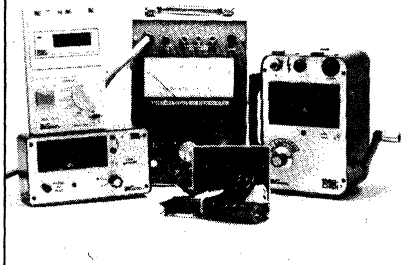

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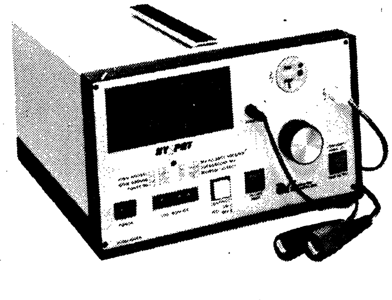

Model 4040a

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FL	Orlando, Datarep	305-843-5224
GA	Marietta, Tanner & Assocs., Inc.	404-952-7773
IL	Columbia, R. L. Weisheimer & Assocs.	618-281-4148
IL	Streamwood, Fortier Testing & Sls.	312-837-5407
LA	Mandeville, Griffith Co., Inc.	504-626-8516
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NY	Buffalo, U. J. Brown	716-839-4232
NC	Charlotte, W. R. Daniel & Assocs.	704-376-8603
OH	Milford, Alexander Equip. Co.	513-248-0901
PA	Pittsburgh, Gateway Equip. Co.	412-795-1315
TN	Knoxville, E-P & Assocs., Inc.	615-966-6131
TX	Houston, E.V. Smith Sls. Co.	713-649-5756
VA	Dumfries, Electra-Tech	703-670-6962
WA	Seattle, Winberg Engr. Sls.	206-523-3370
WI	Appleton, Carl Stracka & Assocs.	414-734-7847

ASSOCIATED SPECIALTIES, 1751 Main St., Orefield, PA 18069, Tel: 215-395-9172; *Sls. Mgr.:* V. Laudenslager; *Dist. Mgr.:* V. Laudenslager

ASSOCIATED SPRING, BARNES GRP., 18 Main St., Bristol, CT 06010, Tel: 203-583-1331, Telex: 962449, TWX: 710-454-0592; Empl.: 1850; *Sls. Mgr.:* R. Hufsmith

ASSOCIATED TESTING LABS., Div. of Kidde, Inc., 53 Second Ave., Burlington, MA 01803, Tel: 617-272-9050; Empl.: 80; *Sls. Mgr.:* Robert H. Croft

ASTEC
A BSR COMPANY

ASTEC USA, LTD., A BSR Intl. Co., 2880 San Tomas Expwy., # 200, Santa Clara, CA 95051, Tel: 408-748-1200, Telex: 4745018 ASTEC UI, TWX: 310-474-5018; *Sls. Mgr.:* Russ Sinagra **D•1512-1514**

Local Sales Offices & Reps

AL	Huntsville, 20th Century Mktg.	205-533-9281
AZ	Phoenix, Compass Mktg. & Sls.	602-996-0635
AZ	Tucson, Compass Mktg. & Sls.	602-293-1220
CA	San Diego, SR Elctrns.	619-560-8330
CA	Santa Clara, Astec (USA) Ltd.	408-748-1200
CA	Santa Clara, I Squared	408-988-3400
CA	Thousand Oaks, SC Cubed	805-496-7307
CA	Tustin, SC Cubed	714-731-9206
CO	Wittleton, Lange Sales Inc.	303-795-3600
PA	Huntingdon Valley, Omega Elctrns. Sls.	215-947-4135
GA	Norcross, 20th Century Mktg.	404-446-1999
IL	Rolling Meadows, Sumer	312-991-8500
IN	Indianapolis, Leslie Devoe	317-842-3245
MA	Burlington, Mill-Bern Assocs.	617-273-1313
MA	Glenburnie, Tri-Mart	301-761-6000
MN	Bloomington, Elctrn. Sls. Agency	612-884-8291
MO	Bridgeton, Centech, Inc.	314-219-4230
NM	Albuquerque, Compass Mktg. & Sls.	505-888-0800
NY	E. Rochester, Tri-Tech Elctrns.	716-385-6500
NY	Elmont, Crane & Egert Corp.	516-872-0800
NY	Jamaica, SJ Assocs.	212-291-3232
OH	Beachwood, Elctrn. Salesmasters	216-831-9555
OK	Tulsa, West Assocs.	918-665-4365
OR	Tigard, Components West, Inc.	503-684-1617
TN	Knottsville, 20th Century Mktg.	615-690-1618
TX	Austin, West Assocs.	512-454-3681
TX	Dallas, West Assocs.	214-248-7060
TX	Houston, West Assocs.	713-777-4108
UT	Salt Lake City, Lang Sls., Inc.	801-487-0843
WA	Bellevue, SDR Squared	206-747-9424
WA	Liberty, Comps. West., Inc.	509-255-6224
WA	Redmond, Comps. West	206-885-5880
WI	Brookfield, Sumer, Inc.	414-784-6641

Local Distributors

CA	Calabasas, Wyle Labs.	213-322-8100,818-880-9000
CA	Irvine, Wyle Labs.	714-863-9953
CA	Rancho Cordova, Wyle Labs.	916-638-5282
CA	San Diego, Wyle Labs.	619-565-9171
CA	Santa Clara, Wyle Labs.	408-727-2500
CO	Phoenix, Wyle Labs.	602-249-2232
CO	Thornton, Wyle Labs.	303-457-9953
OK	Tulsa, Quality Comps.	918-664-8812
OR	Hillsboro, Wyle Labs.	503-640-6000
TX	Addison, Quality Comps.	214-733-4306
TX	Austin, Quality Comps.	512-835-0220
TX	Sugarland, Quality Comps.	713-491-8812, 713-240-2255
UT	Salt Lake City, Wyle Labs.	801-974-9953
WA	Bellevue, Wyle Labs.	206-453-8300

ASTON ELECTRONICS, INC., Aston Electronic Designs, Ltd., 531 North Murlen Rd., Olathe, KS 66062, Tel: 913-782-4007; *Sls. Mgr.:* D. MacClymont

ASTRO CIRCUIT, 100 Hale St., Lowell, MA 01851, Tel: 617-458-3240, TWX: 710-343-0754; Empl.: 220; *Sls. Mgr.:* Don Gingras

ASTROCOM ELECTRONICS, INC., Box 370, Oneonta, NY 13820, Tel: 607-432-1930

ASTRO DYNAMICS, INC., 2 Gill St., Woburn, MA 01801, Tel: 617-935-4944; Empl.: 50

ASTRO-GEO-MARINE, INC., 202 E. Cota St., Santa Barbara, CA 93101, Tel: 805-965-7005; FSC No.: 51473; Empl.: 15

ASTRO INSTRUMENT CORP., 2501 NW 17th Ln., Pompano Beach, FL 33064, Tel: 305-973-8900, TWX: 510-956-9601; FSC No.: 51761; *Sls. Mgr.:* Peter J. Sinatra, Jr.

ASTROLAB INC., 4 Powder Horn Drive, Warren, NJ 07060, Tel: 1-201-560-3800, Telex: 710-991-9713; FSC No.: 16301; Empl.: 36; *Sls. Mgr.:* J. R. Toma

ASTRO-MED, INC., 600 East Greenwich Avenue, W. Warwick, RI 02893, Tel: 401-828-4000, TWX: 710-382-6409; Empl.: 120; *Sls. Mgr.:* Everett V. Pizzuti; *Dist. Mgr.:* Everett V. Pizzuti **D•1402**

ASTRONAUTICS CORPORATION OF AMERICA, P.O. Box 523, Milwaukee, WI 53201-0523, Tel: 414-447-8200, TWX: 910-262-3153; FSC No.: 10138; Empl.: 1,500; *Dist. Mgr.:* L. J. Singleton

ASTRON
CORPORATION

ASTRON CORP., 2852 Walnut # E, Tustin, CA 92680, Tel: 714-832-7770; *Sls. Mgr.:* William Pochirowski; *Dist. Mgr.:* William Pochirowski **D•1515**

Local Distributors

CA	Los Angeles, Henry Radio	213-820-1234
CA	Northridge, Ora Elctrns.	213-701-5848
CA	Sun Valley, Cartwright Comms.	213-768-7744
CO	Aurora, Electro Tech Sls.	303-343-8937
GA	Marrietta, NBC Mktg.	404-424-9097
IL	Joliet, Communications Assoc.	815-744-6444
IL	Joliet, Primus Elctrns.	815-436-8945
MD	Cockleysville, Tessco.	301-252-0860
NJ	Clifton, Meridian Comms.	201-473-1623
OH	Cincinnati, Cartwright Comms.	513-489-1755
TX	Dallas, M. Hutton Co.	214-484-0580

ASTRO PACKAGING, INC., 100 Thomas Road North, Hawthorne, NJ 07507, Tel: 201-423-3000, Telex: 130545; Empl.: 125; *Sls. Mgr.:* Phillip L. Steiner

ASTROSYN AMERICA, 14349 Victory Blvd., Ste. 304, Van Nuys, CA 91401, Tel: 213-785-2197, Telex: 651446; *Sls. Mgr.:* D. F. Dowis; *Dist. Mgr.:* D. F. Dowis

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ASTROSYSTEMS, 6 Nevada Dr., Lake Success, NY 11042, Tel: 516-328-1600, TWX: 510-223-0411; Empl.: 150; *Sls. Mgr.:* Howard Lazarus ... **D•1183, 1517, 1888**

Local Sales Offices & Reps

AL	Huntsville, Kemp Engrg.	205-837-4304
AZ	Mesa, Foxco Equip., Inc.	602-820-8685
AR	El Dorado, Indust. Controls Assoc.	501-862-2051
AR	Searcy, Industrial Controls Assocs.	800-643-1109
CA	Cerritos, Foxco Equip.	213-921-3421
CA	Long Beach, Saber Entprs., Inc.	213-595-5645
CO	Englewood, Dynatech	303-773-2830
DE	Garrison Lake, Broge-Matarese, Inc.	302-653-5005
FL	Melbourne, Reynolds & Assocs.	305-259-7000
GA	Atlanta, Kemp Instrs.	404-452-8050
IL	Elgin, JHS Assocs.	312-741-9070
IN	Mishawaka, Engineered Sls.	219-255-5111
IA	Cedar Rapids, Di-Tronix, Inc.	319-377-8275

KS	Wichita, Di-Tronix, Inc.	316-838-0884
LA	Baton Rouge, Industrial Controls Assocs.	800-643-1109
MA	Ashland, Polytek Assocs., Inc.	617-881-4741
MA	Southborough, Motion Engrg.	617-485-2144
MO	Bridgeton, Di-Tronix, Inc.	314-291-4777
MO	Raytown, Di-Tronix, Inc.	816-365-6340
NY	Cazenovia, D & O Engrg.	315-655-8602
NY	Youngstown, D & O Engrg.	716-745-3915
NC	Charlotte, Jake Rudisill Assoc. Inc.	704-377-6901
OH	Cleveland, Instr. Sys.	216-845-8800
OH	Dayton, Instr. Sys.	513-294-2838
OR	Portland, Frys Controls, Inc.	503-226-2620
PA	Pittsburgh, Instrumentation Sys.	412-823-7005
PA	Warminster, Multi-Measurements	215-675-3082
TN	Memphis, Industrial Controls Assocs.	800-643-1109
TX	Dallas, Data Mktg. Assocs., Inc.	214-661-0330
TX	Fort Worth, Indust. Controls Assoc.	800-643-1109
TX	Houston, Indust. Controls Assoc.	501-862-2051
TX	Humble, Industrial Controls Assocs.	800-643-1109
WA	Bellevue, Fry Controls, Inc.	206-282-9270
WA	Seattle, Datacom & Assocs., Inc.	206-285-2525
WI	Appleton, Bu-Nell Eng. Co.	414-733-4242
WI	Waukesha, Bu-Nell Eng. Co.	414-784-0994
Can	Willowdale, Ont., Arthur Rosenblum Sls.	416-224-1177

ASTRO TOOL CO., INC., 21615 Southwest Tualatin Valley Hwy., Beaverton, OR 97006, Tel: 503-642-9853

AT&T

AT&T, 1 Oak Way, Berkeley Heights, NJ 07922, Tel: 1-800-372-2447; *Sls. Mgr.:* W. R. Sherman

Local Sales Offices & Reps

CA	Los Angeles, AT&T Technlg. Sys.	213-726-5184
CA	Sunnyvale	408-746-2332
CO	Denver	303-538-2406
GA	Atlanta	404-447-6495
IL	Chicago, AT&T Technlg. Sys.	312-494-5190
MA	Burlington	617-229-5672
MN	Minneapolis	612-724-2019
NJ	Berkeley Heights	201-771-2601
PA	King of Prussia, AT&T Technlg. Sys.	215-768-2626

ATC POWER SYSTEMS, INC., 472 Amherst Street, Nashua, NH 03063, Tel: 603-882-1366, Telex: 756779; FSC No.: 61814; Empl.: 26; *Sls. Mgr.:* Wendall Finneault

ATEC, INC., Box 19426, 8219 Kempwood Dr., Houston, TX 77055, Tel: 713-468-7971, Telex: 77-4132 FLEKS HOU; FSC No.: 09552; Empl.: 82; *Sls. Mgr.:* F. Sawberger

A-SYSTEMS INC., 1500 Avon St. Extd., Charlottesville, VA 22901, Tel: 804-295-7200; *Sls. Mgr.:* F. M. Artrip

ATEC SYS., 107 N. Washington St., E. Rochester, NY 14445, Tel: 716-381-4740; Empl.: 6; *Sls. Mgr.:* Harry Turner

ATHENA CONTROLS, INC., 5145 Campus Dr., Whitemarsh Ind. Campus, Plymouth Meeting, PA 19462, Tel: 215-828-2490; Empl.: 85; *Sls. Mgr.:* David A. Tryon; *Dist. Mgr.:* Allen Breckenridge

ATKINS TECH., 3321 S.W. 40th Blvd., Gainesville, FL 32608, Tel: 904-378-5555, Telex: 51-4736-HALA; Empl.: 30; *Sls. Mgr.:* Walter Fitz-William; *Dist. Mgr.:* Walter Fitz-William

ATLANTIC MAGNETICS, INC., 1441 S.W. 30th Ave., Pompano Beach, FL 33061, Tel: 305-979-7920; *Sls. Mgr.:* Edward Cammarata; *Dist. Mgr.:* Scott Thompson

ATLANTIC OPTICAL MOULDING, Ellis St., P.O. Box 309, Dudley, MA 01570, Tel: 617-943-1746; Empl.: 6

ATLANTIC RESEARCH, 5390 Cherokee Ave., Alexandria, VA 22312, Tel: 703-642-4000, Telex: 248893; FSC No.: 95335; Empl.: 2400

ATLANTIC SCIENTIFIC CORP., 2711 S. Harbour City Blvd., Melbourne, FL 32901, Tel: 305-725-8000, Telex: 755959; *Sls. Mgr.:* Murray W. Boggs

ATLANTIC SWITCH CONTROLS, INC., 194 Elliott St., Hartford, CT 06114, Tel: 203-527-7705

ATLANTIC SWITCH CONTROLS, INC., 5 Coliseum Ave., Nashua, NH 03063, Tel: 603-880-1971

ATLAS ENERGY SYS., 9457 Rush St., S. El Monte, CA 91733, Tel: 213-575-0755, TWX: 910-587-3531; Empl.: 35; *Sls. Mgr.:* J. Thompson

ATLAS ENGRG. CORP., 10 Cheney St., Dorchester, MA 02121, Tel: 617-445-7100; FSC No.: 07001; Empl.: 61; *Sls. Mgr.:* Norman Scotch

ATLAS EYELETS, Pinkham St., Fairhaven, MA 02719, Tel: 617-997-9491; *Sls. Mgr.:* Arthur S. Tisch

ATLAS SOUND DIV., 10 Pomeroy Rd., Parsippany, NJ 07054, Tel: 201-887-7800, Telex: 13-6119; Empl.: 350; *Sls. Mgr.:* Paul Grote; *Dist. Mgr.:* David A. Chambers

ATLEE

ATLEE INC., One Gill St., Woburn, MA 01801, Tel: 617-933-3510, Telex: 949407; FSC No.: 99378; Empl.: 40 **B•1229; C•1009, 1684, 1701, 1722**

Local Sales Offices & Reps

CA	Agoura, Cal Rep	213-991-1940
CA	Corte Madera, Paul Oneal Assoc.	415-924-1691
CO	Arvada, Challange Sls.	303-427-3149
FL	Melbourne, R-Rep	305-725-6993
MD	Baltimore, Stitzer Assocs.	301-823-7688
MA	Sharon, Cummings	617-784-5600
MN	St. Paul, Countryman Assoc	612-645-9151
NY	Huntington, C. R. Mayer Co.	516-921-7876
NY	Latham, L-Tron	518-785-5032
NC	Raleigh, B. T. Funderburk	919-782-3493
OH	Cleveland, Techn. Sls. Assocs.	216-461-0826
PA	Paoli, Stitzer Assocs.	215-644-5500
TX	Dallas, Rem-Air Comp. Corp.	214-234-1069

Local Distributors

AZ	Phoenix, EGR	602-840-0320
CA	Northridge, Acort Inds.	213-993-6444
CA	San Jose, Bisco Inds.	408-946-8980
IN	Ft. Wayne, Graham Elec. Supp.	219-423-3422
IA	Cedar Rapids, Deeco	319-365-7551
MA	Winchester, Rush Inds.	617-729-5800
MN	Minneapolis, Aerospace Computer	612-884-4725
NJ	Nutley, Essex Electric	201-661-2600
NJ	Paramus, N.Y. Fastener	201-265-8770
NY	Bayshore, Merrit Fastener	516-242-1800
NY	Bohemia, Car-Lac	516-567-4200
NY	Buffalo, Summit Dist.	716-887-2800
NY	Long Island City, Hardware Specialty	212-361-9393
NY	Plainview, G & B Fasteners	516-694-0990
TX	Dallas, National Precision	214-357-3921
TX	Richardson, Altair Co.	214-231-5166
VA	Charlottesville, Virginia Radio Supp. Co.	804-296-4184

ATMOSPHERE CONTROLS PRODS., 295 Polaris, Mountain View, CA 94043, Tel: 415-969-2640; Empl.: 14; *Sls. Mgr.:* Walter Quave Jr.; *Dist. Mgr.:* W. H. Ellis

ATOMERGIC CHEMETALS CORP., 100 Fairchild Ave., Plainview, NY 11803, Tel: 516-349-8800, Telex: 144612, TWX: 6852289; *Sls. Mgr.:* H. J. Gary

ATR ELCTRNS., INC., P.O. BOX 7008, St. Paul, MN 55107, Tel: 612-738-6520, 414-297-7374 **D•1889**

ATV RESEARCH, INC., 1301 Broadway, Dakota City, NE 68731, Tel: 402-987-3771; *Sls. Mgr.:* Mel Shadbolt

AUBURN MFG., Pease Ave. & Stack St., Middletown, CT 06457, Tel: 203-346-6677; Empl.: 45; *Sls. Mgr.:* Richard Agria

AUDIO EQUIP., Div. W. Kidde & Co., Inc., 706 Forrest St., Charlottesville, VA 22901, Tel: 804-977-8050, TWX: 510-587-5461; Empl.: 50

AUDIOSEARS, South St., Stamford, NY 12167, Tel: 607-652-7305; FSC No.: 97101; Empl.: 140; *Sls. Mgr.:* D. Hartwell

AUDIOSONE, INC., 617 Fan Hill Rd., Monroe, CT 06468, Tel: 203-268-4372, 203-268-6703; *Sls. Mgr.:* Rudolph Duris

AUDIOTRONICS CORP., 7428 Bellaire Ave., N. Hollywood, CA 91605, Tel: 818-765-2645, Telex: 69-1241; Empl.: 300; *Sls. Mgr.:* Roy Schaub

AUDIOVOX CORP., 150 Marcus Blvd., Hauppage, NY 11787

AUGAT INTERCONNECTION SYSTEMS

AUGAT INC., 33 Perry Ave., Box 779, Attleboro, MA 02703, Tel: 617-222-2202, TWX: 710-391-0644; FSC No.: 91506; Empl.: 3,200; *Sls. Mgr.:* Jim Fuchs/Jeff Mahall; *Dist. Mgr.:* William Hall **C•1702-1703**

Local Sales Offices & Reps

AL	Huntsville, Glen White Assocs.	205-883-7938
AZ	Scottsdale, Augat Sls.	602-224-0950
CA	Los Angeles, Wiley Co.	213-666-1611
CA	San Diego, Wiley Co.	619-571-2881
CA	Santa Clara, Augat Sls.	408-980-0955
CO	Littleton, Simpson Assocs.	303-794-8381
FL	Safety Harbor, Augat Sls.	813-725-1037
FL	Tamarac, Augat Sls.	305-721-6021
GA	Norcross, Glen White Assocs.	404-441-1447
HI	Honolulu, Hawaii Elctrns. Sls. & Svc.	808-845-8207
IL	Rolling Meadows, Sumer	312-991-8500
IA	Davenport, Ensco-Rep. Inc.	319-386-6600
KS	Overland Park, Ensco-Rep. Inc.	913-381-7557
KS	Wichita, Ensco-Rep. Inc.	316-683-1070
MD	Silver Spring, NKA Inc. (Govt.)	301-585-6141
MA	Norwood, Augat Sls.	617-762-3164
MI	Detroit, Rathsburg Assocs.	313-882-1717
MN	Edina, Augat Sls.	612-925-0255
MN	Minnetonka, Gibb Elctrn. Sls.	612-935-4600
MO	Maryland Hts., Ensco-Rep. Inc.	314-423-3935
NJ	Cherry Hill, Trinkle Sls.	609-795-4200
NJ	Maple Shade, NKA Inc. (Govt.)	609-234-4008
NM	Albuquerque, C. T. Carlberg Assoc.	505-888-3883
NY	N. Syracuse, L. D. Allen, Inc.	315-437-8387
NY	Yonkers, D. Sonkin Assocs.	914-968-8282
NC	Raleigh, Glen White Assocs.	919-848-1931
OH	Dayton, NKA, Inc.	513-268-8771
OH	Englewood, A. Nace Co.	513-836-0931
OH	Richfield, A. Nace Co.	216-659-7178
OR	Portland, Augat Sls.	503-256-4596
TN	Gray, Glen White Assocs.	615-447-8850
TX	Dallas, Augat Sls.	214-788-4211
TX	Georgetown, Augat Sls.	512-479-9447
TX	Houston, Augat Sls.	713-781-9343
UT	Midvale, Simpson Assocs.	801-566-3691
VA	Lynchburg, Glen White Assocs.	804-237-6291
WA	Bellevue, Augat Sls.	206-451-9777
WI	Brookfield, Sumer Inc.	414-784-6641

AUGAT/ALCOSWITCH, See Alco Elctrn. Prods., Inc.

AUGAT/ES•P. INC., /Augat, Inc., 12832 Chadron Ave., Hawthorne, CA 90250, Tel: 213-973-0262, Telex: 66-4467; Empl.: 125; *Sls. Mgr.:* Karl f. Zimmermann

AUGAT FIBEROPTICS, 710 Narragansett Park Dr., Pawtucket, RI 02861, Tel: 401-724-4400, Telex: 511450; *Sls. Mgr.:* Bob Goecheler; *Dist. Mgr.:* Bill Hall

AUGAT/PYLON CO., INC., P.O. Box 2510, Attleboro Falls, MA 02763, Tel: 617-699-7646, TWX: 948095; Empl.: 200; *Sls. Mgr.:* John Deichl

AULT, INCORPORATED, 1600 Freeway Blvd., Minneapolis, MN 55430, Tel: 612-560-9300, TWX: 910-756-3435; Empl.: 300; *Sls. Mgr.:* John Newhouse **D•1518-1519**

Local Sales Offices & Reps

AL	Huntsville, L & D, Inc.	205-837-1469
AZ	Scottsdale, DAR-C, Inc.	602-948-2240
CA	Los Angeles, West Elctrn. Sls.	714-898-0120
CA	San Diego, West Elctrn. Sls.	619-576-9268
CA	Santa Clara, Magna Sls.	408-727-8753
CO	Denver, William J. Purdy	303-777-1411
CO	Denver, William J. Purdy	303-753-6800
CT	Manchester, G/M Assocs.	203-646-4443
CT	Wallingford, Marathon Sls., LTD	617-875-3566
FL	Boca Raton, QXI, Inc.	305-392-2626
FL	St. Petersburg, QXI, Inc.	813-821-2281
GA	Atlanta, L & D, Inc.	404-455-3483
IL	Arlington Hgts., MSI	312-956-1000
OH	Columbus, McFadden Sls.	614-459-1280
IA	Des Moines, Beams Co.	515-255-1148
KS	Shawnee Mission, Beams Co.	913-631-0300

MD	Columbia, Delta III Assocs.	301-730-4700
MA	Framingham, Marathon Sls., LTD	617-875-3566
MI	Plymouth, Jay Mktg. Assocs.	313-459-1200
MO	St. Louis, Beams Co.	314-434-8448
NV	Carson City, Magna Sls.	702-883-1471
NJ	Ocean, P. Saftler Assocs.	201-922-3014
NY	Lynbrook, P. Saftler Assocs.	516-593-7880
NC	Greensboro, L & D, Inc.	919-292-3201
OH	Cleveland, Lyons Corp.	216-659-9224
OH	Dayton, E. Lyons Co.	513-278-0714
OR	Portland, Jas. J. Bacher Co.	503-297-8744
PA	Philadelphia, Samuel K. MacDonald, Inc.	215-545-1205
TX	Austin, R. F. Kimball Co.	512-443-5284
TX	Houston, R. F. Kimball Co.	713-890-8810
TX	Houston, R. F. Kimball Co.	713-840-0590
TX	Richardson, R. F. Kimball Co.	214-231-3447
WA	Seattle, Jas. J. Backer Co.	206-285-1300

Local Distributors

CA	Cincinnati, Hughes Peters	513-351-2000
CA	Mountain View, USI Elctrn. Comps.	415-969-5420
CA	San Diego, Tauber Elctrns.	619-274-7242
CA	Santa Monica, Distr. Specialists	213-393-9666
CA	Van Nuys, Natl. Electro Sls. Corp.	213-781-0505
MA	Sharon, Adcour	617-784-8123
MO	St. Charles, Finnigan Elctrns.	314-946-6201
Can	St. Laurent, Que., Tech-Rep Elctrns., Ltd.	514-337-6046

AURA MFG., 50 McDermott Rd., North Haven, CT 06473, Tel: 203-777-2541; Empl.: 200; *Sls. Mgr.:* Fred Bonito

AURIC CORP., 470 Frelinghuysen Ave., Newark, NJ 07114, Tel: 201-242-4100; Empl.: 35

AUSTIN ELECTRONICS, The Austin Co., 17-01 Pollitt Drive, Fair Lawn, NJ 07410, Tel: 201-794-0200, TWX: 710-988-2262; Empl.: 100; *Sls. Mgr.:* Frank J. Cerven

AUSTRON, INC.

AUSTRON, INC., P.O. Box 14766, Exit 248 N. IH 35, Austin, TX 78761, Tel: 512-251-2341, TWX: 910-874-1356; FSC No.: 24672; Empl.: 153; *Sls. Mgr.:* R. Ellis **A•1314-1315**

Local Sales Offices & Reps

AL	Huntsville, Sci. Devices - SE	205-536-1969
AZ	Scottsdale, Territorial Mktg.	602-994-8665
CA	Pleasant Hill, Austron	415-930-7268
CA	San Carlos, Westronics Assocs.	415-592-1417
CA	San Diego, Thorson Co.	619-292-8525
CA	Signal Hill, Thorson Co.	213-595-0361
CT	Southington, Scheinfein Assocs.	203-621-3492
FL	Orlando, Sci. Devices - SE	305-841-8180
FL	Shalimar, Sci. Devices - SE	904-651-4407
GA	Atlanta, Sci. Devices-SE	404-452-8709
IL	Elk Grove, Loren Green Assoc.	312-593-0282
IN	Indianapolis, Loren Green Assoc.	317-293-9827
MA	Reading, Scheinfein Assocs.	617-944-2304
MI	Union Lake, Ashby Assocs.	313-363-1100
MN	Minneapolis, Loren Green Assoc.	612-571-6666
NY	Frankfort, Kapital Instr. Sls.	315-894-4245
NY	Huntington, CDB Entprs.	516-692-5200
NC	Winston Salem, Sci. Devices-SE	919-765-5766
OH	Dayton, Ashby Assocs.	513-252-5627
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NY	Brooklyn, Irv Morse Sls.	212-444-4974
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AUTOMATIC TEST SYSTEMS, 23 Poplar St., Malden, MA 02148, Tel: 617-322-1107

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MO	St. Louis, E. Mooney Co.	314-878-9910
NE	Omaha, Lakeland Engrg. Equipt.	402-734-2600
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NY	Syracuse, Niagara Elec. Sls.	315-437-1656
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PA	Pittsburgh, Gilson Engrg. Sls.	412-931-6114
TX	Houston, Gettys-Eads-Adair	713-781-3005
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OR	Portland, Syscom Sls., Inc.	503-644-2505
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Can	Candiac, Que., W. H. Elctrns. Registered	514-632-3685

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AUTO-TROL TECH., 12500 N. Washington St., Denver, CO 80233, Tel: 303-452-4919, TWX: 910-320-0772; Empl.: 600; *Sls. Mgr.:* Jim Norrod

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GA	Atlanta, Rakes Engrg. and Mktg.	404-447-6937
MA	Needham Heights, Shain Assocs.	617-449-4380
MN	Edina, JH Hansen	612-893-9960
MO	St. Louis, Harris Hanson Co.	314-432-3611
NV	Las Vegas, 3-B Assocs.	805-581-5681
NJ	Rahway, Avionic Instrs. Inc.	201-388-3500
NC	Raleigh, Rakes Engrg. and Mktg.	919-847-5079
OH	Hudson, Integrated Aircraft Sys.	216-656-4251
TX	Dallas, Seaton Corp.	214-380-0414
WA	Seattle, Rep West	206-283-8351
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AZ	Scottsdale, Thorson Desert Sls.	602-998-2444
AR	Little Rock, Beacon Elctrns.	501-224-5449
CA	San Diego, Interstate Mktg.	619-292-8117
CA	San Jose, Quadrep Inc.	408-946-4000
CA	Woodland Hills, Interstate Mktg. Assocs.	818-883-7606
CO	Denver, Elcom	303-337-2300
FL	Clearwater, Dyne-a-Mark	813-441-4702
FL	Fort Lauderdale, Dyne-a-Mark	305-771-6501
FL	Maitland, Dyne-a-Mark	305-831-2097
FL	Palm Bay, Dyne-a-Mark	305-727-0192
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TX	Houston, Ammon & Rizos Co.	713-781-6240
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VA	Lynchburg, Burgin-Kreh Assoc.	804-239-2626
WA	Bellevue, Western Tech. Sls.	206-641-3900
WA	Spokane, Western Techn. Sls.	509-922-7600
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Can	Mississauga, Ont., Longman Sls.	416-677-8100
Can	Ottawa, Ont., Longman Sls.	613-564-0100

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AZ	Phoenix, Wyle Elctrns.	602-249-2232
AZ	Tempe, Arrow Elctrns.	602-968-4800
CA	Chatsworth, Arrow Elctrns.	818-701-7500
CA	Chatsworth, IEC	213-998-2200
CA	Chatsworth, IEC Elctrns.	213-998-2200
CA	El Monte, Marshall Elctrns	818-442-7204
CA	El Segundo, Wyle Elctrns.	818-880-9001
CA	Hayward, Arrow Elctrns.	415-487-4300
CA	Irvine, IEC	714-660-1055
CA	Irvine, Marshall Elctrns	714-660-9261
CA	Irvine, Wyle Elctrns.	714-863-9953
CA	Los Angeles, Kierulff Elctrns.	213-725-0325
CA	N. Hollywood, T.T.I.	818-709-1010
CA	Rancho Cordous, Wyle Elctrns.	916-638-5282
CA	Sacramento, IEC	916-424-5297
CA	San Diego, Arrow Elctrns.	619-565-4800
CA	San Diego, Kierulff Elctrns.	619-278-2122
CA	San Diego, Wyle Elctrns.	619-565-9171
CA	San Jose, Cetec Elctrns.	408-980-0110
CA	San Jose, Eric Elctrns.	408-262-1111
CA	San Jose, IEC	408-263-1100
CA	Santa Clara, Wyle Elctrns.	408-727-2500
CA	Southgate, Cetec Elctrns.	213-773-6521
CA	Sun Valley, Q.C. Comps.	818-700-2622
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CA	Tustin, Arrow Elctrns.	714-838-5422
CA	Tustin, Kierulff Elctrns.	714-731-5711
CO	Denver, Arrow Elctrns.	303-696-1111
CO	Denver, IEC	303-292-6121
CO	Denver, Kierulff Elctrns.	303-371-6500
CO	Thornton, Wyle Dist. Gp.	303-457-9953
CT	E. Haven, J. V. Elctrns.	203-469-2321
CT	Wallingford, Arrow Elctrns.	203-265-7741
CT	Wallingford, Kierulff Elctrns.	203-265-1115
CT	Wallingford, Marshall Elctrns.	203-265-3822
FL	Ft. Lauderdale, Arrow Elctrns.	305-429-8200
FL	Ft. Lauderdale, NRC Elctrns.	305-772-4500
FL	Orlando, Marshall Elctrns.	305-841-1878
FL	Orlando, T.T.I.	305-859-1000
FL	Palm Bay, Arrow Elctrns.	305-725-1480
FL	St. Petersburg, Kierulff Elctrns.	813-576-1966
GA	Norcross, Arrow Elctrns.	404-449-8252
GA	Norcross, Kierulff Elctrns.	800-241-0560
GA	Norcross, Marshall Elctrns.	404-923-5750
IL	Elk Grove, Kierulff Elctrns.	312-640-0200
IL	Lombard, RM Elctrns.	312-932-5150
IL	Schaumburg, Arrow Elctrns.	312-397-3440
IL	Schaumburg, Marshall Elctrns.	314-490-0155
IN	Indianapolis, Arrow Elctrns.	317-243-9353
IN	Indianapolis, RM Elctrns.	317-291-7110
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MN	Edina, Kierulff Elctrns.	612-941-7500
MN	Plymouth, Marshall Elctrns.	612-559-2211
MO	Maryland Hgts., Kierulff Elctrns.	314-739-0855
MO	St. Louis, Arrow Elctrns.	314-567-6888
NH	Manchester, Arrow Elctrns.	603-668-6968
NJ	Clifton, J-Mar Elctrns.	201-772-6400
NJ	Fairfield, Arrow Elctrns.	201-575-5300
NJ	Fairfield, Marshall Elctrns.	201-882-0320
NJ	Marlton, Arrow Elctrns.	609-596-8000
NJ	Mt. Laurel, Marshall Elctrns.	609-234-9100
NM	Albuquerque, Arrow Elctrns.	505-243-4566
NY	Bohemia, TTI	516-567-1500
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NY	Hauppauge, Jaco Elctrns.	516-273-5500
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NY	Melville, Arrow Elctrns.	516-391-1484
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NY	Rochester, Marshall Inds.	716-235-7620
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NC	Raleigh, Arrow Elctrns.	919-876-3132
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NC	Winston Salem, Arrow Elctrns.	919-725-8711
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OH	Centerville, Arrow Elctrns.	513-435-5563
OH	Cleveland, Kierulff Elctrns.	216-587-6558
OH	Dayton, Marshall Elctrns.	513-236-8088
OH	Solon, Arrow Elctrns.	216-248-3990
OK	Tulsa, Arrow Elctrns.	918-665-7700
OK	Tulsa, Kierulff Elctrns.	918-252-7537
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TX	Dallas, Kierulff Elctrns.	214-343-2400
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TX	Ft. Worth, T.T.I.	817-429-1440
TX	Richardson, Jaco	214-235-9575
TX	Stafford, Arrow Elctrns.	713-530-4700
UT	N. Salt Lake City, IEC	801-298-1868
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UT	Salt Lake City, Kierulff Elctrns.	801-973-6913
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Can	Downsview, Ont., Future Electrns	514-694-7710

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AXIAL MAGNETICS, 15922 Strathern, Van Nuys, CA 91406, Tel: 818-994-3346 .... **B•1139**

Local Sales Offices & Reps

OH	Cleveland, S.B. Reese Sls.	216-932-8079
TX	Houston, Southland Engrg. & Sls.	713-772-3170

AXIOM CORP., 1014 Griswold Ave., San Fernando, CA 91340, Tel: 213-365-9521

AXIS, INC., 7825 Engineer Rd., Ste. 208, San Diego, CA 92111, Tel: 619-560-7737; FSC No.: 9S849; Empl.: 12; *Sls. Mgr.:* Mark J. Prager

AYDIN CORP., 700 Dresher Rd., Horsham, PA 19044, Tel: 215-657-7510, Telex: 685 1211, TWX: 510-661-0518; Empl.: 2,000; *Sls. Mgr.:* B. Jack Miller

AYDIN CONTROLS, 414 Commerce Dr., Ft. Washington, PA 19034, Tel: 215-542-7800, Telex: 6851057, TWX: 510-661-0518; Empl.: 533; *Sls. Mgr.:* Joseph J. Taylor

AYDIN MICROWAVE, 75 East Trimble Rd., San Jose, CA 95131, Tel: 408-946-5600, Telex: 4990756, TWX: 910-338-0216; Empl.: 200; *Sls. Mgr.:* Bruce M. Jennings

AYDIN MONITOR SYS., 502 Office Center Dr., Ft. Washington, PA 19034, Tel: 215-646-8100, TWX: 510-661-1520; Empl.: 241

AYDIN VECTOR DIV., Box 328, Newtown, PA 18940, Tel: 215-968-4271, TWX: 510-667-2320; FSC No.: 13923; Empl.: 280

BABCOCK, INC., 1717 West Collins Ave., Orange, CA 92667, Tel: 714-633-3700, TWX: 910-595-1517; FSC No.: 56623; Empl.: 245; *Sls. Mgr.:* Albin Gudis; *Dist. Mgr.:* Albin Gudis

BACH-SIMPSON LTD., 1255 Brydges St., London, ON, Canada N5W-2C2, Tel: 519-452-3200

BACON INDS., 192 Pleasant St., Watertown, MA 02172-2399, Tel: 617-926-2550, TWX: 710-327-6518; FSC No.: 99098; Empl.: 23; *Sls. Mgr.:* R. S. Cass

BAILEY CONTROLS CO., 29801 Euclid Ave., Wickliffe, OH 44092, Tel: 216-585-5800, Telex: 980621, TWX: 216-944-4160; Empl.: 2300; *Sls. Mgr.:* R. A. Purmal; *Dist. Mgr.:* R. C. Wright

BALDOR ELECTRIC COMPANY, P.O. Box 2400, Fort Smith, AR 72901, Tel: 501-646-4711, Telex: 53-7425

BALLY ELECTRONICS, Bally Mfg., 10750 W. Grand Ave., Franklin Park, IL 60131, Tel: 312-451-7223; Empl.: 300; *Sls. Mgr.:* Lam McGannon

BAKER, J. T., CHEMICAL CO., 222 Red School La., Phillipsburg, NJ 08865, Tel: 201-859-2151, TWX: 510-235-2924; Empl.: 1,200; *Sls. Mgr.:* D. J. Calder

BAKER CO., INC., Drawer E - Sanford Airport, Sanford, ME 04073, Tel: 207-324-8773; Empl.: 150

BALLANTINE LABS., 90 Fanny Rd., Boonton, NJ 07005, Tel: 201-335-0900, TWX: 710-987-8380; FSC No.: 50423; Empl.: 90; *Sls. Mgr.:* Joe Deery; *Dist. Mgr.:* Joe Deery .... **D•1185**

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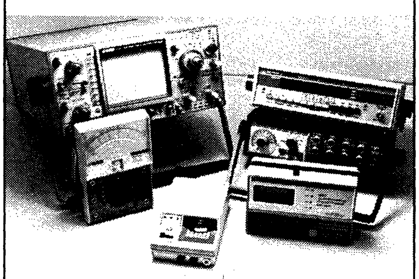

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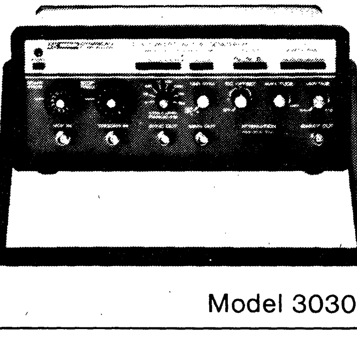

Model 3030

AZ	Tempe, Fry-Gates Inc.	505-262-1525
CA	Laguna Hills, Elotek Sys. Inc.	714-830-4856
CA	Los Angeles, Elotek Sys., Inc.	213-416-9190
CA	San Diego, Elotek Sys., Inc.	619-438-4856
CA	San Jose, MCH Assocs.	408-246-7330
CO	Denver, Fry-Gates, Inc.	303-321-6818
CT	Southington, Scheinfein Assocs.	203-621-3492
FL	Orlando, Micro Spec, Inc.	305-299-6508
GA	Lilburn, Micro Spec, Inc.	404-921-3840
IL	Arlington Hgts., Dytec/Central	312-394-3380
IN	Indianapolis, Dytec/Central	317-247-1316
KS	Kansas City, Marsland Assocs.	913-888-2840
MA	Reading, Scheinfein Assocs.	617-944-2304
MI	Madison Hgts., WKM Assocs.	313-588-2300
MO	St. Louis, Marsland Assocs.	314-991-1399
NJ	Elmwood Park, L & M Assocs.	201-797-0441
NM	Albuquerque, Fry-Gates, Inc.	505-262-1525
NY	Canandaigua, Mamula Sls.	716-394-5560
NY	New York, L & M Assocs.	212-243-6155
OH	Cleveland, WKM Assoc.	216-267-0445
OH	Dayton, WKM Assoc.	513-434-7500
OH	Independence, WKM Assocs.	216-524-5930
OR	Portland, Westcon	503-283-0132
PA	Andalusia, L & M Assocs.	215-245-6658
PA	Pittsburgh, WKM Assoc.	412-292-2953
SC	Rock Hill, Micro Spec, Inc.	803-366-3015
TN	Nashville, Micro Spec. Inc.	615-383-4064
TX	Austin, Lear Assocs.	512-450-1059
TX	Richardson, Lear Assocs.	214-231-5388
UT	Salt Lake City, Zeus Elctrns.	801-534-0500
VA	Alexandria, Dyna Rep Co.	703-354-1222
WI	Elm Grove, Dytec/Central	414-784-9686

BALL ELCTRN. SYS. DIV., Ball Corp., P. O. Box 64376, St Paul, MN 55164, Tel: 612-786-8900, TWX: 910-563-3552; FSC No.: 612-786-4577; Empl.: 150; *Sls. Mgr.:* Richard C. Scarle

BALL ELECTRONIC, Systems Div., 9300 W. 108th Circle, Broomfield, CO 80020, Tel: 303-460-5256, Telex: 45776; Empl.: 500; *Sls. Mgr.:* R. Scarle

BALSTON, 703 Massachusetts Ave., Lexington, MA 02173, Tel: 617-861-7240, Telex: 92-3481; Empl.: 50; *Sls. Mgr.:* J. Alpert

BALZERS OPTICAL GRP., 170 Locke Dr., Marlboro, MA 01752, Tel: 617-481-9860, Telex: 951-562; Empl.: 136; *Sls. Mgr.:* C. A. Burke

B & B MOTOR & CONTROL CORP., Apple Hill Commons, Burlington, CT 06013, Tel: 203-673-7151, Telex: 14-1484; Empl.: 90; *Sls. Mgr.:* Sam Mandel

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CT	Berlin	203-828-8550
FL	Clearwater	800-845-1020
IL	Chicago, B & B Motor & Control Corp.	312-681-0089
IN	Indianapolis	317-248-0396
KY	Louisville	502-589-7753
MA	Boston, B & B Motor & Control Corp.	617-890-4944
NH	Nashua, B & B Motor & Control Corp.	603-883-1062
NJ	Piscataway	201-572-0500
NY	Baldwin, B & B Motor & Control Corp.	212-784-1313
NY	Elmira	607-732-6599
NY	Long Island City, B & B Motor & Control Corp.	212-784-1313
NY	Rochester	716-424-7040
NC	Charlotte	704-375-0577
OH	Cincinnati	513-381-1885
SC	Greenville	803-268-5702
TX	Dallas	214-641-0857
TX	Houston	713-820-7931

B & G PRECISION ELCTRNS., 538 Maple Ave., Doylestown, PA 18901, Tel: 215-348-4413; *Sls. Mgr.:* Eugene R. Bigay; *Dist. Mgr.:* Xavier Garcia

B & K PRECISION, INDUSTRIAL ELECTRONICS PRODUCT GROUP, Dynascan Corporation, 6460 W. Cortland, Chicago, IL 60635, Tel: 312-889-9087, Telex: 253475; FSC No.: 08098, 18110, 48560, 30678; Empl.: 250; *Sls. Mgr.:* Dennis Hoy
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AL	Alabaster, Maitland K. Smith, Inc.	205-664-3093
AR	Little Rock, Erickson Sls., Inc.	501-225-7379
CA	Irvine, Mike Roth Sls.	714-250-0722
CA	Pleasanton, Moulthrop Sls.	415-463-0450
CO	Denver, K-C Marketers, Inc.	303-733-5561
FL	Maitland, Hutto, Hawkins, Peregoy	305-831-2474
GA	Tucker, Maitland K. Smith	404-939-3322
HI	Honolulu, Omega Hawaii, Inc.	808-946-2983
IL	Arlington Hgts., Brainard-Wilson Mktg.	312-437-2700
KS	Shawnee Mission, Lowell-Kangas & Assocs.	913-631-3515
LA	Chalmette, Erickson Sls.	504-271-1976
MD	Perry Hall, Electra-Tech	301-256-2723
MA	Woburn, W & D Mktg.	617-935-5610
MI	Southfield, Robert Milsk Co., Inc.	313-354-3310
MN	Minneapolis, HMR, Inc.	612-888-2122
MO	St. Louis, Lowell-Kangas Assocs.	314-821-4050
NJ	Medford, Champion Elctrn. Sls. Co.	609-983-0932
NY	Bellmore, Selectra Sls.	516-221-7865
NY	East Greenbush, Warren Kaufman & Assocs.	518-477-9864
NY	Rochester, Warren Kaufman & Assocs.	716-266-2728
NC	Charlotte, Maitland K. Smith, Inc.	704-372-2681
OH	Cleveland, Marlow Assocs.	216-991-6500
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OK	Broken Arrow, Erickson Sls., Inc.	918-455-4276
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EXP	NY, Plainview, Empire Exporters	516-293-5582

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BARBER-COLMAN CO., Indl. Instrs. Div., P.O. Box 2940, 1354 Clifford Ave., Loves Park, IL 61132, Tel: 815-877-0241, Telex: 257327; Empl.: 5000; *Sls. Mgr.:* John Parry

BARCEL WIRE & CABLE CORP., Electronics Div., 2851 Aton Ave., Irvine, CA 92714

BARKSDALE CONTROLS DIV., Transamenca DeLaval, 3211 Fruitland Ave., P.O. Box 58843, Los Angeles, CA 90058, Tel: 213-589-6181; Empl.: 325; *Sls. Mgr.:* R. C. Wolf

BARNES & REINECKE, INC., 2375 Estes Ave., Elk Grove Village, IL 60007, Tel: 312-640-7200; Empl.: 290

BARNES ENGRG., 1645 So. Claudina Way, Anaheim, CA 92805, Tel: 714-533-7530; FSC No.: FSCM 53823 S.I.C. 3469; Empl.: 38; *Sls. Mgr.:* Gordon Mackenzie
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OH	Miamisburg (Dayton), Components, Inc.	513-866-0661
PA	Pittsburgh, Components, Inc.	412-824-1600

BARNES ENGRG., 44 Commerce Rd., P.O. Box 53, Stamford, CT 06904, Tel: 203-348-5381, Telex: 965921, TWX: 710-474-3367; Empl.: 300; *Sls. Mgr.:* H. R. Hofmann, Jr.

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BARON WIRE & CABLE, 1811 W. Bryn Mawr Ave., Chicago, IL 60660, Tel: 312-728-7480, Telex: 72-4322; Empl.: 50; *Sls. Mgr.:* Al Desaluo

BARRY CONTROLS, Barry Wright Corp., 700 Pleasant St., Watertown, MA 02172, Tel: 617-923-1150, TWX: 710-327-1290; FSC No.: 81860; *Sls. Mgr.:* Philip R. Littlewood

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BASE TEN SYS., One Electronics Dr., Box 3151, Trenton, NJ 08619, Tel: 609-586-7010, Telex: 4754158, TWX: 510-685-5692; FSC No.: 30377; Empl.: 255; *Sls. Mgr.:* Oleh Pavlovsky

BASF SYS., Crosby Dr., Bedford, MA 01730, Tel: 617-271-4000, 800-343-4600, Telex: 92-3423; Empl.: 1,300; *Sls. Mgr.:* David F. Pippin

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BASIC MEASURING INSTS., 402 Lincoln Centre Dr., Foster City, CA 94404, Tel: 415-570-5355; *Sls. Mgr.:* Robert Moore

BASIC SYSTEMS, 1919 S. 129 5. Ave., Tulsa, OK 74108, Tel: 918-437-7066; Empl.: 20; *Sls. Mgr.:* Karen Duggan; *Dist. Mgr.:* Karen Duggan

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BAUSCH & LOMB, O.S.D. Div., 1400 N. Goodman St., Rochester, NY 14692, Tel: 716-338-6000, Telex: 97-8231; Empl.: 5000; *Sls. Mgr.:* Martin L. Green

BAY COMPONENTS, INC., 1806 Dreams Landing Way, Annapolis, MD 21401, Tel: 301-266-6767, Telex: 710-867-8567; Empl.: 55; *Sls. Mgr.:* Lois Levit

BAYLEY INSTR. CO., Box 357, Kenwood, CA 95452, Tel: 707-833-6014

BAY PRODS., 8701 Torresdale Ave., Phila., PA 19136, Tel: 215-DE8-7300, Telex: 83-4434; Empl.: 150; *Sls. Mgr.:* Frank Stewart

BAYTRON, See M/A-Com Millimeter Products Inc.

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BBC-METRAWATT/GOERZ, 2150 W. 6th Ave., Broomfield, CO 80020, Tel: 303-469-5231, 800-821-6327, Telex: 4970869; Empl.: 20; *Sls. Mgr.:* Andy Zeidler/Mac McChesney .... **D•1192-1193**

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CA	Sun Valley, Teqni-Rep. Assocs.	818-768-4223
CO	Louisville, Stan Sliz Assocs.	303-666-4760
FL	Lake Park, Adams & Assocs.	305-694-1543
GA	Marietta, Adams & Assocs.	404-973-0853
HI	Honolulu, Hawaiian Indl. Inst. Sls. Corp.	808-533-5170
LA	Kenner, Assoc. Mktg. Grp.	504-443-5072
MA	Norwood, Mac Innis Corp.	617-762-8090
MI	Livonia, Harvey Sls.	313-591-1975
MN	Edina, Pec/Levi & Assocs.	612-944-8540
NJ	Medford, Jack McCoy Assocs.	609-953-0770
NM	Tijeras, Stan Sliz Assocs.	505-281-3856
NY	Kew Gardens, Jack Brown Elec.	212-805-0343
NY	Liverpool, Jack Brown Elec.	315-622-3211
NY	Whitestone, Jack Brown Elec.	212-767-1977
NC	Charlotte, Adams & Assocs.	704-552-7800
NC	Greensboro, Adams & Assocs.	919-272-6838
PA	Dawnington, Jack Brown Elec.	215-363-0350
TX	Dallas, Assoc. Mktg. Grp.	214-241-7190
TX	Houston, Assoc. Mktg. Grp.	713-466-8673
UT	So. Jordan, Stan Sliz Assocs.	801-254-4141
WA	Seattle, Northmar	206-524-5170

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AL	Huntsville, Newcomb Assocs.	205-837-3233
CA	Berkeley, Rotech	415-428-2044
CA	Woodland Hills, Friedman & Assocs.	818-702-0665
CO	Arvada, Air-Row Entprs.	303-421-4204
GA	Roswell, Newcomb Assocs.	404-641-7942
HI	Honolulu, Hawaiian Indl. Inst. Sls. Corp.	808-533-4232
IL	Rolling Meadows, Commodore-I	312-394-5441
MD	Rockville, Dela Technlg.	301-881-6292
MA	Sharon, Reptek	617-784-6700
MI	Trenton, I & C Sls.	313-671-1320
MN	Burnsville, Commodore-I	612-894-5488
MT	Billings, Geo Research	406-248-6771
NY	Albany, L-Tron	518-482-1987
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BDS COMPUTER CORP., 800 Maude Ave., Mountain View, CA 94043, Tel: 415-964-2115, TWX: 910-373-2005; *Sls. Mgr.:* Dave Lester

BEAD ELECTRONIC CONNECTORS, Bead Chain Manufacturing Co., 10878 Wiles Rd., Box 9897, Coral Springs, FL 33075, Tel: 305-753-3639; Empl.: 150; *Sls. Mgr.:* Bruce Thomas; *Dist. Mgr.:* Bruce Thomas .... **C•1162-1167**

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CA	Anaheim, Galaxie Sls. Intl.	714-937-5622
CO	Denver, Gribble Sls. Engrg.	303-278-1495
CT	Kensington, Metal Tech., Inc.	203-828-1148
FL	Coral Springs, Janco Sls.	305-755-0631
IL	Chicago, Electro Mech. Sls. Co.	312-777-0554
IN	Indianapolis, Hoster & Sieloff Assocs.	317-842-3700
MI	Detroit, Fox Inds., Inc.	313-363-7183
MN	Minneapolis, Gribble Sls. Engrg.	612-788-7028
TX	Dallas, Gribble Sls. Engrg.	214-221-5109
VA	Williamsburg, Dyneers, Inc.	804-229-3612

Local Distributors

CA	Anaheim, Beta Inds.	714-978-7544

BEAD ELCTRNS., Div. Bead Chain Mfg. Co., 110 Mountain Grove St., Bridgeport, CT 06605, Tel: 203-334-4124; Empl.: 175; *Sls. Mgr.:* Mrs. B. M. Krafcik .... **C•1686-1688**

Local Sales Offices & Reps

CA	Anaheim, Galaxie Sls. Intl.	714-937-5622
CO	Denver, Gribble Sls. Engrg.	303-279-4545
CT	Kensington, Metal Tech, Inc.	203-828-1148
FL	Coral Springs, Janco Resch. & Sls. Co.	305-755-0631
IL	Chicago, Electro-Mech Sls. Co.	312-777-0554
IN	Indianapolis, Hoster & Sieloff Assocs.	317-842-3700
MI	Union Lake, Fox Inds.	313-363-7183
MO	Independence, Gribble Sls. Engrg.	816-796-4333
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VA	Williamsburg, Dyneers	804-229-3612
EXP	NJ Rochelle Park, Richmen Metals & Comps.	201-796-6271

BEA ELECTRO-OPTICS, INC., 690 First Ave., Des Plaines, IL 60016, Tel: 312-298-1420, Telex: 882903; *Sls. Mgr.:* George E. Magerl; *Dist. Mgr.:* Vic Halkyn

BEAL COMMUNICATIONS, Beneficial Properties, 11020 Audelia Rd. Ste. C 101, Dallas, TX 75243, Tel: 214-340-2044, 214-340-2045; Empl.: 7; *Sls. Mgr.:* Robert Farrier

BEAM TUBE CO., INC., 11 Beach St., Milford, MA 01757, Tel: 617-473-0660; FSC No.: 5960; Empl.: 25; *Sls. Mgr.:* Joseph A. Casciano

BEAN RUBBER MFG. CO., 1623 S. 10th St., San Jose, CA 95112, Tel: 408-293-2790; FSC No.: 18545; *Sls. Mgr.:* Kris Mosher

BEARING INSPECTION, 10041 Shoemaker Ave., Santa Fe Springs, CA 90670, Tel: 213-944-6251; Empl.: 31

BEAU PRODUCTS DIV., Vernitron Corp., Box 10, Laconia, NH 03247, Tel: 603-524-5101, TWX: 710-364-1843; FSC No.: 13150; Empl.: 230; *Sls. Mgr.:* John Jansen; *Dist. Mgr.:* Larry Murphy .... **C•1168-1170**

Local Sales Offices & Reps

AL	Huntsville, Cartwright & Bean	205-830-1540
AZ	Phoenix, The Knight Co.	602-582-8506
CA	Los Angeles, The Knight Co.	213-670-2833
CA	Santa Clara, Nova-Tronix Elec. Sls.	408-727-9530
CO	Denver, W.J. Purdy Co.	303-753-6800
FL	Orlando, Cartwright & Bean	305-422-4531
GA	Atlanta, Cartwright & Bean	404-233-2939
IL	Lisle, W-G Controls	312-963-5954
LA	Kenner, Cartwright & Bean	504-466-0020
MA	Needham, R. Perron & Co.	617-449-6162
MN	Minneapolis, Hei-Lite Sls.	612-861-6051
MO	Kansas City, Forristal-Young Sls. Co.	816-358-6771
NH	Dover, R. Perron & Co.	603-742-2321
NJ	West Caldwell, Grimm, Siegel Assoc.	201-575-9300
NM	Albuquerque, C.T. Carlberg & Assoc.	505-883-3883
NY	Buffalo, Rudell-Merrifield Assoc	716-634-4300
NC	Charlotte, Cartwright & Bean	704-377-5673
OH	Cleveland, Jim Finnegan & Co.	216-238-5905
OK	Oklahoma City, Erickson Sls.	405-682-2947
PA	Broomall, L.D. Lowery	215-356-5300
PA	Pittsburgh, Jim Finnegan	412-561-4687
TN	Memphis, Cartwright & Bean	901-276-4442
TX	Dallas, Erickson Sls.	214-739-5833
WA	Medina, Henry Paulman Sls. Co.	206-455-3311
WA	Seattle, Don Smith Sls. Co.	206-633-3160

BEAU TECH, P.O. Box 598, Portland, ME 04122, Tel: 207-775-6139; Empl.: 9

BEAVER LABS, P. O. Box 202, Kingston, MA 02364, Tel: 617-585-5666; Empl.: 5

BEC INC., 2709 N. Broad St., Philadelphia, PA 19132, Tel: 215-229-9800; *Sls. Mgr.:* Bob Kandel

BECKMAN INDUSTRIAL CORP., Cedar Grove Div., 89 Commerce Rd., Cedar Grove, NJ 07009, Tel: 201-239-6200, TWX: 710-994-5781

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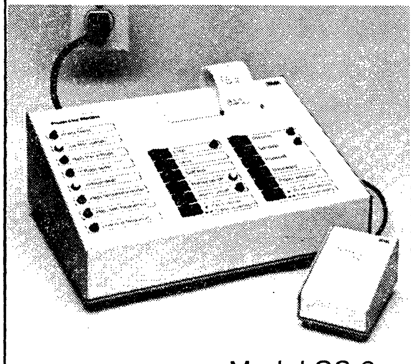

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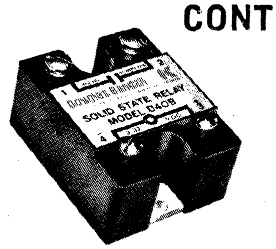
CONTROLS



AUTHORIZED & STOCKING
DISTRIBUTOR

ALPHA
DISTRIBUTOR
CORP

550 E. ROYALTON ROAD
CLEVELAND, OHIO 44147
PHONE 216/526-3716

BECKMAN INDUSTRIAL CORP., Emerson Electric Co., 630 Puente Street, Brea, CA 92621, Tel: 714-773-8111, Telex: 06-78413; *Sls. Mgr.:* P. E. Spillane/John Tyree

BECKMAN INSTRS., 2500 Harbor Blvd., Fullerton, CA 92634, Tel: 714-871-4848, Telex: 06-7413; Empl.: 12000

BECKMAN INSTRS., HELIPOT DIV., See Beckman Instrs., Electro-Prods. Grp.

BEECHWOOD MFG., 310 S. Ohmer, Indianapolis, IN 46219, Tel: 317-356-2493; *Sls. Mgr.:* Robt. Cox

BEEDE ELECTRICAL INSTR. CO., S. Main St., Penacook, NH 03303, Tel: 603-753-6362, TWX: 710-364-6977; Empl.: 500; *Sls. Mgr.:* Mike Harbour

BEHLMAN DIV., CALIFORNIA INSTRS., Div. of Norlin Inds., 5150 Convoy St., San Diego, CA 92111, Tel: 619-279-8620, Telex: 695-047; FSC No.: 16067; Empl.: 90

BEHLMAN ENGINEERING, 1142 Mark Ave., Carpinteria, CA 93013, Tel: 805-684-8311; FSC No.: 53636; *Sls. Mgr.:* Edward C. Bertolet/Frank Chase; *Dist. Mgr.:* John White .... **D•1898-1905**

Local Sales Offices & Reps

AL	Huntsville, Reynolds & Assocs.	305-259-7000
AZ	Phoenix, J. Smith & Assocs., Inc.	602-267-0981
AZ	Phoenix, R. L. Davis	602-955-2266
CA	Cupertino, T. Louis Snitzer	408-257-8333
CA	Del Mar, T. Louis Snitzer	714-226-0305
CA	Los Angeles, T. Louis Snitzer	213-836-6170
CO	Colorado Springs, J. Smith & Assocs., Inc.	303-597-5343
FL	Melbourne, Reynolds & Assocs.	305-259-7000
FL	Satellite, Reynolds & Assocs.	305-773-4700
GA	Atlanta, Reynolds & Assocs.	404-252-5360
IL	Wheeling, Ed Joyner & Co.	312-520-1200
IN	Noblesville, R & D Elctrns.	317-849-2026
MD	Rockville, Farrell Assocs.	301-424-9460
MA	Needham, Addelco Corp.	617-444-4754
MI	Farmington Hills, Carter, McCormic & Peirce, Inc.	313-477-7700
MN	St. Paul, Dytec No.	612-645-5816
MO	Independence, Engineering Svcs. Co.	816-254-3600
MO	St. Louis, Engineering Svcs. Co.	314-997-1515
NM	Albuquerque, J. Smith & Assocs., Inc.	505-265-3406
NY	Great Neck, Industron Assocs., Inc.	516-487-2620
NC	Raleigh, Reynolds & Assocs.	305-259-7000
OH	Cleveland, Carter, McCormic & Peirce, Inc.	216-779-5100
OH	Dayton, Carter, McCormic & Peirce, Inc.	513-836-0951
OK	Tulsa, Testech, Inc.	918-665-7788
PA	Pittsburgh, Carter, McCormic & Peirce, Inc.	412-372-4415
TX	Austin, Testech, Inc.	512-327-7033
TX	Houston, Testech, Inc.	713-956-0837
TX	Richardson, Testech, Inc.	214-644-5010
WA	Seattle, Datacom Assocs.	206-285-2525
Can	Burnaby, B.C., Atelco, Inc.	604-299-9331
Can	Calgary, Alberta, Atelco, Inc.	403-230-1697
Can	Montreal, Que., Atelco, Inc.	514-481-7733
Can	Ottawa, Ont., Atelco, Inc.	613-596-5894
Can	Scarborough, Ont., Atelco, Inc.	416-497-2208

BEI

BEI MOTION SYSTEMS CO., Corporate Off., 166 Geary St., Ste. 1400, San Francisco, CA 94108, Tel: 415-788-6840, Telex: 910-380-5402; Empl.: 5 .... **B•1782-1783**

Local Sales Offices & Reps

CA	Santa Ana, BEI Motion Sys. Co.	714-973-8510
CA	Santa Clara, BEI Motion Sys. Co.	408-986-9006
CO	Westminster, BEI Motion Sys. Co.	303-426-1566
GA	Lawrenceville, BEI Motion Sys. Co.	404-963-0673
IL	Rockford, BEI Motion Sys. Co.	815-968-9528
MA	Wakefield, BEI Motion Sys. Co.	617-245-3851
MI	Plymouth, BEI Motion Sys. Co.	313-451-0359
OH	Cincinnati, BEI Motion Sys. Co.	513-232-4545
OR	Beaverton, Thorson Co. NW	503-644-5900
PA	Exton, BEI Motion Sys. Co.	215-363-5444
TX	Hurst, BEI Motion Sys. Co.	817-284-4313
WA	Bellevue, Thorson Co. Northwest	206-455-9180
Can	Montreal, Miller Engrg., Ltd.	514-748-6169
Can	Willowdale, Miller Engrg., Ltd.	416-499-4421

BEI MOTION SYS. CO., Computer Prod. Div., 1755 B La Costa Meadows Dr., San Marcos, CA 92069, Tel: 619-471-2600; *Sls. Mgr.:* Everett McElroy .... **B•1783**

BEI MOTION SYS. CO., Digital Prods. Div., P.O. Box 3838, Little Rock, AR 72203, Tel: 501-851-4000, TWX: 910-722-7384; Empl.: 103; *Sls. Mgr.:* H. O. Tyler .... **B•1782**

Refer to BEI Motion Sys. Co., Corporate Off., San Francisco, CA for sales office information.

BEI MOTION SYS. CO., General Control Systems Div., 564 Alpha Dr., Pittsburgh, PA 15238, Tel: 412-963-0515; *Sls. Mgr.:* Chic Sweeney .... **B•1783**

Refer to BEI Motion Sys. Co., Corporate Off., San Francisco, CA for sales office information.

BEI MOTION SYS. CO., Industrial Encoder Div., 7230 Hollister Ave., Goleta, CA 93117, Tel: 805-968-0782; *Sls. Mgr.:* Glenn Avolio .... **B•1782**

Refer to BEI Motion Sys. Co., Corporate Off., San Francisco, CA for sales office information.

BEI MOTION SYSTEM COMPANY, Kimco Division, 150 Vallecitos de Oro, San Marcos, CA 92069, Tel: 619-744-5671, TWX: 910-322-1168; Empl.: 43; *Sls. Mgr.:* William Byrnes .... **B•1783**

BEI MOTION SYS. CO., Position Controls Div., 819 Reddick Ave., Santa Barbara, CA 93103, Tel: 805-966-1538, TWX: 910-334-4903; *Sls. Mgr.:* K. Capps .... **B•1782**

Refer to BEI Motion Sys. Co., Corporate Off., San Francisco, CA for sales office information.

COOPER INDUSTRIES BELDEN

BELDEN, Electronic Wire & Cable, P.O. Box 1980, Richmond, IN 47375, Tel: 317-983-5200, TWX: 810-345-1393; Empl.: 2180; *Sls. Mgr.:* Bill Donahoe .... **C•1742, 1750-1789**

Local Sales Offices & Reps

Regional Sales Offices

CA	Cannon Country, John Duffin	805-252-2525
CA	Hayward, Harry Furst	415-278-1607
CA	Irvine	714-474-1200
CA	Lafayette, Mark Warren	415-284-5064
CA	Placentia, Rick Webber	714-524-7619
CA	San Diego, Judy Hummerich	619-484-5766
CA	Torrance, Dave Wilhide	213-373-1967
CO	Englewood, Terry Godwin	303-694-3292
FL	Orlando, Brad Hahn	305-291-7739
GA	Norcross, Tom Beane	404-925-0679
IL	Naperville, Kelley Smith	312-961-1249
IL	Palatine, Phil Dunn	312-358-9336
IL	St. Charles, Joe Prechodnik	312-377-9464
IN	Richmond	317-983-5200
KS	Shawnee, Dave Phelps	913-268-6528
LA	St. Rose, Kyle Ingram	504-464-0125
MA	Framingham, John Kennedy	617-872-4585
MA	Wayland, Cathie Hamel	617-651-1213
MN	Plymouth, Ken Pratt	612-593-0907
MN	Spring Park, Jim Hughes	612-471-9478
NY	Huntington Station, Dale Ambery	516-549-9731
NY	Oyster Bay, Mike Wakeland	516-922-3762
OK	Broken Arrow, Jeff Cooper	918-251-2027
PA	Bethel Park, J. D. Allen	412-831-9312
PA	Exton, Tom Deckard	215-363-2874
PA	Rosemont, Brian Easley	215-525-3268

TN	Hendersonville, Dale Diedrichs	615-822-3861
TX	Carrollton, Tim Fast	214-492-0937
TX	Dallas	214-788-4300
TX	Dallas, Mike Kipper	214-553-0521
TX	Houston, Charles Amonett	713-350-2271
TX	Plano, Mary McQuistion	214-423-2335
VA	Richmond, Karen Jones	804-747-1090

Local Sales Reps.

AZ	Scottsdale, W. Atkins	602-998-7355
CA	Huntington Beach, E. Kerezsi	714-848-2157
CA	Newark, R. Tribendis	415-490-0838
CA	Northridge, J. Duffin	213-993-8919
CA	San Jose, S. Landis	408-723-7117
CA	Tustin, W. Caughlin	714-832-5278
CT	South Bury, L. Kerchief	212-264-8012
FL	Boca Raton, G. Pedigo	305-482-1279
GA	Atlanta	404-934-6767
GA	Marietta, J. Fienning	404-973-6212
IL	Oakbrook	312-789-0800
IN	Indianapolis, L. Brown	317-849-1945
IN	Richmond, J. Daggy	317-962-6103
MD	Columbia, E. Wunder	301-997-4480
MA	Framingham	617-872-7846
MA	Framingham, A. Harris	617-872-2066
MA	Franklin, S. LaRocco	617-528-1896
MO	Clayton, Fletcher Lane	314-725-1488
NY	Rochester, T. Centofonti	716-461-0818
NY	Sunnyside, E. Mammone	212-361-0993
NC	Raleigh, A. Hatcher	919-848-3342
OH	Medina, H. Flanders	216-725-4285
OR	Lake Oswego, D. Clicquennoi	503-638-0271
SC	Columbia, G. Owen	803-781-9739
TX	Austin, M. Mullery	512-345-5204
TX	Houston, C. Amonett	713-350-2271
TX	Houston, M. Masucci	713-721-6023
WA	Bellevue, S. Abernethy	206-885-5808
WI	Milwaukee, M. Lucky	414-355-4986

BELDEN, Fiber Optics, 2000 S. Batavia Ave., Geneva, IL 60134, Tel: 312-232-8900, TWX: 910-237-1681

bel BEL FUSE INC.

BEL FUSE, 198 Van Vorst St., Jersey City, NJ 07302, Tel: 201-432-0463, TWX: 710-730-5301; Empl.: 225; *Sls. Mgr.:* A. Sutta; *Dist. Mgr.:* S. Rader ....**A•1468-1486; B•1230-1232**

Local Sales Offices & Reps

Delay Lines

AL	Huntsville, EMA, Inc.	205-830-4030
AZ	Scottsdale, SMS & Assocs.	602-998-0831
CA	Escondido, Cirolia Elctrn.	619-743-3015
CA	Los Angeles, Corcoran Assocs.	213-823-4589
CA	Santa Clara, Thresum Assocs.	408-996-9889
CO	Boulder, Front Range Mktg.	303-443-4780
CT	Branford, L.J.M. Assocs.	203-488-4244
FL	Altamonte Springs, Semtronics Assocs.	305-831-8233
FL	Clearwater, Semtronic Assocs.	813-461-4675
FL	Fort Lauderdale, Semtronics Assocs.	305-731-2484
GA	Atlanta, Beacon Elctrns.	404-256-9640
IL	Chicago, MGA	312-775-1151
IN	Indianapolis, Insul-Reps, Inc.	317-251-1994
MA	Wellesley Hills, Sturdy Co.	617-235-2330
MI	Bloomfield Hills, Enco Mktg.	313-642-0203
MN	So. St. Paul, Northport Engr.	612-457-8000
NH	Milford, D. A. Crowley Assocs.	603-673-7050
NJ	East Brunswick, Winch Sls. Assocs.	201-828-4615
NM	Albuquerque, SMS & Assocs.	505-883-9765
NY	E. Rochester, Tri-Tech Elctrns.	716-385-6500
NY	Fayetteville, Tri-Tech Elctrns.	315-446-2881
NY	Roslyn Hgts., Winch Sls. Assocs.	516-621-6378
NC	Raleigh, Beacon Elctrns.	919-787-0330
OH	Cleveland, J. Finnegan & Co.	216-238-5905
PA	Bala Cynwyd, Friedman & Assocs.	215-667-1838
TN	Knoxville, Insul-Reps	615-691-7586
TX	Austin, Oeler & Menelaides	512-453-0275
TX	Dallas, Oeler & Menelaides	214-361-8876
TX	Houston, Oeler & Menelaides	713-682-1083
UT	Salt Lake City, Front Range Mktg.	801-364-6481
WA	Kirkland, A/D Elctrns.	206-821-3205
PR	Hato Rey, M. Anderson Co.	809-751-2026
Can	Downsview, Ont., Cantronics	415-665-8020

Fuses

CA	Huntington Beach, Corcoran Assocs.	714-841-4759
CA	Playa Del Rey, Corcoran Assocs.	213-823-4589
CA	Sunnyvale, W. W. Posey	408-746-0771
CO	Boulder, Front Range Mktg.	303-443-4780
IL	Chicago, MGA	312-775-1151
IN	Indianapolis, Insul-Reps., Inc.	317-842-5203
MI	Bloomfield Hills, Enco Mktg., Inc.	313-642-0203
MN	S. St. Paul, Northport Engrg., Inc.	612-457-8000
NH	Milford, David A. Crowley & Assocs.	603-673-7050
NJ	So. Orange, Ira Brody	201-992-1727
NM	Albuquerque, Syntech	505-266-7951
NY	East Rochester, Tri-Tech Elctrns.	716-385-6500
NY	Fayetteville, Tri-Tech Elctrns.	315-446-2881
NY	Hempstead, L.I., Kahgan Sls.	516-538-2300
PA	Philadelphia, Check Assocs.	215-487-3007
TN	Knoxville, Insul-Reps., Inc.	615-691-7586
UT	Salt Lake City, Front Range Mktg.	801-364-6481
WA	Kirkland, A/D Elctrns., Inc.	206-821-3205
PR	Hato Rey, Max Anderson Co., Inc.	809-751-2026
Can	Downsview, Ont., Cantronics	416-665-8020

Local Distributors

Fuses

CA	Santa Ana, Amco Tech.	714-957-3003
DE	Danbury, Future Elctrns.	203-743-9594
FL	Clearwater, Future Elctrns.	813-441-4771
IN	Indianapolis, MAR Elctrns.	317-875-4510
IA	Cedar Rapids, Deeco Elctrns.	319-365-7551
MD	Columbia, D-K Elctrns.	301-995-1950
MA	Boston, Future Elctrns.	617-366-2400
MN	New Brighton, Chris Elctrns.	612-631-2647
MO	St. Charles, Finnigan Elctrns.	314-946-6201
NJ	Mt. Laurel, Future Elctrns.	609-778-7600
NY	Liverpool, Future Elctrns.	315-451-2371
OR	Beaverton, Component Resources	503-641-8488
PA	Harrisburg, Cumberland Elctrns.	717-232-9715
PA	Lyndora, Seneca Fuse	412-285-8544
UT	Salt Lake City, Future Elctrns.	801-972-8489
UT	Salt Lake City, Standard Supp. Co.	801-486-3371
Can	Pointe Claire, Quebec, Future Elctrns.	514-694-7710
CA	El Segundo, Force Elctrns.	213-772-1324
NH	Hudson, C & H Elctrns.	603-882-1133
CA	Anaheim, Deco Elctrns.	714-630-8252
CA	City of Industry, Ital Elctrns.	213-968-8515
CA	Hayward, KEA Elctrns.	415-887-2900
CA	San Diego, Sigma Elctrns.	619-763-0545
CA	San Jose, Force Elctrns.	408-943-1324
CT	Norwalk, Cobra Comps.	203-847-6442
FL	Boca Raton, D & R Assocs.	305-395-2341
MA	Canton, Electronic Packaging Comps.	617-821-2111
NH	Hudson, C & H Elctrns.	603-882-1133
NY	Bohemia, Key Comps.	516-567-7500
TX	Dallas, Fuses, Inc.	214-341-6407

BELL, FLOYD, ASSOCS., INC., 897 Higgs Ave., Columbus, OH 43212, Tel: 614-488-3193, TWX: 810-482-1763; FSC No.: 56493; *Sls. Mgr.:* Tom Shain ...**D•1023**

Local Sales Offices & Reps

CA	Pasadena, Paul Nurches Co.	213-681-8957
CA	Redwood City, Hickey Indl. Sls. Corp.	415-368-3849
CO	Denver, Moss Mktg.	303-455-7205
FL	Casselberry, Barrett & Assocs.	305-699-0311
FL	Melbourne, Barrett Assocs.	305-727-2491
FL	Miami, Barrett Assocs.	305-681-4957
FL	Palm Harbor, Barrett Assocs.	813-785-1954
IL	Mt. Prospect, Robert Adams Sls. Co.	312-297-8733
KY	Edgewood, ELECCO	606-341-0330
MD	Columbia, Tyler Griffin Co.	301-995-1215
MA	Scituate, New England Area Reps.	617-545-6327
MI	Jenison, R.C. Nordstrom	616-457-5762
MI	Lathrup Village, R.C. Nordstrom	313-559-7373
MN	Minneapolis, A.J. Warner Co.	612-729-7371
NJ	Ocean, P. Saftler Assocs.	516-593-7880
NY	Fulton, P. Saftler Assocs.	315-592-7184
NY	Lynbrook, P. Saftler Assocs.	516-593-7880
OR	Aloha, Elctrn. Comp. Sls.	503-245-2342
PA	Paoli, Tyler Griffin Co.	215-647-1550
TX	Dallas, Jim D. Gray & Assocs.	214-341-7190
WA	Mercer Island, Elctrn. Comp. Sls.	206-232-9301

BELL, F. W., INC., 6120 Hanging Moss Rd., Orlando, FL 32807, Tel: 305-678-6900, TWX: 810-853-3115; FSC No.: 18479; *Dist. Mgr.:* Edward S. Wilush .....**B•1784-1785; D•1113, 1194-1195, 1977**

Local Sales Offices & Reps

CA	Milpitas, Maxim Elctrn. Sls.	408-946-6001
CA	Pasadena, Jim Robins Assoc.	818-795-9118
CO	Denver, Moss Mktg.	303-455-7205
FL	Indian Rock Beach, Par Assoc.	813-596-8841
GA	Atlanta, Par Assoc.	404-391-9117
IL	Downers Grove, Splon Assoc.	312-963-7011
MA	Needham Hgts., Shain Assoc.	617-449-4380
MI	Royal Oak, Dave Ray & Assocs.	616-792-9831
NM	Albuquerque, Moss Mktg.	505-292-7505
NY	White Plains, Cane Tech. Sls.	914-694-9240
OH	Chagrin Falls, RPM Indl. Sls.	216-247-3295
PA	Paoli, T. Griffin Co.	215-644-7710
TX	Carrollton, Seaton Corp.	214-380-0414

Local Distributors

AZ	Phoenix, Jensen Tools & Alloys	602-968-6231
CA	Milpitas, Maxim Elctrn. Sls.	408-946-6001
CA	Pasadena, Jim Robins Assoc.	818-795-9118
CA	Pasadena, Pasadena Elctrns.	818-796-5844
CO	Denver, Moss Mktg.	303-455-7205
GA	Atlanta, Process Meas. Co.	404-696-7481
IL	Rolling Meadows, Commodore-1	312-394-5441
MA	Needham Hgts., Shain Assocs.	617-449-4380
NY	White Plains, Cane Tech. Sls.	914-694-9240
OH	Chagrin Falls, RPM Indl. Sls.	216-247-3295
OH	Dayton, National Instr. Distrs.	513-435-4503
PA	Paoli, Tyler Griffin Co.	215-644-7710
TN	Chattanooga, Edwin Bohr Elctrns.	615-877-8207
TX	Houston, Quality Instr. Lab.	713-524-0528

BELL & HOWELL/CEC DIV., 360 Sierra Madre Villa, Pasadena, CA 91109, Tel: 213-796-9381, Telex: 67-5415, TWX: 910-582-3205; Empl.: 500

BELL AUDIO SERVICE CO., Magnetic Programming, Inc., 6740-G Huntley Road, Worthington, OH 43085, Tel: 614-846-2766; Empl.: 20; *Sls. Mgr.:* Thomas A. Curran

BELL CO., INC., 106 Morrow Ave., Box 92E, Trussville, AL 35173, Tel: 205-655-2135; Empl.: 19; *Sls. Mgr.:* R. Bell; *Dist. Mgr.:* Neil H. Bell

J. W. Miller Division
BELL INDUSTRIES

BELL INDS., J. W. Miller Div., 19070 Reyes Ave., P.O. Box 5825, Rancho Dominguez, CA 90224, Tel: 213-537-5200, TWX: 910-346-6740; FSC No.: 76493; Empl.: 55 .... **A•1210-1217**

Local Sales Offices & Reps

AZ	Phoenix, Moore Sls.	602-274-4558
AR	El Dorado, D. Bellew Sls.	501-863-8325
CA	Santa Clara, Logan Sls. Co.	408-496-0660
CO	Denver, Wm. J. Purdy Co.	303-777-1411
FL	Ft. Lauderdale, Hutto-Hawkins-Peregoy	305-971-5750
FL	Maitland, Hutto-Hawkins-Peregoy	305-831-2474
GA	Atlanta, Millar Elctrns.	404-261-6160
HI	Gardena, CA, Bidwell Sls. Assoc.	213-770-0300
IL	Chicago, Ken Levy & Assocs.	312-763-5000
IN	Indianapolis, Elctrn. Reps.	317-894-1414
IN	South Bend, Elctrn. Reps.	219-277-4565
LA	Metairie, D. Bellow Sls.	504-887-1195
MD	Columbia, Par-Nell Sls. Co.	301-992-5454
MA	N. Scituate, W. A. Hendrickson Co.	617-545-0652
MI	Grand Rapids, Burcaw Co. & Assoc. Inc.	313-573-4605
MI	Warren, Burcaw Co. & Assoc. Inc.	313-573-4605
MN	Eden Prairie, Electro Mark, Inc.	612-944-5850
MO	Raytown, Marty Taraski Sls. Co.	816-358-1442
NJ	Englewood, Baum & Epstein Assoc.	201-569-7600
NM	Albuquerque, Wm. J. Purdy Co.	505-266-7959
NY	Syracuse, PI'Tronics, Inc.	315-455-7346
NC	Raleigh, Millar Elctrns.	919-787-9585
OH	St. Marys, T. Shelby & Co.	419-394-3377
OR	Portland, Earl & Brown Co.	503-245-2283
PA	Langhorne, Par-Nell Sls. Co.	215-750-0380
TN	Memphis, D. Bellew Sls.	901-452-1468
TX	Ft. Worth, Chet Wells & Co.	817-284-0261
UT	Salt Lake City, Wm. J. Purdy Co.	801-486-8557
WA	Seattle, Earl & Brown Co.	206-284-1121
EXP	NY, New York, Roburn Agencies	212-989-5939

Local Distributors

AZ	Tempe, Bell Industries/EDD	602-966-7800
AZ	Tempe, Circuit Specialists	602-966-0764
CA	Buena Park, RPS Elctrns.	714-521-5230
CA	Garden Grove, Bell Industries/EDD	714-220-0681
CA	Gardena, Bell Industries/EDD	213-515-1800
CA	Mountain View, Abacus Elctrns.	415-961-1500
CA	Palo Alto, Zack Elctrns.	415-326-5432
CA	Riverside, Elctrn. Supp.	714-683-7300
CA	Sacramento, Integrated Elctrns.	916-424-5297
CA	San Diego, Bell Industries/EDD	619-268-1277
CA	San Jose, Cypress Elctrns.	408-945-8400
CA	San Jose, Quement Elctrns.	408-998-5900
CA	Sunnyvale, Bell Industries/EDD	408-734-8570
CA	Thousand Oaks, Bell Inds./Ventura/EDD	805-499-6821
CO	Denver, Bell Industries/EDD	303-424-1985
CO	Denver, Integrated Elctrns.	303-292-6121
CO	Denver, Ragon Elctrn. Parts	303-744-3601

CT	Danbury, Pilgrim Elctrns.	203-792-7274
CT	New Haven, Greene-Shaw Co.	203-397-0710
CT	Wallingford, Sager Elctrcl. Supp.	203-265-4600
FL	West Palm Beach, Nurmi Elctrns.	305-686-8553
IL	Chicago, Bell Industries/EDD	312-640-1910
IL	Chicago, Newark Elctrns.	312-784-5100
IL	Palatine, Ohm/Elctrns, Inc.	312-359-5500
IN	Fort Wayne, Graham Elect./Div. Bell Ind.	219-423-3422
IN	Indianapolis, Graham Elect./Div. Bell Ind.	317-634-8202
IN	Indianapolis, Meunier Elctrn. Supp.	317-635-3511
IA	Cedar Rapids, Bell Industries/EDD	319-395-0730
LA	New Orleans, Wm. B. Allen Supp.	504-525-8222
MD	Gaithersburg, MS Elctrns.	301-921-0200
MA	Hingham, Sager Elctrcl. Supp.	617-749-6700
MA	Newton, Greene-Shaw Co.	617-969-8900
MN	Minneapolis, Ind. Comps., Inc.	612-831-2666
MN	Thief River Falls, Dici-Key Corp.	218-681-6674
MO	Saint Louis, Olive Elctrns.	314-426-4500
NJ	Camden, General Radio	609-964-8560
NJ	East Hanover, State Elctrn. Parts	201-887-2550
NM	Albuquerque, Bell Industries/EDD	505-292-2700
NY	Bohemia, Key Comps.	516-567-7500
NY	Buffalo, Summit Elctrns.	716-887-2800
NY	Hempstead, Davis Elctrns.	516-483-9200
NY	Rochester, Summit Elctrns.	716-334-8110
NY	Rome, Rome Elctrns.	315-337-5400
NC	Raleigh, Southeastern Elctrns.	919-828-2311
OH	Columbus, Hughes-Peters, Inc.	614-294-5351
OH	Dayton, Bell Industries/Micro-Mil Div.	513-434-8231
OH	Dayton, Stotts-Friedman Corp.	513-298-5555
OK	Tulsa, Radio, Inc.	918-587-9123
OR	Portland, Bell Industries/EDD	503-241-4115
PA	Allentown, P. A. Peters, Inc.	215-434-5237
PA	Braddock, Leff Elctrns.	412-351-5000
PA	Philadelphia, PEI Genesis	215-568-7400
PA	Reading, Barbey Elctrns.	215-376-7451
PA	Willow Grove, Resco Elctrns.	215-659-4575
TN	Hixson, Techni-Tronics, Inc.	615-842-0514
TX	Dallas, Wholesale Elctrns./Ind. Div.	214-824-3001
TX	Fort Worth, TTI, Inc.	817-831-0441
TX	Houston, Lenert Co.	713-225-1465
UT	Salt Lake City, Bell Industries/EDD	801-972-6969
VA	Charlottesville, Virginia Radio	804-296-4184
WA	Bellevue, Bell Industries/EDD	206-747-1515
WI	Milwaukee, Bell Industries/EDD	414-547-8879
WI	Milwaukee, Marsh Elctrns.	414-475-6000

BELLOFRAM CORP., A Rexnord Co., 30 Blanchard Rd., Burlington, MA 01803, Tel: 617-272-2100, 800-225-1031, Telex: 94-9457; Empl.: 400; *Sls. Mgr.:* Steve Jackson; *Dist. Mgr.:* Steve Jackson

BELL PA PRODS., See Bell Audio Sys.

BELTING INDS. CO. INC., 20 Boright Ave., Kenilworth, NJ 07033, Tel: 201-272-8591, Telex: 138045; Empl.: 125; *Sls. Mgr.:* Harry K. Denaker

BEMCO, 9908 San Fernando Rd., Pacoima, CA 91331, Tel: 818-899-5296, TWX: 910-496-1520; Empl.: 45; *Sls. Mgr.:* John Riddle; *Dist. Mgr.:* Brian Duggan

BENDIX CORP., Electrical Comps. Div., Sidney, NY 13838, Tel: 607-563-5324, Telex: 932 456, TWX: 510-261-7550; FSC No.: 77820; Empl.: 3000; *Dist. Mgr.:* G. Anderson

BENDIX CORP., Electric Power Div., Hwy. 35, Eatontown, NJ 07724, Tel: 201-542-2000, Telex: 132-444 TWX: 710-722-6686; FSC No.: 83298;Multiple; Empl.: 950; *Sls. Mgr.:* R. Freeman; *Dist. Mgr.:* Cal-Schrum

BENDIX CORP., Electrodynamics Div., 11600 Sherman Way, N. Hollywood, CA 91605, Tel: 818-765-1010, TWX: 910-499-2151; Empl.: 1200

BENDIX CORP., MOTOR COMPS. DIV., See Facet Entprs.

BENDIX CORP., Test Systems Div., Teterboro, NJ 07608. Tel: 201-288-2000, TWX: 710-990-6136; Empl.: 1,077

BENJAMIN ELECTROPRODUCTS, INC., Robins Div., 80 Smith St., Farmingdale, NY 11735, Tel: 516-293-7744, Telex: 12-7908; Empl.: 50

BENSON, INC., 2690 Orchard Parkway, P.O. Box 32059, San Jose, CA 95152-2059, Tel: 408-945-1000, Telex: 4941178 BENUW, TWX: 8104941178 BENUW; Empl.: 400; *Sls. Mgr.:* Alexander Salottolo

BENTHOS, INC., Edgerton Dr., N. Falmouth, MA 02556, Tel: 617-563-5917, 617-540-5500, Telex: 820673; Empl.: 80; *Sls. Mgr.:* R. K. Church

BENTLY NEVADA CORP., P.O. Box 157, Minden, NV 89423, Tel: 702-782-3611, Telex: 354437

BERG, W. M., INC., 499 Ocean Ave., East Rockaway, NY 11518, Tel: 516-599-5010; Empl.: 150; *Sls. Mgr.:* C. Keenan

BERGER-LAHR CORP., Fitzgerald Dr., Jaffrey, NH 03452, Tel: 603-532-7701, Telex: 92-8445; Empl.: 50; *Sls. Mgr.:* Wolfgang Hartert

BERGQUIST, 5300 Edina Ind'l., Minneapolis, MN 55435, Tel: 612-835-2322, TWX: 910-576-2423; FSC No.: 55285; Empl.: 105; *Sls. Mgr.:* Bob Savage; *Dist. Mgr.:* Larry Kocon

BERGQUIST SWITCH, INC., Bergquist Co., 5300 Edina Indl. Blvd., Edina, MN 55435, Tel: 612-835-2322, TWX: 910-576-2423; *Sls. Mgr.:* Lamar Popp

BNC

BERKELEY NUCLEONICS CORP., 1198 Tenth St., Berkeley, CA 94710, Tel: 415-527-1121, Telex: 677-1167; Empl.: 30; *Sls. Mgr.:* E. J. Buchs .... **D•1196**

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BERKELEY PROCESS CONTROL, INC., 5327-K Jacuzzi St., Richmond, CA 94804, Tel: 415-526-3333; Empl.: 8; *Sls. Mgr.:* Paul Sagues; *Dist. Mgr.:* Paul Sagues

BERKSHIRE TRANSFORMER CORP., Route 341, P.O. Box 129, Kent, CT 06757, Tel: 203-927-3541; FSC No.: 89870; Empl.: 105; *Sls. Mgr.:* David Barbierl

BERK TEK, INC., Box 60, RD 1, Reading, PA 19607, Tel: 215-376-8071, TWX: 510-651-0511; Empl.: 350; *Sls. Mgr.:* Chester Klinke; *Dist. Mgr.:* Chester Klinke

Local Sales Offices & Reps

AZ	Scottsdale, Bill Earl Assocs.	602-994-3813
CA	Los Angeles, The Knight Co.	213-670-2833
CA	Milpitas, Maxim Elctrn. Sls.	408-946-6001
FL	Tampa, APM	813-886-2457
IL	Des Plaines, Electron Mktg.	414-547-1505
MD	Wheaton, Electronic Data Assocs.	301-699-1843
MA	Shrewsbury, B&N Assoc.	617-845-1613
MI	Orchard Lake, TPM & Assoc.	313-851-2784
MN	St. Paul, Arkco Sls.	612-777-7454
NY	Poughkeepsie, C.W. Floring & Assoc.	914-471-2973
NY	Syracuse, C.W. Floring & Assoc.	315-478-2149
NC	Raleigh, B. T. Funderburk, Inc.	919-782-3493
OR	Tualatin, NICOR	503-692-0421
PA	Huntingdon Valley, Inacker Sls.	215-947-5660
TX	Houston, Yeager, Sumners & Assocs.	713-271-8104
UT	Salt Lake City, Aspen Sls.	801-943-1346
Can	Mississauga, Ontario, Micronex Co.	416-624-1076

BERMAR CORP., P.O. Box 12844, Research Triangle Park, NC 27709, Tel: 919-489-4316; *Sls. Mgr.:* M. Conland

BA
BERTAN ASSOCIATES, INC.

BERTAN ASSOCS., 121 New South Rd., Hicksville, NY 11801, Tel: 516-433-3110, TWX: 510-221-2144; FSC No.: 6130; Empl.: 140; *Sls. Mgr.:* Howard Bertan .... **D•1522-1535**

Local Sales Offices & Reps

AZ	Phoenix, Thor Engrg.	602-437-1463
CA	Encino, King-Way Assoc.	213-788-4124
CA	Los Altos, Cain-White & Co.	415-948-6533
CO	Boulder, H. Bass Assocs.	303-530-7509
CT	Madison, Dave Minshall	203-421-4561
FL	DeBary, DJE Assocs.	305-668-6827
GA	Lawrenceville, Electramark	404-963-4793
IL	Arlington Hgts., Coombs Assocs.	312-439-9810
IN	Fort Wayne, Coombs Assocs.	219-747-4017
IA	Cedar Rapids, Coombs Assocs.	319-362-4116
MD	Randallstown, Beacon North	703-591-1300
MI	Farmington, Carter, McCormic & Peirce	313-477-7700
MO	Bridgeton, Electro Mechanical Assoc.	314-291-8661
NM	Albuquerque, Thorson Co.	505-293-8555
NY	Fairport, NACO Elctrns. Corp.	716-223-4490
NY	Syracuse, NACO Elctrns. Corp.	315-699-2651
NY	Utica, NACO Elctrns. Corp.	315-732-1801
OH	Cleveland, Geotronix	216-526-2535
OR	Portland, Showalter Instrs.	503-224-8487
PA	Audubon, Holmes Assocs.	215-666-0636
TX	Dallas, Automated Motion Control	214-340-4192
TX	Denton, Automated Motion Control	817-382-4159
UT	Bountiful, H. Bass Assoc.	801-295-7100
VA	Fairfax, Beacon North	703-591-1300
WA	Bellevue, Showalter Instrs.	206-746-6032
WI	Milwaukee, Coombs Assocs.	414-351-6123

BERTSCH U.S., SYCAMORE RESCH. CTR., 2142F Industrial Ct., Vista, CA 92083, Tel: 619-727-7420; FSC No.: 619-727-4436; Empl.: 25; *Sls. Mgr.:* B. Linko

BEST ELECTRICS DIV., 400 Boren Ave. North, Seattle, WA 98109, Tel: 206-382-1300, TWX: 910-444-2154; Empl.: 8 .... **B•1743**

Local Sales Offices & Reps

CA	Mountain View, Straube Assocs.	415-969-6060
CO	Westminster, Straube Assocs.	303-426-0890

BEST POWER TECHNOLOGY, P.O. Box 280, Necedah, WI 54646, Tel: 608-565-7200, 800-356-5794, Telex: 701934; Empl.: 60; *Sls. Mgr.:* Terrance D. Paul

BEST WAY TOOLS, 171 Brook Ave., Deer Park, NY 11729, Tel: 516-586-4702; Empl.: 49

BETA TRANSFORMER TECHNOLOGY CORP., One Comac Loop, Ronkonkoma, NY 11779, Tel: 516-588-2505

BG ELCTRNS., 30 South St., Mt. Vernon, NY 10550, Tel: 914-664-5591, Telex: 6818048; FSC No.: 33791; Empl.: 36

B-G INSTRUMENTS, P.O. Box 67, Alta Loma, CA 91701, Tel: 714-989-4802, 980-2826, Telex: 517174; *Sls. Mgr.:* John Baum .... **D•1060**

Local Sales Offices & Reps

WA	Spokane, B-G Instrs., Inc.	509-238-4757

B. G. LABORATORIES, INC., 75 Travis Ave., Binghamton, NY 13904, Tel: 607-722-2376, Telex: 510-252-0185; FSC No.: 26522; Empl.: 150; *Sls. Mgr.:* Carol Clason

B. H. ELCTRNS., 331 Bremer Bldg., St. Paul, MN 55101, Tel: 612-228-6463, Telex: 297080; FSC No.: 3677; Empl.: 300; *Sls. Mgr.:* Fred LaMarche .... **A•2122-2123**

Local Sales Offices & Reps

AZ	Fountain Hills, Halbar Assocs.	602-837-2464
CA	Glendale, Halbar Assocs.	213-246-8263
CA	San Mateo, Halbar Assocs.	415-349-4700
CO	Denver, Electro Comp. Sys.	303-781-5904
IL	Chicago, I. E. Hampton & Assocs.	312-593-2410
MI	Detroit, I. E. Hampton & Assocs.	313-851-0820
MI	St. Joseph, I. E. Hampton & Assocs.	616-983-0862
MN	Osseo, Gaffney Sls. Co.	612-425-5484
NH	Nashua, C & C Sls.	603-889-8350
NJ	Dunellen, J. A. Maguire	201-752-8480
NY	Syracuse, C & L Sales	315-451-7810
OR	Portland, Halbar & Assocs.	206-696-0170
PA	Broomall, TCA Assocs.	215-353-2022
TX	Dallas, Aid Elctrns.	214-790-4761
WA	Redmond, Halbar Assocs.	206-882-0990
WI	Theinsville, TFL Assoc.	414-242-6800

B.H. INDS., INC., 5784 Venice Blvd., Los Angeles, CA 90019, Tel: 213-937-4763; Empl.: 6

BICC-VERO ELCTRNS., INC., 40 Lindeman Drive, Trumbull, CT 06611, Tel: 203-372-0038, TWX: 510-227-8890; Empl.: 50; *Sls. Mgr.:* Michael Humphrey; *Dist. Mgr.:* Christine A. Martin

Local Sales Offices & Reps

AL	Huntsville, Raycom	205-859-2017
CA	Anaheim, Bicc-Vero Elctrns.	714-630-2030
CA	San Diego, Professional Sls.	619-578-8831
CA	San Jose, H Tech Sls.	408-279-2443
CA	Sunnyvale, BICC-Vero (Wally Light)	408-738-6911
CO	Arvada, Delconac	303-422-7023

CT	Milford, Todino Engrg.	203-874-6643
FL	Melbourne, Star-Tec	305-727-2247
FL	Palm Bay, Star Tec	305-727-2247
GA	Duluth, Raycom Inc.	404-446-9015
KS	Overland Park, Barnes-Midwest Sls.	913-341-9317
MD	Lutherville, J. A. Dougherty Sls.	301-321-7890
MA	Needham Hgts., Todino Engrg.	617-444-7925
MN	St. Paul, Proud Inds.	612-646-9428
NY	Kingston, P.R.M. Elctrns.	914-331-0872
NY	Macedon, PRM	315-986-3742
NY	Pleasantville, BICC-Vero (Robert Hoffman)	914-769-6197
NC	Raleigh, Raycom	919-847-8276
NC	Raleigh, Tingen Tech. Sls.	919-781-1100
OH	Chesterland, K-T Mktg.	216-729-3588
OH	Cleveland, KT/Depco	216-442-6200
OH	Westchester, KT/Depco	513-874-0236
OR	Beaverton, Luscombe	503-636-6664
PA	Hatboro, Delta Squared	215-441-4178
PA	Hatboro, Rep Force	215-441-4178
PA	Pittsburgh, KT/Depco	412-367-1011
TX	Austin, Texport	512-834-8374
TX	Garland, Texport	214-681-1376
TX	Houston, Texport Elctrn. Sls. Co.	713-777-1443
TX	Mesquite, BICC-Vero (Robert Land)	214-289-1153
UT	Salt Lake City, Chuck Fields & Assocs.	801-531-6177
WA	Renton, Luscombe Engrg.	206-223-1541

Local Distributors

CA	Los Angeles, Dyna Svc.	213-268-8531
CT	Wallingford, Mid-State Elctrns.	203-265-9900
FL	Dania, Summit Distr.	305-920-6253,920-6509
IL	Arlington Hgts., Redel Labs	312-253-5000, 529-0500
IN	Ft. Wayne, Graham Elctrns.	219-423-3422
IN	Indianapolis, Graham Elctrns.	317-634-8202
LA	Baton Rouge, Menard	504-355-0323
MD	Baltimore, Resco	301-823-0070
MA	Framingham, NOW Elctrns.	617-872-5876
MI	Lansing, Demco Controls	517-321-1700
MI	Madison Heights, McNaughton-McKay Elec. Co.	313-399-7500
NJ	Pennsauken, Resco	609-662-4000
NJ	Springfield, Route Elctrns.	201-467-0266
NY	Buffalo, Summit Distr.	716-884-3450
NY	Hempstead, Davis Elctrns.	516-483-9200
NY	Rochester, Summit Distr.	716-442-3494
NC	Raleigh, Resco	919-781-5700
OH	Cincinnati, Graham Elctrns.	513-772-1661
PA	Braddock, Leff Elctrs.	412-351-5000
PA	Greensburg, Leff Elctrns.	412-834-5400
TX	Houston, City Elctrns.	713-621-1060
TX	Houston, Electrolot	713-957-1982
WI	Mequon, Taylor Elctrns.	414-241-4321

BICRON ELCTRNS., Box 807, Barlow St., Canaan, CT 06018, Tel: 203-824-5125; FSC No.: 10617; Empl.: 105; *Sls. Mgr.:* Peter B. Kent

Local Sales Offices & Reps

CO	Denver, Omega, Ltd.	303-762-1921
IL	Rolling Meadows, KMA Sls. Co.	312-398-5300
OH	Cleveland, Arthur H. Baier Co.	216-461-6161
OH	Dayton, Arthur H. Baier Co.	513-276-4128
PA	Media, Homer Smith Co.	215-543-2434
PA	Pittsburg, Gormley Elec.	412-795-8010
UT	Salt Lake City, Omega, Ltd.	303-762-1921
VA	Salem, Homersmith, Inc.	215-543-2434
WI	Milwaukee, KMA Sls. Co.	414-259-1771

BIDDLE INSTRUMENTS, A Thorn EMI Co., 510 Township Line Rd., Blue Bell, PA 19422, Tel: 215-646-9200, Telex: 83-4423 BIDDLE PMTG; Empl.: 285; *Sls. Mgr.:* R. S. Kennedy

BIKOR, 1504 W. 228th St., Torrance, CA 92718, Tel: 213-539-6320, TWX: 910-349-6667; Empl.: 50; *Sls. Mgr.:* James Rorke .... **D•1536**

Local Sales Offices & Reps

MO	St. Louis, B & H Assocs.	314-434-4425
NJ	Hasbrouck Hgts., Comp. Tech. Sls.	201-288-7400
NY	Rochester, Tae-Rep	716-586-8710

BINDICATOR, P.O. Box 9, 1915 Dove St., Port Huron, MI 48060, Tel: 313-987-2700; *Sls. Mgr.:* Rick Secord; *Dist. Mgr.:* Rick Secord

BIO-IMAGING RESEARCH, #1 Bio-Imaging Plaza, 425 Barclay Blvd., Lincolnshire, IL 60069, Tel: 312-564-3190; *Sls. Mgr.:* J. G. Close

BIOSPHERICAL INSTRS., INC., 4901 Morena Blvd. #1003, San Diego, CA 92117, Tel: 619-270-1315; *Sls. Mgr.:* Dennis Bryan

BIRD, RICHARD H., & CO., INC., 1 Spruce St., Waltham, MA 02154, Tel: 617-894-0160, Telex: 923-441; FSC No.: 17706; Empl.: 50; *Sls. Mgr.:* R.J. Cameron

BIRD ELCTRN., 30303 Aurora Rd., Cleveland, OH 44139, Tel: 216-248-1200, Telex: 706898 Bird Elec. UD; FSC No.: 70998; Empl.: 250; *Sls. Mgr.:* W. L. Yochum; *Dist. Mgr.:* Greg Johns

BIRTCHER CORP., See EG & G Birtcher

BISHOP ELECTRONICS CORP., 3729 San Gabriel River Pkwy., Pico Rivera, CA 90660, Tel: 213-695-0446, 213-692-9391, TWX: 910-586-1922

BISHOP GRAPHICS, INC., 5388 Sterling Center, Westlake Village, CA 91359, Tel: 818-991-2600, Telex: 66-2400 BISHOP WKVG; Empl.: 160; *Sls. Mgr.:* Lynn Knudsen

Bivar

BIVAR, INC., 4 Thomas, Irvine, CA 92718, Tel: 714-951-8808; FSC No.: 32559; Empl.: 22; *Sls. Mgr.:* E. 'Bill' Muldoon .... **C•1025**

Local Sales Offices & Reps

CA	San Diego, Qualtronics Co.	619-695-0118
CO	Westminster, D. Barth	303-427-8679
IL	Chicago, Berndt Assocs., Inc.	312-283-0713
IN	Indianapolis, Wilson Tech. Sls.	317-298-3345
KS	De Soto, Midtec Assocs.	913-441-6565
MA	Newtonville, C. Segel	617-969-6900
MI	Milford, Dodsworth	313-875-5755
MN	Minneapolis, Berndt Assocs.	612-546-2021
MO	Florissant, Midtec Assocs.	314-837-5200
NJ	Berkeley Heights, Cambridge-Allen	201-464-0203
NY	Syracuse, T-Squared Elctrns.	315-463-8592
NC	Raleigh, B. T. Funderburk	919-782-3493
OH	Cincinnati, Tri-State Mktg.	513-761-7993
OR	Beaverton, Eclipse Mktg. Grp.	503-642-1661
OR	Portland, Eclipse Mktg. Grp.	503-644-2550
PA	Elkins Park, K. B. Erdman Co.	215-224-1833
TX	Richardson, Draper Co.	214-680-1650
WA	Redmond, Eclipse Mktg. Grp.	206-885-6991
WI	Milwaukee, Berndt Assocs.	414-545-8400
Can	Mississauga, Ont., Wilson Elctrns.	416-677-7280

Local Distributors

AZ	Phoenix, EKO Sales	602-275-7501
CA	Fountain Valley, Components Ctr.	714-979-0433
CA	Mountain View, Energy Sls.	415-969-0800
CA	San Diego, Sigma Elctrns.	619-565-2000
CA	Santa Clara, Components Ctr.	408-988-3751
CA	Santa Fe Springs, F T R Fasteners	714-957-0202, 213-946-6464
CA	Sunnyvale, R. C. Dudek	408-734-3830
CA	Sunnyvale, Vic/Tal Sls.	408-738-3450
CA	Temple City, Fastening Sys.	213-579-4600
CA	Westlake Village, R. C. Dudek	213-707-1310
CO	Englewood, Indus. Elctrns.	303-694-9444
CT	East Haven, J. V. Elctrns.	203-469-2321
CT	Milford, Plastic & Metal Comps. Co.	203-877-2723
GA	Norcross, Atlanta Hardware Specialty	404-449-3000
GA	Peachtree City, Spyraflo, Inc.	404-487-7600
IL	Chicago, EMF	800-621-0080,312-889-8323
IL	Chicago, Waldom Elctrns.	312-585-1212
IL	Elmhurst, Miltex Sls.	312-941-7100
MD	Gaithersburg, Capitol Fasteners	301-948-9310
MA	Burlington, Contact East	617-272-5051
MA	Marlboro, Hardware Specialty Co.	617-481-8622
MA	Waltham, Electronic Fasteners	617-890-7780
MA	Winchester, RUSH	617-729-5800
MN	Eden Prairie, S. W. Anderson Co.	612-941-4108
NH	Londonderry, E.P.E. Corp.	603-669-9181
NY	Central Islip, Domino Comps.	516-582-3050
NY	Long Island City, Hardware Specialty Co.	212-361-9393
NY	Mt. Vernon, QAR Elctrns.	914-699-2224
NY	Plainview, Tower Fastener Co.	516-349-7670
NY	Rochester, Masline Elctrns.	716-546-5373
NC	Raleigh, Century Elctrn. Comps.	919-872-2203
NC	Raleigh, Century Fasteners	919-787-1800
OH	Cincinnati, Hughes-Peters	513-351-2000
OH	Columbus, Hughes-Peters	614-294-5351
OH	Englewood, Argent Inds.	513-836-8633
OH	Solon, REH/Electra	216-248-1636
OR	Beaverton, Component Resources	503-641-8488
OR	Beaverton, Murphy Elctrns.	503-642-2001
PA	Huntington Valley, Plastic & Metal Prods.	215-322-2000
PA	Norristown, Century Elctrns.	215-631-5400
PA	Pittsburgh, Alder-Tronics	412-821-5565
TX	Grand Prairie, Tech Supp.	214-660-4888
WA	Redmond, Energy Sls.	206-883-2343
WA	Redmond, Murphy Elctrns.	206-881-1234
WA	Seattle, Component Resources	206-454-8666
WA	Seattle, Pacific Elctrns.	206-575-1050
Can	Mississauga, Ont., Rush/Ontario	416-677-7280

BIW CABLE SYS., INC., 65 Bay St., Dorchester, MA 02125, Tel: 617-265-2102, Telex: 94-0604; FSC No.: 71102; Empl.: 600; *Sls. Mgr.:* E. McCormick

BLACK & WEBSTER, 219 Bear Hill Rd., Waltham, MA 02254, Tel: 617-890-9100, Telex: 951102; Empl.: 80

BLACK BOX CORP., Micom Sys., P.O. Box 12800, Pittsburgh, PA 15241, Tel: 412-746-5500, Telex: 510-697-3125; *Sls. Mgr.:* Peter Highberg

BLACKHAWK NETWORKS CORP., 14 N. Parker Dr., P.O. Box 919, Janesville, WI 53545, Tel: 608-752-8701, TWX: 910-350-8266; FSC No.: 12724; Empl.: 10

BLANCK, A. R., CO., Box 249, Rutherford, NJ 07070, Tel: 201-933-2091; Empl.: 6; *Sls. Mgr.:* Dr. A. R. Blanck; *Dist. Mgr.:* Dr. A. R. Blanck

BLATEK INDS., INC., Box 574, Bellefonte, PA 16823, Tel: 814-355-4910; Empl.: 20; *Sls. Mgr.:* Linda C. Feltman .... **B•1787**

Local Sales Offices & Reps

CA	Burbank, Modco	818-848-2215
CO	Littleton, McCarthy Co.	303-773-0643
CT	Woodbridge, Elctrn. Mktg.	203-397-1461
MI	Benton Harbor, McNabb & Assocs.	616-925-2166

BLH ELCTRNS., 75 Shawmut Road, Canton, MA 02021, Tel: 617-821-2000, Telex: 92-3413, TWX: 710-324-0683; FSC No.: 03089; Empl.: 250; *Sls. Mgr.:* C. Wesley

BLILEY ELEC. CO., 2545 W. Grandview Blvd., Erie, PA 16506, Tel: 814-838-3571, Telex: 510-696-6886; FSC No.: 71034;3098; Empl.: 200; *Sls. Mgr.:* H. A. Yocum .... **A•1316-1323**

Local Sales Offices & Reps

AL	Huntsville, R. W. Mitscher Co.	205-882-6050

BLILEY REPRESENTATIVES COVER THESE STATES:

Southern California, Arizona
CAIN TECHNOLOGY, INC.

Northern California, Northwestern Nevada
GENE C. WOEMPNER COMPANY

Massachusetts, Connecticut, Maine, New Hampshire, Vermont, Rhode Island
STURGEON COMPANY

New York (Metropolitan NYC), Northern New Jersey
SCHMITT INDUSTRIAL MARKETING CORP.

New York State (excluding Metropolitan NYC), Virginia, North & South Carolina, Georgia, Mississippi, Alabama, Tennessee, Maryland, Delaware, Florida, Eastern Pennsylvania, Southern New Jersey, Canadian Provinces of Ontario & Quebec
R.W. MITSCHER CO., INC.

Washington, Oregon
DUSSAULT & ASSOCIATES, INC.

Texas, Louisiana, Arkansas, Oklahoma
VECTOR SALES CO., INC.

Missouri, Kansas, Nebraska, Southern Iowa, Middle & Southern Illinois
AME SALES, INC.

See adjacent listing for the address and telephone number of your Bliley representative.

Bliley
ELECTRIC COMPANY

CA	Los Angeles, Cain Technology, Inc.	213-477-9054
CA	Mountain View, Gene C. Woempner Co.	415-964-5454
CA	Orange, Cain Technology, Inc.	714-997-7311
CT	Hartford, Sturgeon Co.	203-249-7800
FL	Altamonte Springs, R. W. Mitscher Co.	305-788-6844
FL	Boca Raton, R. W. Mitscher Co.	305-368-3841
GA	Lawrenceville, R. W. Mitscher Co.	404-923-3239
MD	Laurel, R. W. Mitscher Co.	301-498-6090
MA	Needham, Sturgeon Co.	617-444-6603
MO	St. Louis, AME Sales, Inc.	314-965-1779
NY	Bainbridge, R. W. Mitscher Co.	607-967-7192
NY	Buffalo, R. W. Mitscher Co.	716-633-7970
NY	Pittsford, R. W. Mitscher Co.	716-586-4012
NY	Red Hook, R. W. Mitscher Co.	914-758-8375
NY	Rochester, R. W. Mitscher Co.	716-227-0839
NY	Utica, R. W. Mitscher Co.	315-733-0171
NY	West Hempstead, Schmitt Indl. Mktg. Corp.	516-486-3510
NC	Charlotte, R. W. Mitscher Co.	704-598-8644
NC	Raleigh, R. W. Mitscher Co.	919-848-0941
OR	Portland, Dussault & Assocs. Inc.	503-641-8780
PA	Huntingdon Valley, R. W. Mitscher Co.	215-355-4452
TN	Johnson City, R. W. Mitscher Co.	615-929-7258
TX	Richardson, Vector Sls. Co.	214-234-4291
VA	Midlothian, R. W. Mitscher Co.	804-744-4676
WA	Seattle, Dussault & Assocs., Inc.	206-527-5454
EXP	CT, Stamford, Dage Corp.	203-324-3123

® BLUE M

BLUE M, A UNIT OF GENERAL SIGNAL, 138th & Chatham Sts., Blue Island, IL 60406, Tel: 312-385-9000, TWX: 910-689-3398; Empl.: 420; *Sls. Mgr.:* H. G. Mathews **D•1165**

Local Sales Offices & Reps

AZ	Tempe, Blue M	602-894-2305
CA	El Monte, Blue M	818-442-6672
CA	Sunnyvale, Blue M	408-734-8734
DE	Wilmington, Blue M	302-478-6983
FL	Winter Park, Blue M	305-671-6655
GA	Atlanta, Blue M	404-455-3452
KS	Overland Park, Blue M	913-888-6483
MA	Natick, Blue M	617-651-1616
MI	Taylor, Blue M	313-281-2107
NY	Nanuet, Blue M	914-623-0900
NY	Syracuse, Blue M	315-437-0192
NC	Charlotte, Blue M	704-527-2492
OH	Cincinnati, Blue M	513-821-6278
OH	Hudson, Blue M	216-656-1177
TX	Garland, Blue M	214-272-2509
TX	San Marcos, Blue M	512-353-8003
WA	Seattle, Blue M	206-763-1030

BLUFFTON PRODUCTS, INC., Tegam, Inc., 7230 North Ridge Road, Madison, OH 44057, Tel: 216-946-3572; *Sls. Mgr.:* Doug Bradley

BLUM, JULIUS & CO., INC., Box 292, Carlstadt, NJ 07072, Tel: 201-438-4600, Telex: 13-3491; Empl.: 40

BMS DATA HANDLING, INC., 12155 Magnolia, Riverside, CA 92503, Tel: 714-359-8824; Empl.: 16; *Sls. Mgr.:* Thomas H. Mitchell

BODINE ELEC. CO., 2500 W. Bradley Pl., Chicago, IL 60618, Tel: 312-478-3515, Telex: 25-3646; Empl.: 800; *Sls. Mgr.:* R. E. Ford; *Dist. Mgr.:* R. E. Ford **B•1140**

Local Sales Offices & Reps

CA	Al Hambra, C. E. Mello	818-282-2000
CA	San Jose, E. W. Duemmlein	408-243-4800
KS	Shawnee Mission, J. S. Gleeson & Assocs.	913-362-4422
MA	Andover, L. R. Cascino	617-470-0050
MI	Plymouth, Steve Cavender	313-453-2730
NY	Massapequa, D. V. Mayorga	516-541-1611
NY	Rochester, Application Specialists	716-586-6226
NY	Syracuse, Application Specialists	315-437-2813
OH	Hudson, J. H. Basten	216-656-4226
OR	Portland, D. E. Johnson	503-246-3131
TX	Richardson, General Power Equip.	214-783-8371
VA	McLean, J. S. Hsia	703-734-1739
EXP	IL, Chicago, Export Dept., Bodine Elec.	312-478-3515

Local Distributors

AL	Mobile, Brownell Instrs. & Conts. Co.	205-479-5405
AK	Anchorage, Airport Machinery Co	907-272-0544
AZ	Phoenix, Minarik Elec. Co.	602-233-3000
CA	Carson, Power Trans. Specialties	213-631-7502
CA	Los Angeles, Minarik Elec. Co.	213-624-3161
CA	Mountain View, King Bearing, Inc.	415-968-8316
CA	San Diego, Minarik Elec. Co.	619-560-6632
CA	San Jose, King Bearing, Inc.	408-998-5464
CA	San Jose, Republic Supp. Co.	408-279-2202
CA	San Leandro, Republic Supp. Co.	415-357-2211
CA	Santa Clara, Minarik Elec. Co.	408-727-0575
CO	Denver, Wazee Elec. Co.	303-623-8658
CT	Berlin, B & B Motor & Control	203-828-8550
CT	Hartford, Machine Drives & Controls	203-728-0403
CT	Norwalk, Machine Drives & Controls	203-846-2007
FL	Hialeah, Condo Elec. & Ind. Supp., Inc.	305-691-5400
FL	Jacksonville, Electrical-Mech. Dr., Inc.	904-783-2730
FL	Orlando, Brownell Instrs. & Conts. Co.	305-843-6770
FL	Tampa, Electrical-Mech. Dr., Inc.	813-621-8675
GA	Hapeville, Brownell Instrs. & Conts. Co.	404-762-5181
IL	Aurora, Industrial Supp. Co.	312-844-5500
IL	Chicago, Excel Elec. Svc. Co.	312-421-7220
IL	Chicago, Harris & Lee	312-372-7272
IL	Rockford, Harris & Lee	815-398-0606
IN	Indianapolis, B & B Motor & Control	317-248-0396
IA	Cedar Rapids, Precision Bearing Co.	319-365-5276
IA	Des Moines, Precision Bearing Co.	515-265-9811
KS	Kansas City, Kornfeld Thorp Elec.	913-321-7070
MA	Medford, Empire Elctrl. Co.	617-395-5000
MA	Somerville, Electro Sls. Co., Inc.	617-666-0500
MI	Detroit, Howard Elec. Co.	313-923-0430
MI	Grand Rapids, MacKay Ind. Sls.	616-241-1671
MN	Minneapolis, Boustead Elec. & Mfg.	612-544-9131
MO	St. Louis, Zeller Elec., Inc.	314-638-9641
NE	Omaha, Precision Bearing Co.	402-444-3939
NV	Reno, Republic Supp. Co.	702-677-1761
NJ	Cherry Hill, Jos. T. Fewkes & Co.	609-424-5810
NJ	Piscataway, B & B Motor & Control	201-572-0500
NY	Binghamton, K. J. Elec. Corp.	607-772-1760
NY	East Syracuse, K. J. Elec. Corp.	315-437-2826
NY	Long Island City, B & B Motor & Control	718-784-1313
NY	Rochester, B & B Motor & Control	716-424-7040
NC	Charlotte, Brownell Instrs. & Conts. Co.	704-597-1270
NC	Charlotte, Mize Co., Inc.	704-375-5761
OH	Cleveland, Reserve Elec. Co.	216-771-5764
OH	Dayton, Thal Mor Assoc., Inc.	513-298-9939
OK	Oklahoma City, Dagwell Dixie Co.	405-232-7671
OK	Tulsa, Southwest Drives, Inc.	918-834-4231
OR	Portland, Campbell Ind. Supp.	503-231-4820
PA	Altoona, Miller Elec. Svc. & Supp.	814-942-9943
PA	Pittsburgh, Braunlich-Roessie	412-471-6995
SC	Taylors, B & B Motor & Control	803-268-5702
TN	Memphis, Brownell Instrs. & Conts. Co.	901-795-8487
TN	Nashville, Tennessee Machinery Co.	615-244-8150
TX	Dallas, Motion Inds.	214-351-2211
TX	Fort Worth, Motion Inds.	817-335-8131
TX	Houston, B & B Motor & Control	713-820-7931
TX	Houston, Research Des., Inc.	713-995-8591
VA	Richmond, Ind. Supp. Corp.	804-355-8041
WA	Seattle, Campbell Ind. Supp. Co.	206-447-7100
WA	Seattle, Industrial Elec.	206-329-3900
WA	Spokane, Campbell Ind. Supp. Co.	509-838-8288
WA	Tacoma, Campbell Ind. Supp. Co.	206-383-2431
WI	Milwaukee, Trester Svc. Elec.	414-264-8170
WI	New Berlin, Elec. Sls. & Engrg.	414-782-2400

BOEING MICROELECTRONICS, PCB OPNS., M/S: 88-34, Box 24666, Seattle, WA 98124, Tel: 206-773-1083, Telex: 32-9430, TWX: 910-423-1563; Empl.: 120; *Sls. Mgr.:* M.A. Schalk

BOKER'S, INC., 3104 Snelling Ave., Minneapolis, MN 55406, Tel: 612-729-9365

BOMAR CRYSTAL, 201 Blackford Ave., Middlesex, NJ 08846, Tel: 201-356-7787, 800-526-3935, TWX: 710-480-4560; Empl.: 75; *Sls. Mgr.:* Phil Casciano

BOMCO, See MuShield Co.

BONUS-BILT, INC., Hofmann Inds., 1096 Air Way, Glendale, CA 91201, Tel: 213-245-9177, 800-692-8888; Empl.: 100; *Sls. Mgr.:* Don Nunnery

BOONTON ELCTRNS. CORP., 791 Route 10, Randolph, NJ 07869, Tel: 201-584-1077, TWX: 710-986-8215 BOONTRONICS; FSC No.: 04901; Empl.: 180; *Sls. Mgr.:* J. Garthwaite **D•1197**

Local Sales Offices & Reps

AL	Huntsville, Sci. Devices	205-536-1969
AZ	Phoenix, Aztec Entprs.	602-943-8178
CA	North Hollywood, O'Halloran Assocs.	213-877-0173
CA	Palo Alto, O'Halloran Assocs.	415-326-1493
CO	Denver, Aztec Entprs.	303-779-5285
CT	Mt. Carmel, Sci. Devices	203-248-9361
FL	Orlando, Sci. Devices	305-841-8180
FL	Shalimer, Sci. Devices	904-651-4407
IL	Elmhurst, Sector Engrg. Sls., Inc.	312-530-7850
IN	Indianapolis, Sector Engrg. Sls., Inc.	317-842-1120
KS	Overland Park, Ramsey Assoc.	913-649-6996
MD	Silver Spring, Sel-Tronics	301-589-3391
MA	Lexington, R. J. Sickles	617-862-5100
MN	Minneapolis, Sector Engrg. Sls., Inc.	612-593-1809
MO	Maryland Hgts., Ramsey Assoc.	314-878-5042
NJ	Englewood Cliffs, Sci. Devices	201-871-3916
NM	Albuquerque, Aztec Entprs.	505-262-1688
NY	Rochester, Sci. Devices	716-334-2445
NC	Winston-Salem, Sci. Devices	919-765-5776
OH	Centerville, Micro Sls.	513-433-8171
OH	N. Olmsted, Micro Sls.	216-734-3080
OR	Portland, Sci. Devices	503-292-6934
PA	Melrose Park, R. Meyers	215-224-1663
TX	Austin, Testech	512-327-7033
TX	Houston, Testech	713-956-0837
TX	Richardson, Testech	214-644-5010
UT	Ogden, Aztec Entprs.	801-621-1655
WA	Bellevue, Sci. Devices	206-747-5169
WI	Milwaukee, Sector Engrg. Sls., Inc.	301-589-3391

bopla ENCLOSURES SYSTEMS

BOPLA ENCLOSURES, 1350 Beverly Rd., Ste. 115-338, McLean, VA 22101, Tel: 703-549-7242, Telex: 298598 ROSE UR; FSC No.: 4Y520; Empl.: 17 **C•1026**

BORG-WARNER THERMOELECTRICS, BORG-WARNER CORP., See TECA, ThermoElectric Cooling America Corp.

BORROUGHS, Lear Siegler, Inc., 3002 N. Burdick St., Kalamazoo, MI 49007, Tel: 616-342-0161, Telex: 224322; Empl.: 417

BOSCH, ROBERT, CORP., 2800 S. 25th Ave., Broadview, IL 60153, Tel: 312-865-5200, Telex: 23-5563; *Sls. Mgr.:* Dieter Bloecks; *Dist. Mgr.:* Dave Robson **B•1296-1297**

Local Sales Offices & Reps

AL	Huntsville, 20th Century Mktg.	205-533-9287
AZ	Scottsdale, Luscombe Engrg.	602-949-9333
CA	Campbell, Luscombe Engrg.	408-370-2020
CA	Pasadena, Luscombe Engrg.	213-684-2000
CA	San Diego, Luscombe Engrg.	619-295-4300
CO	Longmont, Piper Sls.	303-651-2378
CT	Madison, Conti Younger Assocs.	203-245-1136
FL	Enterprise, D.J.E. Assocs., Inc.	305-321-6623
GA	Norcross, 20th Century Mktg.	404-446-1999
IL	Woodridge, Trend-Tronics, Inc.	312-985-0626
IA	Davenport, Rush & West	319-326-3091
KS	Kansas City, Rush & West	913-764-2700
MA	Burlington, Conti Younger	617-273-1582
MN	Minneapolis, H.M.R., Inc.	612-888-2122
MO	Ballwin, Rush & West Assocs.	319-394-7271
NY	Yonkers, Sonkin Assocs.	914-968-8282
NC	Raleigh, 20th Century Mktg.	919-782-4333
PA	Cornwells Hts., William Staats Co.	215-639-5231
TN	Memphis, 20th Century Mktg.	901-756-4681
TX	Dallas, P.J. Scanlon Co.	214-231-4661
WA	Mercer Island, Electronic Comp. Sls.	206-232-9301
WI	Waukesha, Trend-Tronics, Inc.	414-542-4919

Local Distributors

CA	Santa Monica, Distributor Specialists	213-393-9666
IL	Woodridge, Trend-Tronics, Inc.	312-985-0626
NY	Yonkers, Sonkin Assocs.	914-968-8282

Boschert

BOSCHERT INC., 384 Santa Trinita Ave., Sunnyvale, CA 94086, Tel: 408-732-2440, TWX: 910-339-9241; Empl.: 1500; *Sls. Mgr.:* Lloyd Schiller; *Dist. Mgr.:* Lloyd Schiller **D•1537-1540**

Local Sales Offices & Reps

AZ	Scottsdale, American Mktg.	602-948-2778
CA	Fountain Valley, K-Two Sls.	714-968-4726
CA	San Diego, Harvey King	619-566-5252
CA	Santa Clara, Criterion	408-988-6300
CA	Sunnyvale, Boschert	408-732-2440
CO	Aurora, Electrodyne	303-695-8903
FL	Clearwater, Dyne-A-Mark	813-441-4702
FL	Ft. Lauderdale, Dyne-A-Mark	305-771-6501
FL	Maitland, Dyne-A-Mark	305-831-2097
IL	Elk Grove Village, Control Sls.	312-595-2110
IN	Indianapolis, SAI Mktg.	317-241-9276
IA	Cedar Rapids, Stan Clothier	319-395-0245
KS	Augusta, Design Solutions	316-775-7424
MA	Marlboro, Eastern Micro	617-480-0400
MI	Brighton, SAI Mktg.	313-227-1786
MN	Minneapolis, Stan Clothier Co.	612-944-3456
MO	St. Louis, Design Solutions	314-961-7170
NJ	Cherry Hill, Power Squared	609-424-6622
NJ	Totowa, Boschert	201-256-4046
NY	Huntington, Morgan Elctrns.	516-549-5180
OH	Centerville, SAI Mktg.	513-435-3181
OH	Shaker Hgts., SAI Mktg.	216-751-3633
TX	Austin, O. M. Sales	512-452-1838
TX	Houston, O. M. Sales	713-789-4426
TX	Richardson, O. M. Sales	214-690-6746
UT	Salt Lake City, Electrodyne	801-486-3801
WI	Thiensville, Control Sls.	414-242-4580

Local Distributors

AL	Huntsville, Arrow Elctrns.	205-882-2730
AL	Huntsville, Marshall	205-881-9235
AZ	Tempe, Anthem	602-244-0900
AZ	Tempe, Arrow Elctrns.	602-968-4800
AZ	Tempe, Marshall Inds.	602-968-6181
CA	Canoga Park, Marshall Inds.	213-999-5001
CA	Chatsworth, Anthem	213-700-1000
CA	Chatsworth, Arrow Elctrns.	818-701-7500
CA	El Monte, Marshall Inds.	213-442-7204
CA	Irvine, Marshall Inds.	714-556-6400
CA	San Diego, Anthem	619-453-9005
CA	San Diego, Arrow Elctrns.	619-565-4800
CA	San Diego, Marshall Inds.	619-578-9600
CA	San Jose, Anthem	408-946-8000
CA	Sunnyvale, Arrow Elctrns.	408-745-6600
CA	Sunnyvale, Marshall Inds.	408-732-1100
CA	Tustin, Anthem	714-730-8000
CA	Tustin, Arrow Elctrns.	714-595-2860
CO	Aurora, Arrow Elctrns.	303-696-1111
CO	Denver, Marshall Inds.	303-427-1818
CO	Englewood, Anthem	303-790-4500
CT	Wallingford, Arrow Elctrns.	203-265-7741
CT	Wallingford, Marshall Inds.	203-265-3822
FL	Ft. Lauderdale, Marshall Inds.	305-928-0661
FL	Palm Bay, Arrow Elctrns.	305-725-1480
GA	Norcross, Arrow Elctrns.	404-449-8252
GA	Norcross, Marshall Inds.	404-923-5750
IL	Schaumberg, Marshall	312-490-0155
IL	Schaumburg, Arrow Elctrns.	312-397-3440
IN	Indianapolis, Arrow Elctrns.	317-243-9353
IA	Cedar Rapids, Arrow Elctrns.	319-395-7230
KS	Lexena, Marshall Ind.	913-492-3121
MD	Gaithersburg, Marshall Inds.	301-840-9450
MA	Burlington, Marshall Inds.	617-272-8200
MI	Ann Arbor, Arrow Elctrns.	313-971-8220
MI	Livonia, Marshall	313-525-5850
MN	Edina, Arrow Elctrns.	612-830-1800
MN	Plymouth, Marshall	612-559-2211
MO	St. Louis, Arrow Elctrns.	314-567-6888
NJ	Fairfield, Marshall Inds.	201-882-0320
NJ	Marlton, Arrow Elctrns.	609-596-8000
NJ	Mt. Laurel, Marshall Inds.	609-234-9100
NM	Albuquerque, Arrow Elctrns.	505-243-4566
NY	Endwell, Marshall	607-754-1570
NY	Hauppauge, Arrow Elctrns.	516-231-1000
NY	Hauppauge, Marshall Inds.	516-273-2424
NY	Liverpool, Arrow Elctrns.	315-652-1000
NY	Melville, Arrow Elctrns.	516-694-6800
NY	Rochester, Arrow Elctrns.	716-427-0300
NY	Rochester, Marshall	716-235-7620
NC	Winston-Salem, Arrow Elctrns.	919-725-8711
OH	Centerville, Arrow Elctrns.	513-435-5563
OH	Dayton, Marshall	513-236-8088
OH	Solon, Arrow Elctrns.	216-248-3990
OK	Tulsa, Arrow Elctrns.	918-665-7700
OR	Beaverton, Marshall	503-644-5050
OR	Lake Oswego, Anthem Elctrns.	503-684-2661
PA	Monroeville, Arrow Elctrns.	412-856-7000
TX	Austin, Marshall	512-458-5654
TX	Dallas, Arrow Elctrns.	214-386-7500
TX	Dallas, Marshall Inds.	214-233-5200
TX	Houston, Arrow Elctrns.	713-530-4700
TX	Houston, Marshall Inds.	713-789-6600
WA	Bellevue, Arrow Elctrns.	206-643-4800
WA	Bellevue, Marshall Inds.	206-747-9100
WA	Redmond, Anthem	206-881-0850
WI	Oak Creek, Arrow Elctrns.	414-764-6600

BOSTON SYSTEMS OFFICE, 469 Moody St., Waltham, MA 02254-9164, Tel: 617-894-7800, TWX: 710-324-0760; Empl.: 80; *Sls. Mgr.:* Francis X. O'Brien; *Dist. Mgr.:* Debra DellaCamera (International)

BOURNS, INC., Resistive Components Group, 1200 Columbia Ave., Riverside, CA 92507, Tel: 714-781-5050, TWX: 910-332-1252; Empl.: 4000; *Sls. Mgr.:* R. A. Sickler; *Dist. Mgr.:* Dennis Lause .... **A•1800-1803, 1996-2008**

Local Sales Offices & Reps

AL	Huntsville, CSR Elctrns.	205-533-2444
AZ	Phoenix, Shefler-Kahn	602-257-9015
CA	Encino, Great American Rep Co.	818-990-4870
CA	San Diego, SR Elctrns.	619-560-8330
CA	San Jose, QuadRep, Inc.	408-946-4000
CA	Tustin, Great American Rep Co.	714-954-0371
CO	Parker, Parker Webster	303-841-4888
FL	Altamonte Springs, Dyne-A-Mark	305-831-2097
FL	Clearwater, Dyne-A-Mark	813-441-4702
FL	Ft. Lauderdale, Dyne-A-Mark	305-771-6501
FL	Palm Bay, Dyne-A-Mark	305-727-0192
GA	Atlanta, CSR Elctrns.	404-396-3720
ID	Boise, Intermountain Technlg.	208-322-5022
IL	Elk Grove Village, John G. Twist Co.	312-593-0200
IN	Carmel, Technlg. Mktg. Corp.	317-844-8462
IN	Ft. Wayne, Technlg. Mktg. Corp.	219-432-5553
IA	Cedar Rapids, REP Assocs. Corp.	319-373-0152
KY	Louisville, Technlg. Mktg. Corp.	502-499-7808
MD	Baltimore, Micro-Comp.	301-247-0400
MA	Lexington, John E. Boeing Co.	617-862-2500
MI	Detroit, Rathburg Assocs.	313-882-1717
MN	Edina, Mel Foster	612-941-9790
MO	Bridgeton, Centech	314-291-4230
MO	Raytown, Centech	816-358-8100
NJ	Bellmawr, Thomas Assocs.	609-933-2600
NM	Albuquerque, Shefler-Kahn Co.	505-296-0749
NY	Ithaca, B. Dean	607-257-1111
NY	Melville, Comtronic Assocs.	516-249-0505
NY	Wappingers Falls, Bourns	914-297-1180
NC	Raleigh, CSR Elctrns.	919-878-9200
OH	Richfield, Bear Mktg.	216-659-3131
OK	Oklahoma City, Ammon & Rizos	405-942-2552
OR	Portland, J. J. Backer	503-297-8744
OR	Salem, J. J. Backer	503-362-0717
TX	Austin, Ammon & Rizos	512-454-5131
TX	Dallas, Ammon & Rizos	214-644-5591
TX	Houston, Ammon & Rizos	713-781-6240
UT	Salt Lake City, Parker Webster	801-266-9939
VA	Huddleston, Micro-Comp	301-247-0400
WA	Seattle, J. J. Backer	206-285-1300

Local Distributors

AL	Huntsville, Hall-Mark Elctrns.	205-837-8700
AL	Huntsville, Hamilton/Avnet Elctrns.	205-837-7210
AL	Huntsville, Pioneer/Washington	205-837-9300
AL	Huntsville, Schweber	205-882-2200
AZ	Phoenix, Elctrn. Parts Co.	602-277-7281
AZ	Phoenix, Hall-Mark Elctrns.	602-243-6601
AZ	Phoenix, Schweber Elctrns.	602-997-4874
AZ	Phoenix, TTI	602-861-0222
AZ	Tempe, Acacia Sls.	602-894-2874
AZ	Tempe, Bell Inds.	602-966-7800
AZ	Tempe, Elctrn. Supp.	602-258-4769
AZ	Tempe, Hamilton/Avnet	602-231-5100
CA	Canoga Park, Schweber Elctrns.	213-999-4702
CA	Chatsworth, Avnet Elctrns.	213-700-2600
CA	Chatsworth, TTI	818-709-1010
CA	Citrus Hts, Hall-Mark Elctrns.	916-443-7282
CA	Compton, Harper S.I.D.	213-979-5090
CA	Costa Mesa, Avnet Elctrns.	714-754-6111
CA	Costa Mesa, Avnet Elctrns.	213-558-2313
CA	Costa Mesa, Hamilton Elctrns.	714-641-4100
CA	Culver City, Hamilton Electro Sls.	213-558-2883/84
CA	Culver City, Hamilton Electro Sls.	213-558-2121
CA	El Segundo, Hall-Mark Elctrns.	213-643-9101
CA	Garden Grove, Bell Inds.	213-444-0301
CA	Gardena, Bell Inds.	213-515-1800
CA	Irvine, Acacia Sls.	714-549-0954
CA	Irvine, Schweber Elctrns.	714-556-3880
CA	Irvine, Schweber Elctrns.	714-863-0261
CA	Oakland, Brill Elctrns.	415-834-5888
CA	Riverside, Elctrn. Supp. Corp.	714-787-9220
CA	Roseville, Bell Inds.	916-969-3100
CA	Sacramento, Hamilton/Avnet	916-920-3150
CA	Sacramento, Schweber Elctrns.	916-929-9732
CA	San Diego, Acacia Sls.	619-565-4365
CA	San Diego, Bell Inds.	619-268-1277
CA	San Diego, Elctrn. Supp.	619-278-5020
CA	San Diego, Hall-Mark Elctrns.	619-268-1201
CA	San Diego, Hamilton/Avnet	619-571-7500
CA	San Jose, TTI	408-943-9155
CA	Santa Ana, Teknopak	714-558-8840
CA	Santa Clara, Schweber Elctrns.	408-748-4700
CA	Santa Clara, Schweber Elctrns.	408-496-0200
CA	Sunnyvale, Acacia Sls.	408-745-7200
CA	Sunnyvale, Bell Inds.	408-734-8570
CA	Sunnyvale, Hall-Mark Elctrns.	408-773-9990
CA	Sunnyvale, Hamilton/Avnet	408-743-3300
CA	Tustin, Hall-Mark Elctrns.	714-669-0681
CA	Woodland Hills, Avnet Elctrns.	213-884-3322
CO	Denver, Newark Elctrns.	303-757-3351
CO	Englewood, Hall-Mark Elctrns.	303-790-1662
CO	Englewood, Hamilton/Avnet	303-779-9998
CO	Lakewood, Acacia Sls.	303-232-2882
CO	Wheat Ridge, Bell Inds.	303-424-1985
CT	Danbury, Hamilton/Avnet	203-797-2856
CT	Danbury, Schweber Elctrns.	203-792-3500
CT	Hamden, Almo Elctrns. Corp.	203-288-6556
CT	Norwalk, Pioneer Std.	203-853-1515
CT	Statford, TTI	203-375-1400
CT	Wallingford, Midan Elctrns.	203-265-2077
FL	Altamonte Springs, Pioneer Std.	305-834-9090
FL	Altamonte Springs, Schweber Elctrns.	305-331-7555
FL	Clearwater, Hall-Mark Elctrns.	813-530-4543
FL	Dania, Summit Distrs.	305-920-625
FL	Ft. Lauderdale, Hall-Mark Elctrns.	305-971-9280
FL	Ft. Lauderdale, Hamilton/Avnet	305-971-2900
FL	Ft. Lauderdale, Hammond Elctrns.	305-973-7103
FL	Ft. Lauderdale, Pioneer/Washington	305-771-7520
FL	Hollywood, Schweber Elctrns.	305-927-0511
FL	Largo, Graham Elctrns.	813-541-4434
FL	Orlando, Hall-Mark	305-855-4020
FL	Orlando, Hammond Elctrns.	305-849-6060
FL	Orlando, Pioneer/Orlando	305-834-9090
FL	Orlando, TTI	305-859-1000
FL	St. Petersburg, Hall-Mark Elctrns.	813-576-8691
FL	St. Petersburg, Hamilton/Avnet	813-576-3930
FL	Winter Park, Hamilton/Avnet	305-628-3888
GA	Norcross, Hall-Mark Elctrns.	404-447-8000
GA	Norcross, Hamilton/Avnet	404-447-7500
GA	Norcross, Hammond Elctrns.	404-449-1996
GA	Norcross, Pioneer/Washington	404-448-1711
GA	Norcross, Schweber Elctrns.	404-449-9170
GA	Norcross, TTI	404-662-0911
IL	Bensenville, Hall-Mark Elctrns.	312-860-3800
IL	Bensenville, Hamilton/Avnet	312-860-8523
IL	Chicago, Bell Inds.	312-982-9210
IL	Chicago, Newark Elctrns.	312-638-4411
IL	Elk Grove Village, Pioneer Std.	312-437-9680
IL	Elk Grove Village, Schweber Elctrns.	312-364-3750
IL	Palatine, Ohm Elctrns.	312-359-5500
IN	Carmel, Hamilton/Avnet	317-844-9333
IN	Fort Wayne, Graham Elctrns.	219-423-3422
IN	Indianapolis, Graham Elctrns.	317-634-8202
IN	Indianapolis, Pioneer Std. Elctrns.	317-849-7300
IN	Lafayette, Graham Elctrns.	317-423-5564
IA	Cedar Rapids, Bell Inds.	319-395-0730
IA	Cedar Rapids, Hamilton/Avnet	319-362-4757
IA	Cedar Rapids, Schweber Elctrns.	319-373-1417
KS	Lenexa, Hall-Mark Elctrns.	913-888-4747
KS	Overland Park, Schweber Elctrns.	913-492-2921
KS	Overland Pk., Hamilton/Avnet Elctrns.	913-888-8900
LA	New Orleans, Wm B Allen Supp.	504-525-8222
MD	Baltimore, Radio Elec. Svc. Co.	301-529-0500
MD	Beltsville, Radio Elec. Svc. Co.	202-937-9100
MD	Columbia, Hall-Mark Elctrns.	301-796-9300
MD	Columbia, Hamilton/Avnet	301-995-3500
MD	Gaithersburg, Almo Elctrns. Corp.	301-670-0090
MD	Gaithersburg, Pioneer/Washington	301-921-0660
MD	Gaithersburg, Schweber Elctrns.	301-840-5900
MA	Bedford, Schweber Elctrns.	617-275-5100
MA	Burlington, Lionex Corp.	617-657-5170
MA	Canton, Almo Elctrns. Corp.	617-821-1450
MA	Lexington, Pioneer Std.	617-863-1200
MA	Norwood, Gerber Elctrns.	617-769-6000
MA	Wilmington, RC Comps.	617-273-1860
MA	Woburn, Hall-Mark Elctrns.	617-935-9777
MA	Woburn, Hamilton/Avnet	617-273-7500
MI	Flint, RS Elctrns.	313-762-5800
MI	Grand Rapids, Hamilton/Avnet	616-243-8805
MI	Grand Rapids, RS Elctrns.	616-241-3483
MI	Kalamazoo, RS Elctrns.	616-381-5470
MI	Livonia, Hamilton/Avnet	313-522-4700
MI	Livonia, Pioneer Std. Elctrns.	313-525-1800
MI	Livonia, RS Elctrns.	313-525-1155
MI	Livonia, Schweber Elctrns.	313-525-8100
MI	Roseville, RS Elctrns.	313-779-2450
MI	Wyandotte, RS Elctrns.	313-AV2-5880
MN	Bloomington, Hall-Mark Elctrns.	612-854-3223
MN	Eden Prairie, Schweber Elctrns.	612-941-5280
MN	Edina, Schweber Elctrns.	612-941-5280
MN	Minneapolis, Newark Elctrns.	612-331-6350
MN	Minnetonka, Hamilton/Avnet	612-932-0600
MN	Minnetonka, Pioneer Std. Elctrns.	612-935-5444
MO	Earth City, Hamilton/Avnet	314-344-1200
MO	Earth City, Schweber Elctrns.	314-739-0526
MO	Maryland Hts, Hall-Mark Elctrns.	314-291-5350
NH	Hudson, C&H Elctrns.	603-882-1133
NH	Manchester, Schweber Elctrns.	603-625-2250
NJ	Camden, General Radio	609-964-8560

NJ	Cherry Hill, Hall-Mark Elctrns.	609-424-7300
NJ	Cherry Hill, Hamilton/Avnet	609-424-0110
NJ	Clifton, J-Mar Elctrns.	201-772-6400
NJ	Fairfield, Hall-Mark Elctrns.	201-575-4415
NJ	Fairfield, Hamilton/Avnet	201-575-3390
NJ	Fairfield, Lionex	201-227-7960
NJ	Fairfield, Schweber Elctrns.	201-227-7880
NJ	Pine Brook, Pioneer Std.	201-227-1262
NM	Albuquerque, Bell Inds.	505-292-2700
NM	Albuquerque, Elctrn. Parts	505-293-6161
NM	Albuquerque, Elctrn. Parts Co.	505-293-6161
NM	Albuquerque, Hamilton/Avnet Elctrns.	505-765-1500
NM	Las Cruces, Elctrn. Parts Co.	505-523-4578
NY	Bohemia, TTI	516-567-1500
NY	Buffalo, Summit Distrs.	716-884-3450
NY	E. Syracuse, Hamilton/Avnet	315-437-2647
NY	Fairport, Pioneer-Harvey	716-381-7070
NY	Hauppauge, Hamilton/Avnet	516-231-9800
NY	Hauppauge, Lionex	516-273-1660
NY	Hauppauge, Mast Distrs.	516-273-4422
NY	Hauppauge, Pioneer-Harvey	516-231-9200
NY	Melville, Hamilton/Avnet	516-454-6000
NY	Rochester, Hamilton/Avnet Elctrns.	716-475-9130
NY	Rochester, Schweber Elctrns.	716-424-2222
NY	Rochester, Summit Distrs.	716-334-8110
NY	Ronkonkoma, Hall-Mark Elctrns.	516-737-0600
NY	Vestal, Pioneer Std.	607-748-8211
NY	Westbury, Schweber Elctrns.	516-334-7474
NC	Charlotte, Pioneer/Washington	704-527-8188
NC	Greensboro, Hammond Elctrns.	919-275-6391
NC	Raleigh, Hall-Mark Elctrns.	919-872-6286
NC	Raleigh, Hall-Mark Elctrns.	919-872-0712
NC	Raleigh, Hamilton/Avnet	919-878-0819
NC	Raleigh, Schweber Elctrns.	919-876-0000
OH	Beachwood, Schweber Elctrns.	216-464-2970
OH	Cincinnati, Hall-Mark Elctrns.	513-563-5980
OH	Cincinnati, Hughes-Peters	513-351-2000
OH	Cleveland, CAM/Ohio	216-461-4700
OH	Cleveland, Hamilton/Avnet	216-831-3500
OH	Cleveland, Pioneer Std.	216-587-3600
OH	Columbus, Graham Elctrns.	614-895-1590
OH	Columbus, Hughes-Peters	614-294-5351
OH	Dayton, Bell Inds.	513-434-8213
OH	Dayton, Hamilton/Avnet	513-433-0610
OH	Dayton, Pioneer Std.	513-236-9900
OH	Dayton, Schweber Elctrns.	513-439-1800
OH	Maumee, RS Elctrns.	419-893-0721
OH	Solon, Hall-Mark Elctrns.	216-349-4632
OH	Westerville, Hall-Mark Elctrns.	614-891-4555
OK	Tulsa, Hall-Mark Elctrns.	918-665-3200
OK	Tulsa, Schweber Elctrns.	918-622-8000
OR	Beaverton, Acacia Sls.	503-646-3377
OR	Beaverton, Almac Elctrns.	503-641-9070
OR	Lake Oswego, Bell Inds.	503-241-4115
OR	Lake Oswego, Hamilton/Avnet Elctrns.	503-635-8831
PA	Horsham, Lionex Corp.	215-443-5150
PA	Horsham, Pioneer/Washington	215-674-4000
PA	Horsham, Schweber Elctrns.	215-441-0600
PA	Lancaster, CAM/RPC	717-392-8141
PA	Philadelphia, Almo Elctrns. Corp.	215-698-4000
PA	Pittsburgh, Almo Elctrns. Corp.	412-931-5990
PA	Pittsburgh, CAM/RCP	412-782-3770
PA	Pittsburgh, Pioneer Std. Elctrns.	412-782-2300
PA	Pittsburgh, Schweber Elctrns.	412-782-1600
SC	Greenville, Hammond Elctrns.	803-233-4121
TN	Nashville, Graham Elctrns.	615-242-2682
TX	Austin, Hall-Mark Elctrns.	512-258-8848
TX	Austin, Hamilton/Avnet	512-837-8911
TX	Austin, Harrison Equip. Co.	512-458-3555
TX	Austin, Pioneer Std. Elctrns.	512-835-4000
TX	Austin, Schweber Elctrns.	512-458-8253
TX	Dallas, Hall-Mark Elctrns.	214-343-5000
TX	Dallas, Hall-Mark Elctrns.	214-341-1147
TX	Dallas, Harrison Equip. Co.	214-239-2750
TX	Dallas, Pioneer Std. Elctrns.	214-386-7300
TX	Dallas, Schweber Elctrns.	214-661-5010
TX	El Paso, Ideal Indl. Elctrn. Supp.	915-779-6647
TX	Fort Worth, TTI	214-429-1440
TX	Houston, Hall-Mark Elctrns.	713-781-6100
TX	Houston, Hamilton/Avnet	713-975-3501
TX	Houston, Harrison Equip. Co.	713-879-2600
TX	Houston, Pioneer Std.	713-988-5555
TX	Houston, Pioneer Std. Elctrns.	214-386-7300
TX	Houston, Schweber Elctrns.	713-784-3600
TX	Irving, Hamilton/Avnet	214-659-4100
TX	Stafford, Harrison Equip.	713-879-2600
UT	Salt Lake City, Bell Inds.	801-972-6969
UT	Salt Lake City, Hamilton/Avnet	801-972-2800
WA	Bellevue, Almac Elctrns.	206-643-9992
WA	Bellevue, Bell Inds.	206-747-1515
WA	Bellevue, Hamilton/Avnet	206-643-3950
WI	Brookfield, Schweber Elctrns.	414-784-9020
WI	Mequon, Taylor Elec.	414-241-4321
WI	Milwaukee, Electronic Expd.	414-228-8100
WI	New Berlin, Hamilton/Avnet	414-784-4510
WI	Oak Creek, Hall-Mark Elctrns.	414-761-3000
WI	Waukesha, Bell Inds.	414-547-8879

BOURNS INSTRS., INC., Technical Prods. Grp., 6135 Magnolia Ave., Riverside, CA 92506, Tel: 714-781-5433; *Sls. Mgr.:* Ken Pinkham; *Dist. Mgr.:* Ken Pinkham

BOURNS INSTRS., INC., Industrial Div., 1960 Chicago Ave., Unit F, Riverside, CA 92503, Tel: 714-781-5147, Telex: 676401, TWX: 910-332-1281; *Sls. Mgr.:* Tom McCarthy

BOURNS MAGNETIC DIV., Technical Products Group, Box 1398, Romoland, CA 92380, Tel: 714-657-5195, TWX: 910-332-1304; Empl.: 120; *Sls. Mgr.:* Dennis Dalbeck

BOWMAN INDUSTRIES, 9300 Hall Rd., Downey, CA 90241

Bowmar

BOWMAR/ALI, Bowmar Instr. Corp., 531 Main St., Acton, MA 01720, Tel: 617-263-8365, TWX: 710-347-1441; Empl.: 175; *Sls. Mgr.:* Allen Warner ...... **D•1331-1333**

Local Sales Offices & Reps

CA	LaCanada, Brooks-Moore & Assocs.	818-790-8358
CA	Orange, Brooks-Moore & Assocs.	714-771-1220
CA	Palo Alto, Mollard Mktg.	415-961-0456
CA	Santa Ana, Brooks-Moore & Assocs.	714-544-8900
CT	Madison, Eastronix, Inc.	203-421-4514
IL	Des Plaines, Lincoln, Hodges & Assocs.	312-297-3810
KS	Overland Park, Barry Sls.	913-642-0270
LA	Baton Rouge, Mid-South Sls.	504-924-0106
LA	Lafayette, Mid-South Sls.	318-233-2546
LA	Lake Charles, Mid-South Sls.	318-433-0356
LA	Slidell, Mid-South Sls.	504-641-7480
ME	Camden, Bernard Sullivan Assocs.	207-236-8394
MD	Columbia, Tyler Griffin Co.	301-995-1215
MA	Bedford, Eastronix, Inc	617-275-5775
MI	Farmington, Amtech Reps.	313-474-8300
MN	Minneapolis, Waltham Sls. Co.	612-781-2778
MO	St. Louis, Barry Sls.	314-821-2525
NJ	Plainfield, Cosine, Inc.	201-654-3551
NY	Clarence, Trott Elctrns.	716-634-8500
NY	Pittsford, Trott Elctrns.	716-586-8251
OH	Cuyanoga Falls, J. C. Hofstetter Co.	216-929-8009
OH	Dayton, J. C. Hofstetter Co.	513-296-1010
OH	Medina, J. C. Hofstetter Co.	216-241-4880
OR	Portland, Frank Jackson Assocs.	503-292-2638
PA	Hickory, J. C. Hofstetter Co.	412-356-2305
PA	Paoli, Tyler Griffin Co.	215-647-1550
TX	Carrollton, Seaton Corp.	214-380-0414
UT	Salt Lake City, Measurement Conslts.	801-364-3174
VT	Shelburne, Eastronix, Inc.	802-985-3743
WA	Redmond, Frank Jackson Assocs.	206-881-7277
WI	Waukesha, Lincoln, Hodges & Assocs.	414-542-3087

Local Distributors

AZ	Phoenix, Metermaster	602-437-1425
CA	Los Angeles, E. I. L.	213-685-7020
CA	Palo Alto, Metermaster	415-968-0313
CA	Ridgecrest, E. I. L.	619-375-5550
CA	San Diego, Metermaster	619-560-4841
CA	Santa Clara, E. I. L.	408-727-0396
CO	Denver, E. I. L.	303-534-4160
CT	Middletown, E. I. L.	203-346-6646
FL	Palm Bay, E. I. L.	305-725-8300
GA	Atlanta, Horton Instr. Co.	404-231-3131
GA	Norcross, Metermaster	404-446-0166
IL	Bridgeview, E. I. L.	312-430-2292
IL	Chicago, DALEC	312-283-0300
IL	Elk Grove Village, Metermaster	812-593-8650
IL	Itasca, Metermaster	312-250-0606
IN	Indianapolis, E. I. L.	317-545-1373
KY	Louisville, E. I. L.	502-454-3420
LA	Slidell, Mid-South Sls. Co., Inc.	504-641-7480
MD	Sparks, E. I. L.	301-771-4800
MA	Billerica, Metermaster	617-523-2580
MA	Burlington, E. I. L.	617-272-9450
MN	Minneapolis, Process Meas. Co.	612-544-4035
NJ	North Caldwell, Hosica Labs.	201-256-7724
NJ	Pennsauken, E. I. L.	609-488-0474
NJ	Plainfield, Integral Control Sys. Corp.	201-561-2323
NY	Hauppauge, E. I. L.	516-231-6333
NY	Rochester, E. I. L.	716-442-2430
NC	Charlotte, Trott Elctrns., Inc.	704-376-2237
OH	Cleveland, Metermaster	216-651-4100
OH	Dayton, E. I. L.	513-435-2134
OR	Portland, Westcon, Inc.	503-283-0132
PA	Philadelphia, Electric Tachometer Corp.	215-726-7723
PA	Pittsburgh, E. I. L.	412-731-5230
TX	Dallas, E. I. L.	214-931-1236
TX	Garland, Metermaster	214-271-5671
TX	Houston, E. I. L.	713-271-3100
TX	Houston, Quality Instr. Lab., Inc.	713-524-0528
VA	Alexandria, E. I. L.	703-354-4330
VA	Virginia Beach, E. I. L.	804-499-3746
WA	Seattle, E. I. L.	206-762-0880
Can	Longueuil, Que., E. I. L.	514-651-4844
Can	Mississauga, Tor., E. I. L.	416-624-6660
Can	Woodbridge, Ont., R. H. Nichols Co., Ltd.	416-851-8871

Bowmar

BOWMAR INSTRUMENT CORP., Aerospace Div., 8000 Bluffton Rd., Ft. Wayne, IN 46809, Tel: 219-747-3121, TWX: 810-332-1510; FSC No.: 99479; Empl.: 215; *Sls. Mgr.:* Herb Black ...... **B•1707**

Local Sales Offices & Reps

CA	Uplander Way, Westaironics, Inc.	213-641-4122
CO	Castle Rock, Romulus Elctrns., Ltd.	303-688-5127
CT	Haver Hill, LK Assocs.	617-373-1313
CT	Lee, LK Assocs.	413-243-1158
FL	Melbourne, Saber Assocs.	305-724-0920
GA	Smyrna, Spartech	404-446-7300
IL	Rolling Meadows, KMA Sls. Co.	312-398-5300
IA	Cedar Rapids, Ard Sls. Inc.	319-393-6392
MN	Bloomington, Electronic Sls. Agy.	612-884-8291
MO	St. Louis, Abrams Assocs.	314-569-0447
NJ	Matawan, Bowmar Instr. Corp.	201-526-0400
NY	Syracuse, Fountain Young Co., Inc.	315-437-7733
OH	Dayton, Raystan Controls	513-278-3559
TX	Addison, Robert R. Thomas Co.	214-233-8235
WI	Milwaukee, JM Sls. Co.	414-546-0040
Can	Ottawa Ont., Subtec, Ltd.	613-738-1470

BOWMAR INSTRUMENT CORP., Commercial Products Div., 4640 126th Ave. N., Clearwater, FL 33520, Tel: 813-576-2525, TWX: 810-863-0375; Empl.: 127; *Sls. Mgr.:* Walt Kunz

BOWMAR/TIC, INC., 850 Lawrence Dr., Newbury Park, CA 91320, Tel: 805-498-2161, TWX: 910-336-1265; FSC No.: 99957; Empl.: 100; *Sls. Mgr.:* Reece Kendall

BOW SOLDER PRODS., 900 Hobson St., Union, NJ 07083, Tel: 201-686-6040, 800-526-4496; Empl.: 38; *Sls. Mgr.:* J. Moran

BRADY CO., 574A Somerset St., N. Plainfield, NJ 07060, Tel: 201-753-7988; *Sls. Mgr.:* Ed Brady; *Dist. Mgr.:* John Blaze

BRADY, W.H., CO., Elctrn. Prods. Div., 6150 N. Flint Rd., Milwaukee, WI. 53201, Tel: 414-332-8100, Telex: 26-677; *Sls. Mgr.:* David D. Tatham

BRADY, W. H., CO., Indl. Prods. Div., 2221 W. Camden Rd., Milwaukee, WI 53201, Tel: 414-351-6630, Telex: 26-677, TWX: 910-262-3151; *Sls. Mgr.:* G. W. Gyllstrom; *Dist. Mgr.:* G. W. Gyllstrom

BRADY, W.H., CO. NAMEPLATE DIV., See Brady, W.H., Co., Elctrn. Prods. Div

BRADY, W. H., CO., Xymox Div., 8225 W. Parkland Ct., P.O. Box 571, Milwaukee, WI 53201, Tel: 414-355-8300, Telex: 26-677, TWX: 910-262-3151; FSC No.: 85480; *Sls. Mgr.:* G. R. Manich; *Dist. Mgr.:* G. R. Manich.

BRAEMAR CORP., 11400 Rupp Drive, Burnsville, MN 55337, Tel: 612-890-5135; Empl.: 130; *Sls. Mgr.:* P. L. Musgrove

BRAILSFORD & CO., 670 Milton Rd., Rye, NY 10580, Tel: 914-967-1820; Empl.: 25

BRAND DIELECTRICS, INC., Route 203, N. Windham, CT 06256, Tel: 203-423-6321; Empl.: 5; *Sls. Mgr.:* Philip Harvey

BRANDEN, T. G., CORP., 5565 S.E. Intl. Way, Portland, OR 97222, Tel: 503-659-9366; Empl.: 8; *Sls. Mgr.:* Ted Brandt

BRAND-REX, Electronic & Indl. Cable Div., Box 498, Willimantic, CT 06226, Tel: 203-456-8000, TWX: 710-440-2247; FSC No.: 71124; Empl.: 1000; *Sls. Mgr.:* J. F. Cichy

Local Sales Offices & Reps

CA	Laguna Hills, Brand-Rex	714-835-0802
CA	San Jose, Brand-Rex	408-247-9811
CO	Boulder, Component Prod. Sls., Inc.	303-530-2800
CT	Manchester, Manu-Rep, Inc.	203-646-6064
FL	Maitland, E.I.R., Inc.	305-660-9600
IN	Indianapolis, Insulation Reps.	317-251-1994
MD	Hanover, J. A. Maguire & Co.	301-796-0970
MA	Clinton, CWS, Inc.	617-368-8753
MI	Albuquerque, Power Entprs., Ltd.	505-298-1918
MI	Farmington Hills, Joseph H. Clark Sls. Co.	313-553-0610
MN	Edina, Grayden & Flemmer	612-941-1120
MO	Chesterfield, Durnin & Assocs.	314-532-9774
NJ	Dunellen, J. A. Maguire & Co.	201-752-8480
NJ	Pennsauken, J. A. Maguire & Co.	609-665-5136
NY	Pittsford, Kirby Mktg.	716-248-8750
OH	Chagrin Falls, Joseph H. Clark Sls.	216-247-7848
OR	Beaverton, Barrett, Squibb & Assocs.	503-642-1661
SC	Greenwood, Bamco	803-229-6801
TN	Knoxville, Insul-Reps	615-691-7586
TX	Richardson, C. J. Tellier Co.	214-231-6348
VA	Portsmouth, J. A. Maguire & Co.	804-398-0202
WA	Redmond, Eclipse Mktg. Grp.	206-885-6991

Local Distributors

AZ	Tucson, A.E. Petsche Co., Inc.	602-746-3128
CA	Carson, A. E. Petsche Co., Inc.	213-639-9500
CA	Inglewood, Storm Prods.	213-649-6141
CA	Santa Clara, Storm Prods.	408-749-9400
CA	Torrance, Blake Wire & Cable	213-515-0561
CO	Broomfield, Storm Prods.	303-466-1991
FL	Ft. Lauderdale, K.S.M. Elctrns.	305-971-5900
FL	Orlando, Cablematics/Action Wire	305-293-1618
GA	Norcross, A. E. Petsche Co., Inc.	404-441-1709
IL	Addison, K.S.M. Elctrns.	312-953-9473
IL	Rosemont, Dearborn Wire & Cable	312-696-1000
KS	Wichita, A.E. Petsche Co., Inc.	316-943-9358
MA	Woburn, Pacer Elctrns.	617-935-8330
MN	Minneapolis, Bergquist Co.	612-835-2322
NH	Amherst, North Country Wire Supp.	603-889-0063
NY	Endicott, Rogan Elctrns.	607-754-3590
NY	Fairport, Pacer Elctrns.	716-377-0462
NY	Farmingdale, Vertx Elctrns.	516-293-9880
NY	Farmingdale, Weico Elctrns.	516-293-0050
NY	Hauppauge, Wintronics, Inc.	516-234-8040
NY	Johnson City, Help Elctrns.	607-729-3528
OR	Beaverton, Murphy Elctrns.	215-534-3900
PA	Folcroft, Delphi Elctrns.	215-534-3900
TX	Dallas, Storm Prods.	214-330-1381
TX	Garland, Southwest Cable	214-494-4009
TX	Houston, A.E. Petsche Co., Inc.	713-641-3386
WA	Redmond, Murphy Elctrns.	206-881-1234

BRANDT ELCTRNS., INC., 1220 Alderwood Ave., Sunnyvale, CA 94086, Tel: 408-734-8310, TWX: 910-339-9560; FSC No.: 57837; *Sls. Mgr.:* Frank D. Brandt

BRAXTON MFG., Echo Lake Rd. N., P.O. Box 429, Watertown, CT 06795, Tel: 203-274-6781, TWX: 710-477-0621; Empl.: 115; *Sls. Mgr.:* Mark W. Ritucci

BREEZE-ILLINOIS, TransTechnology Corp., 401 S. Main Street, P.O. Box 368, Wyoming, IL 61491, Tel: 309-695-2511, TWX: 510-390-3691; Empl.: 180; *Sls. Mgr.:* Patrick Banakis .... **C•1171, 1790-1792**

Local Sales Offices & Reps

CA	Woodland Hills, Cal Ward Sls.	213-883-2202
CO	Longmont, Todd & Fry Assocs.	303-776-7331
FL	St. Petersburg, Tech. Reps. Assocs.	813-577-2779
IL	Berkeley, Cadre Tech. Rep., Inc.	312-449-3900
KS	Desoto, Midtec Assocs., Inc.	913-441-6565
MI	Madison Heights, Pine Sls., Inc.	313-589-0350
MN	Bloomington, Merrill Franklin	612-854-9446
NY	Great Neck, Trionic Assocs.	516-466-2300
OH	Chagrin Falls, Pine Sls., Inc.	216-247-6198
PA	Pittsburgh, Pine Sls., Inc.	412-456-7471
TX	Bedford, DeArmond Entprs.	817-267-2048
WA	Bellevue, Lehr Assocs.	206-453-9993

BRELONIX, 106 No. 36th St., Seattle, WA 98103, Tel: 206-633-1964; Empl.: 10; *Sls. Mgr.:* A. L. DeVore

BREN-TRONICS, INC., 10 Brayton Ct., Commack, NY 11725, Tel: 516-499-5155, Telex: 22-1213 TTCUR; FSC No.: 51828; Empl.: 75; *Sls. Mgr.:* R. Mainzer

BREVEL MOTORS, INC., Sub. Vernitron Corp., Broad & 16th Sts., Carlstadt, NJ 07072, Tel: 201-933-0220; *Sls. Mgr.:* Jack Dominice .... **B•1141**

Local Sales Offices & Reps

AR	El Dorado, Industrial Control Assocs.	501-862-2051
CA	Los Angeles, Electric Motor Engrg.	213-469-7393
CT	Old Saybrook, M. L. Assocs.	203-388-9718
FL	Altamonte Springs, Machine Controls	305-788-6607
IL	Chicago, Jerry Golten Co.	312-792-1991
KS	Prairie Village, Darco Sls.	913-381-7913
MA	Ashland, M. L. Assocs.	617-485-6190
MN	St. Paul, Vikeland Sls.	612-645-4647
NJ	Teaneck, Herbert Rude & Assocs.	201-836-6778
NY	Penfield, Upstate Comps.	716-381-6070
NC	Raleigh, Leigh Sls.	919-872-1484
OH	Bucyrus, Sissler & Assocs.	419-562-9311
OH	Columbus, Sissler & Assocs.	614-488-4455
PA	Exton, Kiley Elec. Co.	215-363-8550
TN	Cleveland, Hicks Sls.	615-472-7398

Local Distributors

AZ	Phoenix, Johnstone	602-269-9354
CA	Baldwin Park, Johnstone	213-962-7138
CA	Los Angeles, Minarik	213-624-3161
CO	Denver, Johnstone	303-573-5626
CT	New Haven, Star Supp. Co.	203-772-2240
FL	Ft. Lauderdale, Johnstone	305-971-9350
GA	Norcross, Johnstone	404-446-0400
ID	Boise, Johnstone	208-377-1600
IL	Chicago, Harry Alter	312-376-3505
KS	Wichita, Johnstone	316-267-3629
LA	New Orleans, Harry Alter Co.	504-488-4435
MD	Rockville, Johnstone	301-251-0281
MA	Medford, Empire	617-395-5000
MI	Farmington Hills, Universal Elec. Prod.	313-476-9500
MO	Kansas City, Johnstone Corp.	816-842-3250
MT	Billings, Johnstone Corp.	406-252-1207
NE	Omaha, Johnstone Corp.	402-339-2342
NV	Sparks, Johnstone Corp.	702-356-6668
NJ	Cherry Hill, Motor and Control Sys.	609-424-5810
NJ	Gafield, The Harry Alter Co.	201-478-0455
NY	Manhattan, The Harry Alter Co.	212-255-5300
OH	Cleveland, Reserve Elec.	216-771-5764
OK	Oklahoma City, Johnstone Corp.	405-232-8576
OR	Portland, Johnstone Corp.	503-233-1151

BREW, RICHARD D., & CO., INC., 90 Airport Rd., Concord, NH 03301, Tel: 603-225-6605, Telex: 943-483; FSC No.: 98913; Empl.: 43

BRIAN INSTRUMENTS, INC., 626 S. State College Blvd., Fullerton, CA 92631, Tel: 714-992-5540, TWX: 910-350-7019; Empl.: 30; *Sls. Mgr.:* E. 'Chuck' Ouellette; *Dist. Mgr.:* Barbara M. Semain

BRIDGE COMPUTER CO., Sea Data Corp., 1 Bridge St., Newton, MA 02158, Tel: 617-244-8190, Telex: 951107; *Sls. Mgr.:* Elaine Doll

BRIGGS, C. A., CO., P.O. Box 151, Glenside, PA 19038, Tel: 215-885-2244, Telex: 83-4753; Empl.: 10; *Sls. Mgr.:* C. A. Briggs, Jr.

BRIM ELCTRNS., 120E Home Pl., Lodi, NJ 07644, Tel: 201-796-2886; FSC No.: 57834 .... **C•1793-1800**

Local Sales Offices & Reps

FL	De Bary, DJE Assocs.	305-668-6827
FL	Enterprise, DJE Assocs., Inc.	305-321-6623
MA	Millis, R G Assocs.	617-376-2044
MA	Stow, R G Assocs.	617-897-7146
EXP	NY, N.Y.C., Roburn Agencies	212-989-5939

Local Distributors

AL	Dothan, Carmichael Whls. Supp.	205-793-7066
CA	Canoga Park, Tim-Co. Sls.	213-992-5040
CA	San Diego, Shanks & Wright	619-239-0176
CT	Manchester, IMS	203-649-4415
CT	Waterbury, Suburban Supp.	203-757-1251
GA	Marietta, Atlanta Elec. Wire & Cable	404-955-6800
LA	New Orleans, Radio Parts	504-581-5959
MA	Billerica, Eastern Video Sys.	617-667-0009
MA	Lexington, Wholesale Elect. Supp.	617-862-3590
MA	Springfield, Electro-Term	413-734-6469
MA	Waltham, Linear Elect.	617-894-7300
MI	Troy, Northern Wire & Cable	313-589-0510
NH	Dover, American Radio Corp.	603-742-6800
NJ	Hackensack, Milcor	201-489-1313
NY	LIC, H.L. Dalis	212-361-1100
NY	N.Y.C., Center Indl.	212-YU9-6363
OK	Tulsa, Radio	918-587-9123
PA	Philadelphia, Spectrum Elec.	215-748-3010
RI	Newport, J & S Elctrn. Distb.	401-847-2977
TN	Knoxville, Bondurant Bros. Co.	615-573-9151
TX	Grand Prairie, Southwest Hardware & Fastever	214-264-4711
TX	Texarkana, Lavender Elec.	501-773-4631
TX	Texarkana, McCulloch Elctrns.	214-792-6923
VA	Norfolk, Todd Elec.	804-855-3111
WA	Seattle, Amateur Radio Supp.	206-767-3222

BRISTOL BABCOCK INC., 40 Bristol St., Waterbury, CT 06708, Tel: 203-575-3000, Telex: 962417, TWX: 203-754-1477; Empl.: 600; *Sls. Mgr.:* William H. Seeley

BRISTOL SAYBROOK, 97 Coulter St., Old Saybrook, CT 06475, Tel: 203-388-3414, Telex: 966-435; Empl.: 125; *Sls. Mgr.:* George S. Willis

Local Sales Offices & Reps

CA	Alhambra, C.E. Mello Co.	818-282-2000
CT	Old Saybrook, M-L Assoc.	203-388-9718
FL	Largo, Kirk Sls, Inc.	813-595-7353

Local Distributors

AL	Arab, Timer & Control Engr. Svc.	205-586-7671
CA	Los Angeles, Minarik Electic Co.	213-624-3161
MA	Somerville, Electro Sls. Co.	617-666-0500
NY	Sodus, AED Distributors	315-483-6561

BROOKS INSTR. DIV., Emerson Elec. Co., 407 W. Vine St., Hatfield, PA 19440, Tel: 215-362-3500, Telex: 846-181; Empl.: 1500; *Sls. Mgr.:* William Weierbach

BROOKS MFG. CO., 2016/24 Amber St., Philadelphia, PA 19125, Tel: 215-425-3395, 800-523-0130; Empl.: 70; *Sls. Mgr.:* G. Brooks; *Dist. Mgr.:* G. Brooks

Local Sales Offices & Reps

CA	Irvine, Mike Roth Sls.	714-850-1254
CA	San Francisco, Maddox Sls.	415-647-5560
FL	Miami, Roulson & Co.	305-666-4240
GA	Atlanta, Dewitt Austin Co.	404-393-3519
IL	Glenview, Reigel Assocs.	312-729-3824
MD	Towson, Ernie Stefkovic Assocs.	301-321-6008
MI	East Detroit, Jack M. Thorpe Co.	313-779-6363
NJ	Cherry Hill, Ernie Stefkovic Assocs.	609-667-4066
NY	New Hyde Park, Harris & Aldrich Sls.	516-488-2622
NC	Charlotte, Dewitt Austin Co.	704-334-0174
OH	Cincinnati, John O. Olsen Co.	513-574-7711

BROOKS MKTG. CORP., 3569 Bristol Pike Bldg. 2 Ste 102, Bensalem, PA 19020, Tel: 215-244-0264, 1-800-523-1551; Empl.: 90; *Sls. Mgr.:* Joseph E. Brooks

BROWN BOVERI ELEC., Norristown Rd., Spring House, PA 19477, Tel: 215-628-7400, TWX: 510-661-0168; Empl.: 3,500

BROWN BOVERI ELECTRIC, INC., 167 Overland Drive, P.O. Box 648, West Columbia, SC 29171, Tel: 803-796-9502

BRUEL & KJAER INSTRS. INC., 185 Forest St., Marlboro, MA 01752, Tel: 617-481-7000, TWX: 710-347-1187; FSC No.: 617-485-0519; Empl.: 40

Local Sales Offices & Reps

CA	Anaheim, Bruel & Kjaer Instrs.	714-978-8066
CA	Foster City, Bruel & Kjaer Instrs.	415-574-8155
IL	Hoffman Estates, Bruel & Kjaer Instrs.	312-358-7582
MD	Gaithersburg, Bruel & Kjaer Instrs.	301-948-0494
MA	Marlborough, Bruel & Kjaer Instrs.	617-481-7000, ext. 139
MI	Livonia, Bruel & Kjaer Instrs.	313-522-8600
NJ	West Caldwell, Bruel & Kjaer Instrs.	201-526-2284
TX	Houston, Bruel & Kjaer Instrs.	713-645-0167
WA	Seattle, Bruel & Kjaer Instrs.	206-625-1112

BRUSH MAGNETIC HEADS, Div. of Brush Ind., Inc., 3rd & Reagan Sts., P.O. Box 638, Sunbury, PA 17801-0638, Tel: 717-286-5611, 800-233-0362, TWX: 510-655-0222; FSC No.: 19418; Empl.: 80; *Sls. Mgr.:* D. Stephen Morrison

WESTINGHOUSE ELEC. CORP., Bryant Circuit Devices Div., 500 Sylvan Ave., Bridgeport, CT 06606, Tel: 203-334-5561, Telex: 643-817, TWX: 710-453-8709; Empl.: 1000; *Sls. Mgr.:* G. V. Curtin

BSR (USA) LTD, Route 303, Blauvelt, NY 10913

BTU ENGRG. CORP., Bruce Sys., Esquire Rd., N. Billerica, MA 01862, Tel: 617-667-4111, Telex: 94-7489; Empl.: 600; *Sls. Mgr.:* D. Barry

BUBBL-TEC, 6800 Sierra Ct., Dublin, CA 94566, Tel: 415-829-8705, TWX: 910-389-6890; Empl.: 19; *Sls. Mgr.:* T. J. Netoff

BUCHANAN, See Control Prods. Div., Amerace Corp.

BUCKBEE-MEARS CO., Nashua Div., 100 Northeastern Blvd., P.O. Box 888, Nashua, NH 03062, Tel: 603-883-5541, Telex: 94-0340; *Sls. Mgr.:* Randolph Roody

BUCKEYE STAMPING CO., 555 Marion Rd., Columbus, OH 43207, Tel: 614-445-8433; Empl.: 85; *Sls. Mgr.:* R. E. Osborne VP Mktg. .... **C•1027**

Local Sales Offices & Reps

CA	Pasadena, P. Nurches Co.	213-MU1-8957
CA	Santa Clara, Engrg. Assocs.	408-988-5001
CO	Denver, Moss Mktg.	303-455-7205
GA	Atlanta, Par Assoc.	404-391-9117
IL	Mt. Prospect, Robert Adams Sls.	312-297-8733
KS	De Soto, Midtec Assoc.	913-441-6565
MA	Belmont, Elctrn. Comps. & Svc.	617-484-8680
MN	Minneapolis, A. J. Warner Co.	612-729-7371
NY	Lynbrook, P. Saftler Assoc.	516-593-7880
OH	Columbus, McFadden Sls.	614-459-1280
PA	Paoli, T. Griffin Co.	215-647-1550
TX	Dallas, Advance Tech. Sls.	214-340-1300
WA	Mercer Island, Elctrns. Comp. Sls.	206-232-9301

Local Distributors

CA	Los Angeles, Elect. Switches	213-664-1141
CA	Redwood City, Hi-Cor	415-368-3849
GA	Atlanta, Lakeland Engrg. Equip.	404-696-7334
MI	Ann Arbor, Wedemeyer Elctrns.	313-665-8611
NY	Hauppauge, Broadline Elctrn. Dist.	516-231-4100
TX	El Paso, Ideal Indl. Elctrn.	915-779-6647
WA	Redmond, Dorn Sls. Assocs.	206-885-1885
WA	Seattle, Radar Elec.	206-282-2511

BUD INDS., INC., 4605 E. 355th St., Willoughby, OH 44094, Tel: 216-946-3200, Telex: 810-427-2604; FSC No.: 71218; Empl.: 200; *Sls. Mgr.:* A. N. Haas; *Dist. Mgr.:* B. K. Haas

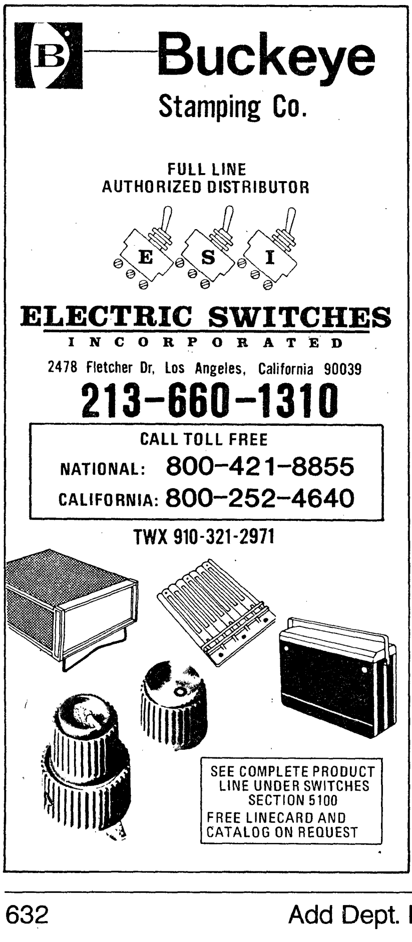
BUD RADIO, 4605 E. 355th St., Willoughby, OH 44094, Tel: 216-946-3200, TWX: 810-427-2604; Empl.: 200; *Sls. Mgr.:* A.N. Haas; *Dist. Mgr.:* Blair Haas

BUDWIG MFG., P.O. Box 829, Ramona, CA 92065-0829, Tel: 619-789-0900; Empl.: 7

BUEHLER PRODUCTS, INC., P. O. Box 33400, Raleigh, NC 27606, Tel: 919-469-8522, TWX: 510-924-2474; Empl.: 400; *Sls. Mgr.:* R. B. Davis .... **B•1142**

BUGGIE H. H., See Caton Connector Corp.

BUGTRAP INSTRUMENTATION, 1209 Alderwood Avenue, Sunnyvale, CA 94089, Tel: 408-734-1118, TWX: 910-333-1168 BUGTRAPSUNNYVA; FSC No.: 5Z365; *Sls. Mgr.:* Jeff Liming



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BULOVA SYS. & INSTR., Green Acres Rd., W., Valley Stream, NY 11582, Tel: 516-561-2600, TWX: 510-225-8709; Empl.: 850

BULOVA WATCH CO., See Frequency Control Prods., Inc., American Time Prods. Div.

BUMPER PRODUCTS CORP., 14 King St., P.O. Box 45, Mt. Holly, NJ 08060, Tel: 609-261-8100, 800-541-2500, Telex: 244437 ACTP-UR; *Sls. Mgr.:* Ed Rosenthal .... **C•1694**

Local Distributors

CA	Covina, Arow Fasteners	818-967-6335
CA	Hayward, Arow Fasteners	800-227-2901
CA	San Leandro, Boyd Corp.	415-278-8000
CA	Santa Clara, San Jose Screw Prods.	408-988-3771
CA	Temple City, Fastening Systems	818-579-4600
FL	Tampa, Spencer Prods.	813-877-8276
GA	Atlanta, Georgia Rubber & Supply	404-355-0830
IL	Schaumburg, Engineered Fastener Co.	312-980-4082
IN	Ft. Wayne, Spencer Prods.	219-482-4882
MA	South Boston, Accurate Fasteners	617-268-8300
MI	Detroit, Tri-West Prods.	313-273-0400
MO	St. Louis, Engineered Fastener Co.	314-434-2888
NY	Buffalo, J.M. Cranz	716-832-3300
NY	Mt. Vernon, S.D. Christie Co.	914-699-7223
OH	Bedford, Spencer Prods.	216-475-8700
OH	Cincinnati, Spencer Prods.	513-771-6821
PA	Southampton, M & C Specialties	215-322-1600
TX	Dallas, Wilshire Foam Prods.	214-869-1727
TX	Ft. Worth, Cut-Craft	817-737-8207
WA	Spokane, Boyd Corp.	509-928-7200
WI	Brookfield, Cable Comps.	414-785-1060
Can	Quebec, Simfer Indl. Prod.	515-354-0886

BUNKER RAMO, see Amphenol, An Allied Co.

BUNTING MAGNETICS, 500 So. Spencer Rd., Newton, KS 67114, Tel: 316-284-2020; Empl.: 100; *Sls. Mgr.:* Robert J. Bunting

BUREAU OF ENGRAVING, INC., Ind'l. Div., 3311 Broadway N.E., Minneapolis, MN 55413, Tel: 612-623-0900, TWX: 910-576-2733; Empl.: 750; *Sls. Mgr.:* Darrell Chayer

BURGESS SWITCH CO., INC., 638 Anthony Trail, North Brook, IL 60062, Tel: 312-291-1760, Telex: 206774; FSC No.: 6U850; *Sls. Mgr.:* Robin Dick; *Dist. Mgr.:* Robin Dick .... **B•1510-1512**

Local Sales Offices & Reps

CA	Mountain View, Westech Sls.	415-961-1422
CA	Tustin, Sierra Pacific Engrg.	714-731-3411
FL	Casselberry, SEMI	305-831-2822
FL	Ft. Lauderdale, SEMI	305-475-3686
GA	Atlanta, Murphy and Cota	404-875-2525
IL	Des Plaines, Lincoln, Hodges and Assocs.	312-297-3810
KS	Mission, Mertens Co.	913-432-9323
MA	Cambridge, R.J.C. Assocs.	617-492-5858
MI	Ferndale, Hilltronics	313-398-5556
MN	St. Paul, Kencotronics	612-645-7717
MO	St. Louis, Mertens Co.	314-993-6600
NJ	Palisades Park, A. P. Technical Sls.	201-461-8875
NY	Albany, Niagara Elec. Sls.	518-869-0130
NY	Buffalo, Niagara Elec. Sls.	716-886-4000
NY	East Syracuse, Niagara Elec. Sls.	315-437-1656
NY	Rochester, Niagara Elec. Sls.	716-271-1223
NC	Burlington, Murphy & Cota	919-584-6450
OH	Cincinnati, Anderson-Bolds, Inc.	513-528-5680
OH	Cleveland, Anderson-Bolds, Inc.	216-229-4700
OH	Worthington, Anderson-Bolds Inc.	614-885-3933
PA	Philadelphia, Kenneth B. Erdman, Co.	215-224-1833
TX	Dallas, William Reese Assocs.	214-351-0703
TX	Houston, William Reese Assocs.	713-463-1453
WA	Seattle, Anthem Corp.	206-824-3399
WI	Janesville, Antek Mktg. Corp.	608-754-4214
WI	Waukesha, Lincoln, Hodges and Assocs.	414-542-3087

Local Distributors

AL	Muscle Shoals, Jones Elctrns., Inc.	205-383-1241
CA	Burlingame, Elec. Control Devices	415-348-0791
CA	Redondo Beach, Elctrl. Power & Controls	213-498-6699
FL	Miami, B & R Elctrns. Supp. Inc.	305-255-4510
FL	Miami, Electro-Standards Labs	305-593-6060
IL	Chicago Heights, Helsel-Jepperson	312-756-5600
MA	Fall River, Broadway Elec. Sls.	617-673-3339
MA	Holyoke, Falcetti & Clark Elec.	413-532-9402
MA	Springfield, Yankee Elec.	413-739-2101
MI	Grand Rapids, S & F Elctrns. Supp.	616-459-0216
MI	St. Clair Shores, Spemco	313-771-2700
MN	Minneapolis, Elctrn. Center Inc.	612-371-5200
NH	Manchester, Cohen Machinery Co. Inc.	603-624-4324
NJ	Fairlawn, Relay Specialties	201-797-3313
NY	Gloversville, Montano Elctrl. Supp.	518-725-3139
NY	Woodside, Switches Unlimited	212-478-5000
NC	Durham, Triangle Elec. Motor	919-596-1333
NC	Gastonia, JMT Elctrns. & Control	704-867-4401
OH	Cincinnati, Richards Elec. Supp.	513-242-8800
PA	Harrisburg, Cumberland Elctrns.	717-233-5883
PA	Philadelphia, Esco Elctrl. Supp.	215-923-6050
RI	Providence, J & H Elec. Co., Inc.	401-421-7840
TX	San Antonio, Sherman Elec. Supp. Inc.	512-224-1001
VA	Roanoke, Peoples Elctrn. Supp.	703-342-8933

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BURLEIGH INSTRS., Burleigh Pk., Fishers, NY 14453, Tel: 716-924-9355, Telex: 978379; Empl.: 50; *Sls. Mgr.:* Dr. Gary Forrest; *Dist. Mgr.:* Dr. Gary Forrest

BURLING INSTR., P.O. Box 298, Chatham, NJ 07928, Tel: 201-635-9481; Empl.: 29; *Sls. Mgr.:* Roger Nation

BURNDY/BERCO, 226 Brookside Road, Waterbury, CT, Tel: 203-574-4766

BURNDY CORPORATION, Richards Ave., Norwalk,, CT 06852, Tel: 203-838-4444, TWX: 710-468-2546; Empl.: 3500; *Sls. Mgr.:* J. Bradley

BURR-BROWN CORP., P.O. Box 11400, Tucson, AZ 85734, Tel: 602-746-1111, Telex: 66-6491, TWX: 910-952-1111; Empl.: 1500; *Sls. Mgr.:* T.W. Fern

BURROUGHS CORP., Borroughs Place, Rm. 4C-51, Detroit, MI 48232, Tel: 313-972-7000, Telex: 164125; Empl.: 65,000

BURTON ELECTRICAL ENGINEERING, Wyle Laboratories, 111 Maryland Street, P.O. Box 217, El Segundo, CA 90245-0217, Tel: 213-772-1406, Telex: 858485, TWX: 910-348-6699; FSC No.: 81861; Empl.: 55; *Sls. Mgr.:* Howard Doty

BUSSCO INC., 119 Standard St., El Segundo, CA 90245, Tel: 213-322-6580, TWX: 910-348-6295; FSC No.: 29593; Empl.: 87

BUSSMANN DIV., P.O. Box 14460, St. Louis, MO 63178, Tel: 314-394-2877, Telex: 44 841; FSC No.: Multiple; Empl.: 3000; *Sls. Mgr.:* George Ockuly; *Dist. Mgr.:* George Ockuly

BYTEK COMPUTER SYSTEMS CORP., 1021 S. Rogers Circle, Boca Raton, FL 33431, Tel: 305-994-3520, Telex: 510-952-7637; Empl.: 15; *Sls. Mgr.:* Madeline Selwitz

Local Distributors

CA	Costa Mesa, Tekcom	714-645-5263
CO	Denver, Aurora Mktg.	303-758-3051
FL	Miami Beach, Infotech Intl.	305-948-7951
MN	Minneapolis, Amex Inc.	612-375-9191

BYTEX CORP., 2 California Ave., Framingham, MA 01701, Tel: 617-879-5050, Telex: 951151; Empl.: 80; *Sls. Mgr.:* Ralph W. Lowry

CABLE SYSTEMS, INC., 210 Broadway, Everett, MA 02149, Tel: 617-389-7080, TWX: 710-348-1760; FSC No.: 33426; Empl.: 175; *Sls. Mgr.:* A. Janelle

Local Sales Offices & Reps

AZ	Tucson, Clemick-Neenan & Assocs.	910-495-1722
CA	Santa Ana, Wyne Champa Assocs.	714-557-2959
CT	Tolland, TMR Corp.	203-872-3624
MD	Ellicott City, Marketing Technlg.	301-465-5944
MA	Tewksbury, Sequel Assocs.	617-851-4010
NY	Commack, MTR Technlg.	516-543-1200

CABLEWAVE SYSTEMS, INC., 718 North Colony Road, Wallingford, CT 06492, Tel: 203-265-6560

CABLEWAVE SYS., 60 Dodge Ave., North Haven, CT 06473, Tel: 203-239-3311, TWX: 710-465-0244; Empl.: 250; *Sls. Mgr.:* William Meola/Ed Hurley; *Dist. Mgr.:* Ed Hurley

CABLEX, INC., 14 Inverness Dr. E. H-136, Englewood, CO 80112, Tel: 303-792-5760; Empl.: 50; *Sls. Mgr.:* Reed C. Mulder; *Dist. Mgr.:* Reed C. Mulder

CABOT BERYLCO, Div. Cabot Corp., PO Box 1296, Reading, PA 19603, Tel: 215-921-5000, TWX: 510-651-0677; Empl.: 600; *Sls. Mgr.:* Thomas N. Marks

CABTRON SYS., INC., 200 N. Anets Dr., Northbrook, IL 60062, Tel: 312-498-6090; Empl.: 30; *Sls. Mgr.:* Mike Gober .... **C•1029**

Local Sales Offices & Reps

AZ	Tempe, Sierra Tech. Grp.	602-894-2335
CA	San Jose, Warren Assoc.	408-988-7762
CO	Englewood, Sierra Tech. Grp.	303-741-0227
CT	Reading, Meco, Inc.	617-944-6660
MD	Silver Spring, Ansell Engrg.	301-949-1655
MA	Reading, Meco, Inc.	617-944-6660
MI	Livonia, H. Lowell Co.	313-464-2722
MN	St. Paul, Countryman Assocs.	612-645-9151
MO	Kansas City, Prod. Automation	816-737-3030
MO	St. Charles, Prod. Automation	314-441-6600
NJ	Mt. Lakes, N.J. Comps. for Elctrns.	201-334-2921
NM	Albuquerque, Sierra Tech. Grp.	505-294-8408
NY	Syracuse, Ossmann Instrs.	315-437-7052
OH	Cleveland, Geotronix	216-526-2535
OH	Columbus, Geotronix	614-457-8472
PA	Albrightville, Centurion Linear	717-722-0166
TX	Addison, Dunbar Assocs.	214-239-7151

CADDELL-BURNS MFG., 40 E. 2nd St., Mineola, NY 11501, Tel: 516-746-2310; Empl.: 30 ..... **A•1218-1229**

CADDELL COIL CORP., 35M Main St., Poultney, VT 05764, Tel: 802-287-4055, Telex: 752092; Empl.: 6; *Sls. Mgr.:* James Caddell

Local Sales Offices & Reps

FL	Sebastian, R.B. Caddell	305-562-4496

CADDOCK ELECTRONICS, INC., 1717 Chicago Ave., Riverside, CA 92507, Tel: 714-788-1700, TWX: 910-332-6108; FSC No.: 19647; Empl.: 300 .... **A•1804-1827**

Local Sales Offices & Reps

OH	Cleveland, Arthur H. Baier Co.	216-461-6161
OH	Dayton, Arthur H. Baier Co.	513-276-4128
OR	Portland, Elctrn. Sources	503-684-0040
WA	Bellevue, Elctrn. Sources	206-451-3500

Local Distributors

TX	Houston, Lenert Co.	713-225-1465

CADILLAC PLASTIC & CHEM., 1221 Bowers St., P.O. Box P-2020, Birmingham, MI 48012, Tel: 313-646-5100, TWX: 810-232-1886; Empl.: 1000

CADNETIX CORPORATION, 5757 Central Ave., Boulder, CO 80301, Tel: 303-444-8075; Empl.: 150

CAELUS COMPUTER, Equipment & Supplies, P.O. Box 6297, San Jose, CA 95150, Tel: 408-729-1800; Empl.: 25; *Sls. Mgr.:* Elaine Green

CAERE CORP., 100 Cooper St., Los Gatos, CA 95030, Tel: 408-395-7000, Telex: 910-597-5391; Empl.: 60+; *Dist. Mgr.:* Terry Livermore

CAI, 550 W. Northwest Hwy., Barrington, IL 60010, Tel: 312-381-2400, Telex: 25-4268, TWX: 910-651-1904; Empl.: 650

CAIG LABS., 1175-0 Industrial Ave., Escondido, CA 92025, Tel: 619-743-7143; Empl.: 15

Local Distributors

CA	Glendale, Western Elctrn. Supp.	213-246-4861
DE	Wilmington, Wholesale Elctrn.	302-656-9988
IL	Champaign, Klaus Radio	309-691-4840
IL	Hillsdale, Complete Reading Elec.	312-547-5400
LA	Lafayette, Ralphs Elctrns. Supp.	318-233-0105
MI	Grand Rapids, Stotts-Friedman	616-459-0216
MO	Kansas City, Walters Radio Supp.	816-531-7015
NY	New York, Argil Elctrns.	212-691-8111
OH	Cleveland, Complete Reading Elec.	216-267-1000
TX	El Paso, Midland Specialty Co.	915-533-9555
VA	Norfolk, Priest Elctrns.	703-855-0105
VA	Norfolk, Radio Parts Distr. Co.	703-461-8095

CALABRO INDS., INC., See UNITRACK Div., Calabro Inds., Inc.

CALAY SYSTEMS, INC., 2698 White Road, Irvine, CA 92714, Tel: 714-863-1700, Telex: 6711321; Empl.: 44

CALCOMP, 2411 W. La Palma Ave., Anaheim, CA 92801, Tel: 714-821-2011, TWX: 910-591-1154; Empl.: 2100; *Sls. Mgr.:* James F. Waltz

CAL CONTROLS INC., 1155 Waukegan Rd., Glenview, IL 60025, Tel: 312-998-5720, Telex: 256293; *Sls. Mgr.:* Alan Bates

CAL COUNT, 5407 Port Royal Rd., Springfield, VA 22151, Tel: 703-321-9625, Telex: 440732, TWX: 440733; Empl.: 35

CAL CRYSTAL LAB., INC., 1142 N. Gilbert, Anaheim, CA 92801, Tel: 714-991-1580, 800-854-XTAL, TWX: 910-591-1892; *Sls. Mgr.:* Herb Plumhoff

Local Sales Offices & Reps

AZ	Scottsdale, Western High Tech. Mktg.	602-949-0873
CA	Arcadia, H.M.C. Inc.	818-447-0958
VA	Front Royal, Eltron Sls., LTD.	703-635-7201

Local Distributors

CA	Chatsworth, Passive Comp.	818-341-1745
CA	Mountain View, Target Elctrns.	415-961-1170

CALEX MFG. CO., INC., 3355 Vincent Rd., Pleasant Hill, CA 94523, Tel: 415-932-3911, Telex: 338 506; FSC No.: 29988; Empl.: 50; *Sls. Mgr.:* Steven M. Mathias .... **D•1006, 1542-1545**

Local Sales Offices & Reps

AZ	Glendale, Adtek Inc.	602-931-9289
CA	Inglewood, Basic Sys.	213-673-4300
CA	San Diego, Basic Sys.	619-729-9641
CA	Santa Clara, Basic Sys.	408-727-1800
CT	Collinsville, Dynamic Sls.	203-693-6567
FL	Melbourne, Raycom, Inc.	305-259-7988
GA	Duluth, Raycom, Inc.	404-446-9015
MA	Burlington, Dynamic Sls.	617-272-5676
NY	White Plains, Cane Techn. Sls.	914-694-9240
OH	Chesterland, EQS	313-961-3042
TX	Garland, Carey, McMahill & Zerbe Co.	214-681-1414
TX	Houston, Carey, McMahill & Zerbe Co.	713-771-1500
WA	Bellevue, Topp Engrg. Sls. Co.	206-747-5401

Local Distributors

CA	Inglewood, Basic Sys.	213-673-4300
CA	Pleasant Hill, Calex Mfg. Co.	415-932-3911

CALIBRON INSTRS., Burton-Rogers Co., 220 Grove St., Waltham, MA 02154, Tel: 617-894-6440; Empl.: 14; *Dist. Mgr.:* W. Burton

CALIFORNIA AVIONICS LABS., Box 701, Palo Alto, CA 94302, Tel: 415-328-7999; Empl.: 5 .... **D•1198**

CALIFORNIA COMPUTER SYSTEMS, 740 S. Milpitas Blvd., Milpitas, CA 95035, Tel: 408-945-0500, Telex: 171959; Empl.: 37; *Sls. Mgr.:* William Crane; *Dist. Mgr.:* William Crane

CA DC CALIFORNIA DC

CALIFORNIA DC, 2150 Anchor Ct., Newbury Park, CA 91320, Tel: 805-499-3621, 213-706-8221; Empl.: 100; *Sls. Mgr.:* Peter Gajewski .... **D•1546**

Local Sales Offices & Reps

AZ	Phoenix, Relcom	602-893-1209
CA	Calabasas, Quadrep Cen.	818-887-3711
CA	Irvine, Quadrep S.	714-261-8141
CA	San Diego, Power Assocs.	619-275-0641
CA	San Jose, Quad Rep	408-946-4000
MA	Falmouth Heights, RJC Assocs.	617-366-0399
OR	Portland, Crown Elctrns.	503-620-8320
TX	Austin, Technlg. Sls.	214-346-9940
TX	Dallas, Technlg. Sls.	214-380-0200
TX	Houston, Technlg. Sls.	713-266-2473
WA	Bellevue, Crown Elctrns.	206-643-8100
Can	Don Mills, Ont., RD Assocs.	416-444-0959

Local Distributors

CA	South Gate, Cetec Elctrns.	213-773-6521

CALIFORNIA EASTERN LABS. INC., 3005 Democracy Way, Santa Clara, CA 95050, Tel: 408-988-3500, Telex: 346393, TWX: 171197; Empl.: 85; *Sls. Mgr.:* Jim McAuley; *Dist. Mgr.:* Jim McAuley

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Local Sales Offices & Reps

AZ	Phoenix, Aztec Ent., Inc.	602-944-9185
CA	Huntington Beach, Sci. Dvcs. West	714-840-3501
CA	Los Altos, Jay Stone Assocs.	415-948-4563
CO	Denver, Aztec Entprs.	303-779-5285
FL	Melbourne, Saber Assocs.	800-327-0853
IL	Chicago, EIA, Inc.	312-298-2290
IN	Indianapolis, EIA, Inc.	317-257-7231
KS	DeSoto, Midtec Assocs.	913-441-6565
LA	Baton Rouge, SESCO	510-993-3103
MA	Waltham, McBar Assocs.	617-890-0233
MN	Minneapolis, Prairie Assocs.	612-559-7550
MO	Florissant, Midtec Assocs.	314-837-5200
NJ	Teaneck, Sci. Dvcs. East, Inc.	201-837-1004
NM	Albuquerque, Aztec Entprs.	505-262-1688
NY	Fayetteville, Andrews Co.	315-637-3144
OH	Dayton, Hocker Assocs.	513-298-8638
OK	Tulsa, SESCO	918-622-3868
PA	Springhouse, Sci. Dvcs. East	215-643-3335
TX	Austin, SESCO	512-892-2490
TX	Dallas, SESCO	214-231-9364
TX	Houston, SESCO	713-999-3510
UT	Ogden, Aztec Ent., Inc.	801-621-1655
VA	McLean, Creative Mktg. Assoc. Ltd.	703-442-9100
WA	Bellevue, Showalter Instrs., Inc.	206-746-7970
Can	Ottowa, Ont., A.I.M.	613-722-8286

CALIFORNIA MICRO DEVICES, INC., 215 Topaz Street, Milpitas, CA 95035, Tel: 408-263-3214

CALIFORNIA MICROWAVE, 990 Almanor Ave., Sunnyvale, CA 94086, Tel: 408-732-4000, Telex: 35 2016, TWX: 910-339-9231; Empl.: 1200

CALIFORNIA MINICOMPUTER SYS., 5534 Westlawn Ave., Los Angeles, CA 90066, Tel: 213-640-2930, TWX: 910-343-6489; Empl.: 50; *Dist. Mgr.:* R. D. Mowry

CALLYER INSULATED WIRE CO., 100 Higginson Ave., Lincoln, RI 02865, Tel: 401-723-7800

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CALMARK CORP., 4915 Walnut Grove Ave., San Gabriel, CA 91776, Tel: 818-287-0451, TWX: 910-589-1540; FSC No.: 52094; Empl.: 70; *Sls. Mgr.:* R. L. Rosenthal; *Dist. Mgr.:* R. L. Rosenthal .... **C•1030-1044**

Local Sales Offices & Reps

AL	Huntsville, Remco	205-533-3763
AZ	Tempe, Delta Elctrn. Sls.	602-224-1601
CA	San Diego, Noo Rep. Tech. Sls.	619-483-4861
CA	Santa Clara, Calmark Corp.	408-984-2618
CO	Denver, Spectrum Mktg.	303-480-9991
FL	Clearwater, WMM Assocs.	813-461-7074
GA	Atlanta, Remco	404-447-6937
IL	Elk Grove, Martec	312-956-8090
KS	DeSoto, Midtec Assocs.	913-441-6565
MA	Westboro, Tech. Mktg. Svcs. Co.	617-366-6655
MN	Minneapolis, Comps. Grp.	612-374-1250
MO	Florissant, Midtec Assocs.	314-837-5200
NH	Windham, Tech. Mktg. Svcs.	603-434-2716
NJ	Madison, Livera-Polk Assocs.	201-377-3220
NY	Cooperstown, Fitzelle Assocs.	607-547-9333

NY	Glen Head, Livera-Polk Assocs.	516-759-9300
NC	Raleigh, Remco	919-847-5079
OH	Miamisburg, Electronics, Inc.	513-866-3340
OR	Troutdale, Comtec	503-227-2111
PA	Horsham, Dalbrook Corp.	215-441-8380
TX	Richardson, Zonk Assocs.	214-238-7651
UT	Ogden, Spectrum Mktg.	801-972-8552
WA	Bellevue, Comtec	206-453-1188
EXP	Cappoquin, Ireland, Calmark-Kileen, Ltd.	058-54205
EXP	San Gabriel, CA, Calmark Corp.	213-287-0451

Local Distributors

AZ	Phoenix, Aero-Space Computer Supps.	602-861-1785
AZ	Phoenix, Scottsdale Tool & Supp.	602-273-7376
CA	Anaheim, Henry Mann West	213-995-3900
CA	Fremont, Terminal Sls. Corp.	415-656-7722
CA	San Jose, Cypress Elctrns.	408-945-8400
CA	Torrance, Cypress Elctrns.	213-533-6005
CO	Denver, Solder Tec.	303-922-6214
FL	Longwood, Intertec Comps.	305-834-7777
IL	Elk Grove, Martec Assocs.	312-956-8090
MA	Waltham, Etchomatic	617-893-2020
MA	Westboro, TMSC Elctrn. Supp.	617-366-8462
MN	Minneapolis, Aero-Space Computer Supp.	612-884-4725
NJ	Collingswood, Index	609-429-4065
NJ	Nutley, Nationwide Circuit Prods.	201-667-1333
NY	Elmsford, Multimetrics Co.	914-347-3667
PA	Huntingdon Valley, Henry Mann, Inc.	215-355-7200
TX	Dallas, Cypress Elctrns.	214-869-1435
TX	Richardson, Zec Sls.	214-238-7651
UT	Salt Lake City, Solder Tec	801-974-0444
EXP	Cappoquin, Ireland, Calmark-Kileen, Ltd.	058-54205
EXP	CA, San Gabriel, Calmark Corp.	213-287-0451
EXP	Osaka, Japan, Settsu Metal Inds.	06-992-2331
EXP	Ramat-Gan, Israel, Shaham Elctrn.	03-700303
EXP	Singapore, Singapore, Mazda Elctrn.	2987851

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Local Sales Offices & Reps

AZ	Phoenix, Toward Engrg. Assocs.	602-277-1453
CA	Cupertino, F & F Assocs.	408-446-2349
CA	San Diego, Interstate Mktg. Assocs.	619-292-8117
CA	Woodland Hills, Interstate Mktg. Assocs.	818-883-7606
IN	Kokomo, Schillinger & Assocs.	317-452-4057
IN	South Bend, Schillinger & Assocs.	219-291-6258
MN	Minneapolis, Bill Deming & Assocs.	612-888-5000
NH	Milford, D. A. Crowley & Assocs.	603-673-8274
PA	Rydal, Espy Sls.	215-576-0780
EXP	CA, Santa Monica, Trans-World Trade	213-472-0444

Local Distributors

CA	Canoga Park, Timco Sls.	818-992-5040
CA	Long Beach, El-Comp Sls.	213-421-7316
CA	San Fernando, Petell Elctrns.	818-365-9841
CT	Fairfield, Sound Elctrns.	203-254-2003
FL	Tampa, Impala Elctrns.	813-885-4747
IN	Indianapolis, Meunier Elctrns. Supp.	317-635-3511
MD	Timonium, Sebra Elctrns.	800-638-1103
MI	Grand Rapids, S. F. Elctrns.	616-459-0216
NJ	East Hanover, State Elctrns. Parts Corp.	201-887-2550
NY	Bohemia, Justin Elctrns.	516-589-4008
NY	Hauppauge, Fairmont Elctrns.	516-231-3313
NY	New York, Centaur Elctrns.	212-685-6984
NY	Valley Stream, L & S Elctrns.	516-561-2474
EXP	CA, Santa Monica, Cal-R, Inc.	213-450-1761

CAL-TEK ENGRG., 36 Riverside Drive, Kingston, MA 02364, Tel: 617-585-5666; Empl.: 5

CAMBION DIV., See Midland-Ross, Cambion Div.

CAMBRIDGE AERO INSTRUMENTS, INC., 6A Dunham Rd., Billerica, MA 01821, Tel: 617-275-0889, Telex: 948503; Empl.: 25 .... **D•1116**

Local Sales Offices & Reps

AZ	Fountain Hills, Halbar Assocs.	602-837-2464
CA	Glendale, Halbar Assocs.	818-246-8263
CA	San Mateo, Halbar Assocs.	415-349-4700
CO	Denver, Comp. Technlg., Inc.	303-758-5750
CT	Canton, Motoreps of New England	203-693-6366
MA	Needham, Motoreps of New England	617-449-3252
MN	St. Paul, Arkco, Inc.	612-777-7454
NJ	Red Bank, Motoreps of New York	800-631-2138
OR	Beverton, Halbar Assocs.	503-226-0451
WA	Redmond, Halbar Assocs.	206-882-0990

CAMBRIDGE DIGITAL SYS., Compumart, P.O. Box 568, 65 Bent St., Cambridge, MA 02139, Tel: 617-491-2700, Telex: 92-1401 COMPUMART/CAM; *Sls. Mgr.:* James O. Tropp

CAMBRIDGE ELECTRONICS LABS, P. O. Box 205, Cambridge, MA 02140, Tel: 1-617-625-7654, Telex: 948580; *Sls. Mgr.:* Mrs. Charlotte Bissell

CAMBRIDGE FILTER CORP., P.O. Box 4906, Syracuse, NY 13221-4906, Tel: 315-457-1000, Telex: 322096; *Sls. Mgr.:* Sam Stenger

CAMBRIDGE PRODS., Tridex, 244 Woodland Ave., Bloomfield, CT 06002, Tel: 203-243-1761; Empl.: 32; *Sls. Mgr.:* A. Horowitz

CAMBRIDGE TECHNOLOGY, INC., 2464 Massachusetts Ave., Cambridge, MA 02140, Tel: 617-876-0891; *Sls. Mgr.:* Bruce Rohr

C.A.M. GRAPHICS CO., INC., 145 Toledo St., Farmingdale, NY 11735, Tel: 516-694-1315, TWX: 510-224-6181; FSC No.: 63203; *Sls. Mgr.:* Manny Cardinale

CANADIAN THERMOSTATS & CONTROL DEV. LTD., 8415 Mountian Sights, Montreal, PQ, Canada H4P2B8, Tel: 514-739-3274, Telex: 05-825619; Empl.: 15; *Sls. Mgr.:* R. Marquis

CANBERRA IND., One State St., Meriden, CT 06450, Tel: 203-238-2351, Telex: 643251, TWX: 710-461-0192; Empl.: 600; *Sls. Mgr.:* Peter Devecchis; *Dist. Mgr.:* Peter Devecchis

C&D POWER SYSTEMS, Allied Corp., 3043 Walton Rd., Plymouth Meeting, PA 19462, Tel: 215-828-9000; Empl.: 1500; *Sls. Mgr.:* L. D. Zachau

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Local Sales Offices & Reps

AL	Huntsville, Beacon Elctrns.	205-881-5031
AZ	Scottsdale, Sls. Engrg.	602-994-3230
AR	Little Rock, Beacon Elctrns.	501-224-5449
CA	Los Altos, Ewing-Foley	415-941-4525
CA	Los Angeles, Universal Comps.	213-641-4255
CO	Boulder, Front Range Mktg.	303-443-4780
CT	Glastonbury, Barton Assoc.	203-633-9417
FL	Boca Raton, Beacon Elctrns.	305-392-3500
FL	Clearwater, Beacon Elctrns.	813-796-2378
FL	Maitland, Beacon Elctrns.	305-647-3498
FL	Melbourne, Beacon Elctrns.	305-724-8010
GA	Atlanta, Beacon Elctrns.	404-256-9640
IL	Elk Grove Vlg., Control Sls.	312-595-2110
IN	Carmel, Technlg. Mktg. Corp.	317-844-8462
IN	Ft. Wayne, Technlg. Mktg. Corp.	219-432-5553
KY	Louisville, Technlg. Mktg. Corp.	502-499-7808
MD	Randallstown, Beacon North	703-591-1300
MA	Ludlow, Gerber Sls. Corp.	413-589-9817
MA	Newton Upper Falls, Gerber Sls. Corp.	617-969-2620
MI	Brighton, AP Assocs.	313-229-6550
MN	Minnetonka, Gibb Elctrns.	612-935-4600
MO	Bridgeton, Dy-Tronix	314-291-4777
MO	Independence, Dy-Tronix	816-373-6600
NJ	W. Berlin, Quality Comps.	609-428-6266
NM	Albuquerque, Reptronix	505-292-1718

NY	Babylon, Astrorep	516-422-2500
NY	Latham, L-Tron Corp.	518-785-5032
NC	Raleigh, Beacon Elctrns.	919-787-0330
OH	Beachwood, Thompson & Assocs.	216-831-6277
OH	Dayton, Thompson & Assocs.	513-435-7733
OR	Beaverton, LD Elctrns.	503-649-6177
TX	Houston, R. F. Kimball Co.	713-890-8810
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VA	Forest, Beacon North	804-239-8486
WA	Snohomish, LD Elctrns.	206-568-0511
WA	Spokane, LD Elctrns.	509-922-4883
WI	Thiensville, Control Sls.	414-242-4580

CANOGA DATA SYS., 6740 Eton Ave., Canoga Park, CA 91303, Tel: 213-888-2003, Telex: 182341

CANON U.S.A., Elctrn. Comps. Div., One Canon Plaza, Lake Success, NY 11042, Tel: 516-488-6700, Telex: 96-1333; Empl.: 500; *Sls. Mgr.:* P. Specter ..... **B•1143**

Local Sales Offices & Reps

AL	Birmingham, Motion Technlg.	404-972-4040
AZ	Phoenix, Thor Engrg.	602-437-1463
AR	El Dorado, Industrial Control Assocs.	501-863-2051
CA	Los Angeles, Motion Dynamics	818-345-2127
CA	San Jose, J.T. McFarland Assoc.	408-286-9333
CT	Wolcott, Vanguard Elctrns.	203-879-9310
FL	Orlando, Motion Technology	404-972-5050
GA	Lilburn, Motion Techn.	404-972-5050
IL	Elgin, JHS & Assocs.	312-741-9070
IL	Glenview, JHS Assocs.	312-998-1960
IN	Ft. Wayne, J&B Engrg.	219-483-2813
IN	Indianapolis, J & B Engrg.	317-842-2681
MA	Needham Hgts., Vanguard Elctrns.	617-449-5578
MI	Farmington Hills, W. R. Hummon & Associates	313-474-0661
MN	Minneapolis, Components Grp.	612-374-1250
NJ	Wayne, SHL Assocs.	201-790-1714
NY	E. Rochester, A & D Devices	716-385-2778
NY	Sidney, A & D Devices	607-563-8488
NC	Charlotte, Motion Technology	704-525-9855
OH	Galion, Retronics	419-468-3253
OR	Portland, Controltek	503-641-0877
PA	Wayne, Technical Indl. Sls.	215-688-0220
TX	Dallas, Blackburn Assocs.	214-692-8885
TX	Houston, Blackburn Assocs.	713-463-1356
WA	Spokane, Controltek	509-922-2971
WI	Milwaukee, EMCO	414-242-0800

CANRAD-HANOVIA, 100 Chestnut St., Newark, NJ 07105, Tel: 201-589-4300, Telex: 13-8531; Empl.: 250; *Sls. Mgr.:* George Baer

Local Sales Offices & Reps

CA	Anaheim, Lou Arti	714-385-1433
FL	Winter Park, R. Evans	305-671-8716
IL	Bloomingdale, Ron Searls	312-980-6391
KS	Wichita, J. O'Reilly	316-744-0851
NJ	Bridgewater, Semi-Matic Co.	201-231-0606
OH	Cincinnati, G. Nichols	513-891-5104
TX	Dallas, Charles Schleeweis	214-386-9747

CANSTAR COMMUNICATIONS, Canada Wire & Cable, Ltd., 1240 Ellesmere Rd., Scarborough, ON, Canada M1P2X4, Tel: 416-293-9722, Telex: 065-25403

CANYON ELCTRNS., 2001 W. North Lane, Phoenix, AZ 85021, Tel: 602-944-4421; *Sls. Mgr.:* George J. Mitlak ..... **B•1022**

CAPACITOR SPECIALIST, See CSI Capacitors

CAPACITOR TECHNOLOGY, INC., 5015 Speedway Dr., Ft. Wayne, IN 46825, Tel: 219-484-9054 .... **A•1012**

CAPAR COMPONENTS CORP., Div. of Diplomat Electronics, 25 Dubon Ct., Farmingdale, NY 11735, Tel: 516-454-6390, Telex: 221794 ..... **A•1013**

Local Sales Offices & Reps

AL	Huntsville, South Eastern Mktg.	205-882-1633
CA	Redwood City, &	415-368-3849
CA	San Diego, Professional Sls.	619-578-8831
CA	San Jose, Class One	408-297-8666
CA	Santa Ana, Caper West	714-547-7034
CA	Santa Ana, El Dorado Sls.	714-954-0285
CO	Lakewood, Andale	303-693-4331
CT	Woodbury, Lindco Assoc. Inc.	203-263-0629
FL	Altamonte Springs, C-Assocs.	305-831-1717
GA	Alpharetta, Futron, Inc.	404-587-3853
IL	Wilmette, Wasserman Assocs.	312-256-3566
IN	Indianapolis, Willson Technical Sls.	317-298-3345
IA	Marion, M-S-B Assocs., Inc.	319-377-6261
KS	Shawnee, M-S-B Assocs., Inc.	913-432-2131
MD	Pillesville, Imagitron Sls. Co.	301-521-2020
MA	Tyngsboro, Comptech, Inc.	617-649-3030
MN	Minneapolis, DeBeck-Hays Assocs.	612-835-3610
MO	St. Charles, M-S-B Assocs., Inc.	314-946-5577
NJ	Fort Lee, Neeco	201-461-2789
NC	Raliegh, Hi-Tech Assocs.	919-781-4139
TX	Plano, B & R Electrnc. Sls. Corp.	214-985-0028
WA	Redmond, Doran Sls. Assocs.	206-885-1885

Western states call Capar West at 714-547-7034 for distributor information. All other states call Capar East at 516-454-6390 for distributor information

CAPCO, Box 1028, Grand Junction, CO 81502, Tel: 303-243-8751, TWX: 910-929-6989; Empl.: 110

CAPINTEC INSTRS., 6 Arrow Rd., Ramsey, NJ 07446, Tel: 201-825-9500, Telex: 642375; FSC No.: 6666;6685; Empl.: 150; *Sls. Mgr.:* R. J. Kanzler

CAPITOL MACHINE & SWITCH CO., Box 890, Danbury, CT 06810, Tel: 203-744-3300; FSC No.: 01548; Empl.: 90; *Sls. Mgr.:* E. P. DiMarco

CAPITOL MAGNETIC PRODS., 6902 Sunset Blvd., Hollywood, CA 90028, Tel: 213-461-2701, Telex: 67-3271, TWX: 910-321-3500; Empl.: 700

CAPITOL TEMPTROL, 5 Coulton Rd., Old Lyme, CT 06371, Tel: 203-739-4421; FSC No.: 4100; *Sls. Mgr.:* James M. Kronick

CAPTOR CORP., 5040 S. County Rd. (25A), Tipp City, OH 45371, Tel: 513-667-8484; FSC No.: 23939; Empl.: 92; *Sls. Mgr.:* Omer B. Bruns

CARBONE-FERRAZ, INC., Eastmans Rd., Parsippany, NJ 07054, Tel: 201-428-8400, 800-526-9067, Telex: 136045; *Sls. Mgr.:* John Harper

CARBONE LORRAINE INDS., 400 Myrtle Ave., Boonton, NJ 07005, Tel: 201-DE4-0700, Telex: 136407; Empl.: 450

CARBONE USA CORP., Carbone Lorraine Inds. Corp., 402 Myrtle Ave., Boonton, NJ 07005, Tel: 201-334-0700, Telex: 136407; *Sls. Mgr.:* Norman Carver; *Dist. Mgr.:* Norman Carver

CARDINAL CONTROL CO., 110 Kensington Rd., Kensington, CT 06037, Tel: 203-828-6379; *Sls. Mgr.:* L.E.P. Beatman; *Dist. Mgr.:* L.E.P. Beatman

CARDION ELCTRNS., Div. of Gen. Sig. Conts., Inc. Unit of Gen. Sig. Corp., Long Island Expwy., Woodbury, NY 11797, Tel: 516-921-7300, Telex: 221683 CARD, TWX: 510-221-2179; FSC No.: 12909; Empl.: 680; *Sls. Mgr.:* J. J. Murphy

CARDON CORP., P.O. Box 2371, Boston, MA 02107, Tel: 617-357-5898; Empl.: 10

CAREY ELCTRN. ENGRG. CO., 1880 Clifton Ave., Springfield, OH 45505, Tel: 513-323-6300; Empl.: 10-25

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CARLINGSWITCH, INC., 505 New Park Ave., W. Hartford, CT 06110-0641, Tel: 203-233-5551, TWX: 710-425-0034; Empl.: 1200; *Sls. Mgr.:* Mark Facey ..... **B•1514-1515**

Local Sales Offices & Reps

Call toll free 1-800-243-8556 for locations of Representatives and Distributors

AL	Huntsville, CSR Elctrn.	205-533-2444
AZ	Phoenix, Robert Anderson Co.	602-266-2070
AR	Little Rock, Welch & Dolby	501-455-2199
CA	Encino, Scott Johnson	818-708-0478
CA	Fullerton, Dave Berryman	714-870-6258
CA	Fullerton, David Berryman	714-870-6258
CA	San Rafael, Wright & Assoc.	415-457-9940
CO	Denver, Quorum 3 Sls. Grp.	303-696-8480
CT	Clinton, Berkshire Elect.	203-669-0752
FL	Tampa, J-R Controls	813-961-9478
GA	Atlanta, CSR Elctrns.	404-396-3720
GA	Atlanta, CSR Elect.	404-396-3720
IL	Schiller Park, Wm. Bolles Assocs.	312-678-7888
IN	Indianapolis, D-M Assoc.	317-842-4424
KS	Mission, Merdens Co.	913-432-9323
MD	Woodbine, Naudain Assocs.	301-442-2270

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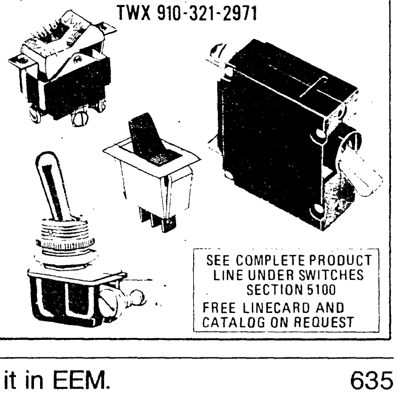

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FREE LINECARD AND CATALOG ON REQUEST

MA	Hopkinton, Berkshire Elctrns.	617-435-6025
MI	Lathrup Village, R. C. Nordstrom & Co.	313-559-7373
MN	Edina, Monroe-Hanna Assoc.	612-925-5700
MS	Jackson, Welch & Dolby	601-932-5534
MO	Clayton, Mertens Co.	314-993-6600
NJ	Burlington, VDE Elctrns.	609-387-9331
NJ	Union, Pacent Engrg.	201-687-7197
NY	Great Neck, Pacent Engrg.	516-482-4678
NY	Rochester, VDE Elctrns.	716-473-5015
NC	Raleigh, Crossroads Elctrns.	919-362-4099
OH	Columbus, Gerry Bryant	614-294-7103
OR	Aloha, Elctrn. Comp. Sls.	503-245-2342
OR	Tigard, Electronic Comp. Sls.	503-245-2342
PA	Carnegie, Brown-Yates	412-279-1101
SC	W. Columbia, Crossroads Elctrns.	919-362-4099
TX	Dallas, Control Comps.	214-458-8877
UT	Salt Lake City, Quorum 3 Sls. Grp.	801-943-9227
WA	Mercer Island, Elctrn. Comp. Sls.	206-232-9301
WI	Mequon, Wm. Bolles Assocs.	414-241-3320
Can	Markham, Ont., Deskin Sls.	416-475-1412

Local Distributors

CA	Anaheim, Electro Comps.	714-666-0180
CA	Hayward, Electro Comps.	415-783-5800
CA	Los Angeles, Electric Switches	213-660-1310
CA	Van Nuys, Pacific Switch Controls	213-873-4802
CT	Hartford, Atlantic Switch Controls	203-527-7705
FL	Lakeland, Switch Controls	813-644-7564
IL	Carol Stream, Conectrix	312-653-1460
MI	St. Clair Shores, Spemco	313-771-2700
MN	Minneapolis, Carl Bergquist Co.	612-835-2322
NJ	Fair Lawn, Relay Specialties	201-797-3313
NJ	Mt. Laurel, Jerseyswitch	609-778-8190
NY	Rochester, Simcona Elctrns. Corp.	716-328-3230
NY	Woodside, Switches Unltd.	718-478-5000
OH	Columbus, Ohioswitch	614-885-0319
SC	Columbia, Dixie Elctrns.	803-779-5332
TX	Dallas, Texaswitch	214-357-1768

CAROL CABLE CO. WEST, 2665 E. Del Amo Blvd., Rando Dominquez, CA 90221, Tel: 213-537-8050

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CAROL CABLE CO., INC., Columbia Elctrn. Cables Div., 249 Roosevelt Ave., Pawtucket, RI 02862, Tel: 401-724-9605, Telex: 927-750; FSC No.: 53909; Empl.: 1,000; *Dist. Mgr.:* Patrick E. Rush .... **C•1801-1819**

Local Sales Offices & Reps

AL	Huntsville, Cartwright & Bean	205-830-1540
AZ	Phoenix, J. R. Morgan	602-268-3464
CA	Aptos, West Cal Sls./Ind.	408-688-6568
CA	Costa Mesa, Berman-Gravley	714-549-2122
CA	San Francisco, Technical Sls.	415-467-1434
CO	Denver, William J. Purdy Co.	303-753-6800
FL	Maitland, Hutto, Hawkins, Peregoy	305-831-2474
GA	Atlanta, Cartwright & Bean	404-233-2939
HI	Honolulu, West Pacific Agy.	808-395-3152
IL	Chicago, IRI, Inc.	312-647-7755
IN	Indianapolis, Mktg. Engrs.	317-872-5665
KS	Shawnee Mission, Lowell-Kangas	913-631-3515
LA	Covington, Cartwright & Bean	504-892-1780
MD	Columbia, Lowery & Assoc.	301-964-0225
MA	Seekonk, Rudolph Mktg.	617-399-6270
MI	E. Detroit, J. M. Thorpe	313-779-6363
MN	Edina, Mel Foster Tech. Sls.	612-941-9790
MO	St. Louis, Lowell-Kangas	314-821-4050
NJ	Cedar Grove, Legtronics	201-239-4098
NY	Rochester, Apex Assocs.	716-254-6050
NY	Tuckahoe, L-C-A Sales	914-961-4700
NC	Raleigh, Cartwright & Bean	919-876-4130
OH	Cleveland, Marlow Assoc.	216-991-6500
OK	Oklahoma City, J. Y. Schoonmaker Co.	405-685-4477
OR	Beaverton, Wm. J. Purdy Co.	503-641-9373
PA	Broomall, L. D. Lowery	215-356-5300
TN	Knoxville, Cartwright & Bean	615-693-7450
TX	Dallas, J. Y. Schoonmaker Co.	214-349-1650
TX	Houston, J. Y. Schoonmaker Co.	713-686-0371
UT	Salt Lake City, W. J. Purdy Co.	801-486-8557
VA	Charlottesville, Lowery & Assoc.	804-973-6672
WA	Redmond, William J. Purdy Co.	206-882-3144
WI	Milwaukee, IRI, Inc.	414-259-0966

CAROLINA STEEL & WIRE, I-20 & S.C. 6, Lexington, SC 29072, Tel: 803-359-5501, Telex: 573355; FSC No.: 72954; Empl.: 125

CARPENTER MFG. CO., INC., Fairgrounds Dr., P.O. Box 188, Manlius, NY 13104-0188, Tel: 315-682-9176; *Sls. Mgr.:* Joseph T. De Peter

CARPENTER TECHN., Box 662, Reading, PA 19603, Tel: 215-371-2000, Telex: 836-432; Empl.: 4500; *Sls. Mgr.:* R. J. Weiler

CARROLL TOUCH TECHNOLOGY, P.O. Box 1309, Round Rock, TX 78680, Tel: 512-244-3500; *Sls. Mgr.:* Alan Hochman

CARSON MFG. CO., INC., 5453 N. Rural St., P.O. Box 20464, Indianapolis, IN 46220, Tel: 317-257-3191; Empl.: 75

CARTER MFG. CORP., Sugar Rd., Bolton, MA 01740, Tel: 617-779-5501; FSC No.: 03929; Empl.: 35; *Sls. Mgr.:* L. W. Tedstone

CARTER MOTOR, 2707 W. George St., Chicago, IL 60618-7898, Tel: 312-588-7700

CASSO-SOLAR, P.O. Box 163, U.S. Route 202, Pomona, NY 10970, Tel: 914-354-2500, Telex: 475-4099; Empl.: 50; *Sls. Mgr.:* Rolf Kates

CASTALL, INC., Weymouth Indl. Park, E. Weymouth, MA 02189, Tel: 617-337-6075, Telex: 955-439; FSC No.: 04-2459700; Empl.: 30; *Sls. Mgr.:* Joe McDonough

Local Sales Offices & Reps

AL	Huntsville, B.J.R. Mfr. Rep.	205-881-3569
CA	Tarzana, Power Comp. Sls.	818-881-9111
CO	Denver, Electro Indl.	303-623-5534
FL	Indian Harbour, Bill Toy Assocs.	305-773-5805
IL	Chicago, Electro-Mech Sls. Co.	312-777-0554
MN	Minneapolis, Norton Assocs.	612-881-6226
NJ	Berkeley Heights, Cambridge-Allen & Assoc.	201-464-0203
TX	Austin, Delta Comp.	512-458-4288
TX	Seagoville, Delta Comp.	214-287-6333
WA	Seattle, J. J. Assocs.	206-246-6619
Can	Markham, Ontario, Matrix Technlg.	416-477-4442

CATALYST RESEARCH, Mine Safety Appliances Co., 1421 Clarkview Rd., Baltimore, MD 21209, Tel: 301-296-7000, Ext. 304, Telex: 87-768; Empl.: 400; *Sls. Mgr.:* Edward S. Hatch, Jr.; *Dist. Mgr.:* Edward Hatch...**D•1417**

CATEL TELECOMMUNICATIONS, United Scientific Corp., 4800 Patrick Henry Dr., Santa Clara, CA 95054, Tel: 408-988-7722, TWX: 910-338-2263; Empl.: 190; *Sls. Mgr.:* Dick Old; *Dist. Mgr.:* Wendell Woody

CATON

CATON CONNECTOR CORP., Jones River Indl. Pk., 20 Wapping Rd., Kingston, MA 02364, Tel: 617-585-4315, TWX: 710-391-7546; FSC No.: 52196; Empl.: 25; *Sls. Mgr.:* D. Galambos .... **C•1172**

Local Sales Offices & Reps

CA	Fullerton, ISI	714-773-0411
FL	Enterprise, DJE Assocs.	305-321-6623
OH	Dayton, Delta Sales	513-271-5444
TX	Dallas, CCI	817-484-9691
TX	Ft. Worth, CCI	817-292-5803

CATRONIX CORP., 620 P/T Stne, Suite 1802, Atlanta, GA 30308, Tel: 404-881-1100; *Sls. Mgr.:* Dr. Charls Pearson

CAYPIN INDUSTRIES, INC., P. O. Box 9737, Ft. Wayne, IN 46899, Tel: 219-432-1515, 1-800-348-1771, Telex: 232-409; FSC No.: 6850

CCD IMAGING, Fairchild Camera & Instr. Corp., 450 National Ave., Mountain View, CA 94043, Tel: 415-493-8001; *Sls. Mgr.:* John Miller

C-COR ELCTRNS., 60 Decibel Rd., State College, PA 16801, Tel: 814-238-2461, TWX: 510-670-3513; FSC No.: 12775; Empl.: 600; *Sls. Mgr.:* D. Pisarcik

CDRL DATA, INC., 320 West Lone Cactus Drive Ste. 6, Phoenix, AZ 85027, Tel: 602-582-8844; FSC No.: 56060; Empl.: 25; *Sls. Mgr.:* James J. Edwards

CDS - COLORADO DATA SYS., 3301 W. Hampden, Unit C, Englewood, CO 80110, Tel: 303-762-1640, TWX: 910-933-0193; Empl.: 35; *Sls. Mgr.:* Louis Klahn

CEA DIVISION OF BERKLEONICS, INC., A Subsidiary of EG & G, 1 Aerovista Pk., San Luis Obispo, CA 93401, Tel: 805-544-5454, TWX: 910-351-6705; FSC No.: 04932; Empl.: 120; *Sls. Mgr.:* Jerry Satuloff

CEAG ELEC. CORP., Power Supp. Div., 1324 Motor Pkwy., Hauppauge, NY 11788, Tel: 516-582-4422, TWX: 510-227-4904; FSC No.: 57973; *Dist. Mgr.:* Bryce Wiedeman

CEC, 330 W. Taft Ave., Orange, CA 92665, Tel: 714-637-2970; Empl.: 50

CELANESE PLASTICS, 26 Main St., Chatham, NJ 07928, Tel: 201-635-2600; *Sls. Mgr.:* L. F. Bond

CELCO, 70 Constantine Dr., Mahwah, NJ 07430, Tel: 201-327-1123, TWX: 710-988-1018; Empl.: 45; *Sls. Mgr.:* P. S. Christaldi

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CELESCO TRANSDUCER PRODS., INC., 7800 Deering Ave., Canoga Pk., CA 91304, Tel: 818-884-6860, Telex: 499-8137; *Sls. Mgr.:* James P. Callahan; *Dist. Mgr.:* James P. Callahan .... **B•1788-1789**

Local Sales Offices & Reps

AK	Soldotna, C. Hillhouse, Inc.	907-262-7340
AZ	Tempe, Trembly Assocs.	602-967-2058
CA	Palo Alto, Gado Instr. Sls.	415-961-2222
CA	Westminster, Transducer Sys.	714-840-5357
CO	Denver, Innovative Prods.	303-691-3575
FL	Indian Rocks Beach, PAR Assocs.	813-596-8841
GA	Atlanta, PAR Assocs.	404-391-9117
IL	Hindsdale, I & C Sls.	312-323-8205
LA	Baton Rouge, Charles Instrs.	504-273-3233
MA	Sharon, Reptek	617-784-6700
MI	Trenton, I & C Sls.	313-671-1320
MN	Minneapolis, CMI Corp.	612-566-6930
MO	Manchester, Universal Precision	314-394-4693
NV	Las Vegas, Trembly Assocs.	702-739-9770
NJ	Hillsdale, C.B. Assocs.	201-664-6230
NM	Albuquerque, Trembly Assocs.	505-266-8616
NY	Clarence, Trott Elctrns.	716-634-8500
NY	Pittsford, Trott Elctrns.	716-586-8251
NC	Charlotte, Par Assocs., Inc.	704-375-9403
OH	Cincinnati, I & C Sls.	513-772-3101
OK	Tulsa, Advance Tech. Sls.	918-664-0482
OR	Portland, Fry Controls, Inc.	412-339-3565
PA	Cheltenham, Test Equip. Sls.	215-379-5431
PA	New Kensington, Bobar Instr., Inc.	412-339-3565
TX	Austin, Advance Tech. Sls.	512-440-7677
TX	Dallas, Advance Tech. Sls.	214-340-1300
TX	Houston, Advance Tech. Sls.	713-440-3888
UT	Salt Lake City, Trembly Assocs.	801-486-5292
WA	Bellevue, Fry Controls, Inc.	206-282-9270

Local Distributors

CA	Ventura, Vacumed	805-644-7461

CELESTION INDS., INC., Kuniholm Dr., Box 521, Holliston, MA 01746, Tel: 617-429-6706, Telex: 948417

CENTENT CO., 3879 S. Main St., Santa Ana, CA 92707, Tel: 714-979-6491; Empl.: 12; *Sls. Mgr.:* A. Freimanis

CENTERFLEX TECHN. CORP., 221 Seventh Ave., P.O. Box 21, Hawthorne, NJ 07507, Tel: 201-423-0505, TWX: 710-988-4147; Empl.: 50; *Sls. Mgr.:* Rolf Fasth

CENTIGRAM CORP., 155A Moffett Park Dr., Sunnyvale, CA 94086, Tel: 408-734-3222, Telex: 171-994; *Sls. Mgr.:* Leonard H. Magnuson; *Dist. Mgr.:* Paul W. Masters

CENTRALAB, INC., A North American Philips Co., 4561 Colorado Blvd., Los Angeles, CA 90039, Tel: 818-240-4880, TWX: 910-497-2282; *Sls. Mgr.:* G. Ollen

CENTRALAB, INC., A North American Philips Co., 2566 Northwestern Ave., McClure Pk., West Lafayette, IN 47906, Tel: 317-463-2536, TWX: 810-342-1889

CENTRALAB, INC., A North American Philips Co., Hwy. 20 W., P.O. Box 858, Ft. Dodge, IA 50501, Tel: 515-573-1300, TWX: 910-520-2493; *Sls. Mgr.:* L. Fette

CENTRALAB, INC., A North American Philips Co., 7158 Merchant Ave., El Paso, TX 79915, Tel: 915-779-3961, TWX: 910-964-1311

CENTRALAB, INC., A North American Philips Co., 5855 N. Glen Park Rd., Milwaukee, WI 53209, Tel: 414-228-7380, TWX: 910-262-3083; Empl.: 5000; *Sls. Mgr.:* F. Funk; *Dist. Mgr.:* R. Booker

CENTRAL DATA CORP., 1602 Newton Dr., Champaign, IL 61820, Tel: 217-359-8010, Telex: 910-245-0787; *Sls. Mgr.:* N. E. Mac Gregor

CENTRAL MICROWAVE CO., Alpha Inds., Inc., 12180 Prichard Farm Rd., Maryland Heights, MO 63043, Tel: 314-291-5270, Telex: 949436, TWX: 710-393-1236; FSC No.: 17540; Empl.: 120; *Sls. Mgr.:* William A. Ruff

CENTRE ENGRG., 2820 E. College Ave., State College, PA 16801, Tel: 814-237-0321, TWX: 510-670-3517; FSC No.: 51642; Empl.: 278; *Sls. Mgr.:* H.D. Shirey

CENTRONIC INC., 1101 Bristol Rd., Mountainside, NJ 07092, Tel: 201-233-7200, TWX: 910-350-3290; FSC No.: 7P396; Empl.: 300; *Sls. Mgr.:* Tony Green .... **B•1204-1205**

Local Sales Offices & Reps

AZ	Tempe, Griot Assocs.	602-968-4428
CA	Los Altos, Griot Assocs.	415-941-2533
CA	Santa Ana, Griot Assocs.	714-662-7525
CA	Santa Clara, Griot Assocs.	408-727-2880
CO	Denver, Griot Assocs.	303-427-1111
FL	Melbourne Bch., Millett Assocs.	305-725-5055
GA	Roswell, Electro Comp Sls.	404-992-2344
IL	Chicago, Coomb Assocs.	312-439-9810
MA	Concord, Nortech. Engrg. Sls.	617-259-0032
MI	Jackson, Norwood Scroggs Co.	517-750-1170
MN	Minneapolis, Intl. Sls.	612-831-8423
NY	Commack, RC Engrg.	516-543-3325
OH	Dayton, Ohmer Assocs.	513-434-1454
PA	Glenside, Koebert & Assocs.	215-887-2310

Local Distributors

AZ	Tempe, Griot Assocs.	602-968-4428
CA	Agoura Hills, Griot Assocs.	818-706-7601
CA	Los Altos, Griot Assocs.	414-941-2533
CA	Santa Ana, Griot Assocs.	714-662-7525
CA	Santa Clara, Griot Assocs.	408-727-2880
CO	Westminster, Griot Assocs.	303-427-1111
FL	Melbourne Beach, Millett Assocs.	305-725-5055
GA	Roswell, Electro Comp Sls.	404-992-2344
IL	Arlington Heights, Coombs Assocs.	312-439-9810
IN	Ft. Wayne, Coombs Assocs.	219-747-7661
MA	Concord, Nortech Engrg.	617-259-0032
MI	Jackson, Norwood Scroggs	517-750-1170
MN	Minneapolis, International Sls.	612-831-8423
NM	Alburquerque, Griot Assocs.	505-883-1022
NY	Commack, RC Engrg.	516-543-3325
OH	Kettering, Ohmer Assocs.	513-434-1454
OR	Beaverton, Griot Assocs.	206-454-8592
PA	Glenside, Koebert Assocs.	215-887-2310
UT	Salt Lake City, Griot Assocs.	801-328-9471
WA	Seattle, Griot Assocs.	206-646-5627

CENTURY DATA SYS., Xerox Corp., 1270 N. Kraemer Blvd., Anaheim, CA 92806, Tel: 714-632-7500, Telex: 655437; Empl.: 901; *Sls. Mgr.:* Richard Brechtlein; *Dist. Mgr.:* Don Wilder

Ceramaseal

CERAMASEAL, Box 25, New Lebanon Center, NY 12126, Tel: 518-794-7800, Telex: 14-5442; FSC No.: 07601; Empl.: 80; *Sls. Mgr.:* Gene D. Sawin .... **C•1173**

Local Sales Offices & Reps

AL	Huntsville, Physimetrics	205-881-8483
AZ	Phoenix, Wadsworth/Bryant	602-275-7366
CA	Atherton, Wadsworth/Bryant	415-321-3619
CA	Hacienda Hgts., Wadsworth/Bryant	213-330-5592
CO	Golden, J. F. Hurlbut Co.	303-279-7796
FL	Orlando, Physimetrics	305-894-8081
GA	Atlanta, Physimetrics	464-955-0155
IL	Mt. Prospect, Automation Equip. Co.	312-398-7550
KS	De Soto, Midtec Assocs.	913-441-6565
MD	Baltimore, R. A. Wafer Assoc.	301-744-1133
MA	Boston, P-J Engrg. Sls.	617-783-0510
MO	Florissant, Midtec Assocs.	314-837-5200
NY	Rochester, Canavan-Scanlon Assoc.	716-424-1830
NY	Syracuse, Canavan-Scanlon Assoc.	315-437-1271
NC	Charlotte, JWL Assoc.	704-523-3001
PA	Feasterville, Knowles Assocs.	215-322-7100
PA	Pittsburgh, Kurt J. Lesker Co.	412-892-2996
TN	Knoxville, Physimetrics	615-966-7553
TX	Richardson, Spectra Sls.	214-234-3600
WA	Seattle, J.J. Assocs.	206-246-6619

CERAMAWIRE, Box 1084, Cranford, NJ 07016, Tel: 201-276-1170; *Sls. Mgr.:* Joe Savare

CERAMIC MAGNETICS, INC., 87 Fairfield Rd., Fairfield, NJ 07006, Tel: 201-227-4222, Telex: 138 730; Empl.: 50

CERA-MITE CORP., 1327 Sixth Ave., Grafton, WI 53024, Tel: 414-377-3500

CERMETEK MICROELECTRONICS INC., 1308 Borregas Ave., Sunnyvale, CA 94088, Tel: 408-752-5000, TWX: 910-379-6931; Empl.: 110; *Sls. Mgr.:* Ken Archbold

CES ELCTRNS., 2968 Avenue Z, Brooklyn, NY 11235; Empl.: 20 .... **D•1606**

Local Sales Offices & Reps

NY Brooklyn, Microwave Labs of America

CETA CORP., See Laser Sonics Power Supply Operations

CETEC RAYMER, 7315 Fulton Ave., No. Hollywood, CA 91605, Tel: 213-875-0423; Empl.: 50; *Sls. Mgr.:* Hugh T. Wilcox

CGIS, A COMSAT CO., 7701 N. Lamar Blvd., Austin, TX 78752, Tel: 512-451-7938; Empl.: 150; *Sls. Mgr.:* Jack Johannsen

CGRS MICROTECH, P. O. Box 102, Langhorne, PA 19047, Tel: 215-757-0284; Empl.: 5; *Sls. Mgr.:* J. Swope; *Dist. Mgr.:* J. Swope

CGTI, 2 Windward Ave., White Plains, NY 10605, Tel: 914-949-3719, TWX: 710-568-1305; Empl.: 210; *Sls. Mgr.:* G. N. Snider

CHABIN CORP., 890 Fortress St., Chico, CA 95926, Tel: 916-891-6410, TWX: 910-536-1001; *Sls. Mgr.:* Peter Tunis

CHADWICK-HELMUTH, 4601 N. Arden Dr., El Monte, CA 91731, Tel: 213-575-6161, Telex: 194-271; Empl.: 75; *Sls. Mgr.:* John Beach

CHA INDUSTRIES, 3565 Haven Avenue, Menlo Park, CA 94025, Tel: 415-363-8011, Telex: 334426; *Sls. Mgr.:* Jack Patten

CHALCO ENGRG., 15126 S. Broadway, Gardena, CA 90248, Tel: 213-FA1-0121, TWX: 910-346-7026; Empl.: 95

CHAMPLAIN CABLE, PO Box 7, Winooski, VT 05404, Tel: 802-655-2121, TWX: 510-299-0018; FSC No.: 05973; Empl.: 425; *Sls. Mgr.:* J. Brooks

CHANNEL INDS., 839 Ward Dr., Santa Barbara, CA 93111, Tel: 805-967-0171, Telex: 658416; Empl.: 75

CHAPMAN CORP., P.O. Box 10700, Portland, ME 04104, Tel: 207-773-4726; Empl.: 60; *Dist. Mgr.:* Elizabeth Angell

CHARLES RIVER DATA SYSTEMS, INC., 983 Concord St., Framingham, MA 01701, Tel: 617-626-1000, Telex: 681-7373; Empl.: 170; *Sls. Mgr.:* S. K. Stephenson

CHARTPAK, 1 River Rd., Leeds, MA 01053, Tel: 413-584-5446; Empl.: 195

CHASSIS-TRAK, General Devices Co., Inc., P.O. Box 39100, Indianapolis, IN 46239, Tel: 317-897-7000, Telex: 27-2169; FSC No.: 06666; Empl.: 190; *Sls. Mgr.:* H. L. Crouch .... **C•1062-1063**

Local Sales Offices & Reps

AL	Huntsville, Hughes Assoc.	205-533-9108
AZ	Phoenix, Snyder Engr.	602-279-2010
CA	Fullerton, Groh Assocs.	714-738-7105
CA	Mountain View, G. Woempner	415-964-5454
CO	Boulder, R. F. Mayo Assoc.	303-499-2155
CT	Waterbury, Coakley, Boyd & Abbett	617-444-5470
FL	Lighthouse Point, J. Krutek & Assoc.	305-941-6544
GA	Atlanta, Hughes Assoc.	404-252-7486
IL	Glencoe, Howard Benjamin Assoc.	312-835-0150
IN	Noblesville, Century Elctrns.	317-849-2026
KS	Shawnee Mission, Lowell, Kangas & Assoc.	913-631-3515
MA	Needham, Coakley, Boyd & Abbett	617-444-5470
MN	St. Paul, Northport Engrg.	612-457-8000
MS	Corinth, Hughes Assoc.	601-287-2915
MO	St. Louis, Lowell, Kangas & Assocs.	314-821-4050
NH	Plaistow, Coakley, Boyd & Abbett	617-444-5470
NJ	Mountainside, Henry G. Richter	201-233-4615
NY	Fayetteville, H. G. Richter	315-637-6713
NC	Raleigh, Hughes Assoc.	919-782-2065
OH	Cleveland, Electronic Comps.	216-261-4103
OH	Miamisburg, Electronic Comps.	513-866-3340
OK	Tulsa, Advance Tech. Sls.	918-664-0482
PA	Doylestown, Monterio Assoc.	215-345-5855
TN	Morristown, Hughes Assoc.	615-587-2433
TX	Austin, Advance Tech. Sls.	512-440-7677
TX	Dallas, Advance Tech. Sls.	214-340-1300
TX	Houston, Advance Tech. Sls.	713-440-3888
WA	Olympia, Bergford Assoc.	206-866-2001
EXP	IN, Indianapolis, General Devices	317-897-7000

CHATHAM CONTROLS, 33 River Rd., Chatham, NJ 07928, Tel: 201-635-8892; FSC No.: 04814; Empl.: 11

CHATSWORTH DATA CORP, Cablemaster Div., 20710 Lassen St., Chatsworth, CA 91311, Tel: 818-341-9200; Empl.: 65; *Sls. Mgr.:* Hank Boehm .... **D•1199**

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MA	Waltham, W. M. Hague	617-863-5600
NJ	Marlton, Javie Pickle	609-596-6900
OH	Cleveland, Triad Assoc	216-248-3350

CHATSWORTH DATA CORP, Impact-o-Graph Div., 20710 Lassen St., Chatsworth, CA 91311, Tel: 213-341-3000; Empl.: 50

CHEM-MIXX CORP., 55 North St., Medford, MA 02155, Tel: 617-395-7270; Empl.: 9; *Sls. Mgr.:* James Hart

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IN	Lawrence, American Indl.	317-897-9900
MN	Edina, Adhesive Sys. Technlg.	612-944-7999
MO	Maryland Hgts., T. B. Moore Co.	314-434-6844
PA	Philadelphia, Air Draulics Div.	215-457-1940
PA	Pittsburgh, Kurt J. Lesker Co.	412-892-2996
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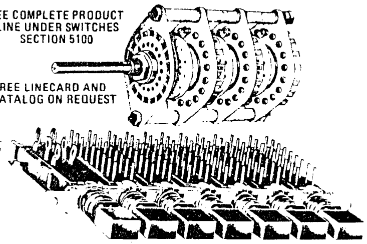

CHEMTRONICS INC., 681 Old Willets Path, Hauppauge, NY 11788, Tel: 516-582-3322, Telex: 968567; FSC No.: 21267; Empl.: 40; *Sls. Mgr.:* Louis Friedman; *Dist. Mgr.:* Scott Friedman

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AL	Huntsville, CSR Elec.	205-533-2444
AZ	Phoenix, O'Donnell Assocs. S.W.	602-944-9542
CA	Palo Alto, Abbott Engrg. Co.	415-968-2265
CA	San Diego, O'Donnell Assocs.	619-578-1645
CA	Torrance, O'Donnell Assocs.	213-539-9664
CO	Boulder, Front Range Mktg.	303-443-4780
CT	North Haven, Coakley, Boyd & Abbett	203-239-6217
FL	Coral Springs, CBC Elctrns.	305-755-1111
FL	Longwood, CBC Elctrns.	305-831-5380
GA	Atlanta, CSR Elctrns.	404-396-3720
IL	Waukegan, Cherry Elec. Prod. Corp.	312-578-3500
IN	Ft. Wayne, Menze Sls.	219-747-5616
IA	Cedar Rapids, Dy-Tronix	319-377-8275
IA	Wichita, Dy-Tronix, Inc.	316-838-0884
MA	Needham Hgts., Coakley, Boyd & Abbett	617-444-5470
MI	Grand Rapids, Miltimore Sls.	616-942-9721
MI	Novi, Miltimore Sls.	313-349-0260
MI	Southfield, Cherry Elec. Prod.	313-358-5588
MI	Southfield, Cherry Elec. Prod. Corp.	313-358-5588
MN	St. Paul, Cahill, Schmitz & Cahill	612-646-7217
MO	Bridgeton, Dy-Tronix	314-291-4777
MO	Raytown, Dy-Tronix, Inc.	816-356-6340
NH	Plaistow, Coakley, Boyd & Abbett	617-444-5470
NJ	Perrineville, Schmitt Inds. Corp.	201-446-2937
NJ	Pitman, Colrud Corp.	609-589-5866
NY	Rochester, Elcom Sls.	716-385-1400
NY	Syracuse, Elcom Sls.	315-685-8245
NY	W. Hempstead, Schmitt Indl. Mktg. Corp.	516-486-3510
NC	Mathews, CSR Elctrns.	704-847-1927
NC	Raleigh, CSR Elctrns.	919-878-9200
OK	Tulsa, Genzel Sls. & Assoc.	918-622-7744
OR	Portland, Jas. J. Bacher Co.	503-297-8744
TN	Knoxville, CSR Elctrns.	615-557-0890
TX	Austin, Bonser-Philhower Sls.	512-346-9186
TX	Houston, Bonser-Philhower Sls.	713-531-4144
TX	Richardson, Bonser-Philhower Sls.	214-234-8438
UT	Salt Lake City, Front Range Mktg.	801-364-6481
VA	Reston, Colrud Corp.	703-620-6612
WA	Seattle, Jas. J. Bacher Co.	206-285-1300
WI	Wauwatosa, Larsen Assocs.	414-258-0529

Local Distributors

AL	Birmingham, Ack Radio Supp. Co.	205-322-0588
AL	Huntsville, Powell Elctrns.	205-539-2731
AZ	Phoenix, Cetec Elctrns.	602-277-7951
AZ	Phoenix, Elctrn. Parts	602-277-7281
AZ	Tempe, Fisher-Brownell	602-967-1464
AR	Little Rock, Carlton-Bates	501-562-9100
CA	Alhambra, Fisher-Brownell	213-289-0255
CA	Chatsworth, Diplomat Elctrns.	213-341-4411
CA	Costa Mesa, Diplomat Elctrns.	714-549-8401
CA	Gardena, Cal Switch	213-770-2330
CA	Irvine, Cetec Elec.	714-250-4141
CA	Los Angeles, Electric Switches	213-660-1310
CA	Oakland, Brill Elctrns.	415-834-5888
CA	San Diego, Diplomat Elctrns.	619-292-5693
CA	San Diego, Fisher-Brownell	619-560-8545
CA	Santa Clara, Cetec Elec.	408-980-0110
CA	Santa Clara, Fisher-Brownell	408-988-6041
CA	Southgate, Cetec Elctrns.	213-773-6521
CA	Sunnyvale, Diplomat Elctrns.	408-744-1555
CO	Denver, Denver Wintronics	303-431-7161
CO	Denver, Integrated Elec.	303-292-6121
CT	Wallingford, Midan Elec.	203-265-2077
FL	Ft Lauderdale, Powell Elec.	305-972-4300
FL	Ft. Lauderdale, KSM Elctrns.	305-971-5900
GA	Atlanta, Ack Radio Supp. Co.	404-351-6340
GA	Atlanta, KSM Elctrns.	404-458-2013
IL	Bensenville, Diplomat Elctrns.	312-595-1000
IL	Champaign, Klaus Radio	217-356-1896
IL	Chicago, Newark Elctrns.	312-638-4411
IL	Palatine, OHM Elctrns.	312-359-5500
IL	Wheeling, Hawk Elctrns.	312-459-4030
IN	Ft. Wayne, Graham	219-423-3422
IN	Indianapolis, Genesis Elctrn.	317-637-5571
IN	Indianapolis, Graham Elec.	317-634-8202
IN	South Bend, Genesis Elctrns.	219-287-2911
IA	Cedar Rapids, Advent Elctrn.	319-363-0221
KS	Edwardsville, C. Tennant Sons & Co.	913-441-1801
KY	Louisville, P. I. Burks Co.	502-589-3960
MD	Columbia, Maryland	301-621-4070
MD	Savage, Pyttronic Ind.	301-792-0780
MA	Billerica, A. W. Mayer Co.	617-229-2255
MA	Needham, Cronin Elctrns.	617-449-5000
MI	Livonia, Rep-Tron Elctrns.	313-525-2700
MI	Troy, Empire Elec. Inc.	313-585-8130
MN	Minneapolis, Newark Elec.	612-331-6350
MN	Minneapolis, Stark Elctrns.	612-332-1325
MO	Kansas City, Walters Radio Supp.	316-531-7015
MO	St. Charles, Finnigan Elctrns.	314-946-6201
NJ	Bellmawr, Mid-Atlantic Elec.	609-931-5303
NJ	Clifton, J-Mar Elec., Inc.	201-772-6400
NM	Albuquerque, Elctrn. Parts	505-293-6161
NY	Hauppage, C. Tennant Sons & Co.	516-434-8200
NY	Liverpool, Diplomat Elec.	315-652-5000
NY	Lynbrook, Peerless Radio Corp.	516-593-2121
NY	Melville, Diplomat Elec.	516-454-6334
NY	Mt. Vernon, QAR Ind'l. Elctrn. Sls.	914-699-2224
NY	Rochester, Rochester Radio & Supp. Co.	716-454-7800
NC	Cary, Powell Elctrns.	919-467-1212
NC	Winston-Salem, Kirkman Elctrn.	919-722-9131
OH	Cincinnati, Graham Elec.	513-772-1661
OH	Cincinnati, Hughes-Peters	513-351-2000
OH	Columbus, Hughes-Peters	614-294-5351
OH	Dayton, Esco Elec.	513-293-1133
OH	Middlesburg Hts., Selectronics	216-243-9700
OH	Worthington, Reptron	614-436-6675
OK	Tulsa, Radio, Inc.	918-587-9123
OR	Portland, Radar Elctrns.	503-232-3404
OR	Portland, Tekelectric Control	503-246-5451
PA	Montgomeryville, Pyttronic Ind.	215-643-2850
PA	Phildelphia, Powell Elec.	215-365-1900
TN	Nashville, Graham Elec.	615-242-2682
TX	Dallas, Wallace Elec. Co.	214-340-0400
TX	Houston, Force Elec.	713-561-8644
TX	Irving, Solid State Elctrns. Co.	214-438-5700
TX	Richardson, Fisher-Brownell	214-235-3177
TX	San Antonio, Sherman Elctrns. Supp.	512-224-1004
TX	Stafford, Southwest Elctrn.	713-240-4000
UT	Salt Lake City, Diplomat Elctrns.	801-486-4134
UT	Salt Lake City, Standard Supp. Co.	801-486-3371
VA	Richmond, Sterling Elctrns.	804-226-2190
WA	Bellevue, Integrated Elec., Inc.	206-455-2727
WA	Seattle, Radar Elctrns.	206-282-2511
WI	Milwaukee, Marsh Elctrns.	414-475-6000
Can	Burnaby, B.C., Rae Ind. Elec., Ltd.	604-291-8866
Can	Downsview, Ont., Trade Elctrns. Supp.	416-661-7111
Can	Edmonton, Alb., Rae Ind. Elec., Ltd.	403-451-4001
Can	London, Ont., C. M. Peterson Co., Ltd.	519-434-3204
Can	Mississauga, Ont., Prelco Elec., Ltd.	416-678-0401
Can	Montreal, Que., Prelco Elec., Ltd.	514-389-8051
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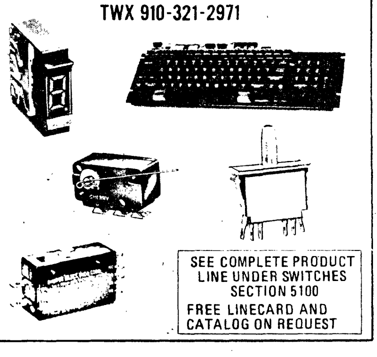

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AL	Birmingham, Spader & Assocs.	205-879-1366
AZ	Phoenix, Southwest Controls, Inc.	602-267-1171
CA	Fountain Valley, Yardley Instrs.	714-963-1000
CA	Oakland, Sabre Controls	415-444-0635
CO	Lakewood, Process Controls	303-232-4996
FL	Clearwater, TCI	813-446-8628
GA	Aeworth, Elam Engrg.	404-974-3300
IL	Lombard, Patricie & Douglas	312-971-1800
IL	Peoria, Tecco	309-692-2312
IN	Ft. Wayne, Domino Unltd.	219-747-5621
KY	Louisville, Domino	502-425-2848
LA	Baton Rouge, Rise Inc.	504-766-4645
MD	Towson, Flotech	301-321-6565
MA	Waltham, Techn. Entprs.	617-890-5300
MI	Farmington Hills, Anderson Elctrns.	313-553-7600
MN	Minneapolis, The Mark Co.	612-920-6280
MO	St. Louis, Adelphi, Inc.	314-821-1232
NV	Reno, Applied Indl. Controls Corp.	702-356-7401
NM	Albuquerque, Southwest Controls, Inc.	505-884-6202
NY	Rochester, Cascade Control Corp.	716-385-1410
NY	White Plains, MIT Sls.	914-946-5077
NC	Charlotte, Algay Controls	704-366-6976
OH	Dayton, P. J. Navin Co.	513-434-8940
OH	Willoughby, P. J. Navin Co.	216-255-1411
OK	Tulsa, Dave Allert Co.	918-743-7705
TN	Knoxville, George C. Paris	615-966-2141
TX	Arlington, Pan-Tech Controls Co.	817-640-3232
TX	Burleson, Chessell Corp.	817-572-4392
TX	Corpus Christi, Cecorp	512-289-6181
TX	Houston, Process Instruments, Inc.	713-893-3310
UT	Midvale, Bee and Tee Controls	801-566-7722
VA	Richmond, Advance Control Equip. Co.	804-270-7182
WA	Bellevue, Topp Engrg. Sls. Corp.	206-747-5400
WI	Brookfield, BII, Inc.	414-786-1980

CHESTER CABLE, Oakland Ave., Chester, NY 10918, Tel: 914-469-2141, TWX: 510-249-4813; *Sls. Mgr.:* William R. Dungan

CHESTERFIELD PRODS., 37 Midland Ave., Elmwood Park, NJ 07407, Tel: 201-797-9655; Empl.: 35; *Sls. Mgr.:* M. Perry .... **A•1593**

Local Sales Offices & Reps

AZ	Tucson, WJM Sls.	602-888-4847
CA	Burbank, Biztek Co., Inc.	818-766-4890
CA	Palo Alto, J M Assocs.	415-857-1260
CO	Loveland, Morbak Mktg.	303-669-8900
FL	Maitland, D. J. Ellis & Assocs., Inc.	305-645-1101
IN	South Bend, Schillinger Assocs., Inc.	219-282-4570
KS	Overland Park, Barnes-Midwest Sls.	913-341-9317
MD	Towson, Holden Engrg.	301-823-3763
MA	Framingham, Bengal Assocs.	617-877-2639
MA	Randolph, Bengal Assocs.	617-961-4120
MN	Chanhassen, Barnes Sls. Assocs.	612-934-2907
NJ	Elmwood Park, L & M Assocs.	201-797-0441
NY	New York, L & M Assocs.	212-243-6155
OH	Dayton, Markus Barnett Assocs., Inc.	513-433-0758
PA	Andalusia, L & M Assocs.	215-245-6658
TX	Richardson, Carl Tinch Sls. Co.	214-231-1322

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CA	Oceanside, Sales Engineer	619-726-9499

CHICAGO MINIATURE, 4433 N. Ravenswood Ave., Chicago, IL 60640, Tel: 312-784-1020

CHICAGO SWITCH, INC., 1714 N. Damen, Chicago, IL 60647, Tel: 312-489-5500, TWX: 910-221-5252; Empl.: 250; *Sls. Mgr.:* A. Steiner; *Dist. Mgr.:* A. Steiner

CHLORIDE POWER ELECTRONICS, 10931 Pellicano Drive, El Paso, TX 79935, Tel: 915-592-9985, Telex: 910-964-1364; FSC No.: 08715; Empl.: 1000; *Sls. Mgr.:* Gordon Goodygar

CHOMERICS, INC., 77 Dragon Ct., Woburn, MA 01888, Tel: 617-935-4850, TWX: 710-393-0173; Empl.: 500; *Sls. Mgr.:* Kevin A. Dunne

CHORUS DATA SYSTEMS, P.O. Box 810, 27 Proctor Hill Rd., Hollis, NH 03049, Tel: 603-465-7100; *Sls. Mgr.:* Bruce Monk

CHR INDS., 407 East St., P.O. Box 1911, New Haven, CT 06509, Tel: 203-777-3631, TWX: 710-465-0264; Empl.: 116

CHRISLIN INDS., 31352 Via Colinas, Westlake Village, CA 91362, Tel: 818-991-2254, TWX: 910-494-1253; Empl.: 38; *Sls. Mgr.:* Edward M. Ross; *Dist. Mgr.:* Edward M. Ross

CHRISTIANSEN RADIO INC., 1950 San Remo, Laguna Beach, CA 92651, Tel: 714-497-1506; Empl.: 9

CHRISTIE, S. D., ASSOCS. INC., 693 Locust St., Mt. Vernon, NY 10552, Tel: 212-597-1773, 914-699-7223; Empl.: 8; *Sls. Mgr.:* Sam D. Christie

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Local Sales Offices & Reps

AZ	Phoenix, PLS Assocs.	602-246-6614
CA	Tustin, John Franek Co.	714-832-0290
CO	Englewood, Omega Ltd.	303-762-1921
CO	Englewood, PLS Assocs.	303-773-1218
FL	Orlando, Newco & Assocs.	305-422-7700
GA	Lithia Springs, Newco, Inc.	404-941-6077
MD	Laurel, CSDS	301-490-3800
MA	Needham, Shain Assocs.	617-449-4380
MO	St. Louis & Grandview, Harris-Hanson	816-763-6200,314-432-3611
NJ	Hohokus, Hansen & Hughes	201-652-7055
NM	Albuquerque, Fry Gates Inc.	505-262-1525
NC	Charlotte, Newco, Inc.	704-527-7070
OH	Chesterland, EQS Systems	216-729-2222
PA	Philadelphia, Technical Instr. Sls. Co.	215-836-2222
SC	Florence, Newco, Inc.	803-662-4878
TX	Richardson, C. Tinch	214-231-1322
TX	Richardson, Carl Tinch Sls. Co.	214-231-1322
UT	Midvale, PLS Assocs.	801-566-0671
UT	Salt Lake City, Omega Ltd.	801-277-8061

CHROMALOX INSTRS. & CONTROLS, 100 Heil-Quaker Blvd., La Vergne, TN 37086-3536, Tel: 615-793-3900, Telex: 55-5129; Empl.: 110; *Sls. Mgr.:* John Cox

CHROMATICS, 2558 Mountain Indl. Bldg., Tucker, GA 30084, Tel: 404-493-7000, TWX: 810-766-8099

CHRONO-LOG CORP., 2 W. Park Rd., Havertown, PA 19083, Tel: 215-853-1130, Telex: 831579; Empl.: 20; *Sls. Mgr.:* David Biberman .... **D•1061**

CHRONOMITE LABS, 21011 S. Figueroa St., Carson, CA 90745, Tel: 213-320-9452; Empl.: 15

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CINCH, See TRW Connector Div.

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Local Sales Offices & Reps

GA	Atlanta, GM Assocs.	404-487-9409
IN	Indianapolis, Dan Larner	513-831-4347

CINCINNATI SUB-ZERO PRODS., 12011 Mosteller Rd., Cincinnati, OH 45241, Tel: 513-772-8810, Telex: 214390 SUBZERO CIN; Empl.: 80; *Sls. Mgr.:* George Molenaar .... **D•1166**

Local Sales Offices & Reps

CA	Diamond Bar, Benedict Mktg.	714-861-9940
IA	Cedar Rapids, Arrow Tech. Sls.	319-396-8030
MI	Orchard Lake, Schober & Assocs., Inc.	313-363-1888
MN	Minneapolis, Arrow Tech. Sls., Inc.	612-545-4481
MO	St. Louis, Arrow Tech. Sls., Inc.	314-991-1399
NJ	Teaneck, Irv Rudnick, Inc.	201-836-7392
NY	Buffalo, Davies Indl. Svcs., Inc.	716-896-3600
OH	Dayton, Boco, Inc.	513-224-0220
TX	Dallas, Merit Co.	214-620-0021

CIPHER DATA PRODS., INC., P.O. Box 85170, San Diego, CA 92138, Tel: 619-578-9100, TWX: 910-335-1251; Empl.: 1750; *Sls. Mgr.:* Frank Kirchhoff; *Dist. Mgr.:* Ruth Lewellyn

CIPRICO INC., 2955 Xenium Lane, Plymouth, MN 55441, Tel: 612-559-2034; Empl.: 71; *Sls. Mgr.:* Stu Reile .... **D•1062**

Local Sales Offices & Reps

AL	Huntsville, Interep Assocs.	205-533-1730
AL	Mobile, Interep Assocs.	205-478-1036
AZ	Scottsdale, Frontier Technlg.	602-998-4438
CA	Larkspur, Data Rep.	415-461-8776
CA	Los Alamitos, Gemini Assocs.	213-594-9618
CA	Los Gatos, Data Rep	408-279-1212
CA	North Hollywood	818-846-2633
CA	San Diego	619-268-1181
CA	Sepulveda	818-891-1000
CO	Parker, Advanced Data Mktg.	303-841-4908
FL	Jupiter, Southeastern First Rep.	305-746-8587
FL	Kissimmee, Southeastern First Rep.	305-846-1306
FL	Melbourne, Southeastern First Rep	305-259-6373
GA	Norcross, Interep Assocs.	404-449-8680
HI	Honolulu, Sam O. Hirota	808-533-3070
IL	Elmhurst, First Rep	312-530-2450
IN	Indianapolis, Carter, McCormic & Peirce	317-844-4175
KS	Shawnee Mission, Panatek	913-362-3349
MD	Baltimore, L. G. White & Co., Inc.	301-358-7803
MD	Silver Spring, L. G. White	301-434-1555
MI	Farmington Hills, Carter, McCormic & Peirce	313-477-7700
MN	Golden Valley, J. R. Assocs.	612-546-4110
NJ	Springfield, Gebhardt Marketing	201-376-4415
NY	New Hartford, PDQ Assocs.	315-768-8167
NY	W. Seneca, PDQ Assocs.	716-674-7816
NC	Carey, Engineering Dvcs., Inc.	919-469-9323
OH	Cleveland, Carter, McCormic & Peirce	216-779-5100
OH	Cleveland, Diamond Point Intl.	216-238-0200
OH	Dayton, Carter, McCormic & Peirce	513-836-0951
OK	Tulsa, Microlog, Inc.	918-665-7788
OR	Portland, Northwest Mktg. Assoc.	503-620-0441
PA	Jenkintown, Monument Technical Assocs.	215-884-3737
PA	Pittsburgh, Carter, McCormic & Peirce	412-372-4415
TN	Greenville, Interep Assocs.	615-639-3491
TX	Austin, Microlog.	512-327-7033
TX	Houston, Microlog.	713-956-0837
TX	Richardson, Microlog.	214-644-5010
WA	Bellevue, Northwest Mktg. Assoc.	206-455-5846
Can	Nepean, Ontario, Multilek Inc.	613-226-2365

CIRCLE ELECTRONICS, A Division of F-Dyne Elctrns., 3501 Electronics Way, W. Palm Beach, FL 33407, Tel: 305-844-1310; *Sls. Mgr.:* John Strickland

CIRCUIT ASSEMBLY CORP., 18 Thomas St., Irvine, CA 92718-2703, Tel: 714-855-7887, TWX: 910-595-1971; FSC No.: 52072; Empl.: 275; *Sls. Mgr.:* Edward Cadden

Local Sales Offices & Reps

AL	Brownsboro, JHU Assocs.	205-536-7455
AZ	Scottsdale, Harris & Croy Sls.	602-941-9059
AZ	Tucson, Harris & Croy Sls.	602-293-5393
CA	Chatsworth, Raltech, Inc.	818-700-0933
CA	Los Altos, Eirepco	415-962-0660
CA	San Diego, Varigon Assocs.	619-576-0100
CO	Aurora, Sage Sls.	303-750-3591
CT	Wallingford, Com Sls.	203-269-7964
FL	Orlando, Tech-Rep Assocs.	305-855-2648
GA	Atlanta, JHU Assocs.	404-662-0792
IL	Itasca, L-Tec, Inc.	312-773-2900
IN	Indianapolis, Frank Kahsar Sls.	317-888-8396
MA	Needham, Com Sls.	617-444-8071
MI	Grand Haven, Frank Kahsar Sls.	616-846-7590
MN	Osseo, Gaffney Sls.	612-425-5484
MO	Grandview, Harris Hanson Co.	816-763-6200
MO	St. Louis, Harris-Hanson Co.	314-432-3611
NJ	Englewood Cliffs, Masin Esco, Inc.	201-569-8868
NM	Albuquerque, Syntech	505-266-7951
NY	Hauppauge, Masin Esco, Inc.	516-273-3500
NY	Rochester, Apex Assocs., Inc.	716-254-6050
OH	Cincinnati, Frank Kahsar Sls.	513-922-3133
OH	Columbus, Frank Kahsar Sls.	614-252-4009
OH	Hudson, Frank Kahsar Sls.	216-650-1089
PA	Hatboro, Jacobsen Assoc.	215-674-2937
TX	Austin, Barry Sls., Inc.	512-837-3616
TX	Houston, Barry Sls., Inc.	713-784-5860
TX	Richardson, Barry Sls., Inc.	214-234-0255
UT	Salt Lake City, Sage Sls.	801-467-5451
VA	Front Royal, Eltron Sls., Ltd.	703-635-7201
WI	Milwaukee, L-Tec, Inc.	414-774-1000
EXP	CASanta Ana, Mann Overseas	714-250-0622
Can	Rexdale, Ont., Source Elctrns.	416-675-6235

Local Distributors

AZ	Phoenix, Arizona Comps.	602-279-9446
AZ	Phoenix, Tri-Tek	602-995-9352
AZ	Tempe, Circuit Specialist	602-966-0764
CA	Fullerton, Carden Elctrns.	714-526-7882
CA	San Diego, Mann San Diego	619-578-1550
CA	San Diego, Ryno Elctrns.	619-453-8430
CA	San Jose, Rose Elctrns.	408-263-9700
CA	Santa Ana, Mann Southwest Corp.	714-558-3202
CA	Santa Clara, Mann Elctrns.	408-988-6061
CO	Denver, C.S.I.D.	303-292-9594
CT	Norwalk, Park Distrs.	800-243-5006
CT	Wallingford, Midstates Elctrns.	203-265-9900
FL	Miami, Electronic Equip.	305-871-3500
FL	W. Palm Beach, Nurmi Elctrn. Supp.	305-684-0321
ID	Spirit Lake, Al Elctrns.	208-623-3111
IL	Chicago, Bell Inds.	312-982-9210
IL	Elk Grove Village, GBL Gould Elctrns.	312-593-3220

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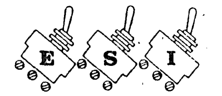

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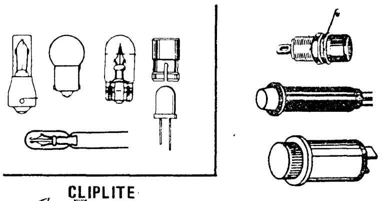

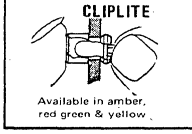

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MN	Minneapolis, Cassidy Elctrns.	612-944-0100
MN	St. Paul, Connectron	612-481-0320
MO	St. Louis, Gateway Elctrns.	314-427-6116
NH	Manchester, Yankee Elctrns.	603-625-9746
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NJ	E. Hanover, State Elctrns.	201-887-2550
NJ	Englewood, Technical Elctrn. Distr.	201-894-0800
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NM	Albuquerque, Connecting Comps.	505-345-8921
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PA	Levittown, G.W. Elctrns.	215-547-7422
TX	McKinney, Prime Distrbg.	214-231-0170
UT	Provo, Omega Elctrns.	801-375-4664
UT	Salt Lake City, Standard Supp.	801-486-3371
WA	Costa Mesa, Mann Overseas	714-557-4080
WI	Waukesha, Bell Inds.	414-547-8879

CIRCUITECH, INC., FCS Industries, 527 Industrial Way West, Eatontown, NJ 07724, Tel: 201-493-4102; Empl.: 75; *Sls. Mgr.:* Jim Harrison

CIRCUITS, INC., 59 Deming Rd., Berlin, CT 06037, Tel: 203-828-3526; Empl.: 105

CIRCUIT TECHN., 160 Smith St., Farmingdale, NY 11735, Tel: 516-293-8686, TWX: 510-224-6555; Empl.: 600; *Sls. Mgr.:* Mel Spitz

CIRTECH, EG & G, 15237 Cherry St., Stanley, KS 66223, Tel: 913-681-2801, TWX: 910-749-6806; FSC No.: 5915; Empl.: 75; *Sls. Mgr.:* Dick Spingler

Local Sales Offices & Reps

AZ	Tempe, Chapman & Assocs.	602-894-6775
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CA	San Jose, Frequency Control Assocs.	408-446-0200
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IN	Ft. Wayne, Technology Mktg. Corp.	219-432-5553
IA	Cedar Rapids, J.R. Sls. Engrg.	319-393-2232
MD	Potomac, Cetech Elctrns.	301-983-2140
NY	Melville, RF Elctrn. Sls.	516-420-8890
PA	Lancaster, Electro-Rep	717-299-5877

CITEL, INC., 3060 Raymond St., Santa Clara, CA 95050, Tel: 408-727-6562, TWX: 910-338-0540; *Sls. Mgr.:* Paul Macdonald

CLAIREX ELECTRONICS, 560 S. 3rd Ave., Mt. Vernon, NY 10550, Tel: 914-664-6602, Telex: 137308; Empl.: 300; *Sls. Mgr.:* Gerald Smith .... **B•1206-1209**

Local Sales Offices & Reps

AL	Huntsville, K & E Assocs.	205-883-9720
CA	Escondido, Clairex Elctronics	619-749-8474
IL	Chicago, Berndt Assoc.	312-283-0713
IN	Carmel, Berndt Assoc.	317-884-0114
KS	Overland Park, Advanced Techn. Sls.	913-492-4333
MD	Silver Springs, Youth Assoc. Inc.	301-598-5740
MA	Bolton, Clairex	617-779-2780
MI	Ferndale, Hilltronics	313-398-5556
MN	Minneapolis, H.M.R.	612-920-8200
MO	St. Louis, A.T.S. Inc.	314-227-4448
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OH	Trotwood, Geotronix Inc.	513-854-5939
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TX	Dallas, J. B. Guenther	214-691-8500
WA	Seattle, H. Levinson	206-323-5100
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Local Distributors

CA	Culver City, EV Roberts	213-870-9561
CT	Wallingford, Sager Elctrns.	203-265-4600
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IN	Indianapolis, Graham Elctrns.	317-634-8486
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MA	Norwell, Bordewieck Eng. Sls.	617-659-4915
MI	Ann Arbor, Wedemeyer Elctrn.	313-665-8611
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MO	St. Louis, Van Sickle Radio Elect.	314-621-5000
NJ	Mt. Laurel, D.F. Assocs.	609-234-5324
NY	Buffalo, Summit Distr.	716-884-3450
NC	Charlotte, Dixie Elctrns.	704-377-4348
OH	Columbus, Hughes Peters	614-294-5351
OK	Tulsa, Altair	918-665-0523
SC	Columbia, Dixie Radio	803-779-5332
TN	Knoxville, Dixie Elctrns.	615-938-4131
TX	Houston, Altair	713-462-2410
TX	Richardson, Altair	214-231-5166
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Local Sales Offices & Reps

AL	Huntsville, General Instr., Clare Div.	205-883-9130
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CA	El Segundo, General Instr., Clare Div.	213-322-7745
CA	Irvine, J. V. Earley & Assocs.	714-833-1806
CA	San Jose, Ruppert Sls. & Engrg.	408-998-8717
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CT	Brookfield, Kanan Assocs.	203-775-0494
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GA	Norcross, Electramark	404-446-7915
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IL	Rolling Meadows, Sumer, Inc.	312-991-8500
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NJ	Palisades Park, Janco Technlg.	201-941-4008
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PA	Erdenheim, Omni Sls.	215-233-4600
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IL	Chicago, Pat Lind Elctrns.	312-726-3513
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MN	Circle Pines, Pat Lind Elctrns.	612-786-5770
WI	Milwaukee, Pat Lind Elctrns.	414-224-0146

CLAROSTAT MFG., Washington St., Dover, NH 03820, Tel: 603-742-1120, TWX: 510-297-4455; FSC No.: 12697; Empl.: 600; *Sls. Mgr.:* H. E. Taylor

CLARY CORP., Precision Instrs. Div., 320 W. Clary Ave., San Gabriel, CA 91776, Tel: 818-287-6111, TWX: 910-589-3369; Empl.: 50; *Sls. Mgr.:* John R. Janner

CLAUSS CUTLERY CO., Box 667, Fremont, OH 43420, Tel: 419-332-7344; Empl.: 175

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CLEMENS MFG., 630 So. Berry Rd., St. Louis, MO 63122, Tel: 314-961-7228; Empl.: 3

CLEVELAND CRYSTALS, Box 17157, Euclid, OH 44117, Tel: 216-486-6100, TWX: 810-421-8031; FSC No.: 8K400; Empl.: 45; *Sls. Mgr.:* P. D. Marlowe

CLEVELAND MICA CO., 1360 Hird Ave., Lakewood, OH 44107, Tel: 216-226-1360; Empl.: 50

CLIFFORD, INC., 83 Main Street, Bethel, VT 05032, Tel: 800-451-4381; Empl.: 42; *Sls. Mgr.:* Martha C. McKinney

CLIFTON PRECISION, Litton Systems, Inc., Marple at Broadway, Clifton Hgts., PA 19018, Tel: 215-622-1000, TWX: 510-669-9782; FSC No.: 86197; Empl.: 1000; *Sls. Mgr.:* J. Gum .... **B•1144**

Local Sales Offices & Reps

AZ	Phoenix, Clifton Precision	602-242-0910
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CA	San Clemente, Clifton Precision	714-492-6904
CA	Woodland Hills, Clifton Precision	818-347-0603
CO	Aurora, Midwest Meridian	303-341-7550
FL	Longwood, Boetto Corp.	305-331-1771
IL	Elk Grove Village, Midwest Meridian	312-640-9540
IA	Cedar Rapids, Midwest Meridian	319-365-6561
MA	W. Newton, Larcom Inc.	617-244-2053
MN	Prior Lake, Midwest Meridian	612-447-8222
MO	Maryland Hgts., Midwest Meridian	314-878-4441
NY	Greenlawn, Reflex Elctrn.	516-549-1888
OH	Fairborn, Midwest Meridian	513-879-7100
OR	Beaverton, Ravencraft	503-646-9261
PA	Clifton Heights, Eastern Sls.	215-622-1000
TX	Ft. Worth, Midwest Meridian	817-654-2132

CLIMATRONICS, 140 Wilbur Pl., Bohemia, NY 11716, Tel: 516-567-7300, Telex: 971329; Empl.: 46

CLINTON ELCTRNS., 6701 Clinton Rd., Rockford, IL 61111, Tel: 815-633-1444, Telex: 257-484; *Sls. Mgr.:* John Hartman

CLIPLITE, See Visual Communications

CMC INSTR. DIV., Connecticut microComputer Inc., 568 Danbury Road, New Milford, CT 06776, Tel: 203-354-9395, TWX: 710-456-0052; *Sls. Mgr.:* Shirley Fletcher

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CML MACARR DIV., Marine Electric RPD, Inc., 666 Pacific St., Brooklyn, NY 11217, Tel: 718-857-2400, Telex: 12-5327; FSC No.: 00062; Empl.: 100; *Sls. Mgr.:* Gary Mandell .... **D•1908-1909**

Local Sales Offices & Reps

MA	Sharon, Adcour Inc.	617-784-8123
MI	Detroit, Bill Teplitz Associates	216-439-3265
OH	Cincinatti, Teplitz Assocs.	513-481-1648
OH	Cleveland, Teplitz Assocs.	216-439-3265

CMV SOFTWARE SPECIALISTS INC., 2720 W. 12th Street, Sioux Falls, SD 57104, Tel: 605-338-6645

COAST COIL CO., 5333 W. Washington Blvd., Los Angeles, CA 90016, Tel: 213-936-6188; Empl.: 50

COASTCOM, P.O. Box 27068, Concord, CA 94527, Tel: 415-825-7500, TWX: 910-481-5781; FSC No.: 415 682-2015; Empl.: 180; *Sls. Mgr.:* Scott Ledgerwood

COAXIAL DYNAMICS, 15210 Industrial Parkway, Cleveland, OH 44135, Tel: 216-267-2233, Telex: 980630; Empl.: 36; *Sls. Mgr.:* R. J. Scott .... **D•1203**

Local Sales Offices & Reps

AZ	Tucson, W.J.M. Sales	602-888-4847
CA	North Highlands, Robert H. Hutter & Assoc.	916-961-6391
DE	Newark, Tom Wright & Assoc.	301-398-3748
IA	Cedar Rapids, S & O Sales	319-393-1845
OH	Dayton, R.P.A. Co.	513-252-7067

COBA

COBA, INC., P. O. Box 14920B 28TH Ave. N., Plymouth, MN 55441, Tel: 612-559-3772; Empl.: 6 ...... **B•1535-1537**

Local Sales Offices & Reps

AZ	Phoenix, Eltron	602-266-2164
CA	Brea, Masco	714-529-0867
CA	Los Angeles, Masco	213-295-7782
CO	Aurora, Mountain View Mktg.	303-360-9641
CT	Guilford, A & M Electrns.	203-453-1612
IN	Indianapolis, Insul-Reps, Inc.	317-251-1994
MA	Needham, A & M Electrns.	617-444-8170
MI	Brighton, AP Assocs.	313-229-6550
MN	Mound, Allyn Assocs.	612-472-4784
MO	Gladstone, Delltron Co., Inc.	816-436-7445
MO	St. Louis, Delltron Co., Inc.	314-869-4779
NY	Great Neck, MOS Assocs.	516-487-3966
OH	Dublin, AP Assocs.	1-800-624-5496
OH	Fairview Park, AP Assocs.	1-800-624-5496
OR	Tigard, Electronic Comp. Sls.	503-245-2342
PA	Horsham, Dalbrook	215-441-8380
UT	Murray, Mountain View Mktg.	801-264-8488
WA	Mercer Island, Electronic Comp. Sls.	206-232-9301
Can	Point Claire, Quebec, COBA Elctrns., Inc.	514-694-1335

Local Distributors

AL	Huntsville, Component Distrs.	205-883-7501
AR	Little Rock, Component Distrs.	501-227-6278
CA	Hollywood, Yale Elec.	213-465-3186
CA	Manhattan Beach, Prime Electro	213-379-3642
CA	San Carlos, Logan Elctrns.	415-594-0700
CA	Santa Monica, Master Distrs.	213-452-1229
CA	Sunnyvale, Target Elctrns.	408-734-5611
CO	Englewood, Industrial Elctrns.	303-694-9444
CT	Shelton, Century Elec. Supp.	203-736-2684
FL	Fort Lauderdale, Component Distrs.	305-971-4950
FL	Fort Lauderdale, KSM Elctrns.	305-971-5900
GA	Atlanta, KSM Elctrns.	404-458-2013
GA	Norcross, AP Sls. Co.	1-800-624-5496
IL	Chicago, UPCO Distrs.	312-631-1122
MD	Beltsville, Petricko Sls., Inc.	301-937-4960
MO	Valley Park, Beckwith Computer & Elctrns.	314-225-4846
NC	Raleigh, Component Distrs.	919-834-9465
TX	Dallas, Heilind Elctrns., Inc.	214-351-2050

COBEHN, INC., 226 Passaic Ave., Fairfield, NJ 07006, Tel: 201-227-6675; Empl.: 5; *Sls. Mgr.:* George L. Henzel

COBER ELCTRNS., 102 Hamilton Ave., Stamford, CT 06902, Tel: 203-327-0003, TWX: 710-474-3371; FSC No.: 28909; Empl.: 100; *Sls. Mgr.:* Saul Haffner

CODAR TECHNOLOGY, INC., 1428 Florida Avenue, Longmont, CO 80501, Tel: 303-776-0472; Empl.: 18

CODENOLL TECHNOLOGY CORP., 1086 N. Bwy., Yonkers, NY 10701, Tel: 914-965-6300, Telex: 646159; *Sls. Mgr.:* Lori Principe

CODI SEMICONDUCTOR, INC., 350 Hurst Ave., Linden, NJ 07036, Tel: 201-862-8484, Telex: 844-796; FSC No.: 16352;19500; Empl.: 48; *Sls. Mgr.:* Joe LaBruna; *Dist. Mgr.:* Joe LaBruna

COGENEL/ENTRELEC DIV., 2 Ram Ridge Rd., Spring Valley, NY 10977, Tel: 914-425-7460, Telex: 0996619; Empl.: 50; *Sls. Mgr.:* F. D. Leynaert

COGNITRONICS, 25 Crescent St., Stamford, CT 06906, Tel: 203-327-5307, TWX: 710-474-3523; Empl.: 200; *Sls. Mgr.:* Vincent Harrison/Lawrence Ganzall

COHERENT COMMUNICATIONS SYS. CORP., 60 Commerce Dr., Hauppauge, NY 11788, Tel: 516-231-1550, Telex: 94-1439; Empl.: 175; *Sls. Mgr.:* Bertram J. Ralph

COHERENT, INC., 3210 Porter Dr., Palo Alto, CA 94304, Tel: 415-493-2111, Telex: 34-8304; Empl.: 1,300; *Sls. Mgr.:* William Shiner/Paul Crosby

COHU, INC., Elctrns. Div., Box 85623, San Diego, CA 92138, Tel: 619-277-6700, TWX: 910-335-1244; Empl.: 178; *Sls. Mgr.:* H. Winter

COILCRAFT, 1102 Silver Lake Rd., Cary, IL 60013, Tel: 312-639-6400, TWX: 910-651-2251

COIL-Q CORP., 340 Bronxville Rd., Bronxville, NY 10708, Tel: 914-337-4775; Empl.: 12

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COILTRONICS INC., 984 SW 13th Court, Pompana Beach, FL 33069, Tel: 305-781-8900, TWX: 510-956-3142; Empl.: 130; *Sls. Mgr.:* Lynn A. Hayden

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COLBER CORP., 26E Buffington St., Irvington, NJ 07111, Tel: 201-371-9500, TWX: 710-995-4416; Empl.: 50; *Sls. Mgr.:* Roberta Bryner ...... **A•1832**

Local Sales Offices & Reps

CT	Vernon, G.M. Assocs.	203-646-4443
IN	Fort Wayne, Walter W. Bieberich	219-432-2537
MI	Grosse Pointe Farms, Ed Walter	313-882-3746
PA	Oreland, CMS Mktg.	215-887-1325
TN	Fairview, Walter W. Bieberich	615-799-0120

COLE-HERSEE CO., 20 Old Colony Ave., Boston, MA 02127-2467, Tel: 617-268-2100, Telex: 94-0901; *Sls. Mgr.:* Wesley L. Peterson

COLE INSTRUMENT CORP.

COLE INSTR., 2650 S. Croddy Way, Santa Ana, CA 92704, Tel: 714-556-3100; Empl.: 50; *Sls. Mgr.:* P. Hanson ...... **B•1538**

Local Sales Offices & Reps

AL	Huntsville, Rakes Engrg. & Mktg.	205-533-3763
AZ	Scottsdale, Semi Systems Arizona Inc.	602-991-1151
CA	Anaheim, Gabriel & Assocs.	714-666-0660
CA	Santa Clara, Context Engrg.	408-748-8676
CT	Glastonbury, Barton Assocs.	203-633-9417
HI	Lihei, Aloha Assocs.	808-941-1574
IL	Wheaton, Chadra Schilke & Assocs.	312-653-8126
KS	Merriam, Midwest Technical Sls.	913-236-8555
MD	Silver Spring, Carwithen Assocs.	301-589-9040
MA	Salem, Barton Assocs.	617-745-4310
MI	Birmingham, Forand Sls. Co.	313-644-0087
MN	Minneapolis, Voltage Control Sls.	612-553-1051
MO	St. Charles, Midwest Technical Sls.	314-441-1012
NJ	Garwood, E.R. Mertz & Assocs.	201-232-4643
NM	Albuquerque, Semi Systems Arizona Inc.	505-344-1517
NY	Fayetteville, R.D. Sherman Inc.	315-637-9861
OH	Cleveland, Jim Finnegan & Co.	216-238-5905
PA	Broomall, TCA	215-353-2022
TX	Dallas, Control Components Inc.	214-458-8877

COLEX, INCORPORATED, 15028 Beltway Dr., Dallas, TX 75234, Tel: 214-458-2779, TWX: 703143 CLEX US; Empl.: 25; *Sls. Mgr.:* Joe Dean; *Dist. Mgr.:* Joe Dean

COLLINS AVIONICS DIVISIONS, Rockwell Intl., 400 Collins Rd. NE, Cedar Rapids, IA 52498, Tel: 319-395-1000, Telex: 464-421, TWX: 910-525-1321; Empl.: 4,325; *Sls. Mgr.:* R. D. Thorpe

COLLINS TRANSMISSION SYS. DIV., See Rockwell Intl., Commercial Elctrns. Opers.

COLLMER SEMICONDUCTOR, INC., 14368 Proton Rd., Dallas, TX 75234-3335, Tel: 214-233-1589, TWX: 910-860-5462; Empl.: 20; *Sls. Mgr.:* Gene Uecker

COLMAN MOTOR PRODUCTS, INC., A Barber-Colman Co., P. O. Box 1240, Rockford, IL 61105-1240, Tel: 815-968-0660, Telex: 4330367; Empl.: 600

Local Sales Offices & Reps

AR	Fort Smith, Electro-Related Prods.	501-452-4030
CA	San Jose, Motion Control, Inc.	408-997-0544
CA	San Marino, Motion Control Southern	818-796-0189
CO	Longmont, Todd & Fry Assoc.	303-776-7331
CT	So. Windsor, Maher Assoc.	203-644-2481
FL	Boca Raton, E. A. Kershaw & Co.	305-482-3003
IL	Northfield, Lenhart Assocs., Inc.	312-446-7460
IN	Ft. Wayne, Menze Sls.	219-747-5616
MA	Lynn, Maher Assocs.	617-581-3244
MI	Detroit, B.L. Hitt & Assoc.	414-476-2210
MN	Minneapolis, Jos-Co/Melius, Inc.	612-861-3343
NJ	River Edge, Maher Assoc.	201-261-2225
NJ	Williamstown, Precision Motion Sls.	609-629-4757
NY	Albany, Robert F. Lamb Co.	518-869-3355
NY	Buffalo, Robert F. Lamb Co.	716-874-4900
NY	Rochester, Robert F. Lamb Co.	716-323-1250
NY	Syracuse, Robert F. Lamb Co.	315-455-2469
NC	Garner, Candor Co.	919-779-1855
OR	Portland, DHS Sls., Inc.	503-285-9790
OK	Tulsa, J. B. Guenther, Inc.	918-660-5126
PA	Abington, Indl. Mkts. Specialists	215-659-0444
SC	Greenville, Candor Co.	803-297-6261
SC	Myrtle Beach, Candor Co.	803-448-8361
TN	Chattanooga, Candor Co.	615-894-9686
TX	Austin, J.B. Guenther, Inc.	512-472-3825
TX	Dallas, J. B. Guenther, Inc.	214-691-8500
VA	Blacksburg, Candor Co.	703-953-2197
WI	Milwaukee, Badgerep	414-258-6630
EXP	WI, Milwaukee, Dummann World Trade	414-464-0100

COLORADO CRYSTAL CORP., 2303 W. 8th St., Loveland, CO 80537, Tel: 303-667-9248; FSC No.: 33096; Empl.: 135; *Sls. Mgr.:* David Lind ...... **A•1324**

Local Sales Offices & Reps

CA	Los Altos, Kolm Mktg. Assoc.	415-948-2635
CO	Loveland, Morbak Mktg.	303-669-8900
KS	Mission, Robinson & Assocs.	913-262-1374
MA	Randolph, Bengal	617-961-4120
OR	Beaverton, L. D. Elctrns.	503-649-6177
PA	Glenside, Koebert	215-887-2310
WA	Spokane, L. D. Elctrns.	509-922-4883

COLORADO DATA SYSTEMS, INC., 3301 W. Hampden Ave., Unit C, Englewood, CO 80110, Tel: 303-762-1640, TWX: 910-933-0193; Empl.: 35; *Sls. Mgr.:* Louis J. Klahn, Jr.; *Dist. Mgr.:* Louis J. Klahn, Jr.

Local Sales Offices & Reps

AZ	Phoenix, Odyssey 1	602-246-8846
NY	Rochester, Scientific Dvcs., New York, Inc.	716-334-2445
CA	San Jose, Moxon Elctrns.	408-298-7290
CT	Mt. Carmel, Scientific Dvcs.-CT.	203-248-9361
PA	Springhouse, Pennsylvania Sci. Dvcs.	215-643-3335
WA	Bellevue, Showalter Instrs., Inc.	206-746-7970
MA	Waltham, Scientific Dvcs.-New Eng., Inc.	617-890-2252
MO	Maryland Heights, Dytec/South, Inc.	314-569-2990
Can	N. Vancouver, B.C., Jerome & Francis Co., Ltd.	604-986-1286
NJ	Teaneck, Scientific Dvcs. East, Inc.	201-837-8720
NM	Albuquerque, Odyssey 1	505-265-6645
CA	Anaheim, Moxon Elctrns.	714-635-7600
OH	Dayton, WKM, Inc.	513-434-7500
CO	Englewood, Odyssey 1	303-773-8176
TX	Dallas, Data Mktg. Assocs., Inc.	214-661-0300
FL	Melbourne, Saber Assocs., Inc.	800-327-0853
IL	Arlington Heights, Dytec/Central, Inc.	312-394-3380
VA	McLean, Creative Mktg. Assocs., Ltd.	703-442-9100
Can	Ottawa, Ont., A.I.M. Elctrns., Inc.	613-722-8286
MN	St. Paul, Dytec/North, Inc.	612-645-5816

COLORADO VIDEO, INC., Box 928, Boulder, CO 80306, Tel: 303-444-3972, TWX: 910-940-3248; Empl.: 47; *Sls. Mgr.:* Jim Dole

COLORGRAPHIC COMMUNICATIONS CORP., 2379 John Glenn Dr. Ste. 105, P.O. Box 80448, Atlanta, GA 30366, Tel: 404-455-3921, Telex: 700574; Empl.: 50; *Sls. Mgr.:* H. Woody Pritchett

COLUMBIA CHASE CORP., HUMISEAL DIV., See HumiSeal Div.

COLUMBIA COMPS., 9 Division St., Sidney, NY 13838, Tel: 607-563-3520; FSC No.: 59178; Empl.: 12; *Sls. Mgr.:* Helen Montren

COLUMBIA ELEC. MFG., 4519 Hamilton Ave. N.W., Cleveland, OH 44114, Tel: 216-361-8060; Empl.: 60; *Sls. Mgr.:* H. W. Sussman

COLUMBIA ELCTRN. CABLES DIV., See Carol Cable Co., Inc., Columbia Elctrn. Cables Div.

COLUMBIA RESCH. LABS., Macdade Blvd. & Bullens La., Woodlyn, PA 19094, Tel: 215-532-9464, TWX: 510-669-3625; FSC No.: 07571; Empl.: 90; *Sls. Mgr.:* Jack Sarty

COLUMBUS ELEC. MFG., Box 289A Rt #2, Piney Flats, TN 37686, Tel: 615-538-8191; Empl.: 160

COLUMBUS INSTRUMENTS, 950 N. Hague Ave., Columbus, OH 43204, Tel: 614-488-6176, Telex: 246514; *Sls. Mgr.:* Jan Czekajewski

COMARK CORP., 93 W St., P. O. Box 474, Medfield, MA 02052, Tel: 617-359-8161, Telex: 703156; Empl.: 50

COMCLOK, INC., 1142 N. Gilbert St., Anaheim, CA 92801, Tel: 714-991-1580, 800-854-XTAL, TWX: 910-591-1892; *Sls. Mgr.:* Herb Plumhoff .... **A•1325**

Local Sales Offices & Reps

AZ	Scottsdale, Western High Tech Mktg.	602-949-0873
CA	Arcadia, HMC	818-447-0958
MA	Malden, J-K Assocs.	617-321-2922
NM	Albuquerque, Western High Tech Mktg.	505-262-2461
TX	Houston, TCI Elctrns.	713-774-5019
VA	Front Royal, Eltron Sls., Ltd.	703-635-7201

COMDATA CORP., 7900 N. Nagle Ave., Morton Grove, IL 60053, Tel: 312-470-9600

COMDESIGN, 751 S. Kellogg Ave., Goleta, CA 93117, Tel: 805-964-9852, TWX: 910-334-1189; Empl.: 125; *Sls. Mgr.:* Ralph M. Armstrong; *Dist. Mgr.:* Donald Sullivan

COMLINEAR CORP., 2468 E. 9th St., Loveland, CO 80537, Tel: 303-669-9433, Telex: 45-0881; FSC No.: 62839; Empl.: 40; *Sls. Mgr.:* John Perzow

COMMERCIAL ELEC. HEATING DEVICES & MFG., INC., 1008 E. Garvey Blvd., Monterey Park, CA 91754, Tel: 213-288-9445; Empl.: 12

COMMERCIAL SYS. LABS., Commercial Sys. Grp., P.O. Box 2710, Auburn, AL 36831, Tel: 205-821-1133; *Sls. Mgr.:* Buzz Mershon; *Dist. Mgr.:* Buzz Mershon

COMMUNICATION ASSOCS., 200 McKay Rd., Huntington Sta., NY 11746, Tel: 516-271-0800, Telex: 510-226-6998; Empl.: 150; *Sls. Mgr.:* Alfred Carlson

COMMUNICATION CABLE, 5 Glen Rd., Manchester, CT 06040, Tel: 203-647-1468; Empl.: 40; *Sls. Mgr.:* E. V. Marozzi

COMMUNICATION CABLES & CONNECTORS, The Dutton Co., 8255 Black Run Rd., Nashport, OH 43830, Tel: 614-828-2468; Empl.: 30; *Sls. Mgr.:* Don Ritterbusch; *Dist. Mgr.:* Don Ritterbusch

COMMUNICATION MACHINERY CORP., 1421 State St., Santa Barbara, CA 93101, Tel: 805-963-9471, TWX: 910-334-3508; Empl.: 50; *Sls. Mgr.:* Russ Sharer

COMMUNICATIONS INSTRS., INC., Box 520, Fairview, NC 28730, Tel: 704-628-1711, Telex: 577436; FSC No.: 58614; Empl.: 450; *Sls. Mgr.:* R. McClinton .... **B•1298-1301**

Local Sales Offices & Reps

AL	Huntsville, Conley Assocs.	205-882-0316
AZ	Phoenix, PLS Assoc. Inc.	602-246-6477
CA	Los Angeles, Wiley Co.	213-666-1611
CA	San Diego, Wiley Co.	619-571-2881
CA	Santa Clare, Ross Mktg.	408-988-8111
CO	Englewood, PLS Assocs.	303-773-1218
CT	Guilford, A & M Elctrns.	203-453-1612
FL	Boca Raton, Conley Assocs.	305-395-3108
FL	Ovieda, Conley Assocs.	305-365-3283
FL	Tampa, Conley Assocs.	813-885-7658
GA	Atlanta, Conley Assocs.	404-447-6992
IL	Glenview, CII	312-792-2508
IN	Indianapolis, Schank Elctrn. Mktg.	317-842-6204
IA	Cedar Rapids, C. H. Horn & Assocs.	319-393-8703
KS	Desoto, Midtec Assocs.	913-441-6565
MD	Ellicott City, Doss Elctrns.	301-465-1336
MA	Needham, A & M Elctrns.	617-444-8170
MO	St. Louis, John G. Macke Co.	314-432-2830
NM	Albuquerque, PLS Assocs.	505-255-2330
NY	Lynbrook, HLJ Comp. Tech.	516-599-2999
NY	Macedon, M. M. Hare Co.	315-986-3742
NC	Raleigh, Conley Assocs.	919-876-9862
OH	Cleveland, Baehr-Greenleaf & Assocs.	216-221-9030
OH	Columbus, Baehr-Greenleaf & Assocs.	614-486-4046
OH	Dayton, Baehr-Greenleaf & Assocs.	513-439-0724
OR	Portland, Syscom Sls. Co.	503-644-2505
UT	Salt Lake City, PLS Assocs.	801-466-8729
WA	Bellevue, Syscom Sls. Co.	206-641-5080

COMMUNICATIONS TECHNOLOGY CORP., 2237 Colby Ave., Los Angeles, CA 90064, Tel: 213-478-5061, TWX: 910-342-6983; Empl.: 250

COMMUNICATION TECHNIQUES INC., 36 Route 10, East Hanover, NJ 07936, Tel: 201-884-2580, TWX: 710-986-8265; FSC No.: 53213; *Sls. Mgr.:* Louis R. Trummel

COMPAC™

COMPAC, 279 Skidmore Rd., Deer Park, NY 11729, Tel: 516-667-3933, TWX: 510-227-1064; FSC No.: 62099; Empl.: 50; *Sls. Mgr.:* Peter C. Rao .... **A•1594, 1706-1707; C•1046-1049**

Local Sales Offices & Reps

AZ	Scottsdale, Territorial Mktg.	602-994-8665
CA	Agoura, Cal-Rep	213-991-1940
CA	Cupertino, Dura Elctrn. Sls.	408-255-2084
FL	Clearwater, Beacon Elctrn. Assoc.	813-796-2378
IL	Prospect Heights, R-Tek, Inc.	312-459-6170
IN	Ft. Wayne, R-Tek, Inc.	219-432-8783
MA	Haverill, L-K Assoc.	617-373-1313
NJ	Haddonfield, Mills-Brown Assoc.	609-429-1005
NY	Deer Park, Compac	516-667-3933
NY	Stoney Brook, Gama Metro	516-751-2072
NY	Utica, B. D. Hummel Co.	315-736-7821
TN	Johnson City, Beacon Elctrn. Assoc.	615-282-2421
TX	Garland, Carey, McMahill & Zerbe	214-681-1414
TX	Houston, Carey, McMahill & Zerbe	713-771-1500
VA	Fairfax, Schibley Assocs.	703-591-3008

Local Distributors

AL	Huntsville, Component Distrs.	205-883-7501
AR	Little Rock, Component Distrs.	501-227-6278
CA	Cupertino, Elctrn. Resources	408-996-8858
FL	Ft. Lauderdale, Component Distrs.	305-971-4950
LA	New Orleans, Component Distrs.	504-525-9668
NY	Deer Park, R. F. Comp. Sources	516-242-6748
NY	Utica, B. D. Hummel Co.	315-736-7821
NC	Raleigh, Component Distrs.	919-781-0262
VA	Falls Church, Component Distrs.	703-241-8227

COMPACT SOFTWARE, INC., Comsat Corp., 1131 San Antonia Rd., Palo Alto, CA 94303, Tel: 415-966-8440; *Sls. Mgr.:* Henry Wong

COMPEX CORP., 35A East Main St., Marlton, NJ 08053, Tel: 609-596-9388; Empl.: 13

Local Sales Offices & Reps

AZ	Phoenix, Odyssey 1	602-246-8846
CA	North Hollywood, Crown Elctrns., Inc.	213-877-3550
CA	Saratoga, E. Reid Miller, Corp.	408-257-6927
FL	Boca Raton, R.W. Mitscher Inc.	305-368-3841
NH	Amherst, Callahan & Tremblay	603-883-9000
NJ	Englewood, Cooper Assocs.	201-871-4985
NJ	Morrestown, Stern Assocs.	609-234-0661
NM	Alburquerque, Odyssey 1	505-265-6645
NY	Buffalo, R.W. Mitscher Co., Inc.	716-633-7970
OH	Lancaster, Cain-Forlaw Co., Inc.	614-654-4800
TX	Dallas, Texas Avionics	214-363-6324
Can	Neapean, Ont., Intrade Canada, Inc.	613-727-1272

COMPLEXX SYSTEMS INC., 4930 Research Dr., Huntsville, AL 35805, Tel: 205-830-4310, Telex: 880114; Empl.: 30; *Sls. Mgr.:* Bill Thomas; *Dist. Mgr.:* Pat Bourgeois

COMPLIANCE DESIGN INC., 593 Massachusetts Ave., Boxboro, MA 01719, Tel: 617-264-4668; *Sls. Mgr.:* Ira Barry

COMPONENT GENERAL, INC., 13620 Wright Cir., Tampa, FL 33625, Tel: 813-855-6655; Empl.: 30; *Sls. Mgr.:* James A. Cook

Local Sales Offices & Reps

CA	Irvine, EBA	714-857-6079
CA	Los Angeles, EBA	213-822-7510
CA	Palo Alto, Mollard Mktg.	415-961-0456
DC	Washington, M. Lader Co.	202-296-2497
MA	Andover, Bee Assoc.	617-475-2124
MN	Minneapolis, Comstrand	612-788-9234
MO	Grandview, R. R. Burton	816-763-5385
NY	Bayside, Robert Diamond Inc.	718-423-7330
NY	Buffalo, Ed Westgren Assoc.	716-632-0011
PA	Lafayette Hill, M. Lader Co.	215-825-3177
PA	Murrysville, Pittsburgh Sls. Assoc.	412-327-3268
EXP	CT, Stamford, Control Devices	203-322-7300

COMPONENT MFG. SVC., INC., 1 Component Park, W. Bridgewater, MA 02379, Tel: 617-580-0111, TWX: 710-390-1081; Empl.: 500; *Sls. Mgr.:* R. E. Owens; *Dist. Mgr.:* R. E. Owens

COMPONENT RESEARCH CO. INC., 1655-26 St., Santa Monica, CA 90404, Tel: 213-829-3615, TWX: 910-343-6864; FSC No.: 12517;Multiple; Empl.: 230; *Sls. Mgr.:* Sylvia Kellerman .... **A•1014-1063**

COMPONENTS CORP., 6 Kinsey Pl., Denville, NJ 07834, Tel: 201-627-0290; FSC No.: 26364; Empl.: 20; *Sls. Mgr.:* W. H. Gordon

COMPONENT SPECIALTIES CORP., 9143 E. La Rosa Dr., Temple City, CA 91780, Tel: 213-283-0015; FSC No.: 28984; Empl.: 45; *Sls. Mgr.:* D.R. Heins

CP COMPUTER PRODUCTS™
POWER CONVERSION GROUP

COMPOWER DIV., Computer Prods., Inc., 2220 Lundy Ave., San Jose, CA 95131, Tel: 408-942-1600, Telex: 172760 Compower Corp.; Empl.: 116; *Sls. Mgr.:* Lyle Bennett; *Dist. Mgr.:* Tazz A. Pettebone .... **D•1446, 1552-1558, 1584-1585**

Refer to Computer Prods., Inc., Pompano Beach, FL for sales offices and representatives and for distributor listings.

COMPUCART, Versa Tec Corp., 107 N. Rome Ave., Tampa, FL 33606, Tel: 800-237-9024, 813-251-2431

COMPUCORP, 2211 Michigan Ave., Santa Monica, CA 90404, Tel: 213-829-7453, Telex: 4720106, TWX: 910-342-6510; Empl.: 450; *Sls. Mgr.:* Joe Thorpe; *Dist. Mgr.:* Richard Venn

COMPU-LITE CORP., 711 W. 17th St. #F12, Costa Mesa, CA 92627, Tel: 714-645-1501; FSC No.: 51420; Empl.: 50; *Sls. Mgr.:* W.D. Cobben

COMPUNETICS, INC., 2000 Eldo Rd., Monroeville, PA 15146, Tel: 412-373-8110; Empl.: 100; *Sls. Mgr.:* Jerry Schmitt

Local Sales Offices & Reps

CT	Marion, Sands Co., Inc.	203-628-4363
FL	Ft. Lauderdale, Southland Comp., Inc.	
MI	Troy, C. B. Jensen & Assocs.	313-643-0506
MN	Mound, Allyn Assocs.	612-472-4784
MO	St. Louis, Harris-Hauson Co.	314-432-3611
NJ	Wayne, SHL Assocs.	201-790-1714
NC	Smithfield, ADI	919-934-8136
OH	Cleveland, Jim Finnegan & Co.	216-238-5905

COMPUPRO, 3506 Breakwater Ct., Hayward, CA 94545, Tel: 415-786-0909; *Sls. Mgr.:* Jim Lanphear; *Dist. Mgr.:* Kevin Coonan

COMPUSCAN, INC., 81 Two Bridges Rd. Bldg. No. 2, Fairfield, NJ 07006, Tel: 201-575-0500; Empl.: 300 +; *Sls. Mgr.:* Peter F. Polizzano

COMP-U-STAFF, 1 Investment Pl., Towson, MD 21204, Tel: 301-828-0788; Empl.: 180; *Sls. Mgr.:* Catherine Harper

COMPUTALKER, Compuvoice, Inc., 1730 21st Street, Santa Monica, CA 90404, Tel: 213-828-6546; Empl.: 5; *Sls. Mgr.:* Ron Anderson; *Dist. Mgr.:* Ron Anderson

COMPUTER AVIONICS, 2 Southgate Dr., Mt. Carmel, IL 62863, Tel: 618-263-4343; Empl.: 64; *Sls. Mgr.:* Jerry R. Hart

COMPUTER CABLE & PRODS. INC., Affil. Vertex Elctrns., 147 Gazza Blvd., Farmingdale, NY 11735, Tel: 516-293-1610, Telex: 14-3155, TWX: VERTEX FDLE; FSC No.: 6T500; Empl.: 100; *Sls. Mgr.:* Michael Scanzano; *Dist. Mgr.:* Penny Shaw

COMPUTER COMPONENTS INC.
629 FIFTH AVENUE, PELHAM, NEW YORK 10803

COMPUTER COMPONENTS, INC., 629 Fifth Ave., Pelham, NY 10803, Tel: 914-738-1611; FSC No.: 12965; Empl.: 25; *Sls. Mgr.:* G. Tsokris .... **B•1307**

COMPUTER CONVERSIONS CORP., 6 Dunton Ct., E. Northport, NY 11731, Tel: 516-261-3300, TWX: 510-226-0448; FSC No.: 51086; Empl.: 100; *Sls. Mgr.:* S. J. Renard .... **D•1140-1141**

Local Sales Offices & Reps

CA	Buena Park, Motion Control	714-994-6952
CA	N. Hollywood. Crown Elctrns.	213-877-3550
CO	Denver, WH Howard Co.	303-426-3499
IL	Downers Grove, GnH Sls.	312-985-3764
MA	Brookline, Technology Prods.	617-731-0858
MI	Newport, Industrial Sensors	313-289-3374
MN	Minneapolis, Busch Elctrns.	612-835-2044
NY	Penfield, Barthel Entprs.	716-377-3018
NC	Kannapolis, Bass & Assocs.	704-933-1762
PA	Ingoma, Greye Glass	412-366-6664
TX	Dallas, Jacobson Co.	214-363-7584

COMPUTER CORP. OF AMERICA, 675 Massachusetts Ave., Cambridge, MA 02139, Tel: 617-492-8860, Telex: II 710-320-6479, TWX: 710-320-6479; *Sls. Mgr.:* Mr. Robert Roda

COMPUTER DESIGN & APPLICATIONS INC., 411 Waverly Oaks Rd., Waltham, MA 02154, Tel: 617-647-1900, Telex: 232-2240; *Sls. Mgr.:* Thomas Goliash

COMPUTER DETAILING CORP., 301 York Rd., Warminster, PA 18974, Tel: 215-675-4831; Empl.: 10; *Sls. Mgr.:* Norman Atterman

COMPUTER DEVICES, 749 Middlesex Turnpike, Nutting Lake, MA 01865, Tel: 617-663-4980, Telex: 949398; Empl.: 100; *Sls. Mgr.:* Robert L. Hengen; *Dist. Mgr.:* Dick Leeman

COMPUTER DEVICES CORP., 63 Austin Blvd., Commack, NY 11725, Tel: 516-543-4220; Empl.: 50 .... **A•1487**

Local Sales Offices & Reps

MD	Baltimore, R. A. Wafer Assocs.	301-744-1133
EXP	NY, New Rochelle, Montclair Elctrns.	914-576-1400

COMPUTER DYNAMICS, 105 S. Main St., Greer, SC 29651, Tel: 803-877-7471; *Sls. Mgr.:* Kurt Priester

COMPUTER FIELD SERVICES, INC., 6 Federal Street, Danvers, MA 01923, Tel: 617-774-2930; *Sls. Mgr.:* Stephen B. Miles

COMPUTER INSTRS., 100 Madison Ave., Hempstead, NY 11550, Tel: 516-483-8200, TWX: 510-222-4189; Empl.: 50; *Sls. Mgr.:* F. Cooper; *Dist. Mgr.:* F. Mitchell

COMPUTER MAINTENANCE CORP., 405 Murray Hill Pkwy, East Rutherford, NJ 07073, Tel: 201-866-6400; Empl.: 61; *Sls. Mgr.:* Anthony Scordo

COMPUTER OPTICAL PRODUCTS, INC.
Subsidiary of Hathaway Corp.

COMPUTER OPTICAL PRODS., INC., Sub. of Hathaway Corp., 9353 Eton Ave., Chatsworth, CA 91311-5866, Tel: 818-882-0424, TWX: 215-406; Empl.: 150; *Sls. Mgr.:* Brian Gillespie

THE COMPUTER PLACE, D & D Financial Entprs. Inc., 4595 Van Epps Rd., Brooklyn Hts., OH 44131, Tel: 216-351-7444, TWX: 810-421-8446; Empl.: 41; *Sls. Mgr.:* William C. Briggs

COMPUTER POWER, 124E W. Main St., High Bridge, NJ 08829, Tel: 201-735-8000, Telex: 847481; FSC No.: 3643; Empl.: 145; *Sls. Mgr.:* George A. Ardolino; *Dist. Mgr.:* Stanley A. Smith, Jr.

COMPUTER PRODUCTS™
POWER CONVERSION GROUP

COMPUTER PRODS. INC., Power Conversion Grp., 2981 Gateway Dr., Pompano Bch., FL 33069-4803, Tel: 305-974-5500, TWX: 510-956-3098; FSC No.: 62125; Empl.: 800; *Sls. Mgr.:* Martin L. Gross; *Dist. Mgr.:* Dale T. Raveney .... **D•1446, 1551-1585**

Local Sales Offices & Reps

AL	Huntsville, Electro-Mech Sls. Engrg.	205-533-2100
AZ	Tempe, Elec-Com Assocs.	602-967-8644
CA	Danville, Power Conversion Grp.	415-837-8593
CA	Folsom, Manco	916-985-0370
CA	Los Angeles, Power Partners, Inc.	213-215-0800
CA	Santa Clara, Manco	408-496-6611
CO	Parker, Parker Webster Co.	303-841-4888
FL	Coral Springs, EPM Corp.	305-755-5387
FL	Orlando, EPM Corp.	305-425-6149
GA	Atlanta, Electro-Mech Sls. Engrg.	404-447-6478
ID	Boise, Intermountain Technlg.	208-322-5022
IL	Des Plaines, Janus, Inc.	312-298-9330
IL	Glenview, Power Conversion Grp.	312-998-6715
IN	Indianapolis, Fred A. Dorsey & Assocs.	317-842-0060
KS	Overland Park, J. F. Guernsey Co.	913-381-2225
KY	Louisville, Fred A. Dorsey & Assocs.	502-426-3540
MD	Columbia, Professional Reps.	301-992-7460
MA	Woburn, Power Conversion Grp.	617-933-0237
MI	Livonia, Lowell Wendt Mktg.	313-464-2722
MN	Bloomington, Smiley Scott Assocs.	612-888-5551
MO	Florissant, J. F. Guernsey Co.	314-921-5720
NJ	Englewood, Tecnimat	201-569-4200
NM	Albuquerque, Elec-Com Assocs.	505-898-6101
NY	Binghamton, Empire Tech. Assocs.	607-772-0651
NY	Fayetteville, Power Unltd.	315-637-5291
NC	Raleigh, Electro-Mech Sls. Engrg.	919-851-8165
OH	Cleveland, Geotronix	216-526-2535
OH	Trotwood, Geotronix	513-252-6700
OK	Bixby, MGR Elctrns.	918-369-5186
OR	Portland, Power Sources Unltd.	503-292-0820
PA	Norristown, Denco	215-630-8990
TN	Nashville, Electro-Mech Sls. Engrg.	615-885-0073
TX	Austin, MGR Elctrns.	512-250-0926
TX	Dallas, MGR Elctrns.	214-238-5246
UT	Salt Lake City, Parker Webster	801-266-9939
WA	Lynnwood, Power Sources Unltd.	206-743-6641
WI	Milwaukee, Janus, Inc.	414-476-9104

Local Distributors

CA	Milpitas, Power Systems Distrs.	408-263-1063
CA	N. Hollywood, B. J. Wolfe Entprs.	213-877-5518
CT	Milford, R. C. Comps.	203-847-0006
FL	Ft. Lauderdale, Dielco	305-973-8700
IL	Chicago, Bell Inds.	312-982-9210
MD	Columbia, Aztech Elctrs.	301-995-1760
MA	Wilmington, RC Comps.	617-273-1860
MI	Livonia, LWC Distrs.	313-464-7700
OH	Cleveland, Alpha Distrs.	216-526-3716
OK	Tulsa, Norvell Elctrns.	918-663-1247
OR	Lake Oswego, Bell Inds.	503-241-4115
PA	Norristown, Century Elctrn. Comps.	215-631-5400
TX	Austin, Norvell Elctrns.	512-458-8106
TX	Dallas, Norvell Elctrns.	214-233-0020
TX	Houston, Norvell Elctrns.	713-777-1666
WA	Bellevue, Bell Inds.	206-747-1515
WI	Waukesha, Bell Inds.	414-547-8879
Can	Concord, Ontario, Kaytronics	416-669-2262
Can	Kanata, Ontario, Kaytronics	613-592-6606
Can	Surrey, BC, Kaytronics	604-581-5005
Can	Ville St. Pierre, Quebec, Kaytronics	514-367-0101

COMPUTERS INTERNATIONAL, 3540 Wilshire Blvd., Los Angeles, CA 90010, Tel: 213-386-3111, TWX: 910-321-4209; FSC No.: 381-7467; *Dist. Mgr.:* Jim Baker

COMPUTER SYSTEM ASSOCS., 7564 Trade St., San Diego, CA 92121, Tel: 619-566-3911; Empl.: 10; *Sls. Mgr.:* Patricia Chovinard; *Dist. Mgr.:* Patricia Chovinard

COMPUTER SYSTEMS PRODUCTS, 740 Washington Ave N, Minneapolis, MN 55401, Tel: 612-338-0995, 800-422-2537; Empl.: 20 +; *Sls. Mgr.:* Tom Kalgrem; *Dist. Mgr.:* Gary Doan

COMPUTER TALK, INC., Box 148, Morrison, CO 80465, Tel: 303-697-5485; Empl.: 20

COMPUTER TERMINAL SYS., 89 Arkay Drive, Hauppauge, NY 11788, Tel: 516-435-2916, Telex: 291411, 291413, TWX: 510-224-6050; FSC No.: 33948; Empl.: 120; *Sls. Mgr.:* K. Oliver

COMPUTERVISION CORP., 201 Burlington Rd., Bedford, MA 01730, Tel: 617-275-1800

COMPUTERWARE, INC., 8480-I Tyco Rd., Vienna, VA 22180, Tel: 703-821-8200; Empl.: 14; *Sls. Mgr.:* Betsy Henderson

COMPUTERWISE, 4006 E 137th Terr., Grandview, MO 64030, Tel: 816-765-3330; Empl.: 20; *Sls. Mgr.:* William W. Brown; *Dist. Mgr.:* William W. Brown

COMPUTROL DIV. KIDDE AUTOMATED SYS., INC., 15 Ethan Allen Hwy., Ridgefield, CT 06877-6297, Tel: 203-544-9371, Telex: 643358; Empl.: 90; *Sls. Mgr.:* Chuck Brewer

COMPUTYPE, INC., 2285 W. County Road "C", St. Paul, MN 55113, Tel: 612-633-0633, 800-328-0852, TWX: 910-563-3699

COMSPEC INC., 10700 Hammerly 5120, Houston, TX 77043, Tel: 713-461-4487, TWX: 910-881-4763; Empl.: 41; *Sls. Mgr.:* Rick Risinger; *Dist. Mgr.:* Rick Risinger

COMSTRON CORP., 200 E. Sunrise Hwy., Freeport, NY 11520, Tel: 516-546-9700, TWX: 510-225-3699; Empl.: 97 .... **A•1327-1329, 1595; D•1204-1205**

Local Sales Offices & Reps

AZ	Phoenix, Odyssey 1	602-246-8846
CA	Anaheim, Blair Assocs.	714-635-1350
CA	San Diego, Interstate Mktg. Assocs.	714-292-8117
CA	Sunnyvale, Applied Sys.	408-773-0616
CA	Woodland Hills, Interstate Mktg. Assocs.	213-883-7606
CO	Castle Rock, Odyssey I	303-688-3555
FL	Altamonte Springs, Dyne-A-Mark Corp.	305-831-2097
FL	Clearwater, Dyne-A-Mark Corp.	813-441-4702
FL	Fort Lauderdale, Dyne-A-Mark Corp.	305-944-5031
FL	Ft. Lauderdale, Reynolds & Assocs.	305-581-6611
FL	Melbourne, Reynolds Assocs.	305-259-7000
FL	Palm Bay, Dyne-A-Mark Corp.	305-727-0192
FL	St. Petersburg, Reynolds & Assocs.	813-360-1484
GA	Acworth, Reynolds & Assocs.	404-451-9558
GA	Marietta, Comstron/Southeast	404-973-3325
IL	Arlington Heights, Dytec Cen.	312-394-3380

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IN	Indianapolis, Dytec Cen.	317-247-1316
KS	Lenexa, Dytec South	913-888-0215
MI	Madison Hts., WKM Assocs.	313-588-2300
MN	St. Paul, Dytec North	612-645-5816
MO	Maryland Hts., Dytec South	314-569-2990
NJ	Englewood Cliffs, Sci. Dvcs. East	201-871-3916
NM	Albequerque, Odyssey 1	505-265-6645
NC	Spring Hope, Reynolds & Assocs.	305-259-7000
OH	Dayton, WKM Assocs., Inc.	513-434-7500
OH	Independence, WKM Assocs., Inc.	216-524-5930
PA	Pittsburgh, WKM Assocs., Inc.	412-892-2953
PA	Spring House, Sci. Dvcs. East	215-643-3335
TX	Dallas, Marcom	214-351-4532
VA	McLean, Creative Mktg. Assocs.	703-442-9100
VA	McLean, Creative Mktg. Assocs.	703-440-9100

COMTECH MICROWAVE CORP., Comtech Corp., 63 Oser Ave., Hauppauge, NY 11788, Tel: 516-435-4646, Telex: 971403 COMMIC HAUP; FSC No.: 61381; *Sls. Mgr.:* M. Javits

COM/TECH SYSTEMS, 505 Eighth Ave., New York, NY 10018, Tel: 212-594-5377; Empl.: 9

COMTEC INFOR. SYS., INC., 53 John St., Cumberland, RI 02864, Tel: 401-724-8500, TWX: 710-387-1171; Empl.: 75; *Sls. Mgr.:* R. A. Hamilton

COMTEK, INC., 309 Breesport, San Antonio, TX 78216, Tel: 512-340-8253

CONCEPT INDUSTRIES

CONCEPT INDUSTRIES, App-Rep, Inc., 3641 San Gabriel River Pkwy., Pico Rivera, CA 90660, Tel: 213-699-0918, Telex: 883123; Empl.: 17; *Sls. Mgr.:* Brad Marsh; *Dist. Mgr.:* Kathy Sawyer .... **A•1064-1065, 1833**

Local Sales Offices & Reps

CA	Huntington Beach, Mil-Com Sls.	714-840-2424
CA	Livermore, O'Reilly Elctrns.	415-443-5343
FL	Indian Harbor Beach, Bill Toy Assocs.	305-773-5805
IL	Medina, Gentry Sls.	312-893-9352
SC	Tega Cay, NU South Sls.	803-548-2238

Local Distributors

CA	Irvine, Kelex Elctrns.	714-863-1230
CA	La Selva Beach, Coast Comps.	408-684-1185
CA	Livermore, O'Reilly Elctrns.	415-443-5343
CA	Los Angeles, All Elctrns.	213-380-8000
CA	San Diego, Sigma Elctrns.	619-565-2000
CA	Santa Clara, Capacitors Unlimited	408-946-7676
CA	Tustin, Caltronics	714-730-0350
FL	Melbourne, T. C. Pridmore	305-727-2491
NY	Dix Hills, Aries Elctrns.	516-499-0369
TX	Garland, J & S Elctrns.	214-487-8808

CONCORD DATA SYSTEMS, 303 Bear Hill Rd., Waltham, MA 02154, Tel: 617-890-1394, Telex: 95-1793; Empl.: 160

CONCORD ELCTRNS., 30 Great Jones St., Dept. JE, New York, NY 10012, Tel: 212-777-6571, TWX: 710-581-4930; Empl.: 225; *Sls. Mgr.:* Josie Wheaton .... **C•1174-1175**

CONDENSER PRODS., P.O. Box 997, Brooksville, FL 33512, Tel: 904-796-3561; Empl.: 26; *Sls. Mgr.:* Pat K. Johnson

CONDITIONING SEMICONDUCTOR DEVICES, Box 2116, Wayne, NJ 07470, Tel: 201-335-6723, Telex: 219023; FSC No.: 60644; Empl.: 20; *Sls. Mgr.:* A. G. Zimmerly; *Dist. Mgr.:* Jill Mullen

CONDOR D.C. POWER SUPPLIES, INC., 201 Flynn Rd., Camarillo, CA 93010, Tel: 805-484-2851, 800-235-5929, Telex: 910-336-1140; Empl.: 220; *Sls. Mgr.:* Fred Adams .... **D•1587-1599**

Local Sales Offices & Reps

AL	Huntsville, Pen-Tech	205-881-9298
CA	Pasadena, RDX Corp.	213-681-3451
CA	San Diego, RDX Corp.	619-292-7744
CA	Sunnyvale, RDX Corp.	408-734-4500
CO	Denver, R. Mktg.	303-455-5360
FL	Casselberry, Pen-Tech	305-645-3444
FL	Deerfield Beach, Pen-Tech	305-421-4989
GA	Marietta, Pen-Tech	404-424-1931
IL	Schaumberg, Engrg. Prods.	312-882-7640
IN	Greenfield, Engrg. Prods.	317-894-7156
IA	Coralville, Engrg. Prods.	319-354-5344
MD	Wheaton, Brimberg Sls.	301-946-2670
MA	Wayland, Daner Hayes, Inc.	617-655-0888
MN	Edina, Engrg. Prods.	612-835-9022
NJ	Bellmawr, TAI	609-933-2600,215-627-6615
NY	Yonkers, Sonkin Assocs.	914-968-7736
NC	Greensboro, Pen-Tech	919-852-6000
OH	Dayton, Thompson Assocs.	513-435-7733
PA	Mars, Thompson Assocs.	412-776-6495
TX	Dallas, Seaton Corp.	214-380-0414
UT	N. Salt Lake City, R. Mktg.	801-298-2631
WA	Bellevue, Al Smith Co.	206-746-6770

Local Distributors

CA	Costa Mesa, FLW	800-225-5359
CA	Hayward, FLW	415-786-9070
FL	Orlando, GMI	305-894-3354
IL	Schaumberg, Engrg. Prods.	312-882-7640
MD	Wheaton, Brimberg Sls.	301-946-2760
MI	Madison Heights, McNaughton-McKay	313-399-7500
MN	Edina, Engrg. Prods.	612-835-9022
NY	Yonkers, Kintronics	914-968-8282
TX	Houston, American Analog	713-941-7265
Intl	Belgium, Mulder-Hardenburg	031-680032
Intl	Denmark, Danika Supp.	09-432122
Intl	England, Gresham/Powerdyne	(025-672)4246
Intl	Finland, Oy Ferrado AB	0-550002
Intl	France, AK Electronique	01-5755353
Intl	Holland, Mulder-Hardenburg BV	023-319184
Intl	Norway, Powerbox AS	02-535-837
Intl	Sweden, Power Box AB	0518-11920
Can	Toronto, Ont., Duncan-Inst. Ltd.	416-742-4448

CONDOR PACIFIC INDS., INC., 8053 Deering Ave., Canoga Park, CA 91304, Tel: 818-347-8331, Telex: 65-1442; Empl.: 40

CONDOR SYSTEMS, INC., 2605 S. Winchester Blvd., Campbell, CA 95008, Tel: 408-866-5900, Telex: 184819 Systems SANTA; FSC No.: 62065; *Sls. Mgr.:* Dick Keenly; *Dist. Mgr.:* Ed Brown

CONDUCTIVE RUBBER TECHNLG., 1235 Coast Village Rd., Santa Barbara, CA 93108, Tel: 805-969-5805, Telex: 658-305

CONECTRIX, INC., 376 E. Gunderson St., Carol Stream, IL 60188, Tel: 312-653-1460

CONFORMING MATRIX, Box 5126, Pt. Pl. Sta., Toledo, OH 43611, Tel: 419-729-3777; Empl.: 35

CONKLIN INSTR. CORP., West Rd., Pleasant Valley, NY 12569, Tel: 914-635-2136; FSC No.: 914-635-2510; Empl.: 65; *Sls. Mgr.:* Tom Dolan

Local Sales Offices & Reps

CT	Bethel, Gemini Elctrn. Sls.	203-748-5506
GA	Newnan, Dolan Assocs.	404-251-1102
NJ	Kinnelon, R.J. Alvarez, Inc.	201-838-5641
OH	Howard, Denman Assocs.	614-397-6240
WA	Seattle, BF Sls. & Engrg.	206-364-3287

CONNECT-AIR INTERNATIONAL, INC., 50 37th St. N.E., Auburn, WA 98002, Tel: 206-939-4880, TWX: 910421-1492; Empl.: 50; *Sls. Mgr.:* Ron Jones

CONNECTICUT HARD RUBBER CO., See CHR Inds.

CONNECTICUT MICROWAVE CORP., 106 Powder Mill Rd., Box 389, Canton, CT 06019, Tel: 203-693-4247; FSC No.: 50974; Empl.: 16; *Sls. Mgr.:* S. T. Urbank

CONNECTOR CORP., 6025 N. Keystone Ave., Chicago, IL 60646, Tel: 312-539-3108, TWX: 910-221-6059 .... **C•1176-1177**

CONNECTOR INDS. OF AMER. DIV., Microdot Mfg., 639 N. Wayne, Cincinnati, OH 45215, Tel: 513-733-3680; FSC No.: 32076; Empl.: 35; *Sls. Mgr.:* K. C. Neal

CONNOR-WINFIELD CORP., 109 Turner Ct., POB L, W. Chicago, IL 60185, Tel: 312-231-5270, TWX: 910-230-3231; FSC No.: 21022; Empl.: 35; *Sls. Mgr.:* John Hoag .... **A•1331-1334**

Local Sales Offices & Reps

CA	Agoura Hills, C.D.H. Assocs.	818-707-1970
CA	Los Altos, Frauman Assocs.	415-941-0660

CONOLOG CORP., 5 Columbia Rd., Somerville, NJ 08876, Tel: 201-722-8081

CONRAC CORP., System Comps. Div., 1700 S. Mountain Ave., Duarte, CA 91010, Tel: 213-359-9141, Telex: 96-5978; Empl.: 200; *Sls. Mgr.:* Albert N. Caputo

CONRAC DIV., Conrac Corp., 600 N. Rimsdale Ave., Covina, CA 91722, Tel: 213-966-3511, Telex: 67-0437; Empl.: 450

CONSELL, 463 Payne Dr., Cheshire, CT 06410, Tel: 203-272-5750; Empl.: 3; *Sls. Mgr.:* A. R. Aikman

CONSOLIDATED CONTROLS, 15 Durant Ave., Bethel, CT 06801, Tel: 203-743-6721, Telex: 969615, TWX: 710-456-0446; FSC No.: 02750; Empl.: 650; *Sls. Mgr.:* A.F. Jakubauskas

CONSOLIDATED ELECTRONIC WIRE & CABLE, 11044 King St., Franklin Park, IL 60131, Tel: 312-455-8830, TWX: 910-227-1705; FSC No.: 73612; Empl.: 57; *Sls. Mgr.:* Karl Rankin; *Dist. Mgr.:* Steve Boynton

CONSOLIDATED PRODUCTS CORP., P.O. Box 67, Idyllwild, CA 92349, Tel: 714-659-2183

CONSOLIDATED RESISTANCE CO. AMERICA, 222 Lake Ave., Yonkers, NY 10701, Tel: 914-YO3-5900; Empl.: 20

CONSOLINK CORP., 1275 S. Sherman Dr., Longmont, CO 80501, Tel: 303-651-2014, TWX: 910-320-0786; Empl.: 40; *Sls. Mgr.:* Dan Zec; *Dist. Mgr.:* Rhonda Cashion

CONSUMERTRONICS, 2011 Crescent Dr., Alamogordo, NM 88310, Tel: 505-434-0234; Empl.: 5; *Sls. Mgr.:* Laurie Laurencia

CONTACT, INC., 5 Elm Ave., Hudson, NH 03051, Tel: 603-883-7708; FSC No.: M07015; Empl.: 11; *Sls. Mgr.:* T. Foresta; *Dist. Mgr.:* R. Reid

CONTACT EAST, 7 Cypress Dr., Burlington, MA 01803, Tel: 617-272-5051; *Sls. Mgr.:* Kai Juel

CONTACT ELECTRONICS, INC., 30 Plymouth St., Fairfield, NJ 07006, Tel: 201-575-7660, 800-221-1451, Telex: 130-216; Empl.: 50; *Sls. Mgr.:* Thomas E. Bodnar; *Dist. Mgr.:* Jaime N. Korosler

CONTEL INFO. SYS., INC., Continental Tel. Corp., 130 Steamboat Rd., Great Neck, NY 11024, Tel: 516-829-5900; Empl.: 450

CONTINENTAL DATA SYS., 131 N. Ludlow St., Dayton, OH 45402, Tel: 513-222-8626; Empl.: 4

CONTINENTAL ELECTRONICS MFG. CO., P.O. Box 270879, Dallas, TX 75227, Tel; 214-381-7161, Telex: 73-398; FSC No.: 52151; Empl.: 400; *Sls. Mgr.:* R. L. Floyd, Domestic Broadcast

CONTINENTAL RESOURCES, INC., 175 Middlesex Tpke., Bedford, MA 01730, Tel: 617-275-0850, TWX: 710-326-0833; Empl.: 275; *Sls. Mgr.:* Michael Mattleman

CONTINENTAL SPECIALTIES CORP., See Global Specialties Corp.

CONTINENTAL WIRE & CABLE, Gulton Rd., P. O. Box 1863, York, PA 17405, Tel: 717-792-2644, Telex: 84-0437; Empl.: 250; *Sls. Mgr.:* Edward W. Holland III; *Dist. Mgr.:* William L.Druck

CONTOURS, INC., P.O. Box 1041, Middletown, CT 06457, Tel: 203-347-5694; FSC No.: 033501; *Sls. Mgr.:* Peter L. DeVit

CONTRAVES GOERZ CORP., 610 Epsilon Dr., Pittsburgh, PA 15238, Tel: 412-967-7700, Telex: 86-6237, TWX: 710-664-2082; FSC No.: 51261; *Sls. Mgr.:* Henry M. Voss; *Dist. Mgr.:* Ronald L. Ekas

CONTROL CONCEPTS CORP., P.O. Box 1380, Binghamton, NY 13902-1380, Tel: 607-724-2484; Empl.: 41; *Sls. Mgr.:* Oral R. Evans .... **B•1233**

Local Sales Offices & Reps

AL	Huntsville, Saber Assocs.	800-327-0853
AZ	Scottsdale, Power Specialists	602-996-4100
CA	Los Alamitos, Power Specs.	213-594-9418
CA	Redwood City, Ault Assocs.	415-367-1710
CA	Simi Vally, Power Specialist Co.	
CA	Vista, Power Specialist Co.	619-726-4799
FL	Melbourne, Saber Assocs.	800-432-6288
GA	Norcross, Saber Assocs.	800-327-0853
IL	Elk Grove Village, Loren Green Assocs.	312-593-0282
IN	Fort Wayne, Domino	219-747-5621
MA	Needham, Shain Assocs.	617-449-4380
MI	Livonia, Electro Sls. Assocs.	313-474-7320
MI	Portage, Electro Sls. Assocs.	616-323-2416
MN	Springlake Park, Holmgren Assocs.	612-786-7641
NY	Binghamton, TAE-Rep, Inc.	607-692-3705
NY	Great Neck, Phase 4, Inc.	516-482-1790
NY	Rochester, TAE-Rep, Inc.	726-586-8710
NC	Clayton, Saber Assocs.	800-327-0853
OH	Cleveland, Electro Sls. Assocs.	216-261-5440
OH	Dayton, Electro Sls. Assocs.	513-426-5551
OK	Edmond, Data Aids	405-478-5000
OR	Portland, SPS Elctrns.	503-297-6919
PA	Montgomeryville, Eastern Sci. Mktg.	215-368-4570
NJ	Vincentown, Eastern Scientific Mktg.	609-268-0250
TX	Austin, Data Aids	512-327-8600
TX	Dallas, Data Aids	214-620-1551
TX	The Woodlands, Data Aids	713-363-3838
WA	Redmond, SPS Elctrns.	206-392-5256
WI	Glendale, Stapleman Corp.	414-352-5777
Can	Toronto, Ont., Norgay Entrps., Ltd.	416-239-3025

CONTROL DATA CORP., P.O. Box O, Minneapolis, MN 55440, Tel: 1-800-828-8001 Operator 82, In MN 612-921-4400; Empl.: 50,000

CONTROL ELCTRNS. CO., INC., 107-B Allen Blvd., Farmingdale, NY 11735, Tel: 516-694-0125; FSC No.: 95924; Empl.: 60; *Sls. Mgr.:* Harold Goldstein; *Dist. Mgr.:* Jack Leonard .... **A•1488**

Local Sales Offices & Reps

CA	Sherman Oaks, R.T. Assocs.	213-788-7588
FL	Melbourne, VPI	305-727-3305
FL	Tampa, VPI	813-832-2041
IL	Chicago, Electro-Tech Mktg. Assoc.	312-676-3151
MD	Ellicott City, VPI	301-461-2525
MA	W. Medway, J. Gallagher	617-533-7292
MN	Fridley, Teskey & Assocs.	612-571-0876
PA	Montgomery, VPI	215-474-3200
TX	Dallas, Texas Avionics Co.	214-363-6324
WI	Brookfield, Electro-Tech Mktg. Assocs.	414-785-9554
EXP	FL, Hallandale, Emec	305-925-6366

CONTROL ENGRG., INC., 1686 Riverdale St., West Springfield, MA 01089, Tel: 413-781-1330; Empl.: 7; *Sls. Mgr.:* Mark Kimball

CONTROL EQUIP. CORP., 171 Lincoln St., Lowell, MA 01851, Tel: 617-459-0573; Empl.: 10

CONTROLEX/EANCO, See Fincor

CONTROL INDS. INC., 530 Burnside Ave., Inwood, NY 11696. Tel: 212-471-9800; Empl.: 40

CONTROL LASER CORP., 11222 Astronaut, Orlando, FL 32821, Tel: 305-851-2540, Telex: 564407; *Sls. Mgr.:* John F. Rogers

CONTROLLED ENVIR. EQUIP. CORP., 3 Delta Drive, Westbrook, ME 04092, Tel: 207-854-9126; Empl.: 5; *Sls. Mgr.:* M. F. Peck

CONTROLLED POWER COMPANY

CONTROLLED POWER CO., 1955 Stephenson Hwy., Troy, MI 48083, Tel: 1-800-521-4792, TWX: 810-232-3401 .... **D•1876, 1910-1915**

Local Sales Offices & Reps

AL	Birmingham, James E. Heusser Agy., Inc.	205-836-3896
AK	Anchorage, Alaska Computer Environment	907-562-2406
AZ	Phoenix, Gruber Assocs.	602-863-2655
CA	LaJolla, Wheelock	619-454-3473
CA	Mountainview, Westech Sls.	415-961-1422
CO	Monument, Precision Environments	303-480-3330
DE	Wilmington, Data Concepts Corp.	302-654-3388
GA	Atlanta, United Engrg. Co. Inc.	404-256-4871
IL	Hoffman Estates, Carvel Engrg.	312-885-8800
IN	Carmel, Ralph Wendel	317-844-2230
KS	Mission, West & Assocs.	913-246-5356
KY	Louisville, Jenkins & Assocs.	502-451-4441
MI	Lansing, Hammond Assocs., Inc.	517-372-4112
MI	Lathrup Village, Carpenter-Cunningham & Assocs.	313-559-9610
MN	Edina, Carvel Engrg.	612-835-7929
MO	Ballwin, Cassidy & Assocs.	314-391-1802
NJ	Cherry Hill, Data Concepts Corp.	609-429-1510
NJ	Englewood Cliffs, Power Conversions & Control	201-569-0015
NM	N.E. Albequerque, Sun Data Sys., Inc.	505-292-1022
NY	Buffalo, Bromor Co.	716-874-4595
NC	Winston Salem, Carrington Elctrl.	919-968-8580
OH	Cleveland, Carter, McCormick & Peirce	216-779-5100
OH	Englewood, Carter, McCormick & Peirce	513-836-0951
OR	Beaverton, Ratec Corp.	503-643-5824
PA	Pittsburgh, Carter, McCormick & Peirce	412-372-4415
SC	Maldin, Carrington Elec. Sls.	803-297-9769
TN	Nashville, Jenkins & Assocs., Inc.	615-256-7606
TX	Dallas, Engineered Computer Rooms	214-644-1963
WA	Seattle, R. W. Campbell	206-622-3403
WV	Charleston, Dave Gandy & Assocs.	304-343-7414
WI	New Berlin, Carvel Engrg.	414-784-7007
Can	Nepean, Ontario, Mech-Co., Ltd.	613-225-0210

CONTROL MODULE, 380 Enfield St., Enfield, CT 06082, Tel: 203-745-2433, Telex: 643167; Empl.: 160; *Sls. Mgr.:* Peter C. DiMaria

CONTROL-O-MATION, INC, 7300 W. Huron River Dr., Dexter, MI 48130, Tel: 313-426-3935; Empl.: 70; *Sls. Mgr.:* Richard Lundy

CONTROL PRODUCTS, INC., 280 Ridgedale Ave., E. Hanover, NJ 07936, Tel: 201-887-9400; FSC No.: 81901; Empl.: 62; *Sls. Mgr.:* J. R. Nile

CONTROL PRODS., Devar, Inc., P.O. Box 589, Bridgeport, CT 06601, Tel: 203-368-6751, Telex: 96-4234; Empl.: 80; *Sls. Mgr.:* T. W. Tomasko

CSI CONTROL SCIENCES INCORPORATED

CONTROL SCIENCES, INC., 9509 Vassar Ave., Chatsworth, CA 91311, Tel: 818-709-5510, Telex: 4970496(CSI); FSC No.: 53317; Empl.: 14; *Sls. Mgr.:* Rhod Zimmerman .... **D•1142-1146**

Local Sales Offices & Reps

IL	Rolling Meadows, KMA Sales	312-398-5300
IN	Ft. Wayne, J & B Engrg.	219-483-2813
MN	St. Paul, Northstar Motion & Control	612-770-5311
MO	Peculiar, PEM Sales	816-884-4784
MO	St. Louis, PEM Sales	314-427-7200
NY	Victor, A & D Devices	716-924-9171
OH	Cleveland, Geotronix	216-526-2535
OH	Columbus, Geotronix	614-457-8472
PA	Media, Homer Smith Sls.	215-543-2434
WI	Milwaukee, KMA	414-259-1771

CONTROLS UNLIMITED, INC., 4823 North Ridge Rd., Perry, OH 44081, Tel: 216-259-2500; Empl.: 35

CONTROL SYSTEMS, 2855 Anthony Lane, Minneapolis, MN 55418, Tel: 612-789-2421, Telex: 756601

CONTROL TECHNOLOGY CO., 41-16 29th St., Long Island City, NY 11101, Tel: 718-361-2133; FSC No.: 14545; Empl.: 35; *Sls. Mgr.:* H. Cooper .... **D•1986-1987**

Local Sales Offices & Reps

CA	Claremont, W. Roth & Assocs.	714-621-1019
Can	Montreal, Que., Control Tech. Elctrns. CTC Canada, Ltd.	514-733-3279

CONTROL TECHNOLOGY, INC., 8200 N. Classen Blvd., Ste. 101, Oklahoma City, OK 73114, Tel: 405-840-3163, Telex: 910-831-3231; *Sls. Mgr.:* Charles Weddington; *Dist. Mgr.:* Charles Weddington

CONVER CORP., 10629 Bandley Dr., Cupertino, CA 95014, Tel: 408-255-0151, TWX: 910-338-2036; Empl.: 40; *Sls. Mgr.:* Robert Lloyd; *Dist. Mgr.:* Lyne Hare

CONVERSION EQUIP. CORP., 330 W. Taft Avenue, Orange, CA 92665, Tel: 714-637-2970; Empl.: 50; *Sls. Mgr.:* Patrick M. D'Acre

CONVERTER CONCEPTS INC

CONVERTER CONCEPTS, INC., Industrial Pkwy., Pardeeville, WI 53954, Tel: 608-429-2144, TWX: 910-280-2630; Empl.: 120; *Sls. Mgr.:* Michael J. Schoenwald; *Dist. Mgr.:* Michael J. Schoenwald .... **D•1600-1603**

Local Sales Offices & Reps

AL	Huntsville, JWL Assocs.	205-883-1712
AZ	Phoenix, Thor Engrg.	602-437-1463
CA	Goleta, The Thorson Co.	805-964-8751
CA	Hayward, Pacific Mktg.	415-887-1620
CA	Signal Hill, The Thorson Co.	213-595-0361
FL	Boca Raton, Perrott Assocs.	305-792-2211
FL	Clearwater, Perrott Assocs.	813-443-5214
FL	Orlando, Perrott Assoc.	305-298-7748
GA	Atlanta, JWL Assocs.	404-429-8010
IL	Rolling Meadows, KMA Sls.	312-398-5300
MA	Natick, Wayland Engrg. Sls.	617-655-6080
MN	Minneapolis, JMI	612-861-3343
NY	Syracuse, Pi-Tronics	315-455-7346
NC	Raleigh, JWL Assocs.	919-787-4826
OH	Dayton, Bradcor	513-294-5477
OH	Euclid, Bradcor Elctrns.	216-261-0888
PA	Glenside, Koebert Assoc.	215-887-2310
TX	Garland, Tesco	214-681-1376
TX	Houston, Tesco	713-777-1443
WA	Linnwood, Power Sources Unltd.	206-784-3336
WI	Milwaukee, KMA Sales	414-259-1771
Can	Rexdale, Ont., Electro-Source, Inc.	416-675-4490

CONVEX CORP., P.O. Box 17225, Dulles Intl. Airport, Washington, DC 20041, Tel: 703-661-8900; Empl.: 24

COOL-AMP CONDUCTO-LUBE CO., 8621 S.W. 17th Ave., Portland, OR 97219, Tel: 503-244-2230; Empl.: 5; *Sls. Mgr.:* Audrea Dick

COONER WIRE CO., 9186 Independence Ave., Chatsworth, CA 91311, Tel: 818-882-8311; *Sls. Mgr.:* Steven W. Smith .... **C•1820-1826**

Local Sales Offices & Reps

CA	Cupertino, Cooner Wire Co.	408-773-1444

COOPER GROUP, PO Box 30100, Raleigh, NC 27622, Tel: 919-781-7200, Telex: 579497

CO-ORD SWITCH DIV., See LVC Inds., Inc.

COORS PORCELAIN, 600 Ninth St., Golden, CO 80401, Tel: 303-278-4000, Telex: 45593; Empl.: 1700

COOSOL, 3013 Harbor Blvd., Costa Mesa, CA 92626, Tel: 714-545-2216; Empl.: 20; *Sls. Mgr.:* Aram Solomonian; *Dist. Mgr.:* Aram Solomonian

CORBY INDS. INC., P. O. Box 2838, Allentown, PA 18001, Tel: 215-433-1412, Telex: 847318 CORBYUHL; Empl.: 22; *Sls. Mgr.:* Glenn M. Matz; *Dist. Mgr.:* Lewis S. Walters

CORCOM, INC., 1600 Winchester Rd., Libertyville, IL 60048, Tel: 312-680-7400, TWX: 687-1058; FSC No.: 05245; Empl.: 1000 .... **A•1596**

Local Sales Offices & Reps

AL	Huntsville, Robert O. Whitesell	205-883-5110
AZ	Phoenix, I.S.D.S.	602-971-6250
CA	Los Angeles, I.S.D.S.	213-478-0183
CA	Mountain View, Straube Assocs.	415-969-6060
CA	San Diego, I.S.D.S.	619-571-1544
CA	Santa Ana, I.S.D.S.	714-973-2162
CA	Woodland Hills, I.S.D.S.	818-883-7130
CO	Arvada, Straube Assocs.	303-426-0890
CT	Madison, Conti-Younger Assocs.	203-245-1136
CT	Norwalk, Wincor Sls.	203-348-7741
FL	Maitland, E.I.R. Inc.	305-660-9600
FL	Oldsmar, E.I.R. Inc.	813-786-2156
FL	Plantation, E.I.R. Inc.	305-581-6905
FL	Plantation, E.I.R. Inc.	305-791-8243
ID	Boise, Cascade Comps.	208-343-9886
IL	Rolling Meadows, Sumer, Inc.	312-991-8500
IN	Ft. Wayne, Robert O. Whitesell	219-432-5591
IN	Indianapolis, Robert O. Whitesell	317-359-9283
IN	Kokomo, Robert O. Whitesell	317-457-9127
IA	Cedar Rapids, PMR, Inc.	319-362-9177
KS	Overland Park, PMR, Inc.	913-381-0004
KS	Wichita, PMR, Inc.	316-684-4141
KY	Louisville, Robert O. Whitesell	502-426-7696
MD	Ellicott City, Marketing Technlg.	301-465-5944
MA	Burlington, Conti-Younger Assocs.	617-273-1582
MI	Grand Rapids, Robert O. Whitesell	616-942-5420
MI	Southfield, Robert O. Whitesell	313-559-5454
MI	St. Joseph, Robert O. Whitesell	616-983-7337
MN	Edina, Mel Foster Co.	612-941-9790
MO	Maryland Heights, PMR, Inc.	314-569-1220
NM	Albuquerque, Straube Assocs.	505-292-0428
NY	Endicott, Noeth-Honsinger Assocs.	607-754-3214
NY	Manhasset, Win-Cor Elctrn. Sls.	516-627-9474
NY	Pittsford, Noeth-Honsinger Assocs.	716-586-9002
NC	Raleigh, Zucker Assoc.	919-782-8433
OH	Cincinnati, Robert O. Whitesell	513-521-2290
OH	Cleveland, Robert O. Whitesell	216-447-9020
OH	Columbus, Robert O. Whitesell	614-888-9396
OH	Dayton, Robert O. Whitesell	513-298-9546
OR	Lake Oswego, Cascade Comps.	503-635-2227
PA	Pittsburgh, Robert O. Whitesell	412-963-6161
PA	Trevose, Professional Svc. Assoc.	215-245-0513
TN	Knoxville, Robert O. Whitesell	615-694-9476
TX	Austin, K & H Sls.	512-258-8841
TX	Plano, K & H Sls.	214-423-6520
UT	Salt Lake City, Straube Assocs.	801-263-2640
VA	Lynchburg, Marketing Technlg.	804-384-6459
WA	Seattle, Cascade Comps.	206-888-3717
WI	Brookfield, Sumer, Inc.	414-784-6641

Local Distributors

AL	Huntsville, Pioneer	205-837-9300
AZ	Phoenix, Cetec Elctrns.	602-272-7951
CA	Canoga Park, Marshall Inds.	818-999-5004
CA	Chatsworth, Diplomat Elctrns.	818-314-4411
CA	Costa Mesa, Diplomat Elctrns.	714-549-8401
CA	El Monte, Marshall Inds.	213-442-7204
CA	Irvine, Cetec Elctrns.	714-250-4141
CA	Irvine, Marshall Ind.	714-660-0951
CA	San Diego, Cetec Elctrns.	619-278-5020
CA	San Diego, Diplomat Elctrns.	619-292-5693
CA	San Diego, Marshall Ind.	619-578-9600
CA	Santa Clara, Cetec Elctrns.	408-263-7373
CA	South Gate, Cetec Elctrns.	213-773-6521
CA	Sunnyvale, Diplomat/Westland	408-734-1900
CA	Sunnyvale, Marshall Ind.	408-732-1100
CO	Denver, Marshall Ind.	303-427-1818
CO	Wheatridge, Diplomat Elctrns.	303-422-9229
CT	Danbury, Diplomat Elctrns.	203-797-9674
CT	E. Haven, J.V. Elctrns.	203-499-2457
FL	Clearwater, Diplomat Elctrns.	813-443-4515
FL	Deerfield Beach, Pioneer	305-771-7520
FL	Ft. Lauderdale, Hammond Elctrns.	305-973-7103
FL	Orlando, Hammond Elctrns.	305-849-6060
FL	Orlando, Pioneer	305-834-9090
GA	Atlanta, Marshall Ind.	404-923-5750
IL	Chicago, Newark Elctrns.	312-638-4411
IL	Elk Grove Village, Pioneer/Chicago	312-437-9680
IL	Palatine, OHM Elctrns.	312-359-5500
IN	Indianapolis, Graham Elctrns.	317-634-8202
IN	Indianapolis, Pioneer	317-849-7300
MD	Beltsville, Resco/Washington	301-937-9100
MD	Gaithersburg, Pioneer	301-921-0660
MD	Savage, Pyttronic Inds.	301-792-0780
MD	White Marsh, Resco	301-529-0500
MA	Burlington, Marshall Ind.	617-272-8200
MA	Newton, Greene Shaw	617-969-8900
MA	Norwood, Gerber Elctrns.	617-769-6000
MI	Livonia, Pioneer	313-525-1800
MI	Livonia, R.S. Elctrns.	313-525-1155
MN	Minneapolis, Newark Elctrns.	612-331-6350
MN	Minnetonka, Pioneer/Twin Cities	612-935-5444
MN	St. Paul, Gopher Elctrns.	612-483-3322
MO	St. Louis, Olive Elctrns.	314-426-4500
NJ	Bellmawr, Mid Atlantic Elctrns. Corp.	609-931-5303
NJ	Totowa, Diplomat Elctrns.	201-785-1830
NY	Buffalo, Summit Distrs.	716-887-2800
NY	Melville, Diplomat Elctrns.	516-454-6400
NY	Mt. Vernon, QAR Indl. Elctrn. Sls.	914-699-2224
NY	Rochester, Rochester Radio Supp.	716-454-7800
NY	Rochester, Summit Distrs.	716-334-8110
NC	Greensboro, Hammond Elctrns.	919-275-6391
OH	Cleveland, Pioneer	216-587-3600
OH	Dayton, Pioneer	513-236-9900
OR	Beaverton, Almac Elctrns.	503-641-9070
PA	Montgomeryville, Pyttronic Inds.	215-242-6700
PA	Philadelphia, Almo Elctrns. Corp.	215-698-4000
PA	Pittsburgh, Pioneer	412-782-2300
SC	Columbia, Dixie Elctrns.	803-779-5332
TX	Austin, Pioneer	512-835-4000
TX	Dallas, Pioneer	214-386-7300
TX	Fort Worth, TTI	817-831-0441
TX	Houston, Pioneer	713-988-5555
UT	Salt Lake City, Diplomat/Alta Land	801-486-4134
WA	Bellevue, Almac Elctrns.	206-643-9992
WI	Milwaukee, Marsh Elctrns.	414-475-6000

CORD ELECTRONICS

PASSIVE COMPONENTS—Meters, Lamps, Potentiometers, Quartz Crystals & Filters, Xenon Flash Tubes & Trigger Coils, Miniature Speakers & Phone Capsules, Chokes, Coils, IFT, Inductors, Headsets, Boom Mic Headsets, Microphones, Mic Cartridges & Cables, Cords, Cables, Plugs, Jacks, Assemblies, Telephone Handsets, Modular Cords & Jacks, Switches.

POWER PRODUCTS—SPS (30W to 200W, 1 to 5 outputs), DC to DC (30W to 150W, 1 to 5 outputs), Magnetic Components.

FIBER OPTICS—Fiber Phone, Terminated Fiber Cables, Active Connectors.

CUSTOM MANUFACTURED PRODUCTS

CORD ELECTRONICS
INCORPORATED

177 Cantiague Rock Road,
Westbury, N.Y. 11590
Phone: (516) 935-3640
Telex: 4758020 FAX: (516) 935-0780

CORD ELECTRONICS
INCORPORATED (Formerly the OEM Division of MURAI)

CORD ELECTRONICS, INC., 177 Cantiague Rock Rd., Westbury, NY 11590, Tel: 516-935-3640, Telex: 475-8020; FSC No.: 516-935-0780; Empl.: 25; *Sls. Mgr.:* William Mercurio .... **A•2009; B•1023; C•1827; D•1024, 1605**

Local Sales Offices & Reps

AL	Huntsville, DHR Mktg., Inc.	205-533-5165
AR	Little Rock, Welch & Doby, Inc.	501-455-2199
CA	San Diego, Littlefield & Smith Assocs.	619-455-0055
CA	Saratoga, Frequency Control Assocs.	408-446-0200
CA	Saratoga, Santana Sls.	714-827-9100
CO	Aurora, Sage Sls.	303-750-3501
CT	Manchester, G. M. Assocs.	203-646-4443
FL	Casselberry, HAI Elctrns., Inc.	305-831-4892
FL	Coral Springs, HAI	305-752-7520
GA	Atlanta, DHR Mktg.	404-451-9848
IL	Highland Park, Bransky Sls.	312-433-2375
IN	Indianapolis, Elctrn. Reps.	317-894-1414
IA	Bettendorf, Weisler & Assocs., Inc.	319-344-0566
LA	Manderville, Design Mktg.	713-237-2319
MD	Timonium, Eastern Comps. Sls. Corp.	301-561-5811
MA	Framingham, G.M. Assocs.	617-872-4871
MI	Adrian, Elctrn. Salesmasters	517-263-2500
MI	Livonia, Elctrn. Salesmasters	313-421-2520
MN	Minneapolis, O.E.M. Elctrl. Sls., Inc.	612-559-2448
MS	Jackson, Welch & Doby, Inc.	601-932-5534
MO	Ellisville, Weisler Assocs.	314-394-4543
MO	N. Kansas City, Weisler Assocs.	816-421-1679
NH	Exeter, G. M. Assocs.	603-778-7472
NM	Alburquerque, Syntech	505-266-7951
NY	Jericho (Downstate), J-Square Mktg., Inc.	516-935-3200
NY	Rochester, J. G. Welch Assocs., Inc.	716-244-1100
NY	Utica, J. G. Welch Assocs., Inc.	315-736-7821
NC	Charlotte, DHR Mktg., Inc.	704-335-1215
NC	Greensboro, DHR Mktg., Inc.	919-273-2671
NC	Raleigh, DHR Mktg.	919-876-5450
OH	Beachwood, Elctrn. Salesmasters	800-328-1848
OH	Cleveland, Arthur H. Baier & Assocs.	216-461-6161
OH	Dayton, Arthur H. Baier & Assocs.	513-276-4128
OK	Tulsa, Design Mktg., Inc.	918-622-7744
OR	Beaverton, Quest Mktg., Inc.	503-641-7377
PA	W. Conshohocken, Eastern Comps.	215-825-8610
SC	Greenville, DHR Mktg.	803-235-3594
TN	Memphis, Welch & Doby, Inc.	901-683-8099
TX	Dallas, Design Mktg., Inc.	214-680-9767
TX	Hurst, Design Mktg., Inc.	817-268-2004
TX	Round Rock, Design Mktg., Inc.	512-255-9896
UT	Salt Lake City, Sage Sls.	801-467-5451
WA	Bellevue, Quest Mktg., Inc.	206-747-9424
WI	Cedarburg, Bransky Sls.	414-377-6837
PR	Puerto Rico, Casanova Indl. Sls.	809-753-8674
Can	Waterloo, Ont., Rytech Co.	519-743-4521

CORLUND ELCTRNS. CORP., 3543 Old Conejo Rd., Newbury Park, CA 91320, Tel: 805-499-6947; Empl.: 45; *Sls. Mgr.:* John Redmond

CORNELL-DUBILIER ELECTRONICS, 150 Avenue 'L', Newark, NJ 07105, Tel: 201-589-7500, Telex: 03-8366

CORNELL-DUBILIER ELECTRONICS, Div. of Federal Pacific Electric Co., 1605 East Rodney French Blvd., New Bedford, MA 02744, Tel: 617-996-8561

CORNELL-DUBILIER ELCTRNS., Wayne Interchange, Plaza 1, Wayne, NJ 07470, Tel: 201-256-2000; *Sls. Mgr.:* A. Cavuto .... **A•1067, 1597; B•1309**

Local Sales Offices & Reps

AZ	Tempe, Electronics Dvcs. & Sls.	602-438-1547
CA	Los Altos, Ewing-Foley, Inc.	415-941-4525
CA	San Diego, Harvey King	619-566-5252
CO	Westminster, Western Region Mktg.	303-430-8883
FL	Fort Lauderdale, Dyne-A-Mark Corp.	305-771-6501
IL	Rolling Meadows, Eagle Tech. Sls., Inc.	312-991-0700
IN	Carmel, Technology Mktg.	317-844-8462
MD	Glen Burnie, Faion Lott & Co.	301-744-4611
MA	Needham Heights, Coakley, Boyd & Abbett	617-444-5470
MI	Detroit, Rathsburg Assocs.	313-882-1717
MN	Minneapolis, Electric Comp. Sls.	612-933-2594
MO	Bridgeton, Dy-Tronix, Inc.	314-291-4771
NY	Syracuse, Leonard D. Allen	315-437-8387
NC	Cary, Montgomery Mktg., Inc.	919-467-6319
OH	Dayton, The Lyons Corp.	513-278-0714
TX	Richardson, R. F. Kimball Co, Inc.	214-231-3447
WA	Bellevue, Northwest Mktg. Assocs.	206-455-5846
PR	Santurce, Sudouest Import Sls. Corp.	809-726-7635

Local Distributors

AL	Huntsville, Arrow Elctrns., Inc.	205-882-2730
AL	Huntsville, Hall-Mark Elctrns.	205-837-8700
AZ	Phoenix, Arizona Comp. Co.	602-269-5655
AZ	Phoenix, Hall-Mark Elctrns.	602-243-6601
AZ	Tempe, Arrow Elctrns., Inc.	602-968-4800
AZ	Tempe, Bell Inds.	602-966-7800
CA	Chatsworth, Arrow Elctrns., Inc.	213-701-7500
CA	Chatsworth, Integated Elctrns. Corp.	213-009-2200
CA	Chatsworth, QC Comps.	818-700-2622

CA	Chatsworth, Shelley Elctrns.	213-009-3333
CA	Englewood, Hall-Mark Elctrns.	303-694-1662
CA	Fountain Valley, Component Ctr., Inc.	714-979-0433
CA	Garden Grove, Bell Inds.	714-895-7801
CA	Garden Grove, National Capacitor Corp.	714-892-7749
CA	Irvine, Integrated Elctrns. Corp.	714-540-5600
CA	Palo Alto, Zack Elctrns.	415-326-5432
CA	Sacramento, Arrow Elctrns. Inc.	916-925-7456
CA	San Diego, Arrow Elctrns., Inc.	619-565-4800
CA	San Diego, Hall-Mark Elctrns.	619-268-1201
CA	San Diego, Shelley Elctrns.	619-453-7133
CA	San Fernando, Petell Elctrns.	818-365-9841
CA	San Francisco, Zack Elctrns.	415-626-1444
CA	San Jose, Integrated Elctrns. Corp.	408-287-6488
CA	San Jose, Shelley Elctrns. Corp.	408-942-9111
CO	Lakewood, Acacia Sls.	303-232-2882
CO	Wheatridge, Bell Inds.	303-424-1985
CT	Greenwich, Wise Comp.	203-531-4880
CT	Stratford, Utronics, Inc.	203-378-4201
CT	Wallingford, Arrow Elctrns.	203-265-7741
FL	Ft. Lauderdale, Arrow Elctrns.	305-776-7790
FL	Ft. Lauderdale, Hall-Mark Elctrns.	305-971-9280
FL	Ft. Lauderdale, Hammond Elctrns., Inc.	305-973-7103
FL	Orlando, Hall-Mark Elctrns.	305-855-4020
FL	Orlando, Hammond Elctrns., Inc.	305-849-6060
FL	Palm Bay, Arrow Elctrns., Inc.	305-725-1480
GA	Norcross, Arrow Elctrns., Inc.	404-449-8252
GA	Norcross, Hall-Mark Elctrns.	404-447-8000
IL	Bensenville, Hall-Mark Elctrns.	312-860-3800
IL	Chicago, Bell Inds.	312-982-9210
IL	Chicago, Newark Elctrns.	312-638-4411
IL	Elk Grove Village, GBL/Goold Elctrns.	312-593-3220
IL	Itasca, Voyager Elctrns.	312-773-4900
IL	Palatine, OHM Elctrns.	312-359-5500
IL	Rosemont, Advent Elctrns., Inc.	312-297-6200
IL	Schaumburg, Arrow Elctrns., Inc.	312-397-3440
IL	Skokie, Kellner Elctrns.	312-677-1120
IN	Fort Wayne, Graham Elctrns.	219-423-3422
IN	Indianapolis, Arrow Elctrns.	317-243-9353
IN	Indianapolis, Graham Elctrn. Supp., Inc.	317-634-8202
IA	Cedar Rapids, Advent Elctrns., Inc.	319-363-0221
IA	Cedar Rapids, Bell Inds.	319-395-0730
IA	Cedar Rapids, Deeco, Inc.	319-365-7551
IA	Cedar Ropids, Arrow Elctrns., Inc.	319-395-7230
KS	Lenexa, Hall-Mark Elctrns.	913-888-4747
KS	Wichita, RSC Elctrns., Inc.	316-267-5213
LA	New Orleans, William B. Allen, Inc.	504-525-8222
MD	Baltimore, A.S.I. Elctrns.	301-265-5200
MD	Baltimore, Arrow Elctrns., Inc.	301-247-5200
MD	Bethesda, Arrow Elctrns., Inc.	301-564-3000
MD	Columbia, Hall-Mark Elctrns.	301-621-4228
MD	Gaithersburg, Pioneer Washington Elctrns.	301-948-0710
MD	Rockville, Capital Radio Whls., Inc.	301-881-2270
MA	Hingham, Sager Elctrl. Supp.	617-749-6700
MA	Newton, Green-Shaw, Inc.	617-969-8900
MA	North Chelmsford, Pilgrim Elctrns.	617-251-8746
MA	Wilmington, RC Comp., Inc.	617-657-4310
MA	Woburn, Arrow Elctrns., Inc.	617-933-8130
MA	Woburn, Jaco Elctrns., Inc.	617-933-7760
MI	Ann Arbor, Arrow Elctrns.	313-971-8220
MI	Grand Rapids, Arrow Elctrns.	616-243-0912
MI	Livonia, Pioneer/Michigan	313-525-1800
MN	Bloomington, Hall-Mark Elctrns.	612-852-3223
MN	Edina, Arrow Elctrns., Inc.	612-830-1800
MN	Minneaolis, Stark Elctrrns. Supp.	612-332-1325
MO	Kansas City, Electronics Supp.	816-931-0250
MO	Maryland Heights, Hall-Mark Elctrns.	314-291-5350
MO	St. Louis, Arrow Elctrns.	314-567-6888
MO	St. Louis, Olive Elctrns.	314-426-4500
NH	Manchester, Arrow Elctrns., Inc.	603-668-6968
NJ	Cherry Hill, Hall-Mark Elctrns. Corp.	609-424-7300
NJ	East Brunswick, Brothers Elctrns.	201-238-2200
NJ	East Hanover, State Elctrns. Parts Corp.	201-887-2550
NJ	Fairfield, Arrow Elctrns.	201-575-5300
NJ	Fairfield, Hall-Mark Elctrns.	201-575-4415
NJ	Kenilworth, Federated Purchased	201-272-0505
NJ	Marlton, Arrow Elctrns., Inc.	609-596-8000
NJ	Moorestown, Arrow Elctrns., Inc.	609-235-1900
NM	Albuquerque, Arrow Elctrns., Inc.	505-243-4566
NM	Albuquerque, Electronic Parts Co., Inc.	505-293-6161
NY	Biminghamton, Help Elctrns., Inc.	607-729-3528
NY	Bohemia, Key Comps., Inc.	516-567-7500
NY	Buffalo, Summit Distrs., Inc.	716-877-2800
NY	Central Islip, Semicap Elctrns. Corp.	516-582-4400
NY	Elmsford, Ancar Elctrns. Supp., Inc.	914-592-7100
NY	Farmingdale, Arrow Intl.	516-293-6363
NY	Farmingdale, Semispecialists of Amer.	516-293-2710
NY	Hauppauge, Arrow Elctrns., Inc.	516-231-1030
NY	Hauppauge, Broad Line Elctrns.	800-645-5444
NY	Hauppauge, Fairmont Elctrn.Sls. Corp.	516-231-3312
NY	Hauppauge, Jaco Elctrns., Inc.	516-273-5500
NY	Liverpool, Arrow Elctrns., Inc.	315-652-1000
NY	Melville, Arrow Elctrns., Inc.	516-391-1300
NY	Rochester, Arrow Elctrns., Inc.	716-275-0300
NY	Rochester, Masline Elctrns.	716-546-5373
NY	Rochester, Rochester Radio Supp. Co.	716-454-7800
NY	Rochester, Simcona Elctrns. Corp.	716-238-3230
NY	Rochester, Summit Elctrns. of Roch., Inc.	716-334-8110
NY	Rockville Center, Douglas Elctrns.	716-764-5710
NY	Rome, Rome Elctrns.	315-337-5400
NY	Ronkonkoma, Hall-Mark Elctrns.	516-737-0600
NC	Greensboro, Hammond Elctrns.	919-275-6391
NC	Raleigh, Arrow Elctrns.	919-876-3132
NC	Winston-Salem, Kirkman Elctrns.	919-722-9131
OH	Akron, Akron Electrns. Supp. Co.	218-762-8818
OH	Centerville, Arrow Elctrns., Inc.	513-435-5563
OH	Cincinnati, Hall-Mark Elctrns.	513-563-5980
OH	Cincinnati, Hughes Peters, Inc.	513-351-2000
OH	Cleveland, Pioneer/Cleveland	216-587-3600
OH	Columbus, Arrow Elctrns.	614-885-8362
OH	Columbus, Hughes Peters	614-294-5351
OH	Dayton, Bell Inds.	513-434-8231
OH	Dayton, Pioneer Elctrns.	513-236-9900
OH	Dayton, Stotts Friedman	513-298-5555
OH	Highland Heights, Hall-Mark Elctrns.	216-473-2907
OH	Solon, Arrow Elctrns., Inc.	216-248-7500
PA	Montgomeryville, Pyttronic Inds.	215-242-6700
PA	Norristown, Century Elctrn. Co., Inc.	215-631-5400
PA	Phildelphia, Shap Elctrns. Co., Inc.	215-969-3300
PA	Pittsburgh, Pioneer/Pittsburgh	412-782-2300
SC	Columbia, Dixie Elctrns.	803-779-5332
TX	Austin, Arrow Elctrns., Inc.	512-835-4180
TX	Austin, Hall-Mark Elctrns.	512-258-8858
TX	Dallas, Arrow Elctrns., Inc.	214-386-7500
TX	Dallas, Captronics, Inc.	214-340-3592
TX	Dallas, Hall-Mark Elctrns.	214-343-5000
TX	Dallas, Harrison Equip. Co.	214-239-2750
WI	Madison, Arrow Elctrns.	608-273-4977
WI	Milwaukee, Electronic Exp.	414-228-8100
WI	Milwaukee, Industrial Elctrns. Corp. of Wis.	414-276-1212
WI	Milwaukee, Marsh Elctrns.	414-475-6000
WI	New Berlin, Hall-Mark Elctrns.	414-707-7844
WI	Oak Creek, Arrow Elctrns.	414-764-6600
WI	Waukesha, Bell Inds.	414-784-0235
Can	Calgary, Alb., Varah's	403-255-9550
Can	Don Mills, Ont., Saynor Elctrns.	416-445-2340
Can	Downsview, Ont., Future Elctrns.	416-638-4771
Can	Hamilton, Ont., Varah's	416-561-9311
Can	Ottawa, Ont., Carsten Elctrns.	613-729-5138
Can	Ottawa, Ont., Future Elctrns.	613-820-8313
Can	Ottawa, Ont., Varah's	613-726-8884
Can	Pointe Claire, Que., Future Elctrns.	514-694-7710
Can	Scarborough, Ont., Carsten Elctrns.	416-495-9999
Can	St. Laurent, Que., Carsten Elctrns.	514-334-8321
Can	Vancouver, BC, Future Elctrns.	604-438-5545
Can	Vancouver, BC, Varah's	604-873-3211
Can	Winnipeg, BC, Varah's	204-633-6190

CORNING GLASS WORKS, Materials Business, Main Plant, MP 21-3, Corning, NY 14831, Tel: 607-974-4102, Telex: 932-499; Empl.: 30000; *Sls. Mgr.:* Bryan Lanahan

CORNING
Your Quality Partner

CORNING GLASS WORKS, Corning Elctrns., Houghton Pk., Bldg. A-2, Corning, NY 14830, Tel: 607-974-8725, Telex: 932481; Empl.: 8000; *Sls. Mgr.:* Graham Wells; *Dist. Mgr.:* Betsey Murray .. **A•1068-1069, 1835**

Local Sales Offices & Reps

AL	Huntsville	205-830-4030
AZ	Phoenix	602-943-6602
CA	Escandido	619-741-0496
CA	Orange	714-771-5160
CA	Santa Clara	408-249-6481
CO	Denver	303-422-4547
FL	Plantation	305-581-3251
FL	St. Petersberg	813-894-1171
FL	Tampa	813-932-1723
FL	W. Palm Beach	305-686-1325
GA	Rosewell	404-992-7240
IL	Arlington Heights	312-228-6070
MD	Columbia	301-964-0225
MA	Littleton	617-486-3125
MN	Eagon	612-544-0206
MN	Shore View	612-780-5044
NY	Horse Head	607-974-8615
NC	Raleigh	919-876-1100
OH	Gahanna	614-476-0028
OR	Beaverton	503-649-9199
PA	Broomall	215-356-5300
PA	Pittsburgh	412-531-2002
TX	Plano	214-578-9360
TX	Round Rock	512-445-1686
Can	Montreal, Que.	514-866-9581

CORNING GLASS WORKS, Memory Prods Dept., 3900 Electronic Dr., Raleigh, NC 27604, Tel: 919-876-1100, TWX: 510-928-1840; Empl.: 17; *Sls. Mgr.:* A. Greenlaw

CORNING GLASS WORKS, Telecomm Prods Dept., BH-5, Corning, NY 14830, Tel: 607-974-9000, Telex: 932498; Empl.: 28,000

CORNING MEDICAL & SCIENTIFIC, See Corning Glass Works, Corning Elctrns.

CORTEC, INC., 15811 Chemical La., Huntington Bch., CA 92649, Tel: 714-897-2529; Empl.: 35

CORTRON DIV., 400 W. Grand Ave., Elmhurst, IL 60126, Tel: 312-279-9110, TWX: 910-254-0154; Empl.: 300; *Sls. Mgr.:* Bob Inglis

COSAR, 3121 Benton St., Garland, TX 75042, Tel: 214-276-9487, 800-527-1207, Telex: 730-764; FSC No.: 20891; Empl.: 50; *Sls. Mgr.:* Jerry Jarka

COSMO PLASTICS CO., 3239 W. 14th St., Cleveland, OH 44109, Tel: 216-861-5594; Empl.: 500; *Sls. Mgr.:* B. Gordon

COSMOS, INC., 19530 Pacific Hwy. S. Suite 102, Seattle, WA 98188, Tel: 206-824-9942, TWX: 910-380-8627; Empl.: 18; *Sls. Mgr.:* Jim Harding; *Dist. Mgr.:* Jim Brewer

COST EFFECTIVE SYSTEMS, INC., Two LeMans Pl., Pine Brook, NJ 07058, Tel: 201-575-5514, Telex: 4944668; *Sls. Mgr.:* Phyllis Gross

COTO
CORPORATION

COTO CORPORATION, 55 DuPont Drive, Providence, RI 02907, Tel: 401-943-2686, TWX: 710-381-8016; Empl.: 200; *Sls. Mgr.:* W. Poisson .... **B•1310-1311**

Local Sales Offices & Reps

CA	Lomita, Component Mktg. Assoc.	213-326-1460
CA	San Diego, D Squared Sls.	619-560-6266
CA	Saratoga, Testco Inc.	408-253-1900
CO	Denver, Spectrum Sls.	303-480-9991
IL	Downers Grove, Richmar Elctrns.	312-968-0118
IN	Indianapolis, Richmar Elctrns.	317-846-6383
NY	Melville, Jarms Assoc.	516-752-0404
OR	Portland, Ecco Mktg.	503-254-5588
PA	Gladwyn, Manreps	215-649-6300
TX	Plano, Richmar Elctrns.	214-867-8224
VA	Front Royal, Eltron Sls. Ltd.	703-635-7201
WA	Seattle, Ecco Mktg.	206-364-0200
WA	Spokane, Ecco Mktg.	509-924-4410
WI	Butler, Richmar Elctrns.	414-781-1730

Local Distributors

Intl	England, Surrey, Rhopoint	08833-OX-7988

COTRONICS, 3379 Shore Pkwy., Brooklyn, NY 11235, Tel: 718-646-7996; Empl.: 15; *Sls. Mgr.:* Alan Marks

COUNTIS INDS., 2670 Lockheed Way, Carson City, NV 89701, Tel: 702-882-6123; Empl.: 12; *Sls. Mgr.:* T. J. Countis; *Dist. Mgr.:* T. J. Countis

CREATIVE MICRO SYSTEMS, 3822 Cerritos Ave., Los Alamitos, CA 90720, Tel: 213-493-2484; Empl.: 40; *Sls. Mgr.:* Elaine Prossen

COVER CRAFT CORP., 540 Commercial St., Manchester, NH 03102, Tel: 603-889-6811; *Sls. Mgr.:* Terry M. Pratt; *Dist. Mgr.:* Terry M. Pratt

COVOX, INC., 675 D Conger St., Eugene, OR 97402, Tel: 503-342-1271, Telex: 706017; Empl.: 25; *Sls. Mgr.:* M. R. Stewart

CPS INC., 110 Wolfe Rd., Sunnyvale, CA 94086, Tel: 408-738-0530, Telex: 35-7450; FSC No.: 31640; Empl.: 80; *Sls. Mgr.:* Wanda Shearin .... **D•1607**

Local Sales Offices & Reps

MA	Burlington, Intersell	617-273-3844
NY	Great Neck, Industron Assocs.	516-487-2620

CRAIG SYSTEMS CORP., 10 Industrial Way, Amesbury, MA 01913-4848, Tel: 617-388-5662, TWX: 710-347-0590; FSC No.: 81902; Empl.: 300; *Sls. Mgr.:* Robert A. Legrow; *Dist. Mgr.:* Robert A. Legrow

CRAMER INC., 625 Adams St., Kansas City, KS 66105, Tel: 913-621-6700, TWX: 910-743-6856; Empl.: 200; *Sls. Mgr.:* Thomas R. Hyland

CRAMER COIL & TRANSFORMER CO., INC., 1121 15th Ave., Grafton, WI 53024, Tel: 414-377-7040; Empl.: 65; *Sls. Mgr.:* Philia G. Hayes

CRAMER CO., Mill Rock Rd., Old Saybrook, CT 06475, Tel: 203-388-3574, Telex: 966-453; Empl.: 200; *Sls. Mgr.:* A. V. Beauregard; *Dist. Mgr.:* E. Latourette

Local Sales Offices & Reps

CA	Anaheim, Spectrum Assocs.	714-630-6977
CA	Palo Alto, Mollard Mktg.	415-961-0456
IL	Elk Grove, Martec Assocs.	312-956-8090
NJ	East Orange, Willgold Sls. Corp.	201-678-7700
NY	East Syracuse, Application Specialists Inc.	315-437-2813
NY	Rochester, Application Specialists Inc.	716-586-6226
NC	Charlotte, Motion Tech.	704-525-9855
OH	Medina, J. C. Hofstetter	216-241-4880
PA	Edgemont, White/Whiddett Co.	215-353-6343
WA	Mercer Island, Andersen Assocs.	206-232-0484

CREARE, INC., Etna Rd., P.O. Box 71, Hanover, NH 03755, Tel: 603-643-3800, Telex: 953101; Empl.: 75; *Sls. Mgr.:* R. M. Zieserl

CREATIVE PACKAGING CO., 1202 Kentucky Ave., Indianapolis, IN 46285

CRESTRON ELEC., 101 Broadway, Cresskill, NJ 07626, Tel: 201-894-0660

Sti/Crestronics

A Division of Applied Electro Technology Int.

CRESTRONICS DIV., Applied Electro Technlg., Int., 2220 S. Anne St., Santa Ana, CA 92704, Tel: 714-556-6570, TWX: 910-595-1797; FSC No.: 52797; Empl.: 25; *Sls. Mgr.:* D. Core; *Dist. Mgr.:* D. Dore .... **D•1609**

CROMEMCO, 280 Bernardo Ave., Mountain View, CA 94043, Tel: 415-964-7400, TWX: 910-379-6988; Empl.: 500; *Sls. Mgr.:* Tom Keating; *Dist. Mgr.:* Tom Keating

CROMPTON INSTRS., 2763 Higgins Road, Elk Grove Village, IL 60007, Tel: 714-841-2901, Telex: 280540, TWX: 692309; FSC No.: 53498; *Sls. Mgr.:* J. Berger

CROMPTON INSTRS., Hawker Siddley, 2763 Old Higgins Rd., Elk Grove Village, IL 60007, Tel: 312-593-1107, Telex: 28-0540; *Sls. Mgr.:* Tony A. Pitt

CROSS ELCTRNS., 100 Commonwealth Dr., Warrendale, PA 15086, Tel: 412-776-1591; Empl.: 35; *Sls. Mgr.:* L. R. Craig

CROSSPOINT, Div. of Info-Lite, 422 Cliff St., Fairview, NJ 07022, Tel: 201-941-4455; FSC No.: FSCM 52116; Empl.: 13; *Sls. Mgr.:* Joseph M. Cartelli; *Dist. Mgr.:* Joseph M. Cartelli .... **B•1539**

Local Sales Offices & Reps

CA	No. Hollywood, Crown Elctrns.	213-877-3550
CA	Redwood City, Caltronic Assocs.	415-365-2545
CT	Weston, CJA Assoc.	203-226-4317
FL	St. Petersburg, R. L. Matus & Assocs.	813-896-4133
GA	Buford, R. L. Matus & Assocs.	404-945-2946
MI	Brighton, Michigan Mktg. & Sls.	313-229-6218
NJ	Wayne, GT Assocs.	201-694-6040
NY	Syracuse, Lenard Co.	315-479-9191
OH	Cleveland, A.S.A.	216-662-6080
OH	Dayton, Mohawk Intronics	513-434-8873
TX	Dallas, Glidden Electro Equip.	214-341-0610
TX	Houston, Glidden Electro Equip.	713-681-1415

CROUSE HINDS CO. - AV. LTG., 1200 Kennedy Rd., Windsor, CT 06095, Tel: 203-683-4300

CROUZET CONTROLS, INC., 1083 State Pkwy., Schaumburg, IL 60195, Tel: 312-843-2200, Telex: 206 297; Empl.: 18; *Sls. Mgr.:* Ben Delcourt .... **B•1145, 1315-1316, 1541**

Local Sales Offices & Reps

AZ	Phoenix, Flexible Technlg.	602-996-6421
CA	San Marino, Motion Control of So. CA	818-796-0189
CA	Santa Clara, Cummings & Assocs.	408-247-8656
CO	Denver, Control Agency	303-936-6641
FL	Tamarac, Davmik Sls.	305-920-2222
IA	Des Moines, Jos-Co/Melius, Inc.	515-277-8597
MA	Wellesley, Electro Kinetics	617-235-9415
MN	Minneapolis, Jos-Co/Melius.	612-861-3343
MO	Webster Grove, Schutz & Assocs. Ind. Sls., Inc.	314-962-2622
NY	Fairport, Tac Sls.	716-425-1070
NY	Syosset, Motion Control Sls.	516-921-5656
NC	Tryon, Halliday & Assoc.	704-894-8205
OH	Cincinnati, Bob Gilbert & Assocs.	513-574-1932
PA	Bensalem, William D. Staats Co.	215-639-5231
TX	Dallas, Automated Motion Control	214-340-4192
UT	Salt Lake City, Control Agency	801-328-4305
WA	Bellevue, Sea Inc.	206-883-4999
WA	Vancouver, Sea Inc.	206-573-5161
Can	St. Hubert, Que., Decofer	514-678-2252
Can	Weston, Ont., Keldco Controls	416-743-6356

Local Distributors

CA	Burlingame, Elec. Control Devices	415-348-0791
CA	Los Angeles, Master Distr.	213-452-1229
FL	Lakeland, A. A. Elec.	813-665-6941
FL	Pembroke Pines, Donza Intl.	305-987-1122
IN	Ft. Wayne, Graham Elctrns.	219-423-3422
IN	Indianapolis, Graham Elctrns.	317-634-8202
IN	Indianapolis, Vonnegut Indl. Prods.	317-899-8800/8877
IA	Bettendorf, Custom Controls Ltd.	319-335-4787
MA	Wellesley, Electro-Mechanical Distr.	617-235-1565
MI	Comstock Park, Mor Elec.	616-784-1121
MI	Grand Rapids, S-F Electronics	616-459-0216
MI	Royal Oak, George Instr. Co.	313-280-1111
MI	Saginaw, Fischer-Flack	517-752-4181
MN	St. Paul, Powermation	612-645-0781
NE	Omaha, Lakeland Engrg.	402-734-2600
NJ	Edison, Howman Applied Control Prods.	201-797-3313
NJ	Fair Lawn, Relay Specialties	201-797-3313
NJ	W. Trenton, Electronic Svc. Div.(Roller Bearing Co)	609-882-7400
NY	Commack, Monarch Comps.	516-499-1770
NC	Asheville, Electric Supply Co.	704-255-8899
NC	Gastonia, J.M.T. Elctrn. Supp.	704-867-4401
NC	Winston-Salem, Kirkman Elctrns.	919-722-9131
ND	Bismarck, Border States Elec.	701-258-6060
OH	Cincinatti, Hughes-Peters.	513-351-2000
OH	Cleveland, Reserve Elec. Co.	216-771-5764
OH	Columbus, Hughes-Peters.	614-294-5351
OH	Dayton, Duellman Elctrns.	513-461-5010
OK	Tulsa, Radio.	918-587-9123
OR	Portland, Familian Automated Valve	503-287-8383
PA	Allentown, P. A. Peters.	215-434-5237
PA	Philadelphia, Herbach & Rademan	215-426-1700
SC	Greenville, Holder Elec. Supp.	803-271-7111
TX	Ft. Worth, Swieco.	817-335-6521
WA	Kent, Motors & Controls Corp.	206-872-8010
WA	Seattle, Eicher-Richards Co.	206-523-7888
WI	Waukesha, Powermation	414-542-2868

CROVEN CRYSTALS, 500 Beech St., Whitby, ON, Canada L1N 5S5, Tel: 416-668-3324, TWX: 610-384-2750; FSC No.: 00809; Empl.: 250; *Sls. Mgr.:* R. McCormick .... **A•1335**

Local Sales Offices & Reps

AZ	Mesa, Sedco Sls.	602-835-6281
CA	San Mateo, Melvin Sls.	415-349-7444
CA	Van Nuys, R.L. Assocs.	213-782-7826
FL	Palm Bay, Spartech Assocs.	305-727-8045
GA	Smyrna, Spartech Assocs.	404-432-3644
MA	Milton, Naton Assoc.	617-698-0670
MO	Blue Springs, Chesco	816-229-1404
MO	St. Charles, Chesco	314-946-6677
NJ	Cherry Hill, Harry J. White	609-428-4544
NY	Melville, Carnes Assocs.	516-694-1600
OH	Englewood, Clayton-Ellier Co.	513-836-3556
TX	Arlington, W. Pat Fralia	817-640-9101
VA	Springfield, Tech Reps Inc.	703-569-6868
WI	Mequon, Artmor Ltd.	414-241-4040

IOR CRYDOM

A DIVISION OF INTERNATIONAL RECTIFIER

CRYDOM DIVISION, Int'l. Rectifier, 1521 Grand Ave., El Segundo, CA 90245, Tel: 213-322-4987, Telex: 67-4660, TWX: 910-348-6283; Empl.: 100; *Sls. Mgr.:* John Deith; *Dist. Mgr.:* Bob Arnstein .... **B•1312-1314**

Local Sales Offices & Reps

AL	Huntsville, EMA, Inc.	205-830-4030
AZ	Phoenix, Eltron	602-266-2164
CA	Pleasanton, Sierra Sls. Engrg.	415-463-2250
CA	San Diego, Cerco	619-450-1754
CA	Tustin, Morgan Johnson Co., Inc.	714-832-7282
CO	Westminster, Control Agy.	303-427-4179
CT	Fairfield, NRG, Ltd.	203-384-1112
GA	Rosswell, EMA, Inc.	404-992-7240
ID	Boise, N.R. Schultz Co.	208-377-8686
IL	Schaumberg, Microtex, Inc.	312-885-1131
IN	Carmel, Technology Mktg. Corp.	317-844-8462
IN	Ft. Wayne, Technology Mktg. Corp.	219-432-5553
KS	Merriam, Midwest Tech. Sls.	913-236-8555
KS	Wichita, Midwest Tech. Sls.	316-262-7240
KY	Louisville, Technology Mktg. Corp.	502-449-7808
MD	Phoenix, Phoenix Elctrn. Sls.	301-628-2066
MA	Lexington, AD Sys. Sls.	617-861-6370
MI	Royal Oaks, Dave Ray & Assocs.	313-280-0000
MN	Eden Prairie, Electronic Innovators, Inc.	612-941-0830
MO	St. Charles, Midwest Tech. Sls.	314-441-1012
NV	Reno, Unitronics Mktg., Inc.	702-825-1978
NJ	Glen Rock, North East Comps. Co., Inc.	201-447-0600
NY	Binghamton, GEN-TECH Elctrns.	607-648-8833
NY	Liverpool, GEN-TECH Elctrns.	315-451-3480
NY	Melville, Parallax Sls.	516-351-1000
NY	Pittsford, GEN-TECH Elctrns.	716-381-2820
NY	Pleasant Valley, GEN-TECH Elctrns.	914-635-3233
NC	Pineville, EMA, Inc.	704-541-0929
NC	Winston Salem, EMA, Inc.	919-784-6953
OH	Cincinnati, Luebbe Sls. Co.	513-891-5770
OH	Cleveland, Cleveland Luebbe Sls.	216-333-0425
OH	Columbus, Luebbe Sls. Co.	614-431-0474
OH	Dayton, Luebbe Sls. Co.	513-294-0426
OK	Tulsa, ION Assocs., Inc.	918-664-0186
OR	Beaverton, N.R. Schultz Co.	503-643-1644
PA	Pittsburgh, Luebbe Sls. Co.	412-931-0414
PA	Spring House, Deltatronics Inc.	215-542-0250
TN	Donelson, EMA, Inc.	615-883-1414
TN	Jonesboro, EMA, Inc.	615-742-8081
TX	Austin, ION Assocs., Inc.	512-331-7251
TX	Grand Prairie, ION Assocs., Inc.	214-647-8225
TX	Houston, ION Assocs., Inc.	713-977-4354
UT	Salt Lake City, Control Agy.	801-972-8787
WA	Bellevue, N.R. Schultz Co.	206-454-0300
WI	Waukesha, Microtex, Inc.	414-542-5352

Local Distributors

CA	Los Angeles, Kierulff Electronics	213-725-0325
CA	Los Angeles, Master Distrs.	213-452-1229
CA	Pico Rivera, Amfac Elec. Supp.	213-949-7841
CA	San Francisco, South, Stevens Engineering	415-588-9200
IL	Chicago, Newark Elect.	312-784-5100
MA	Hingham, Sager Electric	617-749-6700
NJ	Fair Lawn, Relay Specialties	201-797-3313
NY	Farmingdale, Milgray Elctrns.	516-420-9800
NY	Melville, Arrow Elctrns.	516-694-6800
NY	Westbury, Schweber Electronics	516-334-7474

CRYOMAGNETICS, INC., 795 Oak Ridge Tpk., Oak Ridge, TN 37830, Tel: 615-482-9551; *Sls. Mgr.:* R. M. Ennis, Jr.

CRYSTALOID ELCTRNS., Box 628, Hudson, OH 44236, Tel: 216-655-2429, Telex: 241-244; Empl.: 130; *Sls. Mgr.:* Sharon Werstler

CRYSTEK CORP, P.O. Box 06135, Ft. Myers, FL 33906, Tel: 813-936-2109, TWX: 510-951-7448; FSC No.: 13454; Empl.: 150

CSI Capacitors

CSI CAPACITORS, CSI Technlgs., 810 Rancheros Dr., San Marcos, CA 92069, Tel: 619-747-4000, Telex: 697832; FSC No.: 10026; Empl.: 50; *Sls. Mgr.:* H. R. Smith .... **A•1070**

Local Sales Offices & Reps

AZ	Tempe, Cleveland Entprs. of AZ	602-820-1127
CA	San Jose, Comtech Mktg.	408-365-7474
CA	San Jose, Silicon Valley Sls.	408-286-7510
CA	Tarzana, High Voltage Sls.	213-881-9194
FL	Orlando, Glenn Tech. Sls. Co.	305-299-8700
IL	Chicago, Esco Assocs.	312-763-0800
KY	Louisville, K. W. Elctrn. Sls.	512-451-1860
MA	Framingham, Sullivan Tech. Sls.	617-620-0195
NJ	Leonia, Peter E. Schmitt Co.	201-944-2806
NM	Albuquerque, Cleveland Entprs.	505-265-7893
NY	Cazenovia, S. T. Woolard	315-655-8145
OH	Dayton, K. W. Elctrn. Sls.	513-890-2150
PA	Washington Crossing, DVS Co.	215-493-4642
TX	Dallas, Cunningham Comps. Corp.	214-233-4303
TX	Houston, Cunningham Comps. Corp.	713-461-4197

CPSI, 40 Linnell Circle, Billerica, MA 01821, Tel: 617-272-6020, 800-325-3110, TWX: 710-347-0176; Empl.: 150; *Sls. Mgr.:* S. Corbit

C-TEK
INCORPORATED

C-TEK INC., 4 Railroad Ave., Wakefield, MA 01880, Tel: 617-246-1720, Telex: 882485; Empl.: 15; *Sls. Mgr.:* John Vanaman .... **D•1114-1115**

Local Sales Offices & Reps

AZ	Phoenix, Thor Eng.	602-437-1463
CT	Ansonia, R. H. Sturdy Co.	203-734-2186
MA	Waltham, Calibron Instrs.	617-894-6440
MA	Wellesley Hills, R. H. Sturdy Co.	617-235-2330
MI	Southfield, Fred H. Gehrke & Assocs.	313-559-5363
MN	St. Paul, Northstar Motion & Control	612-770-5311
NJ	Sparta, E.S. Williams	201-729-4049
NY	Champlain, Premier Automation	514-684-6610
NY	Syosset, Motion Control Sls.	516-921-5656
NC	Charlotte, Jake Rudisill Assocs.	704-377-6901
OH	Cincinatti, KCH Co.	513-931-1686
VA	Richmond, Jake Rudisill Assocs.	804-320-0201
WA	Seattle, Eicher-Richards Co.	206-523-7888

Local Distributors

NY	Clarence, Trott Elctrns.	716-634-8500
NY	Pittsford, Controlled Motion Prods.	716-381-1933
NY	Pittsford, Trott Elctrns.	716-586-8251
NC	Charlotte, Trott Elctrns.	704-376-2237

CTI-CRYOGENICS, 266 Second Ave, Waltham, MA 02254, Tel: 617-890-9400, Telex: 92-3442; Empl.: 350; *Sls. Mgr.:* R. A. Bryce

CTS CORPORATION, 905 North West Blvd., Elkart, IN 46514, Tel: 219-293-7511, TWX: 810-294-2167; Empl.: 8,200; *Dist. Mgr.:* J. C. Wells .... **A•1336-1357, 1663-1667; B•1542-1546**

Local Sales Offices & Reps

AL	Huntsville, Interep Assocs.	205-533-1730
AL	Mobile, Interep Assocs., Inc.	205-478-1036
AZ	Phoenix, Compass Mktg. & Sls.	602-996-0635
AZ	Tucson, Compass Mktg. & Sls., Inc.	602-293-1220
CA	Calimesa, Eltronics	714-795-1521
CA	Fremont, CTS Corp.	415-659-1704
CA	Los Altos, Ewing & Foley, Inc.	415-941-4525
CA	South Pasadena, CTS Corp.	213-682-1137
CO	Denver, ELCOM	303-337-2300
CT	Wallingford, CompRep Assocs.	203-269-1145
FL	Altamonte Springs, Electrocomp Assocs.	305-429-0802
FL	Deerfield Beach, Electrocomp Assocs.	305-429-0802
FL	Melbourne, Electrocomp Assocs.	305-242-0621
FL	St. Petersburg, Electrocomp Assocs.	813-327-9677
GA	Norcross, Interep Assocs.	404-449-8680
IL	Addison, CTS Corp.	312-543-5021
IN	Carmel, Brainard-Wilson Mktg.	317-844-2800
IN	Indianapolis, Elctrn. Reps.	317-894-1414
IA	Cedar Rapids, Seltec Sls. Corp.	319-393-1114
KS	Overland Park, Advanced Tech. Sls.	913-642-6675
MD	Columbia, Professional Reps.	301-992-7460
MA	Westwood, CompRep Assocs.	617-329-3454
MI	Southfield, J. L. Montgomery Assocs.	313-358-2616
MN	Minneapolis, Robert W. Marshall Co.	612-929-0457
MN	Minneapolis, S & R Sls.	612-559-3090
MO	St. Charles, Buckman & Assocs.	314-946-6201
MO	St. Louis, Advanced Tech. Sls.	314-878-2921
NM	Albuquerque, Compass Mktg. & Sls.	505-888-0800
NY	E. Syracuse, Nycom	315-437-8343
NY	Jamaica, S-J Sales Assocs.	212-291-3232
NY	Pittsford, Kirby Mktg., Inc.	716-248-8750
NC	Raleigh, Zucker Assocs.	919-782-8433
OH	Cleveland, Baehr, Greenleaf & Assocs.	216-221-9030
OH	Columbus, Baehr, Greenleaf & Assocs.	614-486-4046
OH	Dayton, Baehr, Greenleaf & Assocs.	513-439-0724
OK	Tulsa, Southern States Mktg.	918-665-8338
OR	Beaverton, Electronics Tech. Sls.	503-641-5180
PA	Mars, Baehr, Greenleaf & Assocs.	412-776-2151
PA	Trevose, P.S.A. Inc.	215-245-0513
TN	Greeneville, Interep Assocs.	615-639-3491
TX	Austin, Southern States Mktg.	512-452-9459
TX	Houston, Southern States Mktg.	713-558-4900
TX	Richardson, Southern States Mktg.	214-238-7500
UT	Salt Lake City, ELCOM	801-485-7415
WA	Kirkland, Electronics Tech. Sls.	206-827-8086
PR	Mayaguez, CompRep de Puerto Rico	809-832-9529
Can	Streetsville, Ont., CTS of Canada, Ltd.	416-826-1141

Local Distributors

AL	Huntsville, Hall-Mark/Huntsville	205-837-8700
AL	Huntsville, RM Elctrns. Co., Inc.	205-852-1550
AZ	Tempe, Bell Inds.	602-966-7800
AZ	Tempe, Marshall Inds.	602-968-6181
CA	Canoga Park, Marshall Inds.	213-999-5001
CA	Chatsworth, Arrow Elctrns., Inc.	213-701-7500
CA	Garden Grove, Bell Inds.	714-895-7801
CA	Gardena, Bell Inds.	213-515-1800
CA	Irvine, Marshall Inds.	213-443-3724,714-556-6400
CA	Irvine, Ratel Elctrns.	714-768-0855,213-637-0839
CA	Los Angeles, Richey/Western Elctrns., Inc.	213-820-3777
CA	Newport Beach, Arrow Elctrns., Inc.	714-851-8961
CA	Orange, Richey/Western Elctrns., Inc.	714-634-2811
CA	Roseville, Bell Inds.	916-969-3100
CA	San Diego, Arrow Elctrns., Inc.	714-565-4800
CA	San Diego, Marshall Inds.	714-578-9600
CA	San Diego, Richey/Western Elctrns., Inc.	714-271-4511
CA	San Jose, Ratel Elctrns.	408-946-4300
CA	San Jose, Rose Elctrns.	408-263-9700
CA	Santa Clara, Richey/Western Elctrns., Inc.	408-727-7411
CA	Sunnyvale, Arrow Elctrns., Inc.	408-745-6600
CA	Sunnyvale, Bell Inds.	408-734-8570
CA	Sunnyvale, Marshall Inds.	408-732-1100
CO	Aurora, Arrow Elctrns., Inc.	303-696-1111
CO	Denver, Integrated Elctrns. Co., Inc.	303-292-6121
CO	Englewood, Industrial Elctrns., Inc.	303-694-9444
CT	New Haven, The Green-Shaw Co., Inc.	203-393-0710
CT	Wallingford, Arrow Elctrns., Inc.	203-265-7741
CT	Wallingford, Marshall Inds.	203-265-3822
CT	Wallingford, MIDAN Elctrns., Inc.	203-265-2077
FL	Deerfield Beach, Arrow Elctrns., Inc.	305-429-8200
FL	Fort Lauderdale, Hall-Mark/Miami	305-971-9280
FL	Largo, Graham Elctrns./Bell Inds.	813-541-4434
FL	Orlando, Hall-Mark/Orlando	305-855-4020
FL	Orlando, Marshall Inds.	305-841-1878
FL	Palm Bay, Arrow Elctrns., Inc.	305-725-1480
GA	Norcross, Arrow Elctrns., Inc.	404-449-8252
GA	Norcross, Graham Elctrns./Bell Inds.	404-662-0923
GA	Norcross, Hall-Mark/Georgia	404-447-8000
GA	Norcross, Marshall Inds.	404-923-5750
IL	Bensenville, Hall-Mark Elctrns. Corp.	312-860-3800
IL	Chicago, Bell Inds.	312-982-9210
IL	Lombard, RM Elctrns. Co., Inc.	312-932-5150
IL	Schaumburg, Arrow Elctrns., Inc.	312-397-3440
IL	Shaumburg, Marshall Inds.	312-490-0155
IN	Fort Wayne, Graham Elctrns./Bell Inds.	219-423-3422
IN	Indianapolis, Arrow Elctrns., Inc.	317-243-9353
IN	Indianapolis, Graham Elctrns./Bell Inds.	317-634-8202
IN	Indianapolis, RM Elctrns. Co., Inc.	317-291-7110
IN	Lafayette, Graham Elctrns./Bell Inds.	317-423-5564
KS	Lenexa, Hall-Mark/Kansas City	913-888-4747
KS	Lenexa, Marshall Inds.	913-492-3121
MD	Baltimore, Arrow Elctrns., Inc.	301-247-5200
MD	Baltimore, Hall-Mark/Baltimore	301-796-9300
MD	Gaithersburg, Marshall Inds.	301-840-9450
MA	Newton, The Greene-Shaw Co., Inc.	617-969-8900
MA	Woburn, Arrow Elctrns., Inc.	617-933-8130
MI	Ann Arbor, Arrow Elctrns., Inc.	313-971-8220
MI	Ann Arbor, Graham Elctrns./Bell Inds.	313-971-9093
MI	Grand Rapids, RM Elctrns. Co., Inc.	616-531-9300
MI	Livonia, Marshall Inds.	313-525-5850
MI	Livonia, RS Elctrns.	313-525-1155
MN	Bloomington, Hall-Mark/Minneapolis	612-854-3223
MN	Edina, Arrow Elctrns., Inc.	612-830-1800
MN	Minneapolis, Industrial Comps., Inc.	612-831-2666
MN	Plymouth, Marshall Inds.	612-559-2211, 612-559-2255
MO	Maryland Hgts., Hall-Mark/St. Louis	314-291-5350
MO	St. Louis, Arrow Elctrns., Inc.	314-567-6888
MO	St. Louis, Graham Elctrns./Bell Inds.	314-821-1541
MO	St. Louis, Olive Elctrns., Inc.	314-426-4500
NE	Lincoln, Scott Elctrn. Supp. Corp.	402-466-8221
NH	Manchester, Arrow Elctrns., Inc.	603-668-6968
NJ	Cherry Hill, Hall-Mark/Cherry Hill	215-355-7300
NJ	Clifton, Vantage Comps., Inc.	201-667-1840
NJ	Fairfield, Arrow Elctrns., Inc.	201-575-5300
NJ	Fairfield, Marshall Inds.	201-882-0320
NJ	Marlton, Arrow Elctrns., Inc.	609-235-1900
NJ	Mt. Laurel, Marshall Inds.	609-234-9100, 215-627-1920
NM	Albuquerque, Arrow Elctrns., Inc.	505-243-4566
NM	Albuquerque, Bell Inds.	505-292-2700
NY	Buffalo, Summit Distrs.	716-884-3450
NY	East Syracuse, Marshall Inds.	315-432-0644
NY	Endwell, Marshall Inds.	607-754-1570
NY	Farmingdale, Semispecialists of America, Inc.	516-293-2710
NY	Hauppauge, Arrow Elctrns., Inc.	516-694-6800, Ext. 316/317
NY	Hauppauge, Marshall Inds.	516-273-2424
NY	Jamaica, Archer Ind. Distrs., Inc.	212-291-3232
NY	Liverpool, Arrow Elctrns., Inc.	315-652-1000
NY	Melville, Arrow Elctrns., Inc.	516-694-6800
NY	Mt. Vernon, QAR Ind. Elctrn. Sls., Inc.	914-699-2224
NY	Rochester, Arrow Elctrns., Inc.	716-427-0300
NY	Rochester, Marshall Inds.	716-235-7620
NY	Rome, Rome Elctrns., Inc.	315-337-5400
NC	Raleigh, Hall-Mark/Raleigh	919-832-4465
NC	Raleigh, RESCO/Raleigh	919-781-5700
NC	Winston Salem, Arrow Elctrns., Inc.	919-725-8711
OH	Centerville, Arrow Elctrns., Inc.	513-435-5563
OH	Cincinnati, Graham Elctrns./Bell Inds.	513-772-1661
OH	Columbus, Graham Elctrns./Bell Inds.	614-895-1590
OH	Dayton, Marshall Inds.	513-236-8088
OH	Solon, Arrow Elctrns., Inc.	216-248-3990
OH	Solon, Hall-Mark/Cleveland	216-349-4632
OH	Solon, Marshall Inds.	216-248-1788
OH	Westerville, Hall-Mark Elctrns. Corp.	614-891-4555
OK	Tulsa, Hall-Mark/Tulsa	918-665-3200
OR	Tigard, Moore Elctrns.	503-684-3100
PA	McKean, ADVACOM/Erie	814-476-7774
PA	Monroeville, Arrow Elctrns., Inc.	412-856-7000
PA	Philadelphia, Philadelphia Elctrns., Inc.	215-568-7400
TN	Nashville, Graham Elctrns./Bell Inds.	615-242-2682
TX	Austin, Arrow Elctrns., Inc.	512-835-4180
TX	Austin, Hall-Mark/Austin	512-258-8848
TX	Austin, Southwest Elctrns., Inc.	512-837-8971
TX	Dallas, Arrow Elctrns., Inc.	214-386-7500
TX	Dallas, Hall-Mark Elctrns., Inc.	214-341-1147
TX	Dallas, Marshall Inds.	214-233-5200
TX	Houston, Arrow Elctrns., Inc.	713-491-4100
TX	Houston, Hall-Mark/Houston	713-781-6100
TX	Richardson, Southwest Elctrns., Inc.	214-234-3050
TX	Stafford, Southwest Elctrns., Inc.	713-491-4900
UT	Salt Lake City, Bell Inds.	801-972-6969
WA	Bellevue, Arrow Elctrns., Inc.	206-643-4800
WA	Seattle, Zepher Elctrn. Sls. Corp.	206-241-1980
WI	Oak Creek, Arrow Elctrns., Inc.	414-764-6600
WI	Oak Creek, Hall-Mark/Milwaukee	414-761-3000
WI	Waukesha, Bell Inds.	414-547-8879

CTS CORPORATION, Asheville Division, P.O. Box 100, Skyland, NC 28776, Tel: 704-684-6451, TWX: 510-935-0059; *Sls. Mgr.:* T. B. Haney

'Refer to CTS Corp., Elkhart, IN, for sales offices & representatives & for distributor listings.'

CTS® CORPORATION*
BERNE DIVISION

CTS CORPORATION, Berne Division, 406 Parr Rd., Berne, IN 46711, Tel: 219-589-3111, TWX: 810-323-1580; Empl.: 1100; *Sls. Mgr.:* Scott Bowman; *Dist. Mgr.:* Cliff Stults .... **A•1836-1844, 2011**

'Refer to CTS Corp., Elkhart, IN, for sales offices & representatives & for distributor listings.'

CTS CORPORATION, Bentonville Division, 1300 S.E. 8th St., Bentonville, AR 72712, Tel: 501-273-9036

Refer to CTS Corp., Elkhart, IN, for sales offices and representatives and for distributor listings.

CTS OF CANADA, LTD., 80 Thomas St., Streetsville, Ontario, Can. L5M 1Y9, Tel: 416-826-1141

Refer to CTS Corp., Elkhart, IN, for sales offices and representatives and for distributor listings.

CTS ELECTRONICS CORP., PASO ROBLES DIV., Electromechanical Gp., 500 Linne Rd., Paso Robles, CA 93446, Tel: 805-238-0350, TWX: 910-351-6796; *Sls. Mgr.:* Jack Bell; *Dist. Mgr.:* Bob Tarkenton .... **B•1542-1546**

'Refer to CTS Corp., Elkhart, IN, for sales offices & representatives & for distributor listings.'

CTS FABRI-TEK CONNECTOR INC., 9210 Science Center Dr., Minneapolis, MN 55428, Tel: 612-533-3533, TWX: 910-576-2717; FSC No.: 16512; Empl.: 300; *Sls. Mgr.:* John B. McKee

'Refer to CTS Corp., Elkhart, IN, for sales offices & representatives & for distributor listings.'

CTS FABRI-TEK, INC., CTS Corporation, 6900 Shady Oak Rd., Eden Prairie, MN 55344, Tel: 612-941-9100, TWX: 910-576-2913; FSC No.: 21542; Empl.: 1400; *Sls. Mgr.:* Bruce Richardson

'Refer to CTS Corp., Elkhart, IN, for sales offices & representatives & for distributor listings.'

CTS CORPORATION, Elkhart Division, 1142 W. Beardsley Ave., Elkhart, IN 46514, Tel: 219-295-3575

Refer to CTS Corp., Elkhart, IN, for sales offices and representatives and for distributor listings.

CTS ELECTRONICS CORP.,, Knights Division, 400 Reimann Ave., Sandwich, IL 60548, Tel: 815-786-8411, TWX: 910-642-0860; Empl.: 500; *Sls. Mgr.:* Larry Barbary; *Dist. Mgr.:* Larry Barbary .... **A•1336-1357**

'Refer to CTS Corp., Elkhart, IN, for sales offices & representatives & for distributor listings.'

CTS CORPORATION, Microelectronics Div., 1201 Cumberland Ave., W. Lafayette, IN 47906, Tel: 317-463-2565, TWX: 810-342-1882; Empl.: 505; *Sls. Mgr.:* David C. Anderson .... **A•1662-1667**

'Refer to CTS Corp., Elkhart, IN, for sales offices & representatives & for distributor listings.'

CTS ELECTRONICS CORP., Halex Division, 1202 McGaw Ave., Irvine, CA 92714, Tel: 714-261-6381, TWX: 910-595-2648; Empl.: 70; *Sls. Mgr.:* Gene P. Markley .... **A•1662-1667**

'Refer to CTS Corp., Elkhart, IN, for sales offices & representatives & for distributor listings.'

CTS CORPORATION, Monon Division, Highway 16 West, Monon, IN 47959, Tel: 219-253-6666

Refer to CTS Corp., Elkhart, IN, for sales offices and representatives and for distributor listings.

CTS ELECTRONICS CORP., San Jose Division, 660 Lenfest Rd., San Jose, CA 95133, Tel: 408-251-1600, Telex: 910-997-8006; Empl.: 500; *Sls. Mgr.:* Ed King; *Dist. Mgr.:* Charles Nadler

'Refer to CTS Corp., Elkhart, IN, for sales offices & representatives & for distributor listings.'

CTS FABRI-TEK CONNECTOR, INC., 400 Cokato St., Cokato, MN 55321, Tel: 612-941-9100

Refer to CTS Corp., Elkhart, IN, for sales offices and representatives and for distributor listings.

CTS PRINTEX, INC., Circuits Division, 47010 Kato Rd., Fremont, CA 94538, Tel: 415-659-1770

Refer to CTS Corp., Elkhart, IN, for sales offices and representatives and for distributor listings.

CTS CORPORATION, Tool, Die & Machine Division, 3000 Engle Rd., Fort Wayne, IN 46809, Tel: 219-747-0531

Refer to CTS Corp., Elkhart, IN, for sales offices and representatives and for distributor listings.

CUESTA SYSTEMS, INC., 3440 Roberto Ct., San Luis Obispo, CA 93401, Tel: 805-541-4160; *Sls. Mgr.:* David V. Dickey

CUPLEX, INC., 1500 E. Hwy. 66, Garland, TX 75040, Tel: 214-276-0333, TWX: 910-860-5098; *Sls. Mgr.:* Grady C. Young

CURRENTECHNOLOGY CORP., 135 Prestige Pk. Circle, E. Hartford, CT 06108, Tel: 203-289-6831, TWX: 710-425-6063; *Sls. Mgr.:* Bob Ramage

CURRENT TECHNOLOGY, INC., 1400 S. Sherman, #202, Richardson, TX 75081, Tel: 214-238-5300; *Sls. Mgr.:* Barry Epstein; *Dist. Mgr.:* Peter Diamond

CURTIS ELECTRO DEVICES, INC., Box 4090, Mountain View, CA 94040, Tel: 415-964-3846; Empl.: 12; *Sls. Mgr.:* J. Curtis

CURTIS INDS., 8000 West Tower Ave., Milwaukee, WI 53223, Tel: 414-354-1500, TWX: 910-262-3035; FSC No.: 73631; Empl.: 160; *Sls. Mgr.:* P. J. McDonnell; *Dist. Mgr.:* A. M. Hungsberg .... **A•1599; C•1178; D•1978**

Local Sales Offices & Reps

AL	Huntsville, K & E Assocs.	205-883-9720
AZ	Scottsdale, Memco Sls., Inc.	602-952-2254
AR	Hot Springs, Automation Supp., Inc.	501-767-5444
CA	Fullerton, GRU Assocs.	714-738-0903
CA	Santa Clara, Gagner-Toomey Assocs., Inc.	408-244-2200
CO	Parker, TMA/COLORADO	303-841-3435
CT	Milford, Sales Engrg.	203-877-2001
CT	New Fairfield, Sales Engrg. Co.	203-746-5604
FL	Altamonte Springs, Lawrence Assocs.	305-339-3855
FL	Boca Raton, Lawrence Assocs.	305-368-7373
FL	Clearwater, Lawrence Assocs.	813-584-8110
FL	W. Melbourne, Lawrence Assocs.	305-724-8294
GA	Doraville, K & E Assocs.	404-448-7025
IL	Downers Grove, Richmar Elctrns. Corp.	312-968-0118
MD	Gaithersberg, Naudain Assocs., Southern	301-258-5040
MI	Farmington Hills, W. R. Hummon & Assocs. Inc.	313-474-0661
MN	Spring Lake Park, Holmgren Assocs. Inc. of MN	612-786-7641
MO	Kansas City, Delltron Co., Inc.	816-436-6445
MO	St. Louis, Delltron Co., Inc.	314-869-4779
NH	Salem, Sales Engrg. Co.	603-893-5521
NJ	Manville, DynoRep, Inc.	201-685-0135
NJ	Marlton, Naudain Assocs.	609-235-1801
NY	Rochester, Ossmann Comp. Sls.	716-424-4460
NY	Syracuse, Ossmann Comp. Sls.	315-455-6611
NY	Vestal, Ossmann Comp. Sls. Corp.	607-754-3264
NC	Raleigh, Crossroads Elctrn. Assocs.	919-362-4099
OH	Aurora, Nationwide Comps., Inc.	216-425-3896
OH	Carmel, Nationwide Comp., Inc.	317-872-7207
OH	Dayton, Nationwide Comps., Inc.	513-299-5174
OH	Willoughby, Nationwide Comp.	216-946-3226
OR	Portland, Electronic Mktg., Inc.	503-252-0610
RI	Warwick, Sales Engrg.	401-738-1319
TN	Signal Mountain, Automation Supp., Inc.	615-866-6623
TX	Arlington, ProComp Sls. Co.	817-640-4336
TX	Houston, ProComp Sls. Co.	713-556-9622
UT	Salt Lake City, TMA/COLORADO	801-483-1009
WA	Redmond, Electronic Mktg. Grp.	206-883-0962
WI	Milwaukee, Richmar Elctrns.	414-781-1730
Can	Ontario, Chartwell Elctrns.	416-477-0400

Local Distributors

AL	Birmingham, M. G. Elctrns. & Equip.	205-328-4525
AL	Montgomery, Southern Controls	205-277-5030
AZ	Phoenix, Dalis Elctrns. Supp.	602-258-8151
AZ	Phoenix, Electro-Comps. Distr.	602-258-2665
AZ	Phoenix, McGraw Edison Co.	602-275-4731
AR	El Dorado, Electra Inc.	501-862-4901
CA	Buena Park, Control Design	714-521-5040
CA	Burlingame, Rose Elctrns.	415-348-2740
CA	Orange, County Wholesale Elec.	714-633-6440
CA	San Carlos, Control Design Supp.	415-592-4806
CA	San Jose, Rose Elctrns.	408-263-9700
CA	Santa Clara, Allied Elctrns.	408-985-2323
CA	Santa Monica, Master Distrs.	213-395-2637
CA	So. San Francisco, Steven Engrg.	415-583-5868
CO	Colorado Springs, Summit Fasteners	303-593-7700
CO	Denver, Integrated Elctrns.	303-534-6121
CT	Fairfield, W.M. Entprs.	203-333-0129
CT	Hartford, Electrical Supp.	203-527-7111
FL	Alta Monte, Control Des. Supp.	305-788-3220
FL	Lakeland, A-A Electric	813-665-6941
FL	Miami, Elctrn. Equip.	305-871-3500
FL	Miami, Hummel Indl. Sls.	305-651-0196
FL	Winter Park, Deanco	305-671-5100
GA	Atlanta, A.C. Equip.	404-451-2747
GA	Atlanta, A-A Electric	404-449-8670
GA	Dalton, Dick Henderson Indl.	404-278-8307
GA	Marietta, Deanco	404-429-0126
GA	Stone Mountain, Control Des. Supp.	404-979-3500
IL	Addison, Lectro Comps.	312-543-1680
IL	Chicago, Electro-Kinetics	312-595-6700
IL	Elgin, Allied Elctrns.	312-697-8200
IL	Elk Grove Village, Nu-Way Elctrns.	312-437-7120
IL	Genoa, Control Des. Supp.	815-784-6515
IL	Hoffman Estates, Control Design	312-882-7232
IL	Palatine, OHM Elctrns.	312-359-5500
IL	Peoria, Klaus Radio & Elec.	309-691-4840
IL	Quincy, Klaus Radio, Inc.	217-223-7560
IL	Rockford, Muntz Elec.	815-968-8866
IN	Elkhart, Elkhart Supp.	219-264-4156
IN	Ft. Wayne, Graham Elec.	219-423-3422
IN	Indianapolis, Control Design	317-788-4559
IN	Indianapolis, Graham Elctrns.	317-634-8202
IN	Indianapolis, Peerless Elctrn.	317-635-2361
IN	Mishawaka, Panel Parts	219-259-0026
IN	South Bend, Koontz-Wagner Elec.	219-232-2051
IN	Wabash, Wabash Elec. Supp.	219-563-4146
IA	Marion, Brenneman & Assocs.	319-377-6394
IA	Marion, Control Des. Supp.	319-373-2923
IA	West Des Moines, Ramco	515-225-6933
KS	Kansas City, Kornfeld-Thorp Elec.	913-321-7070
KS	Wichita, L Comp	316-265-5100
KY	Lexington, American Elec. Supp.	606-353-5664
KY	Louisville, Peerless Elctrn. Equip.	502-637-7677
LA	Harahan, MG Elctrn.	504-733-0070
LA	Lafayette, Ralph's Indl. Elctrns.	318-234-4507
ME	Aberdeen, Harco Elctrns.	301-838-7990
ME	Portland, Leen Co.	207-774-6266
ME	Portland, Rockingham Elec. Supp.	207-772-4614
MD	Gaithersburg, Deanco	301-948-5444
MA	Allston, Apparatus Svc.	617-787-1300
MA	Middleboro, Glynns Elctrns.	617-947-4262
MA	Springfield, T. F. Cushing	413-788-7341
MA	West Springfield, Control Engrg.	413-781-1330
MA	Woburn, Brownell-Electro	617-935-7820
MI	Augusta, Great Lakes Elctrns.	616-731-4156
MI	Detroit, Madison Elec.	313-875-1560
MI	Grand Rapids, S-F Elctrn. Supp.	616-495-0216
MI	Hibbing, NWR Elctrns. Corp.	218-262-5228
MI	Madison Hgts., McNaughton-McKay	313-399-7500
MI	Muskegon, Fitzpatrick Elec. Supp.	616-722-6621
MN	Minneapolis, Control Design	612-721-1628
MN	Minneapolis, Stark Elctrn. Supp.	612-332-1325
MO	Maryland, Lcomp St. Louis	314-291-6200
MO	St. Louis, Control Design	314-426-3150
MO	St. Louis, L Comp, Inc.	314-291-6200
NJ	Englewood, Techn. Elctrn. Distrs.	201-894-0800
NJ	Fairfield, Relay Specialties	201-797-3313
NY	Albany, Adirondack Elctrns.	518-456-0203
NY	Bohemia, Kay Comp.	516-567-7500
NY	Buffalo, Wehle Elec.	716-854-3270
NY	Farmingdale, Pride Elctrns.	516-293-4020
NY	Hempstead, Elctrn. Equip.	516-538-5510
NY	Henrietta, CAM/RPC Ind.	716-334-5510
NY	Ithaca, Deanco, Inc.	607-257-4444
NY	Mamaroneck, Logicomp Elec.	914-698-9332
NY	Rochester, Masline Elctrns.	716-546-5373
NY	Rochester, Wehle Elec.	716-275-0200
NC	Charlotte, Dixie Elctrns.	704-377-5413
NC	Greenboro, Hammond Elec.	919-275-6391
NC	Greensboro, Hammond Elect.	919-275-6391
NC	Winston-Salem, Dixie Elctrns.	919-724-5961
NC	Winston-Salem, Kirkman Elctrns.	919-722-9131
OH	Akron, Akron Elctrn. Supp.	216-773-9183
OH	Cincinnati, Hughes-Peters	513-251-2000
OH	Cleveland, Gateway Megatech	216-944-5801
OH	Columbus, Hughes-Peters	614-294-5351
OH	Columbus, McJunkin Corp.	614-294-3711
OH	Dayton, Esco Inc.	513-226-1133
OH	Toledo, Girkins Elec.	419-243-9238
OH	Warren, REM Elctrn. Supp.	216-373-1300
OH	Wickliffe, Gateway Megatech	216-444-5801
OK	Tulsa, Altair Co.	918-252-5781
OK	Tulsa, Oil Capitol Elctrns.	918-622-8520

PA	Erie, REM Elctrns.	814-453-5626
PA	Malvern, Control Design	215-296-0150
PA	McKean, Advacom	814-476-7774
PA	Philadelphia, Lindley Elec.	215-329-7005
PA	Pittsburgh, CAM/RPC Indl. Elctrns.	412-782-3770
PA	Pittsburgh, Mosebach Elec.	412-488-5000
PA	Yeadon, Earl B. Beach Co.	215-622-2210
PA	York, Electronic Comp.	717-843-8971
SC	Columbia, Dixie Elctrns.	803-779-5332
SC	Florence, Dixie Elctrns.	803-669-8201
SC	Greenville, Dixie Elctrns.	803-232-5357
SC	Greenville, Hammond Elctrns.	803-233-4121
TN	Knoxville, Dixie Elctrns.	615-938-4131
TX	Austin, Active Comp. Tech.	512-452-5254
TX	Austin, Altair Co.	512-837-4970
TX	Dallas, Active Comp. Tech.	214-980-1880
TX	Dallas, Control Design	214-358-1441
TX	Fort Worth, Allied Elctrns.	817-336-5401
TX	Houston, Active Comp. Tech.	713-496-4000
TX	Houston, Altair Co.	713-462-3029
TX	Richardson, Altair Co.	214-231-5166
UT	Salt Lake City, Kimball Elctrn.	801-328-2075
VA	Richmond, Sterling Elctrns.	804-226-2190
WA	Kent, C. B. Parsons & Co.	206-762-7373
WA	Seattle, C. B. Parsons & Co.	206-762-7373
WI	Cedarburg, A-A Electric	414-377-8000
WI	Green Bay, A-A Elec.	414-499-0258
WI	Milwaukee, Marsh Elctrns.	414-475-6000
WI	Milwaukee, Midwestern Elec.	414-449-1500
WI	New Berlin, Control Design	414-784-1015

CURTIS

CURTIS INSTRS., INC., 200 Kisco Ave., Mt. Kisco, NY 10549, Tel: 914-666-2971, TWX: 710-571-2163; FSC No.: 18530; Empl.: 95; *Sls. Mgr.:* Rhoda McDonald ..**D•1117**

Local Sales Offices & Reps

CA	Burlingame, Polach & Bensinger	415-697-2525
CA	Seal Beach, Texel Engrg.	213-596-9411
CO	Littleton, Grifco	303-795-1989
FL	Longwood, NSL Assocs.	305-629-5226
IL	La Grange Park, Bierhaus Sls.	312-354-5100
IN	Ft. Wayne, Aktron Sls.	219-747-3650
MA	Brookline, Harman Assocs.	617-232-6687
MN	Minnetonka, S. J. Collins	612-933-7661
NY	Manhasset, WinCor Elctrn. Sls. Corp.	516-627-9474
OH	Chagrin Falls, K. F. Naverz	216-338-8450
PA	Media, W. Reeves Assocs.	215-566-6709
TX	Dallas, Etron Corp.	817-498-8924
WA	Lynnwood, Blum & Assocs.	206-775-6656
WI	Milwaukee, Bierhaus Sls.	414-963-0318

CUSHMAN ELCTRNS., 2450 N. 1st St., San Jose, CA 95131, Tel: 408-263-8100, TWX: 810-338-0556; Empl.: 400; *Sls. Mgr.:* Harris Fuller

CUSTOM CABLE, 242 Butler, Westbury, NY 11590, Tel: 516-334-3600; Empl.: 15; *Sls. Mgr.:* J. Michelman; *Dist. Mgr.:* D. Pollack

CUSTOM COIL & TRANSFORMER, Box 2369, Zanesville, OH 43701, Tel: 614-452-6973, TWX: 810-238-2629; Empl.: 80

CUSTOM CONNECTOR, 1738 E. 30th St, Cleveland, OH 44114, Tel: 216-241-1679; Empl.: 36; *Sls. Mgr.:* Larry Weider

CUSTOM CONTROL SYS., 21 E. Canon Perdido St., Santa Barbara, CA 93101, Tel: 805-965-7577; Empl.: 2; *Sls. Mgr.:* Fred Winter

CUSTOM ELCTRNS., Browne St., Oneonta, NY 13820, Tel: 607-432-3880, TWX: 510-241-8292; FSC No.: 23280; Empl.: 110; *Sls. Mgr.:* D. Hathaway

Local Sales Offices & Reps

CA	Brea, Masco Elec.	714-529-0866
CA	San Jose, Richards Assocs.	408-297-3010
IL	Chicago, Rozner Sls.	312-283-0022
MD	Ellicot City, Nelson Assocs.	301-747-7887
MA	Stow, Musello Assocs.	617-369-5900
TX	Houston, Custom Elctrns., Inc.	713-686-4874
EXP	NY, Baldwin, Milano Bros. Intl.	516-223-9000

CUSTOM PRODS. GRP., Sys. Dev. Corp.-A Burroughs Co., P.O. Box 517, Paoli, PA 19301, Tel: 215-648-7660, Telex: 215-647-9961, TWX: 510-668-7243; *Sls. Mgr.:* Spiro Greenwood; *Dist. Mgr.:* Sarah Jones-Chambers

CUSTOM SCI. INSTRS., 13 Wing Dr., Cedar Knolls, NJ 07927, Tel: 201-538-8500, Telex: 25-4328; Empl.: 20; *Sls. Mgr.:* Henry J. Bultman, Jr.

CUTLER HAMMER GRP., EATON CORP., Aerospace Controls/Systems Div., 2074 Whitfield Ave. East, Sarasota, FL 33578, Tel: 813-758-7726

CUTLER-HAMMER, INC., SHALLCROSS RESISTOR PRODS., See RCL Shallcross, Inc.

CUTLER-HAMMER PRODS., See Eaton Corp./Cutler-Hammer Prods.

CVC PRODS., 525 Lee Rd., Rochester, NY 14603, Tel: 716-458-2550, Telex: 97-8269; Empl.: 160; *Sls. Mgr.:* Steven Rothstein

CW INDUSTRIES, 130 James Way, Southhampton, PA 18966, Tel: 215-355-7080, Telex: 831470; FSC No.: 79727; Empl.: 450; *Sls. Mgr.:* Keith D. Nelson

CYBERNETIC MICRO SYS., P.O. Box 3000, 3000 Hwy. 84, San Gregorio, CA 94074, Tel: 415-726-3000, Telex: 171-135 Attn: CYBERNETICS; *Sls. Mgr.:* K. Moty

CYBERSONIC CORP., Box 38, Glenside, PA 19038, Tel: 215-885-1734, Telex: 83-4753; Empl.: 11; *Sls. Mgr.:* Norman Rivers

CYBERSYSTEMS, INC., 7540 South Memorial Pkwy., Huntsville, AL 35802, Tel: 205-883-4410; FSC No.: 66; Empl.: 25; *Sls. Mgr.:* Mike Long

CYBER SYS., INC., 2031 E. Cerritos Ave., Anaheim, CA 92806, Tel: 714-722-2051, Telex: 692-375; *Sls. Mgr.:* Charles Muhle

CYCLO-TRONICS, INC., 1345 N. Old Rand Rd., Wauconda, IL 60084, Tel: 312-526-0800; Empl.: 10

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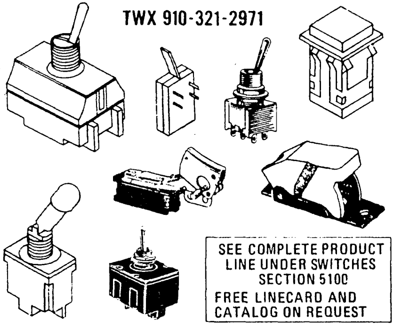

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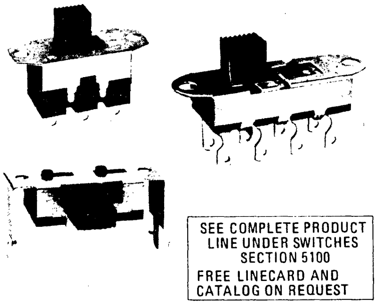

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CYTEC CORP., 107 N. Washington St, E. Rochester, NY 14445, Tel: 716-381-4740; *Sls. Mgr.:* Harry Turner .... **D•1207**

Local Sales Offices & Reps

MA	Burlington, Tritek	617-272-4550
NY	Frankfort, Kapital Sls.	315-896-4225

DABURN ELCTRNS. & CABLE, 70 Oak St, Norwood, NJ 07648, Tel: 201-768-5400, TWX: 710-991-9856; FSC No.: 25706; *Sls. Mgr.:* Randy Hibshman ...**C•1828-1837**

Local Sales Offices & Reps

CA	Anaheim, Galaxie Sls.	714-752-1580
CA	Palo Alto, Reliable	415-494-3266
CO	Aurora, Sage Sls.	303-750-3501
FL	Casselberry, H A, Inc.	305-695-8592
FL	Coral Springs, H A, Inc.	305-752-7520
GA	Atlanta, Eff Mktg. Force	404-948-6023
IL	Elgin, Markar Sls.	312-888-2207
IN	Carmel, STB & Assocs.	317-844-9227
LA	Kenner, Assoc. Mktg. Grp.	504-443-5072
MA	No. Scituate, W. A. Hendrickson	617-545-0652
MI	Grand Rapids, Carl Orwant Assocs.	616-241-4927
MN	Minneapolis, R. K. Sls.	612-786-5713
MO	Raytown, Marty Taraski	816-358-1442
NY	N.Y.C., Robt. Smith Assocs.	212-541-4885
NY	Plainview, Robt. Smith Assocs.	516-681-3155
OH	Cincinnati, John Olsen Co.	513-574-7711
OH	Goshen, John Olsen Co.	513-722-1497
OR	Hillsboro, Rhodes Sls.	503-640-6666
PA	King of Prussia, Freedman-Malta	215-337-9211
PA	Pittsburgh, John Olsen Co.	412-279-2550
TX	Dallas, Assoc. Mktg. Grp.	214-241-7190
VA	Arlington, Howard Golonpaul & Assocs.	703-525-5898
Can	Montreal, Que., Avotronics	514-697-2135

DADEN ASSOCS., 23011 Moulton Pkwy., Ste. A12, Laguna Hills, CA 92653, Tel: 714-770-1522, TWX: 910-596-1324; FSC No.: 57032; Empl.: 26; *Sls. Mgr.:* Dennis Hook

Local Sales Offices & Reps

CA	Los Angeles, McDougall-McLaughlin	213-477-8556
CA	Saratoga, E. Reid Miller Corp.	408-257-6927
FL	Winter Park, Microwave Mktg.	305-678-2141
MA	Chelmsford, BBC	617-256-6593
TX	Dallas, Southwest Microwave Elctrns.	214-669-1195

DAICO INDUSTRIES, INC.

DAICO INDS., INC., Box 5225, Compton, CA 90224, Tel: 213-631-1143, TWX: 910-346-6741; FSC No.: 28983; Empl.: 170; *Sls. Mgr.:* James Adamson ... **A•1708-1709**

Local Sales Offices & Reps

AZ	Phoenix, Faser Tech. Sls.	602-948-4404
CA	Los Altos, Cain-White & Co.	415-948-6533
CA	Los Angeles, Midwin & Olifson	213-838-3455
CA	San Diego, Midwin & Olifson, Inc.	619-571-0177
FL	Palm Bay, Spartech Assocs.	305-727-8045
GA	Smyrna, Spartech Assocs.	404-446-7300
IL	Mt. Prospect, Cain-Forlaw Co.	312-253-3578
ME	Ogunquit, Micronic Assocs.	617-933-2121
MD	Burtonsville, Eastern Instrmn.	301-384-8500
NJ	Hackensack, Technical Mktg. Assocs.	201-342-4008
OH	Lancaster, Cain-Forlaw Co.	614-654-4800
PA	Newtown Square, SWR Assocs.	215-353-6711
TX	Dallas, McDonald Assocs.	214-238-1858

DAI-ICHI SHOJI OF AMER., INC., 150 Fifth Ave., New York, NY 10011, Tel: 212-691-9050, Telex: 429120 DSANY; Empl.: 3; *Sls. Mgr.:* A. Takayama ......**A•1071; B•1548-1549; C•1179**

DALE ELECTRONICS, INC., Columbus Div., Box 609, 2064 12th Ave., Columbus, NE 68601, Tel: 402-564-3131; FSC No.: 91637; Empl.: 2800; *Sls. Mgr.:* Darrel Smejkal; *Dist. Mgr.:* Jerry Jilek .... **B•1025-1027**

Local Sales Offices & Reps

AL	Huntsville, JWL Assocs.	205-883-1712
AZ	Tempe, Dale Elctrns. Sls.	602-966-0291
CA	Los Alamitos, Reed Elctrn. Mktg.	213-598-6676
CA	Redwood City, J. S. Heaton Co.	415-367-9000
CA	San Diego, Reed Elctrn. Mktg.	619-452-1456
CO	Loveland, Dale Elctrns. Sls.	303-667-7500
FL	Lake Park, Graham Assocs.	305-622-4049
FL	Melbourne, Graham Assocs.	305-773-6631
FL	Winter Garden, Graham Assocs.	305-656-9369
GA	Marietta, JWL Assocs.	404-429-8010
ID	Boise, LD Elctrns.	208-343-2741
IL	Chicago, Indl. Reps.	312-647-7755
IN	Fort Wayne, Scott Elctrns.	219-484-7865
IN	Indianapolis, Scott Elctrns.	317-897-9976
KS	Shawnee Mission, Dale Sls.	913-432-9140
MD	Glen Burnie, Tri-Mark	301-761-6000
MA	Wakefield, Howard C. Jappe Co.	617-245-9359
MI	Plymouth, Jay Mktg. Assocs.	313-459-1200
MN	Bloomington, Merrill Franklin Co.	612-854-9446
MO	St. Louis, Industrial Reps., Inc.	314-227-7401
NJ	Fairlawn, Kaelber & Mack	201-797-7782
NY	Commack, Kaelber & Mack	516-499-2924
NY	Ithaca, Dale Elctrns. Sls.	607-272-6212
NC	Pineville, JWL Assocs.	704-541-5750
NC	Raleigh, JWL Assocs.	919-787-4826
OH	Cincinnati, Scott Elctrns.	513-791-2513
OH	Cleveland, Scott Elctrns.	216-473-5050
OH	Dayton, Scott Elctrns., Inc.	513-294-0539
OH	Reynoldsburg, Scott Elctrns.	614-863-1281
OR	Beaverton, LD Elctrns.	503-649-6177
PA	Horsham, TMI	215-441-4300
PA	Pittsburgh, Scott Elctrns.	412-963-6116
TX	Dallas, E. F. Aymond Co.	214-826-7620
TX	Houston, E. F. Aymond Co.	713-880-8229
TX	San Antonio, E. F. Aymond Co.	512-366-1526
WA	Snohomish, LD Elctrns.	206-568-0511
WA	Spokane, LD Elctrns.	509-922-4883
WI	Milwaukee, Indl. Reps.	414-259-0965

Local Distributors

AL	Huntsville, Hamilton/Avnet	205-837-7210
AZ	Phoenix, T.T.I., Inc.	602-861-0222
AZ	Tempe, Acacia Sls., Inc.	602-894-2874
AZ	Tempe, Hamilton/Avnet	602-231-5100
AZ	Tempe, Shelley Elctrns.	602-894-2058
CA	Chatsworth, Avnet Elctrns.	818-700-6264
CA	Chatsworth, Hamilton/Avnet	818-700-6536
CA	Chatsworth, Shelly Elctrns.	818-998-3333
CA	Chatsworth, T.T.I., West	818-709-1010
CA	Costa Mesa, Avnet Elctrns.	714-754-6021
CA	Costa Mesa, Hamilton Electro Sls.	714-641-4100
CA	Culver City, Hamilton Electro Sls.	213-558-2883
CA	Culver City, Hamilton/Avnet	213-558-2662
CA	Huntington beach, Inductor Supp., Inc.	714-891-4524
CA	Irvine, Acacia Sls.	213-971-2428
CA	Ontario, Hamilton/Avnet	714-989-8816
CA	Sacramento, Hamilton/Avnet	916-920-3150
CA	San Diego, Anacia Sls., Inc.	619-565-4365
CA	San Diego, Hamilton/Avnet	619-571-7536
CA	San Diego, Shelley Elctrns.	619-453-7133
CA	San Jose, Shelley Elctrns.	408-942-9111
CA	San Jose, T.T.I., Inc.	408-943-9155
CA	Sunnyvale, Acacia Sls.	408-745-7200
CA	Sunnyvale, Hamilton/Avnet	408-734-3358
CO	Boulder, Shelley Elctrns.	303-442-2718
CO	Commerce City, Waco Elctrns.	303-289-4743
CO	Denver, Newark Elctrns.	303-757-3351
CO	Englewood, Hamilton/Avnet	303-740-1020
CO	Lakewood, Acacia Sls., Inc.	303-232-2882
CT	Danbury, Hamilton/Avnet	203-797-2802
CT	Stratford, Electro/Comp.	203-375-5811
FL	Ft. Lauderdale, Hamilton/Avnet	305-979-5211
FL	Orlando, T.T.I., II	305-859-1000
FL	Palm Beach Gardens, Legri S. Resistor	305-845-7101
FL	St. Petersburg, Hamilton/Avnet	813-576-3930
FL	Tampa, Shelley Elctrns., Inc.	813-884-0946
FL	Winter Park, Hamilton/Avnet	305-628-3888
GA	Atlanta, Specialty Distr. Co., Inc.	404-873-2521
GA	Norcross, Hamilton/Avnet	404-447-7504
GA	Norcross, T.T.I., Inc.	404-662-0911
IL	Bensenville, Hamilton/Avnet	312-860-8558
IL	Chicago, Bell Ind.	312-982-9210
IL	Chicago, Newark Elctrns.	312-638-4411
IL	Crystal Lake, Sub-Sem	815-459-4139
IL	Palatine, Ohm Elctrns.	312-359-5500
IN	Carmel, Hamilton/Avnet	317-844-9333
IN	Ft. Wayne, Graham Elctrns.	219-423-3422
IN	Indianapolis, Graham Elec.	317-634-8202
IA	Cedar Rapids, Deeco, Inc.	319-365-7551
IA	Cedar Rapids, Hamilton/Avnet	319-362-4757
KS	Overland Park, Hamilton/Avnet	913-541-7922
MD	Beltsville, RESCO	301-937-9100
MD	Columbia, Hamilton/Avnet	301-995-3525
MD	White Marsh, RESCO	301-529-0500
MA	Billerica, A. W. Mayer Co.	617-229-2255
MA	Waltham, Sterling Elctrns.	617-894-6200
MA	Woburn, Hamilton/Avnet	617-273-7562
MA	Woburn, T.T.I.	617-938-8800
MI	Grand Rapids, Hamilton/Avnet	616-243-8805
MI	Grand Rapids, S-F Elctrn. Supp.	616-459-0216
MI	Livonia, Hamilton/Avnet	313-522-4700
MI	Livonia, R-S Elctrns.	313-525-1155
MI	Livonia, Reptron Elctrns.	313-525-2700
MI	Oak Park, Newark Elec.	313-967-0600
MN	Minneapolis, Stark Elctrns.	612-332-1325
MN	Minnetonka, Hamilton/Avnet	612-932-0674
MO	Earth City, Hamilton/Avnet	314-344-1254
NH	Manchester, Hamilton/Avnet	603-524-9400
NJ	Cherry Hill, Hamilton/Avnet	609-424-0117
NJ	Cranford, G.S.I. Elec.	201-272-6400
NJ	Fairfield, Hamilton/Avnet	201-575-3490
NJ	Kenilworth, Federated Purchaser	201-272-0505
NM	Albuquerque, Hamilton/Avnet	505-765-1500
NY	Bohemia, Shelley Elctrns., Inc.	516-567-7751
NY	Bohemia, L.I., T.T.I., New York	516-567-1500
NY	Buffalo, Summit Distr.	716-884-3450
NY	E. Syracuse, Hamilton/Avnet	315-437-2641
NY	Endwell, A.S.I. Elctrns.	607-754-3823
NY	Farmingdale, Command Elctrns.	516-293-1212
NY	Hauppauge, Fairmont	516-231-3313
NY	Hauppauge, Hamilton/Avnet	516-231-9800
NY	Rochester, Hamilton/Avnet	716-475-9130
NY	Rochester, Simcona Elctrns.	716-328-3230
NY	Rome, Rome Elctrns.	315-337-5400
NY	Valley Stream, L&S Elctrns.	516-561-2474
NY	W. Hempstead, March Elctrns.	516-486-6511
NC	Raleigh, Hamilton/Avnet	919-878-0819
NC	Raleigh, RESCO	919-781-5700
NC	Winston-Salem, Kirkman Elctrns.	919-722-9131
OH	Cleveland, Hamilton/Avnet	216-831-3500
OH	Cleveland, Pioneer Standard	216-587-3600
OH	Dayton, Hamilton/Avnet	513-439-6700
OH	Dayton, Pioneer Standard	513-236-9900
OH	Dayton, Stotts-Friedman Co.	513-298-5555
OH	Westerville, Hamilton/Avnet	614-882-7004
OK	Tulsa, Radio, Inc.	918-587-9123
OR	Beaverton, Acacia Sls.	503-646-3377
OR	Lake Oswego, Hamilton/Avnet	503-635-8831
OR	Portland, Radar Elec.	503-232-3404
PA	McKean, Advacom	814-476-7774
PA	Philadelphia, Herbach & Rademan	215-426-1700
PA	Pittsburgh, CAM/RPC	412-782-3770
PA	Pittsburgh, Hamilton/Avnet	412-281-4150
PA	York, E.C.I., Inc.	717-846-5334
TX	Austin, Hamilton/Avnet	512-837-8911
TX	Dallas, Sterling Elctrns.	214-243-1600
TX	Ft. Worth, T.T.I., Inc.	817-831-0441
TX	Houston, Hamilton/Avnet	713-975-3516
TX	Houston, Lenert Co.	713-225-1465
TX	Houston, Sterling Elctrns.	713-627-9800
TX	Irving, Hamilton/Avnet	214-659-4111
UT	Salt Lake City, Hamilton/Avnet	801-972-2800
WA	Bellevue, Hamilton/Avnet	206-453-5842
WA	Seattle, Radar Elec.	206-282-2511
WI	Milwaukee, Marsh Elctrns.	414-475-6000
WI	New Berlin, Hamilton/Avnet	414-784-4510

DALE ELECTRONICS, INC., El Paso Div., P.O. Box 26728, El Paso, TX 79926, Tel: 915-592-3253; FSC No.: 91637; Empl.: 272; *Sls. Mgr.:* Douglas Wagenknecht; *Dist. Mgr.:* Jerry Jilek .... **A•1845-1863**

Refer to Dale Electronics, Inc., Columbus, NE for sales office and distributor information.

DALE ELECTRONICS, INC., Norfolk Div., 2300 Riverside Blvd., Norfolk, NE 68701, Tel: 402-371-0080; FSC No.: 91637; Empl.: 1200; *Sls. Mgr.:* Jim Filips; *Dist. Mgr.:* Jerry Jilek .... **B•1748-1749**

Refer to Dale Electronics, Inc., Columbus, NE for sales office and distributor information.

DALE ELECTRONICS, INC., Tempe Div., 1155 W. 23rd St., Tempe, AZ 85282, Tel: 602-967-7874; FSC No.: 22929; Empl.: 139; *Sls. Mgr.:* Mike Brown; *Dist. Mgr.:* Jerry Jilek .... **A•1358-1359**

Refer to Dale Electronics, Inc., Columbus, NE for sales office and distributor information.

DALE ELECTRONICS, INC., Yankton Div., E. Hwy. 50, Box 180, Yankton, SD 57078, Tel: 605-665-9301; FSC No.: 09969; Empl.: 400; *Sls. Mgr.:* John Elliot; *Dist. Mgr.:* Jerry Jilek .... **A•1231-1237, 2125-2132; C•1180-1183**

Refer to Dale Electronics, Inc., Columbus, NE for sales office and distributor information.

DALE WESTERN THERMISTOR DIVISION, See Dale Norfolk Division

DAMON/ELCTRNS. DIV., 80 Wilson Way, Westwood, MA 02090, Tel: 617-329-2460, TWX: 710-348-6722; Empl.: 90; *Sls. Mgr.:* Edward J. Doherty .... **A•1360**

Local Sales Offices & Reps

AZ	Phoenix, Sanford Sls. Assocs.	602-957-3570

CA	N. Hollywood, Jewett Co.	213-789-8103
CA	Palo Alto, Waldman Assocs.	415-961-4100
DC	Washington, Stemler Assocs.	301-944-8262
FL	Melbourne, Repcom	305-254-1877
MD	Baltimore, Stemler Assocs.	301-944-8262
MA	Waltham, Del Tech Sls.	617-890-1020
NJ	Cherry Hill, Stemler Assocs.	609-966-4070
NJ	Hackensack, T.M.A. Assoc.	201-342-4008
NY	Cazenovia, S. T. Wollard Co.	315-655-8145
TX	Ft. Worth, El-Tec Sls.	817-268-2896

D & B POWER, INC.

D & B POWER, INC., 204 N. Fehr Way, P.O. Box 40M, Bayshore, NY 11706, Tel: 516-586-5955; FSC No.: 54337; Empl.: 25; *Sls. Mgr.:* Gordon Best; *Dist. Mgr.:* Dan Hall .... **D•1610-1611**

Local Sales Offices & Reps

CA	Pasadena, Electro Mecha. Instrs.	818-795-7193
CA	Sunnyvale, Schwerin & Merrill	408-735-7900
MD	Randallstown, Beacon North, Inc.	301-655-2265
NY	Cortland, Net Sls. Co.	607-756-6592
NY	DeRuyter, Net Sls. Co.	315-662-7996
NY	East Setauket, Edgerton Elctrn.	516-751-7089
NY	Fairport, Net Sls. Co.	716-467-4538
NY	Troy, Net Sls. Co.	518-274-4758
VA	Fairfax, Beacon North, Inc.	703-591-1300

Local Distributors

MA	Shannon, Adcour, Inc.	617-784-8123

D & L SALES CO. INC., 296 Preakness Ave., Paterson, NJ 07502, Tel: 201-684-8223/8224; Empl.: 10

DMC DANIELS MANUFACTURING CORPORATION

DANIELS MFG. CORP., 6103 Anno Ave., Orlando, FL 32809, Tel: 305-855-6161, Telex: 564321; FSC No.: 5935; Empl.: 150; *Sls. Mgr.:* John Jago-Ford; *Dist. Mgr.:* Tina Holder .... **C•1741**

Local Sales Offices & Reps

AZ	Scottsdale, Nelligan Co.	602-990-1415
CA	Irvine, DMC Western Sls. Off.	714-660-1901
CO	Englewood, Nelligan	303-761-2121
CT	Orange, DMC Northeastern Sls. Off.	203-799-2343
FL	Zephyrhills, Tool Tronics & Hydrospace	813-782-7177
TX	Fort Worth, Wadco	817-284-4445
UT	Salt Lake City, Nelligan Co.	801-261-1121
WA	Redmond, Pan Pacific Electronics	206-881-7252

Local Distributors

CA	Burbank, Stratos, Inc.	213-245-8914
CO	Englewood, Columbine Fabricators	303-761-2121
CT	Hamden, Connector Company	203-288-0044
FL	Zephyrhills, Tool Tronics & Hydrospace	813-782-7177
NJ	South River, Da-Green Electronics	201-254-2735
TX	Fort Worth, Wadco	817-284-4445
WA	Redmond, Pan Pacific Electronics	206-881-7252
Can	Ontario, Patlon Aircraft	416-624-5572

DAN-L INC., 229 Laurel Rd., E. Northport, NY 11731, Tel: 516-757-8000; FSC No.: 28327; Empl.: 22

DANMAR INDS., 9705 Lurline Ave., Chatsworth, CA 91311, Tel: 818-882-7979/5280; FSC No.: 31690; Empl.: 6; *Sls. Mgr.:* Mukund Patel

DANTEL, 2991 N. Argyle Ave., Fresno, CA 93727, Tel: 209-292-1111, Telex: 35-5457; FSC No.: 56960; Empl.: 110; *Sls. Mgr.:* Peter Normandin

DANTRONICS, INC., 3175 Hafner Ct., St. Paul, MN 55112, Tel: 612-484-2108; Empl.: 22

DASH, STRAUS & GOODHUE, INC., 593 Massachusetts Ave., Boxboro, MA 01719, Tel: 617-263-2662; Empl.: 7; *Sls. Mgr.:* Ira Barry

DASOFT DESIGN SYSTEMS, INC., 2550 9th St. #113, Berkeley, CA 94710, Tel: 415-486-0822; Empl.: 8

DATABASE DESIGN INC., 2020 Hogback Rd., Ann Arbor, MI 48104, Tel: 313-971-5363, TWX: 810-223-2412; FSC No.: 7030-0003; Empl.: 35; *Sls. Mgr.:* Terry R. McGown

DATA, INC., 7702 Emerald Ave., Box 2071, Ft. Collins, CO 80525, Tel: 303-493-1222; Empl.: 3; *Sls. Mgr.:* Sharon Shilling; *Dist. Mgr.:* Sharon Shilling

D.A.T.A., INC., Cordura Co., P.O. Box 26875, San Diego, CA 92126, Tel: 619-578-7600, TWX: 910-322-1340; Empl.: 39

DATA CAPTURE TECHNOLOGY, Hathaway Instruments, 5436-F South Mingo Rd., Tulsa, OK 74146, Tel: 918-627-7521, Telex: 796355; FSC No.: 7E812; Empl.: 50; *Sls. Mgr.:* Gary DeShazer; *Dist. Mgr.:* Gary DeShazer

DATA CHECK CORP., 10070 Willow Creek Rd., San Diego, CA 92131, Tel: 619-578-0101, TWX: 910-335-1596; FSC No.: 55792; *Sls. Mgr.:* Al Agent

DATACHRON INC., 3186 J Airway Ave., Costa Mesa, CA 92626, Tel: 714-751-2211, Telex: 678401; FSC No.: 56259; Empl.: 16; *Sls. Mgr.:* Clyde Davis

DATACOM, INC., Box 278, Ft. Walton Beach, FL 32548, Tel: 904-244-6121, TWX: 510-730-7693; Empl.: 50

dataCon

DATACON, INC., 60 Blanchard Rd., Burlington, MA 01803, Tel: 617-273-5800, Telex: 951651; FSC No.: 617 273 4809; Empl.: 400; *Sls. Mgr.:* Stephen J. Day .... **C•1705**

Local Sales Offices & Reps

AZ	Phoenix, Cristee - Meade Co.	602-867-6000
CA	Chatsworth, DataCon	818-700-0600
CA	Mountain View, DataCon	415-967-5700
CA	Santa Clara, DC Elctrns.	408-980-1199
CO	Lakewood, Christee - Meade Co.	303-232-0287
FL	Orlando, Mackay Smith & Assocs.	305-423-4353
GA	Decatur, DataCon	404-373-1212
GA	Norcross, Mackay Smith	404-449-7444
IL	Lisle, W. G. Controls	312-963-5954
IL	Schaumburg, DataCon	312-529-7690
IN	Indianapolis, CC Elctrns., Inc.	317-255-1508
MA	Burlington, DataCon	617-273-5800
MN	St. Paul, Countryman Assocs.	612-645-9151
NY	Bohemia, DataCon	516-589-1100
NC	Cary, Mackay Smith	919-467-5400
PA	Newton Square, Hagy Assocs.	215-459-0504
TN	Chattanooga, Mackay Smith	615-899-6951
TX	Carrollton, DataCon	214-245-6161
TX	Richardson, Lear Assocs.	214-231-5388
WA	Seattle, Gompf & Assocs.	206-575-6999

DATA-CONTROL SYS., Commerce Dr., Box 860, Danbury, CT 06810, Tel: 203-743-9241, TWX: 710-456-0376; FSC No.: 08539; Empl.: 87

DATA CONVERSION, See Analogic Corp., Data Conversion Prods. Grp.

DATACOPY CORP., 1215 Terra Bella Ave., Mountain View, CA 94043, Tel: 415-965-7900, Telex: 701994 DATACOPY UO; Empl.: 75; *Sls. Mgr.:* Charles Joseph

data delay devices, inc.®

DATA DELAY DEVICES, 385 Lakeview Ave., Clifton, NJ 07011, Tel: 201-772-1106 .... **A•1489-1501**

Local Sales Offices & Reps

AZ	Phoenix, Tech Sls., Inc.	602-246-1614
CA	El Toro, Martronix	714-858-0632
CA	Mountain View, Weseloh/Swanson & Assocs.	415-961-0565
GA	Stone Mountain, Mountain Electro Prods., Inc.	404-448-5594
MA	Woburn, Radian Assocs., Inc.	617-933-7386
TX	Irving, IMPAQ Sales Co.	214-257-3677

Local Distributors

CA	Sunnyvale, Target Elctrns.	415-961-1170

DATA-DESIGN LABS., P.O. Box 711, 7925 Center Ave., Cucamonga, CA 91730, Tel: 714-987-2511; Empl.: 1300; *Sls. Mgr.:* M. L. Sneller

DATA DEVICE CORP., See ILC Data Device Corp.

DATA DISPLAY PRODUCTS, Box 91072, Los Angeles, CA 90009, Tel: 213-640-0442, Telex: 664690; FSC No.: 15513; Empl.: 20; *Sls. Mgr.:* William F. Million

DATADYNE, Box 247, King of Prussia, PA 19406, Tel: 215-666-5751; FSC No.: 53032; Empl.: 23; *Sls. Mgr.:* James Riggs

DATA ENGINEERING, INC., 2515 N. State Rd. 7 Ste. 207, Margate, FL 33063, Tel: 974-7861

DATA GENERAL, 4400 Computer Dr., Westboro, MA 01581, Tel: 617-366-8911, Telex: 920-329, TWX: 710-390-1217; Empl.: 18,000; *Sls. Mgr.:* Frank Keaney

DATA INSTRUMENTS, INC., 4 Hartwell Pl., Lexington, MA 02173, Tel: 617-861-7450, TWX: 200081; Empl.: 250; *Sls. Mgr.:* Ernest C. Lutfy .... **B•1790**

Local Sales Offices & Reps

CA	Riverside, Jim Mitchell	714-684-6404
CA	San Carlos, Elctrn. Engrg. Assocs.	415-593-2189
CO	Boulder, Herb Bass Assocs.	303-530-7509
GA	Decatur, Bandy & Co.	404-296-1027
HI	Kihei, Aloha Assocs.	808-879-5296
MO	Kansas City, Delltron Co.	816-436-6445
MO	St. Louis, Delltron Co.	314-869-4779
NY	Buffalo, The Robert F. Lamb Co.	
OH	Mansfield, Bob Young	419-522-3738
PA	Broomall, Robert Snyder	215-356-1418
TX	Dallas, Griffin Sls.	214-234-5013
UT	Bountiful, Herb Bass Assocs.	801-295-7100
WA	Redmond, S.E.A. Sls.	206-883-4999
WA	Vancouver, S.E.A. Sls.	206-573-5161
Can	Don Mills, Ontario, Intertechnology	416-445-5500

DATA I/O CORP., 10525 Willows Rd. N.E., Redmond, WA 98073-9746, Tel: 206-881-6444, Telex: 15-2167; Empl.: 550

Local Sales Offices & Reps

CA	Costa Mesa, Data I/O	714-662-1182
CA	Santa Clara, Data I/O	408-727-0641
NH	Nashua, Data I/O	603-889-8511

DATAK CORP., 65 Seventy-First St., Guttenberg, NJ 07093, Tel: 201-869-2200; *Sls. Mgr.:* Theresa Pflueger .... **C•1100, 1590, 1838**

Local Sales Offices & Reps

CA	Burlingame, Polach & Bensinger	415-697-2525
CA	West Covina, Don Forth Assocs.	213-919-2322
CO	Broomfield, Conners Co.	303-466-9628
FL	Bradenton, T. G. & Assocs.	813-753-5632
GA	Roswell, Henry W. Phillips Co.	404-992-3070
IL	Wheaton, Archie Joyner Assocs.	312-665-6662
IN	Indianapolis, Elmarcon, Inc.	317-846-0221
MI	Grand Blanc, Inter-Comm, Inc.	313-695-0666
MN	Minneapolis, Kodo Assocs.	612-881-1255
MO	Raytown, Marty Taraski Sls.	816-358-1442
NJ	Teaneck, Steve Fisher Sls.	201-837-1200
NY	Rochester, Warren Kaufman & Assocs.	716-266-2728
NC	Matthews, Henry W. Phillips Co.	704-882-2878
OH	Cuyahoga Falls, Buckeye Mktg. Grp.	216-929-6536
PA	Library, Buckeye Mktg. Grp.	412-854-5727
RI	Coventry, Adams-McGregor	401-821-1320
RI	Lincoln, Adams-McGregor	401-726-1300
TX	Dallas, J & J Sls. Co.	214-328-9739
WA	Woodenville, McLaughlin Long, Inc.	206-743-1161

Local Distributors

AL	Birmingham, Forbes Distrbg.	205-251-4104
AK	Anchorage, Alaska Elctrns. Supp.	907-563-3774
AZ	Phoenix, Tri-Tek	602-995-9352
AZ	Tucson, Inland Elctrns.	602-889-5301
CA	Berkeley, Al Lasher's Elec.	415-843-5915
CA	Canoga Park, Sandy's Elec.	213-346-8353
CA	Chatsworth, Priority One Elctrns.	818-709-5464
CA	El Cerrito, Trumbull Co.	415-525-7242
CA	Palo Alto, Zack Elctrns.	415-326-5432
CA	San Francisco, Zack Elctrns.	415-626-1444
CA	San Jose, Quement Elctrns.	408-998-5900
CO	Boulder, Boulder Whls. Elctrns.	303-530-1666
CT	Greenwich, Wise Comps.	203-531-4880
CT	Hartford, Hatry Elec.	203-527-1881
CT	Wallingford, Tron Town U.S.A.	203-237-5598
FL	Miami, Elctrn. Equip.	305-871-3500
FL	Orlando, Sun Elctrns.	305-841-4650
FL	St. Petersburg, Knapp of Florida	813-392-0406
GA	Atlanta, Ack Elctrn. Supp.	404-351-6340
GA	Atlanta, Specialty Distrb. Co.	404-873-2521

HI	Honolulu, Honolulu Elec.	808-949-5564
IL	Berwyn, B-B & W, Inc.	312-749-1710
IL	Mt. Prospect, Tri-State Elec.	312-255-0600
IL	Niles, Joseph Elec.	312-297-4200
IL	Northbrook, Reproduction Specialists	312-564-0404
IN	Evansville, Hutch & Son	812-425-7201
IN	Indianapolis, Graham Elec.	317-634-8202
IA	Cedar Rapids, Deeco, Inc.	319-365-7551
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MO	St. Louis, Van Sickle	314-621-5000
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NV	Reno, Elect. Distr. Co.	702-323-2766
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NH	Hudson, C & H Elec.	603-882-1133
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NJ	Ringoes, Scientific Inst. Svcs.	201-788-5550
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OR	Beaverton, Norvac Elec.	503-644-1025
OR	Portland, Portland Radio Supp.	503-228-8647
PA	Braddock, Leff Elctrns.	412-351-5000
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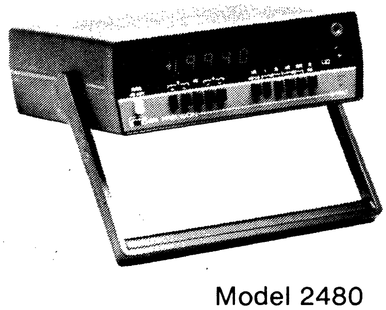

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PA	Horsham, RM Elctrns.	215-674-1181
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TX	Dallas, A.C.T./Diplomat	214-980-1888
TX	Dallas, RM Elctrns.	214-869-2080
TX	Houston, A.C.T./Diplomat	713-975-8447
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WI	New Berlin, RM Elctrns.	414-784-4420

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NY	Pittsford, KLM-Garner	716-381-8350
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NC	Charlotte, MacKay, Smith & Assocs.	704-372-1188
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TX	Denton, Automated Motion Control	817-382-4159
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WA	Vancouver, Al Smith Co.	206-892-9912
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FL	Orlando, Col-Ins-Co.	800-432-4480
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IL	Oak Brook, Dataram Corp.	312-789-3710
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MO	St. Louis, Engineering Serv.	314-997-1515
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CT	Hamden, JBL Assocs.	203-281-3161
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GA	Atlanta, Electronic Mfrs' Agts.	404-329-0530
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KS	Wichita, Ensco-Rep Inc.	316-683-1070
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MI	Portage, Electro Sls. Assocs.	616-323-2416
MN	Minneapolis, Electro Sls. Assocs.	612-546-4110
MN	Minneapolis, J. R. Assocs.	612-546-4110
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CA	San Diego, M. Ficken	619-292-9392
CA	Santa Clara, Ward/Davis Assocs.	408-245-3700
CO	Denver, BFA Corp.	303-777-8070
CT	Mt. Carmel, Scientific Dvcs.- Connecticut	203-248-9361
FL	Fort Walton Beach, RAM-Z	904-862-2700
FL	S. Palm Beach, RAM-Z	305-388-0784
FL	Sarasota, RAM-Z	813-957-4900
IL	Des Plaines, Marsland Assocs.	312-298-2620
IN	Indianapolis, Marsland Assocs.	317-293-5437

IA	Cedar Rapids, Marsland Assocs.	319-396-8030
MA	Waltham, Scientific Devices-New England	617-890-2252
MA	Wayland, Daner-Hayes	617-655-0888
WI	New Berlin, Marsland	414-786-6611
MN	Minneapolis, Marsland Assocs.	612-545-4481
MO	St. Louis, Marsland Assocs.	314-991-1399
NJ	Haddonfield, G. L. Williams Assocs.	609-428-6060
NM	Albuquerque, BFA Corp.	505-292-1212
NM	Las Cruces, BFA Corp.	505-524-9693
OH	Centerville, Micro Sls. Corp.	513-433-8171
OH	No. Olmsted, Micro Sls. Corp.	216-734-3080
OK	Tulsa, Data Mktg. Assocs.	918-299-4818
TX	Austin, Data Mktg. Assocs.	512-451-5174
TX	Dallas, Data Mktg. Assocs.	214-661-0300
TX	El Paso, BFA Corp.	915-542-1762
TX	Houston, Data Mktg. Assocs.	713-780-2511
TX	San Antonio, Data Mktg. Assocs.	512-342-3031
UT	Salt Lake City, BFA Corp.	801-265-1771
VA	McLean, Creative Mktg. Assocs.	703-442-9100
WA	Seattle, Comptronics	206-284-4842

DAVEN COMPONENTS GRP., See Armtec Inds., Inc., Daven Comps. Grp.

DAVIDGE CORP., 1951 Colony St., Mountain View, CA 94043, Tel: 805-688-7707; *Sls. Mgr.:* Don French

THE DAVID HAFLER CO., 5910 Crescent Blvd., Pennsauken, NJ 08109, Tel: 609-662-6355, Telex: 710-892-1475; Empl.: 38

DAVIDSON ELCTRN. DEV. CO., 113 E. 13th St., Erie, PA 16512, Tel: 814-453-7547, Telex: 914-529; Empl.: 27

DAVIES, HARRY, MOLDING CO., 4920 Bloomingdale Ave., Chicago, IL 60639, Tel: 312-622-8966; FSC No.: 72512; Empl.: 140; *Sls. Mgr.:* Leo A. Sera; *Dist. Mgr.:* Leo A. Sera

DAVIS, J. W., & CO., P.O. Box 26177, Dallas, TX 75226, Tel: 214-651-7341; Empl.: 42

DAVIS ELEC. CO., Box 38, Cape Girardeau, MO 63701, Tel: 314-335-5547; Empl.: 40

DAVONG SYSTEMS, INC., 217 Humboldt Ct., Sunnyvale, CA 94089, Tel: 408-734-4900, Telex: 176386; Empl.: 110; *Sls. Mgr.:* John Houghton; *Dist. Mgr.:* Michael Redmond

DAYCO CORP., 333 W. First St., Dayton, OH 45402, Tel: 513-226-5927, Telex: 288219, TWX: 810-459-1822; Empl.: 10000

DAYTRONIC CORP., 2589 Corporate Pl., Miamisburg, OH 45342, Tel: 513-866-3300, TWX: 810-473-2978; Empl.: 130; *Sls. Mgr.:* John A. Perkins

D-B-DEVELOPMENTS, 7709 Kilbourne Rd., Rome, NY 13440, Tel: 315-339-1265; Empl.: 3

D-CEMCO, INC., 3200 N. San Fernando Blvd., Burbank, CA 91504, Tel: 213-849-6341, TWX: 910-498-2228; Empl.: 30

D-CEMCO, 3200 N. San Fernando Blvd., Burbank, CA 91504, Tel: 213-849-6341, TWX: 970-498-2228; Empl.: 50; *Sls. Mgr.:* Cliff Crowder

DCI INC., 14812 W. 117th Street, P.O. Box 215, Olathe, KS 66061, Tel: 913-782-5672; FSC No.: 58677; Empl.: 9; *Sls. Mgr.:* William D. Cook .... **D•1347**

Local Sales Offices & Reps

AZ	Phoenix, J. Smith & Assoc.	602-267-0981
CA	Redwood City, N-S Assocs.	415-851-2703
CA	San Diego, Mesa Engrg.	619-278-8037
CA	Torrance, Cutlass Elctrns. Inc.	714-549-9358
CA	Woodside, N-S Assoc.	415-854-4870
CO	Colorado Springs, J. Smith & Assoc.	303-597-5343
CT	Tolland, R. G. Assoc.	203-875-4201
FL	Melbourne, Saber Assocs.	305-724-0920
IL	Chicago, Commodore I	312-394-5441
IN	Indianapolis, Commodore I	317-636-3318
KS	Shawnee Mission, Vertec	913-677-3200
MA	Danvers, R. G. Assocs.	617-777-3199
MI	Detroit, Michigan Valve & Fitting	313-884-9415
MN	Minneapolis, Trask Engrg.	612-537-2434
MO	St. Louis, Vertec	314-394-6242
NJ	Cherry Hill, Analectro, Inc.	609-424-2883
NJ	Wayne, Ramapo	201-839-6767
NM	Albuquerque, J. Smith & Assoc.	505-265-3406
NY	Latham, L-Tron	518-785-5032
OH	Columbus, R. D. Cloon Assoc.	614-459-2890
PA	Pittsburg, Wainwright Tech. Sls. Inc.	412-487-5055
TX	Richardson, Meas. Sys. & Sls.	214-644-4954

DEAK TECHNOLOGY, INC., Sainte Claire Plaza, 1121 Boyce Rd., Pittsburgh, PA 15241, Tel: 412-941-9520; *Sls. Mgr.:* Dr. David Deak .... **D•1208-1210**

YOUR FULL SERVICE SOURCE
DEARBORN
FOR WIRE CABLE INSULATION

DEARBORN WIRE & CABLE CO., 9299 Evenhouse Ave., Rosemont, IL 60018, Tel: 312-696-1000, TWX: 910-253-0343; Empl.: 80 .... **C•1839**

Local Sales Offices & Reps

CA	Chino, Dearborn West	714-591-9393
CA	San Diego, OHM Spun Elctrns.	619-695-8102
CA	Santa Clara, Ferreria Entprs.	408-988-8323
CO	Denver, Kastler Cable & Equip., Inc.	303-571-4455
FL	Orlando, Admiral Sls.	305-352-0046
GA	Atlanta, Southwest Elctrl., Inc.	404-691-0648
IL	Chicago, LGS Sls.	312-456-9616
IL	Wilmette, Joel Wasserman Assocs.	312-256-3566
IN	Indianapolis, Elctrn. Reps.	317-894-1414
MD	Baltimore, Market Line, Ltd.	301-944-2111
MA	Norwood, Mac Innis Co.	617-762-8090
MI	Farmington Hills, R.C. Merchant & Co., Inc.	313-476-4600
MI	St. Joseph, R. C. Merchant & Co.	616-983-7378
MN	Golden Valley, Ambassador Indl. Mktg.	612-542-8437
MS	Jackson, Doby Assocs.	601-981-1138
MO	St. Charles, Buckman & Assocs.	314-946-6201
NJ	Medford, Jack McCoy, Inc.	609-953-0770
NJ	New Brunswick, Synergy Sls.	201-828-5090
NY	Fairport, Net Sls.	716-467-4538
NC	Kernersville, Heritage Sls. Assocs., Inc.	919-996-4374
OH	Cleveland, Depco, K.T.	216-442-6200
OH	Cleveland, Hawkins-Burwell Co.	216-888-1533
WA	Renton, Carlyle Tech. Sls.	206-226-5951

Local Distributors

AL	Madison, Sea Wire & Cable	205-772-9619
CA	Chatsworth, Sonic Wire	213-701-0565
FL	Altamonte Springs, Royce Elctrns.	305-869-4700
FL	Ft. Lauderdale, Pacer Elctrns.	305-462-0902
IL	Chicago, Newark Elctrns.	312-784-5100
IL	Elk Grove Village, GBL/Goold Elctrns.	312-593-3220
IL	Northbrook, Classic Comps.	312-272-9650
IL	Palatine, Ohm Elctrns.	312-359-5500
IN	Carmel, Altex	317-848-1323
IN	Evansville, Hutch & Sons	812-425-7201
IN	Indianapolis, Graham	317-634-8202
IN	Indianapolis, PEI Genesis	317-637-5571
IA	Cedar Rapids, Deeco	319-365-6205
LA	New Orleans, Radio Parts	504-581-5959
MI	Grand Rapids, R. M. Electrns.	616-531-9300
MI	Livonia, RS Elctrns.	313-525-1155
MN	Bloomington, Berquist Corp.	612-835-2322
MN	Bloomington, NWR Elctrns.	612-854-7329
MN	Cambridge, RSI	612-689-4870
MN	Fridley, Voyager	612-571-7766
MN	New Brighton, Chris	612-631-2647
MO	St. Charles, Finnigan Elctrns.	314-946-6201
NJ	Dover, Electro Spec	201-361-6300
NJ	E. Brunswick, Brothers Elec.	201-238-2200
NJ	East Hanover, Delburn	201-884-0800
NY	Elmira, CAC Elec. Supp.	607-734-1696
NY	Johnson City, Help Elctrns.	607-729-3528
NY	Rochester, Simcona Elctrns.	716-328-3230
NC	Raleigh, Wholesale	919-782-8500
OH	Akron, Akron Elctrn. Supp.	216-762-8818
OH	Mansfield, National Elec. Supp.	419-524-1042
PA	Harrisburg, Pyttronics	717-236-8001
PA	McKean, Advacom	814-476-7774
TN	Nashville, Carlton Bates	615-244-3562
TX	Dallas, Shearson Elec.	214-340-3094
TX	Odessa, Superior Elect.	915-332-0276
UT	Salt Lake City, RA-ELCO	801-487-0571
WA	Seattle, Carlyle Tech. Sls.	206-575-6750
WI	Oconomowoc, G.W. Elctrns.	414-367-6003

DECC DIV., See Helionetics, Inc., DECC Div.

DECISION DATA COMPUTER CORP., 100 Witmar Rd., Horsham, PA 19044

DECISION GRAPHICS, 11 Main St., P.O. Box 306, Southboro, MA 01772, Tel: 617-481-4119, TWX: 710-390-1890

DECOM SYS., 340 Rancheros Dr., San Marcos, CA 92069, Tel: 619-744-1002, TWX: 910-322-1758; FSC No.: 55744; Empl.: 44; *Sls. Mgr.:* G. F. Tremain

Local Sales Offices & Reps

AL	Lake Guntersville, Kelley Sys. Corp.	205-582-8677
CA	Los Angeles, L. L. Stoakes, Inc.	213-640-2178
CA	Palo Alto, Egbert Engrg.	415-326-1387
CA	San Diego, L. L. Stoakes, Inc.	619-452-1600
CO	Boulder, Grady Moore Assocs.	303-494-3351
FL	Sarasota, S. Bass Assocs.	813-922-9538
IN	Indianapolis, Loren Green Associates	317-293-9827
KS	Shawnee Mission, Techn. Sls. Assocs.	913-888-3330
MD	Severna Park, Delmarva, Ltd.	301-647-8007
MA	Bedford, Claflin Assocs.	617-275-7428
MO	St. Louis, Techn. Sls. Assocs.	314-725-5361
NM	Albuquerque, Grady Moore Assocs.	505-262-1416
PA	Huntingdon, Rabal Assocs.	215-947-4825
EXP	CA, San Marcos, Decom Sys.	619-744-1002

DE COURSEY ENGRG. LAB., 11828 W. Jefferson, Culver City, CA 90230, Tel: 213-EX7-9668; Empl.: 7

DEGUSSA CORP., 104 New Era Drive, So. Plainfield, NJ 07080, Tel: 201-757-6500, Telex: 4754247; FSC No.: 630673043; *Sls. Mgr.:* Stacey A. Mack

DEK, INC., 3480 Swenson Ave., St. Charles, IL 60174, Tel: 312-377-2575, Telex: 297284 DEK UR; FSC No.: 312-377-0372; Empl.: 115; *Sls. Mgr.:* L. R. Pappone

DELBERT BLINN CO., Box 2007, Pomona, CA 91766, Tel: 714-629-3900; Empl.: 10

DELCO WIRE & CABLE, INC., 257 Rittenhouse Cir., Bristol, PA 19007, Tel: 215-785-0511, Telex: 06-964523, TWX: 510-667-0968; *Sls. Mgr.:* T. Blick

DEL

DEL ELCTRNS. CORP., 250 E. Sandford Blvd., Mt. Vernon, NY 10550, Tel: 914-699-2000, TWX: 710-562-0130; FSC No.: 01378; Empl.: 180 .... **A•2133; D•1614-1615**

Local Sales Offices & Reps

AZ	Tempe, Trembly Assocs.	602-967-2058
CA	Mountain View, Leddy Assocs., Inc.	415-969-6313
CA	Pasadena, A-F Sales Engrg.	213-681-5631
CO	Lakewood, Trembly Assocs.	303-233-9544
IL	Elmhurst, Scott Assocs.	312-279-5681
MA	Burlington, TriTek	617-272-4550
MI	Dearborn, Pitcher-Poulin	313-582-5450
NV	Las Vegas, Trembly Assocs.	702-739-9770
NM	Albuquerque, Trembly Assocs.	505-266-8616
NY	Smithtown, T & K Sls.	516-724-3456
PA	Ardmore, Martin Assocs.	215-649-6332
UT	Salt Lake City, Trembly Assocs.	801-486-5292

DELEVAN DIV., American Precision Inds. Inc., 270 Quaker Rd., E. Aurora, NY 14052, Tel: 716-652-3600, Telex: 91-293; FSC No.: 99800; Empl.: 400; *Sls. Mgr.:* R. Nareau .... **A•1238**

Local Sales Offices & Reps

AL	Huntsville, Conley & Assocs.	205-882-0316
AZ	Phoenix, Toward Engrg.	602-955-3193
CA	Culver City, Bestronics	213-870-9191
CA	El Toro, Delevan	714-768-5522
CA	Freemont, Advanced Technlg. Sls.	415-651-0123
CA	Irvine, Bestronics	714-261-7233
CA	San Diego, Bestronics	619-693-1111
CA	Woodland Hills, Bestronics	213-704-5616
CO	Aurora, High Tech Assocs.	303-695-1990
FL	Deerfield Beach, Conley & Assocs.	305-421-7180
FL	Oviedo, Conley & Assocs.	305-365-3283
FL	Tampa, Conley & Assocs.	813-885-7658
GA	Doraville, Conley & Assocs.	404-447-6992
IL	Downers Grove, Momak Sls.	312-963-6400
IN	Fort Wayne, Walter W. Bieberich	219-432-2537
IN	New Albany, Walter W. Bieberich	812-945-3187
IA	Cedar Rapids, Lorenz Sls.	319-377-4666

KS	Parker, S. W. Wollard	913-898-6552
MD	Lutherville, D. A. Dougherty Sls. Co.	301-321-7890
MA	Boston, P. J. Engrg. Sls. Co.	617-924-5950
MN	Mendota Hgts., G-II Sls.	612-454-3086
NJ	Bellmawr, TAI	609-933-2600
NJ	Parlin, Martech Assocs.	201-721-2200
NY	Endicott, Tech-Mark	607-748-7473
NY	Manhassett, Martech Assocs.	516-627-1151
NY	Mendon, Tech-Mark	716-624-3840
NY	Utica, Tech-Mark	315-733-0575
NC	Raleigh, Conley & Assoc.	919-876-9862
OH	Beachwood, Electronic Salesmasters	216-831-9555
TX	Irving, Kite Elctrn. Sls. Co.	214-438-9336
Can	Mississauga, J. G. Weiss Co. Ltd.	416-673-0011
Can	Nepean, J. G. Weiss Co. Ltd.	613-726-1436
Can	North Vancouver, J. G. Weiss Co. Ltd.	604-987-3833
Can	St. Laurent, J. G. Weiss Co. Ltd.	514-337-5022
Can	Winnipeg, J. G. Weiss Co. Ltd.	204-783-4387

Local Distributors

CA	Chatsworth, IEC	213-998-2200
CA	Glendale, R. V. Weatherford	213-849-3451
CA	Santa Clara, WDG/Santa Clara	408-727-2500
FL	West Palm Beach, Nurmi Elctrn. Supp. Co.	305-686-8553
MD	Savage, Pyttronics Inds. Inc.	301-792-0780
MA	Boston, P. J. Engrg. Supp.	617-783-0510
NJ	New Brunswick, Brothers Elctrns.	201-238-2200
NY	Bohemia, Car-Lac	516-567-4200
NY	Buffalo, Summit Distrs.	716-884-3450
NY	Farmingdale, Milgray/New York	516-420-9800
PA	Norristown, Century Elctrn. Comp.	215-631-5400
TX	Dallas, R. V. Weatherford Co.	214-931-7333
TX	Fort Worth, Patco Supply	817-429-8596
Can	Burnaby B.C., R-A-E Indl. Elctrns. Ltd.	604-291-8866
Can	Don Mills, Ontario, Saynor Elctrns. Ltd.	416-445-2347
Can	Montreal, Quebec, Prelco Elctrns. Ltd.	514-389-8051
Can	Pointe-Claire Quebec, Future Elctrn.	514-694-7710

DELTA DATA SYSTEMS CORP., 2595 Metropolitan Dr., Trevose, PA 19047, Tel: 215-322-5400, Telex: 510-667-1650; Empl.: 280; *Sls. Mgr.:* Gene Mitchell

DELTA DESIGN, 5775 Kearny Villa Rd., San Diego, CA 92123, Tel: 619-292-5000, TWX: 910-335-1215; Empl.: 159; *Sls. Mgr.:* Bob Williams

DELTA ELECTRONIC CONTROLS CORP. (DECC), See Helionetics, Inc., DECC Div.

DELTA ELECTRONIC IND. USA, Delta Elctrn. Ind. Co. Ltd., 3401 Investment Blvd., Ste. 5, Hayward, CA 94545, Tel: 415-785-5231, 415-785-5235, Telex: 4992342 DELTAITTHY; Empl.: 1207; *Sls. Mgr.:* Elson Chang; *Dist. Mgr.:* Bruce Cheng .... **A•1600-1601; D•1616-1617**

Local Sales Offices & Reps

AL	Huntsville, Technlg. Mktg. Assocs. Inc.	205-883-7893
CA	Burbank, Tri-Electro Sls., Inc.	818-954-9955
CO	Aurora, Mountain View Mktg. Ltd.	303-699-1665
CT	Wallingford, Midstate Elctrns.	203-265-9900
GA	Atlanta, Technlg. Mktg. Assocs., Inc.	404-257-0374
FL	Melbourne, Technlg. Mktg. Assocs., Inc.	305-676-3776
FL	Pompano Beach, Technlg. Mktg. Assocs., Inc.	305-942-0774
IL	Chicago, United Prods. Co.	312-631-1122
IN	Indianapolis, Electronic Sls. & Engrg., Inc.	317-849-4260
IA	Cedar Rapids, Palatine Engrg. & Sls. Inc.	319-365-8071
KS	Mission, Palatine Engrg. & Sls. Inc.	913-831-0555
MA	Woburn, Mascon Inc.	617-938-8950
MI	Ypsilanti, Tamco, Inc.	313-572-1950
MN	Edina, Monroe Hanna	612-925-5700
MO	Hazelwood, Palatine Engrg & Sls.	314-839-0800
NJ	Kenilworth, Ventronics	201-272-9262
NY	Penfield, Tech. Assocs., Inc.	716-385-4240
NC	Charlotte, Robert W. Chapman & Co.	704-525-2421
OH	Centerville, Omega Sls., Inc.	513-434-5507
OH	University Hgts., Omega Sls., Inc.	216-381-1404
OK	Tulsa, Advance Tech. Sls., Inc.	918-664-0482
OR	Portland, Jas. J. Backer & Co.	503-297-8744
PA	McKean, Ecco Elctrns. Sls.	814-476-1376
SC	W. Columbia, Robert W. Chapman & Co.	803-256-0072
TX	Austin, Advance Tech. Sls., Inc.	512-440-7677
TX	Dallas, Advance Tech. Sls., Inc.	214-860-5455
TX	Houston, Advance Tech. Sls., Inc.	713-440-3888
VA	Lynchburg, Burgin-Kreh Assocs., Inc.	804-239-2626
WA	Seattle, Jas. J. Backer Co.	206-285-1300
Can	Astec Comps. Ltd.	416-630-8463

Local Distributors

CA	Irvine, Retel Elctrns.	714-768-0855
CA	Mission Viego, Tri-Electro Sls., Inc.	714-643-9486
CA	Mountain View, Cornett Elctrns.	415-969-5420
CA	San Jose, Capacitors Unlimited	408-946-7676
CA	San Jose, Cypress Elctrns.	408-945-8400
CA	San Jose, K-Lectron	408-942-9177
CA	Torrance, Cypress Elctrns.	213-533-6005
CO	Englewood, Industrial Elctrns.	303-694-9444
CT	Wallingford, Midstate Elctrns.	203-265-9900
IL	Chicago, Upco Distrs., Ltd.	312-631-1122
IA	Cedar Rapids, Berquist Co.	319-366-8733
MA	Westford, Electronics Specialties Intl., Inc.	617-486-8495
MN	Minneapolis, Berquist Co.	612-835-2322
PA	McKean, Advacom, Inc.	814-476-7774
TX	Allen, Prime Distrbg. Co.	800-442-4008, 800-526-7478

DELTA ELCTRNS., 145 Fayette St., Winston-Salem, NC 27101, Tel: 919-725-4122; Empl.: 45; *Sls. Mgr.:* L. E. Hancock

DELTA ELECTRONICS MFG. CORP., 416 Cabot St., Beverly, MA 01915, Tel: 617-927-1060; FSC No.: 00795; Empl.: 170; *Sls. Mgr.:* S. J. Somerset; *Dist. Mgr.:* C. F. Lassiter

DELTA PRODS., Box 1147, Grand Junction, CO 81501, Tel: 303-242-9000; Empl.: 35; *Sls. Mgr.:* K. D. Braa

DELTA WIRE & CABLE CO., P.O. Box 833, 1900 Marquette, North Chicago, IL 60064, Tel: 312-473-4990; Empl.: 12; *Sls. Mgr.:* Mike Golden; *Dist. Mgr.:* Matt Coleman

DEL-TELEPRODUCTS, 230 N. Market Pl., Escondido, CA 92025, Tel: 619-743-8344; Empl.: 30; *Sls. Mgr.:* Genrik Sirvis

DELTROL CONTROLS, 2745 S. 19th St., Milwaukee, WI 53215, Tel: 414-671-6800; Empl.: 300 .... **B•1320-1321, 1464-1465**

Local Sales Offices & Reps

AL	Huntsville, JWL Assocs.	205-883-1712
CA	Canoga Park, Cummings & Assocs.	818-340-6035
CT	Marion, Sands Co., Inc.	203-628-4363
FL	Lighthouse Point, Jack Krutek & Assocs.	305-931-6544
GA	Marietta, JWL Assocs.	404-429-8010
IL	Glenview, E. J. McCaffrey & Assocs.	312-272-2820
IN	Carmel, Nationwide Comps.	317-872-7207
MI	Farmington Hills, W. R. Hummon & Assocs.	313-474-0661
MN	St. Paul, Kencotronics, Inc.	612-645-7717
MO	Ballwin, Weisler & Assocs.	314-394-4543
NJ	Perth Amboy, Astrorep, Inc.	201-826-8050
NY	Babylon, Astrorep., Inc.	516-422-2500
NY	Rochester, Omni Sls.	716-342-5270
NC	Pineville, JWL Assocs.	704-541-5750
OH	Willoughby, Nationwide Comps.	216-946-3226
OR	Portland, Control Dvcs. N.W.	503-230-7171
TX	Garland, R. May Assocs.	214-276-5214
TX	Houston, Weisler & Assocs.	713-467-1862
UT	Salt Lake City, Cummings & Assocs.	801-261-4836
WI	Milwaukee, Werking Ind. Sls.	414-964-2225
Can	Pointe Claire, Que., Elcom GBM, Inc.	514-697-4556

Local Distributors

AL	Birmingham, American Elctrn. Supp.	205-942-4656
AL	Montgomery, Southern Controls	205-277-5030
AZ	Phoenix, Elctrns. Parts Co.	602-277-7281
AR	Little Rock, Carlton-Bates Co.	501-562-9100
CA	Anaheim, Electro Comps. Distrs.	714-634-0222
CA	Buena Park, Control Design	714-521-5040
CA	Canoga Park, C & A Elctrns.	213-340-6022
CA	City of Commerce, Electro Comps. Distrs.	213-727-0200
CA	Los Angeles, Electric Switches	213-664-2125
CA	Mt. View, Cornett Elctrns.	415-969-5420
CA	Pasadena, Dow Radio Co.	213-793-1195
CA	San Jose, Consolidated Parts	408-263-9521
CA	Tustin, Western Switches	714-731-4333
CO	Colorado Springs, Centennial Elctrns.	303-633-4666
CO	Denver, Fistell's Elctrn. Supp.	303-629-1312
CO	Denver, Integrated Elctrns.	303-534-6121
CT	Danbury, Pilgrim Elctrns.	203-792-7274
CT	New Haven, Hatry Elctrns.	203-787-5921
CT	Shelton, Century Elec.	203-736-2684
FL	Altamore Springs, Control Des.	305-788-3220
FL	Ft. Lauderdale, Peerless Radio Corp.	305-566-5966
FL	Ft. Lauderdale, SE Elctrns.	305-563-4131
FL	Jacksonville, Mitchell Elctrns.	904-356-8427
FL	Lakeland, Switch Controls	813-644-7564
FL	Orlando, Hammond Elctrns.	305-849-6060
GA	Atlanta, A-C Equip.	404-451-2747
GA	Atlanta, Georgia Control Ctr.	404-876-8833
GA	Stone Mountain, Control Des.	404-979-3502
ID	Boise, Kimball Elctrns.	208-342-3559
IL	Chicago, Otto Frankenbush	312-647-0755
IL	Elk Grove Village, GBL	312-593-3222
IL	Genoa, Control Design	815-784-6515
IL	Kankakee, Blitz Elctrl. Supp.	815-933-5536
IN	Gary, G. W. Berkheimer	219-887-0141
IN	Indianapolis, Control Design	317-788-4559
IN	Lafayette, CWY Elctrns.	317-447-4617
IA	Cedar Rapids, Iowa Radio Supp.	319-364-6154
IA	Davenport, Warren Radio	319-322-5301
IA	Marion, Control Des.	319-373-2923
IA	West Des Moines, Ramco Co.	515-225-6933
KS	Kansas City, Kornfield Thorp Elec.	913-321-7070
KS	Topeka, Carroll Radio	913-234-6677
KY	Ashland, Ashland Elec. Co.	606-324-4107
KY	Bowling Green, Randolph, Hale & Meredith	502-781-1460
KY	Louisville, Peerless Elctrn. Equip.	502-637-7677
LA	Shreveport, Indl. Elec. Supp.	318-222-9459
MD	Aberdeen, Harco Elctrns.	301-838-7990
MA	Boston, Ralph Pill Elec. Supp.	617-269-8200
MA	Brighton, Interstate Elctrns. Equip.	617-782-9000
MA	Burlington, QPL Elctrns.	617-229-2424
MA	Newton Upper Falls, Instock Prods.	617-964-6200
MI	Augusta, Great Lakes Elec.	616-731-4156
MI	Farmington Hills, Advent Elctrns.	313-477-1650
MI	Flint, Roth Elec. Supp.	313-234-8661
MN	Minneapolis, Control Design	612-721-6555
MO	Kansas City, Western Extralite	816-421-8404
MO	St. Louis, Control Design	314-426-3150
MO	St. Louis, Van Sickle Radio Elctrns.	314-621-5000
NE	Omaha, West Dodge Elec.	402-393-8071
NJ	Edison, William Elctrns. Supp.	201-985-3700
NJ	Fairlawn, Relay Specialties	201-797-3313
NJ	Paterson, Feldman Brothers	201-742-7329
NJ	Raritan, Masters Elctrn.	201-725-3533
NY	Hempstead, Elctrn. Equip. Co.	516-895-5757
NY	Lynbrook, Peerless Radio Corp.	516-593-2121
NY	Rochester, Masline Elctrns.	716-546-5373
NC	Charlotte, Control Des.	704-588-4410
NC	Raleigh, Southeastern Radio Supp.	919-828-2311
ND	Grand Forks, Border States	701-772-3477
OH	Columbus, McJunkin Corp.	614-294-3711
OH	Medina, Wolff Bros. Supp.	215-725-3451

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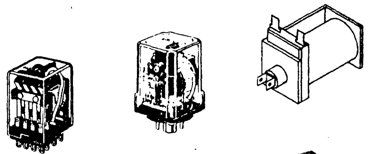

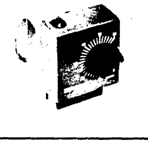

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OH	Toledo, Warren Radio Supp.	419-248-3364
OH	Wickliffe, Gateway Elctrns.	216-944-8565
OK	Tulsa, Radio, Inc.	918-587-9123
OR	Portland, Dunn Elec.	503-285-0214
PA	Erie, REM Elctrns.	814-453-5626
PA	Malvern, Control Design	215-296-0150
PA	Philadelphia, Lindley Elec.	215-329-7005
SC	Greenville, Hammond Elec.	803-233-4421
SD	Aberdeen, Plainco	605-225-7100
TN	Chattanooga, Curle Elctrns.	615-266-4728
TN	Knoxville, CED	651-521-6262
TN	Memphis, Warren Radio	901-274-2460
TX	Dallas, Control Design	214-358-1441
TX	Dallas, Watson Elec. Supp.	214-742-8441
TX	Garland, J & S Elec.	214-487-8808
TX	Lubbock, R & R Elec. Co.	806-765-7727
TX	San Antonio, Blackburn Drives Controls	512-349-2621
UT	Salt Lake City, Kimball Elctrns.	801-328-2075
VA	Ashland, Hermitage Distrs.	801-328-2075
VA	Staunton, Southern Elec.	703-886-6218
WI	Manitowoc, Englewood Elec.	414-684-6653
WI	Milwaukee, Marsh Elctrns.	414-475-6000
WI	New Berlin, Control Design	414-784-1015

DELTRON, INC., P.O. Box 1369, Wissahickon Ave., N. Wales, PA 19454-9990, Tel: 215-699-9261, TWX: 510-661-8061; Empl.: 175-180; *Sls. Mgr.:* Jack Phillips

DELTRONIC CRYSTAL INDS., 215 Rt. 10, Bldg. 3, Sec. 5, Randolph, NJ 07869, Tel: 201-361-2222, Telex: 13-6170; Empl.: 8

DENNIS CHEMICAL, 2700 Papin St., St. Louis, MO 63103, Tel: 314-771-1800; Empl.: 70; *Sls. Mgr.:* Charles F. Seger III; *Dist. Mgr.:* Charles F. Seger III

DENNISON KUBE, Div. Dennison Computer Supplies Inc., 132 Calvary St., Waltham, MA 02254-0472, Tel: 617-899-0012, Telex: 94-0179; FSC No.: 17691; Empl.: 150; *Sls. Mgr.:* Alfred J. Black

DENNISON MFG. CO., 300 Howard St., Framingham, MA 01701, Tel: 617-879-0511, Telex: 948-478; FSC No.: 5975;2310; Empl.: 8000; *Sls. Mgr.:* Dan Shearn; *Dist. Mgr.:* Marlene Hajduk

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DENSITRON CORP., 20775 Western Ave., Torrance, CA 90501, Tel: 213-618-9647, TWX: 910-349-6200; FSC No.: 62483; Empl.: 65; *Sls. Mgr.:* Robert Turner; *Dist. Mgr.:* Robert Turner **B•1029-1031**

Local Sales Offices & Reps

AL	Huntsville, Elctrn. Mktg., Inc.	205-837-7363
AZ	Phoenix, Chaparral Elctrn., Inc.	602-252-0897
CA	Laguna Hills, Comp. Mktg. Assocs.	714-951-6046
CA	Lomita, Comp. Mktg. Assocs.	213-326-1460
CA	San Mateo, Comp. Mktg. Assocs.	415-345-7373
CA	Simi Valley, (CMA) Repco	805-583-5710
CO	Arvada, Delconec	303-422-7023
FL	Coral Springs, E.P.M. Corp.	305-755-5387
FL	Orlando, E.P.M. Corp.	305-425-6149
GA	Atlanta, Elctrn. Mktg. Assoc., Inc.	404-448-1215
IL	Park Ridge, Bob Burns & Assocs., Inc.	312-775-1233
IA	Davenport, Ensco-Rep, Inc.	319-386-6600
KS	Overland Park, Ensco-Rep, Inc.	913-381-7557
KS	Wichita, Ensco-Rep, Inc.	316-683-1071
MA	Braintree, Nova Assocs.	617-848-9330
MI	Southfield, R. C. Nordstrom & Co.	313-559-7373
MN	Minneapolis, Electro-Serv	612-338-3475
MO	Maryland Heights, Ensco-Rep, Inc.	314-423-3935
NY	Mastic, Optimum Sls. Co.	516-589-4664
NY	Rochester, J. G. Welch Assocs.	716-244-1100
NY	Utica, J. G. Welch Assocs.	315-736-7821
NC	Raleigh, Elctrn. Mktg. Assoc., Inc.	919-847-8800
OH	Dayton, Dynel Co.	513-434-6467
PA	Wynnewood, Metz-Benham Assocs., Inc.	215-896-7300
SC	Greenville, Elctrn. Mktg. Assoc., Inc.	803-233-4637
TX	Austin, Delta Comp., Inc.	512-458-4288
TX	Seagoville, Delta Comp., Inc.	214-287-6333
UT	Salt Lake City, Delconec, Inc.	801-531-6177
WA	Seattle, J. J. Assocs., Inc.	206-246-6619
WI	Milwaukee, Taylor Mktg. & Sls.	414-332-1211

DESIGNATRONICS, INC., See Automatic Coil Corp., Sub. Designatronics, Inc.

DESIGN AUTOMATION, INC., 809 Massachusetts Ave., Lexington, MA 02173-3992, Tel: 617-862-8998, Telex: 951833 SBSB WOR; Empl.: 5

DESIGN TECHNOLOGY, 7760 Vickers St., San Diego, CA 92111-1871, Tel: 619-268-8194; *Sls. Mgr.:* Pam Hamilton; *Dist. Mgr.:* Sherry Kuzara

DESPATCH INDS., P.O. Box 1320, Minneapolis, MN 55440, Tel: 612-331-1873, Telex: 29-0704; Empl.: 475; *Sls. Mgr.:* T. Hostad

DEST CORP., 2380 Bering Dr., San Jose, CA 95131, Tel: 408-946-7100; Empl.: 50; *Sls. Mgr.:* Richard Dixon

DETORONICS CORPORATION, 10660 E. Rush St., S. El Monte, CA 91733, Tel: 818-579-7130, TWX: 910-587-3436; FSC No.: 29867; Empl.: 45

DEUTSCH CO., Deutsch Fiber Optics Div., 7001 W. Imperial Hwy., Los Angeles, CA 90045, Tel: 213-649-1400; *Sls. Mgr.:* Ken Ahmad

DEUTSCH FASTENER, 1315 East Grand Ave., El Segundo, CA 90245, Tel: 213-322-8840, Telex: 66-4453, TWX: 910-348-6676; Empl.: 300; *Sls. Mgr.:* Ian J. Skone-Rees

DEUTSCH RELAYS, INC., 65 Daly Road, East Northport, NY 11731, Tel: 516-499-6000

DEVCO ENGRG., Control Sys. Div., 36 Pier Lane West, Fairfield, NJ 07006, Tel: 201-CA8-0321, Telex: 139-340; Empl.: 36

DEVELCO, INC., 404 Tasman Dr., Sunnyvale, CA 94089-1797, Tel: 408-734-5700, TWX: 910-339-9295; Empl.: 50; *Sls. Mgr.:* W. J. Baker

DEVELOPMENT ASSOCIATES, 1520 S. Lyon, Santa Ana, CA 92705, Tel: 714-835-9512; Empl.: 6

DEXCEL, Div. of Gould, 2285C Martin Ave., Santa Clara, CA 95050, Tel: 408-727-9833, TWX: 910-338-0180; Empl.: 210; *Sls. Mgr.:* Art Kawai

DEXTER RESEARCH CTR., INC., 7300 Huron River Dr., Dexter, MI 48130, Tel: 313-426-3921, Telex: 757075 DEXTER RES UD; Empl.: 22; *Sls. Mgr.:* D. M. Szeles

DGS ASSOCS., 1353 Sarita Way, Santa Clara, CA 95051, Tel: 408-554-1469, Telex: 6502163796

DIALIGHT CORP., 203 Harrison Pl., Brooklyn, NY 11237-1587, Tel: 718-497-7600, TWX: 710-584-5487; Empl.: 400; *Sls. Mgr.:* I. Jaffe **B•1032-1038, 1550-1551**

Local Sales Offices & Reps

AL	Huntsville, Cartwright & Bean	205-830-1540
AZ	Phoenix, Ralph Stitzer Co.	602-997-7415
CA	Anaheim, Westrep	213-404-3881
CA	Pleasanton, Moulthrop Sls.	415-463-0450
CA	San Diego, Westrep	619-566-6580
CO	Boulder, Comp. Prods. Sls.	303-530-2800
FL	Deerfield Bch., Cartwright & Bean	305-429-3400
FL	Orlando, Cartwright & Bean	305-422-4531
GA	Atlanta, Cartwright & Bean	404-233-2939
IL	Chicago, D. Dolin Sls.	312-498-6770
IN	Indianapolis, Elctrn. Reps.	317-894-1414
KS	Overland Park, Advanced Tech. Sales	913-642-6675
LA	Covington, Cartwright & Bean	504-892-1780
MI	Ferndale, Hilltronics	313-398-5556
MN	Minneapolis, Professional Sales For Ind.	612-944-8545
MS	Jackson, Cartwright & Bean	601-981-1170
NY	Liverpool, Gen-Tech	315-451-3480
NC	Charlotte, Cartwright & Bean	704-377-5673
NC	Raleigh, Cartwright & Bean	919-876-4130
OH	Dayton, K.W. Elctrn. Sls.	513-890-2150
OH	Shaker Hgts., K.W. Elctrn. Sls.	216-491-9177
OH	Worthington, K.W. Elctrn. Sls.	614-888-0483
OR	Tigard, Elctrn. Sources	503-684-0040
PA	Allison Park, K.W. Elctrn. Sls.	412-487-4300
PA	Broomall, L.D. Lowery	215-528-5170
TN	Knoxville, Cartwright & Bean	615-693-7450
TN	Memphis, Cartwright & Bean	901-276-4442
TX	Austin, Tesco	512-834-8374
TX	Garland, Tesco	214-681-1376
UT	Woodscross, Comp. Prods. Sls.	801-292-8882
WA	Bellevue, Elctrn. Sources	206-451-3500
WI	Milwaukee, D. Dolin Sls.	414-482-1111

Local Distributors

AZ	Tempe, Richey Western Elctrns.	602-894-9251
CA	Alhambra, Fisher/Brownell	213-289-0255
CA	Chatsworth, Diplomat Westates Elctrns.	213-341-4411
CA	Costa Mesa, Diplomat Westates	714-549-8401
CA	Gardena, Bell Indus.	213-515-1800
CA	Inglewood, Newark Elctrns.	213-671-7387
CA	Los Angeles, Richey Western Elctrns.	213-820-3777
CA	Sacramento, Sacramento Elctrns.	916-441-4821
CA	San Diego, Fisher/Brownell	714-560-8545
CA	San Diego, Richey Western Elctrns.	714-565-4444
CA	Santa Clara, Fisher/Brownell	408-988-6041
CA	Santa Clara, Richey Western Elctrns.	408-727-7411
CA	Sun Valley, Richey Western Elctrns.	213-768-3800
CA	Sunnyvale, Bell Indus.	408-734-8570
CA	Sunnyvale, Time Elect.	408-734-9888
CO	Denver, CSID Inc.	303-292-9594
CO	Denver, Newark Denver Elctrns.	303-757-3351
CT	Wallingford, Sager Elctrl. Supply	203-265-4600
FL	Ft. Lauderdale, Peerless Radio	305-973-4141
FL	Orlando, Hammond Elctrns.	305-849-6060
GA	Atlanta, Specialty Dist.	404-873-2521
IL	Chicago, Newark Elctrns.	312-638-4411
IL	Northbrook, Classic Comps. Supp.	312-272-9650
IL	Palatine, OHM Elctrns.	312-359-5500
IL	Peoria, Klaus Radio & Elect.	309-691-4840
IN	Ft. Wayne, Graham Elctrn.	219-423-3422
IN	Indianapolis, Graham Elctrn.	317-634-8202
IN	South Bend, Genesis Elctrn.	219-287-2911
KY	Louisville, P.I. Burks	502-589-3960
LA	Lafayette, Ralph's of Lafayette	318-234-4507
LA	New Orleans, Southern Radio Supp.	504-524-2343
MD	Baltimore, Resco/Baltimore	301-529-0600
MD	Gaithersburg, Pioneer Wash. Elect.	301-948-0710
MD	Rockville, Capitol Radio Whlsrs.	301-881-2270
MA	Hingham, Sager Elec. Supp.	617-749-6700
MA	Norwood, Gerber Elctrns.	617-769-6000
MA	Springfield, T.F. Cushing	413-788-7341
MA	Wilbraham, Ind'l. Comps.	413-596-3854
MI	Ann Arbor, Wedemeyer Elctrn. Supp.	313-665-8611
MI	Livonia, RS Elctrns.	313-525-1155
MI	Oak Park, Newark Elctrn.	313-967-0600
MN	St. Paul, Gopher Elctrns.	612-483-3322
MO	Kansas City, LCOMP	816-221-2400
MO	Kansas City, Walters Radio Supp.	816-531-7015
MO	Maryland Hgts., LCOMP	314-291-6200
NE	Lincoln, Scott Elctrn. Supp.	402-466-8221
NJ	Hanover, State Elctrns.	201-887-2550
NJ	Kenilworth, Federated Purchaser	201-272-0505
NJ	Pennsauken, Resco Elctrns.	609-662-4000
NY	Buffalo, Summit Dists.	716-887-2800
NY	Elmsford, Ancar Elctrns. Supp.	914-592-7100
NY	Endwell, ASI Elect.	607-754-3823
NY	Farmingdale, Arrow Elctrns.	516-694-6800
NY	Hauppauge, Broadline Elec. Dists.	516-231-4100
NY	Long Island City, Dalis Indl. Elect.	212-361-1100
NY	Lynbrook, Peerless Radio	516-593-2121
NY	Rochester, Summit Elctrns.	716-334-8110
NY	Rome, Rome Elctrns.	315-337-5400
NY	Woodbury, Pioneer/Harvey	516-921-8700
NC	Greensboro, Hammond Elctrns.	919-275-6391
NC	Raleigh, Southeastern Elctrns.	919-828-2311
OH	Akron, Akron Elctrn. Supp.	216-762-8818
OH	Akron, Sun Radio	216-434-2171
OH	Cincinnati, Hughes-Peters	513-351-2000
OH	Cincinnati, URI Elctrns.	513-761-4030
OH	Cleveland, Pioneer-Cleveland	216-587-3600
OH	Columbus, Hughes-Peters	614-294-5351
OH	Dayton, Pioneer/Dayton	513-236-9900
OH	Dayton, Stotts-Friedman	513-298-5555
OH	Solon, REPCO Elctrn.	216-248-8900
OK	Tulsa, Radio, Inc.	918-587-9123
OR	Beaverton, Almac Elctrns.	503-641-9070
PA	McKean, Advacom	814-476-7774
PA	Montgomeryville, Pyttronic Indus.	215-643-2850
PA	Philadelphia, Almo Elctrns.	215-698-4000
PA	Philadelphia, Philadelphia Elctrns.	215-568-7400
PA	Pittsburgh, Cam RPC Elect.	412-782-3770
PA	Reading, Barbey Elctrns.	215-376-6116
RI	Providence, Wm. Dandreta	401-861-2800
SC	Greenville, Hammond Elctrns.	803-233-4121
TN	Kingsport, Radio Elec. Supp.	615-247-8111
TN	Nashville, Carlton-Bates Co.	615-244-3562
TN	Nashville, Electra Dist.	615-329-3971
TX	Dallas, Norvell Elctrns.	214-233-0020
TX	Garland, Newark Elctrns.	214-494-5911
TX	Houston, Newark Elctrns.	713-782-4800
TX	Stafford, Harrison Equip.	713-879-2600
UT	Salt Lake City, Standard Supp.	801-486-3371
VA	Norfolk, Priest Elctrns.	804-855-0105
VA	Richmond, Sterling Elctrns.	804-226-2190
WA	Bellevue, Almac Elctrns.	206-643-9992
WI	Milwaukee, Elctrn. Expeditors	414-228-8100
WI	Milwaukee, Indl. Elect.	414-276-1212
WI	Milwaukee, Marsh Elctrns.	414-475-6000

DIAL PRODS. CO., 19-21 Cottage St., Bayonne, NJ 07002, Tel: 201-HE7-0720; Empl.: 100; *Sls. Mgr.:* Beverly Malen

DIAMOND MAGNETICS, P.O. Box 4736, San Luis Obispo, CA 93403, Tel: 805-544-4019; Empl.: 10; *Sls. Mgr.:* Lyle Nighswonger

DIAMOND SHAMROCK CORP, 1100 Superior Ave, Cleveland, OH 44114, Tel: 216-694-5000

DIANACHART INC., 129 Hibernia Ave., Rockaway, NJ 07866, Tel: 201-625-2299; Empl.: 10; *Sls. Mgr.:* D. Brodie

DI/AN CONTROLS, INC., 944 Dorchester Ave., Boston, MA 02125, Tel: 617-288-7700, TWX: 710-333-1732; FSC No.: 06900; Empl.: 135; *Sls. Mgr.:* C. S. Aspinwall, Jr.; *Dist. Mgr.:* C. S. Aspinwall, Jr.

DIA-NETICS, INC., 18823 Napa St., Northridge, CA 91324, Tel: 818-886-2616; Empl.: 35

DIEGO POWER, 5350 Eastgate Mall, San Diego, CA 92121, Tel: 587-1925; Empl.: 12; *Sls. Mgr.:* Jack Jaquay .... **D•1916**

Local Sales Offices & Reps

CA	Campbell, Elcor Assocs.	408-866-5505
CA	Garden Grove, Elcor Assocs.	714-895-3422
CT	Hamden, AMI, Inc.	203-288-5288
IL	Rolling Meadows, Commodore I	312-394-5441
MA	Acton, AMI, Inc.	617-263-2766
MN	Burnsville, Commodore I	612-894-5488
NJ	Lodi, SDM Reps., Inc.	201-368-0123
NY	Rochester, SDM Reps., Inc.	716-247-8770
OH	Miamisburg, Swenson Assocs.	513-866-3233
WA	Seattle, Datacom Assocs.	206-285-2525

DIELECTRIC COMMUNICATIONS, General Signal, Tower Hill Rd., Raymond, ME 04071, Tel: 207-655-4555, 800-341-9678, Telex: 710-229-6890; FSC No.: 08441; Empl.: 250; *Sls. Mgr.:* Rolf Olsen

DIELECTRIC INSTR. CORP., 761 Franklin Ave., Pittsburgh, PA 15221, Tel: 412-731-6566; Empl.: 7

DIELECTRIC LABS., 69 Albany St., Cazenovia, NY 13035, Tel: 315-655-8710, TWX: 710-541-1530; FSC No.: 55153; Empl.: 65; *Sls. Mgr.:* David Carter

DIETZ DESIGN, INC., 100 Electronics Pkwy., Belton, MO 64012, Tel: 816-331-4911; Empl.: 75

DIETZGEN CORP., 250 Wille Rd., Des Plaines, IL 60018, Tel: 312-635-5200; Empl.: 200

DIGELEC, INC., Affil. Wavetek Corp., 586 Weddell Drive, Suite 1, Sunnyvale, CA 94089, Tel: 408-745-0722, Telex: 821877; *Sls. Mgr.:* Karl Sturz

DIGIAC CORP., 175 Engineers Rd., Hauppauge, NY 11788, Tel: 516-273-8600, TWX: 510-227-9879; Empl.: 25; *Sls. Mgr.:* L. Keckeisen; *Dist. Mgr.:* S. Opperer

DIGI-DATA CORP., 8580 Dorsey Run Rd., Jessup, MD 20794, Tel: 301-498-0200, Telex: 87-580; Empl.: 75; *Sls. Mgr.:* Allen Grams

DIGIMAX INSTRS. CORP., 5625 Kearny Villa Rd., San Diego, CA 92123, Tel: 619-569-6582, Telex: 697120-DATAMAX; FSC No.: 5T492; *Sls. Mgr.:* Dan Burton; *Dist. Mgr.:* Dan Burton

DIGITAL COMMUNICATIONS ASSOCS., INC., 303 Technology Pk., Norcross, GA 30092, Tel: 404-448-1400, Telex: 261333 DCAATL; Empl.: 500; *Dist. Mgr.:* Jerry Buran

DIGITAL DATA SYS., 1551 N.W. 65 Ave., Plantation, FL 33313, Tel: 305-792-3290, Telex: 9109974751 (DIGITAL); Empl.: 20; *Sls. Mgr.:* Floyd Simon; *Dist. Mgr.:* A. Gomez

DIGITAL DEV. CORP., 8650 Balboa Ave., San Diego, CA 92123, Tel: 619-278-9920, Telex: 69-54-30; Empl.: 430; *Sls. Mgr.:* Charles Theodore

DIGITAL DYNAMICS, INC., 108 Water St., Watertown, MA 02172, Tel: 617-923-4315, Telex: 9580076; Empl.: 26; *Sls. Mgr.:* Eric Kapust

DIGITAL ELCTRNS., 26142 Eden Landing Rd., Ste. 2, Hayward, CA 94545, Tel: 415-786-0520, Telex: 334422; *Sls. Mgr.:* Bob Christensen

DIGITAL EQUIP., One Iron Way, Marlborough, MA 01752

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DIGITAL EQUIPMENT CORP., 33 Cabot Rd., Woburn, MA 01801, Tel: 800-225-5385 .... **D•1063-1065**

DIGITAL GRAPHIC SYS., 2629 Terminal Blvd., Mountain View, CA 94043, Tel: 415-962-0200; *Sls. Mgr.:* Radcliffe Goddard

DIGITAL MICROSYSTEMS, 1755 Embarcadera, Oakland, CA 94606, Tel: 415-532-3686, TWX: 910-366-7310; Empl.: 200; *Sls. Mgr.:* Terry Forde

DIGITAL MEDIA, 3178 Gibraltar Ave., Costa Mesa, CA 92626, Tel: 714-751-1373; *Sls. Mgr.:* David Scott

DIGITAL PATHWAYS, INC., 1060 E. Meadow Cir., Palo Alto, CA 94303, Tel: 415-493-5544, TWX: 910-379-5034; *Sls. Mgr.:* Jan Legassick

DIGITAL POWER CORP., 686 East Gish Rd., San Jose, CA 95112, Tel: 408-288-5600, TWX: 910-338-0579; *Sls. Mgr.:* Claude Adkins

DIGITAL PRODUCTS, INC., 600 Pleasant St., Watertown, MA 02172, Tel: 617-924-1680; Empl.: 25; *Sls. Mgr.:* William M. Kahn

DIGITAL RADIO CORP., 8901 La Cienega Blvd., Inglewood, CA 90301, Tel: 213-670-8611; *Sls. Mgr.:* Arvin L. Perry

DIGITAL TRANSMISSION TECHNIQUES, INC., P.O. Box 1847, Wayne, NJ 07470, Tel: 201-831-1615; Empl.: 3; *Sls. Mgr.:* Charles Herbst

DIGITEC CORP., 918 Woodley Rd., P.O. Box 458, Dayton, OH 45401, Tel: 513-254-6251, Telex: 6874219 W.U.I.; FSC No.: 16152; Empl.: 135; *Sls. Mgr.:* Jerry Rozek; *Dist. Mgr.:* Jerry Rozek .... **D•1066, 1149, 1348**

Local Sales Offices & Reps

AL	Huntsville, W. A. Brown	205-883-8660
CA	Huntington Beach, AWC	714-969-2468
CA	Santa Clara, Johnson Assocs.	408-984-4626
CT	New Canaan, R. J. Sickles Assoc.	203-966-4630
IL	Des Plaines, Marsland Assocs.	312-298-2620
IN	Indianapolis, Marsland Assocs.	317-924-3568
IA	Cedar Rapids, Marsland Assocs.	319-396-8030
KS	Shawnee, Marsland Assocs.	913-631-5400
MI	Southfield, Comtel-Instr.	313-358-2505
MN	Minneapolis, Marsland Assocs.	612-545-4481
MO	St. Louis, Marsland Assocs.	314-878-2402
NJ	Cedar Grove, KLS	201-785-4450
NJ	Cherry Hill, Sci. Reps.	609-482-0059
NM	Albuquerque, Fry-Gates	505-262-1525
NY	Glens Falls, Glen Instrs.	518-798-1993
NY	Rochester, Glen Instrs.	716-338-7148
OH	Cleveland, Comtel-Instr.	216-442-8080
OH	Dayton, Comtel-Instr.	513-298-7573
PA	Pittsburgh, Comtel-Instr.	412-922-5720
TX	Houston, Adaptive Controls	713-995-9791
UT	Salt Lake City, Meas. Conslts.	801-364-3174
VA	Fairfax, Scientific Reps.	703-385-0600
VA	Richmond, Cavalier	804-794-4033

DIGITECH INDUSTRIES, INC., 66 Grove St., Ridgefield, CT 06877, Tel: 203-438-3731, Telex: 969-623; Empl.: 70

DIGITEK INC., P.O. Box 468, Kenmore, WA 98028, Tel: 206-485-6571; *Sls. Mgr.:* Paul J. McManus; *Dist. Mgr.:* Paul J. McManus

DIGITRAN CO., Becton Dickinson & Co., 3100 New York Dr., Pasadena, CA 91107, Tel: 818-791-5600, Telex: 67-5485, TWX: 910-588-3794; Empl.: 300

Local Sales Offices & Reps

AL	Huntsville, Beacon Elctrns. Assoc.	205-881-5031
AZ	Scottsdale, Arcom Sls.	602-947-5745
AR	Little Rock, Beacon Elctrn. Assoc.	501-224-5449
CA	Anaheim, Westrep	213-404-3881, 714-527-2822
CA	San Diego, Westrep	619-276-0751
CA	Santa Clara, Westrep	408-988-8833
CO	Littleton, Omega, Ltd.	303-798-7040
CT	North Haven, Kitchen & Kutchin	203-239-0212
FL	Clearwater, Beacon Elec. Assoc.	813-796-2378
FL	Ft. Lauderdale, Beacon Elec. Assocs.	305-491-1054
FL	Maitland, Beacon Elec. Assocs.	305-647-3498
FL	Melbourne, Beacon Elec. Assoc.	305-724-8010
GA	Atlanta, Beacon Elctrns. Assoc.	404-256-9640
IL	Elk Grove Village, Carlson Elctrn. Sls.	312-956-8240
IN	Ft. Wayne, R. O. Whitesell & Assoc.	219-432-5591
IN	Indianapolis, R. O. Whitesell & Assoc.	317-359-9283
IN	Kokomo, R. O. Whitesell & Assoc.	317-457-9127
IA	Des Moines, The Beams Co.	515-255-1148
KS	Shawnee Mission, The Beams Co.	913-631-0300
KY	Louisville, R. O. Whitesell & Assoc.	502-426-7696
MD	Silver Spring, Marktron	301-460-6100
MD	Timonium, Marktron	301-252-7111
MA	Burlington, Kitchen & Kutchin	617-229-2660
MI	Grand Rapids, R. O. Whitesell & Assoc.	616-942-5420
MI	Southfield, R. O. Whitesell & Assoc.	313-559-5454
MI	St. Joseph, R. O. Whitesell & Assoc.	616-983-7337
MO	St. Louis, The Beams Co.	314-569-1060
NJ	Haddonfield, Sunday-O'Brien	609-429-4013
NJ	Hasbrouck Hgts., Comp-Tech Sls.	201-288-7400
NY	New York, Comp-Tech Sls.	516-593-2628
NY	Rochester, Ossmann Comp. Sls.	716-424-4460
NY	Syracuse, Ossmann Comp. Sls.	315-455-6611
NC	Greensboro, Beacon Elctrns. Assoc.	919-275-9997
NC	Raleigh, Beacon Elec. Assoc.	919-787-0330
OH	Cincinnati, R. O. Whitesell & Assoc.	513-521-2290
OH	Cleveland, R. O. Whitesell & Assoc.	216-447-9020
OH	Columbus, R. O. Whitesell & Assoc.	614-888-9396
OH	Dayton, R. O. Whitesell & Assoc.	513-298-9546
PA	Pittsburgh, R. O. Whitesell & Assoc.	412-963-6161
TX	Dallas, Allied Comps.	214-238-0408
TX	Houston, Allied Comps.	713-988-1600
TX	Hurst, Allied Comps.	817-589-0456
TX	Round Rock, Allied Comps.	512-244-1166
UT	Riverton, Omega, Ltd.	801-254-6723
VA	Charlottesville, Marktron	301-460-6100
WA	Bellevue, Underwood Hanify	206-451-8223
WA	Vancouver, Underwood Hanify	503-641-4463
WI	Milwaukee, Carlson Elctrn. Sls.	414-476-2790

Local Distributors

AL	Huntsville, Comp. Distrs.	205-883-7501
AL	Huntsville, Powell Elec.	205-539-2731
AZ	Tempe, Powell Elctrns.	602-967-7538
AR	Little Rock, Comp. Distrs.	501-227-6278
CA	Cerritos, El-Com	213-404-2961
CA	Fullerton, Pyramid	714-773-0781, 213-691-0561
CA	San Diego, El-Com	619-578-0900
CA	San Jose, Powell Elctrns.	408-943-9020
CA	Santa Clara, Pyramid Elec.	408-727-9810
CO	Denver, CSID, Inc.	303-292-9594
CT	Hamden, Impact Elctrns.	203-281-1331
FL	Ft. Lauderdale, Comp. Distrs.	305-971-4950
FL	Ft. Lauderdale, Powell Electr./Fla.	305-972-4300
GA	Norcross, Comp. Distrs.	404-441-3320
IL	Mt. Prospect, Magnuson Elctrns.	312-956-0700
IN	Indianapolis, Graham Elec.	317-634-8202
MD	Columbia, Powell Electr.	301-621-4070
MA	Canton, Impact Sls. Co.	617-821-1500
MA	West Borough, Powell Electrns.	617-336-6100
MI	Livonia, Pioneer/Michigan	313-525-1800
MI	St. Clair Shores, Specialties Mfg.	313-771-2700
MN	St. Paul, Magnuson Elec.	612-227-8495
NJ	Hasbrouck Hgts., Tory Sls.	201-288-5656
NY	Rochester, Modutex Corp.	716-647-9700
NC	Cary, Powell Elec.	919-467-1212
NC	Raleigh, Comp. Distrs.	919-834-9465
OH	Cleveland, Pioneer-Cleveland	216-587-3600
OH	Columbus, Elctrns. Mktg. Corp.	614-299-4161
OH	Dayton, Pioneer/Dayton	513-236-9900
OK	Tulsa, Norvell Elctrns.	918-663-1247
OR	Beaverton, Shannon, Ltd.	503-644-8077, 800-426-4615
PA	Philadelphia, Powell Electr.	215-365-1900
PA	Pittsburgh, Pioneer/Pittsburgh	412-782-2300
WA	Kent, Shannon, Ltd.	206-763-0545

DIGITUS CORPORATION, 22 West 25th Street, Baltimore, MD 21218, Tel: 301-467-3223, TWX: 908248 SVCETCY; Empl.: 12; *Sls. Mgr.:* Mr. Henry Mo; *Dist. Mgr.:* Mr. Henry Mo

DILLON, W. C., & CO., National Controls, Inc., 2320 Airport Blvd., Santa Rosa, CA 95401, Tel: 707-527-5555, TWX: 510-744-2076; Empl.: 500

DIMCO-GRAY, 8200 S. Suburban Rd., Dayton, OH 45459, Tel: 513-433-7600, Telex: 288-367; Empl.: 150; *Sls. Mgr.:* R. Cramer

DIMENSIONS UNLIMITED, INC., 1636 Gervais Ave., St. Paul, MN 55109, Tel: 612-770-5630; *Sls. Mgr.:* Dennis Getter

DIODES INC., 9957 Canoga Ave., Chatsworth, CA 91311, Tel: 818-882-4920, 800-821-1178; Empl.: 30; *Sls. Mgr.:* Tim Regan; *Dist. Mgr.:* Tim Regan

DIONICS, 65 Rushmore St., Westbury, NY 11590, Tel: 516-997-7474, TWX: 510-222-0974; Empl.: 85; *Sls. Mgr.:* Mel Geffner

DIO-REY, Div. of Info-Lite, 422 Cliff St., Fairview, NJ 07022, Tel: 201-941-4455; FSC No.: FSCM 52116; Empl.: 13; *Sls. Mgr.:* Joseph M. Cartelli; *Dist. Mgr.:* Joseph M. Cartelli .... **B•1040-1046**

Local Sales Offices & Reps

CA	No. Hollywood, Crown Elctrns.	213-877-3550
CA	Redwood City, Caltronic Assocs.	415-365-2545
CT	Weston, CJA Assoc.	203-226-4317
FL	St. Petersburg, R. L. Matus & Assocs.	813-896-4133
GA	Buford, R. L. Matus & Assocs.	404-945-2946
IL	Lake Zurich, L & B Assocs.	312-438-7917
MI	Brighton, Michigan Mktg. & Sls.	313-229-6218
NJ	Wayne, GT Assocs.	201-694-6040
NY	Syracuse, Lenard Co.	315-479-9191
OH	Cleveland, A.S.A.	216-662-6080
OH	Dayton, Mohawk Intronics	513-434-8873
TX	Dallas, Glidden Electro Equip.	214-341-0610
TX	Houston, Glidden Electro Equip.	713-681-1415

DISC INSTRUMENTS, Honeywell, 102 E. Baker St., Costa Mesa, CA 92626, Tel: 714-979-5300, TWX: 910-595-1987; Empl.: 175; *Sls. Mgr.:* Don Risk

DISPLAY DEVICES, Box 667, Encinitas, CA 92024, Tel: 619-753-0113; FSC No.: 26107

DISPLAY INTERFACE CORP., 525 Boston Post Rd., P.O. Box 250, Milford, CT 06460, Tel: 203-877-7661; *Sls. Mgr.:* Leigh H. Hickcox

DISPLAYS, INC., Mifflin Countey Indl. Pk., Rte. 4, Box 6AAA, Lewistown, PA 17044, Tel: 717-242-2541, Telex: 842540; Empl.: 50

Local Sales Offices & Reps

IL	Des Plaines, Esco Assocs.	312-298-5310
MA	Framingham, Bay Colony Reps.	617-620-0607

DISPLEX, INC., Alexander Place, Glen Cove, NY 11542, Tel: 516-671-4400, Telex: 46-6886 NOHILL CI; Empl.: 12; *Sls. Mgr.:* Alan Kushner; *Dist. Mgr.:* Alan Kushner .... **D•1619, 1917**

Local Sales Offices & Reps

CA	Gardena, Bidwell Sls.	213-532-7305
CA	Westlake Village, WEW Entprs.	213-707-1551
IL	Elmhurst, First Rep Co.	312-530-2450
MD	Wheaton, Brimberg Sls.	301-946-2670
MA	Needham, Addelco Corp.	617-444-4754
NY	Great Neck, F & F Metro	516-482-4080
OH	Cleveland Heights, Seltech	614-451-3868
OH	Columbus, Seltech	614-451-3865
OR	Portland, Belusko & Co.	503-222-4279
TN	Nashville, Computer Power Corp.	615-366-1703
PR	Casuas, Micro-Tech Sys & Controls.	809-783-0100

DISTRIBUTED COMPUTER SYS., 223 Crescent St., Waltham, MA 02154, Tel: 617-899-6619, TWX: 710-324-6476; Empl.: 32; *Sls. Mgr.:* Garry Stephens

DISTRIBUTED LOGIC CORP. (DILOG), 12800-G Garden Grove Blvd., Garden Grove, CA 92643, Tel: 714-534-8950, Telex: 681399; FSC No.: 95-3205555; Empl.: 105; *Sls. Mgr.:* Dennis Edwards; *Dist. Mgr.:* Dennis Edwards

Distributor

DISTRIBUTOR SPECIALISTS, 632 Santa Monica Blvd., Santa Monica, CA 90401, Tel: 213-393-9666 .... pgs. **708, 775**

DIVERSIFIED CASE CO., Ellis Ave., Off. 2, Whitesboro, NY 13492, Tel: 315-736-3028; Empl.: 75; *Sls. Mgr.:* John Fitzsimmons

DIVERSIFIED ELECTRONICS, INC.

DIVERSIFIED ELCTRNS., INC., Indl. Controls Div., 119 N. Morton Ave., Evansville, IN 47711, Tel: 812-426-2806; Empl.: 55; *Sls. Mgr.:* Ken Qualls ..... **B•1322**

Local Sales Offices & Reps

CA	Danville, Stuart Assocs.	415-837-8197
CA	Signal Hill, California Electro Sls. Co.	213-595-7427
CO	Denver, Empire Elctrl. Sls.	303-744-1776
FL	Leesburg, Diversified Elctrns.	800-874-0619
GA	Atlanta, Grady Duckett	404-451-3529
IL	Des Plaines, Antek/Lincoln, Hodges & Assocs.	312-297-0885
IN	Seymour, Diversified Elctrns. Inc.	812-522-1481
IA	Bettendorf, Weisler & Assocs.	319-344-0566
MD	Fulton, S. Jefferies	301-792-7452
MO	Ellisville, Weisler & Assocs.	314-394-4543
MO	Kansas City, Weisler & Assocs.	816-421-1679
NY	Great Neck, Frank Tylinski Co.	516-466-9070
NC	Charlotte, Sentry Power	704-535-1774
NC	Wake Forrest, Sentry Power Controls	704-535-1774
OH	Cleveland, Arthur Baier	216-461-6161
OH	Cleveland, Syntron, Inc.	216-572-2848
OH	Dayton, Arthur Baier	513-276-4128
OR	Forest Grove, Doran Sls. Assocs., Inc.	503-357-3333
PA	Narberth, S. A. Jefferies	215-664-8500
TX	Houston, Weisler & Assocs.	713-467-1847
UT	Salt Lake City, Conely Engrg. Co.	801-972-5923
WA	Green Acres, Doran Sls. Assocs., Inc.	509-922-2317
WA	Redmond, Doran Sls. Assocs., Inc.	206-855-1885
WI	Janesville, Antek Mktg. Assocs.	608-754-4214
EXP	MO, St. Louis, Brauner Export Co.	314-426-2600
Can	Mississauga, Ont., Knox Elctrl. Specialities, Inc.	416-646-6080

Local Distributors

AL	Birmingham, MG Elctrns. & Equip., Co., Inc.	205-328-4525
AL	Mobile, Specialty Distrg. Co.	205-344-0450
AR	Rogers, Evans Elec. Motor Centers	501-636-0721
CA	Cathedral City, Consolidated Elec.	714-328-1131
CA	Danville, Cal-West Supp.	415-837-8245
CA	Fresno, Electric Motor & Supp.	209-233-1155
CA	Long Beach, Mag-Trol/Long Beach, Inc.	213-435-3451
CA	Palm Springs, Lake Service	619-320-2727
CA	Palo Alto, Elctrl. Matls., Inc.	415-494-0400
CA	Redondo Beach, Elctrl. Power & Controls, Inc.	213-772-8890
CA	South El Monte, Walton Electrical Controls, Inc.	213-442-4610
CO	Denver, Control Comps, Inc.	303-371-2727
CO	Golden, Utility Control & Equip. Co.	303-425-1990
DC	Washington, Wesco	202-833-5250
FL	Crystal River, Crems Indl. Sls.	813-795-2230
FL	Ft. Lauderdale, Graybar Elec.	305-467-1453
FL	Ft. Myers, Con. Elec. Supp. Co.	813-332-1515
FL	Jacksonville, Graybar Elec.	904-356-7611
FL	Lakeland, A-A Elc.	813-665-6941
FL	Largo, Graybar Elec.	813-535-6460
FL	New Port Richey, Pasco Elec. Sup.	813-842-8405
FL	Orlando, Consolidated Elec.	305-849-6532
FL	Tallahassee, Graybar Elec.	904-222-5332
FL	Tampa, Electric Supp. of Tampa	813-872-1894
FL	W. Palm Beach, Nurmi Elctrn. Supp., Inc.	305-686-8553
GA	Albany, Specialty Distrbg. Co., Inc.	912-435-1711
GA	Athens, Specialty Distrbg. Co., Inc.	404-548-1334
GA	Atlanta, Dapco, Inc.	404-458-6341
GA	Atlanta, Specialty Distrbg. Co., Inc.	404-873-2521
GA	Augusta, Speciality Distrbg. Co., Inc.	404-722-1526
GA	Brunswick, Specialty Distrbg. Co., Inc.	912-265-1927
GA	College Park, Specialty Distrbg. Co., Inc.	404-763-3828
GA	Columbus, Specialty Distrbg. Co., Inc.	404-327-7414
GA	Macon, Specialty Distrbg. Co., Inc.	912-743-5421
GA	Marietta, Specialty Distrbg. Co., Inc.	404-422-4333
GA	Norcross, A-A Electric	404-449-8670
GA	Savannah, Graybar Elec.	912-232-1121
GA	Savannah, Specialty Distrbg. Co., Inc.	912-234-1684
GA	Valdosta, Specialty Distrbg. Co., Inc.	912-242-4910
ID	Coeur d'Alene, R. C. Worst & Co., Inc.	208-664-2133
ID	Idaho Falls, Electrical Supp.	208-523-2800
ID	Pocatello, Electrical Supp.	208-233-1362
ID	Rexburg, Electrical Supp.	208-356-7282
IL	Bloomingdale, Seversen Engrg.	312-529-0501
IL	Fairfield, Precision Elec. Co.	618-842-7000
IL	Mt. Prospect, Legend Elctrl. Sls.	312-952-0090
IN	Evansville, Hutch & Son, Inc.	812-425-7201
IN	Indianapolis, Genesis Elec.	317-637-5571
IN	Indianapolis, Jackson Controls Co., Inc.	317-887-3111
IN	Vincennes, Valley Elec.	812-882-7860
KS	Salina, American Elec.	913-823-2248
KY	Louisville, CDE/E & H Elec. Supp. Co.	502-587-0991
KY	Louisville, Peerless Elec.	502-637-7677
KY	Louisville, Peterson Elec. Supp. Co., Inc.	502-491-5010
ME	Auburn, Gilman Elec. Supp.	207-784-6906
MD	Baltimore, Infinity Sys., Inc.	301-358-8500
MD	Baltimore, Wesco	301-327-4300
MD	Salisbury, Wesco	301-742-2193
MN	Minneapolis, Texa Minn Prods.	612-861-2900
MO	St. Louis, United Elec. Supp.	314-771-5555
NE	Omaha, West Dodge Elec.	402-393-8071
NH	Manchester, Graybar Elec.	603-624-4341
NJ	Audubon, Universal Elctrns. Supp. Co.	609-547-3430
NJ	E. Rutherford, A-A Elec.	201-777-5477
NJ	Fairlawn, Relay Specialties	201-797-3313
NY	Long Island, Graybar Elec.	212-392-2000
NY	Maybrook, Air Power House	914-457-3113
NY	Whitestone, Power Electro Supp. Co., Inc.	212-767-1447
NC	Charlotte, Southern Elec. Svc. Co.	704-372-4832
NC	Huntersville, Scott Equip.	704-875-1611
OH	Cincinnati, Wesco	513-542-4300
OH	Cleveland, Milner Elec.	216-361-0300
OK	Oklahoma City, Evans Elec. Motor Centers	405-631-1344
OK	Tulsa, Cooper Supp. Co.	918-628-1500
OK	Tulsa, Evans Elec. Motor Centers	918-587-1566
OR	Bend, North Coast Elec. Co., Inc.	503-382-6211
OR	Coos Bay, North Coast Elec. Co., Inc.	503-267-2145
OR	Eugene, North Coast Elec. Co., Inc.	503-343-7701
OR	Klamath Falls, North Coast Elec. Co., Inc.	503-884-4171
OR	Medford, North Coast Elec. Co., Inc.	503-772-7131
OR	Portland, North Coast Elec. Co., Inc.	503-228-5111
OR	Portland, Reed Elec. Sls. & Supp., Inc.	503-223-8191
OR	Tualatin, North Coast Elec. Co., Inc.	503-620-3910
PA	Bala-Cyn-Wyd, Wesco	215-581-9314
PA	Erie, Wesco	814-454-8191
PA	Johnstown, Wesco	814-536-8761
PA	Monroeville, Wesco	412-325-1300
PA	Philadelphia, Mechanical Specialties, Inc.	215-331-5555
PA	Pittsburgh, Wesco	412-255-4290
PA	York, Wesco	717-843-0891
SC	Columbia, J. W. Vaughn Co.	803-779-2690
SC	Greenville, Shealy Elctrl. Whlsrs.	803-242-6880
TN	Chattanooga, Specialty Distrbg. Co., Inc.	615-267-9531
TX	Ft. Worth, Swieco, Inc.	817-335-6521
TX	Houston, Commercial Equip.	713-237-8682
TX	Houston, Hedco	713-224-4771
TX	Midland, Energy Sys., Inc.	915-694-9657
TX	San Antonio, Summers Elec.	512-824-1451
TX	Waco, Smith Pump Co.	817-776-0377
TX	Wichita Falls, Evans Elec. Motor Ctrs.	817-723-7466
UT	S. Salt Lake, Engineered Control Sys., Inc.	801-487-6226
VA	Alexandria, Calvert-Jones Co., Inc.	703-370-5850
VA	Chantilly, Engineered Svcs., Inc.	703-471-6310
VA	Danville, Wesco	804-792-2274
VA	Hampton, Wesco	804-826-6730
VA	Lynchburg, Wesco	804-845-0948
VA	Norfolk, Wesco	804-625-7451
VA	Petersburg, Wesco	804-732-1222
VA	Richmond, Wesco	804-353-7353
VA	Roanoke, Wesco	703-344-3271
WA	Longview, North Coast Elec. Co., Inc.	206-423-1550
WA	Moses Lake, Inland Elctrl. Supp. Co.	509-765-1251
WA	Renton, Debenham	206-251-5055
WA	Richland, Wesco	509-783-1397
WA	Spokane, North Coast Elec. Co., Inc.	509-922-1317
WA	Spokane, Power Pump & Elec. Supp.	509-534-5616
WV	Beckley, Wesco	304-252-8633
WV	Bluefield, Wesco	304-325-6151
WV	Bridgeport, Wesco	304-624-6311
WV	Parkersburg, Wesco	304-485-6541
WI	Cedarburg, A-A Elec.	414-377-7500
WI	Green Bay, Climatic Control Co., Inc.	414-336-4060
WI	Madison, Climatic Control Co., Inc.	608-273-1717
WI	Milwaukee, Climatic Control Co., Inc.	414-259-9070
WI	Monroe, Precision Drive & Control, Inc.	608-328-5600
WY	Casper, Crum Elec. Supp. Co.	307-266-1278
WY	Casper, Wesco	307-266-3740
WY	Gillette, Wesco	307-687-0014
EXP	Jamaica, Kingston, Calcon Exporters	809-926-3320
Intl	St. Thomas, Power Sys., Inc.	809-776-0217
PR	Bayamon, Jenson Protective Dvcs.	809-798-3264

DIVERSIFIED TECHNLG., P.O. Box 748, Ridgeland, MS 39157, Tel: 601-856-4121, Telex: 585326, TWX: 810-966-2626; Empl.: 65; *Sls. Mgr.:* Bill Long; *Dist. Mgr.:* Bill Long

DIXON INDS., 386 Metacom Ave., Bristol, RI 02809, Tel: 401-253-2000, Telex: 927706

DIXSON
INSTRUMENTS

DIXSON, INC., INSTRUMENT DIV., Box 1449, Grand Junction, CO 81502, Tel: 303-242-8863, TWX: 910-929-6991; Empl.: 250; *Sls. Mgr.:* Ray Carlson .... **D•1349**

Local Sales Offices & Reps

AL	Birmingham, Sesco-Birmingham	205-988-8304
AZ	Phoenix, Finn-Pat Co. Inc.	602-954-0301
CA	Arcadia, Van Gott & Assocs.	818-445-9728
CA	Newark, Jacobson & Assocs.	415-791-2336
CO	Lakewood, Loritz Controls	303-232-7803
CT	Hamden, Pond Tech. Sls.	203-281-0005
FL	North Palm Beach, Sesco-Miami	305-832-0770
GA	Atlanta, Sesco-Atlanta	404-458-6423
IL	Bartlett, JJS Mktg. Svcs.	312-830-1670
LA	Baton Rouge, Sesco-Baton Rouge	504-928-4951
ME	W. Buxton, Pond Tech. Sls.	207-637-2200
MA	Waltham, Pond Tech. Sls.	617-890-5535
MI	Swartz Creek, JJS Mktg. Svcs.	313-635-7305
MN	Chanhassen, Elctrn. Instr. Cnslts.	612-445-7056
MO	Manchester. Control Sys. Des.	314-227-4212
NY	Mt. Vernon, Sonkin Assocs.	914-668-9809
NY	North Syracuse, Naco Elctrns.	315-699-2651
NC	Cary, Sesco-Raleigh	918-467-7482
OK	Tulsa, Sesco-Tulsa	918-622-3868
OR	Portland, Instr. Rep. Assocs.	503-245-6103
PA	King of Prussia, FLW of PA, Inc.	215-337-4343
TN	Knoxville, Sesco-Knoxville	615-588-5455
TX	Austin, Sesco-Austin	512-892-2490
TX	Dallas, Sesco-Dallas	214-231-9364
TX	Houston, Sesco-Houston	713-999-3510
WA	Seattle, Instr. Rep. Assocs.	206-762-0707
EXP	Toronto, Ontario, Versatile Meas. Instr.	416-239-8161

DMA SYS., 601 Pine St., Goleta, CA 93117, Tel: 805-683-3811; *Sls. Mgr.:* Don M. Minami

DOCUMATION, Box 1240, Melbourne, FL 32901, Tel: 305-725-5500, TWX: 510-959-6286; Empl.: 2800; *Sls. Mgr.:* K. Nelson; *Dist. Mgr.:* D. Carson

DODGE-MASTER-REEVES, Reliance Electric, P. O. Box 99502, Cleveland, OH 44199, Tel: 800-245-4501, in OH 800-245-4497

D. O. INDUSTRIES, 317 E. Chestnut St., E. Rochester, NY 14445, Tel: 716-385-4920, Telex: 200802; FSC No.: 716-381-7032; *Sls. Mgr.:* Jeremy Goldstein

DOLAN-JENNER INDS., Box 1020, Woburn, MA 01801, Tel: 617-935-7444, Telex: 94-8161; Empl.: 120; *Sls. Mgr.:* S. Futran; *Dist. Mgr.:* S. Futran

Local Sales Offices & Reps

CA	Hollywood, Duncan Engrg.	213-462-5880
CA	Mountain View, C/G Assocs.	415-968-6062
CO	Denver, Gribble Sls.	303-279-4545
IL	Buffalo Grove, Jim Laganowski Assoc.	312-520-0130
MA	Hingham, R. J. Wilson	617-749-7575
MI	Walled Lake, Static Controls Corp.	313-363-4500
MN	Minneapolis, Gribble Sls.	612-788-7028
MO	Independence, Gribble Sls.	816-796-4333
NJ	Mt. Laurel, Speck Indl. Controls	609-778-8924
NJ	Rivervale, Budd-Tronics	201-666-5030
NY	Frankfort, Kapital Instr. Sls.	315-894-4245
NC	Greensboro, Ron Ingle	919-273-4042
OH	Novelty, Rogers Sls.	216-338-8500
TN	Knoxville, Stephenson Controls & Sys.	615-588-7473
TX	Lewisville, Gribble Sls.	214-221-5109
WI	Cedarburg, TFL Assocs.	414-377-7030

DOLCH LOGIC INSTRS., 2029 O'Toole Avenue, San Jose, CA 95131, Tel: 408-945-1881, TWX: 910-338-2023; *Sls. Mgr.:* Terry Larson

DOLPH, JOHN C., CO., New Rd., Monmouth Junction, NJ 08852, Tel: 201-329-2333; *Sls. Mgr.:* J. E. Rooze

DONGAN ELECTRIC MFG. CO., 2987 Franklin St., Detroit, MI 48207, Tel: 313-964-3500

DONTECH INC., 601-606 Airport Indl. Blvd., Doylestown, PA 18901, Tel: 215-348-5010, Telex: 685 1155 DONTK; *Sls. Mgr.:* Bernard Sherer

DORAN MFG. CO., 2851 Massachusetts Ave., Cincinnati, OH 45225, Tel: 513-681-5424; Empl.: 40; *Sls. Mgr.:* Russ DeMar

DORMAN BOGDONOFF CORP., Corp. Center, Willow Pond, Andover, MA 01810, Tel: 617-470-0001, Telex: 710-347-0333; *Sls. Mgr.:* Charles P. Centore

DORMEYER INDS., 3418 N. Milwaukee, Chicago, IL 60641, Tel: 312-283-4000, TWX: 910-221-3831; Empl.: 400; *Sls. Mgr.:* Richard Henry

DOTRONIX, 160 First St. SE, New Brighton, MN 55112, Tel: 612-633-1742, TWX: 910-563-3541; Empl.: 130; *Sls. Mgr.:* L. R. Lemke

Local Sales Offices & Reps

GA	Atlanta, E. G. Holmes & Assocs.	404-451-6161
ME	Newton, Gerber Sls. Corp.	617-969-2620
MN	New Brighton, Dotronix	612-633-1742
TX	Dallas, MGR	214-238-5246

DOUGLAS ELCTRNS., 718 Marina Blvd., San Leandro, CA 94577, Tel: 415-483-8770

DOUGLAS RANDALL, 6 Pawcatuck Ave., Pawcatuck, CT 06379, Tel: 203-599-2075, Telex: 6814060; Empl.: 125; *Sls. Mgr.:* N. Paulson .... **B•1323-1331**

Local Sales Offices & Reps

AZ	Tempe, Trembly Assoc.	602-967-2058
CA	Anaheim, Galaxie Sls. Int'l.	714-937-5622
CA	Oakland, Powermatic Assoc.	415-635-6825
CA	San Diego, Qualtronics	619-695-0118
CO	Wheat Ridge, Trembly Assoc.	303-421-8900
CT	Yalesville, JMG-Glynn Connecticut	203-265-9452/2498
FL	Maitland, Ellis & Assoc.	305-645-1101
GA	Lilburn, W. A. Stancil	404-962-5643
IL	Chicago, Ropek-Cahill-Vogt	312-631-0070
MA	Norwood, JMG, Inc.	617-762-5333
MI	Southfield, Fred H. Gehrke & Assoc.	313-559-5363
MN	Osseo, Gaffney Sls. Co.	612-425-5484
MO	Kansas City, Delltron Co. Inc.	816-436-6445
MO	St. Louis, Delltron Co.	314-869-4779
NV	Las Vegas, Trembly Assoc.	702-739-9770
NJ	Morristown, Andrews & Andrews	201-569-8800
NM	Albuquerque, Trembly Assoc.	505-266-8616
NY	Fayetteville, C. W. Floring & Assocs.	315-637-4552
NY	Glen Head, Andrews & Andrews	516-692-8686
NY	Rochester, J. G. Welch Assoc.	716-244-1100
NY	Syracuse, C. W. Floring & Assoc.	315-478-2149
NC	Raleigh, Leigh Sls.	919-872-1484
OH	Cleveland, Geotronix Mktg. Assoc.	216-526-2535
OH	Trotwood, Geotronix, Inc.	513-252-6700
OR	Beaverton, Caruso & Northcutt	503-646-4973
PA	Glenside, Elcom	215-885-1715
TX	Dallas, Paramount Controls	214-341-4561
WA	Bellevue, Caruso & Northcutt	206-454-9699
Can	Mont., Que., Solid State Engrg. Co.	514-481-3313

Local Distributors

CA	Chatsworth, Mil-Comm Dist.	213-998-3111
CA	S. San Francisco, Steven Engrg.	415-588-9200
MA	Middleboro, Glynn Elect.	617-947-4262
OH	Cleveland, Alpha Corp.	216-526-3716
TX	Houston, Alpha Distr. Corp.	713-464-4662
EXP	Jerusalem, Efraim Ben Yakir	
Intl	London, England, Kynmore Eng.	01-839-2371

DOW CHEMICAL CO., 2020 Dow Center, Midland, MI 48640, Tel: 517-636-1000, Telex: 227455, TWX: 810-266-9490; Empl.: 53,300

DOW CORNING CORP., Box 0994, Midland, MI 48686-0994, Tel: 517-496-4000, Telex: 227450, TWX: 810-266-9006; Empl.: 5800

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Local Sales Offices & Reps

AZ	Tempe, Gassner & Clark	602-968-9037
CA	Mountain View, Peninsula Tech. Sls.	415-965-3636
CA	Torrance, Detomasi & Grupp, Inc.	213-327-1775
CO	Englewood, Sierra Tech. Grp., Inc.	303-790-1700
FL	Melbourne, Saber Assocs., Inc.	305-724-0920
FL	Melbourne, Saber Assocs., Inc.	305-742-0920
IL	Schaumburg, Gassner & Clark	312-882-8608
IA	Cedar Rapids, H. R. Brown Sls. Co.	319-366-0635
MD	Beltsville, Applied Engrg. Conslts.	301-792-2211
MA	Lowell, Matrix Sls., Inc.	617-458-2096
MN	Minneapolis, De Beck-Hays Assocs., Inc.	612-835-4649
MN	St. Paul, De Beck	612-635-4649
MO	St. Louis, Abrams & Assocs.	314-569-0447
NM	Albuquerque, Data Handling	505-884-0284
NY	Casenovia, S. T. Woolard Co.	315-655-8145
NY	Melville, Metro-Mics	516-271-6677
NY	Rochester, Lamb Comps., Inc.	716-323-1250
OH	Cincinnati, Delta Sls.	513-271-5444
OR	Tigard, Components West, Inc.	503-684-6171
PA	Paoli, Tyler Griffin Co.	215-647-1550
TX	Houston, Lear Assocs., Inc.	713-488-7893
TX	Richardson, Lear Assocs., Inc.	214-231-5388
WA	Redmond, Components West, Inc.	206-885-5880
Can	Mississauga, Ont., Vitel Elctrns.	416-676-9720

Local Distributors

TX	Ft. Worth, Allied Elctrns.	817-336-5041

DRACON DIV., See Harris Corp., Dracon Div.

DRAKE, R. L., CO., 540 Richard St., Miamisburg, OH 45342, Tel: 513-866-2421, Telex: 28-8017; *Sls. Mgr.:* Richard Renken; *Dist. Mgr.:* Richard Renken

DRANETZ TECHNOLOGIES, INC, Computer Products Division, 1000 New Durham Rd., P.O. Box 4019, Edison, NJ 08818-4019, Tel: 201-287-3680, Telex: 499-7808, TWX: 710-997-9553; FSC No.: 23207; Empl.: 230; *Sls. Mgr.:* A. Orlacchio .... **D•1167**

Local Sales Offices & Reps

AL	Huntsville, Kemp Instrs., Inc.	205-837-4304
AZ	Scottsdale, Barnhill Assocs., Inc.	602-947-7841
CA	Redondo Beach, Ward/Davis Assocs., Inc.	213-643-6977
CA	Santa Clara, Ward/Davis Assocs., Inc.	408-245-3700
CO	Englewood, Barnhill Assocs., Inc.	303-779-3600
CT	Mount Carmel, Scientific Dvcs. - Conn.	203-248-9361
FL	Melbourne, Datarep, Inc.	305-259-8924
FL	Orlando, Datarep, Inc.	305-843-5224

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GA	Atlanta, Kemp Instrs., Inc.	404-452-8050
IL	Elk Grove Village, Loren Green Assocs. Central, Inc.	312-593-0282
IN	Indianapolis, Loren Green Assocs. Central, Inc.	317-293-9827
KS	Shawnee, Atech, Inc.	913-268-9644
LA	Lafayette, Kemp Instrs., Inc.	318-269-9452
MI	Brighton, Stress Anls. Svcs.	313-632-6110
MI	Farmington, Carter, McCormic & Peirce, Inc.	313-477-7700
MN	Edina, Carvel Engrg. & Sls. Co.	612-835-7929
MN	Minneapolis, Loren Green Assocs., Inc.	612-571-6666
MO	St. Louis, Atech, Inc.	314-576-2884
NE	Lincoln, Harry Ferris Co.	402-464-6148
NJ	Lodi, SDM Reps., Inc.	201-368-0123
NM	Albuquerque, Barnhill Assocs., Inc.	505-299-7658
NY	Rochester, SDM Reps., Inc.	716-247-8770
NC	Charlotte, Baesel & Assocs., Inc.	704-375-1044
OH	Cleveland, Carter, McCormic & Peirce, Inc.	216-779-5100
OH	Englewood, Carter, McCormic & Peirce, Inc.	513-836-0951
OR	Portland, Topp Engrg. Sls. Corp.	503-244-7265
PA	Monroeville, Carter, McCormic & Peirce, Inc.	412-372-4415
PA	Plymouth Meeting, Elctrn. Mktg. Assocs., Inc.	215-828-7400
TX	Austin, Barnhill Assocs., Inc.	512-451-0217
TX	Houston, Barnhill Assocs., Inc.	713-688-9971
TX	Richardson, Barnhill Assocs., Inc.	214-231-2573
UT	Murray, Barnhill Assocs., Inc.	801-262-3000
WA	Bellevue, Topp Engrg. Sls. Corp.	206-747-5400
Can	Toronto, Ont., Atelco, Inc.	416-497-2208

DRANETZ TECHNOLOGIES, INC., General Instrument Division, 1000 New Durham Rd., P.O. Box 4019, Edison, NJ 08818-4019, Tel: 201-287-3680, Telex: 4997808, TWX: 710-997-9553; FSC No.: 23207; Empl.: 230; *Sls. Mgr.:* A. Orlacchio

Local Sales Offices & Reps

AL	Huntsville, Kemp Instrs., Inc.	205-837-4304
CA	Costa Mesa, Ward/Davis Assocs., Inc.	714-556-0955
CA	Redondo Beach, Ward/Davis Assocs., Inc.	213-643-6977
CA	Santa Clara, Ward/Davis Assocs., Inc.	208-245-3700
GA	Atlanta, Kemp Instrs., Inc.	404-452-8050
IL	Elk Grove Village, Loren Green Assocs., Central, Inc.	312-593-0282
IN	Indianapolis, Loren Green Assocs., Central, Inc.	317-293-9827
KS	Shawnee, Atech, Inc.	913-268-9644
LA	Lafayette, Kemp Instrs., Inc.	318-269-9452
MI	Southfield, Comtel Instrs. Co.	313-358-2505
MN	Minneapolis, Loren Green Assocs., Inc.	612-571-6666
MO	St. Louis, Atech, Inc.	314-576-2884
NY	Rochester, Harmony Labs	716-458-3376
NC	Charlotte, Baesel & Assocs., Inc.	704-375-1044
OH	Cleveland, Comtel Instrs. Co.	216-442-8080
OH	Dayton, Comtel Instrs. Co.	513-298-7573
OH	Hilliard, Comtel Instrs. Co.	614-876-8305
OR	Portland, Topp Engrg. Sls. Corp.	503-244-7265
PA	Pittsburgh, Comtel Instrs. Co.	412-922-5720
PA	Plymouth Meeting, Electronic Mktg. Assocs., Inc.	215-828-7400
WA	Bellevue, Topp Engrg. Sls. Corp.	206-747-5400-1
Can	Toronto, Ont., Atelco, Inc.	416-497-2208

DRANETZ TECHNOLOGIES, INC., Industrial Products Division, 1000 New Durham Rd., P.O. Box 4019, Edison, NJ 08818-4019, Tel: 201-287-3680, Telex: 499-7808, TWX: 710-997-9553; FSC No.: 23207; Empl.: 230; *Sls. Mgr.:* A. Orlacchio

Local Sales Offices & Reps

AL	Huntsville, Kemp Instrs., Inc.	205-837-4304
CA	Orange, Sterling West	714-997-1862
CA	Pasadena, Jim Robins & Assocs.	818-795-9118
CA	San Jose, D.P. Assocs., Inc.	408-296-1492
CO	Wheatridge, MC2	303-431-2262
FL	Melbourne, Datarep, Inc.	305-259-8924
FL	Orlando, Datarep, Inc.	305-843-5224
GA	Atlanta, Kemp Instrs., Inc,	404-462-8050
IL	Elk Grove Village, MEMECO Sls. & Svc. Corp.	312-228-9555
LA	Lafayette, Kemp Instrs., Inc.	318-269-9452
MI	Brighton, Stress Analysis Svcs.	313-632-6110
MN	Bloomington, Arjay Sls.	612-854-4972
MO	Raytown, Power Spec., Inc.	816-353-6550
MO	St. Charles, Gramlich Elec. Power	314-928-1075
NE	Lincoln, Harry Ferris Co.	402-464-6148
NJ	Bayonne, Long, Poveromo & Assocs., Inc.	201-858-3745
NM	Albuquerque, MC2	505-293-9090
NY	Syracuse, O. R. Lawrence Co.	315-455-5587
NC	Charlotte, Baesel & Assocs., Inc.	704-375-1044
OH	Medina, Stress Analysis Svcs.	216-725-7733
OH	Middletown, Stress Analysis Svcs.	513-422-7900
OK	Stillwater, Acudata, Inc.	405-743-1886
OR	Portland, Topp Engrg. Sls. Corp.	503-244-7265
PA	Carnegie, Stress Analysis Svcs.	412-344-5555
PA	Plymouth Meeting, Electronic Mktg. Assocs., Inc.	215-828-7400
TX	Austin, Acudata, Inc.	512-478-1018
TX	Houston, Acudata, Inc.	713-580-2451
TX	Houston, Payne Assocs./EMS Engrg.	713-537-0056
TX	Plano, Acudata, Inc.	214-424-3567
TX	Rockdale, K & K Elctrns.	512-446-3773
UT	Salt Lake City, MC2	801-364-3174
WA	Bellevue, Topp Engrg. Sls. Corp.	206-747-5400-1
Can	Toronto, Ont., Atelco, Inc.	416-497-2208

DRAWN METAL PRODUCTS, 6143 W. Howard St., Niles, IL 60648, Tel: 312-647-8941; Empl.: 60; *Sls. Mgr.:* Tom Amundson

Dreefs

DREEFS SWITCH, INC., 3782 Hawthorn Ct., Waukegan, IL 60087, Tel: 312-662-7667, 800-323-9605, Telex: 703784; Empl.: 63; *Sls. Mgr.:* Ed Magiera; *Dist. Mgr.:* Ed Magiera .... **B•1553-1555**

Local Sales Offices & Reps

AZ	Tempe, Trembly Assocs., Inc.	602-967-2058
CA	Anaheim, Spectrum Assocs., Inc.	714-630-6977
CA	Sunnyvale, Schwerin Merrill,Inc.	408-735-7900, 312-662-7667
CO	Wheat Ridge, Trembly Assocs., Inc.	303-421-8900
CT	Madison, Reptron Sls.	203-245-2242
IL	Roselle, MSL & Assocs.	312-893-9555
IL	Waukegan, Dreefs Switch, Inc.	800-323-9605
MA	Newton Highlands, WM. Valle Assocs., Inc.	617-965-0002
MO	Raytown, Centech, Inc.	816-358-8100
NJ	Ocean, P. Saftler Assocs.,Inc./Gordon	201-922-3014
NM	Albuquerque, Trembly Assocs., Inc.	505-266-8616
NY	Fulton, P. Saftler Assocs.	315-592-7184
NY	Lynbrook, P. Saftler Assocs.	516-593-7880
OH	Cleveland, Goory Sls. Co.	216-777-2011
OH	Toledo, Jim Finnegan Co.	419-865-5306
OR	Portland, Controltek Sls., Ltd.	503-641-0877
OR	Portland, Controltek, Sls.	503-641-0877
PA	Malvern, Stitzer Assocs.	215-644-5500
TX	Dallas, Blackburn Assocs., Inc.	214-692-8885
TX	Houston, Blackburn Assocs., Inc.	713-463-1354
UT	Salt Lake City, Trembly Assocs., Inc.	801-486-5292
WA	Seattle, Controltek Sls., Ltd.	206-467-0622
WI	Mequon, Badgerep, Inc.	414-241-9200
Can	Concord, Astec Comps.	416-669-4022

Local Distributors

CA	San Jose, Cypress Elctrns.	408-945-8400, 800-538-5112
CA	Torrance, Cypress Elctrns.	213-530-1900
CO	Wheat Ridge, Cypress Elctrns., Inc.	303-431-2622
IL	Wheeling, Hawk Elctrns.	213-459-4030, 800-843-4295
TX	Dallas, Cypress Elctrns., Inc.	214-869-1435
TX	McKinney, Sunbelt Elctrns.	214-542-1432
Can	Mississauga, Ont., Prelco Elctrns., Ltd.	416-745-9370,800-387-3874

DRESSEN-BARNES ELCTRNS., 1600 E. Valencia Dr., Fullerton, CA 92631, Tel: 714-871-3020, TWX: 910-592-1256; FSC No.: 89321; Empl.: 220; *Sls. Mgr.:* B. Guy

DRESSER INDS., 1505 Elm St., Dallas, TX 75201, Tel: 214-746-6000, Telex: 73-2489, TWX: 910-861-4136; Empl.: 55,000

DUKANE CORP., Communications Sys. Div., 2900 Dukane Dr., St. Charles, IL 60174, Tel: 312-584-2300, Telex: 720426; Empl.: 700; *Sls. Mgr.:* Jack Hollis; *Dist. Mgr.:* Jack Hollis

DUMONT ELCTRNS., See Thomson-CSF Comps. Corp., DuMont Div.

DUMONT INSTRUMENTATION, INC., 75 Mall Dr., Commack, NY 11725, Tel: 516-864-8500, TWX: 510-226-3739; Empl.: 15,000; *Sls. Mgr.:* H. Poschmann

DUMONT OSCILLOSCOPE LABS., 40 Fairfield Pl., W. Caldwell, NJ 07006, Tel: 201-575-8666, Telex: 219236 DOLI-UR; FSC No.: 30669; Empl.: 30; *Sls. Mgr.:* John Carter, Jr.

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Local Sales Offices & Reps

AL	Huntsville, L. & D., Inc.	205-837-1469
AZ	Tempe, Southwest E/M Engrg.	602-941-2828
AR	El Dorado, Kemp Engrg. Co., Inc.	501-862-5869
CA	Irvine, Comar Co.	714-540-1219
CA	Mountain View, Caltron Comps.	415-964-3244
CA	San Diego, Comar Co.	619-565-6097
CO	Denver, Elcom	303-337-2300
CT	Guilford, A & M Elctrn.	203-453-1612
FL	Ft. Lauderdale, ElectroComp Assocs.	305-491-4141
FL	Melbourne, ElectroComp Assocs.	305-242-0621
FL	St. Petersburg, ElectroComp Assocs.	813-822-9677
GA	Atlanta, L. & D., Inc.	404-455-3483
IL	Rolling Meadows, KMA Sales Co.	312-398-5300
KS	Shawnee Mission, Florence & Meyer	913-722-5210
LA	Lafayette, Kemp Engrg. Co.	318-269-9452
MA	Needham, A & M Elctrn.	617-444-8170
MI	Farmington Hills, Elcon Michigan Sls.	313-855-3240
MN	St. Paul, J. J. Exon Co.	612-636-5533
NY	Clinton, Advanced Comps.	315-853-6438
NY	Copiague, Sencor	516-842-7676
NY	Endicott, Advanced Comps.	607-785-3191
NY	N. Syracuse, Advanced Comps.	315-699-2671
NY	Scottsville, Advanced Comps.	716-889-1429
NC	Greensboro, L. & D., Inc.	919-292-3201
NC	Raleigh, L. & D., Inc.	919-876-5301
OH	Dayton, Rockford Controls Ohio	513-898-5452
OH	Euclid, Rockford Controls Ohio	216-731-5250
OH	Reynoldsberg, Rockford Controls Ohio	614-868-5577
OK	Tulsa, Kemp Engrg. Co.	918-663-4501
OR	Portland, Dussault & Assocs.	503-641-8540
PA	Philadelphia, Sencor	215-698-9660
TN	Seymour, Tennessee	615-573-6511
TX	Addison, Kemp Engrg. Co.	214-931-7100
TX	Houston, Kemp Engrg. Co.	713-466-1465
UT	Salt Lake City, Elcom	801-532-7940
VA	Richmond, L & D, Inc.	804-257-7717
WA	Seattle, Dussault & Assocs.	206-527-5454
WI	Milwaukee, KMA Sales Co.	414-259-1771

Local Distributors

AZ	Phoenix, Aero-Space SW, Inc.	602-861-1785
CA	Hollywood, Yale Radio Elec. Co.	213-465-3186
CA	Sun Valley, Richey Elctrns.	213-875-2862
CO	Englewood, Industrial Elctrns.	303-694-9444
IL	Elk Grove, RM Co.	312-364-6622
IL	Elk Grove Village, GBL Elctrns.	312-593-3220
LA	Baton Rouge, Industrial Elctrn. Supp.	504-926-0513
LA	Shreveport, Industrial Elctrn. Supp.	318-222-9459
MA	Waltham, Sterling Elctrns.	617-894-6200
MN	Minneapolis, The Bergquist Co.	612-835-2322
NY	Hauppauge, Broadline Elctrns.	516-231-4100
NY	Mt. Vernon, Kin-Tronics	914-668-9885
NC	Winston-Salem, Kirkman Elctrns.	919-722-9131
OH	Akron, Akron Elctrns. Supp.	216-762-8818
OK	Tulsa, Southwest Elctrns.	918-583-7776
OR	Portland, Radar Elec.	503-232-3404
PA	Erie, REM Elctrns. Supp.	814-453-5626
PA	McKeesport, Barno Radio	412-664-9394
TX	Austin, Southwest Elctrns.	512-837-8971
TX	Richardson, Southwest Elctrns.	214-234-3050
TX	Stafford, Southwest Elctrns.	713-491-4900
UT	Salt Lake City, Standard Supp. Co.	801-486-3371
WA	Seattle, Radar Elec.	206-282-2511
WI	Hartland, GW Elctrns.	414-276-1212

DUNEGAN CORPORATION, P.O. Box 3238, Mission Viejo, CA 92690, Tel: 714-831-9131, Telex: 68-3430; FSC No.: 66; Empl.: 70; *Sls. Mgr.:* Mike Kelly

DUOTONE, 6875 S.W. 81st St., S. Miami, FL 33143, Tel: 305-665-1121; Empl.: 20; *Sls. Mgr.:* S. Nester; *Dist. Mgr.:* S. G. Nester

DU PONT CONNECTOR SYSTEMS, 30 Hunter La., Camp Hill, PA 17011, Tel: 800-237-2374, TWX: 510-650-3538; *Sls. Mgr.:* J. McAluney; *Dist. Mgr.:* E. Abbott

DUPONT DE NEMOURS, E. I., & CO., 1007 Market St., Wilmington, DE 19898, Tel: 302-773-3218; Empl.: 130,000

DUPREE, INC., 9835 Dupree St., So. El Monte, CA 91733, Tel: 818-442-4700; Empl.: 60; *Sls. Mgr.:* Beverly Bowdry

DURACELL INTL., S. Broadway, Tarrytown, NY 10591, Tel: 914-591-7000, Telex: 131548, TWX: 710-564-0810; Empl.: 4000

DURAKOOL, 1010 N. Main St., Elkhart, IN 46514, Tel: 219-264-1116, Telex: 25-8482; Empl.: 200; *Sls. Mgr.:* Stan Kalin; *Dist. Mgr.:* Larry Hedeen/Dave Deuel

DURALITH, 525 Orange St., Millville, NJ 08332, Tel: 609-825-6900, TWX: 510-687-7520; Empl.: 500; *Sls. Mgr.:* James Potter

DURGIN & BROWNE, 80 Allen Rd., So. Burlington, VT 05401, Tel: 802-863-6873; Empl.: 35; *Sls. Mgr.:* Chris Riggs

DVE/CALTRONIC CO., LTD., A Sub. of Dee Van Entrp. Co., Ltd., 407 S. Palm Ave., Alhambra, CA 91803, Tel: 818-289-0310 .... **D•1613**

DY-4 SYSTEMS INC., 888 Lady Ellen Pl., Ottawa, ON, Canada K1Z 5M1, Tel: 613-728-3711, Telex: 053-4969; Empl.: 90; *Sls. Mgr.:* Terry Black

DYLON DATA CORP., 9561 Ridgehaven Ct., San Diego, CA 92123, Tel: 619-292-5584, TWX: 910-335-1524; Empl.: 20; *Sls. Mgr.:* R. A. Comstock; *Dist. Mgr.:* Steve Komarek

DYMA ENGRG., Box 1535, Los Lunas, NM 87031, Tel: 505-865-6700; Empl.: 14; *Sls. Mgr.:* Wiley R. Cunningham; *Dist. Mgr.:* Patrick Cating

DYMEC, 8 Lowell Ave., Winchester, MA 01890, Tel: 617-729-7870, TWX: 710-348-6596; Empl.: 80; *Sls. Mgr.:* Bill Schromm

DYMEK CORP., 1851 Zanker Road, San Jose, CA 95070, Tel: 408-947-8700, Telex: 910-338-2174; Empl.: 65; *Sls. Mgr.:* Dan Cribbs; *Dist. Mgr.:* Dan Cribbs

DYNACIRCUITS INC., 11230 W. Addison, Franklin Park, IL 60131, Tel: 312-451-1700; *Sls. Mgr.:* Fred Stein

DYNAGE/CONTROLS, INC., 2 Willowbrook Rd., Cromwell, CT 06416, Tel: 203-635-6257, Telex: 753243 (OAKLEAFINC); Empl.: 9; *Sls. Mgr.:* Helen S. Mendello

Local Sales Offices & Reps

AZ	Scottsdale, Williams Assocs.	602-947-4297
CA	Mountain View, Claypool Controls Corp.	415-968-7488
CO	Commerce City, Williams Assocs.	303-289-5647
CT	Hamden, Applied Meas., Inc.	203-288-5288
FL	Deland, Dell-Tech Control Co.	904-734-4200
IL	Palatine, Delta Instrmn.	312-934-8328
IN	Indianapolis, R. R. Harden Assocs., Inc.	317-849-1708
LA	Metairie, Slaton & Assocs., Inc.	504-455-3855
MD	Gaithersburg, Powell-Pendergraph, Inc.	301-921-4200
MA	Acton, Applied Meas., Inc.	617-263-2766
MI	Lathrop Village, Electro-Assocs. of Mich., Inc.	313-533-8797
MN	Minneapolis, Busch-Elctrns., Inc.	612-835-2044
MO	Ellisville, Advanced Ind. Sys.	314-458-2034
NJ	Plainfield, Cosine, Inc.	201-654-3551
NM	Albuquerque, Williams Assocs.	505-255-1638
NY	Buffalo, Seelbach & Schmitt, Inc.	716-839-2300
OH	Cleveland, Fox & Dole, Inc.	216-476-2625
OH	Dayton, Mohawk Intronics	513-434-8873
OK	Tulsa, Electronic Pneumatic Instrmn.	918-834-8400
OR	Portland, Topp Engrg. Sls. Corp.	503-244-7265
PA	Ingomar, Greye Glass Assocs.	412-366-6664
PA	Pittsburgh, Greye Glass Assocs.	412-366-6664
PA	Thornton, Sentech Co.	215-459-4260
TN	Concord, Technical Automation, Inc.	615-966-5107
TX	Corpus Christi, Collinsystems/Pro-Quip	512-887-9711
TX	Houston, Collinsystems/Pro-Quip	713-464-9428
TX	Weatherford, Collinsystems/Pro-Quip	817-599-8252
UT	Salt Lake City, Applied Engrg. Prods.	801-532-5343
VA	Richmond, Powell-Pendergraph, Inc.	804-270-1400
WA	Bellevue, Topp Engrg. Sls. Corp.	206-747-5400
WI	Milwaukee, Star Engrg. Sls. Corp.	414-645-3680

DYNAGE/POWER & MAGNETICS, Division Of Oakleaf, Inc., 2 Willowbrook Road, Cromwell, CT 06416, Tel: 203-635-3510, Telex: 753243 (OAKLEAFINC); Empl.: 9; *Sls. Mgr.:* Helen S. Mendello

Local Sales Offices & Reps

CT	Cromwell, Oakleaf Engrg. Sls.	203-635-5213
NJ	East Rutherford, L & L Comp. Sls.	201-933-8542
SD	Hartford, Oakleaf Engrg. Sls.	605-528-6701

DYNALOY, INC., 7 Great Meadow La., Hanover, NJ 07936, Tel: 201-887-9270, Telex: 642-033; FSC No.: 27908; Empl.: 19

Local Sales Offices & Reps

CA	Westminster, Contronic Devices	714-897-2266
FL	Ft. Lauderdale, Etchomatic	305-563-5060
MA	Waltham, Etchomatic	617-893-2020
MN	Minneapolis, International Sls.	612-831-8423

DYNAMIC AIR ENGRG, INC., EMC Filter Div., 620 E. Dyer Rd., Santa Ana, CA 92705, Tel: 714-540-2081, TWX: 910-595-2588

DYNAMICS, Div. of Waugh Controls Corp., 9001 Fullbright Ave., Chatsworth, CA 91311, Tel: 818-998-8281, Telex: 69-6171; Empl.: 100; *Sls. Mgr.:* Tony Mastroianni

DYNAMICS RESEARCH CORP., Encoder Division, 60 Concord St., Wilmington, MA 01887, Tel: 617-658-6100; *Sls. Mgr.:* Dave Silva .... **B•1793**

Local Sales Offices & Reps

AZ	Phoenix, Thor Engrg.	602-437-1463
CA	Laguna Beach, Comar Co.	714-240-0140
CA	San Diego, Comar Co.	619-565-6097
CA	San Jose, Motion Sys.	408-246-0641
CO	Aurora, HI Tech.	303-696-7403
CT	Ansonia, Sturdy Corp.	203-734-2186
FL	Tampa, Brawley Tech. Sls.	813-251-6816
MD	Columbia, Tyler Griffen	301-995-1215
MA	Wellesley Hills, Sturdy Corp.	617-235-2330
MI	Southfield, Fred H. Gehrke & Assocs.	313-559-5363
MN	Newport, Applied Motion Technlg.	612-459-0600
MO	St. Louis, Delltron Co.	314-869-4779
NJ	Sparta, E.S. Williams Co.	201-729-4049
NY	Pittsford, Controlled Motion Prods. Co.	714-381-1933
NC	Charlotte, Jake Rudisill Assocs.	704-377-6901
OH	Cincinnati, Kenneth C. Hoffman	513-931-1686
PA	Paoli, Tyler Griffen	215-647-1550
TX	Fort Worth, El-Tech Sls.	817-268-2896
TX	Houston, C.R. Colvin Assocs.	713-961-1262
WI	Colgate, Rep 1 & Assocs.	414-628-4016
Can	Lachine, Que., Electro Design	514-636-4838

DYNAMIC TIME SYSTEMS, INC., 150 West 1230 North, Ste. 2, Provo, UT 84604, Tel: 801-377-9154; *Sls. Mgr.:* Graham Hawkins; *Dist. Mgr.:* Graham Hawkins

DYNAPAR, 1675 Delany Rd., Gurnee, IL 60031, Tel: 312-662-2666, TWX: 910-235-1865; Empl.: 100

DYNAPLEX INC., Interplex, 120-12 28th Ave., Flushing, NY 11354, Tel: 212-961-6750, TWX: 710-582-3048; *Sls. Mgr.:* Lester Zimmerman; *Dist. Mgr.:* Lester Zimmerman

DYNATECH CORP., 1225 E. Wakeham Ave., P.O. Box 1019, Dept. E, Santa Ana, CA 92702, Tel: 714-558-8755, TWX: 910-595-1951; Empl.: 340; *Sls. Mgr.:* Rick Burbank

DYNATEC INTERNATIONAL, 3594 West 1820 South, Salt Lake City, UT 84104, Tel: 801-973-9500, 800-722-7425; *Sls. Mgr.:* Robert Checketts; *Dist. Mgr.:* Robert Checketts

DYNATRONIX, INC., 105 Power St., Amery, WI 54001, Tel: 715-268-8118, 800-826-7172, TWX: 297861 DYTX UR; Empl.: 25; *Sls. Mgr.:* R. W. Kappler; *Dist. Mgr.:* R. W. Kappler, Natl. Sls. Mgr.

DYNISCO, 10 Oceana Way, Norwood, MA 02062, Tel: 617-769-6600, Telex: 092-4347; Empl.: 153

DYSAN CORP., 5201 Patrick Henry Dr., P.O. Box 58053, Santa Clara, CA 95050, Tel: 408-988-3472, Telex: 171551 DYSAN SNTA

Local Sales Offices & Reps

CA	Culver City, Dysan Corp.	213-215-1754
CA	Fair Oaks, Dysan Corp.	916-966-8039
CA	Santa Clara, Dysan Corp.	408-727-9552
CA	Santa Clara, Dysan Corp.	408-988-3472
CO	Denver, Dysan Corp.	303-452-8487
GA	Atlanta, Dysan Corp.	404-952-0919
IL	Rolling Meadows, Dysan Corp.	312-577-2572
MA	Chelmsford, Dysan Corp.	617-256-1900
MI	Livonia, Dysan Corp.	313-525-8240
MN	Bloomington, Dysan Corp.	612-854-4500
MO	St. Louis, Dysan Corp.	314-434-4011
NJ	Marlton, Dysan Corp.	609-596-8210
NY	Forest Hills, Dysan Corp.	718-268-7656
OH	Rocky River, Dysan Corp.	216-333-3725
TX	Dallas, Dysan Corp.	214-256-7446
TX	Houston, Dysan Corp.	713-961-1461
VA	Springfield, Dysan Corp.	703-941-0566
WA	Bellevue, Dysan Corp.	206-455-4724

DYTRONICS CO., See Ryan Intl. Corp.

DZUS FASTENER, 425 Union Blvd., W. Islip, NY 11795, Tel: 516-669-6000, Telex: 96-1454; FSC No.: 72794; Empl.: 100; *Sls. Mgr.:* George R. Davis

EAGLE ELECTRIC MFG. CO., INC., 45-31 Court Sq., L.I.C., NY 11101, Tel: 212-937-8000, Telex: ITTEAGLE 426774; *Sls. Mgr.:* Joseph Mannarino; *Dist. Mgr.:* John Chambers

EAGLE MAGNETIC COMPANY, INC., P.O. Box 24283, Indianapolis, IN 46224, Tel: 317-297-1030, TWX: 810-341-3386; Empl.: 44; *Sls. Mgr.:* Robert Jackson .... **C•1723**

EAGLE-PICHER INDS., INC., Elctrns. Div., Box 47, Joplin, MO 64801, Tel: 417-623-8000, TWX: 910-774-4508; Empl.: 700

EAGLE SIGNAL CONTROLS, Mfg. Div. Gulf & Western Inds., Box 16100, Austin, TX 78761, Tel: 512-837-8300; Empl.: 600

EALING OPTICS CO., Ealing Corp., 22 Pleasant St., S. Natick, MA 01760, Tel: 617-655-7000, Telex: 948339; *Sls. Mgr.:* Peter Andreas

E & L INSTRUMENTS, INC., 61 First St., Derby, CT 06418, Tel: 203-735-8774, Telex: 963536; Empl.: 46

EAO SWITCH CORP., 198 Pepe's Farm Rd., P.O. Box 552 MO, Milford, CT 06460, Tel: 203-877-4577, Telex: 96-4347; FSC No.: 61706; Empl.: 19; *Sls. Mgr.:* George T. Bracci .... **B•1557**

Local Sales Offices & Reps

AL	Huntsville, Conley and Assocs.	205-882-0316
AZ	Scottsdale, Luscombe Engrg. Co. of AZ	602-949-9333
CA	Campbell, Luscombe Engrg. Co. of S.F.	408-370-2020
CA	Pasadena, Luscombe Engrg. Co. of L.A.	213-684-2000
CA	San Diego, Luscombe Engrg. Co. of L.A.	619-295-4300
CO	Boulder, Luscombe Engrg. Co. of CO	303-772-3342
CT	Farmington, Ray Perron & Co., Inc.	203-673-4825
FL	Boca Raton, Conley and Assocs.	305-395-6108
FL	Deerfield Beach, Conley & Assocs.	305-421-7180, 305-358-3735
FL	Oviedo, Conley and Assocs.	305-365-3283
GA	Atlanta, Conley and Assocs.	404-447-6992
FL	Tampa, Conley and Assocs.	813-885-7658
IL	Arlington Hgts., Brainard-Wilson Mktg., Inc.	312-437-2700
IN	Ft. Wayne, M/S Sls. & Assocs.	219-436-3023
IN	Indianapolis, M/S Sls. & Assocs.	317-257-8915
KS	Mission, Mertens Co.	918-432-9323
MD	Columbia, Delta III Assocs., Inc.	301-730-4700
MA	Needham, Ray Perron & Co., Inc.	800-225-4280, 617-449-6162
MI	Plymouth, Jay Mktg. Assocs., Inc.	313-459-1200
MN	Golden Valley, Highland Elctrn. Sls.	612-546-2123
MO	St. Louis, Mertens Co.	314-993-6600
NH	Dover, Ray Perron & Co., Inc.	603-742-2321, 800-225-4280
NJ	Englewood, Sprung/Nussbaum	201-569-5666
NY	Rochester, Apex Assocs., Inc.	716-254-6050
NC	Raleigh, Conley and Assocs.	919-876-9862
OH	Mentor, Jay Mktg. Assocs., Inc.	216-257-5244
OR	Lake Oswego, Luscombe Engrg. Northwest	503-636-6664
PA	Hatboro, Jacobsen Assocs.	215-674-2937
PA	Pittsburgh, R. W. Kneip	412-823-0169
TX	Dallas, Glidden Electro Equip. Co	214-341-0610
TX	Houston, Glidden Electro Equip. Co.	713-681-1415
WI	Milwaukee, Badgerep	414-258-6630

Local Distributors

AL	Huntsville, R.M. Alabama	205-852-1550
AZ	Phoenix, Minarik Elec.	602-233-3000

AZ	Tempe, Fisher Brownell	602-967-1464
CA	Alhambra, Fisher Brownell	714-739-2201
CA	Burlingame, Electric Control Dvcs.	415-348-0791
CA	Gardena, California Switch & Sig.	213-770-2330
CA	Los Angeles, Minarik Elec. Co.	213-624-3161
CA	San Diego, Fisher Brownell	619-560-8545
CA	San Diego, Minarik Elec. Co.	619-560-6632
CA	Santa Clara, Fisher Brownell	408-988-6041
CA	Santa Clara, Minarik Elec. Co.	408-727-0575
CA	Van Nuys, Patane Avionics, Inc.	818-988-4455
CO	Denver, CSID, Inc.	303-292-9594
CT	New Canaan, Impact Sls. Co.	203-972-1458
CT	Shelton, Century Elec. Supp.	203-736-2684
FL	Oviedo, Dixie Sls.	305-365-5211
GA	Norcross, Marshall Elctrn. Grp.	404-923-5750
IL	Elk Grove, Martec Assoc.	312-956-8090
IL	Lombard, R.M. Illinois	312-364-6622,800-325-1433
IL	Rosemont, Advent Elctrns., Inc.	312-297-6200
IN	Indianapolis, R.M. Indiana	317-291-7110
KY	Louisville, Peerless Elctrns.	502-637-7674
LA	Baton Rouge, Menard Elctrns.	504-355-0323
LA	Jefferson, Gulfside Co., Inc.	504-733-4481
ME	Scarborough, Nelson & Wright	207-883-4388
MD	Gaithersburg, Axis Elctrns.	301-840-9640, 800-492-3190
MA	Canton, Impact Sls. Co.	617-821-1500
MI	Grand Rapids, R. M. Elctrns. Co.	616-531-9300
MI	St. Claire Shores, SPEMCO Switches	313-771-2700
MN	Minneapolis, Electronic Ctr., Inc.	612-371-5200
NJ	Cranford, Garden State Indl. Elctrns., Inc.	201-272-6400
NY	Bohemia, Key Comps., Inc.	516-567-7500
NY	Buffalo, Summit Distrs., Inc.	716-887-2800
NY	New York, Martin-Audio/Video	212-541-5900
NY	Rochester, Modutex Corp.	716-647-7900
NY	Rochester, Summit Elctrns., Inc.	716-334-8110
NY	Woodside, Switches Unlimited	718-478-5000
NC	Charlotte, Elctrns. Mktg. Corp.	704-394-6195
NC	Winston-Salem, Kirkman Elctrns., Inc.	919-722-9131,800-334-8688
OH	Columbus, Electronics Mktg. Corp.	614-299-4161
OH	Highland Hgts., Electronics Mktg. Corp.	216-442-3441
OK	Tulsa, Radio, Inc.	918-587-9123
OR	Portland, Minarik Elc. Co.	503-253-3402
PA	Horsham, R. M. Philadelphia	215-674-1181
PA	Lancaster, Advacom	717-299-5615
PA	McKean, Advacom	814-476-7774
PA	Norristown, Kimberly-James Co.	215-666-7286
PA	Pittsburgh, Grant Indl. Controls, Inc.	412-787-9770
TX	Dallas, R.M. Dallas	214-263-8361
TX	Garland, Indl. Equip. Co. of Dallas	214-271-5494
TX	Richardson, Fisher Brownell	214-235-3177
TX	San Antonio, Minarik Elec. Co.	512-822-7097
WA	Bellevue, Integrated Elctrns., Inc.	206-455-2727
WI	Milwaukee, Marsh Elctrns. Corp.	414-475-6000

E-A-R DIV., Cabot Corp., 7911 Zionsville Rd., Indianapolis, IN 46268, Tel: 317-872-1111, TWX: 810-341-3412; *Sls. Mgr.:* Lawrence K. Landers .... **C•1695**

EASCO/K-D TOOLS, 3575 Hempland Rd., Lancaster, PA 17604, Tel: 717-665-4557, Telex: 848429; *Sls. Mgr.:* Mark Lax

EASTERN AIR DEVICES MOTOR DIV., 1 Progress Dr., Dover, NH 03820, Tel: 603-742-3330, TWX: 510-297-4454; Empl.: 200; *Sls. Mgr.:* H. Dumas .... **B•1146**

Local Sales Offices & Reps

AL	Huntsville, Montgomery Mktg.	205-830-0498
CA	Los Altos, Servo Data	415-964-1325
CA	Tustin, Schoenbachler-Dobson Co.	714-544-1888
CO	Boulder, R. G. Entprs.	303-447-9211
FL	Orlando, Perrott Assoc.	305-275-1132
GA	Norcross, Montgomery Mktg.	404-447-6124
IL	Chicago, Berndt Assocs.	312-283-0713
IN	Carmel, Berndt Assocs.	317-844-0114
IA	Cedar Rapids, REPCO, South	319-373-0525
MA	Framingham, Gerald Rosen Co.	617-879-5505
MN	St. Paul, REPCO	612-488-0201
MO	Independence, REPCO, South	816-254-3410
NJ	Ridgefield, Rical Assocs.	201-945-5250
NY	Rochester, Elcom Sls.	716-385-1400
NY	Syracuse, ELCOM Sls.	315-685-8245
NC	Cary, Montgomery Mktg.	919-467-6319
OH	Cleveland, Jim Finnegan & Co.	216-238-5905
PA	Paoli, ETC Sales	215-296-3527
TX	Austin, Oeler & Menelaides Inc.	512-453-0275
TX	Dallas, Oeler & Menelaides Inc.	214-361-8876
WA	Seattle, Eltech	206-767-4330
WI	Milwaukee, Berndt Assocs.	414-545-8400

EASTERN DELTA CORP., 29-09 S. Broadway, Fair Lawn, NJ 07410, Tel: 201-797-4200; FSC No.: 18105; Empl.: 35

EASTERN ELCTRNS. MFG. CORP., 180 Roberts St., East Hartford, CT 06108, Tel: 203-528-9821; Empl.: 100; *Sls. Mgr.:* M. Bengala

EASTERN MARKING MACHINES, 422 S Franklin St., Hempstead, NY 11550, Tel: 516-483-7070, Telex: 968095; Empl.: 8; *Sls. Mgr.:* P. Coburn; *Dist. Mgr.:* L. Sherman

EASTERN MICROWAVE, 4 Gill St., Woburn, MA 01801, Tel: 617-935-8600; FSC No.: 30616; Empl.: 45; *Sls. Mgr.:* Maximilian J. Fuchs

EASTERN SMELTING & REFINING CORP., 37-39 Bubier St., Lynn, MA 01901, Tel: 617-599-9000, Telex: 940108; *Sls. Mgr.:* Donald Decareau

EAST PENN. MFG. CO., INC., Main Office, Lyon Station, PA 19536, Tel: 215-682-6361; Empl.: 1200; *Sls. Mgr.:* John Rickolt/Stanley Glass

EASY HEAT-WIREKRAFT, 555 North Michigan St., Lakeville, IN 46536, Tel: 219-784-3011, Telex: 233159; *Sls. Mgr.:* Russell W. Riddle

EATON CORP., Aerospace Controls/Systems Div., 2074 Whitfield Ave., East, Sarasota, FL 33578, Tel: 813-758-7726

EATON CORP., Microwave Components Div., 680 W. Maude Ave., Sunnyvale, CA 94086, Tel: 408-733-3883, TWX: 910-339-9252; FSC No.: 54987; Empl.: 30

Local Sales Offices & Reps

AZ	Tempe, Sierra Technl. Grp.	602-894-2335
CA	Costa Mesa, EBA Microwave	714-857-6079
CA	Sunnyvale, Loeswicks	408-745-6751
FL	Winter Park, Microwave Mktg.	305-678-2141
IA	Cedar Rapids, S & O Sls.	319-393-1845
KS	Merriam, Midwest Tech. Sls.	913-236-8555
ME	Ogunquit, Micronic Assocs.	617-933-2121
MD	Silver Spring, Youth-Nelson Assocs.	301-598-5740
NY	Fayetteville, R. D. Sherman & Co.	315-637-9861
PA	Huntingdon Valley, Rabal Assoc., Inc.	215-947-4825
TX	Dallas, Stevens Sls. Co.	214-350-2476
WA	Seattle, Ecco Mktg.	206-364-0200

EATON CORP., A.I.L. Div., Comac Rd., Deer Park, NY 11729, Tel: 516-595-3094, TWX: 510-227-6073; FSC No.: 00752; Empl.: 2250; *Sls. Mgr.:* H. N. Kreisberg

EATON CORP., Microwave Products Division, 955 Benicia Avenue, Sunnyvale, CA 94086, Tel: 408-730-6300, TWX: 910-339-9556; FSC No.: 27338; Empl.: 400; *Sls. Mgr.:* J. R. Campbell

EATON CORP, Durant Products, 901 S. 12th St., Watertown, WI 53094, Tel: 414-261-4070, TWX: 910-260-3713; Empl.: 400; *Sls. Mgr.:* H. L. Sisson; *Dist. Mgr.:* Dennis G. Walz

EATON CORP., Elctrn. Instrmn. Div., 5340 Alla Rd., Los Angeles, CA 90066; Empl.: 400

EATON CORP., Printer Prods Oper., Technical Research Park, Riverton, WY 82501, Tel: 307-856-4821, Telex: 910 949 4864; Empl.: 185; *Sls. Mgr.:* Rich Phillips; *Dist. Mgr.:* Rich Phillips

EATON CORP., TEST SYS. DIV., Discrete Test, Precision Rd., Danbury, CT 06810, Tel: 203-797-1281, TWX: 710-456-5030; *Sls. Mgr.:* Dennis Riccio

EATON CORP., TEST SYS. DIV., Memory Test Sys., 21135 Erwin St., Woodland Hills, CA 91365, Tel: 213-887-5550, Telex: 69-8489; Empl.: 200+; *Sls. Mgr.:* Chuck Winick

EATON CORP, Yig-Tek Prods., 785 Palomar Ave., Sunnyvale, CA 94086, Tel: 408-737-7300, TWX: 910-339-9395; Empl.: 100

EATON CORP./CUTLER-HAMMER PRODS, Aerospace & Commercial Controls Div., 4201 N. 27th St., Milwaukee, WI 53216, Tel: 414-449-7487, Telex: 26-716; FSC No.: 81640; *Sls. Mgr.:* J. R. McDonough; *Dist. Mgr.:* E. G. Caporellie

EBERHARD MFG. CO., DIV., Eastern Co., 21944 Drake Rd., Strongsville, OH 44136, Tel: 216-238-9720, Telex: 98-5301; FSC No.: 19220; *Sls. Mgr.:* Edward Hongosh

EBM INDS., INC., 525 New Britain Ave., Unionville, CT 06085, Tel: 203-674-1515, TWX: 710-423-8723; FSC No.: 62292; *Sls. Mgr.:* Robert Sobolewski ..... **C•1626-1628**

Local Sales Offices & Reps

AL	Huntsville, Raycom	205-859-2017
AZ	Scottsdale, Harris And Croy	602-951-9121
AZ	Tucson, Harris and Croy	602-293-5393
CA	Chatsworth, WCV-Raltech, Inc.	818-700-0933
CA	Los Angeles, Wiley Co.	213-666-1611
CA	Palo Alto, Abbott Engrg.	415-968-2265
CA	San Diego, Cerco	619-450-1754
CA	San Diego, Wiley Co.	619-571-2881
CA	Santa Clara, Ross Mktg. Assocs.	408-988-8111
CO	Littleton, Simpson Assocs.	303-794-8381
CT	Clinton, Selmark Assocs.	203-573-9088
FL	Melbourne, Raycom, Imc.	305-259-7988
FL	Orlando, Raycom, Inc.	305-859-5504
FL	Plantation, Raycom, Inc.	305-741-6690
FL	Wellborn, Raycom, Inc.	904-963-5023
GA	Fayetteville, Raycom	406-446-9015
IL	Schaumburg, Micro-Tex, Inc.	312-885-1131
IN	Columbus, Technical Reps.	812-376-9226
IN	Indianapolis, Technical Reps.	317-882-4407
KS	Overland Park, Web Elctrns.	913-381-7986
MD	Columbia, Delta III	301-730-4700
MA	Millis, Selmark Assocs.	617-376-2914
MI	Warren, Burcaw Co.	313-573-4605
MI	Wyoming, Burcaw	616-532-2756
MN	St. Paul, Arkco Sls.	612-777-7454
MO	Florissant, Web Elctrns.	314-921-5720
NH	Hopkinton, Selmark Assocs.	603-746-3299
NJ	Marlton, b.g.r. Assocs.	609-983-1020
NJ	Palmyra, RD Indl. Sls.	609-829-4441
NJ	Perth Amboy, Astrorep, Inc.	201-826-8050
NY	Babylon, Astrorep, Inc.	516-422-2500
NY	Buffalo, Rudell-Merrifield Assocs.	716-634-4300
NY	Skaneateles, ADN/Rudell-Merrifield	315-685-8991
NC	Raleigh, Raycom	919-847-8276
OH	Cleveland, DT/Depco	216-442-6200
OH	West Chester, KT/Depco	513-874-0236
OK	Tulsa, Bonser-Philhower Sls.	918-744-9964
OR	Portland, Earl & Brown Co.	503-245-2283
PA	Harrison City, Rudell-Merrifield Assocs.	412-327-0858
TX	Austin, Bonser-Philhower Sls.	512-346-9186
TX	Dallas, Bonser-Philhower Sls.	214-234-8438
TX	Houston, Bonser-Philhower Sls.	713-531-4144
UT	Midvale, Simpson Assocs.	801-566-3691
WA	Seattle, Earl & Brown Co.	206-284-1121
WA	Seattle, Earl & Brown Co., Inc.	206-284-1121
WI	Waukesha, Mirco-Tex, Inc.	414-542-5352

Local Distributors

AL	Huntsville, Powell Elec.	205-539-2731
AZ	Scottsdale, Hall Elctrns.	602-946-9977
AZ	Tempe, Powell	602-967-7538
CA	Anaheim, Deco Elec.	714-630-8252
CA	Chatsworth, Integrated	213-998-2200
CA	Costa Mesa, Powell	714-754-1717
CA	Fullerton, Pyramid/Fullerton	714-773-0781
CA	Fullerton, Young Sls. Co.	714-871-5355
CA	Hollywood, Yale Elctrns.	213-465-3186
CA	San Diego, Deco Elctrns.	619-693-1595
CA	San Jose, Integrated	408-263-1100
CA	San Jose, Powell Elec.	408-943-9020
CA	Santa Clara, Pyramid Elctrns.	408-727-9810
CA	Sunnyvale, Target Elctrns., Inc.	408-734-5611
CO	Denver, Integrated Elctrns.	303-292-6121
CO	Englewood, Indl. Elctrns.	303-694-9444
CT	Danbury, Pilgrim Elctrns.	203-792-7274
CT	New Canaan, Impact	203-972-1458
CT	Wallingford, Cronin Elec.	203-265-3134
FL	Ft. Lauderdale, Powell Elec.	305-979-5606
FL	Melbourne, Eurick	305-254-8718
FL	Melbourne, Raycom, Inc.	305-259-7988
FL	Pompano Beach, Peerless Radio	305-973-4141
FL	Tampa, Reptron	813-855-4656
GA	Atlanta, ACK Radio Supp.	404-351-6340
GA	Fayetteville, Frankland	404-461-4026
IL	Chicago, NEP Elctrns.	312-625-8400
IL	Hoffman Estates, I.E.C. Intercomp	312-843-2040
IL	Rosemont, Advent Elctrns.	312-297-6200
IN	Indianapolis, Advent Elctrns.	317-872-4910
IA	Cedar Rapids, Advent Elctrns.	319-363-0221
IA	Cedar Rapids, Bergouist	319-366-8733
MD	Beltsville, Resco/D.C.	301-937-9100
MD	Columbia, Powell	301-621-4070
MD	White Marsh, Resco/Baltimore	301-529-0500
MA	Canton, Impact Sls. Co.	617-821-1500
MA	Middleboro, Glynn Elctrns.	617-947-4262
MA	Needham, Cronin	617-449-5000
MA	Westborough, Powell	617-366-6100
MA	Wilmington, J.V. Elctrns.	617-273-4300
MI	Bloomington, NWR Elctrns.	612-854-7329
MI	Farmington Hills, Advent Elctrns.	313-477-1650
MI	Grand Rapids, S.F. Elctrns.	616-459-0216
MI	Grand Rapids, T & W Elctrns.	616-241-3645
MI	Lansing, Fulton Radio Supp. Co.	517-394-5020/2
MI	Livonia, Reptron	313-525-2700

MN	Minneapolis, Bergquist	612-835-2322
MN	Minneapolis, Control Des. Supp.	612-721-1628
MO	Kansas City, L Comp	816-221-2400
NH	Salem, Glynn Elctrns.	603-893-8313
NJ	Berlin, General Comps.	609-768-6767
NJ	Englewood, Powell Elec.	201-894-0800
NJ	Rockaway, Tonar Indus.	201-586-9000
NY	Central Islip, Domino Comps.	516-582-3050
NY	Farmingdale, Addem Sls.	201-882-0993
NY	Hauppauge, Broadline Elec. Distr.	516-231-4100
NY	Lynbrook, Peerless Radio	516-593-2121
NY	Poughkeepsie, Kabelton, Inc.	914-473-1222
NY	Rochester, Simcona	716-328-3230
NY	Suffern, Nobel Elctrns.	914-357-4500
NC	Cary, Powell Elec.	919-467-1212
NC	Raleigh, Century	919-872-2203
OH	Akron, Akron Elctrns.	216-762-8818
OH	Dayton, Related Comps.	513-253-6116
OH	North Royalton, Related Comp.	216-237-7271
OH	Worthington, Reptron Ohio	614-436-6675
OR	Beaverton, Norvac Elctrns.	503-644-1025
OR	Tigard, Integrated Elctrns.	503-639-9661
PA	Harrisburg, Advacom	717-545-5674
PA	McKean, Advacom/Erie	814-476-7774
PA	Norristown, Century Elctrn. Comp. Co.	215-631-5400
PA	Phildelphia, Powell	215-365-1900
RI	Warwick, Cal-Greg	401-738-6170
TN	Hixson, Techni-Tronics	615-842-0514
WA	Bellevue, Integrated Elctrns./Jaco	206-455-2727
WA	Bellevue, Powell Elec.	206-641-4446
WI	Mequon, Taylor Elec. Co.	414-241-4321
WI	New Berlin, Nep Electrns.	414-785-9100

EBY CO., 2751 Southampton Rd., Philadelphia, PA 19154, Tel: 215-969-4200, TWX: 710-670-0452; FSC No.: 72825; Empl.: 150; *Sls. Mgr.:* C. R. Dedera .... **C•1184-1185**

Local Sales Offices & Reps

AZ	Tempe, Gassner & Clark	602-968-9037
CA	Anaheim, Galaxie Sls. Intl.	714-752-1580
CA	Los Altos, J. W. Wilhoit Co.	415-961-3660
CO	Boulder, R. F. Mayo Assocs.	303-499-2155
FL	Coral Springs, EPM Corp.	305-755-5387
GA	Atlanta, Effective Mktg. Force	404-948-6023
IL	Chicago, Rendell Sls. Co.	312-528-9025
IN	Ft. Wayne, Given Corp.	219-432-5585
IA	Cedar Rapids, Gassner & Clark	319-393-5763
MD	Glen Burnie, Macrotech Assocs.	301-437-5588
MA	Newton Upper Falls, Anchor Engrg.	617-964-6205
MI	Brighton, Electronic Sources, Inc.	313-227-3598
MN	Edina, Grayden & Flemmer	612-941-1120
NY	Fairport, Bastian Sls. Agy., Inc.	716-223-0237
NY	Melville, Comtronic Assocs.	516-249-0505
NY	Syracuse, Bastian Sls. Agency, Inc.	325-437-1482
OH	Dayton, J. N. Bailey & Assocs.	513-226-0512
OR	Beaverton, Caruso & Northcutt, Inc.	503-646-4973
PA	Springhouse, Deltatronics, Inc.	215-542-0250
TX	Austin, Stevens Sls. Co.	512-250-5104
TX	Dallas, Stevens Sls. Co.	214-350-2476
VA	Gladys, Ralley Entprs., Inc.	804-283-5656
WA	Bellevue, Caruso & Northcutt, Inc.	206-454-9699

Local Distributors

AL	Birmingham, American Elec. Supp. Co.	205-254-3280
AL	Huntsville, Contact Elctrns.	205-881-9321
AL	Mobile, Electronic Supp. Co.	205-478-0455
AZ	Phoenix, Lion Elctrn. Distrs.	602-869-9611
CA	City of Industry, Ital Elctrn. Sls.	213-968-8515
CA	Irvine, AMC Milliken	714-549-9811
CA	San Carlos, Logan Elctrns.	415-594-0700
CA	San Jose, Afcom	408-263-0660
CA	Santa Ana, Amcotec Elec. Comp. Sls.	714-957-3003
FL	Miami, Alpeco Intl.	305-592-2985
FL	W. Palm Beach, Nurmi Elctrn. Supp.	305-686-8553
GA	Atlanta, Accu-Tech Cable, Inc.	404-455-6422
GA	Atlanta, ACK Radio Supp.	404-351-6340
GA	Atlanta, Prehler Elctrns.	404-447-5540
GA	Atlanta, Specialty Dist. Co., Inc.	404-873-2521
IL	Chicago, Prehler Elctrns.	312-384-6100
IN	Indianapolis, Prehler Elctrns.	317-841-0018
KY	Bowling Green, Randolph, Hale & Meredith	502-781-1460
KY	Hopkinsville, Randolph & Hale	502-885-5357
KY	Louisville, P.I. Burkes Co.	502-589-3960
MD	Columbia, Aztech Elctrns., Inc.	301-995-1760
MI	Farmington Hills, Prehler Elctrns.	313-473-7200
MI	Grand Rapids, S-F Elctrn. Supp. Co.	616-459-0216
MN	Bloomington, Prehler Elctrns.	612-854-4106
NJ	Union, Cougar Elctrns.	201-687-7722
NY	Albany, E.E. Taylor	518-438-7811
NY	Jamaica, Eby Sls. Co. of NY	212-291-3232
NY	Long Island City, Hardware Specialty Co.	212-361-9393
NY	Rome, Rome Elctrns.	315-337-5400
NC	Raleigh, Carolina Cable & Conn.	919-876-9100
NC	Raleigh, Prehler Elctrns.	919-876-9111
NC	Raleigh, Southeastern Elctrns.	919-828-2311
NC	Winston-Salem, Kirkman Elctrns.	919-722-9131
OH	Dayton, Televox, Inc.	513-294-4499
OH	Middleburg Heights, Prehler Elctrns.	216-243-5510
PA	Allentown, Lehigh Elctrns.	215-433-3045
PA	Philadelphia, Spectrum Elctrns., Inc.	215-748-3010
PA	York, Electronic Comps. for Ind.	717-843-8971
SC	Columbia, Dixie Elec.	803-779-5332
TN	Chattanooga, Curle Elctrns.	615-266-4727
TN	Chattanooga, Indl. Elec. Dist., Inc.	615-698-3413
TN	Clarksville, Randolph, Hale & Matthews	615-647-2325
TN	Cookville, Randolph & Parks	615-526-6184
TN	Memphis, Bluff City Distrs.	901-345-9500
TN	Nashville, Randolph & Rice	615-255-5602
TN	Tullahoma, Randolph, Rice & Williams	615-455-4531
TX	El Paso, Midland Specialty Co.	915-533-9555
VA	Roanoke, Peoples Elctrn. Supp.	703-342-8933

ECD CORP., 196 Broadway, Cambridge, MA 02139, Tel: 617-661-4400, TWX: 710-320-6965; Empl.: 40

ECI COMPANY, Box 1565, Terra Haute, IN 47808, Tel: 812-232-4442; Empl.: 3

ECO INSTRS. DIV., Sea Data Corp., 1 Bridge St., Newton, MA 02158, Tel: 617-964-8360, Telex: 951107; Empl.: 40; *Sls. Mgr.:* Jill Shipman

ECOSOFT, INC., 6413 N. College Ave., Indianapolis, IN 46220, Tel: 317-255-6476; Empl.: 6; *Sls. Mgr.:* Emma Alkire

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ECTRON CORP., 8159 Engineer Rd., San Diego, CA 92111, Tel: 619-278-0600, TWX: 910-335-1259; FSC No.: 24856; Empl.: 50; *Sls. Mgr.:* W. W. Hanford ..... **D•1007**

Local Sales Offices & Reps

AZ	Phoenix, Aztec Entprs.	602-944-9185
CA	Costa Mesa, FLW Inc.	714-751-7512
CA	Hayward, FLW Inc.	415-487-2222
CA	San Diego, FLW Inc.	619-277-0993
CA	Van Nuys, FLW Inc.	818-989-5238
CO	Denver, Aztec Entprs.	303-779-5285
FL	Melbourne, Saber Assocs.	305-724-0920
GA	Griffin, Saber Assoc. Inc.	800-327-0853
IL	Elmhurst, Sector Engrg. Sls.	312-530-7850
IN	Indianapolis, Sector Engrg. Sls.	317-842-1120
KS	Overland Park, Ramsey Assocs.	913-649-6996
LA	Baton Rouge, Sesco	504-928-4951
MD	Rockville, Elctrn. Mktg. Assoc.	301-744-7700
MA	Needham, Addelco Corp.	617-444-4754
MI	Royal Oak, Satullo	313-549-3910
MN	Minneapolis, Sector Eng. Sls. Inc.	612-593-1809
MO	Maryland Hgts., Ramsey Assocs.	314-878-5042
NM	Albuquerque, Aztec Entprs.	505-262-1688
NY	East Syracuse, Ossmann Instrs.	315-437-7052
NY	Plainview, Eastern-Metro Assoc.	516-931-1414
NY	Rochester, Ossmann Instrs.	716-424-4460
NY	Saratoga Springs, Ossmann Instrs.	518-377-8604
NC	Clayton, Saber Assocs.	800-327-0853
OH	Cleveland, Instrmn. Sys.	216-845-8800
OH	Dayton, Instrmn. Sys.	513-294-2838
OK	Tulsa, Sesco	918-622-3868
PA	Pittsburgh, Instrmn. Sys.	412-243-1111
PA	Plymouth Meeting, Elctrn. Mktg. Assoc.	215-828-7400
SC	Columbia, Saber Assoc. Inc.	800-327-0853
TX	Dallas, Sesco	214-231-9364
TX	Houston, Sesco	713-999-3510
UT	Ogden, Aztec Entprs.	801-621-1655
VA	Chesapeake, Elctrn. Mktg. Assoc.	804-482-3318
WA	Seattle, Datacom Assoc. Inc.	206-285-2525
WI	Milwaukee, Sector Eng. Sls. Inc.	414-352-8280

EDAC INC., 20 Railside Rd., Toronto, ON, Canada M3A 1A4, Tel: 416-445-2292, TWX: 610-492-1398; FSC No.: 31781; Empl.: 120; *Sls. Mgr.:* Alan Little; *Dist. Mgr.:* Alan Little

EDA INSTRUMENTS, INC., 4 Thorncliffe Park Dr., Toronto, ON, Canada M4HIHI, Tel: 416-425-7800, Telex: 06 23222; Empl.: 50; *Sls. Mgr.:* Scott Hepburn

EDEN EQUIPMENT CO., 17649 Jacquelyn Lane, Huntington Beach, CA 92647, Tel: 714-842-8181

EDL, INC., 385 Oser Ave., Hauppauge, NY 11788, Tel: 516-435-2808, 1-800-DIAL EDL; Empl.: 50; *Sls. Mgr.:* Donna Oliveri

EDMAN CORP., Subsidiary of Rospatch, 7500 Main St., P.O. Box 750, Fishers, NY 14453-0750, Tel: 716-924-4000, TWX: 510-254-2896; Empl.: 170; *Sls. Mgr.:* Howard Potter

EDO CORP./ELINCO DIV., 272 Main Ave., Norwalk, CT 06851, Tel: 203-847-5861, Telex: 96-5945; FSC No.: 73693; Empl.: 87

EDO WESTERN CORP., EDO Corp., 2645 South 300 W., Salt Lake City, UT 84115, Tel: 801-486-7481/3846, Telex: 388-315; Empl.: 360; *Sls. Mgr.:* Doug Moore

EDWARDS CO., Signaling Prods. Div., P.O. Box 1188, Farmington, CT 06034, Tel: 203-678-0410; *Sls. Mgr.:* Al Canevari; *Dist. Mgr.:* Al Canevari

EECO INCORPORATED, 1601 E. Chestnut Ave., P.O. Box 659, Santa Ana, CA 92702-0659, Tel: 714-835-6000, Telex: 67-8420, TWX: 910-595-1550; Empl.: 625; *Sls. Mgr.:* Frank Bruder; *Dist. Mgr.:* Ken Plount .... **B•1558-1561**

Local Sales Offices & Reps

CA	El Monte, Cook Entprs.	213-686-2120
AL	Huntsville, Montgomery Mktg.	205-830-0498
AZ	Scottsdale, Thom Luke Sls.	602-941-1901
AR	Fort Smith, Electra Reps.	501-452-4030
CA	Fountain Valley, Bager Elctrns.	714-957-3367
CA	Los Altos, Recht Assocs.	415-964-6321
CA	San Diego, Harvey King Inc.	619-566-5252
CO	Denver, Delltron Co.	303-373-0300
CT	Danbury, Ray Perron & Co.	203-798-6392
CT	Farmington, Ray Perron & Co.	203-673-4825
FL	Pompano Beach, Ema, Inc.	305-943-3732
FL	Winter Park, EMA, Inc.	305-671-6800
GA	Norcross, Montgomery Mktg.	404-447-6124
IL	Elk Grove Village, John G. Twist Co.	312-593-0200
IN	Fort Wayne, M/S Sls. & Assoc.	219-484-1904
IN	Indianapolis, M/S Sls. & Assocs.	317-257-8915
IA	Cedar Rapids, Palatine Sls.	319-365-8071
KS	Mission, Palatine Sls.	913-831-0555
MD	Rockville, EMA (Elctrn. Mktg. Assts.)	301-881-5300
MA	Needham, Ray Perron & Co.	617-449-6162
MI	Livonia, Lowell Wendt Mktg.	313-464-2722
MN	Bloomington, Elctrn. Sls. Agecy.	612-884-8291
MO	Hazelwood, Palatine Sls.	314-839-0800
NJ	Englewood, Tecnimat	201-569-4200
NY	Endicott, Tech-Mark, Inc.	607-748-7473
NY	Mendon, Techmark, Inc.	716-624-3840
NY	Utica, Techmark, Inc.	315-733-0575
NC	Cary, Montgomery Mktg.	919-467-6319
OH	Aurora, EMA, Inc.	216-562-6104
OH	Centerville, EMA, Inc. (Engr. Mktg. Assts.)	513-433-2800
OR	Beaverton, Blair Hirsh Co.	503-641-1875
PA	Plymouth Meeting, EMA (Elctrn. Mktg. Assts.)	215-828-7400
TX	Austin, Electra Reps. Inc.	512-339-1163
TX	Dallas, Electra Reps. Inc.	214-248-3852
UT	Salt Lake City, Delltron Co.	800-692-2069
WA	Lynnwood, Blair Hirsh Co.	206-774-8151
WI	Brookfield, John G. Twist Co.	414-782-2670

Local Distributors

CA	San Diego, Fisher Brownell	619-560-8545
AL	Huntsville, Hall-Mark Elctrns.	205-837-8700
AL	Huntsville, Marshall Inds.	205-881-9235
AZ	Phoenix, Hall-Mark Elctrns.	602-437-1200
AZ	Tempe, Fisher-Brownell	602-967-1464
AZ	Tempe, Marshall Inds.	602-968-6181
CA	Alhambra, Fisher Brownell	818-289-0255
CA	Canoga Park, Hall-Mark Elctrns.	818-716-7300
CA	Canoga Park, Marshall Inds.	818-999-5001
CA	El Monte, Marshall Inds.	818-442-7204
CA	Irvine, Marshall Inds.	714-660-0952
CA	San Diego, Fisher Brownell	714-560-8545
CA	San Diego, Hall-Mark Elctrns.	619-268-1201
CA	San Diego, Marshall Inds.	619-578-9600
CA	San Jose, Hall-Mark Elctrns.	408-946-0900
CA	Santa Clara, Fisher Brownell	408-988-6041
CA	Sunnyvale, Marshall Inds.	408-732-1100
CA	Sunnyvale, Time Electronics	408-734-9888
CA	Tustin, Hall-Mark Elctrns.	714-669-4700
CO	Denver, Marshall Inds.	303-427-1818
CO	Englewood, Hall-Mark Elctrns.	303-790-1662
CT	Wallingford, Hall-Mark Elctrns.	203-269-0100
CT	Wallingford, Marshall Inds.	203-265-3822
CT	Wallingford, Sager Electrical Supply Co.	203-265-4600
FL	Clearwater, Hall-Mark Elctrns.	813-530-4543
FL	Orlando, Hall-Mark Elctrns.	305-855-4020
FL	Orlando, Marshall Inds.	305-841-1878
FL	Pompano Beach, Hall-Mark Elctrns.	305-971-9280

GA	Atlanta, Marshall Inds.	404-923-5750
GA	Norcross, Hall-Mark Elctrns.	404-447-8000
IL	Bensenville, Hall-Mark Elctrns.	312-860-3800
IL	Schaumburg, Marshall Inds.	312-490-0155
IN	Indianapolis, Mar Elctrns., Inc.	317-875-4510
KS	Lenexa, Hall-Mark Elctrns.	913-888-4747
MD	Baltimore, Hall-Mark Elctrns.	301-988-9800
MD	Gaithersburg, Marshall Inds.	301-840-9450
MA	Billerica, Hall-Mark Elctrns.	617-667-0902
MA	Burlington, Marshall Inds.	617-272-8200
MA	Hingham, Sager Elctrn. Supp. Co.	617-749-6700
MI	Livonia, LWC Distrs.	313-464-7700
MN	Bloomington, Hall-Mark Elctrns.	612-854-3223
MN	Plymouth, Marshall Inds.	612-559-2211
MO	Earth City, Hall-Mark Elctrn.	314-291-5350
MO	St. Louis, Olive Elctrns.	314-426-4500
NJ	Cherry Hill, Hall-Mark Elctrns.	609-355-7300
NJ	Cherry Hill, Hall-Mark Elctrns.	609-424-7300
NJ	Fairfield, Hall-Mark Elctrns.	201-575-4415
NJ	Fairfield, Marshall Inds.	201-882-0320
NJ	Mt. Laurel, Marshall Inds.	215-627-1920
NM	Albuquerque, International Elctrns.	505-345-8127
NY	Endwell, Marshall Inds.	607-754-1570
NY	Hauppauge, Marshall Inds.	516-273-2424
NY	Lynbrook, L.I., Peerless Radio Corp.	516-593-2121
NY	Rochester, Marshall Inds.	716-235-7620
NY	Ronkonkoma, Hall-Mark Elctrns.	516-737-0600
NC	Raleigh, Hall-Mark Elctrns.	919-872-0712
OH	Cincinatti, Hall-Mark Elctrns.	513-563-5980
OH	Dayton, Marshall Ind.	513-236-8088
OH	Solon, Hall-Mark Elctrns.	216-349-4632
OH	Solon, Marshall Inds.	214-248-1788
OH	Westerville, Hall-Mark Elctrns.	614-891-4555
OK	Tulsa, Hall-Mark Elctrns.	918-665-3200
OR	Beaverton, Almac/Stroum	503-641-9070
OR	Beaverton, Marshall Inds.	503-644-5050
TX	Austin, Hall-Mark Elctrns.	512-258-8848
TX	Dallas, Hall-Mark Elctrns.	214-341-1147
TX	Dallas, Marshall Inds.	214-233-5200
TX	El Paso, International Elctrns.	915-598-3406
TX	Houston, Hall-Mark Elctrns.	713-781-6100
TX	Houston, Marshall Inds.	713-789-6600
TX	Richardson, Fisher Brownell	214-235-3177
UT	Murray, Hall-Mark Elctrns.	801-268-3779
WA	Bellevue, Almac Elctrns.	206-643-9992
WA	Bellevue, Marshall Inds.	206-747-9100
WA	Spokane, Almac Elctrns.	509-924-9500
WI	Oak Creek, Hall-Mark Elctrns.	414-797-7844
Can	Burnaby, BC, RAE Indl. Elec. Ltd.	604-291-8866
Can	Calgary, Alb., Cardinal Ind. Elec. Ltd.	403-259-6817
Can	Edmonton, Alb., Cardinal Ind. Elec. Ltd.	403-483-6266
Can	Ottawa, Ont., Carsten Elctrns., Ltd.	613-729-5138
Can	Scarborough, Ont., Carsten Elctrns., Ltd.	416-495-9999
Can	St. Laurent, Que., Carsten Elctrns., Ltd.	514-334-8321

EEMCO DIV., 4585 Electronics Pl., Los Angeles, CA 90039, Tel: 213-247-7060, TWX: 910-497-2269; FSC No.: 72121; Empl.: 350; *Sls. Mgr.:* D. Haymond; *Dist. Mgr.:* D. Haymond

EEV INC., 7 Westchester Plaza, Elmsford, NY 10523, Tel: 914-592-6050, Telex: 6818096; Empl.: 36; *Sls. Mgr.:* Tom Soldano

EFECTOR, INC., 201 So. Gulph Rd., King of Prussia, PA 19406, Tel: 215-337-5500, 800-441-8245, Telex: 84-6437; Empl.: 300; *Sls. Mgr.:* J. Kelly

EFI CORPORATION, 350 West 2700 South, Salt Lake City, UT 84115, Tel: 801-486-5871; Empl.: 35; *Sls. Mgr.:* George O. Stewart

EFRATOM, a division of Ball Corp., 18851 Bardeen Ave, Irvine, CA 92715, Tel: 714-752-2891, Telex: 68-5635; Empl.: 105 .... **A•1361**

Local Sales Offices & Reps

CA	Los Altos, Kolm Mktg. Assoc.	415-948-2635
CA	Los Angeles, Cain Technlg.	213-477-9054
FL	Sarasota, Bass Assocs.	813-922-9538
MA	Natick, Wayland Engrg. Sls.	617-655-6080
NJ	Pennsauken, Sci. Reps.	609-662-5222
NY	Huntington, CDB Entprs.	516-692-5200
TX	Houston, Sci. Devices	713-864-1711
TX	Richardson, Sci. Devices	214-231-8106
VA	Fairfax, Scientific Assocs.	703-385-0600

EG&G, INC., Electro-Optics Div., 35 Congress St., Salem, MA 01970, Tel: 617-745-3200, Telex: 681-7405 EGGSA; FSC No.: 25506; Empl.: 500; *Sls. Mgr.:* J. Murachver

EG & G ALMOND INSTRUMENTS, 1330 E. Cypress St., Covina, CA 91724, Tel: 818-967-9521, TWX: 910-584-1320; Empl.: 260; *Sls. Mgr.:* Dave Adams .... **D•1620-1621**

Local Sales Offices & Reps

FL	Orlando, Truex Assocs.	305-859-2160
MA	Lexington, Circuit Sls. Co.	617-861-0567
NY	Yonkers, Sonkin Assocs.	914-968-8282

EG&G BIRTCHER
INDUSTRIAL
PRODUCTS

EG & G BIRTCHER, 4505 N. Arden Dr., El Monte, CA 91731, Tel: 818-442-2572, Telex: 247345 EGGUR; *Sls. Mgr.:* H. Robert Sproul .... **C•1051-1053**

Local Sales Offices & Reps

AL	Huntsville, Mar-Tec, Inc.	205-883-5910
AZ	Phoenix, Mercury Engrg. Sls.	602-244-0123
CA	Brea, Masco	714-529-0866
CA	San Diego, Masco	619-234-6905
CA	Santa Clara, Nova-Tronix, Inc.	408-727-9530
CO	Broomfield, Connors Co.	303-466-9628
FL	Clearwater, Hutto, Hawkins, Peregory, Inc.	813-797-4447
FL	Maitland, Hutto, Hawkins, Peregory, Inc.	305-831-2474
FL	Pompano Beach, Hutto, Hawkins, Peregoy, Inc.	305-971-5750
GA	Roswell, Mar-Tec, Inc.	404-992-0040
IL	Rollings Meadows, Heartland Technlg. Mktg., Inc.	312-577-9222
KS	Shawnee Mission, Midland Engrg. Sls. Assocs.	913-262-5500
MD	Baltimore, Burgin Kreh Assocs., Inc.	301-265-8500
MA	Burlington, Conti-Younger Assocs., Inc.	617-273-1582
MN	Minneapolis, Hei-Lite Sls., Inc.	612-861-6051
NY	Great Neck, Frank Tylinski Co., Inc.	516-466-9070
NY	Syracuse, IA Hotze Assocs.	315-479-6641
NC	Raleigh, Tingen Technlg. Sls., Inc.	919-878-4440
OH	Cleveland, Jim Finnegan & Co.	216-238-5905
OH	Dayton, Jim Finnegan & Co.	513-890-8322
OR	Beaverton, Eclipse Mktg. Grp.	503-642-1661
TX	Dallas, El-Com Mktg., Inc.	214-241-2166
VA	Lynchburg, Burgin Kreh Assocs., Inc.	804-239-2626
WA	Redmond, Eclipse Mktg. Grp.	206-885-6991
WI	Milwaukee, Heartland Technlg. Mktg., Inc.	414-931-0606

Local Distributors

CA	Cerritos, El-Com, Inc.	213-404-2961
CA	Manhattan Beach, Prime Electro Prods.	213-379-1724
CA	San Diego, El-Com	619-578-0900
CA	San Jose, Bisco Inds.	408-946-8980
CA	Santa Clara, Pyramid Elctrns.	408-727-9810
CO	Aurora, Jet Elctrns. Supp. Co., Inc.	303-364-5487
FL	Pompano Beach, Peerless Radio Corp. of FL	305-973-4141
IL	Franklin Park, Bisco Inds.	
MA	Winchester, Rush Inds., Inc.	617-729-5800
MN	Minneapolis, Stark Elctrns., Inc.	612-322-1325
NH	Hudson, C & H Elctrns., Inc.	603-882-1133
NY	Bohemia, Car Lac Inds. Sls., Inc.	516-567-4200
NY	Buffalo, Summit Distrs.	716-884-3450
NY	Lynbrook, Peerless Radio Corp.	516-593-2121
NY	Rochester, Summit Distrs.	716-334-8110
OH	Englewood, Argent Inds.	513-836-8633
TX	Ft. Worth, Industrial Elctrns.	817-731-7321
TX	Houston, Force Elctrns.	713-561-8644
TX	Irving, Force Elctrns.	214-438-5700
WA	Redmond, Murphy Elctrns.	206-881-1234

EG&G GAMMA SCIENTIFIC, Div. of EG&G Inc., 3777 Ruffin Rd., San Diego, CA 92123, Tel: 619-279-8034, Telex: 697938; Empl.: 75; *Sls. Mgr.:* Robert Ruff

EG&G GEOMETRICS, Div. of EG&G Inc., 395 Java Dr., Sunnyvale, CA 94089, Tel: 408-734-4616, Telex: 357435; FSC No.: 34314; *Sls. Mgr.:* Ross Johnson; *Dist. Mgr.:* Fritz Faber

EG&G RETICON, Div. of EG&G, 345 Potrero Ave., Sunnyvale, CA 94086-4197, Tel: 408-738-4266, Telex: 910-339-9343; *Sls. Mgr.:* John Skurla

EG&G ROTRON

EG & G ROTRON, Commercial Div., Saugerties, NY 12477, Tel: 914-246-3615, Telex: 551496; *Sls. Mgr.:* Michael Keating; *Dist. Mgr.:* Ralph Stevens .... **C•1630-1636**

Local Sales Offices & Reps

AL	Huntsville, Over & Over	205-837-7105
AZ	Phoenix, Westrep	602-997-8899
CA	Anaheim, Westrep	213-404-3881
CA	Chatsworth, EG & G Rotron	818-709-2133
CA	San Diego, Hadden Assoc.	619-565-9444
CA	Santa Clara, Westrep	408-988-8833
CO	Littleton, Lange Sls.	303-795-3600
CT	Stamford, Circuit Sls.	203-322-0240
FL	Apopka, G. Bohman	305-886-1882
GA	Norcross, Over & Over, Inc.	404-449-6205
HI	Honolulu, R. Clark	808-531-5897
IL	Rolling Meadows, Sumer	312-991-8500
IN	Indianapolis, F. J. Campisano	317-253-7651
IA	Cedar Rapids, S & O Sls.	319-393-1845
KS	Raytown, CenTech	816-358-8100
MD	Columbia, L. D. Lowery	301-964-0225
MA	Lexington, Circuit Sls.	617-861-0567
MI	Detroit, Rathsburg Assocs.	313-882-1717
MN	Mendota Heights, G-11 Sales	612-454-3086
MO	Bridgeton, CenTech	314-291-4230
MO	Raytown, CenTech	816-358-8100
NJ	Springfield, F. Sylvester	201-376-3324
NY	Saugerties, Rotron (Commercial Div.)	914-246-3615
NC	Charlotte, Over & Over	704-527-3070
OH	Cincinnati, F. J. Campisano	513-574-7111
OH	Cleveland, Comp., Inc.	216-243-9200
OK	Tulsa, Ammon & Rizos	918-663-8788
PA	Broomall, L. D. Lowery	215-356-5300
TX	Dallas, Ammon & Rizos	214-644-5591
TX	Houston, Ammon & Rizos	713-781-6240
UT	Salt Lake City, Lange Sls.	801-487-0843
WA	Lynnwood, Blum & Assocs.	206-775-6656
WI	Brookfield, Sumer, Inc.	414-784-6641
EXP	NY, Great Neck, A. Auriema	516-487-0700

Local Distributors

	Chatsworth, Arrow Elctrns.	818-701-7500
AL	Huntsville, Arrow Elctrns.	205-882-2730
AL	Huntsville, Hall-Mark Elctrns.	205-837-8700
AL	Huntsville, Schweber Elctrns.	205-882-2200
AZ	Phoenix, Cetec Elctrns.	602-272-7951
AZ	Phoenix, Hall-Mark Elctrns.	602-243-6601
AZ	Phoenix, Schweber Elctrns.	602-997-4874
AZ	Tempe, Arrow Elctrns.	602-968-4800
CA	Canoga Park, Hall-Mark Elctrns.	818-716-7300
CA	Canoga Park, Schweber Elctrns.	818-999-4702
CA	El Segundo, Hall Mark Elctrns.	213-643-9101
CA	Gardena, Schweber Elctrns.	213-327-8409
CA	Glendale, R. V. Weatherford	213-849-3451
CA	Hayward, Arrow Elctrns.	415-487-4600
CA	Irvine, Cetec Elctrns.	714-521-7412
CA	Irvine, Schweber Elctrns.	714-863-0200
CA	Los Angeles, Richey/Western	214-820-3777
CA	Sacramento, Arrow Elctrns.	916-925-7456
CA	Sacramento, Schweber Elctrns.	916-929-9732
CA	San Diego, Arrow Elctrns.	619-565-4800
CA	San Diego, Cetec Elctrns.	619-278-5020
CA	San Diego, Hall-Mark Elctrns.	619-268-1201
CA	San Diego, Schweber Elctrns.	619-450-0454
CA	San Jose, Cetec Elctrns.	408-263-7373
CA	San Jose, Hall-Mark Elctrns.	408-773-9990
CA	San Jose, Schweber Elctrns.	408-946-7171
CA	South Gate, Cetec Elctrns.	213-773-6521
CA	Sunnyvale, Arrow Elctrns.	408-745-6600
CA	Tustin, Arrow Elctrns.	714-838-5422
CA	Tustin, Hall Mark Elctrns.	714-669-0681
CO	Aurora, Hall-Mark Elctrns.	303-696-1111
CO	Denver, R. V. Weatherford	303-428-6900
CO	Englewood, Schweber Elctrns.	303-799-0258
CT	Danbury, Schweber Elctrns.	203-748-7080
CT	Wallingford, Arrow Elctrns.	203-265-7741
FL	Altamonte Springs, Schweber Elctrns.	305-331-7555
FL	Clearwater, Arrow Elctrns.	813-576-8995
FL	Clearwater, Hall-Mark Elctrns.	813-530-4543
FL	Deerfield Beach, Arrow Elctrns.	305-429-8200
FL	Hollywood, Schweber Elctrns.	305-927-0511
FL	Orlando, Hall-Mark Elctrns.	305-855-4020
FL	Palm Bay, Arrow Elctrns.	305-725-1480
FL	Pompono Beach, Hall-Mark Elctrns.	305-971-9280
GA	Atlanta, Schweber Elctrns.	404-449-9170
GA	Norcross, Arrow Elctrns.	404-449-8252
GA	Norcross, Hall-Mark Elctrns.	404-447-8000
IL	Bensenville, Hall-Mark Elctrns.	312-860-3800
IL	Elk Grove, Schweber Elctrns.	312-364-3750
IL	Schaumburg, Arrow Elctrns.	312-397-3440
IN	Indianapolis, Arrow Elctrns.	317-243-9353
IA	Cedar Rapids, Arrow Elctrns.	319-395-7230
IA	Cedar Rapids, Schweber Elctrns.	319-373-1417
KS	Kansas City, Schweber Elctrns.	913-492-2922
KS	Lenexa, Hall-Mark Elctrns.	913-888-4747

KS	Overland Park, Arrow Elctrns.	913-642-0592
MD	Columbia, Arrow Elctrns.	301-995-0003
MD	Columbia, Hall-Mark Elctrns.	301-796-9300
MD	Gaithersburg, Schweber Elctrns.	301-840-5900
MA	Bedford, Schweber Elctrns.	617-275-5100
MA	Billerica, Hall Mark Elctrns.	617-935-9777
MA	Woburn, Arrow Elctrns.	617-933-8130
MI	Ann Arbor, Arrow Elctrns.	313-971-8220
MI	Grand Rapids, Arrow Elctrns.	616-243-0912
MI	Livonia, RS Elctrns.	313-525-1155
MI	Livonia, Schweber Elctrns.	313-525-8100
MN	Bloomington, Hall-Mark Elctrns.	612-854-3223
MN	Edina, Arrow Elctrns.	612-830-1800
MN	Edina, Schweber Elctrns.	612-941-5280
MN	Minneapolis, I.C.I.	612-831-2666
MO	Maryland Hts., Hall-Mark Elctrns.	314-291-5350
MO	St. Louis, Arrow Elctrns.	314-567-6888
MO	St. Louis, Schweber Elctrns.	314-739-0562
NH	Manchester, Arrow Elctrns.	603-668-6968
NH	Manchester, Schweber Elctrns.	603-625-2250
NJ	Cherry Hill, Hall-Mark Elctrns.	609-424-7300
NJ	Fairfield, Arrow Elctrns.	201-575-5300
NJ	Fairfield, Hall-Mark Elctrns.	201-575-4415
NJ	Fairfield, Schweber Elctrns.	201-227-7880
NJ	Marlton, Arrow Elctrns.	609-596-8000
NM	Albuquerque, Arrow Elctrns.	505-243-4566
NY	Buffalo, Summit Elctrns.	716-884-3450
NY	Buffalo, Summit Elctrns.	607-748-8211
NY	Hauppauge, Arrow Elctrns.	516-231-1000
NY	Liverpool, Arrow Elctrns.	315-652-1000
NY	Rochester, Arrow Elctrns.	716-427-0300
NY	Rochester, Schweber Elctrns.	716-424-2222
NY	Ronkonkoma, Hall Mark Elctrns.	516-737-0600
NY	Westbury, Schweber Elctrns.	516-334-7474
NC	Raleigh, Hall-Mark Elctrns.	919-832-4465
NC	Raleigh, Schweber Elctrns.	919-876-0000
NC	Winston-Salem, Arrow Elctrns.	919-725-8711
OH	Beachwood, Schweber Elctrns.	216-464-2970
OH	Centerville, Arrow Elctrns.	513-435-5563
OH	Cincinnati, Hall-Mark Elctrns.	513-563-5980
OH	Cleveland, Hall-Mark Elctrns.	216-349-4632
OH	Columbus, Arrow Elctrns.	614-885-8362
OH	Dayton, Schweber Elctrns.	513-439-1800
OH	Solon, Arrow Elctrns.	216-248-3990
OK	Tulsa, Arrow Elctrns.	918-665-7700
OK	Tulsa, Hall-Mark Elctrns.	918-665-3200
OK	Tulsa, Schweber Elctrns.	918-622-8000
OR	Beaverton, Almac Elctrns.	503-641-9070
OR	Tigard, Arrow Elctrns.	503-684-1690
PA	Horsham, Schweber Elctrns.	215-441-0600
PA	Philadelphia, Almo Elctrns.	215-698-4000
PA	Pittsburgh, Schweber Elctrns.	412-782-1600
TX	Austin, Schweber Elctrns.	512-458-8253
TX	Carrollton, Arrow Elctrns.	214-380-6464
TX	Dallas, Hall-Mark Elctrns.	214-553-4300
TX	Dallas, Schweber Elctrns.	214-661-5010
TX	Houston, Arrow Elctrns.	713-530-4700
TX	Houston, Hall-Mark Elctrns.	713-781-6100
TX	Houston, Schweber Elctrns.	713-784-3600
UT	Salt Lake City, Arrow Elctrns.	801-972-0404
UT	Salt Lake City, Hall-Mark Elctrns.	801-268-3779
VA	Richmond, Arrow Elctrns.	804-282-0413
WA	Bellevue, Almac Elctrns.	206-643-9992
WA	Bellevue, Arrow Elctrns.	206-643-4800
WI	Brookfield, Schweber Elctrns.	414-784-9020
WI	Oak Creek, Arrow Elctrns.	414-764-6600
WI	Oak Creek, Hall-Mark Elctrns.	414-761-3000

EG & G ROTRON, Custom Div., Hasbrouck La., Woodstock, NY 12498, Tel: 914-679-5201, TWX: 510-247-9033; FSC No.: 82877; *Sls. Mgr.:* Mike Lyon; *Dist. Mgr.:* Mary Fellows .... **B•1210**

EG & G TORQUE SYSTEMS, 36 Arlington St., Watertown, MA 02172, Tel: 617-924-6000, Telex: 95-1736; Empl.: 200; *Sls. Mgr.:* W. F. O'Leary; *Dist. Mgr.:* H. D. Waddell

EG & G VACTEC, 10900 Page Blvd., St. Louis, MO 63132, Tel: 314-423-4900, TWX: 910-764-0811; Empl.: 250; *Sls. Mgr.:* D. Hartley; *Dist. Mgr.:* D. Hartley .... **B•1210**

Local Sales Offices & Reps

CA	Encino, King-Way Assocs.	818-788-4124
CA	Redwood City, Ault Assocs.	415-367-1710
CO	Arvada, Arrowhead Sls. Corp.	303-423-5556
CT	Gilford, A & M Elctrn. Reps.	203-453-1612
FL	Orlando, EAB Assocs.	305-898-7444
IL	Highland Park, T. B. Hunter Assocs.	312-433-7000
IN	Fort Wayne, Scott Elctrns.	219-484-7865
IN	Indianapolis, Scott Elctrns.	317-897-9976
MA	Needham, A & M Elctrn. Reps.	617-444-8170
MI	Southfield, O.E.M. Technical Sls.	313-444-1680
MI	Troy, Scott Elctrns.	313-585-7690
MN	Eden Prairie, Rockmore Sls.	612-941-1390
MO	Independence, Engrg. Svcs. Co.	816-254-3600
MO	St. Louis, Engrg. Svcs. Co.	314-997-1515
NJ	Marlton, B.G.R. Assocs.	609-428-2440
NY	Pittsford, C. W. Beach Co.	716-586-3200
NY	Syracuse, C. W. Beach Co.	315-446-9587
OH	Cincinnati, Scott Elctrns.	513-791-2513
OH	Cleveland, Scott Elctrns.	216-473-5050
OH	Kettering, Scott Elctrns.	513-294-0539
OH	Reynoldsburg, Scott Elctrns.	614-863-1281
PA	Pittsburgh, Scott Elctrns.	412-828-1073
TX	Dallas, S. W. Mktg. Assocs.	214-341-8631
WA	Bellevue, N. R. Schultz Co.	206-454-0300

Local Distributors

AZ	Scottsdale, Instate Mktg.	602-244-9050
CA	Encino, King Way West	818-788-4124
CA	Palo Alto, Zack Elctrns.	415-326-5432
CA	Santa Clara, Allied Elctrns.	408-727-1690
CO	Denver, Integrated Elctrns. Co.	303-534-6121
FL	Orlando, EAB, Inc.	305-898-7444
ID	Boise, N. R. Schultz	208-377-8686
IL	Chicago, Newark Elctrns.	312-638-4411
IL	Elgin, Allied Elctrns.	312-697-8200
MO	St. Louis, Olive Indl. Elec.	314-426-4500
OH	Dayton, Televox, Inc.	513-294-4499
OR	Beaverton, N. R. Schultz	503-643-1644
TX	Fort Worth, Allied Elctrns.	817-336-5401
Intl	Reading, Berkshire U.K., Norbain Opto Elctrns. Div.	0734-864411

EG&G WAKEFIELD ENGRG., 60 Audubon Rd., Wakefield, MA 01880, Tel: 617-245-5900, TWX: 710-348-6713; Empl.: 240; *Sls. Mgr.:* Ray A. Radford; *Dist. Mgr.:* Carl Swanson

EH ELECTRONICS, INC., Sub. EH Intl., Inc., 48507 Milmont Drive, Fremont, CA 94538, Tel: 415-651-2340, TWX: 910-366-7258; FSC No.: 13488; Empl.: 67; *Sls. Mgr.:* Donald F. Smith

EHRHORN TECHNOLOGICAL OPERS., INC., P.O. Box 888, Canon City, CO 81212, Tel: 303-275-1613; Empl.: 50; *Sls. Mgr.:* Terry Dillahunty

EIGEN VIDEO, P.O. Box 848, Nevada City, CA 95959, Tel: 916-272-3461, Telex: 298788 EIG UR; FSC No.: 59535; Empl.: 50

EIKONIX CORP., 23 Crosby Dr., Bedford, MA 01730, Tel: 617-275-5070

EI NORTH AMERICA, 15 W. 53rd St. Suite 47E, New York, NY 10019, Tel: 212-315-3099, Telex: 803347 'EINA'

EIP MICROWAVE, INC., 2731 North First St., San Jose, CA 95134, Tel: 408-946-5700, TWX: 910-338-0155; FSC No.: 34257; Empl.: 250; *Sls. Mgr.:* Robert Loft/Bill Dentinger

EITEL MFG., 2835 Laguna Canyon Rd., Laguna Beach, CA 92652, Tel: 714-494-2012; Empl.: 6; *Sls. Mgr.:* H. Mengel

ELANTEC, INC., 1996 Tarob Ct., Milpitas, CA 95035, Tel: 408-945-1323, 800-821-7429, TWX: 910-997-0649; FSC No.: 64762; Empl.: 90; *Sls. Mgr.:* Jerry Zis

ELCO CORP., Electronic Connector Div., Huntingdon Ind'l. Park, Huntingdon, PA 16652, Tel: 814-643-0700, TWX: 510-691-3117; Empl.: 500; *Sls. Mgr.:* J. J. Smith; *Dist. Mgr.:* John J. Galiney, Jr.

ELCO CORP., Interconnect Systems Div., 2250 Park Pl., El Segundo, CA 90245, Tel: 213-675-3311; *Sls. Mgr.:* T. Tuttle

ELCOM INDUSTRIES, INC., 10268 Bach Blvd., St. Louis, MO 63132, Tel: 314-429-3100

Local Sales Offices & Reps

CA	Anaheim, Magna-Code, Inc.	714-821-7500
MA	Newton Highlands, Butler Assocs., Inc.	617-965-1080

ELCOM SYSTEMS, INC., 932 Clint Moore Rd., Boca Raton, FL 33431, Tel: 305-994-1774; FSC No.: 32424; Empl.: 5; *Sls. Mgr.:* D. Pollachek .... **A•1711**

Local Sales Offices & Reps

EXP	MA, Mattapoisett, Clark Export-Import Co.	617-758-6448

ELCON PRODUCTS INTERNATIONAL COMPANY, 44036 Grimmer Blvd., Fremont, CA 94538, Tel: 415-490-4200, Telex: 910-381-7026; FSC No.: 85901; Empl.: 25; *Sls. Mgr.:* Shirley Gendreau; *Dist. Mgr.:* Shirley Gendreau

ELDEC CORP., Monitor & Control Div., 16700 13th Ave. W., P.O. Box 100, Lynnwood, WA 98046-0100, Tel: 206-743-1313, Telex: 32-8959, TWX: 910-449-2855

ELDEC CORP., Power Conversion Div., 16700 13th Ave. W., P.O. Box 100, Lynnwood, WA 98036, Tel: 206-743-1313, Telex: 32-8959, TWX: 910-449-2855

ELDEC CORPORATION, Sensing Systems Div., 16700 13th Ave. West, P.O. Box 100, Lynnwood, WA 98046-0100, Tel: 206-487-4000, Telex: 32-8959, TWX: 910-449-0873

ELDORADO INSTRS., 7303 Edgewater Dr., Oakland, CA 94621, Tel: 415-638-5656, TWX: 910-366-7258; FSC No.: 54495; *Sls. Mgr.:* Paul Magnusson

ELDRE CORPORATION, 1500 Jefferson Rd., Rochester, NY 14623, Tel: 716-427-7280, TWX: 510-253-4347; FSC No.: 19648; Empl.: 220; *Sls. Mgr.:* Harvey Erdle

Local Sales Offices & Reps

AL	Huntsville, Elctrns. Mktg. Assocs.	205-837-7363
AZ	Tucson, W.J.M. Sls. Co.	602-888-4847
CA	Beverly Hills, ELDRE West	213-271-4485
CA	Palo Alto, ELDRE West	415-325-0838
CO	Denver, Spectrum Sls.	303-480-9991
FL	Altamonte Springs, V. G. Sls. Co., Inc.	305-831-8688
FL	Pompano Bch., V. G. Sls. Co., Inc.	305-971-0900
GA	Atlanta, Electronic Mktg. Assocs.	404-448-1215
GA	Norcross, Elctrns. Mktg. Assocs.	404-448-1215
IL	Oak Park, ELDRE Midwest	312-383-1414
MD	Ellicott City, Arbotek Assocs.	301-461-1323
MA	Brookline, Harman Assocs.	617-232-6687
MO	St. Louis, Cadon Techn. Sls.	314-645-8670
NJ	Haddonfield, Tritek Sls.	609-429-1551
NM	Albuquerque, W.J.M. Sls. Co.	505-898-5917
NY	Rochester, ELDRE Corp.	716-427-7280
NC	Raleigh, Electronic Mktg. Assocs.	919-847-8800
NC	Winston-Salem, lctrns. Mktg. Assocs.	919-722-5151
OH	Cleveland, Marlow Assocs., Inc.	216-991-6500
OH	Columbus, Marlow Assocs., Inc.	614-885-7643
OR	Portland, Electronic Mktg. Grp.	503-252-0610
PA	Pittsburgh, Marlow Assocs., Inc.	412-367-8886
SC	Greenville, Elctrns. Mktg. Assocs.	803-233-4673
UT	Ogden, Spectrum Sls.	801-972-8552
WA	Redmond, Electronic Mktg. Grp.	206-882-0962

ELEC-TEK, INC., 10280 Alliance Rd., Cincinnati, OH 45242, Tel: 513-793-7937; FSC No.: 5U373; Empl.: 10; *Sls. Mgr.:* Rick Groth

ELECTRAC, INC., 1614 Orangethrope Way, Anaheim, CA 92801, Tel: 714-879-6021, Telex: 692433; FSC No.: 016154; Empl.: 21

ELECTRICAL INDS., 691 Central Ave., Murray Hill, NJ 07974, Tel: 201-464-3200, TWX: 710-984-7979; FSC No.: 20093; *Sls. Mgr.:* D.V. Wilson

ELECTRICAL INSTR. SVC., 25 Dock St., Mt. Vernon, NY 10550, Tel: 914-699-9717; FSC No.: 32590;16034A; Empl.: 35

ELECTRICAL PLASTICS CORP., 500 Long Branch Ave., Long Branch, NJ 07740, Tel: 201-870-9500; Empl.: 50

ELECTRICAL STANDARDS DIV., E.S.R.S., Inc., 7337 Greenbush, N. Hollywood, CA 91605, Tel: 818-765-4224; Empl.: 6

ELECTRIC DEVICE, PO Box 337, Canfield, OH 44406, Tel: 216-533-3060

ELECTRIC FIELD MEASUREMENTS, Box 326, W. Stockbridge, MA 01266, Tel: 413-637-1929; Empl.: 3; *Sls. Mgr.:* L. Hegl

Distributor

ELECTRIC SWITCHES, INC., 2478 Fletcher Dr., Los Angeles, CA 90039, Tel: 213-660-1310, TWX: 910-321-2971; Empl.: 42; *Sls. Mgr.:* Louis Lim ..... **B•1516,1517, pgs. 605, 614, 616, 632, 635, 637, 638, 639, 651, 657, 669, 672, 675, 676, 688, 689, 701, 709, 711, 719, 724, 726, 731, 736, 747, 751, 753, 766, 767, 768, 781, 786, 789, 794, 801, 803, 816.**

ELECTRIC TACHOMETER, 68th & Upland Sts., Philadelphia, PA 19142, Tel: 215-SA6-7723, Telex: 83-1475; FSC No.: 20049; Empl.: 50; *Sls. Mgr.:* F. M. Porter

ELECTRIC TIME COMPANY, INC., P.O. Box 298, Natick, MA 01760, Tel: 617-653-1341; FSC No.: 6645; Empl.: 10

ELECTRO ASSEMBLIES, 425 Huehl Rd. Bldg. 17, Northbrook, IL 60062, Tel: 312-498-6520

ELECTROCHEM INDS., Wilson Greatbatch Ltd., 10000 Wehrle, Clarence, NY 14031, Tel: 716-759-6901, Telex: 91-386; FSC No.: 6U589; *Sls. Mgr.:* R. Carey; *Dist. Mgr.:* L. Hanitz, M. Brookman

ELECTROCOM INDS., 1105 N. Ironwood Dr., S. Bend, IN 46615, Tel: 219-232-2743; FSC No.: 27114; *Sls. Mgr.:* B. Jaffe

ELECTRO COMP., INC., 2415 Main St, Stratford, CT 06497, Tel: 203-375-5811 .... **A•1864-1865**

EC
ELECTRO-CRAFT CORPORATION

ELECTRO-CRAFT, 1600 2nd St. S., Hopkins, MN 55343, Tel: 612-931-2700 .... **B•1147-1149**

Local Sales Offices & Reps

CA	Westlake Village, Electro-Craft	818-889-3631
CO	Denver, Electro-Craft	303-839-5565
GA	Marietta, Electro-Craft	404-971-2669
IL	Palatine, Electro-Craft Corp.	312-991-4570
MA	Salem, Electro-Craft	603-893-5552
MN	Hopkins, Electro-Craft	612-931-2700
NH	Salem, Electro-Craft	603-893-5552
NJ	Cherry Hill, Electro-Craft	609-662-0555
OH	Cincinnati, Electro-Craft	513-474-4171

Local Distributors

Can	Edmonton, Alb., H.M. Mott Mktg., Ltd.	403-468-1292
Intl	England, Crewe, Electro-Craft, Ltd.	0270-584416
Intl	Finland, Helsinki, Stig Wahlstrom OY	90-5577 x51
Intl	France, Tekelec Airtronic	1-534-7535
Intl	Holland, Rotterdam, Van Gelder Compagnie B.V.	010-156622
Intl	India, Hyderabad, Kashinath & Co.	36942
Intl	Israel, Tel-Aviv, Abiry Agencies (1979), Ltd.	03-254106-253337
Intl	Italy, Milano, Pamoco S.r.l.	02-3452531/5
Intl	Japan, Tokyo 104, Midoriya Electric Co.	03-561-8851
Intl	Sweden, Johanneshov, L. Ostergren El.	08-815013
Intl	W. Germany, Darmstadt, Eduard Bautz G.m.b.H.	06151/82973
Intl	Hong Kong, Kowloon, Nanco Elctrns. Supp. Ltd.	3-335121-10
Intl	Japan, Toshima-Ku Tokyo, Sanyo Denki Co., Ltd.	03-917-5151
Intl	Korea, Seoul, Lucky-Gold Star Intl.	778-247315
Intl	Rep. of China, Taiwan, Sertek	02-7134022-7134027-7135435
Intl	Switzerland, Lohwisst Rasse, EME AG Zurich	019801111

ELECTROCUBE, 1710 So. Del Mar Ave., San Gabriel, CA 91776, Tel: 818-573-3300, TWX: 910-589-1609; FSC No.: 14752; Empl.: 175; *Sls. Mgr.:* E. F. Bryant; *Dist. Mgr.:* E. F. Bryant

ELECTRODATA, INC., 23020 Miles Rd., Bedford Heights, OH 44128, Tel: 216-663-3333, TWX: 810-427-2280; FSC No.: 34-1173465; Empl.: 15; *Sls. Mgr.:* Philip Ardire; *Dist. Mgr.:* Philip Ardire

ELECTRO DESIGN SYS., 100 W. 35th St., Ste. S, National City, CA 92050, Tel: 619-420-2351, Telex: 182827; Empl.: 35

ELECTRODYNAMICS

ELECTRODYNAMICS, INC., A Talley Inds. Co., 1200 Hicks Rd., Rolling Meadows, IL 60008, Tel: 312-259-0740, Telex: 28-1070; FSC No.: 10236; Empl.: 250; *Sls. Mgr.:* Frank Rafferty .... **D•1119**

Local Sales Offices & Reps

CA	Alhambra, M. W. Riedel & Co.	213-283-7694
CA	Hayward, Avionics, Inc.	415-783-1131
CO	Denver, West, Inc.	303-773-8180
CT	Old Saybrook, FJS Assocs.	203-388-5374
FL	Clearwater, Delmac Sls.	813-447-5192
FL	Orlando, Delmac Sls.	305-898-4688
FL	Tamarac, Delmac Sls.	305-726-1330
IA	Cedar Rapids, J.R. Sales Engrg.	319-393-2232
MD	Severna Park, Delmarva Engrg. Assocs., Ltd.	301-647-8007
MA	Winchester, FJS Assocs.	617-729-3135
MN	New Brighton, TWC Sls.	612-636-1770
MO	Maryland Hgts., Midwest Meridian Corp.	314-878-4441
NJ	Clinton, Churchill Assocs.	201-735-8971
NY	Endicott, Noeth Honsinger Assocs.	607-754-3214
NY	Larchmont, Hingston Walsh Assocs., Inc.	914-834-5781
NY	Pittsford, Noeth Honsinger Assocs.	716-586-9002
OR	Portland, Caruso & Northcutt	503-646-4973
PA	Norristown, Rivco January Inc.	215-631-1414
TX	Hurst, Midwest Meridian	817-654-2132
UT	Salt Lake City, Meridian West	801-466-5739
WA	Bothwell, Caruso & Northcutt	206-454-9699

ELECTRO-DYNAMICS DEV. CO., 475 Mt. Hood Dr. S.W., Issaquah, WA 98027, Tel: 206-392-2493; *Sls. Mgr.:* W. A. Pommer

ELECTROFILM, 27727 Avenue Scott, Valencia, CA 91355, Tel: 805-257-2240, Telex: 65-1438; FSC No.: 85932; Empl.: 250; *Sls. Mgr.:* George Hulett

ELECTRO-FILMS, INC., 111 Gilbane St., Warwick Central Indl. Pk., Warwick, RI 02886, Tel: 401-738-9150, TWX: 710-382-0405; Empl.: 100; *Sls. Mgr.:* Frank Urrico .... **A•1866-1867**

Local Sales Offices & Reps

CA	Santa Ana, Weatherman Assocs.	714-544-1304
CA	Sunnyvale, NES Assocs.	408-738-3259
GA	Doraville, BCI, Inc.	404-455-0405
IL	Hinsdale, Willtech Corp.	312-655-4850
IN	Indianapolis, CC Electronics	317-255-1508
MA	Allston, Vector Sls.	617-787-2790
MA	Boston, Vector Assocs.	617-787-2790
MI	Livonia, Electro Sls. Assocs.	313-474-7320
MN	Minneapolis, Comprehensive Tech. Sls.	612-888-7011
NM	Albuquerque, Grady Moore Assocs.	505-262-1416
NY	Kew Gardens, Robert Smith Assocs.	212-780-0097
NY	New York, Robert Smith Assocs.	212-541-4885
NY	Plainview, Robert Smith Assocs.	516-681-3155
NY	Syracuse, Labtronics	315-455-7314
NC	Charlotte, BCI, Inc.	704-567-0473
NC	Raleigh, BCI, Inc.	919-781-9426
OH	Cleveland, Electro Sls. Assocs.	216-261-5440
OH	Dayton, Electro Sls. Assocs.	513-426-5551
PA	Allison Park, Electro Sls. Assocs.	412-487-3801
PA	Colman, EL Assocs.	215-822-2510
PA	Oreland, EFW Tech. Sls.	215-887-5300
TX	Austin, J. Clay Co.	512-346-7340
TX	Dallas, J. Clay Co.	214-350-1281
TX	Houston, Elctrn. Mktg. Assocs.	713-498-8120
WA	Seattle, MARS	206-747-3292
EXP	MA, Plainville, Teknis, Inc.	617-695-3591

ELECTRO IMPULSE, Box 870, Red Bank, NJ 07701-0870, Tel: 201-741-0404, TWX: 710-722-5717; FSC No.: 91161; Empl.: 99; *Sls. Mgr.:* Mark Rubin ....**C•1637; D•1211**

Local Sales Offices & Reps

CA	Los Angeles, RDH Assocs.	213-396-4100
MA	Reading, Geder Assocs.	617-944-3105
NY	Greenvale, B. D. Aaron & Co.	516-621-0630
TX	Richardson, Spectra Sls. Corp.	214-234-3600
EXP	NJ, Oradell, Sylvan Ginsbury Ltd.	201-261-3200

Local Distributors

CA	Los Angeles, RDH Assocs.	213-396-4100
MA	Reading, Geder Assocs.	617-944-3105
NJ	Oradell, Sylvan Ginsbury	201-261-3200
NY	Greenvale, Bertram D. Aaron & Co.	516-621-0630
TX	Richardson, Spectra Sls.	214-234-3600

ELECTRO INDUSTRIES, Div. E.I. Elctrns., Inc., 1800 Shames Drive, Westbury, NY 11590, Tel: 516-334-0870; Empl.: 20; *Sls. Mgr.:* S. Kagan ..... **D•1350-1351**
For further information call toll free: 800-645-6342

ELECTRO KINETICS CO., Sub. HTL Inds., Inc., 402 E. Gutierrez St., Santa Barbara, CA 93102, Tel: 805-963-2055, TWX: 910-334-1177; FSC No.: 02101; Empl.: 260; *Sls. Mgr.:* N.G. Otis

ELEC-TROL

ELEC-TROL, INC., 26477 N. Golden Valley Rd., Saugus, CA 91350, Tel: 805-252-8330, Telex: 310-372-0331; FSC No.: 15636; Empl.: 650; *Sls. Mgr.:* Frank Cooper; *Dist. Mgr.:* Barbara J. Owens .... **B•1332-1342**

Local Sales Offices & Reps

AL	Huntsville, Beacon Elctrn. Assocs.	205-881-5031
AZ	Scottsdale, TC Electronics	602-944-5153
AR	Little Rock, Beacon Elctrn. Assocs.	501-224-5449
CA	Garden Grove, Elsco	714-891-4621
CA	San Jose, Jeff Mallman	408-972-9072
CO	Denver, Elcom	303-337-2300
FL	Boca Raton, Beacon Elctrn. Assocs.	305-392-3500
FL	Clearwater, Beacon Elctrn. Assocs.	813-796-2378
FL	Maitland, Beacon Elctrn. Assocs.	305-647-3498
FL	Melbourne, Beacon Elctrn. Assocs.	305-724-8010
GA	Atlanta, Beacon Elctrn. Assocs.	404-256-9640
IL	Des Plaines, Lincoln, Hodges & Assocs.	312-297-3810
IN	Granger, Gregory Sls.	219-272-9626
KS	Overland Park, John F. Guernsey Co.	913-381-2225
MA	Framingham, Stone Comps.	617-875-3266
MN	Minneapolis, Westlund & Assoc.	612-866-5002
MO	Florissant, John F. Guernsey Co.	314-921-5720
NY	Clark Mills, KLM-Garner Co.	315-853-6126
NY	Mt. Vernon, Sonkin Assocs.	914-968-8282
NY	North Syracuse, KLM-Garner Co.	315-458-6214
NY	Pittsford, KLM-Garner Co.	716-381-8350
NC	Greensboro, Beacon Elctrn. Assocs.	919-275-9997
OH	Columbus, Mulligan & Assoc.	614-457-2242
OR	Portland, Earl & Brown Co.	503-245-2283
PA	Birchrunville, Jadelectronics	215-296-3800
TX	Houston, Aid Elctrns.	713-955-6204
TX	Irving, Aid Elctrns.	214-790-4761
UT	Salt Lake City, Elcom	801-485-7415
WA	Seattle, Earl & Brown Co.	206-284-1121
WI	Waukesha, Lincoln, Hodges & Assocs.	414-542-3087

Local Distributors

AL	Huntsville, Component Distrs.	205-883-7501
AZ	Tempe, Acacia Sls.	602-894-2874
CA	Anaheim, Arrow Elctrns.	714-774-5290
CA	Chatsworth, Arrow Elctrns.	213-701-7500
CA	Irvine, Acacia Sls.	714-549-0954
CA	San Carlos, Control Design	415-592-4806
CA	San Diego, Acacia Sls.	619-565-4365
CA	San Diego, Arrow Elctrns.	619-565-4800
CA	Santa Clara, Patane/Selectronics	408-496-6151
CA	Santa Monica, Master Distrs.	213-452-1229
CA	Sunnyvale, Acacia Sls.	408-745-7200
CA	Sunnyvale, Arrow Elctrns.	408-745-6600
CA	Van Nuys, Patane Avionics	213-988-4455
CO	Denver, Arrow Elctrns.	303-758-2100
CO	Lakewood, Acacia Sls.	303-232-2882
CT	Wallingford, Arrow Elctrns.	203-265-7741
FL	Clearwater, Diplomat Elctrns.	813-443-4514
FL	Ft. Lauderdale, Arrow Elctrns.	305-776-7790
FL	Ft. Lauderdale, Component Distrs.	305-971-4950
FL	Palm Bay, Arrow Elctrns.	305-725-1480
IL	Bensenville, Diplomat Elctrns.	312-595-1000
IL	Itasca, Voyager Elctrns.	312-773-4900
IN	Indianapolis, Arrow Elctrns.	317-243-9353
MA	Framingham, Jaks Elctrns.	617-875-3266
MA	Woburn, Arrow Elctrns.	617-933-8130
MA	Woburn, Diplomat Elctrns.	617-935-6611
MI	Ann Arbor, Arrow Elctrns.	313-971-8220
MN	Edina, Arrow Elctrns.	612-830-1800
MN	Fridley, Voyager Elctrns.	612-571-7766
MO	St. Louis, Arrow Elctrns.	314-567-6888
NH	Manchester, Arrow Elctrns.	603-668-6968
NJ	Fairlawn, Relay Specialties	201-797-3313
NJ	Moorestown, Arrow Elctrns.	609-235-1900
NJ	Saddle Brook, Arrow Elctrns.	201-797-5800
NY	Farmingdale, Arrow Elctrns.	516-694-6800
NY	Farmingdale, Arrow Elctrns.	516-293-6363
NY	Hauppauge, Arrow Elctrns.	516-231-1000
NY	Liverpool, Arrow Elctrns.	315-652-1000
NY	Rochester, Arrow Elctrns.	716-275-0300
NY	Rochester, Simcona Elctrns. Corp.	716-328-3230
NY	Yonkers, Kin-Tronics	914-968-7736
NC	Raleigh, Arrow Elctrns.	919-876-3132
NC	Winston Salem, Arrow Elctrns.	919-725-8711
OH	Centerville, Arrow Elctrns.	513-435-5563
OH	Dayton, Bell Inds.	513-435-8660
OH	Solon, Repco	216-248-8900
OR	Beaverton, Acacia Sls.	503-646-3377
PA	Monroeville, Arrow Elctrns.	412-856-7000
PA	Philadelphia, Shap Elctrns.	215-969-3300
TX	Dallas, Arrow Elctrns.	214-386-7500
TX	Houston, Force Elctrns. Co. of TX	713-772-8510
TX	Irving, Force Elctrns. Co. of TX	214-438-5700
TX	Stafford, Arrow Elctrns.	713-491-4100
UT	Salt Lake City, Diplomat Elctrns.	801-486-4134
WA	Bellevue, Arrow Elctrns.	206-643-4800
WI	Oak Creek, Arrow Elctrns.	414-764-6600

ELECTROL CO., 321 Dewey St., P.O. Box 29, York, PA 17405, Tel: 717-848-1722; Empl.: 30; *Sls. Mgr.:* Debra Dudley; *Dist. Mgr.:* Debra Dudley

ELECTROLOGIC, INC., 1359 28th St., Signal Hill, CA 90806, Tel: 213-595-0551; FSC No.: 213-595-0554; Empl.: 8; *Sls. Mgr.:* Don Masadao

ELECTROMAGNETIC INDUSTRIES, INC., Box 6440, Clearwater, FL 33518, Tel: 813-447-2511

ELECTRO-MAGNETIC PROCESSES, INC., 9616 Owensmouth Ave., Chatsworth, CA 91311, Tel: 818-882-6333, Telex: 499 2240 EMP UI; FSC No.: 51290; Empl.: 70; *Sls. Mgr.:* Arthur Sullivan

ELECTRO MATERIALS CORP. AMER., See EMCA, Sub. Rohm & Haas Advanced Matls. Co.

ELECTROMATIC CONTROLS CORP., 2495 Pembroke Road, Hoffman Estates, IL 60195-2010, Tel: 312-882-5757, TWX: 910-222-3452; FSC No.: 75203; Empl.: 400; *Sls. Mgr.:* Robert Martin

ELECTROMECH, INC., 528 Elm Street, Kearny, NJ 07032, Tel: 201-997-0950; Empl.: 40; *Sls. Mgr.:* Solomon Ezraseneh .... **A•2134**

ELECTRO MECHANICAL DESIGN SERVICES, INC., 16698 Oakmont Ave., Gaithersburg, MD 20877, Tel: 301-840-5710; *Sls. Mgr.:* Patrick E. Roney

ELECTRO-MECHANICS CO., Box 1546, Austin, TX 78767, Tel: 512-835-4684, Telex: 767178

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ELECTRO-MECHANISMS, 2745 E. Huntington Dr., Duarte, CA 91010, Tel: 818-359-2535; FSC No.: 52592; Empl.: 27 .... **B•1466-1467**

Local Sales Offices & Reps

CA	Arcadia, Van Gott & Assoc.	818-445-9729
CA	Redwood City, Hickey Indl. Sls.	415-368-3849
CA	San Diego, Van Gott & Assocs.	619-280-1041
CO	Lakewood, Cristee-Meade Co.	303-232-0287
FL	Ft. Meyers, Rainbow Sls., Inc.	813-332-2210
IL	Addison, Engrd. Sls. Co.	312-832-8425
MD	Baltimore, R. P. Luce	301-752-8200
MN	St. Paul, Vikeland Sls., Inc.	612-645-4647
NJ	Piscataway, R. P. Luce	201-752-8750
NY	Buffalo, Good Comps.	716-634-4400
NY	New Hyde Park, R. P. Luce	516-437-4550
NC	Raleigh, G. P. O'Malley & Assoc., Ltd.	919-848-9865
OH	Dayton, Harvey Teplitz	513-898-4330
PA	Philadelphia, R. P. Luce & Co.	215-233-0999
TX	Dallas, Marcom	214-351-4532
WA	Vancouver, Ray Over Sls.	206-695-6179

ELECTRO-MECH COMPS., 1826 N. Floradale Ave., So. El Monte, CA 91733, Tel: 818-442-7180; FSC No.: 07150; Empl.: 75; *Sls. Mgr.:* Walter H. Trumbull; *Dist. Mgr.:* Margaret W. Ambrose .... **B•1562-1563**

Local Sales Offices & Reps

CA	Los Angeles, Universal Comps. Co.	213-641-4255
CA	San Diego, Qualtronics	619-560-8955
CA	Santa Clara, Engrg. Assocs.	408-988-5001
CO	Englewood, Franklin Sls.	303-789-2526
CT	Milford, Todino Engrg.	203-874-6643
FL	Orlando, Publicover	305-898-9361
IL	Chicago, Indl. Rep.	312-647-7755
IN	Fort Wayne, Scott Elctrns.	219-484-7865
IN	Indianapolis, Scott Elctrns.	317-897-9976
MA	Needham Hgts., Todino Engrg.	617-444-7925
MI	Brighton, Michigan Mktg. & Sls.	313-229-6218
MN	Minneapolis, D. A. Case Assocs.	612-869-3700
NJ	Medford, Comp. Consits.	609-654-5300
NY	Camillus, SHR	315-487-3232
NY	Mamaroneck, Bassin Tech.	914-698-9332
OH	Cincinnati, Scott Elctrns.	513-791-2513
OH	Cleveland, Scott Elctrns.	216-473-5050
OH	Dayton, Scott Elctrns.	513-294-0539
OH	Reynoldsburg, Scott Elctrns.	614-863-1281
OR	Forest Grove, Doran Sls.	503-357-3333
PA	Pittsburgh, Scott Elctrns.	412-963-6116
TX	Leander, McCoy Assocs.	512-259-1109
TX	Richardson, McCoy Assocs.	214-238-1017
VA	Front Royal, Eltron	703-635-7201
WA	Redmond, Doran Sls.	206-885-1885
WI	Milwaukee, Indl. Rep.	414-259-0965

Local Distributors

AZ	Phoenix, Parts Elctrn.	602-258-6476
CA	Los Angeles, Elec. Distr.	213-660-1310
CA	Los Angeles, Master Distrs.	213-452-1229
FL	Pompano Beach, Components South	305-971-0350
NY	Buffalo, Genesee Radio & Parts	716-873-9661
NY	Mamaroneck, Logi Comp Elctrns.	914-698-9332
Intl	England, Kensington, London, G.E. Elctrns.	01-727 0711/3
Intl	Israel, Holon, M.S.R. Engrg. & Dev.	847686
Intl	Switzerland, Oberengstringen, G & P Elctrns.	(01)643231/644555

ELECTRO-METRICS, Penril Corp., 100 Church St., Amsterdam, NY 12010, Tel: 518-843-2600, TWX: 710-446-4798; FSC No.: 18581; Empl.: 105; *Sls. Mgr.:* David Cook

ELECTRO NATL., Matthews Ave., Canton, MS 39046, Tel: 601-859-5511, TWX: 810-990-0938; FSC No.: M-54208; Empl.: 40

ELECTRONETICS, INC., Paine Field Bldg 335, Everett, WA 98204, Tel: 206-355-1855; Empl.: 10

ELECTRON, INC., P.O. Box 28640, San Diego, CA 92128, Tel: 216-681-4700, Telex: 98-0240; Empl.: 85

ELECTRONIC COIL CORP., Farmington Industrial Park, Farmington, CT 06032, Tel: 203-677-6731; Empl.: 127; *Sls. Mgr.:* Raymond Gorski, Jr.

ELECTRONIC COMPONENT ASSEMBLY, INC., 9500 Alto Drive, La Mesa, CA 92041, Tel: 619-464-0910; Empl.: 70; *Sls. Mgr.:* Daniel J. McGillicuddy

ECG ELECTRONIC COMPONENTS GROUPE

ELECTRONIC COMPONENTS GROUPE, Stein Industries, Inc., 14143 21st Ave. No., Minneapolis, MN 55441, Tel: 612-559-0720, TWX: 910-576-1725; *Sls. Mgr.:* Ehrhard Goebel; *Dist. Mgr.:* Tom Coey .... **B•1566**

Local Sales Offices & Reps

AL	Huntsville, Beacon Elctrns.	205-881-5031
AZ	Scottsdale, SMS & Assocs.	602-998-0831
AR	Little Rock, Beacon Elctrns.	501-224-5449
CA	Cupertino, F & F Assocs.	408-446-2349
CA	Marina Del Ray, Spec-Rep, Inc.	213-827-7767
CO	Englewood, Electronic Comp. Sls.	303-781-5904
FL	Clearwater, Beacon Elctrns.	813-796-2378
FL	Ft. Lauderdale, Beacon Elec.	305-491-1054
GA	Atlanta, Beacon Elctrns.	404-256-9640
IL	Downers Grove, Richmar Elec.	312-968-0118
IN	Indianapolis, Insul-Reps	317-842-5203
IA	Cedar Rapids, Palatine	319-365-8071
KS	Mission, Palatine	913-831-0555
MA	Plainville, Enterprise Tech., Inc.	617-695-4700
MN	Minneapolis, Comps. Representative Groupe	612-894-8055
MO	Hazelwood, Palatine	314-839-0800
NJ	Ho-Ho-Kus, D. J. Fisher Co., Inc.	201-652-0090
NM	Albequerque, Syntech	505-266-7951
NY	Fairport, TAC Sls., Inc.	716-425-1070
NC	Raleigh, Beacon Elctrns.	919-787-0330
OH	Cleveland, Components, Inc.	216-243-9200
OK	Tulsa, Southern States Mktg.	918-369-3233
TX	Austin, Southern States Mktg.	512-473-2741
TX	Houston, Southern States Mktg.	713-558-4900
TX	Richardson, Southern States Mktg.	214-238-7500
UT	Salt Lake City, Quality Comp. Sls.	801-268-8000
VA	Fairfax, Beacon North, Inc.	703-591-1300
WA	Kirkland, A/D Elctrns.	206-821-3205
WI	Butler, Richmar Elctrns.	414-781-1730

Local Distributors

CA	Hollywood, Yale Radio	213-465-3186
CA	Manhattan Beach, Prime Electro	213-379-3642
CA	Mountain View, Target Elctrns.	415-961-1170
CA	San Carlos, Logan Elec.	415-594-0700
CO	Englewood, Industrial Elctrns.	303-694-9444
CT	Shelton, Century Elec. Supp.	203-736-2684
MD	Beltsville, PSI	301-937-4960
MD	Columbia, D. K. Elctrns.	301-995-1950
MN	Mpls., Glenmark, Inc.	612-941-4825
WA	Seattle, Radar Elec.	509-747-3053

ELECTRONIC CONCEPTS, INC., Box 627 E, Eatontown, NJ 07724, Tel: 201-542-7880, Telex: 7107226661; Empl.: 240; *Sls. Mgr.:* Philip N. Lepore .... **A•1072-1077**

Local Sales Offices & Reps

AZ	Tempe, Piper Sls. Co.	612-949-0048
CA	Colton, Elctrn. Concepts, Inc.	714-824-2525
CA	La Mirada, Select Elctrns.	714-739-8891
CA	Los Gatos, Elctrn. Concepts, Inc.	408-395-4224
CA	San Jose, Landia Sls. Grp.	408-280-5695
CO	Aurora, Sage Sls.	303-750-3501
FL	Sunrise, Electronic Concepts, Inc.	305-748-4604
IL	Wheaton, Elctrn. Concepts, Inc.	312-668-8747
MA	Wakefield, Omni-Rep	617-245-4511
MN	Minneapolis, Components Grp.	612-374-1250
MO	Grandview, Harris-Hanson Co.	816-763-6200
NJ	Englewood Cliffs, Ed Glass Assocs.	201-592-0200, 212-586-8440
OR	Portland, Components West	503-684-1671
MO	St. Louis, Harris-Hanson Co.	314-432-3611
PA	Lansdale, Industrial Comps., Inc.	215-368-3382
TX	Austin, Milred Assocs., Inc.	512-459-8602
TX	Houston, Milred Assocs., Inc.	713-937-0127
TX	Richardson, Milred Assocs., Inc.	214-644-6731
UT	Salt Lake City, Sage Sls.	801-467-5451
WA	Seattle, Components West	206-885-5880

Local Distributors

IL	Chicago, Nep Elctrns.	312-625-8400
NJ	Teterboro, Elcon Sls.	201-288-8170
TX	Dallas, R. V. Weatherford	214-931-7333
TX	Houston, R. V. Weatherford	713-688-7406
WI	New Berlin, Nep Elctrns.	414-785-9100

ELECTRONIC CONNECTOR DIV., Midland-Ross Corp., One Alewife Pl., Cambridge, MA 02140, Tel: 617-491-5400; *Sls. Mgr.:* Jim Gomes; *Dist. Mgr.:* Karen McMillan

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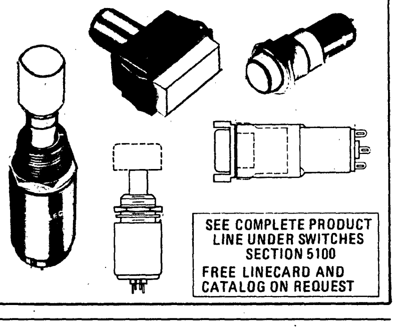

SEE COMPLETE PRODUCT LINE UNDER SWITCHES SECTION 5100
FREE LINECARD AND CATALOG ON REQUEST

ELECTRONIC CONTROLS, INC., 561 Tamarack Ave., Brea, CA 92621, Tel: 714-990-0850; Empl.: 9

ELECTRONIC CONTROLS DESIGN, 13626 S. Freeman Rd., Mulino, OR 97042, Tel: 503-829-9108, Telex: 703874 ECDINC UD; Empl.: 103; *Sls. Mgr.:* Rex Breunsbach

ELECTRONIC CONVENTIONS, INC., P.O. Box 92275, Worldway Postal Ctr., Los Angeles, CA 90009, Tel: 213-772-2965; *Sls. Mgr.:* William C. Weber, Gen. Mgr.

ELECTRONIC DEV. CORP., 11 Hamlin St., Boston, MA 02127-4198, Tel: 617-268-9696, Telex: 951596; FSC No.: 12619; *Sls. Mgr.:* R. B. Ross .... **D•1213-1215**

Local Sales Offices & Reps

AL	Huntsville, MOCO	205-881-5968
AZ	Phoenix, R. A. Mayes Co.	602-279-5243
CA	Costa Mesa, Feeger, Lucas, Wolf	714-751-7512
CA	Hayward, Feeger, Lucas, Wolf	415-786-9070
CA	San Diego, Feeger, Lucas, Wolf	619-277-0993
CA	Van Nuys, Feeger, Lucas, Wolf	213-989-5237
CO	Englewood, R. A. Mayes Co.	303-761-9447
FL	Winter Haven, Lee Assocs.	813-294-5815
IL	Hoffman Estates, Carvel Engrg.	312-885-8800
IN	Carmel, Berndt Assocs.	317-844-0114
KS	Overland Park, Ramsey Assts.	913-649-6996
MD	Gaithersburg, Powell-Pendergraph	301-921-4200
MA	Hudson, Datarep	617-481-0333
MI	Hazel Park, Tiby Co.	313-547-3550
MN	Edina, Carvel Engrg. & Sls.	612-835-7929
MO	St. Louis, Ramsey Assocs.	314-878-5042
NM	Albuquerque, R. A. Mayes Co.	505-292-2330
NY	E. Syracuse, Ossmann Instrs.	315-437-7052
NY	Rochester, Ossmann Instrs.	716-442-6990
NY	White Plains, Cane Techn. Sls.	914-694-9240
NC	Raleigh, Lee Assocs.	919-848-8818
OH	Cleveland, Tiby Co.	216-371-5335
OH	Dayton, Tiby Co.	513-277-3822
OR	Portland, Topp Engrg. Sls.	503-244-7265
PA	Willow Grove, Powell-Pendergraph	215-657-0330
TX	Dallas, Tech Rep Mktg.	214-241-2434
TX	El Paso, R. A. Mayes Co.	Enterprise 750
TX	Kemah, Hi Tech Sys.	713-783-3856
UT	West Jordan, R. A. Mayes Co.	801-292-6781
VT	Burlington, Data Reps.	802-864-0933
VA	Richmond, Powell-Pendergraph	804-270-1400
WA	Bellevue, Topp Engrg. Sls.	206-747-5400
WI	New Berlin, Carvel Engrg.	414-784-7007

ELECTRONIC DEVELOPMENT LABS., See EDL Inc.

ELCTRN. DEVICES, 21 Gray Oaks Ave., Yonkers, NY 10710, Tel: 914-965-4400, TWX: 710-560-0021; Empl.: 200; *Sls. Mgr.:* Dennis Dean; *Dist. Mgr.:* Dennis Dean

ELECTRONIC ENCLOSURES, Div. Wyle Labs, 225 South Aviation Blvd., El Segundo, CA 90245, Tel: 213-643-8181, TWX: 910-348-6699; FSC No.: 09097; Empl.: 400; *Sls. Mgr.:* Hillard W. Sorey .... **C•1056**

Local Sales Offices & Reps

AL	Huntsville, Macro Mktg. Assocs.	205-833-9630
CA	Campbell, Carlson, Bob	408-370-1284
CA	Los Angeles, Chris Allen Elec. Encl.	213-643-8181
CA	San Diego, De LaTorre & Assocs.	213-323-0922
CO	Denver, Odyssey 1	303-688-3555
FL	Palmetto, Southeast Tech. Sls., Inc.	813-729-3112
IL	Elmhurst, Scott Assocs.	312-279-5681
MD	Randallstown, Imagitron Sls. Co.	301-521-2020
MI	Jackson, Norwood Scroggs Co.	517-750-1170
MN	St. Paul, Charles E. Bohlig & Assocs.	612-944-8404
NJ	Pennsauken, Elctrn. Encls.	609-665-6810
NJ	Randolph, D. Despins Elctrn. Encls.	201-361-2864
NM	Albuquerque, Odyssey 1	505-265-6645
NY	Binghamton, Precision Sls.	607-648-8833
NY	Liverpool, Precision Sls.	315-451-3480
NY	Pittsford, Precision Sls.	716-381-2820
NY	Pleasant Valley, Precision Sls.	914-635-3233
NY	Syracuse, Precision Sls.	315-472-3010
OH	Dayton, Technical Dvcs. Co.	513-890-6811
OR	Portland, Jas. J. Backer Co.	503-297-3776
TX	Houston, Zonk Engrg. Co.	713-895-9131
TX	Richardson, Zonk Engrg. Co.	214-238-7651
WA	Seattle, Jas. J. Backer Co.	206-285-1300

ELECTRONIC ENGRG. CO. OF CAL., See EECO

ELECTRONIC HARDWARE, 320 Broad Hollow Rd., Farmingdale, NY 11735, Tel: 516-752-1950; Empl.: 100

ELECTRONIC INSTR. & SPECIALTY CORP., 42 Pleasant St., Stoneham, MA 02180, Tel: 617-438-5300, Telex: 948-025; FSC No.: 14908; Empl.: 180 .... **B•1344-1345**

Local Sales Offices & Reps

AL	Huntsville, JWL Assocs.	205-881-0413
AL	Huntsville, REMCO (Rakes Engr. & Mktg. Corp.)	205-533-3763
AZ	Glendale, Southwest Elctrn. Mktg.	602-278-0500
CA	Escondido, Cirolia Elctrn. Sls. Inc.	619-489-2452
CA	Granada Hills, C & W Comps.	213-368-4032
CA	Hayward, Pacific Mktg. Inc.	415-887-1620
CA	San Diego, Cirolia Elctrn. Sls.	619-743-3015
CO	Golden, J. F. Hurlbut Co.	303-279-7796
FL	Lighthouse Point, Jack Krutek & Assocs.	305-941-6544
GA	Atlanta, REMCO (Rakes Engr. & Mktg. Corp.)	404-447-6937
IL	Lincolnwood, Saffro & Assocs., Inc.	312-677-9720
IN	Carmel, Brainard-Wilson Mktg.	317-844-2800
MD	Woodbine, Naudain Assocs.-Southern	301-442-2270
MA	Stoneham, E I & S	617-438-5300
MN	Minneapolis, Peterson Sls. & Assocs.	612-944-0030
NJ	Perth Amboy, Astrorep	201-826-8050/51
NY	Babylon, Astrorep	516-422-2500
NY	Buffalo, Lynn Assocs., Inc.	716-631-0054
NC	Raleigh, REMCO	919-847-5079
OH	Cleveland, Jim Finnegan & Co.	216-238-5905
OR	Portland, SPS Elctrns.	503-297-6919
PA	Norristown, Rivco-January Inc.	215-631-1414
PA	Willow Grove, Harry Nash Assoc.	215-657-2213
TX	Dallas, P. J. Scanlon Co. Inc.	214-231-4661
UT	Salt Lake City, J. F. Hurlbut Co.	801-973-4443
WA	Redmond, SPS Elctrns.	206-323-4140
WA	Seattle, SPS Elctrns.	206-323-4140
WI	Lake Mills, Saffro & Assocs.	414-648-2605

Local Distributors

CA	San Jose, Cypress Elctrns.	408-945-8400
CA	Santa Clara, Cypress Elctrns.	408-727-7080
CA	Torrance, Cypress Elctrns.	215-530-1900
CT	New Haven, The Greene-Shaw Co.	203-397-0710
MD	Columbia, DK Elctrns.	301-995-1950
MA	Billerica, A. W. Mayer Co.	617-229-2255
MA	Newton, The Greene-Shaw Co.	617-969-8900
NJ	Fairlawn, Relay Specialties	201-797-3313
NY	Lynbrook, Peerless Radio Corp.	516-593-2121
NY	Troy, Trojan Elctrn. Supp. Co.	518-274-4481
OK	Tulsa, Radio, Inc.	918-587-9123
TX	Houston, Gaumer Co.	713-460-5200

ELCTRN. INSTR. & SPEC. CORP., MC DIV., See Millen Comps.

ELECTRONIC KITS INTL., INC., 791 Redrock Rd., St. George, UT 84770, Tel: 801-628-3627; *Sls. Mgr.:* Gary Gibson; *Dist. Mgr.:* Charles Meinkey

ELECTRONIC MEASUREMENTS, 405 Essex Rd., Neptune, NJ 07753, Tel: 201-922-9300, Telex: 132-424; Empl.: 250; *Sls. Mgr.:* Charles Lehmann ...**D•1622-1625**

Local Sales Offices & Reps

AL	Huntsville, Sci. Devices	205-536-1969
AZ	Phoenix, Sci. Devices	602-957-0401
CA	Huntington Beach, Sci. Devices	714-840-3501
CA	San Diego, Sci. Devices	619-573-0157
CA	San Jose, Sci. Devices	408-554-0455
CO	Broomfield, Sci. Devices	303-469-5145
FL	Orlando, Sci. Devices	305-841-8180
GA	Marietta, Sci. Devices	404-427-8660
IL	Chicago, Comtel	312-539-4838
IN	Indianapolis, Comtel	317-253-1681
IA	Cedar Rapids, Comtel	319-377-9434
MA	Winchester, FJS Assoc.	617-729-3135
MI	Southfield, Comtel	313-358-2510
MN	Wayzata, Comtel	612-476-1551
NM	Albuquerque, Sci. Devices	505-883-3668
NY	East Syracuse, Ossmann Insts.	315-437-7052
NJ	Ridgefield, Rical Assocs.	201-945-5250
NC	Winston-Salem, Sci. Devices	919-765-5776
OH	Dayton, WKM Assoc.	513-434-7500
PA	Pittsburgh, WKM Assoc.	412-892-2953
PA	Plymouth Meeting, Electronic Mktg. Assocs.	215-828-7400
TX	Austin, Alphatech	512-458-9179
WA	Bellevue, Al Smith Co.	206-746-6770
WA	Vancouver, Al Smith Co.	206-892-9912
WI	New Berlin, Comtel	414-544-6042

ELCTRN. MOLDING CORP., 96 Mill St., Woonsocket, RI 02895, Tel: 401-769-3800, TWX: 710-387-1350; FSC No.: 17117; Empl.: 350; *Sls. Mgr.:* Scott R. Tate; *Dist. Mgr.:* Irene S. Dulude .... **C•1186-1188, 1698, 1706-1709**

Local Sales Offices & Reps

AL	Huntsville, Cartwright & Bean of GA	205-830-1540
AZ	Scottsdale, EDP & Assocs., Inc.	602-991-6119
CA	Huntington Beach, Pegasus	714-964-8731
CA	Mountain View, West Mark Assocs.	415-969-1700
CA	Torrance, EMC	213-325-5801
CO	Englewood, Delta Sls., Inc.	303-799-0646
FL	Deerfield Beach, Cartwright & Bean of FL	305-429-3400
FL	Orlando, Cartwright & Bean of FL	305-422-4531
GA	Atlanta, Cartwright & Bean of GA	404-233-2939
IL	Oak Brook, Winner Co.	312-655-3545
IN	Ft. Wayne, Denton Mktg.	219-627-5525
KS	Shawnee Mission, Lowell-Kangas & Assocs.	913-631-3515
LA	Kenner, Cartwright & Bean of TN	504-466-0020
MD	Pasadena, Macrotech Assocs.	301-437-5588
MA	Needham Heights, Todino Engrg. Sls.	617-444-7925
MI	Ferndale, Hilltronics, Inc.	313-398-5556
MN	Hopkins, The Kits Co.	612-933-1888
MS	Jackson, Cartwright & Bean of TN	601-981-1170
MO	St. Louis, Lowell-Kangas & Assocs.	314-821-4050
NJ	Englewood, Harold Gray Assocs.	201-894-0894
NJ	Sicklerville, Brown Assocs.	609-629-2240
NY	Binghamton, Empire Tech. Assocs.	607-772-0651
NC	Charlotte, Cartwright & Bean of GA	704-377-5673
NC	Raleigh, Cartwright & Bean of GA	919-781-6560
TN	Knoxville, Cartwright & Bean of TN	615-693-7450
TN	Memphis, Cartwright & Bean of TN	901-276-4442
TX	Austin, Mil-Rep Assocs.	512-459-8602
TX	Houston, Mil-Rep Assocs.	713-937-0127
TX	Richardson, Mil-Rep Assocs.	214-644-6731
UT	Salt Lake City, Delta Sls., Inc.	801-487-7571
Can	Brampton, Ont., Clark-Hurman Assocs.	416-453-1118
Can	Nepean, Ont., Clark-Hurman Assocs.	613-727-5626

Local Distributors

AL	Huntsville, Electro-Wise, Inc.	205-830-4764
AZ	Phoenix, Heilind Elctrns.	602-437-1060
CA	El Segundo, Force Elctrn.	714-522-1324
CA	San Jose, Force Elctrn.	408-943-1324
CO	Denver, C.S.I.D.	303-292-9594
CO	Wheat Ridge, ACT	303-422-9229
CT	Bethel, Heilind Elctrns.	203-797-8600
CT	Bridgeport, Millenium Elctrns.	203-372-2037
FL	Melbourne, Action Elctrns.	305-725-4920
FL	Orlando, Axtech Elctrns.	305-291-1681
IL	Elk Grove Village, Nu Way Elctrns.	312-437-7120
IA	Cedar Rapids, Bergquist	319-277-5155
MD	Columbia, Aztech Elctrns.	301-995-1760
MA	Boston, Vector Sls.	617-787-2790
MA	Burlington, Heilind Elctrns.	617-272-5610
MA	Woburn, EPC	617-935-0400
MI	Grand Rapids, Calder Elctrns	616-698-7400
MN	Minneapolis, Bergquist	612-835-2322
NJ	Pennsauken, RESCO Elctrns.	609-662-4000
NJ	Union, Meridian Supp. Co.	201-839-8665
NM	Albuquerque, Betatron	505-344-2381
NM	Albuquerque, International Elctrns.	505-345-8127
NY	Bohemia, L.I., Car-Lac Elctrns.	516-567-4200
NY	Lynbrook, L.I., Peerless Radio Corp.	516-593-2121
NY	Millbrook, Villarreal Elctrns.	914-677-3447
NY	Rochester, Masline Elctrns.	716-546-5373
NY	Suffern, Nobel Elctrns.	914-357-4500
NC	Raleigh, Southeastern Elctrns.	919-828-2311
OH	Cincinnati, Schuster Elctrns.	513-489-1400
OH	Twinsburg, Schuster Elctrns.	216-425-8134
OK	Tulsa, Altair Co.	918-252-5781
OR	Beaverton, Norvac Elctrns.	503-644-1025
PA	Allentown, Lehigh Elctrns.	215-433-3045
TX	Austin, Altair Co.	512-837-4970
TX	Austin, Heilind Elctrns.	512-834-9711
TX	Dallas, Heilind Elctrns.	214-351-2050
TX	Dallas, International Elctrns.	214-233-9323
TX	El Paso, International Elctrns.	915-598-3406
TX	Houston, Altair Co.	713-462-3029
TX	Houston, Lenert Co.	713-225-1465
TX	Richadson, Altair Co.	214-231-5166

ELECTRONIC NAVIGATION INDS, Emerson Electric Co., 100 Highpower Road, Rochester, NY 14623, Tel: 716-427-8300, Telex: 671-1542 ENI UW; FSC No.: 10226; Empl.: 200; *Sls. Mgr.:* Leonard A. Benedict **D•1008-1009**

Local Sales Offices & Reps

AL	Huntsville, W. A. Brown Instrs.	205-883-8660
AZ	Tempe, Trembly Assocs.	602-967-2058
CA	Los Altos, Jay Stone Assocs.	415-948-4563
CA	Los Angeles, McDougall/McLaughlin Co.	213-477-8556
CO	Wheat Ridge, Trembly Assocs.	303-421-8900
FL	Orlando, W. A. Brown Instrs.	305-425-5505
GA	Norcross, W. A. Brown Instrs.	404-441-2980
IL	Elmhurst, Sector Engrg.	312-530-7850
IN	Indianapolis, Sector Engrg.	317-842-1120
KS	Overland Park, Ramsey Assocs.	913-649-6996
LA	Mandeville, W. A. Brown Instrs.	504-626-9701
MD	Silver Spring, Gawler Knoop Co.	301-589-4406
MI	Madison Heights, WKM Assocs.	313-588-2300
MN	Minneapolis, Sector Engrg.	612-593-1809
MO	Maryland Hgts., Ramsey Assocs.	314-878-5042
NV	Las Vegas, Trembly Assocs.	702-739-9770
NH	Nashua, JPR Elctrn. Sls.	603-889-8285
NM	Albuquerque, Trembly Assocs.	505-266-8616
NY	Great Neck, RTI, Inc.	516-829-3770
NC	Durham, W. A. Brown Instrs.	919-479-5200
OH	Dayton, WKM Assocs.	216-434-7500
OH	Independence, WKM Assocs.	216-524-5930
PA	Mechanicsville, John Bell Assocs.	215-794-7075
PA	Pittsburgh, WKM Assocs.	412-892-2953
SC	Columbia, W. A. Brown Instrs.	803-798-8070
TN	Oakridge, W. A. Brown Instrs.	615-482-5761
TX	Houston, Lear Assocs.	713-488-7893
TX	Richardson, Lear Assocs.	214-231-5388
UT	Salt Lake City, Trembly Assocs.	801-486-5292
WA	Bellevue, Sci. Dvcs. Northwest	206-747-5169
WI	Milwaukee, Sector Engrg.	414-352-8280
Can	Toronto, Rayonics Scientific	416-736-1600

ELECT. PREC. COMP. CORP., 11 W. Sandford Blvd., Mt. Vernon, NY 10550, Tel: 914-664-2333; FSC No.: 75898; Empl.: 8; *Sls. Mgr.:* Don Edwards **A•1603, 1868; D•1217**

Local Sales Offices & Reps

CA	Granada Hills, W. H. Inds., Inc.	213-363-3910
CO	Denver, Midwest Meridian Corp.	303-341-7550
IL	Elk Grove Village, Midwest Meridian Corp.	312-640-9540
IA	Cedar Rapids, Midwest Meridian Corp.	319-365-6561
MA	Andover, William Crawford Assocs.	617-470-2122
MN	Prior Lake, Midwest Meridian Corp.	612-447-8222
MO	Marylan Heights, Midwest Meridian Corp.	314-878-4441
OH	Fairborn, Midwest Meridian Corp.	513-879-7100
TX	Fort Worth, Midwest Meridian Corp.	817-654-2132
WA	Kirkland, W.H. Industries	206-827-1024

ELECTRONIC PRODS. CORP., Interstate Indl. Plaza, R. D. # 5, York, PA 17402, Tel: 717-767-6517; Empl.: 16; *Sls. Mgr.:* M. E. Lehman; *Dist. Mgr.:* M. E. Lehman

ELECTRONIC RELAYS, 30 Plaza Dr., Westmont, IL 60559, Tel: 312-789-8166, TWX: 910-991-3903; FSC No.: 53087; Empl.: 29; *Sls. Mgr.:* Barbara Breibach; *Dist. Mgr.:* Barbara Breibach

ELECTRONIC RESEARCH CO., 7618 Wedd St., Overland Park, KS 66204, Tel: 913-631-6700, TWX: 910-749-6477; FSC No.: 13571; Empl.: 60; *Sls. Mgr.:* Charles Ditzler **A•1362**

Local Sales Offices & Reps

Frequency Product

NJ	Riverdale, Comp-Tech Sls.	201-935-5454
NJ	Union, Comp-Tech Sls.	201-687-2484
NY	New Hyde Park, Comp-Tech Sls.	516-593-2628

ELECTRONIC SOLUTIONS, 9255 Chesapeake Drive, San Diego, CA 92123, Tel: 619-292-0242, 800-854-7086, TWX: 910-335-1169; FSC No.: 61081; Empl.: 90; *Sls. Mgr.:* R. J. Felker; *Dist. Mgr.:* Kim E. Mamer **D•1084-1086**

Local Sales Offices & Reps

AL	Huntsville, Remco	205-533-3763
AZ	Tempe, Mar Tech	602-968-4944
CA	Anaheim, Qualtech South	714-639-9820
CA	Brentwood, Qualtech South	408-732-4800
CA	Los Angeles, Qualtech South	805-495-7100
CA	San Diego, Mesa Engrg.	619-278-8021
CA	Sunnyvale, Qualtech	408-732-4800
CT	Canton, Bell Controls	603-882-6984
FL	Melbourne, Southeastern First Rep	305-259-6373
GA	Atlanta, Remco	404-447-6937
IL	Chicago, Mar-Con Assocs.	312-675-6450
IA	Des Moines, The Beams Co.	515-255-1148
KS	Shawnee Mission, The Beams Co.	913-631-0300
MD	Rockville, Spectro	301-294-9770
MA	Nashua, Bell Controls	603-882-6984
MI	Livonia, Lowell Wendt	313-464-2722
MN	Minneapolis, Micro Res.	612-830-1454
MO	St. Louis, The Beams Co.	314-434-8448
NH	Nashua, Bell Controls	603-882-6984
NM	Albuquerque, Mar Tech Assocs.	602-968-4944
NJ	Springfield, Gebhardt Mktg.	201-376-4415
NC	Raleigh, Remco	919-847-5079
OH	Cleveland, Geotronix	216-526-2535
OH	Trotwood, Geotronix	513-252-6700
OR	Portland, Thorson Co., N.W.	503-644-5900
PA	Jenkintown, Monument Tech. Assocs.	215-884-3737
TX	Austin, Acudata	512-478-1018
TX	Houston, Acudata	713-580-2451
TX	Plano, Acudata	214-424-3567
WA	Bellevue, Thorson Co., N.W.	&
WI	Waukesha, Computer & Sys. Sls.	414-544-1141

Local Distributors

CA	Mountain View, I/O Sls., Inc.	415-968-1080
CT	Danbury, Pilgrim Elctrns.	203-792-7274
Can	Mississauga, Ont., Allan Crawford Assocs.	416-678-1500

ELECTRONIC SPACE SYS. CORP., Old Powder Mill Rd., Concord, MA 01742, Tel: 617-369-7200, Telex: 923480 ESSCO WCRD; FSC No.: 15175; Empl.: 82; *Sls. Mgr.:* Susan M. Cuevas

ELECTRONIC SPECIALISTS, 171 South Main St., Natick, MA 01760, Tel: 617-655-1532, 800-225-4876, Telex: 955-329 ATTN: ESP; Empl.: 42; *Sls. Mgr.:* Alice Brown

ELECTRONIC SPECIALTY DIV., ElecSpec Corp., 14511 N.E. 13th Ave., Vancouver, WA 98668-3501, Tel: 206-574-5000, Telex: 360-453, TWX: 910-469-8782; FSC No.: 98927;Multiple; Empl.: 250; *Sls. Mgr.:* L. Fuller **B•1346-1347**

Local Sales Offices & Reps

CA	Anaheim, Gabriel & Assocs.	713-666-0660
CA	San Jose, Ruppert Sls. & Engrg.	408-998-8717
CT	Bethel, Livera-Polk Assocs.	203-744-1426
FL	Lighthouse Point, Jack Krutek & Assocs.	305-941-6544
KS	Wichita, BAKA Corp.	316-682-8411
MD	Timonium, Eastern Comp.	301-561-5811
MN	Hopkins, The Kits Co.	612-933-1888
NJ	Madison, Livera-Polk Assocs.	201-377-3239
NY	Glen Head, Livera-Polk Assocs.	516-759-9300
NC	Raleigh, Eastern Comp.	919-787-3416
PA	West Conshohocken, Eastern Comp.	215-825-8610
TX	Dallas, MARCOM	214-351-4521
TX	Houston, MARCOM	713-271-5635
VA	Annandale, Eastern Comp.	703-354-0723

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ELECTRONIC TRANSFORMER CORP., P.O. Box 188, Totowa, NJ 07511, Tel: 201-942-2222; FSC No.: 72149; Empl.: 130; *Sls. Mgr.:* Dan Rovine

ELECTRONIC TRANSISTORS, 112-15 Northern Blvd., Flushing, NY 11368, Tel: 212-651-7200, Telex: 96-0173; FSC No.: 12045; Empl.: 45; *Sls. Mgr.:* Mike Byrnes; *Dist. Mgr.:* Mike Byrnes

ELECTRONIC TREND PRODS., 10080 N. Wolfe Rd., Ste. 372, Cupertino, CA 95014, Tel: 408-996-7401, Telex: 345516; Empl.: 3; *Dist. Mgr.:* Gene Selven

ELECTRONIC WATTMETER CO., 2275 Sixth St., Sarasota, FL 33577, Tel: 813-953-5355; Empl.: 6

ELECTRONIZED CHEMICALS CO., Div. of High Voltage Engrg., 23 Industrial Way, Wilmington, MA 01887, Tel: 617-657-8030, Telex: 68-17284

ELECTRON-MACHINE CORP., Box M, Umatilla, FL 32784, Tel: 904-669-3101, Telex: 56-4300; Empl.: 55; *Sls. Mgr.:* S. K. Kemp V.P. Mktg

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ELECTRO-NUMERICS, 1811 Reynolds, Irvine, CA 92714, Tel: 714-250-1501, Telex: 68-5612; FSC No.: 51666; Empl.: 24

ELECTRO-OPTICAL INDS., Box 3770, Santa Barbara, CA 93130, Tel: 805-964-6701, Telex: 65-8427; Empl.: 130

ELECTRO-PACIFIC, 5782 Thornwood Dr., Goleta, CA 93017, Tel: 805-964-0751; FSC No.: 29853; Empl.: 60; *Sls. Mgr.:* Verne White

ELECTRO PHYSICS, 1910 West Birchwood Ave., Chicago, IL 60626, Tel: 312-274-9669; Empl.: 6; *Sls. Mgr.:* Abe Siegelman

ELECTROPHYSICS CORP., 48 Spruce St., Nutley, NJ 07110, Tel: 201-667-2262, Telex: 642277

ELECTRO-PREP, LTD., Rt 28A, P.O. Box 437, Cataumet, MA 02534, Tel: 617-563-5559; *Sls. Mgr.:* J. Anderson

ELECTRO-RACK PRODUCTS CO., 1742 S. Clementine St., Anaheim, CA 92802, Tel: 714-776-5420; FSC No.: 26073; Empl.: 25; *Sls. Mgr.:* Allen Benson

ELECTRO RENT CORP., 4209 Van Owen Place, Burbank, CA 91505, Tel: 818-843-1221, Telex: 314225, TWX: 910-498-2238; Empl.: 350; *Sls. Mgr.:* R. Tarullo

ELECTRO SCIENTIFIC INDS., 13900 N.W. Science Pk. Dr., Portland, OR 97229, Tel: 503-641-4141, Telex: 474-2064; FSC No.: 11837; Empl.: 1100; *Sls. Mgr.:* Dick Donaca

Local Sales Offices & Reps

Impedance Measuring Devices

CA	Anaheim, Gary Ingbretson	714-995-2141
TX	Austin, Pete Fugger	512-258-7362
PA	Sewickley, Charles Molitor	412-255-1577
NC	Cary, Gay Gasque	919-481-0058
OR	Portland, Stan Gressel	503-641-4141

Laser Trimming & Processing Systems

IN	Kokomo, Doug Goad	317-453-9293
CA	San Jose, Tom White	408-243-8700
GA	Rosewell, Jack Fedon	404-998-0545
MN	Minneapolis, Tom Goodnow	612-870-9192
NH	Nashua, Roy Johnson	603-888-7605
NJ	Mt. Laurel, John Alpaugh	609-235-2474
OR	Portland, Stan Gressel/Russ Schlager	503-641-4141
TX	Plano, Doug Dickinson	214-867-4647

ELECTRO SPACE FABRICATORS, 300 W. High St., P.O. BOX 67, Topton, PA 19562-0067, Tel: 215-682-7181; Empl.: 205; *Sls. Mgr.:* T. Roth **C•1054-1055**

Local Sales Offices & Reps

AL	Huntsville, Mackan, Smith & Assocs.	205-539-8000
CA	Irvine, Vale Assocs.	714-551-4004, 4821
CA	San Jose, Silicon Valley Sls.	408-286-7510
CA	San Jose, Silicon Valley Sls.	408-371-8814
CO	Boulder, Starsales	303-440-4193
CT	Bridgeport, Betronic Assocs.	203-374-6404
FL	Lighthouse Point, Jack Krutek & Assocs.	305-941-6544
FL	Madeira Beach, MacKay, Smith & Assocs.	813-393-7144
FL	Orlando, MacKay, Smith & Assocs.	305-277-1513
GA	Norcross, MacKay, Smith & Assocs.	404-449-7444
IL	Northbrook, Raines & Assocs.	312-498-0890
MD	Pikesville, Imagitron Sls.	301-521-2020
MD	Pikesville, Imagitron Sls. Co.	800-638-3592
MA	Waltham, Betronic Assocs.	617-894-8400
MN	Minneapolis, Jen-Ray Sys.	612-831-5060
NJ	Boonton, Winter Assocs.	201-334-3434
NY	Morrisville, Promark-Electrns.	315-662-3310
NY	Morrisville, Promark Elctrns., Inc.	315-662-3310
NC	Charlotte, MacKay, Smith & Assocs.	704-372-1188
OH	Galion, James R. Bright	419-468-3787
OK	Tulsa, Advance Techn. Sls.	918-664-0482
PA	Doylestown, Monteiro Assocs.	215-345-5855
PA	McKean, Ecco Electrns. Sls.	814-476-1376
PA	McKean, ECCO	814-476-1376
TN	Chattanooga, MacKay, Smith & Assocs.	615-899-6951
TX	Austin, Advance Techn. Sls.	512-459-1351
TX	Dallas, Advance Techn. Sls.	214-340-1300
TX	Houston, Advance Techn. Sls.	713-440-3888
WA	Auburn, Elctrn. Sls. Northwest	206-839-5808
WA	Maple Valley, Electrn. Sls. Northwest	206-432-1002
Can	Downsview, Ont., Designtronics	1-416-747-1171

ELECTROSPACE SYS., INC., P. O. Box 831359, Richardson, TX 75083-1359, Tel: 214-783-2004, TWX: 910-867-4768; FSC No.: 33875; Empl.: 1,269

ELECTRO STANDARDS LAB., INC., P.O. Box 9144, Providence, RI 02940, Tel: 401-943-1164, Telex: 697-2057 ESLAB; Empl.: 20; *Sls. Mgr.:* R. B. Sepe; *Dist. Mgr.:* R. B. Sepe

ELECTROSTATIC CONSLTG. ASSOCS., 556 Lowell Rd., Groton, MA 01450, Tel: 617-448-5485; Empl.: 5; *Sls. Mgr.:* Paul Malinaric

ELECTROSTATICS, 7718 Clairemont Mesa Blvd., San Diego, CA 92111, Tel: 619-279-1414; FSC No.: 34538; Empl.: 17

ELECTRO STYLUS, 31 Cheyenne Blvd., Colorado Springs, CO 80906, Tel: 303-633-5969; Empl.: 10; *Sls. Mgr.:* L. F. Murray; *Dist. Mgr.:* M. L. Murray

ELECTRO SWITCH, King Ave., Weymouth, MA 02188, Tel: 617-335-5200, TWX: 710-388-0377; FSC No.: 82121; Empl.: 260; *Sls. Mgr.:* H. F. Peters .... **B•1564-1565**

Local Sales Offices & Reps

AZ	Phoenix, Howe & Howe Sls.	602-264-7971
CA	Los Angeles, Wiley	213-666-1611
CA	Moraga, W. Nott & Co.	415-376-1922
CA	San Diego, Wiley Co.	619-571-2881
CO	Boulder, Comp. Prods. Sls.	303-530-2800
FL	Winter Park, Floritronics	305-886-4818
GA	Atlanta, Holman-Gillespie	404-992-8820
IL	Elk Grove Village, Electro Switch	312-593-2225
IA	Bettendorf, H. J. Weisler & Assocs.	319-344-0566
MD	Gathersburg, Naudain Assocs.	301-258-5040
MI	Ferndale, Hilltronics	313-398-5556
MN	St. Paul, Kencotronics	612-645-7717
MO	Ellisville, H. J. Weisler & Assocs.	314-394-4543
MO	No. Kansas City, H.J. Weisler & Assocs.	816-421-1679
NJ	Fairfield, Electro Switch	201-227-6559
NJ	Marlton, Naudain Assocs.	609-983-5300
NY	Rochester, Sweetco Assocs.	716-225-2383
NY	Utica, Sweetco Assocs.	315-797-6721
NC	Winston-Salem, L. G. White Southern, Inc.	
NC	Winston-Salem, L.G. White Southern	919-725-3612
OH	Dayton, Rockford Controls	513-898-5452
OH	Euclid, Rockford Controls	216-731-5250
OH	Reynoldsburg, Rockford Controls	614-868-5577
PA	Pittsburgh, R. F. Clark	412-242-9500
SC	Greenville, L.G. White Southern	803-271-0630
TX	Bellaire, Brice Co.	713-666-1788
TX	Dallas, Brice Co.	214-233-9808
UT	Woodscross, Comp. Prods. Sls.	801-292-8882
VA	Richmond, L.G. White Southern	804-740-7093
WA	Seattle, C.B. Parsons & Co.	206-762-7373
WI	Wauwatosa, Larsen Assocs.	414-258-0529

Local Distributors

CA	Concord, Omega	415-671-7796
CA	Los Angeles, Electric Switches	213-660-1310
CO	Denver, Wesco	303-573-7550
FL	Ft. Lauderdale, Peerless Radio Corp. of Fla.	305-973-4141
GA	Atlanta, Georgia Control Ctr.	404-876-8833
IL	Bridgeview, Midco Comp. Sls.	312-599-7777
MD	Kensington, Marine Air Supp.	301-949-9560
MA	Sharon, Adcour	617-784-8123
MI	Grand Rapids, S-F Elctrn. Supp.	616-459-0216
MN	St. Paul, K. D. I.	612-645-7717
MO	St. Louis, Industrial Svc. Labs	314-535-5760
NY	Hempstead, Electronic Equip. Co.	516-538-5510
NC	Winston-Salem, General Prods. Co.	919-725-3612
OH	Euclid, Rockford Controls Ohio	216-731-5250
OK	Tulsa, Nelson Elec. Supp.	918-583-1212
PA	Conshohocken, I/O Elec. Supp. Corp.	215-825-4610
TX	Bellaire, Barclay Whls.	713-666-1788
WA	Seattle, C.B. Parsons Co.	206-762-7373
WI	Milwaukee, I/O Elec. Supp. Corp.	414-963-9050

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ELECTRO VECTOR, INC., 6555 Covey Rd., Forestville, CA 95436, Tel: 707-887-2292, TWX: 510-746-6024; *Sls. Mgr.:* Wayne Brigden

ELECTROVERT INC., 399 Executive Blvd., Elmsford, NY 10523, Tel: 914-592-7322, Telex: 646186; *Sls. Mgr.:* Steve Vineis

ELECTROVERT USA CORP., 10969 Shady Trail, # 101, Dallas, TX 75220, Tel: 214-353-9950, Telex: 4630186; FSC No.: 1-214-350-4991; Empl.: 175; *Sls. Mgr.:* Tom Gill

Local Sales Offices & Reps

CA	Santa Ana	714-835-2033
CA	Santa Clara	408-739-6015
CO	Denver	303-423-5598
GA	Norcross	404-441-3644
IL	Rosemont	312-678-5557
NH	Manchester	603-625-5877
NY	Elmsford	914-592-7322
TX	Dallas	214-353-9950

ELECTRO WEAVE, 425 Shrewsbury St., Worcester, MA 01604, Tel: 617-752-8932, TWX: 710-340-0635; FSC No.: 54207; Empl.: 18; *Sls. Mgr.:* C. J. Nowasacki

ELFAB CORP., 1097 Yates Street, Lewisville, TX 75067, Tel: 214-221-8776, 214-233-3033, TWX: 910-860-5460; Empl.: 350; *Sls. Mgr.:* Kermit Dye; *Dist. Mgr.:* Bud Addington .... **C•1190-1191**

Local Sales Offices & Reps

AL	Brownsboro, J.H.U. Assocs.	205-536-7455
AZ	Tempe, Delta Elec.	602-224-1601
CA	Escondido, Cirolia Elctrn. Sls.	619-743-3015
CA	Los Alamitos, Reed Elctrns. Sls.	714-821-9600
CA	Santa Clara, Elfab Corp.	408-988-1716
CA	Tustin, Elfab Corp.	714-731-2515
CO	Littleton, Lange Sls., Inc.	303-795-3600
FL	Goldenrod, Sunland Assocs.	305-365-9533
FL	Winter Park, Elfab Corp.	305-678-7759
GA	Atlanta, J.H.U. Assocs.	404-662-0792
IL	Arlington Heights, Brainard-Wilson Mktg.	312-437-2700
IL	Crystal Lake, E. S. Healy & Assocs.	815-459-4386
MD	Hunt Valley, Phoenix Elctrn. Sls.	301-628-2066
MA	Hopkinton, Marathon Sls., Ltd.	617-875-3566
MI	Grand Rapids, R. P. Urban Assocs.	616-245-0511
MN	Edina, Mel Foster Tech Sls.	612-941-9790
MO	St. Charles, Microtronics	314-946-8500
NJ	Cherry Hill, Elfab Corp.	609-795-6262
NY	N. Syracuse, Advanced Comps.	315-699-2671
NC	Raleigh, Rick Burns Assoc., Inc.	919-876-2224
OH	Dayton, Duane Thompson & Assocs.	513-237-9422
OK	Oklahoma City, Ammon & Rizos Co.	405-942-2552
TX	Austin, Ammon & Rizos Co.	512-454-5131
TX	Dallas, Ammon & Rizos Co.	214-644-5591
TX	Houston, Ammon & Rizos Co.	713-781-6240
UT	Salt Lake City, Lange Sls., Inc.	910-925-4006
WA	Seattle, Blum & Assocs.	206-285-2590
PR	Rio Piedras, D. K. Mktg.	809-765-5380

Local Distributors

CA	Santa Clara, Cetec Elctrns.	408-748-8550

ELFORM, INC., 521 Dunn Circle, Sparks, NV 89431, Tel: 702-356-1734, Telex: 170037; *Sls. Mgr.:* Roger R. Reinke

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Local Sales Offices & Reps

AL	Huntsville, Pen-Tech Assocs.	205-881-9298
AZ	Tempe, Trembly Assoc.	602-967-2058
CA	Costa Mesa, Ward Davis Assocs.	714-556-0755
CA	Pasadena, A & F Sls.	213-681-5631
CA	Redondo Beach, Ward/Davis Assocs.	213-973-7772
CA	San Diego, Ward/Davis Assocs.	619-292-1000
CA	San Jose, D.P. Assocs.	408-296-1492
CA	Santa Clara, Ward Davis Assocs.	408-245-3700
CO	Wheat Ridge, Trembly Assocs.	303-421-8900
FL	Casselberry, Pen-Tech Assocs.	305-645-3444
FL	Deerfield Beach, Pen-Tech Assocs.	305-421-4989
GA	Marietta, Pen-Tech Assocs.	404-424-1931
IL	Arlington Heights, Dytec/Central	312-394-3380
IL	Hoffman Estates, Carvel Engrg.	312-885-8800
IN	Indianapolis, Dytec/Central	317-247-1316
KS	Lenexa, Dytec/South	913-888-0215
MD	Rockville, Elctrn. Mktg. Assocs.	301-881-5300
MA	Woburn, P. Jenks Assocs.	617-938-0488
MI	Madison Heights, WKM Assocs.	313-588-2300
MN	Edina, Carvel Engrg.	612-835-7929
MN	Minneapolis, Berndt Assocs.	612-546-2021
MO	Maryland Hgts., Dytec/South	314-569-2990
NV	Las Vegas, Trembly Assocs.	702-739-9770
NJ	Fairfield, G & A Sls.	201-575-8080
NM	Albuquerque, Trembly Assoc.	505-266-8616
NY	Fairport, NACO Elctrns. Corp.	716-223-4490
NY	Great Neck, RTI	516-829-3770
NY	North Syracuse, NACO Elctrns. Corp.	315-699-2651
NY	Utica, NACO Elctrns. Corp.	315-732-1801
NC	Greenboro, Pen Tech Assocs.	919-852-6000
OH	Dayton, WKM Assocs.	513-434-7500
OH	Independence, WKM Assocs.	216-524-5930
OK	Edmond, Data Aids Assocs.	405-478-5000
OR	Beaverton, Northwest Test & Meas.	503-646-9966
OR	Portland, Topp Engrg.	503-244-7265
PA	Pittsburgh, WKM Assocs.	412-892-2953
PA	Plymouth Meeting, Elctrn. Mktg. Assocs.	215-828-7400
TX	Austin, Data Aids Assocs.	512-327-8600
TX	Dallas, Data Aids Assocs.	214-620-1551
TX	Woodlands, Data Aids Assocs.	713-363-3838
UT	Salt Lake City, Trembly Assocs.	801-486-5292
WA	Bellevue, Topp Engrg.	206-747-5400
WA	Redmond, Northwest Test & Meas.	206-881-8857
WI	Elm Grove, Dytec Central Inc.	414-784-9686
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Local Distributors

CA	Inglewood, Cal. Micro	213-671-6075
IL	Arlington Heights, Peak Distrs., Inc.	312-394-3380
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WA	Bellevue, Topp Engrg. Sls. Corp.	206-747-5400

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CA	Woodside, N-S Assocs.	415-851-2703
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NM	Albuquerque, Technology Mktg. Assoc.	505-345-8921
PA	Newtown Square, Holdsworth & Co.	215-356-8550

ELGIN ELECTRONICS, Combustion Engineering, 5533 New Perry Hwy., Erie, PA 16509-3570, Tel: 814-864-4921, TWX: 510-699-6870; Empl.: 500; *Sls. Mgr.:* C. G. Searles

Local Sales Offices & Reps

CA	Chatsworth, Elgin Elctrns.	818-700-0299
GA	Atlanta, Elgin Elctrns.	404-925-2572
IN	Redkey	317-369-2012
PA	Wayne	215-687-6100
TX	Fort Worth, Elgin Elctrns.	817-429-7331

ELIN DIV., California Instrs. Co., Div. of Norlin Ind., 5150 Convoy St., San Diego, CA 92111, Tel: 619-279-8620, Telex: 695-047; FSC No.: 16067; Empl.: 90; *Sls. Mgr.:* W.W. Hanford

ELITE ELECTRONICS, INC., 1408 Summit - Suite #5, Plano, TX 75074, Tel: 214-881-0026; Empl.: 3

ELITE SOFTWARE DEVELOPMENT, INC., P.O. Drawer 1194, Bryan, TX 77806, Tel: 409-846-2340, Telex: 910-997-6760; Empl.: 4; *Sls. Mgr.:* Terri J. King

ELMA ENGRG., 1066 E. Meadow Circle, Palo Alto, CA 94303, Tel: 415-494-7303, Telex: 345-560; FSC No.: 59810; Empl.: 50

ELMAG, 54 Clark St., Newark, NJ 07104, Tel: 201-481-1600; FSC No.: 23160; Empl.: 25

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CA	San Jose, O'Donnell Assocs.	408-263-6500
CA	Torrance, O'Donnell Assocs.	213-539-9664
CO	Boulder, Front Range Mktg.	303-443-4780
FL	Coral Springs, CBC Electronics	305-755-1111
GA	Atlanta, Tenn. Tech. Sls.	404-622-5784
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IN	Fort Wayne, O. Bromberg	219-456-6010
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MO	St. Louis, Hill & Co.	314-432-1136
NH	Durham, C. H. Burnham Assoc.	603-868-2282
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NY	Larchmont, G. M. Moch Co.	914-834-3530
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NC	Charlotte, Tenn-Tech Sls.	704-525-6295
NC	Raleigh, Tenn-Tech	919-226-3610
OH	Cincinnati, O. Bromberg	513-771-9333
OH	Cleveland, Allied Entprs.	216-779-0080
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OR	Hillsboro, Temco-Northwest	503-648-8171
PA	Huntington Valley, Omega Elctrns. Sls.	215-947-4135
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RI	Johnston, C. H. Burnham Assoc.	401-231-7475
TX	Austin, Ion Assocs.	512-331-7252
TX	Grand Prairie, Ion Assocs.	214-647-8225
TX	Houston, Ion Assocs.	713-977-4354
UT	Salt Lake City, Front Range Mktg.	801-364-6481
VA	Midlothian, Daniel E. Boehling Assocs.	804-794-5879
WA	Bellevue, Lehr Assocs.	206-453-9993
WA	Bothell, Temco Northwest	206-821-5434
WI	Milwaukee, R. Zingler	414-351-5005
Can	Mississauga, Ont., Andy Baumen Assocs.	416-828-2600

ELNA AMERICA, INC., 153 E. Savarona Way, Carson, CA 90746, Tel: 213-327-6090, Telex: 68-6427, TWX: 910-346-6730; *Sls. Mgr.:* Don L. Bilsing; *Dist. Mgr.:* Isao Kikuchi

ELNETIC ELCTRNS., 1730 21st St., Santa Monica, CA 90404, Tel: 213-828-9541; FSC No.: 98460; Empl.: 25; *Sls. Mgr.:* Ernest H. Carlson, Jr.

ELNIK INSTRS., 3 Edison Place, Fairfield, NJ 07006, Tel: 201-882-8033, Telex: 13-0567; Empl.: 8; *Sls. Mgr.:* Claus J. Joens

ELOGRAPHICS, 105 Randolph Rd., Oak Ridge, TN 37830, Tel: 615-482-4100; *Sls. Mgr.:* R. Highfill

ELPAC COMPS., 3131 S. Standard Ave., Santa Ana, CA 92705, Tel: 714-979-4440, TWX: 910-595-1513; Empl.: 130; *Sls. Mgr.:* Rod Bolton .... **A•1078-1079**

Local Sales Offices & Reps

AZ	Tempe, Sunwest Mktg. Assocs.	602-838-7586
CA	San Diego, Wes-K Assocs.	619-578-2040
CA	Santa Clara, Westrep	408-988-8833
CA	Van Nuys, Wes-K Assocs.	213-989-3070
CO	Arvada, Wescom Mktg.	303-422-7619
CT	Milford, Todino Engr. Sls.	203-874-6643
FL	Orlando, OEM Mktg. Corp.	305-299-1000
IL	Highland Park, Bransky Sls.	312-433-2375
MA	Needham Heights, Todino Engr. Sls.	617-444-7925
MN	Bloomington, Smiley-Scott Assocs.	612-888-5551
NJ	Englewood, Harold Gray Assocs.	201-894-0894
OH	Dayton, J. C. Hofstetter Co.	513-296-1010
OH	Medina, J. C. Hofstetter Co.	216-241-4880
OR	Beaverton, Caruso & Northcutt	503-646-4973
PA	Hickord, J. C. Hofstetter Co.	412-356-2305
TX	Richardson, Mech-Tron	214-437-4833
UT	Salt Lake City, Wescom Mktg.	801-466-9594
WA	Bellevue, Caruso & Northcutt	206-454-9699
WI	Cedarburg, Bransky Sls.	414-377-8507

Local Distributors

AZ	Phoenix, T.T.I.	602-861-0222
CA	Chatsworth, Mil-Comm	213-998-3111
CA	Garden Grove, Megacap	714-891-5176
CA	Irvine, Kelex	714-863-1230
CA	San Jose, T.T.I.	408-943-9155
FL	Orlando, T.T.I. Florida	305-859-1000
IL	Northbrook, Classic Components	312-272-9650
IL	Skokie, Kellner Elctrns.	312-677-1120
MA	Wilmington, Aved Elctrns.	617-657-8311
MA	Woburn, T.T.I., Inc. NE	617-938-8800
MO	Maryland Heights, Ensco Distribg., Inc.	314-423-3935
NJ	S. Hackensack, Waltech	201-641-7300
NY	Bohemia, T.T.I.	516-567-1500
NY	Elmsford, Ancar	914-592-7100
OK	Tulsa, Altair Co.	918-252-5781
TX	Austin, Captronics	512-459-4328
TX	Dallas, Captronics	214-340-3592
TX	Ft. Worth, T.T.I.	817-429-1440
TX	Houston, Altair Co.	713-462-3029
WI	Mequon, Taylor Elec. Dists.	800-558-8921
WI	Racine, Badger Elctrns.	414-637-1256, 414-933-6685

ELPAC POWER SYS., 3131 S. Standard Ave., Santa Ana, CA 92705, Tel: 714-979-4440, TWX: 910-595-1513; Empl.: 270; *Sls. Mgr.:* Randy Bilsley; *Dist. Mgr.:* Randy Bilsley .... **D•1626-1631**

Local Sales Offices & Reps

AL	Huntsville, K&E Assoc.	205-883-9720
AZ	Phoenix, Westrep	602-997-8899
CA	Anaheim, Westrep	714-527-2822
CA	San Diego, Westrep	619-276-0751
CA	Santa Clara, Westrep	408-988-8833
CO	Parker, A-5 Co.	303-841-3651
CT	Yalesville, The Newscott Co.	203-269-2654
FL	Casselberry, Semi	305-831-2822
GA	Doraville, K&E Assoc.	404-448-7025
IL	Highland Park, Bransky Sls.	312-433-2375
IN	Ft. Wayne, F. J. Campisano	219-747-2633
IN	Indianapolis, F. J. Campisano	317-253-7651
KS	Overland Park, Electri-Rep	913-649-2168
MD	Pikesville, Imagitron Sls.	301-521-2020
MA	Needham Hgts., Newscott Co.	617-444-1923
MI	Brighton, Michigan Mktg.	313-229-6218
NJ	Cedar Knolls, TAM	201-285-9094
NY	S. Hauppauge, TAM	516-348-0800
NC	Greenboro, Imagitron Sls.	919-292-5474
OH	Cincinnati, F. J. Campisano	513-574-7111
OH	Cleveland, F. J. Campisano	216-749-5550
OK	Tulsa, ION Assocs.	918-664-0186
OR	Beaverton, Caruso & Northcutt	503-646-4973
PA	Coraopolis, F. J. Campisano	412-264-5151
TX	Austin, Ion Assocs	512-346-7160
TX	Grand Prairie, ION Assocs.	214-647-8225
TX	Houston, Ion Assocs.	713-977-4354
UT	Murray, A-5 Co.	801-483-1034
WA	Bellevue, Caruso & Northcutt	206-454-9699
WI	Cedarburg, Bransky Sls.	414-377-6837

Local Distributors

AL	Marshall Inds.	
AL	Birmingham, ACK Radio Supp.	205-322-0588
AL	Huntsville, Powell Elec.	205-539-2731
AL	Huntsville, RM Elctrns.	205-852-1550
AZ	Phoenix, Heilind Elec.	602-437-1060
AZ	Tempe, Marshall Inds.	602-968-6181
CA	Costa Mesa, Powell Elec.	714-754-1717
CA	El Monte, Marshall Inds.	213-442-7204
CA	San Jose, Powell Elec.	408-943-9020
CO	Denver, Marshall Inds.	303-427-1818
CT	Bethel, Heilind Elec.	203-797-8600
CT	Wallingford, Marshall Inds.	203-265-3822
CT	Wallingford, Sager Elctrns.	203-265-4600
FL	Ft. Lauderdale, Powell Elec.	305-979-5000
FL	Orlando, Marshall Inds.	305-841-1878
GA	Atlanta, ACK Radio Supp.	404-351-6340
GA	Norcross, Marshall Inds.	404-923-5750
IL	Chicago, Newark Elctrns.	312-638-5100
IL	Northbrook, Classic Comps.	312-272-9650
IL	Schaumburg, Marshall Inds.	312-490-0155
IN	Indianapolis, RM Elctrns.	317-291-7110
MD	Gaithersburg, Marshall Inds.	301-840-9450
MA	Burlington, Marshall Inds.	617-272-8200
MA	Burlington, QPL Elctrns.	617-229-2424
MA	Hingham, Sager Elctrns.	617-749-6700
MI	Grand Rapids, RM Elec.	616-531-9300
MI	Livonia, Marshall Inds.	313-525-5850
MN	Plymouth, Marshall Inds.	612-559-2211
MO	St. Charles, Finnigan Elec.	314-946-6201
NH	Hudson, Heilind Elec.	603-883-9536
NJ	Cranford, Garden State Indl.	201-272-6400
NJ	Fairfield, Marshall Inds.	201-882-0320
NJ	Mt. Laurel, Marshall Inds.	609-234-9100
NY	Hauppauge, Broadline Elctrns.	212-895-6232
NY	Hauppauge, Marshall Inds.	516-273-2424
NY	Johnson City, Marshall Inds.	607-798-1611
NY	Rochester, Marshall Inds.	716-235-7620
NC	Greensboro, Hammond	919-275-6391
OH	Dayton, Marshall Inds.	513-236-8088
PA	Philadelphia, Shap Elctrns.	215-969-3300
SC	Greenville, Hammond Elctrns.	803-233-4121
TN	Austin, Marshall Inds.	512-458-5654
TX	Dallas, Heilind Elec.	214-351-2050
TX	Dallas, Marshall Inds.	214-233-5200
TX	Dallas, RM Elctrns.	214-235-3100
TX	Houston, Heilind Elec.	713-988-2711
TX	Houston, Marshall Inds.	713-789-6600
TX	Houston, Newark Elctrns.	713-782-4800
WA	Bellevue, Marshall Inds.	206-747-9100
WI	New Berlin, Classic Comps.	414-786-5300
WI	New Berlin, RM Elctrns.	414-784-4420

ELPA MARKETING IND., Thorens & Atlantic Ave., Garden City Park, NY 11040, Tel: 516-746-3002

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ELPOWER, 2117 S. Anne St., Santa Ana, CA 92704, Tel: 714-540-6155, Telex: 678354 ELPOWER SNA; Empl.: 200; *Sls. Mgr.:* D. Keil; *Dist. Mgr.:* Ronnie LeFevre .... **D•1418-1420**

Local Sales Offices & Reps

AZ	Phoenix, Shefler-Kahn	602-257-9015
CA	Hayward, Pacific Mktg.	415-887-1620
CO	Denver, Moss Mktg.	303-455-7205
CT	Milford, Todino Engrg. Sls. Co.	203-874-6643
GA	Norcross, Hollingsworth & Still	404-447-1700
IL	Chicago, G. Mcl. Cole Co.	312-774-3535

IN	Indianapolis, Elctrn. Mktg. Conslts.	317-253-1668
KS	Overland Park, Thomas L. Dowell & Assocs.	913-648-7373
MA	Needham Heights, Todino Engrg.	617-444-7925
MI	Livonia, Electronic Salesmasters	800-321-1848
MN	Edina, Restronics	612-941-9135
MO	St. Louis, Thomas L. Dowell & Assoc.	314-849-4234
NJ	Englewood Cliffs, Masin Esco	201-569-8868
NJ	Marlton, Twin Sls.	609-966-4070
NY	Chappaqua, Masin Esco	914-238-8337
NY	East Syracuse, Nycom, Inc.	315-437-8343
NY	Hauppauge, Masin Esco	516-273-3500
OH	Beachwood, Electronic Salesmasters	216-831-9555
PA	Bensalem, Twin Sls.	215-638-4850
TX	Dallas, R. E. Nesbitt Co.	214-357-4601
VA	Herndon, Stinson Assocs.	703-620-0088
WA	Seattle, Northmar	206-524-5170

Local Distributors

AL	Huntsville, Components Distrs.	205-883-7501
CA	Cerritos, El Com	213-404-2961
CA	Fremont, Terminal Sls.	415-656-7722
CA	Gardena, Culver Elctrn. Sls.	213-538-2811
CA	Mountain View, Energy Sls.	415-969-0800
CO	Denver, Hensley Battery	303-455-3643
CT	Middletown, Mid-State Elctrns.	203-347-5638
FL	Ft. Lauderdale, Component Dist.	305-971-4950
GA	Atlanta, Custom Alarm Prods.	404-458-0990
IL	Downers Grove, Telecommunication Dvcs.	312-971-3460
IL	Palatine, Ohm Elctrns.	312-359-5500
IN	Indianapolis, Graham Elctrns.	317-634-8202
LA	New Orleans, Allen Supp. Corp.	504-525-8222
MD	Savage, Pyttronic	301-792-0780
MI	Livonia, Alarm Supp. Co.	313-591-9100
MN	Burnsville, Power Trust Grp.	612-890-1360
MO	St. Louis, Olive Elctrns.	314-426-4500
MO	St. Louis, Van Sickle Radio	314-621-5000
NJ	Hanover, State Elctrns Pts.	201-887-2550
NY	Jackson Hgts., A-1 Alarmatic	212-639-8300
OR	Portland, Radar Elec.	503-232-3404
PA	Allentown, A. A. Peters	215-434-5237
UT	Salt Lake City, Standard Supp.	801-486-3371
VA	Richmond, AVCC Elctrns.	804-359-6071
WA	Seattle, Radar Elec.	206-282-2511

EL-RAD MFG., 2800 W. Cullom Ave., Chicago, IL 60618, Tel: 312-478-7300, TWX: 910-221-0104; FSC No.: 11253; Empl.: 225; *Sls. Mgr.:* Marvin S. Christ

Local Sales Offices & Reps

J. J. Riley Assocs.

AZ	Scottsdale, Memco Sls.	602-241-2254
AR	Little Rock, Jaro Electro Sls.	214-231-6654
CA	Huntington Beach, J. J. Riley Assoc.	714-841-1411
CA	Mountain View, Westech Sls.	415-961-1422
FL	Pompano Beach, Cole-Tek	305-781-8110
IL	Elk Grove Village, I R O Co.	312-593-0644
MD	Glen Burnie, Faion Lott & Co.	301-744-4611
MD	St. Louis, Abrams & Assocs.	314-569-0447
MI	Benton Harbor, Mc Nabb & Assocs.	616-925-2166
NJ	Baltimore, Faion Lott & Co.	301-744-4611
NM	Phoenix, Memco Sls.	602-952-2254
TX	Richardson, Jaro Electro Sls.	214-231-6654

ELTEC INSTRUMENTS INC., P.O. Box 9610, Daytona Bch., FL 32020, Tel: 904-253-5328, TWX: 810-832-6294; Empl.: 120; *Sls. Mgr.:* Douglas S. Armstrong

EMCA, Sub. Rohm and Haas Advanced Matls. Co., 605 Center Ave., Mamaroneck, NY 10543, Tel: 914-698-8434, TWX: 710-566-1128; Empl.: 70; *Sls. Mgr.:* Dennis Hanley

EMCO HIGH VOLTAGE CO., 11126 Ridge Road, Sutter Creek, CA 95685, Tel: 209-223-3626; Empl.: 38 .... **D•1632**

EMCON INC., Sub. of Kyocera Intl., 11620 Sorrento Valley Rd., San Diego, CA 92138, Tel: 619-459-4355, TWX: 910-322-1130; Empl.: 500; *Sls. Mgr.:* Bob Goodman; *Dist. Mgr.:* George Maines

EMCOR PRODUCTS, Crenlo, Inc., 1600 Fourth Ave. NW, Rochester, MN 55901, Tel: 507-289-3371, TWX: 910-565-2374; *Sls. Mgr.:* John Horton .... **C•1057**

EMC TECHNOLOGY INC, 1971 Old Cuthbert Rd., Cherry Hill, NJ 08034, Tel: 609-429-7800, Telex: 710 896 0193; FSC No.: 24602; Empl.: 75; *Sls. Mgr.:* Peter Semitschew

Local Distributors

CA	Los Altos, SIDCO, Inc.	415-949-0440
CA	Malibu, RL Comp., Inc.	213-456-9021
NJ	E. Windsor, Micro-Lambda, Inc.	609-443-3113

EMERGENCY BEACON CORP., 15 River St., New Rochelle, NY 10801, Tel: 914-235-9400; Empl.: 25; *Sls. Mgr.:* Judith L. Weber

EMERGENCY POWER ENGINEERING INC., 3580 Cadillac Ave., Costa Mesa, CA 92606, Tel: 714-557-1636, Telex: 183535; Empl.: 356; *Sls. Mgr.:* Warren Caves

EMERSON, INDL. CONTROLS DIV., 3300 Standard St., Santa Ana, CA 92702, Tel: 714-545-5581, Telex: 67-8460; Empl.: 800; *Sls. Mgr.:* R. L. Calvin

Please call factory for sales offices and nearest rep.

EMERSON & CUMING, W. R. Grace & Co., 59 Walpole St., Canton, MA 02021, Tel: 617-828-3300, TWX: 710-348-1324; Empl.: +500

EMHART CANADA, LTD., See Mallory Components Div.

EMICO INC., Box 368, Dublin, PA 18917, Tel: 215-249-9330, TWX: 510-665-9583; FSC No.: 85925; Empl.: 170; *Sls. Mgr.:* R. Jones .... **D•1352-1353**

Local Sales Offices & Reps

AZ	Scottsdale, Luscombe	602-949-9333
CA	Campbell, Luscombe Engrg.	408-370-2020
CA	Pasadena, Luscombe	213-684-2000
CO	Arvada, Arrowhead Sls. Co.	303-423-5556
FL	Semenole, Chaco Sls.	813-397-4843
IL	Chicago, Ropek & Cahill	312-631-0070
IN	Carmel, S T B & Assocs.	317-844-9227
KS	Shawnee Mission, Robinson & Assocs.	913-262-1374
MD	Silver Spring, H.R. Sieber Co.	301-681-3770
MA	Braintree, Anderson Sls. Co.	617-848-9194
MN	Minneapolis, H.M.R., Inc.	612-888-2122
NJ	Marlton, B.G.R. Assocs.	609-428-2440
NY	Syracuse, Nycom, Inc.	315-437-8343
NY	Yonkers, Sonkin Assoc.	914-968-8282
NC	Charlotte, Electro-Rep. Assocs.	704-527-2530
OH	Rocky River, Loesch Assocs.	216-333-0077
TX	Rowlett, Campion Sls.	214-475-8313
WA	Redmond, Eclipse Mktg.	206-885-6991
WI	Colgate, Rep I and Assocs.	414-628-4016

EMI GENCOM INC., See THORN EMI Gencom Inc.

EMI TECHNOLOGY INC., See THORN EMI Technology Inc.

E/M LUBRICANTS, INC., Div. of Great Lakes Chemical Corp., Highway 52 NW, W. Lafayette, IN 47906, Tel: 317-463-2511, Telex: 27-9428; FSC No.: 11770

Local Sales Offices & Reps

CA	Mt. View	415-961-5865
CA	North Hollywood	213-875-0101
CO	Denver	303-371-6771
CT	New Britain, E/M Lubricants, Inc.	203-224-9148
GA	Atlanta	404-361-2550
IL	Lombard	312-620-6808
MA	Auburn	617-792-6919
MI	Roseville	313-779-6460
MN	New Brighton	612-780-3202
OH	Dayton	513-254-8481
PA	Sharon Hill	215-461-1015
TX	Ft. Worth	817-834-8817

EMM SEMI, SUB OF EM & M, See GTE Microcircuits

EMM/SESCO, 20630 Plummer St., Chatsworth, CA 91311, Tel: 213-998-9090, Telex: 691404, TWX: 910-494-4990; *Sls. Mgr.:* Russ Summers

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EMPRO MFG. CO., INC., P.O. Box 26060, Indianapolis, IN 46226, Tel: 317-823-4478; Empl.: 25 .... **D•1224**

Local Sales Offices & Reps

CA	La Canada, Lew Brooks Co.	213-790-8358
CA	Santa Ana, Lew Brooks Co.	714-544-8900
GA	Atlanta, Brownell Electro Inc.	404-762-5181
IL	Chicago, Best Rep Co.	312-992-1055
MA	Burlington, E.I.L. Instr.-Mancib Div.	617-272-9450
NJ	Belleville, D. F. Tobias & Co.	201-751-8680
OH	Cleveland, Weschler Elec. Corp.	216-238-2550
PA	Philadelphia, Sunshine Sci. Instr. Inc.	215-673-5600
TX	Houston, Ev Smith Sls.	713-649-5756

EMR DATA SYSTEMS, DIV. SANGAMO- WESTON, Box 3041, Sarasota, FL 33578, Tel: 813-371-0811, Telex: 052-890, TWX: 810-864-0406; Empl.: 1100; *Sls. Mgr.:* F. V. Hinkel

E M S DEVELOPMENT CORP., 200 Allen Blvd., Farmingdale, NY 11735, Tel: 516-694-2886, TWX: 510-224-6480; FSC No.: 51435; Empl.: 115; *Sls. Mgr.:* Ed Simkovich

EMULOGIC, 3 Technology Way, Norwood, MA 02062, Tel: 617-329-1031; *Sls. Mgr.:* Robert Smith

ENCLOSURE CORP., 4529 Adams Circle, Cornwells Hts., PA 19020, Tel: 215-638-9550; FSC No.: 32360; Empl.: 106; *Sls. Mgr.:* Gene Goldner

ENCODER DIV., LITTON SYSTEMS, INC., See Litton Encoder Div.

ENCODER PRODS., 1601B Dover Rd., Sandpoint, ID 83864, Tel: 208-263-8541, TWX: 510-776-1595; Empl.: 70; *Sls. Mgr.:* Vance Conner

ENDEVCO, 30700 Rancho Viejo Rd., San Juan Capistrano, CA 92675, Tel: 714-493-8181, Telex: 68-5608, TWX: 910-596-1415; FSC No.: 95411; Empl.: 400; *Sls. Mgr.:* C. Bowes

Local Sales Offices & Reps

AL	Huntsville, &	205-536-4454
CA	Anaheim	714-831-9200
CA	San Francisco, &	415-552-1763
CT	West Mystic	203-572-0571
FL	Orlando, &	305-855-4535
IL	Chicago	312-754-3888
MD	Annapolis, &	301-269-8800
NJ	Lambertville, &	201-254-9600
TX	Dallas	214-458-7720

Local Distributors

MI	Charlotte, RDP Assocs.	517-543-6212
OH	Cleveland, RDP Assocs.	216-659-3138
OH	Dayton, RDP Assocs.	513-253-6175

ENDICOTT COIL, 22 E. Charlotte St., Binghamton, NY 13905, Tel: 607-797-1263, Telex: 932411; Empl.: 140; *Sls. Mgr.:* Norman Aprile .... **A•1239, 2135**

Endicott Research Group. Inc.

ENDICOTT RESCH. GRP., INC., 2601 Wayne St., P.O. Box 269, Endicott, NY 13760, Tel: 607-754-9187, TWX: 510-252-0155; FSC No.: 63312; Empl.: 102 .... **B•1047-1049; D•1633**

Local Sales Offices & Reps

CA	Laguna Hills, Component Mktg. Assocs.	714-951-6046
CA	Lomita, Component Mktg. Assoc.	213-326-1460
CA	Saratoga, Testco	408-253-1900
CO	Denver, West Incorporated	303-773-5150
CT	Bloomfield, SIR Assocs.	203-243-9343
FL	Pompano Beach, Cole-Tek Assocs.	305-781-8110
GA	Atlanta, Wallace Electronics	404-471-6297
IL	Elk Grove Village, Carlson Elctrn. Sls.	312-956-8240
IN	Indianapolis, J & W Sls.	317-842-3740
IA	Cedar Rapids, Carlson Elctrn. Sls.	319-377-6341
KS	Wichita, PMR, Inc.	316-684-4141
MA	Bedford, SIR Assocs.	617-275-5550
MI	West Bloomfield, Granneman & Assocs.	313-661-4891
MN	Minneapolis, Jos-Col Melius	612-861-3343
MO	Maryland Hts., PMR, Inc.	314-569-1220
NE	Overland Park, PMR, Inc.	913-381-0004
NJ	Livingston, Eagle Sls. Co.	201-992-2030
NY	Albany, H. C. Johnson Agencies	716-632-7880
NY	Buffalo, H. C. Johnson Agencies	716-632-7880
NY	Jericho, Metro-Tech	516-935-3330
NY	Rochester, H. C. Johnson Agencies	716-482-3000
NC	Kernersville, Wallace Electronics	919-996-2742
OH	Dayton, Dynel Co.	513-434-6467
PA	Glenshaw, H. C. Johnson Agencies	412-487-1246
PA	King of Prussia, Freedman-Malta Assocs.	215-337-9211
TX	Austin, Mil-Rep Associates	512-258-2828
TX	Houston, Mil-Rep Associates	713-937-0127
TX	Richardson, Mil-Rep Associates	214-644-6731
UT	Salt Lake City, West Inc.	303-773-8180
WA	Bellevue, Testco	206-454-7422
WI	Milwaukee, Carlson Elctrn. Sls.	414-476-2790

Can	Toronto, Norgay Entprs., Ltd.	416-239-3025

ENERCO, INC., 9615 W. Marginal Way S., Seattle, WA 98108, Tel: 206-762-1422; Empl.: 5; *Sls. Mgr.:* Lee Rabie

ENERGETEC SYSTEMS, INC., 130 E. St. Charles Rd., Carol Stream, IL 60188, Tel: 312-653-1920, Telex: 910-380-8574; Empl.: 40

ENERGY CONCEPTS, PO Box 128, Carlsbad, CA 92008, Tel: 619-942-3144; FSC No.: 01830; Empl.: 6; *Sls. Mgr.:* Marilyn Decarlo

ENERGY, LTD., 4714 Upshur Street, Bladensburg, MD 20710, Tel: 301-699-1144; FSC No.: Easylink 62837736; Empl.: 6 .... **D•1923**

ENGELHARD CORP., 70 Wood Ave. S., Iselin, NJ 08830, Tel: 201-321-5900, Telex: 83-3147; Empl.: 8500

ENGELMANN MICROWAVE CO., KDI Pyrofilm, 60 S. Jefferson Rd., Whippany, NJ 07981, Tel: 201-887-5700, TWX: 710-986-8220; *Sls. Mgr.:* Carl Schraufnagl

ENGINEERED COMPS. CO., P. O. Box 8121, San Luis Obispo, CA 93403-8121, Tel: 805-544-3800; FSC No.: 32440; Empl.: 250

ENGD. PROD., Div. of Acme Elec. Corp., 40 Water St., Cuba, NY 14727, Tel: 716-968-2400, Telex: 91-6451, TWX: 510-245-2700; Empl.: 850; *Sls. Mgr.:* Dick Milne

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CA	San Diego, Saber Entprs.	619-271-1523
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GA	Atlanta, Quantum Meas.	404-351-3531
IN	Plainfield, Stress Analysis Svcs.	317-839-8235
MI	Brighton, Stress Analysis Svcs.	313-632-6110
NJ	Hopatcong, Measurements, Inc.	201-770-1281
NM	Albuquerque, J. Smith & Assocs.	505-265-3406
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NY	Pittsford, Trott lectrns.	716-586-8251
NC	Chapel Hill, Quantum Meas.	919-933-7408
OH	Dayton, Stress Analysis Svcs.	513-263-8036
OH	Medina, Stress Analysis Svc.	216-725-7733
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VA	Fredericksburg, Measurements, Inc.	703-373-5520
Can	Ontario, Intertechnology	416-445-5500

ENTRELEC DIV., See Cogenel, Inc./Entrelec Div.

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TX	Houston, Advance Tech. Sls.	713-440-3888

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EOTEC CORPORATION, Fiber Optic Interconnect Group, 420 Frontage Road, West Haven, CT 06516, Tel: 203-934-7961, Telex: 358190; Empl.: 24; *Sls. Mgr.:* Lou Maiolo

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OR	Beaverton, Demarest Assoc.	503-643-0141
TX	Arlington, Whitehead & Assoc.	817-261-5794
UT	West Jordan, Specialty Sales Co.	801-561-0222
WA	Seattle, Demarest Assoc.	206-523-3210

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IN	Indianapolis, Electro Prods.	317-298-8255
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MI	Lansing, Fulton Radio	517-394-5020
MO	Kansas City, Walters Radio Supp.	816-531-7015
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NM	Albuquerque, Walker Radio	505-247-2288
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OH	Dayton, The John A. Becker Co.	513-226-1341
OH	Warren, Rem Elctrns. Supp.	216-373-1300
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SC	Charleston, Wholesale Inds. Elec.	803-722-2634
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UT	Salt Lake City, Newark Elctrns.	801-486-1048
VA	Norfolk, Avec Elctrns.	804-627-3502
WI	Milwaukee, Industrial Elctrns. Supp.	414-276-1212

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EPSILON-LAMBDA ELCTRNS. CORP., 427 Stevens St., Geneva, IL 60134, Tel: 312-232-9611, TWX: 910-237-1684; Empl.: 30; *Sls. Mgr.:* Robert Knox

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CT	Bridgeport, Technical Instrs.	203-368-4582
FL	Ft. Lauderdale, Hollingsworth & Still	800-241-5712
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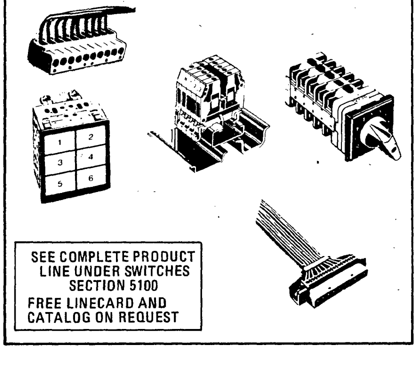

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TX	Houston, ION Assocs., Inc.	713-977-4354
WA	Seattle, S.J.I. Corp.	206-763-8981

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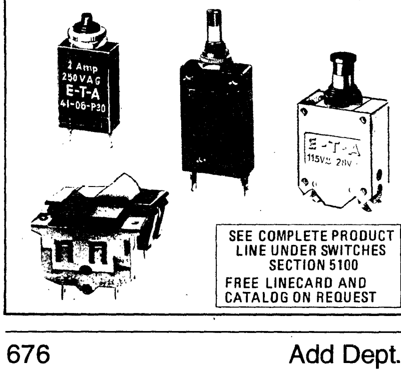

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ERM, 27 Water St., Wakefield, MA 01880, Tel: 617-246-3550

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E-SYSTEMS, Memcor Div., 1320 Flaxmill Rd., Huntington, IN 46750, Tel: 219-356-4300, TWX: 810-333-1530; FSC No.: 24681; Empl.: 450; *Sls. Mgr.:* Ray Vanderspool ...... **A•1869, 2015**

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ETI SYSTEMS, Polaris Indl. Entprs., 215 Via Del Norte, Oceanside, CA 92054, Tel: 619-757-7770, TWX: 910-322-1396; FSC No.: 952 762672; *Sls. Mgr.:* Bill Tice; *Dist. Mgr.:* Bill Tice ...... **A•2016-2017; B•1150-1152; D•1120-1121**

Local Sales Offices & Reps

CT	Washington, Tri-Com Assocs.	203-563-2241
IL	Arlington Heights, Brainard-Wilson Mktg.	312-437-2700
IN	Carmel, Brainard-Wilson Mktg.	317-844-2800
LA	Covington, HBT Assocs.	504-892-4045
MA	Burlington, Tri-Com Assocs.	617-272-8163
MA	Newburyport, Tri-Com Assocs.	617-465-3205
MI	Livonia, Lowell Wenot	313-464-2722
MN	Minneapolis, Intl. Elctrns.	612-571-0000
NJ	Morristown, Andrews & Andrews	201-569-8800
NY	Huntington, Andrews & Andrews	516-692-8686
OH	Cleveland, Baehr Greenleaf & Assocs.	216-221-9030
OH	Columbus, Baehr Greenleaf & Assocs.	614-486-4046
OH	Dayton, Baehr Greenleaf & Assocs.	513-439-0724
OR	Hillsboro, Rhodes Sls. Corp.	503-640-6666
PA	Dowington, Homersmith, Inc.	215-269-3637
PA	Evans City, Baehr Greenleaf	412-776-2151
PA	Media, Homersmith, Inc.	215-543-2434
TX	Dallas, Allied Comp., Inc.	214-238-0408
TX	Houston, Allied Comp., Inc.	713-988-1600
TX	Hurst, Allied Comp., Inc.	817-589-0456
TX	Round Rock, Allied Comp., Inc.	512-244-1166
VA	Roanoke, Homersmith, Inc.	703-774-7411
WA	Kent, Rhode Sls. Corp.	206-251-5396
WI	Waukesha, Brainard-Wilson	414-797-7940

Local Distributors

AZ	Tempe, Anjon Enterprises	602-894-1332
CA	Anaheim, A To Z Elctrns.	714-634-3620
CA	Canoga Park, Tim-Co. Sls.	213-992-5040
CA	Garden Grove, Allied Elctrns.	714-544-0731
CA	Hayward, Allied Elctrns.	415-487-5250
CA	Los Angeles, Allied Elctrns.	213-725-7111
CA	San Jose, Allied Elctrns.	408-727-1690
CA	San Jose, Vader Elec.	408-971-0288
CO	Wheatridge, Allied Elctrns.	303-425-7144
CT	Hamden, Allied Elctrns.	203-248-8900
FL	Ft. Lauderdale, Allied Elctrns.	305-486-0500
FL	Jupitor, Brosey Entprs.	305-746-2439
GA	Atlanta, Allied Elctrns.	404-237-3366
IL	Elgin, Allied Elctrns.	312-697-8200
IL	Lisle, Components, Inc.	312-852-7707
MD	Marlow Heights, Allied Elctrns.	301-423-0161
MA	Holliston, Add Elctrns.	617-478-4200
MA	Wilmington, Allied Elctrns.	617-942-0150
MA	Woburn, Mac Bearing Co.	617-933-2110
NY	Mineola, Allied Elctrns.	516-248-2360
NY	Port Washington, Connector Concepts Corp.	516-883-3800
NC	Raleigh, Allied Elctrns.	919-467-0720
OH	Cleveland, Allied Elctrns.	
OH	Cleveland, Specialized Comp. Sls.	216-464-0405
OK	Oklahoma City, Trice Wholesales Elec.	405-524-4411
OK	Tulsa, Allied Elctrns.	918-663-7630
OR	Beaverton, Shannon, Ltd.	503-644-8077
PA	Bala Cynwyd, Allied Elctrns.	215-667-6940
TX	Ft. Worth, Allied Elctrns.	817-336-5401
TX	Houston, Lenert Co.	713-225-1465
TX	Humble, Allied Elctrns.	713-852-3730
WA	Kent, Shannon, Ltd.	206-763-0545
WA	Seattle, Allied Elctrns.	206-767-5772
WI	Milwaukee, Allied Elctrns.	414-355-8866
WI	Oshkosh, Electronic Inds.	414-235-8930

ETM ELECTROMATIC INCORPORATED

ETM ELECTROMATIC, 470 San Antonio Ave., Palo Alto, CA 94306, Tel: 415-494-1505; *Sls. Mgr.:* Wes Henderson .... **D•1226-1227, 1638**

ETRI

ETRI, INC., 608 Broome St., P.O. Box 5006, Monroe, NC 28110, Tel: 704-289-5423, TWX: 810-649-1352; FSC No.: FAX 704-283-7170; *Sls. Mgr.:* G. Wolf ... **C•1638-1640**

Local Sales Offices & Reps

AL	Huntsville, Montgomery Mktg.	205-830-0498
AZ	Scottsdale, Luscombe Engrg.	602-949-9333
CA	Los Gatos, Nor-West Elctrns.	408-395-1190
CA	Pasadena, Luscombe Engrg.	213-684-2000
CA	San Diego, Bestronics	619-693-1111
CO	Boulder, Comp. Prods. Sls.	303-530-2800
FL	Altamonte Springs, Semitronics Assocs.	305-831-8233
FL	Clearwater, Semtronics Assocs.	813-461-4675
FL	Ft. Lauderdale, Semtronics Assocs.	305-731-2484
GA	Norcross, Montgomery Mktg.	404-447-6124
IL	Des Plaines, Lincoln, Hodges & Assocs.	312-297-3810
IN	Ft. Wayne, Advanced Comp. Sls.	219-484-0722
IN	Indianapolis, Advanced Comp. Sls.	317-545-6441
IA	Cedar Rapids, PMR, Inc.	319-362-9177
KS	Overland Park, PMR, Inc.	913-381-0004
MA	Lexington, John E. Boeing Co., Inc.	617-862-2500
MI	Birmingham, Favco Techn. Reps.	313-644-0173
MN	Minneapolis, Milt Westlund Assocs.	612-866-5002
MO	Maryland Heights, PMR, Inc.	314-569-1220
NJ	Cherry Hill, Trinkle Sls., Inc.	609-795-4200
NY	Endicott, Noeth-Honsinger	607-754-3214
NY	Manhasset, Win-Cor Elctrns.	516-627-9474
NY	Pittsford, Noeth-Honsinger	716-586-9002
NC	Cary, Montgomery Mktg.	919-467-6319
OH	Cincinnati, Makin & Assocs., Inc.	513-871-2424
OR	Wilsonville, RTS, Inc.	503-638-5670
TX	Austin, Nova Mktg.	512-343-2321
TX	Dallas, Nova Mktg.	214-750-6082
TX	Houston, Nova Mktg.	713-988-6082
WA	Vashon, RTS, Inc.	206-285-1363
WI	Janesville, Antek/Lincoln Hodges & Assocs.	608-754-4214
WI	Waukesha, Lincoln, Hodges & Assocs.	414-542-3087
PR	Santurce, John E. Boeing Co., Inc.	809-722-6942
Can	Monroe, NC, ETRI, Inc.	704-289-5423

Local Distributors

AL	Huntsville, RM Elctrns.	205-852-1550
AZ	Tempe, Acacia Sls., Inc.	602-894-2874
AZ	Tempe, Fisher Brownell	602-967-1464
CA	Alhambra, Fisher-Brownell	818-289-0255
CA	Fountain Valley, Components Ctr.	714-979-0433
CA	Irvine, Acacia Sls., Inc.	714-660-0834
CA	San Diego, Acacia Sls., Inc.	619-565-4365
CA	San Diego, Fisher Brownell	619-560-8545
CA	Santa Clara, Fisher Brownell	408-988-6041
CA	Sunnyvale, Acacia Sls., Inc.	408-745-7200
CO	Denver, Integrated Elctrns.	303-292-6121
CO	Lakewood, Acacia Sls., Inc.	303-232-2882
CT	Milford, RC Comps.	203-874-0006
CT	Orange, Milgray Elctrns.	203-795-0711
FL	Altamonte Springs, Pioneer Elctrns.	305-834-9090
FL	Deerfield Beach, Pioneer Elctrns.	305-428-8877
FL	Ft. Lauderdale, Hammond Elctrns.	305-973-7103
FL	Winter Park, Milgray Elctrns.	305-647-5747
GA	Atlanta, Milgray Elctrns.	404-393-9666
IL	Addison, L-Comp	312-628-1400
IL	Bensenville, Milgray Elctrns.	312-350-0490
IL	Elk Grove Village, RM Elctrns.	312-364-6622
IL	Itasca, Voyager Elctrns.	312-773-4900
IL	Palatine, OHM Elctrns.	312-359-5500
IN	Indianapolis, Advent Elctrns.	317-872-4910
IN	Indianapolis, RM Elctrns.	317-291-7110
KS	Overland Park, Milgray Elctrns.	913-236-8800
KS	Wichita, L-Comp	316-265-5100
MD	Gaithersburgh, MS Elctrns.	301-921-0200
MD	Rockville, Milgray Elctrns.	301-468-6400
MA	Burlington, Milgray Elctrns.	617-272-6800
MA	Wilmington, R C Comps. Inc.	617-273-1860
MI	Grand Rapids, RM Elctrns.	616-531-9300
MI	Livonia, LWC Distrs.	313-464-7700
MN	Minneapolis, Industrial Comps.	612-831-2666
MN	Minneapolis, Stark Elctrns.	612-332-1325
MO	Kansas City, L-Comp	816-221-2400
MO	Maryland Heights, L-Comp	314-291-6200
NH	Hudson, C & H Elctrns.	603-882-1133
NJ	Marlton, Milgray Elctrns.	609-983-5010
NY	Bohemia, Key Comps.	516-567-7500
NY	Buffalo, Summit Distrs.	716-884-3450
NY	Farmingdale, Milgray Elctrns.	516-420-9800
NY	Pittsford, Milgray Elctrns.	716-385-9330
NY	Rochester, Summit Elctrns.	716-334-8110
NC	Charlotte, Electronic Mktg. Corp.	714-394-6195
NC	Greensboro, Hammond Elctrns.	919-275-6391
OH	Cleveland, Alpha Distrs.	216-526-3716
OH	Cleveland, Milgray Elctrns.	216-447-1520
OH	Columbus, Electronic Mktg. Corp.	614-299-4161
OH	Dayton, Electronic Mktg. Corp.	513-439-4711
OH	Highland Heights, Electronic Mktg. Corp.	216-442-3441
OK	Tulsa, Norvell Elctrns.	918-663-1247
OR	Beaverton, Acacia Sls., Inc.	503-646-3377
PA	Allentown, P.A. Peters	215-434-5237
PA	Montgomeryville, Pyttronics Inds.	215-643-2850
SC	Greenville, Hammond Elctrns.	803-233-4121
TX	Austin, Norvell Elctrns.	512-458-8106
TX	Dallas, Milgray Elctrns.	214-248-1603
TX	Dallas, Norvell Elctrns.	214-233-0020
TX	Houston, Force Elctrns. of TX	713-561-8644
TX	Houston, Norvell Elctrns.	713-777-1666
TX	Irving, Force Elctrns. of TX	214-438-5700
TX	Richardson, Components Ctr.	214-644-3444
TX	Richardson, Fisher-Brownell	214-235-3177
UT	Salt Lake City, Bell Indus.	801-972-6969
VA	Charlottesville, Virginia Radio & Supp.	804-296-4184
WI	Milwaukee, Indl. Elctrns.	414-276-1212
WI	New Berlin, RM Elctrns.	414-784-4420
Can	Markham, Ont., International Rectifier	416-475-1897
Can	Vancouver B.C., Intek Elctrns.	604-324-6831

E-TRONICS, 16774 Schoenborn, Sepulveda, CA 91343, Tel: 213-892-7279; Empl.: 28

EUBANKS ENGRG., 1307 So. Myrtle Ave., Monrovia, CA 91016, Tel: 818-357-7011, Telex: 675403; Empl.: 90; *Sls. Mgr.:* J. Reed

EVANS & SUTHERLAND COMPUTER CORP., P.O. Box 8700, 580 Arapeen Dr., Salt Lake City, UT 84108, Tel: 801-582-5847, Telex: 389492, TWX: 910-925-5818; Empl.: 850; *Sls. Mgr.:* William Elstun

EVANS ELECTRONICS, Box 5055, Berkeley, CA 94705, Tel: 415-653-3083

EVAPORATED COATINGS, P.O. Box 160, Huntingdon Valley, PA 19006, Tel: 215-947-1465; Empl.: 24; *Sls. Mgr.:* Stephen L. Schaffer

EVENTIDE, INC., One Alsan Way, Little Ferry, NJ 07643, Tel: 201-641-1200, TWX: 710-991-8715; Empl.: 38; *Sls. Mgr.:* Michele Natter; *Dist. Mgr.:* Michele Natter

EVEREADY-ENERGIZER, See Union Carbide Battery Prods. Div.

EVEREST INTERSCIENCE, INC., P.O. Box 345, Tustin, CA 92681, Tel: 714-992-4461, 714-730-0747, Telex: 295368 EVER OR; Empl.: 11; *Sls. Mgr.:* Steve A. Giffin

Local Sales Offices & Reps

AL	Huntsville, Newcomb Assocs.	205-837-3233
CA	Gardena, Instrument Lab.	213-327-3282
CO	Littleton, Radco Elctrns.	303-794-4279
IL	Decatur, Mueller Sls.	217-442-6379
IA	Cedar Rapids, Mueller Sls.	319-365-1196
LA	Baton Rouge, Allesco	504-928-1571
MN	Golden Valley, Mueller Sls.	612-544-8888
NE	Omahab'	402-571-3033
NY	Buffalo, Seelbach & Schmitt Inc.	716-839-2300
OH	Cincinnati, Pro-Con Analytical	513-272-3300
OR	Portland, Fairman B. Lee Co.	503-283-9442
PA	Havertown, Shelby Jones Co.	215-446-6600
TX	Dallas, Allesco	817-261-3966

TX	Houston, Allesco	713-771-0115
WA	Seattle, Fairman B. Lee Co.	
WI	Brookfield, Mueller Sls.	414-781-5310

EVERETT/CHARLES AUTOMATION SYS. INC., 6101 Cherry Ave., Fontana, CA 92335, Tel: 714-899-2411, TWX: 4720716; *Sls. Mgr.:* Jim Meadville

EVERETT/CHARLES CONTACT PRODS. INC., 700 E. Harrison Ave., Pomona, CA 91767, Tel: 714-625-5551, Telex: 67-55-78, TWX: 910-581-1210; Empl.: 100; *Sls. Mgr.:* Bud Fabian

EVERETT/CHARLES TEST EQUIP. INC., 2887 N. Towne Ave., Pomona, CA 91767, Tel: 714-621-9511, TWX: 910-581-3838; Empl.: 200; *Sls. Mgr.:* Jim Malloy

EVERSHED & VIGNOLES, LTD., Acton Lane, Chiswick, London, England W4 5HJ, Tel: 01-994-3670, Telex: 22583; Empl.: 300; *Sls. Mgr.:* J. Gilpin

EV-GAME INC., See EVG, Inc.

EVI, INC., 8970 F Route 108, Columbia, MD 21045, Tel: 301-964-1660; Empl.: 4 **D•1639**

EWALD INSTRS., Rte. 7R, Kent, CT 06757, Tel: 203-927-3278

EWC® INC.

EWC, INC., 725 Federal Ave., Kenilworth, NJ 07033, Tel: 201-245-3200, 800-526-4048, TWX: 710-996-5993; FSC No.: 15387;MIL-T-27D; Empl.: 210; *Sls. Mgr.:* C. G. Hiotis; *Dist. Mgr.:* C. G. Hiotis **A•2136-2148**

Local Sales Offices & Reps

AZ	Mesa, Cummings & Assoc.	602-994-9027
CA	Canoga Park, Cummings & Assocs.	818-340-6035
CA	Santa Clara, Cummings & Assocs.	408-247-8656
CO	Denver, Cummings & Assocs., Mktg. Inc.	303-455-6860
CT	Ridgefield, Phoenix Sales	203-438-9644
FL	Apopka, Tech-Rep Assoc.	813-577-2779
FL	Greenacres City, Tech-Rep. Assoc.	813-577-2779
FL	St. Petersberg, Tech-Rep. Assoc.	813-577-2779
FL	Winter Park, Tech-Rep Assoc.	813-577-2779
IL	Pallatine, T-Squared Assoc.	312-991-2144
IN	Fort Wayne, Giesting & Assoc.	219-486-1912
IA	Cedar Rapids, Lorenz Sales	319-377-4666
KS	Overland Park, Lorenz Sales	913-649-5556
MI	Coloma, Geisting & Assoc.	616-468-4200
MI	Farmington Hills, Giesting & Assoc.	313-478-8106
MN	St. Paul, Proud Inds.	612-646-9428
NE	Lincoln, Lorenz Sales	402-475-4660
NJ	E. Brunswick, Winch Assoc.	201-828-4615
NY	Cortland, Net Sales	607-756-6592
NY	Roslyn Heights, Winch Assoc.	516-621-6378
NY	Troy, Net Sls. Co.	518-274-4758
NY	Webster, Net Sales	716-467-4538
OH	Cincinnati, Giesting & Assoc.	513-385-1105
OH	Cleveland, Giesting & Assoc.	216-261-9705
OH	Dayton, Giesting & Assoc.	513-433-5832
OR	Portland, DHS Sales	503-285-9790
PA	Bensalem, Stemler Assoc.	215-638-4850
PA	Greensberg, Pro-Mark	412-832-3800
RI	Worwick, Cal-Greg Comps.	401-738-6170
RI	Worwick, Monette Eng. & Assoc.	401-885-2205
TX	Irving, Impaq Sales	214-257-3677
UT	Salt Lake City, Cummings & Assocs., Mktg. Inc.	801-263-8131
VA	Reston, Stinson Assoc.	703-471-0723, 703-620-0088
VA	Troutville, Stinson Assoc.	703-992-5459
Can	Montreal, Solid State Engrg.	514-481-3313

Local Distributors

CA	Mountain View, Abacus Elctrns.	415-961-1500
CA	San Diego, Park-West Inc.	619-277-8433
CA	Woodland Hills, C & A Elctrns.	213-340-6036
CT	Norwalk, Park Dist.	203-853-2010
FL	West Palm Beach, Nurmi Elctrn. Supp.	305-686-8553
IL	Arlington Heights, Reptron Elctrns.	312-593-7070
MD	Baltimore, Whitney Dist.	301-944-8080
OR	Portland, Dunn Elctrns.	503-285-0214
OR	Portland, Radar Elec.	503-233-3691
PA	McKean, Advocom Elctrns.	814-476-7774
WA	Seattle, Radar Elec.	206-282-2511

EXACT ELECTRONICS, Div. of Dynatech Nevada Inc., Box 1925, 2000 Arrowhead Dr., Carson City, NV 89701, Tel: 702-883-3400, 800-648-7952, Telex: 170054; FSC No.: 34511; Empl.: 60; *Sls. Mgr.:* Joe Foster

EXAR

EXAR CORP., P. O. Box 62229, 750 Palomar Ave., Sunnyvale, CA 94086, Tel: 408-732-7970, TWX: 910-339-9233; Empl.: 550; *Dist. Mgr.:* Jack Hanoka **A•1668-1669**

Local Sales Offices & Reps

AZ	Scottsdale, Summit Sls.	602-998-4850
CA	Los Angeles, Landa/Minyard, Inc.	213-879-0770
CA	San Diego, Harvey Kinc	619-566-5252
CA	Santa Clara, Criterion Sls.	408-988-6300
CO	Golden, Candal, Inc.	303-233-0155
CT	Ridgefield, Phoenix Sls	203-438-9644
FL	Orlando, Donato & Assocs.	305-352-0727
GA	Tucker, Rep Inc.	404-938-4358
IL	Des Plaines, Janus, Inc.	312-298-9330
MD	Baltimore, Comp. Sls.	301-484-3647
MA	Westwood, Mass Tech Sales	617-329-8820
MN	Minneapolis, Dan'l Engrg.	612-854-7550
MO	St. Louis, KKB & Co.	314-647-2400
NM	Albuquerque, Syntech	505-266-7951
NY	Buffalo, Quality Comps.	716-837-5430
NY	Great Neck, Trionic Assocs.	516-466-2300
NC	Raleigh, Zucker Assocs.	919-782-8433
OH	Columbus, McFadden Sls.	614-459-1280
OR	Tigard, Comps. West	503-684-1671
TN	Jefferson City, Rep Inc.	615-475-4105
TX	Carrollton, Technical Mktg.	214-387-3601
WA	Redmond, Comps. West	206-885-5880
WI	Milwaukee, Janus, Inc.	414-476-9104

Local Distributors

AL	Huntsville, Pioneer Elctrns.	205-837-9300
CA	Anaheim, Zeus Comps.	714-632-6880
CA	Irvine, IEC/Jaco	714-660-1055
CA	Sunnyvale, Bell Indus.	408-734-8570
CA	Tustin, A.V.E.D.	213-770-0871
CT	East Haven, J.V. Elctrns.	203-469-2321
FL	Clearwater, Future Elctns.	813-596-8295
GA	Comming, Pan American	404-577-2144
IL	Arlington Hgts., Reptron	312-593-7070
IN	Indianapolis, Graham Elctrns.	317-634-8202
IA	Cedar Rapids, Deeco	319-377-5795
MA	Norwood, Gerber Elctrns.	617-329-2400
MI	Grand Rapids, R.M. Elctrns.	616-531-9300
MN	Minneapolis, Merit Elctrns.	612-546-5583
NJ	Berlin, GCI	609-768-6767
NY	Melville, Diplomat Elctrns.	516-454-6400
OH	Columbus, Reptron Elctrns.	614-436-6675
OK	Tulsa, Quality Comps.	918-664-8812
OR	Beaverton, Western Microtechnology	503-641-9312
PA	Philadelphia, Almo Elctrns.	215-698-4000
TX	Dallas, Act/ Diplomat Elctrns.	214-980-1818
WA	Seattle, Radar Elec. Co., Inc.	206-282-2511
WI	Berlin, RM Elctrns., Inc.	414-784-4420
Can	Pt. Claire, Que., Future Elctrns.	514-694-7710

exatron
automatic test equipment

EXATRON AUTOMATIC TEST EQUIP., 3513 Ryder St., Santa Clara, CA 95051, Tel: 408-737-7111, 800-EXA-TRON, Telex: 172-090; Empl.: 14; *Sls. Mgr.:* Kathryn Henderson

Local Sales Offices & Reps

AL	Huntsville, Pen-Tech Assocs.	205-881-9298
AZ	Phoenix, Zeus Elctrns.	602-263-6022
CA	Covina, Romar Intl.	213-332-8548
CA	Sunnyvale, C.C.L.M.	408-578-6119
CO	Denver, Zeus Elctrns.	303-321-4246
FL	Casselberry, Pen Tech Assocs.	305-678-6809
FL	Deerfield Beach, Pen Tech Assocs.	305-421-4989
GA	Marietta, Pen Tech Assocs.	404-424-1931
IL	Chicago, Solid St. Elctrns. of IL	312-889-8033
MA	Tyngsboro, J. R. Sls.	617-649-3449
MN	Edina, P.E.C./Levi	612-944-8540
NJ	Vincentown, JRM Elctrns.	609-859-2106
NM	Albuquerque, Zeus Elctrns.	505-842-6633
NC	Greensboro, Pen Tech Assocs.	919-852-6000
OH	Hudson, Technical Sls.	216-656-3978
OR	Beaverton, Northwest Test & Meas.	503-646-9966
TX	Dallas, Elctrn. Prod. Spec.	214-985-1932
UT	Salt Lake City, Zeus Elctrns.	801-534-0500
WA	Redmond, Northwest Test & Meas.	206-881-8857
Can	Burlington, Ont., Arbell, Inc.	416-632-9494

EXCELLON AUTOMATION, 24215 Garnier St., Torrance, CA 90505, Tel: 213-325-8000, Telex: 67-4562; Empl.: 570; *Sls. Mgr.:* R. Schreuders

EXCEL PRODS., 401 Joyce Kilmer Ave., New Brunswick, NJ 08903, Tel: 201-249-6600, TWX: 710-480-6255; Empl.: 360; *Sls. Mgr.:* Jack Luch; *Dist. Mgr.:* Jack Luch

EXCEL SPECIALTY CORP., 6335 N. Broadway, Chicago, IL 60660, Tel: 312-262-4781; Empl.: 50

EXCEL TECHNOLOGY INTL. CORP., 4-5 Stryker La., Hillsborough Indl. Pk., Belle Mead, NJ 08502, Tel: 201-874-4747, TWX: 910-333-9588; *Sls. Mgr.:* Michi Chen **B•1050-1052**

Local Sales Offices & Reps

CA	Marina Del Ray, Electro-Optical Mktg.	213-822-0702
CA	San Diego, Uni-Rep	619-746-5131
CA	San Jose, Cerco	408-298-1918
FL	Coral Springs, HAI Elctrns.	305-752-7520
GA	Norcross, Mountain Electro Prods., Inc.	404-469-0603
IL	Westchester, W. G. Brouillette & Assocs., Inc.	312-345-6500
MO	Independence, Engrg. Svcs. Co.	816-254-3600
MO	St. Louis, Engrg. Svcs. Co.	314-997-1515
NJ	E. Brunswick, Kong Sys.	201-390-8523
NM	Azcapotzaico, Dicopel	561-32-11
OR	Portland, Frank Jackson, Assoc.	503-292-2638
TX	Dallas, Southwest Elctrn. Inds.	214-690-9881
TX	Houston, Dunkel Elctrn. Assocs.	713-729-1670

EXERGETIC SYS., INC., 1499 Franklin St., Oakland, CA 94612, Tel: 415-763-3460; *Sls. Mgr.:* R. W. Beckwith

EXIDE CORP., 101 Gibraltar Rd., Horsham, PA 19044, Tel: 215-674-9500, TWX: 215-725-7397; Empl.: 2200

EXIDE ELCTRNS., P.O. Box 58189, Raleigh, NC 27658, Tel: 919-872-3020, TWX: 510-928-0598; FSC No.: 31795; Empl.: 900; *Sls. Mgr.:* Richard King

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MD	Silver Spring, Sel-Tronics	301-589-3391
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MD	Woodbine, Naudain Assoc. So., Inc.	301-442-2270
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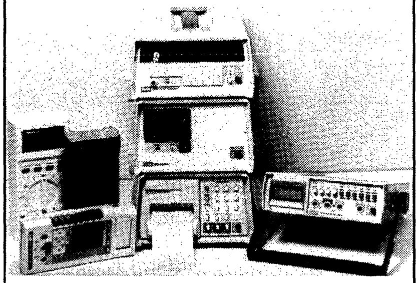

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FLEXCO MICROWAVE, INC., P.O. Box 174, Karrville Rd., Port Murray, NJ 07865, Tel: 201-689-3020, Telex: 467439; FSC No.: 52214; Empl.: 50; *Sls. Mgr.:* Robert C. Tappen; *Dist. Mgr.:* Robert C. Tappen

FLEX-CORE DIV., Morlan & Assocs., Inc., 6625 McVey Blvd., Worthington, OH 43085, Tel: 614-889-6152; *Sls. Mgr.:* D. Morlan .... **A•2149**

FLEX-KEY DIVISION, Rogers Corp., 18 Sargent St., Gloucester, MA 01930, Tel: 617-281-2040, Telex: 94-0333; FSC No.: 51163; Empl.: 50; *Sls. Mgr.:* Philip P. Bodoni .... **B•1714-1715**

FLEXPRINT DIV, Sanders Assocs., Inc., Grenier Field, Manchester, NH 03103, Tel: 603-669-4615, TWX: 710-220-1845; Empl.: 700

FLIGHT CONNECTOR CORP., Dubilier America, 233 E. Manville St., Rancho Dominguez, CA 90220, Tel: 213-631-1133, Telex: 664734; FSC No.: 28680; *Sls. Mgr.:* Ken Tillery; *Dist. Mgr.:* Ken Tillery

FLIGHT SYSTEMS, INC., Tracor, Inc., 1091 Dove St., Newport Beach, CA 92660, Tel: 714-833-9661, Telex: 183542 FSI NPBH; FSC No.: 6B468; Empl.: 514; *Sls. Mgr.:* William J. Weiss

FLITE-TRONICS COMPANY, INC., See Marathon Flite-Tronics Company

FLOATING POINT SYSTEMS, INC., P.O. Box 23489, Portland, OR 97223, Tel: 503-641-3151, Telex: 4742018 FLPT UI; *Sls. Mgr.:* Paul Shapiro

FLORIDA DATA, 600D John Rodes Blvd., Melbourne, FL 32935, Tel: 305-259-4700, Telex: 56-210 FDC MELB

FLOW TECHNOLOGY, INC., Box 21346, Phoenix, AZ 85036, Tel: 602-437-1315, Telex: 249-995; Empl.: 85; *Sls. Mgr.:* Art Marshall

FLUKE, JOHN, MFG. CO., Box C9090, MS 250C, Everett, WA 98206, Tel: 206-356-5400, Telex: 152662, TWX: 910-445-2943; Empl.: 2645; *Sls. Mgr.:* W. Hoffman; *Dist. Mgr.:* T. Rockney

FMC CORP., Ind'l. Chemical Grp., 2000 Market St., Philadelphia, PA 19103, Tel: 215-299-6000; Empl.: 800

FOGG SYS., 15592 E. Batavia Dr., Aurora, CO 80011, Tel: 303-344-1883; Empl.: 7

FOREDOM ELEC. CO., Blackstone Inds. Inc., Route 6, Bethel, CT 06801, Tel: 203-792-8622, Telex: 643483; Empl.: 80; *Sls. Mgr.:* Kent Kristensen; *Dist. Mgr.:* Kent Kristensen

FORK STANDARDS, INC., 666 Western Ave., Lombard, IL 60148, Tel: 312-932-9380; Empl.: 14

FORMA SCIENTIFIC, Div. of Mallinckrodt Inc., Box 649, Marietta, OH 45750, Tel: 614-373-4763, Telex: 29-8205; Empl.: 290; *Sls. Mgr.:* Ned Urschel

FORMULATED RESINS INC., Box 508, Greenville, RI 02828, Tel: 401-949-2060; Empl.: 15; *Sls. Mgr.:* H. R. Oldham

FORTE TECHNOLOGY, INC., 201 Carnegie Row, Norwood, MA 02062, Tel: 617-769-9150, TWX: 710-348-0872

FOUNDATION INSTRUMENTS INC., 24 Colonnade Rd., Nepean, ON, Canada K2E 7J6, Tel: 613-226-4000, Telex: 053-4153; *Sls. Mgr.:* Jean Paul Clermont

FOURJAY INDUSTRIES, Box 14617 Northridge Br., Dayton, OH 45414, Tel: 513-278-9416; Empl.: 30; *Sls. Mgr.:* M. W. Frawley

FOXBORO CO., 28020 Stanford Ave., Valencia, CA 91355, Tel: 805-257-4200, Telex: 67-4389

FOX ELCTRNS., P.O. Box 1078, Cape Coral, FL 33910, Tel: 813-482-7212, TWX: 510-951-7386; FSC No.: 61429; *Sls. Mgr.:* Vivian Lee/Lynn Thorsen .... **A•1363**

Local Sales Offices & Reps

AL	Huntsville, Beacon	205-881-5031
AZ	Scottsdale, Thom Luke Sls., Inc.	602-941-1901
CA	El Monte, Cook Entprs.	213-686-2120
CA	Mountain View, Brooks Tech. Grp.	415-960-3880
CA	Riverside, Cal Rep Branch	714-682-6762
CA	San Diego, DePierre & Assocs.	619-578-2555
CO	Englewood, Delta Sls.	303-799-0646
CT	Waterbury, HLM CT	203-753-9894
FL	Clearwater, Beacon	813-796-2378
FL	Ft. Lauderdale, Beacon	305-491-1054
FL	Maitland, Beacon	305-647-3498
FL	Melbourne, Beacon	305-724-8010
GA	Atlanta, Beacon	404-256-9640
IL	Palatine, Technology Sls.	312-991-6600
KS	Wichita, D.L.E.	316-774-2126
LA	Mandeville, Design Mktg.	713-273-2319
LA	Mandeville, Design Mktg.	
MD	Gaithersburg, Naudain & Assocs.	301-258-5040
MD	Woodbine, Naudain Assocs. Southern	301-442-2270
MI	Fenton Lake, McNab & Assoc.	616-925-2166
MN	Bloomington, 2 M Sales	612-890-7774
MO	Gladstone, R.E.P.S.	816-452-1003
MO	St. Louis, R.E.P.S.	314-241-4432
NJ	Parsippany, HLM NJ	201-263-1535
NY	Northport, HLM NY	516-757-1606
NY	Syracuse, Pitronics	315-455-7346
NC	Raleigh, Beacon	919-787-0330
OH	Akron, B.J. Davis	216-645-0517
OK	Tulsa, Design Mktg.	918-622-7387
OR	Portland, Earl & Brown Co.	503-245-2283
PA	Southampton, Vista Sls. Assocs.	215-322-7420
TX	Dallas, Design Mktg.	214-680-9767
TX	Hurst, Design Mktg.	817-268-2004
TX	Round Rock, Design Mktg.	512-255-9896
WA	Seattle, Earl & Brown	206-284-1121
WI	Waukesha, Technology Sls.	414-786-5015

Local Distributors

AL	Hunstville, Component Distrs.	205-883-7501
AL	Huntsville, Contact Elctrns.	205-881-9321
AZ	Phoenix, CETEC	602-882-0808
AR	Little Rock, Component Distrs.	501-227-6278
CA	Belmont, Arndt	415-592-8097
CA	Chatsworth, Integrated Elctrns.	213-998-2200
CA	Irvine, CETEC	714-250-4141
CA	Irvine, Integrated Elctrns.	714-660-1055
CA	Sacramento, Integrated Elctrns.	916-424-5297
CA	San Diego, CETEC	619-278-5020
CA	San Jose, Cypress	408-945-8400
CA	San Jose, Future	408-945-9100
CA	San Jose, Integrated Elctrns.	408-287-6488
CA	Santa Clara, California Capac.	408-980-8495
CA	Santa Clara, Cypress	408-727-7080
CA	Santa Clara, CETEC	
CA	South Gate, CETEC	213-773-6521
CA	Torrance, Cypress	213-533-6005
CO	Denver, Integrated Elctrns.	303-292-6121
CO	Westminster, Future Elctrns.	303-650-0123
CO	Wheatridge, Cypress	
CT	Danbury, Future Elctrns.	203-743-9594
CT	Milford, R. C. Comp.	203-874-0006
CT	Wallingford, Cronin Elctrns.	203-265-3134
FL	Clearwater, Future Elctrns.	813-441-4771
FL	Ft. Lauderdale, Component Distrs.	305-971-4950
FL	Ft. Lauderdale, Reptron Elctrns.	305-974-3454
FL	Longwood, CAM/RPC	305-834-2031
FL	Orlando, Hammond Elec.	305-849-6060
FL	Tampa, Reptron	1-800-282-1360
GA	Atlanta, Reptron Elctrns.	404-455-8423
GA	Warcross, Component Distrs.	404-441-3320
IL	Arlington Heights, Reptron	
IL	Hoffman Estates, Integrated Elctrns.	312-843-2040
IL	Palatine, Technology Sls.	312-991-6600
IN	Carmel, Altex	317-848-1323
LA	Harvey, AFG Elctrn. Supp.	504-368-9696
MD	Columbia, Future Elctrns.	301-995-1222
MA	Needham, Cronin Elctrns.	617-449-5000
MA	Needham, Cronin Elctrns., Inc.	617-449-5000
MA	Westborough, Future Elctrns.	617-366-2400
MA	Wilmington, RC Comps.	617-273-1860
MI	Grand Rapids, Calder Elctrns.	616-698-7400
MI	Livonia, Reptron	313-525-2700
MI	Walled Lake, Ambur Elctrns.	313-659-3710
MN	Edina, Northern Elctrns. Supp.	612-944-1167
MO	St. Louis, Franklin Elctrns.	314-993-5333
NJ	Bellmawr, Mid Atlantic Elec. Corp.	609-931-5303
NJ	Mount Laurel, Future Elctrns.	609-778-7600
NY	Liverpool, Future Elctrns.	315-451-2371
NY	Rochester, Cam/RPC Ind. Elec.	716-865-2080
NY	Syracuse, Add	315-437-0300
NC	Raleigh, Component Distrs.	919-834-9465
OH	Cleveland, CAM/Ohio Ind. Elec.	216-461-4700
OH	Dayton, Televox	513-294-4499
OH	Worthington, Reptron	614-436-6675
OR	Beaverton, Almac Elctrns.	503-641-9070
PA	Lancaster, Cam/RPC Ind. Elec.	717-392-8141
PA	Pittsburgh, Cam/RPC Ind. Elec.	412-782-3770
TX	Austin, Tinkertronics	512-926-4420
TX	Channel View, Henry Radio	713-452-4451
TX	Dallas, Component Distrs.	214-644-0373
TX	Dallas, Cypress	214-869-1435
TX	Dallas, Heilind Elctrns.	713-988-2711
TX	Houston, Essential Elctrns.	713-493-5028
TX	McKinney, Sunbelt Elect.	214-235-0587
UT	North Salt Lake, Integrated Elctrns.	801-298-1868
UT	Salt Lake City, Future	801-972-8489
WA	Bellevue, Almac Elctrns.	206-643-9992
WA	Bellevue, Future Elctrns.	206-881-8199
WA	Bellevue, Integrated Elctrns.	206-455-2727
WV	Charleston, Cam/WVA Ind. Elec.	304-344-8029
WI	Waukesha, Technology Sls.	414-786-5015
Can	Calgary, Alb., Future Elctrns.	403-235-5325
Can	Downsview, Ont., Future Elctrns.	416-638-4771
Can	Edmonton, Alb., Future Elctrns.	403-438-2858
Can	Ottawa, Ont., Carsten Elctrns.	613-729-5138
Can	Ottawa, Ont., Future Elctrns.	613-820-8313
Can	Pointe Claire, Que., Future Elctrns.	514-694-7710
Can	Scarborough, Ont., Carsten Elctrns.	416-495-9999
Can	St. Laurent, Que., Carsten Elctrns.	514-334-8321
Can	Vancouver, B.C., Future Elctrns.	604-438-5545

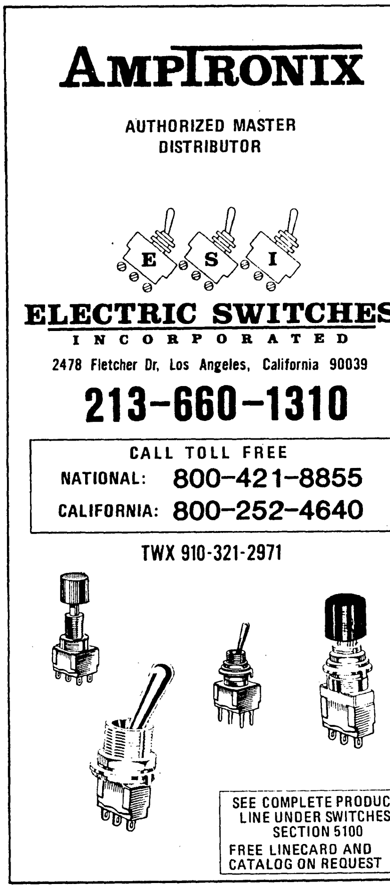
FRAMAR METAL PRODUCTS CO., INC., 345 Carnegie Avenue, Kenilworth, NJ 07033, Tel: 201-241-0710; Empl.: 6; *Sls. Mgr.:* J. W. Moore

FRANEK, JOHN, CO., INC., P.O. Box 11752, Santa Ana, CA 92711-1752, Tel: 714-832-0290, 800-854-9420; Empl.: 8; *Sls. Mgr.:* John Franek; *Dist. Mgr.:* Tom Goreth .... **D•1924-1927**

FRANK, B.H., CO., 3733 W. 139th St., Hawthorne, CA 90250, Tel: 213-675-9182, Telex: 674432; *Sls. Mgr.:* Andrew Hilbert

FRAZIER, 1930 Valley View La., Dallas, TX 75234, Tel: 214-241-3441; Empl.: 20; *Sls. Mgr.:* W. A. Wadkins

FREDERICK CABLE PRODS., Digital Systems Corp., 406 Sagner Ave., Frederick, MD 21701, Tel: 301-694-9355; *Sls. Mgr.:* Robert Pennington; *Dist. Mgr.:* Robert Pennington



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Local Sales Offices & Reps

AZ	Scottsdale, Sales Engrg., Inc.	602-994-3230
CA	Chatsworth, Frederick Comps. Int'l.	818-882-0868
CO	Englewood, Dynatech, Inc.	303-773-2830
GA	Marietta, Rick Burns & Assocs.	404-951-1181
IL	Park Ridge, Bob Burns & Assocs.	312-823-9360
KS	Overland Park, Barnes Midwest Sls.	913-341-9317
MA	Framingham, Marathon Sls., Ltd.	617-875-3566
MN	Chanhassen, Barnes Sls. Assocs.	612-934-2907
NJ	Medford, Jack McCoy, Inc.	609-953-0770
NM	Albuquerque, Nelco Electronix	505-292-3657
NY	Hilton, Charles Avery Assocs.	716-271-2132
NY	Rye, Charles Avery Assocs.	914-967-7610
NC	Raleigh, Rick Burns Assocs.	415-941-0660
OH	Dayton, Electro-Com	513-898-5140
PA	McKean, Ecco Elctrn. Sls.	814-476-1376
PA	Murrysville, Ecco Elctrn. Sls.	412-795-6934
TX	Dallas, Electra III	214-358-0753
WA	Bellevue, Systems Tech. Sls.	206-462-8088
Can	Rexdale, Ont., Bestec Elctrns.	416-674-1330

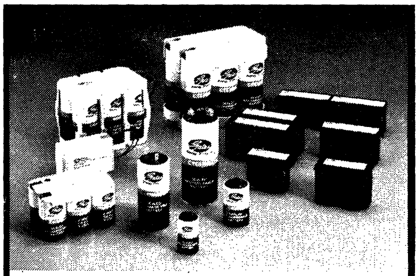
Local Distributors

CA	Sacramento, Sacramento Elctrns.	916-441-4821
CA	Santa Ana, Advanced Computer	714-558-8813
CA	Santa Clara, RM/ISC, Inc.	408-496-0411
MA	Needham, You Do It Elctrn. Ctr.	617-449-1005
NH	Hampstead, Astrum Elctrns., Inc.	603-329-5656
NJ	Medford, Jack McCoy, Inc.	609-953-0770
NY	Rye, Electro/Mec	914-967-7610
TX	Dallas, Electra III	214-869-1959

FREDERICK ELCTRNS. CORP., 7630 Hayward Rd., P.O. Box 502, Frederick, MD 21701-0502, Tel: 301-662-5901, Telex: 893438; FSC No.: 15230; Empl.: 350; *Sls. Mgr.:* Marty Bandler

FREDERICKS CO., Philmont & Anne Sts., Huntingdon Valley, PA 19006, Tel: 215-947-2500; Empl.: 150

FREED TRANSFORMER, 1718 Weirfield St., Ridgewood, NY 11385, Tel: 212-386-1300; FSC No.: 73386; Empl.: 200; *Sls. Mgr.:* M. Salzberg .... **A•2150-2153; D•1229**



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CO	Denver, Nelson Co.	303-573-1516
CT	Marlborough, Precision Sls.	203-295-0580
GA	Smyrna, B-C. Elctrn. Sls.	404-436-5169
MD	Baltimore, B. White & Co.	301-484-5400
NY	Pittsford, Noeth-Honsinger Assoc.	716-586-9002
NY	White Plains, QED Elctrns.	914-946-3424
OH	Cleveland, Scott Elctrns.	216-473-5050
OH	Trotwood, I. Atkind & Assoc.	513-837-4750
PA	King of Prussia, Freedman-Malta Assoc.	215-337-9211
EXP	NY, Plainview, Morhan Exp.	516-293-5582

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Local Sales Offices & Reps

AL	Huntsville, Lee Assocs.	205-533-5896
AZ	Tempe, Mar Tech Assocs., Inc.	602-968-4944
CA	Anaheim, Datum Timing	714-533-6333
CA	Santa Clara, Ward-Davis Assocs.	408-245-3700
FL	Coral Springs, Electrocraft	305-753-8666
FL	Largo, Electrocraft	813-530-4749
FL	Winter Park, Electrocraft	305-628-4705
IL	Park Ridge, Electronic Instr. Assocs.	312-298-2290
IN	Indianapolis, Electronic Instr. Assocs.	317-257-7231
IA	Hiawatha, Gassner & Clark Co.	319-393-5763
MD	Burtonsville, Eastern Instrmn.	301-384-8500
MA	Lexington, Del-Con Sls.	617-862-1118
MN	Minneapolis, Electronic Instr. Assocs.	612-374-5628
NJ	Haddonfield, G. L. Williams Assocs.	609-428-6060
NY	Bayside, Robert Diamond, Inc.	718-423-7330
NY	Liverpool, R & D Assocs.	315-457-0100
NC	Burlington, P.J. Nahser Co., Inc.	919-226-8053

OH	Centerville, Micro Sls. Corp.	513-433-8171
TX	Houston, Lear Assocs., Inc.	713-488-7893
TX	Richardson, Lear Assocs., Inc.	214-231-5388
WA	Kirkland, Manon Engrg.	206-827-7449
Can	St. Laurent, Que., RF Microwave, Ltd.	514-335-2335

FREQUENCY CONTROL PRODS., INC., American Time Prods. Div., 61-20 Woodside Ave., Woodside, NY 11377, Tel: 212-458-5811, TWX: 710-582-2637; FSC No.: 59559;03040; *Sls. Mgr.:* Sanford Cohen - Crystals, Ed Cohen - Oscillators Servo, John Murray - Electro Optic

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Local Sales Offices & Reps

AL	Huntsville, Lee Assocs. Mid-South, Inc.	205-533-5896
CA	San Jose, Texel North	408-272-6836
CA	Seal Beach, Texel	213-596-9411
IL	Palatine, Kingston Comps., Inc.	312-359-7990
MA	Holbrook, McLellan Assocs.	617-767-4771
NJ	East Brunswick, Winch Sls. Assocs.	201-828-4615
NY	Roslyn Heights, Winch Sls. Assocs.	516-621-6376
TX	Houston, TCI Elctrns.	713-774-5019
Can	Don Mills, Ontario, R. D. Assocs.	416-444-0959

FREQUENCY ELCTRNS., 55 Charles Lindbergh Blvd., Mitchel Field, NY 11553, Tel: 516-794-4500, TWX: 510-223-0418; Empl.: 350; *Sls. Mgr.:* A. Lazar .... **A•1366-1367**

Local Sales Offices & Reps

CA	Mountainview, Disman-Baker	415-969-3010
FL	Orlando, Truex Assoc.	305-859-2160
MD	Hunt Valley, Marktron	301-628-1111
MD	Rockville, Marktron	301-251-8990
MA	Cochituate, High-Tech Sls.	617-653-3838
NJ	East Windsor, Micro Lambda	609-443-3113
NJ	W. Orange, E-F Techn. Sls.	201-731-7203
NY	Huntington Sta., E-F Techn. Sls.	516-549-1818
OH	Cleveland, Tiby Co.	216-371-5335
TX	Houston, Spectra Sls. Corp.	713-783-8333
TX	Richardson, Spectra Sls. Corp.	214-234-3600
VA	Charlottesville, Marktron	804-973-5874
EXP	NY, New York, Henley Elctrns.	212-986-5544

FREQUENCY SELECTIVE NETWORKS, INC., 69-20 Garfield Ave., Woodside, NY 11377, Tel: 718-424-7500; FSC No.: 56662; Empl.: 30; *Sls. Mgr.:* Michael L. Izzolo .... **A•1369**

Local Sales Offices & Reps

FL	Ft. Lauderdale, Donato Assoc.	305-733-3450
MN	Bloomington, 2M Sls.	612-888-7414
NY	Huntington, Carnes Assocs.	516-694-1600
OH	Dayton, Aschbacher Assocs.	513-252-7785

FREQUENCY SOURCES, KSW Semiconductor Div., 16 Maple Rd., Chelmsford, MA 01824, Tel: 617-256-8101, TWX: 710-343-0404; FSC No.: 50101; Empl.: 80

FREQUENCY WEST, INC., 3140 Alfred St., Santa Clara, CA 95054, Tel: 408-727-8500, TWX: 910-338-0163; FSC No.: 8F150; Empl.: 158; *Sls. Mgr.:* James K. McGuinness

FRESNEL OPTICS, Div. of Alliance Tool Corp., 1300 Mt. Read Blvd., Rochester, NY 14606, Tel: 716-647-1140, Telex: 97-8322; *Sls. Mgr.:* Helmut Walter

FRONT PANEL DEVICES, INC., 530 Burnside Ave., Inwood, NY 11696, Tel: 212-471-9800, Telex: 645-580; Empl.: 20; *Sls. Mgr.:* Michael Geller

FSI/FORK STANDARDS INC., 666 Western Ave., Lombard, IL 60148, Tel: 312-231-3511, 312-932-9380; FSC No.: 14986; Empl.: 20; *Sls. Mgr.:* A. E. Toht; *Dist. Mgr.:* A. E. Toht

FTS SYS., POB 158, Stone Ridge, NY 12484, Tel: 800-824-0400, TWX: 510-247-0547; Empl.: 100; *Sls. Mgr.:* T. N. Thompson, Jr.

FUJI-SVEA, P.O. Box 3375, Torrance, CA 90510, Tel: 213-533-1221, Telex: 182-392

FUJITSU

FUJITSU AMERICA, INC., 918 Sherwood Dr., Lake Bluff, IL 60044, Tel: 312-295-2610, Telex: 206196, TWX: 910-651-2259; Empl.: 40 .... **B•1349-1368; C•1104, 1195-1224**

Local Sales Offices & Reps

AZ	Phoenix, Sanford Sls.	602-957-3570
CA	San Diego, Earle Assocs., Inc.	619-278-5441
CA	San Jose, Applied Elctrn. Mktg.	408-971-9377
CA	Thousand Oaks, SC Cubed	805-496-7307
CA	Tustin, SC Cubed	714-731-9206
CO	Denver, Donohue Sls.	303-455-1719
FL	Altamonte Springs, 'C' Assocs.	305-831-1717
FL	Pompano Beach, 'C' Assocs.	305-972-9200
IA	Cedar Rapids, R. W. Kunz & Assocs.	319-396-5386
GA	Lawrenceville, Tek-Rep Mktg.	404-963-1600
IL	Elk Grove Vl., John G. Twist	312-593-0200
IL	Highland Park, Bransky Sls.	312-433-2375
KS	Prairie Village, R. W. Kunz & Assocs., Inc.	913-648-3535
ME	E. Sabago, Electrical Comps. Inc.	207-787-3145
MD	Baltimore, Component Sls., Inc.	301-484-3647
MA	Fall River, Elec. Comps.	617-674-0064
MA	Longmeadow, Elec. Comps.	413-567-0153
MA	Natick, Elec. Comps.	617-655-2225
MI	Warren, DEM Elctrn. Sls.	313-575-9444
MN	Bloomington, John G. Twist	612-835-2120
MO	St. Louis, R. W. Kunz & Assocs., Inc.	314-966-4977
NJ	Bellmawr, TAI Corp.	609-933-2600
NJ	Parlin, JMR Sls.	201-254-8484
NY	E. Setauket, JMR Sls.	516-689-8871
NY	E. Syracuse, Nycom, Inc.	315-437-8343
NC	Charlotte, Robert W. Chapman Co.	704-525-2421
NC	Greensboro, Robert W. Chapman	919-275-0003
NC	Raleigh, Robert W. Chapman	919-782-2624
OH	Columbus, McFadden Sls.	614-459-1280
OR	Aloha, Whisler Sls. Co.	503-649-9078
PA	Greensburg, Pro-Mark	412-832-3800
TX	Garland, Savarese & Assocs.	214-475-8360
UT	Bountiful, Anderson Assocs.	801-292-8991
VA	Richmond, Component Sls., Inc.	804-741-4072
WA	Bellevue, Whisler Sls. Co.	206-643-1463
WI	Brookfield, John G. Twist	414-782-2670
WI	Cedarburg, Bransky Sls.	414-377-6837
Can	Concord, Ont., Votran Elctrns., Inc.	416-669-9870, 416-661-5190

Local Distributors

CA	Brisbane, Automated Process Controls	415-467-6162
CA	Buena Park, Control Design Supp.	714-521-5040
CA	San Carlos, Control Design Supp.	415-592-4808
CA	San Jose, Cypress Elctrns.	408-945-8400
CA	Santa Ana, Pacesetter Elctrns.	714-557-7131, 213-233-5800
CA	Santa Monica, Distr. Specialists	213-393-9666
CA	Torrance, Cypress Elctrns.	213-533-6005, 714-761-3366
CO	Denver, CSID	303-292-9594
CO	Wheat Ridge, Cypress Elctrns.	303-431-2622
CT	Orange, Milgray Elctrns.	203-795-0711
FL	Altamonte Springs, Control Design Supp.	305-788-3220
FL	Lakeland, A-A Elec.	813-665-6941
FL	Winter Park, Milgray Elctrns.	305-647-5747
GA	Atlanta, Milgray Elctrns.	404-393-9666
GA	Atlanta, Prehler Elctrns., Inc.	404-447-5540
GA	Stone Mountain, Control Design Supp.	404-979-3500
IL	Addison, L Comp.	312-628-1400
IL	Bensenville, Milgray Elctrns., Inc.	312-350-0490
IL	Carol Stream, Lectro Comps.	312-690-0520
IL	Chicago, Prehler Elctrns., Inc.	312-384-6100
IL	Genoa, Control Design Supp.	815-784-6519
IL	Northbrook, Classic Comp. Supp.	312-272-9650
IL	Wheeling, Hawk Elctrns.	312-459-4030
IN	Indianapolis, Classic Comps. Supp., Inc.	317-872-4777
IN	Indianapolis, Control Design Supp.	317-788-0551
IA	Cedar Rapids, Bergquist	910-525-1335
IA	Marian, Control Design Supply, Inc.	319-373-2923
KS	Wichita, L Comp.	316-265-5100
ME	Gray, Longhill Electro-Tech	207-657-2183
MD	Rockville, Milgray Elctrns.	301-468-6400
MA	Burlington, Milgray Elctrns.	617-272-6800
MA	Burlington, Q.P.L. Elctrns.	617-947-2424
MA	Middleboro, Glynn Electronics	617-947-4262
MA	Natick, Tec-Con Elctrns.	617-655-9333
MA	Somerville, Electro Sls.	617-666-0500
MI	Farmington Hills, Prehler Elctrns., Inc.	313-473-7200
MN	Burnsville, Custom Connections	612-894-4090
MN	Minneapolis, Bergquist	612-835-2322
MN	Minneapolis, Control Design Supp.	612-721-1628
MO	Kansas City, L Comp.	816-221-2400
MO	Maryland Heights, L Comp.	314-291-6200
MO	St. Louis, Control Design Supp.	314-426-3160
MO	St. Louis, Interstate Industrial Elctrns.	314-423-4322

NE	Omaha, Radio Equip.	402-341-7700
NJ	Marlton, Milgray Elctrns.	609-983-5010
NJ	Nutley, Vantage Comps.	201-667-1840
NY	Buffalo, Summit Distrs., Inc.	716-887-2800
NY	Farmingdale, Milgray Elctrns.	516-420-9800
NY	Farmingdale, Pride Elctrns.	516-293-4020
NY	Pittsford, Milgray Elctrns.	716-385-9330
NC	Charlotte, Control Design Supp.	704-588-4410
NC	Raleigh, Prehler Elctrns., Inc.	919-876-9111
OH	Cleveland, Milgray Elctrns.	216-447-1520
OH	Middleburg Heights, Prehler Elctrns., Inc.	216-243-5510
OH	Solon, Repco	216-248-8900
OK	Tulsa, Altair Co.	918-252-5781
PA	Harrisburg, Cumberland Elctrns.	717-232-5999
PA	Malvern, Control Design Supp.	215-296-0150
PA	McKean, Advacom, Inc.	814-476-7774
TX	Austin, Altair Co.	512-837-4490
TX	Dallas, Control Design Supp.	214-358-1441
TX	Dallas, Cypress Elctrns.	214-869-1435
TX	Dallas, Milgray Elctrns.	214-248-1603
TX	Houston, Altair Co.	713-462-3029
TX	Richardson, Altair Co.	214-231-5166
UT	Salt Lake City, ACT/Diplomat	801-486-4134
WA	Bellevue, Integrated Elctrns., Inc.	206-455-2727
WI	Milwaukee, Indl. Elctrns.	414-276-1212
WI	New Berlin, Classic Comp. Supp.	414-786-5300
WI	New Berlin, Control Design Supp.	414-784-1016
WI	New Berlin, NEP Elctrns.	414-785-9100
WI	Racine, Badger Elctrn. Parts Co.	414-637-1256

FURMAN SOUND, INC., 30 Rich St, Greenbrae, CA 94904, Tel: 415-927-1225, Telex: 172029 SPXSRFL; *Sls. Mgr.:* Diane Poole; *Dist. Mgr.:* Diane Poole

FURNAS ELEC., 1197 McKee St, Batavia, IL 60510, Tel: 312-879-6000, Telex: 72-0458; Empl.: 1360; *Sls. Mgr.:* T. W. Thornton; *Dist. Mgr.:* R. Lanser

FUSECOM, 14864 NE 95th St, Redmond, WA 98052, Tel: 206-881-2442; *Sls. Mgr.:* Bruce Barndt

Distributor

FUSES UNLIMITED, 9300 Mason Av., Chatsworth, CA 91311, Tel: 818-882-1515 .... **B•1234**

FUSION INC., 4658 E. 355th. St, Willoughby, OH 44094, Tel: 216-946-3300, Telex: 98-0445; Empl.: 85; *Sls. Mgr.:* Raymond C. Yuhasz

GABRIEL ELCTRNS., Box 70, Scarborough Indl. Pk., Scarborough, ME 04074, Tel: 207-883-5161, Telex: 95-0113; Empl.: 135; *Sls. Mgr.:* D. B. Crisman

GALILEO ELECTRO-OPTICS CORP., Galileo Pk., Sturbridge, MA 01518, Tel: 617-347-9191, TWX: 710-347-1190; FSC No.: 28719; Empl.: 330; *Sls. Mgr.:* L. P. Thompson

GALITE, 2 Tower Dr., Wallingford, CT 06492, Tel: 203-265-7126, TWX: 710-476-0764; FSC No.: 56447; *Sls. Mgr.:* James W. Campbell, Jr.

GAMBLE, CHARLES T., INDS., 605 Perkins La., Delanco, NJ 08075, Tel: 609-461-1900; Empl.: 150; *Sls. Mgr.:* W. Snyder

GAMMA HIGH VOLTAGE RESCH. INC., 152 S. MacQuesten Pkwy., Mt. Vernon, NY 10550, Tel: 914-667-5050 .... **D•1644-1645**

Local Sales Offices & Reps

IL	Chicago, Ropek, Cahill & Vogt	312-631-0070
MD	Timonium, Eastern Comps.	301-561-5811
NJ	Nutley, Irwin Brill Sls.	201-667-0653
NM	Albuquerque, Cleveland Entprs.	505-265-7893
NC	Raleigh, Eastern Comps.	800-223-3850
PA	W. Conshocken, Eastern Comps.	215-825-8610

GAMMA SCIENTIFIC INC., 3777 Ruffin Rd., San Diego, CA 92123, Tel: 619-279-8034, Telex: 69-7938; Empl.: 65; *Sls. Mgr.:* G.C. Unangst

GANDALF DATA, INC., 1019 S. Noel Ave., Wheeling, IL 60090, Tel: 312-541-6060, TWX: 910-651-4951; Empl.: 350; *Sls. Mgr.:* Ken Charbauski

GANDALF TECHNOLOGIES, INC., 350 E Dundee Rd., Suite 301, Wheeling, IL 60090, Tel: 312-459-6630, TWX: 910-651-4951

GAP INSTR., 40 Oser Ave., Hauppauge, NY 11787, Tel: 516-273-0909, TWX: 510-227-6237; FSC No.: 00607; Empl.: 50

GARDINER ELCTRNS., 4729 North 7th Ave., Phoenix, AZ 85013, Tel: 602-274-9681

GARDINER SOLDER CO., Div. of Gardiner Metal Co., 4820 S. Campbell Ave., Chicago, IL 60632, Tel: 312-847-0100, TWX: 910-221-2510; Empl.: 100; *Sls. Mgr.:* John A. Seyda .... **C•1738**

Local Sales Offices & Reps

AZ	Phoenix, Astro Prods.	602-268-2948
AZ	Phoenix, Tooltronics, Inc.	602-257-0768
CA	Glendale, Tooltronics, Inc.	818-240-4000
CA	La Mirada, Gardiner Solder	714-994-6350
CA	Santa Clara, Tooltronics, Inc.	408-496-6000
CO	Littleton, West Mark Denver, Inc.	303-979-3720
FL	Merritt Island, James A. Kennedy Assocs.	305-452-9821
GA	Tucker, Electrical Concepts, Inc.	404-491-3154
IA	Princeton, Johnson Mfg.	319-289-5123
MA	Woburn, Yankee Tech Sls.	617-935-6278
MI	East Detroit, Fred Harris & Assocs.	313-776-5430
MO	St. Charles, Phillips & Assocs.	314-441-0148
NJ	Norwood, Wilson Inds.	201-767-7060
NJ	Scotch Plains, Gardiner Solder Co.	201-232-1965
NC	Charlotte, Electro-Rep Assocs., Inc.	704-527-2530
OH	Cleveland, Jim Finnegan & Co.	216-238-5905
PA	Carnegie, Lloyd K. Lombardi	412-279-2017
TX	Dallas, Elctrn. Production Specialists	214-422-5476
TX	El Paso, Aztec Microelectronics	915-581-6130
WA	Bellevue, Doland Co.	206-454-4952
PR	Rio Tiedras, Electronic Sls. Assocs.	809-762-6459

Local Distributors

CA	So. San Francisco, Electrical Specialty Co.	415-589-9611
AL	Birmingham, E.I.S., Inc.	205-252-9046
AZ	Phoenix, Elctrl. Specialty Co.	602-275-5736
CA	Anaheim, Advance Electrical Sls., Inc.	714-870-0300
CA	Anaheim, Elctrl. Specialty Co.	714-630-7050
CA	Belmont, Advance Elctrl. Sls.	415-592-4550
CA	Chino, Tracy Elctrns.	714-591-4736
CA	Fawnskin, Pat Dooley	714-866-3413
CA	Glendale, Mac Donald & Co.	818-241-1101
CA	Lakeside, CASCO	619-560-9319
CA	Los Angeles, Elctrl. Specialty Co.	213-724-9600
CA	Los Angeles, John Cameron Supply Co.	213-870-7403
CA	San Diego, Casco	619-560-9319
CA	San Diego, Elctrl. Specialty Co.	619-560-1800
CA	San Diego, Hi-Tech Metals Co.	619-270-8081
CA	Santa Clara, RGB Electro Indl. Tool	408-980-1300
CA	Simi Valley, Cal-Pacific Suppliers	213-998-4982
CO	Denver, Advance Elctrl. Sls.	303-388-0923
CO	Denver, Elctrl. Specialty Co.	303-321-0226
CO	Denver, Integrated Elec.	303-292-6121
CT	Wallingford, ASTECH	203-265-4241
FL	Boca Raton, KIMCO	305-994-0590
FL	Clearwater, Your Production Cupboard	813-447-2581
FL	Orlando, E.I.S., Inc.	305-855-7100
FL	Orlando, Mavidon Entprs.	305-298-7324
FL	Palm Bay, Enstice Tool Grinding	305-734-2100
GA	Atlanta, E.I.S., Inc.	404-355-1651
IL	Addison, International Soldering Supplies	312-628-8083
IL	Bensenville, MASTCO	312-595-0414
IL	Chicago, Fay Elec. Wire Corp.	312-267-9222
IL	Hillside, Complete-Reading Electric Co.	312-547-5400
IN	Indianapolis, Complete-Reading Electric Co.	317-872-3710
IA	Princeton, Johnson Mfg. Co.	319-289-5123
KS	Louisburg, Ambrose Sls. Co.	913-541-8476
KY	Louisville, E.I.S., Inc.	502-636-0384
LA	New Orleans, Complete-Reading Elec. Co.	504-733-9435
MD	Baltimore, Complete-Reading Elec. Co.	301-646-1330
MA	Leominster, Elctrn. Tool Specialists	617-534-3324
MA	Woburn, Pacer Elctrns.	617-935-8330
MI	Warren, Complete-Reading Elec. Co.	313-755-6020
MN	Edina, Complete-Reading Elec. Co.	612-831-8145
MN	Minneapolis, W. D. Forbes Co., Inc.	612-378-1917
MN	New Brighton, Chris Elctrns.	612-631-2647
MN	St. Paul, Nordic Elctrns.	612-228-9027
MO	Kansas City, Complete-Reading Elec. Co.	816-471-5966
MO	Maryland Heights, Complete-Reading Elec. Co.	314-569-1611
MO	St. Charles, Finnigan Wire & Cable	314-946-6201
NV	Carson City, Gibson Tool Co.	702-883-3566
NH	Manchester, E.P.E. Corp.	603-669-9181
NJ	Livingston, Robert McKeown Co., Inc.	201-992-0700
NJ	Stirling, Janel	201-647-5600
NY	Fairport, Pacer Elctrns.	716-377-0462
NY	Farmingdale, S.A.I.	516-293-2710
NY	Liverpool, Complete-Reading Elec. Co.	315-457-1350
NY	Sidney, Wingate & Assocs.	607-563-2113
NC	Charlotte, E.I.S., Inc.	704-392-7366
NC	Raleigh, E.I.S., Inc.	919-781-4750
OH	Cincinnati, E.I.S., Inc.	513-771-4073
OH	Cleveland, Complete-Reading Elec. Co.	216-827-8891
OH	Mentor, Kimco	216-255-1992
OK	Tulsa, Complete-Reading Elec. Co.	918-664-4000
OR	Portland, Elctrl. Specialty Co.	503-227-3601
PA	Pittsburgh, Complete-Reading Elec. Co.	412-788-1580
RI	Warwick, Bayside Tech Inds.	401-737-5366
TN	Memphis, E.I.S., Inc.	901-947-4176
TN	Nashville, E.I.S., Inc.	612-883-0862
TX	Beaumont, Complete-Reading Elec. Co.	713-842-2117
TX	Dallas, Complete-Reading Elec. Co.	214-827-8891
TX	El Paso, Elctrl. Specialty Co.	915-594-8251
TX	Garland, Complete Reading Elec. Co.	214-840-6000
TX	Houston, Complete-Reading Elec. Co.	713-691-0080
TX	Houston, Fay Elec. Wire Corp.	713-923-2825
TX	Plano, Fay Elec. Wire Corp.	214-422-2797
UT	Salt Lake City, Electrical Specialty Co.	801-972-4184
VA	Bluefield, Complete-Reading Elec. Co.	703-322-5424
VA	Richmond, E.I.S., Inc.	804-649-9221
WA	Kirkland, R G B Electro Indl. Tool	800-958-5811
WA	Seattle, Advanced Elctrl. Sls., Inc.	206-575-4323
WA	Tukwila, Electrical Specialty Co.	206-241-1010
WV	Bluefield, E. I. S.	703-322-5424
WI	Mequon, Complete-Reading Elec. Co.	414-241-3880
WI	Oshkosh, Fay Elec. Wire Corp.	414-426-0792
EXP	PR, Carolina, E. I. S.	809-757-6565
PR	San Juan, Distributronics, Inc.	809-781-0631

GAR ENTERPRISES, 2029 N. Lincoln Ave., Pasadena, CA 91103, Tel: 818-798-0785; Empl.: 25

GARNER GLASS CO., 177 S. Indian Hill Blvd., Claremont, CA 91711, Tel: 714-624-5071; Empl.: 50; *Sls. Mgr.:* Joseph C. Hyatt

GARRY MFG. CO., DIV. OF BRAND-REX CO., 9 Queen Anne Ct, Laghorne, PA 19047, Tel: 215-949-2300; Empl.: 250; *Sls. Mgr.:* Tom Malek; *Dist. Mgr.:* Bob D'Autrachy

GASKET INTL. INC., 49 Ackerman St, Bloomfield, NJ 07003, Tel: 201-338-6814; Empl.: 5; *Sls. Mgr.:* Russell L. Steinman

GATES, GEO. W., & CO., INC., Hempstead Tpke. & Lucille Ave., Franklin Sq., NY 11010, Tel: 516-352-2904; Empl.: 10; *Sls. Mgr.:* T. E. Schulz, Jr

GATES DATA PRODUCTS, Gates Corporation, 2455 Executive Circle, Colorado Springs, CO 80906, Tel: 303-579-0330; *Sls. Mgr.:* Donald D. Stucker; *Dist. Mgr.:* Gregory D. Easton

GATES ENERGY PRODS., 1050 S. Broadway, Denver, CO 80217, Tel: 303-744-4806, Telex: 045-511, TWX: 910-931-2658; Empl.: 500; *Sls. Mgr.:* R. O. Hammel; *Dist. Mgr.:* M. R. Harrison

GATEWAY COMMUNICATIONS INC., 16782 Redhill Ave., Irvine, CA 92714, Tel: 714-261-0762; *Sls. Mgr.:* David S. McMaster

GAVITT WIRE & CABLE, Brookfield, MA 01506, Tel: 617-867-6476; Empl.: 75

GAYNOR ELEC. CO., 135 South Main St, P.O. Box 316, Thomaston, CT 06787-0316, Tel: 203-283-4388; Empl.: 50; *Sls. Mgr.:* John Swanson; *Dist. Mgr.:* John Swanson

Local Sales Offices & Reps

CA	Chatsworth, Porter Co.	818-700-0808
CT	Madison, United Comps.	203-562-4002
IL	Elk Grove Village, Control Sls.	312-595-2110
MN	St. Louis, Lestronix	612-926-8466
NJ	Mountain Lakes, Browning-Naughton Co., Inc.	201-335-2029
OH	Cleveland, Jubell Assoc.	216-831-0364
OH	Mentor, Appliance Elctrns.	216-257-6019
WI	Thiensville, Control Sls.	414-242-4580

G B INSTRUMENTS INC., 2030 Coolidge St., Hollywood, FL 33020, Tel: 305-920-0225, TWX: 510-954-9813; FSC No.: 31601; Empl.: 30; *Sls. Mgr.:* B. J. Weiss

GC ELCTRNS., 400 S. Wyman St., Rockford, IL 61101, Tel: 815-968-9661, Telex: 237-318, TWX: 257318 GC Elect; Empl.: 360; *Sls. Mgr.:* Owen Jackson

GCI, INC., 14520 Lima Rd., Fort Wayne, IN 46818, Tel: 219-637-5520, TWX: 883910; Empl.: 108; *Sls. Mgr.:* C. Ward

GECO, 145 Penn St., Millheim, PA 16854, Tel: 814-349-5555; Empl.: 21

GEC TECHNOLOGY CORP., 4430 Forest Lane, Garland, TX 75042, Tel: 214-276-1164

GEMCOR, See General-Electro-Mechanical Corp.

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GEMINI, 103 Mensing Way, Cannon Falls, MN 55009, Tel: 507-263-3957; *Sls. Mgr.:* Gary Pearson ...**C•1060-1061**

Local Sales Offices & Reps

AL	Huntsville, L & D, Inc.	205-836-1469
AZ	Phoenix, Ken Maynard Assocs.	602-581-8107
AR	North Little Rock, Leo Barker Co.	501-834-2537
CA	Orange, XBX Sls., Inc.	714-998-8200
CA	San Diego, Qualtronics	619-560-8955
CA	San Jose, Gemini, Inc.	408-225-3362
CO	Arvada, Delconec, Inc.	303-422-7023
FL	Key Largo, Jerrold Helbein & Assocs.	305-367-3025
GA	Atlanta, L & D, Inc.	404-455-3483
IL	Palatine, JRS Assocs.	312-991-6626
IN	Noblesville, Century Elctrns.	317-849-2026
IA	Cedar Rapids, Dick Taylor	319-364-2282
LA	Folsom, Leo Barker Co.	504-796-9825
MA	Brookline, Harman Assocs.	617-232-6687
MI	Plymouth, Jay Mktg. Assocs.	313-459-1200
MN	Bloomington, Heil's Temi	612-854-2001
MO	St. Louis, Harris Hanson Co.	816-763-6200
NY	New York, Reuse Pkg.	212-939-6080
NY	Rochester, Leonard D. Allen, Inc.	716-377-3530
NY	Syracuse, Leonard D. Allen, Inc.	315-437-8387
NC	Thomasville, Jerrold Helbein & Assocs.	919-476-2365
OH	Cleveland, Jim Finnegan Co., Inc.	216-238-5905
OH	Dayton, Jim Finnegan & Co., Inc.	513-890-8322
OR	Beaverton, Underwood-Hanify	503-641-4463
PA	King of Prussia, Freedman-Malta Assocs.	215-337-9211
TN	Knoxville, L & D, Inc.	615-573-6511
TX	Dallas, J. Clay Co.	214-350-1281
TX	Houston, J. Clay Co.	713-583-2912
UT	Salt Lake City, Medax	801-266-4545
WA	Bellevue, Underwood-Hanify	206-451-8223
WI	Wauwatosa, Larsen Assocs.	414-258-0529
Can	Markham, Ont., Avotronics, Ltd.	416-475-2024

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GEN/COMP INC., 6 Algonquin Rd., Canton, MA 02021, Tel: 617-828-2008; *Sls. Mgr.:* G. Nutter

GENERAL ATRONICS CORP., 1200 E. Mermaid Lane, Philadelphia, PA 19118, Tel: 215-233-4100

GENERAL AUTOMATIC CORP., 70 Liberty St., Metuchen, NJ 08840, Tel: 201-494-9300; Empl.: 59; *Sls. Mgr.:* M. Barron

GENERAL BUSINESS TECH., 1891 McGraw Avenue, Irvine, CA 92714, Tel: 714-261-1891; Empl.: 32

GENERAL CABLE CO., Cornish Products Div., 160 Water Street, Williamstown, MA 01267, Tel: 413-458-8171

GENERAL CABLE CO., Fiber Optics Div., 160 Fieldcrest Ave., Raritan Ctr., Edison, NJ 08818, Tel: 201-225-4780, Telex: 642892; *Sls. Mgr.:* Pieter de Bruijn

GENERAL COMPUTERS, 1624 Veteran Ave., Los Angeles, CA 90024; Empl.: 10

GENERAL CONNECTOR CORP., 80 Bridge St., Newton, MA 02158, Tel: 617-244-5706

GENERAL CONTROL CO., 1200 Soldiers Field Rd., Boston, MA 02134, Tel: 617-782-7440; Empl.: 25

GENERAL DATACOMM, INC., Rt. 63, Middlebury, CT 06762-1299, Tel: 203-574-1118; *Dist. Mgr.:* Vince Dailey

GENERAL DEVICES, Box 39100, Indianapolis, IN 46239-9632, Tel: 317-897-7000, Telex: 27-2169; Empl.: 220 ...**C•1062-1065**

Local Sales Offices & Reps

AL	Huntsville, Hughes Assocs., Inc.	205-533-9108
AZ	Phoenix, Snyder Engrg.	602-279-2010
CA	Fullerton, Groh Assoc.	714-738-7105
CA	Mountain View, G. Woempner Co.	415-964-5454
CO	Boulder, R. F. Mayo Assoc.	303-499-2155
CT	North Haven, Coakley, Boyd & Abbett	203-481-2828
FL	Lighthouse Point, J. Krutek & Assoc.	305-941-6544
FL	Maitland, J. Krutek	305-628-4837
GA	Norcross, Hughes Assocs., Inc.	404-622-1587
IL	Glencoe, Howard Benjamin	312-835-0150
IN	Noblesville, Century Elctrns.	317-849-2026
KS	Shawnee Mission, Lowell & Kangas	913-631-3515
MA	Needham, Coakley, Boyd & Abbett	617-444-5470
MN	St. Paul, Northport Engrg.	612-457-8000
MS	Corinth, Hughes Assocs., Inc.	601-287-2915
MO	St. Louis, Lowell & Kangas	314-821-4050
NH	Plaistow, Coakley, Boyd & Abbett	617-444-5470
NJ	Mountainside, Henry G. Richter	201-233-4615
NY	Fayetteville, H.G. Richter	315-637-6713
NC	Raleigh, Hughes Assocs., Inc.	919-782-2065
OH	Cleveland, Electronic Comps., Inc.	216-261-4103
OH	Dayton, Electronic Comps., Inc.	513-866-3340
OK	Tulsa, Advance Tech. Sls.	918-664-0482
PA	Doylestown, Monteiro Assoc.	215-345-5855
TN	Morristown, Hughes Assocs., Inc.	615-587-2433
TX	Austin, Advance Tech. Sls.	512-440-7677
TX	Dallas, Advance Tech. Sls.	214-340-1300
TX	Houston, Advance Tech. Sls.	713-440-3888
WA	Olympia, Bergford & Assocs.	206-866-2001

GENERAL DIGITAL CORP., 700 Burnside Ave., E. Hartford, CT 06108, Tel: 203-528-9041; Empl.: 70 ...**D•1067**

Local Sales Offices & Reps

MA	Wayland, Daner-Hayes, Inc.	617-894-7290

GENERAL DIGITAL INDUSTRIES INC., 7702 Governors Dr. W., Huntsville, AL 35805, Tel: 205-837-8305; Empl.: 29; *Sls. Mgr.:* Nelson Carney

GENERAL ELECTRIC CO., 333 W. Seymour Ave., Cincinnati, OH 45216, Tel: 513-948-5050, Telex: 810-461-2070; FSC No.: 05326

GENERAL ELECTRIC CO., Battery Business Dept., P.O. Box 992, Gainesville, FL 32602, Tel: 904-462-4480, TWX: 810-836-8500; *Sls. Mgr.:* K. Edwards

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MS	Hattiesburg, Mfg. Sls. & Mktg.	601-264-4755
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NE	Omaha, Forristal Young Sls. Co., Inc.	402-333-0800
NJ	Englewood, Baum & Epstein	212-564-4105
NY	Grand Island, L. J. H. McTaggart Assocs.	716-773-9222
NY	New York, Baum and Epstein	212-564-4105
NC	Greensboro, Adams & Assocs.	919-272-6838
OH	Chesterfield, K. T. Depco	216-729-3588
OH	Westchester, K. T. Depco	513-381-0232
OK	Tulsa, ION Assocs.	918-664-0186
PA	Doylestown, Tech. Instr.	215-345-4110
PA	Pittsburgh, K. T. Depco	412-367-1011
TX	Grand Prairie, ION Assocs.	212-647-8225
WA	Tumwater, Global Spec. - San Fran. Office	415-648-0611

GLOBE BATTERY DIV., See Johnson Controls, Globe Battery Div.

GLOBE PLASTICS, 1342 S. Signal Dr., Pomona, CA 91766, Tel: 714-623-2747; FSC No.: 21071; Empl.: 27; *Sls. Mgr.:* J. R. Humphreys

GLOBE UNION, See Johnson Controls, Globe Battery Div.

GM NAMEPLATE, INC., 2040 15th Ave. West, Seattle, WA 98119, Tel: 206-284-2200, TWX: 910-444-2053; *Sls. Mgr.:* Ed Westfall

GMR CO., 8801 Sepulveda Blvd., Los Angeles, CA 90045, Tel: 213-216-9516, Telex: 499 2468; Empl.: 87; *Sls. Mgr.:* Harvey Mushman

GNB BATTERIES INC., Ind'l. Battery Div., 2010 Cabot Blvd. W., Langhorne, PA 19047, Tel: 215-752-0555, TWX: 510-667-2056

GNT AUTOMATIC, 1560 Trapelo Rd., Waltham, MA 02154, Tel: 617-890-3305; FSC No.: 617-890-7825; Empl.: 14; *Sls. Mgr.:* K. P. Olson

GOLDEN PACIFIC ELCTRNS., INC., 1020 N. Batavia St., Ste. Q, Orange, CA 92667, Tel: 714-538-9752/9753, TWX: 910-593-1620

GOLDWELL COMPS., 1815 W. 205th St. Ste. 201, Torrance, CA 90501, Tel: 213-533-1228, Telex: 182-392; *Sls. Mgr.:* S. Komori

GOOD-ALL ELECTRIC, INC., 3725 Canal Drive, Fort Collins, CO 80524, Tel: 303-484-3080, TWX: 910-930-9015; FSC No.: 22096; Empl.: 100; *Sls. Mgr.:* Dennis M. Pearson

GORDON, CLAUD S., CO., 5710 Kenosha St., Richmond, IL 60071, Tel: 815-678-2211, Telex: 72-2427; Empl.: 260

GORDON, L., PACKAGING, 1050 S. Paca St., Baltimore, MD 21230, Tel: 301-539-6537; Empl.: 150

GORDON PRODS., 67 Del Mar Dr., Brookfield, CT 06804, Tel: 203-775-4501; Empl.: 30; *Sls. Mgr.:* Leon Najman; *Dist. Mgr.:* Leon Najman

GORDOS CORPORATION, Gordos International Corp., 250 Glenwood Ave., Bloomfield, NJ 07003, Tel: 201-743-6800, TWX: 710-994-4787; Empl.: 350; *Sls. Mgr.:* Ed Barry; *Dist. Mgr.:* Ed Barry .... **B•1375-1379, 1568-1570**

Local Sales Offices & Reps

CA	Costa Mesa, Jim Pancake	714-751-6760
CA	Milpitas, Maxim Elctrn. Sls.	408-946-6001
CO	Wheatridge, Waugaman Assocs.	303-423-1020
CT	Orange, R. F. Duffy Assocs.	203-795-3678
NJ	Red Bank, Jack Silance	201-530-3222
NY	Pittsford, Noeth-Howsinger Assocs.	716-586-9002
NC	Peachland, D. P. McDonald	704-272-8474
OR	Aloha, Micro Sls.	503-642-1818
WA	Bellevue, Micro Sls.	206-451-0568
WI	Milwaukee, Bill Swanson	414-543-2727

Local Distributors

AL	Birmingham, Regal Controls	205-967-5770
AL	Huntsville, Pioneer	205-837-9300
AL	Huntsville, RM	205-852-1550
AZ	Phoenix, Arizona Comps.	602-279-9446
AZ	Phoenix, Be Switched	602-275-4805
AZ	Phoenix, Newark	602-957-0085
AZ	Tempe, Bell Inds.	602-966-7800
AZ	Tempe, Time	602-967-2000
CA	Buena Park, Control Design	714-521-5040
CA	Chatsworth, IEC	213-998-2200
CA	Foster City, Newark	415-572-8300
CA	Garden Grove, Advanced Digital	714-897-0319
CA	Inglewood, Newark	213-671-7066
CA	Los Angeles, Elec. Switches	213-660-1310
CA	Riverside, Elctrn. Supp.	714-683-7300
CA	San Carlos, Control Design	415-592-4808
CA	San Diego, Elctrn. Supp.	619-693-8222
CA	Santa Clara, Manco	408-496-6611
CA	Sunnyvale, Time	408-734-9888
CA	Torrance, Time Elctrns.	213-320-0880
CO	Denver, Integrated Elctrns.	303-534-6121
CO	Denver, Newark	303-757-3351
CO	Wheatridge, Bell Inds.	303-424-1985
CO	Wheatridge, Hannah Hill	303-424-0108
FL	Ft. Lauderdale, Hammond Elctrns.	305-973-7130
FL	Ft. Lauderdale, Newark	305-587-2372
FL	Ft. Lauderdale, Pioneer	305-771-7520
FL	Ft. Lauderdale, Power Comps.	305-565-1614
FL	Lakeland, A. A. Elec.	813-665-6941
FL	Orlando, Hammond Elctrns.	305-849-6060
FL	Orlando, Pioneer	305-834-9090
GA	Atlanta, Control Design	404-979-3500
GA	Norcross, A. A. Elec.	404-449-8670
GA	Norcross, Newark	404-448-1300
GA	Norcross, Pioneer	404-448-1711
IL	Addison, L Comp	312-628-1400
IL	Chicago, Newark	312-784-5100
IL	Elk Grove Village, Pioneer	312-437-9680
IL	Genoa, Control Design	815-784-6515
IL	Lombard, RM	312-364-6622
IN	Carmel, Altex Elctrns.	317-848-1323
IN	Indianapolis, Control Design	317-788-4559
IN	Indianapolis, Pioneer	317-849-7300
IN	Indianapolis, RM	317-291-7110
IA	West Des Moines, Ramco	515-225-6933
KS	Wichita, L Comp	316-265-8501
LA	New Orleans, Currier P Roser	504-734-1147
MD	Columbia, Time	301-964-3090
MD	Gaithersburg, Pioneer	301-921-0660
MA	Westboro, Future Elctrns.	617-366-2400
MA	Woburn, Newark	617-935-8350
MA	Woburn, Time	617-935-8080
MI	Grand Rapids, RM Elctrns.	616-531-9300
MI	Livonia, Pioneer	313-525-1800
MI	Oak Park, Newark	313-967-0600
MN	Minneapolis, Control Design	612-721-1628
MN	Minneapolis, Newark	612-331-6350
MN	Minnetonka, Pioneer	612-935-5444
MO	Kansas City, L Comp	816-221-2400
MO	St. Louis, Control Design	314-426-3150
MO	St. Louis, L Comp	314-291-6200
NE	Omaha, L Comp	402-895-5517
NJ	East Rutherford, A. A. Elec.	201-777-5477
NJ	Fair Lawn, Relay Specialties	201-797-3313
NJ	Pennsauken, Resco	609-662-4000
NJ	Springfield, Newark	201-376-9500,212-349-7087
NM	Albuquerque, Bell Inds.	505-292-2700
NM	Albuquerque, Elctrn. Dvcs.	505-884-2950
NY	Buffalo, Summit	716-887-2800
NY	Hauppauge, JACO	516-273-5500
NY	New York, Time	516-273-0100
NY	Rochester, Simcona Elctrns.	716-328-3230
NY	Rochester, Summit	716-334-8110
NC	Charlotte, Pioneer/Carolina	704-527-8188
NC	Greensboro, Hammond Elctrns.	919-275-6391
NC	Pineville, Control Design	704-588-4410
NC	Shelby, Dixie Indl. Supply	704-482-5641
OH	Cleveland, Pioneer	216-587-3600
OH	Columbus, Elctrns. Mktg. Corp.	614-299-4153
OH	Dayton, Pioneer	513-236-9900
OH	Kettering, Elctrns. Mktg. Corp.	513-439-4711
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OH	Valley View, Newark	216-447-1050
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OR	Lake Oswego, Bell Inds.	503-241-4115
OR	Portland, Dunn Elctrns.	503-285-0214
PA	Horsham, Pioneer	215-674-4000
PA	King of Prussia, Time Elctrns.	215-337-0900
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PA	Pittsburgh, Pioneer	412-782-2300
PA	Willow Grove, Resco Elctrns.	215-659-4575
SC	Greenville, Hammond	803-233-4121
TX	Austin, Pioneer	512-835-4000
TX	Dallas, Control Design	214-358-1441
TX	Dallas, Pioneer	214-386-7300
TX	Dallas, RM Elctrns.	214-263-8361
TX	Garland, Newark	214-494-5911
TX	Houston, Newark	713-782-4800
TX	Houston, Pioneer	713-988-5555
TX	Richardson, JACO	214-235-9575
UT	Salt Lake City, Ballard Supp. Corp.	801-972-2435
UT	Salt Lake City, Bell Inds.	801-972-6969
VA	Chester, Virginia Control Equip. Co.	804-796-3001
WA	Bellevue, Bell Inds.	206-747-1515
WA	Bellevue, IEC	206-455-2727
WA	Bellevue, Newark	206-641-9800
WA	Kirtland, Cascade Data Mktg.	206-747-6190
WI	Milwaukee, Indl. Elctrns.	414-276-1212
WI	New Berlin, Control Design	414-784-1015
WI	New Berlin, RM Elctrns.	414-784-4420
PR	Carolina, Newark	809-762-4490
Can	Alberta, Future Elctrns.	403-259-6408
Can	Calgary, L. A. Varah	403-255-9550
Can	Downsview, Future Elctrns.	416-663-5563
Can	Hamilton, L. A. Varah	416-561-9311
Can	Montreal, Future Elctrns.	514-694-7710
Can	Ottawa, Future Elctrns.	613-820-8313
Can	Pointe Clare, Futrue Elctrns.	514-694-7710
Can	Vancouver, Future Elctrns.	604-438-5545
Can	Vancouver, L. A. Varah	604-873-3211
Can	Winnepeg, L. A. Varah	204-633-6190

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CA	Milpitas, Maxim Elctrn. Sls.	408-946-6001
CO	Wheat Ridge, Waugaman Assocs.	303-423-1020
CT	Orange, R. F. Duffy Assocs.	203-795-3678
MA	Braintree, R. F. Duffy Assocs.	617-848-3550
NJ	Red Bank, Jack Silance	201-530-3222
NY	Pittsford, Noeth-Honsinger	716-586-9002
NC	Peachland, D.P. McDonald	704-272-8474
OR	Aloha, Micro Sls.	503-642-1818
WA	Bellevue, Micro Sls.	206-451-0568
WI	Milwaukee, Bill Swanson	414-543-2727

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GORMAN MACHINE CORP., 7 Burke Dr., Brockton, MA 02401, Tel: 617-588-2900, TWX: 710-345-0679; Empl.: 25; *Sls. Mgr.:* Kenneth P. Gorman

GORMAN-REDLICH MFG. CO., 6 Curtis St., Athens, OH 45701, Tel: 614-593-3150; Empl.: 4; *Sls. Mgr.:* Jim Gorman

GOULD INC., Corporate Headquarters, 10 Gould Center, Rolling Meadows, IL 60008; Empl.: 20,650

GOULD-AMI, Sub. Gould Inc., 3800 Homestead Rd., Santa Clara, CA 95051, Tel: 408-554-2150, TWX: 910-338-0018;910-338-0024; *Dist. Mgr.:* Judi MacGregor

GOULD INC., Circuit Protection Div., 374 Merrimac St., Newburyport, MA 01950, Tel: 617-462-6662/3131, Telex: 94-7427, TWX: 710-347-0264; *Sls. Mgr.:* Malcolm Allison

GOULD COMPION, 1101 E. University, Urbana, IL 61081, Tel: 217-384-8500

GOULD INC., Computer Sys. Div., 6901 W. Sunrise Blvd., Ft. Lauderdale, FL 33313, Tel: 305-587-2900, TWX: 510-955-9843; FSC No.: 59-0913135; Empl.: 2376; *Sls. Mgr.:* Howard Kossak; *Dist. Mgr.:* Lionel Agar (Intl.)

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CA	Redondo Beach, Ward/Davis Assocs., Inc.	213-643-6977
CA	San Diego, Ward/Davis Assocs.	619-292-1000
CA	Santa Clara, Ward/Davis Assocs.	408-245-3700
CO	Englewood, Barnhill Assocs., Inc.	303-779-4494, 303-779-3600
CT	Wallingford, Pat Jenks Assocs.	203-265-9939
FL	Ft. Lauderdale, W. A. Brown Instrs.	305-776-4800
FL	Ft. Lauderdale, W.A. Brown Instrs.	305-949-1022, 305-776-4800
FL	Melbourne, W.A. Brown Instrs.	305-723-0835, 305-723-0766
FL	Orlando, W.A. Brown Instrs.	305-425-5505
GA	Norcross, W. A. Brown Instrs.	404-441-2980
IN	Indianapolis, Dytec Central	317-247-1316
KS	Lenexa, Dytec South	913-888-0215
LA	Mandeville, W. A. Brown Instrs.	504-626-9701
MA	Woburn, Pat Jenks Assocs.	617-938-0488
MI	Farmington Hills, Carter, McCormic & Peirce, Inc.	313-477-7700
MN	Minneapolis, Sector Engrg. Sls.	612-593-1809
MO	Maryland Heights, Dytec South	314-569-2990
NE	Omaha, Dytec South, Inc.	402-345-6477
NM	Albuquerque, Barnhill Assocs., Inc.	505-299-7658
NY	De Witt, D.B. Assocs.	315-446-0220
NY	Great Neck, RTI	516-829-3770
NC	Durham, W. A. Brown Instrs.	919-479-5200
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TX	Houston, Barnhill Assocs., Inc.	713-688-9971
TX	Richardson, Barnhill Assocs., Inc.	214-231-2573
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Can	Burnaby, B.C., Allan Crawford Assocs.	604-294-1326
Can	Calgary, Alb., Allan Crawford Assocs.	403-230-1341
Can	Darthmouth, N. S., Allan Crawford Assocs.	902-463-8640
Can	Mississauga, Ont., Allan Crawford Assocs.	416-890-2010
Can	Ottowa, Ont., Allan Crawford Assocs.	613-722-7682
Can	St. Laurent, Mon., Allan Crawford Assocs.	514-731-8564

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GOULD INC., Imaging & Graphics Div., 1870 Lundy Ave., San Jose, CA 95131, Tel: 408-263-7155, TWX: 910-338-7656; Empl.: 200; *Sls. Mgr.:* Mike Battaglia; *Dist. Mgr.:* Ernie Ohrenstein

GOULD INC., Industrial Controls Div., 901 Baltimore Blvd., Westminster, MD 21157, Tel: 301-876-2214, TWX: 710-862-0846; Empl.: 325; *Sls. Mgr.:* M. Freyermuth

GOULD INC., Meas. Sys. Div., 2230 Statham Blvd., Oxnard, CA 93030, Tel: 805-487-8511, Telex: 65-9223; Empl.: 500

GOULD INC., Medical Prods. Div., 1900 Williams Dr., Oxnard, CA 93030, Tel: 805-983-1300, Telex: 182-204

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GOULD INC., Recording Systems Div., 3631 Perkins Ave., Cleveland, OH 44114, Tel: 216-361-3315, Telex: 196113GLD RS UT; FSC No.: 96795; Empl.: 550; *Sls. Mgr.:* David Friggle **D•1400, 1404**

Local Sales Offices & Reps

CA	Cerritos, Gould Inc., Recording Sys. Div.	213-404-1919
CA	Hayward, Gould Inc., Recording Sys. Div.	415-782-0852
CO	Englewood, Gould Inc., Recording Sys. Div.	303-781-4473
FL	Altamonte Springs, Gould Inc., Recording Sys. Div.	305-830-0695
GA	Atlanta, Gould Inc., Recording Sys. Div.	404-441-5556
HI	Honolulu, Hawaiian Industrial Instr.	808-523-3676
IL	Elk Grove Village, Gould Inc., Recording Sys. Div.	312-640-4135
IN	Indianapolis, Gould Inc., Recording Sys. Div.	317-842-4484
MD	Greenbelt, Gould Inc., Recording Sys. Div.	301-345-0050
MA	Burlington, Gould Inc., Recording Sys. Div.	617-272-0750
MI	Madison Heights, Gould Inc., Recording Sys. Div.	313-588-4020
MN	Minneapolis, Gould Inc., Recording Sys. Div.	612-544-5253
MO	Florissant, Gould Inc., Recording Sys. Div.	314-921-3444
NJ	Saddle Brook, Gould Inc., Recording Sys. Div.	201-845-0220
NM	Albuquerque, Gould Inc., Recording Sys. Div.	505-292-4063
NY	Albany, Gould Inc., Recording Sys. Div.	518-584-7999
NY	Rochester, Gould Inc., Recording Sys. Div.	716-235-4980
NC	Greensboro, Gould Inc., Recording Sys. Div.	919-275-1978
OH	Centerville, Gould Inc., Recording Sys. Div.	513-433-9586
OH	Cleveland, Gould Inc., Recording Sys. Div.	216-361-3315
PA	Malvern, Gould Inc., Recording Sys. Div.	215-647-2214
PA	Pittsburgh, Gould Inc., Recording Sys. Div.	412-838-7700
TN	Hermitage, Gould Inc., Recording Sys. Div.	615-754-7100
TX	Dallas, Gould Inc., Recording Sys. Div.	214-634-2131
TX	Houston, Gould Inc., Recording Sys. Div.	713-680-1121
VA	Richmond, Gould Inc., Recording Sys. Div.	804-282-5533
WA	Bellevue, Gould Inc., Recording Sys. Div.	206-453-2461

GOULD DATAMETRICS, See Datametrics Inc.

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CA	Fremont, William Parks Assocs.	415-490-2011
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FL	Longwood, NSL Assocs.	305-629-5226
GA	Atlanta, L & D, Inc.	404-455-3483
IL	Chicago, W. F. Hamilton Co.	312-867-5030
IA	Cedar Rapids, Snider Sls. Co.	319-362-4410
KS	Overland Park, Barnes MidWest Sls.	913-341-9317
MD	Baltimore, Mech-Elec. Sls.	301-342-1984
MA	Reading, Lincoln Assocs.	617-944-9020
MI	Southfield, Fred H. Gehrke & Assocs.	313-559-5363
MN	Chanhassen, Barnes Sls. Assocs.	612-934-2907
NJ	Medford, Mech Elec. Sls.	609-654-8209
NY	Cazenovia, Naylor Elec.	315-655-8174
NY	Kew Gardens, Robert Smith Assocs.	212-780-0097
NY	New York, Robert Smith Assocs.	212-541-4885
NY	Plainview, Robert Smith Assocs.	516-681-3155
NC	Greensboro, L & D, Inc.	919-292-3201
NC	Raleigh, L & D, Inc.	919-876-5301
TX	Dallas, P. J. Scanlon Co.	214-231-4661
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WA	Olympia, Bergford & Assocs.	206-866-2001

GOW-MAC INSTR. CO., P.O. Box 32, Bound Brook, NJ 08805, Tel: 201-560-0600, Telex: 833-174; Empl.: 40; *Sls. Mgr.:* R. J. Mathieu

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GRANGER ASSOCS., 3101 Scott Blvd., Santa Clara, CA 95051, Tel: 408-727-3101, Telex: 34-8380; Empl.: 750; *Sls. Mgr.:* Rick Green

GRANITE STATE CIRCUITS, Power Elctrns. Corp., P.O. Box 2208, 96 Milton Rd., Rochester, NH 03867, Tel: 603-332-3334, TWX: 510-297-4462; *Sls. Mgr.:* Robert S. Karstedt

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Local Sales Offices & Reps

CA	Canoga Park, Catlin Inds.	213-347-0444
CA	City of Industry, Grant Hardware Co.	213-686-2110
CA	Santa Clara, Nova-Tronix	408-243-9530
CO	N. Glenn, Challege Sls.	303-450-2402
FL	Deerfield Bch., Electro-Comp Assocs.	305-429-0802
IL	Des Plaines, Lincoln, Hodges & Assocs.	312-297-3810
KS	Overland Park, J. Singer Indl. Sls. Corp.	913-381-3684
MA	Lexington, E.F. Del Fino Co.	617-938-1217
MI	Farmington, Carter, McCormic & Peirce	313-477-7700
MN	St. Paul, Repco	612-642-2828
NJ	Ridgefield, M - D Inds.	201-941-3113
NY	Liverpool, Precision Sls.	315-451-3480
NC	Charlotte, J. Corn Assocs.	704-552-0991
OH	Cincinnati, Tri State Mktg.	513-761-7993
OH	Cleveland, Carter, McCormic & Peirce	216-779-5100
TX	Dallas, Blackburn Assocs.	214-692-8885
WA	Kirkland, Norwest Co.	206-827-9562
WI	Waukesha, Lincoln, Hodges & Assocs.	414-542-3087

GRANT TECHNOLOGY SYS. CORP., Computer Products, 11 Summer St., Chelmsford, MA 01824, Tel: 617-256-8881; Empl.: 1122; *Sls. Mgr.:* V.P.T. McLeod

Local Sales Offices & Reps

CA	Hacienda Heights, Mico Assocs.	213-330-6819
CA	Los Gatos, Datarep, Inc.	408-395-1212
CT	Portland, BBI	203-342-0648
FL	Port St. Lucie, Shamrock Computer	305-878-6771
GA	Marietta, SEA, Inc.	404-953-3970
MD	Rockville, J4 Computer Sys., Inc.	301-424-0700
MA	Chelmsford, R.O.I., Inc.	617-250-0099
NY	Latham, L-Tron Corp.	518-785-5032
NY	Wainscott, CPS of New York	516-324-7965
PA	Mendenhall, Clark Bach Assocs.	215-388-7903
PA	Pittsburgh, C G Controls, Inc.	412-931-9351
WA	Bellevue, Meritech	503-644-0304
Can	Mississauga, Tracan Elctrns.	416-625-7752

GRAPHITE METALLIZING CORP., 1036 Nepperhan Ave., P.O. Box 110, Yonkers, NY 10702, Tel: 914-968-8400, Telex: 13-1571; Empl.: 178; *Sls. Mgr.:* E. Walker **B•1160**

Local Sales Offices & Reps

OR	Beaverton, Graphite Metallizing	503-646-9964

GRAPHTEC SERVICES, INC., 1600 N.W. Madrid Way, Boca Raton, FL 33432, Tel: 305-392-3373; Empl.: 12

GRASSLIN CONTROLS CORP., Dieter Grasslin Feinwerktechnik, 45 Spear Rd., Ramsey, NJ 07446, Tel: 201-825-9696, Telex: 135038; Empl.: 5

GRAYHILL INC., 569 Hillgrove Ave., La Grange, IL 60525, Tel: 312-354-1040, Telex: 6871375 GHLG UW, TWX: 910-683-1850; FSC No.: 5930; Empl.: 1000; *Sls. Mgr.:* Richard K. Neumann; *Dist. Mgr.:* Robert J. Ferrel .. **B•1384-1385, 1571-1587, 1704, 1718-1725; C•1225**

Local Sales Offices & Reps

AL	Huntsville, Rep, Inc.	205-881-9270
AZ	Phoenix, Mercury Engrg. Sls.	602-244-0123
CA	Anaheim, Impact Elctrns.	714-533-1351
CA	Cupertino, West-Comp	408-996-1001
CA	San Diego, Earle Assocs.	619-278-5441
CO	Denver, Lindberg Co.	303-758-9033
FL	Deerfield Beach, Newell-Hynes	305-429-3207
GA	Tucker, Rep, Inc.	404-938-4358
IL	La Grange, Grayhill, Inc.	312-354-1040
IN	Ft. Wayne, Menze Sls.	219-747-5616
IA	Cedar Rapids, Lorenz Sls.	319-377-4666
KS	Overland Park, PMR, Inc.	913-381-0004
KS	Wichita, PMR, Inc.	316-684-4141
MD	Gaithersburg, Naudain Assocs. Southern	301-258-5040
MA	Needham Hgts., Newscott Co.	617-444-1923
MI	Troy, C. B. Jensen & Assocs.	313-643-0506
MN	S. St. Paul, Northport Engrg.	612-457-8000
MO	St. Louis, PMR Corp.	314-569-1220
NJ	Marlton, Naudain Assocs.	609-983-5300
NM	Albuquerque, Lindberg Co.	505-881-1006
NY	Great Neck, Tylinski Assocs.	516-466-9070
NY	Ithaca, B. Dean, Inc.	607-257-1111
NC	Charlotte, R. W. Chapman & Co.	704-525-2421
NC	Greensboro, R. W. Chapman	919-275-0003
NC	Raleigh, R. W. Chapman	919-782-2624
OH	Cleveland, A. H. Baier Co. & Assocs.	216-461-6161
OH	Dayton, A. H. Baier Co. & Assocs.	513-276-4128
PA	Pittsburgh, Covert & Newman Co.	412-531-2002
TN	Jefferson City, Rep, Inc.	615-475-9012
TX	Austin, W. Pat Fralia Co.	512-835-7911
TX	Bedford, W. Pat Fralia Co.	817-267-3577
TX	Houston, W. Pat Fralia Co.	713-772-1572
UT	Salt Lake City, Lindberg Co.	801-467-1794
WA	Bellevue, Eltech, Inc.	206-643-4330
WI	Mequon, Badgerep	414-241-9200

Local Distributors

AL	Huntsville, Powell Elctrns.	205-539-2731
AZ	Tempe, Fisher/Brownell	602-967-1464
AR	Little Rock, Carlton-Bates Co.	501-562-9100
CA	Alhambra, Fisher/Brownell	213-289-0255
CA	Gardena, Calif. Switch	213-770-2330
CA	Los Angeles, Electric Switches	213-660-1310
CA	Los Angeles, Richey/Western	213-820-3777
CA	Riverside, Electronic Supp.	714-683-7300
CA	San Diego, Fisher/Brownell	619-560-8545
CA	San Diego, Richey/Western Electrns.	619-271-4511
CA	San Jose, Powell Elctrns.	408-943-9020
CA	Santa Clara, Fisher/Brownell	408-988-6041
CA	Santa Clara, Richey/Western Electrns.	408-727-7411
CO	Denver, CSID, Inc.	303-292-9594
CO	Denver, Newark Elctrns.	303-757-3351
CO	Denver, Ragon Elctrns.	303-777-9430
CT	Bethel, Heilind Elctrns.	203-797-8600
CT	Wallingford, Midan Elctrns.	203-265-2077
CT	Wallingford, Sager	203-265-4600
FL	Ft. Lauderdale, Powell Elctrns.	305-972-4300
FL	Orlando, Hammond Elctrns.	305-849-6060
FL	Pompano Beach, Peerless Radio	305-973-4141
GA	Norcross, A-A Elec.	404-449-8670
HI	Honolulu, Precision Radio	808-537-5291
IL	Chicago, Newark Elctrns.	312-638-4411
IL	Elk Grove, GBL	312-593-3220
IL	Northbrook, Classic Comp. Supp.	312-272-9650
IL	Palatine, Ohm Elctrn.	312-359-5500
IL	Peoria, Klaus Radio	309-691-4840
IN	Evansville, Hutch & Son	812-425-7201
IN	Fort Wayne, Graham Elctrns.	219-423-3422
IN	Indianapolis, Genesis Elctrns.	317-637-5571
IN	Indianapolis, Graham Elctrns.	317-634-8202
IA	Cedar Rapids, Deeco, Inc.	319-365-7551
KS	Wichita, LComp, Inc.	316-265-5100
MD	Baltimore, Resco	301-529-0500
MD	Columbia, Powell Elctrns.	301-621-4070
MD	Gaithersburg, Pioneer/Wash.	301-921-0660
MD	Kensington, Marine Air Supp.	301-949-9560
MA	Burlington, Heilind Elctrns.	617-272-5610
MA	Hingham, Sager Elctrns.	617-749-6700
MA	North Adams, Elctrn. Supp. Ctr.	413-663-6828
MA	Norwood, Gerber Elctrns.	617-329-2400
MA	Worcester, R M Elctrns.	617-791-7861
MI	Livonia, Pioneer Mich	313-525-1800
MI	Livonia, R.S. Elctrns.	313-525-1155
MI	Oak Park, Newark Detroit Elctrns.	313-967-0600
MI	St. Clair Shores, Spemco	313-771-2700
MN	Minneapolis, Newark Elec.	612-331-6350
MN	Minneapolis, Stark Elctrns.	612-332-1325
MN	St. Paul, Gopher Elctrns.	612-483-3322
MS	Jackson, Ellington Elctrn. Supp.	601-355-0561
MO	Kansas City, LComp, Inc.	816-221-2400
MO	Maryland Hgts., LComp, Inc.	314-291-6200
MO	St. Louis, Olive Indl. Elctrns.	314-426-4500
NE	Lincoln, Scott Elctrns.	402-466-8221
NH	Hudson, Heilind Elctrns.	603-883-9536
NJ	East Hanover, State Elec.	201-887-2550
NJ	Englewood, Powell Elec.	201-894-8900
NJ	Kenilworth, Federated Purch.	
NJ	Mt. Laurel, Jerseyswitch, Inc.	609-778-8190
NM	Albuquerque, Intl. Elctrns.	505-345-8127
NM	Albuquerque, Walker Elctrn. Supp.	505-247-2288
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NY	Buffalo, Summit Distrs.	716-887-2800
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NY	Hempstead, Electronic Equip.	516-538-5510
NY	Lynbrook, Peerless Radio	516-593-2121
NY	Rochester, Simcona Elctrns.	716-328-3230
NY	Rome, Rome Elctrns.	315-337-5400
NC	Cary, Powell Elec.	919-467-1212
NC	Charlotte, Pioneer/Carolina	704-527-8188
NC	Greensboro, Hammond Elctrns.	919-275-6391
NC	Raleigh, Southeastern Elctrns.	919-828-2311
OH	Cincinnati, Hughes-Peters	513-351-2000
OH	Cincinnati, URI Elctrns.	513-761-4030
OH	Cleveland, Pioneer/Cleveland	216-587-3600
OH	Columbus, Hughes-Peters	614-294-5351
OH	Dayton, Pioneer/Dayton	513-236-9900
OH	Dayton, Stotts-Friedman	513-298-5555
OK	Oklahoma City, Electro Entprs.	405-427-6591
OK	Tulsa, Norvell	918-254-8608
PA	Erie, REM Elctrns.	814-453-5626
PA	Harrisburg, Cumberland Elctrns.	717-232-5999
PA	McKean, Advacom	814-476-7774
PA	Philadelphia, Almo Elctrns.	215-698-4000
PA	Philadelphia, Herbach & Rademan	215-426-1700
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PA	Pittsburgh, Pioneer/Pittsburgh	412-782-2300
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SC	Greenville, Hammond Elctrns.	803-233-4121
TX	Dallas, Associated Air	214-331-4381
TX	Dallas, Harrison Equip. Co.	214-239-2750
TX	Dallas, Norvell Elctrns.	214-233-0020
TX	El Paso, Intl. Elctrns.	915-598-3406
TX	Garland, Newark Elctrns.	214-494-5911
TX	Richardson, Fisher/Brownell	214-235-3177
TX	Stafford, Harrison Equip.	713-879-2600
TX	Stafford, Southwest Elctrns.	713-491-4900
UT	Salt Lake City, Standard Supp.	801-486-3371
VA	Richmond, Sterling Elctrns.	804-226-2190
WI	Milwaukee, Marsh Elctrns.	414-475-6000

GREEN ENGINEERING, 78 Stone Place, Melrose, MA 02176, Tel: 617-665-8994

GREENLEE TOOL CO., 2330 23rd Ave., Rockford, IL 61108, Tel: 815-399-3903; *Sls. Mgr.:* J. Kraysman

GREENRAY INDS., INC., 840 W. Church Rd., Mechanicsburg, PA 17055, Tel: 717-766-0223, TWX: 510-650-4939; FSC No.: 16681; Empl.: 65; *Sls. Mgr.:* D. R. Widener

GREGG ELEC., 608 W. Emporia, Ontario, CA 91761, Tel: 714-983-1794; FSC No.: 53014; Empl.: 8

GREIBACH INSTRS. DIV., 25 Dock St., Mt. Vernon, NY 10550, Tel: 914-699-9717; FSC No.: 32590; Empl.: 35

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IL	Lincolnwood, Saffro & Assocs.	312-677-9720
MD	Baltimore, Whitcomb Assocs.	301-889-1245
MN	Minneapolis, Hei-Lite Sls.	612-861-6051
WI	Lake Mills, Saffro & Assocs.	414-648-2605

G. R. ELECTRONICS, 1640 5th St., Suite 224, Santa Monica, CA 90401, Tel: 213-395-4774, Telex: 65-2337 (BT Smedley SNM); *Sls. Mgr.:* Jillian I. Girard; *Dist. Mgr.:* Christopher E. Thomson

GRIES/DYNACAST, Div. Coats & Clark Inc., 162 Beechwood Ave., New Rochelle, NY 10801, Tel: 914-633-8600, TWX: 914-235-2188; Empl.: 600

GRIM CORPORATION, Box 67, Medford, NJ 08055, Tel: 609-267-7950, TWX: 510-683-9392; FSC No.: 21870; Empl.: 125; *Sls. Mgr.:* Eileen Muzina .... **D•1051**

GRM CORP., See Grim Corp.

GROVER PATENT PRODUCTS, 339 W. Arden Ave., Glendale, CA 91203, Tel: 213-245-4400; Empl.: 4

GRUENBERG OVEN CO., INC., P.O. Box 3246, 2121 Reach Rd., Williamsport, PA 17701, Tel: 717-326-1755, Telex: 350079; Empl.: 90; *Sls. Mgr.:* James Polk

GSE, 23640 Research Dr., Farmington Hills, MI 48024, Tel: 313-476-7875, Telex: 23-0738; Empl.: 105; *Sls. Mgr.:* Harold G. Munn

GSI

GSI CORP., 1917 Greenspring Dr., Timonium, MD 21093, Tel: 301-252-1768, Telex: 292319 GSIC UR; FSC No.: 60990; Empl.: 28; *Sls. Mgr.:* R. A. Higgins ...... **C•1840**

Local Sales Offices & Reps

AL	Huntsville, Montgomery Mktg., Inc.	205-830-0498
FL	Palmetto, Southeast Tech. Sls., Inc.	813-729-3112
GA	Norcross, Montgomery Mktg., Inc.	404-447-6124
NC	Cary, Montgomery Mktg., Inc.	919-467-6319
VA	Charlottesville, Electronic Sources	804-293-4041

GTE CORP., Sylvania Emissive Prods./Process Heat, Portsmouth Ave., Exeter, NH 03833, Tel: 603-772-4331, TWX: 510-294-4471; Empl.: 200000

GTEK, INC., 307 Coleman Ave., Waveland, MS 39576, Tel: 601-467-8048, Telex: 315814; Empl.: 8; *Sls. Mgr.:* Bill Groves; *Dist. Mgr.:* Bill Groves

GTE METAL LAMINATES, 1704 Barnes St., Reidsville, NC 27320, Tel: 918-342-2381; Empl.: 260; *Sls. Mgr.:* J. W. Leone

GTE MICROCIRCUITS, 2000 W. 14th. St., Tempe, AZ 85281, Tel: 602-968-4431, TWX: 910-951-1383; FSC No.: 16766; Empl.: 432; *Sls. Mgr.:* David Thompson

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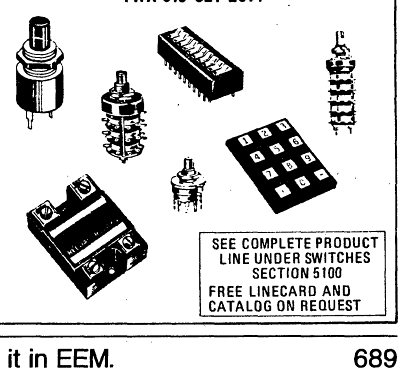

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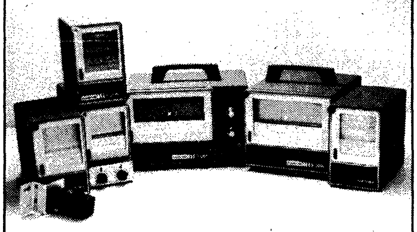

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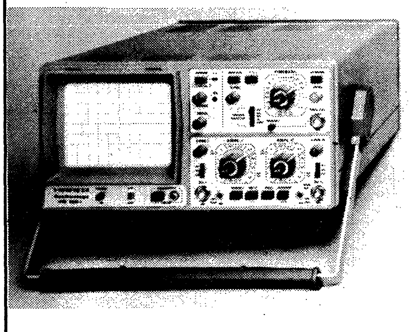

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GTE SUPPLY, GTE Communications Systems, 5225 Wiley Post Way, Salt Lake City, UT 84116, Tel: 801-537-5237, TWX: 910-925-4081; Empl.: 500; *Sls. Mgr.:* J. E. Murphy

GTE SWITCHING & TELEPHONE PRODUCTS, 400 N. Wolf Rd., Northlake, IL 60164, Tel: 312-681-7100

GTE SYLVANIA, INC., CHEM. & METAL DIV., See Sylvania Chemicals/Metals

GTE SYLVANIA LIGHTING PRODS., Sylvania Lighting Ctr., 100 Endicott St., Danvers, MA 01923, Tel: 617-777-1900

GTE SYLVANIA, INC., CIRCUIT MOD. OPER., See Sylvania Electronics

GTE SYLVANIA, INC., CONNECTOR PRODS. OPER., See Sylvania Connector Prods. Oper.

GTE SYLVANIA, INC., DETROIT, MI, See GTE Metal Laminates

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GTE SYLVANIA, INC., STANDISH, ME, See Sylvania Control Devices

GTE SYLVANIA, INC., TECH PRODS. DIV., See Sylvania Parts

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GTI/ELCTRNS. DIV., P.O. Box 96, Hadley, PA 16130, Tel: 412-253-3161, Telex: 914-545; Empl.: 250; *Sls. Mgr.:* Richard C. Kaufman; *Dist. Mgr.:* Richard C. Kaufman

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GUILDLINE INSTRS., 4403 Vineland Rd, Suite B-10, Orlando, FL 32811-9998, Tel: 305-423-8215, Telex: 856443; Empl.: 85; *Sls. Mgr.:* W. Dietz

GULTON INDS., INC., ELCTRN. COMPS. DIV., See Gulton Inds., Inc., Piezo Products Div.

GULTON INDUSTRIES, INC., Engineered Magnetics Division, 13041 Cerise Ave., Hawthorne, CA 90250, Tel: 213-679-0111, TWX: 910-325-6208; FSC No.: 06509; Empl.: 250

GULTON INDS., INC., Graphic Instruments Div., Gulton Ind'l. Pk., E. Greenwich, RI 02818, Tel: 401-884-6800, TWX: 710-387-1500; Empl.: 400; *Sls. Mgr.:* Anthony Tuccillo

GULTON INDS., INC., Piezo Prods. Div., Box 4300, Fullerton, CA 92634, Tel: 714-871-2150, TWX: 910-592-1247; Empl.: 120; *Sls. Mgr.:* J. Sloane

GULTON INDS., INC., Servonic Div., 1644 Whittier Ave., Costa Mesa, CA 92627, Tel: 714-642-2400, 800-854-4066, Telex: 183-532, TWX: 910-596-1352; FSC No.: 99564; Empl.: 320; *Sls. Mgr.:* Tom Perrin, Jr.

Local Sales Offices & Reps

AL	Tanner, W. Tom Escue, So. Rdeg. Sls. Mgr.	205-232-1549
CA	Ventura, Harry Stonelake, W. Reg. Sls. Mgr.	805-658-1484
CT	Tolland, Phillip Butler, N.E. Reg. Sls. Mgr.	203-872-3454

GUNTHER, W., GMBH, Virnsberger Strasse 51, D 8500 Nurnberg 82, West Germany, Tel: (0)911/65521 or 65520, TWX: 622351 Wigu d; Empl.: 340; *Sls. Mgr.:* Peter Hammel

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GW3

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HADCO PRINTED CIRCUITS, Manchester Rd. Rte. 28, Derry, NH 03038, Tel: 603-432-9541, TWX: 710-366-0788; *Sls. Mgr.:* Ronald Boutin

HADES MFG. CORP., 151-A Verdi St., Farmingdale, NY 11735, Tel: 516-249-4244; FSC No.: 51578; Empl.: 18; *Sls. Mgr.:* K. Norris

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Local Sales Offices & Reps

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CT	Fairfield, Wexler-Court Sls. Co.	203-334-1122
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NY	East Syracuse, Ossman Instrs.	315-437-6666
NY	Rochester, Ossman Instrs.	716-473-5720
NY	Saratoga Springs, Ossman Instrs.	518-377-8604
NY	Vestal, Ossman Instrs.	607-785-9947
WA	Edmonds, Cunningham Sls.	206-771-4848

THE HALL COMPANY, 420 East Water St., Urbana, OH 43078, Tel: 513-652-1376; Empl.: 69

HALLMARK METALS INC., 610 W. Foothill Blvd., Glendora, CA 91740, Tel: 213-335-1263; Empl.: 20; *Sls. Mgr.:* Robert Schoenick

HALLMARK NAMEPLATE, INC./ELECTROPANEL CO., 1855 New Highway, Farmingdale, NY 11735, Tel: 516-454-0700, Telex: 510-222-0884; *Sls. Mgr.:* Florence Finkle

HALMAR ELECTRONICS, INC., 900 N. Hague Ave., Columbus, OH 43204, Tel: 614-275-0131, TWX: 810-482-1654; Empl.: 110

HAMAMATSU PHOTONICS K.K., 325-6 Sunayama-Cho, Hamamatsu City, Shizuoka Pref, Japan, Tel: 0534-52-2141; FSC No.: 0534-52-2139; Empl.: 900; *Sls. Mgr.:* M. Ito

HAMEG, INC., 88-90 Harbor Rd., Port Washington, NY 11050, Tel: 516-883-3837, TWX: 510-223-0889; *Sls. Mgr.:* John F. King

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HAMILTON STANDARD CONTROLS/STANCOR, See Stancor/Hamilton Standard Controls

HAMILTON STANDARD CONTROLS, 9100 Airport Dr., P.O. Box 11648, Fort Wayne, IN 46859, Tel: 219-747-6142, TWX: 810-295-0699; Empl.: 3,700; *Sls. Mgr.:* C. Michalski .... **B•1447**

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PA	E. Stroudsburg	717-421-1025

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HAMLIN, Lake & Grove Sts., Lake Mills, WI 53551, Tel: 414-648-2361, TWX: 910-260-3740; Empl.: 1800; *Sls. Mgr.:* Ken Deans .... **B•1389, 1588**

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CA	Anaheim, Westrep	213-404-3881
CA	San Diego, Westrep	619-566-6580
CA	San Diego, Westrep	619-276-0751
CA	Santa Clara, Westrep	408-988-8833
CO	Boulder, R-G Entprs.	303-447-9211
CT	North Haven, Coakley, Boyd & Abbett, Inc.	800-225-8402
FL	Casselberry, Southern Elctrn. Mktg.	305-695-3334
FL	Ft. Lauderdale, Southern Electrn. Mktg.	305-475-3686
GA	Jonesboro, Wallace Elctrn. Sls.	404-471-6297
IL	Chicago, Indl. Rep.	312-647-7755
IN	Carmel, Rich Elctrn. Mktg.	317-844-8462
IN	Fort Wayne, Rich Elctrn. Mktg.	219-432-5553
IA	Cedar Rapids, Palatine Sls.	319-365-8071
KS	Mission, Palatine Sls.	913-831-0555
KY	Louisville, Rich Elctrn. Mktg.	502-499-7808
MD	Churchville, Atlantic Technical Sls.	301-879-2236
MA	Needham Heights, Coakley, Boyd & Abbett, Inc.	617-444-5470
MI	Brighton, A.P. Assocs.	313-229-6550
MN	Minneapolis, R-J, Inc.	612-866-3661
MO	Hazelwood, Palatine Sls.	314-839-0800
NH	Plaistow, Coakley, Boyd & Abbett, Inc.	800-225-8402
NJ	Marlton, Naudain Assoc.	609-983-5300
NJ	West Caldwell, Grimm Siegel	201-575-9300
NM	Albuquerque, Shefler-Kahn	505-296-0749
NY	Great Neck, Tylinski Assocs.	516-466-9070
NY	Ithaca, Bob Dean, Inc.	607-257-1111
NC	Kernersville, Wallace Elctrn. Sls.	919-996-2742
OH	Richfield, Bear Mktg.	216-659-3131
OR	Portland, Syscom	503-644-2505
TX	Dallas, Allied Comps.	214-238-0408
TX	Houston, Allied Comps.	713-988-1600
TX	Hurst, Allied Comps.	817-589-0456
TX	Round Rock, Allied Comps.	512-244-1166
WA	Bellevue, Syscom	206-641-5080
WA	Bellevue, Testco, Inc.	206-454-7422
WI	Milwaukee, Indl. Rep.	414-259-0965
Can	Calgary, Alb., Weber Div. of DGW Elctrns.	403-264-5963
Can	Markham, Ont., Weber Div. of DGW Elctrns.	416-475-8500
Can	Ottawa, Ont., Weber Div. of DGW Elctrns.	613-728-2746

Local Distributors

AZ	Tempe, Circuit Specialties	602-966-0764
CA	Fullerton, Pyramid Elctrns.	714-773-0781
CA	San Jose, Cypress Elctrns. Inc.	408-945-8400
CA	Santa Clara, Pyramid Elctrns.	408-727-9810
CA	Torrence, Cypress Elctrns. Inc.	213-533-6005
CA	Van Nuys, Patane Avionics	213-988-4455
CO	Englewood, Ind. Elctrns.	303-694-9444
CT	Bethel, Heilind Elctrns.	203-797-8600
CT	Hartford, Hatry Elctrns.	203-527-1881
CT	New Haven, Hatry Elctrns.	203-787-5921
CT	Stratford, Hatry Elctrns.	203-375-5866
CT	Wallingford, Sager Elect. Supp.	203-265-4600
CT	Waterbury, Hatry Elctrns.	203-755-1181
FL	Lakeland, AA Elec.	813-665-6941
FL	Longwood, Intertec Inc.	305-834-7777
FL	Miami, Elctrn. Equip. Co.	305-871-3500
FL	Orlando, Hammond Elctrn.	305-849-6060
FL	Tampa, Leader Elctrns.	813-870-3315
GA	Norcross, AA Elec.	404-449-8670
IL	Chicago, Newark Elctrns.	312-638-4411
IL	Palatine, Ohm Elctrns.	312-359-5500
IN	Carmel, Altex Elctrns.	317-848-1323
IN	Ft. Wayne, Graham Elctrns.	219-424-3422
IN	Indianapolis, Graham Elctrns.	317-634-8202
IA	Cedar Rapids, Iowa Radio Supp. Co.	319-393-4510
MD	Gaithersburg, Pioneer/Wash.	301-921-0660
MA	Hingham, Sager Elec. Supp.	617-749-6700
MA	Norwood, Gerber Elctrns.	617-769-6000
MI	Oak Park, Newark Elctrns.	313-967-0600
MN	Fridley, Voyager Electronics	612-571-7766
MN	Minneapolis, Newark Elctrns.	612-331-6350
MO	St. Louis, Olive Indl. Elctrns.	314-426-4500
NH	Hudson, Heilind Elctrns.	603-883-9536
NJ	Berlin, General Comps., Inc.	609-768-6767
NJ	Fairlawn, Relay Spec.	201-797-3313
NJ	Pennsauken, Resco Elctrns.	609-662-4000
NM	Albuquerque, Bell Inds.	505-292-2700
NY	Buffalo, Summit Distr.	716-844-3540
NY	Lynbrook, Peerless Radio Corp.	516-593-2121
NY	Rochester, Masline Elctrns.	716-546-5373
NY	Rome, Rome Elctrns.	315-337-5400
NC	Greensboro, Hammond Elctrns.	919-275-6391
NC	Winston-Salem, Kirkman Elctrns.	919-722-9131
OH	Cincinnati, Graham Elctrns.	513-772-1661
OH	Solon, Repco	216-248-8900
OK	Tulsa, Radio, Inc.	918-587-9123
OR	Portland, Radar Elec.	503-233-3691
PA	McKeesport, Barno Radio	412-751-5966
RI	Providence, Wm. Dandreta & Co.	401-861-2800
TX	Austin, Harrison Equip. Co.	512-458-3555
TX	Dallas, Harrison Equip. Co.	214-239-2750
TX	Dallas, Heilind Elctrns.	214-351-2058
TX	Fort Worth, Allied Elctrns.	214-265-9341
TX	Houston, Harrison Equip.	713-879-2711
TX	Houston, Heilind Elctrns.	713-988-2711
WA	Kent, Interface Elctrns.	206-872-5800
WA	Seattle, Radar Elec. Co.	206-282-2511
WA	Spokane, Radar Elec. Co.	509-747-3053
WI	Cedarburg, AA Elec.	414-377-7500
WI	Mequon, Taylor Elec.	414-241-4321
Can	Burnaby, B. C., Rae Indl. Elctrns.	604-291-8866
Can	Burnaby, B. C., Semad Elctrns.	604-438-2515
Can	Dorval, Que., Semad Elctrns.	514-636-4614
Can	Downsview, Ont., Rae Indl. Elctrns.	416-736-1750
Can	Markham, Ont., Semad Elctrns.	416-475-3922
Can	Ottawa, Ont., Semad Elctrns.	613-729-6145
Can	Surrey, B. C., Memco Elctrn. Mkts.	604-590-1553

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Local Sales Offices & Reps

AZ	Scottsdale, Mahaffey & Assocs.	602-991-9790
CA	Laguna Hills, English/Damco Sls. Assocs.	714-837-3801
CA	Redwood City, Hickey Indl. Sls.	415-368-3849
GA	Atlanta, Millar Elctrns.	404-261-6160
IL	Highland Park, Bransky Sls.	312-433-2375
IN	Indianapolis, Wilson Tech. Sls.	317-298-3345
MD	Silver Spring, Mid Atlantic Sls.	301-593-7749
MA	N. Scituate, W. A. Hendrickson Co.	617-545-0652
MI	Southfield, Component Assocs.	313-557-3232
MN	Golden Valley, Ambassador Inds. Mktg.	612-542-8437
MO	St. Louis, Kathrinus, Kelly & Baumhauer	314-647-2400
NY	Bellmore, Selectra Sls.	516-221-7865
NY	Syracuse, Paston-Hunter Co., Inc.	315-437-2992
NC	Raleigh, Millar Elctrns.	919-787-9564
OH	Dayton, Shamrock Elctrn. Sls.	513-258-1227
OR	Portland, Dussault & Assocs., Inc.	503-641-8780
PA	Springfield, George M. Conneen	215-544-5884
TX	Dallas, J. Y. Schoonmaker Co., Inc.	214-349-1650
WA	Seattle, Dussault & Assocs., Inc.	206-527-5454

Local Distributors

AZ	Phoenix, Electronic Parts Co.	602-277-7281
AZ	Tucson, Southwest Sls.	602-628-1613
AR	Ft. Smith, Carlton Bates	501-646-8201
AR	Little Rock, Carlton Bates	501-562-9100
AR	Texarkana, Lavender Dist. Corp.	501-773-4631
CA	Burlingame, Logan Elctrns.	415-697-6481
CA	Chatsworth, Poco Sls.	818-700-8727
CA	Manhattan Beach, Prime Electro	213-379-3642
CA	Palo Alto, Zack Elctrns.	415-326-5432
CA	Redwood City, H.D.B.	415-368-1388
CA	San Diego, Western Radio Elec.	619-268-4400
CA	San Jose, Con. Parts, Inc.	408-263-9521
CA	San Jose, Quement Elctrns.	408-998-5900
CA	San Rafael, Elctrns. Plus	415-457-0466
CA	Santa Ana, ITT Multicomponents	714-835-9019
CA	Santa Clara, Pyramid Elctrns.	408-727-9810
CO	Denver, Fistell Elctrns.	303-629-1312
CO	Denver, Integrated Elctrns.	303-292-6121
CT	Danbury, Pilgrim Elec.	203-792-7274
CT	Hartford, Hatry Elec.	203-527-1881
CT	Middletown, Midstate Elec.	203-347-5638
CT	Norwalk, Cobra	203-853-8228
CT	Norwalk, Park Distrbg.	203-853-2011
CT	Stratford, Hatry Elec.	203-375-5866
FL	Ft. Lauderdale, Hammond Elctrns.	305-973-7103
FL	Orlando, Hammond Elctrns.	305-849-6060
GA	Atlanta, Wholesale Dist.	404-447-8431
IL	Chicago, Newark Elec.	312-638-4411
IL	Joliet, Mainline Elec.	815-436-3900
IL	Mt. Prospect, Magnuson Elctrns.	317-247-5108
IL	Niles, Joseph Elec.	312-297-4200
IL	Northbrook, Classic Comps.	312-272-9650
IL	Wheeling, Hawk Elec.	312-459-4030
IN	Indianapolis, Advent Elec.	317-872-4910
IN	Indianapolis, Mar Elec.	317-875-4510
IN	Lafayette, C.W.Y. Elec.	317-448-1611
IA	Cedar Rapids, Deeco, Inc.	319-365-7551
IA	Davenport, Warren Radio	319-322-5301
KY	Louisville, Peerless Elctrns.	502-637-7677
LA	Harvey, A.F.G. Elec.	504-368-9696
LA	Shreveport, Industrial Elec. Supp.	318-222-9459
MD	Bethesda, Empire Elec.	301-656-3300
MD	Rockville, M. S. Elec.	301-921-0200
MA	Haverhill, Spartan Elctrns.	617-373-1200
MA	Lynn, Land Elec. Supp.	617-592-2220
MA	Wellesley Hills, Target Elctrns. Supp.	617-235-2545
MA	Woburn, Abbott Elec.	617-935-2040
MI	Farmington Hills, Advent Elctrns.	313-477-1650
MI	Grand Rapids, S. F. Electrns.	616-459-0216
MN	Eden Prairie, Cassidy Elctrns.	612-944-0100
MO	Kansas City, Electronic Supp.	816-931-1321
MO	St. Louis, Van Sickle Radio	314-621-5000
NH	Dover, American Radio Corp.	603-742-6800
NJ	Fairlawn, Relay Specialties	201-797-3313
NJ	Totowa, Route Elctrns.	201-256-8555
NM	Albuquerque, Beta Tron Elctrns.	505-344-2381
NY	Buffalo, Genesee Radio	716-873-9661
NY	Buffalo, Summit Dist.	716-884-3450
NY	Commack, Sparton Elec.	516-499-9500
NY	Hempstead, Davis Elctrns.	516-483-9200
NY	Rochester, Goldcrest Elec.	716-546-8464
NY	Rochester, Masline Elec.	716-546-5373
NY	Rochester, Rochester Radio	716-454-7800
NY	Rome, Rome Elec.	315-337-5400
NY	Syracuse, Salina Elec.	315-422-2336
NY	Troy, Trojan Elec.	518-272-4481
NC	Greensboro, Hammond Elec.	919-275-6391
NC	Winston-Salem, Kirkman Elctrns.	919-722-9131
OH	Cincinnati, URI Elctrns.	513-716-4030
OH	Cleveland, Roberts Elec.	216-238-1711
OH	Cleveland, Selectronics	216-243-9700
OH	Columbus, Thompson Elec. Supp.	614-228-6191
OH	Dayton, Stott Friedman	513-298-5555
OH	Toledo, Warren Radio	419-248-3364
OK	Oklahoma City, Radio, Inc.	405-528-2391
OK	Tulsa, Radio, Inc.	918-587-9123
PA	Drexel Hill, Kass Elec.	215-449-2300
PA	Erie, J. V. Duncombe Elec.	814-454-5278
PA	Erie, Warren Radio	814-454-5285
PA	McKean, Advacom	814-476-7774
PA	Wayne, Peak Elec.	215-293-[illegible]000
PA	York, Rosen Elctrns.	717-843-3875
RI	Pawtucket, Major Elec. Supp.	401-725-7400
RI	Providence, Hope Elctrns.	401-521-5600
SC	Charleston, Wholesale Inds. Elctrns.	803-722-2634
SC	Greensville, Hammond Elec.	803-242-6880

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TX	Corpus Christi, Douglas Elec.	512-883-5103
TX	Dallas, Electrotex	214-234-0433
TX	Dallas, Wholesale Elec.	214-824-3001
TX	Ft. Worth, Allied Elec.	817-336-5401
TX	Houston, Electrotex	713-526-3456
TX	Houston, The Altair Co.	713-462-3029
TX	Midland, ESI Supp.	915-694-9657
TX	San Antonio, Sherman Elec.	512-224-1001
UT	Salt Lake City, Standard Elec. Supp.	801-486-3371
VT	Burlington, Greylock Elec.	802-658-5700
WA	Bellevue, Integrated Elec.	206-455-2727
WI	Mequon, Taylor Elec.	414-241-4321
WI	New Berlin, R. M. Wisconsin	414-784-4420

H&T COMPONENTS INC., H&T Components Ltd., 35 Carlough Road, Bohemia, NY 11716, Tel: 516-567-2282, Telex: 510-228-7886; *Sls. Mgr.:* Bert Freifeld; *Dist. Mgr.:* Mario Nardini **C•1226**

Local Sales Offices & Reps

AL	Huntsville, Advanced Comps. Mktg.	205-881-5493
AZ	Phoenix, Adtek, Inc.	602-931-9289
CA	Laguna Niguel, H & T Comps., Inc.	714-831-8705
CA	San Jose, Class One Corp.	408-297-8666
CO	Englewoood, Elctrn. Comp. Sys.	303-781-5901
CT	Milford, Todino Engrg. Sls.	203-874-6643
FL	Ft.Lauderdale, Freeman Assocs.	305-522-5606
IL	Chicago, Esco Assocs.	312-293-5310
KS	DeSoto, Midtec Assocs.	913-441-6565
LA	Hammond, Design Mktg.	504-296-3076
MD	Columbia, Delta III Assocs.	301-730-4700
MA	Needham Heights, Todino Engrg. Sls.	617-444-7925
MI	Birmingham, Favco	313-644-0173
MN	Minneapolis, D. A. Case Assocs.	612-869-3700
MO	Florissant, Midtec Assocs.	314-837-5200
NY	Hackensack, Meg Elctrns.	201-489-7700
NY	Syracuse, Advanced Comp. Corp.	315-699-2671
NC	Raleigh, McGee Assocs.	919-781-9579
OH	Akron, Augnat Assocs.	216-273-1211
OR	Beaverton, Eclipse Mktg.	503-642-1661
TX	Hurst, Design Mktg.	817-268-2004
UT	Salt Lake City, Charles Fields & Assocs.	801-531-6177
VA	Richmond, Delta III Assocs.	804-771-9204
WA	Redmond, Eclipse Mktg.	206-885-6991

Local Distributors

AL	Huntsville, Contact Elctrns.	205-881-9321
AZ	Tempe, Pacer Elctrns.	602-829-0330
AZ	Tucson, Inland Elctrn. Supp.	602-294-2628
AZ	Tuscon, Southwest Sls.	602-628-1613
CA	Canuga Park, Tim-Co	818-992-5040
CA	Corona, Konex Corp.	800-821-8021
CA	Cypress, On-Line Elctrns.	714-826-8200
CA	Huntington Beach, California Connector & Cable	714-895-3990
CA	Mountain View, Bell Inds.	415-960-1440
CA	S. San Francisco, Peters deLaet	415-873-9595
CA	San Diego, D. Squared Sls.	619-560-6266
CA	San Jose, Cablecon	408-298-3011
CA	Santa Ana, C. R. Elctrns.	714-556-2040
CA	Van Nuys, Mil-Conn Dvcs., Inc.	818-782-2644
CO	Englewood, Colorado Computer Cable	303-789-1869
CT	Bridgeport, Accurate Elctrns.	203-366-0214
CT	Bridgeport, Millennium Elctrns.	203-372-2037
FL	Ft. Lauderdale, Simcona	305-485-4455
GA	Norcross, Whitehead Elctrns.	404-923-6667
IL	Lisle, Components, Inc.	312-852-7707
LA	Lafayette, Ralphs Indl. Elctrn. Supp.	318-234-4507
MD	Baltimore, Pyttronic Inds.	301-792-0780
MA	Hopkinton, Interface Elctrns.	617-435-6858
MA	Lowell, Colonial Wire & Cable	617-459-6400
MA	Wilmington, Aved Elctrns.	617-657-8310
MI	Farmington Hills, Advent Elctrns.	313-477-1650
MN	Shore View, Northern Automatic	612-481-0022
NH	Manchester, Components North	603-624-4661
NY	Buffalo, Summit Distrs.	800-462-1880
NY	Farmingdale, Pride Elctrns.	516-293-4020
NY	Hauppauge, Broadline Elctrns.	516-231-4100
OH	Cleveland, Roberts Elctrns.	216-238-1711
OH	Columbus, Whitehead Elctrns.	614-224-1186
OH	Dayton, Televox, Inc.	513-294-4499
OR	Beaverton, Murphy Elctrns.	503-642-2001
PA	Montgomeryville, Pyttronic Inds.	215-242-6700
TN	Knoxville, Mac-1 Elctrns.	615-966-4143
TX	Dallas, Computer Comps.	214-239-0271
TX	Houston, Ralphs Indl. Elctrn. Supp.	713-748-4902
UT	Salt Lake City, Pen-Tec Entprs.	801-972-4817
WA	Redmond, Murphy Elctrns.	206-881-1234

HANDY & HARMAN, 850 Third Ave., New York, NY 10022, Tel: 212-752-3400; Empl.: 800; *Sls. Mgr.:* C. P. Zitzmann

HANDY & HARMAN ELCTRN. MATLS. CORP., 72 Elm St. N., Atteboro, MA 02760, Tel: 617-695-1401, Telex: 6711549; Empl.: 600

HANKSCRAFT MOTORS, Div. of Gerber Prods. Co., P.O. Box 120, Reedsburg, WI 53959, Tel: 608-524-4341; Empl.: 550

HANSCOM, H. F., CO., INC., 225 Chapman St., Providence, RI 02905, Tel: 401-941-1455, Telex: 952107; Empl.: 50; *Sls. Mgr.:* William E. Taplin

HAPCO, Box 1205, Boulder, CO 80302, Tel: 303-447-0441; Empl.: 8; *Sls. Mgr.:* Allen Lopez

HARBISON INDL. PRODS., Sub. of Polymer Corp., 7205 Hibbs La., Levittown, PA 19057, Tel: 215-943-9000; Empl.: 65

HARDIGG INDS., INC., North Main St., South Deerfield, MA 01373, Tel: 413-665-2163, Telex: 955431; FSC No.: 11214; *Dist. Mgr.:* Warren H. Bickford

HARDMAN INC., 600 Cortlandt St., Belleville, NJ 07109, Tel: 201-751-3000, TWX: 710-995-4940; Empl.: 105; *Sls. Mgr.:* Carl T. Sanford

HAROWE SERVO CONTROLS, Bowmar Inst. Corp., Westtown Rd. at West Chester Pike, W. Chester, PA 19380, Tel: 215-692-2700, Telex: 83-5486, TWX: 510-663-0335; FSC No.: 06989; Empl.: 329; *Sls. Mgr.;* Dennis B. Daisy/Chuck Burgess

HARREL, INC., 16 Fitch St., E. Norwalk, CT 06855, Tel: 203-866-2573; *Sls. Mgr.:* W. Becker **D•1122**

Local Sales Offices & Reps

CA	Sherman Oaks, Windsor Dynamics	213-990-4173
CA	Walnut Creek, Viking Instr.	415-946-1226
NY	Cazenovia, P. M. Decew, Inc.	315-655-8602
NC	Pineville, Beck Sls.	704-542-9329
OH	Medina, Odessa Instr. Co.	216-725-0575
PA	Elkins Park, Edwin F. Gregg	215-635-0450
TN	Knoxville, Robert Olsen Co.	615-688-4038

HARRIS CALORIFIC, Emerson Electric Co., 400 Clark St., Elyria, OH 44036, Tel: 216-961-5700; *Sls. Mgr.:* Phil Preuninger

HARRIS CIRCUITS MFG., 2706 Colley Ave., Norfolk, VA 23517, Tel: 804-467-1116; Empl.: 15

HARRIS CORP., Computer Systems Div., 2101 W. Cypress Creek Rd., Ft. Lauderdale, FL 33309, Tel: 305-974-1700, TWX: 510-956-3096; FSC No.: 29436; Empl.: 1000; *Sls. Mgr.:* Frank P. Carollo

HARRIS CORP., Dracon Div., 809 Calle Plano, Camarillo, CA 93010, Tel: 805-987-9511, Telex: 182327; Empl.: 400; *Sls. Mgr.:* Tom Erdmann; *Dist. Mgr.:* Keith Boutillier

Local Sales Offices & Reps

CA	Anaheim, Marlene Chase	714-921-1156
CA	Cypress, Keith Boutillier	714-892-1439
CA	Fremont, Dave Buechner	415-490-2816
CO	Denver, Richard Jones	303-337-7779
FL	Eustis, Jeff Hearsey	904-589-4412
IL	Rantoul, Howard Darnell	217-897-6666
MO	Lake Ozark, Gary Foster	314-365-5055
NJ	Oak Ridge, J. B. Behan	201-697-5222

HARRIS CORP., PRD Elctrns. Div., 6801 Jericho Tpke., Syosset, NY 11791, Tel: 516-364-0400, TWX: 510-222-4494; FSC No.: 77327; Empl.: 1,850; *Sls. Mgr.:* R. A. Lebowitz

HARRIS MICROWAVE SEMICONDUCTOR, 1530 McCarthy Blvd., Milpitas, CA 95035, Tel: 408-262-2222, TWX: 910-338-2247

HARRIS SEMICONDUCTOR, Box 883, Melbourne, FL 32901, Tel: 305-724-7400, TWX: 510-959-6259; FSC No.: 34371; Empl.: 2300; *Sls. Mgr.:* Dan McCranie; *Dist. Mgr.:* Charles H. Beaty

HARSHAW FILTROL PARTNERSHIP, 1945 E. 97th St., Cleveland, OH 44106, Tel: 216-721-8300; *Sls. Mgr.:* Robert Anfang

HARTLEY PRODS., 620 Island Rd., Ramsey, NJ 07446, Tel: 201-327-4443; *Sls. Mgr.:* R. Schmetterer

HARTMAN SYSTEMS, Figgie Intl., 360 Wolf Hill Rd., Huntington Sta., NY 11746, Tel: 516-427-7500, TWX: 510-226-6982; FSC No.: 92220; Empl.: 310; *Sls. Mgr.:* Robert Griffith

HARTWELL CORP., 900 S. Richfield Rd., Placentia, CA 92670, Tel: 714-993-4200, Telex: 683-485, TWX: 910-596-1294; FSC No.: 83014; Empl.: 425

HARWIL, 1548 17th St., Santa Monica, CA 90404, Tel: 213-829-2310; Empl.: 8

HASCO COMPONENTS, INC., 247-40 Jericho Tpke., Bellrose Village, NY 11001, Tel: 516-328-9292, TWX: 710-582-5750; Empl.: 6; *Sls. Mgr.:* Tab Hauser **B•1390-1396, 1589-1591**

HAVERLY SYSTEMS, INC., 78 Broadway, Denville, NJ 07834, Tel: 201-627-1424, Telex: 710-987-8402; Empl.: 33; *Sls. Mgr.:* Wm. Parkins

HAYDON SWITCH & INSTR., 1500 Meriden Rd., P.O. Box 3329, Waterbury, CT 06705, Tel: 203-756-7441, Telex: 643852 - HSIINTLWBY; FSC No.: 02005; Empl.: 350; *Sls. Mgr.:* Scott Moulton

HAZELTINE CORP., 500 Commack Rd., Commack, NY 11725, Tel: 516-462-5100, Telex: 64-0525, TWX: 510-226-0239; Empl.: 2,500

H-A-Z LABORATORIES, Brass Castle Rd., P.O. Box 67-M, Washington, NJ 07882, Tel: 201-689-0110; *Sls. Mgr.:* Henry Zajac

HBS EQUIPMENT DIV., 3000 Supply Ave., Los Angeles, CA 90040, Tel: 213-726-3033, TWX: 910-580-3179; Empl.: 40; *Sls. Mgr.:* K. Lowery

HDR POWER SYS., INC., 600 Oakland Park Ave., Columbus, OH 43214, Tel: 614-262-6832, Telex: 246524; Empl.: 41; *Sls. Mgr.:* Harlan W. Bates

HDS INC., 12310 Pinecrest Rd., Reston, VA 22091, Tel: 703-620-6200, Telex: 64585; Empl.: 65

HEADWAY RESCH., INC., 3713 Forest La., Garland, TX 75042, Tel: 214-272-5431, Telex: 73-0257; Empl.: 50; *Sls. Mgr.:* Mina Kelly

Local Sales Offices & Reps

CA	Santa Clara, California Tech. Serv.	408-496-1156, 408-496-1157
CA	Tarzana, California Tech. Serv.	818-343-3131
PA	Haverford, Blason Ent., Inc.	609-767-6733

HEATH CO., Benton Harbor, MI 49022, Tel: 616-982-3886, Telex: 72-9421

HEAT SYSTEMS-ULTRASONICS, INC., 1938 New Hwy., Farmingdale, NY 11735, Tel: 516-694-9555, Telex: 14-3101; *Sls. Mgr.:* Irwin Leibson

HECON CORP., 31 Park Rd., Tinton Falls, NJ 07724, Tel: 201-542-9200, Telex: 13-2457; Empl.: 200; *Sls. Mgr.:* P. Shine; *Dist. Mgr.:* R. Drum

HEI CORPORATION, 290 S. Main Place, Carol Stream, IL 60188, Tel: 312-665-5500; Empl.: 8

HEI, INC., 1495 Steiger Lake La., Victoria, MN 55386, Tel: 612-443-2500, TWX: 910-578-3961; Empl.: 175; *Sls. Mgr.:* R. D. Young **B•1211**

Local Sales Offices & Reps

AL	Huntsville, REP, Inc.	205-881-9270
AZ	Phoneix, Toward Engrg.	602-955-3193
CA	Brea, MASCO	714-529-0866
CA	Mountain View, Leddy Assocs.	415-969-6313
CA	Vista, MASCO	619-758-5562
CO	Denver, Ausco Sls.	303-750-3846
FL	Coral Springs, CBC Elctrns.	305-755-1111
FL	Longwood, CBC Elctrns.	305-831-5380
GA	Tucker, REP, Inc.	404-938-4358
IL	Schaumburg, Micro-Tex	312-885-1131
KS	De Soto, Midtec Assocs.	913-441-6565
MI	Grand Rapids, Miltimore Sls.	616-942-9721
MI	Novi, Miltimore Sls.	313-349-0260
NH	Salem, Sls. Engrg.	603-893-5521
NJ	Pitman, Colrud Corp.	609-589-5866
NY	Kingston, D. L. Eiss Assocs.	914-338-7588
NY	Massapequa, Coughlin Assoc.	516-799-7743
NY	Rochester, D. L. Eiss Assocs.	716-328-3000
NC	Raleigh, REP, Inc.	919-851-3007
OH	Rocky River, Norm Case Assocs.	216-333-0400
TN	Jefferson City, REP, Inc.	615-475-9012
TX	Austin, Quad State Mktg.	512-282-2046
TX	Dallas, Quad State Mktg.	214-680-0411
VA	Reston, Colrud Corp. South	703-620-6612
WA	Bellevue, Comtec	206-453-1188
WI	Waukesha, Micro-Tex	414-542-5352
Can	Oakville, Ont., Haltronics, Ltd.	416-844-2121

HEINEMANN ELEC. CO., Brunswick Pike, Alt. Rte. #1, P.O.Box 6800, Lawrenceville, NJ 08648-0800, Tel: 609-882-4800, Telex: 843431; FSC No.: 74193; Empl.: 625; *Sls. Mgr.:* N. J. Alzamora .... **B•1236-1237**

Local Sales Offices & Reps

AL	Birmingham, Austin Brown Assocs. Inc.	205-822-6198
AL	Mobile, Austin Brown Assocs., Inc.	205-344-0728
AZ	Phoenix, O'Donnell Assocs. SW	602-944-9542
CA	Chatsworth, Porter Co.	818-700-0808
CA	San Diego, Porter Co.	619-275-0641
CA	San Jose, O'Donnell Assocs. No.	408-263-6500
FL	Deerfield Beach, Conley & Assoc.	305-421-7180
FL	Oviedo, Conley & Assocs.	305-365-3283
FL	Tampa, Conley & Assocs.	813-885-7658
GA	Atlanta, Austin Brown Assocs. Inc.	404-457-6381
IL	Chicago, D. Dolin Sls.	312-498-6770
IN	Ft. Wayne, O.H. Bromberg & Assocs.	219-456-6010
KY	Louisville, O.H. Bromberg & Assocs.	502-245-8916
MD	Pikesville, Imagitron Sls. Co.	301-521-2020
MA	Framingham, Sullivan Tech. Sls.	617-620-0195
MI	Southfield, L. H. Dickelman Co.	313-353-8210
MN	Minneapolis, Furber Sls. Co., Inc.	612-881-3620
MO	Creve Coeur, Hill & Co.	314-432-1136
NJ	Ridgewood, Ballou, Inc.	201-444-6990
NY	Rochester, Canavan-Scanlon	716-424-1830
NY	Syracuse, Canavan-Scanlon	315-437-1271
NC	Charlotte, J. Rudisill Assocs.	704-377-6901
OH	Cincinnati, O.H. Bromberg & Assocs.	513-771-9333
OH	Cleveland, Brown Elect. Prod.	216-331-2072
OH	Dayton, KW Elctrn. Sls.	513-890-2150
OH	Dayton, O. H. Bromberg & Assocs.	513-434-8788
PA	Allison Park, KW Electrn. Sls.	412-487-4300
PA	Washington Crossing, DVS Co.	215-493-4642
TN	Brentwood, Austin Brown Assocs. Inc.	615-373-2068
TX	Dallas, Glidden Electro Equip.	214-341-0610
TX	Houston, Glidden Electro Equip.	713-681-1415
WA	Mercer Island, Andersen Assocs.	206-232-0484
WI	Elm Grove, Key Entpr.	414-784-3390

Local Distributors

AL	Montgomery, Southern Controls	205-277-5030
CA	Burlingame, Campbell & George	415-697-2965
CA	Chatsworth, POCO Sls.	818-700-8727
CA	San Jose, Cazco Sls.	408-263-6503
CO	Denver, CSID Inc.	303-292-9594
CT	Hartford, L. E. Whelan Co.	203-246-5694
CT	New Haven, Green Shaw Co.	203-397-0710
FL	Oviedo, Dixie Sls.	305-365-5211
IL	Chicago, Nedco Elctrns.	312-286-5565
IL	Chicago, Newark Elctrns.	312-638-4411
IL	Northbrook, Classic Comps. Supp.	312-272-9650
IN	Indianapolis, Graham Elctrns.	317-634-8202
KS	Edwardville, C. Tennant & Sons	913-441-1801
MA	Boston, Apparatus Svc.	617-787-1300
MA	Newton, Green Shaw Co.	617-969-8900
MI	Southfield, Michigan Lectrols Corp.	313-353-1350
MN	Minneapolis, Northland Elec. Supp.	612-341-6100
NH	Hudson, C & H Elctrns.	603-882-1133
NY	Syracuse, Baldwin Hall	315-463-9251
NY	Whitestone, Power Electro Supp. Co.	212-767-1447
NC	Charlotte, Joyce Sls. Co.	704-377-1555
OH	Cincinnati, Cartessa Corp.	513-385-7700
OH	Dayton, Duellman Elec.	513-461-5010
OH	Dayton, Stotts Friedman Co.	513-298-5555
OH	Solon, REH Electrns.	216-248-1636
OH	Valley View, Newark Elctrns.	216-447-8860
OR	Portland, Taylor Elec.	503-233-5321
PA	Washington Crossing, Riverside Comps.	215-493-5228
PA	West Chester, West Chester Elec. & Electrn.	215-696-7500
TN	Chattanooga, Techni-Tronics	615-875-5449
TX	Dallas, Geeco Sls. Co.	214-341-2626
VA	Charlottesville, Va. Radio Supp. Co. Inc.	804-296-4184
VA	Richmond, General Elec. Supp.	804-358-4941

HEINEMANN ELECTRIC CO., P.O. Box 6800, Lawrenceville, NJ 08648-0800, Tel: 609-882-4800

HEITZ, KARL, INC., P.O. Box 427, Woodside, NY 11377, Tel: 718-565-0004; Empl.: 15

HELICAL PRODS. CO., INC., Box 1069, Santa Maria, CA 93456, Tel: 805-928-3851, TWX: 910-351-5856; FSC No.: 13201; Empl.: 55

HELIONETICS, INC., DECC Div., 17312 Eastman St., Irvine, CA 92714, Tel: 714-546-4731, 800-421-7915, TWX: 910-595-2829; *Sls. Mgr.:* R. S. Tullock

HELLESENS BATTERY ENGRG., INC., A/S Hellesens, 1636 Hyde Park Ave., Hyde Park, MA 02136, Tel: 617-361-7555, Telex: 294116 BOSTELEX; FSC No.: 617-361-1835; *Sls. Mgr.:* James Epstein

HELM INSTR. CO., INC., 1387 Dussel Drive, Maumee, OH 43537, Tel: 419-893-4356, Telex: 28-6078

HENES PRODS., 4301 E. Madison St., Phoenix, AZ 85034, Tel: 602-275-4126; Empl.: 25

HENSCHEL, General Signal Corp., 9 Hoyt Drive, P.O. Box 30, Newburyport, MA 01950, Tel: 617-462-2400, Telex: (RCA) 294074; FSC No.: 28199;Multiple; Empl.: 190

HERAEUS-VOLKERT INC., 222-34 96th Ave., Queens Village, NY 11429, Tel: 212-464-8400, Telex: 142338; Empl.: 250

HERBERT PRODS. INC., 180 Linden Ave., Westbury, NY 11590-0384, Tel: 516-334-6500, TWX: 510-222-5963; Empl.: 98; *Sls. Mgr.:* L. C. Peshkin

HERMETIC SEAL, 4232 Temple City Blvd., Rosemead, CA 91770, Tel: 818-283-0411, TWX: 910-587-3352; FSC No.: 04820; Empl.: 220

HERMETIC SWITCH, Box 1325, Hwy. 92, Chickasha, OK 73018, Tel: 405-224-4046, Telex: 796125 Hermetic CKSA; Empl.: 150; *Sls. Mgr.:* E. R. Andrus .... **B•1592**

Local Sales Offices & Reps

CA	Arcadia, V. Gott & Assocs.	818-445-9728
CA	San Diego, V. Gott & Assocs.	612-272-8452
GA	Atlanta, Electro Technlg. Prods.	404-458-4427
MD	Timonium, Heller Sls.	301-252-4780
MA	Canton, New England Elctrn. Sls.	617-828-4835
MN	Minneapolis, Peterson Sls. & Assocs.	612-944-0030
NY	Oceanside, Current Inds.	516-678-3895
NY	Rochester, Electronic Mktg. Assocs.	716-427-8115
OR	Beaverton, LD Elctrns.	503-649-8556
PA	Furlong, Avenir	215-348-8290
TX	Austin, R. F. Kimball Co.	800-442-4506
TX	Houston, R. F. Kimball Co.	713-840-0590
TX	Richardson, R. F. Kimball Co.	214-231-3447
WA	Snohomish, LD Elctrns.	206-568-0511
WA	Spokane, LD Elctrns. .... (Boise, ID #)	208-343-2741

HERTNER DIV., 12690 Elmwood Ave., Cleveland, OH 44111, Tel: 216-252-4242, Telex: 98-5552; Empl.: 125; *Sls. Mgr.:* S. Steven

HERTZ FILTER, 3 Aerial Way, Syosset, NY 11791, Tel: 516-822-4770; Empl.: 22

HEURIKON CORPORATION, 3201 Latham Dr., Madison, WI 53713, Tel: 800-356-9602, 608-271-8700, Telex: 469532; Empl.: 80; *Sls. Mgr.:* Ed DeWitt .... **D•1091**

Local Sales Offices & Reps

AL	Huntsville, Magaro & Assocs.	205-882-0827
AZ	Tempe, Mar Tech Assocs.	602-968-4944
CA	Concord, Qualtech	415-680-1800
CA	N. Hollywood, Qualtech	818-765-1419
CA	Orange, Qualtech	714-639-9820
CA	Palo Alto, Qualtech	415-494-9060
CA	San Diego, Mesa Engrg. & Sls.	619-278-8021
CA	Sunnyvale, Qualtech	408-732-4800
CO	Aurora, Par Assocs.	303-363-6636
CO	Denver, PAR Assocs.	303-371-4140
GA	Atlanta, Magaro & Assocs.	404-451-8862
IN	Indianapolis, CMP, Inc.	317-844-4175
KS	Kansas City, Panatek	913-362-3349
KS	Prairie Village, Panatek	913-362-3349
MD	Rockville, Spectro Assocs.	301-294-9770
MA	Brockton, Daner-Hayes, Inc.	617-538-0598
MA	Canton, Daner-Hayes, Inc.	617-828-1997
MA	Concord, Daner-Hayes, Inc.	617-828-1997
MA	Waltham, Daner-Hayes	617-894-7290
MA	Wayland, Daner-Hayes, Inc.	617-655-0888
MA	Weston, Daner-Hayes, Inc.	617-891-5548
MI	Detroit, CMP, Inc.	313-477-7700
MN	Minneapolis, Micro Resources Corp.	612-830-1454
NJ	Glen Gardner, Daner-Hayes, Inc.	201-537-4534
NJ	Scotch Plains, Daner-Hayes, Inc.	201-889-4515
NM	Albuquerque, Mar Tech Assocs.	505-821-2775
NY	Brewster, Daner-Hayes, Inc.	914-279-2168
NY	Rochester, Daner-Hayes, Inc.	716-288-0921
NC	Greensboro, Magaro & Assocs.	919-294-4783
OH	Cincinnati, Applied Data Mgmt.	513-579-8108
OH	Cleveland, CMP, Inc.	216-779-5100
OH	Dayton, CMP, Inc.	513-836-0951
OK	Stillwater, Acudata, Inc.	405-743-1886
PA	Doylestown, Daner-Hayes, Inc.	215-345-6056
PA	Pittsburgh, CMP, Inc.	412-372-4415
TX	Dallas, Acudate, Inc.	214-424-3567
TX	Houston, Acudata, Inc.	713-580-2451
TX	Plano, Acudata	214-424-3567
TX	Austin, Acudata, Inc.	512-478-1018
UT	Centerville, PAR Assocs.	801-292-8145
UT	Salt Lake City, Par Assocs.	801-537-1900
VT	White River Junction, Daner-Hayes, Inc.	802-295-5260
WI	Madison, Heurikon Corp.	608-271-8700
Intl	Japan, Tokyo, NPS, Inc.	Telex-781/27832
Intl	UK, Thame, Oxon, Thame Sys. Lt.	011-44-84-421-5471
Intl	W. Germany, Munchen, Tekelec Airtronic	011-49-89-59-4621
Can	Nepean, Ont., Multilek, Inc.	800-267-1070
Can	Ottawa, Multilek, Inc.	613-226-2365

HEWLETT-PACKARD CO., P.O. Box 301, 815 Southwest 14th St., Loveland, CO 80537, Tel: 303-667-5000

HEWLETT-PACKARD CO., 1820 Embarcadero Rd., Palo Alto, CA 94303, Tel: Call Local Sls. Off.; Empl.: 68,000 .... **D•1653-1656**

Local Sales Offices & Reps

AL	Birmingham	205-881-6802
AL	Huntsville	205-830-2000
AZ	Phoenix	602-273-8000
AZ	Tucson	602-573-7400
CA	Brisbane	415-330-2500
CA	Fresno	209-252-9652
CA	Fullerton	714-999-6700
CA	Goleta	805-967-3405
CA	Lawndale	213-970-7500
CA	Los Angeles	213-643-7500
CA	Palo Alto	415-857-8000
CA	Sacramento	916-929-7222
CA	San Diego	714-279-3200
CA	San Ramon	415-838-5900
CA	Santa Ana	714-641-0977
CA	Santa Clara	408-988-7000
CA	Westlake Village	213-706-6800
CO	Englewood	303-649-5000
CT	Bridgeport	203-371-6454
CT	Wallingford	203-265-7801
FL	Ft. Lauderdale	305-973-2600
FL	Jacksonville	904-398-0663
FL	Orlando	305-859-2900
FL	Pensacola	904-476-8422
FL	Tampa	813-884-3282
GA	Atlanta	404-955-1500
HI	Honolulu	808-526-1555
IL	Bloomington	309-662-9411
IL	Chicago	312-930-0010
IL	Naperville	312-357-8800
IL	Rolling Meadows	312-255-9800
IN	Carmel	317-844-4100
IA	Cedar Rapids	319-390-4250
IA	West Des Moines	515-224-1435
KY	Louisville	502-426-0100
LA	Kenner	504-467-4100
MD	Baltimore	301-644-5800
MD	Rockville	301-948-6370
MA	Andover	617-682-1500
MA	Lexington	617-861-8960
MI	Grand Rapids	616-957-1970
MI	Novi	313-349-9200
MI	Troy	313-643-6474
MN	St. Paul	612-644-1100
MO	Bridgeton	314-344-5100
MO	Kansas City	816-941-0411
NE	Omaha	402-334-1813
NJ	Paramus	201-265-5000
NJ	Piscataway	201-981-1199
NM	Albuquerque	505-292-1330
NY	Albany	518-458-1550
NY	Clarence	716-759-8621
NY	Fairport	716-223-9950
NY	Liverpool	315-451-1820
NY	Manhattan	212-971-0800
NY	Syracuse	315-455-2486
NY	White Plains	914-684-6100
NY	Woodbury	516-921-0300
NC	Cary	919-467-6600
NC	Charlotte	704-527-8780
NC	Greensboro	919-852-1800
OH	Cincinnati	513-891-9870
OH	Cleveland	216-243-7300
OH	Miamiburg	513-859-8202
OH	Westerville	614-436-1041
OK	Oklahoma City	405-446-9499
OK	Tulsa	918-665-3300
OR	Wilsonville	503-682-8000
PA	Harrisburg	717-657-5900
PA	Pittsburgh	412-782-0400
PA	Valley Forge	215-666-9000
SC	Columbia	803-732-0400
SC	Greenville	803-297-4120
TN	Knoxville	615-966-4747
TN	Memphis	901-346-8370

TN	Nashville	615-255-1271
TX	Austin	512-835-6771
TX	El Paso	915-833-4400
TX	Fort Worth	817-232-9500
TX	Houston	713-776-6400
TX	Irvine	214-556-1950
TX	Richardson	214-231-6101
TX	San Antonio	512-494-9336
UT	Salt Lake City	801-974-1700
VA	Richmond	804-747-7750
WA	Bellevue	206-643-4000
WA	Spokane	509-922-7000
WV	Charleston	304-925-0492
WI	Brookfield	414-784-8800

HEXACON ELEC., 161 W. Clay Ave., Roselle Park, NJ 07204, Tel: 201-245-6200, Telex: 13-8812; Empl.: 150; *Sls. Mgr.:* Robert L. Miller .... **C•1739**

Local Sales Offices & Reps

AL	Huntsville, BJR Mfrs. Reps.	205-881-3569
AZ	Tucson, Ross IV Assocs.	602-299-1425
CA	Newport Beach, Ross IV Assocs.	714-650-5542
CA	Sunnyvale, J. F. Pell Co.	408-730-5869
CO	Littleton, Production Equip. Sls.	303-795-5022
CT	E. Woodstock, H & M Assocs.	203-928-9442
FL	Merritt Island, J. A. Kennedy Co.	305-452-9821
IL	Elk Grove Village, Bradley Reps.	312-228-8450
IN	Indianapolis, Bradley Reps, Ind.	317-631-3106
MD	Phoenix, B&W Mktg.	301-592-8907
MN	Edina, Pec/Levi	612-944-8540
NJ	Jersey City, Dunn & Bryan	201-963-4478
NY	New Hartford, V. Clair	315-735-8122
OH	Solon, KDF Co.	216-248-8010
OR	Gladstone, Northcoast Mfrs. Agy. II	503-657-9427
PA	West Chester, B&W Mktg.	215-692-7155
TX	Dallas, P. J. Scanlon	214-231-4661
WA	Seattle, Northcoast Mfrs. Agy.	206-284-5024
EXP	NY, New York, W. D. Blood & Co.	212-344-0210

HEYCO MOLDED PRODUCTS, Box 160, Kenilworth, NJ 07033, Tel: 201-245-0033, 800-526-4182, Telex: 844771; FSC No.: 28520; Empl.: 135 .... **C•1227**

Local Distributors

Intl	Australia, Kilkenny, Werner Elctrn. Inds.	268-2766
Intl	Austria, Braunau/Inn, Albert Berner	07722-2211
Intl	Belgium, Bruxelles, N.V. Beluma S.A.	02-427-42-15
Intl	Denmark, Herlev, Harttung Fasteners A/S	02-84-11-00
Intl	England, Wimborne, Heyco Mfg.	0202-89-68-28
Intl	Finland, Tampere, United Shoe Mach.	28-180
Intl	France, Paris, M.F.O.M.	205-67-39
Intl	Germany, Giessen, Heyman Mfg.	0641-76250
Intl	Hong Kong, North Point, S & T Entprs.	5-784-0921
Intl	Israel, Tel Aviv, Helet Trading Ltd.	216-157
Intl	Italy, Milan, Elektrozubehor	02-74-90-541
Intl	Japan, Tokyo, Hakuto Co. Ltd.	03-341-2611
Intl	Korea, Seoul, Phoenix Corp.	261-5768
Intl	Mexico, Mexico City, Retenes y Refacciones Ind.	5-754-0503
Intl	Netherlands, Diemen, Onkenhout & Onkenhout B.V.	020-90-40-40
Intl	Norway, Oslo, United Shoe Mach.	02-21-86-50
Intl	S. America, Columbia - Cordoba, Ira Export	40-4648
Intl	Singapore, 1334, S & T Entprs.	745-9235
Intl	South Africa, Durban, Three-D Agencies	23-42-61
Intl	South Africa, Johannesburg, Three-D Agencies	825-5065
Intl	South Africa, Port Elizabeth, Three-D Agencies	52-1644
Intl	Sweden, Orebro, United Shoe Mach.	019-12-42-30
Intl	Switzerland, Hunzenschwil, Agro AG	064-472-61
Intl	Taiwan, Taipei, Shigma Inc.	771-3403
Can	Toronto, Ont., Cords Canada	416-787-1114

HGA ELCTRNS., 519 S. Fifth Ave., Mt. Vernon, NY 10550, Tel: 914-664-5393; Empl.: 2

HH CONTROLS CO., INC., 16 Frost St., Arlington, MA 02174, Tel: 617-646-2626; Empl.: 13

HHK IND., Telan Int., Rte. 611, P. O. Box 690, Plumsteadville, PA 18949, Tel: 215-766-0990; *Sls. Mgr.:* Fred Yodis; *Dist. Mgr.:* Fred Yodis

HICKOK ELEC. INSTR., 10514 DuPont Ave., Cleveland, OH 44108, Tel: 216-541-8060, TWX: 810-421-8286; Empl.: 450; *Sls. Mgr.:* Norm Holliday; *Dist. Mgr.:* Jeff Snider

HICO HORIZONS INTL. CO., See Maxon Precision Motors

HI G, CO., INC., 580 Spring St., Windsor Locks, CT 06096, Tel: 203-623-2481

HI-G COMPANY, A Subsidiary of Nytronics Inc., 101 Locust St., Hartford, CT 06114, Tel: 203-522-8600, Telex: 643394, TWX: 710-425-1379; FSC No.: 02289; Empl.: 550; *Sls. Mgr.:* J. Parsons .... **B•1398-1407**

Local Sales Offices & Reps

AL	Huntsville, L & D Inc.	205-837-1469
AZ	Phoenix, Westrep	602-997-8899
CA	Anaheim, Westrep	213-404-3881
CA	San Diego, Westrep	619-566-6580
CA	Santa Clara, Westrep	408-988-8833
CO	Englewood, Omega	303-762-1921
FL	Melbourne, Beacon	305-724-8010
IL	Highland Park, Bransky Sls.	312-433-2375
IN	Fort Wayne, Given Corp.	219-432-5585
IA	Cedar Rapids, Lorenz Sls.	319-377-4666
KS	Overland Park, Advanced Tech. Sls.	913-642-6675
MD	Pikesville, Imagitron Sls. Co.	301-521-2020
MA	Woburn, Astrorep New England	617-938-6692
MI	Ann Arbor, Elliott Sls. Co.	313-662-4087
MN	St. Paul, Repco	612-642-2828
MO	St. Louis, Advanced Tech. Sls.	314-878-2921
NE	Lincoln, Lorenz Sls.	402-475-4660
NJ	Perth Amboy, Astrorep	201-826-8050
NY	Babylon, Astrorep	516-422-2500
NY	Fayetteville, Tri-Tech Elctrns.	315-446-2881
NY	Ronkonkoma, Hallmark Elctrns.	516-737-0600
NC	Greensboro, L & D Inc.	919-292-3201
OH	Miamisburg, Elctrns. Comps., Inc.	513-866-3340
OK	Tulsa, Bonser-Philhower Sls.	918-744-9964
OR	Wilsonville, RTS	503-638-5670
TX	Richardson, Bonser - Philhower Sls.	214-234-8438
WA	Vashon, RTS	206-285-1363
WI	Cedarburg, Bransky Sls.	414-377-6837

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AL	Huntsville, Hallmark Elctrns.	205-837-8700
AZ	Phoenix, Hallmark Elctrns.	602-243-6601
AR	Little Rock, Electro Entprs.	501-664-9207
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CA	San Diego, Hallmark Elctrns.	619-268-1201
CA	San Jose, Cypress Elctrns.	408-945-8400
CA	Santa Ana, Norstan Elctrns.	714-250-4903
CA	Sunnyvale, Bell Inds.	408-734-8570
CA	Torrance, Cypress Elctrns.	714-761-3366
CA	Tustin, Hallmark Elctrns.	714-669-4700
CO	Englewood, Hallmark Elctrns.	303-790-1662
CT	Branford, A.C.I.	203-481-9335
CT	Wallingford, Hallmark Elctrns.	203-269-0100
FL	Clearwater, Hallmark Elctrns.	305-530-4543
FL	Ft. Lauderdale, Hallmark Elctrns.	305-971-9280
FL	Orlando, Hallmark Elctrns.	305-855-4020
GA	Norcross, Hallmark Elctrns.	404-447-8000
IL	Bensenville, Hallmark Elctrns.	312-860-3800
IL	Northbrook, Classic Comps.	312-272-9650
IN	Indianapolis, Classic Comps.	317-872-4777
KS	Lenexa, Hallmark Elctrns.	913-888-4747
KS	Wichita, Lee Prods.	316-264-2172
MD	Columbia, Hallmark Elctrns.	301-988-9800
MA	Waltham, QPL Elctrn. Distrs.	617-229-2424
MA	Woburn, A.C.I. Elctrns.	617-935-7230
MA	Woburn, Hallmark Elctrns.	617-935-9771
MN	Bloomington, Hallmark Elctrns.	612-834-3223
MN	St. Paul, Ragon Elctrns.	612-642-2828
MO	Maryland Heights, Hallmark Elctrns.	314-291-5350
NJ	Cherry Hill, Hallmark Elctrns.	609-424-7300
NJ	Fair Lawn, Relay Specialties	201-797-3313
NJ	Fairfield, Hallmark Elctrns.	201-575-4415
NM	Albuquerque, Bell Inds.	505-292-2700
NY	Farmingdale, Midway	516-293-6800
NY	Hauppauge, Jaco Elctrns.	516-273-5500
NY	Hauppauge, Sherburn Elctrns.	516-231-4300
NY	Lynbrook, Peerless Radio Corp.	516-593-2121
NY	Ron Kon Koma, Hallmark Elctrns.	516-737-0600
NC	Raleigh, Hallmark Elctrns.	919-832-4465
OH	Solon, Hallmark Elctrns.	216-349-4632
OH	Wosterville, Hallmark Elctrns.	614-891-4555
OK	Oklahoma City, Electro Entprs.	405-478-1752
OK	Tulsa, Hallmark Elctrns.	918-665-3200
TX	Austin, Hallmark Elctrns.	512-837-2814
TX	Dallas, Hallmark Elctrns.	214-341-1147
TX	Houston, Hallmark Elctrns.	713-781-6100
UT	Salt Lake City, Bell Inds.	801-972-6969
WI	New Berlin, Classic Comps.	414-786-5300
WI	Oak Creek, Hallmark Elctrns.	414-761-3000
Can	Toronto, Designtronics	416-936-0196

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HIGHTEMP RESINS, INC., 225 Greenwich Ave., Stamford, CT 06902, Tel: 203-357-7401; Empl.: 5

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HIPOTRONICS, P.O. Drawer A, Brewster, NY 10509, Tel: 914-279-8091, Telex: 425476 (Ams. Back:Hipo UI), TWX: 710-574-2420 (Ams. Back:Hipo Brws NY); Empl.: 200; *Sls. Mgr.:* Steve Peschel ...... **A•2154-2156; D•1238-1240, 1658-1659, 1934-1935**

Local Sales Offices & Reps

AL	Birmingham, E. J. Ruth Assocs.	205-979-0880
AZ	Phoenix, Qualtech	602-998-1848
CA	Pasadena, RDX Corp.	213-681-3451
CA	San Diego, RDX Corp.	619-292-7744
CA	Sunnyvale, RDX Corp.	408-734-4500
CO	Denver, E. C. Rudy Co.	303-433-1066
CT	Meriden, Abbott Allison Co.	203-481-0405
FL	Ft. Lauderdale, Powercom Engrg. Corp.	305-463-6059
HI	Honolulu, B. F. Wittenberg	808-833-1602
IL	Hawthorne Woods, Ryan & Assocs.	312-438-2905
IN	Ossian, Science Sls.	219-622-7383
KS	St. Louis, Fitzgerald Sls. Co.	314-862-1660
MN	Edina, Ainslie Co.	612-920-2996
NJ	East Orange, Friedman Assocs.	201-964-6200
NM	Albuquerque, Hewitt & Assocs.	505-229-7746
NY	Cazenovia, Peter De Cew Agy.	315-655-8602
PA	Downingtown, Kenn Ebert-Hipotronics	215-269-5898
TX	Richardson, Hipotronics-Dusty Arnold	214-644-7607
WA	Bellevue, Topp Engrg. Sls. Corp.	206-747-5400
Can	Scarborough, Ont., A.B. Chance of Can.	416-759-1144

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AL	Huntsville, MacKay, Smith & Assocs.	205-539-8000
AZ	Scottsdale, Arcom Sls., Inc.	602-947-5745
FL	Ft. Lauderdale, MacKay, Smith & Assocs.	305-467-3888
FL	Madeira Beach, MacKay, Smith & Assocs.	813-393-7144
FL	Orlando, MacKay, Smith & Assocs.	305-277-1513
FL	St. Petersburg, MacKay, Smith & Assocs.	813-393-7144
GA	Atlanta, MacKay, Smith & Assocs.	404-449-7444
KS	Shawnee Mission, Florence & Meyer	913-722-5210
MO	St. Louis, Florence & Meyer	913-722-5210
NC	Cary, MacKay, Smith & Assocs.	919-467-5400
NC	Charlotte, MacKay, Smith & Assocs.	704-372-1188
NC	Raleigh, MacKay, Smith & Assocs.	919-851-5000
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TX	Irving, AID Elctrns.	214-259-4761

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AL	Huntsville, Beacon Sls. Co.	205-881-5031
AZ	Tucson, WJM Sls. Co.	602-888-4847
CA	San Diego, De Pierre & Assocs.	619-578-2555
CA	San Jose, Q.C.I.	408-942-1070
CA	Tustin, S.C.S.C.S.C.	714-731-9206
CT	Southington, The Orion Grp.	203-621-8371
FL	Boca Raton, Beacon Sls. Co.	305-392-3500
GA	Atlanta, Beacon Sls. Co.	404-256-9640
IL	Rolling Meadows, Eagle Tech. Sls.	312-991-0700
MA	Wakefield, The Orion Grp.	617-245-5220
MI	Novi, Action Comp. Sls.	313-349-3940
MN	St. Paul, State of The Art Comps.	612-646-8178
NY	Great Neck, F & F Metro, Inc.	516-482-4080
NY	Syracuse, Leonard D. Allen, Inc.	315-437-8387
NC	Raleigh, Beacon Sls. Co.	919-787-0330
OH	Medina, J. C. Hofstetter Co.	216-241-4880
TX	Richardson, O.M. Sls., Inc.	214-690-6746

HI-TECH, INC., 3600 16th St., Zion, IL 60099, Tel: 312-746-2447; Empl.: 35 .... **C•1642**

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AL	Birmingham, Wade Prods.	205-822-5546
AR	Fort Smith, Electro-Related Prods.	501-452-4030
CA	San Francisco, Serra Assocs.	415-964-4300
CA	Woodland Hills, Glenn M. Stevenson Co.	213-348-5506
CO	Denver, Palmer Assocs.	303-233-9423
CT	South Windsor, Maher Assocs.	203-644-2481
FL	Orlando, Alcott Prods. Co.	305-295-5457
KS	Derby, Jay-Len Assocs.	316-788-1594
MA	Lynn, Maher Assocs.	617-581-3244
MI	Sheridan, MacDougall and Assocs.	517-291-3334
MN	Minneapolis, Elec. Comp. Sls.	612-933-2594
NJ	River Edge, Maher Assocs.	201-261-2225
NY	Rochester, Talty Assocs.	716-323-1210
NC	Fairview, Maher Assocs.	704-628-2191
OH	Seven Hills, Nenaoal Entprs.	216-524-4293
OR	Beaverton, Gauss Inds.	503-629-9692
TN	Chattanooga, Wade Prods. Co.	615-266-2262

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AL	Huntsville, Mac Kay, Smith & Assocs.	205-539-8000
CA	Los Angeles, RF Assocs.	213-478-1586
CA	Palo Alto, RF Assocs.	415-494-3331
CO	Denver, Calvert Controls	303-428-4852
CT	Ridgefield, Manning & Assocs., Inc.	203-438-5027
FL	Ft. Lauderdale, MacKay, Smith & Assocs.	305-467-3888
FL	Orlando, MacKay, Smith & Assocs.	305-423-4353
FL	St. Petersburg, MacKay, Smith & Assocs.	813-393-7144
GA	Atlanta, MacKay, Smith & Assocs.	404-449-7444
ID	Boise, Calvert Controls	208-343-3964
NY	Moravia, Electrotech Sys.	315-497-1598
NC	Charlotte, MacKay, Smith & Assocs.	704-372-1188
NC	Raleigh, MacKay, Smith & Assocs.	919-851-5000
OH	Dayton, Mohawk Intronics	513-434-8873
OR	Eugene, Calvert Controls	503-683-2018
OR	Portland, Calvert Controls	503-222-6473
PA	Fort Washington, Hostvedt-Pavoni, Inc.	215-643-5757
PA	Pittsburgh, Greye Glass Assocs.	412-366-6664
UT	Salt Lake City, Calvert Controls	801-531-8129
VA	Charlottesville, Marktron	804-973-5874
WA	Seattle, Calvert Controls	206-447-9375
WA	Spokane, Calvert Controls	509-244-3601
WA	Tri-Cities, Calvert Controls	509-545-4506

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FL	Orlando, Elctrn. Tech.	305-291-1047
PA	Plymouth Meeting, Data Envrts.	215-825-5950

HIVEC/ASTRODYNE, INC., 35 Executive Dr., Hudson, NH 03051, Tel: 603-880-8600; FSC No.: 28023; Empl.: 45; *Sls. Mgr.:* Warren Heinzelmann; *Dist. Mgr.:* Warren Heinzelmann

HM ELCTRNS., 6151 Fairmount Ave., San Diego, CA 92120, Tel: 619-280-6050, Telex: 697-122; Empl.: 55; *Sls. Mgr.:* John Kenyon

HMW ENTERPRISES, INC., 604 Salem Road, Etters, PA 17319, Tel: 717-938-4691, TWX: 510-650-3536; FSC No.: 06A150; Empl.: 40; *Sls. Mgr.:* Gerhard Schmutz

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CA	Los Angeles, Corcoran Assocs.	213-823-4589
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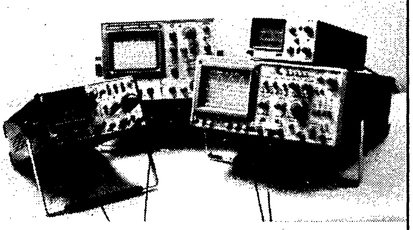

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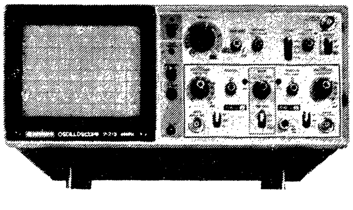

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AR	Little Rock, Erickson Sls., Inc.	501-255-7379
CA	Costa Mesa, Berman Gravely	714-549-2122
CA	San Diego, Hadden Assocs., Inc.	619-565-9444
CA	San Jose, Class 1 Elctrns.	408-297-8666
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FL	Clearwater, Lawrence Assocs., Inc.	813-584-8110
GA	Lawrenceville, B.T.F., Inc.	404-963-9495
IL	Cary, ECRO, Inc.	312-639-1162
IN	Indianapolis, Electronic Mktg. Conslts.	317-253-1668
LA	Chalmette, Erickson Sls., Inc.	504-271-1976
MA	Hopedale, H.E.S. Comps.	617-473-4324
MI	Novi, Lektronics	313-349-3304
PA	Philadelphia, Check Assocs.	215-487-3007
NJ	Manville, Dynorep, Inc.	201-685-0135
NM	Alburquerque, Fred Board & Assocs.	505-293-1399
NY	Morrisville, Promark Elctrns.	315-662-3310
NC	Raleigh, B.T.F., Inc.	919-782-3493
OH	Dayton, Del Steffen & Assocs., Inc.	513-293-3145
OK	Broken Arrow, Erickson Sls., Inc.	405-682-2947
OR	Beaverton, Eclipse Mktg. Grp.	503-642-1661
TX	Austin, Erickson Sls., Inc.	512-244-3068
TX	Dallas, Erickson Sls., Inc.	214-739-5833
TX	Houston, Erickson Sls., Inc.	713-266-1604
UT	Salt Lake City, Electrodyne	801-486-3801
VA	Herndon, Stinson Assocs.	703-620-0088
WA	Redmond, Eclipse Mktg. Grp.	206-885-6991
PR	Caguas, K.D. Tronics	809-746-0275
Can	Rexdale, Ont., Frank Eakin Sls., Ltd.	416-245-3600

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AZ	Mesa, Bergquist Co.	602-986-4271
AZ	Phoenix, Arizona Comps. Co.	602-269-5655
AZ	Tempe, Bell Inds.	602-966-7800
CA	Belmont, Lodan, Inc.	415-592-4600
CA	Cerritos, El-Com Sls.	619-739-5656
CA	Riverside, Electronic Supp.	714-787-9220
CA	Sacramento, Integrated Elctrns.	916-424-5297
CA	San Diego, El-Com Sls.	619-578-0900
CA	San Diego, Electronic Supp.	619-693-8222
CA	San Francisco, Peters-De-Laet	415-873-9595
CA	San Jose, Cypress Elctrns.	408-945-8400
CA	Santa Clara, El-Com Sls.	408-496-0800
CA	Santa Clara, Peters-De-Laet	415-980-9243
CO	Denver, CSID Elctrns.	303-292-9594
CO	Englewood, Industrial Elctrns.	303-694-9444
CT	Yalesville, Schaal Assocs.	203-269-3779
FL	Ft. Lauderdale, K.S.M. Elctrns.	305-971-5900
FL	Longwood, Intertec Comps., Inc.	305-834-7777
FL	Winter Park, Deanco	305-671-5100
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GA	Cumming, Pan American	404-577-2113, 800-554-9796
GA	Marietta, Deanco	404-429-0126
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IL	Arlington Heights, Lodan Elctrns.	312-398-5311
IL	Lisle, Components, Inc.	312-852-7707
IN	Indianapolis, RM Indiana, Inc.	317-291-7110
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MA	Burlington, Schaal Assocs.	617-272-7940
MA	Natick, Tec-Con Elctrns., Inc.	617-655-9333
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TX	Addison, Connec/Tek, Inc.	214-733-4411
TX	Corpus Christi, Douglas Elctrns.	512-883-5103
TX	Fort Worth, Texas Connector Corp.	817-246-0109
UT	Salt Lake City, Diplomat	800-453-5503
VA	Virginia Beach, Deanco	804-460-3558
WA	Bellevue, Bell Inds.	206-747-1515
WA	Redmond, Murphy Elctrns.	206-881-1234
WI	Hartland, G.W. Elctrns.	414-367-6003
WI	New Berlin, RM Elctrns.	414-784-4420
EXP	CA, Irvine, Product Supp. Co.	714-250-0622
Can	London, Ont., C.M. Peterson Co., Ltd.	519-434-3204
Can	Scarborough, Ont., Carsten-Elctrns., Ltd.	416-495-7705,416-495-9999
Can	Vancouver, L.A. Varah, Ltd.	604-873-3211

HOLT INC., 9351 Jeronimo Rd., Irvine, CA 92718, Tel: 714-859-8800, Telex: 753307; Empl.: 77; *Sls. Mgr.:* Ed Fernandez

HOLUB INDUSTRIES, 1701 W. Bethany Rd., Sycamore, IL 60178, Tel: 815-895-6501, Telex: 25-7359; Empl.: 90; *Sls. Mgr.:* R. J. Morrison

HONEYWELL INC., Aerospace & Defense Grp., Honeywell Plaza, Minneapolis, MN 55408, Tel: 612-870-5186, TWX: 910-576-2692; Empl.: 15,000

HONEYWELL INC., Commercial Div., MN 27-7246, Honeywell Plaza, Minneapolis, MN 55408, Tel: 612-870-5357; Empl.: 3000; *Sls. Mgr.:* Doyle G. Adams

HONEYWELL INFO. SYS., 200 Smith St., MS 440, Waltham, MA 02154, Tel: 617-895-6000

HONEYWELL MICRO SWITCH DIV., See Micro Switch, a Honeywell Division

HONEYWELL OPTOELECTRONICS, 830 E. Arapaho Dr., Richardson, TX 75080, Tel: 214-234-4271, Telex: 73-0890; Empl.: 300; *Sls. Mgr.:* Joe Tucker; *Dist. Mgr.:* Joe Tucker

HONEYWELL, Process Control Div., 1100 Virginia Dr., Ft. Washington, PA 19034, Tel: 800-321-5111, Ext. 596; Empl.: 2500

HONEYWELL, Test Instrs. Div., P.O. Box 5227, Denver, CO 80217, Tel: 303-773-4700, Telex: 45793 DVR; Empl.: 850; *Sls. Mgr.:* Frank Doherty

THE HOOSIER MAGNETICS GROUP, Hoosier of Ohio, Inc., 700 North Wheeling Street, Toledo, OH 43607, Tel: 419-698-8087; Empl.: 90

HOOSIER MAGNETICS, INC., 520 E. Van Trees St., P.O. Box 753, Washington, IN 47501, Tel: 812-254-1901; Empl.: 90

HOOSIER OF NEW YORK, INC., Lower Denny Street, P.O. Box 372, Ogdensburg, NY 13669, Tel: 315-393-2293; Empl.: 90

HOPKINS ENGRG., 12900 Foothill Blvd., San Fernando, CA 91342, Tel: 213-361-8691, TWX: 910-496-1531; FSC No.: 02777; Empl.: 100; *Sls. Mgr.:* Gary M. Smith; *Dist. Mgr.:* Clyde M. Salisbury

HOPT, KARL, CO., 118 First Ave., Atlantic Highlands, NJ 07716, Tel: 201-291-0633, Telex: 132496; Empl.: 400; *Sls. Mgr.:* G.C. Ellis

HOTPACK CORP., Heinicke Instrs., 10940 Dutton Rd., Philadelphia, PA 19154, Tel: 215-824-1700, 800-523-3608, TWX: 710-670-1694; FSC No.: 66; Empl.: 100; *Sls. Mgr.:* Tim Fitzgerald

Hotpack is a manufacturer and is sold direct. To contact the salesman in your area call 800-523-3608 or 215-824-1700.

HOTTINGER BALDWIN MEASUREMENTS, 139 Newbury St., Framingham, MA 01701, Tel: 617-875-8282, Telex: 94-8499; Empl.: 179; *Sls. Mgr.:* Robert Haggerson

HOUSE OF METAL ENCLOSURES, 500 W. 9th St., Box 225, Hermann, MO 65041, Tel: 314-486-3111; Empl.: 100; *Sls. Mgr.:* Richard L. Kastel

HOUSTON INSTRUMENT, 8500 Cameron Rd., Austin, TX 78753, Tel: 512-835-0900, TWX: 910-874-2022; Empl.: 450; *Dist. Mgr.:* Rod Schaffner

HOWARD INDUSTRIES, MSL Ind., Inc., Box 287, Milford, IL 60953, Tel: 815-889-4105, TWX: 910-642-2950; FSC No.: 815-889-4105; Empl.: 500; *Sls. Mgr.:* Ralph Young; *Dist. Mgr.:* Alan Mancuso

HOWELL INSTRS., 3479 W. Vickery Blvd., Ft. Worth, TX 76107, Tel: 817-336-7411, Telex: 75-8233; FSC No.: 98869; Empl.: 180; *Sls. Mgr.:* Bruce Pike

HTL ELECTRO KINETICS, 402 E. Gutierrez St., Santa Barbara, CA 93101, Tel: 805-963-2055, TWX: 910-334-1177; Empl.: 180; *Sls. Mgr.:* Robert E. Lynch

HUDSON TOOL & DIE CO., INC., 18 Malvern St., Newark, NJ 07105, Tel: 201-589-1800, TWX: 710-995-4445; FSC No.: 02875; Empl.: 300; *Sls. Mgr.:* William Miller

HUGHES AIRCRAFT CO., 6155 El Camino Real, Carlsbad, CA 92008, Tel: 619-931-3000, TWX: 910-322-1393; Empl.: 1000

HUGHES AIRCRAFT CO, Aerospace Grps./Support Sys., P.O. Box 90515, Los Angeles, CA 90009, Tel: 213-670-1515, Telex: 67222, TWX: 213-871-5210; *Sls. Mgr.:* W. L. Pemberton

HUGHES AIRCRAFT CO., Connecting Devices Div., 17150 Von Karman Ave., Irvine, CA 92714, Tel: 714-660-5701, TWX: 910-595-2523; FSC No.: 53669; *Sls. Mgr.:* Bill Strobel

HUGHES AIRCRAFT CO., Electron Dynamics Div., 3100 W. Lomita Blvd., P.O. Box 2999, Torrance, CA 90509-2999, Tel: 213-517-6000, Telex: 67-7064, TWX: 910-347-7321; Empl.: 2,200; *Sls. Mgr.:* Robert L. Woods

HUGHES AIRCRAFT CO., Indl. Prods. Div. FACT Sys., 6155 El Camino Real, Carlsbad, CA 92008, Tel: 619-931-3000, TWX: 910-332-1393

HUGHES AIRCRAFT CO., Microelctrn. Sys. Div., 2601 Campus Dr., Irvine, CA 92715, Tel: 714-752-3800, TWX: 910-595-2435; *Sls. Mgr.:* J. L. Waters

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HUGHES SOLID STATE PRODUCTS, 500 Superior Ave., Dept. E8, Newport Bch., CA 92658-8903, Tel: 714-759-2411, TWX: 910-596-1374 .... **A•1370-1373**

Local Sales Offices & Reps

AL	Huntsville, L & D Inc.	205-837-1469
AZ	Phoenix, Toward Engrg. Assocs.	602-955-3193
CA	Mountain View, Weseloh/Swanson	415-961-0565
CA	San Diego, Wes-K Assocs.	619-295-3501
CA	Van Nuys, Wes-K Assocs.	213-989-3070
CT	Ansonia, R. H. Sturdy Co.	203-734-2186
CT	Rocky Hill, R. H. Sturdy Co.	203-563-8455
FL	Clearwater, Delmac Sls.	813-447-5192
FL	Orlando, Delmac Sls.	305-898-4688
FL	Tamarac, Delmac Sls.	305-726-1330
GA	Atlanta, L & D Inc.	404-455-3483
IL	Elk Grove Village, Carlson Elctrn. Sls.	312-956-8240
IN	Indianapolis, J & W Sales	317-842-3740
IA	Cedar Rapids, Carlson Elctrn. Sls.	319-377-6341
KS	Shawnee Mission, Technical Sls. Assocs.	913-888-3330
MD	Glen Burnie, Faion Lott & Co.	301-744-4611
MA	Salisbury, R. H. Sturdy Co.	617-465-1505
MA	Wellesley Hills, R. H. Sturdy Co.	617-235-2330
MI	Livonia, Luebbe Sls.	313-477-3131
MN	Minneapolis, Deming (Bill) & Assocs.	612-888-5000
MO	Ferguson, Technical Sls. Assocs.	314-725-5361
NY	Endwell, Tri-Tech Elctrns.	607-754-1094
NY	Fairport, Tri-Tech Elctrns.	716-223-5720
NY	Fayetteville, Tri-Tech Elctrns.	315-446-2881
NY	Great Neck, Cooper-Simon & Co.	516-487-1142
NY	Poughkeepsie, Tri-Tech Elctrns.	914-473-3880
NC	Greensboro, L & D Inc.	919-292-3201
NC	Raleigh, L & D Inc.	919-876-5301
OH	Cincinnati, Luebbe Sls.	513-891-5770
OH	Cleveland, Luebbe Sls.	216-333-0425
OH	Columbus, Luebbe Sls.	614-431-0474
OH	Dayton, Luebbe Sls.	513-294-0426
PA	Bala Cynwyd, Electro-Comp Sls.	215-667-9360
PA	Pittsburgh, Luebbe Sls.	412-931-0414
TX	Dallas, Southern States Mktg.	214-248-8600
TX	Houston, Southern States Mktg.	713-988-0991
WI	Milwaukee, Carlson Elctrn. Sls.	414-476-2790

HUGHEY & PHILLIPS, INC., 3050 N. California St., Burbank, CA 91504, Tel: 818-849-1104, TWX: 910-498-2252; FSC No.: 94295; Empl.: 38; *Sls. Mgr.:* C.L. Phillis; *Dist. Mgr.:* C.L. Phillis

HUGIN INDS. INC., 745 Distel Dr., Los Altos, CA 94022, Tel: 415-961-2950, Telex: 348 399; Empl.: 4; *Sls. Mgr.:* Peter Hugin

Local Sales Offices & Reps

IL	Chicago, Patton Sls.	312-325-2170
NJ	Tenafly, D&D Engrg.	201-568-5032
NY	Rochester, Irondequoit Inds.	716-544-6257
NC	Fayetteville, Zim-Tek	919-488-4101
OH	Dover, AJ Assocs.	216-343-2224

HULL CORP., Davisville Rd., Hatboro, PA 19040, Tel: 215-672-7800, TWX: 510-665-6822; Empl.: 200; *Sls. Mgr.:* Eldon Avery

HUMISEAL DIV., Columbia Chase Corp., 26-60 Bklyn.-Queens Expwy., Woodside, NY 11377, Tel: 718-932-0800, TWX: 710-582-2141; FSC No.: 99109;46058; Empl.: 150

HUMPHREY, INC., 9212 Balboa Ave., San Diego, CA 92123, Tel: 619-565-6631, TWX: 910-335-2001; Empl.: 220

HUNTER STANLEY ELEC., 1813 Church St., Nashville, TN 37203, Tel: 615-321-0500; FSC No.: 21675; Empl.: 10; *Sls. Mgr.:* W. D. Stanley

HUNTER TOOLS, 6721 Baymeadow Dr., Glen Burnie, MD 21061, Tel: 301-760-2200; Empl.: 450

HUNTINGTON ELECTRIC INC., P.O. Box 366, Dept. EEM 80-81, Huntington, IN 46750, Tel: 219-356-0778; *Sls. Mgr.:* Robert Smith .... **A•1871**

Local Sales Offices & Reps

CA	Chino, Tracy Elctrns. Sls.	714-591-4736
FL	Lighthouse Point, Mr. Jack Krutek & Assocs., Inc.	305-941-6544
IL	Arlington Heights, Rozner Sls.	312-577-0067
IN	Huntington, HEI	219-356-0756
MA	Burlington, Tri-Com Assocs., Inc.	617-272-8163
MN	St. Louis Park, Parq Sls.	612-920-3643
MO	St. Louis, Rep-Tronics	314-576-9816
NJ	Medford, Champion Elctrns. Sls. Co.	609-983-0932
OK	Tulsa, Genzel Sls. & Assocs., Inc.	918-622-7744
PA	Greensberg, Pro-Mark	412-832-3800
TX	Fort Worth, Component Concepts, Inc.	817-292-5803

Local Distributors

AZ	Phoenix, Camco Elctrn. Comps.	602-269-6201
CA	Burbank, Welco Elctrns.	213-840-9020
CA	Costa Mesa, Orange County Comps., Inc.	714-979-3597
CA	Los Angeles, Cal State Elctrns.	213-933-8187
CA	Tustin, Cal-Tronic Sls., Inc.	714-730-0350
CA	Van Nuys, EW Elctrns.	818-782-9020
FL	Fort Lauderdale, NRC Elctrns., Inc.	305-772-4500
IN	Huntington, HEI	219-356-0756
MI	St. Clair Shores, Spemco	313-771-2700
NY	Valley Stream, L & S Elctrns., Inc.	516-561-2474
OK	Oklahoma City, She Elctrns., Inc.	405-843-5941

HUNTRON INSTRS., INC., 15123 Highway 99, Lynnwood, WA 98036, Tel: 206-743-3171, 800-426-9265, Telex: 152951 Hunt Inst, TWX: Lywd; FSC No.: 57705; *Sls. Mgr.:* Jim Crosson; *Dist. Mgr.:* Jim Crosson

HURRICANE ELECTRNS. LAB, P.O. Box 1280, Hurricane, UT 84737, Tel: 801-635-2003; FSC No.: 64109; Empl.: 11; *Sls. Mgr.:* C. R. Reeve

HURST MFG. CORP., Emerson Elec. Co., Box 326, Princeton, IN 47670, Tel: 812-385-2564; Empl.: 200; *Sls. Mgr.:* Jac Diano

HUTSON INDS., 1000 Hutson Cir., Frisco, TX 75034, Tel: 214-377-3557, TWX: 910-860-5051; *Sls. Mgr.:* Bill Giles

Hybricon Corporation

HYBRICON CORP., 410 Great Rd., Littleton, MA 01460, Tel: 617-486-0311, TWX: 710-347-0654; Empl.: 74; *Sls. Mgr.:* Richard W. Palmer .... **C•1710**

Local Sales Offices & Reps

AZ	Phoenix, Cristee-Meade Co.	602-867-6000
CA	Inglewood, Basic Sys. Corp.	213-673-4300
CA	San Diego, Basic Sys. Corp.	619-268-8000
CA	Santa Clara, Basic Sys. Corp.	408-727-1800
CO	Lakewood, Cristee-Meade Co.	303-232-0287
MN	Minneapolis, Mark Co.	612-933-3026
NH	Salem, OEM Mktg. & Sls.	603-893-0009
NY	New Hartford, PDQ Assocs.	315-768-8167
OH	Cincinnati, Applied Data Mgmt.	513-579-8108
OR	Beaverton, Elctrns. Tech. Sls. Assoc.	503-641-5180
PA	Huntingdon Valley, Lynbar Grp. Inc.	215-947-3554
TX	Houston, System Tech. Assocs.	713-440-8340
VA	Alexandria, Scott Corp.	703-765-7901
WA	Kirkland, Elctrns. Tech. Sls. Assoc.	206-827-8086

HYBRID ELCTRNS., 142 Adams St., Newton, MA 02158, Tel: 617-527-2711; Empl.: 28; *Sls. Mgr.:* D. Kates

HYBRID SVCS. INC., 38 Main St., North Reading, MA 01864, Tel: 617-664-5500; Empl.: 45; *Sls. Mgr.:* Richard A. Vogel

HYBRID SYSTEMS CORP., 22 Linnell Circle, Billerica, MA 01821, Tel: 617-667-8700, TWX: 710-347-1575; Empl.: 250; *Sls. Mgr.:* H. Diamond

HYBRILONICS, INC., P.O. Box 217, Lasalle Sta., Niagara Falls, NY 14304, Tel: 716-731-9080, TWX: 910-333-0624; Empl.: 20

Local Sales Offices & Reps

AZ	Tempe, Wm. Brierton & Assocs.	602-839-9107
CA	Torrance, Basic Trade, Inc.	213-214-4677
CT	Avon, Martech	203-673-5132
GA	Norcross, Mountain Electro Prods.	404-448-5594
IL	Woodridge, Trend-Tronics	312-985-0626
KS	Overland Park, Lorenz Sls. Co.	913-649-5556
MA	Peabody, OEM Sls. of New England	617-535-2521
MN	Wayzata, White Sls. Co.	612-920-3558
NY	Buffalo, Antil-Thrasher Assocs.	716-652-0423
NY	Manhasset, Martech	516-627-1151
NY	Syracuse, Antil-Thrasher Assocs.	315-468-2370
NC	Raleigh, Mountain Electro Prods.	919-846-1514
OH	Cincinnati, Bill Teplitz Assocs.	513-481-1648
OH	Cleveland, Bill Teplitz Assocs.	216-439-3265
PA	Langhorne, Spiral Sls.	215-968-9250
TX	Arlington, Electronic Prods. Rep.	817-467-0377
VA	Front Royal, Eltron Sls.	703-635-7201
WI	Waukesha, Trend-Tronics	414-542-4919
Can	Markham, Ont., Avotronics, Ltd.	416-475-2024

HY-CAL ENGRG., 9650 Telstar Ave., El Monte, CA 91731, Tel: 213-444-4000, Telex: 67-5548; FSC No.: 12199; Empl.: 120

HyComp, Inc.

HYCOMP INC., 75 Union Ave., Box 377, Sudbury, MA 01776, Tel: 617-443-4631, TWX: 710-347-0385; FSC No.: 34707; Empl.: 60; *Sls. Mgr.:* James Chacharone .... **A•1670, 1872-1873**

Local Sales Offices & Reps

AL	Huntsville, Magaro & Assocs.	205-882-0827
AZ	Mesa, SEDCO Sls.	602-835-6281
CA	Mountain View, Leddy Assocs.	415-969-6313
CA	Santa Ana, Calif. Elctrn. Mktg.	714-835-2701
CT	Collinsville, Dynamic Sls. of New Eng.	203-693-6567
FL	Clearwater, Cherith Sls.	813-797-3004
GA	Atlanta, Magaro & Assocs.	404-451-8862
IL	Palatine, T-Squared Assocs.	312-991-2144
IN	Ft. Wayne, Scott Elctrns.	219-484-7865
IN	Indianapolis, Scott Elctrns.	317-897-9976
KS	Kansas City, BC Elctrns.	913-342-1211
KS	Wichita, BC Elctrns.	316-942-9840
KY	Louisville, Scott Elctrns.	502-964-0640
MD	Lutherville, Walker-Houck Assocs.	301-296-6021
MA	Burlington, Dynamic Sls. of New Eng.	617-272-5676
MN	Minnetonka, S.A.I. Mktg. Corp.	612-935-0777
MO	Bridgeton, BC Elctrns.	314-291-1101
NY	Lynbrook, HLJ Comp-Tech	516-599-2999
NY	Rochester, Murcan Sls. Corp.	716-586-4450
NY	Syracuse, Murcan Sls. Corp.	315-437-0734
NC	Greensboro, Magaro & Assocs.	919-294-4783
OH	Cincinnati, Scott Elctrns.	513-791-2513
OH	Cleveland, Scott Elctrns.	216-473-5050
OH	Kettering, Scott Elctrns.	513-294-0539
OH	Reynoldsburg, Scott Elctrns.	614-863-1281
PA	Norristown, Rivco January	215-631-1414
PA	Pittsburgh, Scott Elctrns.	412-963-6116
TX	Austin, Dyna Mktg.	512-454-3114
TX	Dallas, Dyna Mktg.	214-438-6528
TX	Houston, Dyna Mktg.	713-460-0314
VA	Moneta, Walker-Houck Assocs.	703-297-4496
WI	Racine, T-Squared Assocs.	414-633-9456

HYDRA-ELECTRIC CO., 3151 Kenwood St., Burbank, CA 91503, Tel: 213-843-6211

HYDROCAP CORP., 975 N.W. 95 St., Miami, FL 33150, Tel: 305-696-2504; Empl.: 5

HYDROSTATICS, INC., 2005 Industrial Dr., Bethlehem, PA 18017, Tel: 215-694-0121, 1-800-441-7301 Outside PA., TWX: 510-662-3306

HYLETRONICS, Newtown Rd., Littleton, MA 01460, Tel: 617-486-8911, TWX: 710-347-0656; FSC No.: 22534; Empl.: 82; *Sls. Mgr.:* Norman Hill

HYPERTRONICS CORP., 16 Brent Dr., Hudson, MA 01749, Tel: 617-568-0451, 800-225-9228, Telex: 95-1152; FSC No.: 50541; Empl.: 100; *Sls. Mgr.:* E. Dalrymple .... **C•1271**

Local Sales Offices & Reps

AL	Brownsboro, JHU Assoc.	205-536-7455
AZ	Scottsdale, Western Tech. Sls.	602-991-7306
CA	Mountain View, Leddy Assocs.	415-969-6313
CA	N. Hollywood, Jewett Co.	213-789-8103
CO	Commerce City, Williams Assocs.	303-289-5647
CT	Bethany, Reps. Corp.	203-393-0024
DC	Washington, Tyler Griffin Co.	EN1-4821
FL	Orlando, Design Mktg.	305-291-8208
GA	Atlanta, Design Mktg.	404-457-5621
IL	Downers Grove, Momak Sls.	312-936-6400
IN	Indianapolis, CC Elctrns.	317-255-1508
KS	Merriam, Midwest Tech. Sls.	913-236-8557
MD	Baltimore, Tyler Griffin Co.	EN9-4821
MA	Wellesley, Reps. Corp.	617-237-6476
MI	Lake Orion, CC Elctrns.	313-338-7400
MN	St. Paul, Murnco, Inc.	612-484-8200

NJ	Wayne, G.T. Assocs.	201-694-6040
NM	Albuquerque, Williams Assocs.	505-255-0622
NY	Fayetteville, R. D. Sherman	315-637-9861
NC	Greensboro, JHU Assoc.	919-852-9097
OH	Centerville, Dolfuss-Root & Co.	513-433-6776
PA	Paoli, Tyler Griffin Co.	215-647-1550
TN	Talbot, JHU Assoc.	615-581-4141
TX	Freeport, Marathon Assoc.	409-233-7026
TX	Lewisville, Marathon Assoc.	214-436-8882
UT	Salt Lake City, Williams Assocs.	801-532-7701
WA	Bellevue, A.I.E. Inc.	206-455-4697

HYSOL, 15051 E. Don Julian, City of Industry, CA 91746, Tel: 818-968-6511, TWX: 910-584-1342; *Sls. Mgr.:* Hugh Dotson

HY-TEC INDUSTRIES, Div. of Topo Industries, Inc., P.O. Box 91, Shoreham, NY 11786, Tel: 516-744-5062; *Sls. Mgr.:* Tom Poole

hytek

HYTEK MICROSYSTEMS, 980 University Ave., Los Gatos, CA 95030, Tel: 408-395-2300, TWX: 910-597-5393; FSC No.: 57474; Empl.: 340; *Sls. Mgr.:* Greg Kizik; *Dist. Mgr.:* Richard Fryhoff .... **A•1522-1527, 1671**

Local Sales Offices & Reps

AL	Huntsville, Reynolds & Assocs.	305-259-7000
AZ	Tempe, Cantec Sls.	602-829-0191
CA	Del Mar, Chapman & Chapman	619-755-0412
CA	Irvine, Centaur Corp.	714-261-2123
CA	Los Gatos, Pro Assocs.	408-358-3861
CO	Englewood, Dynatech, Inc.	303-773-2830
CO	Englewood, Dynatech, Inc.	705-773-2830
FL	Melbourne, Reynolds & Assocs.	305-259-7000
FL	St. Petersburg, Reynolds & Assocs.	305-259-7000
MA	Tyngsboro, Comtech, Inc.	617-649-3030
MN	Minneapolis, Components Grp.	612-374-1250
MN	Minneapolis, Comps. Grp.	612-374-1250
MN	Roseville, Components Grp.	612-636-5060
NV	Carson City, Hytek Microsystems	702-883-0820
NM	Albuquerque, Power Entprs.	505-298-1918
NY	Rochester, L-Mar Assocs., Inc.	716-323-1000
NY	Wantagh, Tri-Tek	516-221-7600
NC	Raleigh, Reynolds & Assocs.	305-259-7000
TX	El Paso, Power Entprs.	915-533-9902
TX	Grapevine, Elctrns. Mktg. Assocs.	817-481-7502
TX	Grapevine, Electronics Mktg. Assocs.	817-488-6583
TX	Houston, Electronics Mktg. Assocs.	713-498-8120
Can	Burnaby, B.C., GNT	604-430-3302
Can	Toronto, Que., Cantec Reps.	613-725-3704

ICCI, 196 Broadway, Cambridge, MA 02139, Tel: 617-864-3270, Telex: 95-1106; *Sls. Mgr.:* Jeremiah Snow

ICI, 570 W. Lambert, Ste. C, Brea, CA 92621, Tel: 714-990-1707; Empl.: 10

I.C. INDS., Box 104, Altamonte Springs, FL 32701, Tel: 305-339-8298, Telex: 56-4303; *Sls. Mgr.:* William S. Hodges

INTERNATIONAL CONTROLS AND MEASUREMENTS CORP., P. O. Box 2578, Syracuse, NY 13220, Tel: 315-699-5262, TWX: 710-545-0235; FSC No.: 52516; Empl.: 45; *Sls. Mgr.:* Frederick W. Schulze; *Dist. Mgr.:* Robert Ford

ICON, 156 Sixth St., Cambridge, MA 02142, Tel: 617-868-5400, TWX: 710-321-1883; Empl.: 81; *Sls. Mgr.:* Irvin L. McKittrick

ICO-RALLY, 2575 E. Bayshore Rd., Palo Alto, CA 94303, Tel: 415-856-9900, Telex: 34-8335; FSC No.: 51705; Empl.: 45; *Dist. Mgr.:* Barbara Enad

ICS ELECTRONICS CORP., 2185 Old Oakland Rd., San Jose, CA 95131, Tel: 408-263-4844, TWX: 910-338-7810; *Sls. Mgr.:* Robert H. Prosin; *Dist. Mgr.:* Robert H. Prosin

ICS, INC., 520 Interstate Rd., Addison, IL 60101, Tel: 312-543-6200, TWX: 910-991-5945; Empl.: 50; *Sls. Mgr.:* Marion Servos; *Dist. Mgr.:* Susan Earnest

IDEAL INDUSTRIES, 4450 Becker Pl., Sycamore, IL 60178, Tel: 815-895-5181, TWX: 910-639-0613; Empl.: 700

IDEAL PRECISION METER, 214 Franklin St., Brooklyn, NY 11222, Tel: 212-383-6904, TWX: 710-584-2160; FSC No.: 11707;10304-41; Empl.: 150; *Sls. Mgr.:* T. Bell

IDE ASSOCIATES, INC., 35 Dunham Rd., Billerica, MA 01821, Tel: 617-663-6878; Empl.: 40; *Sls. Mgr.:* James Bender

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IDEC SYSTEMS & CONTROLS CORP., 1213 Elko Drive, Sunnyvale, CA 94089-2211, Tel: 408-747-0550, Telex: 34-0601, TWX: 910-339-9383; Empl.: 60; *Sls. Mgr.:* D.J. Synnott; *Dist. Mgr.:* James Young .... **B•1056, 1408-1412**

Local Sales Offices & Reps

AL	Decatur, El Tech, Inc.	205-353-7899
AZ	Phoenix, Neal-Miller Sls.	602-274-0898
AR	Jonesboro, Electro-Tech, Inc.	501-932-0366
CA	Fremont, Thebrege Sls. Reps.	415-651-8775
CA	Santa Fe Springs, J. H. Grace Co.	213-868-6771
CO	Lakewood, T.M.M.I.	303-232-1516
FL	Oldmar, Boggs & Assocs.	813-855-1812
FL	Sarasota, Boggs & Assocs.	813-351-3338
GA	Grayson, El Tech, Inc.	404-466-2997
IL	Hoffman Estates, Bu-Nell Engrg.	312-843-8600
IN	Indianapolis, Gurney Indl. Sls.	317-293-2333
KS	Overland Park, TMW	913-383-1818
MA	Norwood, Hyland Assocs.	617-762-0345
MI	Southfield, Component Assocs.	313-557-3232
MN	Minnetonka, S. J. Collins & Assocs.	612-933-7661
NJ	W. Long Branch, Eastern Indl. Sls.	201-544-0600
NM	Albuquerque, T.M.M.I.	505-298-6893
NY	Syracuse, WM Stamp Co.	315-463-4390
NC	Kernersville, Heritage Sls. Assocs.	919-996-4374
OH	Cincinnati, James Murray & Assocs.	513-574-8500
OH	Cleveland, Matthew Haley Co.	216-892-1820
OH	Toledo, Matthew Haley Co.	419-382-9588
OK	Tulsa, Associated Sls. Agy.	918-838-8930
OR	Portland, SPS Elctrns.	503-297-6919
PA	Ingomar, RW Moulton Assocs.	412-935-3333
PA	Philadelphia, Fite-El Tech	215-248-3171
SC	Taylors, Heritage Sls. Assocs.	803-292-1723
TN	Knoxville, Tubbs Agy.	615-577-0689
TX	Dallas, SW Mktg. Assocs.	214-341-8631
TX	Houston, SW Mktg. Assocs.	713-864-6281
UT	Salt Lake City, T.M.M.I.	801-487-7676
VA	Alexandria, T.D.I.	703-971-8982
VA	Richmond, Dunnington & Assocs.	804-282-8383
WA	Redmond, SPS Elctrns.	206-323-4140
WV	Bluefield, RW Moulton Assocs.	304-327-6421
WI	Appleton, Bu-Nell Engrg.	414-733-4242
WI	Waukesha, Bu-Nell Engrg.	414-784-0994

IDENTATRONICS, INC., 425 Lively Blvd., Elk Grove, IL 60007, Tel: 312-437-2654, 1-800-323-5403, Telex: 254708; *Sls. Mgr.:* Gregg Powell

VERTEX INDUSTRIES, INC., Indenticon Div., 23 Carol St., P. O. Box 1123, Clifton, NJ 07014, Tel: 201-472-2121, TWX: 710-989-7021 VER TOT CLIF; Empl.: 85; *Sls. Mgr.:* Ronald Byer

Local Sales Offices & Reps

AZ	Tempe, Burland Assocs.	602-894-5564
CA	Santa Ana, California Elec. Mktg.	714-835-2702
FL	Melbourne, Reynolds & Assocs.	305-259-7000
IL	Elk Grove Village, Quad Data	312-228-1722
KS	Shawnee Mission, Panatek Tech. Sls.	913-362-3349
MA	Wayland, Daner Hayes, Inc.	617-655-0888
MI	Farmington Hills, Carter, McCormic & Pierce	313-477-7700
MO	Rockville, Spectro Assocs.	301-294-9770
TX	Dallas, IBL Engrg. & Sls.	214-363-2921
WA	Seattle, SJI Corp.	206-763-8981

IEC CORPORATION, 3100 Longhorn Blvd., Austin, TX 78759, Tel: 512-836-0547, Telex: 757025; FSC No.: 16071; Empl.: 23; *Sls. Mgr.:* Florencio Canizales, Jr.

IEC ELCTRNS., 105 Norton St., Newark, NY 14513, Tel: 315-331-7742, TWX: 510-250-2515; Empl.: 650; *Sls. Mgr.:* Russ Stingel; *Dist. Mgr.:* Steve Hotchkiss

IEE, See Industrial Elctrn. Engrs., Inc.

IEI-ISKRA

IEI-ISKRA ELECTRONICS, INC., 222 Sherwood Ave., Farmingdale, NY 11735, Tel: 516-753-0400, Telex: 645127; *Sls. Mgr.:* Tom Juliano ..... **A•1080-1083, 1875, 2020, 2072-2073; B•1413**

Local Sales Offices & Reps

AZ	Tempe, Sunwest Mktg.	602-838-7586
CA	San Diego, C. K. Assocs.	619-279-0420
CA	San Jose, K-Lectron	408-942-9177
IL	Chicago, Berndt Assocs., Inc.	312-283-0713
IN	Indianapolis, Electronic Reps.	317-894-1414
KS	Shawnee Mission, K & M Sls.	913-262-1444
MD	Pikesville, Muncy Sls.	301-484-6376
NY	Macedon, M. M. Hare Co.	315-986-3742
NY	West Hempstead, Schmitt Indl. Mktg.	516-486-3510
PA	Philadelphia, Paragon Sls.	215-563-7060
SC	Easley, R A Sls.	803-859-1859
TX	El Paso, EPEC Elctrns., Inc.	915-593-8481
UT	South Jordan, MAC III	801-566-3781
WA	Bellevue, Communication Comp. Sls.	206-643-0500

Local Distributors

GA	Tucker, Shamrock Comps.	404-939-9198
NY	West Islip, Shamrock Comps.	516-669-2027
TX	El Paso, Shamrock Comps.	915-593-8554

IERC, 135 W. Magnolia Blvd., Burbank, CA 91502, Tel: 818-849-2481, 818-786-1182, TWX: 910-498-2206; *Sls. Mgr.:* Richard Schuckman .... **C•1643**

Local Sales Offices & Reps

AL	Huntsville, Murcota Corp.	205-539-8476
AZ	scottsdale, SMS & Assocs.	602-998-0831
CA	Burlingame, Jack Logan & Assocs.	415-348-8822
CA	Burlingame, Mollard Mktg., Inc.	415-961-0456
CA	Los Angeles, Ed Landa Co.	213-879-0770
CO	Denver, Elcom, Inc.	303-337-2300
FL	Boca Raton, Lawrence & Assocs.	305-368-7373
IL	Mt. Prospect, Magnuson & Assocs.	312-956-0700
IN	Indianapolis, Magnuson & Assocs.	317-247-5108
KS	Leawood, Thunderbird Tech. Sls. & Svcs., Inc.	913-642-7220
KS	Wichita, Thunderbird Tech. Sls. & Svcs., Inc.	316-684-3941
MA	Lexington, Hathaway Elctrns., Inc.	617-861-7010
MI	Ferndale, Shalco, Inc.	313-547-4771
MO	Maryland Heights, Thunderbird Tech. Sls. & Svcs., Inc.	314-567-6488
NJ	Wayne, G. T. Assocs., Inc.	201-694-6040
NY	Rochester, Ossman Comp. Sls. Corp.	716-424-4460
NY	Syracuse, Ossman Comp. Sls. Corp.	315-455-6611
NC	Winston-Salem, Murcota Corp.	919-722-9445
OH	Cleveland, Norm Case & Assocs.	216-333-0400
OR	Portland, Frank Jackson & Assocs.	503-292-2638
PA	Philadelphia, Kenneth B. Erdman Co.	215-224-1833
PA	Pittsburgh, Russell F. Clark Co., Inc.	412-242-9500
TX	Houston, Barry Sls., Inc.	713-784-5860
TX	Richardson (Dallas), Barry Sls., Inc.	214-234-0255
UT	Salt Lake City, Elcom, Inc.	801-532-7940
WA	Redmond, Frank Jackson Assocs.	206-881-7277
Can	Burlington, Ont., White Radio Ltd.	416-632-6894
Can	Montreal, Que., White Radio Ltd.	514-481-0158

Local Distributors

CA	Burlingame, Rose Elctrns.	415-348-2740
CA	Chatsworth, Mil-Comm Distrs.	213-998-3111
CA	San Diego, Deco Elctrns.	619-693-1595
CO	Denver, Integrated Elctrns.	303-292-6121
CO	Englewood, Industrial Elctrns., Inc.	303-694-9444
CT	Norwalk, Park Distrs., Inc.	203-853-2011
FL	Clearwater, Lynch Gentry Assocs.	813-433-2697
GA	Atlanta, Ack Radio Supp. Co.	404-351-6340
IL	Mt.Prospect, Magnuson & Assocs.	312-956-0700
MD	Towson, Jones-Maryland Elctrns.	301-823-5721
MA	Billerica, A. W. Mayer Co., Inc.	617-667-6900
MA	Waltham, Sterling Elctrns.	617-894-6200
NH	Hudson, C & H Elctrns., Inc.	603-882-1133
NY	Bohemia, Car-Lac Elctrn. Indl. Sls.	516-567-4200
NY	Rochester, Modutex Corp.	716-424-1620
NY	West Hempstead, March Elctrns.	516-486-6511
OH	Englewood, Argent Inds., Inc.	513-836-8633
PA	McKeesport, Barno Radio	412-751-5966
RI	Providence, William Dandreta & Co.	401-861-2800
TX	Fort Worth, C & W Supp.	817-831-0395
TX	Houston, Lenert Co.	713-225-1465
UT	Provo, Omega Elctrns.	801-375-4664
UT	Salt Lake City, Kimball Elctrns., Inc.	801-328-2075
WA	Redmond, Elwood Inds.	206-881-7277

IET LABS, INC.

IET LABS, INC., 534 Main St., Westbury, NY 11590, Tel: 516-334-5959; FSC No.: 62015; *Sls. Mgr.:* Sam Sheena .... **D•1242-1245**

DDC®

ILC DATA DEVICE CORPORATION

ILC DATA DEVICE CORP., 105 Wilbur Pl., Bohemia, NY 11716, Tel: 516-567-5600, TWX: 510-228-7324; FSC No.: 19645; Empl.: 850; *Sls. Mgr.:* J. P. Sheahan; *Dist. Mgr.:* Mort Lux .... **D•1150-1151**

Local Sales Offices & Reps

AL	Huntsville, Montgomery Mktg.	205-830-0498
AZ	Scottsdale, Fred Board Assocs.	602-994-9388
AZ	Tuscon, Fred Board Assocs.	602-299-1508
CA	Santa Clara, ILC Data Dev.	408-244-0831
CA	Woodland Hills, ILC Data Dev.	818-992-1772
CO	Englewood, Western Sls., Inc.	303-798-0945
CT	Canton Center, Dynamic Sls. of New Eng.	203-693-6567
FL	Boca Raton, Perrott Assocs.	813-443-5214
FL	Clearwater Beach, Perrott Assocs.	813-443-5214
FL	Orlando, Perrott Assocs.	305-298-7748
GA	Norcross, Montgomery Mktg., Inc.	404-447-6124
HI	Kihea, Aloha Assocs.	808-879-5296
IL	Chicago, John Alexander & Assocs.	312-233-7788
IL	Des Plaines, Elctrn. Mktg.	312-298-2330
IN	Carmel, Giesting & Assocs.	317-844-5222
IN	Fort Wayne, Giesting & Assocs.	219-486-1912
KS	Lenexa, Dytec/South	913-888-0215
MA	Burlington, Dynamic Sls. of New Eng.	617-272-5676
MI	Coloma, Giesting & Assocs.	616-468-4200
MI	Farmington Hills, Giesting & Assocs.	313-478-8106
MN	Minneapolis, Comprehensive Techn.	612-888-7011
MO	Maryland Hgts., Dytec/South	314-569-2990
NJ	Totowa, ILC Data Dev. Corp.	201-785-1734
NM	Albuquerque, Vermillion Co.	505-883-3668
NY	E. Rochester, Tri Tech Elctrns.	716-385-6500
NY	Endwell, Tri Tech Elctrns.	607-754-1094
NY	Fayetteville, Tri Tech Elctrns.	315-446-2881
NY	Fishkill, Tri Tech Elctrns.	914-897-5611
NC	Cary, Montgomery Mktg., Inc.	919-467-6319
OH	Cincinnati, Giesting & Assocs.	513-385-1105
OH	Cleveland, Giesting & Assocs.	216-261-9705
OH	Dayton, Giesting & Assocs.	513-433-5832
OH	Dayton, Lionel Fedotin	513-275-9345
OK	Tulsa, Bonser-Philhower Sls.	918-744-9964
OR	Aloha, Venture Elctrns.	503-642-9090
PA	Glenside, Koebert Assocs.	215-887-2310
PA	New Kensington, Bobar Instr.	412-339-3565
PA	Pittsburgh, Giesting & Assocs.	412-963-0727
TX	Austin, Bonser-Philhower Sls.	512-346-9186
TX	Houston, Bonser-Philhower Sls.	713-531-4144
TX	Richardson, Bonser-Philhower Sls.	214-234-8438
VT	Burlington, Dynamic Sls. of New Eng.	802-863-6665
VA	Vienna, ILC Data Dev.	201-785-1734
WA	Bellevue, Venture Elctrns.	206-454-4594
WI	Milwaukee, JM Sls.	414-546-0040
WI	Waukesha, Electron Mktg.	414-547-1505
Can	Montreal, Repco Engrg.	514-694-1877

ILC TECHNOLOGY, INC., 399 Java Dr., Sunnyvale, CA 94089, Tel: 408-745-7900, TWX: 910-339-9389; *Sls. Mgr.:* Robert Turner

ILLINOIS CAPACITOR, INC.

ILLINOIS CAPACITOR, INC., 3757 W. Touhy Ave., Lincolnwood, IL 60645, Tel: 312-675-1760, Telex: 72-4361; Empl.: 44; *Sls. Mgr.:* C. Kurland .... **A•1084-1085**

Local Sales Offices & Reps

AL	Huntsville, Electro-Mech. Sls.	205-533-2100
AZ	Phoenix, Howe & Howe Sls.	602-264-7971
CA	El Cajon, KCE Corp.	619-588-1198
CA	Palo Alto, Mollard Mktg.	415-961-0456
CA	Woodland Hills, Illinois Capacitor, Inc.	800-323-3652
CO	Denver, Elcom	303-337-2300
CT	Bristol, Technology Prods. Grp.	617-731-0858
FL	Miami Beach, Ben Goldner	305-932-2782
GA	Norcross, Electro-Mech. Sls.	404-447-6478
IN	Indianapolis, Fred Dorsey Assoc.	317-842-0060
KY	Louisville, Fred Dorsey Assoc.	502-426-3540
MA	Brookline, Technology Prods. Grp.	617-731-0858
MI	Warren, Dem Elctrns. Sls.	313-575-9444
MN	Golden Valley, Highland Elctrn. Sls. Co.	612-545-4028
MS	Jackson, IL Capacitor	312-675-1760
MO	Hazelwood, Jim Moore & Assocs.	314-731-2240
MO	Overland Park, Guernsey-Moore Assocs.	913-381-2225
NY	Commack, ERA	516-543-0510
NY	De Ruyter, Net Sales, Inc.	315-662-7996
NY	Fairport, Net Sls.	716-467-4538
NY	Webster, Net Sales, Inc.	716-671-0022
NC	Raleigh, Electro-Mech. Sls.	919-851-8165
OR	Beaverton, Caruso-Northcutt	503-646-4973
PA	Narberth, J. Bresson Assocs.	215-664-6460
TN	Jonesboro, Electro-Mech. Sls.	615-753-2964
TX	Austin, Mil-Rep	512-459-8602
TX	El Paso, EPEC, Inc.	915-593-8481
TX	Houston, Mil-Rep	713-444-2557
TX	Richardson, Mil-Rep Assocs.	214-664-6731
UT	Salt Lake City, Elcom	801-532-7940
WA	Bellevue, Caruso-Northcutt	206-454-9699
WI	Milwaukee, Erdman Sls. Co.	414-281-1330
Can	Downsview, Ont., Designtronics	416-747-1171

Local Distributors

CA	Anaheim, A to Z Elctrns.	714-634-3620
CA	Canoga Pk., Myco/Vickers Elctrn. Supp.	213-340-2025
CA	Irvine, Hi-Rel Distr. Sls.	714-768-6656
CA	Santa Ana, Projections Unltd.	714-641-1472
CA	Santa Clara, California Capacitor	408-980-8495
CO	Englewood, Industrial Elctrns.	303-694-9444
IL	Northbrook, Classic Comps.	312-272-9650
IN	Carmel, Altex Elctrns.	317-848-1323
IA	Cedar Rapids, Bergquist Co.	319-366-8733
LA	Harvey, AFG Electrn. Supp.	504-368-9696
MD	Columbia, General Radio Supp.	301-997-6337
MA	Wakefield, Lorcor	617-246-1903
MA	Woburn, Semtex	617-935-2150
MI	Grand Rapids, R M Elctrns.	616-531-9300
MN	Minneapolis, Bergquist Co.	612-835-2322
MO	St. Charles, Finnigan Elctrns.	314-946-6201
NJ	Camden, General Radio Supp. Co.	609-964-8560
NJ	Roselle, Lectron Ind.	201-245-5859
NY	Buffalo, Genesee Radio & Parts Co.	716-873-9661
NY	Buffalo, Summit Distrbg.	716-887-2890
NY	E. Syracuse, Add Elctrns.	315-437-0300
NY	Freeport, Semtex Ind. Corp.	800-645-3960
NY	Rochester, Masline Elctrns.	716-546-5373
NY	Troy, Trojan Elctrn. Supp.	518-274-4481
NC	Greensboro, Hammond Elctrns.	919-275-6391
OH	Dayton, Semtex Ind. Corp.	513-435-6600
OK	Tulsa, Altair Elctrns.	918-252-5781
SC	Greenville, Hammond Elctrns.	803-233-4121
TX	Austin, Altair Elctrns.	512-837-4490
TX	Channelview, Henry Elctrns.	713-452-4451
TX	Houston, Altair Elctrns.	713-462-3029
TX	Richardson, Altair Elctrns.	214-231-5166
WI	Milwaukee, Badger Capacitor Sls.	414-281-1330
EXP	Rexdale, ON, Electrn. Supp., Inc.	416-741-4000

ILLINOIS LOCK CO., The Eastern Co., 301 W. Hintz Rd., Wheeling, IL 60090, Tel: 312-537-1800; *Sls. Mgr.:* Kim Palmer .... **B•1593-1595**

Local Sales Offices & Reps

AZ	Tempe, Desert-West Technical Sls.	602-244-0735
CA	Los Angeles, Spectrum Assocs.	213-641-4255
CA	San Rafael, Wright Assoc.	415-457-9940
FL	New Port Richey, Lobo Mktg. Assocs.	813-848-8578
IN	Carmel, TMC	317-844-8462
IN	Fort Wayne, TMC	219-432-5553
KY	Louisville, TMC	502-499-7808
MN	Minneapolis, Jos. Co/Melius	612-861-3343
NJ	Haddonfield, Gray Assocs.	
VA	Front Royal, Eltron Sls.	

Local Distributors

CA	Gardena, California Switch & Signal	213-770-2330
CA	San Leandro, Electro-Components	415-352-5210

IMAGE GRAPHICS, INC., 107 Ardmore Street, Fairfield, CT 06430, Tel: 203-259-1394; FSC No.: 5M867; Empl.: 35; *Sls. Mgr.:* J. P. Whitley

IMAGE MAKERS OF PITTSFORD, 6 Wood Gate, Pittsford, NY 14534, Tel: 716-385-4567; *Sls. Mgr.:* Richard H. Roberts; *Dist. Mgr.:* Richard H. Roberts

IMAGE TECHNOLOGY METHODS CORP., 103 Moody St., Waltham, MA 02154, Tel: 617-894-1720

IMAGING TECHNOLOGY, INC., 600 W. Cummings Park, Woburn, MA 01801, Tel: 617-938-8444, Telex: 948263; Empl.: 70; *Sls. Mgr.:* Ronald A. Massa

imc

IMC MAGNETICS CORP., Exec. Off., 100 Jericho Quadrangle, Ste. 221, Jericho, NY 11753, Tel: 516-938-0800, TWX: 510-221-2126; *Sls. Mgr.:* E. Egan .... **B•1161; C•1644-1645, 1647**

IMC MAGNETICS CORP., Arizona Div., 1900 East Fifth St., Tempe, AZ 85281, Tel: 602-968-4441, Telex: 910-951-0001; *Sls. Mgr.:* Alex Lazutin

IMC MAGNETICS CORP., Eastern Div., 570 Main St., Westbury, NY 11590, Tel: 516-334-7070, TWX: 510-222-4469; *Sls. Mgr.:* A. Chillemi .... **B•1161; C•1644-1645**

Local Sales Offices & Reps

AL	Huntsville, Beacon Elctrns.	205-881-5031
AZ	Tempe, Gassner & Clark	602-968-9037
CA	Cerritos, El-Com, Inc.	213-404-2961
CA	Los Altos, Recht Assocs.	415-964-6321
CA	San Diego, El-Com, Inc.	619-578-0900
CO	Englewood, Thorson Rocky Mtn.	303-779-0666
CT	Middletown, Gerber Sls. Corp.	203-347-3000
FL	Coral Springs, HAI Elctrns.	404-256-9640
GA	Atlanta, Beacon Elctrns.	404-256-9640
IL	Chicago, Industrial Reps., Inc.	312-647-7755
MD	Mt. Airy, Beacon N.	800-336-3747
MA	Monson, Gerber Sls. Corp.	413-267-5051
MA	Newton Upper, Gerber Sls. Corp.	617-969-2620
MN	Minneapolis, Holmgren Assocs.	612-786-7641
MO	Grandview, Harris-Hanson Co.	816-763-6200
MO	St. Louis, Harris-Hanson	314-432-3611
MO	St. Louis, Harris-Hanson Co.	314-432-3611
NJ	Haddonfield, Mesa Tech Assoc.	609-429-9531
NJ	Haddonfield, Mesa Tech. Assoc.	609-429-9531
NY	Fairport, Net Sales Co.	716-467-4538
NY	Great Neck, Trionics Assocs.	516-466-2300
NY	Syracuse, Electra Sls. Corp.	315-463-1248
NC	Greensboro, Beacon Elctrns.	919-275-9997
NC	Raleigh, Beacon Elctrns.	919-787-0330
OH	Dayton, Electrical Sys. Co.	513-434-9822
OH	Dayton, Electrical Systems Co.	513-434-9822
OH	Westlake, Electrical Sys. Co.	216-835-8672
OR	Alhoa, Huntley Assocs.	503-649-5388
OR	Lake Oswego, Huntley Assocs.	503-636-7558
TX	Dallas, Kruvand Assocs.	214-691-4592
TX	Dallas, Kruvand Assocs.	801-973-7969
UT	Valley City, Thorson Rocky Mtn.	214-437-3355
VA	Fairfax, Beacon N.	703-591-1300
VA	Falls Church, Beacon North	703-534-7200
WA	Everett, Huntley Assocs.	206-353-1833
PR	San Juan, Jorge Donato Assocs.	809-790-1300
Can	Markham, Ont., Lenbrook Elctrns.	416-477-7722
Can	Surrey, B.C., Lenbrook Elctrns.	604-585-9599

IMC/HANSEN, Box 23, Princeton, IN 47670, Tel: 812-385-3415, Telex: 27-8458 HANSON PEON; Empl.: 350; *Sls. Mgr.:* George A. Gilbert

IMC MAGNETICS CORP., New Hampshire Div., Rte. 16B, Rochester, NH 03867, Tel: 603-332-5300, TWX: 510-297-4466; *Sls. Mgr.:* William Beaulieu; *Dist. Mgr.:* Dave Flanagan .... **C•1647**

Local Sales Offices & Reps

AL	Huntsville, Beacon Elctrns.	205-881-5031
AZ	Tempe, Gassner & Clark	602-968-9037
CA	Cerritos, El-Com, Inc.	213-404-2961
CA	Los Altos, Recht Assocs.	415-964-6321
CA	San Diego, El-Com, Inc.	619-578-0900
CO	Englewood, Thorson Rocky Mtn.	303-779-0666
CT	Middletown, Gerber Sls. Corp.	203-347-3000
FL	Coral Springs, HAI Elctrns.	404-256-9640
GA	Atlanta, Beacon Elctrns.	404-256-9640
IL	Chicago, Industrial Reps., Inc.	312-647-7755
MD	Mt. Airy, Beacon N.	800-336-3747
MA	Monson, Gerber Sls. Corp.	413-267-5051
MA	Newton Upper, Gerber Sls. Corp.	617-969-2620
MN	Minneapolis, Holmgren Assocs.	612-786-7641

MO	Grandview, Harris-Hanson Co.	816-763-6200
MO	St. Louis, Harris-Hanson Co.	314-432-3611
NJ	Haddonfield, Mesa Tech Assoc.	609-429-9531
NY	Great Neck, Trionics Assocs.	516-466-2300
NY	Syracuse, Electra Sls. Corp.	315-463-1248
NC	Raleigh, Beacon Elctrns.	919-787-0330
OH	Dayton, Electrical Sys. Co.	513-434-9822
OH	Westlake, Electrical Sys. Co.	216-835-8672
OR	Alhoa, Huntley Assocs.	503-649-5388
TX	Dallas, Kruvand Assocs.	214-437-3355
UT	Valley City, Thorson Rocky Mtn.	801-973-7969
VA	Fairfax, Beacon N.	703-591-1300
WA	Everett, Huntley Assocs.	206-353-1833
PR	San Juan, Jorge Donato Assocs.	809-790-1300
Can	Markham, Ont., Lenbrook Elctrns.	416-477-7722
Can	Surrey, B. C., Lenbrook Elctrns.	604-585-9599

Local Distributors

AL	Huntsville, C.D.I.	205-883-7501
AK	Little Rock, C.D.I.	501-227-6278
AZ	Phoenix, Sterling Elctrns.	602-268-2121
AZ	Tempe, Bell Inds.	602-966-7800
AZ	Tuscon, Southwest Sls.	602-325-4087
CA	Cerritos, El-Com	213-404-2961
CA	Garden Grove, Bell Inds.	714-220-0681
CA	Gardena, Bell Inds.	213-515-1800
CA	Inglewood, Newark Elctrns.	213-671-7387
CA	Roseville, Graham Elctrns.	916-969-3100
CA	San Diego, Bell Inds.	619-268-1277
CA	San Diego, El-Com	619-578-0900
CA	Santa Clara, El-Com	408-496-0880
CA	Sunnyvale, Bell Inds.	408-734-8570
CA	Thousand Oaks, Bell Inds.	805-499-6821
CO	Denver, Newark Denver Elctrnd.	303-757-3351
CO	Ravada, Denver Wintronics	303-431-7161
CO	Wheatridge, Bell Inds.	303-424-1985
CT	East Haven, J. V. Elctrns.	203-469-2321
CT	Wallingford, Sager Elctrl. Supp. Co.	203-265-4600
CT	Wallingford, Sterling Elctrns.	203-265-9535
FL	Ft. Lauderdale, C.D.I.	305-971-4950
FL	Ft. Lauderdale, Hammond Elctrns.	305-973-7103
FL	Largo, Graham Elctrns.	813-541-4434
FL	Orlando, Hammond Elctrns.	305-849-6060
GA	Norcross, C.D.I.	404-441-3320
IL	Chicago, Bell Inds.	312-982-9210
IL	Chicago, Newark Elctrns.	312-638-4411
IL	Northbrook, Classic Comps.	312-272-9650
IN	Carmel, Altex Elctrns., Inc.	317-848-1323
IN	Ft. Wayne, Graham Elctrns.	219-423-3422
IN	Indianapolis, Graham Elctrns.	317-634-8202
IN	Lafayette, Graham Elctrns.	317-423-5564
IA	Cedar Rapids, Bell Inds.	319-395-0730
KS	Wichita, RSC Elctrns., Inc.	316-267-5213
MD	Columbia, Lionex Corp.	301-964-0040
MD	Savage, Pyttronic Inds.	301-792-0780
MA	Hingham, Sager Elctrl. Sup. Co.	617-749-6700
MA	Norwood, Gerber Elctrns.	617-769-6000
MA	Somerville, Electro Sls.	617-666-0500
MA	Waltham, Sterling Elctrns.	617-894-6200
MA	Wilmington, Lionex Corp.	617-657-5170
MI	Adrian, Wedemeyer Elctrn. Supp. Co.	517-263-2925
MI	Ann Arbor, Graham Elctrns.	313-884-4725
MI	Ann Arbor, Wedemeyer Elctrn. Supp. Co.	313-665-8611
MI	Lansing, Wedemeyer Ecltrn. Supp. Co.	517-484-9009
MN	Minneapolis, Aero-Space Computer Supps., Inc.	612-884-4725
MO	St. Louis, Olive Elctrns., Inc.	314-426-4500
NJ	Bellmawr, Mid-Atlantic	609-931-5303
NJ	Fairfield, Lionex Corp.	201-227-7960
NJ	Perth Amboy, Sterling Elctrns.	201-442-8000
NM	Albuquerque, Bell Inds.	505-292-2700
NM	Albuquerque, International Elctrns.	505-345-8127
NM	Albuquerque, Sterling Elctrns.	505-884-1900
NY	Buffalo, Summit Distrs.	716-884-3450
NY	Endwell, A.S.I. Elctrns.	607-754-3823
NY	Hauppauge, Lionex Corp.	516-273-1660
NY	Mt. Vernon, Q.A.R. Indl. Sls.	914-699-2224
NY	Plainview, Progress Elctrns.	516-433-1700
NY	Rochester, Summit Elctrns.	716-334-8110
NC	Greensboro, Hammond Elctrns.	919-275-6391
NC	Raleigh, C.D.I.	919-834-9465
OH	Cincinnati, Graham Elctrns.	513-772-1661
OH	Columbus, Graham Elctrns.	614-895-1590
OH	Columbus, Wedemeyer Elctrn. Supp. Co.	614-436-2410
OH	Dayton, Bell Inds.	513-434-8231
OH	Dayton, Esco Elctrons.	513-293-1133
OH	Dayton, Stotts-Friedman	513-298-5555
OH	Youngstown, Newark Elctrns.	216-793-6134
OR	Lake Oswego, Bell Inds.	503-241-4115
PA	Braddock, Leff Elctrns.	412-351-5000
PA	Horsham, Lionex Corp.	215-443-5150
PA	McKean, Advacom, Inc.	814-476-7774
PA	Montgomeryville, Pyttronic Inds.	215-643-2850
PA	Reading, Barbey Elctrns.	215-376-6116
RI	Providence, William Dandreta Co.	401-861-2800
SC	Greenville, Hammond Elctrns.	803-233-4121
TN	Nashville, Electra Distrbg. Co.	615-329-3971
TN	Nashville, Graham Elctrns.	615-242-2682
TX	Austin, Sterling Elctrns.	512-836-1341
TX	Dallas, Heilind Elctrns.	214-351-2050
TX	Dallas, Sterling Elctrns.	213-243-1600, 800-225-9618
TX	El Paso, International Elctrns.	915-598-3406
TX	Houston, Sterling Elctrns.	713-623-6600
UT	Salt Lake City, Bell Inds.	801-972-6969
UT	Salt Lake City, Standard Supp.	801-486-3371
VA	Richmond, Sterling Elctrns.	804-226-2190
WA	Bellevue, Bell Inds.	206-747-1515
WI	New Berlin, Classic Comps.	414-786-5300
WI	Waukesha, Bell Inds.	414-547-8879
Can	Downsview, Ont., Westburne Indl. Entprs., Ltd.	416-635-2950
Can	Montreal, Que., Electronic Whls., Ltd.	514-769-8851/61
Can	Ottawa, Ont., Electronic Whls., Ltd.	613-746-4413
Can	Ottawa, Ont., Wackid Radio	613-728-1821
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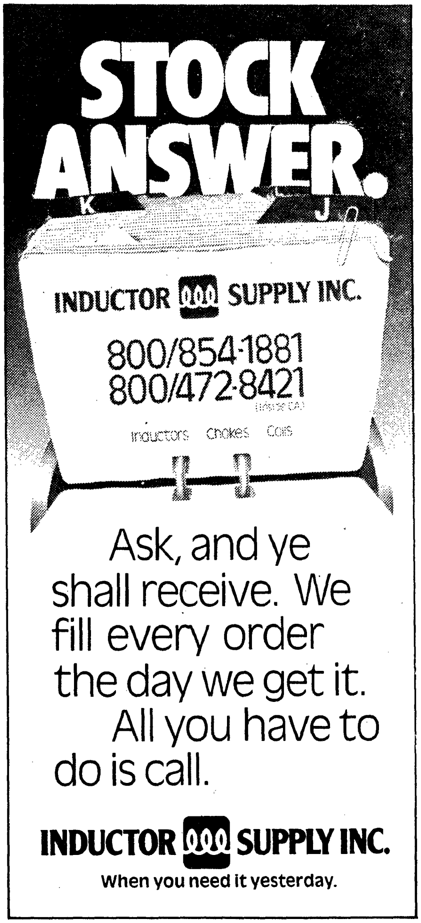
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IMEC CORP., 2434 Southport Way, National City, CA 92050, Tel: 619-474-8991

IMPANDEX, INC., 203 Brookdale St., Maywood, NJ 07607, Tel: 201-845-4664, Telex: 134 656; Empl.: 11; *Sls. Mgr.:* Stanley I. Goldberg; *Dist. Mgr.:* Rober F. Carlson

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AL	Huntsville, Naylor Assocs.	205-830-1957
AZ	Phoenix, Tri Fab Sls.	602-265-3341
AZ	Tucson, W.J.M. Sales	602-888-4847
CA	Orange, E.T.A.	714-998-9241
CA	San Diego, Savage Assocs.	619-457-2644
CA	Santa Clara, M2 Mktg. Grp.	408-986-0676
CO	Sedalia, Jensen Reps.	303-688-4154
FL	Casselberry, Southern Elctrn. Mktg.	305-695-3334
IL	Chicago, Electro-Tech Mktg.	312-672-3151
MD	Silver Springs, Mid Atlantic Sls.	301-583-7749
MA	Framingham, Sullivan Tech. Sls.	617-620-0195
MN	Minnetonka, Frank Anthony Mktg.	612-934-0773
MO	Clayton, Mertens Co.	314-993-6600
MO	Silver Springs, Mid Atlantic Sls.	301-593-7749
NJ	Mountainside, Henry G. Richter	201-233-4615
NY	Rochester, Henry G. Richter	716-436-0300
NC	Research Triangle Park, Naylor Assocs.	919-286-7007
OH	Columbus, Micro-Tec	614-888-9761
OR	Portland, Power Sources, Unltd.	503-292-0820
PA	Pittsburgh, Micro-Tec	412-931-3380
SC	Greenville, Naylor Assocs.	803-297-9969
TX	Dallas, Milco Mktg.	214-783-2716
TX	Houston, Milco Mktg.	713-723-5003
WA	Lynnwood, Power Sources, Unltd.	206-743-6641
WI	Brookfield, Electro-Tech Mktg.	414-785-9554
Can	Pointe Claire, Que., A. R. Gray & Assocs.	514-694-6378

Local Distributors

AZ	Phoenix, Tri Tek, Inc.	602-995-9352
CA	Costa Mesa, Escot	714-557-3252
CA	Fullerton, Pyramid Elctrns.	714-773-0781
CA	San Diego, Lauber Elctrns.	619-274-7242
CA	San Jose, Compumech	408-289-9171
CA	Santa Ana, C. R. Elctrns.	714-556-2040
CA	Santa Clara, Escot	408-988-4991
CA	Santa Clara, Pyramid Elctrns.	408-727-9810
CA	Sunnyvale, Sierra West	408-747-1188
CO	Broomfield, Escot	303-465-2346
FL	Longwood, Cam RPC	305-834-2031
GA	Norcross, Cam RPC	404-441-1188
IL	Wheeling, Escot	312-459-5750
MD	Aberdeen, Harco Elctrns.	301-575-6885
MD	Beltsville, Treeko Sls.	301-937-8260
MD	Towson, Cam RPC	301-337-5545
MA	Newton, Greene-Shaw Co.	617-969-8900
MN	Bloomington, N.W.R. Elctrns.	612-854-7329
NJ	East Brunswick, Brothers Elec.	201-238-2200
NY	Henrietta, Cam RPC	716-334-5600
OH	Cleveland, Cam RPC	216-461-4700
OH	Dayton, Micro-Mil/Bell	513-434-8231
PA	Philadelphia, Cam RPC	215-739-4095
PA	Pittsburgh, Cam RPC	412-782-3770
TX	Dallas, Cam RPC	214-644-4325
VA	Annandale, Arcade Elctrns.	703-256-4610
WA	Kent, Pyramid Elctrns.	206-872-5800

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INCONIX CORP., 10 Tech Circle, Natick, MA 01760, Tel: 617-655-1170, TWX: 710-386-1997; Empl.: 60; *Sls. Mgr.:* Al Vitale

INDEPENDENT CABLE, INC., 43 Broad St., Hudson, MA 01749, Tel: 617-562-9913; Empl.: 120; *Sls. Mgr.:* Gary W. Nace

INDIANA GENERAL/DIV. EMM CORP., Magnet Prods., 405 Elm St., Valparaiso, IN 46383, Tel: 219-462-3131, Telex: 25-8489, TWX: 910-690-4891; Empl.: 1200; *Sls. Mgr.:* Royce D. Wright

INDOCOMP, INC., Newcor, 5409 Perry Dr., P.O. Box 157, Drayton Plains, MI 48020, Tel: 313-674-2294; Empl.: 26; *Sls. Mgr.:* Robert Watt

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INDUCTIVE PRODS., INC., 11733 Markon Dr., Garden Grove, CA 92641, Tel: 714-891-2572; Empl.: 10; *Sls. Mgr.:* Michael Rynkewicz .... **A•1230**

Distributor

INDUCTOR SUPPLY, 15204 Transistor Lane, Huntington Beach, CA 92649, Tel: 714-891-4524 .... p. 700

INDUSTRIAL COMPUTER DESIGNS, INC., 31264 La Baya Drive, Westlake Village, CA 91362, Tel: 818-889-3179; Empl.: 33; *Sls. Mgr.:* David J. Knight

INDUSTRIAL CONTROL CO., 3100 Pineda Ave., Rockledge, FL 32955, Tel: 305-259-7105; Empl.: 15; *Sls. Mgr.:* I. Nobilio .... **D•1988**

INDUSTRIAL DEVICES, INC., 7 Hudson St., Edgewater, NJ 07020, Tel: 201-224-4700, Telex: 12-7459; FSC No.: 91802; Empl.: 200; *Sls. Mgr.:* Michael Diceglie .... **B•1014, 1017, 1057-1077**

Local Sales Offices & Reps

AL	Huntsville, E.M.A., Inc.	205-837-7363
AZ	Scottsdale, Bill Earl Assocs., Inc.	602-994-3813
CA	Los Angeles, Universal Comps.	213-641-4255
CA	Mountain View, Westech Sls.	415-961-1422
CO	Aurora, Sage Sls.	303-750-3501
FL	Casselberry, Southern Elctrn. Mktg.	305-831-2822
GA	Atlanta, E.M.A., Inc.	404-448-1215
IL	Chicago, K. D. Engle	312-539-1820
IN	Indianapolis, Elctrn. Mktg. Consits.	317-253-1668
KS	Shawnee Mission, Lowell-Kangas Assocs.	913-631-3515
MD	Towson, Ernie Stefkovic Assocs.	301-321-6008
MA	Newton Upper Falls, Anchor Engrg.	617-964-6205
MI	Oak Pk., W. Spenser	313-967-0808
MN	Minneapolis, Elec. Comp. Sls.	612-933-2594
MO	St. Louis, Lowell-Kangas Assocs.	314-821-4050
NJ	Cherry Hill, Ernie Stefkovic Assocs.	609-667-4066
NJ	Manville, Dyno Rep	201-685-0135
NY	Rochester, Apex Assocs.	716-254-6050
NC	Raleigh, E.M.A., Inc.	919-847-8800
OH	Cleveland, Marlow Assocs.	216-991-6500
OH	Columbus, Marlow Assocs.	800-362-2265
OR	Portland, Earl & Brown	503-245-2283
PA	Pittsburgh, Marlow Assocs.	412-367-8886
SC	Greenville, E.M.A., Inc.	803-233-4637
TX	Austin, R. F. Kimball Co.	512-443-5284
TX	Houston, R. F. Kimball Co.	713-890-8810
TX	Richardson, R. F. Kimball Co.	214-231-3447
UT	Salt Lake City, Sage Sls.	801-467-5451
WA	Seattle, Earl & Brown	206-284-1121
EXP	NY, Jericho, E.T.I., Inc.	516-931-3434

Local Distributors

AZ	Phoenix, Dalis Elctrn. Supp.	602-275-2885
CA	Gardena, Calif. Switch & Signal	213-770-2330
CA	Los Angeles, Elec. Switches	213-664-1141
CA	Palo Alto, Zack Elctrns.	415-326-5432
CA	Pasadena, Empire Elctrn. Distr.	213-681-2711
CA	S. San Francisco, Steven Engrg.	415-588-9200
CA	San Diego, Shanks & Wright	619-239-0176
CA	San Diego, Sigma Elctrns.	714-565-2000
CA	San Francisco, Zack Elctrns.	415-626-1444
CA	San Jose, Quement Elctrns.	408-998-5900
CA	Santa Monica, Master Distrs.	213-452-1229
CO	Arvada, Denver Wintronics	303-431-7161
CT	Norwalk, Park Distrs.	800-243-5006
CT	Stratford, Utronics, Inc.	203-378-4201
CT	Wallingford, Sager Electrical Supp.	203-265-4600
FL	Longwood, Inter Tec	800-432-1654
FL	Miami, Electro Standard Lab (ESL)	305-593-6060
FL	Tampa, Leader Elctrns.	813-870-3315
FL	W. Palm Beach, Nurmi Elctrn.	305-686-8553
GA	Atlanta, Wholesale Indl. Elec.	800-282-1857
IL	Villa Park, Melvin Elctrns.	312-279-5015
IL	Wood Dale, Electro-Kinetics	312-595-6700
IN	East Chicago, ACRO Elctrns.	312-375-1269
IN	Evansville, Hutch & Son	812-425-7201
IN	Fort Wayne, Graham Elctrs.	219-423-3422
IN	Indianapolis, Graham Elctrns.	317-634-8202
IN	South Bend, Genesis Elctrns.	219-287-2911
IA	Cedar Rapids, Bergquist Co.	319-366-8733
IA	Cedar Rapids, Iowa Radio Supp.	319-393-4510
KY	Bowling Green, Crescent Elctrns.	502-842-2444
LA	Lafayette, Ralph's	318-234-4507
LA	New Orleans, Wm. B. Allen Supp. Co.	800-462-9520
MD	Rockville, Capitol Radio Whlsrs.	301-881-2270
MA	Hingham, Sager Elec. Supp.	617-749-6700
MA	N. Wilbraham, Indl. Comps.	413-596-3854
MA	Norwood, Gerber Elctrns.	617-329-2400
MA	Worcester, RM Elctrns.	617-756-8311
MI	Flint, Shand Elctrns.	313-743-8940
MN	Minneapolis, Bergquist Co.	612-835-2322
MN	Minneapolis, Elctrn. Center	612-371-5200
MN	Minneapolis, Stark Elctrns.	612-332-1325
MO	Kansas City, Olive Indl. Elect.	816-842-8556
MO	St. Louis, Olive Indl. Elctrns.	314-426-4500
MO	St. Louis, Van Sickle Radio-Elec.	314-621-5000
NE	Lincoln, Scott Elctrn. Supp.	402-466-8221
NV	Las Vegas, Kiesub Elctrns.	702-733-3888
NJ	Fair Lawn, Relay Spec.	201-797-3313
NJ	Hanover, State Elctrns. Parts	201-887-2550
NJ	Springfield, Route Elctrns.	201-379-7710
NY	Albany, E. E. Taylor Co.	518-438-7811
NY	Buffalo, Summit Distrs.	716-887-2800
NY	Hauppauge, Broadline Elctrns.	516-231-4100
NY	Hempstead, Elctrn. Equip.	800-645-1605
NY	Mt. Vernon, Q.A.R. Indl. Elctrn. Sls.	914-699-2224
NY	Rochester, Simcona Elctrns.	716-328-3230
NY	Rochester, Summit Elctrns.	716-334-8110
NC	Raleigh, Southeastern Radio Supp.	919-828-2311
OH	Cincinatti, Hughes-Peters	513-351-2000
OH	Cincinnati, United Radio	513-761-4030
OH	Cleveland, Roberts Elctrns.	216-238-1711
OH	Columbus, Hughes Peters	614-294-5351
OH	Dayton, Stotts-Friedman Co.	513-298-5555
OH	Toledo, Warren Radio	419-248-3364
OK	Oklahoma City, Trice Whls. Elctrns.	405-524-4411
OK	Tulsa, Oil Capitol Elctrns.	918-622-8520
OR	Eugene, United Radio Supp.	503-342-3381
OR	Portland, United Radio Supp.	503-233-7151
PA	Erie, Rem/Mace Elctrns.	814-453-5626
PA	Harrisburg, Cumberland Elctrns.	717-233-5883
PA	Philadelphia, Philadelphia Elctrns.	215-568-7400
TN	Memphis, Bluff City Elctrns.	901-345-9500
TN	Nashville, Randolph & Rice	615-255-5601
TX	Fort Worth, Swieco	817-335-6521
TX	Ft. Worth, Allied Elctrns.	817-336-5401
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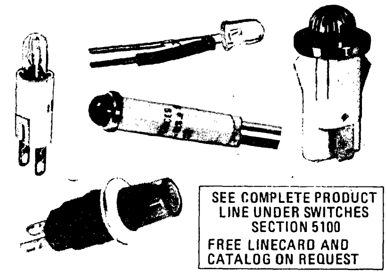

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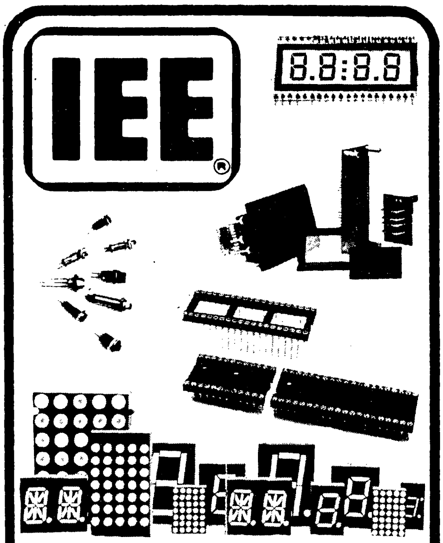

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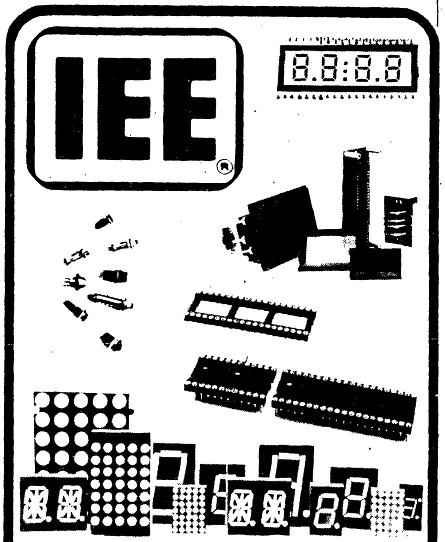

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		716-479-9700
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	Circuit Specialist Co.	
	Elctrn. Equip. Co., Inc.	
	Ital Elctrn. Sls., Inc.	
	Philadelphia Elctrns., Inc.	
AL	Huntsville, TMA Technlg. Mktg. Assocs.	205-883-7893
AZ	Phoenix, Gramer & Co.	602-995-9455, 602-942-1415
CA	Brea, Masco Elctrns., Inc.	714-529-0866
CA	Campbell, LCO Tech. Sls.	408-378-9900
CA	Los Angeles, Masco Elctrns., Inc.	714-529-0866
CA	Vista, Masco Elctrns., Inc.	619-758-5562
CO	Lakewood, Cristee-Meade Co.	303-232-0287
CA	San Jose, Class One Elctrns.	408-297-8666
CT	North Haven, Kitchen & Kutchin, Inc.	203-239-0212
FL	Melbourne, TMA Tech. Mktg. Assocs.	305-676-3776
FL	Orlando, TMA Tech. Mktg. Assocs.	305-857-3760
FL	Pompano Beach, TMA Tech. Mktg. Assocs.	305-942-0774
GA	Atlanta, TMA Tech. Mktg. Assocs.	404-257-0374
ID	Boise, Huntley Assocs.	208-343-3753
IL	Highland Park, Bransky Sls.	312-433-2375
IN	Carmel, TMC Tech. Mktg. Corp.	317-844-8462
IN	Ft. Wayne, TMC Techng. Mktg. Corp.	219-432-5553
KS	De Soto, Midtec	913-441-6565
KY	Louisville, TMC Tech. Mktg. Corp.	502-499-7808
MD	Hunt Valley, Marktron, Inc.	301-628-1111
MD	Rockville, Marktron, Inc.	301-251-8990
MA	Burlington, Kitchen & Kutchin, Inc.	617-229-2660
MI	Southfield, L. H. Dickelman Co.	313-353-8210
NJ	Englewood, ABS	201-871-0020,212-594-4090
MN	Burnsville, 2M Sales, Inc.	612-890-7774
MO	Florissant, Midtec	314-837-5200
NC	Raleigh, DHR Mktg, Inc.	919-876-5450
OH	Cleveland, Geotronix, Inc.	216-526-2535
OH	Trotwood, Geotronix, Inc.	513-252-6700
OR	Aloha, Huntley Assocs.	503-649-5388
PA	Norristown, RJI	215-631-1414
SC	Greenville, DHR Mktg., Inc.	803-235-3594
TX	Dallas, MGR Elctrns., Inc.	214-238-5246, 713-759-0187
UT	Sandy, Cristee-Meade/GTM Assocs.	801-483-4103
VA	Charlottesville, Marktron, Inc.	804-973-5874
WA	Everett, Huntley Assocs.	206-353-1833
WI	Cedarburg, Bransky Sls.	414-377-6837

Local Distributors

AL	Huntsville, C.D.I.	205-883-7501
AZ	Phoenix, Tri-Tek, Inc.	602-995-9352
AZ	Tempe, Circuit Specialist Co.	602-966-0764
AR	Little Rock, C.D.I.	501-227-6278
CA	Cerritos, El-Com, Inc.	213-404-2961
CA	Gardena, California Switch & Signal Co.	213-538-9830
CA	Industry, Ital Elctrn. Sls., Inc.	818-968-8515, 714-990-0922
CA	Lakeside, Mouser Elctrn. Corp.	619-449-2229
CA	San Diego, El-Com, Inc.	619-578-0900
CA	San Diego, Richey/Western Elctrns.	619-565-4444
CA	San Jose, Richey/Western Elctrns.	408-946-6611
CA	Santa Clara, Waltronic Sls.	408-727-1200
CA	Sun Valley, Richey/Western Elctrns.	818-768-3800
CO	Denver, Integrated Elctrns.	303-292-6121
CT	East Haven, J. V. Elctrns.	203-469-2321
FL	Alamonte Springs, Pioneer/Orlando	305-834-9090, 800-432-6094
FL	Ft. Lauderdale, C.D.I.	305-971-4950
FL	Miami, Elctrn. Equip. Co., Inc.	305-871-3500
GA	Norcross, C.D.I.	404-441-3320
IL	Chicago, Bell Inds.	312-982-9210
IL	Chicago, Newark Elctrns.	312-638-4411
IL	Elgin, Allied Elctrns.	312-697-8200
IL	Elmhurst, Semiconductor Specialists, Inc.	312-279-1005
IL	Northbrook, Classic Comps.	312-272-9650
IN	Carmel, Altex Elctrns., Inc.	317-848-1323, 800-692-6039
KS	Wichita, R.S.C.	316-267-5213
MD	Beltsville, Treeko Sls.	301-937-8260
MD	Gaithersburg, Pioneer/Washington	301-948-0710
MA	Billerica, A. W. Mayer Co., Inc.	617-667-6900
MA	Danvers, Criterion Elctrns.	617-777-4725
MA	Needham, Cronin Elctrns., Inc.	617-449-5000
MI	Grand Rapids, S-F Elctrn. Supp. Inc.	616-459-0216
MI	Southfield, Michigan Lectrols Corp.	313-353-1350
MN	Minneapolis, Stark Elctrns.	612-332-1325
MO	Kansas City, Semiconductor Specialists, Inc.	816-452-3900
MO	St. Louis, Olive Indl. Elctrns.	314-426-4500
NM	Albuquerque, Betatron Elctrns.	505-344-2381
NM	Albuquerque, Intl. Elctrns.	505-345-8127
NY	Farmingdale, Pride Elctrns.	516-293-4020
NY	Farmingdale, S.A.I.	516-293-2710
NY	Mamaroneck, Logicomp Elctrns.	914-698-9332
NY	Rochester, Masline Elctrns.	716-647-9700
NY	Rochester, Modutex Corp.	716-647-9700
NC	Greensboro, Hammond Elec.	919-275-6391
NC	Raleigh, So. Eastern. Elctrns.	919-828-2311
NC	Winston-Salem, Kirkman Elctrns.	919-722-9131
OH	Cleveland, Alpha Distr. Corp.	216-526-3716
OH	Dayton, The Stotts-Friedman Co.	513-298-5555
OK	Oklahoma City, Electro Entrs., Inc.	405-427-6591
PA	Philadelphia, Herbach & Rademan, Inc.	215-426-1700
PA	Philadelphia, Philadelphia Elctrns., Inc.	215-568-7400
SC	Taylors, Cantrell Whls.	803-268-1194
TX	Austin, Southwest Elctrns.	512-837-8971
TX	Austin, The Altair Co.	512-837-4490
TX	Fort Worth, Allied Elctrns.	817-336-5401
TX	Houston, Solid State Elctrns.	713-772-8483
TX	Houston, The Altair Co.	713-462-3029
TX	Irving, Solid State Elctrns.	214-438-5700
TX	Richardson, Southwest Elctrns.	214-234-3050
TX	Richardson, The Altair Co.	214-231-5166
TX	Stafford, Southwest Elctrns.	713-491-4900
WA	Kent, Shannon Ltd.	206-763-0545
WI	Mequon, Taylor Elec. Co.	414-241-4321
WI	Milwaukee, Marsh Elctrns.	414-475-6000

IEH

INDUSTRIAL ELCTRN. HARDWARE CORP., 109 Prince St., New York, NY 10012, Tel: 212-677-1881, TWX: 710-581-4338; FSC No.: 97913; Empl.: 430; *Sls. Mgr.:* Louis Roberts; *Dist. Mgr.:* Louis Roberts .... **C•1272**

Local Sales Offices & Reps

AL	Huntsville, Beacon Elctrns.	205-881-5031
AZ	Phoenix, Knight Co.	602-582-8506
CA	Los Angeles, Knight Co	213-670-2833
CA	San Diego, Knight Co.	619-743-5136
CA	Sunnyvale, M2 Mktg. Grp.	408-986-0676
FL	Maitland, Ellis Assocs.	305-645-1101
GA	Atlanta, Beacon Elctrns.	404-256-9640
KS	Wichita, Thunderbird Tech. Sls.	316-684-3941
MD	Ellicot City, Techn. Sls.	301-461-2400
MA	Lowell, Todino Engrg.	617-444-7925
MN	St. Paul, Countryman	612-645-9151
NJ	Fort Lee, FJK Assocs., Inc.	201-592-1002
NJ	Haddonfield, Brown Assocs.	609-429-1005
NY	Buffalo, Franklin Sls.	716-248-8251
NY	Pittsford, Franklin Sls.	716-248-8251
NY	Ronkonkoma, PMR	516-467-8200
NC	Raleigh, Beacon Elctrns.	919-787-0330
OH	Beachwood, Elctrn. Salesmasters, Inc.	216-831-9555
OR	Beaverton, Eclipse Mktg.	206-885-6991
TX	Dallas, Pro-Mark	214-644-0497
WA	Redmond, Eclipse Mktg.	206-885-6991

Local Distributors

AL	Huntsville, Powell Elctrns.	205-539-2731
CA	San Jose, Powell Elctrns.	408-943-9020
CA	Sunnyvale, Time Elctrns.	408-734-9888
FL	Ft. Lauderdale, Time Elctrns.	305-974-4800
MA	Westborough, Powell Elctrns.	617-366-6100
MA	Woburn, Time Elctrns.	617-935-8080
NY	Hauppauge, Time Elctrns.	516-273-0100
PA	Philadelphia, Powell Elctrns.	215-365-1900
TX	Dallas, Time Elctrns.	214-385-0566
TX	Los Colinas, Powell Elctrns.	214-258-6841

INDUSTRIAL FABRICATING CO., 820 Woodend Ave., Stratford, CT 06497, Tel: 203-375-5853; Empl.: 30; *Sls. Mgr.:* Ray Peterson

INDUSTRIAL INDEXING SYS., INC., 626 Fishers Run, Victor, NY 14564, Tel: 716-924-9181; Empl.: 30; *Sls. Mgr.:* Raymond F. Coller

Local Sales Offices & Reps

CA	San Carlos, Cymatix	415-592-8076
IN	Fort Wayne, Aktron Corp.	219-747-3650
MA	Bedford, AID Engrg. Sls.	203-663-2225
MI	Grand Rapids, Ackerman Elec. Supp.	616-459-8327
MI	Walled Lake, Static Controls	313-363-4500
NY	East Rochester, A & D Dvcs.	716-385-2778
NY	Sidney, A & D Dvcs.	603-563-8488
OH	Medina, Cygnus Corp.	216-725-1663
PA	Media, Homersmith, Inc.	215-543-2434
WI	Milwaukee, KMA Sls. Co.	414-259-1771

INDUSTRIAL MIDWEC CAPACITORS, 4902 Tollview Dr., Rolling Meadows, IL 60008, Tel: 312-577-0120, TWX: 910-687-3375; Empl.: 800; *Sls. Mgr.:* Andy Kaluski

Powertron

INDUSTRIAL TEST EQUIP., 21 Yennicock Ave., Port Washington, NY 11050, Tel: 516-883-1700; FSC No.: 99074; *Sls. Mgr.:* Robert Loiacono .... **D•1247, 1938-1941**

INERTIAL MOTORS, 280 N. Broad St., Doylestown, PA 18901, Tel: 215-345-1010, Telex: 83-1633; Empl.: 49; *Sls. Mgr.:* Lori Clarkin

INFICON LEYBOLD-HERAEUS, INC., 6500 Fly Rd, E. Syracuse, NY 13057, Tel: 315-437-0377, TWX: 710-541-0594; Empl.: 165; *Sls. Mgr.:* D. A. DiRenzo

INFINETICS INC., Friskem Div., 201 Vandever Ave., Wilmington, DE 19802, Tel: 302-658-2471, TWX: 510-632-2332; *Sls. Mgr.:* M. Schwartz

INFOCAP, INC., 31119 Via Colinas #502, Westlake Village, CA 91362, Tel: 818-991-1410; *Sls. Mgr.:* David Knight

INFODEX

INFODEX, INC., 395 W. Main St., Waterbury, CT 06702, Tel: 203-757-9291, Telex: 178702 IFDX; FSC No.: 09087; Empl.: 45; *Sls. Mgr.:* E. H. Ulm .. **B•1080-1081; D•1410**

Local Sales Offices & Reps

CA	Pasadena, A-F Sales Engrg.	818-681-5631
MA	Boston, Nortech Engrg. Sls.	617-359-6063
MA	Concord, Nortech Engrg. Sls.	617-259-0032

INFOLINK CORP., 1925 Hoiste Rd., Northbrook, IL 60062, Tel: 312-291-2900; Empl.: 200; *Sls. Mgr.:* Joseph F. Guzman; *Dist. Mgr.:* Joseph F. Guzman

INFO-LITE CORP., See Dio-Rey and Crosspoint

INFO-PROS INC., 2102 Business Center Dr., Irvine, CA 92715, Tel: 714-851-8975

INFORMATION CONTROL, Dept. EM7 9610 Bellanca Ave., Los Angeles, CA 90045, Tel: 213-641-8520, TWX: 910-328-7234; Empl.: 55; *Sls. Mgr.:* Carol J. Smith

INFORMATION CONTROL CORP., Abacus Div. Dept. EM7, 9610 Bellanca Ave., Los Angeles, CA 90045, Tel: 213-641-8520, TWX: 910-328-7234; Empl.: 50

INFORMATION CONTROL CORP., 9610 Bellanca Ave., Los Angeles, CA 90045, Tel: 213-641-8520, TWX: 910-328-7234; Empl.: 30; *Sls. Mgr.:* J. M. Boyle

INFORMATION TECHNOLGOY A.D.S.C., P.O. Box 470, College Park, MD 20740, Tel: 301-779-5110; *Sls. Mgr.:* Daniel Akers

INFORMATION TERMINALS, See Verbatim Corp.

OTTO THE SWITCHING COMPANY

INFORMATION TRANSFER INDL., Box 357, Holcomb, NY 14469, Tel: 716-657-7074; FSC No.: 55137; Empl.: 70; *Sls. Mgr.:* J. E. Wiseman .... **D•1152-1154, 1248-1249**

Local Sales Offices & Reps

AZ	Scottsdale, Luscombe Engrg.	602-949-9333
CA	Campbell, Luscombe Engrg.	408-370-2020
CA	Pasadena, Luscombe Engrg.	213-684-2000
CA	San Diego, Luscombe Engrg.	714-295-4300
CO	Littleton, Pond Assocs., Inc.	303-798-2904
CT	Marion, Polytek Assocs.	203-621-4542
IL	Schaumburg, Kenneth W. Meyers Co.	312-882-4808
IN	Indianapolis, Kenneth W. Meyers Co.	317-783-1030
IA	Cedar Rapids, Kenneth W. Meyers Co.	319-363-8987
MD	Clarksville, Riffe Assocs.	301-953-2811
MA	Ashland, Polytek Assocs.	617-881-4741
MN	Minneapolis, Kenneth W. Meyers Co.	612-920-7080
NJ	Oxford, Malin Assocs.	201-689-7398
NY	Albany, R. F. Lamb Co.	518-869-3355
NY	Buffalo, R. F. Lamb Co.	716-874-4900
NY	Rochester, R. F. Lamb Co.	716-323-1250
NY	Syracuse, R. F. Lamb Co.	315-454-2469
OR	Portland, Tasco	503-245-8168
PA	Melrose Park, Robert Meyers Assocs.	215-224-1663
TX	Houston, Sci. Sls. Co.	713-460-9170
TX	Richardson, Sci. Sls. Co.	214-231-6541
WA	Bellevue, Tasco	206-453-1414
WI	Brookfield, Kenneth W. Meyers Co.	414-784-3790
EXP	Brampton, Ontario, Misner Mktg. Ltd.	416-456-3777

INFOSPHERE, INC., 4730 S.W. Macadam Ave., Portland, OR 97201, Tel: 503-226-3515, Telex: 360312; *Sls. Mgr.:* Wm. David Sharon; *Dist. Mgr.:* Wm. David Sharon

INFRARED INDS., INC., P.O. Box 14200, Orlando, FL 32857, Tel: 305-282-7700, Telex: 568908; Empl.: 80; *Sls. Mgr.:* Thomas Chisholm

INJECTORALL ELCTRNS., 98-100 Glen St., Glen Cove, NY 11542, Tel: 516-671-6010 .... **C•1101**

Local Sales Offices & Reps

AL	Birmingham, John F. Russell Co.	205-822-2196
CA	Burlingame, Carelli-Ema	415-342-4514
CA	Long Beach, Ross Sls.	213-424-9818
FL	Miami Beach, Everett Wollman Sls.	305-932-1790
MA	Northboro, W. B. Pray Co.	617-393-3434
MI	Livonia, Harvey Sales Co.	313-476-1974
NY	Brooklyn, Moet Maltz & Co.	212-252-1139
WA	Edmonds, McLaughlin Mktg. Inc.	206-743-1161

Local Distributors

AL	Huntsville, Mock	205-539-2401
AZ	Tucson, Electronic City	602-622-1173
CA	Los Angeles, ITC	213-388-0621
CA	San Jose, Quement	408-998-5900
CA	San Rafael, Elctrns. Plus	415-457-0466
CA	Sunnyvale, Halted Specialties	408-732-1573
FL	Pensacola, Pensacola Elctrns.	904-478-3771
GA	Atlanta, Delta	404-458-4690
IL	Chicago, Tron Elctrns.	312-640-8822
IN	East Chicago, Acro	219-397-8681
KY	Louisville, P.I. Burkes	502-589-3960
MA	Needham, Y.D.I.	617-449-1005
MI	Bay City, KDC	517-892-1594
MI	Port Huron, Main	313-985-5103
NJ	Vineland, Laraco	609-691-2900
NY	Elmsford, Ancar	914-592-7100
NY	Levittown, Edlies Elctrns.	516-735-3330
NY	New York City, Taft	212-575-5194
NY	Richmond Hill, Anchor	212-846-2420
OR	Beaverton, Norvac	503-644-1025
PA	Norristown, Philadelphia Elctrns.	215-275-5550
TX	Fort Worth, Sweico	817-335-6521
WA	Seattle, Elctrn. Supermart	206-575-1093
WA	Seattle, Radar	206-282-2511

INLAND MOTOR DIV. KOLLMORGEN, INDL. DRIVES GRP., See Kollmorgen Corp.

INLAND MOTOR DIVISION, Kollmorgen Corp., 4020 E. Inland Rd., Sierra Vista, AZ 85635, Tel: 602-459-1150, Telex: 62858, TWX: 910-973-9869; *Sls. Mgr.:* Mike Malcoun

INLAND MOTOR
KOLLMORGEN CORPORATION

INLAND MOTOR, Kollmorgen Corp., 501 First St., Radford, VA 24141, Tel: 703-639-9045, TWX: 710-875-3740; FSC No.: 11384; Empl.: 450

Local Sales Offices & Reps

PA	Media, Homersmith, Inc.	215-543-2434
FL	Melbourne, Technology Mktg. Assocs.	305-676-3776
FL	Orlando, Technology Mktg. Assocs.	305-857-3760
FL	Pampano Beach, Technology Mktg. Assocs.	305-942-0774
FL	Winter Park, Magna Engrg. Sls.	305-671-8716
OH	Medina, Cygnus	216-725-1663
PA	Doylestown, Magna Engrg. Sls.	215-345-5111

Specialty/Instrument/Industrial Drive Group

AL	Huntsville, Technology Mktg. Assocs.	205-883-7893
AZ	Phoenix, Thor Engrg. Mfrs. Reps.	602-437-1463
AZ	Sierra Vista, Inland Motor	602-459-1150
CA	Alhambra, Thorson Co. of Southern CA	818-281-2280
CA	Goleta, Thorson Co. of Southern CA	805-964-8751
CA	Mountain View, Thorson Co. of Southern CA	415-964-9300
CA	San Diego, Thorson Co. of San Diego	619-292-8525
CA	Signal Hill, Thorson Co. of Southern CA	213-595-0361
CO	Englewood, Thorson Rocky Mt., Inc.	303-779-0666
CT	Wolcott, Vanguard Elctrns. Corp.	203-879-9310
GA	Atlanta, Technology Mktg. Assocs.	404-257-0374
IL	Collinsville, Magna Engrg. Sls.	618-345-5583
IL	Elk Grove Village, Carlson Elctrn. Sls.	312-956-8240
IN	Indianapolis, J & W Sls.	317-842-3740
IA	Cedar Rapids, Carlson Elctrn. Sls.	319-377-6341
KS	Wichita, Magna Engrg. Sls.	316-744-0851
MD	Baltimore, Rep-Tron, Inc.	301-799-7490
MA	Needham Heights, Vanguard Elctrns. Corp.	617-449-5578
MI	Grand Rapids, R. P. Urban & Assocs.	616-245-0511
MI	Redford, R. P. Urban & Assocs.	313-535-2355
MN	St. Paul, John J. Exon Co.	612-636-5533
NJ	Wayne, SHL Assocs., Inc.	201-790-1714
NY	E. Rochester, A & D Dvcs.	716-385-2778
OR	Beaverton, Thorson Co. Northwest	503-644-5900
TX	Dallas, Magna Engrg. Sls.	214-349-6171
UT	W. Valley City, Thorson Rocky Mt., Inc.	801-973-7969
WA	Bellevue, Thorson Co. Northwest	206-455-9180
WI	Milwaukee, Carlson Elctrn. Sls.	414-476-2790

INMAC, 2465 Augustine Dr., Santa Clara, CA 95054, Tel: 408-727-1970, TWX: 910-338-2091; Empl.: 500

INMARK CORP., 147 West Cedar St., Norwalk, CT 06854, Tel: 203-866-8474, Telex: 99-6419; *Sls. Mgr.:* Lars Giers

INMOS CORP., P.O. Box 16000, Colorado Springs, CO 80935, Tel: 303-630-4000 Ext. 4454, TWX: 910-920-4904; Empl.: 1500; *Sls. Mgr.:* Peter Fowler; *Dist. Mgr.:* Jim O'Sullivan

INNOTRONICS, Brooks Rd., Lincoln, MA 01773, Tel: 617-678-8720; *Dist. Mgr.:* Stephen Scheuer

INNOVATEK MICROSYSTEMS, INC., Smithfield Rd., R1 Box 104, Millerton, NY 12546-9720, Tel: 914-373-9003, Telex: 750120; Empl.: 8; *Sls. Mgr.:* Paul F. Fitts

INNOVATIVE DATA TECHNOLOGY, 5340 Eastgate Mall, San Diego, CA 92121, Tel: 619-587-0555, TWX: 910-335-1610 IDT SDG; Empl.: 80; *Sls. Mgr.:* Robert G. Christy

INNOVATIVE ELECTRONICS, INC., 4714 N.W. 165th St., Miami, FL 33014, Tel: 305-624-1644, Telex: 80-7121; Empl.: 28; *Sls. Mgr.:* Tom Wullen; *Dist. Mgr.:* Tom Wullen

INRECO, See Ransco Industries

INRESCO, INC., 654 Ocean Road, Pt. Pleasant, NJ 08742, Tel: 201-892-5881, Telex: WUD, TWX: 844228; Empl.: 16; *Sls. Mgr.:* G. L. Martin

INSERVCO, INC., Box 106, La Grange, OH 44050

INSTRON CORP., 100 Royall St., Canton, MA 02021, Tel: 617-828-2500, Telex: 924434; Empl.: 1000; *Sls. Mgr.:* S. J. Vinciguerra; *Dist. Mgr.:* Lawrence Frost

INSTRULAB, P.O. B. 98, Dayton, OH 45404, Tel: 513-223-2241; Empl.: 22; *Sls. Mgr.:* Philip C. Alderton

INSTRU-LEC, 44 Old State Rd, #18, New Milford, CT 06776, Tel: 203-355-3717; FSC No.: 13782; Empl.: 4

ICS INC.

INSTRUMENTATION & CONTROL SYS., 520 Interstate Rd, Addison, IL 60101, Tel: 312-543-6200, TWX: 910-991-5945; Empl.: 50; *Sls. Mgr.:* Ken Horning .... **B•1318-1319; D•1933**

Local Sales Offices & Reps

Industrial Control Component Reps.

CA	Arcadia, HMC, Inc.	818-447-0958
FL	Miami, Hummel Indl. Sls.	305-651-0196
IL	Elmhurst, Hill-Gray Assocs.	312-832-4101
NY	Rochester, J. G. Welch Assocs., Inc.	716-244-1100
IN	Indianapolis, Fred A. Dorsey & Assocs.	317-842-0060
KS	Shawnee Mission, Microtronics	913-262-1444
MI	Brooklyn, ECI	517-592-3236
MN	Minneapolis, R. W. Marshall Co.	612-929-0457
CO	Denver, West Incorporated	303-477-8180
NH	Durham, C. H. Burnham Assocs.	603-868-2282
NY	Plainview, R. Smith Assocs.	516-681-3155
NY	Tonwanda, Ronco Power Sys.	716-873-0760
VA	Warrenton, Mid-Atlantic Power Specialists	703-442-8249

Power Conditioning Reps.

AL	Birmingham, C. S. Phillips Co.	205-870-0640
CA	San Ramon, Synergy	415-838-8300
CO	Englewood, Data Specialties	303-761-5763
FL	Newport Richey, R. C. Todd	813-849-6067
GA	Atlanta, Fincannon Assocs.	404-451-7841
IL	Chicago, Ropek-Cahill & Vogt	312-631-0070
LA	Lake Charles, Devitt Pancoast Controls Co., Inc.	318-439-1255
LA	Baton Rouge, Devitt Pancoast Controls Co., Inc.	318-439-1255
NJ	Franklin Lakes, Lambert Assocs.	201-891-7154
NM	Albuquerque, E.E.R.	505-265-7148
LA	Metairie, Devitt Pancoast Controls Co., Inc.	504-835-1713
NY	Rochester, RG Engrg.	716-424-7492
TX	Houston, Gettys-Eads-Adair	713-781-3005

Local Distributors

CA	Canoga Park, C & A Elctrns.	818-340-6022
CA	Garden Grove, Allied Elctrns.	714-554-0731
CA	Hayward, Allied Elctrns.	415-487-5250
CA	San Jose, Allied Elctrns.	408-995-0470
CO	Denver, Colorado Bus.	303-759-4589
MA	Wilmington, Allied Elctrns.	617-942-0150
FL	Ft. Lauderdale, Allied Elctrns.	305-486-0500
FL	Miami, Hummel Indl. Sls.	305-651-0196
GA	Atlanta, Automatic Controls Co.	404-266-0130
IL	Berwyn, B-B & W, Inc.	312-749-1710
IL	Elgin, Allied Elctrns.	312-697-8200
IL	Rosemont, Advent Elctrns.	312-297-6200
IA	Cedar Rapids, Advent Elctrns.	319-363-0221
IA	Indianapolis, Advent Elctrns.	317-872-4910
MD	Marlow Hgts., Allied Elctrns.	301-423-0161
MI	Farmington Hills, Advent Elctrns.	313-447-1650
MN	St. Paul, Powermation	612-645-0781
NY	Bay Shore, Soundview Instrs.	516-666-1000
NY	Mineola, Allied Elctrns.	516-248-2360
OH	Chagrin Falls, Neptune	216-247-7030
OH	Warren, REM Elctrn. Supp. Co., Inc.	216-373-1300
TX	Brownsville, Garden Indl. Grp.	512-546-1612
TX	Ft. Worth, Allied Elctrns.	817-336-5401, 214-265-9341
TX	Ft. Worth, Allied Export Svcs.	817-336-5401
TX	Garland, Powertronics	214-272-4640
WA	Seattle, Allied Elctrns.	206-767-2827
WI	Fond du Lac, Fedco Elctrns.	414-922-6490
WI	Waukesha, Powermation	414-542-2868

INSTRUMENTATION MEAS. LAB., Div. of Lockheed Electronics Co., Inc., 1501 Rt. 22, Plainfield, NJ 07061, Tel: 201-757-3730; *Sls. Mgr.:* P. Murray Grinnell

INSTRUMENTATION PRODS., 3M Co., 300 S. Lewis Rd., Camarillo, CA 93010, Tel: 805-482-1911, TWX: 910-336-1676; Empl.: 500

INSTRUMENTATION SERVICES, INC., 957 Winnetka Ave. N., Minneapolis, MN 55427, Tel: 612-544-8916, Telex: 29-0101; Empl.: 30; *Sls. Mgr.:* G. Ryan

INSTRUMENT ENCLOSURES, 9767 Glenoaks Blvd., Sun Valley, CA 91352, Tel: 818-768-4622, Telex: 66-2442; FSC No.: 62012; Empl.: 28; *Sls. Mgr.:* William B. Taylor

Distributor

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GA	Atlanta, Brandel-Stephens	404-261-7579
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NC	Winston Salem, D.G.W.	919-768-7166
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CA	San Diego, Metermaster	619-560-4841
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CA	Santa Clara, E.I.L. Instrs., Inc.	408-727-0396
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WA	Seattle, Eicher Richards	206-523-7888

INTERNATIONAL LASER SYS., 3404 N. Orange Blossom Trail, Orlando, FL 32804, Tel: 305-295-4010, TWX: 810-850-0195; Empl.: 408; *Sls. Mgr.:* W. C. Hudson

INTERNATIONAL MFG. SVCS., 50 Schoolhouse La., Portsmouth, RI 02871, Tel: 401-683-9700; Empl.: 25; *Sls. Mgr.:* Jay Benson

INTERNATIONAL MICROELECTRONIC PRODS., 2830 North First Street, San Jose, CA 95134, Tel: 408-262-9100, Telex: 499-1041, TWX: 910-338-2274; FSC No.: 408-262-3981 (Manual); Empl.: 380; *Sls. Mgr.:* Robert Kromer .... **A•1674-1676**

Local Sales Offices & Reps

AL	Huntsville, The Novus Grp.	205-881-2207
AZ	Scottsdale, Summit Sls.	602-998-4850
CA	Los Alamitos, Santana Sls.	213-431-3533
CA	San Diego, SR Elctrns.	619-560-8330
CA	San Jose, IMP West Area Sls. Off.	408-262-9100
CA	San Jose, Quadrep	408-946-4000
CT	Orange, Access Sys. Corp.	203-795-0201
FL	Orlando, Perrott Assocs., Inc.	305-298-7748
GA	Norcross, The Novus Grp.	404-939-1135
IL	Schaumburg, Gassner & Clark	312-882-8608
IN	Indianapolis, CC Elctrns.	317-225-1508
MD	Towson, DG Reps.	301-583-1360
MN	St. Paul, Northport Engrg., Inc.	612-457-8000
NH	Nashua, Access Sys. Corp.	603-888-8160
NY	Melville, IMP East Area Sls. Off.	516-752-1166
NC	Greensboro, United Sls.	919-674-9849
OH	Cincinnati, Applied Data Mgmt.	513-579-8108
TX	Plano, Texas Sls. Co.	214-867-0644
WA	Redmond, Quadra, Sls. Corp.	206-883-3550

INTERNATIONAL MICROSYSTEMS, 11554 C Ave., Auburn, CA 95603, Tel: 800-325-6028; Empl.: 12; *Sls. Mgr.:* Stan Burmich

INTERNATIONAL MICROTRONICS CORP., 4016 E. Tennessee St., Tucson, AZ 85714, Tel: 602-748-7900, TWX: 910-952-1170; Empl.: 30; *Sls. Mgr.:* Tommy Follis; *Dist. Mgr.:* Tommy Follis

INTERNATIONAL POWER
DC POWER SUPPLIES

INTERNATIONAL POWER, 350 N. Lantana, Ste. 710, Camarillo, CA 93010, Tel: 805-987-7900 .... **D•1670-1675**

INTERNATIONAL POWER MACHINES, 11534 Pagemill Rd., Dallas, TX 75243, Tel: 214-343-6076; *Sls. Mgr.:* Jack Conn

INTERNATIONAL RECTIFIER CORP., Semiconductor Div., 233 Kansas St., El Segundo, CA 90245, Tel: 213-772-2000, Telex: 472-0403, TWX: 910-348-6291; Empl.: I200; *Sls. Mgr.:* W. Lewis; *Dist. Mgr.:* D. Coppinger

INTERNATIONAL RESOURCE SVCS., 7343 N.W. 79th Terr., Miami, FL 33166, Tel: 305-884-2924, Telex: 522261 MIA DEPT 343; Empl.: 5; *Sls. Mgr.:* Richard L. Winn

INTERNATIONAL SENSOR SYSTEMS, INC., Aurora Industrial Pk., Box 345, Aurora, NE 68818, Tel: 402-694-6111; Empl.: 45; *Sls. Mgr.:* Michael E. Fattig .... **A•1677**

Local Sales Offices & Reps

AZ	Tempe, Spectrum Assoc. SW	602-966-1788
CA	Palo Alto, Tri-Rep	415-965-1822
CT	Branford, LJM Assocs.	203-488-4244
IL	Chicago, Esco Assocs.	312-763-0800
MN	Minneapolis, R-J Inc.	612-866-3661
PA	Southampton, Campbell Assocs.	215-322-6630
TX	El Paso, Nokomis Consumer Prods.	915-778-2801
TX	Euless, Andy Byles Intl.	817-267-4099

Local Distributors

CA	Arcadia, Van Gott & Assocs. Inc.	818-445-9728
FL	Jupiter, Southern Elctrn. Sls., Inc.	305-744-0028
IL	Des Plaines, Esco Assocs., Inc.	312-298-5310
IN	Indianapolis, Electronic Sls. & Engrg., Inc.	317-849-4260
MD	Lutherville, Quarterback Sls., Inc.	301-252-6167
NE	Omaha, IONEB	402-895-4431
NJ	Wayne, Ramapo Mfrs. Agt., Inc.	201-839-6767
NY	Liverpool, Syronics, Inc.	315-451-0968
NC	Charlotte, Over and Over	704-527-3070
OH	Brecksville, WRR Assocs., Inc.	216-526-2023
TX	El Paso, Nokomis of El Paso, Inc.	925-778-2801

INTERNATIONAL TRANSDUCER CORP., Channel Technologies, Inc., 93 Castilian Dr., Goleta, CA 93117, Tel: 805-685-1441, Telex: 658 495; FSC No.: ID 532; Empl.: 65; *Sls. Mgr.:* Roland 'Fred' Dutton

INTERNATIONAL WIRE PRODUCTS CO., 500 W. Main St., Wyckoff, NJ 07481, Tel: 201-891-5800, Telex: 642580; Empl.: 700; *Sls. Mgr.:* C. D. Abbott

INTEROPTICS, Purdy Group, 770 Airport Blvd., Burlingame, CA 94010, Tel: 415-347-7727

INTERPRETATION SYS., INC., A DBA Systems Company, 420 S. Fairview Ave., Goleta, CA 93117, Tel: 805-967-2383, Telex: 658336; *Sls. Mgr.:* Stan Schlosser

INTERSIL, 10710 N. Tantau Ave., Cupertino, CA 95014, Tel: 408-996-5000, TWX: 910-338-0583; FSC No.: 32293; Empl.: 4102; *Dist. Mgr.:* Bruce Mattern

INTERSTATE ELECTRONICS CORP., Box 3117, 1001 E. Ball Rd., Anaheim, CA 92803, Tel: 714-635-7210, Telex: 655443, TWX: 910-591-1197; FSC No.: 6625, 5985; Empl.: 1500; *Sls. Mgr.:* Darryl Watanabe; *Dist. Mgr.:* R. Sorenson

INTERSWITCH, 770 Airport Blvd., Burlingame, CA 94010, Tel: 415-347-8217, TWX: 910-374-2353; Empl.: 30; *Sls. Mgr.:* Ray G. Vorce

The Inter-Technical Group Inc.
WIMA Division

INTER-TECHNICAL GRP., Box 23, Irvington, NY 10533, Tel: 914-591-8822, TWX: 710-564-0802; Empl.: 21; *Sls. Mgr.:* T. A. Galgano .... **A•1087-1092**

Local Sales Offices & Reps

AL	Huntsville, J. R. Assocs.	205-830-2130
AZ	Scottsdale, Semper Fi Sls., Inc.	602-991-4606
CA	Santa Clara, Engineering Assocs. Corp.	408-988-5001
CO	Lakewood, Palmer Assocs.	303-233-9423
CT	Colchester, Normell Assocs.	203-537-5555/3758
FL	Altamonte Springs, 'C' Assocs., Inc.	305-831-1717
GA	Dunwoody, J. R. Assocs.	404-399-1831
IL	Westchester, W. G. Brouilette & Assocs.	312-345-6500
IN	Noblesville, W. G. Brouillette & Assocs.	317-877-4508
MA	Newton, Normell Assocs.	617-969-5478
MN	Minneapolis, Intl. Sls. Co.	612-831-8423
NJ	Colonia, H. B. Heft Assocs.	201-381-5193
NJ	Colonia, Heft & Ficarra Assocs.	201-381-5193
NY	Lynbrook, H. B. Heft Assocs.	516-LY 9-3351
NY	Rochester, BKT Assocs., Inc.	716-586-5814
NC	Winston Salem, J. R. Assocs.	919-768-7738
OH	Dayton, Markus Barnett Assocs., Inc.	513-293-6778
OR	Portland, Harry Levinson Co.	503-245-1902
PA	King of Prussia, R. D. Freedman Assocs.	215-279-5767
PA	W. Conshohocken, Eastern Comps. Sls. Corp.	215-825-8610
TN	Chattanooga, J. R. Assocs.	615-892-7630
TX	Carrollton, Paulsen Elctrn. Sls.	214-386-4785
TX	Richardson, Lelko-Paulsen Sls.	214-475-8052
UT	Salt Lake City, Alpine Entprs.	801-278-5081
VA	Front Royal, Eltron Sls., Ltd.	703-635-7201
VA	Manassas, Eastern Comps. Sls.	800-223-3850
WA	Seattle, Harry Levinson Co.	206-382-1300
PR	Ponce, Burke Assocs., Inc.	809-840-2444

Local Distributors

CA	Santa Clara, ISC	408-496-0411
FL	Ft. Lauderdale, NRC Elctrns., Inc.	305-772-4500
FL	Indialantic, T. C. Pridmore Co.	305-727-2491
NJ	East Brunswick, Brothers Elctrns., Inc.	201-238-2200
NY	Port Chester, MKM Elctrn. Comps., Inc.	914-382-3940
PA	Exton, VSH Elctrns.	215-363-2250
TX	Allen, Prime Distrbg. Co.	214-231-0170
WA	Seattle, Kam Elctrns. Div.	206-382-1300

INTEX MICRO SYSTEMS CORP., 725 S. Adams Rd., Suite L-8, Birmingham, MI 48011, Tel: 313-540-7601, Telex: 230254 WUPUBTLX; *Sls. Mgr.:* R. Thielman

INTRA-COMPUTER, 101 W. 31st St., New York, NY 10001, Tel: 212-947-5533, Telex: 64-5067; Empl.: 9; *Sls. Mgr.:* Art Yaglian

INTRONICS, INC., 57 Chapel St., Newton, MA 02158, Tel: 617-964-4000, Telex: 200095, TWX: 710-335-6835; Empl.: 130; *Sls. Mgr.:* J. Swartz .... **D•1676-1677**

Local Sales Offices & Reps

AL	Huntsville, Over & Over, Inc.	205-837-7105
AZ	Tempe, Delta Elctrns.	602-224-1601
CA	Los Alamitos, Power Specialists	213-594-9418
FL	Melbourne, Reynolds & Assocs.	305-259-7000
GA	Norcross, Over & Over, Inc.	404-449-6205
IL	Palatine, Kingston Comps.	312-359-7990
IN	Fort Wayne, Domino Unltd.	219-747-5621
IA	Cedar Rapids, Technical Elctrns.	319-362-4116
KS	De Soto, Midtec Assocs.	913-441-6565
MI	Grand Rapids, KRW Sls.	616-363-2925
MN	Minneapolis, Dan'l. Engrg.	612-854-7550
MO	Florissant, Midtec Assocs.	314-837-5200
NY	Canandaigua, Bensman/Upstate Assocs.	716-396-2498
NY	Hicksville, J-Square Mktg.	516-935-3200
NC	Raleigh, Over & Over, Inc.	919-872-2262
OH	Dayton, Del Steffen & Assocs.	513-293-3145
PA	Montgomeryville, Eastern Sci. Mktg.	215-368-4570
TX	Houston, Scientific Sls. Co.	713-460-9170
TX	Richardson, Scientific Sls. Co.	214-231-6541
UT	Bountiful, Anderson Assocs.	801-292-8991
WA	Seattle, Data Com. Assoc.	206-285-2525
Can	Mississauga, Ont., Giden-Morton Assocs.	416-671-8111

ION PHYSICS CO., 323 Andover St., Wilmington, MA 01887, Tel: 617-658-6030, Telex: 951733 ...... **D•1123**

IPAC GRP., 3047 Indl. Blvd., Bethel Pk., PA 15102, Tel: 412-831-9200, TWX: 510-697-3935; Empl.: 50; *Sls. Mgr.:* D. T. Cusack

IQ SYSTEMS, Applied Circuit Tech., 2931 La Jolla St., Anaheim, CA 92806, Tel: 714-630-6834; *Sls. Mgr.:* Jim Stedt

IR SCIENTIFIC, Box 110, Carlisle, MA 01741, Tel: 617-369-7118; Empl.: 10; *Sls. Mgr.:* S. J. Sommer

ISC MAGNETICS DIV., See Aeroflex Labs., Inc., Magnetic Prods. Div.

ISL PRODUCTS INT'L, LTD., 235 P Robbins Lane, Syosset, NY 11791-6093, Tel: 516-822-9601, TWX: 510-221-2109; Empl.: 25,000; *Sls. Mgr.:* Ken Kawaller .... **A•1094-1095, 1877, 2075, 2159**

Local Sales Offices & Reps

IL	Chicago, Rendell Sls.	312-528-9025
IN	Noblesville, Newton & Assoc.	317-845-8157
MD	Pikesville, Muncy Sls.	301-484-6376
MA	Topsfield, RFC Assocs.	617-887-8545
MN	Edina, Components Rep. Grp.	612-944-1160

ISOCHEM PRODUCTS CO., A Sub. of Rohm and Haas Adv. Matls., 99 Cook St., Lincoln, RI 02865, Tel: 401-723-2100, Telex: 845-247, TWX: 710-670-5335; Empl.: 26; *Sls. Mgr.:* W. Lott

ISOLATION PRODUCTS, INC., 157 San Lazaro Ave., Sunnyvale, CA 94086, Tel: 408-730-4672; Empl.: 5

ISOREG CORP., 410 Great Rd., P.O. Box 486, Littleton, MA 01460, Tel: 617-486-9483, TWX: 710-347-6974 ISOREG LTTN; Empl.: 75; *Sls. Mgr.:* Paul Foss; *Dist. Mgr.:* Paul Foss

ISOTEMP RESEARCH, INC, Box 3389, Charlottesville, VA 22901, Tel: 804-295-3101; FSC No.: 031785; Empl.: 30 .... **A•1374-1375**

Local Sales Offices & Reps

AZ	Scottsdale, Faser Technical Sls.	602-948-4404
CA	Fremont, Wm. Parks & Assocs.	415-796-0875
CA	Irvine, EBA Microwave	714-857-6079
CA	San Diego, Qualtronics	619-695-0118
IL	Woodridge, Trend-Tronics	312-985-0626
IN	Fort Wayne, Given Corp.	219-432-5585
NC	Raleigh, Godwin Assocs.	919-847-3006

ISOTRONICS, Industrial Park, New Bedford, MA 02745, Tel: 617-998-2000, TWX: 710-344-1961; *Sls. Mgr.:* Dennis T. Hanley

I² INTERFACE, INC., 21101 Osborne St., Canoga Park, CA 91304, Tel: 818-341-7014, TWX: 662 949 CNPK; Empl.: 40; *Sls. Mgr.:* Gilbert Gautereaux

ITC SYSTEMS, INC., 3739 Meru Lane, Santa Barbara, CA 93105, Tel: 805-682-8122, Telex: 295-298 INTERTEL SNC; *Sls. Mgr.:* W. Schulz

ITEK MEASUREMENT SYS., Div. Litton Inds., 27 Christina St., Newton, MA 02161, Tel: 617-969-7300, TWX: 710-335-6783; Empl.: 100 .... **B•1797**

Local Sales Offices & Reps

CA	Los Angeles, Measurement Sys. Div.	213-641-0476
FL	Orlando, K. S. Chaney	305-293-5656
IL	Des Plaines, Marsland Assocs.	312-298-2620
IN	Indianapolis, Marsland Assocs.	317-293-5437
IA	Cedar Rapids, Marsland Assocs.	319-396-8030
MN	Minneapolis, Marsland Assocs.	612-545-4481
NJ	Metuchen, Measurement Sys. Div.	201-548-1500
NM	Las Cruces, BFA Corp.	505-524-9693

Local Distributors

FL	Orlando, Kenneth S. Chaney	305-423-9465
IL	Des Plaines, Marsland Assocs.	312-298-2620
IN	Indianapolis, Marsland Assocs.	317-293-5437
MN	Minneapolis, Marsland Assocs.	612-545-4481
NM	Las Cruces, BFA Corp.	505-524-9693
Intl	England, Tadley, Hampshire, Hightech Comps., Ltd.	07356-3922
Intl	France, Paris, Sedeme	580.72.000
Intl	Germany, Munich, Weltronic GmbH	089-49 20 66
Intl	Holland, Rotterdam, Anru	010-137395
Intl	India, Bombay, Echbee Corp.	253489
Intl	Israel, Tel-Aviv, Airtronic Engrg., Ltd.	45 48 71
Intl	Italy, La Spezia, Motordiesel Elec. Instr. & Comp.	36.232
Intl	Japan, Tokyo, Nippon Engrg. Sys.	494-4045
Intl	Norway, Oslo, Ole A. Nordby A/S	02 55 07 50
Intl	Sweden, Waxholm, Saven AB	764-315 80
Intl	Switz., Zurich, Litton Prec. Prods. Intl.	01/48 35 44

ITHACO, INC., Meas. & Control Instrs. Div., 735 W. Clinton St., P.O. Box 6437, Ithaca, NY 14851-6437, Tel: 607-272-7640, TWX: 510-255-9307; Empl.: 120; *Sls. Mgr.:* E. W. Seymour

ITOH ELECTRONICS, INC. (C.), 5301 Beethoven St., Los Angeles, CA 90066, Tel: 212-682-0420, Telex: 12-5059; Empl.: 100; *Sls. Mgr.:* F.I. Makstein, VP Mktg.

ITT CANNON, 666 E. Dyer Road, Santa Ana, CA 92705-5684, Tel: 714-557-4700, Telex: 75-3917, TWX: 910-997-0523; FSC No.: 71468;Multiple; Empl.: 2500; *Sls. Mgr.:* Joel Urban; *Dist. Mgr.:* Richard Torson .... **C•1274-1288**

Local Sales Offices & Reps

AL	Huntsville, Brandel-Stephens & Co.	205-833-0445
AZ	Phoenix, ITT Cannon	602-275-4792
CA	Campbell (San Jose), ITT Cannon	408-559-1777
CA	Fountain Valley, ITT Cannon	714-964-7400
CA	San Diego, ITT Cannon	619-560-0917
CA	Santa Ana, ITT Cannon	714-557-4700
CO	Franktown, ITT Cannon	505-293-0457
CO	Littleton, ITT Cannon	303-973-8766
CT	New Fairfied, ITT Cannon	203-746-7160
FL	Deerfield Beach, Brandel-Stephens & Co.	305-427-8558
FL	Orlando, Brandel-Stephens & Co.	305-425-3202
IL	Des Plaines, ITT Cannon	312-297-3150
IN	Fort Wayne, ITT Cannon	219-484-6447
IA	Swisher, ITT Cannon	319-369-9107
KS	Wichita, ITT Cannon	316-681-2029
MD	Baltimore, ITT Cannon	301-882-4760
MD	Baltimore, ITT Cannon	301-254-3707
MA	Wakefield, ITT Cannon	617-246-2510
MI	Sterling Heights, ITT Cannon	313-643-4620
MN	Minneapolis, ITT Cannon	612-854-1973
MO	Bridgeton, ITT Cannon	314-739-6040
NM	Albuquerque, ITT Cannon	505-293-0457
NH	Henniker, ITT Cannon	603-428-3883
NY	Holbrook, ITT Cannon	215-646-2801
NY	Poughkeepsie, ITT Cannon	914-473-3314
NY	Rochester, L-Mar Assocs.	716-323-1000
NC	Greensboro, Brandel-Stephens & Co.	919-274-6952
OH	Kettering, ITT Cannon	513-434-8181
OH	Uniontown, ITT Cannon	216-494-6749
OR	Beaverton, ITT Cannon	503-626-4394
PA	Blue Bell, ITT Cannon	215-646-2801
PA	Trevose, P.S.A., Inc.	215-245-0513
TX	Dallas, ITT Cannon	214-661-0302
TX	Houston, ITT Cannon	713-777-1177
WA	Bellevue, ITT Cannon	206-454-3903
WI	Waukesha, ITT Cannon	414-544-1018

Local Distributors

AZ	Tempe, Arrow Elctrns., Inc.	602-986-4800
AZ	Tempe, Time Elctrns.	602-967-2000
CA	Anaheim, Time Elctrns.	714-937-0911
CA	Chatsworth, Arrow Elctrns., Inc.	818-701-7500
CA	Chatsworth, Time Elctrns.	818-998-7200
CA	Hayward, Arrow Elctrns., Inc.	415-487-4600
CA	Orange, Richey/Western Elec., Inc.	714-634-2811
CA	Sacramento, Arrow Elctrns., Inc.	916-925-7456
CA	San Diego, Arrow Elctrns., Inc.	619-565-4800
CA	San Diego, Richey/Western	619-271-4511
CA	San Diego, Time Elctrns.	619-586-1331
CA	Santa Clara, Richey/Western Elec., Inc.	408-727-7411
CA	Sun Valley, Richey Elctrns.	213-875-2862
CA	Sunnyvale, Arrow Elctrns., Inc.	408-745-6600
CA	Sunnyvale, Time Elctrns.	408-734-9888
CA	Torrance, Time Elctrns.	213-320-0880
CA	Tustin, Arrow Elctrns., Inc.	714-838-5422
CO	Denver, Arrow Elctrns.	303-758-4585
CO	Englewood, Time Elctrns. of CO	303-850-7701
CT	Cheshire, Time Elctrns., Inc.	203-271-3200
CT	Hamden, A.S.I. Connector Corp.	203-288-0044
CT	Wallingford, Arrow Elctrns., Inc.	203-265-7741
FL	Deerfield Beach, Arrow Elctrns., Inc.	305-429-8200
FL	Ft. Lauderdale, Time Elctrns.	305-974-4800
FL	Orlando, Time Elctrns.	305-841-6565
FL	Palm Bay, Arrow Elctrns., Inc.	305-725-1480
GA	Atlanta, Electro Air	404-351-3545
GA	Norcross, Arrow Elctrns., Inc.	404-449-8252
GA	Norcross, Time Elctrns.	404-448-4448
IL	Elmhurst, P.E.I./Genesis	312-530-2272
IL	Schaumburg, Arrow Elctrns., Inc.	312-397-3440
IN	Indianapolis, Arrow Elctrns., Inc.	317-243-9353
IN	Indianapolis, P.E.I./Genesis	317-637-5571
IN	South Bend, P.E.I./Genesis	219-287-2911
MD	Baltimore, A.S.I. Elecrrns. Co.	301-265-5100
MD	Columbia, Arrow Elctrns., Inc.	301-995-0003
MD	Columbia, Time Elctrns.	310-964-3090
MD	Timonium, P.E.I./Genesis	301-561-5235
MA	Woburn, Arrow Elctrns., Inc.	617-933-8130
MA	Woburn, Time Elctrns.	617-935-8080
MI	Ann Arbor, Arrow Elctrns., Inc.	313-971-8220
MI	Bloomington, Time Elctrns., Inc.	612-944-9192
MN	Edina, Arrow Elctrns., Inc.	612-830-1800
MO	St. Louis, Arrow Elctrns., Inc.	314-567-6888
MO	St. Louis, Time Elctrns.	314-391-6444
NH	Manchester, Arrow Elctrns., Inc.	603-668-6968
NH	Manchester, Arrow Elctrns., Inc.	603-688-6968
NJ	Fairfield, Arrow Elctrns., Inc.	210-575-5300
NJ	Marlton, Arrow Elctrns., Inc.	609-596-8000
NM	Albuquerque, Arrow Elctrns., Inc.	505-243-4566
NY	Buffalo, Summit Distrs.	716-887-2800
NY	Hauppauge, Arrow Elctrns., Inc.	516-231-1000
NY	Hauppauge, Time Elctrn. Sls.	516-273-0100
NY	Liverpool, Arrow Elctrns., Inc.	315-652-1000
NY	Plainview, Progress Elctrns. Co., Inc.	516-433-1700
NY	Rochester, Arrow Elctrns., Inc.	716-427-0300
NC	Raleigh, Arrow Elctrns., Inc.	919-876-3132
NC	Winston-Salem, Arrow Elctrns., Inc.	919-725-8711
OH	Centerville, Arrow Elctrns., Inc.	513-435-5563
OH	Cleveland, P.E.I./Genesis	216-662-0737
OH	Dayton, P.E.I./Genesis	513-258-0040
OH	Solon, Arrow Elctrns., Inc.	216-248-3990
OK	Tulsa, Arrow Elctrns., Inc.	918-665-7700
OK	Tulsa, P.E.I./Genesis	918-622-8520
OR	Beaverton, Almac Elctrns.	503-629-8090
OR	Portland, Time Elctrns.	503-684-3780
OR	Tigard, Arrow Elctrns., Inc.	503-684-1690
PA	Monroeville, Arrow Elctrns., Inc.	412-856-7000
PA	Philadelphia, P.E.I./Genesis	215-568-7400
PA	Warminster, Henwarr	215-675-4104
TX	Austin, Arrow Elctrns., Inc.	512-835-4180
TX	Austin, Harrison Equip. Co., Inc.	512-458-3555

TX	Carrollton, Arrow Elctrns., Inc.	214-380-6464
TX	Dallas, Harrison Equip. Co., Inc.	214-239-2750
TX	Dallas, Time Elctns.	214-385-0566
TX	Houston, Arrow Elctrns., Inc.	713-530-4700
TX	Stafford, Harrison Equip.	713-879-2600
UT	Salt Lake City, Arrow Elctrns., Inc.	801-972-0404
WA	Bellevue, Almac Elctrns.	206-643-9992
WA	Bellevue, Arrow Elctrns., Inc.	206-643-4800
WA	Bellevue, Time Elctrns.	206-641-3640
WA	Spokane, Almac Elctrns.	509-924-9500
WI	Oak Creek, Arrow Elctrns., Inc.	414-764-6600

ITT CANNON ELECTRIC, 666 East Dyer Rd., Santa Ana, CA 92702, Tel: 714-557-4700

ITT Components
A unit of ITT Corporation
Electromechanical Group

ITT COMPONENTS ELECTROMECHANICAL GRP., 1201 E. McFadden Ave., Santa Ana, CA 92705, Tel: 714-836-0351, Telex: 681-389, TWX: 910-595-1744; FSC No.: 61725; Empl.: 40; *Sls. Mgr.:* T. Beaumont; *Dist. Mgr.:* B. Holter .... **B•1414-1417, 1419, 1422, 1471**

Local Sales Offices & Reps

AL	Huntsville, Brandel-Stephens & Co.	205-883-0445
AZ	Scottsdale, Semi-Systems	602-991-1151
CA	Laguna Hills, English Damco	714-837-3801
CA	Los Angeles, English Damco	213-598-6146
CA	Mountain View, Caltron Comps. Corp.	415-964-3244
CA	San Diego, English Damco	619-942-8282
CO	Denver, I. W. Strong & Assocs.	303-292-6900
CT	Guilford, Data Mark, Inc.	203-453-0575
FL	Deerfield Beach, Brandel-Stephens & Co.	305-427-8558
FL	Orlando, Brandel-Stephens & Co.	305-425-3202
GA	Atlanta, Brandel-Stephens & Co.	404-261-7579
IL	Rolling Meadows, Heartland Tech. Sls.	312-577-9222
IN	Fort Wayne, M/S Sls.	219-484-1904
IN	Indianapolis, M/S Sls.	317-257-8916
KS	Leawood, Thunderbird Tech. Sls.	913-642-7220
KS	Wichita, Thunderbird Tech. Sls.	316-684-3941
MD	Millersville, Trimark	301-987-9103
MA	Southboro, KSA of New England	617-485-9432
MI	Brighton, SAI Mktg.	313-227-1786
MN	Minneapolis, SAI Mktg.	612-935-0777
MN	Minnetonka, SAI Mktg. Corp.	612-935-0777
MO	Maryland Heights, Thunderbird Tech. Sls.	314-567-6488
NM	Albuquerque, Syntech	505-266-7951
NY	Manhasset, Win Cor Elctrns.	516-627-9474
NY	Rochester, D. L. Eiss Assocs.	716-328-3000
NC	Greensboro, Brandel-Stephens & Co.	919-274-6952
OH	Beachwood, Thompson & Assocs.	216-831-6277
OH	Dayton, Thompson & Assocs.	513-435-7733
OK	Tulsa, Norcom	918-832-7747
OR	Portland, Jas. J. Backer Co.	503-297-8744
PA	Prospect Park, Elf Sls.	215-534-3340
TN	San Antonio, Norcom	512-680-4513
TX	Austin, Norcom	512-451-2757
TX	Dallas, Norcom	214-386-4888
TX	Houston, Norcom	713-778-0392
UT	Salt Lake City, I. W. Strong & Assocs.	810-942-6998
VA	Lynchburg, Trimark	804-528-0681
WA	Seattle, Jas. J. Backer Co.	206-285-1300
WI	Milwaukee, Heartland Tech. Mktg.	414-931-0606

Local Distributors

AL	Huntsville, RM Elctrns.	205-852-1550
AZ	Tempe, Richey Western Elctrns.	602-894-9251
AZ	Tempe, TIME Elctrns.	602-967-2000
CA	Anaheim, TIME Elctrns.	714-937-0911
CA	Chatsworth, Integrated Elctrns.	818-998-2200
CA	Chatsworth, Q.C. Comps.	818-700-2622
CA	Chatsworth, Time Elctrns.	818-998-7200
CA	Irvine, Integrated Elctrns.	714-660-1055
CA	Los Angeles, Master Distrs.	213-452-1229
CA	Los Angeles, Richey Western Elctrns.	213-820-3777
CA	Los Angeles, Time Elctrns.	213-477-1251
CA	Orange, Richey Western Elctrns.	714-634-2811
CA	Sacramento, Integrated Elctrns.	916-424-5297
CA	San Diego, Richey Western Elctrns.	619-271-4511
CA	San Diego, Time Elctrns.	619-586-1331
CA	San Jose, Integrated Elctrns.	408-263-1100
CA	Santa Ana, ITT Multi Comps.	714-835-9019
CA	Santa Clara, Richey Western Elctrns.	408-727-7411
CA	Santa Clara, RM Elctrns.	408-496-0411
CA	Santa Monica, Distr. Specialists	213-393-9666
CA	Sunnyvale, TIME Elctrns.	408-734-9888
CA	Torrance, TIME Elctrns.	213-320-0880
CO	Denver, Integrated Elctrns.	303-292-6121
CO	Englewood, NEP Elctrns.	303-799-9898
CO	Englewood, TIME Elctrns.	303-850-7701
CT	East Haven, J.V. Elctrns.	203-469-2321
CT	New Haven, Greene Shaw Co.	203-397-0710
FL	Davie, ARCO Distrs.	305-473-2550
FL	Fort Lauderdale, NRC	305-772-4500
FL	Fort Lauderdale, TIME Elctrns.	305-974-4800
FL	Orlando, Time Elctrns.	305-841-6565
FL	Tampa, Reptron	810-876-0671
GA	Atlanta, Prehler Elctrns.	404-447-5540
GA	Norcross, Time Elctrns.	404-448-4448
IL	Arlington Heights, Reptron Elctrns.	312-593-7070
IL	Chicago, NEP Elctrns.	312-625-8400
IL	Chicago, Prehler Elctrns.	312-384-6100
IL	Hoffman Estates, Integrated Elctrns.	312-843-2040
IL	Lombard, RM Elctrns.	312-932-5150
IN	Indianapolis, RM Elctrns.	317-291-7110
MD	Baltimore, Resco	301-529-0500
MD	Beltsville, RESCO-Washington	301-937-9100
MD	Beltsville, TREEKO Sls.	301-792-0112
MD	Columbia, TIME Elctrns.	301-964-3090
MA	Newton, Greene-Shaw Co.	617-969-8900
MA	Wilmington, R. C. Comps.	617-273-1860
MA	Woburn, TIME Elctrns.	617-935-8080
MI	Farmington Hills, Prehler Elctrns.	313-473-7200
MI	Grand Rapids, RM Elctrns.	616-531-9300
MI	Livonia, Reptron Elctrns.	313-525-2700
MN	Bloomington, Time Elctrns.	612-944-9192
MN	Minneapolis, Industrial Comps.	612-831-2666
MO	St. Louis, TIME Elctrns.	314-391-6444
NV	Las Vegas, Kiesub Elctrns.	702-733-3888
NJ	Whippany, Tonar Inds.	201-586-9000
NM	Albuquerque, Betatron Elctrns.	505-344-2381
NM	Albuquerque, International Elctrns.	505-345-8127
NY	Hauppauge, TIME Elctrns.	516-273-0100
NC	Raleigh, Prehler Elctrns.	919-876-9111
OH	Columbus, Reptron	614-436-6675
OH	Middleburg Hts., Prehler Elctrns.	216-243-5510
OK	Tulsa, Quality Comps.	918-664-8812
OR	Portland, Time Elctrns.	503-684-3780
PA	Broomall, TIME Elctrns.	215-337-0900
PA	Essington, Tri-Com	215-521-3080
PA	Horsham, RM Elctrns.	215-674-1181
TX	Addison, Quality Comps.	214-733-4300
TX	Austin, Quality Comps.	512-835-0220
TX	Dallas, RM Elctrns.	214-263-8361
TX	Dallas, Time Elctrns.	214-385-0566
TX	El Paso, ERA Elctrns.	915-592-4126
TX	El Paso, International Elctrns.	915-598-3406
TX	Sugarland, Quality Comps.	713-491-2255
UT	North Salt Lake, Integrated Elctrns.	801-298-1869
WA	Bellevue, Integrated Elctrns.	206-455-2727
WA	Bellevue, Time Elctrns.	206-641-3640
WA	Seattle, Richey Western Elctrns.	206-575-1910
WI	New Berlin, NEP Elctrns.	414-785-9100
WI	New Berlin, RM Elctrns.	414-784-4420

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Local Sales Offices & Reps

AL	Huntsville, Brandel-Stephens & Co.	205-833-0445
AZ	Scottsdale, Semi-Systems Arizona	602-991-1151
CA	Laguna Hills, English Damco	714-837-3801
CA	Mountain View, Caltron Comp. Corp.	415-964-3244
CO	Denver, T. W. Strong & Assoc.	303-292-6900
CT	Guilford, Data Mark	203-453-0575
GA	Atlanta, Brandel-Stephens & Co.	404-261-7579
IL	Rolling Meadows, Heartland Tech. Mktg., Inc.	312-577-9222
IN	Fort Wayne, M/S Sls. & Assoc.	219-483-4520
IN	Indianapolis, SAI Mktg.	317-241-9276
KS	Leawood, Thunderbird Tech. Sls.	913-642-7220
MD	Millerville, Tri-Mark	301-761-6000
MA	Southboro, KSA of New England	617-485-9432
MI	Brighton, SAI Mktg.	313-227-1786
MN	Minneapolis, SAT Mktg.	612-935-0777
MO	Maryland Hts., Thunderbird Tech. Sls.	314-567-6488
NM	Albuquerque, Syntech	505-266-7951
NY	Manhasset, Win-Cor Elctrn. Sls.	516-627-9474
NY	Rochester, D. L. Eiss Assoc.	716-328-3000
NY	Syracuse, D. L. Eiss Assoc.	315-457-0492
NC	Greensboro, Brandel-Stephens & Co.	919-274-6952
OH	Beachwood, Thompson Assoc.	216-831-6277
OH	Dayton, Thompson Assoc.	513-435-7733
OR	Portland, Jas J. Backer Co.	503-297-3777
OR	Salem, Jas J. Backer Co.	503-362-0717
TX	Austin, Norcom	512-451-2757
TX	Dallas, Norcom	214-386-4888
VA	Lynchburg, Tri-Mark	804-528-0681
WA	Seattle, Jas J. Backer Co.	206-285-1300

Local Distributors

AL	Huntsville, RM Elctrns.	205-852-1550
AZ	Phoenix, Kachina Elctrn. Distrs.	602-269-6201
AZ	Tempe, Richey Western Elctrns.	602-894-9251
AZ	Tempe, Time Elctrns.	602-967-2000
CA	Anaheim, Time Elctrns.	714-937-0911
CA	Chatsworth, Integrated Elctrns.	213-998-2200
CA	Chatsworth, Shelley Elctrns.	619-453-7133
CA	Chatsworth, Shelley Elctrns.	213-998-3333
CA	Irvine, Integrated Elctrns.	714-660-1055
CA	Los Angeles, Richey Western Elctrns.	213-820-3777
CA	San Diego, Richey Western Elctrns.	619-271-4511
CA	San Diego, Shelly Elctrns.	619-453-7133
CA	San Jose, Integrated	408-263-1100
CA	San Jose, Shelley Elctrns.	408-942-9111
CA	Santa Clara, Richey Western Elctrns.	408-727-7411
CA	Sun Valley, G. C. Comps.	213-768-6111
CA	Sunnyvale, Capsco Sls.	408-734-3020
CA	Sunnyvale, Time Elctrns.	408-734-9888
CA	Torrance, Time Elctrns.	213-320-0880
CA	Van Nuys, Nesco	213-781-0505
CO	Denver, Integrated Elctrns.	303-292-6121
CO	Englewood, Time Elctrns.	303-850-7701
CT	East Haven, J.V. Elctrns.	203-469-2321
CT	New Haven, Greene Shaw Co.	203-397-0710
FL	Dania, Arco Distrs.	305-462-3370
FL	Fort Lauderdale, NRC	305-772-4500
FL	Fort Lauderdale, Time Elctrns.	305-974-4800
GA	Atlanta, Prehler Elctrns.	404-447-5540
GA	Atlanta, Time Elctrns.	404-351-3545
IL	Arlington Hgts., Reptron Elctrns.	312-593-7070
IL	Chicago, Integrated	312-625-8400
IL	Chicago, NEP Elctrns.	312-625-8400
IL	Chicago, Prehler	312-384-6100

IL	Lombard, RM Elctrns.	312-932-5150
IN	Indianapolis, RM Elctrns.	317-247-9701
MD	Baltimore, Resco-Baltimore	301-823-0700
MD	Beltsville, Resco, Washington	301-937-9100
MD	Columbia, Time Elctrns.	301-964-3090
MA	Burlington, TLC	617-273-0140
MA	Newton, Greene-Shaw Co.	617-969-8900
MA	Wilmington, R.C. Comps.	617-273-1860
MA	Woburn, Time Elctrns.	617-935-8080
MI	Farmington Hills, Prehler elctrns.	313-473-7200
MI	Grand Rapids, RM Elctrns.	616-531-9300
MI	Livonia, Reptron Elctrns.	313-525-2700
MN	Bloomington, Time Elctrns.	612-944-9192
MN	Eden Prairie, Cassidy Elctrns.	612-944-0100
MN	Edina, Cassidy Elctrns.	612-835-7747
MN	Minneapolis, Industrial Comps.	612-831-2666
MO	St. Louis, Time Elctrns.	314-391-6444
NV	Las Vegas, Klesub Elctrns.	702-733-3888
NJ	Whippany, TONAR Inds.	201-884-1400
NM	Albuquerque, Betatron Elctrns.	505-344-2381
NM	Albuquerque, Intl. Elctrns.	505-345-8127
NY	Fairport, Pioneer Elctrns.	716-381-7070
NY	Hauppauge, Time Elctrns.	516-273-0100
OH	Columbus, Reptron	614-436-6675
OH	Middleburg Hieghts, Prehler Elctrns.	216-243-5510
OK	Tulsa, The Altair Co.	918-252-5781
OR	Portland, Time Elctrns.	503-684-3780
PA	Broomall, Time Elctrns.	215-359-1200
PA	Essington, Tri-Com	215-521-3080
PA	Horsham, RM Elctrns.	215-674-1181
TX	Addison, Quality Comps.	214-387-4949
TX	Austin, Quality Comps.	512-835-0220
TX	Dallas, Captronics	214-340-3592
TX	Dallas, RM Elctrns.	214-263-8361
TX	El Paso, International Elctrns.	915-598-3406
TX	Ft. Worth, TTI, Inc.	817-831-0441
TX	Houston, The Altair Co.	713-462-3029
TX	Richardson, The Altair Co.	214-231-5166
UT	Salt Lake City, Integrated Elctrns.	801-298-1869
WA	Bellevue, Time Elctrns.	206-641-3640
WA	Seattle, Richey Western Elctrns.	206-575-1910
WI	Maguon, Taylor Elec. Co.	414-241-4321
WI	New Berlin, NEP Elctrns.	414-785-9100
WI	New Berlin, RM Elctrns.	414-784-4420

ITT ELECTRON TUBE, ITT Corp., Box 100, Easton, PA 18042, Tel: 215-252-7331, Telex: 847494; FSC No.: 20948; Empl.: 550

ITT ELECTRO-OPTICAL PRODS., 7635 Plantation Rd., Roanoke, VA 24019, Tel: 703-563-0371, Telex: 829458; Empl.: 1000; *Sls. Mgr.:* R. Moore; *Dist. Mgr.:* P. Williams

ITT GENERAL CONTROLS DIV., Intl. Telephone & Telegraph Corp., 801 Allen Ave., Glendale, CA 91201, Tel: 213-842-6131, Telex: 673147, TWX: 910-498-2225; Empl.: 1545; *Sls. Mgr.:* Phillip Vaughn

ITT GILFILLAN, 7821 Orion Ave., Van Nuys, CA 91409, Tel: 818-988-2600, Telex: 651421, TWX: 910-495-1787; FSC No.: 24930; Empl.: 2000; *Sls. Mgr.:* Robert McBride

ITT-HIGBIE MFG., Wagner Rd., Rochester, MI 48063, Tel: 313-651-5300, TWX: 810-232-1592; Empl.: 1500; *Sls. Mgr.:* C. J. Clemens

ITT POMONA ELECTRONICS, 1500 E. 9th St., P.O. Box 2767, Pomona, CA 91766, Tel: 714-623-3463, TWX: 910-581-3822; FSC No.: 05276; Empl.: 170; *Sls. Mgr.:* Carl Wm. Musarra; *Dist. Mgr.:* Carl Wm. Musarra ... **C•1289-1407**

Local Sales Offices & Reps

AL	Madison, South Eastern Assocs.	205-772-9616
AZ	Phoenix, More Sls.	602-274-4558,602-265-9201
CA	Burlingame, Carelli/EMA	415-342-4514
CA	Culver City, DeAngelo, Rothman & Co.	213-827-2202
CA	Pasadena, Paul Nurches Co.	818-681-8957, 818-796-5844
CA	Santa Clara, Engrg. Assocs. Corp.	408-988-5001
CO	Denver, A-E-S Inc.	303-777-8733
FL	Hialeah, L. Haas Co.	305-822-2300
IL	Northbrook, W. M. Linz	312-498-9600
IN	Indianapolis, Blind Elctrn. Sls. Co.	317-241-3742, 317-293-6205
IN	Indianapolis, Blind Elctrns. Sls. Co.	317-241-3742
IA	West Des Moines, Nevco	515-225-9866
MA	Sharon, A Appell Assoc.	617-784-3439
MI	Kentwood, C. Geer	616-534-9449,616-243-2746
MN	Minneapolis, Hei-lite Sls.	612-861-6051
MO	Kansas City, Nevco	816-421-1751
OH	Mentor, Perry Lohse & Co., Inc.	216-255-1992
MO	North Kansas City, Nevco, Inc.	816-421-1751
NJ	Belleville, D. F. Tobias & Co.	201-751-8680
OH	Dayton, Lessis Assocs.	513-294-1551
OR	Beaverton, Eclipse Mktg. Grp.	503-642-1661
OR	Beaverton, Eclipse Mktg. Grp. Ltd.	503-642-1661
OR	Portland, Eclipse Mktg. Grp.	503-644-2550
PA	Philadelphia, David S. Linz	215-379-0734
SC	Greenville, H. C. Norman	803-244-6254
TX	Dallas, Techno Assocs.	214-357-9212
WA	Redmond, Eclipse Mktg. Grp.	206-885-6991
Can	Whitby, ITT Canon Elec. Canada	416-668-8881

ITT POWER SYSTEMS CORP., Box 688, Galion, OH 44833-0688, Tel: 419-468-8100, Telex: 24-1401, TWX: 810-248-2907; Empl.: 800; *Dist. Mgr.:* W. E. Fox

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ITT SCHADOW, 8081 Wallace Rd., Eden Prairie, MN 55344, Tel: 612-934-4400, Telex: 29-0556, TWX: 910-576-2469; Empl.: 170; *Sls. Mgr.:* Darrell Wilk; *Dist. Mgr.:* Darrell Wilk ... **B•1598-1602**

Local Sales Offices & Reps

AL	Huntsville, Brandel-Stephens	205-883-0445
CA	Los Angeles, Landa/Minyard	213-879-0770
CA	Mountain View, Caltron Comps.	415-964-3244
CA	San Diego, Landa/Minyard	619-942-1086
CO	Boulder, Component Prod. Sls.	303-530-2800
CT	Farmington, R. Perron & Co.	203-673-4825
FL	Deerfield Beach, Brandel-Stephens	305-427-8558
FL	Orlando, Brandel-Stephens	305-425-3202
GA	Atlanta, Brandel-Stephens	404-261-7579
IL	Chicago, IRI	312-647-7755
KS	Wichita, PMR	316-684-4141
MA	Newton, R. Perron & Co.	617-449-6162
MI	Lathrup Village, R. C. Nordstrom Co.	313-559-7373
MN	Edina, Monroe Hanna	612-925-5700
MO	Maryland Heights, PMR	314-569-1220
NH	Bedford, Ray Perron & Co.	603-472-3030
NH	Dover, Ray Perron & Co.	603-742-2321
NM	Albuquerque, Thorson Desert States	505-265-5655
NY	Albany, Regan-Compar, Inc.	518-489-4777
NC	Greensboro, Brandel-Stephens	919-274-6952
OH	Columbus, K. W. Elctrns.	614-888-0483
OH	Dayton, K. W. Elctrns.	513-890-2150
PA	Philadelphia, P.S.A., Inc.	215-245-0513
TX	Arlington, W. Pat Fralia Co.	817-267-3577
TX	Houston, W. Pat Fralia Co.	713-772-1572
UT	Salt Lake City, Comp. Prods.	801-262-0000
WA	Seattle, Jas. J. Backer Co.	206-285-1300

Local Distributors

AL	Huntsville, Hallmark	205-837-8700
CA	Cerritos, El-Com, Inc.	213-404-2961
CA	Gardena, Cal-Switch	213-770-2330
CA	Los Angeles, Richey Western	213-820-3777
CA	San Diego, El-Com, Inc.	619-272-4511
CA	Sunnyvale, Time Elctrns. Nor/Cal	408-734-9888
CO	Denver, Integrated Elctrns.	303-292-6121
FL	Miami, Hallmark	305-971-9280
FL	Orlando, Hallmark	305-855-4020
IL	Bensenville, Hallmark	312-860-3800
IL	Wheeling, Hawk Elctrns.	312-459-4030
KS	Kansas City, Hallmark	913-888-4747
KS	Wichita, R.S.C. Elctrns.	316-267-5213
MD	Beltsville, Treeko Sls.	301-937-8260
MD	Columbia, Hallmark	301-988-9800
MA	Canton, Impact Sls. Co.	617-444-3971
MA	Hingham, Sager Elec.	617-749-6700
MI	Kentwood, R.M. Elctrns.	616-531-9300
MN	Bloomington, Hallmark	612-854-2223
MN	Minneapolis, Berquist Co.	612-835-2322
MO	Maryland Heights, Hallmark	314-291-5350
NY	Buffalo, Summit Distr.	716-884-3450
NY	Lynbrook, Peerless Radio	516-593-2121
NY	Rochester, Modutex, Inc.	716-647-9700
NC	Raleigh, Hallmark	919-872-0712
OH	Cincinnati, Schuster Elec.	313-489-1400
OH	Twinsburg, Schuster/Cleveland	216-425-8134
OH	Westerville, Hallmark	614-891-4555
OK	Tulsa, Hallmark	918-665-3200
PA	Philadelphia, Hallmark	215-355-7300
PA	Philadelphia, Phila. Elctrns.	215-568-7400
TX	Austin, Hallmark	512-258-8848
TX	Dallas, Hall-Mark	214-343-5000
TX	Houston, Hall-Mark	713-781-6100
TX	Stafford, SW Elctrns.	713-491-4900
WI	Milwaukee, Hallmark	414-761-3000

ITT SEMICONDUCTORS, 500 Broadway, Lawrence, MA 01841, Tel: 617-688-1881, Telex: 947413, TWX: 710-342-1357; *Sls. Mgr.:* Ed Burgess; *Dist. Mgr.:* John Flannery

ITT SURPRENANT DIVISION, 172 Sterling St., Clinton, MA 01510, Tel: 617-368-1401, Telex: 920451, TWX: 710-347-1736; Empl.: 500; *Sls. Mgr.:* I. W. Forrest; *Dist. Mgr.:* E. Michaud

ITT TELECOMMUNICATIONS, Apparatus Dept., Fulton Dr., Corinth, MS 38834, Tel: 601-287-3771, TWX: 510-984-0211; Empl.: 2000; *Sls. Mgr.:* Charles Yancey

ITT THERMOTECH, Div. IT & T, 1203 S. 5th St., Hopkins, MN 55343, Tel: 612-933-9400, Telex: 29-0414; Empl.: 605; *Sls. Mgr.:* Gene Christiansen

ITW, Cortron Div., 400 W. Grand, Elmhurst, IL 60126, Tel: 312-279-9110

ITW SWITCHES, Illinois Tool Works, 6615 W. Irving Park Rd., Chicago, IL 60634, Tel: 312-282-4040, Telex: 4330130, TWX: 910-221-0275; Empl.: 500; *Sls. Mgr.:* A. Steiner; *Dist. Mgr.:* A. Steiner

IVEK CORP., 43 School St., N. Springfield, VT 05150, Tel: 802-886-8278; Empl.: 4; *Sls. Mgr.:* Gene Williams

IVERON PACIFIC, 1150 Morena Boulevard, San Diego, CA 92110-3899, Tel: 619-275-1500; Empl.: 16; *Sls. Mgr.:* Lee Kerl

IVO INDS., INC., 201 Industrial Way W., P.O. Drawer 917, Eatontown, NJ 07724, Tel: 201-542-5151, Telex: 132-414; Empl.: 10; *Sls. Mgr.:* Tom Jones ... **B•1603**

Local Sales Offices & Reps

CA	Los Altos, J. W. Wilhoit, Inc.	415-961-3660
CA	Tustin, Sierra-Pacific Engrg.	714-731-3411
IL	Buffalo Grove, Jim Laganowski & Assocs.	312-520-0130
NY	Buffalo, Rudell-Merrifield Assoc.	716-634-4300
OH	Beachwood, Elctrn. Salesmasters	216-831-9555
PA	Willow Grove, Indl. Mktg. Specialists	215-659-0444

Local Distributors

		818-991-3864
CA	Agoura, Sibbald Instrs.	213-991-3864
CA	San Carlos, Logan Elctrns.	415-594-0700
CA	San Diego, Electric Power & Controls	619-483-1126
CA	San Jose, Consolidated Parts	408-263-9521
CA	Santa Monica, Master Distr.	213-452-1229
CT	New Preston, AALE Equip.	203-868-0501
FL	Lakeland, A A Electric	813-665-6941

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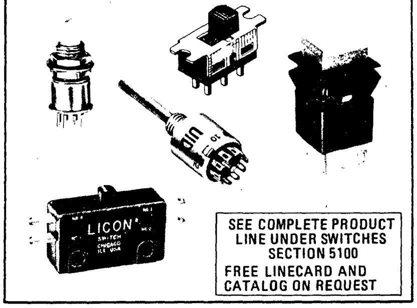

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IL	Arlington Heights, Martec Assocs.	312-956-8090
MD	Towson, Kraft Indl.	301-828-5838
MI	Detroit, E & E Engrg.	313-371-2000
MN	St. Paul, Power/Mation Div.	612-645-0781
NJ	E. Rutherford, A A Electric	201-777-5477, 800-223-0119
NY	Clarence, Trott Elctrns.	716-634-8500
NC	Charlotte, Trott Elctrns.	704-376-2237
NC	Huntersville, Scott Equip.	704-875-1611
SC	Greenville, Automation Supp. Co.	800-845-5274
TX	Dallas, Dallas Meter Tek	214-349-6044
WI	Green Bay, Control Speciality	414-468-1967
WI	Waukesha, Power/Mation Div.	414-542-2868
WI	Wausau, Control Speciality	715-359-9122

IWATSU INSTRUMENTS, INC., 430 Commerce Blvd., Carlstadt, NJ 07072, Tel: 201-935-5220, TWX: 710-989-0255; Empl.: 8; *Sls. Mgr.:* Alex Orloff ..... **D•1390-1392**

Local Sales Offices & Reps

CA	Garden Grove, Advanced Digital Grp.	213-598-9645
CA	Sunnyvale, ICHIREP	408-249-2585
CT	Old Saybrook, MJT Assocs.	203-38-5890
FL	Sarasota, Ram-Z Assocs.	813-921-5561
IL	Rolling Meadows, Commodore 1	312-394-5441
MN	Minneapolis, Kodo Assocs.	612-881-1255
NH	Nashua, MJT Assocs.	603-889-5373
NJ	Parlin, J.M.R. Sls., Inc.	201-254-8484
NY	Rochester, Harmony Labs.	716-458-3376
NC	Pineville, TESTREPS	704-588-4624
OH	North Ridgeville, TMS	216-327-3527
OK	Tulsa, Spectra Sls. Corp.	918-663-7188
TX	Houston, Spectra Sls. Corp.	713-747-2798

Local Distributors

CA	Anaheim, R & D Elctrn. Supp.	714-773-0240
CA	Burbank, U.S. Instr. Rentals	213-849-5861
CA	Canoga Park, Rag Elctrns.	213-998-6500
CA	Freemont, Rep Inc.	415-651-4131
CA	Lakewood, R. D. Technology	213-595-9468
CA	Oceanside, Palomar Elctrn. Prods.	619-439-7541
CA	San Diego, Instrument Engrs.	619-268-8344
CA	San Mateo, U.S. Instr. Rentals	415-572-6686
CA	Van Nuys, Testek Corp.	213-786-6890
CO	Boulder, Instr. Repair Labs	303-449-2721
CT	Monroe, Connecticut Calibration	203-261-9518
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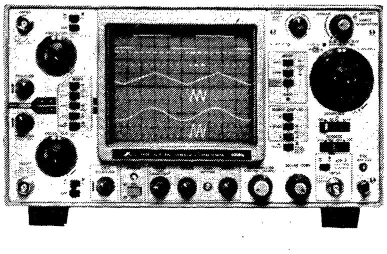

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FL	St. Petersburg, H. J. Knapp	813-392-0406
FL	W. Palm Beach, Nurmi Elctrn. Supp.	305-686-8553
IL	Downers Grove, Ames Supply Co.	800-942-1596
MA	Billerica, Hayes Instr. Svc.	617-663-4800
MA	N. Billerica, A.S.T./Servo Sys.	617-667-8541
MA	Newton, Interfax Sys., Ltd.	617-332-4621
MA	Waltham, Calibron Instrs.	617-894-6440
MI	Royal Oak, Programmed Learning Measures	313-549-3936
MN	Minneapolis, Tonka Tech. Labs	612-593-1770
MO	St. Louis, Indl. Svc. Lab. Corp.	314-535-5760
NJ	North Caldwell, Hosica	201-256-7724
NM	Albuquerque, Electronic Parts Co.	505-293-6161
NY	Frankfort, Kapital Instr. Sls.	315-894-4245
NY	Great Neck, Instrument Mart	516-487-7430
NY	Melville, Exphil Calibration	516-694-5755
NY	Morrisville, D.F.I. Entprs.	315-684-9693
NY	Poughquag, Schmidt Elctrns.	914-724-3400
NY	Rochester, Caltronix, Inc.	716-359-3780
NC	Pineville, Elctrn. Measuring Instr. Svc.	704-588-4624
OK	Oklahoma City, Houston De Pue Labs.	404-235-5469
OK	Tulsa, Tri-State Instrs.	918-836-0286
PA	Philadelphia, Jan Ind. Elctrns.	215-922-1321
PA	Philadelphia, Sunshine Instrs.	215-673-5600
PA	York, Y.I.S., Inc.	717-854-7804
TX	Austin, Galtronics, Inc.	512-837-7470
TX	Austin, Tinkertronics	512-926-4420
TX	Dallas, Hutton Co.	214-484-0580
TX	Garland, Tucker Elctrns.	214-348-8800
TX	Houston, Houston Whls. Elctrns.	713-644-8320
TX	Houston, Meters & Instrs.	713-644-1631
VA	Chesterfield, Chesapeake Sys.	804-271-7725
VA	Vienna, Electronic Equip. Bank	703-938-3350
WA	Seattle, Vanguard Elctrn. Tool	206-284-6186
WI	Madison, Schrenk Sls.	603-255-7400

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JACO MFG. CO., 468 Geiger St., Berea, OH 44017, Tel: 216-234-4000

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JAE, 1901A E. Carnegie Ave., Santa Ana, CA 92705, Tel: 714-250-8770, TWX: 681-438 ZEMCO SNA; Empl.: 20; *Sls. Mgr.:* James R. Clark .... **B•1604-1607**

Local Sales Offices & Reps

CA	Irvine, Angle Assocs.	714-833-0692
CA	Santa Clara, M2 Mktg. Grp.	408-986-0676
FL	Miami, Intro Corp.	305-387-1176
IL	Downers Grove, Momak Sls.	312-963-6400
IN	Indianapolis, Frank J. Campisano Co.	317-253-7651
MA	Wakefield, Kentronics, Inc.	617-246-0245
MO	St. Louis, Abrams & Assocs.	314-569-0447
NJ	Wayne, G. T. Assocs.	201-694-6040
OH	Cincinnati, Frank J. Campisano Co.	513-574-1111
OR	Hillsboro, Rhodes Sls. Corp.	503-640-6666
PA	Coraopolis, Frank J. Campisano Co.	412-264-5151

JAIDINGER MFG., 1921 W. Hubbard St., Chicago, IL 60622, Tel: 312-421-1090; Empl.: 35; *Sls. Mgr.:* John S. Jaidinger

JAMB INDS., Box 281, Rockaway Valley Rd., Boonton, NJ 07005, Tel: 201-263-9295; Empl.: 3

JAMESBURY CORP., Div. of Combustion Engineering, Inc., 640 Lincoln St., Worcester, MA 01605, Tel: 617-852-0200, Telex: 92-0448, TWX: 710-240-1268; Empl.: 1000; *Sls. Mgr.:* C. A. Richardson

JAMES ELECTRONICS, 4050 N. Rockwell, Chicago, IL 60618, Tel: 312-463-6500, TWX: 910-221-5034; *Sls. Mgr.:* J. R. Ther; *Dist. Mgr.:* J. R. Ther

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Local Sales Offices & Reps

AZ	Tempe, Piper Sls.	602-949-0048
AR	Dallas, Kruvand Assocs.	214-437-3355
CA	Cupertino, Codella	408-257-2561
CA	San Diego, Qualtronics	619-695-0118
CO	Longmont, Piper Sls.	303-651-2378
FL	Orlando, MacKay, Smith & Assocs.	305-423-4353
GA	Atlanta, MacKay, Smith & Assocs.	404-449-7444
IL	Addison, Engineered Sls.	312-832-8425
IN	Ft. Wayne, Aktron Corp.	219-747-3650
KS	Wichita, T-Bird Tech. Sls. & Svc.	316-684-3941
MD	Silver Spring, H.R. Sieber	301-589-9110
MA	Mendon, B. Caron Assocs.	617-478-4519
MN	St. Paul, Cahill, Schmitz & Cahill	612-646-7217
MO	Maryland Heights, T-Bird Sls. & Svc.	314-567-6488
NJ	Cherry Hill, Quality Comps.	609-428-6266
NY	Albertson, C.F. Ward	516-742-5561
NC	Charlotte, MacKay, Smith & Assocs.	704-372-1188
OH	Columbus, Tom Mulligan Company	614-457-2242
TX	Dallas, Kruvand Assocs.	214-437-3355
WA	Seattle, Norwest	206-827-9562

Local Distributors

CA	Burbank, Merit Comp. Supp.	818-842-8162
CA	Westlake Village, Tech-Cable Prods.	818-991-4697

J & S TOOL, 70 Okner Pkwy., Livingston, NJ 07039, Tel: 201-533-0700, Telex: 139229; Empl.: 50; *Sls. Mgr.:* K.F. Swenson

JAN HARDWARE MFG. CO., 47-27 36th St., Long Island City, NY 11101, Tel: 212-361-0800; FSC No.: 99813; Empl.: 60; *Sls. Mgr.:* Irwin E. Wasserman; *Dist. Mgr.:* Bob Anzalone .... **C•1588, 1591-1611**

Local Sales Offices & Reps

AZ	Phoenix, Steve Fisher Assocs.	602-247-7865
CA	Menlo Park, Long Assocs.	415-327-1300
CA	San Diego, Robert Scott Co.	619-420-6446
CA	Thousand Oaks, S.A.R.G.E.	213-991-6706
FL	Seminole, Custom Assembly	813-397-8302
IL	Woodale, Croydon Elec.	312-595-2300
MD	Woodbine, Naudain Assocs. South.	301-442-2270
MA	Brookline, Harman Assocs., Inc.	617-232-6687
MA	Lee, Harman Assocs., Inc.	413-243-1158
MN	Golden Valley, A.I.M.	612-542-8437
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NJ	Englewood, H. Gray Assocs.	201-894-0894
NJ	Marlton, Naudain Assocs.	609-983-5808
OH	Dayton, F. L. Ohmer & Assocs.	513-434-1454
TX	Richardson, AGM Sls.	214-644-1475

JAPANESE PRODS. CORP., 31368 Via Colinas, Ste. 103-104, West Lake Village, CA 91362, Tel: 818-991-6111

JARO COMPONENTS, INC., 5549 Powerline Rd., Ft. Lauderdale, FL 33309-2883, Tel: 305-771-7000, Telex: 522-334; Empl.: 30; *Sls. Mgr.:* Robert C. Flipse; *Dist. Mgr.:* Floyd Burwell

JAY CONTROL CO., 21 Sequin Dr., Glastonbury, CT 06033, Tel: 203-633-5294; Empl.: 40; *Sls. Mgr.:* Mike Colomonico

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JAY-EL PRODS., Sub. Ducommun Inc., 1859 W. 169th St., Gardena, CA 90247, Tel: 213-323-7130, TWX: 910-346-7633; FSC No.: 08719;Multiple; Empl.: 310

JB ELCTRN. TRANSFORMERS, 2300 W. Armitage Ave., Chicago, IL 60647, Tel: 312-342-0080, TWX: 910-221-1283; FSC No.: 11700; Empl.: 150; *Sls. Mgr.:* J. M. Blacklidge

JBM ELECTRONICS, INC., 531 Front St, Manchester, NH 03102, Tel: 603-623-0222, Telex: 953134, TWX: 710-220-8978; FSC No.: 62694; Empl.: Approx. 100; *Sls. Mgr.:* Mr. Steve Glorioso; *Dist. Mgr.:* Mr. Steve Glorioso .... **A•1528-1529**

J-B-T INSTRS., Box 1818, New Haven, CT 06508, Tel: 203-776-1111; Empl.: 25; *Sls. Mgr.:* Virginia Devitt .... **D•1358**

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MN	Minneapolis, Hei-Lite Sls.	612-861-6051
TX	Dallas, Elcom Mktg., Inc.	214-241-2166
Can	Thornhill, Ont, R. C. Kahnert Sls., Ltd.	416-221-7755
Can	Winnipeg, Vancouver, Smith-Paterson & Assocs.	604-681-0743

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AL	Montgomery, Southern Controls	205-277-5030
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CA	Los Angeles, Metermaster	213-685-4340
CA	San Francisco, Pacific Elctrns.	415-543-3104
CA	Wilmington, Wilmington Instrs.	213-834-1133
CO	Denver, E.I.L. Instrs.	303-534-4160
CT	New Haven, Hatry Elctrns.	203-787-5921
FL	Miami, Florida Precision	305-324-1731
GA	Augusta, Speciality Distributing	404-873-2521
IL	Bridgeview, E.I.L. Instrs.	312-430-2292
IL	Elk Grove Village, Metermaster	312-593-8650
LA	Lafayette, Ralph's Elctrns.	318-234-4507
MD	Sparks, E.I.L. Instrs.	301-771-4800
MA	Hingham, Sager Elec.	617-749-6700
MN	Minneapolis, Instrument Controls	612-871-2514
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NJ	Belleville, Miscorp	201-751-8680
NJ	North Caldwell, Hosica Labs	201-256-7724
NY	Long Island City, Metermod	718-726-4850
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NY	Maspeth, Harry Alter	718-366-0123
NC	Winston-Salem, Kirkman Elctrns.	919-722-9131
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OH	Cleveland, Weschler Elec.	216-238-2550
OH	Dayton, Scott-Friedman	513-298-5555
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TX	Garland, Metermaster	214-271-5671
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TX	Houston, Quality Instrs.	713-524-0528
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WV	St. Albans, Preiser Scientific	304-727-2902

J-B-T SWITCHES, CUTLER-HAMMER PRODS., EATON CORP., Box 1904, New Haven, CT 06509, Tel: 203-772-2220; FSC No.: 55459; Empl.: 160; *Sls. Mgr.:* C. A. Peffer

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JEFFERS ELCTRNS., Grand Plaza, 945 Grand Ave., Nogales, AZ 85621, Tel: 602-287-5851, TWX: 910-973-9794; FSC No.: 59474; Empl.: 400; *Sls. Mgr.:* Ken Shobert; *Dist. Mgr.:* Steve Morris

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AL	Huntsville, Cartwright & Bean	205-830-1540
AZ	Phoenix, O'Donnell Assoc.	602-944-9542
CA	Garden Grove, Elsco	714-891-4621
CA	Santa Clara, I Squared	408-988-3400
CO	Boulder, R.G. Entprs.	303-447-9211
CT	Middletown, Gerber Sls.	203-347-3000
FL	Tampa, APM Assoc.	813-886-2457
GA	Atlanta, Cartwright & Bean	404-233-2939
IL	Arlington Hgts., C.L. Greenslade Sls.	312-593-3450
IN	Ft. Wayne, J.F. Kilfoil	219-436-7233
KS	Overland Park, Advanced Techn. Sls.	913-642-6675
LA	Covington, Cartwright & Bean	504-892-1780
MA	Newton Upper Falls, Gerber Sls.	617-969-2620
MI	Lathrup Village, R. C. Nordstrom	313-559-7373
MN	Edina, Grayden & Flemmer	612-941-1120
NM	Albuquerque, Power Entprs.	505-298-1918
NY	E. Rochester, Tri-Tech Elctrns.	716-385-6500
NY	Great Neck, MOS Assoc.	516-487-3966
NC	Raleigh, Cartwright & Bean	919-876-4130
OH	Cincinnati, J.F. Kilfoil Co.	513-791-6150
OR	Beaverton, Eclipse Mktg.	503-642-1661
PA	Ardmore, Wm. K. Metz	215-896-7300
TX	Lewisville, Jim Hughes	214-221-1536
WA	Puerto Rico, Hato Rey, M. Anderson Co.	809-751-2026
WA	Redmond, Eclipse Mrktg.	206-885-6991

JEFFERSON ELEC., MagneTek, Inc., 1400 Center Circle Drive, Downers Grove, IL 60515-1021, Tel: 312-691-2400, Telex: 72-8408; Empl.: 1200; *Sls. Mgr.:* Tom Hull; *Dist. Mgr.:* Frank Michalik

Local Sales Offices & Reps

AZ	Phoenix, Ross-Bloom & Assoc.	602-955-5024
CA	Los Angeles, J. G. Pomeroy	213-263-9381
CA	San Francisco, Black & Egbert Assocs.	415-282-0840
CO	Denver, Electra-Tech Sls.	303-778-1900
FL	Tampa, Clement-Kinzel, Inc.	813-839-4470
GA	Atlanta, Berry-Elsberry Co.	404-355-9296
IL	Hillside, Archibald & Hamel	312-449-0202
IL	Wood Dale, Power Prods. Co.	312-595-1142
MD	Annapolis, Peter Straaten	301-261-2831
MA	Framingham, Gerald Rosen Co.	617-879-5505
MA	Stoughton, North Coast Sls.	617-344-1007
MI	Livonia, Electric Sls. Co.	313-464-1800
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MS	Jackson, Welch & Doby	601-932-5534
MO	Kansas City, Mid-States Elec. Sls.	913-621-6161
MO	St. Louis, Schaeffer Sls.	314-647-1000
NE	Omaha, Boyle & Williamson	402-553-1666
NJ	Edison, Bizzarro Elec. Sls.	201-757-7010
NJ	Gloucester City, ESA Mfgrs. Rep.	609-456-7110
OH	Westlake, Associated Elec. Comps.	216-835-9960
NY	New Hartford, F. W. Laver & Son	315-724-2304
NC	Charlotte, W. H. Lassister Sls.	704-523-2736
OH	Cincinnati, Bryan, Haley & Cunningham	513-561-0500
PA	Pittsburgh, Robert Colley Assocs.	412-331-3121
TX	Dallas, The Rich Co.	214-742-1758
TX	Houston, Gulf Elec. Mktg.	713-868-2517
WA	Seattle, Bangs Assocs.	206-762-0262
WI	Butler, J. F. Nolan & Assocs.	414-781-1140

JENNINGS, 970 McLaughlin Ave., San Jose, CA 95122, Tel: 408-292-4025, Telex: 34-6311, TWX: 910-338-0159; FSC No.: 73905; Empl.: 370; *Sls. Mgr.:* E. V. Valehrach .... **A•1102-1103; B•1424-1425, 1610; D•1251**

Local Sales Offices & Reps

AL	Huntsville, Brandel-Stephens	205-883-0445
AZ	Phoenix, Crown Systems	602-274-3180
CA	Granada Hills, C & W Comps.	213-368-4032
CA	Santa Clara, Silicon Valley Sls.	408-371-8814
CO	Denver, Lindberg Co.	303-758-9033
FL	Deerfield Beach, Brandel-Stephens	305-427-8558
FL	Orlando, Brandel-Stephens	305-425-3202
GA	Atlanta, Brandel-Stephens	404-261-7579
IL	Chicago, Berndt Assocs.	312-283-0713
IN	Carmel, Berndt Assocs.	317-844-0114
KS	Shawnee Mission, Lowell-Kangas & Assoc.	913-631-3515
MD	Silver Spring, Marktron	301-460-6100
MD	Timonium, Marktron	301-252-7111
MA	Haverhill, L. K. Harman, Inc.	617-373-1313
MN	Minneapolis, Berndt Assocs.	612-546-2021
MO	St. Louis, Lowell-Kangas & Assoc.	314-821-4050
NJ	Englewood, Cooper Assocs.	201-871-4985
NM	Albuquerque, Lindberg Co.	505-881-1006
NC	Greensboro, Brandel-Stephens	919-274-6952
OH	Westlake, Harry W. Applegate Co.	216-331-2960
PA	Huntingdon Valley, Omega Elctrns.	215-947-4135
PA	Pittsburgh, Covert & Newman & Co.	412-531-2022
TX	Houston, Barry Sales	713-784-5860
TX	Richardson, Barry Sales	214-234-0255
UT	Salt Lake City, Lindberg Co.	801-969-2400
VA	Charlottesville, Marktron	804-973-5874
WI	Milwaukee, Berndt Assocs.	414-545-8400

Local Distributors

CA	Oceanside, Surcom Assocs.	619-722-6162
IL	Franklin Park, Richardson Elctrns., Ltd.	312-456-0600

JENSEN TOOLS, INC., Axia, Inc., 7815 S. 46th St, Phoenix, AZ 85040, Tel: 602-968-6241, TWX: 910-950-0115; Empl.: 100; *Sls. Mgr.:* Tom Fenzel

JEROME INDUSTRIES CORP., B 730 Division St, Elizabeth, NJ 07201, Tel: 201-353-5700, Telex: 132001-JEROME, ELIZ; Empl.: 150; *Sls. Mgr.:* Anthony Di Girolamo .... **D•1678-1679**

Local Sales Offices & Reps

MN	St. Paul, Countrymen Assocs.	612-645-9151

JEROME INDUSTRIES CORP., Transformer Div., 730 Division St, Elizabeth, NJ 07201, Tel: 201-353-5700, Telex: 132001-JEROME, ELIZ; *Sls. Mgr.:* Anthony Di Girolamo

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JERSEYSWITCH, INC., 129A Gaither Dr., Mt. Laurel, NJ 08054, Tel: 609-778-8190

JETTRON PRODS., P.O. Box 337, E. Hanover, NJ 07936, Tel: 201-887-0571; FSC No.: 04435; Empl.: 30; *Sls. Mgr.:* J. M. Schill .... **C•1408-1410**

Local Sales Offices & Reps

CA	El Cajon, A-Tronics	619-444-1501
CA	Woodland Hills, A-Tronics	818-703-7212
NY	New York, Eltron Export Co.	212-944-7635

Local Distributors

Intl	England, Slough, Berks, LPPI	44-753-77788
Intl	France, Le Chesnay, LPPI	33 3 955 2104
Intl	Italy, Cinisello Balsamo (Mila, LPPI	2-6127821
Intl	Netherland, Krimpen a.d. Yssel, LPPI	31-1807-1 8555
Intl	Sweden, Stockholm, LPPI	46-8-132030
Intl	Switzerland, Zurich, Litton Precision Prods. Intl. (LPPI)	1 312 35 44

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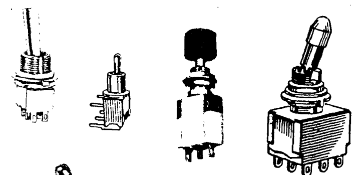

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Local Sales Offices & Reps

AL	Huntsville, Currie, Peak & Frazier	205-536-1506
AZ	Phoenix, The Knight Co.	602-582-8506
AR	Little Rock, J. Y. Schoonmaker	501-375-2168
CA	Fremont, William Parks Assocs.	415-796-0875
CA	Los Angeles, Knight Co.	213-670-2833
CA	San Diego, Knight Co.	619-571-7903
CT	Middletown, Gerber Sls.	203-347-3000
GA	Norcross, Currie, Peak & Frazier, Inc.	404-449-7662
IL	Chicago, Berndt Assocs.	312-283-0713
IN	Carmel, Berndt Assocs.	317-844-0114
IA	Cedar Rapids, Gassner & Clark Co.	319-393-5763
MA	Monson, Gerber Sls.	413-267-5051
MA	Newton Upper Falls, Gerber Sls.	617-969-2620
MI	Troy, C. B. Jensen	313-643-0506
MN	Edina, M. Foster Co.	612-941-9790
NJ	Cherry Hill, Trinkle Sls.	609-795-4200
NM	Albuquerque, C. T. Carlberg	505-888-3883
NY	Buffalo, Rudell-Merrifield Assocs.	716-634-4300
NY	Melville, Comtronics Assocs.	516-249-0505
NC	Greensboro, Currie, Peak & Frazier, Inc.	919-373-0380
NC	Raleigh, Currie, Peak & Frazier, Inc.	919-787-0808
OH	Cleveland, Marlow Assocs.	216-991-6500
OH	Columbus, Marlow Assocs.	614-885-7643
OH	Dayton, Marlow Assocs., Inc.	513-275-4147
OK	Oklahoma City, J. Y. Schoonmaker	405-685-4477
OR	Portland, Frank Jackson	503-292-2638
TX	Austin, J. Y. Schoonmaker	512-480-9257
TX	Dallas, J. Y. Schoonmaker	214-349-1650
TX	Houston, J. Y. Schoonmaker	713-738-2427
WA	Redmond, F. Jackson	206-881-7277
WI	Milwaukee, Berndt Assocs.	414-545-8400

Local Distributors

AL	Birmingham, Brownell Electro, Inc.	205-322-3374
AL	Mobile, Brownell Electro, Inc.	205-479-5404
AZ	Phoenix, Metermaster, Inc.	602-437-1425
AR	Little Rock, Brownell Electro, Inc.	501-562-2061
CA	Lamirada, Stevens Instr. Co.	714-994-5111
CA	Los Angeles, E.I.L. Instrs., Inc.	213-685-7020
CA	Los Angeles, Metermaster, Inc.	213-685-4340
CA	Palo Alto, Metermaster, Inc.	415-968-0313
CA	San Diego, Metermaster, Inc.	619-560-4844
CA	Santa Clara, Dynametron, Inc.	408-727-6531
CA	Santa Clara, E.I.L. Instrs., Inc.	408-727-0396
CA	Santa Clara, Fisher-Brownell	408-988-6041
CO	Denver, E.I.L. Instrs., Inc.	303-534-4160
CO	Denver, Metermaster Instr., Inc.	303-722-5766
CT	Middletown, E.I.L. Instrs., Inc.	203-346-6646
FL	Miami, Brownell Electro, Inc.	305-592-2636
FL	Orlando, Brownell Electro, Inc.	305-843-6770
FL	Palm Bay, E.I.L. Instrs., Inc.	305-725-8300
GA	Atlanta, Brownell Electro, Inc.	404-762-5181
IL	Bridgeview, E.I.L. Instrs., Inc.	312-430-2292
IL	Countryside, Pacific Indicator Co.	312-352-3500
IL	Itasca, Metermaster, Inc.	312-250-0606
IN	Evansville, Electro-Lab Svcs., Inc.	812-423-5211
IN	Indianapolis, E.I.L. Instrs., Inc.	317-545-1373
KY	Louisville, E.I.L. Instrs., Inc.	502-454-3420
LA	Kenner, Breard-Gardner	504-466-3401
MD	Baltimore, Sunshine Sci. Instr., Inc.	301-661-5900
MD	Gaithersburg, Pioneer/Instrmn.	301-921-0660
MD	Sparks, E.I.L. Instrs., Inc.	301-771-4800
MA	Burlington, E.I.L. Instrs., Inc.	617-272-9450
MA	Waltham, Calibron Corp.	617-894-6440
MA	Woburn, Brownell Electro, Inc.	617-935-7820
MI	Ferndale, Ram Meter, Inc.	313-398-6767
MN	Minneapolis, Instrumentation Svcs., Inc.	612-544-8916
MN	Minneapolis, Process Measurement Co.	612-544-4035
MO	St. Louis, Industrial Svc. Labs	314-535-5760
NJ	Belleville, Miscorp	201-751-1190
NJ	Edison, Brownell Electro, Inc.	201-287-2030
NJ	Pennsauken, E.I.L. Instrs., Inc.	609-488-0474
NM	Albuquerque, Walker Elctrn. Supp. Co.	505-883-2992
NY	Clarence, Trott Elctrns., Inc.	716-634-8500
NY	Hauppauge, E.I.L. Instrs., Inc.	516-231-6333
NY	New York, Brownell Electro, Inc.	212-924-6000
NY	Rochester, E.I.L. Instrs., Inc.	716-427-8000
NC	Charlotte, Brownell Electro, Inc.	704-597-1270
NC	Charlotte, Trott Electronics, Inc.	704-376-2237
NC	Raleigh, Brownell Electro, Inc.	919-876-6524
OH	Cleveland, Pioneer Instrmn.	216-587-3600
OH	Cleveland, Weschler Elec. Co.	216-237-2550
OH	Dayton, E.I.L. Instrs., Inc.	513-435-2134
OH	Dayton, Pioneer Std. Elctrn.	513-236-9900
OK	Tulsa, Combined Technlg. Co.	918-665-3002
OK	Tulsa, Genesis Elctrns. Corp.	918-622-8520
OR	Portland, Branom Instr. Co.	503-283-2555
PA	Philadelphia, Sunshine Sci. Instr.	215-673-5600
PA	Pittsburgh, C.A.M. Inst.	412-963-1885
PA	Pittsburgh, E.I.L. Instrs., Inc.	412-731-5230
SC	Columbia, Brownell Electro, Inc.	803-772-6111
TN	Knoxville, Brownell Electro, Inc.	615-966-3441
TN	Memphis, Brownell Electro, Inc.	901-795-8483
TN	Nashville, Brownell Electro, Inc.	615-885-1302
TX	Dallas, Dallas Meter-Tek Supp.	214-349-6044
TX	Dallas, E.I.L. Instrs., Inc.	214-931-1236
TX	Dallas, Ultra Instr. Lab, Inc.	214-357-0297
TX	El Paso, McNicol Elctrns.	915-566-2936
TX	Garland, Metermaster, Inc.	214-271-5671
TX	Houston, E.I.L. Instrs., Inc.	713-271-3100
TX	Houston, Quality Instr. Lab	713-524-0528
VA	Richmond, Meter Metrics	804-275-1431
WA	Richland, Branom Instr. Co.	509-943-6664
WA	Seattle, Branom Instr. Co.	206-762-6050
WA	Seattle, E.I.L. Instrs., Inc.	206-762-0880
VA	Alexandria, E.I.L. Instrs., Inc.	703-354-4330
VA	Virginia Beach, E.I.L. Instrs., Inc.	804-499-3746
WI	Milwaukee, E-M Instrs., Inc.	414-272-7799

JFD ELCTRNS., See Murata Erie No. Amer., Inc.

JF MICROSYSTEMS, 3641 Frontier Road, Pasco, WA 99301, Tel: 509-297-4294, 800-JF-CARDS; Empl.: 2; *Sls. Mgr.:* Jim Follansbee

JFW INDS., INC., 2719 E. Troy Ave., Indianapolis, IN 46203, Tel: 317-783-9875; Empl.: 30; *Sls. Mgr.:* Joetta Walker; *Dist. Mgr.:* Joetta Walker

JKL COMPS., 13343 Paxton St., Pacoima, CA 91331, Tel: 818-896-0019, Telex: 910-496-1504; FSC No.: 55335; Empl.: 18; *Sls. Mgr.:* Bob Brandt

JMJ TECHNICAL PRODS., 50 Wheeler Point Rd., Newark, NJ 07105, Tel: 201-589-4257; Empl.: 8; *Sls. Mgr.:* Kevin Kolenut .... **C•1613**

JMK

JMK, INC., 15 Caldwell Dr., Amherst, NH 03060, Tel: 603-886-4100, Telex: 955329; Empl.: 200; *Sls. Mgr.:* J. Kennedy .... **A•1611**

Local Sales Offices & Reps

AL	Huntsville, JWL Assocs.	205-881-0413
CA	Santa Clara, Cummings & Assocs.	408-247-8656
CA	Woodland Hills, Cummings & Assocs.	213-340-6035
CO	Denver, Arkco Sls.	303-758-1151
FL	Lantana, Burke Assocs.	305-585-3238
FL	Largo, Burke Assocs.	813-584-5699
FL	Orlando, Burke Assocs.	305-298-4783
IL	Downers Grove, Momak Sls.	312-963-6400
IN	Indianapolis, Gorny Sls.	317-271-7504
MD	Riderwood, W.S. Warrington & Assocs.	301-823-8759
MA	Framingham, STS	617-620-0195
MI	Novi, Lektronics	313-349-3304
MN	St. Paul, Arkco Sls.	612-777-7454
NJ	Haddonfield, Gray Assocs.	609-429-5300
NJ	Ridgewood, Ballou Assocs.	201-444-6990
NY	Rochester, Elcom Sls.	716-385-1400
NY	Syracuse, Elcom Sls.	315-685-8245
NC	Charlotte, JWL Assocs.	704-523-3001
OK	Tulsa, Barry Sls.	918-749-7775
OR	Hillsboro, Temco NW	503-648-8171
OR	Portland, Cummings & Assocs.	503-761-4411
TX	Austin, Barry Sls.	512-837-3616
TX	Houston, Barry Sls.	713-784-5860
TX	Richardson, Barry Sls.	214-234-0255
WA	Bothell, Temco NW	206-821-5434
WA	Edmonds, Cummings & Assocs.	206-775-1421
WI	Muskego, Momak Sls.	414-363-7744

Local Distributors

CA	Woodland Hills, C & A Elctrns.	213-340-6022
MN	St. Paul, Voyager Elctrns.	612-571-7766
NH	Hudson, C & H Elctrns.	603-882-1133
Can	Toronto, Ont., RAE Elctrns.	416-736-1744

JM TRANSFORMER CO., INC., 112 Florida St., Farmingdale, NY 11735, Tel: 516-293-0475; Empl.: 13; *Sls. Mgr.:* J. Millman .... **A•2160-2163**

JOBMASTER CORP., 9008 Liberty Rd., Randallstown, MD 21133, Tel: 301-655-1400; Empl.: 16; *Sls. Mgr.:* Wendy Goldman .... **A•1303**

JOHANSON DIELECTRICS

JOHANSON DIELECTRICS, 2220 Screenland Dr., Burbank, CA 91505, Tel: 818-848-4465, TWX: 910-498-2735; Empl.: 154 .... **A•1104**

Local Sales Offices & Reps

AZ	Phoenix, Compass Mktg. & Sls.	602-266-5400
CA	Glendale, Mission Mktg.	818-247-9110
CA	Mountain View, Straube Assocs.	415-969-6060
CO	Westminster, Straube Assocs.	303-426-0890
FL	Boca Raton, Lawrence Assocs	305-368-7373
IL	Northfield, Johanson Dielectrics	312-446-8425
IL	Park Ridge, Metcom Assocs.	312-696-1490
IN	Kokomo, Schillinger Assocs.	317-452-4057
KS	Shawnee Mission, Florence & Meyer	913-722-5210
MA	Wethersfield, Compac Sls.	203-563-4784
MN	Minneapolis, Bill Deming & Assocs.	612-888-5000
NY	Bablyon, Astro Rep.	516-422-2500
NY	Syracuse, Pitroncis	315-455-7346
NC	Greensboro, L & D Inc.	919-292-3201
OH	Breckville, WRR Assocs.	216-526-2023
PA	Trevose, PSA Co.	215-245-0513
TX	Arlington, W. Pat Fralia Co.	817-640-9101
WA	Seattle, Northmar Inc.	206-524-5170
Can	Hamilton, Ont., Cartwright/Southhall	416-528-0294

Local Distributors

CA	Los Alamitos, SEMI DICE	213-594-4631
CA	Santa Clara, SEMI DICE	408-980-9777
NJ	Fairfield, CHPS Inc.	201-882-0997

JOHANSON MFG. CORP., 400 Rockaway Valley Rd., Boonton, NJ 07005, Tel: 201-334-2676, TWX: 710-987-8367; FSC No.: 91293; Empl.: 200 .... **A•1105**

Local Sales Offices & Reps

AZ	Phoenix, Compass Mktg. & Sls.	602-996-0635
CA	Los Angeles, Knight Co.	213-670-2833
CA	Mountain View, Straube Assocs.	415-969-6060
CO	Westminster, Straube Assoc., Mt. States	303-426-0890
FL	Orlando, Perrott Assocs.	305-298-7748
IL	Northfield, Johanson Mfg.	312-446-4021
IN	Kokana, Schillinger Assocs.	317-452-4057
IA	Cedar Rapids, ARD Sales Co.	319-393-6392
MA	Seekonk, J. Murphy Assocs.	617-761-7153
MN	Bloomington, Bill Deming & Assoc.	612-888-5000
NJ	Boonton, Johanson Mfg. Corp.	201-334-2676
NY	Mount Vernon, Friedman-Smith Elctrn. Sls.	914-664-4866
NY	Pittsford, NHA, Inc.	716-586-9002
NC	Winston-Salem, Murcota Corp.	919-722-9445
OH	Cleveland, Baehr, Greenleaf & Assoc.	216-221-9030
PA	Trevose, P.S.A.	215-245-0513
TX	Bedford, W. Pat Fralia Co.	817-267-3577
WA	Seattle, Northmar	206-524-5170

Local Distributors

AZ	Tempe, Bell Inds.	602-267-7774
AZ	Tempe, Shelley Elctrns.	602-894-2058
CA	Chatsworth, Shelley Elctrns.	213-998-3333
CA	Chatsworth, Shelley Elctrns.	818-998-3333
CA	Gardena, Bell Inds.	213-515-1800
CA	San Diego, Shelley Elctrns.	619-453-7133
CA	San Jose, Integrated Electronics	408-263-1100
CA	San Jose, Shelley Elctrns.	408-942-9111
CA	Sunnyvale, Bell Inds.	408-734-8570
CA	Van Nuys, CW Swift & Assocs.	818-989-1133
CO	Boulder, Shelley Elctrns.	303-442-2718
CO	Wheatridge, Bell Inds.	303-424-1985
FL	Orlando, Pelcor Co.	305-299-1541
IL	Chicago, Bell Inds.	312-982-9210
IL	Chicago, Newark Elctrns.	312-784-5100
MD	Baltimore, Radio Elec. Svc.	301-823-0070
MD	Beltsville, Radio Elec. Svc.	301-937-9100
MA	Medford, Blake Assocs.	617-391-7890
NM	Albuquerque, Bell Inds.	505-292-2700
NY	Hauppauge, Jaco Elctrns.	516-273-5500
NY	Mt. Vernon, ASAP Elctrns.	914-699-2727
NY	Syracuse, Newark Elctrns.	315-437-6611
OR	Lake Oswego, Bell Inds.	503-241-4115
PA	Philadelphia, Philadelphia Elctrns.	215-568-7400
TX	Ft. Worth, PATCO Supplies	817-429-8596
UT	Salt Lake City, Bell Inds.	801-972-6969
WA	Bellevue, Bell Inds.	206-747-1515

JOHNSON, E. F., CO., 299 Johnson Ave., Waseca, MN 56093, Tel: 507-835-6222, Telex: 290470, TWX: 910-565-2161; Empl.: 1400; *Sls. Mgr.:* G. Mena

JOHNSON CONTROLS, Battery Div., 5757 N. Green Bay Ave., Milwaukee, WI 53201, Tel: 414-228-2581, Telex: 026-650; Empl.: 20,000

JOLO INDS., 13921 Nautilus Dr., Garden Grove, CA 92643, Tel: 714-554-6840, TWX: 910-595-1138; Empl.: 20; *Sls. Mgr.:* J.S. Giampiccolo, Jr.

JONARD INDUSTRIES CORP., 134 Marbledale Rd., Tuckahoe, NY 10707, Tel: 914-793-0700, Telex: 996570, TWX: 710-562-0107; Empl.: 65; *Sls. Mgr.:* R. Fersen

JONATHAN MFG., 1101 So. Acacia Ave., Fullerton, CA 92631, Tel: 714-526-4651, Telex: 910 592-1241; Empl.: 375

JONES, HIRAM, ELCTRNS. INC., See Hiram Jones Elctrns. Inc.

JORDAN ELEC., See Vishey Resistance Sys. Grp.

JORI RESOURCES, 2128 Knoll Dr., Ventura, CA 93003, Tel: 805-642-2266; Empl.: 4

JOSLYN ELCTRN. SYS., P.O. Box 817, Goleta, CA 93116, Tel: 805-968-3551, TWX: 910-334-3464; FSC No.: 23663; Empl.: 210; *Sls. Mgr.:* A. deSouza

JRW INDS., INC., 2312 N Second St., Harrisburg, PA 17110, Tel: 717-236-1418; Empl.: 4; *Sls. Mgr.:* James Thorbahn

JSC WIRE & CABLE
QUALITY WIRE AT THE RIGHT PRICE

JSC WIRE & CABLE, Box 248, Burgess Pl., Wayne, NJ 07470, Tel: 201-694-6200; Empl.: 40; *Sls. Mgr.:* R. Dulude .... **C•1841**

Local Sales Offices & Reps

CA	Van Nuys, Art Szerlip Sls. Co.	818-782-1765
CO	Colorado Springs, Norris & Warren Assocs.	303-576-8697
CO	Denver, Norris & Warren Assocs.	303-579-1676
DE	Newark, Carmine Assocs.	302-731-0697
FL	Crystal River, Foster Sls.	904-795-7831
IL	Chicago, Ken Levy Assocs.	312-763-5000
IA	Burlington, J. S. Ridge Entprs.	319-754-8745
KY	Louisville, Mid Central Sls. Co.	502-239-5614
MA	Lynn, Keene Sls. Co.	617-595-2300
MI	Livonia, Harvey Sls.	313-591-1975
NJ	Teaneck, Steve Fisher Sls.	201-837-1200
NY	Rochester, Warren Kaufman	716-266-2728
NC	Charlotte, D. Austin Co.	704-334-0174
OH	Columbus, Benchmark	614-861-2070
OR	Portland, R. M. Minthorne	503-246-4556
TX	Dallas, Crockett Sls. Co.	214-350-3377
MN	Minneapolis, John E. M. Anderson	612-823-6459
EXP	NY, New York, Roburn Agencies	212-989-5939

J. TRONICS, Apollo Magnetics, 2720 W. Beverly Rd., Los Angeles, CA 90057, Tel: 213-381-2500, TWX: 910-321-4348; *Sls. Mgr.:* Michael Ronzon

JUDCO MFG. INC., P.O. Box 487-E84, 24030 Frampton Ave., Harbor City, CA 90710, Tel: 213-534-0959 .... **B•1611**

Judd Wire
DIVISION OF
HIGH VOLTAGE ENGINEERING

JUDD WIRE, High Voltage Engrg., 57 Turnpike Rd., Turners Falls, MA 01376, Tel: 413-863-4357, TWX: 510-290-2147; FSC No.: 3357; Empl.: 148; *Sls. Mgr.:* Jack Allen .... **C•1842-1843**

Local Sales Offices & Reps

AL	Huntsville, Hughes Assocs.	205-533-9108
CA	Los Altos, Ewing Foley	415-941-4525
CO	Denver, Duffy Assocs.	303-595-4244
FL	Coral Springs, HAI Elctrns.	305-752-7520
GA	Atlanta, Hughes Assocs.	404-252-7486
IL	Arlington Heights, Rozner Sls. Co.	312-577-0067
MA	Marlborough, O.K. Engrg.	617-481-6400
MI	Southfield, C. H. Schmidt Co.	313-353-6000
MN	Brooklyn Center, Willman Assocs.	612-566-5010
MS	Corinth, Hughes Assocs.	601-287-2915
NJ	Haddonfield, Mesa Tech. Assocs.	609-429-9531
NY	Attica, B. H. Tollefson Assocs.	716-591-1219
NY	Auburn, B. H. Tollefson Assocs.	315-253-4109
NY	Rochester, B. H. Tollefson Assocs.	716-271-4141
NC	Research Triangle Park, Naylor Assocs.	919-836-0478
OH	Worthington, Simcox Assocs.	614-885-8995
OR	Portland, Jas. J. Backer Co.	503-297-8744
SC	Greenville, Naylor Assocs.	803-297-9969
TN	Morristown, Hughes Assocs.	615-587-2433
TX	Dallas, Stevens Sls. Co.	214-350-2476
UT	Salt Lake City, Electrodyne	801-486-3801
WA	Seattle, Jas. J. Backer Co.	206-285-1300

Local Distributors

AL	Madison, Sea Wire & Cable	205-772-9616
AZ	Tempe, Pacer Elctrns.	602-267-0299
CA	Anaheim, Innovative Sys.	714-632-8800
CA	Concord, Control Master	415-939-3600
CA	Irvine, Republic Elctrns.	714-855-2222
CA	Mountain View, Sonic Wire	415-965-4646
CA	San Leandro, Anixter	415-352-3100
CA	Torrance, Blake Wire & Cable	213-515-0561
CA	Valencia, Wirenetics Co.	805-257-2400
CT	East Hartford, E. J. Stephens Co.	203-568-1927
CT	Manchester, I.M.S.	203-649-4415
FL	Altamonte Springs, Royce Elctrns.	305-869-4700
FL	Ft. Lauderdale, Pacer Elctrns.	305-462-0902
FL	Ft. Lauderdale, Simcona Elctrn.	305-485-4455
GA	Clarkston, Lance Engrg.	404-292-4404
MA	Burlington, QPL Elctrn. Dist.	617-229-2424
MA	Woburn, Pacer Elctrns.	617-935-8330
MN	Bloomington, K. L. Tannehill	612-881-6700
NH	Amherst, North Country Wire & Cable	603-889-0063
NH	Manchester, Yankee Elctrn.	603-625-9746
NJ	Dover, Electro Spec.	201-361-5079
NJ	Fairfield, Olympic Wire & Cable	201-227-7996
NJ	Red Bank, Freedom Elctrns.	201-747-4666
NY	Fairport, Pacer Elctrns.	716-377-0462
NY	Farmingdale, Weico Elctrns.	516-293-0050
NY	Rochester, Simcona Elctrn.	716-328-3230
NY	Ronkonkoma, Zenith Wire	516-585-1444
OH	Dayton, Astro Inds.	513-429-5900
PA	Harleysville, Omega Wire & Cable	215-256-6577
PA	Montgomeryville, Pyttronic Ind.	215-242-6700
TX	Dallas, Interstate Wire	214-553-1311
WA	Seattle, Anixter	206-251-5287
WI	New Berlin, Indl. Elec. Wire & Cable	414-782-2323

JUDD WIRE, High Voltage Engrg., 870 Los Vallecitos Blvd., San Marcos, CA 92069, Tel: 619-744-7720, TWX: 910-322-1149; FSC No.: 3357 .... **C•1842-1843**

Refer to Judd Wire, Turners Falls, MA for sales office and distributor information.

JRL JULIE RESEARCH

JULIE RESCH. LABS., 211 West 61st St., New York, NY 10023, Tel: 212-245-2727, TWX: 710-581-5138; Empl.: 45; *Sls. Mgr.:* Pamela Spencer ..... **A•1878; D•1252-1256**

Local Sales Offices & Reps

Resistors

CA	Northridge, Craig Assocs.	213-993-4060

JUMBO PROCESS CONTROL, INC., 410 Garibaldi Ave., Lodi, NJ 07644, Tel: 201-779-7744, Telex: 642-406; *Sls. Mgr.:* W. F. Feiler

JUNCTION DEVICES, INC., 2488-A Townsgate Rd., Westlake Village, CA 91361-2594, Tel: 818-889-4030, 805-497-4421, TWX: 910-336-1293; FSC No.: 60858; Empl.: 70; *Sls. Mgr.:* N. Pena

JUPITER SYSTEMS, 1100 Marina Village Parkway, Alameda, CA 94501, Tel: 415-523-9000; *Sls. Mgr.:* Richard MacElhiney

KAHGAN ELCTRNS. CORP., 605 Peninsula Blvd., Hempstead, NY 11550, Tel: 516-538-2300, TWX: 510-222-4347; Empl.: 39; *Sls. Mgr.:* Fred Strauss; *Dist. Mgr.:* Carl Clemente

Local Sales Offices & Reps

AL	Huntsville, BCI, Inc.	205-539-4411
CA	Los Angeles, Corcoran Assocs.	213-823-4589
CA	Santa Clara, Maxim Elctrn. Sls.	408-946-6001
CO	Aurora, High Tech Assocs.	303-695-1990
FL	Casselberry, Southern Elctrn. Mktg. (A/K/A Semi)	305-831-2822
IL	Palatine, Technology Sls.	312-991-6600
KS	Overland Park, J. F. Guernsey Co.	913-381-2225
MA	Lexington, Del-Con Sls.	617-938-1929
MI	Southfield, Gehrke, Fred & Assocs.	313-559-5363
MN	Minneapolis, Smiley-Scott Assocs.	612-888-5551
NY	N. Syracuse, R. F. Roux Co.	315-458-6576
OH	Cincinnati, Gilbert, Bob & Assocs.	513-574-1932
PA	King of Prussia, Emerald Elctrns.	215-265-1360
SC	Easley, RA Sls.	803-859-1859
TX	Dallas, Marcom	214-351-4532
TX	El Paso, Aztec Microelectronics	915-581-6130
VA	Reston, Tytronics Tech. Sls.	703-471-0440
WA	Vancouver, Ray Over Sls.	206-695-6179
WI	Wauseka, Techn. Sls.	414-787-5015

KAHLE ENGRG., Div. Joule Machinery Grp., 3344 Hudson Ave., P.O. Box 877, Union City, NJ 07087, Tel: 201-867-6500, Telex: 42-7757, TWX: 710-992-8835; Empl.: 50; *Sls. Mgr.:* Carl A. Napor

KAISER ELCTRNS., Kaiser Aerospace & Elctrns., 2701 Orchard Pkwy., San Jose, CA 95134, Tel: 408-946-3000, TWX: 910-338-0196; Empl.: 1200

KAISER ELECTROPRECISION, Kaiser Aerospace & Elctrns., 1700 S. Redhill Ave., Irvine, CA 92714, Tel: 714-250-1015, Telex: 678467; FSC No.: 86831; Empl.: 387; *Sls. Mgr.:* Gerald W. Allen

KSI Kaiser Systems, Inc.

KAISER SYSTEMS, INC., 126 Sohier Road, Beverly, MA 01915, Tel: 617-922-9300, Telex: 887159; FSC No.: 3698; Empl.: 100 .... **D•1680-1683**

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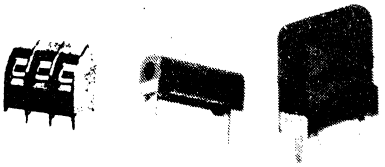

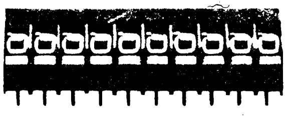

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KALART VICTOR CORP., Hultenius St., Plainville, CT 06062, Tel: 203-747-1663; *Sls. Mgr.:* J. J. Costag

KALGLO ELCTRNS. CO., INC., 6584 Ruch Rd., E. Allen Twp., Bethlehem, PA 18017, Tel: 215-837-0700; FSC No.: 64521; *Sls. Mgr.:* Joe H. Ungerer

KALMUS & ASSOCS., INC., 2424 S. 25th Ave., Box 525, Broadview, IL 60153, Tel: 312-343-7004, TWX: 910-226-0713; Empl.: 346; *Sls. Mgr.:* William R. Blinn

Local Sales Offices & Reps

AL	Huntsville, L & D, Inc.	205-837-1469
CA	Pasadena, Black & White, Inc.	818-792-2133
CA	San Diego, Varigon Assocs.	619-576-0100
CA	San Jose, Class One Elctrns. Corp.	408-297-8666
CO	Boulder, Comp. Product Sls.	303-530-2800
FL	Plantation, Gallagher & Assocs.	305-473-2101
GA	Atlanta, L & D, Inc.	404-395-7079
IL	Arlington Heights, M. J. Petersen & Assocs.	312-577-8200
IL	Chicago, W. F. Hamilton Co.	312-867-5030
IN	Ft. Wayne, F. J. Campisano Co.	219-747-2633
IN	Indianapolis, F. J. Campisano Co.	317-253-7651
MA	Braintree, Nova Assocs.	617-848-9330
MI	Jackson, Jim Jordan Assocs.	517-750-2677
MN	Minneapolis, Northstar Comps.	612-553-1888
MS	Meridian, Alpha Mktg.	601-483-9306
MO	Independence, Engrg. Svcs. Co.	816-254-3600
MO	St. Louis, Engrg. Svcs. Co.	314-997-1515
NJ	Mountainside, Henry G. Richter Co.	201-233-4615
NY	Fayetteville, Henry G. Richter Co.	315-637-6713
NC	Greensboro, L & D, Inc.	919-292-3201
OH	Cincinnati, F. J. Campisano Co.	513-574-7111
OH	Cleveland, F. J. Campisano Co.	216-749-5550
PA	Corapolis, F. J. Campisano Co.	412-264-5151
TN	Austin, C. R. Colvin Assocs.	512-474-8698
TN	Houston, C. R. Colvin Assocs.	713-961-1262
TX	Richardson, McCoy Assocs. Co.	214-238-1017

K&L MICROWAVE, INC., 408 Coles Circle, Salisbury, MD 21801, Tel: 301-749-2424, TWX: 710-864-9683; FSC No.: 50140; Empl.: 320; *Sls. Mgr.:* Paul J. Leo

K & L QUARTZTEK, K & L Microwave, 20 S. 48th Ave., Phoenix, AZ 85043, Tel: 602-272-7944, TWX: 910-951-1305; FSC No.: 59492; *Sls. Mgr.:* Mark H. Story

K & M ELCTRNS., 123 Interstate Dr., W. Springfield, MA 01089, Tel: 413-781-1350, TWX: 710-350-6463; FSC No.: 6M312; Empl.: 500; *Sls. Mgr.:* Allan Mallanik ... **A•1879**

Local Sales Offices & Reps

CT	Marlborough, Precision Sls., Inc.	203-295-0580
OH	Akron, Augnat Assocs.	216-273-1211

Local Distributors

MA	West Springfield, Moldcon	413-736-0371

KANTZ ELCTRN. IND., 1804 Wall Church Rd., Wall Township, NJ 07719, Tel: 201-974-0090; Empl.: 12; *Sls. Mgr.:* L. Herold

KAPPA
NETWORKS INC

KAPPA NETWORKS, INC., 1443 Pinewood St., Rahway, NJ 07065, Tel: 201-541-1600, Telex: 130081 Kappa Rhwy; FSC No.: 20933; Empl.: 237; *Sls. Mgr.:* D. Pearl .... **A•1530-1545**

Local Sales Offices & Reps

AL	Huntsville, Electro-Mech Sls. Engrg. Co.	205-533-2100
CA	Alhambra, Kappa Networks	213-283-2048
CA	Alhambra, M. W. Riedel & Co.	213-283-7694
CA	Santa Clara, Emerging Tech. Sls.	408-727-1771
CO	Englewood, White Sls. Co.	303-694-9555
CT	Cheshire, Selmark Assocs.	203-573-9088
FL	Altamonte Springs, 'C' Assocs., Inc.	305-831-1717
GA	Norcross, Electro-Mech Sls. Engrg. Co.	404-447-6478
IA	Grandview, R.R. Burton & Assocs.	816-763-5385
MD	Columbia, Eastern Tech. Corp.	301-995-0202
MA	Millis, Selmark Assocs.	617-376-2914
MN	Osseo, Gaffney Sls. Co.	612-425-5484
MO	Grandview, R.R. Burton & Assocs.	816-763-5385
NH	Hopkinton, Selmark Assocs.	603-746-3299
NJ	Madison, Livera-Polk Assocs.	201-377-3220
NY	Glen Head, Livera-Polk Assocs.	516-759-9300
NC	Raleigh, Electro-Mech Sls. Engrg. Co.	919-851-8165
PA	Wynnewood, Metz-Benham Assocs.	215-896-7300
TN	Jonesboro, Electro-Mech Sls. Engrg. Co.	615-753-2964
TX	Dallas, Technlg. Sls.	214-380-0200
TX	Houston, Technlg. Sls.	713-266-2473
EXP	Carteret NJ, Kappa Networks	800-223-0603

Local Distributors

CA	Sherman Oaks, Delay Line Distrs. Co.	800-624-2617

KAPPA SCIENTIFIC CORP., Box 30585, Santa Barbara, CA 93105, Tel: 805-687-9648; Empl.: 4

KARKAR ELECTRONICS, INC., 245 Eleventh St., San Francisco, CA 94103, Tel: 415-552-1247, TWX: 910-372-7754 or 650-157-2515 MCI; FSC No.: 017857; *Sls. Mgr.:* A. Slikkerveer

KARL HOPT CO, See Hopt, Karl, Co.

KATES SCI. INSTRS., 142 Adam St., Newton, MA 02158, Tel: 614-527-2711; Empl.: 28; *Sls. Mgr.:* D. Kates

KATO ENGINEERING, Reliance Electric, P. O. Box 99502, Cleveland, OH 44199, Tel: 800-245-4501, in OH 800-245-4497

KAUFMAN DATA COMMS., INC., Orange Nassau Elctrns. Co., 145 E. Dana St., Mountain View, CA 94041, Tel: 415-962-8811, TWX: 910-379-5021

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KAVLICO CORP., 20869 Plummer St., Chatsworth, CA 91311-5096, Tel: 818-882-2400, FAX 818-998-2050, Telex: 65-1481; Empl.: 250; *Dist. Mgr.:* Rudi Kettler .... **B•1798**

Local Sales Offices & Reps

AL	Adamsville, SouthRep	205-674-3056
CA	Dana Point, Avia-Tech	714-661-1914
CO	Lakewood, Loritz Controls	303-232-7803
IL	Lansing, Van Meter Instr.	312-474-3580
KS	Desoto, Midtec Assocs.	913-441-6565
MA	Lexington, Jodan Tech.	617-863-8898, 617-862-2354
MI	Taylor, Source Elctrns.	313-295-7790
MN	Minneapolis, Industra Co.	612-835-5535
NM	Albuquerque, Indl. Prods. Corp. (IPC)	505-256-3561
NJ	Haledon, E. A. Oliva Co.	914-457-9209
OH	Middleburgh Hgts., J. L. Finnicum	216-234-2323
PA	King of Prussia, FLW of PA	215-337-4343
SC	Greenville, E. C. Capell & Assocs.	803-297-6550
TX	Ft. Worth, UTM Engineering	817-429-2456
TX	Houston, Collinsystems Pro-Quip	713-464-9428

KAYE INSTRUMENTS, 15 De Angelo Dr., Bedford, MA 01730, Tel: 617-275-0300, Telex: 6817183; Empl.: 170

KAY ELEMETRICS CORP., 12 Maple Ave., Pine Brook, NJ 07058-9797, Tel: 201-227-2000, TWX: 710-734-4347; FSC No.: 80138; Empl.: 70; *Sls. Mgr.:* Stephen P. Crump .... **A•1713**

KAY-TOWNES ANTENNA, P.O. Box 593, Rome, GA 30161, Tel: 404-291-9871, TWX: 810-764-4809; Empl.: 85; *Sls. Mgr.:* Charles S. Ford; *Dist. Mgr.:* James A. Sheffiled

KB ELCTRNS., 73 Wortman Ave., Brooklyn, NY 11207, Tel: 718-257-3300, TWX: 710 584 2308; Empl.: 125; *Sls. Mgr.:* A Bueller

KBI, A Div. of Cabot Corp., PO Box 1462, Reading, PA 19603, Tel: 215-371-3600, Telex: 902251, TWX: 510-651-0106; Empl.: 600; *Sls. Mgr.:* Robert J. Longenecker

KCK AMERICA INC., 1245 Forest Ave., Ste. 10, Des Plaines, IL 60018, Tel: 312-297-5435, Telex: 726481; *Sls. Mgr.:* Carl Bronder; *Dist. Mgr.:* Carl Bronder

KD COMPONENTS, INC., 3016 S. Orange Ave., Santa Ana, CA 92707, Tel: 714-545-7108, TWX: 910-595-2678; Empl.: 25

KDI ELECTRONICS, INC., Engelmann & Pyrofilm Divisions, 60 S. Jefferson Rd., Whippany, NJ 07981, Tel: 201-887-8100, TWX: 710-986-8220; FSC No.: 64537; Empl.: 300; *Sls. Mgr.:* Carl Schraufnagl; *Dist. Mgr.:* Carl Schraufnagl .... **A•1881**

Local Sales Offices & Reps

AZ	Phoenix, Toward Engrg. Assocs.	602-955-3193
CA	Los Angeles, Elsco	714-891-4621
CA	Mountain View, Gene Woempner	415-964-5454
CA	Mountain View, Gene Woempner Co., Inc.	415-964-5454
CA	Mountain View, J.L. Tech. Sls.	415-969-5552
CO	Englewood, High Plains Mktg.	303-792-2020
FL	PalmBay, Spartech Assocs., Inc.	305-727-8045
GA	Norcross, Spartech Assocs., Inc.	404-446-7300
IL	Northfield, Imex Ltd.	312-446-8934
IL	Park Ridge, Probe Elctrns.	312-698-2044
MD	Owings Mills, Neal Deoul Assocs.	301-363-4311
MA	Ashland, John O'Donnell	617-881-1380
MA	N. Andover, Torrey Assocs.	617-687-0099
MN	New Brighton, TWC Sls.	612-636-1770
MO	Grandview, Harris - Hanson	816-763-6200
MO	St. Louis, Harris - Hanson	314-432-3611
NJ	Madison, Livera-Polk Assocs.	201-377-3220
NY	Glen Head, Livera-Polk Assocs.	516-759-9300
NY	Huntington, CDB Entrps., Inc.	516-692-5200
NY	Syracuse, T-Squared Elctrns.	315-463-8592
OH	Dayton, Frederick L. Ohmer & Assocs.	513-434-1454
PA	Doylestown, Lou Adezio	215-249-9729
TX	Garland, Carey, McMahill & Zerbe Co., Inc.	214-681-1414
WA	Vancouver, Ray Over Sls.	206-695-4697

Local Distributors

CA	Chatsworth, MIL-COMM Distrs.	213-998-3111
CA	Mountain View, Target Elctrns.	415-961-1170
NJ	Englewood, Tech. Elctrn. Distrs.	201-894-0800
NY	Farmingdale, Command Elctrns.	516-293-1212
TX	Houston, Lenert Co.	713-225-1465

KEARNEY MAGNETICS, 150 Charcot Ave., San Jose, CA 95131, Tel: 408-262-4136, Telex: 910-338-2108; Empl.: 150; *Sls. Mgr.:* Carolyn Morton; *Dist. Mgr.:* Aki Fusimoto

KEC ELCTRNS., INC., 20817 Western Ave., Torrance, CA 90501, Tel: 213-320-3902, TWX: 910-349-6962; FSC No.: 213-618-1197; Empl.: 8; *Sls. Mgr.:* Frank Chase .... **D•1685-1687**

Local Sales Offices & Reps

AZ	Tempe, Quatra	602-894-2802
CA	Cupertino, Costar	408-446-9339
CA	Los Alamitos, Power Specialists	213-594-9418
CO	Fort Collins, Vic Myers Assocs.	303-223-8907
FL	Cocoa Beach, Teqspec	305-748-9292
FL	Hobe Sound, Teqspec	305-746-4987
FL	Palm Harbor, Teqspec	813-785-2276
GA	Atlanta, Teqspec	404-455-7222
IL	Elk Grove Village, Loren Green Assocs.	312-593-0282
IN	Indianapolis, Loren Green Assocs.	317-293-9827
MA	Danvers, C. H. Burnham Assocs.	617-774-0111
MI	Jenison, R. C. Nordstrom & Co.	616-457-5762
MI	Southfield, R. C. Nordstrom & Co.	313-559-7373
MN	Minnetonka, Chris-Tek	612-934-1334
NH	Durham, C. H. Burnham Assocs.	603-868-2282
NJ	Springlake, Neville & Vespo	201-974-1520
NM	Albuquerque, Quatra Assoc. Inc.	505-821-1355
NY	Binghamton, TAE-Rep.	607-772-6952
NY	Rochester, TAE-Rep.	716-586-8710
NY	Thompson Ridge, Neville & Vespo	914-457-9209
NC	Winston Salem, Teqspec	919-723-8102
OH	Chesterland, KT/DEPCO	216-729-3588
PA	Erdenheim, Omni Sls.	215-233-4600
PA	Pittsburg, KT/Depco	412-487-8777
RI	Johnston, C. H. Burnham Assocs.	401-231-7475
TN	Morristown, Teqspec	615-587-0980
VA	Fairfax, Nine Assocs.	703-273-1803
WA	Bellevue, Elctrn. Mktg. Grp.	206-746-5915

KEENE LAMINATES, Keene Corp., 199 Amaral St., E. Providence, RI 02914, Tel: 800-556-7683, Telex: 927524; Empl.: 75

KEDMAN CO., Box 25667, Salt Lake City, UT 84125, Tel: 801-973-9112, TWX: 910-925-4116; Empl.: 100

KEENE RAY PROOF, Keene Corp., 50 Keeler Ave., Norwalk, CT 06878, Tel: 203-838-4555, Telex: 96-5812; *Sls. Mgr.:* Robert C. Barbour; *Dist. Mgr.:* Ken Makowski

KEITHLEY INSTRS., 28775 Aurora Rd., Cleveland, OH 44139, Tel: 216-248-0400, Telex: 98-5469; Empl.: 461; *Sls. Mgr.:* Ron Ruiz; *Dist. Mgr.:* T. A. Hayden

KEL-AM INCORPORATED

KEL-AM, 308 E. 5th, P.O. Box 313, Eldon, MO 65026, Tel: 314-392-7174, Telex: 42-301; FSC No.: 57856; Empl.: 67; *Sls. Mgr.:* Mark Hayes .... **C•1412-1423**

Local Sales Offices & Reps

AZ	Scottsdale, BH&B Sls.	602-994-4455
CA	El Toro, Kel-Am Pacific	714-859-2093
CA	San Jose, Pilgrim Elctrns.	408-249-7500
CO	Boulder, Component Prod. Sls.	303-530-2800
CT	North Haven, Kitchen & Kutchin	203-239-0212
FL	Sarasota, Phoenix Comps.	813-371-1163
GA	Atlanta, Electro Sls.	404-394-1122
IN	Fort Wayne, CC Elctrns.	317-255-1508
IA	Davenport, Electro Tech.	319-386-1134
MD	Baltimore, Faion Lott, Inc.	301-744-4611
MA	Lexington, &	617-862-8230
MA	Wakefield, Kentronics	617-246-0245
MI	Ypsilanti, Tamco, Inc.	313-572-1950
MN	Minneapolis, Electro-Tech	612-927-5878
MO	N. Kansas City, Weisler & Assocs.	314-394-4543
MO	St. Louis, Weisler & Assocs.	314-394-4543
NJ	Clark, R. E. Breuer Co.	201-388-5045
NM	Albuquerque, Nelco Elctrns.	505-293-1399
NY	Port Washington, R. E. Breuer Co.	516-883-7810
NY	Rochester, Tech. Comps.	716-342-2406
OR	Portland, SPS Engrg.	503-297-6919
PA	McKean, &	814-476-1376
PA	Willow Grove, Meldena Sls.	215-657-7760
NC	Matthews, RG Sls.	704-847-0049
TN	Chattonooga, Electro Sls.	615-267-4260
TX	Grapevine, Elctrn. Mktg. Assoc.	817-481-7502
TX	Houston, Elctrn. Mktg. Assoc.	713-498-8120
WA	Redmond, SPS Elctrns.	206-392-5264

Local Distributors

AZ	Tempe, Anjon	602-894-1332
AZ	Tucson, Southwest Sls.	602-628-1613
CA	Belmont, LO-DAN Elctrns.	415-592-4600
CA	Corona, Konex Corp.	714-371-1200
CA	Costa Mesa, Ascot	714-557-3252
CA	Glendale, Remco	714-558-3202
CA	Mountain View, Cornett Elctrns.	415-969-5420
CA	San Diego, Mann	619-578-1550
CA	San Diego, R. David Miner, Inc.	619-566-9891
CA	San Fernando, REMCO	213-365-1176
CA	Santa Ana, Mann S.W.	714-558-3202
CA	Santa Clara, Ascot	408-988-4991
CA	Santa Clara, Mann Elctrns.	408-988-6061
CO	Broomfield, Ascot	303-465-2346
CO	Denver, CSID Intergrated Elctrns.	303-893-9594
FL	Ft. Lauderdale, Intertec Comps.	305-975-8644
FL	Largo, Lo Dan Elctrns.	813-586-2851
FL	Longwood, Intertec Comps.	305-834-7777
IL	Arlington Hgts., Lo Dan Elctrns.	312-398-5311
IL	Hoffman Estates, Intercomp	312-843-2040
IL	Wheeling, Ascot	312-459-5750
KS	Shawnee, Besco Elctrns.	913-631-3882
KS	Wichita, Radio, Inc.	316-264-2798
MA	Canton, Elctrn. Packaging Comps.	617-821-2111
MA	Lowell, Bay State Wire & Cable	617-454-2444
MI	Southfield, LSI Mktg.	313-356-7002
MN	Farmington, Tel-Tek, Inc.	612-460-6299
MN	Farmington Hills, Advent Elctrns.	313-477-1650
MN	Minneapolis, Glenmark	612-941-4825
MO	Independence, H.F. Signalling	816-833-4448
NE	Lincoln, Scott Elctrns.	402-466-8221
NE	North Platte, Scott Elctrns.	308-532-9260
NE	Omaha, Scott Elctrns.	402-734-6750
NH	Hampstead, Astrum Elctrns.	603-329-5656
NH	Manchester, Components North	603-624-4661
NJ	Roselle, Lectron Inds.	201-245-5858
NM	Albuquerque, Connecting Comps.	505-345-8921
NM	Albuquerque, Elctrn. Devices	505-293-1935
NY	Ithaca, OHM Elctrns.	602-273-8406
NY	Port Washington, Connector Concepts	516-883-3800
NY	Rochester, E.I.C. Elctrns.	716-544-4392
OK	Oklahoma City, Radio, Inc.	405-789-0741
OK	Tulsa, Radio, Inc.	918-587-9123
OR	Beaverton, Zepher Elctrns.	503-643-1980
PA	McKean, Advacom	814-476-7774
PA	Montgomeryville, Pyttronics	215-643-2850
TX	Addison, Connec/Tek	214-239-7552
WA	Seattle, Zepher Elctrns.	206-241-1980

KELTEC FLORIDA, P.O. Box 2917, Ft. Walton Bch., FL 32549, Tel: 904-651-9749, TWX: 510-730-7654; FSC No.: 09062; Empl.: 400 .... **D•1688**

Local Sales Offices & Reps

AZ	Phoenix, J. Smith Assoc.	602-267-0981
CA	Los Altos, Stout Inds.	415-949-0440
CA	Los Angeles, Cain Technology	213-477-9054
CA	Orange, Cain Technology	714-997-7311
CO	Colorado Springs, J. Smith Assoc.	303-597-5343
FL	Melbourne, V.P.I.	305-727-3305
FL	Tampa, V.P.I.	813-832-2041
IN	Ossian, Science Sls.	219-622-7383
IA	Cedar Rapids, Palatine Sls.	319-365-8071
KS	Goddard, Palatine Engrg. & Sls.	316-788-5521
KS	Mission, Palatine Sls.	913-831-0555
MD	Ellicott City, VPI	301-461-2525
MA	Needham Hgts., O'Sullivan & Murphy	617-449-4141/4142/4144
MO	Hazelwood, Palatine Sls.	314-839-0800
NJ	Danville, Metro-MICS	201-625-5959
NM	Albuquerque, J. Smith Assoc.	505-265-3406
NY	Melville, Metro MICS	516-271-6677
OH	Brunswick, Science Sls.	216-273-4429
PA	Montgomerysville, VPI	215-474-3200
TX	Richardson, Lear Assocs.	214-231-5388

KELTLON CORP., Viking Modules Div., 225 Crescent St., Waltham, MA 02154, Tel: 617-894-8700, Telex: 948197; Empl.: 75; *Sls. Mgr.:* T. Chadurjian

KELTRON CORP., 225 Crescent St., Waltham, MA 02154, Tel: 617-894-8700, Telex: 948197; Empl.: 270; *Sls. Mgr.:* Scott J. Shrier; *Dist. Mgr.:* Scott J. Shrier

KELTRON CORP., Walden Div., 225 Crescent St., Waltham, MA 02154, Tel: 617-894-8700, Telex: 948197; Empl.: 225; *Sls. Mgr.:* T. Chadurjian

KELVIN, 5919 Noble Ave., Van Nuys, CA 91411, Tel: 818-782-6662, Telex: 65-1417; FSC No.: 19587; Empl.: 250; *Sls. Mgr.:* R. A. Featherston .... **A•1882-1883**

Local Sales Offices & Reps

AL	Huntsville, Macro Mktg.	205-883-9630
AZ	Tempe, Sunwest Mktg.	602-838-7586
CA	Mountain View, G. C. Woempner Co.	415-964-5454
CA	San Diego, Wes-K Assoc.	619-578-2040
CA	Van Nuys, Wes-K Assocs.	213-989-3070
CO	Boulder, R-G Entprs.	303-447-9211
CT	Milford, Todino Engrg. Sls.	203-874-6643
FL	Lighthouse Point, R. C. Simon & Co.	305-941-2757
IL	Deerfield, Walt Krueger	312-945-3720
MD	Reisterstown, Massey Assocs.	301-833-2039
MA	Needham Hgts., Todino Engrg.	617-444-7925
MI	Birmingham, Forand Sls.	313-644-0087
MN	Minneapolis, Parker Shoap	612-934-5812
NJ	Medford, Jack McCoy Inc.	609-953-0770
NY	Fayetteville, Foster & Wager	315-637-5427
NY	Great Neck, Trionic	516-466-2300
NY	Webster, Foster & Wager	716-265-2072
OH	New Lebanon, J. N. Bailey & Assocs.	513-687-1325
OR	Beaverton, General Elctrns.	503-641-5288
TX	Austin, C. R. Colvin Assocs.	512-474-8698
TX	Dallas, Stasco	214-239-4517
TX	Houston, C. R. Colvin Assocs.	713-961-1262
WA	Renton, General Elctrns.	206-228-9505

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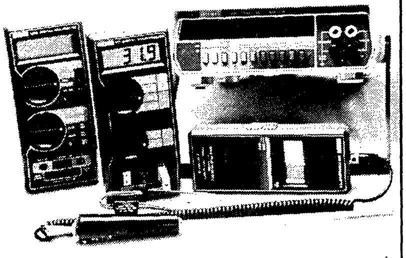

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AZ	Phoenix, Schweber	602-997-4874
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CA	Sacramento, Hamilton/Avnet Elctrns.	916-648-3227
CA	Sacramento, Integrated	916-424-5297
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CA	San Jose, Schweber Elctrns.	408-748-4700
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CA	Sunnyvale, Bell Inds. (Corp. Off.)	408-734-8570
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CA	Thousand Oaks, Bell Inds.	805-499-6821
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IN	Fort Wayne, Bell/Graham	219-423-3422
IN	Indianapolis, Graham Elctrns.	317-634-8202
IN	Indianapolis, Pioneer/Indianapolis	317-849-7300
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MN	Minneapolis, Merit Elctrns. Corp.	612-546-5383
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PA	Pittsburgh, Schweber Elctrns.	412-782-1600
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TX	Austin, Schweber Elctrns.	512-458-8253
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UT	Salt Lake City, Hamilton/Avnet Elctrns.	801-972-2800
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Can	Montreal, Hamilton/Avnet	514-331-6443
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KEN-TRON MFG., INC., 1204 Industrial Dr., Owensboro, KY 42301, Tel: 502-684-0431, Telex: 20-4305; Empl.: 100; *Sls. Mgr.:* J. Douglas

KENYON MAGNETICS, 1040 Grand St, Hoboken, NJ 07030, Tel: 201-798-6511; FSC No.: 54194; Empl.: 47; *Sls. Mgr.:* J. R. Siegel

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CA	San Diego, Windsor Dynamics	619-452-1891
CA	San Francisco, N-S Assocs.	415-851-2703
CO	Denver, J. F. Hurlbut Co.	303-279-7796
CT	Farmington, R. Perron Co.	203-673-4825
FL	Boca Raton, J. L. Highsmith Co.	305-368-9194
FL	Orlando, J. L. Highsmith Co.	305-422-5794
GA	Tucker, J. L. Highsmith Co.	404-493-1055
IL	Chicago, Century Elctrns.	312-777-9700
IN	Noblesville, Century Elctrns.	317-849-2026
KS	Shawnee, ATECH	913-268-9644
MD	Burtonsville, Eastern Instrmn.	301-384-8500
MA	Needham, R. Perron Co.	617-449-6162
MI	Detroit, Carter McCormic & Peirce	313-477-7700
MN	Minneapolis, E.C. Elctrn. Sls.	612-831-0229
MO	St. Louis, ATECH	314-576-2884
NH	Dover, R. Perron & Co.	603-742-2321
NJ	Woodcliff Lake, Eastern Instrmn.	201-664-0907
NM	Albuquerque, Techn. Mktg. Assoc.	505-345-8921
NY	Rochester, NACO Elctrns. Corp.	716-223-4490
NY	Syracuse, NACO Elctrns. Corp.	315-699-2651
NY	Utica, NACO Elctrns. Corp.	315-732-1801
NC	Charlotte, J. L. Highsmith Co.	704-527-2382
OH	Cleveland, Carter McCormic & Peirce	216-779-5100
OH	Dayton, Carter McCormic & Peirce	513-836-0951
OR	Portland, H. Levinson	503-245-1902
PA	Bensalem, Eastern Instrmn.	215-245-6660
PA	Pittsburgh, Carter McCormic & Peirce	412-372-4415
TX	Austin, Airep Elctrns.	512-327-0778
TX	Dallas, Airep Elctrns.	214-349-4360
TX	Houston, Airep Elctrns.	713-944-2055
UT	Salt Lake City, J. F. Hurlbut Co.	801-531-7472
VA	Richmond, J. L. Highsmith Co.	804-745-5555
WA	Seattle, H. Levinson Co.	206-382-1300
WI	Milwaukee, Century Elctrns. Sls.	414-645-3680

KEPRO CIRCUIT SYS., 630 Axminister Dr., Fenton, MO 63026, Tel: 314-343-1630; Empl.: 15; *Sls. Mgr.:* Jeff R. Keil; *Dist. Mgr.:* Jeff R. Keil

KESSLER-ELLIS PRODS., 120 1st Ave., Atlantic Highlands, NJ 07716, Tel: 201-291-0500, 800-631-2165, Telex: 13-2496; FSC No.: 28222; Empl.: 85; *Sls. Mgr.:* Frank Vogt; *Dist. Mgr.:* Debbie Santelli ... **D•1124-1125**

Local Distributors

MO	St. Louis, ISL	314-535-5760
AL	Birmingham, Industrial Elctrl. Supp.	205-956-8504
AL	Dothan, All-Phase Elec. Supp. Co.	205-793-2313
AZ	Phoenix, Graybar Elec. Co., Inc	602-269-2131
AZ	Phoenix, Keystone Electro Sls.	602-995-3005
AZ	Phoenix, Metermaster	602-437-1425
AZ	Tucson, Trident Instr. Svcs.	602-790-0343
AR	Little Rock, Drives and Elec.	501-568-8800
CA	Burbank, All-Phase Elec. Supp. Co.	213-843-4111
CA	Dublin, Standard Meter Lab, Inc.	415-828-4837
CA	Fresno, Allied Elec. Motor Svc.	209-486-4222
CA	Irvine, Metercraft	714-261-7135
CA	Los Angeles, E.I.L. Instrs.	213-685-7020
CA	Los Angeles, Graybar Elec. Co., Inc	213-265-7000
CA	Los Angeles, Metermaster	213-685-4340
CA	Oakland, Western Electro-Mechanical	415-452-1936
CA	Palo Alto, Metermaster	415-968-0313
CA	Riverside, California Whls.	213-268-0550
CA	San Diego, Metermaster	619-560-4841
CA	Santa Clara, E.I.L. Instrs.	408-727-0396
CA	Santa Monica, Master Distrs.	213-452-1229
CA	South San Francisco, Graybar Elec. Supp., Inc.	415-871-7000
CO	Denver, E.I.L. Insco	303-534-4160
CO	Denver, Graybar Elec. Co., Inc.	303-458-7770
CT	Middletown, E.I.L. Instrs.	203-346-6646
CT	Southington, Electro Mech. Drives, Inc.	203-621-7335
FL	Cantonment, C.B. Metcalf	904-968-5500
FL	Ft. Lauderdale, Electronic Dvcs. & Controls	305-974-2500
FL	Ft. Lauderdale, McDonald Distr. of Fla.	305-563-1255
FL	Ft. Lauderdale, Power & Pumps	305-566-3261
FL	Jacksonville, Graybar Elec. Co., Inc.	904-356-7611
FL	Jacksonville, Power & Pumps	904-356-5881
FL	Orlando, Power & Pumps	305-843-7400
FL	Palm Bay, E.I.L. Instrs.	305-725-8300
FL	Perrine, Graybar Elec. Co., Inc.	305-232-1530
FL	Tampa, Chemco Elec. Supp.	813-621-8611
FL	Tampa, Graybar Elec. Co., Inc.	813-253-8881
GA	Albany, Weatherbee Elec. Supp. Co.	912-883-2034
GA	Atlanta, Graybar Elec. Co., Inc.	404-892-6950
GA	Columbus, Weatherbee Inds. Elec. Supp.	404-568-0157
GA	Norcross, AA Elec.	404-449-8670
GA	Norcross, Metermaster	404-446-0166
HI	Honolulu, Process Valve & Control	808-848-0337
ID	Pocatello, Consolidated Elec. Distrs.	208-232-2585
IL	Aurora, Englewood Elec. Supp.	312-897-9296
IL	Berkeley, Tara Prods.	312-449-6436
IL	Bridgeview, E.I.L. Instrs.	312-430-2292
IL	Chicago, Englewood Elec. Supp.	312-376-8750
IL	Chicago, Newark Elctrns.	312-638-4411
IL	Crystal Lake, Englewood Elec. Supp.	815-459-6500
IL	Decatur, Englewood Elec. Supp.	217-875-7300
IL	Des Plaines, Englewood Elec. Supp.	312-299-3300
IL	Downers Grove, Neuco, Inc.	312-960-3800
IL	Hoffman Estates, Englewood Elec. Supp.	312-882-2424
IL	Itasca, Metermaster	312-251-0606
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IL	LaSalle, Complete Indl. Entprs.	815-244-1485
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IL	Melrose Park, Graybar Elec. Co., Inc.	312-287-7700
IL	Oak Brook, Englewood Elec. Supp.	312-626-3232
IL	Peoria, Tecco, Inc.	309-692-2312
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IL	Rockford, Englewood Elec. Supp.	815-226-8750
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LA	Harvey, Nunn-IC Elec. Supp. Co.	504-341-4281
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LA	West Monroe, Weaks Supp. Co.	318-323-8831
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MD	Gaithersburg, Pioneer Gaithersburg	301-921-0660
MD	Glen Burnie, EJ Varholy Sons, Inc.	301-760-3344
MD	Sparks, E.I.L. Instrs.	301-771-4800
MA	Billerica, Metermaster	617-523-2580
MA	Boston, Graybar Elec. Co., Inc.	617-482-9320
MA	Burlington, E.I.L. Instrs.	617-272-9450
MA	W. Springfield, Control Engrg.	413-781-1330
MI	Adrian, Englewood Elec. Supp.	517-265-5148
MI	Battle Creek, Englewood Elec. Supp.	616-968-3336
MI	Cadillac, Ackerman Elctrl. Supp.	616-775-9734
MI	Clio, Control Dvcs.	313-686-2410
MI	Coldwater, Englewood Elec. Supp.	517-278-7395
MI	Grand Rapids, Ackerman Elctrl. Supp.	616-459-8327
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MI	Negaunee, Northwest Elec. Supp.	906-228-9050
MI	Sterling Heights, Esco Svcs.	313-254-3367
MN	Bloomington, NWR	612-854-7329
MN	Hibbing, NWR	218-262-5228
MN	Minneapolis, DOT Elctrns.	612-861-3343
MN	Minneapolis, Graybar Elec. Co., Inc.	612-721-3545
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MO	Joplin, Covert Elec. Machinery, Inc.	417-623-4827
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MO	Kansas City, ISL	818-333-6569
MO	St. Louis, Graybar Elec. Co., Inc.	314-531-4700
NJ	Green Brook, Apparatus Elctrl. Supp.	201-752-8400
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NJ	Pennsauken, E. I. L. Instrs.	609-488-0474
NY	Albany, Niagara Elec. Sls. Co.	518-869-0130
NY	Bohemia, In-Control	516-567-6800
NY	Buffalo, Niagara Elec. Sls. Co.	716-886-4000
NY	East Syracuse, Niagara Elec. Sls. Co.	315-437-1656
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NY	Floral Park, Elemco Indl. Svc. Corp.	718-343-8166
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NY	Maspeth, Babco, Inc.	212-446-5120
NY	Rochester, E.I.C.	716-544-4392
NY	Rochester, E.I.L. Instrs.	716-427-8000
NY	Rochester, Niagara Elec. Sls. Co.	716-271-1223
NY	Rockaway Park, Metropolitan Sls.	212-634-3100
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OH	Cincinnati, Graybar Elec. Co., Inc.	513-621-0600
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OH	Dayton, E.I.L. Instrs.	513-435-2134
OH	Dayton, Pioneer Dayton	513-236-9900
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OH	Defiance, Northwest Elec. Controls	216-253-2141
OH	Media, Reeves Assocs., Inc.	215-566-6709
OH	Sandusky, Sandusky Elec., Inc.	419-625-4915
OH	Solon, Midland Elec.	216-248-3800
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PA	Pittsburgh, E.I.L. Instrs.	412-731-5230
PA	Pittsburgh, Graybar Elec. Co., Inc.	412-323-0600
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TX	Corpus Christie, Nunn Elec. Supp. Co.	512-884-0311
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TX	Dallas, Graybar Elec. Co., Inc.	214-744-1421
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UT	Salt Lake City, Stuart Elec. Supp.	801-466-8603
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VA	Richmond, GE Supp.	804-358-4941
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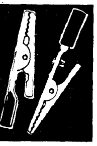

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CO	Englewood, Omega Ltd.	303-762-8061
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IN	Fort Wayne, R.O. Whitesell & Assocs.	219-432-5591
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KS	Shawnee, Benson Engrg.	913-491-4446
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TN	Greenville, R.O. Whitesell & Assocs.	615-639-6154
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TX	Houston, Benson Engrg.	713-672-2194
WA	Seattle, Northmar, Inc.	206-524-5170
WI	New Berlin, T. L. Labant	414-425-7157
EXP	NY, Freeport, Minthorne Int'l.	516-546-4700

Local Distributors

AZ	Scottsdale, Allied Elctrns.	602-990-9549
CA	Garden Grove, Allied Elctrns.	714-554-0731
CA	Inglewood, Newark Elctrns.	213-671-7066
CA	Santa Clara, Allied Elctrns.	408-727-1690
CO	Wheatridge, Allied Elctrns.	303-425-7144
FL	Ft. Lauderdale, Allied Elctrns.	305-486-0500
GA	Atlanta, Allied Elctrns.	404-237-3366
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MO	St. Louis, Allied Elctrns.	314-878-1229
NJ	Springfield, Newark Elctrns.	212-349-7087
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AZ	Scottsdale, Power Specialist (Power Supp.)	602-996-4100
CA	Carson, Amasco South	213-516-8561
CA	Sunnyvale, Amasco North	408-733-8690
CO	Aurora, R & R Instrmn.	303-340-8728
CT	Madison, Eastronix, Inc.	203-421-4514
FL	Melbourne, EMS, Inc.	305-724-1027
HI	Honolulu, Hawaiian Ind. Instr.	808-533-4232
IL	Elmhurst, Sector Engrg. Sls.	312-530-7850
IN	Indianapolis, Sector Engrg. Sls.	317-842-1120
KS	Olathe, Rush & West Assocs. (Power Supp.)	913-764-2700
KS	Overland Park, Ramsey Assocs. (Scopes)	913-649-6996
MD	Burtonsville, Eastern Instrmn.	301-384-8500
MD	Wheaton, Brimberg Sls. (Power Supp.)	301-946-2670
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MO	Maryland Hgts., Ramsey Assocs. (Scopes)	314-878-5042
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NM	Albuquerque, Cleveland Entprs.	505-265-7893
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TX	Richardson, Scientific Dvcs. SW	214-231-8106
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CT	Brookfield, Kanan Assocs.	203-775-0494
FL	St. Petersburg, K-Square	813-381-1893
GA	Atlanta, Electro Tech	404-262-1522
IL	Schaumburg, Gassner & Clark	312-882-8608
IA	Cedar Rapids, H. R. Brown Sls. Co.	319-366-0635
KS	Olathe, M. E. Bettis Co.	913-764-0621
KS	Wichita, M. E. Bettis Co.	316-265-8250
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KLM ELECTRONICS, 16890 Church St., P.O. Box 816, Morgan Hill, CA 95037, Tel: 408-779-7363, TWX: 910-590-4468; Empl.: 250; *Sls. Mgr.:* Chuck McKinney

KLOCKNER MOELLER, 4 Strathmore Rd., Natick, MA 01760, Tel: 617-655-1910, Telex: 94-8434; Empl.: 250; *Sls. Mgr.:* George Tamer

KMC SYSTEMS, INC., 140 Greenwood Ave. (Bldg. 3), Midland Pk., NJ 07432, Tel: 201-447-0007, Telex: 642-374; Empl.: 120; *Sls. Mgr.:* E. Verder

Local Sales Offices & Reps

NJ	Marlton, Control Equip., Inc.	215-676-1460
TX	Irving, DACO	216-986-1506
UT	Bountiful, Lectrol, Inc.	801-292-7674
Can	Downsview, Ont., Displayco, Ltd	416-663-6405

KNOL ENTERPRISES, 3468 Sacramento Dr., San Luis Obispo, CA 93401, Tel: 805-544-4881; Empl.: 6; *Sls. Mgr.:* Dave Bone

KNOWLES ELCTRNS., INC., 3100 N. Mannheim Rd., Franklin Park, IL 60131, Tel: 312-455-3600, Telex: 72-8397; *Sls. Mgr.:* Reginald G. Garratt, VP-Mktg.

KOA SPEER ELCTRNS., Bolivar Dr., P.O. Box 547, Bradford, PA 16701, Tel: 814-362-5536, Telex: 91-4404, TWX: 510-695-5921; FSC No.: 09021; Empl.: 3000; *Sls. Mgr.:* L. G. Holzwarth; *Dist. Mgr.:* L. Rice .... **A•1108, 1884-1886**

Local Sales Offices & Reps

AL	Huntsville, Cartwright & Bean	205-830-1540
AZ	Phoenix, O'Donnell Assocs.	602-944-9542
CA	Anaheim, Westrep	213-404-3881
CA	San Diego, Westrep	619-566-6580
CA	Santa Clara, Westrep	408-988-8833
CO	Boulder, R. G. Entprs.	303-447-9211
CT	Middletown, Gerber Sls.	203-347-3000
FL	Altamonte Springs, APM Assocs.	305-869-6831
FL	Ft. Lauderdale, APM Assocs.	305-565-0056
FL	Tampa, APM Assocs.	813-886-2457
GA	Atlanta, Cartwright & Bean	404-233-2939
IL	Arlington Hgts., C. L. Greenslade Sls.	312-593-3450
IN	Fort Wayne, John F. Kilfoil	219-436-7233
KS	Overland Park, Advanced Techn. Sls.	913-642-6675
LA	Covington, Cartwright & Bean	504-892-1780
MA	Monson, Gerber Sls.	413-267-5051
MA	Newton Upper Falls, Gerber Sls.	617-969-2620
MI	Troy, C. B. Jensen & Assocs.	313-643-0506
MN	Edina, Grayden & Flemmer	612-941-1120
MS	Jackson, Cartwright & Bean	601-981-1170
MO	St. Louis, Advanced Techn. Sls.	314-878-2921
NM	Albuquerque, Power Entprs.	505-298-1918
NY	East Rochester, Tri-Tech Elctrns.	716-385-6500
NY	Endwell, Tri-Tech Elctrns.	607-754-1094
NY	Fayetteville, Tri-Tech Elctrns.	315-446-2881
NY	Fishkill, Tri-Tech Elctrns.	914-897-5611
NY	Great Neck, MOS Assocs.	516-487-3966
NC	Charlotte, Cartwright & Bean	704-377-5673
NC	Raleigh, Cartwright & Bean	919-876-4130
OH	Cincinnati, John F. Kilfoil	513-791-6150
OR	Beaverton, Eclipse Mktg. Grp.	503-642-1661
PA	Wynnewood, Metz-Benham Assocs.	215-896-7300
TN	Knoxville, Cartwright & Bean	615-693-7450
TN	Memphis, Cartwright & Bean	901-276-4442
TX	Lewisville, Jim Hughes	214-221-1536
TX	Stafford, Jim Hughes	713-343-0673
WA	Redmond, Eclipse Mktg. Grp.	206-885-6991
PR	Hato Rey, M. Anderson	809-751-2026
Can	Ontario, Cantronics Ltd.	416-665-8020

Local Distributors

AZ	Phoenix, Kachina	602-269-6201
AZ	Phoenix, Sterling Elctrns.	602-258-4531
AR	Little Rock, Carlton-Bates	501-562-9100
CA	Chatsworth, QC Comps.	818-700-2622
CA	Chatsworth, T.T.I.	818-709-1010
CA	Fountain Valley, Comps. Ctr.	714-979-0433
CA	Irvine, KELEX	714-957-3247
CA	Irvine, Ryno Elctrns.	714-557-5021
CA	San Diego, Ryno Elctrns.	619-453-8430
CA	San Jose, Eric Elctrns.	408-262-1111
CA	Santa Clara, Components Ctr.	408-988-3751
CO	Boulder, R. G. Entprs.	303-447-9211
CO	Denver, Ragon Elec. Parts	303-744-3601
CT	Stratford, Utronics	203-378-4201
CT	Wallingford, Midstate Elctrns.	203-265-9900
FL	Orlando, TTI	305-859-1000
FL	W. Palm Beach, Nurmi Elctrn. Supp.	305-684-0320
GA	Atlanta, Prehler Elctrns.	404-447-5540
GA	Roswell, Quality Comps.	404-993-8146
IL	Elk Grove Village, GBL/Goold Elctrns.	312-593-3220
IL	Elk Grove Village, Ragon Elctrns.	319-373-0525
IL	Northbrook, Classic Comp. Supp.	312-272-9650
IL	Rosemont, Advent Elctrns.	312-298-4210
IN	Indianapolis, Advent Elctrns.	317-872-4910
IA	Cedar Rapids, Advent Elctrns.	319-363-0221
LA	Baton Rouge, Indl. Elctrn. Supp.	504-357-4249
LA	Shreveport, Indl. Elctrn. Supp.	318-222-9459
MD	Beltsville, Radio Elec. Svc.	301-937-9100
MD	White Marsh, Radio Elec. Svc. Co.	301-529-0500
MA	Billerica, Baldwin Comp. Ctr.	617-667-6710
MA	Hingham, Sager Elec. Supp.	617-749-6700
MA	Norwood, Gerber Elctrns.	617-769-6000
MA	Waltham, Sterling Elctrns.	617-894-6200
MA	Westford, Electronic Specialties	617-486-8495
MA	Woburn, T.T.I	617-938-8800
MI	Ann Arbor, Wedemeyer	313-665-8611
MI	Farmington Hills, Advent Elctrns.	313-477-1650
MI	Farmington Hills, Prehler Elctrns.	313-476-7084
MI	Livonia, Reptron	313-525-2700
MN	St. Paul, Ragon Elctrns.	612-642-2828
MO	Independence, Ragon Elctrns.	816-254-3410
NE	Lincoln, Scott Elctrns.	402-466-8221
NH	Nashua, Brevan Elctrns.	603-889-7230
NJ	Mountainside, Enox Resistor Co.	201-654-7600

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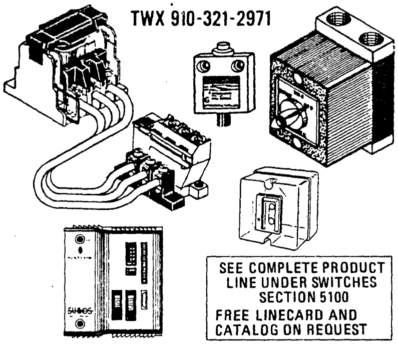

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NY	Farmingdale, SAI	516-293-2710
NY	Hauppauge, Fairmont Elctrn. Sls.	516-231-3313
NY	Hauppauge, Jaco	516-273-5500
NY	Hauppauge, Sherburn Elctrns.	516-231-4300
NY	Rochester, Summit Distrs.	716-334-8110
NY	Ronkonkoma, Baldwin Comp. Ctr.	516-588-5700
NY	Ronkonkoma, Prime Comps.	516-737-1730
NC	Greensboro, Golden Elctrns.	919-373-0038
NC	Raleigh, Southeastern Radio	919-828-2311
OH	Cleveland, Roberts Elect. Corp.	216-238-1711
OH	Dayton, Stotts-Friedman Elctrns.	513-298-5555
OH	Worthington, Reptron/Ohio	614-436-6675
OK	Tulsa, Altair Co.	918-252-5781
OR	Beaverton, Murphy Elctrns.	503-642-2001
PA	Allentown, Lehigh Elctrn. Comp.	215-433-3045
PA	Drexel Hill, Kass Elctrns. Dist.	215-449-2300
PA	Erie, Rem Elctrns.	814-453-5626
PA	Harrisburg, Cumberland Elctrns.	717-233-5883
PA	Philadelphia, Philadelphia Elctrns.	215-568-7400
RI	Providence, Wm. Dandreta Co.	401-861-2800
TN	Knoxville, Bondurant Bros. Co.	615-573-9151
TN	Memphis, Bluff City Elctrns.	901-345-9500
TN	Nashville, Bluff City Elctrns.	615-242-8000
TX	Ft. Worth, Allied Elctrns.	817-336-5401
TX	Ft. Worth, T.T.I. Inc.	817-429-1440
TX	Houston, Altair Co.	713-462-3029
TX	Richardson, Altair Co.	214-231-5166
TX	Richardson, CCI	214-644-3444
WA	Kent, Shannon Ltd.	206-763-0545
WA	Redmond, Murphy Elctrns.	206-881-1234
WI	Hartland, G W Elctrns.	414-367-6003
WI	New Berlin, Classic Comp.	414-786-5300
Can	Mississauga, Ont., Prelco	416-678-0401
Can	Montreal, Que., Prelco	514-389-8051

KODE, 1515 S. Manchester Ave., Anaheim, CA 92802, Tel: 714-758-0400, TWX: 910-595-2680; FSC No.: 62767; Empl.: 40; *Sls. Mgr.:* LeRoy Koonsman

KOEP PRECISION STANDARDS, INC., P. O. Box 191, So. Plainfield, NJ 07080, Tel: 201-549-9280, TWX: 710-998-0503; Empl.: 6; *Sls. Mgr.:* Dennis M. Koep; *Dist. Mgr.:* Dennis M. Koep **D•1257**

Local Sales Offices & Reps

AZ	Scottsdale, Williams Assocs.	602-947-4297
CA	Torrance, Cutlas Elctrns.	213-324-7360
CO	Commerce City, Williams Assocs.	303-289-5647
FL	Winter Haven, Lee Assocs.	813-294-5815
IL	Des Plaines, Marsland Assocs.	312-298-2620
IN	Indianapolis, Marsland Assocs.	317-924-3568
IA	Cedar Rapids, Marsland Assocs.	319-296-8030
MN	Minneapolis, Marsland Assocs.	612-545-4481
MO	St. Louis, Marsland Assocs.	314-878-2404
NM	Albuquerque, Williams Assocs.	505-255-1638
NY	Binghamton, Tae-Rep	607-722-9265
NY	Rochester, Tae-Rep	716-586-8710
UT	Salt Lake City, Williams Assocs.	801-532-7701
WA	Portland, Westcon	503-283-0132
WI	New Berlin, Marsland Assocs.	414-786-6611

KOGYOSHA, 179 Riveredge Rd., Tenafly, NJ 07670, Tel: 201-569-8769; Empl.: 3; *Sls. Mgr.:* Mark Nakanishi; *Dist. Mgr.:* Mark Nakanishi

KOLE IND., 3553 N.W. 50th St., Miami, FL 33102-0152, Tel: 305-633-2556, 800-327-6085; Empl.: 45; *Sls. Mgr.:* B. J. Neelands

KOLIN INDS., Box 300, Pound Ridge, NY 10576, Tel: 914-764-5775, Telex: 137453; Empl.: 30; *Sls. Mgr.:* J. Kolinsky

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KOLLMORGEN CORP., Industrial Drives Div., 201 Rock Rd., Radford, VA 24141, Tel: 703-639-2495, TWX: 710-875-3743; FSC No.: 11384; Empl.: 343; *Sls. Mgr.:* Sandor L. Tako/G. Wayne Coleman **B•1163-1165; C•1483**

Local Sales Offices & Reps

AL	Huntsville, Techn. Mktg. Assoc.	205-883-7893
AZ	Phoenix, Thor Engr.	602-437-1463
CA	Alhambra, Thorson	818-281-2280
CA	Goleta, Thorson	805-964-8751
CA	Mountain View, Thorson	415-964-9300
CA	Signal Hill, Thorson	213-595-0361
CT	Meriden, Whitehead Assocs., Inc.	203-634-1280
CT	Tolland, Whitehead Assocs., Inc.	
FL	Melbourne, Technlg. Mktg. Assocs.	305-676-3776
FL	Orlando, Techn. Mktg. Assoc.	305-857-3760
FL	Pompano Beach, Techn. Mktg. Assoc.	305-942-0774
GA	Atlanta, Technlg. Mktg. Assocs.	404-257-0374
IL	Schaumburg, Industrial Drives	312-893-8886
MA	Wakefield, Whitehead Assocs., Inc.	617-246-5155
MI	Farmington Hills, Electro-Matics Prods., Inc.	313-478-1182
MN	St. Paul, John J. Exon Co.	612-636-5533
MO	Raytown, Cadon Techn. Sls.	816-356-7685
MO	St. Louis, Cadon Techn. Sls.	314-645-8670
NJ	Wayne, S. Howard Lagerveld & Assocs.	201-790-1714
NY	Rochester, A & D Devices	716-385-2778
NY	Sydney, A & D Dvcs.	607-563-8488
NC	Matthews, Industrial Drives Div.	704-821-9875
OH	Chagrin Falls, Jerry Kilroy Corp.	216-543-3370
OH	Kettering, Kilroy Corp.	513-294-1235
OR	Beaverton, Thorson NW	503-644-5900
PA	Downingtown, Homersmith, Inc.	215-269-3637
PA	Media, Homer Smith Engr. Prods. Rep.	215-543-2434
TX	Austin, P.J. Scanlon Co.	512-255-2664
TX	Dallas, P. J. Scanlon Co., Inc.	214-231-4661
VA	Salem, Homersmith, Inc.	703-774-7411
WA	Bellevue, Thorson	206-455-9180
WI	Wauwatosa, Industrial Drives	414-475-5985

KOLLSMAN INSTR., 220 Daniel Webster Hwy., Merrimack, NH 03054, Tel: 603-889-2500, Telex: 94-3537, TWX: 710-366-6883; Empl.: 2200

KONTES, Kimble Div. of Owens/IL, 1001 Spruce St., Vineland, NJ 08360, Tel: 609-692-8500, TWX: 510-687-8967; *Sls. Mgr.:* Peter Davenport

KONTRON ELCTRNS., 1230 Charleston Rd., Mountain View, CA 94039-7230, Tel: 415-965-7020, TWX: 910-378-5207; Empl.: 200; *Sls. Mgr.:* Dick Ridas

KOOLTRONIC, Hamilton Ave., Hopewell, NJ 08525, Tel: 609-466-3400, Telex: 84-3345; Empl.: 150; *Sls. Mgr.:* Gerald H. Freedman

KORRY ELECTRONICS, INC., 223 8th Ave. N., Seattle, WA 98109, Tel: 206-223-5400, TWX: 910-444-2295; Empl.: 410; *Sls. Mgr.:* Woody Hertzog

KRECKMAN, HERB, CO., Cresco, PA 18326, Tel: 717-595-2212; Empl.: 4

KR ELECTRONICS, INC., 91 Avenel St., Avenel, NJ 07001, Tel: 201-636-1900; Empl.: 15 **A•1613**

KRL ELCTRNS., 160 Bouchard St., Manchester, NH 03103, Tel: 603-668-3210, 800-257-3300, TWX: 710-220-1662; Empl.: 65; *Sls. Mgr.:* Bert A. Spiller

KROHN CERAMICS, INC, See Centerflex Techn.

KROHN-HITE CORP., Avon Indl. Pk., Bodwell St., Avon, MA 02322, Tel: 617-580-1660, TWX: 710-345-0831; Empl.: 100; *Sls. Mgr.:* Craig S. Dunbar **D•1258-1259**

Local Sales Offices & Reps

AL	Huntsville, Gentry Assocs.	205-837-0692
AZ	Phoenix, Odyssey 1	602-246-8846
AR	Eldorado, Kemp Engrg.	501-826-5869
CA	Inglewood, L & M Engrg. Assocs.	213-674-6850
CA	San Jose, MCH Assocs.	408-246-7330
CO	Englewood, Odyssey 1	303-773-8176
CT	New Haven, McBar Assocs.	203-865-4376
FL	Ft. Lauderdale, Gentry Assocs.	305-791-8405
FL	Orlando, Gentry Assocs.	305-859-7450
FL	Tampa, Gentry Assocs.	813-886-0720
GA	Atlanta, Gentry Assocs.	404-998-2828
IL	Chicago, Berndt Assocs.	312-283-0713
IN	Carmel, Berndt Assocs.	317-844-0114
KS	Overland Park, Ramsey Assocs.	913-649-6996
LA	Gretna, Gentry Assocs.	504-367-3975
MD	Baltimore, Sci-Rep	703-385-0600
MA	Waltham, McBar	617-890-0233
MI	Detroit, EQS Sys.	313-961-3042
MN	Minneapolis, Berndt Assocs.	612-546-2021
MO	St. Louis, Ramsey Assocs.	314-878-5042
NJ	Englewood, Sci. Devices E.	201-871-3916
NM	Albuquerque, Odyssey 1	505-265-6645
NY	Syracuse, Labtronics	315-455-7314
OH	Chesterland, EQS Sys.	216-729-2222
OH	Columbus, EQS Sys.	614-228-3453
OK	Tulsa, Kemp Engrg.	918-663-4501
OR	Portland, McLaren	503-297-2248
PA	Pittsburgh, EQS Sys.	216-729-2222
PA	Spring House, Scientific Devices East	215-643-3335
SC	Columbia, Gentry Assocs.	803-772-6786
TN	Knoxville, Gentry Assocs.	615-584-0281
TX	Dallas, Kemp Engrg.	214-931-7100
TX	Houston, Kemp Engrg.	713-466-1465
VA	Fairfax, Sci-Rep	703-385-0600
WA	Bellevue, McLaren	206-454-3400
WI	Milwaukee, Berndt Assocs.	414-545-8400

KRYSTINEL CORP., 126 Pennsylvania Ave., Paterson, NJ 07503, Tel: 201-345-8900, TWX: 710-988-5931; Empl.: 200; *Sls. Mgr.:* Joseph Barreca **A•1304-1306**

Local Sales Offices & Reps

AZ	Phoenix, Charles T. Fink & Assoc.	602-992-9884

Local Distributors

CA	Los Alamitos, Permag Pacific Corp.	213-594-6515
CA	Sunnyvale, Permag Sierra Corp.	408-738-1080
CO	Aurora, Permag Corp.	303-693-6612
GA	Norcross, Permag Dixie Corp.	404-448-5661
IL	Elk Grove Vl., Permag Cen. Corp.	312-956-1140
MA	Billerica, Permag NE Corp.	617-273-2890
MN	Eden Prairie, Permag Minn. Corp.	612-934-4635
NY	Hicksville, Permag Corp.	516-822-3311
OH	Toledo, Permag Magnetics Corp.	419-385-4621
OR	Portland, Permag Corp, Sierra Div.	503-252-9610
TX	Richardson, Permag S.W. Corp.	214-699-1121

KSI, See Kaiser Systems, Inc.

KSW ELCTRNS. CORP., See Frequency Sources, KSW Semicond. Div.

K-SYSTEMS, INC., 3902 Lilac, Las Cruces, NM 88005, Tel: 505-526-3209, Telex: 910-380-3378; Empl.: 2; *Sls. Mgr.:* Alice Furphy

H. KUHNKE, INC., 26 W. Highland Ave., Atlantic Highlands, NJ 07716, Tel: 201-291-3334, 800-221-0714, Telex: 854041; Empl.: 12; *Sls. Mgr.:* John Chapski

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KULITE SEMICONDUCTOR PRODS., INC., 1039 Hoyt Ave., Ridgefield, NJ 07657, Tel: 201-945-3000, Telex: 13-5458; Empl.: 300 **B•1799**

Local Sales Offices & Reps

AL	Huntsville, Lee Assocs.	205-533-5896
AZ	Scottsdale, Dave Menegey Assocs.	602-994-9519
CA	Hollywood, B. J. Wolfe Entprs.	213-877-5518
CA	Walnut Creek, Dale-Dahl Assocs.	415-933-9595
CO	Boulder, Measurement Cnslts.	303-449-7506
DC	Baltimore, Reptron, Inc.	301-799-7490
FL	Osprey, Dick Ridgewell Co.	813-484-2020
IN	Indianapolis, EIA, Inc.	317-257-7231
MD	Baltimore, Reptron	301-799-7490
MA	Wayland, Daner-Hayes	617-655-0888
MI	Madison Heights, WKM Assocs.	313-588-2300
MN	Minneapolis, Trask Engrg.	612-537-2434
MO	St. Louis, Ozark Elctrn. Mktg.	314-423-7200
NH	Wilton, Daner-Hayes, Inc.	800-225-8760
NJ	Glen Gardner, Daner-Hayes, Inc.	800-225-8760
NM	Albuquerque, Amonette Entprs.	505-344-4143
NY	Brewster, Daner-Hayes, Inc.	800-225-8760
NY	Rochester, Daner-Hayes, Inc.	800-225-8760
OH	Dayton, WKM Assocs	513-434-7500
OH	Pittsburgh, WKM Assocs.	412-892-2953
OK	Edmond, Data Aids Assocs.	405-478-5000/01
PA	Doylestown, Daner-Hayes, Inc.	800-225-8760
PA	Pittsburgh, WKM Assocs.	412-892-2953
TX	Austin, Data Aids	512-327-8600/01
TX	Dallas, Data Aids	214-620-1551
UT	Salt Lake City, Measurement Cnslts.	801-364-3174
VT	White River Junction, Daner-Hayes, Inc.	800-225-8760
WA	Seattle, Brett Assocs.	206-431-8090

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KULKA SMITH, INC., 1913 Atlantic Ave., Manasquan, NJ 08736, Tel: 201-223-9400, TWX: 244536; Empl.: 500; *Sls. Mgr.:* John Chirico **C•1424-1429**

Local Sales Offices & Reps

AZ	Phoenix, Shefler-Kahn Co.	602-257-9015
CA	Los Angeles, E E Strassner	818-242-8823
CA	Santa Clara, Ross Mktg. Assocs.	408-988-8111
CO	Denver, Lindberg Co.	303-758-9033
CT	North Haven, Coakley, Boyd & Abbett	800-225-8402
FL	Orlando, Hollingsworth & Still, Inc.	305-859-9423
GA	Norcross, Hollingsworth & Still, Inc.	404-447-1700
IL	Lombard, RMP/McBride Corp.	312-932-9090
IL	Northbrook, Dolin Sls.	312-498-6770
IN	Indianapolis, Electronic Reps., Inc.	317-894-7414
KS	Shawnee Mission, Lowell-Kangas & Assocs.	913-631-3515
MA	Needham Hgts., Coakley, Boyd & Abbett	617-444-5470
MI	Southfield, R. C. Nordstrom & Co.	313-559-7373
MN	Minneapolis, Electronic Comp. Sls.	612-933-2594
MO	St. Louis, Lowell-Kangas & Assocs.	314-821-4050
NH	Plaistow, Coakley, Boyd & Abbett	617-444-5470
NJ	Clifton, R.O.I. Sls. Co.	201-340-1515
NY	Syracuse, Allen, Leonard D., Inc.	315-437-8387
NC	Kenersville, Hollingsworth & Still, Inc.	800-241-5712
OH	Richfield, Bear Mktg.	216-659-3131
OR	Portland, Dale J Weber Co.	503-234-7671
PA	Trevose, P.S.A., Inc.	215-245-0513
TX	Dallas, Schoonmaker, J. Y. Co.	214-349-1650
WI	Milwaukee, D. Dolin Sls.	414-482-1111
Can	Rexdale, Ont., Frank Eakin Sls.	416-245-3600

Local Distributors

AZ	Tempe, Fisher/Brownell	602-967-1464
CA	Alhambra, Fisher/Brownell	818-289-0255
CA	Buena Park, Control Design	213-802-1371
CA	Buena Park, RPS Elctrns.	714-521-5040
CA	Mountain View, Cornett Elctrns.	415-969-5420
CA	San Carlos, Control Design	415-592-4808
CA	San Diego, Fisher/Brownell	619-560-8545
CA	Santa Clara, El-Com Comps.	408-496-0880
CA	Santa Clara, Fisher/Brownell	408-988-6041
CO	Arvada, Denver Wintronics	303-431-7161
CO	Englewood, Industrial Elctrns.	303-694-9444
CT	Stratford, Utronics	203-378-4201
CT	Wallingford, Midan	203-265-2077
FL	Altamonte Springs, Control Design Supp.	305-788-3220
FL	Clearwater, Electronic Precepts	813-530-9781
FL	Ft. Lauderdale, Peerless Radio/Fla.	305-973-4141
FL	Miami, Electronic Equip. Co.	305-871-3500
GA	Stone Mountain, Control Design Supp., Inc.	404-979-3500
IL	Addison, Lectro Comps.	312-543-1680
IL	Chicago, Newark Elctrns.	312-784-5100
IL	Genoa, Control Design Supp., Inc.	815-784-6515
IL	Palatine, OHM Elctrns.	312-359-5500
IL	Peoria, Klaus Radio	309-691-4840
IN	Indianapolis, Control Design	317-788-4559
IN	Indianapolis, Graham Elctrn. Supp.	317-634-8202
IA	Cedar Rapids, Deeco, Inc.	319-365-7551
IA	Cedar Rapids, Vrbik-Berquist	319-366-8733
IA	Marion, Control Design	313-373-2923
KS	Wichita, RSC Elctrns.	316-267-5213
KY	Louisville, Peerless Elctrn. Equip.	502-637-7677
LA	New Orleans, Radio Parts	504-581-5959
LA	New Orleans, W. B. Allen Supp.	504-525-8222
MD	Baltimore, Resco/Baltimore	301-529-0500
MA	Newton, Greene Shaw Co.	617-969-8900
MA	Norwood, Gerber Elctrns.	617-769-6000
MI	Battle Creek, Great Lakes Elctrns.	616-731-4156
MI	Grand Rapids, S. F. Elctrns.	616-459-0216
MN	Minneapolis, Control Design	612-721-6555
MN	St. Paul, Ragon Elctrns.	612-642-2828
MO	Kansas City, Walter Radio Supp. Co.	816-531-7015
MO	Maryland Hgts., L-Comp., Inc.	314-291-6200
MO	St. Louis, Control Design Supp.	314-426-3150
NE	Lincoln, Scott Elctrns. Supp.	402-466-8221
NJ	Prospect Park, Kappe Electrical Distrs.	201-790-1999
NM	Albuquerque, Walker Elctrl.	505-883-2992
NY	Bohemia, Key Comps., Inc.	516-567-7500
NY	Buffalo, Summit Distrs.	716-884-3450
NY	Elmsford, Ancar Elctrns.	914-592-7100
NY	Lynbrook, Peerless Radio	516-593-2121
NY	Mt. Vernon, Qar Indl. Elctrns.	914-699-2224
NY	Rochester, Simcona Elctrns.	716-328-3230
NY	Rochester, Summit Distrs.	716-334-8110
NY	Rockville Center, Midway Indl.	516-293-6800
NC	Charlotte, Control Design Supp.	704-588-4410
NC	Raleigh, Southeastern Radio Supp.	919-828-2311
NC	Winston-Salem, Kirkman Elctrns.	919-722-9131
OH	Cincinnati, URI Elctrns.	513-761-4030
OH	Cleveland, Roberts Elctrns.	216-238-1711
OH	Cleveland, W. M. Pattison Supp.	216-441-3000
OH	Columbus, Electronics Mktg.	614-299-4161
OH	Dayton, John A. Becker Co.	513-226-1341
OH	Dayton, Stotts-Friedman	513-298-5555
OH	Warren, Rem Elctrns.	800-262-9050
OK	Oklahoma City, Electro Entprs.	405-427-6591
OR	Portland, Radar Elec.	503-232-3404
PA	Altoona, Allegheny Elctrns.	814-946-0871
PA	Harrisburg, Pyttronics	215-643-2850
PA	Malverne, Control Design	215-296-0150
PA	McKean, Advacom	814-476-7774
PA	Philadelphia, Almo Elctrns.	215-698-4000
PA	Philadelphia, Shap Elctrns.	215-969-3300
PA	Pittsburgh, CAM/RPC Co.	412-782-3770
PA	Reading, Barbey Elctrns.	215-376-1451
TN	Knoxville, Industrial Elctrns.	615-573-7135
TX	Dallas, Force Elctrns.	214-438-5700
TX	Fort Worth, Allied Elctrns.	817-336-5401
TX	Ft. Worth, Industrial Elctrns.	817-731-7321
TX	Houston, Altair Corp.	214-231-5176
TX	Houston, Sterling Elctrns.	713-627-9800
TX	Richardson, Altair Corp.	214-231-5166
UT	Salt Lake City, Ra-Elco	801-487-7749
VA	Charlottesville, Virginia Radio Supp.	804-296-4184
WA	Seattle, Pacific Elctrns.	206-575-1050
WA	Seattle, Radar Elec.	206-282-2515
WI	New Berlin, Control Design	414-784-1015
WI	New Berlin, RM Wisconsin	414-784-4420
Can	Pte. Claire, Que., Future Elctrns.	514-694-7710

KURZ INSTRUMENTS INC.

KURZ INSTRUMENTS, INC., P.O. Box 849, Carmel Valley, CA 93924, Tel: 800-424-7356, Telex: 172275; FSC No.: 94-24-11681; Empl.: 45; *Sls. Mgr.:* Phil Hickerson .... **B•1800**

Local Sales Offices & Reps

FL	Jacksonville, Hile Controls Of Florida	904-268-4880
GA	Woodstock, Hile Controls Of Georgia	404-928-6844
IL	South Holland, Carrier-Oehler Co.	312-339-8200
KS	Mission, Vertec Assocs.	913-677-3200
KY	Ft. Mitchell, Giangarlo Sci. Co.	606-341-9570
LA	Baton Rouge, Desselle-Maggard Corp.	504-293-3290
MA	Newton, ETA Assocs.	617-527-4544
MI	Kalamazoo, Giangarlo Sci. Co.	616-345-9182
MN	Cedar, Bican Co.	612-434-7733
MO	Manchester, Vertec Assocs.	314-394-6242
NJ	Clifton, I.R.I.	201-471-2614
NM	Albuquerque, A-Tek Co.	505-265-8325
NY	Hamilton, Giangarlo Sci. Co.	315-824-1883
NC	Matthews, W. K. Hile Co.	704-847-9125
OR	Portland, Extech, LTD.	503-292-9219
PA	Pittsburgh, Giancarlo Sci., Co.	412-584-0208
TX	Houston, Stringer Assocs.	713-469-9209
TN	Knoxville, Hile Controls of Tennessee	615-584-0208
UT	Salt Lake City, MC2	801-364-3174
VA	Chester, Hile Controls Of Virginia	804-796-3001
WA	Enumclaw, Extech, LTD.	206-825-2308
WI	Milwaukee, Jensen Reynolds Corp.	414-351-1100
Can	Toronto, Safety Supply Canada	416-364-3234

KURZ-KASCH, Knob Div., 711 Hunter Dr., Wilmington, OH 45177, Tel: 513-382-0966; Empl.: 250; *Sls. Mgr.:* J. McGeady, M. Krystofik

KYOCERA INTL., INC., Elctrn. Comps. Grp., 11425 Sorrento Valley Rd., San Diego, CA 92138, Tel: 619-454-1800, TWX: 910-322-1130; *Sls. Mgr.:* Clif Nehlsen; *Dist. Mgr.:* Bill McKelvy

LAAKMANN ELECTRO-OPTICS, INC., 33052 Calle Aviador, San Juan Capistrano, CA 92675, Tel: 714-493-6624, Telex: 681335; *Sls. Mgr.:* John Wheeler

LAB-LINE INSTRS., 15th & Bloomingdale, Melrose Park, IL 60160, Tel: 312-450-2600, Telex: 270-312; Empl.: 225

LABORATORY PRODUCTS, INC., 57 Cornwall St., P. O. Box 1750, Jamaica Plain, MA 02130, Tel: 617-522-7800; FSC No.: 04-2593524; Empl.: 9; *Sls. Mgr.:* R. J. Toronto

LAFRANCE CORP., Entprs & Exec Aves, Philadelphia, PA 19153, Tel: 215-365-8000, Telex: 83-1732; *Sls. Mgr.:* James Craig

LAFRANCE CORP., PACTEC DIV., See PacTec Div., LaFrance Corp.

LA MARCHE MFG., 106 Bradrock Dr., Des Plaines, IL 60018, Tel: 312-299-1188, Telex: 28-2526; FSC No.: ;15736; Empl.: 225

LAMBDA ELECTRONICS, Veeco Instr., Inc., 515 Broad Hollow Rd., Melville, NY 11747, Tel: 516-694-4200, TWX: 510-224-6484; Empl.: 1200; *Sls. Mgr.:* R. Koslow

LAMBDA SEMICONDUCTORS, Veeco Instr., 121 International Dr., Corpus Christi, TX 78410, Tel: 512-289-0403, 800-255-9606, TWX: 910-876-1404; Empl.: 200; *Sls. Mgr.:* Derek Roberts

LAMP TECHNOLOGY, INC., 141A Central Ave., Farmingdale, NY 11735, Tel: 516-454-6464, Telex: 645543; Empl.: 10; *Sls. Mgr.:* Edith Reuter

LAMPTRONIX CO., LTD., 85 N. Williams St., Crystal Lake, IL 60014, Tel: 815-455-0400, Telex: 280191; FSC No.: 61342; *Sls. Mgr.:* Nancy E. Towe

Local Sales Offices & Reps

FL	Orlando, Over & Over Florida, Inc.	305-857-4057
IL	Addison, Engineered Sls.	312-832-8425
IN	Noblesville, W.G. Brouillette & Assocs.	317-345-6500
KS	Wichita, D & O Engrg.	316-686-2802
NJ	Haddonfield, Gray Assocs.	609-429-5300
TN	Antioch, Over & Over, Inc.	615-834-0140
WA	Lynwood, Blum & Assocs.	206-775-6656

LAMTECH ELECTRONICS, 620 Easy Street, Garland, TX 75042, Tel: 214-272-3504; Empl.: 100; *Sls. Mgr.:* Phillip Rasor; *Dist. Mgr.:* Phillip Rasor .... **C•1845**

Local Sales Offices & Reps

TX	Dallas, Zonk & Assocs.	214-238-7651
TX	Houston, Zonk & Assocs.	713-895-9131

LANCE INDS., P.O. Box 4156, Sylmar, CA 91342-0156, Tel: 818-367-1811, Telex: 66-2443; *Sls. Mgr.:* Jerry Updyke; *Dist. Mgr.:* Joe Barris

LANCE WIRE & CABLE, INC., 1010 Sherman Ave., Hamden, CT 06514, Tel: 203-288-5571; Empl.: 50; *Sls. Mgr.:* Bill Kahler

LANCORE TECHNOLOGIES, INC., 31324 Via Colinas, Westlake Village, CA 91362, Tel: 818-991-5100, Telex: 532044

LANDIS & GYR, INC., 4 Westchester Plaza, Elmsford, NY 10523, Tel: 914-592-4400, Telex: 137345; FSC No.: 914-592-1179; Empl.: 65; *Sls. Mgr.:* Joe Depaola; *Dist. Mgr.:* R. W. Strohm

L & L SPECIAL FURNACE, 166 Kent Rd., Aston, PA 19014, Tel: 215-459-9216, Telex: 753264; Empl.: 20; *Sls. Mgr.:* Greg Lewicki; *Dist. Mgr.:* Stephen Lewicki

L & R MFG. CO., 577 Elm St., Kearny, NJ 07032, Tel: 201-991-5330, Telex: 642078 Ellanar Krny.; Empl.: 220; *Sls. Mgr.:* Bruce Bernardo

LANGLEY, P.O. Box 2911, San Diego, CA 92112, Tel: 619-264-3181; FSC No.: 83549; Empl.: 140; *Sls. Mgr.:* A. Kremm

LANSING

LANSING RESEARCH CORP., 705 Willow Ave., Ithaca, NY 14850, Tel: 607-272-3265, 800-847-3535; *Sls. Mgr.:* Fred B. Widding .... **C•1069**

LA POINTE INDUSTRIES, INC., Electronics Products Div., 155 W. Main St., Rockville, CT 06066, Tel: 203-872-8581, TWX: 710-435-1663; FSC No.: 70117; Empl.: 650

LARK ELECTRONICS, INC., Box 390, New York, NY 10040, Tel: 212-569-0430; FSC No.: 52682

LARK ENGINEERING CO., 26401 Calle Rolando, San Juan Capistrano, CA 92675, Tel: 714-493-9501, TWX: 910-596-1411; FSC No.: 33175; Empl.: 40

LARSON INSTR., Greenbush Rd., Orangeburg, NY 10962, Tel: 914-359-3800; Empl.: 18; *Sls. Mgr.:* A. D. Stephens

LASER APPLICATIONS, 91 Carver Ave., Westwood, NJ 07675, Tel: 201-664-7636; Empl.: 5

LASER CONCEPTS, Omega Organization Intl., P.O. Box 687, Mercer Island, WA 98040, Tel: 206-232-6256; *Sls. Mgr.:* Sheila Chatelaine

LASER DIODE LABS, 1130 Somerset St., New Brunswick, NJ 08901, Tel: 201-249-7000, TWX: 710-998-0597; *Sls. Mgr.:* Steve Klunk

LASER INC., Laser Lane, Box 537, Sturbridge, MA 01566, Tel: 617-347-7314, Telex: 95-1806; Empl.: 110; *Sls. Mgr.:* William H. Shiner

LASER PRECISION CORP., 1231 Hart St., Utica, NY 13502, Tel: 315-797-4449, Telex: 646803; Empl.: 110; *Sls. Mgr.:* Don Sypek

LASERSONICS POWER SUPPLY OPERATION, 177 N. Wolfe Rd., Sunnyvale, CA 94086, Tel: 408-732-9880 .... **D•1719**

LASER TECHN., 10624 Ventura Blvd., N. Hollywood, CA 91604, Tel: 818-763-7091; Empl.: 18; *Sls. Mgr.:* H. B. McLaughlin

LATTIN RADIO LABS., 1431 Sweeney, P.O. Box 44, Owensboro, KY 42302, Tel: 502-683-2868; Empl.: 3; *Sls. Mgr.:* Wm J. Lattin

LAWRENCE-CROW ELCTRNS. INC., 2100 Stemmons, Dallas, TX 75207, Tel: 214-749-5440, Telex: 730213; *Sls. Mgr.:* Jesse Hall; *Dist. Mgr.:* Michael T. McAndrews

L-COM INC., 1755 Osgood St., Unit 11EM, N. Andover, MA 01845, Tel: 617-682-6936, Telex: 882157; Empl.: 14; *Sls. Mgr.:* Mark W. Tomkins; *Dist. Mgr.:* Mark W. Tomkins .... **C•1846-1847**

Local Sales Offices & Reps

CA	Anaheim, Galaxie Sls. Intl.	714-937-5622
CT	Middletown, Gerber Sls.	203-347-3000
FL	Apopka, G. F. Bohman Assoc., Inc.	305-886-1882
IL	Chicago, Ed Joyner & Co.	512-320-1200
KS	Kansas City, BC Elctrns. Sls.	913-342-1211
MA	Newton Upper Falls, Gerber Sls.	617-969-2620
MO	Bridgeton, BC Elctrns. Sls.	314-291-1101
NJ	Marlton, Naudain Assoc.	609-983-5300
NY	Great Neck, F & F Metro, Inc.	516-482-4080
NY	Rochester, Lamb Comps., Inc.	716-323-1250
NY	Syracuse, Lamb Comps., Inc.	315-455-2469
TX	Houston, Repmasters-Houston	713-692-8204
TX	Sherman, Repmasters-Dallas	214-247-6236

Local Distributors

CA	Los Angeles, Electric Switches	213-660-1310
GA	Atlanta, A.P. Sales	800-624-5496
IL	Chicago, Classic Comp. Supp.	800-842-5149
MA	Canton, Impact Sls.	617-821-1500
MA	Newton Upper Falls, In-Stock Prods.	617-964-6200
MI	Brighton, A.P. Sls.	313-229-6550
NY	Victor, Add Elctrns.	716-924-4760
OH	Dayton, Televox	513-294-4499
TN	Knoxville, Mac-One	615-690-6221

LDJ INCORPORATED, 2200 Stephenson Hwy., P.O. Box 219, Troy, MI 48099-0219, Tel: 313-528-2202, TWX: 810-232-1509 LDJ TRMI; Empl.: 63; *Sls. Mgr.:* Jim Ling .... **D•1260**

LEACH®
CONTROL PRODUCTS DIVISION

LEACH CORP., Control Prods. Div., 6900 Orangethorpe Ave., Buena Pk., CA 90620, Tel: 714-739-0770, TWX: 910-596-2867; Empl.: 220; *Sls. Mgr.:* Ron Zimmerman; *Dist. Mgr.:* Ron Zimmerman .... **A•1378-1379, 1678-1679; B•1428-1429**

Local Sales Offices & Reps

AL	Huntsville, Brandel-Stephens & Co., Inc.	205-883-0445
AZ	Tempe, ELEC-COM Assocs.	602-967-8644
CA	Granada Hills, C & W Comps. Sls.	213-368-4032
CA	San Mateo, Halbar Assocs.	415-349-4700
FL	Orlando, Donato & Assocs.	305-352-0727
GA	Atlanta, Brandel-Stephens & Co., Inc.	404-261-7579
IN	Carmel, Giesting & Assocs.	317-844-5222
KS	Wichita, BAKA Corp.	316-682-8411
MD	Hunt Valley, Marktron	301-628-1111
MD	Rockville, Marktron	301-251-8990
MA	Woburn, Comp. Techn.	617-933-5390
MI	Farmington Hills, Giesting & Assocs.	313-478-8106
MN	Minneapolis, Comprehensive Tech. Sls.	612-888-7011
NJ	Englewood Cliffs, Leach Corp.	201-567-6795
NY	Fayetteville, R. D. Sherman	315-637-9861
NC	Greensboro, Brandel-Stephens & Co., Inc.	919-275-9059
OH	Cincinnati, Giesting & Assocs.	513-521-8800
PA	Trevose, PSA, Inc.	215-245-0513
TX	Dallas, Caton Sls.	214-661-5792
VA	Charlottesville, Marktron	804-973-5874
VA	Charlottesville, Marktron	301-251-8990
WA	Bellevue, Leach Corp.	206-746-7263
Can	Kirkland, Que., Robin Aerospace Prods., Ltd.	514-694-1315

Local Distributors

AZ	Tempe, Time Elctrns.	602-967-2000
CA	Anaheim, Time Elctrns.	714-937-0911
CA	Sunnyvale, Time/Nor-Cal.	408-734-9888
CA	Torrance, Time Elctrns. West	213-320-0880
FL	Ft. Lauderdale, Time Elctrns. - FL	305-974-4800
GA	Atlanta, Electro Air Corp.	404-351-3545
MD	Columbia, Time Elctrns.	301-964-3090
MA	Woburn, Time/New Eng.	617-935-8080
MO	St. Louis, Time Midwest	314-391-6444
NY	Hauppauge, Time Elctrn. Sls.	516-273-0100
PA	Broomall, Time/Mid-Atlantic	215-359-1200
TX	Dallas, Electro Air Corp.	214-385-0566
WA	Bellevue, Electro-Air/NW	206-641-3640
WA	Redmond, Pan Pacific Elctrns.	206-881-7252

LEACH®
RELAY DIVISION

LEACH CORP., Relay Div., 5915 Avalon Blvd., Los Angeles, CA 90003, Tel: 213-232-8221, TWX: 910-321-2303; FSC No.: 35344; Empl.: 630; *Sls. Mgr.:* S. Whitcomb; *Dist. Mgr.:* D. Robinson .... **B•1430-1435**

Local Sales Offices & Reps

AZ	Tempe, Elec-Com Assocs.	602-967-8644
CA	San Mateo, Halbar Assocs.	415-349-4700
CO	Denver, Quorum 3	303-696-8480
FL	Orlando, Donato & Assocs.	305-352-0727
FL	Palm Harbor, Donato & Assocs., Inc.	813-785-3327
GA	Atlanta, Craft Assocs.	404-256-0420
IN	Fort Wayne, Denton Mktg.	219-627-5525
KS	Wichita, BAKA Corp.	316-682-8411
MD	Hunt Valley, Marktron	301-628-1111
MD	Rockville, Marktron	301-251-8990
MA	Woburn, Comp. Techn.	617-933-5390
MN	Minneapolis, Comprehensive Tech. Sls.	612-888-7011
MO	Ferguson, Leach Corp.	314-524-2880
NJ	Englewood Cliffs, Leach Corp.	201-567-6795
NY	Fayetteville, R. D. Sherman	315-637-9861
OH	Dayton, Leach Corp.	513-434-8151
PA	Trevose, PSA, Inc.	215-245-0513
TX	Dallas, Caton Sls.	214-243-4716
UT	Sandy, Quorum 3: Sls. Grp., Inc.	801-943-9227
VA	Charlottesville, Marktron	804-973-5874
WA	Bellevue, Leach Corp.	206-746-7263
Can	Kirkland, Que., Robin Aerospace Prods.	514-694-1315
Can	Mississauga, Ont., Robin Aerospace Prods.	416-673-1666

Local Distributors

AZ	Tempe, Time Elctrns.	602-967-2000
CA	Anaheim, Time Elctrns.	714-937-0911
CA	Chatsworth, Time Elctrns.	818-998-7200
CA	San Diego, Time Elctrns.	619-586-1331
CA	Sunnyvale, Time/Nor-Cal	408-734-9888
CA	Torrance, Time Elctrns. West	213-320-0880
CO	Englewood, Time Elctrns.	303-850-7701
CT	Cheshire, Time Elctrns.	203-271-3200
FL	Ft. Lauderdale, Time Elctrns.-Fla.	305-974-4800
FL	Orlando, Time Elctrns.	305-841-6565
GA	Atlanta, Electro Air Corp.	404-351-3545
MD	Columbia, Time Elctrns.	301-964-3090
MA	Woburn, Time/New Eng.	617-935-8080
MN	Bloomington, Time Elctrns.	612-944-9192
MO	St. Louis, Time/Midwest	314-391-6444
NY	Hauppauge, Time Elctrn. Sls.	516-273-0100
OR	Portland, Time Elctrns.	503-664-3780
PA	King of Prussia, Time/Mid-Atlantic	215-337-0900
TX	Dallas, Time Elctrns.	214-385-0566
WA	Bellevue, Time Elctrns.	206-641-3640
WA	Redmond, Pan Pacific	206-881-7252

LEADER INSTRS. CORP., 380 Oser Ave., Hauppauge, NY 11788-3694, Tel: 516-231-6900, TWX: 510-227-9669; Empl.: 42; *Sls. Mgr.:* B. Storch; *Dist. Mgr.:* A. Ambrosio

LEA DYNATECH, INC., 12516 Lakeland Rd., Santa Fe Springs, CA 90670-9990, Tel: 213-944-0916, TWX: 910-586-1381; FSC No.: 57499; Empl.: 35

Local Sales Offices & Reps

AL	Huntsville, FM Assocs. Ltd.	205-882-0689
AZ	Phoenix, Indl. Prods. Corp.	602-954-7300
CA	Burbank, Biztek Co., Inc.	213-766-4890
CA	Mountain View, Leddy Assocs.	415-969-6313
CO	Boulder, Abco, Inc.	303-444-1173
CT	Hamden, Applied Meas.	203-288-5288
DC	Washington, Instrucom	202-223-1759
FL	Jupiter, FM Assocs. Ltd.	305-746-2996
GA	Atlanta, FM Assocs. Ltd.	404-451-2293
HI	Honolulu, Nustate Aircon	808-839-1212
IN	Fort Wayne, Century Dynamics, Inc.	219-486-2681
KS	Lenexa, C & C Sls.	913-888-6200
LA	Baton Rouge, Fogarty Engrg. Co.	504-928-3372
ME	Waterville, Kentrol	207-873-7741
MI	Birmingham, Thibodeau Engrg.	313-642-6620
MN	St. Paul, Knox Assocs.	612-488-5402
MO	Bridgeton, Electro Mech. Assocs.	314-291-7661
NM	Albuquerque, Industrial Prods. Corp.	505-256-3561
NY	Lynbrook, Puleo Elctrns., Inc.	516-599-4875
NC	Ramseur, FM Assocs., Ltd.	919-824-2196
OH	Wickliffe, Walter J. Brauer & Assocs.	216-943-0601
PA	Warminster, Multi-Meas., Inc.	25-675-3082
TX	Houston, Texas Tech. Prods. Co.	713-526-0656
TX	Midland, Total Flow Meas.	915-694-1567
VT	Bennington, Applied Meas., Inc.	802-422-2222
WA	Seattle, R. W. Campbell, Inc.	206-622-3403
WY	Casper, ABCO, Inc.	307-577-1851

LEAR SIEGLER, INC., 2850 Ocean Park Blvd., P.O. Box 2158, Santa Monica, CA 90406, Tel: 213-452-5444, TWX: 910-343-6463; Empl.: 30,860

LEAR SIEGLER, INC., Elctrn. Instr. Div., 714 N. Brookhurst St., Anaheim, CA 92803, Tel: 714-774-1010, TWX: 910-591-1157; Empl.: 256; *Sls. Mgr.:* J. Horgan .... **C•1430**

Local Sales Offices & Reps

CA	San Diego, Qualtronics	619-695-0118
GA	Atlanta, Grady Duckett	404-451-3529
IL	Chicago, Mauer Co.	312-677-4771
IN	Indianapolis, Elctrn. Sls. & Engrg.	317-849-4260
MA	Haverhill, L.K. Harmon	617-373-1313
MI	Detroit, Hummon Assocs.	313-474-0661
MN	Minneapolis, Paul Ericson & Assocs., Inc.	612-884-1969
NJ	Bellmawr, Mid Atlantic Corp.	609-931-5303
NY	Syracuse, C. W. Floring & Assocs.	315-478-2149
NY	Williston Park, ABC Elec.	516-747-6610
OH	Cleveland, Geotronix	216-526-2535
TX	Austin, Alphatech, Inc.	512-458-9179

Local Distributors

CA	Placentia, Local Sls., Inc.	714-993-1800
IL	Evanston, Mauer Co.	312-677-4771
Intl	Eng., Eastleigh Hants, BICC Vero Elctrns.	TWX 851-47-551
Intl	Japan, Tokyo, Hakuto Co.	TWX 78-12-2912
Can	Kingston, Ont., Elctrn. Pkg. Sys.	613-549-5152

LEASAMETRIC, INC., 1164 Triton Dr., Foster City, CA 94404, Tel: 415-574-4441; *Sls. Mgr.:* David Sobo

LEBOW CO., 5960 Mandarin Ave., Goleta, CA 93117, Tel: 805-964-7117; *Sls. Mgr.:* Sharon J. Neiman

LEBOW PRODUCTS, Eaton Corp., 1728 Maplelawn Rd., Troy, MI 48084, Tel: 313-643-0220, TWX: 810-232-4818; Empl.: 110; *Sls. Mgr.:* Michael J. Parker

LECROY RESCH. SYS. CORP., 700 S. Main St., Spring Vly., NY 10977, Tel: 914-425-2000, TWX: 710-577-2832; Empl.: 300; *Sls. Mgr.:* Henry Bickel

LECROY RESCH. SYS. CORP. (CAL.), 1806 Embarcadero Rd., Palo Alto, CA 94303, Tel: 415-856-1800, TWX: 910-373-1791; *Sls. Mgr.:* Andy Keyser

LECTROHM DIV. OF CAPCO, INC., Box 1028, Grand Junction, CO 81502, Tel: 303-243-8480, TWX: 910-929-6989; Empl.: 110

LECTRO MAGNETICS, INC., 6056 W. Jefferson Blvd., Los Angeles, CA 90016, Tel: 800-325-9814, 213-870-9383; FSC No.: 29098; Empl.: 60; *Sls. Mgr.:* Bill DeSalle

LECTROTECH, INC., 5810 N. Western Ave., Chicago, IL 60659, Tel: 312-769-6262; Empl.: 42

LEDCO DIV., 240 Plato Blvd., St. Paul, MN 55107, Tel: 612-222-2791, TWX: 910-563-3679; FSC No.: 55292; Empl.: 300; *Sls. Mgr.:* Laurie Wilbrecht

LEDEX INC., P.O. Box 427, Vandalia, OH 45377, Tel: 513-898-3621, Telex: 28-8228, TWX: 810-450-2526; FSC No.: 81840; Empl.: 500; *Sls. Mgr.:* T. C. Ristoff .... **B•1462, 1468-1470, 1612-1614**

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CA	Woodland Hills, Interstate Mktg. Assocs.	818-883-7606
CO	Boulder, Front Range Mktg.	303-443-4780
CT	Bloomfield, SIR Assoc.	203-243-9343
FL	Largo, Techn. Mktg. Assocs.	813-536-3796
FL	Melbourne, Techn. Mktg. Assocs.	305-676-3776
FL	Orlando, Techn. Mktg. Assocs.	305-857-3760
FL	Pompano Beach, Techn. Mktg. Assocs.	305-942-0774
IL	Elk Grove Village, Control Sls.	312-595-2110
IN	Greenwood, Valentine & Assoc.	317-888-2260
IN	South Bend, Valentine & Assoc.	219-288-7070
KS	Leawood, Thunderbird Tech. Sls. & Svcs.	913-642-7220
KS	Wichita, Thunderbird Tech. Sls. & Svcs.	316-684-3941
MA	Bedford, SIR Assocs.	617-275-5550
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MO	Maryland Heights, Thunderbird Tech. Sls. & Svcs.	314-567-6488
NY	Clark Mills, KLM-Garner Co.	315-853-6126
NY	N. Syracuse, KLM-Garner Co.	315-458-6214
NY	Oceanside, Bittan Assocs.	516-678-6222
NY	Pittsford, KLM-Garner Co.	716-381-8350
NC	Research Triangle Park, A. B. Andrews & Co.	919-544-1762
OH	Cleveland, Del Steffen & Assoc.	216-461-8333
OH	Dayton, Del Steffen & Assoc.	513-293-3145
OH	Lexington, Del Steffen & Assoc.	419-884-2313
OK	Tulsa, ION Assocs., Inc.	918-664-0186
PA	Carnegie, Del Steffen & Assocs., Inc.	412-276-7366
PA	King of Prussia, Freedman-Malta Assoc.	215-337-9211
PA	Pittsburgh, Del Steffen & Assoc.	412-276-7366
TX	Austin, ION Assocs., Inc.	512-331-7251
TX	Grand Prairie, ION Assocs., Inc.	214-647-8225
TX	Houston, ION Assocs., Inc.	713-977-4354
UT	Salt Lake City, Front Range Mktg.	801-364-6481
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WA	Bellevue, Testco	206-454-7422
WI	Thiensville, Control Sls.	414-242-4580

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Local Sales Offices & Reps

CA	Santa Clara, Cummings & Assocs.	408-247-8656
CA	Woodland Hills, Cummings & Assocs.	818-340-6035
CO	Aurora, Butler Tech. Sls.	303-842-3787
IN	Indianapolis, Shank Elctrn. Mktg. Assocs.	317-842-6204
NE	Lincoln, Creative Concepts	402-474-2033
WI	Brookfield, Electro Tech. Mktg. Assocs.	414-785-9554

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AL	Huntsville, Ultra Sls.	205-539-7911
AZ	Phoenix, Dodds & Co., Inc.	602-482-9330
CA	Freemont, Hartfield, Kennan, Freytag	415-863-2200
CA	Los Angeles, Hartfield-Kennan-Freytag	213-225-1318
CA	Union City, Hartfield, Kennan, Freytag	415-471-2493
CT	Ansonia, Zaslow Sls. Co.	203-735-9851
CT	Bloomfield, Zaslow Sls.	203-242-7781
DE	Washington, Dus Co.	215-493-4642
FL	Maitland, D.J. Ellis & Assocs., Inc.	305-645-1101
GA	Decatur, Tenn Tech, Inc.	205-350-0630
IL	Naperville, Electra Sls. Assocs.	312-369-8240
IN	Fort Wayne, Needler Sls. Co., Inc.	219-447-2123
IN	Indianapolis, Needler Sls. Co.	317-255-8056
IA	Cedar Rapids, PMR Corp.	319-362-9177
KS	Overland Park, PMR Corp.	913-381-0004
KS	Wichita, PMR	316-684-4141
KY	Nicholasville, Summers & Mathews	606-885-4943
MA	Westboro, Zaslow Sls.	617-393-8150
MI	Livonia, Electronic Salesmasters	313-591-2433
MN	Minneapolis, Boerger & Assocs.	612-560-3425
MO	St. Louis, PMR Corp.	314-569-1220
NH	Londonderry, Zaslow Sls.	603-432-8907
NY	New York, T.J. Marine	718-392-8800
NC	Charlotte, Robert W. Chapman Co.	704-525-2421
OH	Beachwood, Elctrn. Sls. Masters	216-831-9555
OR	Forest Grove, Doran Sls. Assocs.	503-357-3333
PA	Philadelphia, Naudain Assocs.	609-235-1801
PA	Pittsburgh, Covert & Newman	412-531-2002
RI	Providence, Zaslow Sls.	401-351-0070
TN	Hixson, Shiles & Assocs.	615-877-7725
TX	Bedford, Fralia & Assocs.	817-354-1144
TX	Houston, Fralia & Assocs.	713-772-1572
WA	Redmond, Doran Sls. Assocs.	206-885-1885
WI	Milwaukee, R.F. Kitchern Co., Inc.	414-327-7300
EXP	NY, Long Island City, Leecraft Intl. Corp.	718-392-8800
Can	Scarborough, Leecraft Inds., Ltd.	416-439-6320

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AZ	Phoenix, Aero-Space Southwest, Inc.	602-861-1785
CA	Alhambra, Fisher Brownell	213-289-0255
CA	El Monte, Kimball & Stark	213-444-2594
CA	Los Angeles, Richey Western Elctrns.	213-820-3777
CA	Sacramento, Sacramento Elec.	916-441-4821
CA	San Diego, Richey Western Elctrns.	714-271-4511
CA	Santa Ana, Sunray Lighting, Inc.	714-556-3630
CA	Santa Clara, Fisher Brownell	408-988-6041
CO	Arvada, Denver Wintronics	303-431-7161
CT	Shelton, Century Elec. Supp.	203-736-2684
FL	Miami, Electronic Equip.	305-871-3500
GA	Atlanta, Specialty Dist.	404-873-2521
IL	Champaign, Klaus Radio	217-356-1896
IL	Chicago, Newark Elctrns.	312-784-5100
IL	Niles, Industribution	312-966-5630
IL	Northbrook, Classic Comps.	312-272-9650
IN	Fort Wayne, Graham Elect.	219-423-3422
KS	Wichita, RSC Electronics	316-267-5213
KY	Louisville, P. I. Burks	502-589-3960
LA	New Orleans, Southern Radio	504-524-2343
MI	Ann Arbor, Wedemeyer Elect. Supp.	313-665-8611
MI	Grand Rapids, SF Elctrns.	616-459-0216
MI	Livonia, LWC Distrs.	313-464-7700
MI	Livonia, RS Elctrns.	313-525-1155
MN	Minneapolis, Aero-Space Computer Supps.	612-884-4725
MN	Minneapolis, Newark Elect.	612-331-6350
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NJ	Pennsauken, Resco Elctrns.	609-662-4000
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NY	Buffalo, Summit Distrs.	716-884-3450
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NY	Farmingdale, Midway Ind. Elctrns.	516-293-6800
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OH	Akron, Akron Elctrn. Supp.	216-762-8818
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OH	Cincinnati, Hughes-Peters	513-351-2000
OH	Cincinnati, United Radio	513-761-4030
OH	Cincinnatti, Stotts-Friedman	513-574-7701
OH	Cleveland, Roberts Elctrns.	216-238-1711
OH	Solon, Repco Elctrns.	216-248-8900
OH	Warren, REM Elect.	216-373-1300
PA	McKeesport, Barno Radio	412-462-7574
PA	Philadelphia, Herbach & Rademan	215-426-1700
PA	Philadelphia, PEI/Genesis	215-568-7400
PA	Reading, Barbey Elctrns.	215-376-7451
RI	Providence, Wm. Dandreta	401-861-2800
TN	Kingsport, Radio Elec. Supp.	615-247-8111
TN	Nashville, Electra Distributing	615-329-3971
TX	McKinney, Prime Distributing	214-231-0170
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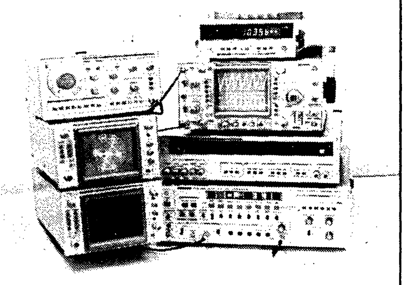

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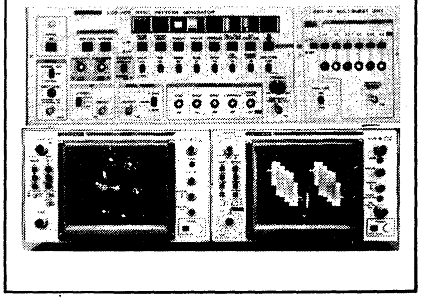

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CT	Avon, Leeds & Northrup	203-678-0270
FL	Lakeland, Leeds & Northrup	813-646-5014
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LEEPOXY PLASTICS, 3324 Ferguson Rd., Ft. Wayne, IN 46809, Tel: 219-747-7411; Empl.: 15

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NY	Cazenovia, Naylor Elctrns.	315-655-8174
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OH	Cincinnati, Frank Campisano & Co.	513-574-7111
VA	Vinton, A. B. Andrews & Co.	703-890-1128

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CA	Moraga, Ruppert Sls. & Engrg.	415-376-8040
CA	San Jose, Ruppert Sls. & Engrg.	408-998-8717
CO	Littleton, Omega Ltd.	303-798-7040
FL	Tampa/Ft. Lauderdale, Hollingsworth & Still, Inc.	800-241-5712
GA	Norcross, Hollingsworth & Still, Inc.	404-447-1700
IL	Northbrook, Raines & Assocs.	312-498-0890
IA	Marion, M-S-B Assoc., Inc.	319-377-6261
KS	Shawnee Mission, M-S-B Assoc., Inc.	913-432-2131
MA	Lexington, Zieco	617-861-8300
MI	Detroit, Jack M. Thorpe Co.	313-779-6363
MN	Edina, Electro-Tech	612-927-5878
MO	St. Charles, M-S-B Assoc., Inc.	314-946-5577
NV	Las Vegas, Trembly Assocs.	702-739-9770
NJ	Ho-Ho-Kus, Don J. Fisher Co.	201-652-0090
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NY	Rochester, Lloyd Hart Assocs.	716-244-3253
NC	Charlotte/Kernersville, Hollingsworth & Still, Inc.	800-241-5712
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OH	Chesterland, K/T Depco	216-729-3588
OH	Troy, K/T Depco	513-335-3914
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PA	Doylestown, T.O.E. Sls.	215-348-2212
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TX	Lewisville, Jim Hughes Co.	214-221-1536
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CA	Palo Alto, TriRep	415-965-1822
FL	Lighthouse Point, NPM Assocs.	305-941-4586
IL	McHenry, Mesa Inc.	815-344-2820
KS	Mission, McAllister Assocs.	913-262-5500
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NJ	Oak Ridge, P.G. Assocs.	201-697-0128
NC	Fripp Island, NPM Assocs.	803-838-4438
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OH	Westlake, KRW Sls.	216-871-7521
PA	Oakmont, KRW Sls.	412-261-1323
TX	Dallas, Seaton Corp.	214-380-0414

LENCO ELCTRNS., INC., 300 N. Maryland St., Jackson, MO 63755, Tel: 314-243-3147, TWX: 910-760-1382; Empl.: 70; *Sls. Mgr.:* Robert N. Henson; *Dist. Mgr.:* Mark A. Hill

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LENOX INSTR., 265 Andrews Rd., Trevose, PA 19047, Tel: 215-322-9990, TWX: 710-670-1440; Empl.: 40; *Sls. Mgr.:* William Lang

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LIBBY OWENS-FORD, 811 Madison Ave., Toledo, OH 43695, Tel: 419-247-4797; Empl.: 225

LIBERTY CONTROLS, 500 Brookforest Ave., Shorewood, IL 60435, Tel: 815-725-2241, TWX: 910-633-1557; Empl.: 60; *Sls. Mgr.:* Cliff Strain .... **B•1472-1473**

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CT	Guilford, A & M Elctrns., Inc.	203-453-1612
MA	Needham Hgts., A & M Elctrn.	617-444-8170
FL	Pompano Beach, Bolton Assocs.	305-781-8887
GA	Lawrence, R. W. Mitscher Co.	404-923-3239
IL	Downers Grove, Splon Assocs.	312-963-7011
IN	Ft. Wayne, Menze Sls., Inc.	219-747-5616
IA	Cedar Rapids, Dy-Tronix, Inc.	319-377-8275
KS	Witchita, Dy-Tronix, Inc.	316-838-0884
MI	Grand Rapids, R. P. Urban & Assocs.	616-245-0511
MN	St. Paul, Countryman Assocs.	612-645-9151
MO	Bridgeton, Dy-Tronix, Inc.	314-291-4777
MO	Raytown, Dy-Tronix, Inc.	816-356-6340
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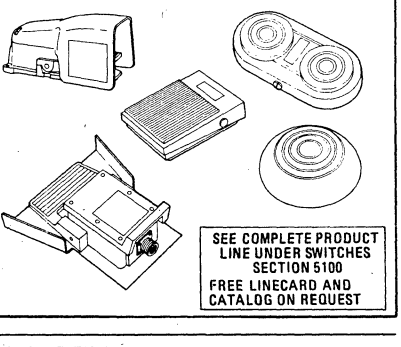

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LXD, INC., 24500 Highpoint Road, Beachwood, OH 44122, Tel: 216-292-3300, Telex: 98-5442 LXD BCWD; Empl.: 100; *Sls. Mgr.:* Gerald G. Gross; *Dist. Mgr.:* Gerald G. Gross

LYNN ELCTRNS., 915 Pennsylvania Blvd., Feasterville, PA 19047, Tel: 215-677-6700, TWX: 510-667-1988; FSC No.: 19151; Empl.: 125; *Sls. Mgr.:* D. Giacomarra

LYN-TRON, INC., 3150 Damon Way, Burbank, CA 91505, Tel: 213-849-6211, 800-423-2734, Telex: 662729; FSC No.: 05791; *Sls. Mgr.:* Alfred C. Redlitz; *Dist. Mgr.:* Alfred C. Redlitz

LYON METAL PRODS., 47 Railroad Ave., Aurora, IL 60507, Tel: 312-892-8941, TWX: 910-232-3132; Empl.: 600; *Sls. Mgr.:* R. R. Bodlund

LZR ELECTRONICS, INC., 8174 Beechcraft Ave., Gaithersburg, MD 20879, Tel: 301-921-9440, Telex: 371-9700 (Plinc); Empl.: 20; *Sls. Mgr.:* Aviva Kelly .... **D•1716-1718**

Local Sales Offices & Reps

CA	Anaheim, Impact Elctrns., Inc.	714-533-1351
CA	City of Industry, Pillage Inds., Inc.	818-333-8803
CA	Santa Cruz, Le Rep	408-458-0667
CO	Englewood, Frontier Rep., Inc.	303-799-6063
CT	Guilford, Data Mark, Inc.	203-453-0575
FL	Melbourne, Kennedy Assocs.	305-676-6875
IL	Chicago, Gaertner & Assocs.	312-593-2332
OH	Cleveland, Emil F. Kirik	216-581-7722
OR	Portland, Power Sources Unlimited	503-292-0820
WA	Lynnwood, Power Sources Unlimited	206-784-3336

MABUCHI MOTOR AMERICA CORP., 475 Park Ave. South, New York, NY 10016, Tel: 212-686-3622, Telex: 23-4374, TWX: 968209 MABU UR NYK; Empl.: 6000 .... **B•1167**

PANAFAX: 212-532-4263

MACHINE COMPONENTS CORP., 70 Newtown Rd., Plainview, NY 11803, Tel: 516-694-7222; FSC No.: 15531; Empl.: 45; *Sls. Mgr.:* D. L. Dubov

Local Sales Offices & Reps

CA	N. Hollywood, Crown Elctrns.	213-877-3550
CA	San Jose, McFarland Assoc.	408-286-9333
IL	Northbrook, Robert Hunter Co.	312-272-6490
IN	Indianapolis, Pacer Sls. & Engrg.	317-849-1481
MA	Salem, Forbes Eng.	617-744-1693
NY	Penfield, W. E. Jordan Technical Assoc.	716-385-4240

MACHLETT LABS., INC., 1063 Hope St., Stamford, CT 06907, Tel: 203-348-7511

MACNEAL-SCHWENDLER CORP., 815 Colorado Blvd., Los Angeles, CA 90041, Tel: 213-258-9111, Telex: 4720462 MSC, TWX: 910-321-2492 MACN SCHW LSA

MACOM INDS., 8230 Haskell Ave., Van Nuys, CA 91406, Telex: 69-1192; Empl.: 31

M/A-COM. CABLE/HOME COMMUNICATIOS COMM/SCOPE COAXIAL CABLE, M/A-Com Inc., P.O. Box 1729, Hickory, NC 28603, Tel: 704-324-2200, 800-438-3331; *Sls. Mgr.:* Stan Lindsay .... **C•1849-1857**

Local Sales Offices & Reps

CA	Merced, Sarah Hanks	209-722-8542
CA	Rancho Cucamonga, Mark Manning	714-989-7700
CO	Aurora, Stan Von Feldt	303-368-8577
GA	Lawrenceville, Bob Loveless	404-923-0920
GA	Stone Mountain, Tom McMinn	404-294-0161
IL	Lake Zurich, Jeff Bixler	312-540-0850
KS	Overland Park, Jerry Smith	913-432-8084
MA	Worcester, Van Costa	617-756-2333
MN	Cottage Grove, Bill Kohrt	612-458-1747
NJ	Oakhurst, George Voehl	201-222-6712
NC	Rural Hall, Mickey Smith	919-377-9814
OH	Dublin, Tony Finger	614-889-6608
PA	Warriors Mark, Dave Herrmann	814-692-7212
TX	Dallas, Ernie Massei	214-556-0755
WA	Bothell, Rich Merel	206-486-8480
WA	Edmonds, Ed Foust	206-775-4803

M/A-COM

CABLE HOME GROUP

M/A-COM CABLE/HOME COMMUNICATION PRODELIN SATELLITE ANTENNA SYSTEMS, M/A-Com, Inc., P.O. Box 468, Newton, NC 28658, Tel: 800-222-1195, 704-464-4141, Telex: 704-830; *Sls. Mgr.:* Dale Sherrill; *Dist. Mgr.:* Phil Cox

M/A-COM LAND MOBILE COMMUNICATIONS, INC., 21 Continental Blvd., Merrimack, NH 03054, Tel: 603-424-3400, TWX: 710-334-3400; Empl.: 44; *Sls. Mgr.:* Jim Flowers

M/A-COM LASER DIODE, INC., M/A-COM, Inc., 1130 Somerset St., New Brunswick, NJ 08901, Tel: 201-249-7000, TWX: 710-998-0597; *Sls. Mgr.:* Stephen Klunk; *Dist. Mgr.:* Stephen Klunk

M/A-COM MICROWAVE CIRCUITS, INC., South Ave., Burlington, MA 01803, Tel: 617-272-3000, Telex: 94-9464, TWX: 710-332-6789; *Sls. Mgr.:* Norm Brown

M/A-COM MICROWAVE COMPONENTS, INC., M/A-Com, South Avenue, Burlington, MA 01803, Tel: 617-272-3000, Telex: 94-9464, TWX: 710-332-6789; Empl.: 500; *Sls. Mgr.:* Rich Beeber

M/A-COM MICROWAVE POWER DVCS., 330 Oser Ave., Hauppauge, NY 11788, Tel: 516-231-1400, TWX: 510-227-6239; FSC No.: 34874; Empl.: 385

M/A-COM MILLIMETER PRODUCTS, M/A-Com, Inc., Second Avenue, Burlington, MA 01803, Tel: 617-272-3000, Telex: 94-9464; Empl.: 300; *Sls. Mgr.:* A. Carlson

M/A-COM MDM, INC., M/A-Com, 9000 Fullbright Ave., Chatsworth, CA 91311, Tel: 818-700-8400, TWX: 910-494-8400; Empl.: 40; *Sls. Mgr.:* Roger Davidson

M/A-COM OMNI SPECTRA, INC., 21 Continental Blvd., Merrimack, NH 03054, Tel: 603-424-4111, Telex: 6817280, TWX: 710-366-0674; FSC No.: 16179; Empl.: 750; *Sls. Mgr.:* Ernest DeVita; *Dist. Mgr.:* Terri Hastings

M/A-COM OSW, INC., 2626 S. Hardy Dr., Tempe, AZ 85282, Tel: 602-966-1471, Telex: 668-332, TWX: 910-950-1296; *Sls. Mgr.:* David Emerick

M/A-COM PHI, INC., M/A-Com, 1742 Crenshaw Blvd., Torrance, CA 90501, Tel: 213-320-6160, TWX: 910-349-6651; Empl.: 260; *Sls. Mgr.:* Fred McAdara

MAC PANEL

MAC PANEL CO., Box 5027, 216 Pine St., High Point, NC 27262, Tel: 919-884-8111, Telex: 510-926-1542; FSC No.: 16654; Empl.: 80; *Sls. Mgr.:* J. E. Craycroft .... **C•1712-1713; D•1411**

MACPOWER, 9115 26th Ave., Kenosha, WI 53140, Tel: 414-694-8866; *Sls. Mgr.:* Edward A. Joyner

MACRODYNE, 1004 Princetown Rd., Schenectady, NY 12301, Tel: 518-356-3500; Empl.: 22

MACRO ELECTRONICS CORP., 23 Royalston Lane, So. Setauket, NY 11720, Tel: 516-698-3357; *Sls. Mgr.:* N. Blumenthal; *Dist. Mgr.:* T. Shlisky

MACROLINK, 1500 N. Kellogg Drive, Anaheim, CA 92807, Tel: 714-777-8800, TWX: 910-591-1671; Empl.: 25; *Sls. Mgr.:* Bill Goodale

MACRONETICS, See Veeco Instrs. Inc.

MACROTRONIX, INC., 4016 N. Home St., Mishawaka, IN 46545, Tel: 219-256-5503; *Sls. Mgr.:* Alan S. Benevich

MAG-CON, 1626 Terrace Dr., St. Paul, MN 55113, Tel: 612-633-8820; Empl.: 30; *Sls. Mgr.:* M. Crellin

MAGNATROL VALVE CORP., 67 Fifth Ave., Hawthorne, NJ 07507, Tel: 201-427-4341, Telex: 130357; *Sls. Mgr.:* R. Kretschmer

MAGNAVOX ADVANCED PRODS. & SYS. CO., Magnavox Govt. Indl. Elctrns. Co., 2829 Maricopa St., Torrance, CA 90503, Tel: 213-618-1200, Telex: 674-373, TWX: 910-349-6657

MAGNECRAFT ELEC. CO., 1910 Techny Road, Northbrook, IL 60062-5376, Tel: 312-282-5500, TWX: 910-221-5221; FSC No.: 94696; Empl.: 700; *Sls. Mgr.:* M. A. Steinback; *Dist. Mgr.:* M. A. Steinback .... **B•1438**

Local Sales Offices & Reps

AL	Huntsville, Electronic Mktg. Assocs.	205-837-7363
AZ	Tempe, Foley, Tallent & Lee	602-438-1564
CA	Campbell, Kottmeier Assocs.	408-866-5153
CA	Los Angeles, Universal Comp. Corp.	213-641-4255
CO	Parker, Technology Mktg. Assocs.	303-841-3435
CT	Farmington, R. Perron & Co.	203-673-4825
FL	Altamonte Springs, Semtronic Assocs.	305-831-8233
FL	Clearwater, Semtronic Assocs.	813-461-4675
GA	Atlanta, Electrn. Mktg. Assocs.	404-448-1215
IN	Carmel, Mktg. Engrs.	312-282-5500
KS	Overland Park, Advanced Techn. Sls.	913-642-6675
LA	Folsom, McKinney Sls.	504-796-5861
MD	Lutherville, Walker-Houck Assocs.	301-296-6021
MA	Needham, R. Perron & Co.	617-449-6162
MI	Ferndale, Hilltronics	313-398-5556
MN	Minneapolis, Elec. Comps. Sls.	612-933-2594
MO	St. Louis, Advanced Techn. Sls.	314-227-4448
NH	Dover, R. Perron & Co.	603-742-2321
NJ	Marlton, B.G.R. Assocs.	609-940-1358
NY	Pittsford, W. A. Franklin Sls	716-248-8251
NY	West Hempstead, Schmitt Ind. Mkt.	516-486-3510
NC	Raleigh, Electrn. Mktg. Assocs.	919-847-8800
OH	Cleveland, Scott Elec., Inc.	216-473-5050
OH	Kettering, Scott Elec., Inc.	513-294-0539
PA	Pittsburg, Scott Elec., Inc.	412-963-6116
SC	Greenville, Electrn. Mktg. Assocs.	803-233-4637
TX	Dallas, McKinney Sls.	214-631-9450
UT	Salt Lake City, Techn. Mktg. & Assocs.	801-483-1009
WA	Redmond, Quadra Sls.	206-883-3550

MAGNETEK, 7315 Red Deer Dr., Boulder, CO 80301-4696, Tel: 303-442-6700; FSC No.: 58439; Empl.: 36; *Sls. Mgr.:* Ruth E. Forsberg

Local Sales Offices & Reps

CA	San Diego, Mesa Engrg. & Sls. Assocs.	619-278-8021
KS	Shawnee Mission, Robinson & Assoc.	913-262-1374

MAGNETIC AUDIO/VIDEO PRODUCTS DIV., 3M Co., 3M Center, Bldg. 223-5 South, St. Paul, MN 55101, Tel: 612-733-1110, TWX: 910-563-3712; Empl.: 38,351

MAGNETIC CIRCUIT ELEMENTS, 1540 Moffett St., Salinas, CA 93905, Tel: 408-757-8752; FSC No.: 09349; Empl.: 24

Local Sales Offices & Reps

CA	Saratoga, Testco,Inc.	408-253-1900
OR	Portland, RTS, Inc.	503-638-5670
WA	Vashon, RTS, Inc.	206-285-1363

MAGNETIC COILS, INC.,, See MCI Transformer Corporation

MAGNETIC DEVICES INC., 5575 Kearny Villa Rd., San Diego, CA 92123, Tel: 619-279-7054; FSC No.: 13786; *Sls. Mgr.:* Dave Loughlin

MAGNETIC INSTRUMENTATION, 8350 E. 48TH ST., Indianapolis, IN 46226, Tel: 317-545-2102, Telex: 27-2111; Empl.: 23 .... **D•1261**

Local Sales Offices & Reps

CA	Aptos, Wasson & Assocs.	408-496-6011
EXP	NY, Irvington, Inter Technical Export Corp.	914-591-8822

MAGNETIC METALS CO., Hayes Ave. at 21st St, Camden, NJ 08105, Tel: 609-964-7842, TWX: 710-891-7054; Empl.: 500; *Sls. Mgr.:* Harry Shepherd

MAGNETICO INC., 182 Morris Ave., Holtsville, NY 11742, Tel: 516-654-1166; Empl.: 45 .... **A•2167**

Local Sales Offices & Reps

CA	Woodland Hills, Interstate Mktg. Assoc.	213-883-7606

MAGNETICS, Box 391, Butler, PA 16003-0391, Tel: 412-282-8282, TWX: 710-373-3821; Empl.: 650; *Sls. Mgr.:* J. F. Huth

MAGNETIC SHIELD DIV., Perfection Mica Co., 750 North Thomas Dr., Bensenville, IL 60106, Tel: 312-766-7800, TWX: 910-256-4815; Empl.: 43 ..... **C•1727-1729**

Local Sales Offices & Reps

AZ	Phoenix, Howe & Howe Sls., Inc.	602-264-7971
CA	Redwood City, Ault Assocs.	415-367-1710
CA	Woodland Hills, Cal-Ward Sls. Co.	213-883-2202
CO	Thornton, E & C Johnson	303-457-2247
FL	Miami, Ludlum Assoc. Co.	305-592-6523
MD	Baltimore, Bernard White & Co.	301-484-5400
MA	Milton, Naton Assocs.	617-698-0607
MI	Farmington, Amtech Reps.	313-474-8300
MN	Minneapolis, Josco-Meluis & Assocs.	612-861-3343
NM	Albuquerque, IMEC	505-883-9010
NY	New York, Kenneth L. Love Assocs.	212-541-4885
NY	Syracuse, Canavan-Scanlon Assocs.	315-437-1271
OH	Cleveland, Bill Teplitz & Co.	216-439-3265
PA	Havertown, QRM, Inc.	215-566-6709
TX	Bedford, De Armond Ent.	817-268-6821
TX	Bedford, De Armond Entprs.	817-268-6821

MAGNETIC SPECS., 10 Albemarle Ave., Trenton, NJ 08638, Tel: 609-883-3150; Empl.: 23

MAGNETIC SYSTEMS, 1021 Pecten Ct., Milpitas, CA 95035, Tel: 408-263-6680

MAGNETIC SYSTEMS, 770 Linden Avenue, Rochester, NY 14625, Tel: 716-385-9010, Telex: 978324; Empl.: 50; *Sls. Mgr.:* Ronald T. Kosmider

MAGNETIC TECHNOLOGY, 21001 Kittridge St., Canoga Pk., CA 91303, Tel: 818-887-7700, TWX: 910-494-1217; Empl.: 150; *Sls. Mgr.:* David Mighdoll .... **B•1168-1169**

Local Sales Offices & Reps

AZ	Fountain Hills, Halbar Assocs.	602-837-2464
AZ	Sun Lake, Kachina Assocs.	602-253-7086
CA	Los Altos, Servo Data	415-964-1325
CA	Los Angeles, Halbar Assocs.	818-246-8263
CT	Stratford, Gerald Rosen Co.	203-375-5456
FL	Orlando, MacKay, Smith & Assocs.	305-277-1513
GA	Atlanta, MacKay, Smith & Assocs.	404-449-7444
IL	Glencoe, Howard Benjamin Assocs.	312-835-0150
MA	Framingham, Gerald Rosen Co.	617-879-5505
MN	Edina, Techo, Ltd.	612-929-9497
NJ	Pennsauken, Vantage Sls. Co.	609-663-6660
OK	Tulsa, Norcom	918-832-7747
TX	Dallas, Norcom	214-386-4888
TX	Houston, Norcom	713-933-6021
WA	Redmond, Halber Assocs.	206-882-0990

MAGNETIKA, INC., 4254 Glencoe Ave., Venice, CA 90292, Tel: 213-391-0391

MAGNETOELASTIC DEVICES, 326 Springside Ave., Box 625, Pittsfield, MA 01201, Tel: 413-445-5608

MAGNETRAN CORP., 5701 Savoy Lane, Houston, TX 77036, Tel: 713-785-4202; Empl.: 15

MAGNET SALES & MFG. CO. INC., 11250 Playa Court, Culver City, CA 90230-6127, Tel: 213-391-7213, 800-421-6692; FSC No.: 95-2916141; Empl.: 25; *Sls. Mgr.:* Anil Nanji; *Dist. Mgr.:* Anil Nanji .... **A•1307**

MAGNOS, Old School House Rd., Harvard, MA 01451, Tel: 617-456-8880; Empl.: 5

MAGNUM ELEC., 6385 Dixie Hwy., Erie, MI 48133, Tel: 313-848-2555, TWX: 810-231-7160; Empl.: 150; *Sls. Mgr.:* Ronald Pitchford; *Dist. Mgr.:* Ronald Pitchford .... **C•1440-1444**

Local Sales Offices & Reps

AZ	Tempe, Delta Elctrns.	602-224-1601
CA	Pleasanton, Moulthrop Sls.	415-463-0450
CA	Westminster, West Elctrn. Sls.	714-898-0120
CO	Englewood, Frontier Representatives	303-799-6063
CT	North Haven, Kitchen & Kutchin	203-239-0212
FL	Pompano Beach, Hutto-Hawkins-Peregoy	305-971-5750
GA	Atlanta, Effective Mktg. Force	404-948-6023
IL	Elk Grove Village, Control Sls.	312-595-2110
IN	Indianapolis, Marketing Engrs.	317-872-5665
KS	Overland Park, Thomas L. Dowell & Assocs.	913-648-7373
MD	Pikesville, Imagitron Sls. Co.	301-521-2020
MA	Burlington, Kitchen & Kutchin	617-229-2660
MN	Brooklyn Center, Willman Assocs.	612-566-5010
MO	St. Louis, Thomas L. Dowell & Assocs.	314-849-4234
NJ	Perth Amboy, Astrorep, Inc.	201-826-8050
NY	Babylon, Astrorep	516-422-2500
NY	Rochester, Marchese Marsey & Barden	716-544-4300
OH	Beachwood, ESI	216-831-9555
OH	Cleveland, Baehr, Greenleaf & Assocs.	216-221-9030
OH	Columbus, Baehr, Greenleaf & Assocs.	614-486-4046
OH	Dayton, Baehr, Greenleaf & Assocs.	513-439-0724
OR	Portland, Jos. V. Belusko Co.	503-222-4279
PA	Huntingdon Valley, Inacker Sls.	215-947-5660
TX	Richardson, Barry Sls.	214-234-0255
WI	Thiensville, Control Sls.	414-242-4580

MAGNUM MICROWAVE CORP., 365 Ravendale Dr., Mountain View, CA 94043, Tel: 415-968-9281, Telex: 171596; FSC No.: 59277; *Sls. Mgr.:* David N. Fealkoff

MAGNUM OPUS CUSTOM ELCTRN. ENGRG., 284 Kennedy St., Iselin, NJ 08830, Tel: 201-283-4925; *Sls. Mgr.:* R. Galanty .... **D•1093**

MAGNUSONIC DEVICES, 290 Duffy Ave., Hicksville, NY 11801, Tel: 516-938-4700, TWX: 510-221-1850; Empl.: 275; *Sls. Mgr.:* M. Stamouli

MAIDA DEVELOPMENT CO., 20 Libby St., Hampton, VA 23663, Tel: 804-723-0785, Telex: 82-3443; Empl.: 299; *Sls. Mgr.:* Edward T. Maida, Frank Thompson .... **A•1109-1113**

Local Sales Offices & Reps

CA	Los Angeles, High Voltage Sls.	213-881-9194
CA	Mountain View, West/Mark Assocs.	415-969-1700
FL	Vero Beach, John Hansen & Assocs.	305-562-2328
MA	Burlington, Conti-Younger	617-273-1582
NC	Cary, FBD Sls.	919-467-7595
SC	Mauldin, FBD Sls.	803-828-2323
VA	Portsmouth, FBD Sls.	804-484-3162
WA	Seattle, ECCO Mktg.	206-364-0200

MALCO, Div. Microdot Electronic Components Group, 12 Progress Dr., Montgomeryville, PA 18936, Tel: 215-699-5373, Telex: 510-661-8260, TWX: 910-588-3768; *Dist. Mgr.:* J. McLaughlin .... **C•1446-1449, 1859**

Local Sales Offices & Reps

AL	Huntsville, Montgomery Mktg.	205-830-0498
AZ	Mesa, Sedco Sls.	602-835-6281
CA	Anaheim, Libratronix	714-534-7073
CA	Santa Clara, Thresum Assocs.	408-249-7400
CO	Longmont, Todd & Fry Assocs.	303-776-7331
CT	West Hartford, Pettigrew Co.	203-236-5891
FL	Clearwater, WMM Assocs.	813-461-7074
GA	Norcross, Montgomery Mktg.	404-447-6124
IL	Elk Grove Village, John G. Twist Co.	312-593-0222
IN	Greenwood, Valentine & Assocs.	317-888-2260
IA	Cedar Rapids, S & O Sls.	319-393-1845
MA	Woburn, Component Tech.	617-933-5390
MN	Bloomington, John G. Twist	612-835-2120
NM	Albuquerque, Reptronix	505-292-1718
NY	Rochester, Ossman Comps.	716-424-4460
NY	Yonkers, Sonkin Assocs.	914-968-8282
NC	Cary, Montgomery Mktg.	919-467-6319
OR	Beaverton, Blair Hirsch Co.	503-641-1875
PA	Hatboro, Jacobsen Assocs.	215-674-2937
TX	Dallas, Kruvand Assocs.	214-437-3355
VA	Fairfax, Beacon North	703-591-1300
WA	Lynwood, Blair Hirsh Co.	206-774-8151
WI	Brookfield, John G. Twist Co.	414-782-2670
Can	Montreal, Que., Kaytronics, Ltd.	514-367-0101

Local Distributors

AL	Huntsville, Hamilton Avnet	205-837-7210
AZ	Tempe, Hamilton Avnet	602-231-5100
CA	Casta Mesa, Hamilton Avnet	714-754-6111
CA	Santa Clara, Pyramid Elctrns.	408-727-9810
CA	Sunnyvale, Hamilton Avnet	408-743-3355
CT	Danbury, Hamilton Avnet	203-797-2800
GA	Norcross, Hamilton Avnet	404-447-7507
IL	Bensenville, Hamilton Avnet	312-860-7700
MD	Columbia, Hamilton Avnet	301-995-3500
MA	Woburn, Hamilton Avnet	617-273-7500
MI	Livonia, Hamilton Avnet	313-522-4700
MO	Earth City, Hamilton Avnet	314-344-1200
NH	Manchester, Yankee Elctrn. Supp.	603-625-9746
NJ	Fairfield, Hamilton Avnet	201-575-3390
NJ	Old Bridge, BTC Elctrn. Comps.	800-526-2828
NY	Hauppauge, Hamilton Avnet	516-231-9800
NY	Plainview, Progress Elctrns.	516-443-1700
NY	Rochester, Hamilton Avnet	716-474-9130
NY	Syracuse, Hamilton Avnet	315-437-2641
OH	Cleveland, Hamilton Avnet	216-831-3500
PA	Wayne, Peak Elctrn. Corp.	215-293-9000
TX	Irving, Hamilton Avnet	214-659-4111
TX	Richardson, Southwest Elctrns.	214-234-3050
UT	Salt Lake City, Hamilton Avnet	801-972-2800
WA	Bellevue, Hamilton Avnet	206-643-3950

MALLORY BATTERY, See Duracell Intl.

MALLORY CAPACITOR CO., Mallory Comps. Grp., 3029 E. Washington St., Indianapolis, IN 46201, Tel: 317-636-5353, Telex: 27-2155, TWX: 687-6015; FSC No.: 317-261-1581; Empl.: 1900; *Sls. Mgr.:* A. E. Irwin; *Dist. Mgr.:* Frank Vendely .... **A•1114-1115**

Local Sales Offices & Reps

AZ	Scottsdale	602-949-7788
CA	Los Angeles	714-523-7992
CA	San Francisco	415-856-1136
CO	Denver	303-457-9373
FL	Orlando	305-855-6353
IL	Chicago	312-364-5750
IN	Indianapolis	317-636-5353
KS	Shawnee Mission	913-362-7099
MA	Boston	617-872-7776
MI	Detroit	313-524-0015
MN	Minneapolis	612-884-2881
MO	St. Louis	314-291-8223
NJ	Hillsdale	201-666-3600
NY	Syracuse	315-425-9800
NC	Raleigh	919-836-0401
OH	Dayton	513-299-5505
OR	Portland	503-643-1203
PA	Carnegie	412-279-4248
PA	Willow Grove	215-657-4250
TN	Nashville	615-889-1174
TX	Dallas	214-324-2448

MALLORY COMPONENTS DIVISION, Emhart Elec./Elctrn. Grp., 3029 E. Washington St., Indianapolis, IN 46201, Tel: 317-261-1361, Telex: 27-2155; *Sls. Mgr.:* Steve Leykauf; *Dist. Mgr.:* Mike Bland .... **A•2022**

MALLORY TIMERS, Emhart Elec./Elctrn. Grp., 3029 E. Washington St., Indianapolis, IN 46201, Tel: 317-636-5353, TWX: 317-634-4214; Empl.: 2,000; *Sls. Mgr.:* Bill Miller

MANAGE, INC., Fibre Optics Elctrns. Sys. Grp., P.O. Box 175, 40 Nichols Rd., Chicopee, MA 01014, Tel: 413-598-8204, 592-3834; Empl.: 30; *Sls. Mgr.:* David Menard

M&T CHEMICALS, INC., Woodbridge Rd. & Randolph Ave., Rahway, NJ 07065, Tel: 201-499-0200, Telex: 710-996-5841, TWX: 710-996-5842; Empl.: 1650

MANGER ELEC. CO., INC., W. Henry St., Stamford, CT 06902, Tel: 203-348-7761; Empl.: 100; *Sls. Mgr.:* J. V. Judge

MANHATTAN ELECTRIC CABLE, 225 Passaic St., Passaic, NJ 07055, Tel: 201-779-8900, Telex: 137-387; Empl.: 125; *Sls. Mgr.:* Ed Harvey; *Dist. Mgr.:* Allan Marconi

MANHATTAN ELEC. CABLE CORP., 1 Station Plaza, Rye, NY 10580, Tel: 914-967-8000, Telex: 137-387; Empl.: 125; *Sls. Mgr.:* Edward J. Harvey

MANN, HENRY, INC., 3983 Mann Road, Huntingdon Valley, PA 19006, Tel: 215-355-7200, Telex: 6851160; FSC No.: 215-355-5134; Empl.: 105; *Sls. Mgr.:* Carol Mann; *Dist. Mgr.:* James P. Massi

MANNESMANN TALLY CORP., 8301 S. 180th St., Kent, WA 98032, Tel: 206-251-5500, Telex: 32-0200; Empl.: 450; *Sls. Mgr.:* John Cooper

MANTEX CORP., 1800 Metamora Rd., P.O. Box 15E, Oxford, MI 48051, Tel: 313-628-9711; Empl.: 100; *Sls. Mgr.:* Dennis J. Stepien .... **B•1727**

Local Sales Offices & Reps

AZ	Phoenix, Cristee-Meade Co.	602-267-7197
CA	Glendale, Halbar Assocs.	213-246-8263
CA	San Diego, Mesa Engr. Sls. Assoc.	619-278-8021
CA	San Mateo, Halbar Assocs.	415-349-4700
CO	Lakewood, Christee-Meade Co.	303-232-0287
IL	Highland Park, Thomas B. Hunter Assoc.	312-433-7000
IN	Indianapolis, S.A.I. Mktg. Corp.	317-241-9276
KS	Leawood, Thunderbird	913-642-7220
KS	Wichita, Thunderbird	316-684-3941
MD	Baltimore, Muncy Sls. Assocs.	301-484-6376
MI	Brighton, S.A.I. Mktg. Corp.	313-227-1786
MN	St. Louis Park, Lestronix	612-926-8466
MO	Leawood, Thunderbird	913-642-7220
MO	Maryland Hgts., Thunderbird	314-567-6488
NH	Salem, Sales Engrg.	603-893-5521
OH	Columbus, S.A.I. Mktg. Corp.	614-454-8942
OH	Dayton, S.A.I. Mktg. Corp.	513-435-3181
OH	Shaker Hgts., S.A.I. Mktg. Corp.	216-751-3633
PA	Pittsburgh, S.A.I. Mktg. Corp.	412-261-0482
TX	Richardson, Thunderbird	214-690-0763
VA	Richmond, Muncy Sales Assoc.	804-288-5720

MANUFACTURING SYS., Div. LeDoux Inds., Inc., 2022-C S. Grand Ave., Santa Ana, CA 92705, Tel: 714-540-6630; Empl.: 6; *Sls. Mgr.:* Larry LeDoux

MARATHON BATTERY CO., 8301 Imperial Dr., Waco, TX 76714, Tel: 817-776-0650, TWX: 910-894-5203 MARATHON WAC; *Sls. Mgr.:* Walter H. Harder

MARATHON FLITE-TRONICS COMPANY, A Marathon Power Technologies Co., 2525 N. Naomi St., Burbank, CA 91504, Tel: 818-841-3210, Telex: 69-1487; Empl.: 65

MARATHON SPECIAL PRODS., 13300 Van Camp Rd., Bowling Green, OH 43402, Tel: 419-352-8441, TWX: 810-499-2988; Empl.: 150; *Sls. Mgr.:* J. Campisi

MARCON AMERICA CORP., 310 Era Drive, Northbrook, IL 60062, Tel: 312-564-2820; FSC No.: 564-1150; Empl.: 9; *Dist. Mgr.:* Helen A. Stubbs .... **A•1116-1117, 1887**

Local Sales Offices & Reps

AL	Huntsville, Electro-Mech Sls.	205-533-2100
AZ	Tucson, Clemick & Assocs.	602-749-4003
CA	San Jose, K-Lectron	408-942-9177
CO	Denver, Lindberg Co.	303-758-9033
FL	Altamonte Springs, Electro-Comp Assocs.	303-331-0173
FL	Deerfield Beach, Electro-Comp Assocs.	305-429-0802
FL	Melbourne, Electro-Comp Assocs.	305-242-0621
FL	St. Petersburg, Electro-Comp Assocs.	813-327-9677
GA	Norcross, Electro-Mech Sls.	404-447-6478
IL	Des Plaines, Electron Mktg.	312-298-2330
IN	Indianapolis, Insul-Reps	317-251-1994
IA	Marion, M-S-B Assocs.	319-377-6261
KS	Shawnee Mission, M-S-B Assocs.	913-432-2131
MD	Baltimore, Mech-Elec Sls.	301-342-1984
MA	Canton, D. Taggart Assocs.	617-828-6064
MI	Farmington, R. C. Merchant Co.	313-476-4600
MI	St. Joseph, R. C. Merchant Co.	616-983-7378
MN	Eden Prairie, Rockmore Sls.	612-941-1390
MO	St. Charles, M-S-B Assocs.	314-946-5577
NJ	Medford, Mech-Elec Sls.	609-654-8209
NM	Albuquerque, Lindberg Co.	505-881-1006
NY	Kingston, R. P. Kennedy Co.	914-331-0755
NY	Melville, L.I., Comtronic Assocs.	516-249-0606
NY	Rochester, R. P. Kennedy Co.	716-271-1910
NY	Rochester, R. P. Kennedy Co.	716-271-6322
NC	Raleigh, Electro-Mech Sls.	919-851-8165
OH	Cincinnati, Jayenbee Mktg.	513-531-3320
OH	Grafton, Jayenbee Mktg.	216-458-8468
OR	Portland, Harry Levinson Co.	503-245-0902
PA	McLean, E.C.C.O. Elctrn. Sls.	814-476-1376
TN	Knoxville, Insul-Reps	615-691-7586
TN	Nashville, Electro-Mech Sls.	615-885-0073
TX	Austin, Sundance Sls.	512-339-6611
TX	Houston, Sundance Sls.	713-772-4988
TX	Plano, Sundance Sls.	214-867-0592
UT	Salt Lake City, Lindberg Co.	801-467-1794
WA	Seattle, Harry Levinson Co.	206-382-1300

MARCONI INSTRUMENTS, 3 Pearl Court, Allendale, NJ 07401, Tel: 201-934-9050, TWX: 710-991-9752; *Sls. Mgr.:* William E. Bean .... **D•1262-1264**

Local Sales Offices & Reps

AL	Huntsville, Beacon Elctrns. Assocs.	205-881-5031
CA	Huntington Beach, Scientific Dvcs. West	714-840-3501
CA	San Jose, Scientific Dvcs. West	408-554-0455
CA	Westminster, Marconi	714-895-7182
FL	Boca Raton, Beacon Electrns. Assocs.	305-392-3500
GA	Atlanta, Beacon Electrns. Assocs.	404-256-9640
IL	Chicago, K.W. Meyers	312-882-4808
IN	Indianapolis, K. Meyers	317-783-1030
MD	Burtonsville, Bekr Inds.	301-421-1200
MA	Stoneham, Ken Corp.	617-926-5525
MN	Minneapolis, K.W. Meyers	612-920-7080
NJ	Elmwood Park, L & M Assocs.	201-797-0441
NM	Albuquerque, Scientific Dvcs.	505-883-3668
NY	New York City, L & M Assocs.	212-243-6155
NY	Whitney Point, Tae-Rep	607-692-3705
NC	Raleigh, Beacon Electrns. Assoc.	919-787-0330
OH	Chesterland, EQS Systems	216-729-2222
PA	Andalusia, L & M	215-245-6658
TX	Dallas, Bradenco	214-243-7261
WA	Marysville, The Western Rep	206-653-6031

MAREL INSTR. CO., 907 South East 13th Pl., Cape Coral, FL 33904, Tel: 813-574-8788; Empl.: 14; *Sls. Mgr.:* T. Swift

MARINE ELECTRIC RPD, INC., See CML Macarr Div. Marine Electric RPD, Inc.

MARINE INDUSTRIAL CABLE CORP., P.O. Box 29207, New Orleans, LA 70189, Tel: 504-254-0754

WILD OATS

MARKAT DIV., Wild Oats Corp., 3 Country Dr., Plainview, NY 11803, Tel: 516-549-9272; Empl.: 228; *Sls. Mgr.:* K. L. Campbell; *Dist. Mgr.:* W. B. Heather

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IN	Carmel, Hoosier Sls.	317-844-4535
NY	Massapequa Park, Systems Design & Engrg.	516-598-1270
OH	Centerville, Grimm & Co.	513-433-1717

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MARKEL CORP., P.O. Box 752, Norristown, PA 19404, Tel: 215-272-8960, TWX: 510-660-0929; FSC No.: 03890; Empl.: 267; *Dist. Mgr.:* E. J. Barth .... **C•1689**

Local Sales Offices & Reps

AZ	Phoenix, K. Jahn Co.	602-956-9060
AR	Hot Springs, MYA, Inc.	501-262-1365
CA	Anaheim, Indl. Dielectrics	714-776-7411
CA	Berkeley, Riggs/LaMoree	415-841-0601
CA	L.A., Natl. Wire & Cable	213-225-5611
CA	Torrance, Insulation Supp.	213-320-9400
CO	Denver, Ward Elec. Supp.	303-572-3541
FL	Lighthouse Point, Jack Krutek & Assoc.	305-941-6544
IL	Naperville, J.J. Glenn	312-961-1902
KS	Overland Park, Mathews	913-642-9063
MD	Glen Burnie, F. Lott	301-744-4611
MA	Waltham, Datcom	617-891-4600
MI	Farmington, L. George & Assoc.	313-474-1505
MN	Edina, PWC	612-933-3393
NJ	Colonia, Heft & Ficarra	201-381-5193
NY	Lynbrook, Heft & Ficarra	516-599-3351
NY	Rochester, Gislason	716-454-4741
OH	Chagrin Falls, Electrolock	216-543-5125
PA	Flourtown, C. Newson	215-248-3377
SC	Greenville, Electrolock Inc.	803-297-9830
TN	Chattanooga, Jackson	615-267-4260
TX	Richardson, C.J. Garvey	214-234-3371
WA	Mercer Is., Electronic Component	206-232-9301
WI	Mequon, Wm. R. Bolles	414-241-3320
EXP	Philadelphia, Markel Corp., Exp. Dept.	215-665-2300

Local Distributors

CA	Berkeley, Riggs/LaMoree	415-841-0601
CA	Los Angeles, Natl. Wire & Cable	213-225-5611
CA	Torrance, Insulation Supp.	213-320-9400
IL	Naperville, J. J. Glenn	312-961-1902
OH	Chagrin Falls, Electrolock	216-543-5125
Can	Mississauga, Ont., Marflex	416-828-0220

MARKEM CORP., 1000 Congress St., Keene, NH 03431, Tel: 603-352-1130, TWX: 710-366-1800; Empl.: 1200; *Sls. Mgr.:* Jack Lyman

MARKENRICH CORP., 14946-A Shoemaker Ave., Santa Fe Springs, CA 90670, Tel: 213-921-0250, Telex: 298727 MARK UR; Empl.: 7

Local Sales Offices & Reps

CA	North Hollywood, Crown Elctrns.	213-877-3550
FL	Melbourne, Electro Mech. Standards	305-724-1027
FL	Sarasota, Electro Mech. Sls.	813-923-2804
GA	Atlanta, Beacon Elctrns.	404-256-9640
IL	Palatine, Somers-Reagan	312-991-1108
IA	Coralville, EPA, Inc.	612-835-9022
MD	Timonium, Heller Sls. Co.	301-252-4780
MA	Reading, Lincoln Tech. Sls.	617-944-9594
MN	Edina, EPA, Inc.	612-835-9022
NJ	Vincentown, Eastern Sci. Mktg.	609-268-0250
NY	Syracuse, I. A. Hotze Assocs.	315-479-6641
OR	Hillsboro, CompRepco	503-796-1350
PA	Chalfont, Eastern Sci. Mktg.	215-822-6503
PA	Montgomeryville, Eastern Sci. Mktg.	215-368-4570
TX	Houston, Spectra Sls.	713-747-2798
TX	Richardson, Spectra Sls.	214-234-3600
VA	Vienna, Eastern Sci. Mktg.	703-281-0778

MARKETING ENGINEERS, INC., 9860 Michigan Rd., Carmel, IN 46032

MARK EYELET & STAMPING, 202 Wakelee Rd., Wolcott, CT 06716, Tel: 203-756-8847, Telex: 69-6191; Empl.: 60; *Sls. Mgr.:* Ed Cyr

MARLEE SWITCH CO., 933-D N. Central Ave., Upland, CA 91786, Tel: 714-982-8988; *Sls. Mgr.:* LeRoy Tichy

MARLOW INDS., 10451 Vista Park Rd., Dallas, TX 75238, Tel: 214-340-4900, TWX: 910-860-5161; FSC No.: 55686; Empl.: 150; *Sls. Mgr.:* Richard J. Buist; *Dist. Mgr.:* David Marlow

MARQUARDT SWITCHES INC., Route 20 East, P.O. Box 465 EEM, Cazenovia, NY 13035, Tel: 315-655-8050, Telex: 703-287-40; FSC No.: 315-655-8042; *Sls. Mgr.:* J. J. Kennedy; *Dist. Mgr.:* R. A. Philipchik .... **B•1622**

Local Sales Offices & Reps

AL	Huntsville, Electro Sls. Co.	205-830-2715
CA	Los Angeles, Universal Components, Inc.	213-641-4255

CA	Santa Clara, M-2 Marketing Group	408-986-0676
CO	Lakewood, Cristee Meade Co.	303-232-0287
FL	Orlando, Stettner Elctrns., Inc.	305-291-7756
GA	Atlanta, Electro Sls. Co.	404-394-1122
IL	Rosemont, Stettner Central, Inc.	312-671-4208
IN	Fort Wayne, J & B Engrg.	219-483-2813
KS	Shawnee Mission, M-S-B Assocs.	913-432-2131
MI	Grand Blanc, Inter-Comm	313-695-0665
MN	St. Paul, Arkco Sls Co.	612-777-7454
MO	St. Louis, M-S-B Assocs.	314-946-5577
NH	Nashua, Bell Controls, Inc.	603-882-6984
NJ	Freehold, Ballou, Inc.	201-431-0514
NJ	Ridgewood, Ballou, Inc.	201-444-6990
NY	Cazenovia, S.T./Woolard Co.	315-655-8145
NY	Syosset, Ballou, Inc.	516-681-3068
NY	Whitestone, Ballou, Inc.	212-352-9233
OK	Tulsa, Rem-Air Comps. Corp.	918-742-2559
PA	Phoenixville, Gil-Tronics, Inc.	215-933-8525
SC	Easley, R-A Sls. Co.	803-859-1859
TN	Chattanooga, Electro Sls.	615-267-4260
TX	Dallas, Rem-Air Comps.	214-234-1069
UT	Sandy, G-M Assocs.	801-532-7501
WA	Kirkland, Manon Engrg.	206-827-7449
WI	Elm Grove, Key Entpr., Inc.	414-784-3390

Local Distributors

CA	Covina, Selecta Switch	213-967-4123
CA	Gardena, California Switch & Signal	213-770-2330
CA	Sunnyvale, Sierra West	408-747-1188
CO	Denver, CSID	303-292-9564
FL	Lakewood, Switch Controls	813-644-7564
FL	West Palm Beach, Nurmi Electrns.	305-686-8553
IL	Itasca, Voyager Elctrns.	312-773-4900
IL	Rosemont, Central Comps.	312-671-4208
KS	Wichita, Radio, Inc	316-264-2798
MI	Grand Rapids, S.F. Elctrns.	616-459-0216
MI	St.Claire Shores, Spemco	313-771-2700
MN	Minneapolis, Control Design Supp.	612-721-1628
MO	Maryland Heights, L-Comp	314-291-6200
NJ	Garfield, B & R Electronics	201-470-0700
NJ	Mt. Laurel, Jersey Switch	609-778-8190
NJ	Warwick, Cal-Greg Comp. Inc.	401-738-6170
NC	Gastonia, J.M.T. Electronics	704-867-4401
OK	Oklahoma City, Radio, Inc.	405-789-0741
OK	Tulsa, Radio, Inc.	918-587-9123
OR	Beaverton, Murphy Electrns,Inc.	503-642-2001
TX	Austin, Southwest Electrns.	512-837-8971
TX	Richardson, Southwest Electrns.	214-234-3050
TX	Stafford, Southwest Electrns.	713-240-4000
WA	Redmond, Murphy Electrns.	206-881-1234

MARTEL ELCTRNS. CORP., 13 Heritage Hill Rd., Windham, NH 03087, Tel: 800-821-0023, 617-275-5970, Telex: 95-1232; *Sls. Mgr.:* David DeVries

MARTIN SOUND PRODS., 28 Alpha Park, Cleveland, OH 44143-2297, Tel: 216-442-2286; Empl.: 2; *Sls. Mgr.:* DeWayne (Bud) Martin; *Dist. Mgr.:* DeWayne (Bud) Martin

MARWAY PRODS. INC., 311 N. Clara St., Santa Ana, CA 92703, Tel: 714-973-1800; FSC No.: 60955; *Sls. Mgr.:* Wayne Whitney .... **D•1944-1945**

MASTER APPLIANCE CORP., 2420 18th St., Box 68, Racine, WI 53403, Tel: 414-633-7791, Telex: 269-505; FSC No.: 83284; Empl.: 50; *Sls. Mgr.:* G. E. Mertins; *Dist. Mgr.:* G. E. Mertins

MASTER BOND, P.O. Box 522, Teaneck, NJ 07666, Tel: 201-343-8983; FSC No.: 59504; Empl.: 16; *Sls. Mgr.:* James Brenner

MASTER DYNAMICS CORP., 922 California Ave., Sunnyvale, CA 94086, Tel: 408-245-9040

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MASTERITE CORPORATION, 2841 Lomita Blvd., Torrance, CA 90505, Tel: 213-775-3471, TWX: 910-347-6237; FSC No.: 05041; Empl.: 680; *Sls. Mgr.:* C.J. Huebert; *Dist. Mgr.:* G. Peterson

MASTER LOGIC, 761 E. Evelyn, Sunnyvale, CA 94086, Tel: 408-732-7777; *Sls. Mgr.:* Stephen Allen

MATEC INSTRUMENTS, INC., 60 Metebello Rd., Warwick, RI 02886, Tel: 401-739-9030, Telex: 952101; Empl.: 55; *Sls. Mgr.:* Jerry Zschau

MATERIALS RESCH., Route 303, Orangeburg, NY 10962, Tel: 914-359-4200, Telex: 221862 MRC UR; Empl.: 1,000; *Sls. Mgr.:* Mel Lipton

MATH ASSOCS., 2200 Shames Dr., Westbury, NY 11590, Tel: 516-334-6800; FSC No.: 60373; Empl.: 37; *Sls. Mgr.:* Robert DeLia .... **B•1124**

Local Sales Offices & Reps

CA	Huntington Beach, Seevid	714-898-6100
NM	Albuquerque, Cleveland Entprs.	505-265-7893
NC	Charlotte, SFI Elctrns.	704-333-0157
TX	Houston, Q-Max Mktg.	713-474-2233

Local Distributors

NY	Farmingdale, Universal Video	516-420-0224
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PA	Uniontown, Allegheney Teleconn Sys.	412-438-0451

MATHEMATICAL APPLICATIONS GROUP/CAD/CAM, 3 Westchester Plaza, Elmsford, NY 10523, Tel: 914-592-4646, Telex: 131644

MATHEMATICAL SYSTEMS DESIGN, INC., 2850 Ocean Park Blvd., Ste. 300, Santa Monica, CA 90405, Tel: 213-450-9851; *Sls. Mgr.:* William E. Schaff

MATRA DESIGN SYSTEMS, 2840-100 Sam Tomas Expressway, Santa Clara, CA 95051, Tel: 408-986-9000, Telex: 299-656; *Sls. Mgr.:* David T. Fletcher; *Dist. Mgr.:* Rex Brooks of Brooks Tech. Grp.

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MATRIX CORP., 1639 Green St., Raleigh, NC 27603, Tel: 919-833-2837; Empl.: 30; *Sls. Mgr.:* Ray Alderman

MATRIX ENGINEERING CORP., 17000 S. Western Ave. 19, Gardena, CA 90247, Tel: 213-770-0521; Empl.: 7

MATRIX SCIENCE CORP., 435 Maple Ave., Torrance, CA 90503, Tel: 213-328-0271

MATRIX
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MATRIX SYS. CORP., 5177 N. Douglas Fir Rd., Calabasas, CA 91302, Tel: 818-992-6776, TWX: 910-494-4975; Empl.: 50; *Sls. Mgr.:* Randy Sue Rabideau .... **A•1715**

Local Sales Offices & Reps

AL	Huntsville, Reynolds Assoc., Inc.	800-255-1965
AZ	Scottsdale, Faser Techn. Sls.	602-948-4404
CA	Milpitas, IFM Inc.	415-961-2828
CA	N. Hollywood, Crown Elctrns.	213-877-3550
CO	Broomfield, Sci. Dvcs.	303-449-9466
CO	Broomfield, Scientific Dvcs.	303-469-5145
CT	Marion, Poly Tek Assocs.	203-621-7000
CT	Marion, Polytek Assocs.	203-621-4542
FL	N. Palm Beach, Reynolds Assoc., Inc.	800-251-1965
GA	Huntsville, Reynolds Assoc., Inc.	800-255-1965
IL	Chicago, Comtel Midwest	312-539-4838
IN	Indianapolis, Comtel Midwest	317-253-1681
IA	Cedar Rapids, Comtel Midwest	319-377-9434
KS	Shawnee Mission, Comtel Midwest	913-722-1030
MA	Ashland, Poly Tek Assocs.	617-881-4741
MA	Falmouth Heights, RJC Assocs.	617-540-8832
MI	Southfield, Comtel-Instr.	313-358-2505
MN	Wayzata, Comtel Midwest	612-476-1551
MO	St. Louis, Comtel Midwest	314-991-5363
NY	Mamaroneck, Bassin Tech. Sls. Co.	914-698-9358
NC	Raleigh, Reynolds Assoc.	800-255-1965
NC	Raleigh, Reynolds Assoc., Inc.	800-255-1965
OH	Cleveland, Comtel Instr.	216-442-8080
OH	Dayton, Comtel Instr.	513-298-7573
OH	Hillard, Comtel Instr.	614-876-8305
OR	Portland, Topp Engrg. Sls.	206-747-5400
PA	Pittsburgh, Comtel Instr.	412-922-5720
TX	Carrollton, Seaton Corp.	214-380-0414
VA	Fairfax, Schibley Assocs.	703-591-3008
WA	Bellevue, Topp Engrg. Sls.	206-747-5400
WI	New Berlin, Comtel Midwest	414-544-6042

MATROX ELCTRN. SYS., 1055 St. Regis Blvd., Dorval, QU, Canada H9P 2T4, Tel: 514-685-2630, Telex: 05-822798; Empl.: 250; *Sls. Mgr.:* Ed Dwyer

MATSUO

MATSUO ELECTRONICS, 2134 Main Street, Suite 200, Huntington Beach, CA 92648, Tel: 714-969-2491, TWX: 910-596-1828; Empl.: 854 .... **A•1118-1123**

Local Sales Offices & Reps

AL	Huntsville, Beacon	205-881-5031
AZ	Tempe, Quatra Assocs.	602-820-7050
CA	Santa Clara, Logan Sls.	408-496-0660
CO	Littleton, Quatra, Inc.	303-795-3187
FL	Ft. Lauderdale, Dyne-A-Mark Corp.	305-771-6501
GA	Atlanta, Beacon	404-256-9640
IL	Chicago, Berndt Assocs.	312-283-0713
IN	Indianapolis, Needler Sls.	317-255-8056
IA	Cedar Rapids, Palatine Sls.	319-365-8071
KS	Mission, Palatine Sls.	913-831-0555
MA	Needham, Hatch Assocs.	617-444-3310
MI	Warren, DEM Elctrn. Sls.	313-575-9444
MN	St. Paul, Proud Inds.	612-646-9428
MO	Hazelwood, Palatine Sls.	314-839-0800
NJ	Medford, Champion Elctrn. Sls.	609-983-0932
NM	Albuquerque, Semi-Systems	505-898-3273
NY	DeRuyter, Net Sls.	315-662-7996
NY	Fairport, Net Sls.	716-467-4538
NY	Seaford, Henry Abbott & Assocs.	516-781-5256
NY	Troy, Net Sls.	518-274-4758
NC	Raleigh, Beacon	919-787-0330
OH	Cleveland, Marlow Assocs.	216-991-6500
OH	Dayton, Marlow Assocs.	513-435-5673
OR	Beaverton, Caruso & Northcutt	503-646-4973
PA	Pittsburgh, Marlow Assocs.	412-367-8886
WA	Bellevue, Caruso & Northcutt	206-454-9699
WI	Milwaukee, Berndt Assocs.	414-545-8400
Can	Markham, Ont., Reptronics	416-474-0111

Local Distributors

AZ	Phoenix, TTI	602-861-0222
CA	Garden Grove, Natl. Capacitor Supp.	714-892-7749
CA	Lakeside, Mouser Elctrns.	714-449-2220
CA	Mountain View, USI Intl.	415-969-5420
CA	N. Hollywood, TTI	213-982-0201
CA	San Diego, Mock III	619-560-0515
CA	San Fernando, Petell Elctrns.	818-365-9841
CA	San Jose, Eric Elctrns.	408-262-1111
CA	San Jose, TTI	408-943-9155
CA	Santa Ana, Projection Unltd.	714-261-2323
CA	Santee, TTI	619-449-2220
CA	Sunnyvale, Capsco	408-734-3020
CO	Commerce City, Waco Elctrns.	303-289-4743
CO	Denver, Waco Elctrns.	303-371-4370
FL	Orlando, TTI	305-859-1000
IL	Palatine, OHM Elctrns.	312-359-5500
IL	Skokie, Kellner	312-677-1120
MA	Billerica, A. W. Mayer Co.	617-229-2255
MA	Wakefield, Lorcor	617-246-1903
NJ	Fairfield, C.H.P.S., Inc.	201-882-0997
NJ	Kenilworth, Ventronics	201-272-9262
NY	Bohemia, TTI	516-567-1500
NY	E. Farmingdale, Tri-Start Elctrns.	516-293-0400
NY	Hauppauge, Prime Comps. Corp.	516-582-6258
NY	Rochester, Masline Elctrns.	716-546-5373
NY	Ronkonkoma, Baldwin Comps.	516-588-5700
NY	Ronkonkoma, Prime Comps.	516-737-1730
OH	Cleveland, Robert Elctrns.	216-238-1711
PA	Norristown, Century Elctrn. Comps.	215-631-5400
PA	York, Elctr. Comps. for Ind.	717-846-5334
TX	El Paso, Era Elctrns.	915-592-4126
TX	Ft. Worth, TTI	817-831-0441
WA	Kent, Shannon, Ltd.	206-763-0545
Can	London, Ont., C.M. Peterson Co.	519-434-3204
Can	Scarborough, Ont., Carsten Elctrns.	416-495-9999

MAUREY INSTR. CORP., 4555 W. 60th St., Chicago, IL 60629, Tel: 312-581-4555, TWX: 910-221-6025; FSC No.: 03942; Empl.: 50; *Sls. Mgr.:* E. Maurey; *Dist. Mgr.:* Louis Derdzinski .... **A•2023-2027; B•1170**

Local Sales Offices & Reps

FL	Orlando, ASI	305-851-7929
FL	Plantation, Innovative Mktg.	305-583-8895
WA	Vancouver, Sls. & Engrg. Assoc.	206-573-5161

Local Distributors

CA	Garden Grove, Allied Elctrns.	714-554-0731
CA	Santa Clara, Allied Elctrns.	408-727-1690
CO	Wheatridge, Allied Elctrns.	303-425-7144
CT	Ridgefield, PIC	203-451-1533
FL	Margate, Allied Elctrns.	305-973-3070
IL	Elgin, Allied Elctrns.	
MA	Wilmington, Allied Elctrns.	617-942-0150
MI	Westland, Allied Elctrns.	313-595-6565

MO	St. Louis, Allied Elctrns.	314-878-1229
NY	Mineola, Allied Elctrns.	516-248-2360
NC	Raleigh, Allied Elctrns.	919-821-0415
OH	Willoughby, Allied Elctrns.	216-951-0908
OK	Tulsa, Allied Elctrns.	918-663-7630
PA	Bala Cynwyd, Allied Elctrns.	215-267-6940
TX	Ft. Worth, Allied Elctrns.	817-336-5401
TX	Houston, Allied Elctrns.	713-932-7321
VA	Alexandria, Allied Elctrns.	703-836-5002
WA	Seattle, Allied Elctrns.	206-767-5772

MAURY MICROWAVE, 8610 Helms Ave., Cucamonga, CA 91730, Tel: 714-987-4715, TWX: 910-581-3408; FSC No.: 13047; Empl.: 85; *Sls. Mgr.:* M. A. Maury, Jr.

MAXI-SWITCH CO., Sub. of EECO, 9697 East River Rd., Minneapolis, MN 55433, Tel: 612-755-7660, TWX: 910-576-2690; Empl.: 160; *Sls. Mgr.:* Hank Maida; *Dist. Mgr.:* E. C. Helme, Jr.

Local Sales Offices & Reps

AL	Huntsville, Montgomery Mktg.	205-830-0498
AZ	Scottsdale, Williams Assocs.	602-947-4297
CA	Elmonte, Cook Entprs.	213-686-2120
CA	Los Altos, Recht Assocs.	415-964-6321
CA	Pomona, Cook Entprs.	818-443-5147
CA	San Diego, Power Assocs.	619-275-0641
CO	Denver, Williams Assocs.	303-373-4730
FL	Altamonte Springs, V.G. Sls.	305-831-8688
FL	Pompano, V.G. Sls.	305-971-0900
GA	Norcross, Montgomery Mktg.	404-447-6124
IN	Ft. Wayne, MS Sls.	219-486-3023
IA	Cedar Rapids, Harris Hanson	800-231-4343
MD	Woodbine, Naudain Assocs.	301-442-2270
MA	Westwood, Comp. Rep. Assocs., Inc.	617-329-3454
MI	Ann Arbor, Dayton Assocs.	313-995-4082
MN	Bloomington, Electronic Sls. Agy., Inc.	612-884-8291
MS	Michigan City, Jack Fisher Sls	601-224-6470
MO	St. Louis, B.C. Elex	314-731-1255
NJ	Secaucus, Addem Sls.	201-330-8300
NM	Albuquerque, Williams Assocs.	505-255-1638
NY	Penfield, John Blair	716-586-1419
NY	White Plains, Cane Tech. Sls.	914-694-9240
NC	Cary, Montgomery Mktg.	919-467-6319
OH	Dayton, Thompson Assocs.	513-435-7733
OR	Beaverton, Quest Mktg., Inc.	503-641-7377
PA	Huntington Valley, Omega Elex	215-947-4135
TX	Austin, West & Assoc	512-441-6973
TX	Dallas, West & Assoc	214-661-9400
TX	Houston, West & Assoc.	713-777-4108
UT	Salt Lake City, Williams Assoc.	801-532-7701
WA	Bellevue, Quest Mktg., Inc.	206-747-9424

maxon DC motor

MAXON PRECISION MOTORS, INC., 838 Mitten Rd., Burlingame, CA 94010, Tel: 415-697-9614, TWX: 910-375-2049; Empl.: 270; *Sls. Mgr.:* Edward Graham ... **B•1171**

MAXWELL LABS., 8835 Balboa Ave., San Diego, CA 92123, Tel: 619-279-5100, TWX: 910-335-2063; Empl.: 300; *Sls. Mgr.:* William Fox (Prods.)

MCCOY ELECTRONICS CO., Sub. Oak Technology Inc., 100 Watts St., P.O. Box B, Mt. Holly Springs, PA 17065, Tel: 717-486-3411, TWX: 510-650-3548; Empl.: 450 **A•1380-1383**

Local Sales Offices & Reps

AL	Huntsville, Conley & Assocs.	205-882-0316
CA	Van Nuys, Wea-K	818-989-3070
CO	Denver, Advanced Tech	303-771-3366
CO	Littelton, Advanced Tech Mktg.	303-979-8420
CT	Meriden, JMG, Inc.	203-235-0819
FL	Deerfield Bch., Conley & Assocs.	305-421-7180
FL	Oviedo, Conley & Assocs.	305-365-3283
FL	Tampa, Conley & Assocs.	813-885-7658
IL	Bensenville, Banner Tech Sls.	312-766-4131
IA	Cedar Rapids, Lorenz Sls.	319-377-4666
MA	Norwood, JMG, Inc.	617-762-5333
MN	Minneapolis, Dunlop Conslts.	612-522-6133
KS	Overland Pk., Lorenz	913-649-5556
NJ	Haddonfield, Gray Assocs.	609-429-5300
NY	Fayetteville, S. F. Foster Co.	315-637-5427
NY	New Rochelle, Ascor Elctrns.	914-235-8838
NY	Webster, S. F. Foster Co.	716-265-2072
OH	Cincinnati, Stegman Bline Mktg.	513-729-1969
WA	Seattle, Evergreen Assocs.	206-633-3160
TX	Austin, R. F. Kimball Co.	512-443-5284
TX	Houston, R. F. Kimball Co.	713-840-0590
TX	Richardson, R. F. Kimball Co.	214-231-3447
EXP	NJ, Oradell, Sylvan Ginsbury Ltd.	201-261-3200

MCE SEMICONDUCTOR, INC., 1111 Fairfield Dr., West Palm Beach, FL 33407, Tel: 305-845-2837, Telex: 513463; Empl.: 140

MCFADDEN SYS., INC., 8953 S. Atlantic Ave., South Gate, CA 90280-9990, Tel: 213-564-5958, Telex: 677161; FSC No.: 25750; Empl.: 42

MCG
ELECTRONICS INC.

MCG ELCTRNS., 12 Burt Dr., Deer Park, NY 11729, Tel: 516-586-5125, Telex: 645518; FSC No.: 29779; Empl.: 45; *Sls. Mgr.:* Cecilia Long **B•1248-1253**

Local Sales Offices & Reps

CT	Norwalk, Gemini Grp.	203-852-8173
LA	Covington, Svc. Elctrl. Sls.	504-893-2830
MA	Woburn, EMS	617-229-6686
MS	Brandon, Svc. Elctrl. Sls.	601-992-9122
MO	St. Louis, Engrg. Svc. Co.	314-997-1515
NJ	Caldwell, Fred Urban	201-228-5249
NC	Greensboro, The Saylor Assocs.	919-292-0452

MCGILL MFG. CO., INC., Bearing Div., 909 N. Lafayette St., Valparaiso, IN 46383, Tel: 219-465-2200, Telex: 25-8446

MCGILL MFG. CO., INC., Electrical Div., 1002 N. Campbell St., Valparaiso, IN 46383, Tel: 219-465-2200, TWX: 910-690-4982; Empl.: 295; *Sls. Mgr.:* David Rickards (OEM Switch), Thomas Frary (Control Prods.); *Dist. Mgr.:* Thomas F. Morris **B•1623**

Local Sales Offices & Reps

AL	Decatur, Tenn Tech Sls.	205-350-0630
CA	S. El Monte, HMC Inc.	213-442-7970
CA	Santa Clara, Logan Sls.	408-496-0660
IN	Indianapolis, A. E. Fred Schaab	317-253-8689
MD	Baltimore, R. A. Wafer Assocs.	301-744-1133
MA	Needham, Hgts. Newscott Co.	617-444-1923
MI	W. Bloomfield, OBE, Inc.	313-332-4900
MN	Minneapolis, Elec. Comp. Sls.	612-933-2594
MO	Ellisville, Larco Sls.	314-394-7141
NJ	Cherry Hill, Danco Elctrn. Sls.	609-424-5590
NY	Baldwin, C. Glianna	516-378-2700
NY	N. Syracuse, Advanced Comp. Corp.	315-699-2671
OH	Cleveland, Allied Entprs.	216-779-0080
SC	Columbia, H. Heaton	803-256-9230
TX	Dallas, Erickson Sls.	214-739-5833
UT	Salt Lake City, Sage Sls.	801-467-5451
WA	Seattle, SPS Elctrns.	206-323-4140

MCGUIRK ELECTRONICS CO. INC., 212 So. Main St, P. O. Box 853, Middleton, MA 01949, Tel: 617-933-3500; FSC No.: 55902; Empl.: 10; *Sls. Mgr.:* L. McCarthy **D•1929**

mci METUCHEN CAPACITORS INC.

MCI TRANSFORMER CORPORATION, 411 Manhattan Ave., Babylon, NY 11704, Tel: 516-587-0510; Empl.: 50; *Sls. Mgr.:* Timothy J. Williams **A•2168-2183**

MCKINSTRY METAL WORKS, INC., 285 McKinstry Ave., Chicopee, MA 01013; Empl.: 80

MCL, INC., 10 North Beach Ave., La Grange, IL 60525-2092, Tel: 312-354-4350, Telex: 910-997-8142; FSC No.: 16469; Empl.: 75; *Sls. Mgr.:* Frank Morgan **D•1408-1409**

Local Sales Offices & Reps

CA	Los Angeles, RF Associates	213-478-1586
CA	Palo Alto, RF Associates	415-494-3331
GA	Riverdale, MCL, Inc./Bob Lundy	404-996-6632
MA	Reading, Geder Assocs.	617-944-3105

MCLEAN ENGRG., Div. of Zero Corp., 70 Washington Rd., Princeton Junction, NJ 08550, Tel: 609-799-0100, TWX: 510-685-2543; FSC No.: 03522; Empl.: 135; *Sls. Mgr.:* William L. Sly; *Dist. Mgr.:* Craig A. Reed **C•1648-1649**

Local Sales Offices & Reps

	Guelph, Ont.	
AL	Huntsville, Beacon Elctrns.	205-881-5031
AZ	Fountain Hills, Halbar Assocs.	602-837-2464
CA	Glendale, Halbar Assocs.	818-246-8263
CA	San Mateo, Halbar Assocs.	415-349-4700
CO	Englewood, Component Tech.	303-758-5750
CT	Canton, Motoreps, Inc.	800-243-1978
FL	Ft. Lauderdale, R.I. Smith Assocs.	305-772-5100
FL	Orlando, R.I. Smith Assocs.	305-365-8077
GA	Atlanta, Beacon Elctrns.	404-256-9640
IL	Elmhurst, Scott Assocs.	312-279-5681
LA	Gretna, M. F. Sls.	504-361-4343
MD	Hunt Valley, Marktron	301-628-1111
MD	Rockville, Marktron	301-251-8990
MA	Needham, Motoreps	617-449-3252
MI	East Detroit, J. Thorpe Co.	313-779-6363
MN	Minneapolis, Scott Elctrn. Sls.	612-929-2985
MO	Grandview, Harris-Hanson	816-763-6200
MO	St. Louis, Harris-Hanson	314-432-3611
NJ	Springfield, Sylvester Assocs.	201-376-3324
NM	Albuquerque, Fry-Gates	505-262-1525
NY	Albany, Reagan/Compar Albany	518-489-4777
NY	Binghamton, Reagan/Compar	607-754-8946
NY	Fairport, Reagan/Compar Albany	716-271-2230
NY	New Hartford, Reagan/Compar Albany	315-732-3775
NY	Rochester, Reagan/Compar	716-271-2230
OH	Cleveland, Marlow Assocs.	216-991-6500
OH	Dayton, Marlow Assocs.	513-275-4147
OR	Beaverton, Halbar Assocs.	503-226-0451
PA	Huntingdon Valley, Inacker Sls.	215-947-5660
PA	Pittsburgh, Marlow Assocs.	412-367-8886
TX	Dallas, Milco Mktg.	214-783-2716
TX	Houston, Milco Mktg.	713-946-2841
VA	Charlottesville, Marktron	804-973-5874
WA	Redmond, Halbar Assocs.	206-882-0990
Can	Guelph, Ont., Hammond Mfg. Co.	519-822-2960

Local Distributors

FL	Ft. Lauderdale, Component Distrs.	305-971-4950
GA	Norcross, Component Distrs.	404-441-3320
MI	Ann Arbor, Wedemeyer Elctrn. Supp. Co.	313-665-8611

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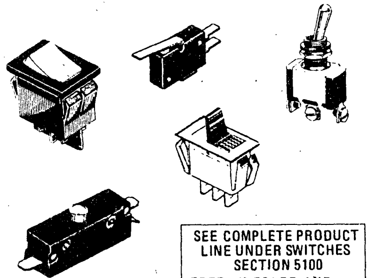

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NC	Raleigh, Component Distrs.	919-834-9465
TX	Dallas, Component Distrs.	214-698-9485
Can	Guelph, Ontario, Hammond Mfg. Co.	519-822-2960

MCLEAN MIDWEST, 4000 83rd Ave. N., Brooklyn Pk., MN 55443, Tel: 612-561-9400, Telex: 29-0883, TWX: 910-576-2951; *Sls. Mgr.:* J. Buyse .... **C•1650-1651**

3M CO., Carbonless/Related Prods Div Ind'l Optics, 3M Center, Bldg. 225-3S, St. Paul, MN. 55144, Tel: 612-733-4403, Telex: 29-7023, TWX: 910-563-3712; *Sls. Mgr.:* A. Rivard

3M-ELECTRONIC PRODUCTS DIVISION, Bldg. 502, P.O. Box 2963, Austin, TX 78769-2963, Tel: 512-834-6682; *Sls. Mgr.:* Bernie Graham

Local Sales Offices & Reps

AK	Anchorage	907-561-1030
CA	Los Angeles	213-726-6300
CA	So. San Francisco	415-571-6700
GA	Atlanta	404-447-7000
HI	Honolulu	808-422-2721
IL	Chicago	312-496-6500
MA	Boston	617-449-0300
MI	Detroit	313-827-2450
MN	St. Paul	612-733-3300
MO	St. Louis	314-997-8500
NJ	West Caldwell	201-575-2000
NC	High Point	919-889-7181
OH	Cincinnati	513-482-3100
OH	Cleveland	216-362-1700
PA	Philadelphia	215-728-5300
TX	Dallas	214-324-8100
WA	Seattle	206-244-7200

Local Distributors

AL	Huntsville, Powell Elctrns.	205-539-2731
AL	Huntsville, RM Alabama	205-852-1550
AZ	Tempe, Acacia Sls.	602-894-2874
AZ	Tempe, Richey/Western Elctrns., Inc.	602-894-9251
CA	Irvine, Acacia Sls.	714-660-0834,213-971-2428
CA	Irvine, Ratel Elctrns./Xytec	714-768-0855
CA	Los Angeles, Richey/Western Elctrns., Inc.	714-895-0060,800-227-0060
CA	San Diego, Acacia Sls.	619-565-4365
CA	San Diego, Richey/Western Elctrns., Inc.	619-271-4511
CA	San Jose, Powell Elctrns.	408-943-9020
CA	San Jose, Ratel Elctrns./Xytec	408-946-4300
CA	Santa Clara, Richey/Western Elctrns., Inc.	408-727-7411
CA	Sun Valley, Richey/Western Elctrns., Inc.	818-768-3800,213-875-2862
CA	Sunnyvale, Acacia Sls.	408-745-7200
CO	Denver, Ragon Elctrn. Parts	303-744-3601
CO	Lakewood, Acacia Sls.	303-232-2882
CT	East Haven, JV Elctrns.	203-469-2321
CT	New Canaan, Impact Sls. Co.	203-972-1458
CT	Yalesville, Schaal Assocs./Deanco	203-269-3779
FL	Ft. Lauderdale, Powell Elctrns.	305-979-5000
FL	Winter Park, Deanco	305-671-5100
GA	Atlanta, A.C. Equip. Co.	404-451-2747
GA	Atlanta, Prehler Elctrns.	404-447-5540
GA	Marietta, Deanco	404-429-0126
IL	Chicago, Prehler Elctrns.	312-328-6100
IL	Elk Grove, RM Illinois	312-364-6622
IL	Mt. Prospect, Magnuson Elctrns.	312-956-0700
IN	Indianapolis, Graham Elctrns.	517-634-8202
MD	Columbia, Aztech Elctrns.	301-995-1760, 301-621-4070 in
MD	Columbia, Powell Elctrns.	301-995-0410, 301-621-4070 in
MD	Gaithersburg, Deanco	301-948-5444
MA	Burlington, Schaal Assocs./Deanco	617-272-1506
MA	Canton, Impact Sls.	617-821-1500
MA	Westboro, Powell Elctrns.	617-366-6100
MI	Grand Rapids, RM Michigan	616-531-9300
MN	St. Paul, Ragon Elctrns.	612-642-2828
MO	Independence, Ragon Elctrns.	816-254-3410
MO	St. Charles, Lectronix	314-946-6424
NJ	Clifton, J-Mar Elctrns.	201-772-6400
NJ	Englewood, Powell Elctrns.	201-894-0800
NJ	Fairfield, Deanco	201-575-7960
NY	Farmingdale, Addem Distrs.	516-752-9303
NY	Hauppauge, Schaal Assocs./Deanco	516-434-4600
NY	Ithaca, Deanco	607-257-4444
NY	Ronkonkoma, Zenith Wire & Cable	516-585-1444
NC	Cary, Powell Elctrns.	919-467-1212
NC	Charlotte, Elctrns. Mktg. Corp.	704-394-6195
NC	Raleigh, Prehler Elctrns.	919-876-9111
OH	Columbus, Elctrns. Mktg. Corp.	614-299-4161
OH	Highland Heights, Elctrns. Mktg. Corp.	216-442-3441
OH	Middleburg Heights, Prehler	216-243-5510
OK	Tulsa, Norvell Elctrns.	918-663-1247
OR	Beaverton, Acacia Sls.	503-646-3377
OR	Lake Oswego, Moore Elctrns., Inc.	503-684-3100
OR	Wilsonville, Ragon Elctrns.	503-682-2929
PA	Malvern, Transtek Inds.	215-296-4400
PA	Philadelphia, Powell Elctrns.	215-365-1900
TX	Austin, Kent Elctrns.	512-834-1900
TX	Austin, Norvell Elctrns.	512-458-8106
TX	Dallas, Norvell Elctrns.	214-233-0020
TX	El Paso, ERA Elctrns.	915-592-4126
TX	Houston, Kent Elctrns.	713-780-7770
TX	Houston, Norvell Elctrns.	713-777-1666
TX	Richardson, Kent Elctrns.	214-669-2600
UT	Midvale, Ratel Elctrns./Xytec	801-562-2600
WA	Bellevue, Powell Elctrns.	206-641-4446
WA	Seattle, Ragon Elctrns.	206-241-1980
Can	London, Ont., 3M	519-451-2500

3M CO., STATIC CONTROL SYS. DIV., P. O. Box 2963, Austin, TX 78769-2963, Tel: 800-328-1368; Empl.: 300; *Sls. Mgr.:* Mike Martin .... **D•1980-1981**

Local Sales Offices & Reps

AZ	Phoenix	602-934-7413,800-221-1046
CA	Los Angeles	800-221-1045
CA	San Francisco	415-761-1155
CO	Denver	303-321-3873
DC	Washington	800-241-3669
FL	Orlando	800-241-3669
GA	Atlanta	800-241-3670
IL	Chicago	312-496-6553
MA	Boston	617-449-0300
MI	Detroit	800-323-4087
MN	St. Paul	800-392-0312
MO	St. Louis	314-997-8500
NJ	Newark	800-221-1454
NJ	West Caldwell	800-221-1454
NY	Syracuse	800-221-1455
NC	High Point	919-889-7181
OH	Cincinnati	800-241-3669
OH	Cleveland	216-362-1700
PA	Philadelphia	215-728-5300
TX	Dallas	800-442-8046
TX	Houston	800-442-8046
WA	Seattle	206-244-7200,206-241-2250

3M CO., TECH CERAMIC RESOURCES, 3M Center 225-4W, St. Paul, MN. 55101, Tel: 617-736-0601, Telex: 29-7023, TWX: 910-563-3712; Empl.: 83000

3M CO. VISUAL PRODS./INDUS. OPTICS., See 3M Co. Carbonless Related Prods. Div.

MDB SYS., 1995 N Batavia St., Orange, CA 92665, Tel: 714-998-6900, TWX: 910-593-1339; Empl.: 200; *Sls. Mgr.:* William Wollam

MDF PRODUCTS INC., 7 Johnson Dr., Danbury, CT 06811, Tel: 203-743-3579, Telex: 499-8051; FSC No.: 60628; Empl.: 5 .... **D•1265**

MEA DIV., See Mechanized Elctrn. Assembly Div., Universal Instrs. Corp.

MEASUREMENTS GROUP, INC., Box 27777, Raleigh, NC 27611, Tel: 919-365-3800, Telex: 802-502, TWX: 510-920-0770; *Sls. Mgr.:* Stephen R. Katz

MEASUREMENT SYS., INC., 121 Water St., Norwalk, CT 06854, Tel: 203-838-5561, Telex: 6813573, TWX: 710-468-2185; Empl.: 97; *Sls. Mgr.:* John Cronan ... **D•1126**

Local Sales Offices & Reps

IA	Cedar Rapids, S & O Sls.	319-393-1845
MD	Columbia, Robert Elctrn. Sls.	301-995-1900
MA	Hudson, Data Rep.	617-481-0333
PA	Melrose Park, R. Meyers Assocs.	215-224-1663
TX	Richardson, OM Sls.,Inc	214-690-6746
VA	Richmond, Robert Elctrn. Sls.	804-276-3979

MEC A/S, Industriparken 23, Ballerup, Denmark DK-2750, Tel: 452-973366

Local Sales Offices & Reps

AL	Huntsville, Beacon Elctrns.	205-881-5031
AZ	Phoenix, Eltron	602-266-2164
AZ	Scottsdale, SMS & Assocs.	602-998-0831
AR	Little Rock, Beacon Elctrns.	501-224-5449
CA	Brea, Masco	714-529-0867
CA	Curpertino, F & F Assocs.	408-446-2349
CA	Mountain View, Switches, Inc.	415-962-8649
CA	Orange County, Pacific Switch Controls, Inc.	714-953-1254
CA	Van Nuys, Pacific Switch Controls, Inc.	213-873-4802
CO	Aurora, Mountain View Mktg.	303-360-9641
CO	Englewood, Electronic Comps. Sys.	303-781-5904
FL	Boca Raton, Beacon Elctrns.	305-392-3500
FL	Clearwater, Beacon Elctrns.	813-796-2378
FL	Fort Lauderdale, KSM Elctrns., Inc.	305-971-5900
FL	Maitland, Beacon Elctrns.	305-647-3498
FL	Melbourne, Beacon Elctrns.	305-724-8010
GA	Atlanta, Beacon Elctrns.	404-256-9640
GA	Atlanta, KSM Elctrns., Inc.	404-458-2013
IL	Downers Grove, Richmar Elctrns.	312-968-0118
IN	Indianapolis, Insul Reps	317-251-1994
IA	Cedar Rapids, Palatine Engrg. & Sls.	319-365-8071
KS	Mission, Palatine Engrg. & Sls.	913-831-0550
MA	Needham, A&M Elctrns.	617-444-8170
MA	Plainville, Enterprise Tech., Inc.	617-695-4700
MI	Bloomfield, Obe, Inc.	313-332-4900
MI	Brighton, AP Assocs.	313-229-6550
MI	Grand Rapids, Obe, Inc.	616-458-8993
MI	St. Joseph, Obe, Inc.	616-429-1160
MN	Minneapolis, Components Rep. Grp.	612-944-0800
MN	Minneapolis, Elctrn. Comps. Grp.	612-559-0720
MO	Hazelwood, Palatine Engrg. & Sls.	314-839-0800
NJ	Ho-Ho-Kus, D. J. Fisher Co., Inc.	201-652-0090
NM	Albuquerque, Syntech	505-266-7051
NY	Fairport, TAC Sls.	716-425-1070
NY	Great Neck, M.O.S. Assocs.	516-487-3966
NC	Raleigh, Beacon Elctrns.	919-787-0330
OH	Cleveland, Components, Inc.	216-243-9020
OK	Bixby, Southern Sts. Mktg.	918-369-3233
PA	Glenside, Wyncote Instrmn.	215-572-6500
TX	Austin, Southern Sts. Mktg.	512-473-2741
TX	Houston, Southern Sts. Mktg.	713-558-4900
TX	Richardson, Southern Sts. Mktg.	214-238-7500
TX	Richardson, Southern Sts. Mktg.	915-238-7500
UT	Salt Lake City, Quality Comps. Sls.	801-268-8000
VA	Fairfax, Beacon North	703-591-1300
VA	Forest, Beacon North	804-239-8486
WA	Kirby, A/D Elctrns.	206-821-3208
WA	Mercer Island, Elctrn. Comp. Sls.	206-232-9301
WI	Butler, Richmar Elctrns.	414-781-1730

Local Distributors

CA	Hollywood, Yale Elec.	213-465-3186
CA	Manhattan Beach, Prime Electro	213-379-3642
CA	Mountain View, Target Elctrns.	415-962-8649
CA	Orange County, Pacific Switch Controls	714-953-1254
CA	San Carlos, Logan Elctrns.	415-594-0700
CA	San Diego, Pacific Switch Controls	619-264-6117
CA	Santa Monica, Master Distrs.	213-452-1229
CA	Van Nuys, Pacific Switch Controls	213-873-4802
CO	Englewood, Industrial Supp.	303-694-9444
CT	Hartford, Atlantic Switch Controls	203-527-7705
CT	Shelton, Century Elec.	203-736-208
FL	Lakeland, Switch Controls, Inc.	813-644-7564
IL	Carol Stream, Conectrix	312-653-1460
MD	Beltsville, P.S.I.	301-937-4960
MD	Columbia, D.K. Elctrns.	301-995-1950
MA	Needham, 'You Do It'	617-449-1005
MN	Minneapolis, Glen Mark	612-941-4825
NH	Nashua, Atlantic Switch	603-880-1971
NJ	Mt. Laurel, Jersey Switch	609-778-8190
OH	Columbus, Ohio Switch	613-885-0391
OR	Portland, Component Resources	503-641-8488
TX	Dallas, TexaSwitch	214-357-1768
TX	Hurst, Alectron Corp.	817-280-0313
WA	Seattle, Component Resources	206-454-8666
WA	Seattle, Radar Elctrns.	507-747-3053
Can	Toronto, Ont., Deskin Sls.	416-475-1412

MECHANICAL ENGRAVING, 4500 Bullard Ave, Bronx, NY 10470, Tel: 212-324-4455; FSC No.: 99040; Empl.: 35; *Sls. Mgr.:* Bernard W. Mandel

MECHANICAL ENTPRS., 461 Carlisle Dr., Herndon, VA 22070, Tel: 703-435-9496, TWX: 710-832-0942; Empl.: 25; *Sls. Mgr.:* R.H. Twyford .... **B•1624, 1728-1729**

Local Sales Offices & Reps

CA	Irvine, Vale Electrn. Assocs.	714-551-4821, 619-693-0113
CA	Santa Clara, Eastec Corp.	408-720-1807
CT	Bristol, Technlg. Prod. Grp.	203-583-0703
FL	Casselberry, Semi	305-831-2822
FL	Ft. Lauderdale, SEMI	305-475-3686
FL	Melbourne, Semi	305-831-2822
FL	Palm Harbor, SEMI	813-441-3902
IL	Arlington Heights, Coombs Assocs., Inc.	312-439-9810
IN	Ft. Wayne, Coombs Assocs., Inc.	219-747-7661
IN	Ft.Waynee, Coombs Assoc., Inc.	219-747-7661
IA	Cedar Rapids, Coombs Assocs., Inc.	319-362-4116

MA	Brookline, Technlg. Prods.	617-731-0858
MA	Brookline, Technology Prod. Grp.	617-731-0858
MI	Jackson, Norwood Scroggs Co.	517-750-1170
NY	Cooperstown, Fitzelle Assoc.	607-547-9333
NY	Cooperstown, Fitzelle Assocs.	607-547-9333
NY	Rochester, Lloyd Hart Assocs.	716-225-4455
TX	Dallas, Stasco	214-239-4517
WI	Milwaukee, Coombs Assocs., Inc.	414-351-6123
Can	Concord, Ont., Delco Electerns.,Inc.	416-738-1090

Local Distributors

CA	Los Angeles, Electric Switches, Inc.	213-660-1310
CA	San Diego, Sigma Electrns.	619-292-1523
IL	Wheeling, Hawk Elctrns., Inc.	312-459-4030
NY	Yonkers, Kintronics, Inc.	914-968-7736, 800-431-1658
Can	Burnaby, B.C., Rae Ind. Electrns.,LTD	604-291-8866

MECHANICAL PRODUCTS, Amstar, 1824 River St. P. O. Box 729E, Jackson, MI 49204, Tel: 517-782-0391, TWX: 810-253-0827; *Sls. Mgr.:* Bob Vangermeersch

MECHANICAL TECHN., 968 Albany Shaker Rd., Latham, NY 12110, Tel: 518-785-2353, TWX: 710-443-8150; Empl.: 1000; *Sls. Mgr.:* David W. Bender; *Dist. Mgr.:* David W. Bender

MECHANIZED ELECTRONIC ASSEMBLY DIV., Universal Instrs. Corp., P.O. Box 825, Binghamton, NY 13902, Tel: 607-772-7522, TWX: 510-252-1990; *Sls. Mgr.:* Gene Exley **D•1982**

Local Sales Offices & Reps

NH	Bedford, Universal Instrs. Corp.	603-625-9600
NY	Binghamton, Universal Instrs. Corp.	607-772-7472
PA	Paoli, Universal Instrs. Corp.	215-296-8811

MEDA, INC., MacIntyre Electronics Design Assocs., Inc., 1930 Isaac Newton Sq., Reston, VA 22090, Tel: 703-471-1445, Telex: 910-350-0132; Empl.: 5

MEDIA RECOVERY INC., Box 1407, Graham, TX 76046, Tel: 800-527-9497, 214-630-9625 (Texas), Telex: 73-2561; Empl.: 130; *Sls. Mgr.:* J. Ricciardi

Local Sales Offices & Reps

CA	San Francisco, Media Recovery	415-572-0167
CT	Hartford, Media Recovery of N.J.	203-528-9776
MA	Boston, Media Recovery Inc.	617-843-8400
MI	Livonia, Media Recovery	313-421-4244
TX	Dallas, Media Recovery of Tex	214-630-9625
TX	Houston, Media Recovery of Tex	713-681-5464
TX	San Antonio, Media Recovery of Texas	512-349-5854

MEGA LOGIC, 9659 Natl. Rd., Brookville, OH 45309, Tel: 513-833-5222

MEGATEK CORP., 9645 Scranton Road, San Diego, CA 92121, Tel: 619-455-5590, TWX: 910-335-2056; Empl.: 500; *Sls. Mgr.:* Robert A. Becker; *Dist. Mgr.:* Michel Schwab, Dir., International Sls.

MEGATEST, 880 Fox La., San Jose, CA 95131, Tel: 408-998-7110, TWX: 910-338-0259; Empl.: 225; *Sls. Mgr.:* Rick Carmichael

MEGATRAN ELECTRONIC POWER, Rising Sun Rd., Bordentown, NJ 08505, Tel: 609-298-7300, TWX: 510-685-3645; Empl.: 25; *Sls. Mgr.:* C. W. Harrison

MEISSNER INDS., 551 Rte. 10, Dover, NJ 07801, Tel: 201-366-1700; Empl.: 10 **A•1889**

MELCHER, INC., 6290 Sunset Blvd., #1126, Los Angeles, CA 90028, Tel: 213-463-5617, TWX: 910-321-2903; *Sls. Mgr.:* Norman R. Sutherland

MELCOR

MELCOR/MATERIALS ELCTRN. PRODS., 994 Spruce St., Trenton, NJ 08648, Tel: 609-393-4178, Telex: 84-3314; FSC No.: 32333; Empl.: 175; *Sls. Mgr.:* M.A. Levine **C•1652-1653**

MELCO SLS., See Mitsubishi Elctrns.

MELLES GRIOT, 1770 Kettering St., Irvine, CA 92714, Tel: 714-261-5600, Telex: 678447; Empl.: 90; *Sls. Mgr.:* Paul H. Shirley

MEL-RAIN CONTROLS, 42974 M-43 Hwy., Paw Paw, MI 49079, Tel: 616-657-2527; FSC No.: 639; Empl.: 20; *Sls. Mgr.:* Howard F. Walter

MEL TEC, Div. Epsco, Inc., 411 Providence Hwy., Westwood, MA 02090, Tel: 617-329-1508, Telex: 95-1110, TWX: 710-348-0484; Empl.: 180

MEMODYNE, 220 Reservoir St., Needham Hgts., MA 02194, Tel: 617-444-7000, Telex: 92-2537; Empl.: 50; *Sls. Mgr.:* Joseph K. McEttrick **D•1068**

Local Sales Offices & Reps

AZ	Tempe, Mar Tech Assocs., Inc.	602-968-4944
CA	Fullerton, Elctrn. Comp. Mktg.	714-879-9460
CA	Santa Clara, Nelson Elctrns. Sls.	408-980-1950
CO	Englewood, F. G. Mktg. Co.	303-795-9176
CT	Hamden, Burton Forrester Associates	203-248-4380
GA	Atlanta, Magaro & Assoc.	404-451-8862
HI	Honolulu, Aloha Assocs.	808-941-1574
IL	Elmhurst, Scott Assocs.	312-279-5681
KS	DeSoto, Midtec Assocs.	910-743-6565
MA	Braintree, Burton Forrester Assocs.	617-848-7234
MI	Detroit, EQS Sys.	313-961-3042
MO	Florissant, Midtec Assocs.	313-837-5200
NY	Clark Mills, KLM Assocs.	315-853-6126
NY	Elmont, Crane & Egert Corp.	516-872-0800
NY	North Syracuse, KLM Assocs.	315-458-6214
NY	Pittsford, KLM Assocs.	716-381-8350
NC	Greensboro, Magaro & Assocs.	919-294-4783
OH	Chesterland, EQS Sys.	216-729-2222
OH	Columbus, EQS Sys.	614-228-3453
OR	Portland, Topp Engrg. Sls.	503-244-7265
PA	Pittsburgh, EQS Sys.	412-261-2604
TX	Houston, Acudata	713-488-8195
TX	Plano, Acudata	214-424-3567
UT	Englewood, F. G. Mktg. Co.	303-795-9176
WA	Bellevue, Topp Engrg. Sls.	206-747-5400

MEMOREX CORP., San Thomas at Central Expwy., Santa Clara, CA 95052, Tel: 408-987-1000; Empl.: 12,284

MEMORY PROTECTION DEVICES INC., 320 Broad Hollow Rd., Farmingdale, NY 11735, Tel: 516-454-0340, 516-454-0341, Telex: 219801; *Sls. Mgr.:* Lou Asighieri/Charlotte Stalker; *Dist. Mgr.:* Sandy Silvani **C•1451-1453**

Local Sales Offices & Reps

AL	Huntsville, REP Inc.	205-881-9270
CA	Pleasonton, Moulthrop Sls.	415-463-0450
CA	San Diego, Tauber Assocs.	619-274-7242
GA	Tucker, Rep., Inc.	404-938-4358
IN	Indianapolis, Marketing Engrg.	317-872-5665
KS	Olathe, Rush & West	913-764-2700
MA	Burlington, Conti Younger	617-273-1582
MO	Ballwin, Rush West	314-394-7271
NJ	Mt. Laurel, Comtek	609-235-8505
NY	Pittsford, Andres Comp.	716-381-3818
NC	Raleigh, Rep., Inc.	919-851-3007
OR	Tigard, Electronic Sources	503-684-0040
TN	Jefferson City, Rep., Inc.	615-475-9012
TX	Dallas, Dunbar	214-239-7151
UT	Salt Lake City, Comp. Sls.	801-268-8440
WA	Bellevue, Elctrn. Sources	206-451-3500

Local Distributors

AL	Huntsville, Resistacap, Inc.	205-883-4270
CA	Burlingame, Rose Elec.	415-348-0483
CA	San Diego, Tauber Elec.	619-272-7242
CA	San Jose, Cypress Elec.	408-945-8400
CA	Van Nuys, Nesco	213-781-0505
FL	Dania, Summit Distr.	305-920-6253
FL	Pompano Beach, Component South	305-971-0350
IL	Chicago, Prehler Elec.	312-384-6100
IN	Indianapolis, Graham Elec.	317-634-8202
MA	Sharon, Adcour	617-784-8123
MI	Brighton, A. P. Sls.	313-229-6550
MI	Farmington Hills, Prehler Elec.	313-473-7200
MN	Burnsville, Power Grp.	612-890-1360
MN	Thief River Falls, Digi Key	218-681-6674
NJ	Bellmawr, Mid-Atlantic	609-931-5303
NJ	Plainfield, Mars Elec.	201-757-4332
NY	Buffalo, Summit Dist.	716-887-2800
OH	Cincinnati, Hughes Peters	513-351-2000
OH	Columbus, Hughes Peters	614-294-5351
PA	Allentown, Lehigh Elec.	215-433-3045
TX	Dallas, Computer Comps.	214-239-0271
WA	Bellevue, Almac Elec.	206-643-9992

MEMTRON TECHNOLOGIES, INC., 1400 Weiss St., Frankenmuth, MI 48734, Tel: 517-652-2652, TWX: 910-380-9153; FSC No.: 6 V 417; Empl.: 53; *Sls. Mgr.:* Daniel T. Ortner **B•1731**

Local Sales Offices & Reps

AZ	Scottsdale, Semi-Systems Arizona, Inc.	602-991-1151
CO	Englewood, Martec Assocs.	303-741-3322
FL	Maitland, EIR, Inc.	305-660-9600
GA	Lawrenceville, Tek-Rep Mktg., Inc.	404-963-1600
IL	Wheaton, Chadra-Schilke & Assocs., Inc.	312-653-8126
IN	Indianapolis, EMCI, Inc.	317-253-1668
MA	Framington, Stone Comp. Sls. Corp.	617-875-3266
MO	Saint Charles, Buckman & Assocs.	314-946-6201
NY	Fairport, Net Sls., Inc.	716-467-4538
NY	Smithtown, T & K Sls.	516-724-3456
OH	Columbus, Tom Mulligan Co.	614-457-2242
PA	Southampton, Campbell Assocs.	215-322-6630
TX	Richardson, Lonk & Assocs.	214-238-7651
VA	Martinsville, Engineering Sls. Corp.	703-632-2365
Can	Rexdale, Ont., Bestec Elctrns., Ltd.	416-674-1330

Mepco//Electra
A NORTH AMERICAN PHILIPS COMPANY

MEPCO//ELECTRA, INC., North American Philips Corp., Columbia Rd., Morristown, NJ 07960, Tel: 201-539-2000, Telex: 136461, TWX: 710-986-7437; *Sls. Mgr.:* Michael F. Kirkowski; *Dist. Mgr.:* Robert G. Elko **A•1124-1126, 1890-1891, 2029; B•1008**

MEPCO//ELECTRA, INC., North American Philips Corp., 11468 Sorrento Valley Rd., San Diego, CA 92121, Tel: 619-453-0332, Telex: 820534, TWX: 910-337-1120 **A•2029; B•1008**

Potentiometers (Cermet, Carbon) Industrial & Military

MEPCO//ELECTRA, INC., North American Philips Corp., 5900 Australian Ave., West Palm Beach, FL 33407, Tel: 305-842-3201, Telex: 387217, TWX: 510-952-7618 **A•1124; B•1009**

Tantalum Capacitors (Solid, Wet Slug, Chip) Military & Industrial

MEPCO//ELECTRA, INC., North American Philips Corp., Columbia Rd., Morristown, NJ 07960, Tel: 201-539-2000, Telex: 136461, TWX: 710-986-4737 **A•1126, 1890-1891**

Metal Film Resistors (Established Reliability-Hermetic) Thick Film Chips, Thick Film Networks, Non-Linear Resistors, Film Trimmer Capacitors

MEPCO//ELECTRA, INC., North American Philips Corp., 6071 St. Andrews Rd., Columbia, SC 29210, Tel: 803-772-2500, Telex: 820676, TWX: 810-666-2662 **A•1124-1126; B•1009**

DC Aluminum Electrolytic Capacitors (Computer Grade, Axial, Radial) Military, Industrial & Consumer, AC Motor Starts, Film Capacitors (Film/Foil, Metallized), Tantalum Capacitors (Foil)

MEPCO//ELECTRA, INC., Airport Road, P.O. Box 760, Mineral Wells, TX 76067, Tel: 817-325-7871, Telex: G.P.R.-881857/S.P.R.-820545 **A•1890**

Metal Film Resistors (General Purpose, Standard Precision, Ultra Precision, Standard Military, Established Reliability) Carbon Film Resistors, Precision Matched Sets

Local Sales Offices & Reps

AL	Huntsville, Macro-Mktg. Assocs.	205-883-9630
AZ	Tempe, Mepco/Electra	602-968-9573
CA	Anaheim, Mepco/Electra	714-441-0385
CA	Harbor City, Refrigeration Comp.	213-325-3420
CA	Milpitas, Mepco/Electra	408-945-1020
CA	San Diego, The Rep Co.	619-292-9001
CA	Santa Clara, I-Squared	408-988-3400
CA	Sherman Oaks, Mepco//Electra	818-986-4892
CO	Englewood, Thorson Rocky Mnt.	303-779-0666
CO	Westminster, Mepco//Electra	303-460-0051
FL	Altamonte Springs, Mepco/Electra	305-339-5073
FL	Ft. Lauderdale, Mepco/Electra	305-485-0115
GA	Norcross, Over & Over, Inc.	404-449-6205
IL	Bannockburn, Heth	312-295-8440
IL	Elk Grove Village, Oasis Sls.	312-640-1850
IL	Itasca, Mepco/Electra	312-773-3399
IN	Fort Wayne, Corrao Marsh, Inc.	219-637-5548
IN	Greenfield, Corrao Marsh, Inc.	317-894-0377
IN	Indianapolis, Corrao Marsh, Inc.	317-872-7157
IN	Indianapolis, Leslie M. Devoe Co.	317-842-3245
IA	Cedar Rapids, Lorenz Sls.	319-377-4666

KS	Overland Park, PMR Corp.	913-381-0004
MD	Columbia, Delta III Assoc.	301-730-4700
MA	Woburn, Mepco/Electra	617-935-6920
MI	Grand Rapids, Miltimore Sls.	616-942-9721
MI	Novi, Miltimore Sls.	313-349-0260
MN	Minneapolis, Electric Comps. Sls., Inc.	612-933-2594
MO	Maryland Heights, PMR Corp.	314-569-1220
NE	Lincoln, Lorenz Sls.	402-475-4660
NJ	Englewood Cliffs, Ed Glass Assocs.	201-592-0200
NJ	Marlton, B.G.R. Assocs.	609-983-1020
NJ	Morristown, Mepco/Electra	201-539-2000
NJ	Springfield, Gebhardt Mktg.	201-376-4415
NY	Rochester, Electra Sls. Corp.	716-427-7860
NY	Syracuse, Electra Sls. Corp.	315-463-1248
NC	Charlotte, Over & Over, Inc.	704-527-3070
NC	Raleigh, Over & Over	919-872-2262
OH	Dayton, Mepco/Electra	513-278-5842
OR	Beaverton, Mepco/Electra	503-643-5516
PA	Greensburg, Pro Mark	412-832-3800
TX	Richardson, Mepco/Electra	214-231-8274
UT	West Valley City, Thorson Rocky Mountain	801-973-7969
WA	Bellevue, Mepco/Electra	206-643-4555
WI	Wauwatosa, Larsen Assoc.	414-258-0529

Local Distributors

AL	Huntsville, Hamilton/Avnet	205-837-7210
AZ	Phoenix, T.T.I.	602-966-1616
AZ	Tempe, Hamilton/Avnet	602-231-5100
AZ	Tempe, Shelley Elctrns., Inc.	602-894-2058
CA	Chatsworth, Avnet Elctrns.	818-700-8668
CA	Chatsworth, Hamilton Electro Sls.	818-700-1222
CA	Chatsworth, QC Comps., Inc.	818-700-2622
CA	Chatsworth, Shelley Elctrns., Inc.	213-998-3333
CA	Chatsworth, TTI	818-709-1010
CA	Compton, Harper, S.I.D.	213-979-5090
CA	Costa Mesa, Avnet Elctrns.	714-754-6077
CA	Costa Mesa, Hamilton Electro Sls.	714-641-4100
CA	Culver City, Hamilton Electro Sls.	213-558-2131
CA	Culver City, Hamilton/Avnet	213-558-2020
CA	Garden Grove, Hi-Rel Elctrns., Inc.	714-898-9858
CA	Ontario, Hamilton/Avnet	714-989-4602
CA	Sacramento, Hamilton/Avnet	916-920-3120
CA	San Diego, Hamilton/Avnet	619-571-7500
CA	San Diego, Shelley Elctrns.	619-453-7133
CA	San Jose, Ratel Elctrns.	408-946-4300
CA	San Jose, Shelley Elctrns., Inc.	408-942-9111
CA	San Jose, TTI, Inc.	408-943-9155
CA	Sunnyvale, Hamilton/Avnet	408-743-3355
CO	Boulder, Shelley Elctrns., Inc.	303-442-2718
CO	Denver, Ragon Elctrns.	303-774-1992
CO	Englewood, Hamilton/Avnet	303-740-1000
CO	Englewood, NEP Elctrns.	303-799-9898
CT	Danbury, Hamilton/Avnet	203-797-2800
CT	New Haven, Greene Shaw Co.	203-397-0710
CT	Stratford, TTI	203-375-1400
FL	Ft. Lauderdale, Dielco	305-973-8700
FL	Ft. Lauderdale, Hamilton/Avnet	305-971-2900
FL	Orlando, T.T.I.	305-859-1000
FL	St. Petersburg, Hamilton/Avnet	813-576-3930
FL	Tampa, Impala Elctrns.	813-885-4747
FL	Tampa, Shelley Elctrns., Inc.	813-884-0946
FL	Winter Park, Hamilton/Avnet	305-628-3888
GA	Norcross, Hamilton/Avnet	404-447-7507
GA	Norcross, TTI	404-662-0911
IL	Bensenville, Hamilton/Avnet	312-860-7700
IL	Chicago, Nep Elctrns.	312-625-8400
IL	Rosemont, Advent Elctrns.	312-298-4210
IN	Carmel, Hamilton/Avnet	317-844-9603
IN	Indianapolis, Advent Elctrns.	317-872-4910
IN	Indianapolis, RM Elctrns., Inc.	317-291-7110
IA	Cedar Rapids, Advent Elctrns.	319-363-0221
KS	Overland Park, Hamilton/Avnet	913-888-8900
MD	Beltsville, Resco/Washington	301-937-9100
MD	Columbia, Aztech Elctrns.	301-995-1760
MD	Columbia, Hamilton/Avnet	301-995-3500
MD	White Marsh, Resco/Baltimore	301-529-0500
MA	Burlington, TLC Elctrns.	617-273-0140
MA	Newton, Greene-Shaw Co.	617-969-8900
MA	Woburn, Hamilton/Avnet	617-935-9700
MA	Woburn, Jaco Elctrns.	617-933-7760
MA	Woburn, T.T.I.	617-938-8800
MI	Grand Rapids, Hamilton/Avnet	616-243-8805
MI	Grand Rapids, RM Elctrns., Inc.	616-531-9300
MI	Livonia, Hamilton/Avnet	313-522-4700
MI	Livonia, RepTron Elctrns.	313-525-2700
MN	Minneapolis, Merit Elctrns.	612-546-5383
MN	Minnetonka, Hamilton/Avnet	612-932-0600
MN	St. Paul, Ragon Elctrns.	612-642-2828
MO	Earth City, Hamilton/Avnet	314-344-1200
MO	Independence, Ragon Elctrns.	816-254-3410
MO	St. Louis, Olive Elctrns.	314-426-4500
NE	Lincoln, Scott Elctrn. Supp. Corp.	402-466-8221
NE	Omaha, Scott Elctrn. Supp. Corp.	402-734-6750
NH	Manchester, Hamilton/Avnet	603-624-9400
NJ	Cherry Hill, Hamilton/Avnet	609-424-0100
NJ	Clifton, J-Mar Elctrns.	201-772-6400
NJ	Fairfield, Hamilton/Avnet	201-575-3390
NM	Albuquerque, Hamilton/Avnet	505-765-1500
NY	Bohemia, Shelley Elctrns.	516-567-7751
NY	Bohemia, T.T.I.	516-567-1500
NY	Buffalo, Summit Distrs.	716-887-2800
NY	Central Islip, Semi-Cap Elctrns.	516-582-4400
NY	East Syracuse, Hamilton/Avnet	315-437-2641
NY	Farmingdale, Command Elctrns. Corp.	516-293-1212
NY	Hauppauge, Fairmont Elctrns.	516-231-3313
NY	Hauppauge, Hamilton/Avnet	516-231-9800
NY	Hauppauge, Jaco Elctrns.	516-273-5500
NY	Hempstead, Kahgan Comps.	516-538-2300
NY	Henrietta, CAM RPC Elctrns.	716-334-5600
NY	Rochester, Hamilton/Avnet	716-475-9130
NY	Rochester, Summit Distrs.	716-334-8110
NY	Rome, Rome Elctrns.	315-337-5400
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NC	Greensboro, Hammond Elctrns.	919-275-6391
NC	Raleigh, Hamilton/Avnet	919-829-8030
OH	Cleveland, CAM RPC Elctrns.	216-461-4700
OH	Cleveland, Hamilton/Avnet	216-831-3500
OH	Columbus, RepTron Elctrns.	614-436-6675
OH	Dayton, Hamilton/Avnet	513-433-0610
OH	Englewood, Argent Electra	513-836-8633
OH	Fairborn, Aschbacher & Assocs.	513-252-7785
OH	Westerville, Hamilton/Avnet	614-882-7004
OK	Tulsa, Altair Co.	918-252-5781
OR	Beaverton, Almac Elctrns.	503-641-9076
OR	Lake Oswego, Hamilton/Avnet	503-635-8157
PA	Allentown, Lehigh Elctrn. Comps.	215-433-3045
PA	McKean, Advacom, Inc.	814-476-7774
PA	Norristown, Century Elctrn. Corp.	215-631-5400
PA	Pittsburgh, CAM RPC Elctrns.	412-782-3770
TX	Austin, Altair Co.	512-837-4970
TX	Austin, Hamilton/Avnet	512-837-8911
TX	Dallas, Computer Comp.	214-239-0271
TX	El Paso, Era Elctrns.	915-592-4126
TX	Ft. Worth, T.T.I. Inc.	817-429-1440
TX	Houston, Altair Co.	713-462-3029
TX	Houston, Hamilton/Avnet	713-780-1771
TX	Irving, Hamilton/Avnet	214-659-4111
TX	Richardson, Altair Co.	214-231-5166
TX	Richardson, Jaco Elctrns.	214-235-9575
UT	Salt Lake City, Hamilton/Avnet	801-972-2800
VA	Arlington, Arlington Elctrns.	703-524-2412
VA	Charlottesville, Virginia Radio Supp. Co.	804-296-4184
WA	Bellevue, Almac Elctrns. Corp.	206-643-9992
WA	Bellevue, Hamilton/Avnet	206-643-3950
WA	Kent, Shannon Ltd.	206-763-0545
WA	Spokane, Almac Elctrns. Corp.	509-924-9500
WI	Milwaukee, Marsh Elctrns.	414-475-6000
WI	New Berlin, Hamilton/Avnet	414-784-4510
WI	New Berlin, NEP Elctrns., Inc.	414-785-9100
WI	New Berlin, R.M. Elctrns.	414-784-4420

MERCURY PLASTICS, A UNIT OF ZERO CORP., 672 Fuller Rd., Chicopee, MA 01020, Tel: 413-267-5561, TWX: 710-354-1450; Empl.: 100; *Sls. Mgr.:* Douglas W. Griffith

MERECO PRODUCTS DIV., Metachem Resins Corp., 1505 Main St., West Warwick, RI 02893, Tel: 401-828-4550; Empl.: 100; *Sls. Mgr.:* John E. Powell, Jr.

MERET, INC., 1815 24th St., Santa Monica, CA 90404-4998, Tel: 213-828-7496, Telex: 371-9305; Empl.: 26; *Sls. Mgr.:* Jonathan Medved .... **B•1121**

Local Sales Offices & Reps

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CA	West Covina, Eureka Tech. Sls., Inc.	213-331-8766
CO	Lakewood, Technical Mktg. Mfg. Inc.	303-232-1516
MA	Brookline, Boston Elctrn. Corp.	617-566-3821
IL	Northrock, Emtech	312-564-0446
NY	White Plains, Metro-Tek Assocs.	914-631-4758
UT	Salt Lake City, Global Tek., Inc.	801-972-0999
VA	Fairfax, Schibley Assocs.,Inc.	703-591-3008

MERIX CHEM. CO., 2234 East 75th St., Chicago, IL 60649, Tel: 312-221-8242; Empl.: 15; *Sls. Mgr.:* E. O. Sonneman; *Dist. Mgr.:* E. O. Sonneman

MERRILL, POB 308, 1316 Sumneytown Pike, Gwynedd Valley, PA 19437, Tel: 215-643-2116; FSC No.: 58624; Empl.: 10; *Sls. Mgr.:* J. Fournier

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METRON OPTICS INC., P.O. Box 690, Solana Beach, CA 92075-0690, Tel: 619-755-4477; Empl.: 15

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MF ELCTRNS. CORP., 10 Renewal Pl., New Rochelle, NY 10801, Tel: 914-576-6570, TWX: 710-563-0643; FSC No.: 08111; Empl.: 100; *Sls. Mgr.:* Bill Braverman; *Dist. Mgr.:* Bill Braverman .... **A•1384-1385**

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AZ	Glendale, Southwest Elec. Mktg. Assoc.	602-278-0500

CA	Irvine, J. V. Earley & Assocs.	714-833-1806
CA	Sunnyvale, W. W. Posey Co.	408-746-0771
CO	Denver, Matthews & Assocs.	303-450-6476
CT	Meriden, Orion Group	203-621-8371
FL	Altamonte Springs, APM Assocs.	305-869-6831
FL	Ft. Lauderdale, APM Assocs.	305-565-0056
FL	Tampa, AMP Assocs.	813-886-2457
GA	Atlanta, E.M.A.	404-448-1215
IL	Bensenville, Banner Tech. Sls.	312-766-4131
ME	Wakefield, The Orion Group	617-245-5220
MI	Brighton, A.P.J. Assocs.	313-229-6550
MN	Minneapolis, Peterson Sls. & Assoc.	612-884-3483
NJ	Perth Amboy, Astro Rep.	201-826-8050
NM	Glendale, S. W. Elec. Mktg. Assoc.	602-278-0500
NY	Rochester, Sweetco Assocs.	716-225-2383
NY	Utica, Sweetco Assocs.	315-733-6721
NY	W. Babylon, Astro Rep.	516-422-2500
NC	Raleigh, E.M.A.	919-847-8800
OH	Dayton, APJ Assoc.	216-356-2424
OR	Portland, Controltek Sls.	503-641-0877
PA	Prospect Park, ELF Sls.	215-534-3340
TX	Austin, Matthews & Assocs.	512-479-0028
TX	Dallas, Matthews & Assocs.	214-931-0167
WA	Bellevue, Controltek Sls.	206-451-8163
WI	Mukwonago, Banner Tech. Sls.	414-363-5086

Local Distributors

CA	Burbank, Atwater Elctrns.	714-670-1426
CA	Sunnyvale, Pacesetter	408-734-5470
NJ	Northtown, Aztec Engrg.	215-539-8200
PA	Northtown, Aztec Engrg.	215-539-8200

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MG ELECTRONICS, 32 Ranick Rd., Hauppauge, NY 11788, Tel: 516-582-3400, Telex: 645113; Empl.: 14; *Sls. Mgr.:* John Kibbit; *Dist. Mgr.:* Stan Grey .... **D•1027**

MHOTRONICS., INC., 444 Lake Cook Rd., Ste. 8, Deerfield, IL 60015, Tel: 312-948-5600, TWX: 910-686-0630 .... **C•1459-1461**

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AL	Huntsville, Cartwright & Bean	205-830-1540
AZ	Phoenix, J. F. Hurlbutt Co.	602-952-2029
CA	Burbank, Mod-Co.	818-848-2215
CA	Santa Clara, Context Engrg.	408-748-8676
CO	Golden, J. F. Hurlbutt	303-279-7796
FL	Deerfield Beach, Cartwright & Bean	305-429-3400
FL	Orlando, Cartwright & Bean	305-422-4531
GA	Atlanta, Cartwright & Bean	404-233-2939
IL	Elk Grove Village, Memetron	312-595-2828
IL	Mt. Prospect, The Dombrow Co.	312-253-3326
LA	Covington, Cartwright & Bean	504-892-1780
MA	Framingham, Marathon Sls., Ltd.	617-875-3566
NY	Hauppauge, Masin-Esco, Inc.	516-273-3500
NY	Syracuse, Northeastern Elctrns. Co., Inc.	315-455-7561
NC	Charlotte, Cartwright & Bean	704-377-5673
NC	Raleigh, Cartwright & Bean	919-876-4130
OR	Portland, SPS Elctrns.	503-297-6919
TN	Knoxville, Cartwright & Bean	615-693-7450
TN	Memphis, Cartwright & Bean	901-276-4442
TX	Austin, Swearingen Sls.	512-339-8663
WA	Redmond, SPS Elctrns.	206-323-4140

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MICHIGAN MAGNETICS, 203 W. Third St., Vermontville, MI 49096, Tel: 517-726-0590; Empl.: 95; *Sls. Mgr.:* B. L. Killinger

MICOM SYSTEMS, INC., 4100 Los Angeles Ave, P.O. Box 8100, Simi Valley, CA 93062-8100, Tel: 805-583-8600, Telex: 687-497, TWX: 910-494-4910; *Sls. Mgr.:* M. Winters; *Dist. Mgr.:* A. Yilmaz

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MICRO ASSOCIATES INC., 2349 Memorial Blvd., Port Arthur, TX 77640, Tel: 409-983-2051

MICROAVIONICS CORP., 3198-K Airport Loop Dr., Costa Mesa, CA 92626, Tel: 714-957-6904; Empl.: 15; *Sls. Mgr.:* B. H. Corzine

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MICRO-CIRCUITS CO., INC., Route 1 - Box 518, New Buffalo, MI 49117, Tel: 616-469-2727

MICRO-COAX COMPONENTS, INC., a UTI Company, Box E, Collegeville, PA 19426, Tel: 215-489-3700, Telex: 84-6428, TWX: 510-660-6107; FSC No.: 215-489-1103; Empl.: 50; *Sls. Mgr.:* Lloyd Deery

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Microcomputer Power, Inc.

MICROCOMPUTER POWER, 15875 Concord Circle, Morgan Hill, CA 95037, Tel: 408-779-5700, TWX: 910-338-7694; Empl.: 60; *Sls. Mgr.:* Jim Armstrong; *Dist. Mgr.:* Jim Armstrong .... **D•1721-1723**

Local Sales Offices & Reps

AZ	Tempe, Electronic Dev. Sls.	602-438-1547
CA	Inglewood, Basic Sys.	213-673-4300
MD	Baltimore, Stemler Assocs.	301-944-8262
MA	Andover, Richard Porinton, Inc.	617-475-7055
NJ	Cherry Hill, Stemler Assocs.	609-966-0470
NY	Plainview, Alto Assocs.	516-681-3163
PA	Feasterville, Stemler Assocs.	215-638-1850
EXP	CA, Santa Clara, Prima Intl.	408-496-0722

Local Distributors

AZ	Glendale, Aspen Power	602-937-4784
CA	Hayward, K E A Electronics	415-887-2900
CA	Inglewood, Basic Sys.	213-673-4300
FL	Orlando, G M I Distrs.	305-894-3354
NM	Albuquerque, Walker Elctrns.	505-883-2992

MICRO COMPUTER RENTALS, 742D Hampshire Rd., Westlake Village, CA 91361, Tel: 213-991-1704

MICRODATA CORP., 17481 Red Hill Ave., Irvine, CA 92705, Tel: 714-540-6730, TWX: 910-595-1764; Empl.: 375

MICRO DEVICES PRODUCT GROUP, Therm-O-Disc, Inc., 1320 South Main Street, P.O. Box 3538, Mansfield, OH 44907, Tel: 419-756-5005, Telex: 987455; *Sls. Mgr.:* J. A. Kight .... **B•1775**

MICRO DIGITAL ASSOCS., INC., 12791 Western Ave., Unit C, Garden Grove, CA 92641, Tel: 714-891-2363; *Sls. Mgr.:* Ralph Moore; *Dist. Mgr.:* Ralph Moore

MICRODRY CORP., Golden Grain Macaroni Co., 3111 Fostoria Way, San Ramon, CA 94583, Tel: 415-837-9106, Telex: 33-5320; Empl.: 40; *Sls. Mgr.:* Al Katskee

MICROELECTRONIC RELAYS, INC., 1300 S. Beacon St., San Pedro, CA 90731, Tel: 213-831-2331, Telex: 297340; Empl.: 25; *Sls. Mgr.:* C. D. Stalker ..... **B•1439**

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CA	San Diego, Manning Co.	619-565-6097
CO	Englewood, Dynatech	303-773-2830
FL	Apopka, G. F. Bohman Assocs.	305-886-1882
IL	La Grange Park, Bierhaus Sls.	312-354-5100
MD	Baltimore, Callas Elctrns.	301-744-7711
MA	Peabody, OEM Sls.	617-535-2521
MI	Jackson, Norwood Scroggs Co.	517-750-1170
NY	Commack, R. C. Engrg.	516-543-3325
NY	Syracuse, L. D. Allen	315-437-8387
NC	Winston-Salem, Murcota	919-722-9445
OR	Portland, Component Technlg.	503-292-1518
PA	Harleysville, Thomas Jackson Assocs.	215-643-5560
TX	Richardson, Eagle Mktg.	
UT	Layton, Dynatech	801-546-4837
WI	Milwaukee, Bierhaus Sls.	414-963-0318
Can	Ontario, Intrade	613-727-1272

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MICRO ELECTRONIC SYS., INC., 3 Quarry Road, Brookfield, CT 06804, Tel: 203-775-1440, 800-243-7254, Telex: 969659

MICRO-ETCH PRODUCTS, INC., 94 Dodge Ave., P.O. Box 9712, Stratford, CT 06497, Tel: 203-378-8610; FSC No.: 24846; Empl.: 42; *Sls. Mgr.:* Frank Dichiara; *Dist. Mgr.:* Frank Dichiara

MICROFLECT, 3575 25th S.E., Salem, OR 97302-0985, Tel: 503-363-9267, TWX: 510-599-0107; Empl.: 98; *Sls. Mgr.:* John J. Kranitz

MICRO INSTR., 2250 Micro Pl., Escondido, CA 92025, Tel: 619-746-2010, Telex: 882205 MICROINST ESCD; FSC No.: FSCM 24836; Empl.: 45; *Sls. Mgr.:* C. Marks

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CO	Conifer, Energy Equip. Sls.	303-674-8111
FL	Clearwater, Teqspec Inc.	813-725-2201
MA	Natick, Wayland Engr. Sls.	617-655-6080
MO	Platte City, Stantec Sales	816-464-2211
NJ	Englewood Cliffs, Power Conversion & Conts.	201-569-0015
NM	Albuquerque, R. A. Mayes	505-292-2330
NC	Winston Salem, Teqspec III	919-723-8102
TX	Allen, Harris Tech. Sls.	214-727-2182

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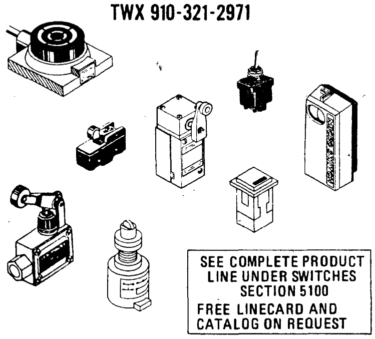

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MA	Woburn, Pat Jenks Assoc.	617-938-0488
NM	Albuquerque, IMEC	505-344-2212
NY	Huntington Station, Metro-Mic	516-GE3-3333
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CA	San Diego, Cerco	619-450-1754
CA	San Marino, Walls Assoc.	213-287-7276
CO	Denver, William Purdy Co.	303-777-1411
FL	DeBary, DJE Assoc.	305-668-6827
IL	Woodridge, Trend-Tronics	312-985-0626
MA	Canton, N E E S Co.	617-828-4835
NM	Albuquerque, Wm. J. Purdy Co.	505-266-7959
OH	Cleveland, Jim Finnigan & Co.	216-238-5905
OR	Beaverton, Wm. J. Purdy Co.	503-641-9373
UT	Salt Lake City, Wm. J. Purdy Co.	801-486-8557
EXP	Herzila, Israel, Relcom Agys.	052-855-46

Local Distributors

CA	Anaheim, A to Z Elctrns.	714-634-3620
CA	Burbank, TAW Elctrns.	213-846-3911
CA	Burlingame, Rose Elctrns.	415-348-2740
CA	Canoga Park, Myco-Vickers	213-340-2025
CA	Costa Mesa, Orange County Comps.	714-979-3597
CA	Industry, Ital Elctrn. Sls.	213-968-8515
CA	San Diego, Shelley Elctrns.	619-453-7133
IL	Des Plaines, Circuit Svc.	312-296-4412
IL	Woodridge, Trend-Tronic	312-985-0626
MN	Minneapolis, Electronic Ctr.	612-371-5200
NH	Hampstead, Astrum Elctrns.	603-329-5656
NY	New Rochelle, Derf Elctrns.	914-235-4600
NY	Oceanside, Tritech	516-678-6222
OH	Toledo, J R Inds.	419-865-1408
PA	McKean, Advacom	814-476-7774
TX	Ft. Worth, Industrial Elect.	817-731-7321
UT	Provo, Central Utah Elctrns. Supp.	801-373-7522
UT	Salt Lake City, Nytronics	800-242-7612
Intl	Japan, Tokyo, Yoshico Intl.	03-230-2641

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MICRO PERIPHERALS INC., 9754 Deering Ave., Chatsworth, CA 91311, Tel: 213-709-4202, TWX: 910-494-1213; Empl.: 400; *Sls. Mgr.:* Keith Murphy; *Dist. Mgr.:* Robert Lewis

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MICRO PLASTICS INC., 20821 Dearborn St., Chatsworth, CA 91311

MICROPLEX, INC., 1977 State College Blvd., Anaheim, CA 92806, Tel: 714-979-8833, 714-634-1535; Empl.: 30

MICRO POWER INTL., INC., 9420 Activity Rd., San Diego, CA 92126, Tel: 619-271-0831

MICRO POWER SYS. INC., 3100 Alfred St., Santa Clara, CA 95050, Tel: 408-727-5350, TWX: 910-338-0154; FSC No.: 54186; Empl.: 305; *Sls. Mgr.:* Don Cavallo; *Dist. Mgr.:* Reed Neddermeyer

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MICRO SEMICONDUCTOR, 2830 S. Fairview St., Santa Ana, CA 92704, Tel: 714-979-8220, TWX: 910-595-1576; FSC No.: 14552; Empl.: 250; *Sls. Mgr.:* M. Gregson; *Dist. Mgr.:* M. Gregson

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Local Sales Offices & Reps

CA	Los Altos, Kolm Mktg.	415-948-2635
CA	Los Angeles, D & G	213-641-7976
CA	Torrance, Detomasit Grp.	213-327-1775
CO	N. Glenn, Hi-Tech	303-457-9666
FL	Boca Raton, Lawrence Assocs.	305-368-7373
FL	Clearwater, Lawrence Assocs.	813-443-2698
FL	Melbourne, Lawrence Assocs.	305-724-8294
IL	Mt. Prospect, Cain forlaw Co.	312-253-3578
MD	Ellicott City, V.P.I.	301-461-2525
MA	Hingham, O'Sullivan & Murphy	617-749-8680
MO	Kansas City, EIR	816-452-7030
MO	Leesburg, EIR	314-245-6860
NJ	Glen Gardner, F & M Tech. Sls.	201-832-7216
NY	Liverpool, Cain Forlaw Co.	315-457-0100
NY	Melville, Metro Mics	516-271-6677
OH	Lancaster, Cain Forlaw Co.	614-654-4800
TX	Dallas, Data Mktg. Assocs.	214-661-6300
WA	Seattle, S.J.I.	206-763-8981

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CO	Englewood	303-779-6439
CT	Hartford	203-695-4011
GA	Atlanta	404-982-2565
IL	Bensenville	312-860-3968
IA	Bettendorf	319-359-3441
MA	Newton	617-969-0265
MI	Southfield	313-424-3569
MN	Minneapolis	612-830-3516
MO	St. Louis	314-576-2518
NJ	Westfield	201-233-9200
NY	Rochester	716-424-2700
NC	Charlotte	704-364-4770
OH	Brooklyn Heights	216-459-6075
OH	Dayton	513-237-4075
PA	Valley Forge	215-666-8340
TX	Dallas	214-688-7533
TX	Houston	713-780-6651
WA	Bellevue	206-453-7591

WI	Brookfield	414-784-6260
Can	Edmonton	403-453-3581
Can	Ottawa	613-224-3822
Can	Vancouver	604-291-6631
Can	Ville St. Laurent	514-731-7681
Can	Willowdale	416-491-1300
Can	Winnepeg	204-632-0250

MICRO/SYS, 1011 Grand Central Ave., Glendale, CA 91201-3010, Tel: 818-244-4600, TWX: 910-588-1988; *Sls. Mgr.:* Dennis Henderson; *Dist. Mgr.:* Dennis Henderson

MICROSYSTEMS DEV. CORP. INC., 1560 Teaneck Rd., Teaneck, NJ 07666, Tel: 201-837-0051, Telex: 13-6479 Att. 296; *Sls. Mgr.:* L. G. Mansoor

MICROTECH, 1420 Conchester Hwy., Boothwyn, PA 19061, Tel: 215-459-3566; Empl.: 22; *Sls. Mgr.:* H. Carter

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OR	Portland, Controltek Sls. Ltd.	503-641-0877
PA	Jenkintown, Arnold Assocs.	215-887-7870
TX	Dallas, Dean Assocs.	214-458-1321
WA	Seattle, Controltek Sls. Ltd.	206-451-8163

MICRO TECHNOLOGY, INC., 1620 Miraloma Ave., Placentia, CA 92670, Tel: 714-632-7580; *Sls. Mgr.:* Christine Schettino

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Local Sales Offices & Reps

AL	Huntsville, Over & Over	205-533-6266
AZ	Scottsdale, F. Schoeffler	602-948-1004
CA	Campbell, Kottmeier Assocs.	408-866-5153
CA	El Monte, Cook Entprs.	213-686-2120
CO	Englewood, Omega, Ltd.	303-762-1921
FL	Orlando, Over & Over, Inc./Florida	305-857-4057
GA	Norcross, Over & Over	404-449-6205
IL	Wheaton, Chadra-Schilke Assoc.	312-653-8126
IN	Noblesville, R & D Elctrn. Sls.	317-849-2026
KS	Overland Pk., J.F. Guernsey Co.	913-381-2225
MA	Reading, Meco, Inc.	617-944-6660
MN	Minnneapolis, RK Sales	612-786-5713
MO	Florissant, John F. Guernsey Co.	314-921-5720
NJ	Englewood Cliffs, E. Glass Assocs.	212-586-8440
NM	Albuquerque, C.T. Carlberg & Assocs.	505-888-3883
NY	Rochester, J.G. Welch Assocs.	716-244-1100
NC	Charlotte, Over & Over	704-527-3070
OH	Cincinnati, J.O. Olsen Co.	513-574-7711
OH	Cleveland, J.O. Olsen	216-662-3454
OR	Portland, SPS Elctrns.	503-297-6919
PA	Jenkintown, Arnold Assocs.	215-887-7870
PA	Pittsburgh, J.O. Olsen Co.	412-279-2550
TN	Antioch, Over & Over, Inc.	615-834-0140
TX	Grand Prairie, Howell Sls.	214-262-5153
WA	Seattle, SPS Elctrns.	206-323-4140
Intl	Israel, Herzlia B, Vectronics	052-56070
Intl	Switzerland, Zurich, Swisel	01-481-9188
Can	Montreal, Quebec, H. W. Brieger Sls., Inc.	514-486-5869

Local Distributors

AL	Birmingham, MG Elctrns. & Equip.	205-328-4525
CA	Fullerton, Pyramid/Fullerton	714-773-0781
CA	Santa Clara, Pyramid Elctrns.	408-727-9810
CA	Santa Monica, Master Distrs.	800-421-8153
CA	Sunnyvale, Sierra West Elctrns.	408-747-1188
CO	Denver, Ragon Elctrns. Parts	303-744-3601
FL	Clearwater, Elctrn. Precepts of Florida	813-530-9781
FL	Ft. Lauderdale, Peerless Radio Corp.	305-973-4141
IL	Northbrook, Classic Comp.	312-272-9650
IN	Indianapolis, Graham Elctrns.	317-634-3202
IA	Cedar Rapids, Deeco, Inc.	319-365-7551
MA	Burlington, QPL Elctrn. Distr.	617-229-2424
MA	Hingham, Sager Elec. Supp.	617-749-6700
MN	Minneapolis, Berqquist	612-835-2322
NJ	Kenilworth, Federated Elctrns.	201-272-0505
NM	Albuquerque, Walker Elctrn. Supp.	505-883-2992
NY	Buffalo, Summit Distrs.	716-884-3450
NY	Johnson City, Help Elctrns.	607-729-3528
NY	Lynbrook, Peerless Radio	516-593-2121
NY	Rochester, Summit Distrs.	716-334-8110
NC	Raleigh, Southeastern Radio	919-828-2311
OH	Cleveland, Pattison Supp.	216-441-3000
OH	Dayton, J.A. Becker Co.	513-226-1341
PA	McKeesport, Barno Radio Co.	412-751-5971
PA	Philadelphia, Shap Elctrns.	215-969-3300
TX	Houston, Lenert Co.	713-225-1465
UT	Salt Lake City, Newark Elctrns.	801-486-1048
WA	Kirkland, Priebe Elexs.	206-821-4695
WI	New Berlin, Classic Comp.	414-786-5300

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MICROWAVE DIODE CORP., Washington St-Box 250, W. Stewartstown, NH 03597, Tel: 603-246-3362/3363, TWX: 710-321-8901; Empl.: 15

MICROWAVE FILTER INC., 6743 Kinne St., East Syracuse, NY 13057-0486, Tel: 315-437-3953, 800-448-1666, TWX: 710-541-0493; FSC No.: 27834; Empl.: 125; *Sls. Mgr.:* E. Bostick, V.P. Mktg.; *Dist. Mgr.:* Bill Bostick

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CA	Del Mar, Chapman & Chapman	619-775-0412
CA	Placentia, Local Sls.	714-993-1800
CA	San Jose, PCA Mktg. Sls.	408-723-2200
CO	Denver, Aspen Sales	801-467-2401
GA	Norcross, Electramark, Inc.	404-446-7915
NH	Nashua, Bell Controls	603-882-6984
NY	Tuxedo Park, Wakeman Norton Assocs.	914-351-5241
PA	Horsham, Dalbrook	215-441-8380
TX	Dallas, Milco Mktg., Inc.	214-783-2716
TX	Houston, Milco Mktg., Inc.	713-723-5003
UT	Salt Lake City, Aspen Sls.	801-467-2401

Local Distributors

CA	Santa Ana, Mann Southwest	714-558-3202
MA	Woburn, Elctrns. Packaging Comp.	617-935-0400

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AL	Pimsom, JM Simpson & Assocs.	205-854-2546
CA	Los Angeles, Dyna Sls.	213-268-1175
FL	Altamonte Springs, WMM Assocs.	305-831-4530
FL	Clearwater, WMM Assocs.	813-442-3913
FL	Ft. Lauderdale, WMM Assocs.	
IL	Des Plains, Marsland Assocs., Inc.	312-298-2620
IN	Indianapolis, Marsland Assocs., Inc.	317-293-5437
IA	Cedar Rapids, Marsland Assocs., Inc.	319-396-8030
MI	Centerline, Dietrich & Assocs.	313-754-6450
MN	Minneapolis, Marsland Assocs., Inc.	612-545-4481
MO	St. Louis, Marsland Assocs., Inc.	314-991-1399
NJ	Cinnaminson, Scott Sls. Co.	609-829-2991
NY	Huntington, C.R. Mayer Co.	516-WA1-7876
OH	Cleveland, Dietrich & Assocs.	216-781-1855
OH	Dayton, Dietrich & Assocs.	513-223-6042
PA	Pittsburgh, Dietrich & Assocs.	412-892-2992
TX	Garland, Tesco	214-681-1376
WA	Seattle, Eicher-Richards Co.	206-LA3-7888
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MIDGET LOUVER, 800 Main Ave., Norwalk, CT 06852, Tel: 203-866-2342; Empl.: 10; *Sls. Mgr.:* Frank J. Scallon; *Dist. Mgr.:* Frank J. Scallon

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CA	Los Angeles, EESCO	818-242-8823
CA	Los Angeles, Landa Minyard, Inc.	213-879-0770
CA	Rancho Bernardo, EESCO	619-233-5660
CA	San Mateo, Midland-Ross	415-573-5824
CA	Santa Ana, Landa Minyard, Inc.	714-543-7805
CA	Santa Clara, Caltronics, Inc.	408-727-7552
CO	Parker, A5 Co.	303-841-3651
CT	Old Saybrook, Bell Controls	203-388-0063
FL	Coral Springs, Electrocraft	305-753-8666
FL	Largo, Electrocraft	813-398-4071
FL	Winter Park, Electrocraft	305-628-4705
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NY	Syracuse, Lamb Comps.	315-455-2469
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OH	Dayton, KW Elctrn. Sls., Inc.	513-890-2150
OH	Shaker Heights, KW Elctrn. Sls., Inc.	216-491-9177
OH	Worthington, KW Elctrn. Sls., Inc.	614-888-0483
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TX	Georgetown, Richmar Elctrn. Corp.	512-863-4535
TX	Plano, Richmar Elctrn. Corp.	214-867-8224
UT	Murray, A5 Co.	801-261-0722
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WA	Seattle, R.T.S., Inc.	206-527-7945
WA	Vashon, R.T.S., Inc.	206-285-1363
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CA	Sacramento, Integrated Elctrns.	916-424-5297
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CA	San Jose, Integrated Elctrns.	408-263-1100
CA	Santa Clara, Glynn Elctrns., Inc.	408-748-1666
CA	Santa Monica, Master Distrs.	213-452-1229
CA	Torrance, All American	213-320-0240
CA	Van Nuys, Patane Avionics	818-988-4455
CO	Denver, Integrated Elctrns.	303-292-6121
CO	Wheat Ridge, Diplomat/ACT	303-422-9229
FL	Miami, All American	305-621-8282
GA	Atlanta, Prehler, Inc.	404-447-5540
IL	Chicago, Prehler, Inc.	312-872-4910
IL	Northbrook, Classic Comps. Supp.	312-272-9650
IL	Rosemont, Advent Elctrns.	312-297-6200
IL	Skokie, Mar-Con Assocs.	312-675-6450
IN	Indianapolis, Advent Elctrns.	317-872-4910
IN	Indianapolis, Classic Comp. Supp.	319-363-0221
IA	Cedar Rapids, Advent Elctrns.	319-363-0221
IA	Cedar Rapids, Bergquist	319-366-8733
MD	Beltsville, Treeko Sls.	301-792-0112
MD	Rockville, All American	301-792-0112
MA	Billerica, A. W. Mayer Co.	617-229-2255
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MN	Minneapolis, Bergquist Co.	612-835-2322
NY	Buffalo, Genessee Radio	716-546-5373
NY	Rochester, Masline Elctrns., Inc.	716-546-5373
NY	Stony Brook, Dove Elctrn. Comp., Inc.	516-689-7733
NC	Raleigh, Prehler Elctrns.	919-876-9111
OH	Cincinnati, Schuster Elec. Co.	800-543-4973
OH	Englewood, Argent Electra	513-836-8633
OH	Solon, Repco Elctrns.	216-248-8900
OK	Tulsa, Altair Co.	918-252-5781
OR	Tigard, Integrated Elctrns.	503-639-9661
PA	Pittsburgh, Alder-Tronics	412-821-5565
TX	Austin, Altair Co.	512-837-4970
TX	Austin, Diplomat/ACT	512-452-5254
TX	Dallas, Diplomat/ACT	214-980-1888
TX	Houston, Altair Co.	713-462-3029
TX	Houston, Diplomat/ACT	713-496-4000
TX	Richardson, Altair Co.	214-231-5166
UT	Salt Lake City, Diplomat/ACT	801-487-8131
UT	Salt Lake City, Integrated Elctrns.	801-298-1868
WA	Bellevue, Integrated Elctrns.	206-455-2727
WI	Mequon, Taylor Elec.	800-242-8914
WI	New Berlin, Classic Comps. Supp.	800-242-7408
EXP	WI, Burlington, Midland-Ross Corp.	414-763-3591
Can	Brampton, Ont., Midland-Ross of Can., Ltd.	416-453-4200

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MIDWAY MFR. CO., 10750 W. Grand Ave., Franklin Park, IL 60131, Tel: 312-451-1360, Telex: 72-1596; Empl.: 2000; *Dist. Mgr.:* Allan Stearns

MIDWEC, See Industrial Midwec Capacitors

MIDWEST COMPS., 1981 Port City Blvd., Muskegon, MI 49443, Tel: 616-777-2602, TWX: 510-394-4130; FSC No.: 50157; Empl.: 125; *Sls. Mgr.:* J. E. Saling .... **B•1740, 1758-1765**

Local Sales Offices & Reps

AL	Huntsville, Glen White Assoc.	205-883-7938
CA	Saratoga, Testco	408-253-1900
FL	Light House Pt., R. C. Simon	305-941-2757
GA	Norcross, Glen White Assoc.	404-441-1447
IL	Chicago, D. Dolin Sls.	312-286-6200
IN	Ft. Wayne, TMC Corp.	219-432-5553
MD	Timonium, Glen White Assoc.	301-252-6360
MN	St. Paul, R. G. Ragon	612-488-0201
NJ	Burlington, Mallon Sls.	609-387-4044
NJ	Ft. Lee, Necco	201-461-2789
NY	New York, Necco	201-461-2789
NC	Raleigh, Glen White Assoc.	919-787-7023
OH	Dayton, Jay Engrg.	513-253-2151
OH	N. Royalton, Jay Engrg.	216-237-4235
OK	Tulsa, Norcom	918-664-9526
TN	Gray, Glen White Assoc.	615-477-8850
TX	Dallas, Norcom	214-386-4888
TX	Houston, Norcom	713-988-0022
VA	Lynchburg, Glen White Assoc.	804-237-6291
WA	Bellevue, Testco	206-454-7422
WI	Milwaukee, D. Dolin Sls.	414-482-1111

MIKRON INSTR., Box 211, Ridgewood, NJ 07451, Tel: 201-891-7330, TWX: 710-988-5821; Empl.: 40; *Sls. Mgr.:* K. Irani

Distributor

MIL-COMM DISTRIBUTORS, INC., 9400 Lurline Ave. #C, Chatsworth, CA 91311, Tel: 818-998-3111 .... **D•1421**

MIL ELECTRONICS, INC., 1 Mill st., Dracut, MA 01826, Tel: 617-453-8000; FSC No.: 07862; Empl.: 40; *Sls. Mgr.:* Mark Ryan

MILFORD RIVET & MACH., 857 Bridgeport Ave., Milford, CT 06460, Tel: 203-878-4631, Telex: 964363, TWX: 710-462-0538; Empl.: 400; *Sls. Mgr.:* Robert E. Kranz, Jr.

MILLEN COMPONENTS, Electronic Instr. & Specialty Corp., 42 Pleasant St., Stoneham, MA 02180, Tel: 617-438-6951, Telex: 948-025; FSC No.: 57285; Empl.: 50; *Sls. Mgr.:* R. A. Boisseau; *Dist. Mgr.:* Gardner Gray

MILLER DIAL CORP., 4400 N. Temple City Blvd., El Monte, CA 91734, Tel: 818-283-5111, TWX: 910-587-3438; *Sls. Mgr.:* Doug Hazelip

MILLER, J.W., CO., See Bell Inds.

MILLER, L.C., CO., 717 Monterey Pass Rd., Monterey Pk., CA 91754, Tel: 213-268-3611; Empl.: 45

MILLER, SANFORD, CORP., See Sanford-Miller Corp.

MILLER, W. A., CO., Mingo Loop, P.O. Box 337, Oquossoc, ME 04964, Tel: 207-864-3344; Empl.: 18; *Sls. Mgr.:* D. Hunger

MILLER-STEPHENSON CHEM. CO., INC., George Washington Hwy., Danbury, CT 06810, Tel: 203-743-4447, Telex: 643-711

MILLIFLECT, 7752 Enterprise Dr., Newark, CA 94560, Tel: 415-791-5188; Empl.: 22; *Sls. Mgr.:* J. F. Rutschow

MILLI-SWITCH CORP., Box 67, Gladwyne, PA 19035, Tel: 215-MI2-9222; Empl.: 15

MILLIVAC INSTRS., Box 997, Curry Rd. Ext., Schenectady, NY 12301, Tel: 518-355-8300; FSC No.: 85711; Empl.: 30; *Sls. Mgr.:* (Mrs.) Pola Metzger .... **D•1266**

Local Sales Offices & Reps

CA	San Diego, Jan B. Metzger	619-571-8406
MA	Needham, Addelco Corp.	617-444-4754
NY	Fayetteville, Martin P. Andrews	315-637-5291
NY	Melville, Paul W. Steen Assocs.	516-427-1114
PA	Media, S & S Div. of Klinetics	215-565-5388
TX	Houston, Scientific Sls.	713-460-9170
TX	Richardson, Scientific Sls.	214-231-6541
Can	Downsview, Ont., Tradeport Elctrns. Grp.	416-736-0866

MILL-MAX MFG. CORP., P.O. Box 300, Oyster Bay, NY 11771, Tel: 516-922-6000, TWX: 510-221-1820; *Sls. Mgr.:* Therese Malhame

MILLS RESISTOR CO., 3840 Catalina St., Los Alamitos, CA 90720, Tel: 213-598-2454; FSC No.: 34238; Empl.: 50 .... **A•1899**

Local Sales Offices & Reps

AZ	Scottsdale, Verein Corp.	602-948-3571
CA	Los Altos, Frauman Assocs.	415-941-0660
CA	Sacramento, Mills Resistor Co.	916-422-5461
CT	Rocky Hill, Jim McPhail	203-721-1802
KS	Leawood, James Dick Co.	913-649-0805
MA	Waltham, Dynasel Assocs.	617-890-6777
OH	Chagrin Falls, ARL Co.	216-543-9124
OR	Gaston, SPS Elctrns.	206-323-4140
TX	Houston, Ev Smith Co.	713-649-5756
WA	Seattle, SPS Elctrns.	206-323-4140

Local Distributors

AZ	Phoenix, Fiesta Elctrns.	602-861-1141
FL	Ft. Lauderdale, Jaro Elctrns.	800-327-5551

MILPOWER SOURCE, INC., 49 Range Rd., Windham, NH 03087, Tel: 603-893-2834; Empl.: 150

Local Sales Offices & Reps

MD	Baltimore, Micro Comp., Inc.	301-247-0400

MILTON ROSS CO., 511 Second St. Pike, Southampton, PA 18966, Tel: 215-355-0200, TWX: 510-667-1702; Empl.: 165; *Sls. Mgr.:* M. I. Ross

MILTOPE CORP., 1770 Walt Whitman Rd., Melville, NY 11747, Tel: 516-420-0200, TWX: 510-221-1803; Empl.: 500; *Sls. Mgr.:* Robert Ceonzo; *Dist. Mgr.:* William Jennings

MILWAUKEE RESISTOR CORP., 700 W. Virginia St., Milwaukee, WI 53204, Tel: 414-271-9900; FSC No.: 82807;15109; Empl.: 100; *Sls. Mgr.:* W. R. Pollock; *Dist. Mgr.:* W. R. Pollock .... **A•1900-1905**

Local Sales Offices & Reps

CA	San Carlos, Electro Pacific	415-592-3114
IL	La Grange, PVA Co.	312-579-9300
NY	Rochester, Gislason Sls.	716-328-7400

MILWAUKEE TRANSFORMER CO., MTE Corporation, 7901 W. Clinton Avenue, Milwaukee, WI 53223, Tel: 414-358-5300; *Sls. Mgr.:* Richard T. Armantrout; *Dist. Mgr.:* Richard T. Armantrout

MIMIC, INC., P.O. Box 921, Acton, MA 01720, Tel: 617-263-2101; Empl.: 5; *Sls. Mgr.:* S. Thurston

MINCO PRODS., 7300 Commerce La., Minneapolis, MN 55432, Tel: 612-571-3121, TWX: 910-576-2848; FSC No.: 09359; Empl.: 400; *Sls. Mgr.:* J. Anderson

MIN-E-CON, 1791 Reynolds, Irvine, CA 92714, Tel: 714-250-0474, TWX: 910-595-1144; *Sls. Mgr.:* Wendell Jacob

MINELCO INC. - A TALLEY IND., 135 S. Main St., Thomaston, CT 06787-0459, Tel: 203-283-8261, TWX: 710-475-1091; FSC No.: 07479; Empl.: 61; *Sls. Mgr.:* John Pfingsten

Local Sales Offices & Reps

AL	Huntsville, L & D Inc.	205-837-1469
AZ	Phoenix, Dood & Co. Inc	602-482-9330
CA	Alhambra, M.W. Riedel & Co.	213-283-7694
CA	Hayward, Liaison, Inc.	415-783-1131
CO	Denver, West Inc.	303-477-8180
CT	Old Saybrook, FJS Assocs.	203-388-5374
FL	Orlando, Delmac	305-898-4688

GA	Atlanta, L & D, Inc.	404-395-7079
IL	Elk Grove Village, Midwest Meridian	312-640-9540
IA	Cedar Rapids, J.R. Sls. Engrg.	319-393-2232
MD	Severna Park, DelMarva Eng. Assoc.	301-647-8007
MA	Winchester, F.J.S. Assocs.	617-729-3135
MN	New Brighton, TWC Sls.	612-636-1770
MO	Maryland Heights, Midwest Meridian	314-878-4441
NJ	Hasbrouck Hgts., Comp-Tech Sls.	201-288-7400
NY	Syracuse, J. R. Costello	315-472-0322
NC	Greensboro, L & D, Inc.	919-292-3201
OH	Cleveland, Jim Finnegan & Co.	216-238-5905
OR	Beaverton, Caruso-Northcutt	503-646-4973
PA	Downingtown, McCoy, Inc.	215-363-0350
TX	Fort Worth, Midwest Meridian	817-654-2132
WA	Bellevue, Caruso-Northcutt	206-454-9699

MINIATURE METAL FORMING DIV., 4819 Emerald St., P.O. Box 2962, Torrance, CA 90509, Tel: 213-370-3679, Telex: 75-7989; *Sls. Mgr.:* William Kramer

MINIATURE PRECISION BEARINGS, MPB Corp., Precision Park, Keene, NH 03431, Tel: 603-352-0310, TWX: 710-366-1801; *Sls. Mgr.:* Thomas A. Rudziensky; *Dist. Mgr.:* Jack E. Barker

Mini-Circuits

MINI-CIRCUITS LAB., 2625 E. 14th St., P.O. Box 166, Brooklyn, NY 11235, Tel: 718-934-4500, Telex: 125460, 620156 (Intl.); FSC No.: 15542 .... **A•1700, 1716-1779**

Local Sales Offices & Reps

AL	Huntsville, Beacon Elctrns.	205-881-5031
AZ	Phoenix, Crown Elctrns.	602-944-3721
AR	Little Rock, Beacon Elctrns.	501-224-5449
CA	Los Altos, Cain-White & Co.	415-948-6533
CA	N. Hollywood, Crown Elctrns.	213-877-3550
FL	Clearwater, Beacon Elctrns.	813-796-2378
FL	Ft. Lauderdale, Beacon Elctrns.	305-491-1054
FL	Maitland, Beacon Elctrns.	305-647-3498
FL	Melbourne, Beacon Elctrns.	305-724-8010
GA	Atlanta, Beacon Elctrns.	404-256-9640
IL	Mount Prospect, Cain Forlaw Co.	312-253-3578
MD	Columbia, M. Lader & Co.	301-730-1550
MD	Conowingo, M. Lader & Co.	301-378-3449
MA	Waltham, Scientific Devices	617-890-2252
NY	Hartsdale, Spectrum Sales	914-997-1166
NY	Skaneateles, Robtron	315-685-5731
NC	Greensboro, Beacon Elctrns.	919-275-9997
OH	Lancaster, Cain Forlaw Co.	614-654-4800
PA	Lafayette Hill, M. Lader & Co.	215-825-3177
TX	Dallas, Cain & Co.	214-233-6809

Local Distributors

AL	Huntsville, Components Distrs.	205-883-7501
AR	Little Rock, Components Distrs.	501-227-6278
CA	Los Altos, Pen Stock	415-948-6552
CA	N. Hollywood, Crown Elctrns.	213-877-3550
FL	Ft. Lauderdale, Components Distrs.	305-971-4950
IL	Mt. Prospect, CFC Distributors	312-253-3578
NC	Raleigh, Components Distrs.	919-781-0262
PA	Lafayette Hill, MLC Distrs.	215-825-3177

MINI COMPUTER TECHNLG., 696 E. Trimble Rd., San Jose, CA 95131, Tel: 408-942-1616, TWX: 910-338-2281; Empl.: 30; *Sls. Mgr.:* Doug Vincent; *Dist. Mgr.:* Ed Hagenbuch

MINI-SYSTEMS, INC., 20 David Rd., North Attleboro, MA 02761, Tel: 617-695-0203, TWX: 710-348-0564; FSC No.: 50316; Empl.: 150 .... **A•1906**

Local Sales Offices & Reps

FL	Coral Springs, Marks Tech. Sls. Assocs.	305-753-3830
MA	Newton, Normell Assocs.	617-969-5478
TX	Lewisville, C & J Assocs.	214-539-0140

MINI-SYSTEMS, INC., Electronic Package Div., 168 E. Bacon St., P.O. Box 1597, Plainville, MA 02762, Tel: 617-695-2000, TWX: 710-348-0564 .... **A•1681**

MINNTRONICS CORPORATION, 2599 White Bear Ave., St. Paul, MN 55109, Tel: 612-770-5247

MITEC ELCTRNS., 15 Commerce St., Williston, VT 05495, Tel: 802-864-0064, TWX: 610-421-3572; *Sls. Mgr.:* Elayne Bernstein

MITEL SEMICONDUCTOR, P.O. Box 13089, Kanata, ON, Canada K2K 1X3, Tel: 613-592-5280, Telex: 053-3221, TWX: 610-562-8529; Empl.: 200

MITEQ INC., 125 Ricefield Lane, Hauppauge, NY 11788, Tel: 516-543-8873, TWX: 510-226-3781; Empl.: 185

MITRONICS, 2908 Oregon Court - Bldg. I-2, Torrance, CA 90503, Tel: 213-320-7011

MITSUBISHI ELCTRNS. AMERICA, Computer Peripheral Div., 991 Knox St., Torrance, CA 90502, Tel: 213-515-3993; *Sls. Mgr.:* Mike Foster

MITSUBISHI ELCTRNS., Industrial Electronics Div., 991 Knox Street, Torrance, CA 90502, Tel: 213-515-3993, Telex: 06-4703-M USA LSA, TWX: 66-4787-MELA TRNC; *Sls. Mgr.:* Don Aarons

MITSUBISHI ELCTRNS. AMERICA, INC., Semiconductor Div., 1050 East Arques Ave., Sunnyvale, CA 94086, Tel: 408-730-5900, Telex: 172296, TWX: 910-339-9549; FSC No.: 408-749-0453; *Sls. Mgr.:* John Zucker

MITSUMI ELEC. CO., LTD., 8-2, 8-Chome, Kokuryo, Chofu-City, Tokyo, Japan, Tel: 489-5333, Telex: J28846/J24935; Empl.: 1700; *Sls. Mgr.:* H. Sato; *Dist. Mgr.:* U. Nishimura

MIZAR INC.

MIZAR, INC., 302 Chester St., St. Paul, MN 55107, Tel: 612-224-8941, Telex: 469542; Empl.: 17; *Sls. Mgr.:* Susan Roth .... **D•1094-1096, 1106**

Local Sales Offices & Reps

AZ	Tempe, Foley, Tallent & Lee Inc.	602-894-2345
CA	Long Beach, B. K. & Associates	213-596-1233
CA	Los Gatos, Data-Rep	408-279-1212
CA	San Jose, Data-Rep Inc.	408-279-1212
FL	Melbourne, Reynolds & Assocs.	305-259-7000
FL	Melbourne, Star-Tec Co.	305-727-2247
IL	North Brook, Epstein & Assocs.	312-564-9292
MA	Waltham, Com-Sls. Inc.	617-890-0011
MN	Minneapolis, D. A. Case & Assoc.	612-888-8666
MO	Ellisville, Advanced Indl. Sys.	314-391-0366
NJ	Nashua, Bell Controls	603-882-6984
NJ	Springfield, Gebhardt Mktg. Inc.	201-376-4415
OH	Cuyahoga Falls, Micrographics, Inc.	216-923-3915
OH	Strongsville, Dolfuss Root & Co.	216-238-0300
PA	Hatboro, Electro-Rep Engrg.	215-674-4421
PA	Ivyland, Technico	215-322-5966
TX	Austin, Acudata, Inc.	512-346-4033
TX	Houston, Acudata, Inc.	713-580-2451
TX	Plano, Acudata, Inc.	214-424-3567
WA	Bellevue, Tasco, Inc.	216-923-3915
Can	Edmonton, Alb., 4.M. Mottl. Mktg., Ltd.	403-486-0091

MKS ELECTRONICS CORP., 454 E. Donovan Rd., Kansas City, KS 66115, Tel: 913-371-1351; Empl.: 26

MKS INSTRS., INC., 22 Third Ave., Burlington, MA 01803, Tel: 617-272-9255, Telex: 94-9375; Empl.: 130

MOBILE-TRONICS CO., INC., Box 1022, Tustin, CA 92680, Tel: 714-546-0884; Empl.: 2

MODERN CONTROLS CORP., 4636 Hidden Forest Dr., Sarasota, FL 33580, Tel: 813-351-3042; Empl.: 4

MODICON PROGRAMMABLE CONTROL DIV., Gould Inc., P.O. Box 83 S.V.S., Andover, MA 01810, Tel: 617-475-4700, Telex: 94-7402, TWX: 710-347-6610; *Sls. Mgr.:* Steven Mader (PC's); *Dist. Mgr.:* George Dannecker (Micro 84)

MODULAR COMPUTER SYSTEMS, P.O. Box 6099, Ft. Lauderdale, FL 33310, Tel: 305-974-1380, Telex: 52-2564, TWX: 510-956-9414; Empl.: 950

MODULAR AUDIO PRODS., Modular Devices Inc., 50 Orville Dr., Bohemia, NY 11716, Tel: 516-567-9620; *Sls. Mgr.:* C. Liptman

MODULAR DEVICES, 50 Orville Dr., Bohemia, NY 11716, Tel: 516-567-9620; FSC No.: 52202; Empl.: 50; *Sls. Mgr.:* C. Liptman .... **D•1011, 1727**

Local Sales Offices & Reps

FL	Enterprise, DJE Assocs.	305-321-6623
NH	Manchester, Northeast Comps.	603-627-7242
NY	Rochester, T.T.A. North-Div. Tri-Tek Assocs.	716-271-6764
NY	Wantagh, Tri-Tek Assocs.	516-221-7600
EXP	CA, San Diego, Total Elctrns. Int'l.	619-224-3291

PHOTON SOURCES, INC., 12163 Globe Rd., Livonia, MI 48150, Tel: 313-591-0101, TWX: 810-242-3270; Empl.: 140; *Sls. Mgr.:* Pete Seamans

MODULAR POWER SYS. INC., P.O. Box 180579, Austin, TX 78718-0579, Tel: 512-834-9262, Telex: 752-890; FSC No.: 58480; Empl.: 86; *Sls. Mgr.:* Manard Overall; *Dist. Mgr.:* Manard Overall

MODULAR SYSTEMS, INC., 905 Albemarle St., Charlottesville, VA 22901, Tel: 804-295-7882; Empl.: 9; *Sls. Mgr.:* G. L. Blencowe

MODUTEC, 18 Marshall St., Norwalk, CT 06854, Tel: 203-853-3636, TWX: 710-468-2039; Empl.: 300; *Sls. Mgr.:* Lester A. Velez; *Dist. Mgr.:* William J. Betz .... **D•1362-1363**

Local Sales Offices & Reps

AL	Huntsville, Beacon Elctrns. Assocs.	205-881-5031
AK	Anchorage, Denali Indl. Sls.	907-243-6283
AZ	Scottsdale, Luscombe Engrg. Co.	602-949-9333
AR	Little Rock, Beacon Elec. Assoc.	501-224-5449
CA	Campbell, Luscombe Engrg. Co.	408-370-2020
CA	Pasadena, Luscombe Engrg. Co.	213-684-2000
CO	Arvada, Arrowhead Sls. Co.	303-423-5556
FL	Clearwater, Beacon Elec. Assoc.	813-796-2378
FL	Ft. Lauderdale, Beacon Elctrn. Assoc.	305-491-1054
FL	Maitland, Beacon Elctrn. Assocs.	305-647-3498
FL	Melbourne, Beacon Elec. Assoc.	305-724-8010
GA	Atlanta, Beacon Elctrn. Assocs.	404-256-9640
HI	Honolulu, Aloha Assocs.	808-941-1574
IL	Arlington Hgts., Brainard-Wilson Mktg.	312-437-2700
IN	Carmel, Brainard-Wilson Mktg.	317-844-2800
IN	Carmel, Carter, McCormic & Peirce	317-844-4175
IA	Marion, M-S-B Assocs.	319-377-6261
KS	Shawnee Mission, M-S-B Assocs.	913-432-2131
MD	Randallstown, Beacon Elec.	703-534-7200
MA	Canton, New England Elctrn. Sls. Corp.	617-828-4835
MI	Farmington, Carter, McCormic & Peirce	313-477-7700
MN	Minneapolis, R.J. Inc.	612-866-3661
MO	St. Charles, M-S-B Assocs.	314-946-5577
NJ	Englewood, Sprung/Nussbaum	201-569-5666
NJ	Marmora, Holdsworth & Co.	609-398-4340
NM	Albuquerque, Amonette Entprs.	505-344-4143
NY	Bainbridge, R. W. Mitscher	607-697-7192
NY	Buffalo, R. W. Mitscher	716-633-7970
NY	N. Syracuse, R. W. Mitscher	315-458-1321
NY	Pittsford, R. W. Mitscher	716-586-4012
NY	Red Hook, R. W. Mitscher	914-758-8375
NY	Rochester, R. W. Mitscher	716-227-0839
NC	Greensboro, Beacon Elctrn. Assoc.	919-275-9997
NC	Raleigh, Beacon Elctrn.	919-787-0330
OH	Cleveland, Carter, McCormic & Peirce	216-779-5100
OH	Englewood, Carter, McCormic & Peirce	513-836-0951
OR	Beaverton, Barrett-Squibb & Assoc.	503-644-2550
PA	Monroeville, Carter, McCormic & Peirce	412-372-4415
PA	Newtown Square, Holdsworth & Co.-SWR	215-356-8550
TX	Houston, Scientific Sls. Co.	713-460-9170
TX	Richardson, Scientific Sls. Co.	214-231-6541
UT	Salt Lake City, Arrowhead Sls.	801-261-1661
VA	Fairfax, Beacon Elctrns.	703-591-1300
VA	Forrest, Beacon North	804-239-8486
WA	Redmond, Barrett Squibb, Inc.	206-885-6991
WI	Colgate, Rep-1 Assoc.	414-628-4016
EXP	Freeport, Minthorne	516-546-4700

Local Distributors

AL	Birmingham, Brownell Electro	205-322-3374
AL	Huntsville, Component Distrs.	205-883-7501
AL	Mobile, Brownell Electro	205-479-8581
AR	Little Rock, Component Distrs.	501-227-6278
CA	Inglewood, Force Elctrns.	213-776-1324
CA	Los Angeles, Erlanger Sls.	213-731-2238
CA	Los Angeles, Erlanger Sls. Co.	213-731-2238
CA	Santa Clara, Fisher-Brownell	408-988-6041
FL	Ft. Lauderdale, Component Distrs.	305-971-4950
FL	Miami, Brownell Electro	305-591-3215
FL	Orlando, Brownell Electro	305-843-6770
GA	Hapeville, Brownell Electro	404-762-5181
IL	Chicago, Newark Elctrns.	312-638-4411
IL	Elk Grove Village, Meter Master	312-593-8650
IN	Ft. Wayne, Graham Elctrns.	219-423-3422

IN	Indianapolis, Graham Elctrns.	317-634-8202
MD	Gaithersburg, Pioneer Instrumentation	301-921-0660
MA	Woburn, Brownell Electro	617-935-7820
MI	Ferndale, RAM Meter	313-398-6767
MO	St. Louis, Olive Elctrns.	314-426-4500
NJ	Belleville, Miscorp	201-751-1190
NJ	Fairfield, Ampower Elctrn. Instr.	201-227-7720
NJ	S. Plainfield, Brownell Electro	201-753-4600
NY	Clarence, Trott Elctrns.	716-634-8500
NY	New York, Brownell Electro	212-691-1171
NY	Pittsford, Trott Elctrns.	716-586-8251
NC	Charlotte, Brownell Electro	704-597-1270
NC	Raleigh, Brownell Electro	919-876-6524
NC	Raleigh, Component Distrs.	919-781-0262
OH	Cleveland, Pioneer Instrumentation	216-587-3600
OH	Cleveland, Weschler Elec. Co.	216-238-2550
OH	Dayton, Pioneer Instrumentation	513-236-9900
PA	Norristown, Kimberly-James Co.	215-666-7286
SC	Columbia, Brownell Electro	803-772-6111
TN	Chattanooga, Techni-Tronics	615-875-5449
TN	Knoxville, Brownell Electro	615-966-3441
TN	Memphis, Brownell Electro	901-795-8483
TN	Nashville, Brownell Electro	615-889-8230
TX	Dallas, Inotek Corp.	214-243-7000
TX	Ft. Worth, Allied Elctrns.	817-336-5401
TX	Ft. Worth, Inotek Corp.	817-831-2126
TX	Houston, American Analog	713-941-7265
TX	Houston, Brownell Electro	713-699-1981
TX	Houston, Inotek Corp.	713-688-4494
WA	Seattle, Eicher-Richards Co.	206-523-7888
WI	Milwaukee, E-M Instrs.	414-272-7799
WI	Milwaukee, Marsh Elctrns.	414-475-6000

MODU-TEL CORP., 1429 N. Halstead, Hutchinson, KS 67501, Tel: 316-662-3302, Telex: 469331 COMTRON CI; Empl.: 5; *Sls. Mgr.:* Paul Bascom

MOHAWK DATA SCIENCES, MDS Center, Herkimer, NY 13350, Tel: 315-866-5300, Telex: (71)662032; Empl.: 4500

MOHAWK WIRE & CABLE CORP., 9 Mohawk Drive, Leominister, MA 01453, Tel: 617-537-9961

MOLDCON CORP., 221 Interstate Dr., W. Springfield, MA 01089, Tel: 413-736-0371, TWX: 710-350-6463; *Sls. Mgr.:* Robert Krzynowck

MOLDING TECHNOLOGY INC., See MTI

MOLDTRONICS, INC., 703 Rogers St., Downers Grove, IL 60515, Tel: 312-968-7000, TWX: 910-695-3537; Empl.: 140; *Sls. Mgr.:* Jim Arnold

Local Sales Offices & Reps

CA	Topanga, S-J-N Sales	213-455-1813
FL	Winter Springs, Martinet Assocs.	305-699-0392
IL	Cary, Ecro Inc.	312-639-1162
IN	Indianapolis, Butler Comps.	317-253-5143
MN	St. Paul, PDQ Comps	612-690-5215
OH	Dayton, H. G. Lake Co.	513-277-8181
PA	Lancaster, Thomas G. Armstrong Assoc.	717-397-2942
RI	Wickford, R. P. Morrison Co.	401-295-5692

MOLECU-WIRE, P.O. Box 495, Farmingdale, NJ 07727, Tel: 201-938-9473, TWX: 710-723-6943; Empl.: 175 .... **C•1860-1862**

Local Sales Offices & Reps

CA	Montrose, Roger D. Dahl	213-245-3817
CT	Orange, KLS Sls.	203-795-6210
IL	Northbrook, Jack Norlie Assocs.	312-498-3657
KS	Shawnee Mission, B.C. Elctrn. Sls.	913-342-1211
NC	Charlotte, QED	704-525-3053
PA	Ligonier, Patterson Elec.	412-238-6238
WA	Seattle, Comptronics	206-284-4842
WI	Mequon, Robco	414-241-3348

molex®

MOLEX, INC., 2222 Wellington Ct., Lisle, IL 60532, Tel: 312-969-4550, TWX: 910-695-3227; Empl.: 4,100; *Sls. Mgr.:* Gregg Johnson; *Dist. Mgr.:* Bill Hyslop ... **B•1671; C•1463-1467**

Local Sales Offices & Reps

AL	Huntsville, Dennis Andrew	404-396-6120
CA	Costa Mesa, Molex	714-241-8588
CA	Encino, Dow Lebowski	714-241-8588
CA	Mission Viejo, Tony Scutetta	714-241-8588
CA	San Diego, Al Batza	619-241-8588
CA	Sunnyvale, Molex	408-773-0505
CT	West Hartford, Randy Stone	617-935-8983
FL	North Palm Beach, Chuck Vincent	404-396-6120
FL	St. Petersburg, Molex	404-396-6120
GA	Atlanta, Molex	404-396-6120
IN	Connersville, George Allen	317-844-8986
IN	Indianapolis, Steve Byrne	317-844-8986
KY	Taylorsville, Jim Lieb	404-396-6120
MD	Bethesda, Molex	404-396-6120
MA	Mansfield, Paul Hansen	617-935-8983
MA	Marblehead, Pete Evans	617-935-8983
MA	Woburn, Molex	617-935-8983
MI	Grand Rapids, Mark Fluga	616-957-1205
MI	Royal Oak, Schwegman & Assocs.	313-542-6767
MN	Edina, Mark Boe	612-893-9029
MO	Gladstone, Mark Rider	818-737-9427
MO	Independence, Dy-Tronix, Inc.	816-373-6600
NJ	Washington, Oscar Cobian	201-267-8014
NY	Webster, Joe Schmitt	716-223-6899
NC	Raleigh, Molex, Inc.	404-396-6120
OR	Lake Oswego, Gary Rohde	503-636-7558
PA	Rosemont, Ed M. Sullivan	617-935-8983
TN	Knoxville, Insul Reps.	615-691-7586
TX	Austin, Daniel Daneff	512-453-1398
TX	Dallas, Dale Otten	214-247-7117
TX	Manchaca, Max Bassler	512-453-1398
UT	West Valley, Thorson Rocky Mountain	801-973-7969
WA	Redmond, Molex	206-881-2042
PR	Hato Rey, Max Anderson Co.	809-751-2202

Local Distributors

AL	Huntsville, Hamilton/Avnet	205-837-7210
AZ	Tempe, Fisher Brownell	602-967-1464
AZ	Tempe, Hamilton/Avnet	602-231-5100
AZ	Tempe, Time Elctrns. Arizona	602-967-2000
AR	Little Rock, Carlton-Bates	501-666-0206
CA	Alhambra, Fisher Brownell	213-289-0255
CA	Chatsworth, Diplomat	213-341-4411
CA	Costa Mesa, Avnet Elctrns.	714-754-6111
CA	Costa Mesa, Diplomat	714-549-8401
CA	Costa Mesa, Hamilton Electro Sls.	714-641-4100
CA	Culver City, Hamilton Electro Sls.	213-558-2121
CA	Inglewood, Force Elctrns.	213-776-1324
CA	Los Angeles, Richley/Western Elctrns.	213-820-3777
CA	S. San Francisco, Peters-delaet	415-873-9595
CA	San Diego, Diplomat	619-292-5693
CA	San Diego, Fisher Brownell	619-560-8545
CA	San Diego, Hamilton/Avnet	619-571-7510
CA	San Diego, Richley/Western Elctrns.	619-271-4511
CA	Santa Clara, Fisher Brownell	408-988-6041
CA	Santa Clara, Force Elctrns.	408-739-1324
CA	Santa Clara, Peters-de Laet	408-727-9440
CA	Sunnyvale, Diplomat	415-964-1700
CA	Sunnyvale, Hamilton/Avnet	408-743-3355
CA	Sunnyvale, Time Northern Calif.	408-734-9888
CA	Torrance, Time Elctrns. West	213-320-0880
CO	Denver, Integrated Elctrns.	303-534-6121
CO	Englewood, Hamilton/Avnet	303-740-1000
CO	Wheat Ridge, Bell Inds.	303-424-1985
CT	Bethel, Heilind Elctrns.	203-797-8600
CT	Danbury, Hamilton/Avnet	203-797-2800
FL	Ft. Lauderdale, Hamilton/Avnet	305-971-2900
FL	Ft. Lauderdale, Time Elctrns.	305-974-4800
FL	Pompano Beach, Comps. South	305-971-0350
GA	Atlanta, Electro-Air Corp.	404-351-3545
GA	Norcross, Hamilton/Avnet	404-447-7507
IL	Bensenville, Hamilton/Avnet	312-860-7700
IL	Chicago, Waldom Elctrns.	312-585-1212
IL	Crystal Lake, Sub-Sem Elctrns.	815-459-4139
IL	Mount Prospect, Magnuson Elctrns.	312-956-0700
IN	Carmel, Hamilton/Avnet	317-844-9333
KS	Overland Park, Hamilton/Avnet	913-888-8900
MD	Columbia, Hamilton/Avnet	301-995-3500
MD	Savage, Pyttronic Inds.	301-953-9650
MA	Burlington, Heilind Elctrns.	617-272-5610
MA	Canton, Impact Elctrns.	617-821-1500
MA	Wilmington, RC Comps.	617-273-1860
MA	Woburn, Hamilton/Avnet	617-273-7500
MA	Woburn, Time New England	617-935-8080
MI	Clawson, Empire Elctrns.	313-435-0460
MI	Grand Rapids, Hamilton/Avnet	616-243-8805
MI	Livonia, Hamilton/Avnet	313-522-4700
MI	Wyoming, R-M Elctrns. Co.	616-531-9300
MN	Minneapolis, Indl. Comps.	612-831-2666
MN	Minnetonka, Hamilton/Avnet	612-932-0600
MO	Earth City, Hamilton/Avnet	314-344-1200
MO	St. Charles, Lectronix	800-325-3348
MO	St. Louis, Time Elctrn./Midwest	314-391-6444
NE	Lincoln, Scott Elctrns.	402-466-8221
NH	Hudson, Heilind Elctrns.	603-883-9536
NJ	Camden, Genral Radio Supp. Co.	609-964-8560
NJ	Cherry Hill, Hamilton/Avnet	609-424-0100
NJ	Clifton, J-Mar Elctrns.	201-772-6400
NJ	Fairfield, Hamilton/Avnet	201-575-3390
NM	Albuquerque, Hamilton/Avnet	505-765-1500
NY	Buffalo, Summit Distrs.	716-884-3450
NY	E. Syracuse, Hamilton/Avnet	315-437-2641
NY	Hauppauge, Time Elctrns. Sls.	516-273-0100
NY	Melville, Hamilton/Avnet	516-454-6060
NY	Plainview, Progress Elctrns.	516-433-1700
NY	Rochester, Hamilton/Avnet	716-475-9130
NC	Raleigh, Hamilton/Avnet	919-829-8030
NC	Raleigh, Resco	919-781-5700
OH	Cleveland, Hamilton/Avnet	216-831-3500
OH	Columbus, Camelot/Ohio	614-252-0728
OH	Dayton, Hamilton/Avnet	513-433-0610
OH	Dayton, Stotts-Friedman	513-298-5555
OH	Wickliffe, Gateway Megatech	216-944-8565
OR	Lake Oswego, Hamilton/Avnet	503-635-8157
PA	Broomall, Time Mid-Atlantic	215-359-1200
PA	McKean, Advacom	814-476-7774
PA	Montgomeryville, Pyttronic Inds.	215-643-2850
TN	Chattanooga, Techni-Tronics	615-875-5449
TX	Austin, Hamilton/Avnet	512-837-8911
TX	Houston, Hamilton/Avnet	713-780-1771
TX	Irving, Hamilton/Avnet	214-659-4111
TX	Richardson, Fisher Brownell	214-235-3177
UT	Salt Lake City, Bell Inds.	801-972-6969
UT	Salt Lake City, Hamilton/Avnet	801-972-2800
VA	Lynchburg, Comps., United	804-237-6286
WA	Bellevue, Electro-Air NW	206-641-3640
WA	Bellevue, Hamilton/Avnet	206-643-3950
WA	Seattle, Radar Elec.	206-282-2511
WI	New Berlin, Hamilton/Avnet	414-784-4510

MOLON MOTOR & COIL CORP., 3737 Industrial Ave., Rolling Meadows, IL 60008, Tel: 312-259-8700, TWX: 910-687-0428; Empl.: 350; *Sls. Mgr.:* J. Bailey

MONITOR LABS, INC., 10180 Scripps Ranch Blvd., San Diego, CA 92131, Tel: 619-578-5060, Telex: 182794

MONITOR PC

MONITOR PRODS. CO., INC., Post Office Box 1966, Oceanside, CA 92054, Tel: 619-433-4510, TWX: 910-322-1381; FSC No.: 54331; Empl.: 65; *Sls. Mgr.:* Patricia Courington .... **A•1388-1391**

Local Sales Offices & Reps

AL	Huntsville, CSR Elctrns.	205-533-2444
AZ	Phoenix, Eltron	602-266-2164
CA	Encino, Great American Rep Co.	818-990-4870
CA	Los Altos, Elrepco	415-962-0660
CA	San Diego, Rep Co.	619-292-9001
CA	Tustin, Great American Rep. Co.	714-954-0371
CO	Aurora, Electrodyne	303-695-8903
CT	Southbury, Lindco Assocs.	203-264-7200
FL	Apopka, Tech Rep Assocs.	305-889-2286
FL	Ft. Lauderdale, Tech Rep Assocs.	305-476-7637
FL	Lake Worth, Tech-Rep Assocs.	305-968-7792
FL	St. Petersburg, Tech-Rep Assocs.	813-577-2779
GA	Atlanta, CSR Elctrns.	404-396-3720
IL	Downers Grove, Momak Sls.	312-963-6400
IA	Davenport, Ensco Rep	319-386-6600
KS	Overland Park, Ensco Rep	913-381-7557
KS	Wichita, Ensco Rep	316-683-1070
MA	Stow, Today Comps. Sls.	617-897-7500
MN	Eden Prairie, Elctrn. Innovators	612-941-0830
MO	Maryland Heights, Ensco Rep	314-423-3935
NY	Melville, Parallax	516-351-1000
NC	Matthews, CSR Elctrns.	704-847-1927
NC	Raleigh, CSR Elctrns.	919-878-9200
OH	Dayton, Berberich & Assocs.	512-433-0342
OR	Hillsboro, Western Tech, Sls.	503-640-4621
PA	Pittsburgh, Covert & Newman Co.	412-531-2002
TX	Austin, Mil-Rep Assocs.	512-459-8602
TX	Houston, Mil-Rep Assocs.	713-937-0127
TX	Richardson, Mil-Rep Assocs.	214-644-6731
UT	Salt Lake City, Electrodyne	801-486-3801
UT	Salt Lake City, Electrodyne, Inc.	801-486-3801
VA	Fairfax, Beacon North	703-591-1300
VA	Forest, Beacon North	804-239-8486
WA	Bellevue, Western Tech. Sls.	206-641-3900
WA	Spokane, Western Tech. Sls.	509-922-7600
WI	Mukwonago, Momak Sls.	414-363-7744

MONOLITHIC COMPONENTS CORP., 6828 Nancy Ridge Drive, San Diego, CA 92121, Tel: 619-457-1727

MONOLITHIC SYS., 84 Inverness Circle E., Englewood, CO 80112, Tel: 303-790-7400, Telex: 45-4498; Empl.: 100; *Sls. Mgr.:* Mike Hart

MONSANTO CO., 800 N. Lindbergh Blvd., St. Louis, MO 63167, Tel: 314-694-1000, Telex: 44-7282

MONSANTO-ELECTRONICS DIV., See General Instr., Optoelctrns. Div.

MONTEK MICROSYSTEMS, P.O. Box 1845, Huntsville, AL 35807, Tel: 205-723-2927; *Sls. Mgr.:* Paul Rainosek; *Dist. Mgr.:* Paul Rainosek

MOODY TOOLS, 43 Crompton Ave., E. Greenwich, RI 02818, Tel: 401-885-0911; Empl.: 11; *Sls. Mgr.:* J. H. Moody; *Dist. Mgr.:* D .H. Moody

Local Sales Offices & Reps

CA	Alamo, Magliano-Dodds-Evans-Hall ...	415-820-6395
CO	Denver, A-E-S	303-777-8733
FL	Winter Park, Floritronics	305-886-4818
IL	Palatine, Witz-Knight, Inc.	312-438-9030
MD	Baltimore, Coastline Sls. Co.	301-828-8520
NY	New York, Lane-Mizner Assocs.	212-883-9711
NY	Orchard Park, S & B Indl. Sls.	716-662-5988
OH	St. Marys, Thomas Shelby & Co.	419-394-3377
RI	Barrington, Kilburn Assocs.	401-437-1839
EXP	IL, Northbrook, Vaco/Intl.	312-564-3300
Can	Islington, Ontario, Toolquip Agy. Ltd. ..	416-274-4918

MORRIS, J. I., CO., 372 Elm St., Southbridge, MA 01550, Tel: 617-764-4394; Empl.: 45

MORRIS ENTPRS., 16799 Schoenborn St, Sepulveda, CA 91343, Tel: 818-894-9103, Telex: 6-74681, TWX: 910-496-1525; FSC No.: 54918; Empl.: 50; *Sls. Mgr.:* J. Dumpert

MOSS CO., See Electron General

MOTION CONTROL DEVICES, INC., 80 Stedman St., Lowell, MA 01851, Tel: 617-454-3407, Telex: 955318-INTL-DIV-ATTEN-MCD-I; Empl.: 25; *Sls. Mgr.:* Joe Laliberte

MOTOROLA INC., Auto. & Indl. Elctrns. Grp., 1299 E. Algonquin Rd., Schaumburg, IL 60196, Tel: 312-576-4850, Telex: 722443; *Sls. Mgr.:* Jay A. Bonk

MOTOROLA INC.

Component Products

MOTOROLA, INC., Compt. Divs. Clock Oscillator Dept., 2553 N. Edgington, Franklin Park, IL 60131, Tel: 312-451-1000, TWX: 910-227-0799; Empl.: 1400; *Sls. Mgr.:* Barnie III; *Dist. Mgr.:* Ted Hoffman ...**A•1392-1393**

Local Sales Offices & Reps

AL	Huntsville, R. O. Whitesell	205-883-5110
AZ	Scottsdale, Thorson Desert States	602-998-2444
AR	Ft. Smith, Electra Reps.	501-452-4030
CA	Campbell, Kottmeier Assocs.	408-866-5153
CA	Fullerton, Groh Assoc.	714-837-9871
CO	Englewood, Thorsen Co.	303-779-0666
FL	Clearwater, Perrott Assocs.	813-443-5414
FL	Orlando, Perrott Assocs.	305-298-7748
FL	Sunrise, Perrott Assocs.	305-792-2211
GA	Norcross, Glen White Assoc.	404-441-1447
IN	Fort Wayne, R. O. Whitesell	219-432-5591
IN	Indianapolis, R. O. Whitesell	317-359-9283
IA	Cedar Rapids, Comstrand	319-377-1575
MD	Timonium, Glen White Assoc.	301-252-6360
MA	Natick, Wayland Engrg. Sls.	617-655-6080
MI	Southfield, R. O. Whitesell Assoc.	313-559-5454
MI	St. Joseph, R. O. Whitesell Assoc.	616-983-7337
MN	Minneapolis, Comstrand	612-788-9234
MO	St. Louis, Abrams Assoc.	314-569-0447
NM	Albuquerque, Thorsen Desert States ..	505-293-8555
NY	Great Neck, Trionic Assoc.	516-466-2300
NY	Rochester, Ossmann Comp. Sls.	716-442-4460
NY	Syracuse, Ossmann Comp. Sls.	315-455-6611
NC	Raleigh, Glen White Assoc.	919-787-7016
OH	Cincinnati, R. O. Whitesell	513-521-2290
OH	Cleveland, R.O. Whitesell & Assoc.	216-447-9020
OH	Columbus, R. O. Whitesell	614-888-9396
OH	Dayton, R. O. Whitesell	513-298-9546
OK	Tulsa, H. J. Daly Co.	918-494-7711
OR	Tigard, Elctrn. Sources	503-684-0040
PA	Glenside, Koebert Assoc.	215-887-2310
PA	Pittsburgh, R. O. Whitesell	412-963-6161
TN	Gray, Glen White Assoc.	615-477-8850
TX	Dallas, Electra Reps.	214-387-3594
TX	Houston, Electra Reps.	713-530-2208
UT	West Valley City, Thorsen Co.	801-973-7969
VA	Colonial Beach, Glen White Assoc. ...	804-224-7764
VA	Lynchburg, Glen White Assoc.	804-237-6291
WA	Bellevue, Electronic Sources	206-451-2530
WI	Milwaukee, KMA Sls. & Co.	414-259-1771
EXP	IL, Franklin Pk., Motorola	312-451-1000

MOTOROLA INC.

MOTOROLA SEMICONDUCTOR PRODS. SECTOR, Adv. 72, Box 20912, Phoenix, AZ 85036, Tel: 602-244-6900, TWX: 910-951-1334; FSC No.: 04713; *Sls. Mgr.:* Brian Hilton; *Dist. Mgr.:* John Dunleavy .... **A•1682-1692, 2066, 2077-2087; D•1098-1101**

Local Sales Offices & Reps

AL	Huntsville	205-830-1050
AZ	Phoenix	602-244-7100
CA	Agoura Hills	213-872-1505,818-706-1929
CA	Los Angeles	818-706-1929
CA	Orange	213-417-8848
CA	Sacramento	916-922-7152
CA	San Diego	619-560-4644
CA	San Jose	408-985-0510
CO	Colorado Springs	303-599-7404
CO	Denver	303-337-3434
CT	Wallingford	203-284-0810
DC	Washington	301-577-2600
FL	Casselberry/Maitland	305-831-3422
FL	Pompano Bch./Ft. Lauderdale	305-486-9775
FL	St. Petersburg	813-576-6030
GA	Atlanta	404-256-0222
IL	Chicago/Schaumburg	312-576-7800
IN	Ft. Wayne	219-484-0436
IN	Indianapolis	317-849-7060
IN	Kokomo	317-457-6634
IA	Cedar Rapids	319-373-1328
KS	Kansas City/Mission	913-384-3050
MD	Hyattsville	301-577-2600
MA	Berlin	617-562-3856
MA	Burlington	617-273-5020
MI	Detroit/Westland	313-261-6200
MN	Minneapolis	612-941-6800
MO	St. Louis	314-872-7681
NJ	Hackensack	201-488-1200
NY	Fairport	716-425-4000
NY	Hauppauge	516-361-7000
NY	Poughkeepsie/Fishkill	914-473-8102
NC	Raleigh	919-876-6025
OH	Cleveland	216-461-3160
OH	Columbus/Worthington	614-846-9460
OH	Dayton	513-294-2231
OR	Portland	503-641-3681
PA	Philadelphia/Horsham	215-443-9400
TN	Knoxville	615-690-5592
TX	Austin	512-452-7673
TX	Dallas	214-699-3900
TX	Houston	713-783-6400
UT	Salt Lake City	801-539-1190
VA	Charlottesville	804-977-3691
WA	Bellevue	206-454-4160
WA	Seattle Access	206-622-9960
WI	Milwaukee/Wauwatosa	414-476-5554

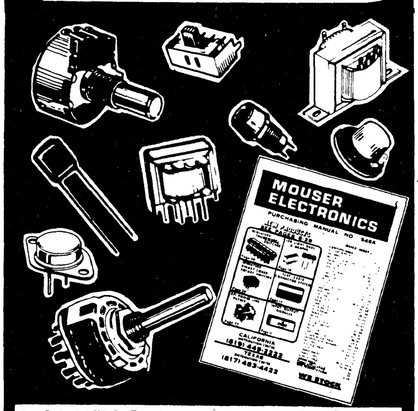
Motorola Systems Reps.

AL	Huntsville, EMA	205-830-4030
CT	Torrington, Northern Computer Sls. ...	203-482-3007
GA	Atlanta, EMA	404-329-0530
MA	Westwood, Northern Computer Sls. ...	617-326-3454
MN	Minneapolis, P.S.I. Co.	612-944-8545
NC	Raleigh, EMA	919-781-9369
OR	Beaverton, Thorson Co. Northwest ...	503-644-5900
PA	King of Prussia, K.S.I.	215-783-6440
WA	Bellevue, Thorson Co. Northwest	206-455-9180

Local Distributors

AL	Huntsville, Hall-Mark Elctrns.	205-837-8700
AL	Huntsville, Hamilton/Avnet Elctrns. ...	205-837-7210
AL	Huntsville, Pioneer/Huntsville	205-837-9300
AL	Huntsville, Schweber Elctrns.	205-882-2200
AZ	Phoenix, Hall-Mark Elctrns.	602-437-1200
AZ	Phoenix, Kierulff Elctrns.	602-437-0750
AZ	Phoenix, Schweber Elctrns.	602-997-4874
AZ	Tempe, Anthem Elctrns.	602-966-6600
AZ	Tempe, Hamilton/Avnet Elctrns.	602-231-5100
CA	Anaheim, Zeus Comps. West	714-632-6880
CA	Canoga Park, Hall-Mark Elctrns.	818-716-7300
CA	Canoga Park, Schweber Elctrns.	213-999-4702
CA	Chatsworth, Anthem Elctrns.	818-700-1000
CA	Chatsworth, Avnet Elctrns.	818-700-2600
CA	Chatsworth, Hamilton Electro Sls.	818-700-6500
CA	Chatsworth, Kierulff Elctrns.	213-341-2211
CA	Costa Mesa, Avnet	714-754-6111
CA	Costa Mesa, Hamilton Electro Sls.	714-641-4100
CA	Culver City, Hamilton Electro Sls./L.A.	213-558-2501
CA	Culver City, Hamilton/Avnet	213-558-2323
CA	Cypress, Kierulff Elctrns.	714-220-6300
CA	El Segundo, Hall-Mark Elctrns.	213-643-9101
CA	Irvine, Schweber Elctrns.	213-537-4321
CA	Irvine, Schweber Elctrns.	213-537-4321, 714-863-0200
CA	Los Angeles, Kierulff Elctrns.	213-725-0325
CA	Ontario, Hamilton/Avnet Elctrns.	714-989-4602
CA	Roseville, Bell Inds.	916-969-3100
CA	Sacramento, Hamilton/Avnet Elctrns.	916-925-2216
CA	Sacramento, Schweber Elctrns.	916-929-9732
CA	San Diego, Anthem Elctrns.	619-270-5200
CA	San Diego, Hall-Mark Elctrns.	619-268-1201
CA	San Diego, Hamilton/Avnet Elctrns. ...	619-571-7510
CA	San Diego, Kierulff Elctrns.	619-278-2112
CA	San Diego, Schweber Elctrns.	619-450-0454
CA	San Jose, Anthem Elctrns.	408-946-8000
CA	San Jose, Future Elctrns.	408-945-9100
CA	San Jose, Hall-Mark Elctrns.	408-773-9990
CA	San Jose, Kierulff Elctrns.	408-971-2600
CA	Santa Clara, Schweber Elctrns.	408-748-4700
CA	Santa Clara, Zeus Comps.	408-727-0714
CA	Sunnyvale, Bell Inds.	408-734-8570
CA	Sunnyvale, Hamilton/Avnet Elctrns. ...	408-743-3360
CA	Torrance, Hamilton/Avnet Elctrns.	213-615-3900
CA	Tustin, Anthem Elctrns.	714-730-8000
CA	Tustin, Hall-Mark Elctrns.	714-586-9346
CA	Tustin, Kierulff Elctrns.	714-731-5711
CA	Woodland Hills, Hamilton/Avnet Elctrns.	818-887-2353
CO	Denver, Kierulff Elctrns.	303-790-4444
CO	Englewood, Anthem Elctrns.	303-790-4500
CO	Englewood, Hall-Mark Elctrns.	303-694-1662
CO	Englewood, Hamilton/Avnet Elctrns. ..	303-740-1000
CO	Westminster, Future Elctrns.	303-650-0123
CO	Wheatridge, Bell Inds.	303-424-1985
CT	Danbury, Future Elctrns.	203-743-9594
CT	Danbury, Hamilton/Avnet Elctrns.	203-797-2800
CT	Danbury, Schweber Elctrns.	203-792-3500
CT	Norwalk, Pioneer-Harvey/Norwalk	203-853-1515
CT	Wallingford, Kierulff Elctrns.	203-265-1115
CT	West Hartford, Hartford Elec. Supp. Co.	203-236-6171
FL	Altamonte Springs, Pioneer/Florida ...	305-834-9090
FL	Altamonte Springs, Schweber Elctrns...	305-331-7555
FL	Bradenton, Zeus Comps.	813-748-3125
FL	Clearwater, Future Elctrns.	813-441-4771
FL	Ft. Lauderdale, Hamilton/Avnet Elctrns.	305-971-2900
FL	Ft. Lauderdale, Kierulff Elctrns.	305-486-4004
FL	Ft. Lauderdale, Pioneer/Ft. Lauderdale.	305-428-8877
FL	Hollywood, Schweber Elctrns.	305-927-0511
FL	Orlando, Hall-Mark Elctrns.	305-855-4020
FL	Orlando, Hamilton/Avnet Elctrns.	305-628-3888
FL	Pompano Beach, Hall-Mark Elctrns. ...	305-971-9280
FL	St. Petersburg, Hall-Mark Elctrns.	813-530-4543
FL	St. Petersburg, Hamilton/Avnet Elctrns.	813-576-3930
FL	St. Petersburg, Kierulff Elctrns.	813-576-1966
FL	Winter Park, Hall-Mark Elctrns.	305-628-3888
GA	Norcross, Hall-Mark Elctrns.	404-447-8000
GA	Norcross, Hamilton/Avnet Elctrns.	404-447-7507
GA	Norcross, Kierulff Elctrns.	404-447-5252
GA	Norcross, Pioneer/Atlanta	404-448-1711
GA	Norcross, Schweber Elctrns.	404-449-9170
IL	Schaumburg, Future Elctrns.	312-882-1255
IL	Bensenville, Hall-Mark Elctrns.	312-860-3800
IL	Bensenville, Hamilton/Avnet Elctrns. ..	312-860-7700
IL	Chicago, Bell Inds.	312-982-9210
IL	Chicago, Newark Elctrns. Corp.	312-784-5100
IL	Elk Grove Village, Kierulff Elctrns.	312-640-0200
IL	Elk Grove Village, Pioneer/Chicago ...	312-437-9680
IL	Elk Grove Village, Schweber Elctrns. ..	312-364-3750
IN	Indianapolis, Graham Elctrns. Supp. ...	317-634-8208
IN	Indianapolis, Hamilton/Avnet Elctrns. ..	317-844-9333
IN	Indianapolis, Pioneer/Indiana	317-849-7300
IA	Cedar Rapids, Bell Elctrns.	319-395-0730
IA	Cedar Rapids, Hamilton/Avnet Elctrns..	319-362-4757
IA	Cedar Rapids, Schweber Elctrns.	319-373-1417
KS	Lexena, Hall-Mark Elctrns.	913-888-4747
KS	Overland Park, Schweber Elctrns.	913-492-2921
KS	Overland Pk., Hamilton/Avnet Elctrns...	913-888-8900
LA	New Orleans, Reily Elctrl. Supp.	504-897-2211
MD	Baltimore, Hall-Mark Elctrns.	301-796-9300
MD	Baltimore, Kierulff Elctrns.	301-636-5800
MD	Columbia, Future Elctrns.	301-995-1222
MD	Columbia, Hall-Mark Elctrns.	301-988-9800
MD	Columbia, Hamilton/Avnet Elctrns.	301-995-3500
MD	Gaithersburg, Pioneer/Washington ...	301-921-0660
MD	Gaithersburg, Schweber Elctrns.	301-840-5900
MA	Bedford, Schweber Elctrns.	617-275-5100
MA	Billerica, Hall-Mark Elctrns.	617-935-9777
MA	Billerica, Kierulff Elctrns.	617-667-8331
MA	Burlington, Lionex Corp.	617-272-9400
MA	Lexington, Pioneer	617-861-9200
MA	Lexington, Zeus Comps.	617-273-0750
MA	Westborough, Future Elctrns.	617-366-2400
MA	Wilmington, Lionex Corp.	617-657-5170
MA	Woburn, Hamilton/Avnet Elctrns.	617-273-7500
MI	Grand Rapids, Hamilton/Avnet Elctrns.	616-243-8805
MI	Livonia, Hamilton/Avnet Elctrns.	313-522-4700
MI	Livonia, Pioneer/Michigan	313-525-1800
MI	Livonia, RS Elctrns.	313-525-1155
MI	Livonia, Schweber Elctrns.	313-525-8100
MI	Madison Hgts., McNaughton-McKay Elec. Co.	313-399-7500
MN	Bloomington, Hall-Mark Elctrns.	612-854-3223
MN	Edina, Kierulff Elctrns.	612-941-7500
MN	Edina, Schweber Elctrns.	612-941-5280
MN	Minnetonka, Hamilton/Avnet Elctrns. ..	612-932-0600
MN	Minnetonka, Pioneer/Twin Cities	612-935-5444
MO	Earth City, Hall-Mark Elctrns.	314-291-5350

MO	Earth City, Hamilton/Avnet Elctrns.	314-344-1200
MO	Earth City, Schweber Elctrns.	314-739-0526
MO	Maryland Hgts., Kierulff Elctrns.	314-739-0855
NH	Manchester, Hamilton/Avnet Elctrns.	603-624-9400
NJ	Cherry Hill, Hall-Mark Elctrns.	609-424-7300
NJ	Cherry Hill, Hamilton/Avnet Elctrns.	609-424-0110
NJ	Fairfield, Hall-Mark Elctrns.	201-575-4415
NJ	Fairfield, Hamilton/Avnet Elctrns.	201-575-3390
NJ	Fairfield, Kierulff Elctrns.	201-575-6750
NJ	Fairfield, Schweber Elctrns.	201-227-7880
NJ	Mount Laurel, Future Elctrns.	609-778-7600
NJ	Pinebrook, Pioneer-Harvey/Pinebrook	201-575-3510
NM	Albuquerque, Alliance Elctrns.	505-292-3360
NM	Albuquerque, Bells Inds.	505-292-2700
NM	Albuquerque, Hamilton/Avnet Elctrns.	505-765-1500
NY	Binghamton, Pioneer-Harvey/Binghamton	607-748-8211
NY	E. Syracuse, Hamilton/Avnet Elctrns.	315-437-2641
NY	Fairport, Pioneer-Harvey/Rochester	716-381-7070
NY	Hauppauge, Lionex Corp.	516-273-1660
NY	Hauppauge, Pioneer/Military	516-231-9800
NY	Liverpool, Future Elctrns.	315-451-2371
NY	Port Chester, Zeus Comps.	914-937-7400
NY	Rochester, Hamilton/Avnet Elctrns.	716-475-9130
NY	Rochester, Schweber Elctrns.	716-424-2222
NY	Vestal, Pioneer Elctrns.	607-748-8211
NY	Westbury, Schweber Elctrns.	516-334-7474
NY	Woodbury, Pioneer-Harvey/Woodbury	516-921-8700
NC	Charlotte, Pioneer/Carolina	704-526-8188
NC	Raleigh, Hall-Mark Elctrns.	919-872-0712
NC	Raleigh, Hamilton/Avnet Elctrns.	919-878-0810
NC	Raleigh, Kierulff Elctrns.	919-872-8410
NC	Raleigh, Schweber Elctrns.	919-876-0000
OH	Beachwood, Schweber Elctrns.	216-464-2970
OH	Centerville, Hamilton/Avnet Elctrns.	513-439-6700
OH	Cincinnati, Graham Elctrns.	513-772-1661
OH	Cincinnati, Hall-Mark Elctrns.	513-563-5980
OH	Cleveland, Hall-Mark Elctrns.	216-349-4632
OH	Cleveland, Hamilton/Avnet Elctrns.	216-831-3500
OH	Cleveland, Kierulff Elctrns.	216-587-6558
OH	Cleveland, Pioneer/Cleveland	216-587-3600
OH	Columbus, Hamilton/Avnet Elctrns.	614-882-7004
OH	Dayton, Pioneer/Dayton	513-236-9900
OH	Dayton, Schweber Elctrns.	513-439-1800
OH	Westerville, Hall-Mark Elctrns.	614-891-4555
OH	Westerville, Hamilton/Avnet Elctrns.	614-882-7004
OK	Tulsa, Hall-Mark Elctrns.	918-665-3200
OK	Tulsa, Kierulff Elctrns.	918-252-7537
OK	Tulsa, Schweber Elctrns.	918-622-8000
OR	Beaverton, Almac Elctrns. Corp.	503-641-9070
OR	Lake Oswego, Anthem Elctrns.	503-684-2661
OR	Lake Oswego, Hamilton/Avnet Elctrns.	503-635-8831
OR	Portland, Kierulff Elctrns.	503-641-9150
PA	Horsham, Lionex Corp.	215-442-5150
PA	Horsham, Pioneer/Delaware Valley	215-674-4000
PA	Horsham, Schweber Elctrns.	215-441-0600
PA	Pittsburgh, Hamilton/Avnet Elctrns.	412-281-4150
PA	Pittsburgh, Pioneer/Pittsburgh	412-782-2300
PA	Pittsburgh, Schweber Elctrns.	412-782-1600
TX	Austin, Hall-Mark Elctrns.	512-258-8848
TX	Austin, Hamilton/Avnet Elctrns.	512-837-8911
TX	Austin, Kierulff Elctrns.	512-835-2090
TX	Austin, Pioneer/Austin	512-835-4000
TX	Austin, Schweber Elctrns.	512-458-8253
TX	Dallas, Hall-Mark Corp.	214-343-5000
TX	Dallas, Hall-Mark Elctrns.	214-341-1147
TX	Dallas, Kierulff Elctrns.	214-343-2400
TX	Dallas, Pioneer/Dallas	214-386-7300
TX	Dallas, Schweber Elctrns.	214-661-5010
TX	Houston, Hall-Mark Elctrns.	713-781-6100
TX	Houston, Hamilton/Avnet Elctrns.	713-780-1771
TX	Houston, Kierulff Elctrns.	713-530-7030
TX	Houston, Pioneer/Houston	713-988-5555
TX	Houston, Schweber Elctrns.	713-784-3600
TX	Irving, Hamilton/Avnet Elctrns.	214-659-4111
UT	Salt Lake City, Anthem Elctrns.	801-973-8555
UT	Salt Lake City, Bell Inds.	801-972-6969
UT	Salt Lake City, Hamilton/Avnet Elctrns.	801-972-2800
UT	Salt Lake City, Kierulff Elctrns.	801-973-6913
WA	Bellevue, Almac Elctrns. Corp.	206-643-9992
WA	Bellevue, Hamilton/Avnet Elctrns.	206-643-3950
WA	Redmond, Anthem Elctrns.	206-881-0850
WA	Tukwila, Kierulff Elctrns.	206-575-4420
WI	Brookfield, Schweber Elctrns.	414-784-9020
WI	New Berlin, Hamilton/Avnet Elctrns.	414-784-4510
WI	Oak Creek, Hall-Mark Elctrns.	414-761-3000
WI	Waukesha, Bell Inds.	414-784-0235
WI	Waukesha, Kierulff Elctrns.	414-784-8160



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CO	Englewood, Integrated Motion Sys.	303-762-1817
IL	Schaumburg, Gassner & Clark Co.	312-882-8608
IN	Beech Grove, Control Sls.	317-353-6094
KS	Shawnee Mission, L.S.C., Inc.	913-362-2121
MA	Southborough, Motion Engrg.	617-485-2144
MI	Livonia, Electrolines	313-591-2428
MN	St. Paul, Northstar Motion & Cont. Co.	612-770-5311
NY	Clark Mills, KLM Garner	315-853-6126
OH	Cleveland, KT/Depco	216-442-6200
PA	Audubon, Holmes Assocs.	215-666-0636
PA	Pittsburgh, Greye Glass Assocs.	412-366-6664
TX	Dallas, Blackburn Assocs., Inc.	214-692-8885
VA	Roanoke, Engrg. & Mktg. Corp. of Vir.	703-986-1410
WA	Bellevue, Al Smith Co.	206-746-6770
WI	Milwaukee, Schreiber-Arterburn	414-545-7800

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Local Sales Offices & Reps

CA	Clayton, Moxness Prods., Inc.	415-672-9213
CA	Escondido, Estco Entprs	619-489-8746
FL	Clearwater, Frisby, Inc.	813-461-6055
GA	Lilburn, R. L. Panyik & Assocs.	404-923-3703
IN	Indianapolis, Elctrn. Sls. & Engrg.	317-849-4260
MA	Framington, Petri & Jones	617-877-4233
NY	Rochester, Empire Indl. Sls. Co., Inc.	716-244-9540
NC	Cary, Moxness Prods., Inc.	919-467-2042
OH	Xenia, Moxness Prods., Inc.	513-372-7334
WI	Racine, Moxness Prods., Inc.	414-554-5050

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MPH ELCTRNS., 2660 Loma Ave., S. El Monte, CA 91733, Tel: 213-442-7818; *Sls. Mgr.:* A. Pastecci

MPI, 4426 S. Century Dr., Salt Lake City, UT 84107, Tel: 800-821-8848; *Sls. Mgr.:* Jamie Johnston

MPS CO., 8 N. Grant Dr., Addison, IL 60101, Tel: 312-543-1748; Empl.: 2; *Sls. Mgr.:* M. C. Mitchell

MSC PRODS./EATON CORP., 1640 Monrovia St., Costa Mesa, CA 92627, Tel: 714-642-2427, Telex: 67-8433; Empl.: 350 +; *Sls. Mgr.:* J. McDorough

MSI DATA CORP., 340 Fischer Ave., Costa Mesa, CA 92626, Tel: 714-549-6000, TWX: 910-595-1719; Empl.: 700; *Sls. Mgr.:* J. Falvey; *Dist. Mgr.:* S. Altice

MSI ELECTRONICS, INC., 34-32 57th St., Woodside, NY 11377, Tel: 212-672-6500, Telex: 426407; FSC No.: 18518; Empl.: 26; *Sls. Mgr.:* A. Lederman

MSS/MACINTOSH SOFTWARE, 170 West 73rd St. Ste 12C, New York, NY 10023, Tel: 212-799-8195; *Sls. Mgr.:* David H. M. Spector

MTE CORP., 7901 W. Clinton Ave., P.O. Box 23957, Milwaukee, WI 53223, Tel: 414-358-5300, 800-558-4332 ..... **A•2199**

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AZ	Tempe, EDS	602-438-1547
CA	Danville, Bontrol Sys.	415-838-8540
CA	San Diego, OMNI	619-268-9606
CA	Santa Ana, El-Mar	714-547-8933
CO	Englewood, C. M. Mktg.	303-850-9841
CT	Avon, Tom Maguire Assocs.	203-673-3019
FL	Casselberry, Southern Elctrn. Mktg.	305-831-2822
FL	Ft. Lauderdale, Southern Elctrn. Mktg.	305-475-3686
FL	Palm Harbor, Southern Elctrn. Mktg.	813-441-3902
GA	Atlanta, Grady-Duckett	404-451-3529
IL	Glencoe, Howard Benjamin Assocs.	312-835-0150
IN	Carmel, Technology Mktg.	317-844-8462
IN	Ft. Wayne, Technology Mktg.	219-432-5553
IA	Cedar Rapids, Palatine Engrg.	319-365-8071
KY	Louisville, Technology Mktg.	502-499-7808
MD	Glen Arm, Rick Volk, Inc.	301-592-7154
MA	Wellesley, Tom Maguire Assocs.	617-431-1120
MI	Birmingham, Favco	313-644-0173
MI	Grand Rapids, Favco	616-459-4425
MN	Bloomington, Kettner & Assocs.	612-884-4343
MO	Hazelwood, Palatine Engrg.	314-839-0800
MT	Blue Springs, Palatine Engrg.	816-229-4007
NH	Windham, Tom Maguire Assocs.	603-432-0363
NJ	Marlton, BGR Assocs.	609-983-1020
NY	Ridgewood, Ballou, Inc.	201-444-6990
OH	Dayton, Electro-Com	513-898-5140
OK	Tulsa, Components, Inc.	918-583-9149
TX	Austin, R. F. Kimball Co., Inc.	512-443-5284
TX	Houston, R. F. Kimball Co., Inc.	713-840-0590
TX	Richardson, R. F. Kimball Co., Inc.	214-231-3447
WA	Mukilteo, Robert Krippner	206-743-3579
WI	Milwaukee, Kettner & Assocs.	414-351-3584

M-TRON INDS., P.O. Box 630, E. Hwy. 50, Yankton, SD 57078, Tel: 605-665-9321, TWX: 910-668-3603; Empl.: 125; *Sls. Mgr.:* Mike Huennekens; *Dist. Mgr.:* Karen Hansen ..... **A•1395**

Local Sales Offices & Reps

AL	Huntsville, 20th Century Mktg.	205-533-9281
AZ	Tempe, SSA Sales	602-829-9338
CA	Mountain View, Taarcom	415-960-1550
CA	San Diego, Bestronics	619-693-1111
CA	Thousand Oaks, SC Cubed	805-496-7307
CA	Tustin, SC Cubed	714-731-9206
CO	Littleton, Simpson Assoc.	303-794-8381
CT	Ridgefield, Phoenix Sls.	203-438-9644
FL	Apopka, G.F. Bohman	305-886-1882
FL	Ft. Lauderdale, Bohman Assoc.	305-979-0008
FL	St. Petersburg, G F Bohman	813-522-6120
GA	Athens, ADI	404-548-0788

GA	Norcross, 20th Century	404-446-1999
IL	Arlington Hgts., Micro Sls.	312-956-1000
IN	Fort Wayne, Given Corp.	219-432-5585
IA	West Des Moines, SPS Assoc.	515-225-0607
KS	Olathe, SPS Assoc.	913-764-4460
MD	Ellicott City, Marketing Tech Inc.	301-465-5944
MA	Needham Heights, Kanan	617-449-7400
MI	Detroit, Rathsburg Assoc.	313-882-1717
MN	Bloomington, Com-Tek Sls.	612-888-7011
MO	St. Ann, SPS Assoc.	314-739-4468
NE	Panama, SPS Assoc.	913-764-4460
NJ	Englewood, Sprung/Nussbaum	201-569-5666
NJ	Marlton, BGR	609-983-1020
NM	Albuquerque, SSA	505-881-8877
NY	Rochester, Ontec Sales	716-464-8636
NC	Smithfield, ADI	919-934-8136
OH	Dayton, Lyons Corp.	513-278-0714
OH	Richfield, Lyons Corp.	216-659-9224
SC	Fort Mill, ADI	803-547-2115
TN	Knoxville, 20th Century	615-966-3608
TN	Memphis, 20th Century	901-756-4681
TX	Austin, Mech-Tron Mktg.	512-459-0802
TX	Houston, Mech-Tron Mktg.	713-462-1432
TX	Richardson, Mech-Tron Mktg.	214-437-4833
UT	Midvale, Simpson Assoc.	801-566-3691
VA	Lynchburg, Marketing Tech Inc.	804-384-6459
WA	Redmond, Quadra Sls.	206-883-3550
WI	Menominee, Micro Sales Inc.	414-251-0151
Can	Mississaqua, Ontario, John Weiss Co.	416-673-0011
Can	Nepean, Ontario, John Weiss Co.	613-726-1436
Can	St. Laurent, Quebec, John Weiss Co.	154-337-5022
Can	Winnipeq, Manitoba, John Weiss Co.	204-774-2119

Local Distributors

AL	Huntsville, Pioneer Elctrns.	205-837-9300
AZ	Phoenix, Sterling Elect.	602-268-2121
AZ	Phoenix, Wyle Distr. Grp.	602-249-2232
AZ	Tempe, Bell Inds.	602-966-7800
AR	Little Rock, Carlton-Bates	501-562-9100
CA	Aquara, Wyle	818-880-9000
CA	Fullerton, Pyramid Elctrns.	714-773-0781
CA	Irvine, Ryno Elctrns.	714-261-2500
CA	Irvine, Wyle	714-863-9953
CA	Rancho Cordova, Wyle	916-638-5282
CA	San Diego, Ryno Elctrns.	619-453-8430
CA	San Diego, Wyle	619-565-9171
CA	San Jose, Capacitors Unltd.	408-946-7676
CA	Santa Clara, Pyramid	408-727-9810
CA	Santa Clara, Wyle Distr. Grp.	408-727-2500
CA	Tustin, Image Elctrns.	714-730-0303
CO	Thornton, Wyle Distr. Grp.	303-457-9953
CO	Wheatridge, Bell Inds.	303-424-1985
CT	E. Haven, J. V. Elctrns.	203-469-2321
CT	Norwalk, Pioneer Elctrns.	203-853-1515
CT	Orange, Milgray Elctrns.	203-795-0711
CT	Wallingford, Mid-State Elect.	203-265-9900
FL	Altamonte Springs, Pioneer	305-834-9090
FL	Deerfield Beach, Pioneer Elctrns.	305-428-8877
FL	Winter Park, Milgray Elctrns.	305-647-5747
GA	Atlanta, Milgray	404-393-9666
GA	Norcross, Pioneer Elctrns.	404-448-1711
IL	Elk Grove, Pioneer Elctrns.	312-437-9680
IL	Hoffman Estates, Inter Comp	312-843-2040
IN	Indianapolis, Advent	317-872-4910
IN	Indianapolis, Pioneer/IN	317-849-7300
IA	Cedar Rapids, Advent	319-363-0221
KS	Overland Park, Milgray Elctrns.	913-236-8800
MD	Beltsville, Resco/Wash.	301-937-9100
MD	Gaithersburg, Pioneer	301-921-0660
MD	Rockville, Milgray Elctrns.	301-468-6400
MD	White Marsh, Resco Washington	301-529-0500
MA	Burlington, Milgray Elctrns.	617-272-6800
MA	Lexington, Pioneer Elctrns.	617-861-9200
MA	Wilmington, J.V. Elctrns.	617-273-4300
MA	Woburn, 1st Frequency	617-935-3885
MI	Farmington Hills, Advent Elec.	313-477-1650
MI	Livonia, Pioneer Elctrns.	313-525-1800
MI	Livonia, RS Elctrns.	313-525-1155
MN	Bloomington, NWR	612-854-7329
MN	Hibbing, NWR Elec.	218-262-5228
MN	Minneapolis, Stark Elec.	612-332-1325
MN	Minnetonka, Pioneer	612-935-5444
MO	St Louis, Ric-tronics	314-576-9816
MO	St. Louis, Olive Elctrns.	314-426-4500
NJ	Berlin, GCI	609-768-6767
NJ	Marlton, Milgray Elctrns.	609-983-5010
NJ	Mt. Laurel, P.A.C. Elctrns.	609-387-3549
NJ	Pinebrook, Pioneer Elctrns.	201-575-3510
NM	Albuquerque, Sterling Elect.	505-884-1900
NY	Binghamton, Pioneer Elctrns.	607-748-8211
NY	Fairport, Pioneer	716-381-7070
NY	Farmingdale, Milgray Elctrns.	516-420-9800
NY	Pittsford, Milgray	716-385-9330
NY	Woodbury, Pioneer Elctrns.	516-921-8700
NC	Charlotte, Pioneer Elctrns.	704-527-8188
NC	Raleigh, Century Elctrns.	918-872-2203
OH	Cleveland, Milgray Elctrns.	216-447-1520
OH	Cleveland, Pioneer Elctrns.	216-587-3600
OH	Dayton, Pioneer Elctrns.	513-236-9900
OH	Maumee, RS Elec.	419-893-0721
OK	Oklahoma City, Radio Inc.	405-789-0741
OK	Tulsa, Altair	918-252-5781
OK	Tulsa, Radio Inc.	918-587-9123
OR	Hillsboro, Wyle Distr. Grp.	503-640-6000
PA	Horsham, Pioneer Elctrns.	215-674-4000
PA	Norristown, Century Elec.	215-631-5400
PA	Pittsburgh, Pioneer Elctrns.	412-782-2300
TX	Austin, Altair	512-837-4970
TX	Austin, Pioneer	512-835-4000
TX	Austin, Wyle Distr.	512-834-9957
TX	Dallas, Pioneer Elctrns.	214-386-7300
TX	Houston, Altair	713-462-3029
TX	Houston, Force Elec.	713-561-8644
TX	Houston, Pioneer	713-988-5555
TX	Houston, Wyle Laboratories	713-879-9953
TX	Irving, Force Elec.	214-438-5700
TX	Richardson, Altair	214-231-5166
TX	Richardson, Wyle Electric	214-235-9953
UT	Salt Lake City, Standard Supp.	801-486-3371
UT	Salt Lake City, Wyle Distr. Grp.	801-974-9953
VT	Richmond, Sterling Elect.	804-226-2190
WA	Bellevue, Wyle Distr. Grp.	206-453-8300
WA	Kent, Pyramid Elec.	206-872-5800
WI	Milwaukee, Marsh Elect.	414-475-6000
Can	Burnaby, BC, R-A-E Ltd / Camgaard	604-291-8866
Can	Edmonton, ALB., Cardinal Elec.	403-483-6266
Can	Montreal, PQ, Prelco Ltd.	514-389-8051
Can	Oakville, ONT., L.A. Varah Ltd.	416-842-8484
Can	Willowdale, Ontario, Electro Sonic	416-494-1666

MTS SYS., Box 24012, Minneapolis, MN 55424, Tel: 612-937-4000, Telex: 29-0521; Empl.: 1100; *Sls. Mgr.:* J. Beal

MU-DEL ELECTRONICS, INC., 2426 Linden Lane, Silver Spring, MD 20910-1288, Tel: 301-587-6087, Telex: 292038; FSC No.: 31563; Empl.: 8; *Sls. Mgr.:* Heinz E. Blum

MUELLER ELEC. CO., 1583 E 31st St., Dept. 20, Cleveland, OH 44114, Tel: 216-771-5225; Empl.: 156; *Sls. Mgr.:* J. E. Wisneski .... **C•1468-1472**

Local Sales Offices & Reps

AZ	Phoenix, The Health Grp.	602-247-9091
CA	Cambell, Olsheski & Assoc. Inc.	408-378-6003
CA	Downey, Ungar Sls. Assoc.	213-923-1467
CA	Gardena, Ungar Sls. Assoc.	213-538-2811
CA	W. Covina, Ungar Sls. Assoc.	213-339-1052
CO	Colorado Springs, Norris & Warren	303-576-8697
FL	Tampa, Palm State Mktg. Inc.	813-888-6316
GA	Stone Mountain, Mfg. Sls. & Mktg. Serv.	404-469-5862
IL	Libertyville, Raymond Klipp Assoc.	312-367-4676
IN	Indianapolis, John Sukup, Inc.	317-253-5501
KS	Shawnee Mission, Microtronics Inc.	913-262-1444
MA	Lynn, Keene Sls. Co., Inc.	617-595-2300
MI	Ferndale, Hilltronics Inc.	313-398-5556
MN	Minneapolis, Boerger & Assoc.	612-560-3435
MS	Jackson, Mfg. Sls. & Mktg. Serv.	601-922-8118
MO	St. Charles, Microtronics Inc.	314-946-8500
NJ	Medford, Champion Elec. Sls. Co.	609-983-0932
NJ	Rockaway, R.O.I. Sls. Co.	201-627-8879
NY	Webster, Richard W. Bienek Assoc.	716-872-0387
OR	Portland, Jud LeBrun Co., Inc.	503-244-6805
PA	Pittsburgh, F. P. Yarussi Co.	412-221-1717
SC	Ft. Lawn, Mfg. Sls. & Mktg. Serv.	803-872-4454
TN	White House, Mfg. Sls. & Mktg. Serv.	615-672-4498
TX	Dallas, J. J. Sls. Co.	214-328-9739
Can	Markham, Ontario, LenBrook Elctrns.	416-477-7722

M. U. INC., P.O. Box 1007, Oceanside, CA 92054, Tel: 619-757-7576

MUIRHEAD, 1101 Briston Rd., Mountainside, NJ 07092, Tel: 201-233-6010, Telex: 13-8275; FSC No.: 03980; Empl.: 60; *Sls. Mgr.:* Martin Wargon

MULTI-AMP CORP., **TBG**, 4271 Bronze Way, Dallas, TX 75237, Tel: 214-333-3201, TWX: 910-861-9052; Empl.: 400; *Sls. Mgr.:* Robert D. Libbey

MULTICORE SOLDERS, Cantiague Rock Rd., Westbury, NY 11590, Tel: 516-334-7997, TWX: 510-222-5185; Empl.: 1000

MULTI-PLATE CO., INC., 2362 Lu Field Rd., Dallas, TX 75229, Tel: 214-243-1557; Empl.: 50; *Sls. Mgr.:* Keith E. Piersall

MULTI PRODS. INTL., 218 Little Falls Rd., P.O. Box 238, Cedar Grove, NJ 07009, Tel: 201-239-8183, Telex: 219289; Empl.: 25; *Sls. Mgr.:* LeRoy Gray .... **A•1135, 2202-2203; D•1728**

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AZ	Scottsdale, Semi Sys., Inc.	602-991-1151
AR	Little Rock, Erickson Sls., Inc.	501-225-7379
CA	Campbell, Kottmeier Assocs.	408-866-5153
CA	Temple City, NMC, Inc.	818-447-0958
FL	Coral Springs, PC Elctrn. Sls.	305-755-3980
GA	Atlanta, Elctrn. Mfrs. Agts.	404-529-0530
IL	Chicago, Esco Assocs.	312-763-0800
IN	Frankfort, C-S Elctrns. Sls.	317-659-1874
KS	Overland Park, Electri-Rep	913-649-2168
LA	Chalmette, Erickson Sls., Inc.	504-271-1976
MD	Columbia, Eastern Tech. Corp.	301-995-0202
MA	Norwood, Mac Innis Co.	617-762-8090
MI	Jenison, R.C. Nordstrom & Co	616-457-5762
MI	Southfield, R. C. Nordstrom & Co.	313-559-7373
MN	St. Paul, Proud Inds.	612-646-9428
NJ	Cedar Grove, Legtonics Assocs.	201-239-4098
NC	Raleigh, Elctrns. Mfg. Agt.	919-781-4139
OH	Cleveland, Jim Finnegan & Co.	216-238-5905
OK	Oklahoma City, Erickson Sls., Inc.	405-682-2947
OR	Portland, Eltech	503-238-0805
PA	Albrightsville, Centurion Linear	717-722-0166
TN	Knoxville, Elctrn. Mfrs. Agts.	615-966-1286
TX	Austin, Erickson Sls., Inc.	512-445-2952
TX	Dallas, Erickson Sls., Inc.	214-739-5833
TX	Houston, Erickson Sls. Inc.	713-980-9606
WA	Bellevue, Eltech	206-643-4330

MULTITECH ELCTRNS. INC., 195 W. El Camino Real, Sunnyvale, CA 94086, Tel: 408-773-8400, Telex: 176004 MAC SUVL; *Sls. Mgr.:* James Tseng

MULTI-TECH INDS., 64 S. Main St., P.O. Box A, Marlboro, NJ 07746, Tel: 201-431-0550; Empl.: 40; *Sls. Mgr.:* James L. Bernard

MULTI-TECH SYSTEMS, INC., 82 Second Ave. S.E., New Brighton, MN 55112, Tel: 612-631-3550, TWX: 910-563-3610; Empl.: 65; *Sls. Mgr.:* Thomas Heimerman; *Dist. Mgr.:* Peter Hanlon

MULTI-TRONIX, 3210 Terry Dr, Toledo, OH 43613, Tel: 419-472-3360; *Sls. Mgr.:* K. L. Schepler

MULTIWIRE DIV., Kollmorgen Corp., 10 Andrews Rd., Hicksville, NY 11801, Tel: 516-938-2000, TWX: 510-223-0639; Empl.: 800

MULTIWIRE NE, Kollmorgen, 41 Simon St., Nashua, NH 03061, Tel: 603-889-0083; FSC No.: 60490; Empl.: 165; *Sls. Mgr.:* Paul Lavigne

MUPAC, 10 Mupac Dr., Brockton, MA 02401, Tel: 617-588-6110, TWX: 710-345-8458; Empl.: 100

Local Sales Offices & Reps

AL	Huntsville, Macro Mktg. Assocs., Inc.	205-883-9630
AZ	Tempe, Trembly Assocs.	602-967-2058
AR	Richardson, Lear Assocs., Inc.	214-231-5388
CA	San Diego, Hadden Assocs. Inc.	619-565-9444
CA	Santa Clara, DC Elctrns.	408-980-1199
CA	West Covina, Mupac - West Coast Off.	213-960-3042
CO	Lakewood, Trembly Assocs.	303-233-9544
FL	Orlando, Currie, Peak & Frazier	305-855-0843
IL	Addison, Engrd. Sls.	312-832-8426
IN	Fort Wayne, Hoyle Assoc.	219-485-6433
MD	Baltimore, Rep-Tron	301-799-7490
MA	Wayland, Daner-Hayes, Inc.	617-655-0888
MI	Northville, Micro Sls. Corp.	313-459-1670
MN	Minneapolis, L. F. Green Assoc.	612-571-6666
MO	Blue Springs, Chesco	816-229-1404
MO	St. Charles, Chesco	314-946-6677
NV	Las Vegas, Trembly Assocs.	702-369-8700
NJ	Woodcliff, J. Fried & Assocs.	201-391-6792
NM	Albuquerque, Trembly Assoc.	505-266-8616
NY	Great Neck, F & F Metro, Inc.	516-482-4080
NY	Syracuse, Labtronics	315-455-7314
NC	Cary, Engineering Dvcs.	510-920-0632
NC	Greensboro, Currie, Peak & Frazier	919-373-0380
OH	Dayton, Micro Sls. Corp.	513-433-8171
OH	N. Olmsted, Micro Sls. Corp.	216-734-3080
PA	King of Prussia, R.J.I.	215-265-5211
PA	Norristown, RJI	215-631-1414
TX	Austin, Lear Assoc.	512-450-1059
TX	Houston, Lear Assoc.	713-488-7893
TX	Richardson, Lear Assocs.	214-231-5388
UT	Salt Lake City, Trembly Assocs.	801-486-5292
WA	Bellevue, Comtec	206-453-1188

MURATA ERIE NORTH AMERICA, INC.

MURATA ERIE NORTH AMERICA, INC., 1148 Franklin Rd., S.E., Marietta, GA 30067, Tel: 404-952-9777, Telex: 54-2329, TWX: 810-766-1531; Empl.: 1800; *Sls. Mgr.:* Jack Driscoll; *Dist. Mgr.:* Kenneth O'Connor .....**A•1002, 1136-1139, 1396-1397, 1582, 1616-1617, 1907-1909, 1990, 2030-2031, 2089, 2205; D•1028, 1729**

Local Sales Offices & Reps

AL	Huntsville, Jack W. Harvey & Assocs.	205-536-4414
AZ	Scottsdale, Murata Erie N. America	602-941-2667
CA	Los Altos, Recht. Assocs.	415-964-6321
CA	Santa Ana, Murata Erie North America	714-835-4822
FL	Lauderhill, Innovative Mktg., Inc.	305-485-6869
FL	Maitland, Murata Erie North America	305-644-0954
GA	Marietta, Murata Erie N. America	404-952-9777
IL	Des Plaines, Murata Erie North America	312-297-5560
IN	Ft. Wayne, Murata Erie North America	219-484-1528
IN	Indianapolis, Jack Harvey & Assocs.	317-872-1031
IN	Kokomo, Jack Harvey & Assocs.	317-453-4260
KY	Prospect, Jack Harvey & Assocs.	502-228-4100
MD	Columbia, Murata Erie North America	301-992-6612
MA	Wakefield, Murata Erie North America	617-245-7880
MI	Southfield, Jack Harvey & Assocs.	313-569-4477
MN	Plymouth, Murata Erie North America	612-553-1594
NJ	Springfield, Radix	201-467-4970
NC	Greensboro, Murata Erie North America	919-299-1905
OK	Tulsa, Marata Erie North America, Inc.	918-254-8668
OK	Tulsa, Murata Erie N. America	918-254-8668
OR	Beaverton, Caruso & Northcutt, Inc.	503-646-4973
TN	Knoxville, Jack Harvey & Assocs.	615-524-7057
TX	Austin, Murata Erie North America, Inc.	512-451-8488
TX	Richardson, Murata Erie North America	214-238-8211
WA	Bellevue, Caruso & Northcutt, Inc.	206-454-9699
Can	Mississuaga, Ont., Murata Erie North America, Inc.	416-676-9484

Local Distributors

AL	Huntsville, Arrow Elctrns.	205-837-6955
AL	Huntsville, Electro-Wise, Inc.	205-830-4764
AZ	Phoenix, R.V. Weatherford	602-272-7144
AZ	Tempe, Arrow Elctrns.	602-701-7500
AZ	Tempe, Shelley Elctrns.	601-894-2058
AZ	Tempe, Time Elctrns.	602-967-2000
CA	Anaheim, R.V. Weatherford Co.	714-547-0981
CA	Anaheim, Time Elctrns.	714-937-0911
CA	Belmont, Varitech Elctrns.	415-593-3300
CA	Chatsworth, Arrow Elctrns.	213-701-7500
CA	Chatsworth, Diplomat Elctrns.	213-700-8700
CA	Chatsworth, Shelley Elctrns.	213-998-3333
CA	Chatsworth, Time Elctrns.	818-998-7200
CA	Costa Mesa, Diplomat Elctrns.	714-549-8401
CA	Englewood, Newark Elctrns.	214-678-0441
CA	Fullerton, Pyramid	714-773-0781
CA	Garden Grove, Inductive Prods. Inc.	714-892-7749
CA	Garden Grove, Natl. Capacitor Supp.	213-598-9611
CA	Glendale, R.V. Weatherford Co.	213-849-3451
CA	Inglewood, Newark Elctrns.	213-678-0441
CA	Mountain View, Shelly Elctrns.	415-969-1820
CA	Newport Beach, Arrow Elctrns.	714-851-8961
CA	Pomona, R.V. Weatherford Co.	714-623-1261
CA	Sacramento, Arrow Elctrns.	916-925-7456
CA	San Diego, Arrow Elctrns.	714-565-4800
CA	San Diego, Diplomat Elctrns.	619-292-5693
CA	San Diego, R.V. Weatherford Co.	714-695-1700
CA	San Diego, Shelley Elctrns.	619-453-7133
CA	San Diego, Time Elctrns.	619-586-1331
CA	San Jose, Shelley Elctrns.	818-998-3333
CA	Santa Barbara, R.V. Weatherford	805-965-8551
CA	Santa Clara, Intl. Standard Comps.	408-496-0411
CA	Santa Clara, Pyramid Elctrns. Supp.	408-727-9810
CA	Sunnyvale, Acacia Sls.	408-745-7200
CA	Sunnyvale, Arrow Elctrns.	408-745-6600
CA	Sunnyvale, Capsco	408-734-3020
CA	Sunnyvale, Diplomat Elctrns.	408-734-1900
CA	Sunnyvale, R.V. Weatherford Co.	408-738-8694
CA	Sunnyvale, Time Elctrns.	408-734-9888
CA	Torrance, Time Elctrns.	213-320-0880
CA	Tustin, Arrow Elctrns.	714-838-5422
CO	Aurora, Arrow Elctrns.	303-696-1111
CO	Boulder, Shelley Elctrns.	303-442-2718
CO	Denver, Newark Elctrns.	303-423-7941
CO	Denver, R.V. Weatherford Co.	303-428-6900
CO	Englewood, Time Electrns.	303-850-7701
CO	Lakewood, Acacia Sls.	303-232-2882
CT	Chesire, Time Elctrns.	203-271-3200
CT	Danbury, Diplomat Elctrns.	203-797-9674
CT	Orange, Milgray Elctrns.	263-795-0711
CT	Wallingford, Arrow Elctrns.	203-265-7741
CT	Wallingford, Cronin Elctrns.	203-265-3134
FL	Clearwater, Diplomat Elctrns.	813-443-4514
FL	Fort Lauderdale, Arrow Elctrns.	305-776-7790
FL	Fort Lauderdale, Diplomat Elctrns.	305-974-8700
FL	Ft. Lauderdale, Newark Elctrns.	305-587-2372
FL	Ft. Lauderdale, Time Elctrns.	305-974-4800
FL	Orlando, Time Elctrns.	305-841-6565
FL	Palm Bay, Arrow Elctrns.	305-725-1480
FL	Tampa, Newark Elctrns.	813-872-5618
FL	Tampa, Shelley Elctrns.	813-884-0946
FL	Winter Park, Milgray Elctrns.	305-647-5747
GA	Atlanta, Milgray Elctrns.	404-393-9666
GA	Atlanta, Spectrum Elctrns.	404-449-4643
GA	Atlanta, Time Elctrns.	404-351-3545
GA	Norcross, Arrow Elctrns.	404-449-8252
GA	Norcross, Diplomat Elctrns.	404-449-4133
GA	Norcross, Newark Elctrns.	404-448-1300
IL	Aurora, Newark Elctrns.	312-844-1988
IL	Bensonville, Diplomat Elctrns.	312-595-1000
IL	Bensonville, Milgray Elctrns.	312-350-0490
IL	Chicago, Bell Inds.	312-982-9210
IL	Chicago, Newark Elctrns.	312-638-4411
IL	Oakbrook, Newark Elctrns.	312-789-3130
IL	Rosemont, Advent Elctrns.	312-297-6200
IL	Schaumburg, Arrow Elctrns.	312-397-3440
IL	Skokie, Kellner Elctrns.	312-677-1120
IN	Indianapolis, Advent Elctrns.	317-872-4910
IN	Indianapolis, Arrow Elctrns.	317-243-9353
IA	Bettendorf, Newark Elctrns.	319-359-1341
IA	Cedar Rapids, Advent Elctrns. Inc.	319-363-0221
IA	Cedar Rapids, Arrow Elctrns.	319-395-7230
KS	Overland Park, Milgray Elctrns.	913-236-8800
MD	Baltimore, Arrow Elctrns.	301-247-5200
MD	Beltsville, Resco	301-937-9100
MD	Columbia, Diplomat Elctrns.	301-995-1226
MD	Columbia, Time Elctrns.	301-964-3090
MD	Rockville, Milgray Elctrns.	301-468-6400
MD	White Marsh, Resco	301-529-0500
MA	Burlington, Milgray Elctrns.	617-272-6800
MA	Needham, Cronin Elctrns.	617-449-5000
MA	Woburn, Arrow Elctrns.	617-933-8130
MA	Woburn, Diplomat Elctrns.	617-935-6611
MA	Woburn, Time Elctrns.	617-935-8080
MI	Ann Arbor, Arrow Elctrns.	313-971-7220
MI	Farmington Hills, Advent Elctrns.	313-477-1650
MI	Grand Rapids, Arrow Elctrns.	616-243-0912
MN	Bloomington, Time Elctrns.	612-944-9192
MN	Edina, Arrow Elctrns.	612-830-1800
MN	Hopkins, The Joal Co.	612-935-6202
MN	Minneapolis, Newark Elctrns.	612-331-6350
MO	St. Louis, Arrow Elctrns.	314-567-6888
MO	St. Louis, Time Elctrns.	314-391-6444
NH	Manchester, Arrow Elctrns.	603-668-6968
NH	Salem, Cronin Elctrns.	603-898-4440
NJ	Cherry Hill, Diplomat Elctrns.	609-751-0440
NJ	Fairfield, Arrow Elctrns.	201-575-5300
NJ	Marlton, Arrow Elctrns.	609-596-8000
NJ	Moorestown, Arrow Elctrns.	609-235-1900
NJ	Rockaway, Tonar Inds.	201-586-9000
NJ	Springfield, Newark Elctrns.	201-376-9500
NJ	Totowa, Diplomat Elctrns.	201-785-1830
NM	Albuquerque, Arrow Elctrns.	505-243-4566
NY	Bohemia, Shelley Elctrns.	516-567-7751
NY	Buffalo, Newark Elctrns.	716-892-4321
NY	Farmingdale, Arrow Elctrns.	516-293-6363
NY	Farmingdale, Milgray Elctrns.	516-420-9800
NY	Hauppauge, Arrow Elctrns.	516-231-1000
NY	Hauppauge, Time Elctrns.	516-273-0100
NY	Liverpool, Arrow Elctrns.	315-652-1000
NY	Liverpool, Diplomat Elctrns.	315-652-5000
NY	Lynbrook, Varitech Elctrns.	516-593-9300
NY	Melville, Arrow Elctrns.	516-391-1485
NY	Melville, Diplomat Elctrns.	516-454-4600
NY	Pittsford, Milgray Elctrns.	711-385-9330
NY	Rochester, Arrow Elctrns.	716-275-0300
NC	Charlotte, Elctrn. Mktg. Corp.	704-394-6195
NC	Raleigh, Arrow Elctrns.	919-876-3132
NC	Raleigh, Resco/Raleigh	919-781-5700
NC	Winston-Salem, Arrow Elctrns.	919-725-8711
OH	Centerville, Arrow Elctrns.	513-435-5563
OH	Cleveland, Milgray Elctrns.	216-447-1520
OH	Cleveland, Newark Elctrns.	216-361-4700
OH	Columbus, Elctrn. Mktg. Corp.	614-299-4161
OH	Columbus, Newark Elctrns.	614-451-0002
OH	Highland Hts., Elctrn. Mktg. Corp.	216-442-3441
OH	Kettering, Electronic Mktg. Corp.	513-439-4711
OH	Solon, Arrow Elctrns.	216-248-3990
OK	Tulsa, Arrow Elctrns.	918-665-7700
OR	Lake Oswego, Moore Elctrns.	503-684-3100
OR	Portland, Newark Elctrns.	503-257-0741
OR	Portland, Time Elctrns.	503-684-3780
OR	Tigard, Arrow Elctrns.	503-684-1690
PA	Broomall, Time Elctrns.	215-359-1200
PA	Monroeville, Arrow Elctrns.	412-856-7000
PA	Versailles, Newark Elctrns.	412-834-8504

TX	Addison, R.V. Weatherford Co.	214-931-7333
TX	Austin, Arrow Elctrns.	512-835-4180
TX	Carrollton, Arrow Elctrns.	214-380-6464
TX	Dallas, Arrow Elctrns.	214-386-7500
TX	Dallas, Diplomat Elcrns.	214-980-1888
TX	Dallas, Milgray Elctrns.	214-248-1603
TX	Garland, Newark Elctrns.	214-494-5911
TX	Houston, Arrow Elctrns.	713-530-4700
TX	Houston, Force Elctrns.	713-561-8644
TX	Houston, R.V. Weatherford Co.	713-688-7406
TX	Irving, Force Elctrns.	214-438-5700
TX	Austin, Diplomat Elctrns.	512-452-5254
UT	Salt Lake City, Arrow Elctrns.	801-539-1135
VA	Richmond, Arrow Elctrns.	804-282-0413
WA	Bellevue, Arrow Elctrns.	206-634-4800
WA	Bellevue, Time Elctrns.	206-641-3640
WA	Seattle, R.V. Weatherford Co.	206-575-1340
WI	Oak Creek, Arrow Elctrns.	414-764-6600
Can	Mississauga, Ont., Prelco Elctrns.	416-678-0401
Can	Montreal, Quebec, Future Elctrns.	514-694-7710
Can	Nepean, Ont., Prelco Elctrns.	613-726-1800
Can	Ottowa, Ont., Carsten Elctrns.	613-729-5138
Can	Scarborough, Ont., Carsten Elctrns.	416-751-2371
Can	St. Laurènt, Quebec, Carsten Elctns.	514-334-8321

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MURATA MFG. CO., LTD., 26-10-2-chome-Tenjin, Nagaoka-Kyo-Shi, Kyoto, Japan, Japan, Tel: 075-951-9111, Telex: J64270; Empl.: 2000; *Sls. Mgr.:* O. Otaka

MUSHIELD CO., Div. Bomco, Inc., 121 Madison St., P.O. Box W, Malden, MA 02148, Tel: 617-321-4410; FSC No.: 22780; Empl.: 10; *Sls. Mgr.:* Mark Standley

MVP ELCTRNS., 1161 N. Tustin, Orange, CA 92667, Tel: 714-639-9246, Telex: 678401; Empl.: 4; *Sls. Mgr.:* M. Vander Plaats .... **D•1012**

MWS WIRE INDS., 31200 Cedar Valley Dr., Westlake Village, CA 91362, Tel: 818-991-8553, TWX: 910-336-1689; FSC No.: 51668; *Sls. Mgr.:* M. D. McClure .... **C•1864-1865**

MYLEE DIGITAL SCIENCES, 155 Weldon Pkwy., Maryland Heights, MO 63043, Tel: 314-567-3420; Empl.: 100; *Sls. Mgr.:* G. Graves

NAE, 69 Bennett St., Lynn, MA 01905, Tel: 617-598-4800, TWX: 710-334-0254; FSC No.: 51182; Empl.: 100; *Sls. Mgr.:* Rick Kassiotis; *Dist. Mgr.:* Ellen Madden

NAMCO CONTROLS, An Acme-Cleveland Co., 7567 Tyler Blvd., Mentor, OH 44060, Tel: 216-946-9900, Telex: 24-1566; Empl.: 200; *Sls. Mgr.:* Jon Slaybaugh, V.P./Sales-Mktg.

NAMCO-LEUZE, A Namco Controls Affiliate Co., 7567 Tyler Blvd., Mentor, OH 44060, Tel: 216-946-9900, Telex: 24-1566; *Sls. Mgr.:* Jon Slaybaugh, V.P./Sales-Mktg.

NAMIKI PRECISION JEWEL CO., LTD., 15 Warren Street, Hackensack, NJ 07601, Tel: 201-343-3080, TWX: 710-990-1273; FSC No.: 201-343-3172

NANMAC CORP., 9 Mayhew St., Framingham, MA 01701, Tel: 617-872-4811; Empl.: 32; *Sls. Mgr.:* G. Nanigian; *Dist. Mgr.:* J. Manigian

NANO PULSE INDUSTRIES, 440 Nibus St., Brea, CA 92670, Tel: 714-529-2600, Telex: 910-997-0422; FSC No.: 57222; *Sls. Mgr.:* Michael J. Schubert .... **A•1546-1549, 2206-2207**

Local Sales Offices & Reps

CA	Mountain View, West Mark Assocs.	415-969-1700
CA	San Diego, D2 Sls., Inc.	619-560-6266
CO	Arvada, Delconec, Inc.	303-422-7023
MA	Sharon, Cummings Assocs.	617-784-5600
MN	Eden Prairie, Aldridge Assocs.	612-994-8433
PA	Newtown, Yax Assocs.	215-860-2540
PA	Waterford, Bacon Elctrns.	814-796-2381
TX	Houston, Milco Mktg.	713-723-5003
WA	Redmond, Electronics Northwest, Inc.	206-883-1959

NARDA MICROWAVE CORP., 435 Moreland Rd., Hauppauge, NY 11788, Tel: 516-231-1700, TWX: 510-221-1867

NASHUA CORP., 44 Franklin St., Nashua, NH 03061, Tel: 603-880-2889, Telex: 943406; *Sls. Mgr.:* Chet Mielcarz

NATEL ENGRG. CO., INC., 4550 Runway St., Simi Valley, CA 93063, Tel: 805-581-3950, TWX: 910-494-1959; Empl.: 95 .... **A•1694-1695**

NATIONAL BERYLLIA CORP., Greenwood Ave., Haskell, NJ 07420, Tel: 201-839-1600, TWX: 710-988-5363; Empl.: 200

Distributor

NATIONAL CAPACITOR, 11731 Markon Dr., Garden Grove, CA 92641, Tel: 714-892-7749, 213-598-9611, 800-854-2451, TWX: 910-596-1316 .... **A•1127**

NATIONAL CONTROLS CORP., 931 N. DuPage Ave., Lombard, IL 60148, Tel: 312-932-6900; Empl.: 250; *Dist. Mgr.:* Cy Pfeifer

NATIONAL ELECTRIC CABLE, 16566 S.W. 72nd Ave., Portland, OR 97224, Tel: 503-620-9400, Telex: 36-0963; FSC No.: 5P935; Empl.: 125; *Sls. Mgr.:* Dick Sass .... **C•1866-1867**

Local Sales Offices & Reps

CA	Hayward	415-785-1277
CO	Englewood	303-797-8448
DE	Wilmington	302-573-2525
IL	Elk Grove Village	312-593-8100
OR	Portland	503-620-9400
TX	Houston	713-464-8555

NATIONAL ELCTRN. DISTRS. ASSN., 1420 Renaissance Dr., Ste. 211, Park Ridge, IL 60068, Tel: 312-298-9747

NATIONAL INFORMATION SYS., INC., 20370 Town Center Lane, Cupertino, CA 95014, Tel: 408-257-7700, Telex: 750031; *Sls. Mgr.:* John Enyedy

NATIONAL INSTRUMENTS, 12109 Technology Blvd., Austin, TX 78759, Tel: 512-250-9119, Telex: 756737 NAT INST AUS; Empl.: 64; *Sls. Mgr.:* Dave Aldrich; *Dist. Mgr.:* John Purvis

NATIONAL MICRONETICS, Route 28, West Hurley, NY 12136, Tel: 914-338-0333, TWX: 510-247-8046; Empl.: 900; *Sls. Mgr.:* P. A. Rivelli

NATIONAL POWER TECHNLG., 2111 Howell Ave., Anaheim, CA 92806, Tel: 714-937-1301, Telex: 910-591-1893; Empl.: 85; *Sls. Mgr.:* Harold Myers .... **D•1730-1732**

Local Sales Offices & Reps

AL	Delta, Gillum Sls., Inc.	205-396-5731
CA	Canoga Park, Cummings & Assocs.	818-340-6035
CA	Palo Alto, Abbott Engrg. Co., Inc.	415-968-2265
CA	San Diego, Mesa Engrg.	619-278-8021
CO	Denver, Cummings & Assocs. Mktg., Inc.	303-455-6860
FL	Clearwater, Gillum Sls., Inc.	813-531-2248
FL	Largo, Gillum Sls., Inc.	813-531-2248
FL	Orlando, Gillum Sls., Inc.	305-857-2110
KY	Ft. Mitchell, G. W. Thelen	606-341-8181
MD	Randallstown, Beacon North	301-655-2265
MA	Chelmsford, Encotronics	617-256-4207
NJ	Berkeley Heights, Cambridge, Allen & Assocs.	201-464-0203
NY	Rochester, Fowler Beach Corp.	716-586-0468
OH	Medina, G. W. Thelen	216-723-1293
PA	Hatboro, Jacobsen Assocs.	215-674-2937
PA	Lebanon, Jacobsen Assocs.	717-273-9746
UT	Salt Lake City, Cummings & Assocs. Mktg., Inc.	801-263-8131

VA	Fairfax, Beacon North	703-591-1300
VA	Forest, Beacon North	804-239-8486
WA	Bellevue, Underwood-Hanify	206-451-8223
WA	Vancouver, Underwood-Hanify	503-224-0583
WI	Greenfield, Olympic	414-281-9294

NATIONAL SEMICONDUCTOR CORP., 2900 Kifer Rd., # 23-200, Santa Clara, CA 95051

NATIONAL SEMICONDUCTOR OPTOELECTRONICS, 365 Jordan Road, Troy, NY 12180-8396, Tel: 518-271-2100, TWX: 710-444-4962; *Dist. Mgr.:* Donna McLaughlin

NATIONAL SEMICONDUCTORS, LTD., See Silonex Inc.

NATIONAL SOLID STATE DEVELOPMENT, INC., See NSD

NATIONAL SONICS/XERTEX CORP., 250 Marcus Blvd., Hauppauge, NY 11787, Tel: 516-273-6600, Telex: 14-4545; Empl.: 140; *Sls. Mgr.:* John Kristoffersen

NATIONAL-STANDARD CO., 601 N. 8th, Niles, MI 49120, Tel: 616-683-8100, Telex: 25-8453, TWX: 810-270-3153; Empl.: 3100; *Sls. Mgr.:* J. L. Dayton; *Dist. Mgr.:* J. L. Dayton

NATIONAL TELEPHONE & ELCTRNS. INC., 2350 N.W. 96 Avenue, Miami, FL 33172, Tel: 305-592-0551; Empl.: 50

NATIONAL TEL-TRONICS, State Road Hill, Meadville, PA 16335, Tel: 814-724-6440, Telex: NATL TELMEAD 91-4405; Empl.: 250; *Dist. Mgr.:* D. R. Booth .... **C•1473**

Local Sales Offices & Reps

AL	Birmingham, Southeastern First Rep	205-967-7082
CA	Milpitas, Ward Elctrn. Pkg.	408-945-0420
CA	San Diego, CK Assocs.	619-279-0420
CA	Santa Ana, Electrotechnical Sls.	714-546-9305
CO	Denver, Donohue Sls. Co.	303-455-1719
CT	Hamden, F. Manzi Sls.	203-281-3534
FL	Kissimmee, Southeastern First Rep	305-846-1306
FL	Melbourne, Southeastern First Rep	305-784-4723
FL	North Palm Beach, Southeastern First Rep	305-844-3758
GA	Atlanta, Effective Mktg.	404-948-6023
GA	Atlanta, Southeastern First Rep	404-393-2073
IL	Chicago, Electro-Mech Sls. Co.	312-777-0554
IN	Columbus, Tech. Reps.	812-376-9226
IA	Des Moines, Beams Co.	515-255-1148
KS	Shawnee Mission, Beams Co.	913-631-0300
MA	Framington, Marathon Sls.	617-875-3566
MN	Minneapolis, Hei-Lite Sls.	612-861-6051
MO	St. Louis, Beams Co.	314-569-1069
NJ	Cherry Hill, Ned Krouse Assocs.	609-424-3543
NJ	Nutley, Falk-Baker Assocs.	201-661-2430
NY	Macedon, M. M. Hare Co.	315-986-3742
NC	Raleigh, RepCo Mktg.	919-787-7887
OH	Cleveland, Jim Finnegan & Co.	216-238-5905
TN	Greeneville, Dimark	615-639-0113
TX	Dallas, Allied Comps.	214-238-0408
TX	Houston, Allied Comps.	713-988-1600
TX	Hurst, Allied Comps.	817-589-0456
TX	Round Rock, Allied Comps.	512-244-1166
UT	Salt Lake City, Meridian Mktg.	801-968-4177
WA	Bellevue, Panoco	206-454-2503
Can	Hamilton, Ont., Cartwright & Southall Assocs.	416-528-0294

Local Distributors

AZ	Phoenix, Tri-Tek, Inc.	602-995-9352
CA	Anaheim, Bisco Inds.	714-635-0380
CA	Haywood, Allied Elctrns.	415-487-5250
CA	Industry, Ital Elctrns.	818-968-8515
CA	Redondo Beach, Mark Elctrns.	213-772-2141
CA	San Jose, Bisco Inds.	408-946-8980
CA	Santa Ana, Compu Svc.	714-546-5140
CA	Santa Ana, CR Elctrns.	714-556-2040
CA	Sunnyvale, Electronics Recs.	408-745-1420
CO	Arvada, Denver Wintronics	303-431-7161
CO	Denver, CSID	303-292-9594
FL	Pompano Beach, Components South	305-971-0350
IL	Elgin, Allied Elctrns.	312-697-8200
IL	Franklin Park, Bisco Inds.	312-451-1230
IN	Fort Wayne, Graham Elctrn.	219-423-3422
IN	Indianapolis, Graham Elctrn.	317-634-8202
MA	Burlington, Heilind Elctrns.	617-272-5610
MA	Lynn, Land Elctrns.	617-592-2220
MN	Fridley, Voyager Elctrns. Corp.	612-571-7766
NH	Dover, American Radio	603-742-6800
NH	Hudson, Heilind Elctrns.	603-883-9536
NJ	Clifton, Meltronics, Inc.	201-340-3200
NY	Buffalo, Summit Distr.	716-884-3450
NY	Port Washington, Connector Concepts	516-883-3800

NY	Rochester, Summit Distr.	716-334-8110
NC	Winston-Salem, Kirkman Elctrns., Inc.	919-722-9131
OR	Portland, United Radio Supp.	503-233-7151
PA	Huntingdon Valley, Shap Elctrns.	215-322-7150
TX	Dallas, Heilind Elctrns.	214-351-2058
TX	Ft. Worth, Allied Elctrns.	817-336-5401
WA	Seattle, Pacific Elctrns.	206-575-1050

NATIONAL WIRE & CABLE CORP., 136 San Fernando Rd., Los Angeles, CA 90031-1780, Tel: 213-225-5611, Telex: 181409, TWX: 910-321-4155; FSC No.: 04569; Empl.: 225 .... **C•1868-1884**

Local Sales Offices & Reps

AZ	Phoenix, Coker Assoc.	602-277-7494
AR	Gassville, P.M.I. Sls. Co.	501-435-2004
CA	Redwood City, National Wire & Cable	415-365-1952
CA	San Diego, McKinley Elctrn. Sls.	619-271-7221
CA	Santa Clara, Ross Mktg.	408-988-8111
CO	Arvada, Arrowhead Sls.	303-423-5556
FL	Altamonte Springs, Gugel-Tuttle Assocs.	305-788-0845
FL	Orlando, National Wire & Cable	305-898-3801
GA	Lawrenceville, Tek-Rep Mktg.	404-963-1600
HI	Hilo, Kirco Corp.	808-959-3888
IL	Northfield, H. S. Tollaksen	312-441-6644
MD	Glen Burnie, Faion Lott	301-744-4611
MA	Wellesley, Tom Maguire Assocs., Inc.	617-431-1120
MI	Livonia, Luebbe Sls.	313-477-3131
MN	Bloomington, Electro Sls. Inc.	612-854-8775
MO	St. Louis, P.M.I. Sls. Co.	314-894-0073
NJ	Wayne, GT Assoc.	201-694-6040
NY	Farmingdale, National Wire & Cable	516-752-8038
NY	Sodus, Kehoe Comp. Sls.	315-483-9122
OH	Cincinnati, Luebbe Sls.	513-891-5770
OH	Cleveland, Luebbe Sls.	216-333-0425
OH	Columbus, Luebbe Sls. Co.	614-431-0474
OH	Dayton, Luebbe Sls.	513-294-0426
PA	Hatboro, Jacobsen Assocs.	215-674-2937
PA	Pittsburgh, Luebbe Sls. Co.	412-931-0414
TX	Fort Worth, J. H. Gibbs Assocs.	817-430-1861

NATIONWIDE ELECTRONIC SYSTEMS, See NES, Inc.

NAUGLER ENGRG., Off Dunham Rd., Beverly, MA 01915, Tel: 617-922-5634; FSC No.: 05222; Empl.: 10; *Sls. Mgr.:* Charles A. Osborn

NAZ-DAR INTL., 1087 N. Branch St., Chicago, IL 60622, Tel: 312-943-8338, Telex: 25-3303; Empl.: 53; *Sls. Mgr.:* Don Finwall; *Dist. Mgr.:* Don Finwall

N.C.E., Mail Station 331, 9925 Lyndale Ave. S., Bloomington, MN 55420, Tel: 612-890-1360; *Sls. Mgr.:* Irene R. Smith .... **D•1428-1429**

NCR COMTEN, INC., NCR Corp., 2700 Snelling Avenue N., St. Paul, MN 55113, Tel: 612-638-7777, Telex: 6879018 COMTEN, TWX: 910-563-3661; FSC No.: 7025-0010; Empl.: 2900; *Sls. Mgr.:* Lewis M. Meador; *Dist. Mgr.:* Michael R. Wageman

NCR MICROELECTRONICS DIV., NCR Corp., 8181 Byers Rd., Miamisburg, OH 45342, Tel: 800-543-5618, 513-866-7471, Telex: 241669 NCR NVMEM MSBG; FSC No.: 60924; *Sls. Mgr.:* Walt Krysiak

NCR CORP., Terminal Sys Div., Babcock Hall, Terrace Hill, Ithaca, NY 14850, Tel: 607-273-5310

NCR POWER SYSTEMS, 584 S. Lake Emma Rd., Lake Mary, FL 32746, Tel: 305-323-9250, 800-327-7612, TWX: 810-856-0290; Empl.: 156; *Sls. Mgr.:* David A. Kemp

NEC ELECTRONICS, INC., 401 Ellis Street, Mtn. View, CA 94039, Tel: 415-960-6000, TWX: 910-379-6985; Empl.: 1100; *Sls. Mgr.:* Bob Commins; *Dist. Mgr.:* Phil Hubbert

NEC ELCTRNS. USA INC., NEC Electron Div., 252 Humboldt Ct., Sunnyvale, CA 94086, Tel: 408-745-6520, Telex: 35-7475, TWX: 910-339-9539; *Sls. Mgr.:* Robert Buchanan; *Dist. Mgr.:* Jason Stewart

NEC INFORMATION SYSTEMS, NEC Corporation, 1414 Massachusetts Ave., Boxborough, MA 01719, Tel: 617-264-8000, Telex: 92-3434; Empl.: 900; *Sls. Mgr.:* Richard Gilbert

NEDA, See National Elctrn. Distrs. Assn.

NEFF INSTR., 700 S. Myrtle Ave., Monrovia, CA 91016, Tel: 818-357-2281, TWX: 910-585-1833; Empl.: 125; *Sls. Mgr.:* James T. Barber

NELSON STUD WELDING TRW INC., 28th & Toledo Ave., Lorain, OH 44055, Tel: 216-245-6931, Telex: 980466; Empl.: 350; *Sls. Mgr.:* B. Robinson

NEPENTHE/YAMAICHI, 2471 E. Bayshore, #520, Palo Alto, CA 94303, Tel: 415-856-9332, TWX: 910-373-2060; FSC No.: 415.856 8650; *Sls. Mgr.:* G. Hall

NESHAMINY TRANSFORMER, Neshaminy Electronics Corp., Edison-Furlong Road, Furlong, PA 18925, Tel: 215-794-7411; *Sls. Mgr.:* Philip Klein

For the finest in Panel Meters!

NES, INC. (NATIONWIDE ELECTRONIC SYSTEMS), 3003 Wakefield, Carpentersville, IL 60110, Tel: 312-426-5900; Empl.: 293; *Sls. Mgr.:* David A. Voelker; *Dist. Mgr.:* David A. Voelker ....**B•1089; D•1069, 1127, 1159, 1365-1368**

Local Sales Offices & Reps

CA	Palo Alto, Priz Co.	415-326-9333
IL	Moline, Jim Otis & Assocs.	309-762-9311
IN	Indianapolis, Electro Dev. & Engrg. Co.	317-547-5274
LA	Baton Rouge, Control Sys. Consultants	504-292-1462
MD	Baltimore, Wistex, Inc.	301-366-6303
NE	Lincoln, Jim Otis & Assocs.	402-474-2390
NY	Albany, L-Tron Assocs. Corp.	518-482-1987
NY	Rochester, L-Tron Assocs. Corp.	716-436-4410
OH	Cincinnati, Anderson-Bolds	513-528-5680
OH	Cleveland, Anderson-Bolds	216-229-4700
PA	Wayne, Wistex, Inc.	215-687-5930
UT	Sandy, Priz Co.	801-571-7311
WI	Waukesha, BII	414-549-4141

Local Distributors

IL	Bridgeview (Chicago), Norman Equip. Co.	312-430-4000
IL	Countryside, Pacific Indicator	312-352-3500
KY	Louisville, Main Elec.	502-587-6511
NC	Charlotte, General Elctrn. of Charlotte	704-568-6793
SC	Charleston, Flow Control	803-722-0176
TX	Houston, Quality Instr. Lab	713-524-0528

NETCOM, 3002 Commercial Ave., Northbrook, IL 60062, Tel: 312-564-5100, TWX: 910-686-5478; FSC No.: 57193; Empl.: 85; *Sls. Mgr.:* Wayne Roeder

NEUTRIK PRODUCTS, See Kulka Smith

NEW ENGLAND INSTR., Robertshaw Controls, 14 Kendal Lane, Natick, MA 01760, Tel: 617-875-9711, TWX: 710-346-0398; Empl.: 600

NEW ENGLAND SMELTING WORKS, INC., 502 Union St., W. Springfield, MA 01090, Tel: 413-734-6491; FSC No.: 3439; Empl.: 35; *Sls. Mgr.:* David R. Saffer

Local Sales Offices & Reps

MI	Franklin, New England Smelting Works Inc.	313-855-1133,800-521-0352
MI	Southfield, New England Smelting Wks. Sls.	313-355-0393, 800-521-0352

NEW HAMPSHIRE BALL BEARINGS, INC., Rte. 202, Peterborough, NH 03458, Tel: 603-924-3311, TWX: 710-364-1805; Empl.: 1000

NEW HAVEN WIRE & CABLE, P.O. Box 266, New Haven, IN 46774, Tel: 219-493-4489, Telex: 232414; Empl.: 52

NEWMAN, M. M., CORP., Heli-Tube Div., P.O. Box 615, Marblehead, MA 01945, Tel: 617-631-7100; FSC No.: 09106; *Sls. Mgr.:* C. Loutrel; *Dist. Mgr.:* C. Loutrel .... **C•1885**

NEW MEDIA GRAPHICS CORP., 279 Cambridge St. #5, Burlington, MA 01803, Tel: 617-272-8501

NEWPORT

NEWPORT ELECTRONICS, 630 E. Young St., Santa Ana, CA 92705, Tel: 714-540-4914, TWX: 910-595-1787; Empl.: 150; *Sls. Mgr.:* Jim Way .... **D•1370-1371**

Local Sales Offices & Reps

AL	Huntsville, Beacon Elctrns. Assocs.	205-881-5031
AZ	Phoenix, CPS Assocs.	602-246-1097
CA	MT. View, IFM, Inc.	415-961-2828
CA	Pasadena, Luscombe Engrg. Co.	213-684-2000
CO	Denver, AKI Entprs.	303-388-4488
CT	Madison, Eastronix, Inc.	203-421-4514
FL	Boca Raton, Beacon Elctrns. Assocs.	305-392-3500
GA	Atlanta, Beacon Elctrns. Assocs.	404-256-9640
IL	Arlington Hgts., Brainard-Wilson	312-437-2700
IN	Carmel, Brainard-Wilson	317-844-2800
KS	Mission, H & H Elec. Sls.	913-236-4460
MD	Perry Hall, Electra-Tech	301-256-2723
MA	Bedford, Eastronix, Inc.	617-275-5775
MI	Farmington, Amtech Reps.	313-474-8300
MN	Eden Prairie, Rockmore Sls. Corp.	612-941-1390
MO	St. Charles, Power Transmission Sys.	314-928-1750
NJ	Parlin, JMR Sls.	201-254-8484
NY	East Setauket, JMR Sls., Inc.	516-689-8871
NY	Skaneateles, ADN Entprs.	315-685-8991
NC	Raleigh, Beacon Elctrns. Assocs.	919-787-0330
OH	Centerville, Dolfuss-Root & Co.	513-433-6776
OH	Strongsville, Dolfuss-Root & Co.	216-238-0300
OK	Tulsa, Associated Dyn.	918-743-8116
OR	Portland, Calvert Controls, Inc.	503-222-6473
PA	Bridgeville, Dolfuss-Root & Co.	412-221-4420
PA	King of Prussia, J. E. Cuesta & Co., Inc.	215-265-5800
TX	Addison, Associated Dyn., Inc.	214-387-3800
TX	Houston, Associated Dyn., Inc.	713-777-9443
VA	Dumfries, Electra-Tech	703-670-6962
WA	Spokane, Calvert Controls	509-244-3601
WI	Menomonee Falls, Brainard-Wilson	414-255-3400

Local Distributors

		615-885-1302
AL	Birmingham, Brownell-Electro, Inc.	205-323-4761
AL	Muscle Schoals, Jones Elctrns.	205-383-1241
AZ	Phoenix, Metermaster	602-437-1425
AZ	Tempe, Beta Distrs.	602-894-9824
AR	Little Rock, Brownell Instr. & Controls	501-562-2061
CA	Costa Mesa, FLW, Inc	714-751-7512
CA	Hayward, FLW, Inc.	415-487-2222
CA	Los Angeles, EIL Instrs., Inc.	213-685-7020
CA	Los Angeles, Metermaster	213-685-4340
CA	San Leandro, Coast Instr.	415-483-3774
CO	Englewood, Beta Distrs.	303-779-4494
CT	Middletown, EIL Instrs., Inc.	203-346-6646
FL	Miami, Brownell Electro, Inc.	305-591-2636
GA	Atlanta (Hapeville), Brownell Electro	404-762-5181
GA	Marietta, FLW, S.E.	404-424-1731
HI	Kailua, FLW, Inc.	808-945-1030
IL	Chicago, Data Elctrns. Co.	312-283-0300
IL	Elk Grove Village, Metermaster	312-593-8650
IN	Indianapolis, Data Elctrns.	317-359-5368
IA	Davenport, Universal Precision Instr.	319-326-5757
KS	Kansas City, Kornfeld Thorp	913-321-7070
KY	Louisville, EIL Instrs.	502-454-3420
LA	Baton Rouge, Beta Distrs.	504-924-6826
MD	Gaithersburg, Pioneer Instrs.	301-921-0660
MD	Sparks, EIL Instr.	301-771-4800
MA	Waltham, Calibron Instrs.	617-894-6440
MI	Livonia, Pioneer Instr.	313-525-1800
MI	Royal Oak, George Instr.	313-280-1111
MN	Plymouth, Data Elctrns.	612-559-1434
MO	St. Louis, Universal Precision Inst.	314-394-4693
NJ	Newfoundland, Hosica Labs.	201-697-6111
NM	Albuquerque, Beta Distrs.	505-966-2420
NY	Buffalo, Robert F. Lamb Co.	716-874-4900
NY	Clarence, Trott Elctrns.	716-634-8500
NY	Hauppauge, EIL Instrs., Inc.	516-231-6333
NY	NYC, Brownell Electro	212-924-6000
NY	Rochester, Robert F. Lamb Co.	716-323-1250
NC	Concord, FLW Southeast	704-597-7623
NC	Raleigh, Brownell Electro	919-876-6524
OH	Cleveland, Metermaster	216-651-4100
OH	Cleveland, Pioneer Instr.	216-587-3600
OH	Cleveland, Weschler Elec.	216-238-2550
OH	Dayton, EIL Instrs., Inc.	513-435-2134

OH	Dayton, Pioneer Instr.	513-236-9900
OK	Tulsa, Inotek	918-622-8570
OR	Portland, Westcon	503-283-0132
PA	Pittsburgh, Pioneer Instr.	412-782-2300
TN	Memphis, FLW Southeast	901-345-3563
TN	Nashville, Brownell Electro, Inc.	615-889-8230
TX	Austin, Beta Distrs.	512-452-0199
TX	Dallas, Dallas Meter Tek	214-349-6044
TX	Dallas, Inotek	214-243-7000
TX	Ft. Worth, Inotek	817-877-5100
TX	Garland, Metermaster	214-271-5671
TX	Houston, American Analog	713-941-7265
TX	Houston, Beta Distrs.	713-682-1234
TX	Houston, Inotek	713-688-7000
TX	Richardson, Beta Distrs.	214-783-1065
UT	S.L.C., Beta Distrs.	801-972-4455
VA	Richmond, Metermetrics	804-275-1431
WA	Seattle, Eicher-Richards Co.	206-523-7888
WA	Seattle, EIL Instrs., Inc.	206-762-0880
WI	Milwaukee, E-M Instrs.	414-272-7799

NEW-TONE ELECTRONICS, INC., 44 Farrand St., Bloomfield, NJ 07003, Tel: 201-748-5089; Empl.: 50; *Sls. Mgr.:* Annette Fuchs

NEW WAVE INSTRUMENTS, 3760 Masters Court, San Jose, CA 95111, Tel: 408-629-3105

N.Y. TESTING LABS., INC., 81 Urban Ave., Westbury, NY 11590, Tel: 516-334-7770, TWX: 212-297-1449; Empl.: 50

NIC COMPONENTS CORP., 238 Rte. 109, Farmingdale, NY 11735, Tel: 516-694-0060, 800-645-9333, Telex: 221-228; Empl.: 50; *Sls. Mgr.:* Ronald J. Travis; *Dist. Mgr.:* Nancy Lamendola **A•1140-1141, 1910**

Local Sales Offices & Reps

AL	Huntsville, Novus Group	205-881-2207
AZ	Phoenix, Sterling Elctrns.	602-258-4531
AZ	Phoenix, Tech Sls.	602-246-1614
AR	Little Rock, Carlton Bates	501-562-9100
CA	Fullerton, Pyramid Elctrns.	714-773-0781
CA	Mission Viejo, Par Mktg.	714-768-6021
CA	Redwood City, James S. Heaton Co.	415-367-9000
CA	San Diego, Bestronic South	619-452-5500
CA	San Diego, Ryno	619-292-6022
CA	Santa Ana, Projections Unlimited	714-641-1472
CA	Sun Valley, QC Comps.	213-768-6111
CT	Bloomfield, SLR Assocs.	203-243-9343
CT	Danbury, Pilgrim Elctrns.	203-792-7274
FL	Clearwater, Perrott Assocs.	813-443-5214
FL	Largo, Graham Elctrns.	813-541-4434
IL	Champaign, Klaus Radio	217-356-1896
IL	Lisle, W. G. Controls	312-963-5954
IL	Melrose Park, Belford Elctrns,	312-865-2400
IN	Fort Wayne, Graham Elctrns.	219-423-3422
IN	Indianapolis, Elctrn. Rep. Inc.	317-894-1414
IA	Cedar Rapids, Deeco	319-365-7551
KS	Shawnee Mission, K&M Sls.	913-262-1444
KY	Louisville, Peerless	502-637-7674
MD	Baltimore, Burgin-Kreh Assocs.	301-265-8500
MD	Rockville, MS Elctrns.	301-340-6400
MA	Bedford, SLR Assocs.	617-275-5550
MA	Burlington, TLC	617-273-0140
MI	Detroit, Burcaw Co.	313-533-7700
MI	Grand Rapids, SF Elctrns.	616-459-0216
MI	Livonia, Reptron	313-525-2700
MN	Bloomington, NWR	612-854-7329
MN	Golden Valley, Ambassador Ino Mktg.	612-542-8437
NH	Londonderry, S Squared	603-434-2033
NJ	Perth Amboy, Sterling	201-442-8000
NJ	Union, Cougar	201-687-7722
NY	Hauppauge, Belmont Elctrns.	516-273-1333
NY	Jericho, J-Square Mktg. Inc.	516-935-3200
NY	Suffern, M&M Assoc.	914-368-0583
NC	Greensboro, United Sls.	919-674-9849
OH	Cincinnati, Graham Elctrns.	513-772-1661
OH	Cincinnati, Stegman Blaine Mktg. Inc.	513-729-1969
OH	Dayton, Dulian	513-445-0424
OH	Vandalia, Stegman Blaine Mktg. Inc.	513-890-7975
OR	Beaverton, ACACIA	503-646-3377
PA	Philadelphia, Paragon Sls.	215-563-7060
TN	Nashville, Graham	615-242-2682
TX	Dallas, Design Mktg.	214-680-9767
TX	Dallas, Heiland Elctrns.	214-351-2050
TX	Hurst, Design Mktg.	817-268-2004
UT	S. Jordan, Mac III	801-566-3781
EXP	New York Farmingdale, NIC Comps. Corp.	516-694-0060

NICHICON (AMERICA) CORP., 927 E. State Pkwy., Schaumburg, IL 60195, Tel: 312-843-7500, Telex: 20-6577; FSC No.: 312-843-2798; 312-843-7125; *Sls. Mgr.:* Russ Edwards; *Dist. Mgr.:* Robert Poteracki

NICHIFU AMERICA, INC., 1494 N. Charlotte St., Pottstown, PA 19464, Tel: 215-323-7120; *Sls. Mgr.:* Roy Allen

NICOLET'S COMPUTER GRAPHICS DIVISION, P.O. Box 3020, 777 Arnold Dr., Martinez, CA 94553, Tel: 415-372-7568, TWX: 910-481-5951 ZETAPLOTS MART; FSC No.: 52893; Empl.: 150; *Sls. Mgr.:* Howard Keiper

NICOLET INSTR. CORP., Oscilloscope Div., 5225 Verona Rd., Madison, WI 53711, Tel: 608-271-3333, TWX: 910-286-2737; Empl.: 525; *Sls. Mgr.:* Dean Dawson

Local Sales Offices & Reps

AZ	Phoenix, Axtec Entprs.	602-944-9185
CA	Los Angeles, Nicolet Instr.	714-549-7611
CA	San Diego, Nicolet Instr.	619-454-6274
CA	San Jose, Nicolet Instr.	408-946-3310
CO	Littleton, Aztec Entprs.	303-795-0250
FL	Valrico, Nicolet Instr.	813-685-0444
GA	Tucker, Nicolet Instr.	404-491-0127
IL	Chicago, Nicolet Instr.	312-843-2905
MD	Lanham, Nicolet Instr.	301-459-2940
MA	Burlington, Nicolet Instr.	617-273-4404
MI	Brighton, Nicolet Instrument	313-229-4655
MN	Minneapolis, Nicolet Instr.	612-933-0048
MO	St. Louis, Nicolet Instr.	314-821-2868
NJ	Cherry Hill, Nicolet Instr.	609-665-5100
NJ	Cranford, Nicolet Instr.	201-276-6677
NM	Albuquerque, Aztec Entprs.	505-262-1688
NY	Schenectady, Nicolet Instr.	518-346-2503
NC	Charlotte, Nicolet Instr. Corp.	704-364-0240
OH	Chardon, Nicolet Instr.	216-951-8249
OH	Hamilton, NIC Inst.	513-868-3611
PA	Beaver Falls, Nicolet Instrument	412-847-0100
TX	Plano, Nicolet Instr.	214-422-4014
UT	Salt Lake City, Aztec Entprs.	801-621-1655
WA	Edmonds, Nicolet Instr. Corp.	206-771-2400
WI	Madison, Nicolet Instr.	608-273-5008

NICOLET PARATRONICS, 201 Fourier Ave., Fremont, CA 94539, Tel: 415-490-8300, TWX: 910-381-7030; FSC No.: 6625; Empl.: 95; *Sls. Mgr.:* Bob Francisco

NIDEC-TORIN CORPORATION, 100 Franklin Drive, Torrington, CT 06790, Tel: 203-482-4422, Telex: 643963; Empl.: 200; *Sls. Mgr.:* Robert Murphy; *Dist. Mgr.:* Rich Brache

NISSEI SANGYO AMERICA, LTD., 1701 Golf Rd., Ste. 401, Rolling Meadows, IL 60008, Tel: 312-981-8989, Telex: 28-0547, TWX: 910-233-5865; *Sls. Mgr.:* Y. Hamada

NITRON, 10420 Bubb Rd., Cupertino, CA 95014, Tel: 408-255-7550, TWX: 910-338-0222; Empl.: 150; *Sls. Mgr.:* R. Gardner

NITTANY PIEZO CERAMICS, Box 756, Pine and Mill Streets, Bellefonte, PA 16823, Tel: 814-355-1593, 814-355-1594; FSC No.: 5955; Empl.: 28; *Sls. Mgr.:* T. E. Kolbe

NITTO DENKO AMERICA, INC., 27 Seaview Blvd., Port Washington, NY 11050, Tel: 516-484-9700, Telex: 96-1386; *Sls. Mgr.:* Steven E. Schoenstadt

NJE CORPORATION, 329 Culver Rd, P.O. Box 669, Dayton, NJ 08810-0669, Tel: 201-329-4611, TWX: 710-480-5674; FSC No.: 98380; Empl.: 125; *Sls. Mgr.:* John M. Slavik **D•1733**

Local Sales Offices & Reps

AL	Huntsville, REMCO-Rakes Engrg. & Mktg.	205-533-3763
AR	Fort Smith, Electra Reps	501-452-4030
CA	Garden Grove, Elsco Elctrns., Inc.	714-891-4621
CA	Los Gatos, Pro Assocs., Inc.	408-358-3861
CO	Englewood, F. G. Mktg.	303-795-9176
CT	Ansonia, R. H. Sturdy Co.	203-734-2186
FL	Coral Springs, CBC Elctrns.	305-755-1111
FL	Longwood, CBC Elctrns.	301-831-5380
GA	Atlanta, REMCO-Rakes Engrg. & Mktg.	404-447-6937
IA	Davenport, Ensco-Rep, Inc.	319-386-6600
KS	Overland Park, Ensco-Rep, Inc.	913-381-7557
KS	Wichita, Ensco-Rep, Inc.	316-683-1070
MD	Rockville, Spectro Assocs., Inc.	301-294-9770
MA	Wellesley Hills, R. H. Sturdy Co.	617-235-2330
MI	Brighton, A. P. Assocs.	313-229-6550
MN	Edina, Grayden & Flemmer	612-941-1120
MO	Maryland Heights, Ensco-Rep, Inc.	314-423-3935
NJ	Dayton, NJE Corp.	201-329-4611
NY	Lynbrook, P. Saftler & Assocs.	516-593-7880
NC	Raleigh, REMCO-Rakes Engrg. & Mktg.	919-847-5079
OH	Englewood, Allen Nace Co.	513-836-0931
OH	Richfield, Allen Nace Co.	216-659-7178
PA	Glenshaw, Allen Nace Co.	412-487-1217
TX	Austin, Electra Reps	512-339-1163
TX	Dallas, Electra Reps	214-248-3842
WA	Bellevue, Underwood-Hanify	206-451-8223
WA	Vancouver, Underwood-Hanify	503-224-0583

NKK SWITCHES OF AMERICA, INC., 14415 N. Scottsdale Rd., Ste. 600, Scottsdale, AZ 85260, Tel: 602-991-0942; TWX: 910-950-1167; FSC No.: 7T118; Empl.: 50; *Sls. Mgr.:* Clemens J. Czapinski, Jr.; *Dist. Mgr.:* Clemens J. Czapinski, Jr. **B•1673-1681**

Local Sales Offices & Reps

AL	Huntsville, Over & Over	205-837-7105
AZ	Scottsdale, Mahaffey & Assocs.	602-991-9790
AZ	Scottsdale, NKK Switches	602-991-0942
CA	Granada Hills, C & W Component Sls.	213-368-4032
CA	Mountain View, Caltron Components Corp.	415-964-3244
CA	San Diego, McKinley Elctrn. Sls.	619-271-7221
CO	Parker, Technology Mktg.	303-841-3435
CT	Yalesville, Newscott Co.	203-269-2645
FL	Brandon, Over & Over, Inc.	813-689-9104
GA	Norcross, Over & Over, Inc.	404-449-6205
IL	Rolling Meadows, KMA Sales	312-398-5300
IN	Fort Wayne, Frank E. Kahsar Sls.	219-422-0311
IN	Indianapolis, Frank E. Kahsar Sls.	317-888-8396
KS	Merriam, Midwest Tech. Sls.	913-236-8557
MD	Timonium, Eastern Comps. Sls.	301-561-5811
MA	Needham Hgts., Newscott Co.	617-444-1923
MI	Farmington, Amtech Reps.	313-474-8300
MN	Minnetonka, SAI Mktg. Corp.	612-935-0777
MO	St. Charles, Midwest Tech. Sls.	314-441-1012
NY	Fairport, NET Sales Co.	716-467-4538
NY	Oceanside, Bittan Assocs.	516-678-6222
NC	Charlotte, Over & Over	704-527-3070
OH	Cincinnati, Frank E. Kahsar Sls.	513-922-3133
OH	Hudson, Frank E. Kahsar Sls.	216-650-1089
OR	Portland, James J. Backer, Inc.	503-297-8744
PA	West Conshohocken, Eastern Comps. Sls.	215-825-8610
TX	Dallas, Rem Air Components Corp.	214-234-1069
UT	Salt Lake City, Tech. Mktg. Assocs.	801-483-1009
WA	Seattle, James J. Backer Co.	206-285-1300
WI	Milwaukee, KMA Sls. Co.	414-259-1771
Can	Toronto, Ont., Renmark Elctrn. Sls.	416-494-5445

Local Distributors

AL	Huntsville, Powell Elctrns.	205-539-2731
AZ	Phoenix, Dalis Elctrn. Supp.	602-275-2885

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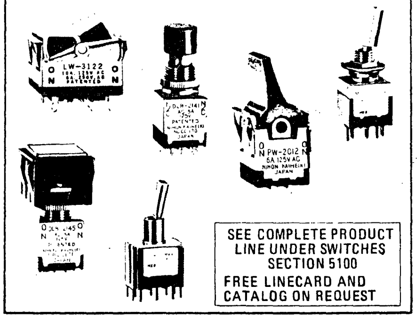

SEE COMPLETE PRODUCT LINE UNDER SWITCHES SECTION 5100
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AZ	Tucson, Inland Elctrn. Supp.	602-889-5301
CA	Costa Mesa, Powell Elctrns.	714-754-1717
CA	Los Angeles, Electric Switches, Inc.	213-660-1310
CA	San Diego, Mock III Sls. Co., Inc.	619-560-0515
CA	San Diego, Shanks & Wright	619-239-0176
CA	San Dimas, Mrs. Switch, Inc.	714-599-6639
CA	San Jose, Cypress Elctrns., Inc.	408-945-8400
CA	San Jose, Powell Elctrns.	408-943-9020
CA	San Jose, Rose Elctrn. Dist. Co.	401-263-9700
CA	Torrance, Cypress Elctrns., Inc.	213-533-6005
CA	Tustin, Western Switches & Controls	714-731-4333
CO	Arvada, Denver Wintronics	303-431-7161
CO	Aurora, Jet Elctrns. Supp. Co.	303-364-1000
CT	Danbury, Pilgrim Elctrns., Inc.	203-792-7274
FL	Ft. Lauderdale, Powell Elctrns.	305-979-5000
FL	Largo, Graham Elctrns.	813-541-4434
FL	Longwood, Interec Comps., Inc.	305-834-7777
FL	Miami, Electronic Equip. Co.	305-871-3500
FL	West Palm Beach, Nurmi Elctrn. Supp., Inc.	305-686-8553
IL	Chicago, NEP Elctrns., Inc.	312-625-8400
IL	Wheeling, Hawk Elctrns., Inc.	312-459-4030
IN	Fort Wayne, Graham Elctrns. Supply	219-423-3422
IN	Indianapolis, Graham Elctrns. Supply	317-634-8202
IN	Indianapolis, MAR Elctrns.	317-875-4510
KS	Wichita, Airtechnics, Inc.	316-267-2849
LA	New Orleans, Southern Radio Supp. Co.	504-524-2343
MD	Columbia, Powell Elctrns.	301-995-0410
MD	Kensington, Marine Air Supply Co.	301-949-9560
MA	Boston, Controller Svc. & Sls.	617-269-1300
MA	Westborough, Powell Elctrns.	617-366-6100
MA	Woburn, E.P.C., Inc.	617-935-0400
MI	St. Clair Shores, Spemco Switches Mfg.	313-771-2700
MN	Eden Prairie, Cassidy Elctrns.	612-944-0100
MN	Hopkins, The Joel Co.	612-935-6202
MO	St. Louis, Franklin Elctrns. Co.	314-993-5333
NJ	E. Brunswick, Brothers Elctrns.	201-238-2200
NJ	Englewood, Powell Elctrns.	201-894-0800
NY	Hempstead, Electronic Equip. Co.	516-538-5510
NY	Mt. Vernon, QAR Industrial Elctrn. Sls., Inc.	914-699-2224
NY	Plattsburgh, Rostech Elctrns.	518-561-8357
NY	Rochester, Masline Elctrns., Inc.	716-546-5373
NY	Rome, Rome Elctrns.	315-337-5400
NY	Troy, Trojan Elctrn. Supp. Co.	518-274-4481
NY	Yonkers, Kintronics, Inc.	914-968-7736
NC	Cary, Powell Elctrns.	919-467-1212
OH	Cincinnati, Schuster Elec. Co.	513-489-1400
OH	Columbus, Wedemeyer Elctrn. Supp. Co., Inc.	614-436-9600
OH	Twinsburg, Schuster Elec. Co.	216-425-8134
OK	Oklahoma City, Radio, Inc.	405-789-0741
OK	Tulsa, Radio, Inc.	918-587-9123
OR	Beaverton, Norvac Elctrns.	503-644-1025
OR	Beaverton, Rose Elctrn. Distr.	503-629-9288
PA	Allentown, Lehigh Elctrn. Comps.	215-433-3045
PA	Exton, VSH Elctrns.	215-363-2250
PA	Philadelphia, Powell Elctrns.	215-365-1900
PA	Wayne, Peak Elctrns.	215-293-9000
SC	Taylors, Cantrell Whlse. Prods.	803-268-1194
TN	Chattanooga, Techni-Tronics, Inc.	615-875-5449
TN	Memphis, Bluff City Elctrns.	901-345-9500
TX	Austin, Southwest Elctrns.	512-837-8971
TX	Dallas, Off The Shelf Comps., Inc.	214-247-0052
TX	Dallas, Wallace Elctrns.	214-340-0400
TX	Houston, E.P.C., Inc.	713-447-5800
TX	Irving, Powell Elctrns.	214-258-6841
TX	Richardson, Southwest Elctrns.	214-234-3050
TX	Stafford, Southwest Elctrns.	713-240-4000
UT	Salt Lake City, Ballard Supp. Corp.	801-972-2430
WA	Bellevue, Powell Elctrns.	206-641-4446
WA	Kirkland, Priebe Elctrns., Inc.	206-821-4695
WI	Mequon, Taylor Elec.	414-241-4321
WI	Oconomowoc, GW Elctrns., Ltd	414-367-6003

NKR PRECISION MFG., Rte. 17M, Box 333, Harriman, NY 10926, Tel: 914-782-8562; Empl.: 17

NL BEARINGS/NL INDUSTRIES INC., PO Box 934, Toledo, OH 43694, Tel: 419-381-3100; Empl.: 1000; *Sls. Mgr.:* James Doherty; *Dist. Mgr.:* B. Sexauer

NMB CORP., MOTOR DIV., 9601 Mason Ave., Chatsworth, CA 91311, Tel: 213-709-1555

NOBEX DIV., Griffith Plastics Corp., 1027 California Dr., Box 4365, Burlingame, CA 94010, Tel: 415-342-8170, TWX: 910-374-2840; FSC No.: 32767; Empl.: 35

NOBLE U.S.A., INC., 151 Stanley St., Elk Grove Village, IL 60007, Tel: 312-364-6038, Telex: 206745; FSC No.: 1-3123646045; *Sls. Mgr.:* Vyto Omilijonas; *Dist. Mgr.:* Vyto Omilijonas

NOLATRON, P.O. Box 4042, Harrisburg, PA 17111, Tel: 717-564-3398; Empl.: 10

NOLL, J. A. CO., P.O. Box 312, Monroeville, PA 15146, Tel: 412-733-1009; *Sls. Mgr.:* P. Carson; *Dist. Mgr.:* P. Carson

NON-LINEAR SYSTEMS/DIV. OF KAYPRO CORP., 533 Stevens Ave., Solana Bch., CA 92075, Tel: 619-481-3900, TWX: 910-322-1132; Empl.: 55; *Sls. Mgr.:* Ben W. Fisher; *Dist. Mgr.:* Jeanne Simmons

Local Distributors

AZ	Phoenix, Metermaster	602-273-7331
CA	Costa Mesa, Marvac Elctrns.	714-540-3280
CA	Garden Grove, Allied Elctrns.	714-554-0731
CA	Hayward, Allied Elctrns.	415-487-5250
CA	Hollywood, Yale	213-465-3186
CA	Irvine, Meter Craft	714-979-1420
CA	Los Angeles, E.I.L. Instrs.	213-685-7020
CA	Los Angeles, Metermaster	213-685-4340
CA	Monterey, Zackit	408-375-3144
CA	Oakland, Western Electro. Mech.	415-452-1936
CA	Palo Alto, Metermaster	415-968-0313
CA	San Diego, Metermaster	619-560-4841
CA	San Jose, Allied Elctrns.	408-727-1690
CO	Denver, E. I. L.	303-534-4160
CT	Middletown, E. I. L.	203-346-6646
FL	Ft. Lauderdale, Allied Elctrns.	305-486-0550
FL	Miami, Brownell Electro	305-591-3215
FL	Orlando, Brownell Electro	305-843-6770
FL	Palm City, Eil Instrs.	305-725-8300
GA	Atlanta, Brownell Electro	404-762-5181
GA	Atlanta, Metermaster	404-446-0166
IL	Bridgeview, Eil Instrs.	312-430-2292
IL	Elgin, Allied Elctrns.	312-697-8200
IL	Elk Grove, Metermaster	312-593-8650
IL	Itasca, Metermaster	312-250-0606
IL	Niles, Joseph Elctrns.	312-297-4200
IL	Peoria, Klaus Radio	309-691-4840
IN	Indianapolis, Eil Instrs.	317-545-1373
KY	Louisville, Eil Instrs.	502-637-7677
LA	Harahan, Indus. Instru. Works	504-733-8355
LA	Lafayette, Ralph's of Lafayette	318-234-4507
MD	Elkridge, Sunshine Sci. Instrs.	301-796-5600
MD	Marlow Heights, Allied Elctrns.	301-423-0161
MD	Rockville, Capitol Radio Whlsrs.	301-881-2270
MD	Sparks, E. I. L. Instrs	301-252-1260
MA	Boston, Allied Elctrns.	617-942-0150
MA	Burlington, E.I.L. Instrs.	617-272-9450
MA	Hingham, Sager Elec. Supp.	617-542-2281
MI	Ferndale, Ram Meter	313-547-1000
MN	Minneapolis, Instrumentation Svc.	612-544-8916
MO	Kansas City, Electronic Supp.	816-931-0250
MO	St. Louis, Eil Instrs.	317-545-1373
NV	Las Vegas, Hurley Elctrns.	702-384-5666
NJ	Edison, Brownell	202-287-2030
NJ	N. Caldwell, Hosica Labs	201-256-7724
NM	Albuquerque, Electronic Parks	505-293-6161
NY	Albany, Edwin E. Taylor	518-438-7811
NY	Buffalo, Summit Distrs.	716-884-3450
NY	Clarence, Trott Elctrns.	716-634-8500
NY	Hauppauge, Eil Instrs.	516-231-6333
NY	Mineola, Allied Elctrns.	516-248-2360
NY	New York, Advance Elctrns.	212-687-2224
NY	Port Chester, Wise Elctrns.	914-939-3940
NY	Rochester, Eil Instrs.	716-424-5750
NY	Rochester, Simcona Elctrns.	716-328-3230
NC	Charlotte, Brownell Electro	704-597-1270
NC	Raleigh, Brownell Electro	919-876-6524
OH	Cincinnati, Hughes-Peters	513-351-2000
OH	Cleveland, Metermaster	216-651-4100
OH	Columbus, Hughes Peters	614-294-5351
OH	Dayton, Eil Instrs.	513-435-2134
OH	Wickliffe, Gateway-Megatech	216-944-8565
OK	Oklahoma City, Trice	405-524-4411
OK	Tulsa, Radio, Inc.	918-587-9123
OK	Tulsa, Trice	918-585-5718
OR	Portland, United Radio Supp.	503-434-2171
PA	Philadelphia, Sunshine Sci. Instrs.	215-673-5600
PA	Pittsburgh, CAM/RPC	412-782-3770
PA	Pittsburgh, Eil Instrs.	412-731-5230
PA	Reading, Barbey	215-376-7451
PA	York, Cumberland	717-845-8791
SC	Columbia, Dixie Elctrns.	803-779-5332
TN	Chattanooga, Curle Elctrns.	615-266-4728
TN	Knoxville, Brownell Electro	615-966-3441
TN	Memphis, Brownell Electro	901-795-8487
TN	Nashville, Brownell Electro	615-889-8230
TX	Austin, Electrotex	512-454-0318
TX	Dallas, Dallas Meter Tek	214-349-6044
TX	Dallas, Eil Instrs.	214-931-1236
TX	Dallas, Metermaster	214-271-5671
TX	Ft. Worth, Allied Elctrns.	817-336-5401
TX	Houston, Allied Elctrns.	713-681-2983
TX	Houston, Eil Instrs.	713-271-3100
TX	Houston, Electrotex	713-526-3456
TX	San Antonio, Sherman Elctrns.	512-224-1001
VA	Alexandria, Eil Instrs.	703-354-4330
VA	Virginia Beach, Eil Instrs.	804-499-3746
WA	Seattle, Eil Instrs.	206-762-0880

NORELCOM INDS., 63 Marine St., Farmingdale, NY 11735, Tel: 516-249-7245; Empl.: 55; *Sls. Mgr.:* Richard E. Thaw; *Dist. Mgr.:* Regina Vena

C. A. NORGREN CO., 5400 South Delaware, Littleton, CO 80120-1663, Tel: 303-794-2611; Empl.: 661; *Sls. Mgr.:* Patrick Maley

NORITAKE ELCTRNS., INC., Noritake Co., Ltd. (Japan), 22410 Hawthorne Blvd., #6, Torrance, CA 90505, Tel: 213-373-6704, Telex: 67-4910; *Sls. Mgr.:* T. Ohki

NORLAND CORP., Norland Dr., Ft. Atkinson, WI 53538, Tel: 414-563-8456, Telex: 26-5448; Empl.: 275; *Sls. Mgr.:* Robert J. Millar

NORPLEX DIV., 10 V.O.P. Plaza, Des Plaines, IL 60016, Tel: 312-391-2000

NORSAL INDS., 85 D Hoffman Lane So., Central Islip, NY 11722, Tel: 516-234-1200, TWX: 510-227-1045; *Sls. Mgr.:* Les Lipset

NORTH AMERICAN PHILIPS CONTROLS CORP., See Airpax Corporation, Cheshire Div.

NORTH AMERICAN PHILIPS LIGHTING, Bank St., Hightstown, NJ 08520, Tel: 609-448-4000, TWX: 510-685-5651; Empl.: 600; *Sls. Mgr.:* C. J. Lehmann

NORTH AMERICAN PRINTED CIRCUIT DIV., Tyco Labs., Inc., Box 145, Stafford, CT 06075, Tel: 203-684-2703; Empl.: 230

NORTH AMERICAN SOAR CORP., 11126 Cornell Ave., Cherry Hill, NJ 08002, Tel: 609-488-1060; Empl.: 7; *Sls. Mgr.:* Robert Liska
.... **D•1174, 1267-1281, 1394-1396**

NORTH ATLANTIC INDS., Instrument Div., 60 Plant Ave., Hauppauge, NY 11788, Tel: 516-582-6500, TWX: 510-227-9660; FSC No.: 07342; Empl.: 320; *Sls. Mgr.:* K. Salz .... **D•1283, 1373**

Local Sales Offices & Reps

AZ	Phoenix, Aztec Entprs.	602-944-9185
CA	Cupertino, T. Louis Snitzer Co.	408-257-8333
CA	Delmar, T. Louis Snitzer Co.	714-226-0305
CA	Los Angeles, T. Louis Snitzer Co.	213-836-6170
CO	Littleton, Aztec Entprs.	303-795-0250
CT	Cheshire, Meco	203-271-0026
FL	Cocoa Beach, TeqSpec	305-783-3444
FL	Palm Harbor, Teqspec	813-785-2296
GA	Marietta, Periphix Teqspec	404-980-9328
IL	Chicago, Pat Lind Elctrns.	312-726-3513
IN	Indianapolis, Pat Lind Elctrns.	317-632-7444
MD	Wheaton, Brimberg Sls. Co.	301-946-2670
MA	Reading, Meco	617-944-6660
MI	Madison Hgts., WKM Assoc.	313-588-2300
MN	Circle Pines, P. Lind	612-786-5770
NM	Albuquerque, Aztec Entprs.	505-262-1688
NC	Winston-Salem, Teqspec III	919-723-8102
OH	Cleveland, WKM Assoc.	216-524-5930
OR	Beaverton, Northwest Test & Meas.	503-646-9966
PA	Doylestown, Tech. Instr. Sls.	215-345-4110
TX	Houston, Scientific Sls.	713-460-9170
TX	Richardson, Sci. Sls.	214-231-6541
UT	Ogden, Aztec Entprs.	801-621-1655
WA	Redmond, Northwest Test & Meas.	206-881-8857
WI	Milwaukee, Pat Lind Elctrns.	414-224-0146

NORTHEAST SCIENTIFIC CORP., 30 Wetherbee St., Acton, MA 01720, Tel: 617-263-2711; Empl.: 10; *Sls. Mgr.:* C. Moritz

NORTHERN ENGRG. LABS., See Midland-Ross Corp., NEL Unit

NORTHERN PRECISION LABS., 11 Madison Rd., Fairfield, NJ 07006, Tel: 201-227-4800, TWX: 710-734-4301; Empl.: 95; *Sls. Mgr.:* M.P. Nigro

NORTH HILLS ELCTRNS., 1 Alexander Pl., Glen Cove, NY 11542, Tel: 516-671-5700, Telex: 46-6886; FSC No.: 98821; Empl.: 100; *Sls. Mgr.:* H. H. Marx
.... **A•1243, 1780, 2208-2210; D•1734**

Local Sales Offices & Reps

CA	Los Angeles, McDougall/McLaughlin Co.	213-477-8556
CA	Palo Alto, Tri Rep	415-965-1822

MD	Silver Spring, A2Y	301-598-5740
MA	Burlington, Microwave Comps. Mktg.	617-273-3106
MA	Woburn, Microwave Comp. Mktg., Inc.	617-273-3106
MN	Minneapolis, Hei-Lite Sls.	612-861-6051

NORTHLAKE ENGRG., 999 Anita Ave., Antioch, IL 60002, Tel: 312-395-5710; FSC No.: 50638; Empl.: 120; *Sls. Mgr.:* W. A. Hardt

NORTHWEST MICROCIRCUITS, INC., 2115 N. College, Newberg, OR 97132, Tel: 503-538-7081; Empl.: 7; *Sls. Mgr.:* Wm. H. Ferwalt

NORTON, One New Bond St., Worcester, MA 01606, Tel: 617-853-1000, Telex: 920428, TWX: 710-340-1126; Empl.: 19000

NORTON ASSOCS., 10 Di Tomas Ct., Copiague, NY 11726, Tel: 516-842-4666; FSC No.: 08739

NORTON CHEMPLAST, 31-150 Dey Rd., Wayne, NJ 07470, Tel: 201-696-4700, TWX: 710-988-5834; Empl.: 300; *Dist. Mgr.:* Wes Wheeler

NORTRAN, Power Elctrns. Corp., 96 Milton Rd., Rochester, NH 03867, Tel: 603-332-3334, TWX: 510-297-4462; *Sls. Mgr.:* Robert S. Karstedt

NOTHELFER WINDING LABS, See NWL Transformers

NOUMENON CORP., 512 Westline Dr., Alamdea, CA 94501, Tel: 415-521-2145, Telex: 176340; *Sls. Mgr.:* Michael C. Mead

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D•1946

Local Sales Offices & Reps

AZ	Glendale, Adtek	602-931-9289
AZ	Phoenix, Adtek	602-931-9289
CA	Laguna Hills, Elotek Sys.	714-830-4856
CA	San Diego, Elotek Sys.	714-830-4856
CA	SunnyVale, Ichirep	408-249-2585
FL	Orlando, Data Rep	305-843-5224
FL	Orlando, Datarep	305-843-5224
GA	Atlanta, Teqspec II	404-399-6780
HI	Honolulu, Victor Kim Assoc.	808-841-6266
IL	Schaumberg, Kenneth Meyers Co.	312-882-4808
IN	Indianapolis, Kenneth Meyers Co.	317-243-6681
IA	Cedar Rapids, Kenneth Meyers Co.	
MD	Silver Springs, Sel-Tronics Inc.	301-589-3391
MA	Norwell, Bordewieck Eng. Sls. Co.	617-659-4915
MA	Wakefield, Bordewieck Engrg.	617-659-4915
MI	Highland Park, Marsh Equip. Co.	313-869-9200
MN	Minneapolis, Kenneth Meyers Co.	612-920-7080
MO	St. Louis, Comtel Midwest	314-991-5363
NJ	Elmwood Park, L&M Assoc.	201-797-0441
NY	Buffalo, Bromor Co.	716-874-4595
NY	New York, L&M Assoc.	212-243-6155
NC	Winston-Salem, Teqspec III	919-723-8102
OH	Columbus, R. D. Cloon Assoc.	614-459-2890
OH	Columbus, R.D. Cloon Assoc.	614-459-2890
PA	Pittsburgh, Donwil Assoc.	412-343-6767
PA	Reading, L&M Assoc.	215-775-9559
TN	Montgomeryville, Teqspec II	615-587-0980
TX	Houston, T-S-H	713-868-2190
WA	Seattle, Industrial Elctrn. Equip.	206-775-3516
EXP	Hayden Int'l. Corp.	
Can	Lachine Quebec, Electro Design	513-636-4838

NOVA TRAN, 100 Deposition Dr., Clear Lake, WI 54005, Tel: 715-263-2333; FSC No.: 56643; Empl.: 45; *Sls. Mgr.:* R. Schley

NOVATRONICS, Box 878, Pompano Beach, FL 33061, Tel: 305-942-5200, TWX: 510-956-9878; Empl.: 225; *Sls. Mgr.:* W. G. Peters

NRD

NRD, Mark IV Ind., Inc., 2937 Alt Blvd. N., Grand Island, NY 14072, Tel: 716-773-7634, Telex: 91578 NRD GRDI; *Sls. Mgr.:* James R. Curtis; *Dist. Mgr.:* Larry Keating
D•1983

Local Sales Offices & Reps

AZ	Scottsdale, Williams Assocs.	602-947-4297
CA	Mountain View, Tech-Ser, Inc.	415-969-9020
CA	Torrance, Tech-Ser, Inc.	213-320-8101
CO	Commerce City, Williams Assocs.	303-289-5647
FL	Orlando, Delmac Sls.	305-898-4688
GA	Atlanta, Electro-Rep Assocs.	404-320-1134
IL	Libertyville, Ray Klipp Assocs.	312-367-4676
IN	Indianapolis, Electronic Mktg. Conslts., Inc.	317-253-1668
MD	Laurel, CSDS	301-490-3800
MA	Ashland, Sullivan & Powers	617-881-5055
MA	Weston, Sullivan & Powers	617-899-3443
MI	Grand Blanc, Inter-Comm	313-695-0666
MN	Eden Prairie, Bitronics Sls. Co.	612-944-9070
MO	Liberty, Lectro-Reps	816-781-2522
NM	Albuquerque, Williams Assocs.	505-255-1638
NY	Mt. Vernon, Oalco	212-260-5637
NY	Rochester, Pak-Tek, Inc.	716-544-5705
NC	Charlotte, Electro-Rep Assocs.	704-527-2530
OH	Cleveland, Marlow Assocs.	216-991-6500
OH	Columbus, Marlow Assocs.	614-885-7643
PA	Pittsburgh, Marlow Assocs.	412-367-8886
TX	Dallas, P. J. Scanlon Co., Inc.	214-231-4661
UT	Salt Lake City, Williams Assocs.	801-485-6511
Can	Scarborough, Ont., Sigma Mktg.	416-752-4017

Local Distributors

CT	Wallingford, Astesch, Inc.	203-265-4241
KS	Witchita, R.S.C. Elctrns.	316-267-5213
MD	Laurel, RMA Co.	703-273-6660
MA	Holliston, R-Tech	617-429-7222
MI	Flint, Royalite	313-238-8641
MI	Grand Rapids, S.F. Elctrns.	616-459-0216
MI	Pontiac, Techno Inds., Inc.	313-628-4090
MO	St. Louis, Van Sickle Radio Elctrns., Inc.	314-621-5000
NY	Cortland, Monroe-Metz	1-800-424-2442
PR	Rio Piedras, Rubber & Gasket Co. of P.R.	809-763-8787
Can	Mississauga, Ont., Prelco Elctrns.	416-678-0401
Can	Montreal, Que., Prelco Elctrns.	514-389-8051
Can	Nepean, Prelco Elctrns.	613-726-1800

NSD, 10936 Portal Dr., Los Alamitos, CA 90720, Tel: 714-527-4896; *Sls. Mgr.:* Paul Pomerantz; *Dist. Mgr.:* Paul Pomerantz

NTK TECHNICAL CERAMICS, NGK Spark Plugs (U.S.A.), Inc., 1701 N. Greenville Ave. #205, Richardson, TX 75081, Tel: 214-235-8332; FSC No.: 95-246-1286; *Sls. Mgr.:* K. C. Ogawa; *Dist. Mgr.:* Mark Ota
A•1398-1399; B•1805; D•1029

Local Sales Offices & Reps

AL	Huntsville, L&D, Inc.	919-292-3201
CA	Culver City, DeAngelo Rothman and Co. Inc.	213-827-2202
CA	San Jose, Frequency Control Assocs.	408-446-0200
CT	Bloomfield, Zaslow Sales Co.	203-242-7781
FL	Maitland, D.J. Ellis & Assocs. Inc.	305-645-1101
GA	Atlanta, L&D Inc.	404-455-3483
IN	Indianapolis, Intl. Elctrns. Corp. of Indiana	317-257-8115
IN	Scottsburg, Intl. Elctrns. Corp. of Indiana	812-752-4611
IA	Chanhassen, Barnes Sls. Assocs.	612-934-2907
KS	Overland Park, Barnes Midwest Sls.	913-341-9317
MD	Baltimore, Espy Sls. Co.	301-441-6982
MI	Ann Arbor, Elliott Sls. Co.	313-662-4087
MN	Chanhassen, Barnes Sales Assocs.	612-934-2907
NY	Smithtown, Pafi Assocs.	516-360-0940
NC	Raleigh, L&D Inc.	919-876-5301
PA	Rydal, Espy Sls. Assocs.	215-576-0780
TN	Seymour, Espy Sls. Assocs.	315-573-6511
VA	Richmond, Espy Sls. Assocs.	804-359-0125
WA	Seattle, Northmar Inc.	206-524-5170

NUCLEAR RESCH. CORP., 125 Titus Ave., Warrington, PA 18976, Tel: 215-343-5900, Telex: 510-665-8525 NRC WNTN; FSC No.: 96696; Empl.: 85; *Sls. Mgr.:* D.T. McIntyre, V.P.

Local Sales Offices & Reps

FL	Naples, Nuclear Research Corp.	813-775-8686
IL	Mt. Prospect, Contemporary Science	312-255-3793
NC	Charlotte, BinCo.	704-366-5092
SC	Georgetown, Nuclear Research	803-546-1724

NUCLEONIC PRODS., See Thomson-CSF Comps. Corp., Passive Comps. Div.

NU-CONCEPT COMPUTER SYS., Rte. 309 & Advance La., Colmar, PA 18915, Tel: 215-822-8400, Telex: 5106614838; FSC No.: 58561; Empl.: 17; *Sls. Mgr.:* Thomas Dvorak

NU DATA, 32 Fairview Ave., Little Silver, NJ 07739, Tel: 201-842-5757, Telex: 132405, TWX: 710-722-5754; Empl.: 20; *Sls. Mgr.:* Keith Taylor

NUMARK ELCTRNS. CORP., 503 Raritan Ctr., Edison, NJ 08817

NUMERIX CORP., 20 Ossipee Rd., Newton, MA 02164, Tel: 617-964-2500, Telex: 948032; *Sls. Mgr.:* Harold Messias

NU-METRICS, 947 Longdale Ave., Longwood, FL 32750, Tel: 305-331-7717; Empl.: 12; *Sls. Mgr.:* Timothy Check

NURAD, INC., 2165 Druid Pk. Dr., Baltimore, MD 21211, Tel: 301-462-1700, TWX: 710-234-1071; Empl.: 120

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NWL TRANSFORMERS, Rising Sun Rd., P.O. Box 358, Bordentown, NJ 08505, Tel: 609-298-7300, TWX: 510-685-3645; Empl.: 230; *Sls. Mgr.:* C. W. Harrison
A•2211; D•1735

NWL TRANSFORMERS, Rising Sun Rd., P.O. Box 358, Bordentown, NJ 08505, Tel: 609-298-7300, TWX: 510-685-3645; Empl.: 225; *Sls. Mgr.:* C. W. Harrison
D•1735

NYE, WILLIAM F., INC., P.O. Box G-927, New Bedford, MA 02742-0927, Tel: 617-996-6721, Telex: 940807; Empl.: 15

NYLTITE, 3451 S. Clinton Ave., S. Plainfield, NJ 07080, Tel: 201-561-1300; *Sls. Mgr.:* Frances Gould

Nytronics Components Group, Inc.

NYTRONICS COMPONENTS GRP., INC., Orange St., Darlington, SC 29532, Tel: 803-393-5421, TWX: 810-665-2182; FSC No.: 83125; Empl.: 502; *Sls. Mgr.:* Mack W. Windham
A•1142-1155, 1204, 1244-1263, 1550-1554, 1911

Local Sales Offices & Reps

AL	Huntsville, B.C.I.	205-539-4411
AZ	Tucson, Clemick & Assocs.	602-749-4003
CA	Granada Hills, Clemick Neenan & Assocs.	818-895-2431
CA	San Diego, Clemick Neenan & Assocs.	619-693-0863
CA	Sunnyvale, W.W. Posey	408-746-0771
CO	Denver, Component Sls.	303-759-1666
FL	Boca Raton, Lawrence Assocs.	305-368-7373
GA	Chamblee, B.C.I.	404-455-0405
IL	Rolling Meadows, Sumer Inc.	312-991-8500
IN	Indianapolis, EMCI	317-253-1668
KS	De Soto, Mid-Tec Assoc.	913-441-6565
MA	Woburn, Astrorep of New England	617-938-6692
MI	Rockford, H.C. Heym Assoc.	616-874-7443
MN	Minneapolis, Dunlop Conslts.	612-529-7626
MO	Florissant, Mid-Tec Assoc.	314-837-5200
NJ	West Orange, National Atlantic	201-731-0703
NY	Pittsford, W.A. Franklin Sls.	716-248-8251
NY	Valley Cottage, LRC Assocs.	914-268-4435
NC	Charlotte, B.C.I. Inc.	704-567-0473
OH	Akron, Imtech	216-666-1185
OK	Tulsa, Design Mktg.	918-742-2589
OR	Tigard, Eltech, Inc.	503-684-3458
PA	Narberth, Bresson Assocs.	215-664-6460
TX	Dallas, Design Mktg.	214-680-9767
TX	Round Rock, Design Mktg.	512-255-9896
UT	Salt Lake City, Component Sls.	801-466-8623

VA	Lynchburg, Bresson Assocs.	703-237-1304
WA	Bellevue, Eltec	206-643-4330
WI	Brookfield, Sumer, Inc.	414-784-6641
Intl	Ramat Gan, Isreal, Sietel Engrg., Ltd.	03-265571
Can	Toronto, Ont., RFQ, Ltd.	416-595-0616

Local Distributors

CA	Garden Grove, Hi Rel	213-594-9571
CA	Garden Grove, Inductive Prods.	714-891-2572
CA	Gardena, Bell Inds.	213-515-1800
CA	San Diego, Mock III	619-560-0515
CA	San Jose, Cypress	408-945-8400
CA	Sunnyvale, Bell Inds.	408-734-8570
CA	Thousand Oaks, Bell	805-499-6821
CA	Walnut, A. C. L.	213-331-0735
CO	Denver, Newark Elec.	303-757-3351
CO	Englewood, Industrial Elctrns.	303-694-9444
CO	Wheatridge, Bell Inds.	303-424-1985
FL	Ft. Lauderdale, Newark Elect.	305-587-2372
IL	Chicago, Bell Inds.	312-982-9210
IL	Chicago, Newark Elect.	312-638-4411
IN	Indianapolis, Graham Elect.	317-634-8202
IA	Cedar Rapids, Newark Elect.	312-362-1171
MD	Baltimore, Radio Elect.	301-823-0070
MD	Beltsville, Newark Elec.	301-937-5085
MA	Needham, Cronin Elctrns.	617-449-0500
MA	Waltham, Sterling Elec.	617-894-6200
MN	Minneapolis, Joel Co.	612-545-5669
MN	Minneapolis, Newark Elect.	216-361-4700
NJ	Kenilworth, Newark Elect.	201-272-8410
NY	Farmingdale, Pride Elctrns.	516-293-4020
NY	Hauppauge, Fairmont Elctrns.	516-231-3313
NY	Hauppauge, Jaco Elect.	516-273-5500
NY	Plainview, ACI Elect.	516-293-6630
NY	Rome, Rome Elect.	315-337-5400
NC	Raleigh, Radio Elec. Svc.	919-781-5700
OH	Centerville, C.V. Clark	513-435-3000
OH	Cleveland, Newark Elect.	216-361-4700
OR	Lake Oswego, Bell Inds.	503-241-4115
PA	Montgomeryville, Pyttronic Inds.	215-643-2850
PA	Philadelphia, Herback Rademan	215-426-1700
PA	Philadelphia, Philadelphia Elctrns.	215-568-7400
PA	York, E. C. I.	717-846-5334
TX	Dallas, Wholesale Elect.	214-824-3001
UT	Salt Lake City, Newark Elect.	801-486-1048
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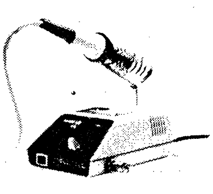

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OAK MATERIALS GROUP INC., Laminates Div., 1 Mechanic Street, Hoosick Falls, NY 12090, Tel: 518-686-4379, Telex: 710-965-9721; FSC No.: 53240; *Sls. Mgr.:* Robert L. Fidrych; *Dist. Mgr.:* Richard Spiak

OAK SWITCH SYS., 100 S. Main St., Crystal Lake, IL 60014, Tel: 815-459-5000, Telex: 72-2447, TWX: 910-634-3353; FSC No.: 76854; Empl.: 1200

OAKTRON INDS., 1000 30th St., Monroe, WI 53566, Tel: 608-328-5560; FSC No.: 07109; Empl.: 250; *Sls. Mgr.:* J. F. Disch; *Dist. Mgr.:* J. F. Disch .... **D•1030**

Local Sales Offices & Reps

AZ	Phoenix, S. Fisher Assoc.	602-247-7865
CA	Mill Valley, Roy Colen Sls., Inc.	415-383-8700
CA	Newhall, Lessing Assoc.	213-348-6662
CO	Arvada, C B Elctrn. Mktg.	303-422-0561
FL	Tampa, SRT Marketing	813-884-4805
GA	Atlanta, Millar Elctrl.	404-261-6160
IL	Elmhurst, E.S.I.	312-941-0710
IN	Mulberry, Maish Sls.	317-296-2322
MA	Millis, R. G. Assoc.	617-376-2044
MN	Minneapolis, Kodo Assoc.	612-881-1255
MO	Kansas City, Nevco	816-421-1751
MO	St. Louis, Nevco	314-843-7406
NY	Rochester, Warren Kaufman Assoc.	716-266-2728
NY	Whitestone, J. Brown Elctrl. Sls.	718-767-1977
NC	Raleigh, Millar Elctrl.	919-787-9564
OH	Akron, Shamrock Elctrl.	614-888-7638
OH	Dayton, Shamrock Elctrl.	513-298-1227
TX	Richardson, Campion Sls.	214-238-8145
VA	Great Falls, Kendall & Assoc.	703-759-3128
WA	Seattle, Vector/RMC	206-322-4343
EXP	IL, Chicago, Magnus Elctrl.	312-679-6070

OAL ASSOCS., P.O. Box J, Escondido, CA 92025, Tel: 619-743-7143; Empl.: 10; *Sls. Mgr.:* Mark Lohkemper

Local Sales Offices & Reps

CA	Costa Mesa, Pat Dooley Co.	714-548-2232
NY	Great Neck, W&A Holland	516-487-8877

OAR CORP., A CompuDyne Co., 10447 Roselle St., San Diego, CA 92121, Tel: 619-453-4013, Telex: 697852; *Sls. Mgr.:* Michael A. Duke

OAS INC., See Optimum Applied Systems

OCEAN MARINE INSTRUMENT, 629 Terminal Way # 15, Costa Mesa, CA 92627, Tel: 714-548-9569 .... **D•1947**

OCEAN RESCH. EQUIP., INC., Box 709, Falmouth, MA 02541, Tel: 617-548-5800, Telex: 94-0859; Empl.: 125; *Sls. Mgr.:* J. Angell

OCLI PHOTOELCTRNS. DIV., See Applied Solar Energy

ODELL, M. P., CO., 1620 Chesapeake Dr., Hoffman Estates, IL 60195, Tel: 312-991-2828; *Sls. Mgr.:* Maria McClurkin

OECO CORP., 712 S.E. Hawthorne Blvd., Portland, OR 97214, Tel: 503-238-2440, Telex: 36-0350; FSC No.: 95266; Empl.: 559; *Sls. Mgr.:* Bob Bunker

OGALLALA ELCTRNS., Div. Arnold Engrg. Co., Box 59, Ogallala, NE 69153, Tel: 308-284-4093; Empl.: 37; *Sls. Mgr.:* H. L. Harrington

O'HANLON COMPUTER SYSTEMS, INC., 8383-158th Ave NE, Seattle, WA 98052, Tel: 206-885-2502; Empl.: 32; *Sls. Mgr.:* Dennis Sullivan; *Dist. Mgr.:* Dennis Sullivan

OSI

OHIO SEMITRONICS, INC., 1205 Chesapeake Ave., Columbus, OH 43212, Tel: 614-486-9561, TWX: 810-482-1630; FSC No.: 12066; Empl.: 58; *Sls. Mgr.:* G. Clagett .... **B•1776, 1806-1819; D•1284-1289**

Local Sales Offices & Reps

CA	Arcadia, Van Gott & Assocs.	818-445-9728
CA	Hayward, FLW, Inc.	415-786-9070
CO	Boulder, Meas. Conslts.	303-449-7506
CT	Wallingford, Pat Jenks Assocs.	
FL	Orlando, Datarep	305-843-5224
GA	Acworth, Zelco Assocs.	404-974-8647
IL	Columbia, R. L. Weisheimer & Assocs.	618-281-4148
IL	Park Ridge, Elctrn. Instr. Assocs.	312-298-2290
MA	Woburn, Pat Jenks Assocs.	617-938-0488
MN	Minneapolis, The Mark Co.	612-933-3026
NJ	Garwood, E. R. Mertz, Inc.	201-232-4643
NY	Latham, L-Tron Corp.	518-785-5032
NC	Charlotte, Zelco Assocs.	704-523-2961
OH	Dayton, Mohawk Intronics	513-434-8873
OH	No. Ridgeville, TMS, Inc.	216-327-3527
PA	Carnegie, Flow Media	412-923-1619
PA	King of Prussia, FLW, PA, Inc.	215-337-4343
TN	Memphis, Jordan/Marlar/Hale, Inc.	901-452-7441
TX	Houston, Scientific Sls. Co.	713-460-9170
TX	Richardson, Scientific Sls. Co.	214-231-6541
UT	Salt Lake City, Meas. Conslts.	801-364-3174
WA	Bellevue, Topp Engrg. Sls. Corp.	206-747-5400

OHIOSWITCH, INC., 6534 Singletree Dr., Columbus, OH 43229, Tel: 614-885-0319

OHMITE MFG. CO., 3601 W. Howard St., Skokie, IL 60076, Tel: 312-675-2600, Telex: 72-4433, TWX: 910-223-0805; FSC No.: 44655; *Sls. Mgr.:* Robt. Axthelm; *Dist. Mgr.:* Robt. Axthelm .... **A•1912-1921, 2032-2033**

Local Sales Offices & Reps

AL	Huntsville, Cartwright & Bean	205-830-1540
AK	Anchorage, H. J. Lang Assoc.	907-279-5741
AZ	Phoenix, Mercury Eng. Sls.	602-244-0123
CA	Los Angeles, Wiley Co.	213-666-1611
CA	Palo Alto, Ohmite Mfg. Co.	415-494-6954
CA	San Diego, Wiley Co.	619-571-2881
CO	Denver, Lindberg Co.	303-758-9033
CT	North Haven, Coakley, Boyd & Abbett	203-239-6217
FL	Deerfield Beach, Cartwright & Bean	305-429-3400
FL	Orlando, Cartwright & Bean	305-422-4531
GA	Atlanta, Cartwright & Bean	404-233-2939
IL	Skokie, Ohmite Mfg. Co.	312-675-2600
IN	Indianapolis, Electronic Reps, Inc.	317-894-1414
IN	Mishawaka, Electronic Reps, Inc.	219-259-9365
LA	Covington, Cartwright & Bean	504-892-1780
MA	Needham Hgts., Coakley, Boyd & Abbett	617-444-5470
MI	Grosse Pointe Park, Greiner Assocs.	313-499-0188
MN	St. Paul, Northport Engrg.	612-457-8000
MS	Jackson, Cartwright & Bean	601-981-1170
MO	Gladstone, Delltron Co.	816-436-6445
MO	St. Louis, Delltron Co.	314-869-4779
NH	Plaistow, Coakley, Boyd & Abbett	617-444-5470
NJ	River Edge, Ohmite Mfg. Co.	201-488-3690
NJ	Willingboro, Ohmite Mfg. Co.	609-871-1691
NM	Albuquerque, Lindberg Co.	505-881-1006
NY	Rochester, Electra Sls.	716-427-7860
NY	Syracuse, Electra Sls. Corp.	315-463-1248
NC	Charlotte, Polytech Svcs.	704-372-4161
OH	Chardon, Ohmite Mfg. Co.	216-287-7454
OH	Dayton, Ohmite Mfg. Co.	513-277-6543
OK	Broken Arrow, Erickson Sls.	918-455-4276
OR	Tigaird, Electronic Sls.	503-245-2342
PA	Monroeville, Ohmite Mfg. Co.	412-373-2695
TN	Knoxville, Cartwright & Bean	615-693-7450
TN	Memphis, Cartwright & Bean	901-276-4442
TX	Austin, Erickson Sls.	512-445-2952
TX	Dallas, Erickson Sls.	214-739-5833
TX	Houston, Erickson Sls.	713-226-1604
UT	Salt Lake City, Lindberg Co.	801-467-1794
WA	Mercer Island, Electronic Comp Sls.	206-232-9301

ohmtek INC.

OHMTEK, INC., 2160 Liberty Dr., Niagara Falls, NY 14304, Tel: 716-283-4025; FSC No.: 57489; Empl.: 143; *Sls. Mgr.:* John Burger .... **A•1923-1925**

Local Sales Offices & Reps

CA	Santa Clara, I2 Inc.	408-988-3400
CA	Woodland Hills, Interstate Mktg. Assoc.	213-883-7606
CO	Aurora, High Tech. Assocs.	303-695-1990
FL	Maitland, Beacon	305-647-3489
KS	Overland Pk., Advanced Techn. Sls.	913-642-6675
MA	Shrewsbury, Compatible Comps.	617-422-7641
MN	Mendota Hgts., G-II Sales	612-454-3086
NJ	Englewood, Harold Gray Assocs.	201-894-0894
NM	Albuquerque, Power Entprs.	505-298-1918
NY	Rochester, Fritz Dasson	716-338-1699
OH	Cincinnati, John F. Kilfoil Co.	513-791-6150
PA	Wynnewood, Metz-Benham Assocs.	215-896-7300
TX	Lewisville, Jim Hughes Co.	214-221-1536

OK INDUSTRIES, INC., 3455 Conner St., Bronx, NY 10475, Tel: 212-994-6600, Telex: 12-5091; Empl.: 100; *Sls. Mgr.:* David Leventhal

OKONITE, Box 340, Ramsey, NJ 07446, Tel: 201-825-0300, TWX: 710-988-1017; Empl.: 1900; *Sls. Mgr.:* A. C. Coppola

Local Sales Offices & Reps

AL	Birmingham	205-592-8968
AZ	Tempe	602-838-8596
CA	Los Angeles	213-802-1759
CA	S. San Francisco	415-873-8590
CO	Denver	303-759-2776
FL	Tampa	813-877-0581
GA	Atlanta	404-953-3510
IL	Downers Grove	312-932-8200
LA	New Orleans	504-246-3840
MA	Hingham	617-749-3374
MI	Southfield	313-569-3230
MO	Frontenac	314-997-2320
MO	Kansas City	816-358-5600
NJ	Cherry Hill	215-567-5739
NY	Syracuse	315-479-8313
NC	Charlotte	704-535-6535
OH	Cincinnati	513-761-1333
OR	Portland	503-228-3172
PA	Leetsdale	412-734-2503
TX	Dallas	214-243-3318
TX	Houston	713-820-9990
UT	Salt Lake City	801-263-3048
VA	Vienna	703-938-4770
WI	Milwaukee	414-476-4550

OLIVER ADVANCED ENGRG., 676 W. Wilson Ave., Glendale, CA 91203, Tel: 818-240-0080, Telex: 194773; Empl.: 28; *Sls. Mgr.:* Dane Hutchins; *Dist. Mgr.:* Dane Hutchins

OLYMPIC WIRE & CABLE, 1 Madison Rd., Fairfield, NJ 07006, Tel: 201-227-7996, Telex: 75-2217; FSC No.: 63830; Empl.: 35; *Sls. Mgr.:* Robert T. Mello; *Dist. Mgr.:* Yvette Archer

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OMEGA ENGRG., Box 4047, Stamford, CT 06907, Tel: 203-359-1660, Telex: 99-6404; Empl.: 400; *Sls. Mgr.:* George Vermilyea .....**B•1683, 1766-1767, 1820-1821; C•1887; D•1013, 1070, 1128, 1160, 1290, 1374-1375, 1407**

OMNI SPECTRA, INC., Microwave Connector Div., 140 Fourth Ave., Waltham, MA 02154, Tel: 617-890-4750

OMNIBYTE CORP., 245 W. Roosevelt Rd., Bldg. 1-5, W. Chicago, IL 60185, Tel: 312-231-6880; Empl.: 35; *Sls. Mgr.:* Susan Cochran

Local Sales Offices & Reps

AZ	Scottsdale, Frontier Technology	602-998-4438
CA	Santa Clara, Applied Micro Tech.	408-730-1289
CA	Woodland Hills, Applied Micro Tech.	213-888-2027
CO	Englewood, Davis Assocs., Inc.	303-761-7980
FL	Melbourne, Reynolds & Assoc.	305-259-7000
IL	Park Ridge, Ad Tech Inc.	312-692-7320
MA	Waltham, Digital Sales	617-899-4300
MI	Southfield, Infinity, Inc.	313-557-7230
MN	Minneapolis, Jen-Ray Sys.	612-831-5060
NJ	Boonton, Winter Assoc.	201-334-3434
NY	Caledonia, E. F. Sls.	716-538-4754
TX	Houston, Dyna Marketing	713-460-0314
EXP	IL, Chicago, Computer Overseas Corp.	312-332-3272
Can	Scarbouough, Ontario, Finnan Engineered Prods., Ltd.	416-438-6070

OMNI SPECTRA, 21 Continental Blvd., Merrimack, NH 03054, Tel: 603-424-4111, Telex: 953053, TWX: 710-366-0674; FSC No.: QUIP; Empl.: 750; *Sls. Mgr.:* Ernest J. Devita; *Dist. Mgr.:* Terri Hastings

OMNI SPECTRA, INC., Microwave Subsystems Div., 2626 So. Hardy Dr., Tempe, AZ 85282, Tel: 602-966-1471, TWX: 910-950-1296; *Sls. Mgr.:* Carl Seburn; *Dist. Mgr.:* Carl Seburn

OMNI SWITCH, INC., 21630 N. 19th Ave., Suite B-20, Phoenix, AZ 85027, Tel: 602-582-0629, Telex: 602-582-0665; Empl.: 100; *Sls. Mgr.:* Jim Burkett

OMNITEC DATA INC., 2405 S. 20th St., Phoenix, AZ 85034, Tel: 602-258-8244, 800-528-8423, TWX: 910-951-4247; *Sls. Mgr.:* Dan J. Mitchell; *Dist. Mgr.:* Dan J. Mitchell

OMNITEK, INC., P.O. Box 102, 820 Pennsylvania Blvd., Feasterville, PA 19047, Tel: 215-355-4443, TWX: 510-667-1730; FSC No.: 54316; *Sls. Mgr.:* Frank Shandelman

OMNI-WAVE ELECTRONICS CORP., P.O. Box 660, Gloucester, MA 01930, Tel: 617-281-2800

OMRON ELCTRNS., INC., Control Comps. Div., One E. Commerce Dr., Schaumburg, IL 60195, Tel: 312-843-7900, TWX: 910-291-2494; Empl.: 209; *Sls. Mgr.:* D. Nelson

ONSET COMPUTER CORP., 199 Main St., PO Box 1030, N. Falmouth, MA 02556, Tel: 617-563-2267, Telex: 469915; Empl.: 8; *Sls. Mgr.:* Elaine Boyd

ONTEL CORP., 250 Crossways Park Dr., Woodbury, NY 11797, Tel: 516-364-2121, Telex: 961-382; Empl.: 430; *Sls. Mgr.:* Ed Heinze

OPAMP LABS, INC., 1033 N. Sycamore Ave., Los Angeles, CA 90038, Tel: 213-934-3566; FSC No.: 24699; Empl.: 18 .... **D•1014**

OPTEK TECHNOLOGY, INC., 345 Industrial Blvd., McKinney, TX 75069, Tel: 214-542-9461, TWX: 910-860-5625; Empl.: 580; *Sls. Mgr.:* James Trautwein; *Dist. Mgr.:* Dave Kimbrough

OPTELECOM, 15940 Luanne Dr., Gaithersburg, MD 20877, Tel: 301-840-2121; FSC No.: 59338; Empl.: 50; *Sls. Mgr.:* F. C. Eggleston

OPTICAL & CONDUCTIVE COATINGS, Meridian Inds., Inc., 428 N. Buchanan Cir., # 8, Pacheco, CA 94553, Tel: 415-798-6066, Telex: 171309 HQ WNCK; FSC No.: 9U775; Empl.: 8; *Sls. Mgr.:* Glenn G. Grupe

OPTICAL ELECTRONICS, INC., Box 11140, Tucson, AZ 85734, Tel: 602-624-8358, TWX: 910-952-1283; FSC No.: 5962; Empl.: 16; *Sls. Mgr.:* George L. Hill

Local Sales Offices & Reps

CA	San Diego, California Elctrn. Mktg.	619-692-3551
CA	Santa Ana, California Elctrn. Mktg.	714-835-2702
CA	Santa Clara, Comtronics	408-773-9800
CT	Burlington, Tritek, Inc.	617-272-4550
MA	Burlington, Tritek, Inc.	617-272-4550
NJ	Paramus, Design Elctrns.	201-845-6224
TX	Hurst, El-Tec Sls.	817-268-2896

OPTICAL FIBER TECHNOLOGIES, INC., P.O. Box 148, Nutting Lake, MA 01865, Tel: 617-663-6629, Telex: 948-288; *Sls. Mgr.:* Patricia Whalen

OPTICAL PUBLISHING CO., INC., Berkshire Common, Pittsfield, MA 01201, Tel: 413-499-0514, Telex: 232-005-ASAS Attention: Optical; *Sls. Mgr.:* George Cominsky

OPTICAL TECHNIQUES INTL., 1800 E. Garry, Ste. # 214, Santa Ana, CA 92705, Tel: 714-540-9040; *Sls. Mgr.:* Robert Theriault; *Dist. Mgr.:* Robert Theriault

OPTICS FOR RESEARCH, INC., P.O. Box 82, Caldwell, NJ 07006, Tel: 201-228-4480, Telex: 130-224; *Sls. Mgr.:* Donald K. Wilson

OPTICS INTERNATIONAL, Box 101, Tenafly, NJ 07670, Tel: 201-567-4799; Empl.: 10

OPTIMA ENCLOSURES, 2166 Mountain Indl. Blvd., Tucker, GA 30084, Tel: 404-939-6340, TWX: 810-766-3967; FSC No.: 10110; Empl.: 250; *Sls. Mgr.:* Al Waters

OPTIMATION, See Julie Research Labs

OPTIMIZED DEVICES, INC., 220 Marble Ave., Pleasantville, NY 10570, Tel: 914-769-6100; Empl.: 30

OPTIMUM APPLIED SYSTEMS, 145 Palisade St., Dobbs Ferry, NY 10522-1696, Tel: 914-693-9001, Telex: 646141 ATT:OAS; Empl.: 30; *Sls. Mgr.:* H. Joseph Brakl

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OPT INDS. INC., 300 Red School La., Phillipsburg, NJ 08865, Tel: 201-454-2600, TWX: 510-235-2920; Empl.: 290 .... **A•1401, 2212; D•1736-1739**

Local Sales Offices & Reps

CA	Campbell, Sheehan Mktg. Assocs.	408-370-6900
CT	Windsor, Janco Technlg.	203-743-9436
FL	Lauderhill, Innovative Mktg.	305-485-6869
FL	Lighthouse Point, Sales Engrg. Concepts	305-781-4800
FL	Melbourne, EMS, Inc.	305-724-1027
GA	Cumming, RGA Sls., Inc.	404-438-4125
IL	Chicago, LGS Elctrns. Co.	312-456-9616
IN	Ft. Wayne, Corrao Marsh, Inc.	219-637-5548
IA	Cedar Rapids, Cahill, Schmitz & Cahill	319-377-8219
MD	Baltimore, Controy Sls.	301-296-2444
MN	Minneapolis, White Sls. Co.	612-755-0855/3511
NJ	Palisades Park, Janco Technlg.	201-941-4008
NY	Rochester, Alan Lupton Assocs., Inc.	716-482-7700
OH	Cincinnati, Ken C. Hoffman, Jr. Co.	513-931-1686
OH	Dayton, Patrick Montplaisir	513-434-4316
OK	Tulsa, The Hugh Daly Co.	918-494-7711

OPTOELECTRONICS, INC., 1309 Dynamic St., Petaluma, CA 94952, Tel: 707-763-4181, Telex: 34-0186; Empl.: 40; *Sls. Mgr.:* Victor Yen

OPTOELECTRONICS, INC., 5821 N.E. 14th Ave., Ft. Lauderdale, FL 33334, Tel: 305-771-2050, Telex: 514849; Empl.: 25; *Sls. Mgr.:* L. R. Hufft; *Dist. Mgr.:* L. R. Hufft

OPTOMICRONIX, 10080 N. Wolfe Rd., SW 3-360, Cupertino, CA 95014, Tel: 408-725-1220; *Sls. Mgr.:* W. M. Otsuka

OPTO TECHNOLOGY, INC., 1674 S. Wolf Rd., Wheeling, IL 60090, Tel: 312-537-4277, TWX: 910-687-1490; Empl.: 35; *Sls. Mgr.:* Richard E. Hegberg

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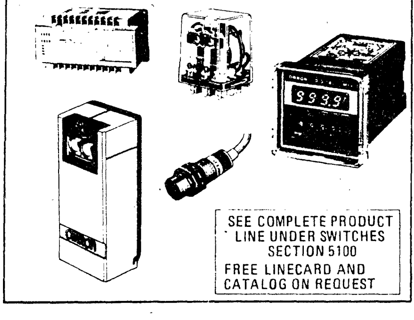

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OPTO 22, 15461 Springdale St., Huntington Bch., CA 92649, Tel: 714-891-5861, Telex: 692-386; Empl.: 120 .... **B•1440-1441**

Local Distributors

AL	Birmingham, Industrial Elec. Supply	205-956-8504
AL	Huntsville, Hamilton Avnet Elctrns.	205-837-7210
AL	Huntsville, Pioneer/Huntsville	205-837-9300
AZ	Phoenix, Wyle Labs.	602-249-2232
AZ	Tempe, Hamilton Avnet Elctrns.	602-231-5100
AZ	Tucson, Wyle Labs.	602-884-7082
AR	Little Rock, Carlton Bates	501-562-9100
CA	Agoura, Wyle Labs.	818-880-9000
CA	Chatsworth, Hamilton Avnet Elctrns.	818-700-2600
CA	Costa Mesa, Avnet Elctrns.	714-754-6111
CA	Costa Mesa, Hamilton Electro Sls. Orange County	714-641-4100
CA	Culver City, Hamilton Electro Sls.	213-558-2121
CA	El Segundo, Wyle Labs.	213-322-8100
CA	Huntington Beach, Opto 22 Distibutor Sls.	714-891-5861
CA	Irvine, Wyle Labs.	714-863-9953
CA	Ontario, Hamilton Avnet Elctrns.	714-989-4602
CA	Rancho Cordova, Wyle Labs.	916-638-5282
CA	Sacramento, Hamilton Avnet Electronics	916-925-2216
CA	San Diego, Hamilton Avnet Elctrns.	619-571-7510
CA	San Diego, Wyle Labs.	619-565-9171
CA	Santa Clara, Wyle Labs.	408-727-2500
CA	Sunnyvale, Hamilton Avnet Elctrns.	408-743-3355
CO	Englewood, Hamilton Avnet Elctrns.	303-740-1000
CO	Thornton, Wyle Labs.	303-457-9953
CT	Danbury, Hamilton Avnet Elctrns.	203-797-2800
CT	Norwalk, Pioneer/Connecticut	203-853-1515
DC	Washington, Hamilton Avnet Elctrns.	301-621-5410
FL	Altamonte Springs, Pioneer/Orlando	305-834-9090
FL	Deerfield Beach, Pioneer/Ft. Lauderdale	305-771-7520
FL	Fort Lauderdale, Hamilton Avnet Elctrns.	305-971-2900
FL	Orlando, Hamilton Avnet Elctrns.	305-628-3888
FL	St. Petersburg, Hamilton Avnet Elctrns.	813-576-3930
GA	Norcross, Hamilton Avnet	404-447-7507
GA	Norcross, Pioneer/Georgia	404-448-1711
GA	Norcross, Professional Control Corp.	404-449-4577
IL	Bensenville, Hamilton Avnet Elctrns.	312-860-7700
IL	Berkeley, Tara	312-449-6434
IL	Elk Grove Village, GBL Goold Elctrns.	312-593-3220
IL	Elk Grove Village, Pioneer/Chicago	312-437-9680
IL	Moline, Jim Otis	309-762-9311
IN	Carmel, Hamilton Avnet Elctrns.	317-844-9333
IN	Indianapolis, Pioneer/Indiana	317-849-7300
IN	Indianapolis, Process Automation Devices	317-849-3682
IA	Cedar Rapids, Hamilton Avnet Elctrns.	319-362-4757
KS	Overland Park, Hamilton Avnet Elctrns.	913-888-8900
MD	Baltimore, Automation Indl. Control	301-944-8400
MD	Columbia, Hamilton Avnet Elctrns.	301-995-3500
MD	Gaithersburg, Pioneer Technlgs. Grp., Inc.	301-921-0660
MD	Mount Airy, Thermal Devices	301-442-1007
MA	Lexington, Pioneer/Massachusetts	617-861-9200
MA	N. Redding, Martindale Assocs.	617-664-0355
MA	Woburn, Hamilton Avnet Elctrns.	617-273-7500
MI	Grand Rapids, Hamilton Avnet Elctrns.	616-243-8805
MI	Livonia, Hamilton Avnet Elctrns.	313-522-4700
MI	Livonia, Pioneer/Michigan	313-525-1800
MI	Madison Heights, McNaughton-McKay Elect.	313-399-7500
MN	Minneapolis, Cassidy Elctrns.	612-944-0100
MN	Minnetonka, Hamilton Avnet Elctrns.	612-932-0600
MN	Minnetonka, Pioneer/Twin Cities	612-935-5444
MN	St. Paul, Kim Controls	612-780-2991
MO	Earth City, Hamilton Avnet Elctrns.	314-344-1200
NE	Omaha, Jim Otis & Assocs.	402-392-0523
NH	Manchester, Hamilton Avnet Elctrns.	603-624-9400
NJ	Cherry Hill, Hamilton Avnet Elctrns.	609-424-0100
NJ	Fairfield, Hamilton Avnet Elctrns.	201-575-3490
NJ	Newark, Norman Bragar	201-344-1100
NJ	Pine Brook, Pioneer/New Jersey	201-227-1262
NM	Albuquerque, Hamilton Avnet Elctrns.	505-765-1500
NY	East Syracuse, Hamilton Avnet Elctrns.	315-437-2641
NY	Fairport, Pioneer/Rochester	716-381-7070
NY	Glen Head, Livera-Polk Assocs.	516-759-9300
NY	Melville, Hamilton Avnet Elctrns.	516-434-7421
NY	Rochester, Hamilton Avnet Elctrns.	716-475-9130
NY	Vestal, Pioneer/Binghamton	607-748-8211
NY	Woodbury, Pioneer/Woodbury	516-921-8700
NC	Charlotte, Pioneer/Carolina	704-527-8188
NC	Charlotte, Regan Controls	704-523-9137
NC	Raleigh, Hamilton Avnet Elctrns.	919-878-0810
OH	Centerville, I. P. D.	513-435-2086
OH	Cincinnati, Richard Equip.	513-271-8666
OH	Cleveland, Hamilton Avnet Elctrns.	216-831-3500
OH	Cleveland, Pioneer/Cleveland	216-587-3600
OH	Columbus, Great Lakes Controls Corp.	614-451-7872
OH	Columbus, Hamilton Avnet Elctrns.	614-882-7004
OH	Dayton, Hamilton Avnet Elctrns.	513-439-6700
OH	Dayton, Pioneer/Dayton	513-236-9900
OH	North Royalton, Great Lakes Controls Corp.	216-582-0020
OK	Tulsa, Quality Comps.	918-664-8812
OR	Hillsboro, Wyle Labs.	503-640-6000
OR	Lake Oswego, Hamilton Avnet Elctrns.	503-635-8831
OR	Portland, Pacific Control Supply	503-249-2033
PA	Horsham, Pioneer/Delaware Valley	215-674-4000
PA	King of Prussia, Applied Controls	215-265-3832
PA	Pittsburgh, Customized Control Sys.	412-921-3196
PA	Pittsburgh, Great Lakes Control Corp.	412-341-8922
PA	Pittsburgh, Hamilton Avnet Elctrns.	412-281-4150
PA	Pittsburgh, Pioneer/Pittsburgh	412-782-2300
TX	Addison, Quality Comps.	214-733-4300
TX	Austin, Hamilton Avnet Elctrns.	512-837-8911
TX	Austin, Pioneer/Austin	512-835-4000
TX	Austin, Quality Comps.	512-835-0220
TX	Austin, Wyle Labs.	512-834-9957
TX	Dallas, Pioneer/Dallas	214-386-7300
TX	Houston, Hamilton Avnet Elctrns.	713-780-1771
TX	Houston, Pioneer/Houston	713-988-5555
TX	Houston, Quality Comps.	713-240-2255
TX	Houston, Wyle Labs.	713-879-9953
TX	Irving, Hamilton Avnet Elctrns.	214-659-4111
TX	Richardson, Wyle Labs.	214-235-9953
UT	Salt Lake City, Hamilton Avnet Elctrns.	801-972-2800
UT	Salt Lake City, Wyle Labs.	801-947-9953
WA	Bellevue, Hamilton Avnet Elctrns.	206-643-3950
WA	Bellevue, Wyle Labs.	206-453-8300
WA	Kent, Shannon, Ltd.	206-763-0545
WA	Redmond, Cascade Controls	206-881-8843
WI	Germantown, Professional Control Corp.	414-251-3000
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WI	Milwaukee, Taylor Elctrns.	414-241-4321

OPTRON, INC., See TRW Optron

ORAM ELCTRNS., Rte. 22, Putnam Business Park, Brewster, NY 10509-9587, Tel: 914-279-2966, Telex: ORAM 628-382-40; Empl.: 25; *Sls. Mgr.:* Vincent A. Gianguzzi

ORAM ELECTRONICS, 12 Cranston Rd., Pittsford, NY 14534, Tel: 716-381-4673; Empl.: 150; *Sls. Mgr.:* M. I. Mindell .... **D•1740**

ORBIT INDS., 2670 Lockheed Way, Carson City, NV 89701, Tel: 702-882-6123; Empl.: 10

ORBIT INSTRUMENT CORP.

ORBIT INSTRUMENT CORP., 80 Cabot Ct., Hauppauge, NY 11788, Tel: 516-435-8300, TWX: 510-221-2122; FSC No.: 11263; *Sls. Mgr.:* Bruce Reissman, Dennis Sunshine .... **B•1735; D•1129**

Local Sales Offices & Reps

CA	San Diego, Orbit Instr. Corp.	619-566-3437

ORBIT INSTRUMENT OF CAL., 6431 Global Dr., Cypress, CA 90630, Tel: 714-527-0561, TWX: 510-221-2122; FSC No.: 11263; *Sls. Mgr.:* Bruce Reissman

ORIEL CORP., 250 Long Beach Blvd., Stratford, CT 06497-0872, Tel: 203-377-8282, TWX: 710-453-8719

ORIONICS, INC., 34368E Frontage Rd., Bozeman, MT 59715, Tel: 406-586-8256, TWX: 910-963-2063

ORTEL CORP., 2015 W. Chestnut St., Alhambra, CA 91803, Tel: 818-281-3636, Telex: 752434; *Sls. Mgr.:* Brent J. Ware

OSBORNE TRANSFORMER, 19636 Derby St., Detroit, MI 48203, Tel: 313-368-4136; Empl.: 30; *Sls. Mgr.:* J. R. Osborne

OSCILLATEK CORP., 620 North Lindenwood Dr., Olathe, KS 66062, Tel: 913-829-1777, Telex: 437045; FSC No.: 57693; Empl.: 24; *Sls. Mgr.:* A. Ghafoor ... **A•1402-1407**

OSHINO ELECTRIC LAMP WORKS, LTD., 5-2, Mianami-Shinagawa 2-chome, Shinagawa-Ku, Tokyo, Japan, Tel: 03-471-8548, Telex: 0242-2117; FSC No.: 03-450-3939; Empl.: 300; *Sls. Mgr.:* T. Koyama .... **B•1090**

Local Sales Offices & Reps

CA	Fountain Valley, WAMCO Inc.	714-545-5560

OSLO CONTROLS, 328 Industrial Ave, Cheshire, CT 06410, Tel: 203-272-2794, TWX: 710-455-3774; *Sls. Mgr.:* J. J. Martinez .... **B•1684-1685**

Local Sales Offices & Reps

	Century Elec. Supp.	
CA	Los Angeles, Minarik Elec.	213-485-1291
CA	Riverside, Elctrn. Supp.	714-683-7300
AZ	Scottsdale, Semi-Systems	602-991-1151
CA	Brea, Masco	714-529-0866
CA	Mountain View, Westech Sls.	415-961-1422
CO	Englewood, Computech Mktg.	303-773-3981
CT	Bloomfield, Zaslow Sls.	203-242-7781
FL	Longwood, CBC Elctrns.	305-831-5380
IL	Lisle, W-G Controls	312-963-5954
MD	Silver Spring, L. G. White & Co.	301-434-1555
MI	Grosse Pointe Park, Greiner Assocs.	313-499-0188
MN	Minneapolis, JOS-CO/Melius	612-861-3343
MO	St. Louis, Hill & Co.	314-432-1136
NJ	Caldwell, Grimm Siegal Assocs.	201-575-9300
NY	Syracuse, Canavan-Scanlon Assocs.	315-437-1271
OH	Cincinnati, O. H. Bromberg & Assocs.	513-771-9333
OH	Mentor, KT/DEPCO	216-729-3588
PA	Broomall, White-Whiddett	215-353-6347
TX	Dallas, Glidden Electro Equip.	214-341-0610
WA	Mercer Island, J. H. Andersen & Assocs.	206-232-0484

Local Distributors

CA	Gardena, California Switch & Signal	213-770-2330, 213-538-9830
CA	Los Angeles, Master Distrs.	213-829-4656
CA	Los Angeles, Minarik Elect.	213-485-1291
CA	Riverside, Elctrn. Supply	714-683-7300
CA	San Diego, Deco Elctrns.	619-693-1595
CA	San Jose, Cypress Elctrns.	408-945-8400
CA	Tustin, Western Switches	714-731-4333
CA	Van Nuys, Pacific Switch Controls	213-873-4802
CT	Shelton, Century Elec. Supply	203-736-2684
CT	West Hartford, Atlantic Switch Controls	203-527-7705
FL	Lakeland, A A Elec.	800-237-8274
FL	Lakeland, Switch Controls	813-644-7564
IL	Lombard, R. M. Elctrns.	312-932-5150
IL	Wheaton, Conectrix	312-653-1460
MA	Canton, Impact Elctrns.	617-821-1500
MI	St. Clair Shores, Spemco	313-771-2700
MN	Minneapolis, Elctrn. Center	612-338-5881
NJ	Fair Lawn, Relay Specialties	201-797-3313
NJ	Mt. Laurel, Jersey Switch	609-778-8190
NY	Woodside, Switches Unltd.	212-478-5000
OH	Cincinnati, Cartessa Mfg.	513-522-3100
OH	Columbus, Ohio Switch	614-885-0319
TX	Dallas, Glidden Electro Equip. Co.	214-341-0610
TX	Dallas, Texaswitch	214-357-1768
WI	Mequon, Taylor Elec.	414-241-4321
EXP	Ponce PR, Distributronics	809-843-3321
PR	Ponce, Distributronics	809-843-3321

OSTBY & BARTON, 487 Jefferson Blvd., Warwick, RI 02886, Tel: 401-739-7310, Telex: 927573; *Sls. Mgr.:* Jos. E. Burns

OTTO ENGRG., 2 E. Main St., Carpentersville, IL 60110, Tel: 312-428-7171, Telex: 722426; FSC No.: 21649; Empl.: 120; *Sls. Mgr.:* R. E. Sparks .... **B•1686-1687**

Local Sales Offices & Reps

CA	Los Angeles, Electric Switches, Inc.	213-664-2125, 213-660-1464
AL	Decatur, El Tech	205-353-7899
CA	Anaheim, Gabriel & Assocs.	714-666-0660
CA	Costa Mesa, Gabriel Assocs.	714-957-1981
CO	Denver, Lindberg Co.	303-758-9033
FL	Deerfield Beach, Newell Hynes Assocs., Inc.	305-429-3207
IL	Downers Grove, Rockford Controls Co.	312-960-2046
IL	Glen Ellyn, Rockford Controls Co.	312-469-6016
IN	Indianapolis, Rockford Controls Co.	317-248-2518
MA	Needhan Heights, Newscott	617-444-1923
MI	Madison Heights, Pine Sls., Inc.	313-589-0350
MN	Minneapolis, Boerger & Assocs.	612-560-3435
MO	Kansas City, Harris-Hanson Co.	816-444-9494

MO	St. Louis, Harris-Hanson Co.	314-432-3611
NJ	Medford, Jack McCoy, Inc.	609-953-0770
NY	Great Neck, Tylinski Co.	516-466-9070
NC	Kernersville, Heritage Sls. Assocs.	919-996-4374
OH	Cleveland, Electro-Com	216-676-8154
OH	Dayton, Electro-Com	513-898-5140
TX	Dallas, Control Comps. Corp.	214-458-8877
WA	Bellevue, James Findlay Co.	206-455-9597

Local Distributors

AZ	Tempe, Fisher Brownell	602-967-1464
CA	Los Angeles, Electric Switches, Inc.	213-664-2125
MD	Kensington, Marine Air Supp.	301-949-1353
MA	Hingham, Sager Elec. Supp.	617-749-6700
NM	Albuquerque, International Elctrns.	505-345-8127
NY	Hicksville, Durham Aircraft Svc., Inc.	516-681-9800
NY	Lynbrook, Peerless Radio Corp.	516-593-2121
NY	Woodside, Durham Aircraft Srvc.	212-274-9000
NC	Greenville, Womack Elctrns.	919-758-5047
TX	Dallas, Associated Aircraft Supp.	214-331-4381

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OVENAIRE, Electronic Technologies Inc., 706 Forrest St., Charlottesville, VA 22901, Tel: 804-977-8050, TWX: 910-997-8053; FSC No.: 12020; Empl.: 165; *Sls. Mgr.:* Andy Bell .... **A•1408-1411**

Local Sales Offices & Reps

AL	Huntsville, L & D, Inc.	205-837-1469
CA	San Mateo, Melvin Sls.	415-349-7445
CA	Van Nuys, R.L. Assocs.	213-782-7826
CO	Loveland, Morbak Mktg.	303-669-8900
FL	Maitland, Ellis & Assocs.	305-645-1101
GA	Atlanta, L & D Inc.	404-395-7079
IL	Des Plaines, Janus Inc.	312-298-9330
IN	Fort Wayne, TX Sls., Inc.	219-489-4447
MD	Towson, Dickison Sls. Co.	301-823-0923
MA	Milton, Naton Assocs.	617-698-0670
MN	St. Paul, Countryman	612-645-9151
NJ	Cherry Hill, H. J. White Co.	609-428-4544
NJ	Paramus, Eltech Sls.	201-967-1309
NY	Buffalo, Quality Comps.	716-837-5430
NC	Greensboro, L & D, Inc.	919-292-3201
NC	Raleigh, L&D Inc.	919-876-5301
TN	Seymour, L&D Inc.	615-577-1549
TX	Bedford, W. Pat Fralia Co.	817-354-1144
WA	Seattle, Carlyle Tech. Sls.	206-575-6750
WI	Milwaukee, Janus Inc.	414-476-9104

OVEN INDS., 191 Hempt Rd., P.O. Box 290, Mechanicsburg, PA 17055, Tel: 717-766-0721; FSC No.: 21302; Empl.: 70; *Sls. Mgr.:* T. M. Nolan

OXLEY, INC., 6290 Sunset Blvd., Ste. 1126, Los Angeles, CA 90028, Tel: 213-463-5120, TWX: 910-321-2903; *Sls. Mgr.:* Norman R. Sutherland

Local Sales Offices & Reps

CA	San Jose, J. T. McFarland Assocs.	408-286-9333
CA	Tustin, West, Inc.	714-852-9211
CT	Meriden, Abbott-Allison Co.	203-481-0405
FL	Tampa, APM Assocs.	813-886-2457
IL	Chicago, Electro-Tech Mktg. Assocs.	312-588-4535
MN	St. Paul, Bonament Heyda Co.	612-484-8531
NY	Rochester, R. P. Kennedy Co.	716-271-6322
PA	Paoli, Stitzer Assocs.	215-644-5500
TX	Richardson, Eagle Marketing	214-238-5383

PACCOM, 3928 148th NE, Redmond, WA 98052, Tel: 206-883-9200, 800-426-6254, TWX: 910-449-2592; Empl.: 15; *Sls. Mgr.:* D. Tully; *Dist. Mgr.:* C. Beaudette

PACE INC., 9893 Brewers Ct., Laurel, MD 20707, Tel: 301-490-9860, Telex: 87446; *Sls. Mgr.:* James K. Bausell

PACER INDUSTRIES, INC., 1450 First Ave., Chippewa Falls, WI 54729, Tel: 715-723-1141, Telex: 260391; FSC No.: 60162; *Sls. Mgr.:* Steven Prince; *Dist. Mgr.:* Steven Prince

PACIFIC ATLANTIC ELCTRNS., Box 754, El Cerrito, CA 94530, Tel: 415-237-5837, TWX: 910-366-7296; Empl.: 4; *Sls. Mgr.:* P. Yen; *Dist. Mgr.:* P. Yen

PACIFIC CYBER/METRIX INC., 6800 Sierra Ct., Dublin, CA 94568, Tel: 415-829-8700, TWX: 910-389-6890; *Sls. Mgr.:* R. Nelson

PACIFIC COMMUNICATIONS, 2041-A S. Grand Ave., Santa Ana, CA 92705, Tel: 714-546-0147; Empl.: 35

PACIFIC ELECTRICORD, 747 W. Redondo Bch. Blvd., Gardena, CA 90247, Tel: 213-532-6600, TWX: 910-346-7619; Empl.: 600; *Sls. Mgr.:* W. A. Fiechtner; *Dist. Mgr.:* Gary M. Payne

PACIFIC ELECTRO DYNAMICS, INC., 11465 Willows Rd. N.E., Redmond, WA 98052, Tel: 206-881-1700, TWX: 910-449-2977; Empl.: 350

PACIFIC INSTRS. INC., 215 Mason Circle, Concord, CA 94518, Tel: 415-827-9010, TWX: 910-481-9977; Empl.: 45 .... **D•1015**

Local Sales Offices & Reps

AL	Huntsville, Lee Assocs.-Mid South, Inc.	205-533-5896
CA	Alhambra, Dale-Dahl Assocs.	213-682-3417
CA	Walnut Creek, Dale/Dahl Assocs.	415-933-9595
CT	Hamden, JBL Assocs.	203-281-3161
FL	Maitland, Wade H. Boggs, Inc.	305-647-2226
IL	Park Ridge, EIA, Inc.	312-298-2290
MA	Acton, Applied Measurements	617-263-2766
MI	Farmington Hill, Anderson Elctrns., Inc.	313-553-7600
NJ	Elizabeth, Instrumentation Prods., Inc.	201-351-1155
NM	Albuquerque, Vic Myers Assocs.	505-884-6878
NY	Latham, L-Tron Corp.	518-785-5332
OH	Dayton, RDP Corp.	513-253-6171
PA	Pittsburgh, Wainwright Tech. Sls., Inc.	412-487-5055
PA	Radnor, Roberts Engrg.	215-688-6525
TX	Arlington, John T. Houston Assocs., Inc.	817-265-2931
VA	Arlington, Gans & Pugh Assocs.	703-527-3262
WA	Bellevue, Tasco, Inc.	206-453-1414
Can	Rexdale, Ont., SRP Control Sys., Ltd.	416-746-0117

PACIFIC MAGNETICS CORP., 2602 Transportation Ave., Ste. F, National City, CA 92050, Tel: 619-474-8216; *Sls. Mgr.:* Mary Hill

PACIFIC MEAS., INC., 488 Tasman Drive, Sunnyvale, CA 94086, Tel: 408-734-5780, TWX: 910-339-9273; Empl.: 100; *Sls. Mgr.:* Ed Mendel

PACIFIC MICROCOMPUTERS, INC., 160 Chesterfield Dr., Cardiff, CA 92007, Tel: 619-436-8649, Telex: 701-578; Empl.: 34; *Sls. Mgr.:* Phyllis Maloy

PACIFIC MICRO SYS., INC., 160 Gate 5 Rd., Sausalito, CA 94965, Tel: 415-331-2525; Empl.: 12; *Sls. Mgr.:* Donald Shipley; *Dist. Mgr.:* Donald Shipley

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POWER SOURCE CORP.

PACIFIC POWER SOURCE CORP., 15122 Bolsa Chica St., Huntington Bch., CA 92649, Tel: 714-898-2691, 800-854-2433; Empl.: 49; *Sls. Mgr.:* A. F. Hatlestad .... **D•1949-1953**

Local Sales Offices & Reps

KS	Overland Park, Ramsey Assocs.	913-649-6996
MA	Burlington, Intersell, Inc.	617-273-3844
MN	Minneapolis, Loren Green Assocs.	612-571-6666
MO	Maryland Heights, Ramsey Assocs.	314-878-5042
NY	Dewitt, D. B. Assocs. Inc.	315-446-0220
NY	Wantagh, Bytec Reps.	516-781-7400
WA	Bellevue, Al Smith	206-746-6770
WA	Vancouver, Al Smith	206-892-9912

Local Distributors

EXP	Los Angeles, CA, Trans World Trade	213-476-8406

PACIFIC RESISTOR CO.

PACIFIC RESISTOR CO., 18300 Oxnard St., Tarzana, CA 91356, Tel: 818-345-7811, Telex: 06416; *Sls. Mgr.:* Douglas Trewhitt .... **A•1926-1927**

Local Sales Offices & Reps

CA	San Jose, Silcon Valley	408-286-7510
MN	St. Paul	612-642-2828

PACIFIC SCIENTIFIC CO., 4301 Kishwaukee, Rockford, IL 61105, Tel: 815-966-3600, Telex: 257-315; Empl.: 400

PACIFIC SWITCH CONTROLS, INC., 16116 Leadwell St., Van Nuys, CA 91406, Tel: 213-873-4802

PACIFIC TIMER INC., 21739 N.E. 18th Way, Redmond, WA 98052, Tel: 206-881-1785; *Sls. Mgr.:* Karen A. Pettyjohn

PACIFIC TRANSDUCER, 2301 Federal, Los Angeles, CA 90064, Tel: 213-478-1134; Empl.: 23

PACTEC DIV., LaFrance Corp., Enterprise & Executive Avenues, Philadelphia, PA 19153, Tel: 215-365-8400, Telex: 83-1732; *Dist. Mgr.:* Edward Fitzpatrick .... **C•1002, 1070-1071**

Local Sales Offices & Reps

AZ	Phoenix, Gramer & Co.	602-995-9455
CA	Buena Park, PAC-TEC CORP.	714-522-6410
CA	Fallbrook, Martronix	619-728-7678
CA	Santa Clara, Warren Assoc.	408-988-7762
CO	Englewood, High Plains Mktg.	303-792-2020
FL	Key Largo, Jerrold Helbein & Assocs., Inc.	305-367-3025
IL	Arlington, Brainard-Wilson Mktg.	312-437-2700
IN	Indianapolis, STB & Assocs., Inc.	317-844-9227
MD	Columbia, Snowden Center	301-964-0225
MA	Newton, Gerber Sls.	617-969-2620
MI	Warren, Burcaw Co.	313-573-4605
MN	Excelsior, Lestronix	612-474-1935
MN	St. Louis Park, Lestronix	612-926-8466
MO	Grandview, Harris Hanson Co.	816-763-6200
MO	St. Louis, Harris Hanson Co.	314-432-3611
NJ	Broomall, L. D. Lowery, Inc.	215-528-5170
NJ	Woodcliff Lake, Joe Freid & Assoc.	201-391-6792
NY	Great Neck, F & F Metro	516-482-4080
NY	Mendon, Tech-Mark	716-624-3840
OH	Richfield, Bear Mktg.	216-659-3131
OR	Portland, James J. Backer Co.	503-297-8744
PA	Broomall, L.D. Lowery, Inc.	215-528-5170
TX	Dallas, MGR Elctrn.	214-238-5246
UT	Salt Lake City, High Plains Mktg.	801-968-9456
WA	Seattle, James J. Backer Co.	206-285-1300
WI	Colgate, Rep 1 & Assocs.	414-628-4016
Can	Markham, Ont., Avotronics, LTD	416-475-2024
Can	Ottawa, Ont., Avotronics, LTD	613-233-5527
Can	Pointe Claire, Que., Avotronics, LTD	514-697-2135

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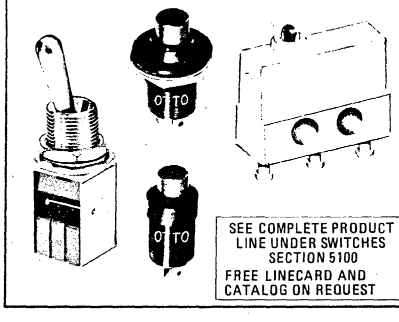

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AL	Decatur, Forbes Distrs.	205-353-4762
AL	Huntsville, Forbes Distrbg.	205-533-4150
AZ	Phoenix, Lion Elctrns.	602-869-9611
AZ	Phoenix, R. V. Weatherford	602-272-7144
AZ	Phoenix, Tri-Tek	602-995-9352
AZ	Tempe, Circut Specialists, Inc.	602-966-0764
AZ	Tucson, Anatech Corp.	602-881-2348
AZ	Tucson, Elliot Elctrns.	602-884-7394
CA	Anaheim, A-Z Elctrns.	714-634-3620
CA	Burbank, Electronic City	213-842-5275
CA	Canoga Park, Sandy's Elctrns. Supp.	213-346-8353
CA	Costa Mesa, Marvac	714-540-3280
CA	Cucamonga, Abletronics	714-987-7606
CA	El Segundo, Force Elctrns.	213-772-1324
CA	El Toro, R-Vac	714-586-1210
CA	Freemont, Terminal Sls. Corp.	415-656-7722
CA	Gardena, California Switch & Signal	714-522-8600
CA	Glendale, R. V. Weatherford	213-849-3451
CA	Goleta, Bill's Stereo	805-967-8280
CA	Monterey, Zackit (Monterey)	408-375-3144
CA	Palo Alto, Zack Elctrns.	415-326-5432
CA	Redding, North Valley Elec. Distr.	916-222-1500
CA	Sacramento, Zackit/Sacramento	916-446-3131
CA	San Diego, R. V. Weatherford	619-695-1700
CA	San Diego, Southland Comps.	619-578-6630
CA	San Jose, Quement Elctrns.	408-998-5900
CA	San Jose, Rose Elctrns.	408-263-2934
CA	San Rafael, Electronics Plus	415-457-0456
CA	Santa Anna, C. R. Elctrns., Inc.	714-556-2040
CA	Valleyo, Zackit (Valleyo)	707-644-6676
CO	Denver, Gateway Elctrns.	303-458-5444
CO	Denver, Intergrated Elctrns.	303-292-5337
CO	Denver, R. V. Weatherford	303-428-6900
CO	Greeley, Greely Walker	303-353-3241
CT	New Haven, Hatry Elctrns.	203-527-1881
CT	New London, Jan Elctrns.	203-442-4386
CT	Stratford, Utronics	203-378-4201
CT	Wallingford, Midstate Elctrns.	203-265-9900
DE	Wilmington, Wholesale Elctrns.	302-656-9988
FL	Clearwater, Electronic Precepts of FL	813-530-9781
FL	Dania, Summit Distrs.	305-920-6253
FL	Longwood, Interec Comps.	305-834-7777
FL	Miami, Electronic Equip. Co.	305-871-3500
FL	Orlando, EMSCO	305-849-6362
FL	St. Petersburg, Knapp of Florida	813-392-0406
FL	Tampa, Dow Elctrns.	813-626-5195
FL	Tampa, Leader Elctrns.	813-870-3315
FL	Tampa, Sunex Elctrns.	813-885-4074
FL	West Palm Beach, Nurmi Elctrns.	305-686-8553
GA	Atlanta, Ack Radio	404-351-6340
GA	Atlanta, Specialty Distr. Co.	404-873-2521
IL	Berwyn, BB & W Inc.	312-242-1533
IL	Chicago, Electronic Distrs.	312-283-4800
IL	Chicago, R. W. Elctrns.	312-248-2480
IL	Elk Grove, Martec Assocs.	312-956-8090
IL	Geneva, Melvin Elctrns.	312-279-5015
IL	Mt. Prospect, Tri State Elctrns.	312-255-0600
IL	Niles, Joseph Elctrns.	312-297-4200
IL	Peoria, Klaus Radio	309-691-4840
IL	Rosemont, Advent Elctrns.	312-298-4210
IN	Bloomington, Stansifer Radio Co.	812-336-6339
IN	Gary, Calumet Elctrns.	317-887-4961
IN	Indianapolis, Advent Elctrns.	317-872-4910
IN	Indianapolis, Electronic Service Parts	317-635-7822
IN	Indianapolis, Prehler Elctrns.	800-228-5839
IN	Jasper, Elex Mart	812-482-4101
IA	Cedar Rapids, Iowa Radio Supply	319-393-4510
KS	Overland Park, Burnstein & Assocs.	913-642-6444
KS	Salina, Electronics, Inc.	913-827-7377
KY	Bowling Green, Randolph, Hale & Meredith	502-781-1460
KY	Louisville, Peerless Elctrns.	502-637-7674
MD	Aberdeen, Harco Elctrns.	301-838-7990
MD	Beltsville, Mark Elctrns.	301-595-5040
MD	Beltsville, P.S.I.	301-937-4960
MD	Gaithersburg, Almo Elctrns.	301-792-9197
MD	Glen Burnie, Revacto of Maryland	301-766-3400
MD	Rockville, Capitol Radio	301-881-2270
MD	Towson, Baynesville Elctrns.	301-823-0082
MA	Hingham, Sager Elec. Supp.	617-749-6700
MA	Newton Upper Falls, In Stock Products Co.	617-964-6200
MI	Battle Creek, Great Lakes Elctrns.	616-731-4156
MI	Berrien Springs, Data Comms.	616-471-2119
MI	Clawson, Radio Supp. & Engrg.	313-435-6420
MI	Farmington Hills, Prehler Elctrns	800-336-1406
MI	Grand Rapids, S. F. Elctrns.	616-459-0216
MI	Lansing, Fulton Radio	517-394-5020
MI	Livonia, RS Elctrns.	313-525-1155
MN	Minneapolis, Aero-Space-Computer Supp.	612-884-4725
MN	Minneapolis, Northern Elctrns.	612-944-1167
MO	St. Louis, Gateway Elctrns.	314-427-6116
NE	Lincoln, Scott Elctrns.	402-466-8221
NJ	Frenchtown, Sintec/Aries	201-996-4093
NJ	Pine Brook, Parts Masters	201-227-7797
NM	Albuquerque, Walker Radio Co.	505-883-2992
NY	Buffalo, Summit Distr.	716-887-2800
NY	Farmingdale, Midway Indl. Electro	516-293-6800
NY	Freeport, KRP Elctrns.	516-623-3346
NY	New York, Advance Elctrns.	212-730-7030
NY	Rochester, Rochester Radio Supp.	716-454-7800
NY	Rochester, Summit Distr.	716-334-8110
NY	Troy, Trojan Elctrn. Supp.	518-274-4481
NC	Burlington, Womack Elctrns.	919-227-7486
NC	Greensboro, Hammond Elctrns.	919-275-6391
NC	Raleigh, Southeastern Elctrns.	919-828-2311
OH	Cincinnati, Hughes-Peters	513-351-2000
OH	Cincinnati, R. S. Elctrns.	513-793-2450
OH	Columbus, Hughes-Peters	614-294-5351
OH	Strongsville, Roberts Elctrns.	216-238-1711
OK	Oklahoma City, She Elctrns.	405-843-5941
OK	Tulsa, Radio Inc.	918-587-9123
OR	Beaverton, Norvac Elctrns.	503-644-1025
OR	Beaverton, Rose Elctrns	503-629-9288
OR	Portland, Radar Elec.	503-232-3404
PA	Allentown, A.A. Peter, Inc.	215-434-5237
PA	Coatesville, County Supply	215-384-4585
PA	Marcus Hook, Linwood Wholesalers	215-485-0777
PA	Philadelphia, Almo Elctrns.	215-698-4000
PA	Willow Grove, Resco Elctrns.	215-659-4575
PA	York, Rosen Elctrns.	717-843-7881
RI	Pawtucket, Jabbour Elctrns.	401-944-2570
SC	Columbia, Dixie Elctrns.	803-779-5332
TN	Chattanooga, Curle Elctrns. Supp.	615-266-4729
TN	Chattanooga, Techni-Tronics	615-842-0514
TN	Clarksville, Randolph, Hale & Matthews	615-647-2325
TN	Columbia, Randolph & Williams	615-388-7566
TN	Cookeville, Randolph & Parks	615-526-6184
TN	Memphis, Bluff City	901-345-9500
TN	Nashville, Bluff City	615-242-8000
TN	Nashville, Randolph & Rice	615-255-5602
TN	Tullahoma, Randolph & Vandergriff	615-455-4531
TX	Austin, EPC	512-339-1131
TX	Austin, Galtronics	512-837-7470
TX	Dallas, R. V. Weatherford	214-243-1571
TX	Dallas, Wholesale Elctrns. Supp.	214-824-3001
TX	Forth Worth, Allied Elctrns.	817-336-5401
TX	Houston, Ace Elctrns.	713-688-8114
TX	Houston, EPC	713-447-5800
TX	Houston, Force Elctrns.	713-561-8644
TX	Houston, Gateway Elctrns.	713-978-6575
TX	Irving, Force Elctrns.	214-438-5700
TX	San Antonio, Altex Elctrns.	512-828-0503
UT	Salt Lake City, Standard Supp.	801-486-3371
VA	Charlottesville, Virginia Radio	804-296-4184
VA	Richmond, Meter Metrics Div./Tr.	804-275-2675
VA	Springfield, Crossroads Elctrns.	703-931-0600
WA	Bellevue, Almac Elctrns. DKM Co.	206-643-9992
WA	Seattle, R. V. Weatherford	206-575-1340
WA	Seattle, Radar Elec.	206-282-2511
WA	Seattle, Zephyr Elctrn. Sls.	206-241-1980
WI	Milwaukee, Industrial Elctrns., Inc.	414-276-1212
WI	Milwaukee, Marsh Elctrns.	414-475-6000
WI	Oshkosh, Electronic Inds., Inc.	414-235-8930
Can	Mississauga, Ont., Rush Elctrns.	416-677-7280
Can	Pointe Claire, Que., Future Elctrns.	514-694-7710

Paine®

PAINE INSTRS., 2401 S. Bayview St., Seattle, WA 98144, Tel: 800-426-0366, TWX: 910-444-2164; FSC No.: 13624; Empl.: 69; *Sls. Mgr.:* R. E. Helmick .... **B•1823**

Local Sales Offices & Reps

CA	Laguna Hills, Elotek Sys., Inc.	714-830-4856
CO	Boulder, A. Bissell Co. Indl. Sls.	303-444-1173
FL	Orlando, Physimetrics, Inc.	305-894-8081
GA	Atlanta, Physimetrics, Inc.	404-955-0155
IL	Lansing, Van Meter Instrs., Inc.	312-474-3580
IN	Indianapolis, Carter, McCormic & Peirce, Inc.	317-844-4175
MD	Rockville, Electronic Mktg. Assocs., Inc.	301-744-7700
MI	Farmington Hills, W. R. Hummon & Assocs., Inc.	313-474-0661
NJ	Plainfield, Cosine, Inc.	201-654-3551
NM	Albuquerque, Burt Dieruf Assocs.	505-299-0989
NY	Clark Mills, KLM-Garner	315-853-6126
NY	N. Syracuse, KLM-Garner	315-458-6214
NY	Pittsford, KLM-Garner	716-381-8350
NC	Concord, Physimetrics, Inc.	704-788-1317
OH	Englewood, Carter, McCormic & Peirce, Inc.	513-836-0951
OH	Fairview, Carter, McCormic & Peirce, Inc.	216-799-5100
PA	Monroeville, Carter, McCormic & Peirce, Inc.	412-372-4415
TX	Houston, Scientific Sls. Co.	713-460-9170
TX	Richardson, Scientific Sls. Co.	214-231-6541
WA	Seattle, Paine Instrs., Inc.	206-723-1705
Can	Burlington, Ont., Panacon Control Sys., Inc.	416-336-7139
Can	Richmond, B.C., Maxwell Morton Assocs., Ltd.	604-273-1337

PAK-TRONIC, See Tracor Paktronics

PALADIN, 3543 Old Conejo Rd., Newbury Park, CA 91320, Tel: 805-499-0318, Telex: 910-494-2799; Empl.: 9; *Sls. Mgr.:* Ronald Vogel

PALL ULTRAFINE FILTRATION CORP., 2200 Northern Blvd., East Hills, NY 11548, Tel: 516-484-5400, Telex: 968855, TWX: 510-223-0606; Empl.: 3500; *Sls. Mgr.:* Alison Ray; *Dist. Mgr.:* Fred Nordhauser

PALOMAR ENGRS., Box 455, Escondido, CA 92025, Tel: 619-747-3343; Empl.: 9

PAMOTOR, 770 Airport Blvd., Burlingame, CA 94010, Tel: 415-347-1203, TWX: 910-374-2353; Empl.: 35; *Sls. Mgr.:* F. L. Nelson; *Dist. Mgr.:* F. L. Nelson

PAMRAN, 1101 Cedar Creek, Racine, WI 53402, Tel: 414-639-9076; Empl.: 28; *Sls. Mgr.:* R. C. Pfeil

PANAMETRICS, 221 Cresent St., Waltham, MA 02254, Tel: 617-899-2740, Telex: 6817337, 951006; Empl.: 200; *Sls. Mgr.:* Bob Mel

PANASONIC, IND'L. ELCTRN. COMPS., Panasonic, Elctrn. Comps. Div., Box 1503, Secaucus, NJ 07094, Tel: 201-348-7000, Telex: 701 992-8920; Empl.: 25 .... **D•1422-1427**

Local Sales Offices & Reps

AZ	Phoenix, Dar-C	602-991-0110
FL	Fern Park, S.E.C.	305-781-4800
FL	Lighthouse Pt., S.E.C.	305-781-4800
MI	Brighton, A.P. Assocs.	313-229-6550
MI	Holland, AP Assocs.	800-624-5496
OH	Dublin, AP Assocs.	800-624-5496
OH	Fairview Park, AP Assocs.	800-624-5496
OH	Lorain, AP Assocs.	800-624-5496
PA	Eastern PA, Comtek	609-235-8505
PA	Western PA, AP Assocs.	800-624-5496

Local Distributors

AZ	Scottsdale, Electro Mktg.	602-991-0110
CO	Colorado Springs, C.M.T.	303-598-6888
NJ	Clifton, Engineered Assem.	201-340-0600
OR	Wilsonville, Micro Power	503-694-2888

PANAVISE PRODS., 2850 E. 29th St., Long Beach, CA 90806, Tel: 213-595-7621, Telex: 18-2135; Empl.: 29; *Sls. Mgr.:* Michael Steffen; *Dist. Mgr.:* Michael Steffen

PANDUIT CORP., 17301 Ridgeland Ave., Tinley Park, IL 60477-0981, Tel: 312-532-1800, Telex: 25-4560; FSC No.: ;06383; Empl.: 1200 .... **C•1474-1476, 1888-1891**

Local Sales Offices & Reps

AL	Birmingham, Frank Parker & Assocs.	205-853-3152
AK	Anchorage, Bar Elec. Agt.	907-345-7281
AZ	Phoenix, Panduit Corp.	602-861-3969
AR	Little Rock, Byron Carson Co.	501-568-6798
CA	Los Altos, Ewing-Foley	415-941-4525
CA	San Diego, Tak Sls. Co.	619-287-6141
CA	Santa Ana, Panduit Corp.	714-546-5700
FL	Lakeland, Panduit Corp.	813-665-5850
GA	Atlanta, Panduit Corp.	404-256-5940
HI	Honolulu, Agencies Co./Pacific	808-359-8343
IN	Fort Wayne, Panduit Corp.	219-424-4082
IN	Indianapolis, Panduit Corp.	317-251-8332
IA	Des Moines, Panduit Corp.	515-280-8343
KS	Kansas City, Panduit Corp.	913-764-7170
KY	Louisville, A. L. Pickens Co.	502-491-4215
LA	New Orleans, Wells-Keown & Assocs.	504-244-0330
MD	Landover, Agency Group, Inc.	301-773-9292
MI	Fraser, Panduit Corp.	313-791-1700
MI	Grand Rapids, Panduit Corp.	616-942-0420
MN	Minneapolis, Electric Comp. Sls.	612-933-2594
MO	St. Louis, Panduit Corp.	314-894-7800
NH	Salem, Sales Eng. Co.	603-893-5521
NY	Niagara Falls, Panduit Corp.	800-532-4439
NC	Winston-Salem, L. G. White Southern	919-725-3612

OH	Cincinnati, Panduit Corp.	513-874-0660
OH	Cleveland, Panduit Corp.	216-835-2050
OH	Columbus, Panduit Corp.	614-262-6052
OK	Tulsa, Panduit Corp.	918-745-1420
OR	Portland, Panduit Corp.	503-654-9455
PA	Carnegie, Myles F. Smith & Assoc.	412-276-5363
PA	Erie, Myles F. Smith & Assocs.	814-459-7464
PA	Glenside, Kunz, Powell & Assoc.	215-224-2434
SC	Greenville, L. G. White Southern	803-271-0630
TN	Knoxville, Panduit Corp.	615-588-2476
TN	Memphis, Byron Carson Co.	901-276-0614
TN	Nashville, Panduit Corp.	615-871-0732
TX	Dallas, Panduit Corp.	214-620-7713
TX	Houston, Panduit Corp.	713-580-0100
TX	San Antonio, Panduit Corp.	512-656-2208
VA	Richmond, L. G. White Southern	804-740-7093
WA	Bellevue, Panduit Corp.	206-454-7267
WV	Dunbar, Myles F. Smith & Assoc.	304-768-9910
WI	Appleton, H. Mercer Co.	414-739-6223
PR	Santurce, L. Gandia & Assocs.	809-725-3473

PANEL COMPONENTS CORP., P.O. Box 6626M, Santa Rosa, CA 95406, Tel: 707-523-0600, Telex: 176-747; Empl.: 18 .... **B•1254-1255; C•1478-1482, 1892-1893**

Local Sales Offices & Reps

AL	Huntsville, DHR Mktg. Inc.	205-533-5165
CA	Santa Clara, Ross Mktg. Assoc.	408-988-8111
CA	Tustin, Schoenbachler-Dobson Co.	714-544-1888
CO	Englewood, Omega Ltd.	303-762-1921
GA	Atlanta, DHR Mktg., Inc.	404-451-9848
IL	Northbrook, Raines & Assocs.	312-498-0890
IA	Marion, M-S-B Assocs., Inc.	319-377-6261
KS	Shawnee Mission, M-S-B Assocs., Inc.	913-432-2131
MA	Lexington, Zieco	617-861-8300
MN	St. Paul, Arkco Sls.	612-777-7454
MO	St. Charles, M-S-B Assocs., Inc.	314-946-5577
NY	Great Neck, Tylinski Assocs.	516-466-9070
NY	Rochester, Lloyd Hart Assocs.	716-244-3253
NC	Raleigh, DHR Mktg., Inc.	919-876-5450
OH	Cleveland, K-T Depco	216-442-6200
OR	Portland, Earl & Brown Co.	503-245-2283
PA	Doylestown, T.O.E. Sls.	215-348-2212
PA	Pittsburgh, K-T Depco	412-367-1011
SC	Greenville, DHR Mktg. Inc.	803-235-3594
TX	Lewisville, Jim Hughes Co.	214-221-1536
TX	Stafford, Jim Hughes Co.	713-343-0673
WA	Seattle, Earl & Brown Co.	206-284-1121
Can	Ottawa, Ont., Lloyd Ellam Assocs.	613-224-1720

PANEL CONTROLS, 1000 Mt. Elliott Ave., Detroit, MI 48207, Tel: 313-568-2400; Empl.: 24

PANELGRAPHIC CORP., 10 Henderson Dr., W. Caldwell, NJ 07006, Tel: 201-227-1500, TWX: 710-734-4367; FSC No.: 52657; Empl.: 100

PAN-MAG

PAN-MAGNETICS INTL., INC., 455-A Carson Plaza Dr., Carson, CA 90746, Tel: 213-532-1790, Telex: 664-759; *Sls. Mgr.:* W. Dull ... **A•1265, 2213-2220; D•1742-1743**

Local Sales Offices & Reps

AZ	Scottsdale, E.D.P. & Assocs.	602-991-6119
CT	Marlborough, Precision Sls.	203-295-0580
GA	Norcross, Dixie Tech. Mktg., Inc.	404-447-6832
IN	Kokomo, Schillinger Assocs., Inc.	317-452-4057
KS	Overland Park, Electri-Rep	913-649-2168
MD	Towson, Electronic Comp. Mktg.	301-321-8611
MA	Newton, Precision Sls.	617-969-0594
MN	Minneapolis, DeBeck-Hays Assocs.	612-835-3610
MO	Maryland Heights, Electri-Rep, Inc.	314-878-8209
NC	Raleigh, Dixie Tech. Mktg., Inc.	919-878-0909
OR	Tigard, Electronic Sources	503-684-0040
WA	Bellevue, Electronic Sources	206-643-0400

PANNIER CORP., Graphics Div., John Fitch Industrial Park, Warminster, PA 18974, Tel: 215-672-3600; Empl.: 45; *Sls. Mgr.:* Barry Stefaniw

PAPST MECHATRONIC CORP., Aquidneck Indl. Pk., Newport, RI 02840, Tel: 401-849-5930, Telex: 952092; *Sls. Mgr.:* Emanuel V. Lauria

PARABAM, INC., 3017 E. Las Hermanas St., Rancho Dominguez, CA 90221, Tel: 213-537-1771; Empl.: 85

PARAGON ELECT., 606 Parkway Blvd., Two Rivers, WI 54241, Tel: 414-793-1161, Telex: 26-3450; Empl.: 1000; *Sls. Mgr.:* Don Karman

PARALINE

TRANSFORMER SPECIALISTS

PARALINE TRANSFORMER CORP., 511 South Palm Ave., Alhambra, CA 91803, Tel: 818-281-0222; FSC No.: 59465; Empl.: 52 .... **A•2221-2225**

PARAMOUNT TUBE, INC., 1430 Progress Rd., Ft. Wayne, IN 46808, Tel: 219-484-4111; Empl.: 46; *Sls. Mgr.:* D. L. Gibson

PARKER HANNIFIN CORP., 17325 Euclid Ave., Cleveland, OH 44112, Tel: 216-531-3000, Telex: 980636

PARKER MCCRORY MFG. CO., 2000 Forest Ave., Kansas City, MO 64108, Tel: 816-221-2000; *Sls. Mgr.:* Ken Turner; *Dist. Mgr.:* Ken Turner

PARKER SEAL GRP., P.O. Box 11751, Lexington, KY 40512, Tel: 606-269-2351; Empl.: 2,200; *Sls. Mgr.:* Frank Chesnik

PARLEX CORP., 145 Milk St., Methuen, MA 01844, Tel: 617-685-4341, ext. 325, TWX: 710-342-1528; Empl.: 600; *Sls. Mgr.:* Valerie Mickalide

PARSONS MFG., 1055 O'Brien Dr., Menlo Park, CA 94025, Tel: 415-324-4726, TWX: 910-373-2106; Empl.: 85; *Sls. Mgr.:* C. E. Plummer

PASO SOUND PRODS., 14 First St, Pelham, NY 10803, Tel: 914-738-4800, Telex: 646783 Paso Pelm; Empl.: 50; *Sls. Mgr.:* David Moore

Local Sales Offices & Reps

CA	West Covina, Don Forth Assocs.	818-919-2322
CT	Greenwich, Miller Assoc.	203-869-7793
FL	Hialeah, Miguel A. Lopez	305-822-6853
FL	Pembrook Pines, World Wide Prods., Inc.	1-800-223-5651
GA	Marietta, Dewitt Austin Co.	404-926-4943
IL	Arlington Heights, Brainard Wilson Mktg.	312-437-2700
IN	Carmel, Brainard Wilson Mktg.	317-844-2800
MA	Braintree, Anderson Sls. Assocs.	617-848-9194
MN	Moorhead, Northland Assocs.	218-233-4616
NJ	Moorestown, Piper Mktg.	609-235-8006
NY	Liverpool, Jack Mesnick Sls.	315-622-3211
NC	Charlotte, De Witt Austen Co.	704-334-0174
OH	Medina, J. H. Podolny Co.	216-725-8814
PA	Pittsburgh, James Podolny Co.	412-353-5877
TN	Memphis, Electronic Sls. Co.	901-682-2281
VA	Ashland, Piper Mktg.	804-798-9299
WI	Waukesha, Brainard Wilson Mktg.	414-255-3400
Can	Toronto, Paco Elctrns.	416-475-0740

PASS & SEYMOUR, INC., P.O. Box 4822, Syracuse, NY 13221, Tel: 315-468-6211, Telex: 93-7232; *Sls. Mgr.:* Kenneth Hooper

PATHCOM, INC., Pace Two-Way Radio Prods., 24105 S. Frampton Ave., Harbor City, CA 90710, Tel: 213-325-1290; Empl.: 600

PATTON-MACGUYER INC., 17 Virginia Ave., Providence, RI 02905, Tel: 401-941-6000; FSC No.: 77147; Empl.: 55; *Sls. Mgr.:* J. Allen

Local Sales Offices & Reps

CA	Mission Viejo, Coastline Connectors	714-859-7878
GA	Cumming, Reno Ivy & Assocs.	404-887-4533
MI	Farmington, Lloyd George & Assocs.	313-474-1505
MO	Lee's Summit, MYA Midwest Inc.	816-525-1290
NC	Greensboro, Manufacturers Sales	919-274-2474
OH	Chesterland, P.M.S. Associates	216-729-2248
RI	Providence, Patton-MacGuyer Inc.	401-941-6000

PAYNE ENGRG., Box 70, Scott Depot, WV 25560, Tel: 304-757-7353, Telex: 88-5452; Empl.: 40; *Sls. Mgr.:* Matthew J. Gilberto; *Dist. Mgr.:* Diane Nelson

PCA ELECTRONICS INC

28 SMD 3/85

PCA ELCTRNS., 16799 Schoenborn St., Sepulveda, CA 91343, Tel: 818-892-0761, Telex: 67-4681, TWX: 910-496-1525; FSC No.: 97722; Empl.: 45; *Sls. Mgr.:* Ben Weinberg .... **A•1556-1566**

Local Sales Offices & Reps

AZ	Phoenix, Toward Engrg. Assocs.	602-955-3193
CA	San Diego, Littlefield & Smith Assoc.	619-455-0055
CA	Santa Clara, Fahrner-Miller Assocs.	408-727-9800
FL	Boca Raton, Lawrence Assocs.	305-368-7373
FL	Clearwater, Lawrence Assocs.	813-584-8110
IL	Westchester, W. G. Brouillette & Assocs.	312-345-6500
MA	Southboro, KSA of New England	617-485-9432
MN	Minneapolis, Bill Deming and Assocs.	612-888-5000
NJ	Wayne, Howard Kagan Assocs.	201-694-1115
OH	Cleveland, Weschler Elec. Corp.	216-238-2550
OR	Portland, Elctrn. Comp. Sls.	503-245-2342
TX	Dallas, Blackburn Assocs.	214-692-8885
TX	Houston, Blackburn Assocs.	713-463-1354
UT	Salt Lake City, Sage Sls.	801-467-5451
VA	Front Royal, Eltron Sls., Ltd.	702-635-7201
WA	Mercer Island, Elctrn. Comp. Sls.	206-232-9301
WA	Seattle, Elctrn. Comp. Sls.	206-232-9301

PCB

PIEZOTRONICS

PCB PIEZOTRONICS, 3425 Walden Ave., Depew, NY 14043-2495, Tel: 716-684-0001, TWX: 710-263-1371; Empl.: 110; *Sls. Mgr.:* Roy Maines

Local Sales Offices & Reps

CA	Alhambra, Dale-Dahl Assocs.	213-682-3417
CA	Walnut Creek, Dale-Dahl Assocs.	415-933-9595
CT	Hamden, Northeast Engrg.	203-248-4481
FL	Orlando, Microspec, Inc.	305-299-6508
GA	Lilburn, Microspec, Inc.	404-921-3840
IL	Crystal Lake, ITI Systems	815-455-1411
MD	Dayton, Gans-Pugh Assocs.	703-527-3262
MA	Danvers, Northeast Engrg.	617-774-3010
MI	Farmington, Carter, McCormic & Peirce	313-477-7700
MO	St. Louis, Adelphi, Inc.	314-821-1232
NM	Albuquerque, Rustco Entprs.	505-292-2741
NY	Manhasset, Northeast Engrg.	516-365-9633
NY	Syracuse, Labtronics, Inc.	315-455-7314
OH	Englewood, Carter, McCormic & Peirce	513-836-0951
OH	Fairview Pk, Carter, McCormic & Peirce	216-779-5100
PA	Chester Springs, Letronix	215-458-8977
PA	Monroeville, Carter, McCormic & Peirce	412-372-4415
SC	Rock Hill, Microspec, Inc.	803-366-3015
TN	Nashville, Microspec, Inc.	615-383-4064
TX	Dallas, Techn. Prods.	214-357-9603
TX	Houston, Techn. Prods.	713-493-6520
UT	Logan, Western Mktg. Assocs.	801-753-0073
VA	Arlington, Gans-Pugh Assocs.	703-527-3262
WA	Seattle, Brett Assocs.	206-431-8090

PC INTERNATIONAL, 4400 MacArthur Blvd., Newport Beach, CA 92660, Tel: 714-476-1020

PCK ELASTOMERICS, INC., Kollmorgen Corporation, 333 Byberry Road, Hatboro, PA 19040, Tel: 215-672-0787; 215-672-4741, TWX: 510-387-236; FSC No.: 64914; *Sls. Mgr.:* Thomas G. Campbell; *Dist. Mgr.:* John Seibert .... **C•1483**

Local Sales Offices & Reps

AZ	Scottsdale, TC Elctrn. Sls., Inc.	602-994-5153
CA	Fullerton, Libratronix	714-871-1513
CA	Mountain View, Marquez & Assocs.	415-966-1012
CT	South Dartmouth, Kentronics	617-999-2188
FL	Coral Springs, Janco Resch. & Sls. Co.	305-755-0631
ID	Spokane, L. D. Elctrns.	509-922-0883
IL	Arlington Heights, Coombs Assocs., Inc.	312-439-9810
IN	Ft. Wayne, Coombs Assocs., Inc.	219-747-4017
IA	Cedar Rapids, Coombs Assocs., Inc.	319-362-4116

MA	Wakefield, Kentronics	617-246-0245
MI	Troy, C. B. Jensen & Assocs.	313-643-0506
MN	Brooklyn Center, William Assocs.	612-566-5010
NJ	Madison, Livera-Polk Assocs., Inc.	201-377-3220
NY	Glen Head, Livera-Polk Assocs., Inc.	516-759-9300
OR	Beaverton, L. D. Elctrns.	503-649-8556
WA	Snohomish, L. D. Elctrns.	206-568-0511
WI	Milwaukee, Coombs Assocs., Inc.	414-351-6123

PCK TECHNOLOGY DIV., Kollmorgen Corp., 322 South Service Rd., Melville, NY 11747, Tel: 516-454-4400, Telex: 6852163, TWX:; Empl.: 250; *Sls. Mgr.:* J. F. Dennis-Browne

PCM-PAC CYBER-METRIC, 6800 Sierra Ct., Dublin, CA 94568, Tel: 415-829-8700, TWX: 910-389-6890; Empl.: 19; *Sls. Mgr.:* T. J. Netoff

PC TRANSFORMER CORP., 64 D Nancy St., West Babylon, NY 11704, Tel: 516-491-3300; FSC No.: 62281; Empl.: 11; *Sls. Mgr.:* Stanley L. Goldstein .... **A•2226-2229**

PEARSON ELCTRNS., 1860 Embarcadero Rd., Palo Alto, CA 94303, Tel: 415-494-6444, Telex: 171-412; FSC No.: 05280; Empl.: 23; *Sls. Mgr.:* Patricia L. Pearson .... **A•2230**

PECA, INC., 592 Winks Lane, Bensalem, PA 19020, Tel: 215-245-1550; Empl.: 30; *Sls. Mgr.:* Jean Douglass

PENFIELD, INC., West & W. Main Sts., Plantsville, CT 06479, Tel: 203-621-9141; Empl.: 25

PENN AIRBORNE PRODS., Industrial Hwy., Southampton, PA 18966, Tel: 215-355-3400, Telex: 834759; FSC No.: 25805; Empl.: 25; *Sls. Mgr.:* W. Williams

PENN ENGRG. & MFG., P.O. Box 1000, Danboro, PA 18916, Tel: 215-766-8853; FSC No.: 46384; Empl.: 480; *Sls. Mgr.:* John E. O'Brien

PENN FIBRE & SPEC., 4343 "G" St., P.O. Box 4890A, Philadelphia, PA 19124, Tel: 215-288-7366; Empl.: 66; *Sls. Mgr.:* L. C. Jones

PENN KEYSTONE CORP., Unimax Switch Corp., Ives Rd., P.O. Box 152, Wallingford, CT 06492, Tel: 203-269-8701, Telex: 96-3485, TWX: 710-476-1397; FSC No.: 03034; *Sls. Mgr.:* Jack Fitzgerald

PENN RESCH. CORP. (PRC), 2652 South Main St., P.O. Box 3357, Kennesaw, GA 30144, Tel: 404-429-9061, Telex: 753010; *Sls. Mgr.:* Wallace Hundley

PENN-TRAN

PENN-TRAN CORP., Box 1321, Rte. 144N, Wingate, PA 16880, Tel: 814-355-1521, Telex: 706473; FSC No.: 50783; Empl.: 115; *Sls. Mgr.:* William Holt .... **A•1266, 2231; D•1741**

Local Sales Offices & Reps

AZ	Tempe, Systems Sls. of Arizona	602-829-9338
CA	Los Altos, Cain-White & Co.	415-948-6533
CA	Pasadena, A-F Sls. Engrg., Inc.	213-681-5631
CO	Englewood, Dynatech, Inc.	303-773-2830
CT	Madison, United Comp.	203-245-4810
IN	Ft. Wayne, Aktron	219-747-3650
MN	Minneapolis, International Sls. Co.	612-831-8423
NM	Albuquerque, Systems Sls. of New Mexico	505-881-8877
NY	Mendon, Tech-Mark, Inc.	716-624-3840
NC	Raleigh, DHR Mktg., INc.	919-876-5450
OR	Portland, Intertech Sls.	503-775-3390
PA	Glenside, Koebert Assocs., Inc.	215-887-2310
UT	Layton, Dynatech, Inc.	801-546-4837
VA	Front Royal, Eltron Sls., Ltd.	703-635-7201

PENNTUBE PLASTICS, Madison Ave. & Holly St., Clifton Heights, PA 19018, Tel: 215-622-2300, Telex: 845-212; Empl.: 145

PENN VIDEO INC., 929 Sweitzer Ave., Akron, OH 44311, Tel: 216-762-4840, Telex: 98-6327 PVI-AKR; Empl.: 40; *Sls. Mgr.:* Sandra Donaldson; *Dist. Mgr.:* Chris Abrams

PENNWALT CORP., Three Pkwy., Philadelphia, PA 19102, Tel: 215-587-7520, TWX: 215-569-9748

PENRIL DATACOMM, Penril Corp., 207 Perry Parkway, Gaithersburg, MD 20877, Tel: 301-921-8600, TWX: 710-828-0522; Empl.: 250; *Sls. Mgr.:* David L. Johnson

PERCON, 2190 W. 11th, Eugene, OR 97402, Tel: 503-344-1189; Empl.: 9; *Sls. Mgr.:* Peter Harnack; *Dist. Mgr.:* Peter Harnack

PERFECT GEAR & INSTR., 2101 Jericho Tpk., New Hyde Park, NY 11040, Tel: 516-328-3300, TWX: 510-223-0642; Empl.: 210; *Sls. Mgr.:* Murray Ores

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PERFORMANCE CONTROLS INC., 333-E Byberry Rd., Hatboro, PA 19040, Tel: 215-675-6500, Telex: 881478; FSC No.: 61773; Empl.: 30; *Sls. Mgr.:* M. Edward Wokulich .... **B•1178**

PERIPHERALS, 3001 Red Hill, Bldg. 6, Ste. 107, Costa Mesa, CA 92626, Tel: 714-540-4925

PERITEK CORP., 5550 Redwood Rd., Oakland, CA 94619, Tel: 415-531-6500, TWX: 910-366-2029; *Sls. Mgr.:* John Brogan

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PERKIN-ELMER CORP., Elctrn. Prods. Dept., Main Ave., Norwalk, CT 06856, Tel: 203-762-4786, TWX: 710-468-3213; Empl.: 70; *Sls. Mgr.:* D. P. Duggan ...**A•2232**

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PERMAG, 400 Karin La., Hicksville, NY 11801, Tel: 516-822-3311, TWX: 710-581-5264; Empl.: 50

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CA	Belmont, The Advance Grp.	415-592-4550
CO	Denver, The Advance Grp.	303-388-0923
FL	Boca Raton, Olson Assocs.	305-368-1845
NC	Raleigh, Southeastern Elctrns.	919-828-2311
OH	Canal Winchester, Rudolph Bros.	614-833-0707
OH	Dayton, Electro Supp.	513-299-5020
TX	Houston, The Advance Grp.	713-956-5436
WA	Seattle, The Advance Grp.	206-575-4323

PERMALUSTER, INC., 1844 N. Keystone St., Burbank, CA 91504, Tel: 213-849-4543; Empl.: 9; *Sls. Mgr.:* J. Ross

PERMANENT MAGNET, 4437 Bragdon St., Indianapolis, IN 46226, Tel: 317-547-1336; Empl.: 85; *Sls. Mgr.:* Jack Amigh

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IN	Indianapolis, Green-Wissler	317-872-9981
MI	Plymouth, J. Malcolm Flora	313-453-4296
MN	St. Paul, R. W. Sls.	612-646-2710
MO	Jefferson City, C. A. Vignola	314-636-3121
NJ	Marlton, Fahy Mktg.	609-983-2366
NY	Phelps, L. S. M. Assocs.	315-548-4891
NY	Plainview, Landau & Mack	516-293-3310
NC	Greensboro, Adams & Assocs.	919-272-6838
OH	Stow, J. Lehner Co.	216-686-1965
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WA	Seattle, Northmar, Inc.	206-524-5170
EXP	N.Y., Plainview, Morhan Export.	516-293-5582

PERRY AMPLIFIER, 138 Fuller St., Brookline, MA 02146, Tel: 617-734-0844; Empl.: 18; *Sls. Mgr.:* N. Geskos

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PHILIPS TELEVISION SYS., INC., P.O. Box 618, 900 Corporate Dr., Mahway, NJ 07430, Tel: 201-529-1550, Telex: 37-62558; *Sls. Mgr.:* Warren Anderson, Dir. of Mktg.

PHILIPS TEST & MEASURING INSTRS., 85 McKee Dr., Mahwah, NJ 07430, Tel: 201-529-3800; Empl.: 70; *Sls. Mgr.:* Bob Hynes

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CA	San Diego, Luscombe Engrg. Co.	619-295-4300
CO	Denver, Spectrum Sls.	303-696-1601
CT	Bloomfield, Zaslow Sls. Co.	203-242-7781
FL	Tampa, J-R Controls	813-961-9478
GA	Atlanta, C.S.R Elctrns.	404-396-3720
IL	Mt. Prospect, Magnuson Assocs./Magnuson Elctrns.	312-956-0700
KS	Merriam, Mid-West Tech. Sls.	913-236-8557
MD	Baltimore, McCourt Co., Inc.	301-747-0044
NJ	Rockaway, R.O.I. Sls. Co.	201-627-8879
NY	North Syracuse, Lachut Electrical Sls.	315-422-2575
NC	Charlotte, Mec-Tric Control Co.	704-376-8555
OH	Medina, J. C. Hofstetter Co.	216-241-4880
PA	Carnegie, Brown-Yates Electrical Equip. Co.	412-279-1101
PA	Willow Grove, Jacobson-Rodger Assocs.	215-657-4300
TX	Dallas, Lynn Elliott Co., Inc.	214-239-8533
TX	Houston, Lynn Elliott Co., Inc.	713-499-1571
VA	Richmond, McCourt Co., Inc.	804-741-3253
WA	Bellevue, Comtec	206-453-1188

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CA	Duarte, Nelson West Coast, Inc.	213-303-1526
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CA	Riverside, Elctrn. Supply Co.	714-683-7300
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CT	Wallingford, Sager Electrical	203-265-4600
FL	Lakeland, A-A Elec.	813-665-6941
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LA	Lafayette, Ralph's Indl. Elctrns.	318-234-4507
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MA	Hingham, Sager Electrical	617-749-6700
MI	Roseville, Madison Elec.	313-778-7640
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NJ	East Rutherford, A-A Elec.	201-777-5477
NJ	Pennsauken, Resco Elctrns.	609-662-4000
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NY	Rochester, Rochester Radio	716-454-7800
NY	Syracuse, Salmon Motor Repair	315-455-7924
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NC	Gastonia, JMT Elctrns. & Controls, Inc.	704-867-4401
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OH	Twinsburg, Schuster Elctrns.	216-425-8134
OR	Portland, North Coast Elec.	503-228-5111
OR	Portland, United Radio Supp.	503-233-7151
PA	Bradford, B-B Elec. Supp. Co.	814-368-4173
PA	Pittsburgh, Grant Industrial Controls	412-787-9770
PA	Reading, R.A.M. Motors and Controls	215-376-7102
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TX	Houston, General Elec. Supp. Co.	713-939-5100
TX	Houston, Sterling Elctrns.	713-627-9800
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HI	Honolulu, Data Mgt. Assn.	808-943-1944
IL	Rosemont, Synmark Sls. Co.	312-825-3455
IN	Ossian, Science Sls.	219-622-7383
MA	Sudbury, Poulin Assocs.	617-443-7333
MN	Minneapolis, All Phase Agency	612-835-4940
MO	St. Louis, Engineering Svcs. Co.	314-997-1515
NJ	Pennsauken, Scientific Reps.	609-662-5222
NM	Albuquerque, Grady Moore Assocs.	505-262-1416
NY	Plainview, Eastern Metro Assocs.	516-931-1414
NC	Fayetteville, Zim-Tek	919-488-4101
OH	Risingsun, Mecom Inc.	419-457-3231
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TX	Houston, Southwestern Engrg. & Equip. Co.	713-820-2500
VA	Fairfax, Scientific Assocs.	703-385-0600
WA	Walla Walla, Northwest Tech. Co.	509-529-2051

PHOTON, INC., 14125 Capri Dr. # 4, Los Gatos, CA 95030, Tel: 408-866-0566, Telex: 17-1618 refer: Photon; Empl.: 12; *Sls. Mgr.:* John M. Fleischer

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IL	Chicago, Shaumberg Phoenix Co.	312-595-2300
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NY	Huntington, Regulus Indl. Sls. Co.	516-673-6252
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TX	Ft. Worth, El-Tec Sls.	817-268-2896
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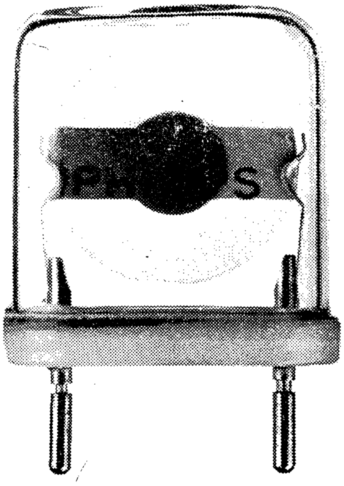

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FL	Plantation, Tropi-Tec	305-581-0101
IL	Mount Prospect, K-W Assocs.	312-253-6680
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NM	Albuquerque, Williams-Assocs.	505-255-1638
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NY	Rochester, Application Spec.	716-586-6226
NY	Syracuse, Application Spec.	315-437-2813
NC	Charlotte, Electro-Rep Assocs.	704-527-2530
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OK	Tulsa, Blair Engrg.	918-622-3100
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TX	Dallas, Blair Engrg.	214-241-5655
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WA	Vancouver, Halbar Assocs.	206-696-0170
PR	Hato Rey, Tropi-Tec	809-759-7303

PKS - DIGIPLAN LTD., 1859 Charter Lane, Lancaster, PA 17601, Tel: 717-299-2706, Telex: 887352; Empl.: 100; *Sls. Mgr.:* Roy J. W. Home

PLAINVIEW ELCTRNS., 28 Cain Dr., Plainview, NY 11803, Tel: 516-249-6677, Telex: 125043; Empl.: 6; *Sls. Mgr.:* B. Erde

PLANT SPECIALTIES, INC., PO Box 1097, Carrollton, TX 75006, Tel: 214-245-9673; *Sls. Mgr.:* J. E. Bryer

PLASMAGRAPHICS CORP., 141 Mount Bethel Rd., P.O. Box 4903, Warren, NJ 07060, Tel: 201-757-5000, Telex: 83-3456-0, TWX: 710-997-9529; *Dist. Mgr.:* Ronald Pignatello

PLASMARC TECHNOLOGIES, INC., 180 Passaic Avenue, Fairfield, NJ 07006, Tel: 201-575-0870, Telex: 833245; FSC No.: 6Y983; Empl.: 15; *Sls. Mgr.:* Gregory A. Galaida

PLASMA RESEARCH CORP., 2900 Main St., Alameda, CA 94501, Tel: 415-521-5532; FSC No.: 84067; Empl.: 3

PLASMA-THERM, INC., Rt. 73, Kresson, NJ 08053, Tel: 609-767-6120, Telex: 837220; *Sls. Mgr.:* John D. Raffl

PLASTIC CAPACITORS, INC., 2623 N. Pulaski Rd., Chicago, IL 60639, Tel: 312-489-2229, TWX: 910-221-1354; FSC No.: 99120; Empl.: 105; *Sls. Mgr.:* F. J. Pavey

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AL	Huntsville, B.J.R., Inc.	205-881-3569
CA	Palo Alto, Horne Electro Sls., Inc.	415-494-6777
CA	San Diego, EESCO/LANDA/MINYARD, Inc.	619-942-1086
CA	Santa Ana, EESCO/LANDA/MINYARD, Inc.	714-543-7805
CT	E. Haven, Eagle Assocs.	203-467-6542
FL	Lighthouse Point, Jack Krutek & Assocs., Inc.	305-941-6544
IL	Elk Grove Village, Carlson Elctrn. Sls. Co.	312-956-8240
IN	Fort Wayne, W. W. Bieberich, Inc.	219-432-2537
IA	Cedar Rapids, Carlson Elctrn. Sls. Assocs.	319-377-6341
MD	Timonium, Eastern Comps. Sls. Corp.	314-645-8670
MA	Pinehurst, Eagle Assocs.	617-444-3446
MO	St. Louis, Cadon Tech. Co.	314-645-8670
NJ	Springfield, F. F. Sylvester Assoc.	201-376-3324
NY	Rochester, APEX Assocs., Inc.	716-235-9052
NC	Raleigh, Eastern Comps. Sls. Corp.	919-787-3416
OH	Dayton, Electro-Com	513-898-5140
OR	Tigard, Components West, Inc.	503-684-1671
PA	W. Conshohocken, Eastern Comps. Sls. Corp.	215-825-8610
TX	Seagoville, Delta Comps., Inc.	214-287-6333
WA	Redmond, Components West, Inc.	206-885-5880
WI	Milwaukee, Carlson Elctrn. Sls. Co.	414-476-2790
EXP	NY, New York, B F I Intl.	212-513-7171
Can	North Vancouver, Interworld Elctrns.	604-984-4171

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PRECISION MOLDED PRODUCTS, INC., 582 Meyer Lane, Redondo Beach, CA 90278, Tel: 213-372-7373

PLASTIGLIDE MFG., 2701 W. El Segundo Blvd., Hawthorne, CA 90250, Tel: 213-777-8108, Telex: 9103215755; Empl.: 425; *Sls. Mgr.:* T. Bubonic

PLASTOID CORPORATION, 45 Gingerbread Castle Rd., Hamburg, NJ 07419, Tel: 201-827-7141

PLASTRONICS INC., 3111 Gardenbrook, Dallas, TX 75234, Tel: 214-243-0611, TWX: 910-860-5542; Empl.: 47

PLATO PRODS., 2120 E. Allen Ave., Glendora, CA 91740, Tel: 800-423-4510, Telex: 673-488; FSC No.: 32399; Empl.: 75; *Sls. Mgr.:* Walter Schaub

PLESSEY CERAMIC DIV., 8th & Harrison Sts., Frenchtown, NJ 08825, Tel: 201-996-2121, TWX: 510-235-3399; Empl.: 198; *Sls. Mgr.:* William Blackford

PLESSEY ELECTRO-PRODUCTS, 3860 Centinela Ave., Los Angeles, CA 90066, Tel: 213-390-3585, TWX: 910-343-6483; Empl.: 60; *Sls. Mgr.:* Joan Marie Hill

PLESSEY MICROSYSTEMS, Plessey Trading Corp., 1641 Kaiser Ave., Irvine, CA 92714, Tel: 714-540-9931/9932, TWX: 910-595-1930; *Sls. Mgr.:* Garry T. Tomlins

PLESSEY MICROSYSTEMS, The Plessey Co., Ltd., One Blue Hill Pla., Pearl River, NY 10965, Tel: 914-735-4661

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AR	Searcy, Industry Controls Assoc.	501-268-8552
CA	Hemet, PMI Motors	714-652-6288
CA	San Jose, Motion Control	408-997-0544
CA	San Marino, Motion Control	818-796-0189
FL	Altamonte Springs, Machine Controls, Inc.	305-788-6606
GA	Atlanta, Factory Automated Inc. Controls	404-355-7475
IL	Bartlett, T. Meyer	312-830-3374
IN	Elkhart, Shaum Mfg.	219-264-0771
IN	Spencer, Shaum Mfg. Inc.	317-842-2255
LA	Baton Rouge, Industrial Controls Assocs.	800-643-1109
MA	Beverly, Electro Kinetics	617-922-4007
MA	Wellesley, Electro Kinetics	617-235-9415
MI	Belding, Shaum Mfg. Inc.	616-897-5385
MI	Birmingham, Pyramid Intergrated Control	313-649-5735
MI	Rochester, Pyramid Intergrated Control	313-652-1375
MN	Cottage Grove, Applied Motion Technlg.	612-459-0600
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NY	Syosset, Motion Control Sls.	516-921-5656
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NC	Greensboro, Engrg. & Mktg. Corp. of Virginia	919-275-1309
NC	Plymouth, Engrg. & Mktg. Corp. of Virginia	919-793-4461
OH	Chagrin Falls, Exonic Sys.	216-247-4788
OH	Cincinnati, Shaum Mfg.	513-793-6145
OK	Edmond, Industrial Controls Assocs.	405-340-8653
OR	Lake Oswego, Drive Motor Control	403-636-7931
PA	King of Prussia, Associated Controls	215-768-9739
PA	Pittsburgh, Exonic Systems	412-784-8400
TN	Memphis, Industrial Control Assocs.	800-643-1109
TX	Arlington, Industrial Controls Assocs.	800-643-1109
TX	Fort Worth, Industrial Controls Assocs.	817-498-6222
TX	Houston, Industrial Control Assocs.	800-643-1109
TX	San Antonio, Industrial Control Assocs.	800-643-1109
UT	Salt Lake City, Control Agency	801-972-8788
VA	Roanoke, Engrg. & Mktg. Corp. of Va	703-986-1410
WA	Renton, Drive Motor Control Sys. Co.	206-872-8446
WI	Racine, T. Beyer	414-632-6100
Can	Willowdale, Ontario, Arthur Rosenblum Sls. Ltd.	416-224-1177

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POLYCORE ELCTRNS., 1107 Tourmaline Dr., Newbury Pk., CA 91320, Tel: 805-499-6777, Telex: 910-336-1547; Empl.: 40; *Sls. Mgr.:* S.K. Leong

POLYMER CORP., P.O. Box 422, Reading, PA 19603, Tel: 215-320-6600, Telex: 836-440, TWX: 510-651-5396; Empl.: 1000; *Sls. Mgr.:* J. D. Beatty

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GA	Atlanta, Cemco	404-491-0520
HI	Honolulu, Manon Engrg.	808-833-9545
IL	Elk Grove Village, IRO-Company	312-593-0644
MI	Grand Blanc, Webster Assocs., Inc.	313-694-3256
MI	Rochester, Webster Assocs.	313-375-0420
MN	Stillwater, Ned Gordon & Assocs.	612-430-1572
NV	Gardnerville, PolyPhaser Corp.	702-782-2511
NM	Albuquerque, Electro-Tek Sls., Inc.	505-883-4871
NM	Albuquerque, Horizon Engrg. Sls. Co.	505-877-0277
OH	Toledo, Webster Assocs.	419-535-0708
OK	Tulsa, Horizon Engrg. Sls. Co.	918-252-7222
OR	Portland, Manon Engrg.	503-245-7553
PA	Venetia, Webster Assocs.	412-941-8848
RI	Lincoln, Adams-McGregor	401-726-1300
RI	West Warwick, Adams McGregor, Inc.	401-821-1320
TX	Houston, Horizon Engrg. Sls. Co.	713-495-1018
TX	Rockwall, Horizon Engrg. Sls. Co.	214-475-1179
WA	Kirkland, Manon Engrg.	206-827-7449

Local Distributors

CA	Sacramento, Sacramento Elctrns.	916-441-4821
CO	Aurora, Electro-Tek Sls.	303-343-8937
IL	Elk Grove Village, IRO Co.	312-593-0644
KS	Dodge City, Teletron	316-225-3736
NV	Carson City, Schwartz Radio, Inc.	702-883-4500
NV	Gardnerville, PolyPhaser Corp.	702-782-2511
NC	Greensboro, West Antenna	919-621-2473
TX	Rowlett, Horizon Engrg. Sls.	214-475-1179
VA	Blacksburg, Professional Comms.	703-552-4443
Can	Ontario, Motorola, Ltd.	416-499-1441

POLY-SCIENTIFIC, Litton Inds., 1213 N. Main St., Blacksburg, VA 24060, Tel: 703-552-3014, TWX: 710-875-3694; Empl.: 625

POLYTRON DEVICES, Box 398 - River St. Sta., Paterson, NJ 07544, Tel: 201-345-5885; Empl.: 10

POMFRET RESEARCH OPTICS, 817 Long Ridge Rd., Stamford, CT 06902, Tel: 203-322-6386; Empl.: 5

POMONA ELECTRONICS, See ITT Pomona

POP FASTENERS DIV., 510 River Rd., Shelton, CT 06484, Tel: 203-735-9341, Telex: 963465, TWX: 710-451-3734; Empl.: 375; *Sls. Mgr.:* James Lynch

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MN	Bloomington	612-854-6456
TX	Richardson	214-690-9000

POSITRONIC INDUSTRIES, INC., 423 North Campbell, Springfield, MO 65801, Tel: 417-866-2322, Telex: 436445; FSC No.: 28198; Empl.: 250; *Sls. Mgr.:* J.E. Myers; *Dist. Mgr.:* Linda Haley

Local Sales Offices & Reps

AZ	Phoenix, Jarko Assocs.	602-243-4387
CA	Irvine, J.V. Earley & Assocs.	714-833-1806
CA	Mountain View, Gene Woempner	415-964-5454
CA	Mountain View, Gene Woempner Co.	415-964-5454
CO	Englewood, Delta Sales Assocs.	303-799-0646
CT	Fairfield, Schumacher/Yarrington	203-259-0772
FL	Coral Springs, H.A. Inc.	305-752-7520
FL	Coral Springs, H.A., Inc.	305-752-7520
IL	Itasca, L-Tec, Inc.	312-773-2900
IN	Carmel, Technology Mktg. Corp.	317-844-8462
MD	Silver Spring, Carwithen Assoc.	301-589-9040
MI	Birmingham, Favco, Inc.	313-644-0173
MN	Minneapolis, R K Sls.	612-786-5713
MO	Springfield, Bill Gentry	417-866-2322
NJ	Medford, Comp. Conslts.	609-386-5300
NJ	Medford, Component Conslts.	609-654-5300
NY	Fairport, Net Sls.	716-467-4538
NY	Manhasset, Martech	516-627-1151
NC	Raleigh, R.W. Mitscher Co., Inc.	919-848-0941
OH	Cleveland, Components, Inc.	216-243-9200
OH	Miamisburg, Components, Inc.	513-866-0661
RI	Warwick, Schumacher/Yarrington	401-884-5671
TX	Plano, Richmar Elctrns.	214-867-8224
WA	Mercer Island, Elctrn. Comp. Sls.	206-232-9301
WA	Mercer Island, Electronic Comp. Sls.	206-232-9301

POTTER & BRUMFIELD, AMF Incorporated, 200 S. Richland Creek Dr., Princeton, IN 47671-0001, Tel: 812-386-1000, Telex: 27-8451, TWX: 810-350-2343; Empl.: 3000; *Sls. Mgr.:* Don Morrow; *Dist. Mgr.:* Gordon Collins

POTTER CO., P.O. Box 337, North Hwy. 51, Wesson, MS 39191, Tel: 601-643-2215, TWX: 510-981-4072; FSC No.: 601-643-5126; Empl.: 300 .... **A•1623**

Local Sales Offices & Reps

CA	Los Angeles, Potter Co.	818-704-1151
CA	San Jose, Potter Co.	408-244-0951
FL	Orlando, Potter Co.	305-831-2782
IL	Chicago, Potter Co.	312-364-0424
MA	Boston, Potter Co.	617-449-1242
MN	Minneapolis, Potter Co.	612-933-7712
NY	Syracuse, Potter Co.	315-455-5808
NC	Raleigh, Potter Co.	919-878-8018
OR	Wilsonville, Potter Co.	503-682-7213
TX	Austin, Potter Co.	512-451-5721
TX	Richardson, Potter Co.	214-644-0575

Local Distributors

AL	Alhambra, Fischer-Brownell	818-289-0255
AZ	Tempe, Fischer-Brownell	602-967-1464
CA	Cerritos, El-Com, Inc.	714-739-5656
CA	San Diego, El-Com, Inc.	619-578-0900
CA	San Diego, Fischer-Brownell	619-560-8545
CA	San Francisco, KEA Elctrn. Distributing	415-887-2900
CA	Santa Clara, Richey Western	408-727-7411
CT	New Haven, Cronin Elctrns.	203-265-3134
CT	Orange, Milgray Elctrns.	203-795-0711
FL	Orlando, Intertec Comps.	305-834-7777
FL	Winter Park, Milgray Elctrns.	305-647-5747
GA	Atlanta, Milgray Elctrns.	404-393-9666
IL	Chicago, Advent Elctrns.	312-297-6200
IN	Indianapolis, Advent Elctrns.	317-872-4910
IA	Cedar Rapids, Advent Elctrns.	319-363-0221
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MD	Rockville, Milgray Elctrns.	301-468-6400
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MA	Burlington, Milgray Elctrns.	617-272-6800
MI	Detroit, Advent Elctrns.	313-477-1650
MN	Minneapolis, Industrial Comps., Inc.	612-831-2666
NJ	Marlton, Milgray Elctrns.	609-983-5010
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TX	Richardson, Fischer-Brownell	214-235-3177
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POULIN ASSOCIATES, INC., 302 North Rd., Sudbury, MA 01776, Tel: 617-443-7333; *Sls. Mgr.:* Scott Spalding

POWERBOX, INC., 1860 Broadway, New York, NY 10023, Tel: 212-586-1992; *Sls. Mgr.:* Len Elmlund

POWER COMPS. CO., Vanguard Elctrns. Co., 1480 W. 178th St., Gardena, CA 90248, Tel: 213-323-8120, TWX: 910-346-7067; FSC No.: 213-329-8427; *Sls. Mgr.:* Ken Finley

POWER CONTROL, 122 Gamma Dr., Pittsburgh, PA 15238, Tel: 412-782-3120; Empl.: 75

POWER CONTROLS, P.O. Box 5860, San Antonio, TX 78201, Tel: 512-734-7155, Telex: 767222; Empl.: 90; *Sls. Mgr.:* Robert A. McAlister

POWER CONVERSION PRODS., 42 East St., Box 380, Crystal Lake, IL 60014, Tel: 815-459-9100, TWX: 910-634-3356; FSC No.: 31751; Empl.: 130; *Sls. Mgr.:* C. Seyer

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CA	San Jose, Manufacturing Mktg. Grp.	408-446-0176
CO	Aurora, Electro-Tek Sales	303-343-8937
DC	Baltimore, Callas Elctrns.	301-744-7711
FL	Tampa, Telcom Assocs.	813-935-5006
IL	Chicago, Power Conversion Prods.	312-787-0723
IL	Park Ridge, Conrardy Co.	312-692-2226
LA	Metairie, Lynn Elliott	504-831-4669
MI	Farmington Hills, Joseph H. Clark Sls. Co.	313-553-0610
NJ	Cherry Hill, L. H. Walke	609-424-3766
NM	Albuquerque, Electro-Tek Sls.	505-883-4871
NY	White Plains, Metrotek Assocs.	914-631-4758
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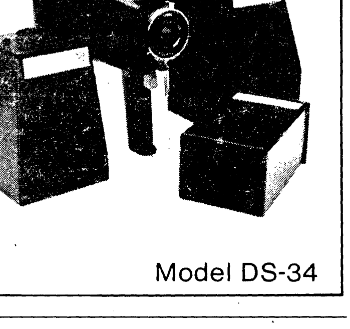

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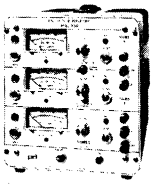

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IL	Elk Grove Village, Loren Green & Assocs.	312-593-0282
IN	Indianapolis, Loren Green & Assocs.	317-293-9827
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NY	Great Neck, The Instrument Mart	516-487-7430
Can	Ottawa, Subtec, Ltd.	613-744-3066

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CA	San Diego, David Budge Assocs.	619-587-0131
CT	Vernon, GM Assoc.	203-646-4443
FL	Coral Springs, E.P.M. Corp.	305-755-5387
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FL	Orlando, EPM Corp.	305-755-5387
FL	Vero Beach, EPM Corp.	305-425-6149
GA	Atlanta, Electro Sls., Inc.	404-394-1122
GA	Lawrenceville, BTF, Inc.	404-963-9495
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MN	Minneapolis, R. K. Sls.	612-786-5713
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NH	Exeter, GM Assoc.	603-778-7472
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NJ	Englewood Cliffs, Ed Glass Assocs.	201-592-0200
NY	Fayetteville, C. W. Floring Assocs., Inc.	315-637-4552
NY	Poughkeepsie, C. W. Floring Assocs., Inc.	914-471-2973
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OH	Dayton, KW Elctrn. Sls.	513-890-2150
OH	Shaker Heights, K. W. Elctrns.	216-491-9177
OH	Shaker Heights, KW Elctrn. Sls.	216-491-9177
OH	Worthington, K. W. Elctrns.	614-888-0483
OH	Worthington, KW Elctrn. Sls.	614-888-0483
OK	Tulsa, Rem-Air Comp.	918-742-2559
OR	Tigard, Electronic Comp. Sls.	503-245-2342
PA	Allison Park, K. W Elctrns.	412-487-4300
PA	Allison Park, KW Elctrn. Sls.	412-487-4300
PA	Prospect Park, Elf Sls.	215-534-3340
TN	Chattanooga, Electro Sls.	615-267-2160
TX	Dallas, Rem-Air Comp.	214-234-1069
TX	Dallas, Rem-Air Comps.	214-234-1069
UT	Salt Lake City, Aspen Sls.	801-467-2401
WA	Mercer Island, Elctrn. Comp. Sls.	206-232-9301
WA	Mercer Island, Electronic Comp. Sls.	206-232-9301
PR	Old San Juan Stn., Casanova Indl. Sls. Corp.	809-753-8674
Can	Toronto, Tienkay, Inc.	416-661-5499

Local Distributors

CA	Burlingame, Rose Elctrns.	415-348-2740
CA	El Segundo, Force Elctrns.	714-522-1324
CA	San Jose, Force Elctrns.	408-943-1324
CA	San Jose, Rose Elctrns.	408-263-9700
CT	New Canaan, Impact Sls.	203-972-1458
FL	Ft. Lauderdale, KSM Elctrns.	305-971-5900
FL	Ft. Lauderdale, NRC Elctrns.	305-772-4500
GA	Atlanta, KSM	404-458-2013
IL	Crystal Lake, Sub-Sem	312-782-3954
MA	Canton, Impact Sls.	617-821-1500
MN	Bloomington, NWR Elctrns.	612-854-7329
NC	Raleigh, Century Elctrns.	919-872-2203
OR	Beaverton, Murphy Elctrns.	503-642-2001
OR	Beaverton, Rose Elctrns.	503-629-9288
PA	Norristown, Century Elctrns.	215-631-5400
TN	Memphis, Electrotec	901-362-1350
TX	Austin, Force Elctrns.	512-476-2104
TX	Austin, Southwest Elctrns.	512-837-8971
TX	Houston, Force Elctrns.	713-561-8644
TX	Irving, Force Elctrns.	214-438-5700
TX	Richardson, Southwest Elctrns.	214-234-3050
TX	San Antonio, Force Elctrns.	512-733-7177
TX	Stafford, Southwest Elctrns.	713-240-4000
WA	Redmond, Murphy Elctrns.	206-881-1234

POWER ELCTRNS., 96 Milton Rd., Rochester, NH 03867, Tel: 603-332-3334; Empl.: 125; *Sls. Mgr.:* Robert S. Karstedt

POWER FUNCTIONS ENGRG., 3831 Cavalier Dr., Garland, TX 75042, Tel: 214-278-0996; Empl.: 9

POWER GENERAL, Unitrode, 152 Will Dr., Canton, MA 02021, Tel: 617-828-6216, TWX: 710-348-0200; Empl.: 400; *Sls. Mgr.:* Steve Dutton; *Dist. Mgr.:* Paul Hurly .... **D•1760-1767**

Local Sales Offices & Reps

AL	Huntsville, Murcota	205-539-8476
AZ	Scottsdale, TC Elctrn. Sls.	602-994-5153
CA	Orange, XBX Sls.	714-998-8200
CA	San Jose, Custom Tech. Sls.	408-252-9901
CO	Englewood, Frontier Reps.	303-799-6063
FL	Melbourne, EMS	305-724-1027
FL	Plantation, EMS	305-587-7146
FL	Sarasota, EMS	813-923-2804
IL	Palatine, T-Squared Assocs.	312-991-2144
IA	Cedar Rapids, Palatine Eng. & Sls.	319-365-8071
KS	Mission, Palatine Eng. & Sls.	913-831-0555
MA	Canton, Power Gen.	617-828-6216
MI	Birmingham, Favco	313-644-0173
MI	Grand Rapids, Favco	616-459-4425
MN	Minneapolis, Comtek Sls.	612-888-7011
MO	Hazelwood, Palatine Engrg. & Sls.	314-839-0800
NV	Reno, Dunning & Assocs.	702-329-9004
NJ	Rockaway, R.O.I. Sls. Co.	201-340-1515
NY	Cortland, Net Sls. Co.	607-756-6592
NY	DeRuyter, Net Sls.	315-662-7996
NY	Fairport, Net Sls.	716-467-4538
NY	Troy, Net Sls.	518-274-4758
NY	Webster, Net Sls. Co.	716-467-4538
NC	Winston Salem, Murcota	919-722-9445
OH	Columbus, McFadden Sls.	614-459-1280
OR	Aloha, Huntley Assocs.	503-649-5388
TX	Austin, Mech-Tron Mktg.	512-835-0980
TX	Dallas, Mech-Tron Mktg.	214-343-3786
TX	Houston, Mech-Tron Mktg.	713-462-1432
VA	Fairfax, Beacon North	800-572-0405
VA	Falls Church, Beacon North, Inc.	703-591-1300
VA	Forest, Beacon North, Inc.	804-239-8486
WA	Everett, Huntley Assocs.	206-353-1833

Local Distributors

Intl	Belgium, Gent, Belgium Computer Prods.	
Intl	France, Orsay, Microel	907.08.24

POWER GROUP INTERNATIONAL, Dept. 227, 2200 West 66th Street, Richfield, MN 55423, Tel: 612-890-1360; FSC No.: 25441; Empl.: 500; *Sls. Mgr.:* Hortense M. Rowe .... **D•1428-1429**

POWER INSTRS. PRODUCTS, Amatek/Mansfield & Green Div., 8600 Somerset Dr., Largo, FL 33543, Tel: 813-536-7831, Telex: 808-741; Empl.: 45; *Sls. Mgr.:* Tony Ruggiero

POWER INTEGRITY CORP., 1840 Pembroke Rd., P.O. Box 9682, Greensboro, NC 27408, Tel: 919-379-9773; *Sls. Mgr.:* James T. Fesmire

POWER LABS, INC., 5 Towle Ave., Dover, NH 03820, Tel: 603-742-4613; Empl.: 9

POWERMARK, 3855 Ruffin Rd., San Diego, CA 92123, Tel: 619-565-8363; Empl.: 75; *Sls. Mgr.:* Ron Baietto .... **D•1955**

Local Sales Offices & Reps

AL	Birmingham, Sesco	205-988-8304
AK	Anchorage, John P. Bagoy & Assocs.	907-274-8531
AZ	Phoenix, Bob Anderson Co.	602-266-2070
CO	Colorado Springs, Cleveland Entprs. of Colo.	303-597-8872
FL	St. Petersburg, Sesco	813-576-6991
GA	Atlanta, Sesco	404-458-6423
HI	Honolulu, Ind'l. Elctrns.	808-533-6095
IL	Elk Grove Village, Loren Green Assocs.	312-593-0282

KS	Shawnee, Atech	913-268-9644
LA	Baton Rouge, Sesco	504-928-4951
MD	Gaithersburg, Powell-Pendergraph	301-921-4200
MA	Wellesley, Power Conversion Sys.	617-235-7884
MN	Minneapolis, Loren Green Assocs.	612-571-6666
MO	St. Louis, Atech	314-428-7447
NH	Londonderry, Power Conversion Sys.	603-434-2371
NJ	Ridgewood, Ballou, Inc.	201-444-6990
NY	Clarence, Trott Elctrns.	716-634-8500
NY	Pittsford, Trott Elctrns.	716-586-8251
NC	Cary, Sesco	919-467-7482
OH	Cleveland, Jim Finnegan & Co.	215-238-5905
OK	Tulsa, Sesco	918-622-3868
PA	King of Prussia, J. E. Cuesta & Co.	215-265-5800
TX	Austin, Sesco	512-892-2490
TX	Dallas, Sesco	214-231-9364
TX	Houston, Sesco	713-999-3510
VA	Richmond, Powell-Pendergraph	804-270-1400
WA	Bellevue, Underwood-Hanify Assocs.	206-451-8223
WA	Vancouver, Underwood-Hanify Assocs.	503-641-4463

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power-one

POWER-ONE, INC., Power-One Linear Products, 740 Calle Plano, Camarillo, CA 93010, Tel: 805-987-8741, TWX: 910-336-1297; FSC No.: 54407; Empl.: 317 .... **D•1768-1773**

Local Sales Offices & Reps

AZ	Tempe, System Sls. of AZ	602-829-9338
CA	Los Angeles, A-F Sls. Engrg.	213-681-5631
CA	Pasadena, A-F Sls. Engrg.	213-681-5631
CA	San Diego, A-F Sls. Engrg.	619-224-8424
CA	San Jose, Richards Assocs.	408-297-3010
CO	Denver, Quorum 3	303-696-8480
FL	Casselberry, Elctrn. Mktg.	305-339-7070
GA	Marietta, FLW Southeast	404-424-1731
IL	Itasca, L-Tec	312-773-2900
IA	Cedar Rapids, Lorenz Sls.	319-377-4666
KS	Overland Park, ATS	913-642-6675
MA	Brockton, Forsberg	617-522-6300
MI	Southfield, L. H. Dickelman	313-353-8210
MN	Minneapolis, Components Grp. Corp.	612-374-1250
MO	St. Louis, ATS	314-227-4448
NE	Lincoln, Lorenz Sls.	402-475-4660
NM	Albuquerque, System Sls. of AZ	505-881-8877
NY	Great Neck, Trionic Assocs.	516-466-2300
NY	Pittsford, C. W. Beach	716-586-3200
NY	Syracuse, C. W. Beach	315-446-9587
OH	Columbus, Tom Mulligan Co.	614-457-2242
OK	Tulsa, Advance Tech. Sls.	918-664-0482
OR	Beaverton, W3	503-641-5790
PA	Philadelphia, Eastern Comp. Sls.	215-825-8610
PA	Stewartstown, Eastern Comp. Sls.	800-223-3850
TX	Austin, Advance Tech. Sls.	512-459-1351
TX	Dallas, Advance Tech. Sls.	214-340-1300
TX	Houston, Advance Tech. Sls.	713-440-3888
UT	Sandy, Quorum 3	801-943-9227
VA	Manasas, Eastern Comp. Sls.	703-368-3936
WA	Seattle, W3	206-285-2667
WI	Milwaukee, L-Tec	414-774-1000

Local Distributors

AZ	Phoenix, Arrow Elctrns.	602-968-4800
AZ	Phoenix, Sterling Elctrns.	602-258-4531
CA	Chatsworth, Arrow Elctrns.	213-701-1133
CA	Chatsworth, Diplomat Elctrns.	818-341-4411
CA	Costa Mesa, FLW	818-989-5237
CA	Los Angeles, Hanex, Inc.	213-556-3807
CA	San Diego, Arrow Elctrns.	619-565-4800
CA	San Diego, Diplomat Elctrns.	619-292-5693
CA	San Jose, Compumech Elctrns.	408-289-9171
CA	Sunnyvale, Arrow Elctrns.	408-745-6600
CA	Sunnyvale, Diplomat Elctrns.	408-734-1900
CA	Tustin, Arrow Elctrns.	714-838-5422
CO	Denver, Arrow Elctrns.	303-696-1111
CO	Englewood, Diplomat Elctrns.	303-799-8300
CT	Danbury, Diplomat Elctrns.	203-797-9674
CT	Norwalk, Pioneer/Connecticut	203-853-1515
CT	Wallingford, Arrow Elctrns.	203-265-7741
CT	Wallingford, Sterling Elctrns.	203-265-9535
FL	Clearwater, Diplomat Elctrns.	813-443-4514
FL	Ft. Lauderdale, Arrow Elctrns.	305-776-7790
FL	Ft. Lauderdale, Pioneer/Lauderdale	305-771-7520
FL	Miami, Elctrn. Equip. Co.	305-871-3500
FL	Palm Bay, Arrow Elctrns.	305-725-1480
GA	Norcross, Arrow Elctrns.	404-449-8253
GA	Norcross, Diplomat Elctrns.	404-449-4133
IL	Arlington Heights, C. W. Elctrns.	312-489-9810
IL	Bensenville, Diplomat Elctrns.	312-595-1000
IL	Elk Grove Village, Pioneer/Chicago	312-439-9680
IL	Northbrook, Classic Comps.	312-272-9650
IL	Schaumburg, Arrow Elctrns.	312-397-3440
IN	Ft. Wayne, Graham Elctrns.	219-423-3422
IN	Indianapolis, Advent Elctrns.	317-872-4910
IN	Indianapolis, Arrow Elctrns.	317-243-9353
IN	Indianapolis, Classic Comps.	317-872-4777
IA	Cedar Rapids, Deeco, Inc.	319-365-7551
KS	Edwardville, C. Tennant & Sons	913-441-1801
LA	Metairie, Sterling Elctrns.	504-887-7610
MD	Baltimore, Arrow Elctrns.	301-247-5200
MD	Columbia, Diplomat Elctrns.	301-995-1226
MD	Timonium, Zebra Elctrns.	301-252-6576
MA	Canton, Impact Sales	617-821-1500
MA	Woburn, Arrow Elctrns.	617-933-6770
MI	Ann Arbor, Arrow Elctrns.	313-971-8220
MI	Grand Rapids, Arrow Elec.	616-243-0912
MI	Livonia, Pioneer/Mich.	313-525-1800
MI	Livonia, Reptron	313-525-2700
MN	Edina, Arrow Elctrns.	612-830-1800
MN	Minneapolis, Aero Space Computer	612-884-4725
MN	Minnesota, Pioneer/Twin Cities	612-935-5444
MO	St. Charles, Finnigan Elctrns.	314-946-6201
MO	St. Louis, Arrow Elctrns.	314-567-6888
NE	Omaha, Scott Elctrns.	402-734-6750
NH	Manchester, Arrow Elctrns.	603-668-6968
NJ	Marlton, Arrow Elctrns.	609-596-8000
NJ	Perth Amboy, Sterling Elctrns.	201-442-8000
NJ	Pine Brook, Pioneer/NJ	201-575-3510
NJ	Saddle Brook, Arrow Elctrns.	201-797-5800
NJ	Totawa, Diplomat Elctrns.	201-785-1830
NM	Albuquerque, Arrow Elctrns.	505-243-4566
NM	Albuquerque, Sterling Elctrns.	505-854-1900
NY	Hauppauge, Arrow Elctrns.	516-231-1000
NY	Liverpool, Arrow Elctrns.	315-652-1000
NY	Mamaroneck, Logicomp Elctrns.	914-698-9332
NY	Melville, Diplomat Elctrns.	516-454-6400
NY	Rochester, Arrow Elctrns.	716-275-0300
NY	Rochester, CAM/RPC Elctrns.	716-865-2080
NY	Rochester, Zeller Elctrns.	716-254-8840
NY	Woodbury, Pioneer/Woodbury	516-921-8700
NC	Charlotte, Pioneer/Carolina	704-527-8188
NC	Raleigh, Arrow Elctrns.	919-876-3132
NC	Raleigh, Southeastern Elctrns.	919-828-2311
NC	Winston-Salem, Arrow Elctrns.	919-725-8711
OH	Centerville, Arrow Elctrns.	513-435-5563
OH	Cincinnati, Applied Data Mgt.	513-579-8108
OH	Cleveland, CAM/RPC Elctrns.	216-461-4700
OH	Cleveland, Pioneer/Cleveland	216-587-3600
OH	Columbus, Reptron	614-436-6675
OH	Dayton, Pioneer/Dayton	513-236-9900
OH	Solon, Arrow Elctrns.	216-248-3990
OK	Tulsa, Sterling Elctrns.	918-663-2410
OR	Portland, Radar Elec.	503-232-3404
PA	Horsham, Pioneer/Delaware Valley	215-674-4000
PA	Lancaster, CAM/RPC Elctrns.	717-392-8141
PA	Monroeville, Arrow Elctrns.	412-856-7000
PA	Pittsburgh, Alder Tronics	412-821-5565
PA	Pittsburgh, CAM/RPC Elctrns.	412-782-3770
PA	Wayne, Peak Elctrns.	215-293-9000
RI	Warwick, Major Edwards Elctrns.	401-781-3000
TX	Dallas, Arrow Elctrns.	214-386-7500
TX	Dallas, Force Elctrnd.	214-438-5700
TX	Dallas, Pioneer/Dallas	214-386-7300
TX	Dallas, Sterling Elctrns.	214-243-1600
TX	Houston, Force Elctrns.	713-772-8483
TX	Houston, Sterling Elctrns.	713-627-9800
TX	Stafford, Arrow Elctrns.	713-491-4100
UT	Salt Lake City, Arrow Elctrns.	801-539-1135
UT	Salt Lake City, Diplomat Elctrns.	801-486-4135
VA	Richmond, Arrow Elctrns.	804-282-0413
VA	Richmond, Sterling Elctrns.	804-226-2190
WA	Bellevue, Arrow Elctrns.	206-643-4800
WA	Seattle, Radar Electric	206-282-2511
WI	Oak Creek, Arrow Elctrns.	414-764-6600
EXP	CA, Los Angeles, Hanex, Inc.	213-556-3807

POWER-ONE, INC., Power-One Switching Products, 833 Flynn Rd., Camarillo, CA 93010, Tel: 805-482-0757, Telex: 752083; FSC No.: 54407; Empl.: 214

POWER PAC INC.

POWER PAC, 32 Meadow St., S. Norwalk, CT 06856, Tel: 203-866-4484; FSC No.: 53998; Empl.: 175; *Sls. Mgr.:* Abe Partner .... **D•1774-1778**

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CA	Los Altos, AARD Engr.	415-948-5740
CA	Westlake Village, Powerdyne Inc.	213-991-0632
CT	Hamden, Digital Sls. Assoc.	203-248-3641
GA	Chamblee, BCI	403-455-0405
MD	Seabrook, W. A. Brown-Equip. Co.	301-577-6105
MA	Waltham, Digital Sls. Assoc.	617-899-4300
MN	Minneapolis, R.J. Inc.	612-866-3661
NJ	E. Hanover, Emtec	201-428-0600
NJ	Princeton, Murtronics	609-394-3737
NJ	Teaneck, SGL Sls.	201-837-2352
NY	Cazenovia, S.T. Woolard	315-655-8145
NY	Melville, Emtec	516-752-1630
NC	Raleigh, BCI	919-781-9426
PA	Harrisburg, Beil & Whitaker	717-564-6900
TX	Houston, Scientific Sls.	713-666-5318
TX	Richardson, Scientific Sls.	214-231-6541

Local Distributors

CT	Hamden, Digital Sls. Assoc.	203-248-3641
MA	Waltham, Digital Sls. Assoc.	617-899-4300

POWER-PAK, INC., 6216 Oakton St., Morton Grove, IL 60053, Tel: 312-966-6000; Empl.: 16; *Sls. Mgr.:* Robert Villari

POWER PRODUCTS DIV., COMPUTER PRODS., INC., See Power Products Group

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Local Sales Offices & Reps

CA	Irvine, English/Damco	714-837-3801
FL	Tampa, SRT Mktg.	813-884-4805
IL	River Forest, Pete Collins	312-366-7076
MA	Natick, Steve Dworkin	617-653-7188
MS	Jackson, Welch & Doby	601-932-5534
NY	Wantagh, Dony Tech. Sls.	516-826-5550
NC	Raleigh, DHR Mktg.	919-876-5450
PA	Media, W. Reeves Assocs.	215-566-6709
SC	Greenville, DHR Mktg.	803-235-3594
TX	Dallas, Power Connection	214-357-8207

Local Distributors

CA	Chatsworth, Mil-Comm Distr.	213-998-3111
CA	Fountain Valley, Components Center	714-979-0433
CA	Santa Clara, Components Center	408-988-3751
CO	Denver, Hensley Battery	303-455-3643
CT	Waterbury, Lighting Svcs., Inc.	203-756-8148
FL	Miami, ESL Elctrn. Distr.	305-633-6973
FL	Tampa, Leader Elctrns.	813-870-3315
GA	Atlanta, Allied Elctrns.	404-237-3366
GA	Atlanta, Security Wherehouse	404-955-1006
IL	Chicago, Allied Elctrns.	312-697-8200
IL	Villa Park, Melvin Elctrns.	312-378-7741
LA	Lafayette, Ralph's Elctrns.	318-234-4507
MA	Sharon, Adcour	617-784-3996
MI	Detroit, Alarm Supp.	313-425-2500
MO	St. Louis, Olive Elctrns.	314-426-4500
NM	Albuquerque, Betatron, Inc.	505-344-2381
NY	Ridgewood, J.A. McDermott Corp.	212-456-3606
OK	Tulsa, Radio, Inc.	918-587-9123
PA	Pittsburgh, Triangle Elctrns.	412-441-9659
TX	Austin, Harrison Indl. Elctrns.	512-458-3555
TX	Ft. Worth, Allied Elctrns.	817-265-9341
TX	Houston, Harrison Equip.	713-652-4700
TX	San Antonio, Sherman Elctrns.	512-224-1001
VA	Richmond, Sterling Elctrns.	804-226-2190

POWER SYSTEMS, 12 Tobey Rd., Bloomfield, CT 06002, Tel: 203-243-0357, TWX: 710-425-8778; FSC No.: 50463; Empl.: 375; *Sls. Mgr.:* Richard Milne ...... **D•1780-1781**

Local Sales Offices & Reps

AZ	Phoenix, Tech Sls./Powerhouse	602-246-1614
CA	San Jose, Powerhouse	408-748-1555
CA	Santa Ana, Powerhouse	714-549-9599
CT	Westbrook, Comptech, Inc.	203-399-9704
MA	Tyngsboro, Comptech	617-649-3030

POWER SYSTEMS & CONTROLS, INC., 3206 Lanvale Ave., Richmond, VA 23230, Tel: 804-355-2803; Empl.: 40

POWER SYS. GRP., Rantec Div., Emerson Elec., 9401 Oso Ave., Chatsworth, CA 91311, Tel: 818-885-8223, TWX: 910-493-1247; FSC No.: 04971; Empl.: 265; *Sls. Mgr.:* Daniel L. Esau

POWERTEC, INC.

POWERTEC, INC., 20550 Nordhoff St., Chatsworth, CA 91311, Tel: 818-882-0004, TWX: 910-494-2092; Empl.: 349; *Sls. Mgr.:* Royston A. Allman .... **D•1782-1799**

POWERTECH, INC., 0-02 Fairlawn Ave., Fairlawn, NJ 07410, Tel: 201-791-5050, Telex: 353970; FSC No.: 32953; Empl.: 49; *Sls. Mgr.:* Alan J. Melnyk

Power Technology Inc.

POWER TECHNOLOGY, INC., P.O. Box 9769, Little Rock, AR 72219, Tel: 501-568-1995, TWX: 910-722-7313; Empl.: 69; *Sls. Mgr.:* John Webb .... **B•1125**

POWERTREND, INC., 3139-G Los Feliz Dr., Thousand Oaks, CA 91362, Tel: 805-496-2945; *Sls. Mgr.:* R. Jones

POWER TEN, INC., 486 Mercury Dr., Sunnyvale, CA 94086, Tel: 408-738-5959, Telex: 172588 SNLO; FSC No.: 61987; *Sls. Mgr.:* Vince Mutascio .... **D•1779**

Local Sales Offices & Reps

AZ	Mesa, Insight	602-820-4955
AZ	Phoenix, Jayson Co., Inc.	602-867-1964
IA	Cedar Rapids, Palatine Engrg. & Sls.	319-365-8071
KS	Mission, Palatine Engrg. & Sls.	913-831-0555
MO	Hazelwood, Palatine Engrg. & Sls.	314-839-0800
NJ	Wayne, Ramapo	201-839-6767
NY	Rochester, Scientific Dvcs.	716-334-2445
OR	Portland, Westcon	503-283-0132
PA	Glenside, Koebert	215-887-2310
TX	Austin, Eberts Elctrns. Sls.	512-258-1067
TX	Latexo, Eberts Elctrns. Sls.	409-687-4342

POWERTRON, See Industrial Test Equipment Co., Inc.

POWERTRON, Contraves Goerz Corp., 3821 Barranger Dr., Charlotte, NC 28210, Tel: 704-525-8962, Telex: 572-444; *Sls. Mgr.:* Sam LoBue

POWR-UPS CORP., 50 Orville Drive, Bohemia, NY 11716, Tel: 516-589-3602; Empl.: 50; *Sls. Mgr.:* Alon Kopstein .... **B•1182-1183**

Local Sales Offices & Reps

CA	Fullerton, ESCO	714-879-7260
CA	San Diego, Total Elctrns. Int'l.	619-224-3291
IL	Oak Brook, A.G. Erickson	312-323-1367
KS	Shawnee Mission, LSC, Inc.	913-362-2121
MA	Southborough, Motion Engrg.	617-485-2144
NY	Pittsford, Magna Prod. Corp.	716-586-8621
OH	Dover, AJ Assocs.	216-343-2224
PA	Audubon, Holmes Assocs.	215-666-0636

PPC PRODS., 7516 Central Industrial Dr., Riviera Beach, FL 33404, Tel: 305-848-9606, TWX: 510-952-7611; FSC No.: 33178; Empl.: 50; *Sls. Mgr.:* Nick Ernick

PPD

PPD, INC., Hwy. 70W, Resco Ct., P.O. Box 31347, Raleigh, NC 27612, Tel: 919-781-3955 .... **A•1157-1165**

PPM, INC., 4521 Emery Ind. Pkwy., Cleveland, OH 44128, Tel: 216-292-6006; Empl.: 20; *Sls. Mgr.:* A. L. Bletcher .... **D•1291**

Local Sales Offices & Reps

AZ	Phoenix, J. Smith & Assocs.	602-267-0981
CO	Denver, J. Smith & Assocs.	303-597-5343
MI	Ferndale, Tiby Co.	313-547-3550
NM	Albuquerque, J. Smith & Assocs.	505-265-3406
NC	Charlotte, Binco	704-366-5092
OH	Cleveland, Tiby Co.	216-371-5335
OH	Dayton, Tiby Co.	513-277-3822

PRACTICAL AUTOMATION, Trap Falls Rd., Shelton, CT 06484, Tel: 203-929-5381, Telex: 6813310; Empl.: 150; *Sls. Mgr.:* R. M. Banzaca

Local Sales Offices & Reps

AL	Huntsville, Elctrn. Mfr. Agts., Inc.	205-830-4030
CA	Los Alamitos, Gemini Assocs.	213-594-9618
CA	Mountain View, Thorson West	415-964-9300
CA	North Hollywood, Gemini Assocs.	818-846-2633
CA	San Diego, Gemini Assocs.	619-268-1181
CT	Ellington, J. J. Wild, Inc.	800-223-9456
FL	St. Petersburg, Elctrn. Mfr. Agts., Inc.	813-894-1171
IL	Elk Grove Village, Martec Assocs.	312-956-8090
MD	Rockville, JH Computer	301-424-0700
MA	Needham, J. J. Wild	617-449-5600
MI	Grand Rapids, R. P. Urban & Assocs.	616-245-0511
MN	Minneapolis, Chris & Assocs.	612-861-1634
NJ	Pompton Lakes, Wild & Rutkowski	201-839-0071
NY	Clark Mills, KLM-Garner	315-853-6126
NY	Jericho, Wild & Rutkowski	516-935-6600
NY	Pittsford, KLM-Garner	716-381-8350
NC	Winston Salem, Elctrn. Mfr. Agts.	919-784-7304
OH	Cleveland, Electro Sls. Assoc.	216-261-5440
OH	Dayton, Electro Sls. Assoc.	513-426-5551
PA	Willow Grove, QED Elctrns.	215-657-5600
TX	Houston, Barry Sls. Inc.	713-784-5860
TX	Richardson, Barry Sls. Inc.	214-234-0255
WA	Bellevue, Tasco Inc.	206-453-1414

PRACTICAL TECHNOLOGY, 12 Village Ctr., Box 449, Carmel Valley, CA 93924, Tel: 408-659-3128; FSC No.: 59089; Empl.: 7; *Sls. Mgr.:* Keith Rosburg

PRAGMATIC DESIGNS, INC., 950 Benicia Ave., Sunnyvale, CA 94086, Tel: 408-736-8670, Telex: 17-1627, TWX: Nanet D Suvl; FSC No.: 94-2543110; Empl.: 45

PRD ELCTRNS., DIV. OF HARRIS CORP., see Harris Corp., PRD Electronics Div.

Precicontact, inc.

PRECICONTACT, INC., 835 Wheeler Way, Langhorne, PA 19047, Tel: 215-757-1202, Telex: 83-4253; FSC No.: 60197; *Sls. Mgr.:* Joseph Carroll .... **C•1494-1495**

Local Sales Offices & Reps

AL	Huntsville, Electro Sls., Inc.	205-830-2715
AZ	Litchfield Park, G. B. Elctrns.	602-935-3984
AZ	Tuscon, G.B. Elctrns.	602-297-9759
CA	Mountain View, The Gene Woempner Co.	415-964-5454
CA	Orange, Elctrn. Tech. Assocs.	714-998-2901
CO	Englewood, White Sls. Co.	303-694-9555
GA	Atlanta, Electro Sls., Inc.	404-394-1122
IL	Rolling Meadows, Heartland Tech. Mktg.	312-577-9222
IN	Greenwood, Valentine & Assocs.	317-888-2260
IN	South Bend, Valentine & Assocs.	219-288-7070
MD	Rockville, Mechtronics Sls., Inc.	301-340-2130
MA	Norwood, The Mac Innis Co.	617-762-8090
NJ	Mountain Lakes, Components for Elctrns.	201-334-2921

NY	Courtland, Net Sls. Co.	607-756-6592
NY	DeRuyter, Net Sls. Co.	315-662-7996
NY	East Northport, Components For Elctrns.	516-266-5020
NY	Fairport, Net Sls. Co.	716-467-4538
NY	Troy, Net Sls. Co.	518-274-4758
NY	Webster, Net Sls. Co.	716-467-4538
NC	Raleigh, Tingen Tech. Sls., Inc.	919-781-1100
OH	Cincinnati, Makin & Assocs.	513-871-2424
OR	Portland, Electronic Mktg. Grp.	503-289-5320
PA	Hatboro, Jacobsen Assocs.	215-674-2937
PA	Lebanon, Jacobsen Assocs.	717-273-9746
PA	Pittsburgh, Kneip Sls.	412-823-0169
TN	Chattanooga, Electro Sls., Inc.	615-267-4260
TX	Plano, Sundance Sls.	214-867-0592
UT	Salt Lake City, Charles Fields & Assocs.	801-531-6177
WA	Redmond, Electronic Mktg. Grp.	206-882-0962
WI	Milwaukee, Heartland Tech. Mktg.	414-931-0606
Can	Rexdale, Ont., Electro Source, Inc.	416-675-4490
Can	Vancouver, B.C., Davetek Mktg.	604-430-3680

Local Distributors

AZ	Litchfield Park, GB Elctrns.	602-935-3984
CA	Orange, Electronic Connexions Corp.	714-998-2901
CA	San Diego, Park West	619-277-8433
CA	San Jose, Cypress Elctrns.	408-945-8400
CA	Santa Clara, DC Elctrns. Supp.	408-980-1199
CA	Sunnyvale, Future Elctrns.	408-745-6570
CA	Torrance, Cypress Elctrns.	213-533-6005
CO	Denver, CSID, Inc.	303-292-9594
CO	Westminster, Future Elctrns.	303-650-0123
CO	Wheatridge, Cypress Elctrns.	303-431-2622
CT	Danbury, Future Elctrns.	203-743-9594
CT	Norwalk, Park Distrs.	203-853-2010
CT	Wallingford, Cronin Elctrns., Inc.	203-265-3134
FL	Clearwater, Electronic Precepts of FL	813-530-9781
FL	Clearwater, Future Elctrns.	813-441-4771
FL	Lake Park, Park/South, Inc.	305-863-7275
FL	Pompano Beach, Components South	305-971-0350
IL	Lisle, Components, Inc.	312-852-7707
IL	Palatine, OHM Elctrns., Inc.	312-359-5500
IN	Indianapolis, Mar Elctrns.	317-875-4510
MD	Columbia, Future Elctrns.	301-995-1222
MD	Rockville, Wire Tech., Inc.	301-340-1445
MA	Needham, Cronin Elctrns.	617-449-5000
MA	Norwood, Emtel Elctrns.	617-769-9500
MA	Westborough, Future Elctrns.	617-366-2400
MA	Westford, Electronic Specialty Intl.	617-486-8495
MA	Wilmington, Aved Elctrns.	617-657-8310
NH	Nashua, Brevan Elctrns.	603-889-7230
NJ	Bellmawr, Mid-Atlantic Elctrns.	609-931-5303
NJ	Berlin, GCI Corp.	609-768-6767
NJ	Englewood, Powell	201-894-0800
NJ	Mt. Laurel, Future Elctrns.	609-778-7600
NJ	Springfield, Route Elctrns.	201-379-7710
NM	Albuquerque, Connecting Comps. Div.	505-345-8921
NY	Bohemia, Norelcom Elctrns. Corp.	516-567-8866
NY	Brooklyn, Beryl Elctrns.	718-383-2208
NY	Brooklyn, Connector Resources	718-383-2208
NY	East Syracuse, Future Elctrns.	315-453-6633
NY	Farmingdale, Resources for Elctrns.	516-420-8555
NY	Hauppauge, Jaco Elctrns.	516-273-5500
NY	Liverpool, Future Elctrns.	315-451-2371
OH	Dayton, Televox, Inc.	513-294-4499
OH	Mansfield, Rush Elctrns. Distrs., Inc.	419-756-2311
OR	Beaverton, Component Resources	503-641-8488
PA	Wayne, Peak Elctrns.	215-293-9000
PA	York, E.C.I.	717-843-8971
TX	Allen, Prime Distrbg. Co.	214-231-0170
TX	Grand Prairie, Dial Supp.	214-647-2371
TX	Richardson, Jaco Elctrns.	214-235-9575
TX	Richardson, Southwest Elctrns.	214-234-3050
TX	Stafford, Southwest Elctrns.	713-240-4000
UT	Salt Lake City, Future Elctrns.	801-972-8489
WA	Bellevue, Future Elctrns.	206-624-9609
WA	Bellevue, Integrated Elctrns.	206-455-2727
WA	Seattle, Pacific Elctrns.	206-575-1050
WI	Brooklyn Center, Willman Assocs.	612-566-5010
Can	Calgary, Alb., Future Elctrns.	403-259-6408
Can	Downsview, Ont., Future Elctrns.	416-663-5563
Can	Edmonton, Alb., Future Elctrns.	403-486-0974
Can	Ottawa, Ont., Future Elctrns.	613-820-8313
Can	Pointe Claire, Que., Future Elctrns.	514-694-7710
Can	Vancouver, B.C., Future Elctrns.	604-438-5545

PRECISION COMPONENTS, INC., 1110 W. National Ave., Addison, IL 60101, Tel: 312-543-6400

PRECISION ELCTRN. COMPS. LTD., 1919 Hafis Rd., Toronto, ON, Canada M6M 2V6, Tel: 416-249-7103, Telex: 06-969671

PRECISION ELCTRNS., 9101 King Ave., Franklin Park, IL 60131, Tel: 312-678-5350; Empl.: 25; *Sls. Mgr.:* William Stow

PRECISION EXTRUSIONS, INC., Box 120, Bensenville, IL 60106, Tel: 312-766-0340; *Sls. Mgr.:* Jim Achen

PRECISION FILTERS, INC.

PRECISION FILTERS, 240 Cherry St., Ithaca, NY 14850, Tel: 607-277-3550, Telex: 646846; FSC No.: 66-II-F & 66-II-I; Empl.: 49; *Sls. Mgr.:* D. F. Chandler .... **A•1624-1627; D•1017**

Local Sales Offices & Reps

AZ	Tempe, Cleveland Entprs.	602-820-1127
CA	La Crescenta, Beckrep	818-957-1111
CA	San Jose, Synergistic Sls.	408-292-6573
CO	Colorado Springs, Cleveland Entprs. of Colorado	303-597-8872
DC	Arlington, Gans & Pugh	703-527-3262
FL	Osprey, Dick Ridgewell Co.	813-484-2020
MD	Dayton, Gans & Pugh Assocs.	301-596-9094
MN	Chanhassen, Electronic Instr. Consits.	612-445-7056
NJ	Midland Park, Langstrom Instrs.	201-891-2829
NM	Albuquerque, Cleveland Entprs.	505-265-7893
UT	Salt Lake City, Cleveland Entprs.	801-355-8424
VA	Arlington, Gans & Pugh Assocs.	703-527-3262
WA	Bellevue, Topp Engrg. Sls.	206-747-5400
Can	Downsview, Ont., Rayonics Scientific	416-736-1600

PRECISION LAMP, INC., 480 Aaron Dr., Cotati, CA 94928, Tel: 707-792-0333, Telex: 348498; Empl.: 25

PRECISION LEVEL VIAL CO., Warren Industries Inc., 1800-D Mearns Rd., Warminster, PA 18974, Tel: 215-675-2355; Empl.: 12; *Sls. Mgr.:* Christopher Beyer; *Dist. Mgr.:* Christopher Beyer

PRECISION MECHANISMS, 44 Brooklyn Ave., Westbury, NY 11590, Tel: 516-ED3-5955; FSC No.: 08127; Empl.: 26; *Sls. Mgr.:* Leon N. Canick

PRECISION METAL PRODS. CO., Centennial Indl. Pk., Peabody, MA 01960, Tel: 617-532-5500, TWX: 710-347-0123; FSC No.: 86577; Empl.: 54; *Sls. Mgr.:* Robert H. Degnan

Local Sales Offices & Reps

AZ	Phoenix, J. Osborn Assocs.	602-996-1291
CA	Corte Madera, P. Oneal & Assocs.	415-924-1691
CA	Garden Grove, Impact Elctrns., Inc.	213-431-3581
CO	Arvada, Challenge Sls.	303-427-3149
FL	Clearwater, Chaco Sls.	813-536-9503
IL	Hinsdale, Hill-Gray Assocs.	312-325-4810
IN	South Bend, Schillinger Assocs.	219-291-6258
NJ	Cherry Hill, ESA Assoc.	609-667-4066
NJ	Verona, L. J. Roth Assoc.	201-857-3393
NY	Syracuse, C.W. Floring & Assocs.	315-478-2149
OH	Dayton, Electro-Com	513-276-3993
OR	Portland, Paul Oneal Assoc N/W, c/o Clyde W. Olsen	503-775-3552
SC	Greenville, Component Sales Co.	803-288-1922
TX	Richardson, Draper Co.	214-680-1650

PRECISION MICRO IMAGES, Box 1330, Altamonte Springs, FL 32701, Tel: 305-830-7244, Telex: 56-4303; *Sls. Mgr.:* Williams S. Hodges

PRECISION MONOLITHICS, INC., 1500 Space Dr., Santa Clara, CA 95054, Tel: 408-727-9222, TWX: 910-338-0218; FSC No.: 06665; Empl.: 1,000; *Sls. Mgr.:* Jo Nall; *Dist. Mgr.:* Mike Dennison

PRECISION RESISTIVE PRODS., INC., P.O. Box 189, Highway 61 South, Mediapolis, IA 52637, Tel: 319-394-9131; Empl.: 90; *Sls. Mgr.:* Oscar Cline; *Dist. Mgr.:* Oscar Cline .... **A•1929**

Local Sales Offices & Reps

CA	Anaheim, Impact Elctrns. Inc.	714-533-1351
CA	Los Altos, Frauman Assoc.	415-941-0660
CA	San Diego, KCE	619-278-7640
CO	Denver, Williams Assocs.	303-373-4730
CT	Milford, Cuming Assocs.	203-878-3946
FL	Cocoa Beach, Reynolds & Assocs.	305-784-4700
IL	Chicago, Ellinger Sls.	312-763-1570
IN	Greenwood, Valentine Assocs.	317-888-2200
MD	Ellicot City, Technical Sls. Inc.	301-461-2400
MA	Waltham, Jesco, Inc.	617-893-0094
MI	Warren, DEM Elctrns. Sls.	313-575-9444
MN	Minneapolis, Intl. Sls.	617-831-8423
MO	St. Charles, Chesco	314-946-6677
NY	Hauppauge, Masin-Enco, Inc.	516-273-3500
NY	Syracuse, C.W. Floring and Assocs., Inc	315-478-2149
OH	Cincinnati, G & H Sls. Co.	513-272-0580
TX	Richardson, Campion Sls. Co.	214-238-8145
WA	Seattle, W3 Assocs., Inc.	206-285-2667

PRECISION RESISTOR CO., INC., 10601 75 St. N., Largo, FL 33543, Tel: 813-541-5771, Telex: 821788; FSC No.: 48615; Empl.: 45; *Sls. Mgr.:* R. L. Wright .... **A•1930-1933; B•1770-1771**

PRECISION TECH. SEWING, 921 E. Charleston Rd., Palo Alto, CA 94303, Tel: 415-856-2128

PRECISION TUBE, Church Rd. & Wissahickon, N. Wales, PA 19454, Tel: 215-699-5801, Telex: 84-6439; FSC No.: 82413; Empl.: 240; *Sls. Mgr.:* William J. McNeil

Local Sales Offices & Reps

AZ	Tempe, Walter Assocs.	602-967-1020
CA	Carlsbad, Addem San Diego	619-729-9216
CA	Santa Ana, RMS Assocs.	714-556-4155
CA	Santa Clara, R. Donahue Assocs.	408-727-6694
CO	Golden, J. F. Hurlbut Co.	303-279-7796
FL	Melbourne, Hanson Assocs.	305-727-7474
IL	Park Ridge, Probe Electrns.	312-696-2828
IN	Indianapolis, John Sukup Inc.	317-253-5501
IA	Cedar Rapids, Snider Sls. Co.	319-362-4410
MD	Frederick, Applied Engrg. Prod., Inc.	301-663-4202
MA	Burlington, Tri Tek	617-272-4550
MO	St. Peters, D-S Sls.	314-928-5153
NJ	Haddonfield, Sunday-O'Brien	609-429-4013
NY	Huntington, CDB Enterprises	516-692-5200
NY	Syracuse, I.A. Hotze	315-479-6641
TX	McKinney, Williams Assocs.	214-548-0995
EXP	Hants England, Sealectro. Ltd	011-44-705-373211
EXP	Ramat-Gan Isreal, Elina, Ltd	03-7514129
EXP	Toulo Cedex France, Sealectro, SA	011-33-947-58443
Can	St. Laurent Quebec, RF Microwave, Ltd	514-931-8115

Local Distributors

CA	El Cajon, Micro Mode Prods.	619-449-3844
CA	Santa Clara, Waltronic Sls.	408-727-1200
CA	Sunnyvale, Electronic Resources	408-745-1420
FL	Stuart, Microwave Comp., Inc.	305-286-4455
MD	Baltimore, Resco Baltimore	301-823-0070
MD	Beltsville, Resco Washington	301-937-9100
MA	Woburn, Pacer Elctrns.	617-935-8330
NY	Freeport, Mil Spec Wire & Cable	516-546-5454
NY	New Rochelle, Compucon Dists.	914-576-2888
Can	St. Laurent Quebec, Omniconnect, Inc.	514-335-2337

PREFERRED ELCTRNS., INC., Main Line Dr, P.O. Box 954, Westfield, MA 01086, Tel: 413-568-2301, Telex: 955-339; Empl.: 250; *Sls. Mgr.:* Merton I. Rosenberg

PEI PREH ELECTRONICS INDUSTRIES, INC.

PREH ELECTRONICS INDUSTRIES, INC., 5665 Howard Street, Niles, IL 60648, Tel: 312-647-8338, Telex: 297112; FSC No.: 36-3193682; Empl.: 7; *Sls. Mgr.:* George Zib .... **A•2034; B•1736; C•1497**

Local Sales Offices & Reps

CA	Sunnyvale, James Inds. West	408-971-6016
IL	Inverness, James Inds., Inc.	312-358-8000

PREMAX PRODS. DIV., Highland & College Aves., Niagara Falls, NY 14305, Tel: 716-285-9186, Telex: 91-531; FSC No.: 74183; Empl.: 350

PREMIER METAL

PREMIER METAL PRODS. CO., 381 Canal Pl., Bronx, NY 10451, Tel: 212-993-9200; Empl.: 75; *Sls. Mgr.:* Anthony E. Bozza .... **C•1072-1073**

Local Sales Offices & Reps

AZ	Phoenix, CPS Associates	602-246-1097
CA	City of Industry, Premier Metal	818-336-4534
CA	San Jose, Silicon Valley Sls., Inc.	408-286-7510
CA	Westmunster, West Elctrn. Sls. Co.	714-898-0120
CO	Denver, AKI Enterprises	303-338-4488
CT	East Haven, Eagle Assocs.	203-467-6542
FL	Lake Worth, Adams & Assocs.	305-588-7630
GA	Marietta, Adams & Assocs.	404-973-0853
IL	Elmhurst, Utronix Sls.	312-834-1100
KS	Overland Park, Delltron Co.	913-649-2078
MD	Burtonsville, Eastern Instrmn.	301-384-8500
MA	Needham, Eagle Assocs.	617-444-3446
MI	Brighton, Electronic Sources	313-227-3598
MN	Minneapolis, J.E.M. Anderson Co.	612-823-6459
MO	St. Louis, Delltron Co.	314-869-4779
NM	Rio Rancho, RML Associates	303-757-6654
NY	New Hyde Park, Harris & Aldrich Sls.	516-488-2622
NY	Syracuse, Lewis-Dunnigan Co.	315-446-5522
NY	Yonkers, Sonkin Assocs.	914-968-8282
NC	Greenboro, Adams & Assocs.	919-272-6838
OH	Akron, ImTech Inc.	216-666-1185
PA	Bensalem, Eastern Instrmn.	215-245-6660
TX	Bedford, W. Pat Fralia Co. Inc.	817-267-3577
TX	Houston, W. Pat Fralia Co. Inc.	713-772-1572
EXP	FL, Miami, Emec, Inc.	305-871-3124

Local Distributors

AL	Huntsville, Mock Elctrns.	205-539-2401
AL	Opelika, Southern Elctrns.	205-745-5298
AZ	Phoenix, Dalis Elctrns.	602-275-2885
CA	Burlingame, Rose Elctrns.	415-348-2740
CA	San Jose, Quement Elctrns.	408-998-5900
CT	Middletown, Midstate Elctrns.	203-347-5638
FL	Dania, Summit Elctrns.	305-920-6253
FL	Miami, Electronic Equip. Co.	305-871-3500
IL	Elk Grove Village, GBL/Gould Elctrns.	312-593-3220
IN	Fort Wayne, Graham Elctrns.	219-423-3422
LA	Baton Rouge, Menard Elctrns.	504-355-0323
MD	Baltimore, ASI Elctrns.	301-265-5100
MD	Baltimore, Resco	301-823-0070
MD	Bethesda, Empire Elctrns.	301-656-3300
MA	Hingham, Sager Electrical Supp.	617-749-6700
MA	Newton, Greene-Shaw Co.	617-969-8900
MI	Ann Arbor, Purchase Radio Supp.	313-668-8696
MO	Kansas City, Walters Radio Supp.	816-531-7015
NJ	Cranford, Garden State Indl. Elec.	201-272-6400
NJ	Green Brook, Green Brook Elctrn.	201-968-3500
NJ	Hanover, State Elctrns. PTS	201-887-2550
NJ	Kenilworth, Federated Purchaser	201-272-0505
NY	Buffalo, Summit Distrs.	716-884-3450
NY	Hauppauge, Broadline Elec. Dist.	516-231-4100
NY	Hempstead, Davis Elctrn. Corp.	516-483-9200
NY	Lynbrook, Peerless Radio Dist. Corp.	212-523-3456
NY	LIC, H. L. Dalis Inc.	212-361-1100
NY	New York, Argil Elec. LTD	212-691-8111
NY	New York, Martin Audio/Video Corp.	212-541-5900
NY	Rochester, Masline Elctrns.	716-546-5373
NY	Rochester, Simcona Elctrn. Corp.	716-328-3230
NY	Rochester, Summit Elctrns.	716-334-8110
NY	Yonkers, Yonkers Elec. Supp.	914-969-6044
NC	Raleigh, Southeastern Radio	919-828-2311
OH	Warren, Rem Elctrns.	814-453-5626
PA	Allentown, Federated Elctrns.	215-437-4481
PA	Braddock, Leff Elctrns.	412-271-7100
PA	Horsham, Toner Cable Equip.	215-675-2053
PA	Philadelphia, Philadelphia Elctrns.	215-568-7400
PA	Reading, Barbey Elctrns.	215-376-6116
PA	West Chester, West Chester Elec. Supp.	215-696-7500
RI	Warwick, Edwards Elctrns.	401-732-3200
SC	Charleston, Wholesale Indl. Elec.	803-722-2634
TN	Clarksville, Randolph Hale & Matthews	615-647-2325
TN	Cookeville, Randolph & Parks	615-526-6184
TN	Nashville, Randolph & Rice	615-255-5601
TN	Tullahoma, Randolph Rice & Williams	615-455-4531
TX	Farmers Branch, Summers Elec. Co.	214-748-6533
TX	Ft. Worth, Swieco Inc.	817-335-6521
TX	Houston, Lenert Co.	713-225-1465
VA	Arlington, Arlington Elctrns.	703-524-2412
WA	Seattle, Radar Elec. Co.	206-282-2511

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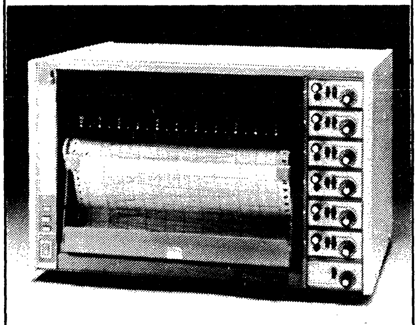

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PREMIER MICROWAVE, 35 New Broad St., Port Chester, NY 10573, Tel: 914-939-8900, TWX: 710-569-1609; FSC No.: 15870; Empl.: 70 .... **A•1781**

Local Sales Offices & Reps

CA	Los Angeles, R.F. Assocs.	213-478-1586
GA	Smyrna, BC Elctrn. Sls.	404-436-5169
IL	Chicago, L.G.S. Elctrns. Sls.	312-456-9616
MD	Catonsville, Callas Elctrns. Dist.	301-744-7711
MA	Natick, Gerald Rosen	617-879-5505
MO	St. Louis, Boweng Tech. Rep.	314-429-7327
NY	Huntington, C.D.B. Entprs.	516-692-5220
OH	Dayton, BEK Assocs.	513-278-1343
EXP	CA, N. Hollywood, Air Frame Mfg. & Supp.	213-765-2600

Local Distributors

CA	Los Angeles, R.F. Assocs.	213-478-1586
FL	Cleatwater, Brennan Assocs., Inc.	813-446-5006
GA	Smyrna, B-C Electrns. of Geroria	404-436-5169
IL	Chicago, L.G.S. Electrns.	312-456-9616
MD	Catonsville, Callas Electrns.	301-744-7711
MA	Framingham, Gerald Rosen Co.,Inc.	617-879-5505
MO	St. Louis, Boweng Technical Reps., Inc.	314-429-7327
NY	Fayetteville, R.D. Sherman, Inc.	315-637-9861
NY	Huntington, GDB Enterprises	516-692-5200
OH	Dayton, KW Electrns., Sls.	513-890-2150
TX	McKinney, Williams Assoc.	214-548-0995
EXP	Shantinagar, Hyderabad, Kashinath & Co.	346-353-6942
Can	Lachine, Quebec, Electrodesign Ltd	514-636-4838

PREM MAGNETICS, 3521 N. Chapel Hill Rd., McHenry, IL 60050, Tel: 815-385-2700, TWX: 910-642-3763; Empl.: 300; *Sls. Mgr.:* D. Hertel .... **A•2265-2267**

PRES-AIR-TROL CORP., 1009 Boston Post Rd., Mamaroneck, NY 10543, Tel: 914-698-2026-800-431-2625 (outside NY) .... **B•1690**

PRESIDIO COMPONENTS, INC., 7185 Construction Ct., San Diego, CA 92121, Tel: 619-578-9390, TWX: 910-335-1254; FSC No.: 60212

Local Distributors

TX	Richardson, Central States Comps.	214-644-2070

PRESS-ON PRODS., 39 Factory Rd., Addison, IL 60101, Tel: 312-628-2255; Empl.: 40; *Sls. Mgr.:* T. Cummins

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PRESSURE SYSTEMS, INC., 15 Research Dr., Hampton, VA 23666, Tel: 804-865-1243, Telex: 901406; Empl.: 45; *Sls. Mgr.:* J. S. Yakshe

PRESTOLITE WIRE DIV., 3529 24th St., Port Huron, MI 48060, Tel: 313-987-6300

PRESTON SCIENTIFIC, 805 E. Cerritos Ave., Anaheim, CA 92805, Tel: 714-776-6400, Telex: 655-321; Empl.: 61; *Sls. Mgr.:* Charles J. McGuire .... **D•1161**

Local Sales Offices & Reps

AL	Huntsville, Mo-Co	205-881-5968
AZ	Scottsdale, Williams Assocs.	602-947-4297
CA	Laguna Hills, Elotek	714-830-4856
CA	Santa Clara, PBC Assocs.	408-727-7244
CO	Denver, Williams Assocs.	303-289-5647
CT	Avon, Power Mark	203-678-0123
FL	Orlando, Truex Assocs.	305-859-2160
IL	Arlington Heights, Coombs Assocs.	312-439-9810
IN	Ft. Wayne, Coombs Assocs.	219-747-7661
KS	Shawnee Mission, Techn. Sls. Assocs.	913-888-3330
MD	Clarkesville, Riffe Assocs.	301-953-2811
MA	Falmouth, RJC Assocs.	617-540-8832
MN	St. Paul, Vikeland Sls.	612-645-4647
MO	Ferguson, Techn. Sls. Assocs.	314-725-5361
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OH	Dayton, Hocker Assocs.	513-298-8638
OR	Portland, Sci. Dvcs.	503-292-6934
PA	Cheltenham, Stein Instrmn.	215-379-1990
TX	Houston, Lear Assocs.	713-488-7893
TX	Spring, Lear Assocs.	713-370-7449
UT	Salt Lake City, Williams Assocs.	801-485-6511
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WI	Milwaukee, Coombs Assocs.	414-351-6123

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PRIME POWER, INC., Prime Technology Co., Twin Lakes Rd., P.O. Box 185, N. Branford, CT 06471, Tel: 203-481-5721, TWX: 710-452-3092; *Sls. Mgr.:* J. L. Jamieson .... **D•1801**

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NJ	Fort Lee, FJK Assocs., Inc.	201-592-1002

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AND INTERNATIONAL INSTRUMENTS, INC.

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PRINCETON ELCTRN. PRODS., Box 101, North Brunswick, NJ 08902, Tel: 201-297-4448, TWX: 710-380-3832; Empl.: 70; *Sls. Mgr.:* R. Shermister; *Dist. Mgr.:* R. Shermister

PRINCO INSTRS., INC., 1020 Industrial Hwy., Southampton, PA 18966, Tel: 215-355-1500; FSC No.: 48620; Empl.: 66; *Sls. Mgr.:* S. A. Clayton

PRINTER PRODUCTS, Capitol Circuits Corporation, 25 Denby Road, Boston, MA 02134, Tel: 617-254-1200; Empl.: 200; *Sls. Mgr.:* John Callanan

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PROBE-RITE, INC., 2725 Lafayette St., Santa Clara, CA 95050, Tel: 408-727-0100, TWX: 910-338-0260; *Sls. Mgr.:* Marilyn Bailey

PROCESS ANALYZERS, INC., 3 Headley Pl., Fallsington Ind'l Pk., Fallsington, PA 19054, Tel: 609-921-7330, TWX: 510-685-9254

PRODUCTION INDUSTRIES, INC., 12880-E Pierce Street, Pacoima, CA 91331, Tel: 818-896-0555, 800-423-5618; *Dist. Mgr.:* Linda Dice ... **C•1075-1077; D•1384**

PRODUCTS FOR RESCH., 88 Holten St., Danvers, MA 01923, Tel: 617-774-3250, Telex: 940-287; Empl.: 20; *Sls. Mgr.:* Harry Martin

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PROJECTS UNLTD., 3680 Wyse Rd., Dayton, OH 45414, Tel: 513-890-1918, TWX: 810-450-2523; Empl.: 75; *Sls. Mgr.:* Greg Kimpton

PRO-LOG, 2411 Garden Rd., Monterey, CA 93940, Tel: 408-372-4593, TWX: 910-360-7082; Empl.: 200

PROTEON, INC., 4 Tech Circle, Natick, MA 01760, Tel: 617-655-3340, Telex: PROTEON; Empl.: 75; *Sls. Mgr.:* Arthur F. Lynch

PROTO STAMPING CORP., 850 Charter St., Redwood City, CA 94063, Tel: 415-365-0498, Telex: 709241; *Sls. Mgr.:* David Duncan

PROTO SYSTEMS OF ATLANTA, 625 Sims Industrial Blvd., Alpharetta, GA 30201, Tel: 404-475-1330, Telex: 469432; *Sls. Mgr.:* John Gregory

PROTOTEK, INC., 25 Standen Dr., Hamilton, OH 45015, Tel: 513-874-5094; FSC No.: 60813 .... **C•1714**

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CA	Riverside, Cal Tech Pro, Inc.	714-682-8506
CA	Santa Clara, Covington Sls.	408-241-2877
CO	Denver, Matthews & Assocs., Inc.	303-450-6476
MD	Gaithersburg, Simcomp, Inc.	301-258-9358
MA	Tewksbury, United Sls., Inc.	617-658-4281
OH	Columbus, Seltech Mktg.	614-451-3865
TX.	Dallas, Matthews & Assocs., Inc.	214-248-7881
EXP	CT, Litchfield, Intrade, Inc.	800-243-5252

PSG INDS., 1225 Tunnel Road, Perkasie, PA 18944, Tel: 215-257-3621, Telex: 827361; FSC No.: 18509; Empl.: 150; *Sls. Mgr.:* John Feldermann, Jr.

PTC TRANSFORMERS, P.O. Box 397, Rising Sun Road, Bordentown, NJ 08505, Tel: 609-298-8200, Telex: 510-685-3645; Empl.: 25; *Sls. Mgr.:* C. W. Harrison

PTK DIVISION, Emerson Electric Co., 1173 Los Olivos Ave., Los Osos, CA 93402, Tel: 805-528-5858, Telex: 88-8863, TWX: 910-351-5802; FSC No.: 60132; Empl.: 140; *Sls. Mgr.:* Wayne Hamari

PTL ELCTRNS., 10211 Vinemont St., Dallas, TX 75218, Tel: 214-327-3180; Empl.: 10

PTS ELECTRONICS INC., Box 272, Bloomington, IN 47401, Tel: 812-824-9331; Empl.: 525; *Sls. Mgr.:* R. W. King; *Dist. Mgr.:* J. Hamilton

PTX-PENTRONIX INC., 1737 Cicotte, Lincoln Park, MI 48146, Tel: 313-388-3100, Telex: 23-0398; Empl.: 21; *Sls. Mgr.:* J. Schultz

PULIZZI ENGINEERING, INC., 3260 S. Susan St., Santa Ana, CA 92704-6865, Tel: 714-540-4229; *Sls. Mgr.:* Michael B. Pulizzi; *Dist. Mgr.:* Michael B. Pulizzi .... **D•1956-1958**

Local Sales Offices & Reps

AL	Huntsville, E.M.A	205-830-4030
CA	San Jose, J & M Mktg.	408-996-8763
IA	Des Moines, Beams 500 to 528	515-255-1148
MA	Brookline, Vernon Newland	617-739-2727
NJ	Union, Stearns Assocs.	201-686-2980
TX	Dallas, T.S.S	214-458-0644

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PULSE ENGRG. INC., A Varian Sub., P.O. Box 12235, San Diego, CA 92112, Tel: 619-268-2400, TWX: 910-335-1527; Empl.: 1200; *Sls. Mgr.:* Leonard M. Luner

PULSE INSTRS. CO., 1234 Francisco, Torrance, CA 90502, Tel: 213-515-5330; Empl.: 20; *Sls. Mgr.:* Ron Perry

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PYROFILM RESISTOR CO., See KDI Electronics

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Q-S PRODUCTS CO., INC., 3605 S.W. Snoqualmie St., Seattle, WA 98126, Tel: 206-937-5505

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Q-TECH CORP., 2201 Carmelina Ave., Los Angeles, CA 90064, Tel: 213-820-4921, Telex: 69-6140; FSC No.: 51774; Empl.: 65; *Sls. Mgr.:* H. Phillips ... **A•1420-1422**

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AZ	Scottsdale, Western High Tech Mktg.	602-949-0873
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IL	Northbrook, Allied Comp. Reps., Inc.	312-498-6658
MA	Malden, J-K Assocs.	617-321-2922
NJ	Glen Gardner, F & M Tech. Sls.	201-832-7216
NJ	Paramus, Eltech Sls.	201-967-1309
NM	Albuquerque, Western High Tech Mktg.	505-262-2461
NY	Kings Park, Eltech Sls.	201-967-1309
TX	Houston, TCI Elctrns.	713-774-5019

QUADRA SALES CORP., 14825 NE 40th, Suite 340, Redmond, WA 98052, Tel: 206-833-3550

QSI

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AL	Huntsville, Beacon Elctrns.	205-881-5031
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CA	Diamond Bar, Raltech, Inc.	714-861-1530
CA	Santa Clara, Gagner-Toomey Assocs.	408-244-2200
CO	Englewood, Frontier Reps., Inc.	303-799-6063
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FL	Maitland, Beacon Elctrns.	305-647-3498
FL	Melbourne, Beacon Elctrns.	305-724-8010
GA	Atlanta, Beacon Elctrns.	404-256-9640
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IA	Cedar Rapids, Electromec Sls., Inc.	319-362-6413
MA	Franklin, OEM Mktg. & Sls.	617-528-4460
MN	Burnsville, Electromec Sls., Inc.	612-894-8200
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NY	Rochester, J.G. Welch Assocs., Inc.	716-244-1100
NY	Utica, J.G. Welch Assocs., Inc.	315-736-7821
NC	Raleigh, Beacon Elctrns.	919-787-0330
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OH	Dayton, Micro Tec, Inc.	513-435-0644
OH	Highland Heights, Micro Tec, Inc.	216-442-1555
OR	Beaverton, Quest Mktg., Inc.	503-641-7377
PA	Pittsburgh, Micro Tec, Inc.	412-931-3380
PA	Spring House, Deltatronics, Inc.	215-542-0250
TX	Richardson, Jim D. Gray & Assocs., Inc.	214-699-9976
UT	Ogden, Frontier Reps., Inc.	801-546-4029
WA	Bellevue, Quest Mktg., Inc.	206-747-9424

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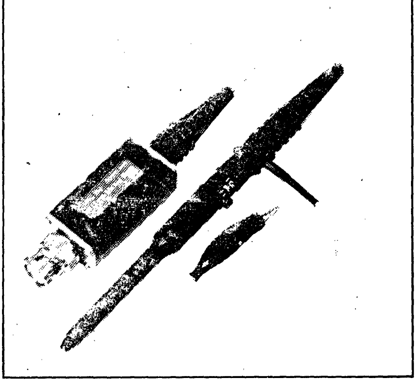

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Q.V.S., INC., 20 North 15th St., East Orange, NJ 07017, Tel: 201-673-3996; FSC No.: 89820; Empl.: 45

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R & D CIRCUITS, 2381B S. Clinton Ave. Dept. 1202, Plainfield, NJ 07080, Tel: 201-561-8286

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RAPIDSYN, 3233 Roymar Rd., Oceanside, CA 92054, Tel: 619-439-7500, Telex: 18-1196; FSC No.: 32423; Empl.: 100; *Sls. Mgr.:* Andrew Boyer

RASTER GRAPHICS, INC., P. O. Box 5157, Bend, OR 97701, Tel: 503-388-2584

RATELCO, 1260 Mercer, Dept. EEM, Seattle, WA 98109, Tel: 206-624-7770, Telex: 888729; FSC No.: 14259; Empl.: 120; *Sls. Mgr.:* D. Terpstra

RATH MICROTECH CORP., Rath Affiliated Cos., 2505 Foster Ave., Janesville, WI 53545, Tel: 608-754-2222, 800-356-9464, Telex: 26-5409; *Sls. Mgr.:* Jim Coenen

RAULAND-ZENITH ELECTRONICS CORP., 2407 W. North Ave., Melrose Pk., IL 60160, Tel: 312-345-4700, Telex: 72-1488; Empl.: 2300

RAWAY BEARING, 8 Melnick Rd., Monsey, NY 10952, Tel: 914-352-4944; FSC No.: 3110-3120; Empl.: 6; *Dist. Mgr.:* Rachel Baskin

RAYCHEM CORP., Elctrns. Grp., 300 Constitution Dr., Menlo Park, CA 94025, Tel: 415-361-3860, Telex: 34-8316, TWX: 910-373-1728; *Sls. Mgr.:* Robert Simpson; *Dist. Mgr.:* Joseph Rodgers

RAYCO ELCTRN. MFG., 1625 12th St., Santa Monica, CA 90404, Tel: 213-450-0777

RAYMOND ENGRG. INC., Raycorder Prods. Div., 217 Smith St., Middletown, CT 06457, Tel: 203-632-1000, TWX: 710-428-7944; FSC No.: 92059; Empl.: 550; *Sls. Mgr.:* Bruce Greenfield

RAYOVAC CORPORATION, 101 E. Washington Ave., Madison, WI 53703, Tel: 608-252-7400, Telex: 26-5462, TWX: 910-286-2730; FSC No.: 6135; Empl.: 2400; *Sls. Mgr.:* Ed Peterson

RAYTHEON CO., 465 Centre St., Quincy, MA 02169, Tel: 617-479-5300, TWX: 710-337-1020; *Sls. Mgr.:* R. Whitt

RAYTHEON CO., Laser Products, Fourth Ave., Burlington, MA 01803, Tel: 617-272-6402, Telex: 92-3455, TWX: 710-324-6568; Empl.: 60; *Sls. Mgr.:* D. J. Hoffman

RAYTHEON CO., Microwave & Power Tube Div., 190 Willow St., Waltham, MA 02154, Tel: 617-899-8400, TWX: 710-324-6568; *Sls. Mgr.:* A. F. Vacaro; *Dist. Mgr.:* R. K. Whitt

RAYTHEON CO., Submarine Signal Div., 1847 W. Main Rd., P.O. Box 360, Portsmouth, RI 02871, Tel: 401-847-8000, Telex: 927787, TWX: 710-382-6923; FSC No.: 94404; Empl.: 2600; *Sls. Mgr.:* Jerry K. Martin

RAYTHEON OCEAN SYS. CO., Submarine Signal Div., Risho Ave., Westminster Pk., E. Providence, RI 02914, Tel: 401-438-1780, Telex: 6814078; Empl.: 90

RAYTHEON SEMICONDUCTOR, 350 Ellis St., Mountain View, CA 94043, Tel: 415-968-9211, TWX: 910-379-6481; FSC No.: 07933; Empl.: 950; *Sls. Mgr.:* R. Goedjen; *Dist. Mgr.:* R. Johnson

RAYTHEON/TAG SEMICONDUCTORS LTD., 43 Third Ave., Burlington, MA 01803, Tel: 617-272-3704 (3705), Telex: 92-3455, TWX: 710-324-6568; Empl.: 7; *Sls. Mgr.:* B. Cavender; *Dist. Mgr.:* Pat Mobilia

RCA DISTR. & SPECIAL PRODS. DIV., RCA Corp., 2000 Clements Bridge Rd., Deptford, NJ 08096, Tel: 609-541-3636; *Sls. Mgr.:* H. L. Craton

RCA SOLID STATE DIV., Route 202, Somerville, NJ 08876, Tel: 201-685-6000, TWX: 710-480-9333; FSC No.: 19089; *Sls. Mgr.:* Mel Morris; *Dist. Mgr.:* Tom Pitera

RCA SOLID STATE DIV., CMOS IC Mktg., Rte. 202, Somerville, NJ 08876, Tel: 201-685-6000, TWX: 710-480-9333

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RCA SOLID STATE DIV., Linear Integrated Circuits, Rte. 202, Somerville, NJ 08876, Tel: 201-685-6000, TWX: 710-480-9333

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RCA SOLID STATE DIV., Micro Processors/ Memories/Peripherals, Route 202, Somerville, NJ 08876, Tel: 201-685-6000, TWX: 710-480- 9333

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RCA SOLID STATE DIV., Thyristors & Rectifiers, Rte. 202, Somerville, NJ 08876, Tel: 201-685-6000, TWX: 710-480-9333

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RCA SOLID STATE DIV., Transistors, Rte. 202, Somerville, NJ 08876, Tel: 201-685-6000, TWX: 710-480-9333

See RCA Solid State Div. for Sls. Reps.

RCD COMPONENTS, INC., 330 Bedford St., Manchester, NH 03101, Tel: 603-669-0054, Telex: 943-512 RCD COMP MAN; Empl.: 350 .... **A•1934-1935**

Local Sales Offices & Reps

AL	Huntsville, Montgomery Mktg. Inc.	205-830-0498
AZ	Phoenix, Elec-Com Assoc.	602-967-8644
CA	Canoga Park, Cummings & Assocs.	213-340-6035
CA	Santa Clara, Cummings & Assocs.	408-247-8656
CA	Woodland Hills, Cummings & Assocs.	213-340-6035
CO	Denver, Cummings & Assocs.	303-455-6860
FL	Apopka, G. F. Bohman	305-886-1882
GA	Norcross, Montgomery Mktg. Inc.	404-447-6124
ID	Boise, N. R. Schultz Co.	208-377-8686
IL	Elk Grove Village, The John G. Twist Co.	312-593-0200
KS	Overland Park, Ensco-Rep Inc	913-381-7557
MI	Livonia, Electronic Salesmasters	800-321-1848
MO	Maryland Heights, Ensco-Rep Inc	314-423-3935
NJ	Cherry Hill, Trinkle Sales Inc.	609-795-4200
NM	Alburquerque, Elec-Com Assocs.	505-898-6101
NY	Hempstead, Kahgan Sls.	516-538-2300
NY	Kingston, R. P. Kennedy Co., Inc.	914-876-2700
NY	Rochester, R. P. Kennedy Co., Inc.	716-271-6322
NC	Cary, Montgomery Mktg. Inc.	919-467-6319
OH	Beachwood, Electronic Salesmasters	216-831-9555
OR	Beaverton, N. R. Schultz Co.	503-643-1644
PA	Allentown, Trinkle Sls. Inc.	800-257-8210
TX	Dallas, Design Mktg. Inc.	214-680-9767
TX	Irving, Design Mktg.	214-255-2110
TX	Round Rock, Design Mktg.	512-255-9686
WA	Bellevue, N. R. Schultz Co.	206-454-0300
WI	Brookfield, The John G. Twist Co.	414-782-2670

R. C. ELCTRNS. INC., 5386 Hollister Ave., Santa Barbara, CA 93111, Tel: 805-964-6708, Telex: 295281; Empl.: 10; *Sls. Mgr.:* Chao-Sun Pang; *Dist. Mgr.:* Chao-Sun Pang

RCI/DATA, 1992 Lakewood Rd., Toms River, NJ 08753, Tel: 201-341-8361; Empl.: 15; *Sls. Mgr.:* Robert Fierro

RCL•Shallcross
• WIREWOUND RESISTORS

RCL ELECTRONICS, INC., 195 McGregor St., Manchester, NH 03102, Tel: 603-627-3831, TWX: 710-220-1876; FSC No.: 01686; Empl.: 300 ... **A•1936-1941**

SHALLCROSS, INC., U.S. 70 East, Smithfield, NC 27577, Tel: 919-934-5181, TWX: 510-939-1463; FSC No.: 54294; Empl.: 150 .... **A•1936-1941**

Local Sales Offices & Reps

NM	Albuqerque, Nelco, Inc.	505-292-3657
NY	Buffalo, Quality Comps.	716-837-5430
OK	Tulsa, Genzel	918-622-7744
TX	Arlington, Procomp	817-640-4336
Can	Kanata, Ont., Gidden/Morton Assocs.	416-671-8111

Local Distributors

CA	Chatsworth, TTI	818-709-1010
CA	San Jose, Shelley Elctrns.	408-942-9111
IN	Indianapolis, Classic Comps.	317-872-4777
MA	Burlington, TLC	617-273-0140
MI	Grand Rapids, S-F Elctrn. Supp.	616-459-0216
NY	Bohemia, Shelley Elctrns.	516-567-7751
PA	Norristown, Century Elctrn. Comps.	215-631-5400
Can	Scarborough, Ont., Carsten Elctrns	416-495-9999

RCL-Shallcross Local Sls. Offs. & Reps.

AL	Huntsville, CSR Elctrns.	205-533-2444
AZ	Phoenix, ISDS	602-971-6250
CA	Chatsworth, WCV Co.	818-700-0933
CA	Palo Alto, Mollard Mktg.	415-961-0456
CO	Denver, Elcom	303-337-2300
CT	North Haven, Kitchen & Kutchen	203-239-0212
FL		
FL	Ft. Lauderdale, AMP Assocs.	305-565-0056
FL	Longwood, AMP Assocs.	305-869-6831
FL	Merritt Island, APM Assocs.	305-453-4322
FL	Tampa, AMP Assocs.	813-886-2457
GA	Dunwoody, CSR Elctrns.	404-396-3720
IL	Schaumburg, Gassner & Clark	312-882-8608
IA	Cedar Rapids, Lorenz Sls.	319-377-4666
MD	Columbia, Delta III Assocs.	301-730-4700
MA	Burlington, Kitchen & Kutchen	617-229-2660
MI	Livonia, Luebbe Sls. Co.	313-477-3131
MN	Minneapolis, Elec. Comp. Sls.	612-933-2594
MO		
MO	Grandview, Harris/Hanson Co.	816-763-6200
MO	St. Louis, Harris/Hanson Co.	312-432-3611
NE	Lincoln, Lorenz Sls. Co.	402-475-4660
NJ	Marlton, BGR Assocs.	609-983-1020
NY		
NY	Buffalo, Quality Comps.	716-837-5430
NY	Manlius, Quality Comps.	315-682-8885
NY	Melville, Comtronic Assocs.	516-249-0505
NC	Raleigh, CSR Elctrns.	919-878-9200
OH	Cincinnati, Luebbe Sls. Co.	513-891-5770
OH	Cleveland, Luebbe Sls. Co.	216-333-0425
OH	Columbus, Luebbe Sls. Co.	614-431-0474
OH	Dayton, Luebbe Sls. Co.	513-294-0426
OR		
OR	Portland, James J. Backer Co.	503-297-8744
OR	Salem, James J. Backer Co.	503-362-0717
PA	Pittsburgh, Luebbe Sls. Co.	412-931-0414
SC	Taylors, CSR Elctrns.	803-292-2292
UT	Salt Lake City, Elcom	801-532-7940
WA	Seattle, James J. Backer Co.	206-285-1300

RCL-Shallcross Local Distributors

AZ	Phoenix, TTI	602-966-1616
AZ	Tempe, Shelley Elctrns.	602-894-2058
CA	Chatsworth, Shelley Elctrns.	818-998-3333
CA	Fountain Valley, Components Ctr.	714-979-0433
CA	San Diego, Shelley Elctrns.	619-453-7133
CA	San Jose, T.T.I.	408-943-9155
CO	Boulder, Shelley Elctrns.	303-442-2718
CT	Stratford, Utronics	203-378-4201
FL	Ft. Lauderdale, Dielco	305-973-8700
FL	Orlando, TTI	305-859-1000
FL	Tampa, Impala Elctrns.	813-885-4747
IL	Melrose Park, Belford Elctrns.	312-865-2400
IL	Northbrook, Classic Comps.	312-272-9650
CT	Hamden, Almo Elctrns.	203-288-6556
MD	Columbia, Aztech Elctrns.	301-995-1760
FL	Tampa, Shelley Elctrns.	813-884-0946
MA	Woburn, TTI	617-938-8800
MA	Billerica, A. W. Mayer Co.	617-229-2255
NY	Bohemia, TTI	516-567-1500
NY	Farmingdale, Command Elctrns.	516-293-1212
NY	Hauppauge, Jaco Elctrns.	516-273-5500
MN	Minneapolis, Aerospace Computer Supp.	612-884-4725
NY	Rochester, Simcona	716-328-3230
NY	Rome, Rome Elctrns.	315-337-4500
NC	Raleigh, Resco-Raleigh	919-781-5700
OH	Dayton, Stotts Friedman	513-298-5555
OH	Englewood, Argent Inds.	513-836-8633
OH	Solon, REH-Electra	216-248-1636
OK	Tulsa, Altair	918-252-5781
PA	McKean, Advacom	814-476-7774
PA	McKeesport, Barno Radio	412-751-5966
PA	Pittsburgh, Aldertronics	412-821-5565
NY	Rockville Center, Milano Bros. Intl.	516-764-2200
TX	Ft. Worth, TTI	817-831-0441
TX	Houston, Altair	713-462-3029
TX	Richardson, Altair	214-231-5166
WA	Bellevue, Almac Elctrns.	206-643-9992
WI	New Berlin, Classic Comps.	414-786-5300

R-COLUMBIA PRODS. CO., INC., 2008 St. Johns Ave., Highland Park, IL 60035, Tel: 312-432-7915; Empl.: 20

RDF CORPORATION, 23 Elm Ave., Hudson, NH 03051, Tel: 603-882-5195, TWX: 710-228-1882; Empl.: 120; *Sls. Mgr.:* Arthur Di Venuti

RDI/REED DEVICES, INC., 525 Randy Rd., Carol Stream, IL 60188, Tel: 312-682-4100, TWX: 910-252-2118; FSC No.: 53337; Empl.: 85; *Sls. Mgr.:* H. J. Roeser .... **C•1498-1501**

Local Sales Offices & Reps

AL	Huntsville, Alpha	205-533-0766
AZ	Phoenix, Augat Sls.	602-224-0950
CA	Los Angeles, Wiley Co.	213-666-1611
CA	San Diego, Wiley Co.	619-571-2881
CA	Sunnyvale, Schwerin/Merrill	408-735-7900
CO	Denver, Augat Sls.	303-757-2100
FL	Ft. Lauderdale, APM Assoc.	305-565-0056
FL	Longwood, APM Assoc.	305-869-6831
FL	Tampa, APM Assoc.	813-886-2457
GA	Atlanta, Alpha	404-491-9430
IL	Glen Ellyn, Rockford Controls	312-469-6016
IN	Indianapolis, Rockford Controls	317-248-2518
IA	Davenport, Ensco-Rep., Inc.	319-386-6600
KS	Overland Park, Ensco-Rep., Inc.	913-381-7557
KS	Wichita, Ensco-Rep., Inc.	316-683-1070
MA	Norwood, Augat Sls.	612-792-3164
MI	Novi, Lektronics	313-349-3304
MN	Minneapolis, HMR	612-831-7400
MO	Maryland Hts., Ensco-Rep., Inc.	314-423-3935
NJ	Pitman, Colrud Corp.	609-589-5866
NY	Commack, Augat Metro	516-864-3811
NY	Farmingdale, Augat Metro	516-753-0012
NY	Rochester, H.C. Johnson	716-586-0777
NC	Kernersville, Wallace Elctrn.	919-996-2742
OH	Columbus, K.W. Elec. Sls.	614-888-0483
OH	Dayton, K W Elctrn. Sls.	513-890-2150
OH	Shaker Hts., K.W. Elec. Sls.	216-491-9177
OR	Portland, Augat Sls.	503-253-7172
PA	Allison Park, K.W. Elec. Sls.	412-487-4300
TN	Memphis, Glen White	901-761-5941
TN	Oak Ridge, Alpha Mktg.	615-482-4681
TX	Dallas, Augat Sls.	214-788-4211
TX	Georgetown, Augat Sls.	512-479-9447
TX	Houston, Augat Sls.	713-495-3100
VA	Reston, Colrud Corp	703-620-6612
WA	Augat Sls.	206-455-2846
WI	Westbend, Rockford Controls	800-323-1042

Local Distributors

AZ	Phoenix, Dalis	602-275-2885
AZ	Phoenix, Tri-Tek	602-995-9352
AZ	Tempe, Time Elctrns.	602-967-2000
AZ	Tucson, Inland Elec. Supp.	602-889-5301
AR	Little Rock, Carlton-Bates	501-562-9100
CA	Anaheim, Time Elctrns.	714-937-0911
CA	Belmont, Lodan Elctrns.	415-592-4600
CA	Buena Park, Control Des.	714-521-5040
CA	Chatsworth, Time Elctrns.	818-998-7200
CA	Fremont, Term. Sls.	415-656-7722
CA	Gardena, Calif. Switch & Signal	213-538-9830
CA	Los Angeles, Elec. Switches	213-660-1310
CA	San Carlos, Control Des.	415-592-4808
CA	San Diego, Deco Elctrns.	
CA	San Diego, Time Elctrns.	619-586-1331

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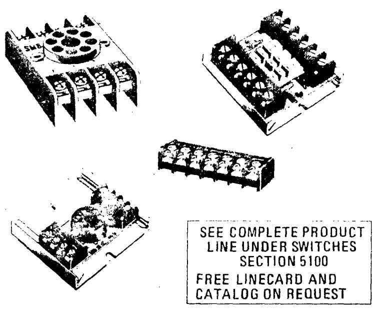

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CA	Sunnyvale, Time Elctrns.	408-734-9888
CA	Torrance, Time Elctrns.	213-320-0880
CO	Denver, CSID	303-292-9594
CO	Englewood, Indl. Elctrns.	303-694-9444
CO	Englewood, Time Elctrns.	303-850-7701
CT	Cheshire, Time Elctrns.	203-271-3200
CT	Stratford, Utronic	203-378-4201
FL	Ft. Lauderdale, Comp. Dist.	305-971-4950
FL	Ft. Lauderdale, Time Elctrns.	305-974-4800
FL	Largo, Lodan Elctrns.	813-595-5811
FL	Orlando, Time Elctrns.	305-841-6565
GA	Atlanta, Elctrl. Control Prod.	404-455-1216
GA	Atlanta, Time Elctrns.	404-351-3545
GA	Norcross, Comp. Dist.	404-441-3320
GA	Stone Mountain, Control Des.	404-979-3500
IL	Addison, Lectro Comps.	312-543-1680
IL	Arlington Heights, Lo Dan Elctrns.	312-398-5311
IL	Chicago, Otto Frankenbush	312-647-0755
IL	Genoa, Control Des.	815-784-6515
IL	Oak Park, Newark Elctrns.	312-524-1800
IL	Peoria, Klaus Radio	309-691-4840
IL	Rockford, Mid-West Assoc.	815-962-8036
IN	Ft. Wayne, Graham Elec.	219-423-3422
IN	Indianapolis, Control Des.	317-788-4559
IA	Cedar Rapids, Deeco	319-365-7551
IA	Marion, Control Des.	319-373-2923
KY	Louisville, P. I. Burks Co.	502-589-3960
LA	Lafayette, Ralph's Indl. Elec.	318-234-4507
LA	New Orleans, Southern Radio Supp.	504-524-2343
LA	New Orleans, Wm. B. Allen Supp.	800-535-9593
MD	Beltsville, Treeko Sls.	301-937-8260
MA	Burlington, QPL Elec. Dist.	617-229-2424
MA	Middleboro, Glynn Elec.	617-947-4262
MI	Farmington Hills, Advent Elctrns.	313-477-1650
MI	Southfield, Michigan Lectrols	313-353-1350
MN	Bloomington, Time Elctrns.	612-944-9192
MN	Minneapolis, Aero-Space Computer Supp.	612-884-4725
MN	Minneapolis, Control Des.	612-721-1628
MN	Minneapolis, Newark Elec.	612-331-6350
MO	St. Louis, Control Des.	314-426-3150
MO	St. Louis, Olive Indl.	314-426-4500
MO	St. Louis, Time Elctrns.	314-391-6444
NE	Lincoln, Scott Elctrn.	402-466-8221
NJ	Fairlawn, Relay Specialties	201-797-3313
NJ	Jersey City, Cuny & Gerber	201-653-0222
NY	Buffalo, Summit	716-884-3450
NY	Lynbrook, Peerless Radio	516-593-2121
NY	Mt. Vernon, QAR Indl. Elec. Sls.	914-699-2224
NY	Rochester, R. Baker Elctrns.	716-586-9164
NY	Rochester, Summit Elctrns.	716-334-8110
NC	Charlotte, Control Des.	704-588-4410
NC	Raleigh, Southeastern Radio	919-828-2311
NC	Winston-Salem, Kirkman Elctrns., Inc.	919-722-9131
OH	Akron, Akron Elctrn.	216-762-8818
OH	Cincinnati, URI Elctrns.	513-761-4030
OH	Columbus, Elctrns. Mktg. Co.	614-299-4161
OH	Columbus, Elm Equip. Co.	614-236-0888
OH	Dayton, ESCO	513-226-1133
OH	Dayton, Scotts-Friedman Co.	513-298-5555
OH	Solon, Repco	216-248-8900
OH	Warren, Rem Elctrn. Supp.	216-373-1300
OH	Wickliffe, Gateway Megatech	216-944-8565
OK	Tulsa, Radio	918-587-9123
OR	Lake Oswego, Rose Elctrn.	503-635-8823
OR	Portland, Platt Elec. Supp.	503-228-3121
OR	Portland, Radar	503-232-3404
OR	Portland, Time Elctrns.	503-684-3780
OR	Tigord, Moore Elctrns.	503-684-3100
PA	Broomall, Time Elctrns.	215-359-1200
PA	Malvern, Control Des.	215-296-0150
PA	McKean, Advacom	814-476-7774
PA	Philadelphia, Phila. Elec.	215-568-7400
SC	Greenville, Emsco	803-233-4121
SC	Greenville, Emsco	
TN	Memphis, Brownell Electro	901-795-8487
TX	Dallas, Control Des.	214-358-1441
TX	Dallas, Dallas Meter-Tech.	214-349-6044
TX	Dallas, Time Elctrns.	214-385-0566
TX	Houston, Angie Elctrns.	713-659-8386
TX	Houston, Electronic Packaging Corp.	713-447-5800
UT	Salt Lake City, Stuart Elctrns. Supp.	801-466-8603
UT	Salt Lake City, Western Controls	801-292-5900
WA	Bellevue, Time Elctrns.	206-641-3640
WA	Seattle, Pacific Elctrns.	206-575-1050
WA	Seattle, Platt Elec. Supp.	206-624-4083
WA	Seattle, Radar Elec.	206-282-2511
WI	Green Bay, A-A Elec.	414-499-0258
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WI	West Allis, Marsh Elctrns.	414-475-6000

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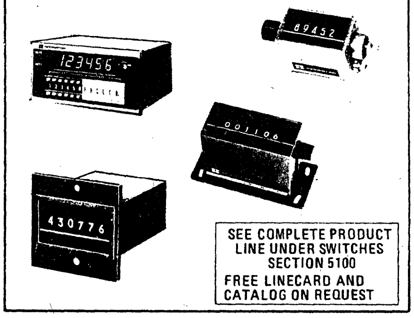

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Local Sales Offices & Reps

CA	North Hollywood, Crown Elctrns.	213-877-3550
CA	Sunnyvale, ESCO Assocs.	408-745-1410
VA	Fairfax, Beacon North	703-591-1300

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RECYCLENE PRODUCTS, 1910 Trade Zone, San Jose, CA 95131, Tel: 408-945-8600; FSC No.: 24496D; *Sls. Mgr.:* Mitch Tuchman

REDINGTON COUNTERS, 130 Addison Rd., Windsor, CT 06095, Tel: 203-688-6205, Telex: 64-3390 REDCO WSOR; *Sls. Mgr.:* Alan Schoenhut; *Dist. Mgr.:* George Angelovich

REED SWITCH DEV. CO. INC., PO Box 1464, Kerrville, TX 78028, Tel: 512-896-4444; Empl.: 1

RE-EL CIRCUITS, INC., See RCI/Data

REEVE ELECTRONICS, Mellish E. Murray, 1720 W. Fulton St, Chicago, IL 60612, Tel: 312-670-0150; Empl.: 25; *Sls. Mgr.:* George Elliott

REEVES-HOFFMAN
Division, Dynamics Corporation of America

REEVES-HOFFMAN DIV., 400 W. North St., Carlisle, PA 17013, Tel: 717-243-5929, TWX: 510-650-3510; Empl.: 391; *Sls. Mgr.:* Daniel V. Kingery **A•1423-1427; C•1619-1621**

Local Sales Offices & Reps

AZ	Phoenix, Chaparral Elctrns.	602-252-0897
CA	Culver City, Westaironics	213-641-4123
CA	Mountain View, Peninsula Tech. Sls.	415-965-3636
CO	Boulder, R.G. Entprs.	303-447-9211
FL	Apopka, G. F. Bohman Assocs.	305-886-1882
ID	Boise, N. R. Schultz	208-377-8686
IL	Chicago, ESCO Assocs.	312-763-0800
MD	Baltimore, R. A. Wafer Assocs.	301-744-1133
MA	Wakefield, H. Jappe Co.	617-245-9359
MN	Minneapolis, Intl. Elctrns.	612-571-0000
NY	Huntington, Compar N.Y.	516-423-5660
NC	Charlotte, JWL Assocs.	704-541-5750
OH	Cincinnati, Tri-State Mktg.	513-761-7993
OR	Beaverton, N. R. Schultz	503-643-1644
PA	Hatboro, Electro Rep Engrg.	215-674-4421
TX	Irving, Kite Elctrns. Sls.	214-438-9336
WA	Bellevue, N. R. Schultz	206-454-0300
Intl	CH, Zurich, Kurt Hirt	(01) 51-21-21
Intl	FR, Orsay, Cemitronic	(6) 907-84-38
Intl	FR, Paris, Tekelec Airtronic	(1) 534-75-35
Intl	GR, Munchen, Tekelec Airtronic	(089) 594621
Intl	IT, Milano, Tekelec Airtronic	(02) 73-80-641
Intl	NL, Zoetermeer, Tekelec Airtronic	(079) 31-01-00
Can	Ontario, R. D. Assocs.	416-444-0959

REFAC ELCTRNS. CORP., P.O. Box 809, Winsted, CT 06098, Tel: 203-379-2731, TWX: 710-449-6464; FSC No.: 28564; Empl.: 80; *Sls. Mgr.:* Chuck Altschul .... **B•1091**

Local Sales Offices & Reps

AL	Huntsville, Montgomery Mktg.	205-830-0498
AZ	Scottsdale, Luscombe Engrg.	602-949-9333
CA	Campbell, Luscombe Engrg.	408-370-2020
CA	Pasadena, Luscombe Engrg.	818-684-2000
CA	San Diego, Luscombe Engrg.	619-295-4300
CO	Boulder, Luscombe Engrg.	303-772-3342
CT	Kensington, Norman Stachelek Co.	203-828-6161
FL	Clearwater, Delmac Sls.	813-447-5192
FL	Fort Lauderdale, Delmac Sls.	305-739-0016
FL	Orlando, Delmac Sls.	305-898-4688
FL	Palm Bay, Delmac Sls.	605-724-8377
GA	Norcross, Montgomery Mktg.	404-447-6124
IL	Mt. Prospect, Interep	312-577-8899
MD	Baltimore, Burgin-Kreh Assocs.	301-265-8500
MA	Canton, New England Elctrn. Sls.	617-828-4835
MI	Madison Heights, Pine Sls.	313-539-0350
MN	Minneapolis, Holmgren Assocs.	612-786-7641
MO	Kansas City, Delltron Co.	816-436-6445
MO	St. Louis, Delltron Co.	314-869-4779
NJ	Englewood, Sprung/Nussbaum	201-569-5666
NY	E. Syracuse, Nycom Co.	315-437-8343
NY	Williamsville, Nycom Co.	716-633-9395
NC	Cary, Montgomery Mktg.	919-467-6319
OH	Columbus, R. J. Sls.	614-253-2898
OR	Beaverton, Luscombe Engrg.	503-636-6664
PA	Norristown, Denco Data Equip. Corp.	215-630-8990
TX	Dallas, SW Mktg.	214-341-8631
TX	Houston, SW Mktg.	713-864-6281
VA	Lynchburg, Burgin-Kreh Assocs.	804-239-2626
WI	Milwaukee, Interep	414-774-1100
Can	Mississauga, Ont., Advanced Sls. Grp.	416-677-8200

Local Distributors

CA	Chatsworth, Anthem Elctrns.	818-700-1000
CA	San Jose, Anthem Elctrns.	408-946-8000
CA	Van Nuys, Pacific Switch Controls	213-873-4802
CA	Van Nuys, Patane Avionics	818-988-4455
CO	Denver, Integrated Elctrns.	303-292-6121
CT	Hartford, Atlantic Switch Controls	203-527-7705
FL	Lakeland, Switch Controls, Inc.	813-644-7564
IL	Carol Stream, Concetrix, Inc.	312-653-1460
IL	Hoffman Estates, Intercomp, Inc.	312-843-2040
IL	Lombard, RM Elctrns.	312-932-5150
IN	Indianapolis, Advent Elctrns.	317-872-4910
MA	Canton, Electronic Pkg.	617-821-2111
NE	Lincoln, Scott Elctrn. Supp.	402-466-8221
NH	Nashua, Atlantic Switch Co., Inc.	603-800-1971
NJ	Milford, Sintec Co.	201-996-4093
NJ	Mt. Laurel, Jersey Switch	609-778-8190
NJ	Roselle, Lectron Inds.	201-245-5858
NY	Buffalo, Summit Distrs.	716-884-3450
NY	Farmingdale, SAI	516-293-2710

NY	Rochester, Summit Distrs.	716-334-8110
OH	Cleveland, Pruitt Energy Sources	216-566-1545
OH	Columbus, Ohioswitch, Inc.	614-885-0319
OR	Beaverton, Hansen Elctrns. Corp.	503-642-4455
PA	Willow Grove, RESCO	215-659-4440
TX	Houston, Electronic Pkg.	713-447-5800
Can	Point Claire, Que., Future Elctrns.	514-694-7710
Can	Scarborough, Ont., Carsten Elctrns.	416-751-5095

REGDON CORP., 3713 Grand Blvd., Brookfield, IL 60513, Tel: 312-485-5152, TWX: 910-691-2214; FSC No.: 27190; Empl.: 65 **B•1475**

Local Sales Offices & Reps

	San Carlos	415-594-0700
AL	Decatur, Tenn Tech	205-350-0630
CA	Los Altos, J. W. Wilhoit	415-961-3660
CA	Valencia, DJM Elctrns.	818-362-4309
CT	Woodbury, Mark-Rep Assocs.	203-263-3047
FL	Maitland, EIR, Inc.	305-660-9600
GA	Atlanta, Tenn Tech	404-622-5784
IL	Downers Grove, Richmar Elect. Corp.	312-968-0118
IN	Indianapolis, Richmar Elctrns.	317-846-6383
MN	Edina, T.H. Hanson & Co.	612-893-9960
NH	Plaistow, Mark-Rep Assocs.	603-382-9563
NJ	Florham Park, Varrelman-Gorman Co.	201-992-2505
NY	Binghamton, NHA	607-754-3214
NY	Pittsford, NHA	716-586-9002
NC	Raleigh, Tenn Tech	919-266-3610
OH	Cleveland, J. N. Bailey	216-892-1510
OH	New Lebanon, J. N. Bailey	513-687-1325
PA	Abington, Indl. Mktg. Specialists Co.	215-659-0444
TN	Chattanooga, Tenn Tech.	615-894-3012
TX	Austin, K & H Sales	512-258-8841
TX	Plano, K & H Sales	214-423-6520
WI	Butler, Richmar Elctrns.	414-781-1730

Local Distributors

CA	San Carlos, Logan Elctrn. Supp.	415-594-0700
MA	Lynn, Land Elctrns.	617-592-2220
NJ	Fairlawn, Relay Specialties	201-797-3313

REGENCY SYSTEMS, INC., 3200 Farber Drive, Champaign, IL 61820, Tel: 217-398-8067, Telex: 27-0486; Empl.: 60; *Sls. Mgr.:* Ken Perry; *Dist. Mgr.:* Jill Koepke

REGENT CONTROLS, 39 Fanny St., P.O. Box 767, Shelton, CT 06484-0767, Tel: 203-736-2924; *Sls. Mgr.:* Wendell E. Carroll

REHLANDER ASSOCS., 118A Bridge St., Beverly, MA 01915, Tel: 617-922-5961; *Sls. Mgr.:* Michael Rehlander **B•1213**

REICH ASSOCS., Rt. 4, Box 4620, Lakehills, TX 78063, Tel: 512-751-3220, Telex: 358048; FSC No.: 55916; Empl.: 10; *Sls. Mgr.:* W. Reich

RE • INSTRUMENTS re

Electronics for Test and Communication

RE INSTRUMENTS CORP., 31029 Center Ridge Rd., Westlake, OH 44145, Tel: 216-871-7617, TWX: 810-427-9257; Empl.: 15; *Sls. Mgr.:* P. A. Bosworth **D•1295**

REI SLS., 19525 Business Centre Dr., Northridge, CA 91324, Tel: 617-938-0900; Empl.: 5; *Sls. Mgr.:* T. P. Fitzgerald

RELATIONAL MEMORY SYS., 1650 Berryessa Rd., Ste. B, San Jose, CA 95133-1082, Tel: 408-729-3011, 800-448-4880, TWX: 910-379-0014; Empl.: 10; *Sls. Mgr.:* Jennifer Phipps

LAW, R. E. INSTRUMENT, INC., 7735 W. 112th Pl., Palos Hills, IL 60465, Tel: 312-974-4000; FSC No.: 6685-6695; *Sls. Mgr.:* Harry Booth; *Dist. Mgr.:* R. Gene Law

RELAY SERVICE CO., 1310 N. Pulaski Rd., Chicago, IL 60651, Tel: 312-AL2-2700; Empl.: 30; *Sls. Mgr.:* Chas. H. Badger

RELAY SPECIALTIES, 1300 Plaza Rd., Fair Lawn, NJ 07410, Tel: 201-797-3313, 800-526-5376, Telex: 642751; Empl.: 48; *Sls. Mgr.:* S. R. Gershberg

Local Sales Offices & Reps

CA	Los Alamitos, The Rep House	213-598-3379
CT	Manchester, Vin-Tech, Inc.	203-646-3007
MD	Baltimore, Com Tech Assocs.	301-583-1993
TX	Dallas, Art Brawner & Assocs.	214-824-4013

RELCO PRODS., 5594 E. Jefferson Ave., Denver, CO 80237, Tel: 303-756-1143; FSC No.: 14454; Empl.: 7

RELIABILITY, INC., 16400 Park Row, P.O. Box 218370, Houston, TX 77218, Tel: 713-492-0550, TWX: 910-881-1739; FSC No.: 54098; Empl.: 800; *Sls. Mgr.:* J. Marcussen

RELIANCE COMM/TEC, Reliance Electric, P. O. Box 99502, Cleveland, OH 44199, Tel: 800-245-4501, in OH 800-245-4497

RELIANCE ELECTRIC CO., Marketing Info Center, P.O. Box 99502, Cleveland, OH 44199, Tel: 800-245-4501, 800-245-4497 In Ohio

RELIANCE FUSE, 2070 Maple St., Des Plaines, IL 60016, Tel: 312-299-2211, Telex: 726-453; FSC No.: 72076;F15160E; Empl.: 200

For nearest sales office, phone 1-800-245-4501 (in Ohio, 1-800-245-4497)

RELIANCE FUSE, Reliance Electric, P. O. Box 99502, Cleveland, OH 44199, Tel: 800-245-4501, in OH 800-245-4497

RELIANCE PLASTICS & PACKAGING, 225 Belleville Ave., Bloomfield, NJ 07003, Tel: 201-748-2222; Empl.: 35; *Sls. Mgr.:* Hale Smith

RELMS, See Relational Memory Systems, Inc.

REMEE PRODS. CORP., 41 Bridge St., Florida, NY 10921, Tel: 914-651-4431, Telex: 64-6715; Empl.: 135; *Sls. Mgr.:* Ken Pimental; *Dist. Mgr.:* Ken Pimental

REMEX CAM OPERATIONS, Ex-Cell-O Corporation, 1230 S. Lewis Street, Anaheim, CA 92805, Tel: 714-535-4160, Telex: 183-040; Empl.: 105; *Sls. Mgr.:* Stan Vitt; *Dist. Mgr.:* Stan Vitt

RENAISSANCE MARKETING, INC., 463 Union Ave., Westbury, NY 11590, Tel: 516-271-2389

RENBRANDT, INC., 6 Parmelee St., Boston, MA 02118, Tel: 617-445-8910; FSC No.: 99934; Empl.: 25; *Sls. Mgr.:* M. Rogers

RENCO, 26 Coromar Dr., Goleta, CA 93017-3094, Tel: 805-968-1525, TWX: 910-334-1180; FSC No.: 34479; Empl.: 170; *Sls. Mgr.:* Larry Wade **B•1824-1825; D•1131**

Local Sales Offices & Reps

CA	Garden Grove, Advanced Digital Group, Inc.	213-598-9645
CA	Westlake Village, Electro-Craft Corp.	818-889-3631
CO	Englewood, Electro-Craft Corp./RENCO	303-762-1754
GA	Marietta, Electro-Craft Corp./RENCO	404-971-2669
IL	Palatine, Electro-Craft Corp./RENCO	312-991-4570
NH	Salem, Electro-Craft Corp./RENCO	603-893-5552
NJ	Cherry Hill, Electro-Craft Corp./RENCO	609-662-0555
NY	Buffalo, Ross Equip. Co., Inc.	716-634-0990
NY	Elmira, Ross Equip. Co., Inc.	607-734-4175
NY	Rochester, Ross Equip. Co., Inc.	716-271-5660
NY	Syracuse, Ross Equip. Co., Inc.	315-463-6691
OH	Cincinnati, Electro-Craft Corp./RENCO	513-474-4171
WA	Bellevue, Sweo Engrg.	206-644-2725
Can	Edmonton, Alb., Hank Mottle Mktg., Ltd.	403-468-1292

RENCO ELCTRNS., 60 Jefryn Blvd., E., Deer Park, NY 11729, Tel: 516-586-5566 **A•1274-1276, 2268-2269**

Toll-Free Engineering Hot Line 800-645-5828, in NY State 516-586-5566

REPCO, 2421 N. Orange Blossom Trail, Box 7065, Orlando, FL 32854, Tel: 305-843-8484, Telex: 56-6536

REPRODUCTION TECHNOLOGIES INC., Dept. EM, P.O. Box 815, Bristol, IN 46507-0518, Tel: 219-848-5233, 219-848-5333; Empl.: 8 **D•1034**

Local Sales Offices & Reps

GA	Chamblee, Secom Sys.	404-455-0672
IN	Indianapolis, Carlton Security Sys.	317-787-8545
KY	Louisville, Audio Mktg. Assocs.	502-935-2580
MA	Falmouth Heights, R J C Assocs.	617-540-8832
MI	Ferndale, Shalco	313-547-4771
MN	Minneapolis, KODO Assocs.	612-881-1255
CH	Brecksville, Audio Mktg. Assocs.	216-526-2426
OH	North Canton, Audio Mktg. Assocs.	216-499-1172

REPUBLIC ELCTRNS. CORP., 176 E. 7th St., Paterson, NJ 07524, Tel: 201-279-0300, TWX: 710-988-5908; FSC No.: 93958; Empl.: 125; *Sls. Mgr.:* W. Eisenberger **A•1167**

Local Sales Offices & Reps

CA	Los Angeles, Corcoran Assocs.	213-823-2425
CA	Sunnyvale, W. W. Posey Co.	408-746-0771
CO	Commerce City, Williams Assocs.	303-289-5647
FL	Sunrise, Arnold Milrot & Assoc.	305-748-6446
IL	Chicago, Ropek, Cahill & Vogt	312-631-0070
IN	Ft. Wayne, Given Corp.	219-432-5585
IA	Cedar Rapids, Ard Sales Co.	319-393-6392
MD	Ellicott City, Nelson Elctrns.	301-747-7887
MA	Walthan, Deltech Sls. Inc.	617-894-4550
MN	Edina, Grayden & Flemmer	612-941-1120
MO	Grandview, R. R. Burton & Assocs.	816-763-5385
MO	Maryland Hgts., R. R. Burton & Assocs.	314-434-1678
NJ	Hasbrouck Hgts., Comp-Tech Sls.	201-288-7400
NY	Liverpool, Precision Sls.	315-451-3480
NY	New Hyde Park, Comp-Tech Sls.	516-593-2628
NY	Pittsford, Precision Sls.	716-381-2820
NY	Pleasant Valley, Precision Sls.	914-635-3233
NC	Charlotte, Jake Rudisill Assocs.	704-377-6901
OH	Columbus, Tom Mulligan & Assocs.	614-457-2242
OK	Tulsa, Hugh J. Daly Co.	918-627-4159
PA	Lancaster, Electro Rep.	717-299-5877
TX	Lewisville, Marathon Assocs.	214-436-8882
WA	Lynnwood, Blum & Assocs.	206-777-6656

Local Distributors

CA	San Fernando, Petell Elctrns.	213-365-9841
IL	Skokie, Kellner Elctrns.	312-677-1120
NJ	Perth Amboy, Metuchen Capacitors	201-442-0500
NY	Hauppauge, Semi Cap Elctrns.	516-582-4400

REPUBLIC ELECTRONICS CO., 575 Broad Hollow Rd., Melville, NY 11747, Tel: 516-249-1414, Telex: 96-1460; FSC No.: 95750; Empl.: 125; *Sls. Mgr.:* William Shaver

REPUBLIC PACKAGING CORP., 9160 S. Green St., Chicago, IL 60620, Tel: 312-233-6530, Telex: 25-4621; *Sls. Mgr.:* Hal Grossman; *Dist. Mgr.:* Herb Fasth

RESDEL ENGRG., 300 E. Live Oak Ave., Arcadia, CA 91006, Tel: 213-684-2600, TWX: 910-582-3219; Empl.: 170

RESEARCH, INC., Box 24064, Minneapolis, MN 55424, Tel: 612-941-3300, Telex: 29-0502; Empl.: 250; *Sls. Mgr.:* Brian Callahan

RESEARCH PRODS., 1015 E Washington Ave., Madison, WI 53701, Tel: 608-257-8801, TWX: 910-286-2781

RESISTANCE TECHNOLOGY INC., 1260 Red Fox Rd., St. Paul, MN 55112, Tel: 612-636-9770; *Sls. Mgr.:* Michael Geraci; *Dist. Mgr.:* Michael Geraci

RESISTORS, INC., 5226 W. 26th St., Chicago, IL 60650, Tel: 312-652-7555; Empl.: 50 **A•1942**

Local Sales Offices & Reps

CT	Plantsville, Parnetics Co.	203-628-9343
IL	Arlington Hgts., Resistance Specialists	312-259-6571
IA	Cedar Rapids, J.R. Sls. Engrg.	319-393-2232
MI	Lathrup Village, R.C. Nordstrom & Co.	313-559-7373
NY	New York City, Symon Assocs.	212-757-3638
OH	Wickliffe, W.J. Brauer & Assocs.	216-943-0601
WI	Milwaukee, Honkamp Sls. Co.	414-463-2530

RES-NET, 110 Route 10, Whippany, NJ 07981, Tel: 201-887-2260, out of state 800-526-0704; FSC No.: 55 877; Empl.: 42; *Sls. Mgr.:* David Beck **A•1943**

Local Sales Offices & Reps

CA	Palo Alto, Mollard Mktg.	415-961-0456
MA	Waltham, Dynasel Assocs.	617-890-6777

Local Distributors

NJ	Whippany, ADI American Distributors Inc.	201-428-0510

REVERE CORP. OF AMER., 845 N. Colony Rd., Wallingford, CT 06492, Tel: 203-269-7701, Telex: 96-3482, TWX: 710-476-3197; Empl.: 389; *Sls. Mgr.:* R. Paukstys

REXNORD CHEMICAL PRODS. INC., 6120 E. 58th Ave., Commerce City, CO 80022, Tel: 303-289-5651, Telex: 45-0331; *Sls. Mgr.:* Michael P. Manegold

Local Sales Offices & Reps

CA	Glendora, Rexnord Chem. Prods.	818-963-1109
FL	South Merritt Island, John Rule Assocs.	305-777-5952

IL	Northfield, Special Elec.	312-446-5113
MI	Roseville, Special Elec. Co.	800-558-0604
MN	Excelsior, JPM Assocs.	612-474-3408
MO	St. Louis, Special Elec. Co.	314-962-1150
OH	Cleveland, Special Elec. Co.	216-441-5244
PA	Doylestown, Rexnord Chem. Prods.	215-348-2147
RI	Lincoln, Special Elec. Co.	401-727-1136
WI	Milwaukee, Special Elec. Co.	414-383-6370

RFD, INC., 5024 Nassau St., Tampa, FL 33607, Tel: 813-872-1502, TWX: 810-876-9146; *Sls. Mgr.:* Thomas W. Facer

RFI CORPORATION, 100 E. Pine Aire Dr., Bay Shore, NY 11706, Tel: 516-231-6400, TWX: 510-227-6233; FSC No.: 13619;15733; Empl.: 250; *Sls. Mgr.:* Robert Fitzpatrick .... **A•1629**

Local Sales Offices & Reps

AL	Huntsville, Murcota Corp.	205-539-8476
AZ	Scottsdale, Williams-Assocs.	602-947-4297
CA	Monterey Park, M.W. Riedel Co.	213-283-7694
CA	Mountain View, Peninsula Tech. Sls.	415-965-3636
CO	Denver, Williams-Assocs.	303-373-4730
FL	St. Petersburg, Tech-Rep Assocs.	813-577-2779
IL	North Riverside, J. Popp Sls.	312-447-6124
IN	Ft. Wayne, Denton Mktg., Inc.	219-627-5515
IA	Davenport, Ensco-Rep	319-386-6600
KS	Overland Park, Ensco-Rep	913-381-7557
MD	Rockville, Mechtronics Sls.	301-340-2130
MO	St. Louis, Ensco-Rep	314-423-3935
NH	Hudson, EMC Sls., Inc.	603-880-3671
NJ	Cherry Hill, H.J. White Co.	609-428-4544
NM	Albuquerque, Williams-Assocs.	505-255-1638
NY	Great Neck, Trionic Assocs.	516-466-2300
NC	Winston-Salem, Murcota Corp.	919-722-9445
PA	McKean, Ecco Elctrn. Sls.	814-476-1376
TX	Garland, McBride Sci. Sls.	214-494-5000
WA	Seattle, Granville Gillette Assocs.	206-284-3344

RFL INDS., A Dowty Grp. Co./Comms. Div., Powerville Rd., Boonton, NJ 07005, Tel: 201-334-3100, TWX: 710-987-8352; FSC No.: 49673; Empl.: 300

RFL INDS., A Dowty Grp. Co./Instr. Div., Powerville Rd., Boonton, NJ 07005, Tel: 201-334-3100, TWX: 710-987-8352; FSC No.: 49673; Empl.: 300

RFL INDS., Thermocontrol Div., W. Prospect St., Box 250, Brandon, VT 05733, Tel: 802-247-6811, TWX: 710-987-8352; Empl.: 350; *Sls. Mgr.:* Bob Berman; *Dist. Mgr.:* Bob Berman

RF MONOLITHICS, INC., 4441 Sigma Rd., Dallas, TX 75234, Tel: 214-233-2903, TWX: 910-860-5474; Empl.: 90; *Sls. Mgr.:* William Spurgeon

RF POWER LABS, INC., 21820 87th S. E., Woodinville, WA 98072, Tel: 206-481-8833, Telex: 32-1042; FSC No.: 057143; Empl.: 17; *Sls. Mgr.:* Greg Cook

RHG ELECTRONICS LAB., INC., 161 E. Industry Ct., Deer Park, NY 11729, Tel: 516-242-1100, TWX: 510-227-6083; Empl.: 180; *Sls. Mgr.:* Martin D. Markson

RHINO SALES CORP., 620 Andrews Ave., P.O. Box 367, Kewanee, IL 61443, Tel: 309-853-4461

RHOMBUS INDS., 15801 Chemical Ln., Huntington Bch., CA 92649-1595, Tel: 714-898-0960, TWX: 910-596-1826; Empl.: 60 .... **A•1568-1573**

Local Sales Offices & Reps

CA	Irvine, J. V. Earley & Assocs.	714-833-1806
CA	Redwood City, James S. Heaton Co.	415-367-9000
CO	Parker, A-5 Co.	303-841-3651
FL	Coral Springs, MTS Assocs.	305-753-3830
MA	Malden, J. K. Assocs.	617-321-2922
NC	Cary, Engineering Dvcs.	919-469-9323
TX	Irving, Space Elctrns.	214-251-3636
PR	Caquas, Arami Camacho	809-743-0657

Local Distributors

AZ	Phoenix, A-5 Co.	602-943-3941
WA	Redmond, Compu-Rep	206-788-3005

RICHARD CALDWELL SOFTWARE, 1617 Whitton Ave., San Jose, CA 95116-2455, Tel: 408-251-3485

RICHARD HIRSCHMANN OF AMERICAN, See Hirschmann

RICHARD-LEE CO., Box 724, New Providence, NJ 07974, Tel: 201-276-0710; Empl.: 8

RICHARDS, ARKLAY S., CO., INC., 72 Winchester St., Newton Highlands, MA 02161-1793, Tel: 617-527-1512; *Sls. Mgr.:* L. K. Richards

RICHCO PLASTIC CO., 5825 N. Tripp Ave., Chicago, IL 60646, Tel: 312-539-4060, TWX: 910-221-1938; FSC No.: 06915; Empl.: 250; *Sls. Mgr.:* Craig Richardson; *Dist. Mgr.:* Ted Pavoris

RI/CONTROL SYSTEMS, Research, Inc., P.O. Box 24064, Minneapolis, MN 55424, Tel: 612-941-3300, Telex: 29-0502; Empl.: 260; *Sls. Mgr.:* Brian Callahan

RIDGE TOOL CO., Sub. Emerson Elec. Co., 400 Clark St., Elyria, OH 44036, Tel: 216-323-5581, Telex: 0243420

RIFA

RIFA, INC., Greenwich Off. Pk. 3, P.O. Box 3110, Greenwich, CT 06836-3110, Tel: 203-625-7300, Telex: 221976 ERIANUR .... **D•1810-1811**

Local Sales Offices & Reps

CA	Cupertino, Pacific Elctrns., Inc.	408-733-9920
FL	St. Petersburg, Tech-Rep Assocs., Inc.	813-577-2779
IL	Elk Grove Village, Carlson Elctrns. Sls.	312-956-8240
MD	Glen Burnie, Macrotech Assocs., Ltd.	301-437-5588
NV	Reno, Unitronics	702-825-1978
NH	Londonderry, Power Conversion Sys.	603-434-2370
NJ	Marlton, Naudain Assocs.	609-983-5300
NJ	Parlin, JMR Sls., Inc.	201-254-8484
NY	East Setauket, JMR Sls., Inc.	516-689-8871
TX	Austin, Tesco, Inc.	512-834-8374
TX	Garland, Tesco, Inc.	214-681-1376
WI	Milwaukee, Carlson Elctrns., Sls.	414-476-2790
Can	Calgary, Alb., Deskin Sls.	403-466-2106
Can	Edmonton, Alb., Deskin Sls.	403-466-2106
Can	Markham, Ont., Deskin Sls.	416-475-1412
Can	Montreal, Que., Deskin Sls.	514-331-2860
Can	Ottawa, Ont., Deskin Sls.	613-729-1099
Can	Vancouver, B.C., Deskin Sls.	604-273-4963
Can	Winnipeg, Man, Deskin Sls.	403-466-2106

Local Distributors

FL	St. Petersburg, Tech-Rep Assocs.	813-577-2779

RIL ELCTRNS., INC., 125 Titus Ave., P.O. Box H, Warrington, PA 18976, Tel: 215-EL5-1361; Empl.: 25

RING KING VISIBLES, INC., 2210 Second Ave., Muscatine, IA 52761, Tel: 319-263-8144, Telex: 468559; Empl.: 150; *Sls. Mgr.:* Dave White

RIPLEY, 46 Nooks Hill Rd., Cromwell, CT 06416, Tel: 203-635-2200, TWX: 710-428-9567; Empl.: 100; *Sls. Mgr.:* R. S. Clark

RISK, GEORGE, INDS., GRI Plaza, Kimball, NE 69145, Tel: 308-235-4645, TWX: 910-620-9040; FSC No.: 24229; Empl.: 100; *Sls. Mgr.:* J. Fisher; *Dist. Mgr.:* J. Fisher .... **B•1737**

Local Sales Offices & Reps

AZ	Tempe, Cleveland Entprs. of Ariz.	602-820-1127
CA	Anaheim, Galaxie Sales Int'l.	714-752-1580
CA	Escondido, Cirolia Elctrn. Sls.	619-743-3015
CA	San Carlos, Kafco	415-591-6758
FL	Tamarac, Davmik Sls.	305-920-2222
AL	Huntsville, Elctrn. Mfr. Agt.	205-830-4030
IL	Wheaton, Chadra-Schilke & Assoc.	312-653-8126
MA	Lexington, Jodan Tech.	617-862-2354
MN	St. Paul, Countryman Assocs.	612-645-9151
MO	Maryland Heights, Kebco	314-576-4111

Local Distributors

CA	Los Angeles, Electric Switches	213-660-1310
CA	Santa Ana, Advanced Computer Prods.	714-558-8813

RLC ELCTRNS., INC., 83 Radio Cir., Mt. Kisco, NY 10549, Tel: 914-241-1334, TWX: 710-571-2103; FSC No.: 12598; *Sls. Mgr.:* Philip H. Wright

RMF PRODS., INC., 1275 Paramount Pkwy., P.O. Box 520, Batavia, IL 60510, Tel: 312-879-0020; Empl.: 11; *Sls. Mgr.:* R. Frieders .... **C•1616**

RMS ELECTRONICS INC., 50 Antin Pl., Bronx, NY 10462, Tel: 212-892-6700; Empl.: 100; *Dist. Mgr.:* Seymour Goldberg

RMS TECHN., 706 Industry Dr., Hampton, VA 23661, Tel: 804-838-2458; Empl.: 7

ROANWELL, 180 Varick St., New York, NY 10014, Tel: 212-989-1090, TWX: 710-581-6555; FSC No.: 82872; Empl.: 200; *Sls. Mgr.:* C. Carl Hilsdorf; *Dist. Mgr.:* C. Carl Hilsdorf

RO
RO ASSOCIATES

RO ASSOCS., 246 Caspian Dr., Box 61419, Sunnyvale, CA 94088, Tel: 408-744-1450, TWX: 910-339-9304; FSC No.: 24230; Empl.: 90; *Sls. Mgr.:* R. D. Okada .... **D•1812-1814**

Local Sales Offices & Reps

AL	Huntsville, Lee Assocs.	205-533-5896
AZ	Phoenix, Sigma	602-241-1334
CA	Los Angeles, Amasco	213-516-8561
CA	San Francisco, Amasco	408-733-8690
CO	Denver, F.G. Mktg.	303-795-9176
DC	Washington, Gans & Pugh	703-527-3262
FL	Orlando, OEM Mktg.	305-299-1000
IL	Chicago, John Kennaugh & Assoc.	312-980-2570
KS	Shawnee Mission, Midtec	913-441-6565
MD	Baltimore, Gans & Pugh	703-527-3262
MA	Boston, Intersell	617-273-3844
MO	St. Louis, Midtec	314-837-5200
NM	Albuquerque, Fry-Gates, Inc.	505-262-1525
NY	Mt Vernon, Sonkin Assocs.	914-968-8282
NY	Utica, B. D. Hummel Co.	315-736-7821
OH	Centerville, Omega Sls., Inc.	513-434-5507
OK	Tulsa, Cunningham Comp. Corps.	918-492-0390
PA	Philadelphia, Gans & Pugh	703-527-3262
TX	Dallas, Cunningham Comps. Corp.	214-669-9706
TX	Houston, Cunningham Comps. Corp.	713-461-4197
WA	Seattle, Huntley Assocs.	206-353-1833

ROBBINS & MEYERS, INC., Motor & Control Sys. Div., Rte. 4, Bob McCormick Rd., Gallipolis, OH 45631, Tel: 614-446-9868, Telex: 241353 .... **B•1184**

ROBERT BOSCH CORP., See Bosch, Robert, Corp.

ROBINSON-HALPERN, One Apollo Rd., P.O. Box 248, Plymouth Meeting, PA 19462-0248, Tel: 215-825-9200, TWX: 510-660-8637; FSC No.: 12400; Empl.: 80; *Sls. Mgr.:* J. Lanza

ROBINSON-NUGENT, INC., 800 East 8th St., New Albany, IN 47150, Tel: 812-945-0211, TWX: 810-540-4082; Empl.: 567; *Sls. Mgr.:* Hap Taylor

ROBISON ELCTRNS., P.O. Box 8121, San Luis Obispo, CA 93403-8121, Tel: 805-544-8000; FSC No.: 19080; Empl.: 45

ROCHESTER INSTR. SYS., 255 N. Union St., Rochester, NY 14605, Tel: 716-263-7700, Telex: 978457; Empl.: 330

ROCKBESTOS CO., P.O. Box 1102, New Haven, CT 06504, Tel: 203-772-2250

ROCKLAND INSULATED WIRE & CABLE, 87 Broadway, Haverstraw, NY 10927, Tel: 914-429-3103; FSC No.: 12111

ROCKLAND SYS. CORP., See Wavetek Rockland Scientific, Inc.

ROCKWELL FILTER PRODS., 2990 Airway Ave., Costa Mesa, CA 92626, Tel: 714-641-5311, Telex: 685532; Empl.: 100; *Sls. Mgr.:* Lee Cornett

ROCKWELL INT'L., 4311 Jamboree Rd., Newport Beach, CA 92660, Tel: 800-854-8099, TWX: 910-591-1654; FSC No.: 34576; Empl.: 1995; *Sls. Mgr.:* K. MacDonald; *Dist. Mgr.:* K. Foster

ROCKWELL INTL., Commercial Elctrns. Opers., 1200 N. Alma Rd., Richardson, TX 75081, Tel: 214-996-5000, Telex: 73-307, 73-2490, TWX: 910-867-4709; Empl.: 15,000

RODALE ELCTRNS. CORP., 603 Chestnut St., Garden City, NY 11530, Tel: 516-222-0050, TWX: 510-222-0274; *Sls. Mgr.:* John B. Clement

RODELCO ELCTRNS. CORP., 356A Comac Rd., Deer Park, NY 11729, Tel: 516-643-5110; Empl.: 28

ROD-L ELECTRONICS, INC., 1098 Hamilton Ct., Menlo Park, CA 94025, Tel: 415-322-0711, TWX: 296210 .... **D•1296-1301**

Local Sales Offices & Reps

AL	Huntsville, Sci. Svcs. SE	205-536-1969
AZ	Phoenix, Venturesearch	602-894-5216
CA	Carson, Amasco	213-516-8561
CA	Sunnyvale, Amasco	408-733-8690
CO	Conifer, Energy Equip. Sls.	303-674-8111
FL	Orlando, Sci. Dvcs. SE	305-841-8180
IL	Elk Grove, Loren Green Assocs.	312-593-0282
IN	Indianapolis, Loren Green Assocs.	317-293-9827
MD	Baltimore, Sci. Reps.	301-321-1411
MA	Reading, Scheinfein Assocs.	617-944-2304
MN	Minneapolis, Instrmn. Svcs., Inc.	612-544-8916
MO	Florissant, Web Elctrns.	314-921-5720
MO	Kansas City, Paloma Sls. Co.	816-358-7272
NJ	Fairfield, Addem Sls.	201-882-0993
NJ	Pennsauken, Sci. Reps.	609-662-5222
NY	De Witt, DB Assocs.	315-446-0220
NC	Winston-Salem, Sci. Dvcs.	919-765-5776
OH	Centerville, Micro Sls.	513-433-8171
OR	Portland, Control Tek Sls., Ltd.	503-641-8180
TX	El Paso, Venturesearch	915-594-4094
TX	Houston, Spectra Sls.	713-747-2798
TX	Richardson, Spectra Sls.	214-234-3600
VA	Fairfax, Sci. Reps.	703-385-0600
WA	Spokane, Control Tek Sls., Ltd.	509-922-2971

ROEAN INDUSTRIES, INC., 12970 Branford, Ste. C, Pacoima, CA 91331, Tel: 818-767-7047, Telex: 758630 TGMC; Empl.: 8

ROEDERSTEIN ELCTRNS., INC., P.O. Box 5588, Statesville, NC 28677, Tel: 704-872-8101, Telex: 240802, TWX: 301-240802; *Sls. Mgr.:* Frank Acuff

Local Sales Offices & Reps

AL	Hunstville, CSR Elctrns.	205-533-2444
AZ	Tempe, Dowling Tech. Grp.	602-893-7555
CA	PAlo Alto, Abbott Engrg. Co., Inc.	415-968-2265
CA	Sunnyvale, REI	408-866-7950
CA	West Covina, Component Svc., Inc.	213-960-4761
CO	Aurora, Sage Sls., Inc.	303-750-3501
CT	North Haven, Kitchen & Kutchin, Inc.	203-239-0212
FL	Coral Springs, E. P. M. Corp.	305-755-5387
FL	Orlando, E. P. M. Corp.	305-425-6149
GA	Atlanta, CSR Elctrns.	404-396-3720
IL	Rosemont, STC	312-671-4208
IN	Bloomington, John Hershman	812-339-9563
IN	Ft. Wayne, J & B Engrg.	219-483-2813
KS	Kansas City, Delltron	816-436-6445
MA	Burlington, Kitchen & Kutchin	617-229-2660
MA	Lincoln, Kitchen & Kutchin	615-259-9017
MO	St. Louis, Delltron	314-869-4779
NJ	Leonia, Peter E. Schmitt Co., Inc.	201-944-2806
NY	Cazenovia, ST/Woolard	315-655-8145
NC	Raleigh, CSR Elctrns.	919-878-9200
PA	Feasterville, Knowles Assocs.	215-322-7100
TX	Austin, Semco	512-837-0893
UT	Salt Lake City, Sage Sls., Inc.	801-467-5451
VA	Lynchburg, ST/Woolard	804-528-5421
WA	Kirkland, Manon Engrg.	206-827-7449
Can	Concord, Ont., Votron Elctrns., Inc.	416-669-9870

ROGAN, 3455 Woodhead Dr., Northbrook, IL 60062, Tel: 312-498-2300, TWX: 910-686-0008; Empl.: 100; *Sls. Mgr.:* D. Pelletier; *Dist. Mgr.:* D. Pelletier

ROGERS CORP., Bus Products Division, 5750 East McKellips Rd., Mesa, AZ 85205, Tel: 602-830-3370

ROGERS CORP., Box 700, Chandler, AZ 85224, Tel: 602-963-4584, TWX: 910-950-1961; Empl.: 400; *Sls. Mgr.:* Paul Anderson

ROGERS CORP., One Technology Dr., Rogers, CT 06263, Tel: 203-774-9605, TWX: 710-448-0047; Empl.: 2500; *Sls. Mgr.:* Paul L. Anderson .... **C•1715**

Local Sales Offices & Reps

AL	Huntsville, G. S. Jordan	205-881-7971
AZ	Scottsdale, H.R. Crowder	602-991-8908
AZ	Tempe, M. F. Iosue	602-839-5478
CA	Carlsbad, D. Bergheimer	619-434-1297
CA	Corona, R. A. Forester	714-734-5881
CA	Palo Alto, R. A. Greenman	408-947-7797
CA	Poway, A. W. Riel	619-487-1065
CA	Poway, A.W. Riel	619-487-1065
CA	San Jose, R.H. Jackson	408-947-7797
CA	San Jose, W. J. Stolp	408-947-7797
CT	Bristol, J. F. Witkewicz	203-583-4341
CT	Norwich, G. R. Jessel	203-376-0276
FL	Melbourne Beach, P. R. Pratt	305-725-6105
IL	Hazel Crest, J. R. Menees	312-798-5800
KY	Louisville, G. P. Harris	502-224-9163
MI	Livonia, J. M. Allan	313-427-8228
MN	Northfield, W. P. Kelly	507-663-1050
NH	Londonderry, W. J. Coyne	603-434-5358
NJ	Pitman, R. M. Neidig	609-582-1666
NJ	Springfield, S. D. Wellen	201-944-7777
NY	Poughkeepsie, V. H. Potter	914-485-6763
NY	Rochester, R. C. Bangs	716-454-6520
OH	Shaker Hgts., E. R. Perme	216-283-5486
OH	Xenia, J. L. Forte	513-426-8993
PA	Hermitage, H. A. Harriman	412-983-3742
PA	Holtwood, T. G. Sleasman	717-284-4328
SC	Rock Hill, E. E. Wild	803-366-2952
TX	Round Rock, B.D. Duke	512-244-3074
VA	Lynchburg, L.J. Rodrigue	804-384-9517
VA	Roanoke, J. L. Settles	703-774-8478
WA	Seattle, L. B. Keen	206-575-4175

R-OHM (EASTERN OPER.), 2303 W. Meadowview Rd. #3, Kingston Bldg., Greensboro, NC 27407, Tel: 919-855-0217

ROHM CORP., 8 Whatney, Irvine, CA 92718, Tel: 714-855-2131, TWX: 910-595-1721; Empl.: 125; *Sls. Mgr.:* Mike Hammel

ROLM MIL-SPEC COMPUTERS, Rolm Corp., 1 River Oaks Pl., San Jose, CA 95134, Tel: 408-942-8000, TWX: 910-338-0247; FSC No.: 14345; Empl.: 1000; *Sls. Mgr.:* Peter Cicata; *Dist. Mgr.:* Peter Cicata

ROLM CORP., 4900 Old Ironsides Dr., M/S 626, Santa Clara, CA 95054, Tel: 408-986-1000; Empl.: 10,000

ROLYN OPTICS CO., 738 Arrowgrand Cir., Covina, CA 91722-2199, Tel: 818-915-5707/5717, Telex: 67-0380

ROME CABLE CORP., P.O. Box 71, Rome, NY 13440, Tel: 315-337-3000

RONOR SYSTEMS, 145 N. Plains Ind. Pk. Rd., Wallingford, CT 06492, Tel: 203-265-2110; Empl.: 12

RONTRON ENGINEERING, 25 Rose St., Branford, CT 06405, Tel: 203-488-5020

ROSE

ROSE ENCLOSURES SYS., INC., 12140 Parklawn Dr., Rockville, MD 20852, Tel: 301-984-1783, Telex: 908-107 Resi Rove; *Sls. Mgr.:* Paul Bruhn .... **C•1078-1079**

ROSEMONT-NASHVILLE, INC., See Chromalox Instrs. & Controls

ROSEN GRANDON ASSOCIATES INC., 7807 Whittier St., Tampa, FL 33617, Tel: 813-985-4911; Empl.: 1; *Sls. Mgr.:* Jane R. Rosen-Grandon

ROSS ENGRG. CORP., 540 Westchester Dr., Campbell, CA 95008, Tel: 408-377-4621, Telex: 858840, TWX: 910-590-8033; FSC No.: 23598; Empl.: 45; *Sls. Mgr.:* Hugh C. Ross .... **B•1443**

ROSTONE CORP., P.O. Box 7497, Lafayette, IN 47903, Tel: 317-474-2421, TWX: 810-342-1887; Empl.: 500

Local Sales Offices & Reps

FL	Fern Park, Blair Engrg., Inc.	305-834-1244
MA	Framingham, Petri-Jones, Inc.	617-877-4233
NY	Canandaigua, Brandon Assocs., Inc.	716-394-6080
NY	Liverpool, Brandon Assocs., Inc.	315-652-3954
NC	Greenboro, Blair Engrg., Inc.	919-292-8200
OK	Tulsa, Blair Engrg., Inc.	918-622-3100
PA	Norristown, Brandon Assocs., Inc.	215-278-0500
TX	Austin, Blair Engrg., Inc.	512-458-3107
TX	Dallas, Blair Engrg., Inc.	214-241-5655
TX	Houston, Blair Engrg., Inc.	713-973-8800

ROTEK INSTR. CORP., 390 Main St., Waltham, MA 02254, Tel: 617-899-4611; *Sls. Mgr.:* Eliot Warner

ROTRON, INC., See EG & G Rotron

ROWE INDUSTRIES, INC., 6225 Benore Rd., P.O. Box 6877, Toledo, OH 43612, Tel: 419-729-9761, TWX: 810-442-1734; FSC No.: 82878; Empl.: 89; *Sls. Mgr.:* D. L. Mang; *Dist. Mgr.:* D. L. Mang .... **C•1502-1504, 1895**

Local Sales Offices & Reps

AZ	Chandler, Blackhart Assocs.	602-831-2566
CA	San Jose, V. C. Robinson	415-969-4831
FL	Fern Park, EIR, Inc.	305-830-9600
KS	Leawood, Thunderbird	913-642-7220
KS	Wichita, Thunderbird	316-684-3941
MD	Baltimore, R. A. Wafer Assocs.	301-744-1133
MA	Burlington, Don C. Richard	617-272-1595
MA	Lowell, Underwood Sls.	617-256-8191
MI	Holland, Com-Tek Sls.	616-399-5719
MN	Hopkins, KITS Co.	612-933-1888
MO	Maryland, Thunderbird	314-567-6488
NM	Albuquerque, Ron-tek	505-299-4124
NC	Winston-Salem, Dula Assocs.	919-768-7166
OH	Beachwood, RC Assocs.	216-292-4954
OH	Cuyahoga Falls, Lee Tronics	216-928-8584

RTE AEROVOX INC., 740 Belleville Ave., New Bedford, MA 02745, Tel: 617-994-9661, TWX: 710-344-6985; FSC No.: 4K459; Empl.: 700; *Sls. Mgr.:* Jack Chmura; *Dist. Mgr.:* Matthew Simon

RTE DELTEC CORP., 2727 Kurtz St., San Diego, CA 92110, Tel: 619-291-4211, 800-854-2658, TWX: 910-335-1246; FSC No.: 52297; Empl.: 200 .... **D•1959**

Local Sales Offices & Reps

AL	Huntsville, FM Assocs., Ltd.	205-882-0689
AK	Soldotna, Air Tek	907-262-5937
AZ	Scottsdale, Barnhill Assocs.	602-947-7841
CA	Los Altos, Jay Stone & Assocs.	415-948-4563
CA	Vista, Failsafe Power Corp.	619-726-0980
CO	Englewood, Barnhill Assocs.	303-779-3600
CT	Avon, Power Mark	203-678-0123
FL	Jupiter, FM Assocs., Ltd.	305-746-2996
FL	Orlando, FM Assocs., Ltd.	305-851-5710
GA	Atlanta, FM Assocs., Ltd.	404-446-0033
HI	Honolulu, Hawaiian Inds. Instru. Sls. Corp.	808-533-4232
IL	Arlington Heights, Dytec/Central, Inc.	312-394-3380
IN	Indianapolis, Dytec/Central, Inc.	317-247-1316
IA	W. Des Moines, Data Power Technlg. Corp.	515-223-5605
KS	Lenexa, Engineered Equip. Co.	913-492-9221
MI	Madison Heights, WKM Assocs., Inc.	313-588-2300
MN	Golden Valley, JR Assocs.	612-546-4110
MO	St. Louis, Applied Power Sys.	314-383-5858
NE	Omaha, Data Power Tech. Corp.	402-592-7860
NJ	Lodi, SDM Reps.	201-368-0125
NJ	Pennsauken, Scientific Reps.	609-662-5222
NM	Albuquerque, Barnhill Assocs.	505-299-7658
NY	Rochester, SDM Reps.	716-247-8770
NC	Ramseur, FM Assocs., Ltd.	919-824-2196
OH	Dayton, WKM Assocs., Inc.	513-434-7500
OH	Independence, WKM Assocs., Inc.	216-524-5930
PA	Pittsburgh, WKM Assocs., Inc.	412-892-2953
TX	Austin, Barnhill Assocs.	512-451-0217
TX	Houston, Barnhill Assocs.	713-688-9971
TX	Richardson, Barnhill Assocs.	214-231-2573
UT	Murray, Barnhill Assocs.	801-262-3000
VA	Fairfax, Scientific Assocs., Inc.	703-385-0600
WA	Seattle, F/M Sales Co.	206-628-9620
EXP	CA, San Diego, RTE Deltec Corp.	619-291-4211

RTE POWER/MATE

RTE, Power/Mate Co., 514 S. River St., Hackensack, NJ 07601, Tel: 201-440-3100, TWX: 710-990-5023; Empl.: 375; *Sls. Mgr.:* Robert E. Allison .... **D•1816-1827**

Local Sales Offices & Reps

AL	Huntsville, Montgomery Mktg.	205-830-0498
AZ	Scottsdale, Luscombe Engrg. Co.	602-949-9333
CA	Campbell, Luscombe Engrg. Co.	408-370-2020
CA	Pasadena, Luscombe Engrg. Co.	213-684-2000
CA	Pasadena, Reaction Comps.	213-648-2000
CA	San Diego, Luscombe Engrg. Co.	619-295-4300
CO	Englewood, Delta Sls.	303-799-0646
FL	Winter Park, EMA, South	305-671-6800
GA	Norcross, Montgomery Mktg.	404-447-6124
IL	Chicago, Data Elctrns. Co.	312-283-0300
IN	Indianapolis, Data Elctrns. Co.	317-359-5368
KS	Overland Pk., Electri-Rep	913-649-2168
MD	Rockville, Marktron	301-251-8990
MA	N. Chelmsford, Power Assocs.	617-251-7756
MI	Southfield, Infinity, Inc.	313-557-7230

MN	Plymouth, Data Elctrns.	612-559-1434
MS	Jackson, Welch & Doby, Inc.	601-932-5534
MO	St. Louis, Electri-Rep	314-878-8209
NJ	Lodi, TRC Elctrns.	201-779-8282
NY	Buffalo, R. W. Mitscher Co., Inc.	716-633-7970
NC	Cary, Montgomery Mktg.	919-467-6319
OH	Aurora, EMA, Inc.	216-562-6104
OH	Centerville, EMA, Inc.	513-433-2800
OR	Beaverton, Luscombe Engrg./NW	503-636-6664
PA	Willow Grove, QED Elctrns.	215-657-5600
TX	Austin, Beacon Elctrns. Assocs.	512-331-5115
TX	Dallas, Beacon Elctrns. Assocs.	214-437-1505
UT	Salt Lake City, Delta Sls. Assocs.	801-487-7571
EXP	NY, Greast Neck, Auriema, Inc.	516-487-0700
Can	Rexdale, Ont., Source Elctrns., Ltd.	416-675-6235

Local Distributors

AZ	Scottsdale, Galtec	602-949-9765
CA	Campbell, Sierra Comps.	408-370-2242
CA	Pasadena, Reaction Comps.	213-648-2000
CO	Englewood, Deltex	303-799-1088
IL	Chicago, Dalec	312-283-0300
MA	North Chelmsford, Power Assocs.	617-251-7756
NJ	Lodi, TRC Elctrns.	201-779-8282
NC	Cary, Distall Sls.	919-467-2902
OH	Centerville, IPD	513-435-2086
OR	Lake Oswego, Cesco Distrs.	503-636-6664
PA	Willow Grove, QED Elctrns. of PA	215-657-5600
TX	Dallas, CDI	214-644-0373

RTRON CORP., 7324 Lawndale, Skokie, IL 60076, Tel: 312-679-7180, TWX: 910-223-0810; FSC No.: 19130; *Sls. Mgr.:* R. McLean

RTS Systems INC

RTS SYSTEMS, INC., Compact Video, Inc., 1100 W. Chestnut St., Burbank, CA 91506, Tel: 818-840-7119, Telex: 194855, TWX: 910-498-4987; Empl.: 75; *Sls. Mgr.:* Shelley Brown **D•1055**

Local Sales Offices & Reps

AL	Birmingham, Gray Comms. Conslt.	205-942-2824
AL	Birmingham, Sonics Assocs.	205-942-9631
AL	Cropwell, Broadcast Sys.	205-525-5467
AL	Huntsville, Central Dynamics Corp.	205-837-5180
AL	Mobile, Gray Comms. Conslt.	205-343-0662
AK	Anchorage, N V S Sys.	907-349-3523
AZ	Cottonwood, R I A Corp.	602-634-8065
AZ	Phoenix, Siboney Communications Inc. (SCI)	602-252-5992
AZ	Tucson, SCI	602-881-5432
CA	Berkeley, Curtis M. Karplus, Esq.	415-642-1942
CA	Burbank, H N E Inc.	213-508-7543
CA	Burbank, Tri Tronics	213-843-2170
CA	El Monte, Cetec Vega	213-442-0782
CA	Encino, Everything Audio	213-995-4175
CA	Glendale, Paramount Sound Sys. Corp.	213-956-3222
CA	Inglewood, Audio Visual Hdqtrs. Corp.	213-419-4040
CA	Lawndale, Omega Video	213-679-9021
CA	Long Beach, K T Elctrns.	213-424-0979
CA	Los Angeles, Acromedia Corp.	213-410-4141
CA	Los Angeles, Hollywood Sound Sys.	213-466-2416
CA	Los Angeles, Shoreline Ltd.	213-851-1236
CA	Los Angeles, Skaggs Video Los Angeles	213-556-2133
CA	Los Angeles, Tourkow & Co.	213-664-8884
CA	N. Hollywood, Audio Svcs. Corp.	213-980-9891
CA	N. Hollywood, Best Audio	213-763-2378
CA	N. Hollywood, Doc Siegel Audio	213-877-2300
CA	N. Hollywood, Theatre Vision	213-769-0928
CA	Newbury Park, Westlake Audio	213-655-0303
CA	Nipomo, Broadcast Sys.	805-929-4476
CA	Pasadena, Audio Engrg. Assocs.	213-798-9127
CA	San Diego, Centro Corp.	619-560-1578
CA	San Diego, Skaggs Video San Diego	619-578-9640
CA	San Diego, SCI	714-578-7777
CA	Santa Clara, Video Comms. Corp.	408-988-2968
CA	Sun Valley, Burns Audio	213-768-1701
CA	Sunnyvale, Video Media	408-733-6500
CA	Walnut, Video Comms. Corp.	714-594-2442
CO	Denver, Film/Video Equip. Svc.	303-778-8616
CO	Englewood, Skaggs Video Denver	303-740-9031
CT	Shelton, Anton Bauer	203-929-1100
FL	Gainesville, Gray Comms. Conslt.	904-376-2435
FL	Miami, Gray Comms. Conslt.	305-591-3637
FL	Miami, Hubbard Comms.	305-594-0744
FL	Miami, Midwest Corp.	305-592-5355
FL	Orlando, Gray Comms. Conslt.	305-896-7414
FL	St. Petersburg, Hubbard Comms.	813-577-7759
FL	Tampa, Gray Comms. Conslt.	813-885-1411
FL	Tampa, SCI	813-985-4687
GA	Albany, Gray Comms. Conslt.	912-883-2121
GA	Doraville/Atlanta, Gray Comms. Conslt.	404-455-3121
GA	Norcross, SCI	404-441-3300
GA	Norcross/Atlanta, Tech. Video Sys.	404-447-6621
GA	Union City/Atlanta, Allied Broadcast Equip.	404-964-1464
IL	Chicago, Allied Broadcast Equip.	312-794-0224
IL	Elk Grove Vlg., Swiderski Elctrns.	312-364-1900
IL	Harvey, Bridgewater Custom Sound	312-596-0309
IL	Morton Grove, Roscor Corp.	312-539-7700
IL	Quincy, Harris Corp.	217-222-8200
IN	Evansville, Kavco	812-476-6327
IN	Indianapolis, Kavco	317-251-0800
IN	Indianapolis, Midwest Corp.	317-251-5750
IN	Indianapolis, R C A Corp.	317-273-3547
IN	Richmond, Allied Broadcast Equip.	317-962-8596
IA	Davenport, Video Midwest	319-322-1525
IA	Des Moines, Video Midwest	515-244-1447
KY	Edgewood, Midwest Corp.	800-543-1584
KY	Lexington, Midwest Corp.	606-277-4994
KY	Louisville, Midwest Corp.	502-491-2888
LA	Harahan/New Orleans, Gray Comms. Conslt.	504-733-7265
MD	Bethesda, Professional Prods.	301-657-2141
MD	Lanham, Midwest Corp.	301-577-4903
MD	Rockville, Peirce Phelps Inc.	301-984-7979
MA	Boston, Professional Recording & Sound	617-254-2110
MA	Framingham, Landy Assocs.	617-877-9570
MA	Needham Hgts., Capron Lighting & Sound Co.	617-444-8850
MA	Newton, Lake Sys. Corp.	617-244-6881
MI	Ann Arbor, Hy James Audio Professionals	313-994-0934
MI	Oak Park, Midwest Corp.	313-399-6361
MI	Troy/Detroit, Midwest Corp.	313-689-9730
MN	Minneapolis, Todd Comms.	612-941-0556
MN	Minneapolis, Video Midwest	612-831-2248
MS	Bay St. Louis, Harris Corp. S. Central Reg.	601-255-3337
MO	Chesterfield, Television Engrg. Corp.	314-532-4700
MO	El Dorado Springs, Broadcast Sys.	417-876-6254
MO	St. Louis, Antech Labs	314-997-5666
NE	Omaha, Todd Comms.	402-341-7600
NV	Las Vegas, Acromedia Corp. Las Vegas	702-362-7552
NV	Las Vegas, Western Media Entprs.	702-873-2014
NJ	Atlantic City, Telemeasurements	609-345-2670
NJ	Cherry Hill, Landy Assocs.	609-424-4660
NJ	Clifton, Telemeasurements	201-473-8822
NJ	Mahwah, Philips Television Sys.	201-529-1550
NJ	Mountain Lakes, Turner Engrg.	201-263-0023
NJ	Northvale, A F Assocs.	201-767-1000
NM	Albuquerque, SCI	505-884-6858
NM	Los Lunas, Dyma Engrg.	505-865-6700
NY	New York, Adcom Comms.	212-265-1760
NY	New York, Camera Mart	212-757-6977
NY	New York, M P C S Video Inds.	212-586-3690
NY	New York, Martin Audio/Video Corp.	212-541-5900
NY	New York, Tech. Video Sys.	212-580-3104
NY	New York, Westec Audio Video	212-586-1662
NC	Charlotte, Midwest Corp.	704-399-6336
NC	Charlotte, Reliable Music	704-375-8662
NC	Raleigh, Southeastern Sight & Sound	919-828-2311
NC	RTP, Broadcast Sys.	919-851-1956
NC	Winston-Salem, Tech. Video Sys.	919-748-0916
OH	Cleveland, Midwest Corp.	216-447-9745
OH	Columbus, Kavco	614-274-0180
OH	Columbus, Midwest Corp.	614-476-2800
OH	Dayton, Kavco	513-898-2003
OH	Dayton, Midwest Corp.	513-275-3339
OH	N. Royalton, Kavco	216-237-1950
OH	Parma Hgts., Reddish Sound	216-885-1222
OK	Claremore, R I A Corp.	918-341-9066
OK	Tulsa, M Z B & Assocs.	918-743-2661
OR	Portland, Baldwin Mktg. Co.	503-234-1359
PA	Allentown, Daveland Co.	215-439-8701
PA	Carnegie, Alpha Video & Elctrns.	412-923-2070
PA	Gibsonia, Midwest Corp.	412-443-6720
PA	King of Prussia, Maris Equip. Corp.	215-275-9300
PA	Philadelphia, Lerro Elctrl. Corp.	215-223-8200
PA	Philadelphia, Peirce Phelps Inc.	215-879-7205
PA	Pittsburgh, R P C Elctrns.	412-782-3770
TN	Knoxville, Gray Comms. Conslt.	615-523-3107
TN	Nashville, Consolidated Media Sys.	615-244-3933
TN	Nashville, Gray Comms. Conslt.	615-883-9175
TX	Amarillo, Magnetic Media Corp.	806-358-2468
TX	Arlington, Midcom	817-640-4573
TX	Austin, Broadcast Sys.	512-836-6014
TX	Austin, M Z B & Assocs.	512-837-7240
TX	Austin, Magnetic Media Corp.	512-451-0138
TX	Austin, SCI	512-454-7194
TX	Corpus Christi, SCI	512-883-6688
TX	Dallas, M Z B & Assocs.	214-233-5535
TX	Dallas, Magnetic Media Corp.	214-931-0404
TX	Dallas, Video Sys.	214-349-0951
TX	El Paso, SCI	915-598-8538
TX	Houston, L D Systems	713-695-9400
TX	Houston, M Z B & Assocs.	713-448-0881
TX	Houston, Magnetic Media Corp.	713-771-9125
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TX	Houston, Video Sys.	713-686-9651
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TX	Lubbock, Video Sys.	806-792-2325
TX	Madison, SCI	615-865-1980
TX	Plano, Allied Broadcast Equip.	214-423-8667
TX	Plano, Broadcast Sys.	214-867-8775
TX	San Antonio, Video Sys.	512-824-2311
UT	Salt Lake City, R I A Corp.	801-486-8822
UT	Salt Lake City, Skaggs Telecom Svc.	801-539-1420
UT	Salt Lake City, Skaggs Video Sls.	801-539-1420
VA	Richmond, Professional Prods.	804-794-2585
VA	Virginia Beach, Midwest Corp.	804-464-6256
VA	Woodbridge, Broadcast Sys.	703-494-4998
WA	Federal Way, Allied Broadcast Equip.	206-927-4337
WV	Charleston, Midwest Corp. Corporate H/Q	304-343-8874
WV	Nitro/Charleston, Midwest Corp.	304-722-2921

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RUSSELL INDS., 3000 Lawson Blvd., Oceanside, NY 11572, Tel: 516-536-5000; Empl.: 20; *Sls. Mgr.:* H. Russell

RUTHERFORD RESCH. PRODS., Box 249, Rutherford, NJ 07070, Tel: 201-933-2091; Empl.: 4; *Sls. Mgr.:* Dr. A. Blanck; *Dist. Mgr.:* Dr. A. Blanck

RVS ELECTRONICS, INC., 40 North St., Middletown, NY 10940, Tel: 914-342-3199, Telex: 820778; Empl.: 15

Local Sales Offices & Reps

CA	San Diego, Mesa Engrg. (Rep)	619-268-3500
NY	Middletown, RVS Elctrns., Inc.	914-342-3199

Local Distributors

AZ	Phoenix, Jensen Tools	602-968-6241
MA	Bedford, Continental Resources	617-275-0850
NJ	Northvale, Glasgal Comms.	201-768-8082
NY	Pleasantville, Electronic Tool	914-769-8070
PA	Blue Bell, W.J. Wisely Assocs.	215-275-0658

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SABRITEC, 16631 Noyes Ave., Irvine, CA 92714, Tel: 714-549-7350, Telex: 678401; *Sls. Mgr.:* M. J. Bennett

SAFEWAY PRODUCTS, 440 Middlefield St., Middletown, CT 06457, Tel: 203-346-6601, TWX: 710-428-7225; Empl.: 241

SAFT AMERICA INC., Box 1886, Valdosta, GA 31601, Tel: 912-247-2331, Telex: 547620, TWX: 810-786-5866

SAFT AMERICA INC., Advanced Battery Sys. Div., 107 Beaver Ct., Cockeysville, MD 21030, Tel: 301-666-3200

SAFT AMERICA, INC., Elctrns. Sys. Div., 2414 W. 14th St., Tempe, AZ 85281, Tel: 602-894-6864

SAFT AMERICA, INC., Portable Battery Division, 711 Industrial Blvd., Valdosta, GA 31601, Tel: 912-247-2331, Telex: 547-620; Empl.: 1300; *Sls. Mgr.:* R. Bartmes **D•1412, 1432-1437**

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CA	San Francisco	415-462-6868
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IL	Chicago	815-455-5344
MA	Quincy	617-773-7980
MN	Minneapolis	612-770-0082
NY	New York City	516-249-3777
NC	Winston-Salem	919-765-6690
OH	Columbus	216-861-1877

PA	Philadelphia	215-831-9520
TX	Dallas	214-436-0757
VT	Rutland	802-773-8748

Local Distributors

AZ	Scottsdale, Electro Mktg.	602-991-0110
CA	Chatsworth, Mill Comm. Distrs., Inc.	818-998-3111
CA	Mountain View, Energy Sls.	415-969-0800
CO	Englewood, Industrial Elctrns.	303-694-9444
FL	Hialeah, Pro Battery	305-944-8800
MA	Billerica, A. W. Mayer Co., Inc.	800-225-6600
MI	Livonia, R. S. Elctrns.	313-525-1155
MN	Minneapolis, D. C. Battery Prods. Inc,	612-721-8547
MO	Maryland Heights, Ensco Distrb. Corp.	314-423-3992
NJ	Clifton, Engineered Assemblies, Inc.	201-340-0600
NY	Deer Park, TWR Tech., Inc.	516-242-4800
NC	Winston-Salem, Kirkman Elctrns.	800-334-8688, 800-672-0109
PA	Bensalem, Avex Elctrns. Corp.	800-345-1295
PA	Philadelphia, Shap Elctrns.	800-523-5248
TN	Mt. Juliet, Batteries Unlimited	617-754-8179
TX	Austin, Kent Elctrns.	512-478-8989
TX	Houston, Kent Elctrns.	713-780-7770
TX	Richardson, Kent Elctrns.	214-669-2600
TX	San Antonio, Kent Elctrns.	512-534-4848
UT	Salt Lake City, Standard Supp. Co.	800-453-7036
VA	Falls Church, Perrott Engrg. Labs, Inc.	703-532-0700
WA	Redmond, Energy Sls.	206-883-2343

SAGE LABORATORIES, INC., 3 Huron Dr.; Natick, MA 01778, Tel: 617-653-0844, TWX: 710-346-0390; FSC No.: 07180; *Sls. Mgr.:* Tony Cieri

SAI TECHNLG. CO., Science Applications Inc., 4060 Sorrento Valley Blvd., San Diego, CA 92121, Tel: 619-452-9150, TWX: 756769; FSC No.: 54779; Empl.: 300

SAMARIUS, INC., 300 Seymour Ave., P.O. Box 377, Derby, CT 06418, Tel: 203-735-7405, TWX: 710-451-2495; FSC No.: 18065; Empl.: 90 **A•2035**

SAMTEC, 810 Progress Blvd., P.O. Box 1147, New Albany, IN 47150, Tel: 812-944-6733, TWX: 810-540-4095; FSC No.: 55322; Empl.: 50; *Sls. Mgr.:* B. Shine; *Dist. Mgr.:* C. Roll

S & EI MFG., Box 832, Northridge, CA 91324, Tel: 818-349-4111, TWX: 910-493-1252; FSC No.: 24152; Empl.: 85

SANDERS ASSOCS., INC., DEFENSE, 95 Canal St., Nashua, NH 03061, Tel: 603-885-3833

SANDERS ASSOCS., INC., Electromagnetic, EMC Dept., 95 Canal St., Nashua, NH 03061, Tel: 603-885-3602; *Sls. Mgr.:* (EMC) R. Despathy

Local Sales Offices & Reps

MA	Scituate, New Eng. Area Reps.	617-545-6327
NJ	Princeton, Murtronic Assocs.	609-394-3737
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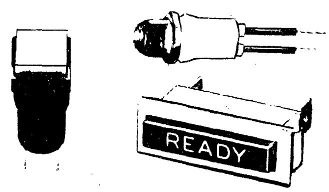

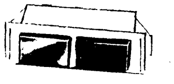

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S & H INDS., 119 Glen Cove Dr., Glen Head, NY 11545, Tel: 516-671-5600; Empl.: 50; *Sls. Mgr.:* R. Smith .... **D•1829, 1984**

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Local Sales Offices &,Reps

AZ	Scottsdale, Ray Morton & Assocs.	502-947-1514
CA	Irvine, Earley & Assocs.	714-833-1806
CA	Mountain View, Westmark Assocs.	415-969-1700
CA	San Diego, CK Assocs.	619-279-0420
CO	Denver, Quorum 3 Sls. Grp.	303-696-8480
FL	Clearwater Beach, Perrott Assocs., Inc.	813-443-5214,813-443-5414
FL	Orlando, Perrott Assocs., Inc.	305-298-7748
FL	Sunrise, Perrott Assocs., Inc.	305-792-2211
GA	Norcross, Mountain Electro Prods., Inc.	404-448-5594
IL	Rolling Meadows, Sumer, Inc.	312-991-8500
IA	Marion, MSB Assocs., Inc.	319-377-6261
KS	Shawnee Mission, MSB Assocs., Inc.	913-432-2131
MA	Westwood, Mass Tech Sls.	617-329-8820
MI	Warren, DEM Elctrn. Sls.	313-575-9444
MN	Minneapolis, Components Grp. Corp.	612-374-1250
MO	St. Charles, MSB Assocs., Inc.	314-946-5577
NJ	Leonia, Peter E. Schmitt Co., Inc.	201-944-2806
NY	Albany, Reagan Compar, Inc.	518-489-4777
NY	Cazenovia, S. T. Woolard, Inc.	315-655-8145
NY	Endwell, Reagan Compar, Inc.	607-723-8743
OH	Rocky River, John Hill	216-331-5222
OR	Beaverton, LD Elctrns.	503-649-8556,503-649-6177
PA	Springhouse, P. W. C.	215-643-2550
TX	Austin, Delta Comps.	512-458-4288
TX	Seagoville, Delta Comps.	214-287-6333
UT	Salt Lake City, Quorum 3 Sls. Grp.	801-943-9227
VA	Fairfax, Beacon North	703-591-1300
VA	Forest, Beacon North	804-239-8486
WA	Snohomish, LD Elctrns.	206-568-0511
WA	Spokane, LD Elctrns.	509-922-4883
WI	Brookfield, Sumer, Inc.	414-784-6641
PR	Playa Ponce, Ditributronics, Inc.	943-395-9311

Local Distributors

AZ	Phoenix, Arizona Comps. Co.	602-269-5655
AZ	Tempe, Circuit Specialists, Inc.	602-966-2878
CA	Belmont, Arndt	415-592-6718
CA	Chatsworth, Diplomat Elctrns.	213-700-8700
CA	Chatsworth, Integrated Elcrns., Inc./JACO	213-998-2200
CA	Chatsworth, Shelly Elctrns., Inc.	213-998-3333
CA	Costa Mesa, Diplomat Elctrns.	714-549-8401
CA	Garden Grove, Hi Rel Distr. Sls., Inc.	213-594-9571
CA	Gardena, Bell Inds.	213-515-1800
CA	Irvine, Kelex, Inc.	714-863-1230
CA	San Diego, Bell Inds.	619-268-1277
CA	San Diego, Diplomat Elctrns.	619-292-5693
CA	San Diego, DECO	619-693-1595
CA	San Diego, Park/West, Inc.	619-277-8433
CA	San Fernando, Petell Elctrns., Inc.	213-365-9841
CA	Santa Clara, Pyramid Elctrns.	408-727-9810
CA	Santee, Mouser Elctrns.	619-449-2222
CA	Sunnyvale, Diplomat Elctrns.	408-734-1900
CA	Van Nuys, Electronic Expediters	213-781-1910
CO	Denver, Ragon-Elctrns. Parts Co.	303-744-1992
CO	Englewood, Diplomat Elctrns.	303-740-8300
CT	Danbury, Diplomat Elctrns.	203-797-9674
CT	Norwalk, Park Distrs.	203-853-2011,212-931-1680
FL	Clearwater, Diplomat Elctrns.	813-443-4514
FL	Longwood, Intertec	305-834-7777
FL	Miami, Electronic Equip. Co., Inc.	305-871-3500
FL	Tampa, Impala Elctrns., Inc.	813-885-4747
GA	Norcross, Diplomat Elctrns.	404-449-4133
ID	Spirit Lake, AI Elctrns.	208-623-3111
IL	Bensenville, Diplomat Elctrns.	312-595-1000
IL	Chicago, Bell Inds.	312-982-9210
IL	Elk Grove Village, GBL/Goold Elctrns.	312-593-3220
IL	Skokie, Marcon Assocs., Inc.	312-675-6450
IN	Indianapolis, Graham Elctrns., Inc.	317-634-8202
IN	Indianapolis, Meunier Elctrn. Supp., Inc.	317-635-3511
KY	Louisville, Peerless Elctrn. Equip. Co., Inc.	502-637-7674
MD	Columbia, Diplomat Elctrns.	301-995-1226
MD	Timonium, Zebra Elctrns., Inc.	301-252-6576
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OH	Dayton, Stotts Friedman Co.	513-298-5555
PA	Montgomeryville, Pyttronic Inds., Inc.	215-643-2850
PA	Philadelphia, Encore Elctrns., Inc.	215-676-7200
PA	Philadelphia, Herbach & Rademan	215-426-1700
PA	Philadelphia, Shap Elctrns.	215-969-3300
PA	Pittsburgh, Alder-Tronics, Inc.	412-821-5565
PA	Willow Grove, Resco Elctrns.	215-659-4575
PA	York, Electronic Comps. for Ind., Inc.	717-843-8971
TX	El Paso, International Elctrns.	915-778-9761
TX	Fort Worth, Allied Elctrns.	817-336-5401
TX	Fort Worth, TTI	817-831-0441,817-429-1440
TX	Stafford, Southwest Elctrns., Inc.	713-491-4900
UT	Salt Lake City, Diplomat Elctrns.	801-486-4134
UT	Salt Lake City, Standard Supp. Co.	801-486-3371
VA	Charlottesville, Virginia Radio Supp. Co., Inc.	804-296-4184
WA	Seattle, Pacific Elctrns.	206-575-1050

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SANKEN ELEC. U.S.A. CORP., 3848 Carson St., Ste. 105, Torrance, CA 90503, Tel: 213-540-2209, Telex: 181839; Empl.: 5; *Sls. Mgr.:* Mr. Tack Kunimi; *Dist. Mgr.:* Mr. Tack Kunimi

SAN-O INDUSTRIAL CORP., 85 Orville Dr., Bohemia, NY 11716, Tel: 516-567-5556, TWX: 510-228-7701; Empl.: 50; *Sls. Mgr.:* M. Castellano

SANTA BARBARA RESCH. CTR., 75 Coromar Dr., Goleta, CA 93117, Tel: 805-968-3511, Telex: 910-334-1885, TWX: Hacsbar; Empl.: 2025; *Sls. Mgr.:* D.K. Smith

SANTA FE TEXTILES, Barcel Wire & Cable, 3151 W. Adams St., Santa Ana, CA 92704-5863, Tel: 714-751-7733, Telex: 910-595-1959; FSC No.: 31415; Empl.: 20; *Sls. Mgr.:* Mike Ross

SANYO ELEC. INC., 200 Riser Rd., Little Ferry, NJ 07643, Tel: 201-641-2333, Telex: 134-394; Empl.: 500; *Sls. Mgr.:* H. Matsuoka

Local Sales Offices & Reps

CA	Compton, Sanyo Elec. Inc.	213-537-5830
IL	Bensonville, Sanyo Elec., Inc.	312-595-5600

SANYO SEMICONDUCTOR CORP., 7 Pearl Ct., Allendale, NJ 07401, Tel: 201-825-8080, Telex: 135138 SANYOSEMI ALNJ; Empl.: 16; *Sls. Mgr.:* Koichi Takahashi; *Dist. Mgr.:* Aki Goto

SAPHIKON, 51 Powers St., Milford, NH 03055, Tel: 603-673-5831, Telex: 95-3067; Empl.: 45; *Sls. Mgr.:* K. G. Lonie

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SARONIX, 4010 Transport at San Antonio, Palo Alto, CA 94303, Tel: 415-856-6900, Telex: 348465; FSC No.: 61441; Empl.: 35; *Sls. Mgr.:* Michael N. Blewett; *Dist. Mgr.:* Michael N. Blewett .... **A•1428-1431**

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CA	Culver City, Bestronics, Inc.	213-870-9191
CA	Fallbrook, Matronix/Chilcote	619-728-7678
CA	Irvine, Bestronics, Inc.	714-261-7233
CA	Southern California, Bestronics, Inc.	213-704-5616
CA	Woodland Hills, Bestronics, Inc.	213-704-5616
CO	Denver, Lindberg Co.	303-758-9033
GA	Marietta, Rick Burns Assocs.	404-951-1181
IL	Elk Grove Vlg., John G. Twist Co.	312-593-0200
IN	South Bend, Schillinger Assocs., Inc.	219-291-6258
KS	Overland Park, EPI, Inc.	314-962-1411
MN	Bloomington, John G. Twist Co.	612-835-2120
MN	Bloomington, The John G. Twist Co.	612-835-2120
MO	St. Louis, EPI, Inc.	314-962-1411
NJ	Cherry Hill, Trinkle Sls.	609-795-4200
NJ	Englewood, Harold Gray Assocs.	201-894-0894
NM	Albuquerque, Lindberg Co.	505-881-1006
NC	Raleigh, Rick Burns Assocs.	919-876-2224
OH	Dayton, J. C. Hofstetter	513-296-1010
OH	Medina, J. C. Hofstetter	216-241-4880
TX	Austin, Logic 1 Sls.	512-459-1297
TX	Houston, Logic 1 Sls.	713-462-0641
TX	Richardson, Logic 1 Sls.	214-234-3375
UT	Salt Lake City, Lindberg Co.	801-969-2400
WI	Brookfield, John G. Twist Co.	414-782-2670
WI.	Milwaukee, The John G. Twist Co.	414-782-2670

EXP	CA, Palo Alto, SaRonix	415-856-6900

Local Distributors

AZ	Tempe, Anthem Elctrns.	602-244-0900
CA	Chatsworth, Anthem Elctrns.	213-700-1000
CA	Costa Mesa, Deco Elctrns.	714-754-1322
CA	Manhattan Beach, Prime Electro Prods.	213-379-3642
CA	San Diego, Anthem Elctrns.	619-279-5200
CA	San Diego, Deco Elctrns.	619-693-1595
CA	San Jose, Anthem Elctrns.	408-946-8000
CA	Tustin, Anthem Elctrns.	714-730-8000
CO	Englewood, Anthem Elctrns.	303-790-4500
CT	North Haven, Coakley, Boyd & Abbett	800-225-8402
FL	Lighthouse Point, Sales Engrg. Concepts., Inc.	305-781-4800
IN	Indianapolis, MAR Elctrns., Inc.	317-875-4510
MA	Andover, R2 Elctrns.	617-475-3777
MA	Needham Heights, Coakley, Boyd & Abbett	617-444-5470
NH	Plainstow, Coakley, Boyd & Abbett	617-444-5470
OR	Lake Oswego, Anthem Elctrns.	503-684-2661
OR	Portland, Northwest Mktg. Assocs.	503-620-0441
TX	Addison, Active Comp. Technlg.	214-980-1888
TX	Austin, Active Comp. Technlg.	512-452-5254
TX	Houston, Active Comp. Technlg.	713-496-4000
UT	Salt lake City, Anthem Elctrns.	801-973-8555
WA	Redmond, Anthem Elctrns.	206-881-0850
Intl	France, St. Quentin En Yveline, A S A P	604 7878
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Intl	Switzerland, Duebendorf-Zueric, Compona	01 821-3737

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CA	San Diego, Qualtronics	619-560-8955
CA	Santa Clara, Fisher Assocs.	408-733-7350
IL	Barrington, Omni Elctrns.	312-381-9087
MA	Sharon, Howard Haffer	617-784-2420

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Local Sales Offices & Reps

AL	Huntsville, L & D, Inc.	205-837-1469
AZ	Scottsdale, Faser Tech. Sls.	602-948-4404
CA	Los Altos, Cain-White & Co.	415-948-6533
CA	Van Nuys, R-L Assocs.	213-782-7826
FL	Maitland, D. J. Ellis & Assocs.	305-645-1101
GA	Atlanta, L & D	404-455-3483
IL	Palatine, R-Tek	991-222-1830
IN	Fort Wayne, R-Tek	219-432-8783
KS	Overland Park, Barnes-Midwest Sls.	913-341-9317
MD	Burtonsville, Eastern Instr. Corp.	301-384-8500
MN	Chanhassen, Barnes Sls. Assocs.	612-934-2907
NH	Amherst, Callahan & Tremblay, Inc.	603-883-9000
NJ	East Windsor, Micro-Lambda	609-443-3113
NY	Buffalo, Quality Comps.	716-837-5430
NY	Great Neck, Phase 4 Technical Rep., Inc.	516-482-1790
NY	Manlius, Quality Comps.	315-682-8885
NC	Greensboro, L & D	919-292-3201
NC	Raleigh, L & D	919-876-5301
TX	Richardson, Vector Sls.	214-234-4291

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SAXTON WIRE AND CABLE, 215 N. Rte. 303, Congers, NY 10920, Tel: 914-268-6848, 800-431-2774, Telex: 13-1538; FSC No.: 16164; Empl.: 130; *Sls. Mgr.:* Bill Cullen; *Dist. Mgr.:* Steve Shelley **C•1896-1903**

Local Sales Offices & Reps

CA	Pico Rivera, Saxton West	213-948-4066, 800-331-WIRE
CO	Denver, Tele-Electric Sls., Ltd.	303-969-9239
CT	Guilford, Phil Orzell Assocs.	203-453-6488
FL	Tampa, Griffin & Assocs. Elctrn. Sls., Inc.	813-887-1945
GA	Marietta, Communication Mktg.	404-424-9097
IN	Angola, Waid Assocs.	219-833-3523
MA	Milford, Jonel Sales Assocs.	617-478-4650
MN	Burnsville, Strong & Assocs.	612-890-3168
MN	Maple Grove, R. C. Sls.	612-425-5543
MO	Kansas City, Ron Forristal	816-358-6771
NY	Mohegan Lake, Travano & De Palma Assocs.	914-245-5269, 914-968-1084
NC	Oxford, Winston Elctrn. Sls. Assocs.	919-693-1561
OH	Cleveland, Hank Miller Sls. Assocs.	216-329-3900
PA	Collegeville, Steve Linton	215-489-9473
TN	Knoxville, John Dickens	615-947-8068
TX	Corwley, David Tuggle	817-294-0850
VA	Arlington, Howard Golen Paul & Assocs.	703-525-5898

Local Distributors

CA	Downey, David Levy Co.	213-869-2539
CA	Montebello, Atlas Wire & Cable	213-723-2401
CT	Manchester, Inventory Mgt. Svs.	203-649-4415
CT	Meriden, New England Insulated Wire	203-204-8927
GA	Atlanta, Atlanta Cable Sls.	404-448-6311
MS	Hattiesburg, Wright Elctrn.	601-545-2545
NY	Brooklyn, Ceco Comm.	212-646-1617
NC	Greenville, Pair Elctrns.	919-756-8007
PA	Broomwall, Omni Cable	215-544-7766
SC	Columbia, Hesco	803-254-4575
VA	Arlington, Arlington Elctrn.	703-524-2412
VA	Leesburg, Elctrn. Wire & Cable	703-777-3551

SAYLOR ELECTRONICS INT'L, INC., 1824 Calash Dr., Carson City, NV 89701, Tel: 702-883-4184; Empl.: 4

SCANBE DIV., 3445 Fletcher Ave., El Monte, CA 91731, Tel: 213-579-2300, TWX: 910-587-3437; Empl.: 125

SCANNING DEVICES, 108 Elm St., Waltham, MA 02154, Tel: 617-891-8991; Empl.: 25; *Sls. Mgr.:* Louis Goldenberg

SCHAEVITZ ENGRG., U.S. 130, Union Ave., Pennsauken, NJ 08110, Tel: 609-662-8000, TWX: 710-892-0714; FSC No.: 93190; Empl.: 325; *Sls. Mgr.:* F. R. Pisaro

SCHAFFNER EMC, INC., 825 Lehigh Ave., Union, NJ 07083, Tel: 201-851-0644, Telex: 685-3444; FSC No.: 201-467-1330; *Sls. Mgr.:* Thomas Pate; *Dist. Mgr.:* Tom Morrone

Local Sales Offices & Reps

CA	Buena Park, RPS Elctrns., Inc.	213-744-8400
CA	Costa Mesa, Berman Gravley Co., Inc.	714-549-2122
CA	Palo Alto, Mollard Mktg.	415-961-0456
CA	San Jose, Cypress Elctrns.	408-945-8400
IL	Arlington Heights, ZMS Elctrn. Sls., Inc.	312-394-4422
KS	Overland Park, Guernsey/Web Assocs.	913-381-2225
MA	Burlington, Kitchen & Kutchin Inc.	617-229-2660
MA	Hopkington, Interface Elctrns., Inc.	617-435-6858
NJ	Marlton, BGR Assocs.	609-983-1020
NJ	Palmyra, Marlac Elctrns., Inc.	609-786-1991
NY	Commack, JL Sls. Assocs.	516-462-5666
NY	Rochester, H.C. Johnson Agy., Inc.	716-586-0777
NC	Raleigh, Tingen Tech. Sls., Inc.	919-781-1100
TX	Arlington, Comptech Sls., Inc.	817-265-6007
WI	Brookfield, ZMS Elctrn. Sls.	414-782-2222

Local Distributors

CA	Buena Park, RPS Elctrns., Inc.	213-744-0355
CA	San Jose, Cypress Elctrns.	408-945-8400
MA	Hopkington, Interface Elctrns., Inc.	617-435-6858

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Local Sales Offices & Reps

CA	Fullerton, GRU Assocs.	714-738-0903
CO	Boulder, Herb Bass Assocs.	303-530-7509
IL	Elk Grove Village, Loren F. Green Assocs./Cen.	312-593-0282
IN	Indianapolis, Loren F. Green Assocs. of Indiana	317-293-9827
MI	Northville, Micro Sls. Corp.	315-459-1670
MN	Minneapolis, Loren F. Green Assocs. of Minn.	612-571-6666
OH	Centerville, Micro Sls. Corp.	513-433-8171
OH	N. Olmstead, Micro Sls. Corp.	216-734-3080
OR	Portland, Harry Levinson Co.	503-245-1902
WA	Seattle, Harry Levinson Co.	206-382-1300

Local Distributors

AL	Huntsville, Scientific Dvcs. SE	205-536-1969
CA	San Jose, D. P. Assocs.	408-296-1492
CT	Higganum, Intersell	203-528-5357
FL	Orlando, Scientific Dvcs. SE	305-841-8180
MA	Burlington, Intersell	617-273-3844
NJ	Woodcliff Lake, Eastern Instrmn.	201-664-0907
NC	Winston-Salem, Scientific Dvcs. SE, Inc.	919-765-5776
PA	Melrose Park, Robert Meyers Assocs.	215-224-1663
WA	Seattle, Harry Levinson Co.	206-382-1300

SCHAUER MFG., 4500 Alpine Ave., Cincinnati, OH 45242, Tel: 513-791-3030, Telex: 21-4576; Empl.: 195; *Sls. Mgr.:* A. A. Groenewold; *Dist. Mgr.:* Dan Shaw

SCHLAGE ELECTRONICS, 3260 Scott Blvd., Santa Clara, CA 95051, Tel: 408-727-5170, Telex: 171122; Empl.: 150; *Sls. Mgr.:* Steve Burt

SCHNEIDER INSTR., 8115 Camargo Rd., Cincinnati, OH 45243, Tel: 513-561-6803; Empl.: 23; *Sls. Mgr.:* C. A. Schneider, Pres.

SCHONSTEDT INSTR. CO., 1775 Wiehle Ave., Reston, VA 22090, Tel: 703-471-1050, TWX: 710-833-9880; Empl.: 45

SCHOTT CORP., 1000 Parkers Lk. Rd., Wayzata, MN 55391, Tel: 612-475-1173, TWX: 910-576-2964; FSC No.: 80023; Empl.: 325; *Sls. Mgr.:* A. Schmitt

Local Sales Offices & Reps

IL	Des Plaines, Electro-Comp. Sls.	312-577-3788
MA	Needham, Hatch Assocs.	617-444-3310

SCHOTT ELCTRNS., Hershey Dr., Ansonia, CT 06401, Tel: 203-736-2677, Telex: 170 451 8911; Empl.: 240; *Sls. Mgr.:* Don Davis

SCHOTT GLASS TECHNOLOGIES, INC., 400 York Ave., Duryea, PA 18642, Tel: 717-457-7485, TWX: 510-671-4535; FSC No.: 23-169-1403; Empl.: 600; *Sls. Mgr.:* D. Dougherty

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AL	Athens, Effective Mktg. Force	205-233-2947
CA	Livemore, O'Rielly Elctrn. Sls.	415-443-5343
CA	Panorama City, Viking Sls.	818-788-5501
CO	Boulder, Stratford Grp.	303-530-3194
CT	Manchester, Vin-Tech	203-646-3007
FL	Tampa, J-R Controls, Inc.	813-961-9478
GA	Atlanta, Effective Mktg. Force	404-948-6023
IL	Barrington, Richard Fisk Mktg.	312-381-0653
IN	Indianapolis, C.C. Elctrns.	317-255-1508
KS	Shawnee Mission, Microtronics (K&M)	913-262-1444
MA	Framingham, Bengal Assocs.	617-877-2639
MA	Randolph, Bengal Assocs.	617-961-4120
MI	Pontiac, C.C. Elctrns., Inc.	313-338-7400
MN	Roseville, TLC Controls	612-483-2226
NJ	Paramus, Jarms Elctrn.	201-265-2032
NY	Melville, Jarms Elctrn.	516-752-0404
OH	Gallion, C.C. Elctrns., Inc.	419-468-3253
TX	Irving, Kite Elctrns. Sls. Co., Inc.	214-438-9336
OR	Portland, Pacific Elec. Sls.	503-235-3456
NY	Syracuse, PI1 Tronics	315-455-7346

Local Distributors

AK	Anchorage, Electronics Supp. Ctr.	907-274-0603
AZ	Phoenix, Capitol Elctrns.	602-252-5897
CA	Santa Monica, Distributor Specialist	213-393-9666
CA	Santa Monica, Master Distrs.	213-452-1229
CA	Tustin, Caltronics Sls.	714-730-0350
CA	Van Nuys, Hurley Elctrns.	818-781-8410
CT	Danbury, Green Elec.	203-748-5644
CT	New Haven, Hatry Elctrns.	203-755-1181
CT	Norwalk, Delta Elctrns.	203-847-7285
CT	Norwalk, Park Distr.	203-853-2010
FL	Lakeland, AA Elec.	813-665-6941
FL	Lakeland, Switch Controls	813-644-7564
FL	Miami, B & R Elctrns.	305-255-4510
FL	Oakland Park, Zelgon, Inc.	305-565-2555
FL	Orlando, Sun Elctrns.	305-841-4650
FL	Tampa, Leader Elctrns.	813-870-3315
FL	W. Palm Beach, Dolphin Elec.	305-659-7166
HI	Honolulu, Industrial Elctrns.	808-533-6095
IL	Arlington Hgts., Lodan Elctrns.	800-323-5207
IN	Bloomington, Hoosier Elctrns.	812-332-9435
IN	Bloomington, Stansifer Radio	812-336-6339
IN	Indianapolis, Mar Elctrns.	317-875-4510
IA	Cedar Rapids, Iowa Radio Supp.	319-393-4510
KS	Salina, Electronics, Inc.	913-827-7377
KY	Mayfield, Pickens Supp.	502-247-6041
MD	Beltsville, PSI	301-937-4960
MD	Gaithersburg, Axis Elctrns.	301-840-9640
MD	Salisbury, Artcraft	301-749-6151
MA	Norwood, Emtel Elctrns.	617-769-9500
MA	Pittsfield, Cash & Carry Elec. Supp.	413-499-9500
MA	Waltham, Standard Elec. Supp.	617-890-1050
MA	Wilmington, Aved Elctrns.	617-245-7406
MA	Woburn, Abbott Elctrns.	617-935-2040
MI	Flint, Advance Whsle. Distr.	313-238-5611
MI	Troy, Empire Elctrns.	313-585-8130
MN	New Brighton, Chris Elctrns.	612-631-2647
NE	Lincoln, Scott Elctrns.	402-466-8221
NJ	Brick, Electronic Entprs.	212-442-1046
NJ	E. Rutherford, AA Elec.	800-228-0131
NJ	Fair Lawn, Relay Specialties	201-797-3313
NJ	Plainfield, Propac	201-755-4940
NY	Bohemia, Omntec Mfg., Inc.	516-567-8685
NY	Buffalo, Summit Elctrns.	716-334-8110
NY	Commack, Choice Comps.	516-543-6060
NY	Elmsford, Ancar Elec.	914-592-7100
NY	Mt. Vernon, Janesway Elctrns.	914-699-6710
NY	Nanuet, Andrea Elec.	914-623-3447
NY	New Rochelle, Derf Elctrns.	914-235-4600
NY	Port Washington, Bradtronics	201-641-6118
NY	Rochester, Masline Elctrns.	716-546-5373
NY	Rome, Rome Security	315-336-0148
NY	Sodus, AED	315-483-6561
NY	Stony Brook, Bomark Elctrns.	516-689-8999
NY	W. Babylon, Septronics	516-643-4990
NY	Wheatfield, EEC	716-693-3970
NY	White Plains, Benfield Pro Shop	914-948-6650
NY	Yonkers, Kintronics	914-968-7736
NC	Knightdale, Systems Elctrns.	919-266-9908
NC	Pineville, Control Design Supps.	702-588-4410
OH	Columbus, Thompson Elec.	614-228-6191
OH	Dayton, Carver Supp.	513-461-9673
OH	Dayton, Industrial Sls. & Svc.	513-439-4131
OH	Zanesville, Thompson Radio Supp.	614-452-8473
OR	Clackamus, Amfac Elec.	503-657-3020
OR	Medford, Medford Elec. Whlsr.	503-773-6656
OR	Ontario, Interstate Elctrn. Corp.	503-889-9679
OR	Pendleton, Round Up Elctrns.	503-276-3152
OR	Portland, O-Four Controls	503-231-8058
PA	Bloomsburg, E. R. Beers	717-784-1600
PA	Philadelphia, Jan Indl.	215-922-1321
PA	Redding, R.A.M. Motor Control	215-376-7102
TX	Brownsville, Carden Inds.	512-541-3660
TX	Dallas, Rawlinson Elec. Supp.	214-741-1721
TX	Ft. Worth, Industrial Equip.	817-831-6151
TX	Garland, Industrial Equip.	214-271-5494
TX	Houston, Commercial Equip.	713-237-8682
TX	Houston, Ralph's Elctrns.	713-748-4902
TX	Hurst, Industrial Equip.	817-595-1814
UT	Provo, Central Utah Elctrns.	801-373-7522
UT	Provo, Omega Elctrns.	801-375-4664
UT	Salt Lake City, Ballard Supp.	801-972-2430
VA	Norfolk, Radio Parts Distr. Co.	804-461-8095
WA	Port Angeles, Alphase Elec.	206-452-9705
WA	Spokane, Consolidated Elctrl. Distr.	509-535-8891
WA	Tacoma, Amfac Elec.	206-383-4303

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AZ	Scottsdale, Luscombe Engr.	602-949-9333
CA	Campbell, Luscombe Engr.	408-370-2020
CA	Pasadena, Luscombe Engr.	213-684-2000
CA	San Diego, Luscombe Engr.	619-295-4300
FL	Pompano Beach, EMA	305-943-3732
FL	Winter Park, EMA	305-671-6800
GA	Atlanta, CRS Elctrns.	404-396-3720
IL	Berkeley, Cadre Tech. Rep.	312-449-3900
MI	Troy, C. B. Jensen	313-643-0506
MN	Minneapolis, D. A. Case Assoc.	612-869-3700
MO	Brigeton, DY-Tronix	314-291-4777
NH	Salem, Sales Engr.	603-893-5521
NJ	Englewood, Sprung-Nussbaum	201-569-5666
NY	Central Sqare, Bastian Sls.	315-437-1482
NY	Fairport, Bastian Sls.	716-223-0237
NY	Port Crane, Bastian Sls. Agency Inc.	607-722-3421
OH	Aurora, EMA	216-562-6104
OH	Centerville, EMA	513-433-2800
PA	Huntington Valley, Omega Elctrn. Sls.	215-947-4135
TX	Austin, CMZ	512-255-1663
TX	Garland, CMZ	214-681-1414
TX	Houston, CMZ	713-771-1500

SCHROFF UK LTD., Maylands Ave., Hemel Hempstead, Herts, England HP2 4SG, Tel: 0442-40471/6, Telex: 825658; *Sls. Mgr.:* Mr. B-U Kaupisch

SCHULZ CONTROLS, INC., P.O. Box 9555, New Haven, CT 06511, Tel: 203-562-2555; Empl.: 35; *Sls. Mgr.:* Paula Calabrese; *Dist. Mgr.:* Paula Calabrese

SCHURTER, INC., 1016 Clegg Ct., Petaluma, CA 94952, Tel: 707-778-6311, Telex: 176-084; FSC No.: 61935; *Sls. Mgr.:* Bruno H. Schurter

Local Sales Offices & Reps

CA	Fullerton, Gru Assocs.	714-738-0903
CA	San Jose, Ruppert Sls. & Engrg.	408-998-8717
CO	Lakewood, Cristee-Meade Co.	303-232-0287
FL	Ft. Lauderdale, IMR, Inc.	305-741-2449
GA	Lithia Springs, Effective Mktg. Force	404-948-6023
IL	Arlington Hgts., MJ Petersen & Assoc., Ltd.	312-577-8200
IN	Noblesville, W. G. Brouillette & Assocs., Inc.	317-845-8157
MN	Minnetonka, Frank Anthony Mktg.	612-934-0773
MS	Jackson, Doby Assocs.	601-981-1138
NH	Nashua, Bell Controls	603-882-6984
NJ	Ho-Ho-Kus, D. J. Fisher Co.	201-652-0090
NJ	Medford, Champion Elctrn. Sls. Co.	609-983-0932
NY	Fairport, TAC Sls, Inc.	716-425-1070
OH	Beachwood, Electronic Salesmasters	216-831-9555
OR	Portland, Dussault & Associates Inc.	503-641-8780
TX	Austin, OM Assocs., Inc.	512-452-1838
TX	Dallas, OM Assocs., Inc.	214-241-3876
TX	Houston, OM Assocs., Inc.	713-789-4426
WA	Seattle, Dussault & Associates Inc.	206-527-5454

Local Distributors

CA	Fremont, Fusecom, Inc.	415-657-FUSE
CA	San Jose, Dansco Comp. Sls., Inc.	408-288-9740
CA	San Jose, Quail Elctrns.	408-995-0812
IL	Elk Grove Village, Nu-Way Elctrn. Distrbs. Inc.	312-437-7120
MD	Rockville, FIC Corp.	800-638-6594
OH	Strongsville, Fuse World	216-238-1330
TX	Dallas, Fuses, Inc.	214-341-6407
WA	Redmond, Fusecom, Inc.	206-881-2442
Can	Markham, Ont., Lenbrook Elctrns.	416-777-7722

SCHWEITZER, DIV., Kimberly Clark Corp., Lee, MA 01238, Tel: 413-243-1000, TWX: 413-243-2121; Empl.: 750

SCIENCE ACCESSORIES CORP., 970 Kings Hwy. W., Southport, CT 06490, Tel: 203-255-1526, Telex: 964300 SAC SPRT; *Sls. Mgr.:* H. A. Cleveland

SCIENCE/ELCTRNS., 1224-26 McCook Ave., Dayton, OH 45404, Tel: 513-228-6011, Telex: 288-004; Empl.: 25; *Sls. Mgr.:* E. E. Pohl; *Dist. Mgr.:* J. Tanksley

SCIENTECH, INC., 5649 Arapahoe Ave., Boulder, CO 80303, Tel: 303-444-1361, 800-525-0522, TWX: 910-940-0994; Empl.: 57

SCIENTIFIC-ATLANTA, INC., P.O. Box 105600, Atlanta, GA 30348, Tel: 404-441-4000, Telex: 0542898, TWX: 810-766-4912

SPECTRAL DYNAMICS, Scientific-Atlanta, Inc., 4255 Ruffin Rd., San Diego, CA 92123-0575, Tel: 619-268-7100, TWX: 910-335-2022; Empl.: 370; *Sls. Mgr.:* Ram Waney

SCIENTIFIC-ATLANTA, INC., See Optima Enclosures

SCIENTIFIC COLUMBUS, INC., Esterline Corp., 1900 Arlingate La., Columbus, OH 43228, Tel: 614-274-7160, Telex: 245-426; Empl.: 210; *Sls. Mgr.:* Don Yore; *Dist. Mgr.:* Don Yore

SCIENTIFIC COMMUNICATIONS, INC., 3425 Kingsley Rd., Garland, TX 75041, Tel: 214-271-3685, TWX: 910-860-5172; *Sls. Mgr.:* Donald G. Luiken

SCIENTIFIC RADIATION CORP., 1201 San Antonio Rd., Mountain View, CA 94043, Tel: 415-965-0910, Telex: 345506; *Dist. Mgr.:* James A. Lazzara

SCIENTIFIC RESEARCH CORP., See TRAK Microwave Corp.

SCIENTIFIC TECHNLG., 1201 San Antonio Rd., Mountain View, CA 94043, Tel: CA 415-965-0910, 800-221-7060, Telex: 34-5506; Empl.: 50

SCITEQ ELECTRONICS, INC., 7380 Clairemont Mesa Blvd., San Diego, CA 92111, Tel: 619-292-0500, Telex: 882008; *Sls. Mgr.:* Henry Eisenson; *Dist. Mgr.:* David Norman

SCOPE, INC., 1860 Michael Faraday Dr., Reston, VA 22090, Tel: 703-471-5600, TWX: 710-883-1178; Empl.: 225; *Sls. Mgr.:* David Bess

SCOTT AVIATION, Figgie International Inc., 123 East Montecito Ave., Sierra Madre, CA 91024, Tel: 213-355-4281

SCREEN DATA CORP., 80 S. Jefferson Rd., Whippany, NJ 07981, Tel: 201-887-7713, 800-248-1212, Telex: 710-387-209; *Sls. Mgr.:* Michael A. Kling

SCREENPRINT/DOW, 271 Ballardvale St., Wilmington, MA 01887, Tel: 617-935-6395, Telex: 948227; *Sls. Mgr.:* W. F. Donovan Jr.

SEABOARD ELCTRNS., 70 Church St., New Rochelle, NY 10805, Tel: 914-235-8073, Telex: 646289; Empl.: 78; *Sls. Mgr.:* Dr. Richard Ader; *Dist. Mgr.:* Dr. R. Ader

SEACOR, INC., 123 Woodland Ave, Westwood, NJ 07675, Tel: 201-666-5600, Telex: 135-354; Empl.: 45

SEA DATA CORP., One Bridge St., Newton, MA 02158, Tel: 617-244-3216, Telex: 951107; Empl.: 40; *Sls. Mgr.:* W. Hill

SEALECTRO, 225 Hoyt St., Mamaroneck, NY 10543, Tel: 914-698-5600; Empl.: 1600; *Sls. Mgr.:* T. Lynn; *Dist. Mgr.:* N. Buonanno

SEALTRON, INC., 9705 Reading Road, Cincinnati, OH 45215, Tel: 513-733-8400, Telex: 21-4609; Empl.: 120; *Sls. Mgr.:* James Dawson

SEASTROM MFG. CO., INC., 701 Sonora Ave., Glendale, CA 91201, Tel: 213-245-9121, TWX: 910-497-2271; FSC No.: 86928; Empl.: 75

SEATTLE COMPUTER PRODUCTS, INC., 1114 Ind. Dr., Seattle, WA 98188, Tel: 206-575-1830, 800-426-8936; *Sls. Mgr.:* Max Gerdts

SECTOR MOTOR IND. INC., 999 Grand Blvd., Deer Park, NY 11729, Tel: 516-242-2300, TWX: 510-227-6075; *Sls. Mgr.:* Victor Nelson

secoinsa

digi-power

SECOINSA/DIGI POWER, 686 E. Gish Rd., San Jose, CA 95112, Tel: 408-288-5600, Telex: 910-338-0579; Empl.: 90; *Sls. Mgr.:* Ron Murphy; *Dist. Mgr.:* Ron Murphy .... **D•1830-1832**

Local Sales Offices & Reps

CA	Inglewood, Basic Sys. Corp.	213-673-4300
KS	Shawnee Mission, Panatek Tech. Sls.	913-362-3349
MD	Rockville, J-4 Computer Sys.	301-424-0700
MN	Spring Lake Park, Holmgren Assocs.	612-786-7641
NJ	Boonton, Winter Assocs.	201-334-3434
OK	Tulsa, Genzal Sls. & Assocs.	918-622-7744
OR	Portland, Power Sources Unlimited, Office 2	503-292-0918
TX	Fort Worth, El Tech Sls., Inc.	817-268-2896
VA	Front Royal, Eltron Sls., Ltd.	703-635-7201
WA	Lynwood, Power Sources Unlimited, Ofice 1	206-743-6641

SECURITY PLASTICS, INC., 14427 N.W. 60th Ave., Miami Lakes, FL 33014, Tel: 305-823-5440, Telex: 803303; Empl.: 400; *Sls. Mgr.:* J. Licht

SEEQ TECHNLG., 1849 Fortune Dr., San Jose, CA 95131, Tel: 408-942-1990, TWX: 9103382313; Empl.: 650; *Sls. Mgr.:* J. Daniel McCranie; *Dist. Mgr.:* J. Daniel McCranie

SEIKO INSTRUMENTS

SEIKO INSTRS. U.S.A., INC., 2990 W. Lomita Blvd., Torrance, CA 90505, Tel: 213-530-8777, TWX: 910-347-7307; *Sls. Mgr.:* John Hawkins, Lee Guio; *Dist. Mgr.:* Lee Guio, John Hawkins .... **A•1433; B•1092; D•1071**

Local Sales Offices & Reps

AL	Huntsville, Electro-Mech	205-533-2100
AZ	Scottsdale, Fred Board Assocs.	602-994-9388
AZ	Tucson, Fred Board Assocs.	602-299-1508
CA	Los Alamitos, Santana Sls.	714-827-9100
CA	San Diego, CK Assocs.	619-279-0420
CA	San Jose, Exis, Inc.	408-287-6680
CO	Golden, Candal, Inc.	303-233-0155
FL	Plantation, Gallagher & Assocs.	305-473-2101
GA	Norcross, Electro-Mech	404-447-6478
IL	Elk Grove Village, The John G. Twist Co., Inc.	312-593-0200
IN	Greenwood, Valentine & Assocs.	317-888-2260
IN	South Bend, Valentine & Assocs.	219-288-7070
IA	Cedar Rapids, Tech. Elctrns.	319-366-5443
KS	Overland Park, Kebco	913-541-8431
KS	Wichita, Kebco	316-733-1301
MD	Annapolis, Vince Iorio Assocs.	301-465-8150
MA	Brockton, Forsberg Sls.	617-522-6300
MI	Grosse Pointe Pk., Greiner Assoc.	313-499-0188
MN	Bloomington, Quantum Sls.	612-884-4700
MO	Maryland Hgts., Kebco	314-576-4111
NJ	Manville, DynoRep, Inc.	201-685-0135
NJ	Mt. Laurel, Comtek, Inc.	609-235-8505
NM	Albuquerque, Fred Board Assocs.	505-293-1399
NY	Kingston, R. P. Kennedy Co.	914-876-2700
NY	Rochester, R. P. Kennedy Co.	716-271-1910
NY	Rochester, R. P. Kennedy Co.	716-271-6322
NC	Raleigh, Electo-Mech	919-851-8165
OH	Wadsworth, Imtech	216-239-2202
OR	Tigard, Components West	503-684-1671
TN	Jonesboro, Electro-Mech	615-753-2964
TX	Austin, TL Mktg.	512-453-4586
TX	Dallas, TL Mktg.	214-357-1752
UT	Salt Lake City, Aspen Sls., Inc.	801-467-2401
WA	Liberty Lake, Components West	509-255-6224
WA	Redmond, Components West	206-885-5880
WI	Brookfield, John G. Twist Co., Inc.	414-782-2670
Can	Pointe Claire, Que., Tech-Trek, Ltd.	514-697-3385
Can	Rexdale, Ont., Tech-Trek, Ltd.	416-674-1717
Can	Richmond, B.C., Tech-Trek, Ltd.	604-271-3149

Local Distributors

AL	Huntsville, Contact Elctrns.	205-881-9321
AZ	Phoenix, Sterling Elctrns.	602-268-2121
CA	San Jose, Eric Elctrns.	408-262-1111
CA	Santa Ana, Pacesetter Elctrns. USA	714-777-4711
CA	Sunnyvale, Pacesetter Elctrns. USA	408-734-5470
CA	Tustin, Added Value Elctrns.	714-730-5848
CO	Denver, Diplomat Elctrns.	303-422-9229
CO	Englewood, Sterling Elctrns.	303-796-7338
CT	Wallingford, Sterling Elctrns.	203-265-9535
IL	Elmhurst, Semi-Conductor Specialists	312-279-1000
IL	Northbrook, Classic Comps.	312-272-9650
IN	Indianapolis, Classic Comps.	317-872-4777
KS	Overland Park, Sterling Elctrns.	913-236-5589
LA	Metairie, Sterling Elctrns.	504-887-7610
MD	Middletown, Current Comps.	301-473-5333
MA	Norwood, Emtel	617-769-9500
MA	Waltham, Sterling Elctrns.	617-894-6200
MN	Bloomington, Semi-Conductor Specialities	612-854-8841
NJ	Perth Amboy, Sterling Elctrns.	201-442-8000
NM	Albuquerque, Sterling Elctrns.	505-884-1905
OH	Cincinnati, Schuster	513-489-1400
OH	Cleveland, Schuster	216-425-8134
OK	Tulsa, Sterling Elctrns.	918-663-2410
OR	Lake Oswego, Moore Elctrns.	503-684-3100
PA	Allentown, Lehigh Elctrns. Comps.	215-433-3045
TX	Austin, Sterling Elctrns.	512-836-1341
TX	Dallas, Sterling Elctrns.	214-243-1600
TX	Houston, Sterling Elctrns.	713-627-9800
UT	Salt Lake City, Diplomat Elctrns.	801-487-8131
VA	Richmond, Sterling Elctrns.	804-226-2190
VA	Sterling, Sterling Elctrns.	703-450-2373
WA	Bellevue, Moore Elctrns., Inc.	206-644-0101
WI	New Berlin, Classic Comps.	414-986-5300
Can	Downsview, Westburne Indl. Entprs.	416-635-2950
Can	Markman, Semad Div. DEW Elctrns.	416-475-8500
Can	Montreal, Semad Div. DEW Elctrns.	514-636-4614
Can	Ottawa, Semad Div. DEW Elctrns.	613-729-6145
Can	Vancouver, Semad Div. DEW Elctrns.	604-438-2515

SEIKO INSTRUMENTS U.S.A., INC., Robotics/Automation Div., 2990 W. Lomita Blvd., Torrance, CA 90505, Tel: 213-530-8777; *Sls. Mgr.:* John Dudley

SEKAI ELCTRNS. OF AMER., INC., 14700 E. Firestone Blvd., Suite 122, La Mirada, CA 90638, Tel: 714-670-1854, Telex: 685521; FSC No.: 8V398; Empl.: 4; *Sls. Mgr.:* Larry Klementowski

SELCO PRODUCTS CO., SEL Sales, Inc., 7580 Stage Rd., Buena Park, CA 90621, Tel: 714-521-8673, Telex: 65-5457; Empl.: 18; *Sls. Mgr.:* Bill Wilkinson; *Dist. Mgr.:* Ray McDowell

SELEC-KEY, Microdot, 302 Roma Jean Pkwy., Streamwood, IL 60103, Tel: 312-837-7970; *Sls. Mgr.:* Charles Stelzner

SEL-REX DIV., OMI Intl. Corp., 75 River Rd., Nutley, NJ 07110, Tel: 201-667-5200, Telex: 133-320, TWX: 710-989-1423; Empl.: 250; *Sls. Mgr.:* Larry Price

SEMCO, Rte. 6, No. Windham, CT 06226, Tel: 203-423-6316; *Sls. Mgr.:* Alan Giordano

SEMICOA, 333 McCormick Ave., Costa Mesa, CA 92626, Tel: 714-979-1900, Telex: 678-315, TWX: 910-595-1961; FSC No.: 34156; Empl.: 65; *Sls. Mgr.:* Mark Ellsberry

SEMICON, 10 North Ave., Burlington, MA 01803, Tel: 617-272-9015, TWX: 710-332-1919; Empl.: 550; *Sls. Mgr.:* Tom Le Blanc; *Dist. Mgr.:* L. Le Bow

SEMICONDUCTOR CIRCUITS, 49 Range Rd., Windham, NH 03087, Tel: 603-893-2330, TWX: 710-366-0505; Empl.: 300; *Sls. Mgr.:* J. Muckenhoupt; *Dist. Mgr.:* Marc Gauthier

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SEMICONDUCTOR PACKAGING MATLS. CO. INC., 431 Fayette Ave., Mamaroneck, NY 10543, Tel: 914-698-5353, TWX: 710-566-1103 .... **C•1097**

Local Sales Offices & Reps

AZ	Tempe, Spectrum Assoc., S.W.	602-966-1788
CA	Anaheim, California Tech Svcs.	714-630-8470
CA	Santa Clara, California Tech. Svcs.	408-496-1155
CA	Tarzana, California Tech. Svcs.	213-343-3131
CT	Southington, Libby Assocs.	203-747-5601
IL	Northfield, Imex, Ltd.	312-446-8934
PA	Franconia, Scharas Assocs.	215-368-2017
WA	Bellevue, Mars	206-747-3292

SEMICONDUCTOR TECHNLG., INC., 3131 S.E. Jay St., Stuart, FL 33497, Tel: 305-283-4500, TWX: 510-953-7511; Empl.: 45

SEMIKRON, INC., 11 Executive Dr., P.O. Box 66, Hudson, NH 03051, Tel: 603-883-8102, 1-800-258-1308, Telex: 6711011; FSC No.: 58687; Empl.: 45; *Sls. Mgr.:* Frank Haase; *Dist. Mgr.:* Bruce Sessler

Local Sales Offices & Reps

AL	Huntsville, R. W. Mitscher	205-882-6050
AZ	Phoenix, Trembly Assocs.	602-967-2058
CA	Downey, Trimarco	213-861-8244
CA	Redwood City, Ault Assocs.	415-367-1710
CO	Denver, Trembly Assocs.	303-233-9544
FL	Oldsmar, Boggs & Assocs.	813-855-1812
GA	Atlanta, R. W. Mitscher	404-923-3239
IL	Chicago, Ropek, Cahill & Vogt	312-631-0070
KS	Kansas City, Harris-Hanson Co.	816-763-6200
MI	Detroit, Favco	313-644-0173
MN	Eden Prairie, Bohlig & Assocs.	612-944-8404
MO	St. Louis, Harris-Hanson Co.	314-432-3611
NV	Las Vegas, Trembly Assocs.	702-369-8700
NH	Amherst, Eva-Tec Mktg.	603-673-4830
NM	Albuquerque, Trembly Assocs.	505-266-8616
NY	Albany, Lynn Assocs.	518-459-1239
NY	Buffalo, Lynn Assocs.	716-631-0054
NC	Raleigh, R. W. Mitscher	919-848-0941
OH	Hamilton, B & J Entprs.	513-863-1353
OR	Portland, Doran Sls. Assocs.	503-357-3333
PA	Pittsburgh, Lynn Assocs.	412-468-8811
TX	Richardson, Barry Sls.	214-234-0255
UT	Salt Lake City, Trembly Assocs.	801-486-5292
WA	Seattle, Doran Sls. Assocs.	206-885-1885

Local Distributors

FL	Hollywood, MRO Elctrn. Distrs.	305-966-4847
GA	Atlanta, Cleveland Elec. Co.	404-696-4550
MI	Detroit, Osborne Transformer Co.	313-368-4136
MN	New Brighton, Chris Elctrns. Distrs.	612-631-2647
NJ	Roselle, Lectron Inds.	201-245-5858
NC	Gastonia, JMT Elctrns. & Controls	704-867-4401
TX	Dallas, Wilkinson Bros. Co., Inc.	214-941-9963
TX	Houston, Industrial Drives Mtce.	713-681-6942
WA	Seattle, Pacific Elctrns.	206-575-1050
WA	Seattle, Radar Elec. Co., Inc.	206-282-2511

SEMTECH, 652 Mitchell Rd., Newbury Park, CA 91320, Tel: 213-628-5392, TWX: 910-336-1264; FSC No.: 14099;Multiple; Empl.: 350; *Sls. Mgr.:* John Mitchell; *Dist. Mgr.:* Will Fiske

SEMTRONICS CORP., 310 Hwy 7 74 S, P.O. Box 2248, Peachtree City, GA 30269, Tel: 404-487-6681, Telex: 8107662244; Empl.: 20; *Sls. Mgr.:* Larry Fowler

SENCORE, 3200 Sencore Dr., Sioux Falls, SD 57107, Tel: 605-339-0100, TWX: 910-660-0300; Empl.: 250 .... **D•1399**

SENSITEK CORPORATION, See Biddle Instruments

Sensitive Research

SENSITIVE RESEARCH INSTRS., 25 Dock St., Mt. Vernon, NY 10550, Tel: 914-699-9717; FSC No.: 32590;16034A; Empl.: 35 .... **D•1304-1306**

Local Sales Offices & Reps

AZ	Scottsdale, Williams Assocs.	602-947-4297
CO	Commerce City, Williams Assocs.	303-289-5647
DC	Washington, Whitcomb Assocs.	202-737-0763
IL	Lincolnwood, Saffro & Assocs.	312-677-9720
KS	Shawnee Mission, Comtel - Midwest	913-722-1030
MD	Baltimore, Whitcomb Assocs.	301-889-1245
MA	Lexington, Zieco	617-861-8300
MI	Southfield, Comtel Instrs. Co.	313-358-2505
MN	Minneapolis, Hei-Lite Sls.	612-861-6051
MO	St. Louis, Comtel - Midwest	314-991-5363
NM	Albuquerque, Williams Assocs.	505-255-1638
NY	Mount Vernon, Elctrl. Instr. Svc.	914-699-9717
OH	Cleveland, Comtel Instrs. Co.	216-442-8080
OH	Dayton, Comtel Instrs. Co.	513-298-7573

OH	Hilliard, Comtel Instrs. Co.	614-876-8305
OK	Tulsa, Data Mktg. Assocs.	918-438-4911
PA	Pittsburgh, Comtel Instrs. Co.	412-922-5720
TX	Austin, Data Mktg. Assocs.	512-451-5174
TX	Dallas, Data Mktg. Assocs.	214-661-0300
TX	Houston, Data Mktg. Assocs.	713-780-2511
TX	San Antonio, Data Mktg. Assocs.	512-342-3031
UT	Salt Lake City, Williams Assocs.	801-532-7701
WI	Lake Mills, Saffro & Assocs.	414-648-2605

SENSOR CORP., Box 140, Scottdale, PA 15683, Tel: 412-887-4080; Empl.: 6

SENSOR ELECTRONICS, INC., 105 Fairway Terrace, Mt. Laurel, NJ 08054, Tel: 609-778-0850; Empl.: 7; *Sls. Mgr.:* J. M. Langberg; *Dist. Mgr.:* J. M. Langberg

SENSOR SCIENTIFIC, INC., 1275 Bloomfield Ave., Fairfield, NJ 07006, Tel: 201-227-7790; *Sls. Mgr.:* Bob Brinley

SENSOR SYSTEMS, INC., 8929 Fullbright Ave., Chatsworth, CA 91311, Tel: 818-341-5366, Telex: 69-1583; *Sls. Mgr.:* E. Schneider

SENSORTEK, INC., 154 Em Huron Ave., Clifton, NJ 07013, Tel: 201-779-5577, Telex: 238790; Empl.: 26

SENSOR TECHN., 21012 Lassen St., Chatsworth, CA 91311, Tel: 213-882-4100, TWX: 910-494-4776; Empl.: 350; *Sls. Mgr.:* Robert Bryden

SENSOTEC, INC., 1200 Chesapeake Ave., Columbus, OH 43212, Tel: 614-486-7723, TWX: 810-482-1188; FSC No.: 29927; *Sls. Mgr.:* Jack Feil

SENSYM, INC., 1255 Reamwood Ave., Sunnyvale, CA 94089, Tel: 408-744-1500, Telex: 176376, TWX: 910-339-9625; *Sls. Mgr.:* Tom Johnson; *Dist. Mgr.:* Tom Johnson

SENTRY MFG., Crystal Park, Chickasha, OK 73018, Tel: 405-224-6780, 800-654-8850, TWX: 910-830-6425; Empl.: 150; *Sls. Mgr.:* R. Stephens

SENTRY SAFES, John D. Brush Co., Inc., 900 Linden Ave., Rochester, NY 14625, Tel: 716-381-4900, TWX: 510-253-6049; Empl.: 220; *Sls. Mgr.:* Ted Brush

SEQUENTIAL INFO. SYS., 249 N. Saw Mill River Rd., Elmsford, NY 10523, Tel: 914-592-5930, TWX: 710-567-1212; Empl.: 90; *Sls. Mgr.:* Murray E. Vinarub

Local Sales Offices & Reps

AL	Jasper, Smith Lake Automation	205-221-2492
CA	Campbell, Sedillo Co.	408-374-5220
CA	Huntington Beach, Wheatcroft Engrg.	714-964-4681
CO	Westminister, RMS Sls., Inc.	303-429-1111
FL	Melbourne, Reynolds Assocs.	305-259-7000
IL	Park Ridge, Mr. V. Kitty Mid-West Mgr.	312-698-5918
MD	Baltimore, Mid States	301-583-8252
MA	Bedford, Datasource, Inc.	617-275-8460
MI	Detroit, Automatic Controls	313-533-8890
MN	Minneapolis, Busch Elctrns.	612-835-2044
MO	St. Charles, Prod. Automation	314-441-6600
NM	Albuquerque, Vermillion Co.	505-883-3668
NY	Melville, Carnes Assocs.	516-694-1600
NY	Millbrook, Mr. R. DiMarso, East Sls. Mgr	914-677-9966
NY	Moravia, Electrotech Sys.	315-497-1598
OH	Cincinnati, Murray & Assocs., Inc. (ATR)	513-574-8500
OH	Cleveland, Automatic Controls	216-631-0333
PA	King of Prussia, Freedman & Malta	215-337-9211
TX	Richardson, Spectra Sls.	214-234-3600
VA	Springfield, Mid-States Mktg.	703-569-2700
WA	Medical Lake, Calvert Controls	509-224-3601
WI	Shorewood, Werking Indl. Sls.	414-964-2225
Can	Lachine, Que., Electrodesign	514-636-4838

SERCOMP CORP., 20721 Superior St., Chatsworth, CA 91311, Tel: 818-341-1680, TWX: 4932014; Empl.: 100; *Sls. Mgr.:* John Marthens; *Dist. Mgr.:* John Marthens

SERIAL LAB PRODS., INC., 162 Cook Lane, P.O. Box 766, Marlboro, MA 01752, Tel: 617-481-1684, Telex: 955318 Attn: SERIAL LAB; Empl.: 12; *Sls. Mgr.:* R. L. Wiedeman; *Dist. Mgr.:* D. Kreck

SERMETEL, 155 Limerick Rd., Limerick, PA 19468, Tel: 215-948-5100, Telex: 84-6335, TWX: 710-637-1263; Empl.: 177; *Sls. Mgr.:* Luke McLaughlin

SERVO-INSTRS. CORP., See Valley Electromagnetics

SERVOMETER CORP., 501 Little Falls Rd., Cedar Grove, NJ 07009, Tel: 201-785-4630, Telex: 384233; FSC No.: 18469; Empl.: 105; *Sls. Mgr.:* D. Walker

SERVO-TEK PRODS. CO., 1086 Goffle Rd., Hawthorne, NJ 07506, Tel: 201-427-3100, Telex: 130273; Empl.: 60; *Sls. Mgr.:* J. Duffy .... **B•1185**

SETRA SYSTEMS, INC., 45 Nagog Park, Acton, MA 01720, Tel: 617-263-1400, Telex: 948440; FSC No.: 53367; Empl.: 85; *Sls. Mgr.:* William R. Stern ... **B•1826**

Local Sales Offices & Reps

AL	Huntsville, Burnette Techno Metrics	205-533-9073
CA	Los Altos, Qcon, Inc.	415-941-5530
CA	Los Angeles, Dynasales Co.	213-268-1175
CO	Westminster, RMS Sls.	303-429-1111
FL	Orlando, Datarep	305-843-5224
GA	Atlanta, Craft Assocs.	404-256-0420
IL	Chicago, Data Elctrns.	312-283-0300
IN	Indianapolis, Data Elctrns.	317-359-5368
LA	Metairie, Slaton & Assocs., Inc.	504-455-3855
MA	Framingham, J. M. Lancaster Co.	617-875-8893
MI	Hazel Park, Tiby Co.	313-547-3550
MN	Plymouth, Data Elctrns.	612-559-1434
MO	St. Louis, Adelphi, Inc.	314-821-1232
NJ	Cedar Grove, KLS Assocs.	201-785-4450
NY	E. Rochester, A & D Dvcs.	716-385-2778
OH	Cleveland, Tiby Co.	216-371-5335
OH	Tulsa, Inotek Corp.	918-622-8570
OR	Portland, McLaren, Inc.	503-297-2248
PA	Cheltenham, Stein Instrm.	215-379-1990
TX	Dallas, Inotek Corp.	214-243-7000
TX	Houston, Inotek Corp.	713-688-7000
WA	Bellevue, McLaren, Inc.	206-454-3400

SEVEN MOUNTAINS SCI. INC., P.O. Box 650, Boalsburg, PA 16827, Tel: 814-466-6559; Empl.: 4; *Sls. Mgr.:* Josephine Chesworth

SFE
TECHNOLOGIES

SFE TECHNOLOGIES, 1501 1st St., San Fernando, CA 91340, Tel: 213-365-9411, TWX: 910-496-1535; FSC No.: 96733; Empl.: 2000; *Sls. Mgr.:* Ron Modugno; *Dist. Mgr.:* Ron Modugno ... **A•1168-1171, 1277, 1434, 1630-1631**

Local Sales Offices & Reps

AL	Huntsville, Electronic Sls., Inc.	205-533-1735
AZ	Tucson, West-Cap Arizona	602-294-2646
CA	Milpitas, SFE Technlgs.	415-825-5133
CA	Newport Beach, SFE Technlgs.	714-953-8064
CA	San Diego, SFE Technlgs.	619-747-2789
CA	San Fernando, San Fernando Elec. Div.	818-365-9411
CO	Parker, Parker Webster	303-841-4888
CT	Stratford, Gerald Rosen Co.	203-375-5456
FL	Orlando, Perrott Assocs.	305-298-7748
GA	Norcross, Electronic Sls., Inc.	404-448-6554
IL	Downers Grove, Splon Assocs.	312-963-7011
IA	Cedar Rapids, Stan Clothier Co.	319-395-0245
KS	Shawnee Mission, Electro Dynamics	913-262-2500
LA	New Orleans, SFE Technlgs.	504-254-5070
MD	Baltimore, Micro-Comp	301-247-0400
MA	Framingham, Gerald Rosen Co.	617-879-5505
MI	Southfield, Lepofsky & Assocs.	313-569-6080
MN	Minneapolis, Stan Clothier Co.	612-944-3456
NY	Bethpage, SFE Technlgs.	212-245-7292
NY	Chester, SFE Technlgs.	914-469-9620
NC	Concord, Orchard Elctrns., Inc.	312-625-8400
OH	Dayton, SFE Technlgs.	513-434-8212
OK	Tulsa, Bonser Philhower	918-744-9964
OR	Beaverton, General Elctrns.	503-641-5288
PA	King of Prussia, SFE Technlgs.	215-265-1628
TX	Austin, Bonser Philhower	512-346-9186
TX	Richardson, Bonser Philhower	214-234-8438
UT	Salt Lake City, Parker Webster	801-266-9939
VA	Huddleston, Micro Comp	703-297-7614
Can	Willowdale, Ont., SFE Technlgs.	416-491-0993

Local Distributors

AZ	Tempe, Time Elctrns.	602-967-2000
CA	Chatsworth, Shelley Elctrns.	818-998-3333
CA	Compton, Harper S.I.D.	213-979-5090
CA	Garden Grove, National Capacitor	213-598-9611
CA	Westlake Village, Distel	805-495-9998
CO	Englewood, Time Elctrns.	303-850-7701
CT	Danbury, Diplomat Elctrns.	203-797-9674
FL	Orlando, TTI, Inc.	305-859-1000
GA	Norcross, Diplomat Elctrns.	404-449-4133
IL	Chicago, Nep Elctrns.	312-625-8400
IL	Elk Grove, Diplomat Elctrns.	312-640-1910
IA	Cedar Rapids, Bell Inds.	319-395-0730
MD	White Marsh, Radio Elec. Svc. Co.	301-529-0500
MA	New Haven, Green Shaw	203-397-0710
MN	Plymouth, Diplomat Elctrns.	612-559-2500
NJ	Audubon, Action Elctrns.	609-858-2450
NJ	Maple Shade, Zebra Elctrns.	609-779-8073
NY	Central Islip, Semi Cap	516-582-4400
NY	E. Farmingdale, Tri-Start	516-293-0400
NY	Hauppauge, Fairmont	516-231-3313
NY	Melville, Diplomat Elctrns.	516-454-6400
OH	Fairborn, Aschbacher & Assocs.	513-252-7785
OR	Portland, Time Elctrns.	503-684-3780
PA	Broomall, Time Elctrns.	215-359-1200
TX	Dallas, Diplomat Elctrns.	713-975-8447
TX	Richardson, Jaco Elctrns.	214-235-9575
UT	Salt Lake City, Diplomat Elctrns.	801-486-4134
WA	Redman, Time Elctrns.	206-882-1600
WI	Racine, Badger Elctrn. Parts	414-637-1256

S. F. PRODUCTS CORPORATION, P. O. Box 369, Southport, CT 06490, Tel: 203-929-6180, Telex: 220883 TAUR; Empl.: 8; *Sls. Mgr.:* Norman W. Johanson; *Dist. Mgr.:* R. S. Johanson

SL PLASTICS, Route 248, Nazareth, PA 18064, Tel: 215-759-0280; Empl.: 60; *Sls. Mgr.:* W. Tomko

SL PRINTED CIRCUITS, 827 Black Oak Ridge Rd., Wayne, NJ 07470, Tel: 201-835-2765; Empl.: 34; *Sls. Mgr.:* R. J. Puzo

SGS-ATES SEMICONDUCTOR CORP., 240 Bear Hill Rd, Waltham, MA 02154, Tel: 617-890-6688, Telex: 923495; Empl.: 9000

SGS SEMICONDUCTOR CORPORATION, 1000 E. Bell Road, Phoenix, AZ 85022, Tel: 602-867-6100, Telex: 249976,667479(Western Union), TWX: 910-950-4654; FSC No.: 7X328; Empl.: 200

SHALLCO, Box 1089, Smithfield, NC 27577, Tel: 919-934-3135, TWX: 510-939-1479; Empl.: 35; *Sls. Mgr.:* M. D. Sutton .... **B•1692-1695; D•1036-1037**

Local Sales Offices & Reps

CA	Chatsworth, WCV/RALTECH	818-700-0933
CA	Santa Clara, Fischer Assocs.	408-733-7350
IL	Northfield, Imex	312-446-8934
IA	Cedar Rapids, S & O Sls.	310-393-1845
KS	Shawnee Mission, Tech. Sls.	913-888-3330
MD	Towson, Holden Engrg. Sls.	301-823-3763
MA	Norwood, MPS Elctrn.	617-769-8700
MO	Ferguson, Tech. Sls.	314-725-5361
NY	Lynbrook, HLJ	516-599-2999
NY	Manhattan, Lothar Sanford Corp.	212-757-3881
NY	Pittsfield, D. Hurley Sls.	716-586-6159
OH	Englewood, Allen Nace Co.	513-836-0931

Local Distributors

FL	Jacksonville, Southeast Elctrns.	904-356-3007
MI	Grand Rapids, Audio Distr.	616-452-1596
OH	Cincinnati, United Radio	513-761-4030
PA	Philadelphia, Philadelphia Elctrns.	215-568-7400
TN	Bristol, Broadcast Equip. & Supp.	615-878-2531
TX	Dallas, Wholesale Elctrns.	214-824-3001
Can	Montreal, Que., Braydon Electro	514-332-5650

SHALLCROSS, INC., See RCL-Shallcross

SHALLTRONIX CORP., Preston St., P.O. Box 235, Selma, NC 27576, Tel: 919-965-6346; FSC No.: 58258; *Sls. Mgr.:* Joe Deans .... **D•1307**

Local Sales Offices & Reps

TX	Arlington, Electronic Prod. Reps.	817-467-0377

SHAPE MAGNETRONICS, INC., 901 DuPage Ave., Lombard, IL 60148, Tel: 312-620-8394, TWX: 910-991-2352; *Sls. Mgr.:* J. Hilgenberg .... **D•1960-1961**

SHAPIRO SCIENTIFIC INST., 3500 E. Coast Hwy., Corona del Mar, CA 92625, Tel: 714-675-1024; Empl.: 7

SHELLY
associates

SHELLY ASSOCIATES, INC., 14281 Chambers Road, Tustin, CA 92680, Tel: 714-669-9850, Telex: 85-2263; FSC No.: 00303; Empl.: 30; *Sls. Mgr.:* Chuck Feeney; *Dist. Mgr.:*

Chuck Feeney ..... **B•1093**

Local Sales Offices & Reps

AL	Mobile, Hollingsworth & Still, Inc.	800-241-5712
CA	Mountain View, Leddy Assocs.	415-969-6313
CA	Redondo Beach, Vedax, Inc.	213-540-1255
FL	Ft. Lauderdale, Hollingsworth & Still, Inc.	800-241-5712
FL	Tampa, Hollingsworth & Still, Inc.	800-241-5712
GA	Norcross, Hollingsworth & Still, Inc.	800-241-5712
IL	Chicago, Electro-Tech Mktg. Assocs.	312-676-3151
IN	Ft. Wayne, Scott Elctrns.	219-484-7865
IN	Indianapolis, Scott Elctrns. Inc.	317-897-9976
LA	Covington, HBT Assocs. Inc.	504-892-4045
MA	Plainville, Enterprise Technlg.	617-695-4700
MN	Mound, Allyn Assocs.	612-472-4784
MO	Grandview, R. R. Burton & Assocs.	816-763-5385
MO	St. Louis, R. R. Burton & Assocs.	314-647-6353
NJ	Boonton, TMA	201-263-2946
NJ	Sicklerville, Brown Assocs.	609-629-2240
NY	Port Washington, TMA	516-883-2432
NC	Charlotte, Hollingsworth & Still, Inc.	800-241-5712
NC	Kernersville, Hollingsworth & Still, Inc.	800-241-5712
OH	Cincinnati, Scott Elctrns.	513-791-2513
OH	Cleveland, Scott Elctrns. Inc.	216-473-5050
OH	Dayton, Scott Elctrns. Inc.	513-294-0539
OH	Reynoldsburg, Scott Elctrns.	614-863-1281
OR	Dallas, Ecco Mktg.	503-228-6401
PA	Pittsburgh, Scott Elctrns.	412-963-6116
TX	Austin, Milco Mktg., Inc.	713-723-5003
TX	Dallas, Milco Mktg., Inc.	214-783-2716
TX	Houston, Milco Mktg., Inc.	713-723-5003
WA	Seattle, Ecco Mktg.	206-364-0200
WI	Brookfield, Electro-Tech Mktg. Assocs.	414-785-9554

Local Distributors

CA	Anaheim, Bisco Inds. Inc.	714-635-0380
CA	San Jose, Bisco Inds. Inc.	408-946-8980
CT	Norwalk, Park Distrs. Inc.	203-853-2010
CT	Wallingford, Midstate Elctrns. Co.	203-265-9900
FL	Clearwater, Jenkins Supp. Co., Inc.	813-584-5282
IL	Franklin Park, Bisco Inds. Inc.	312-451-1230
IN	Indianapolis, Mar Elctrns., Inc.	317-875-4510
IA	Cedar Rapids, Iowa Radio Supp. Co.	319-393-4510
LA	Harvey, AFG Elctrns. Supp.	504-368-9696
MA	Chelmsford, Pilgrim Elctrns.	617-251-8746
MA	Woburn, Elctrn. Packaging Comps.	617-935-0400
NJ	Cranford, Garden State Indl. Elctrns.	201-272-6400
NJ	East Brunswick, Brothers Elctrns.	201-238-2200
NJ	Fair Lawn, Relay Specialties	201-797-3313
NJ	Saddle Brook, Tide Elctrns.	201-794-9660
NY	Elmsford, White Plains Elctrl. Supp. Co.	914-592-9555
OH	Dayton, Televox, Inc.	513-294-4499
OH	Strongsville, Roberts Elctrns. Co., Inc.	216-238-1711
OK	Tulsa, Radio, Inc.	918-587-9123
TX	Dallas, Wilkinson Brothers Co.	214-941-9963
WI	Mequon, Lakeview Elctrns.	414-377-8250

SHIELDING TECHNOLOGY, INC., 120 Ethel Rd. West, Piscataway, NJ 08854, Tel: 201-985-8800, TWX: 710-480-6297; *Sls. Mgr.:* Mason Carter

SHINANO KENSHI CORP. (SKC), 7525 Ethel Ave., Ste. 1, N. Hollywood, CA 91605, Tel: 818-764-4266; Empl.: 5; *Sls. Mgr.:* William F. Dowis ..... **B•1187**

Local Sales Offices & Reps

CA	North Hollywood, Shinano Kenshi Corp.	818-764-4266
CA	Santa Clara, Logan Sales	408-496-0660
CO	Denver, Tech Rep Sls. Co.	303-758-7031
CT	Bloomfield, SIR Assocs.	203-243-9343
FL	Sarasota, Phoenix Comps., Inc.	813-371-1163
IL	Barrington, Richard Fisk Mktg.	312-381-0653
MA	Bedford, SIR Assocs.	617-275-5550
MI	Southfield, Fred Gehrke & Assoc.	313-559-5363
MN	Eagan, J. Jorgenson & Assoc.	612-452-9541
NJ	Hatboro, PA, Electro Rep	215-674-4421
NJ	Oxford, Malin Assocs.	201-689-7398
NC	Greenville, Ranico Representatives	615-639-7696
OK	Oklahoma City, Precision Technlg. Assocs.	405-755-3103
OR	Portland, Intertech Sls.	503-775-7885
TN	Greenville, Lamons Sales Co.	615-639-8711
TX	Austin, Precision Technlg. Assocs.	512-250-0201
TX	Richardson, Precision Technlg. Assoc.	214-234-8071

SHOGYO

SHOGYO INTL. CORP., 287 Northern Blvd., Great Neck, NY 11021, Tel: 516-466-0911, Telex: 4758024, TWX: 12218 ..... **A•2037, 2270-2271; B•1094-1096; C•1506-1508, 1905; D•1038, 1376**

SHOKAI FAR EAST, LTD., 280 North Central Ave., Hartsdale, NY 10530, Tel: 914-681-0700, Telex: 22-4219; Empl.: 362; *Sls. Mgr.:* Bob Craig ..... **D•1039**

SHOW 'N TELL PRODUCTS, AMG, Inc., 155 Franklin Street, Dayton, OH 45402, Tel: 513-223-8211; *Sls. Mgr.:* Jon A. Bloyd

OPTIMEM, 435 Oakmead Parkway, Sunnyvale, CA 94086, Tel: 408-737-7373, TWX: 910-339-9615; Empl.: 140; *Sls. Mgr.:* Tom Jarrett; *Dist. Mgr.:* Tom Jarrett

SHURE BROS., 222 Hartrey Ave., Evanston, IL 60204, Tel: 312-866-2200, Telex: 72-4381, TWX: 910-231-0048; *Sls. Mgr.:* R. T. Murphy

SHURITE METERS, INC., 577 Grand Ave., P.O. Box 1848, New Haven, CT 06508, Tel: 203-624-1188; Empl.: 30; *Sls. Mgr.:* Joseph V. LeBlanc; *Dist. Mgr.:* Joseph V. LeBlanc

SIDAC ENCLOSURES, Div. of Triac Electronic Systems, Inc., 87-27 Myrtle Ave., Glendale, NY 11385, Tel: 718-441-4728; Empl.: 14; *Sls. Mgr.:* Victor Botnick ..... **C•1082**

SIDEREAL CORP., 9600 S.W. Barnes Rd., Portland, OR 97225, Tel: 503-297-5531, Telex: 36-0640, TWX: 910-464-6139; *Sls. Mgr.:* Jim Miller & Jeff Gretz; *Dist. Mgr.:* Joy Sakata

SIECOR CORP., Box 489, Hickory, NC 28603, Tel: 704-328-2171, Telex: 800-510, TWX: 510-934-1204; Empl.: 600; *Sls. Mgr.:* J. English

SIEMENS COMPS., INC., Optoelectronics Div., 19000 Homestead Rd., Cupertino, CA 95014, Tel: 408-257-7910, Telex: 352084, TWX: 910-338-0022; FSC No.: 50579; Empl.: 1100; *Sls. Mgr.:* Gary Durgin; *Dist. Mgr.:* Kathy Renz

SIEMENS COMPONENTS, INC., 186 Wood Ave., S., Iselin, NJ 08830, Tel: 201-321-3400, TWX: 710-998-0588/0529; Empl.: 800

Sierracin/Magnedyne

SIERRACIN/MAGNEDYNE, 2258 Rutherford Rd., P.O. Box 458, Carlsbad, CA 92008, Tel: 619-438-3321, Telex: 910 322-1391; Empl.: 190 ..... **B•1188-1189**

Local Sales Offices & Reps

AZ	Scottsdale, Terry Thatford	602-998-3009
CA	Campbell, Luscombe Engrg. Co.	408-370-2020
CA	Laguna Beach, Comar Co.	714-250-0140
CA	Palos Verdes, Clay Walters	213-541-6361
CA	San Diego, Comar Co., Inc.	619-565-6097
CA	Torrance, Carl J. Aguirre	213-541-6361
CT	Tolland, Don Fontaine	203-875-0720
FL	Deerfield Beach, Electrocomp Assocs.	305-429-0802
FL	St. Petersburg, Electro Comp. Assocs.	813-327-9677
GA	Atlanta, L & D Inc.	404-455-3483
IL	Rolling Meadows, KMA Sls. Co.	312-398-5300
MD	Churchville, Atlantic Tech. Sls.	301-879-2236
MI	Troy, Xanthus, Inc.	313-528-2000
MN	Minneapolis, North Star Motion & Controls	612-545-0586
MN	St. Paul, North Star Motion & Controls	612-770-5311
NY	Hasbrouck Hgts., Carnes Diamond Assocs.	516-694-1600
NY	Melville, Carnes Assocs.	315-446-2346
NY	Pittsford, Controlled Motion Prods. Co.	716-381-1933
NY	Syracuse, Controlled Motion Prods.	315-424-0839
NC	Greensboro, L & D Inc.	919-292-3201
OH	Cleveland, Servo-Mark	216-871-2353
PA	Morristown, Rivco January	215-631-1414
TX	Austin, The Thorson Co.	512-451-7527
TX	Dallas, Thorson Co.	214-233-5744
TX	Houston, The Thorson Co.	713-771-3504
VA	Richmond, L & D, Inc.	804-257-7717
WA	Bellevue, Quest Mktg.	206-747-9424
WI	Milwaukee, KMA Sls. Co.	414-259-1771

Sierracin/Power Systems

SIERRACIN/POWER SYSTEMS, 20500 Plummer St., Chatsworth, CA 91311, Tel: 818-998-9873, TWX: 910-494-4830; FSC No.: 58999; Empl.: 450; *Sls. Mgr.:* Nick Freyling; *Dist. Mgr.:* Julius Hirsh ..... **D•1834-1836**

Local Sales Offices & Reps

AZ	Scottsdale, Fred Board Assocs.	602-994-9388
AZ	Tucson, Fred Board Assocs.	602-299-1508
CA	Huntington Beach, J. J. Riley Assocs.	714-841-1411
CA	San Jose, Fahrner-Miller Assocs.	408-727-9800
CO	Denver, Wm. J. Purdy Co.	303-753-6800
CT	Meriden, Whitehead Assocs.	203-634-1280
FL	Altamonte Springs, Semtronic	305-831-8233
FL	Clearwater, Semtronic	813-461-4675
IL	Elk Grove Village, John G. Twist Co.	312-593-0200
IN	Noblesville, KW Elctrns. Sls.	317-773-5536
IA	Cedar Rapids, Comstrand	319-377-1575
KS	Merriam, Midwest Tech. Sls.	913-236-8555
KS	Wichita, Midwest Tech. Sls.	316-262-7240
KY	Louisville, KW Elctrn. Sls.	502-451-1860
MD	Columbia, Delta III Assocs., Inc.	301-730-4700
MA	Wakefield, Whitehead Assocs.	617-246-5070
MI	Novi, Lektronics	313-349-3304
MN	Bloomington, John G. Twist Co.	612-835-2120
MN	Minneapolis, Comstrand	612-788-9234
MO	St. Charles, Midwest Tech. Sls.	314-441-1012
NJ	Franklin Lake, Hansen & Hughes	201-848-8900
NJ	Marlton, BGR Assocs.	609-983-1020
NM	Albuquerque, Fred Board Assocs.	505-293-1399
NY	Batavia, Tech-Mark, Inc.	716-343-2568
NY	Endicott, Tech-Mark, Inc.	607-748-7473
NY	Greenlawn, Hansen & Hughes	516-754-3608
NY	Mendon, Tech-Mark, Inc.	716-624-3840
NY	Utica, Tech-Mark, Inc.	315-733-0575
NC	Raleigh, J & B Sls.	919-878-8600
OH	Dayton, K. W. Elctrn. Sls.	513-890-2150
OH	Shaker Heights, K. W. Elctrn. Sls.	216-491-9177
OH	Worthington, K. W. Elctrn. Sls.	614-888-0483
OR	Beaverton, Wm. J. Purdy Co.	503-641-9373
PA	Allison Park, K. W. Elctrn. Sls.	412-487-4300
TN	Tullahoma, J. & B Sls.	615-455-7487
TX	Austin, Kruvand Assocs.	512-441-6777
TX	Dallas, Kruvand Assocs.	214-437-3355
TX	Houston, Kruvand Assocs.	713-780-9710
UT	Salt Lake City, Wm. J. Purdy Co.	810-486-8557
WA	Redmond, Wm. J. Purdy Co.	206-882-3144
WI	Brookfield, John G. Twist Co.	414-782-2670

Local Distributors

AL	Huntsville, Hall-Mark Elctrns. Corp.	205-837-8700
AZ	Phoenix, Hallmark Elctrns. Corp.	602-437-1200
CA	Canoga Park, Hallmark Elctrns. Corp.	818-716-7300
CA	Chatsworth, Priority One	818-709-6789
CA	Citrus Heights, Hall-Mark Elctrns. Corp.	916-722-8600
CA	Costa Mesa, FLW	714-751-7512
CA	El Segundo, Hall-Mark Elctrns. Corp.	213-643-9101
CA	Hayward, FLW, Inc.	415-786-9070
CA	San Diego, FLW	619-277-0993
CA	San Diego, Hall-Mark Elctrns. Corp.	619-268-1201
CA	San Jose, Hallmark Elctrns. Corp.	408-946-0900
CA	Tustin, Hall-Mark Elctrns. Corp.	714-359-0330
CA	Van Nuys, FLW, Inc.	818-989-5237
CO	Englewood, Hall-Mark Elctrns. Corp.	303-694-1662
CT	Wallingford, Hallmark Elctrns. Corp.	203-269-0100
FL	Clearwater, Hall-Mark Elctrns. Corp.	813-530-4543
FL	Orlando, Hall-Mark Elctrns. Corp.	305-855-4020
FL	Pompano Beach, Hall-Mark Elctrns. Corp.	305-971-9280
FL	Tampa, Reptron	813-855-4656
GA	Norcross, Hall-Mark Elctrns. Corp.	404-447-8000
GA	Norcross, Reptron Elctrns.	404-446-1300
IL	Schaumburg, Reptron Elctrns.	312-882-1700
IL	Woodale, Hall-Mark Elctrns. Corp.	312-860-3800
KS	Lenexa, Hall-Mark Elctrns. Corp.	913-888-4747
MD	Columbia, Hall-Mark Elctrns. Corp.	301-988-9800
MA	Billerica, Hallmark Elctrns. Corp.	617-935-9777
MI	Grand Rapids, Calder Elctrns.	616-949-2900

MI	Livonia, Reptron Elctrns.	313-525-2700
MN	Bloomington, Hall-Mark Elctrns. Corp.	612-854-3223
MO	Earth City, Hall-Mark Elctrns. Corp.	314-291-5350
NJ	Fairfield, Hall-Mark Elctrns. Corp.	201-575-4415
NJ	Mt. Laurel, Hall-Mark Elctrns. Corp.	609-235-1900
NY	Ronkonkoma, Hall-Mark Elctrns. Corp.	516-737-0600
NC	Raleigh, Hall-Mark Elctrns. Corp.	919-872-0712
OH	Cincinnati, Schuster Elctrn. Co.	513-489-1400
OH	Solon, Hall-Mark Elctrns. Corp.	216-349-4632
OH	Worthington, Hall-Mark Elctrns. Corp.	614-888-3313
OH	Worthington, Reptron Elctrns.	614-888-3313
OK	Tulsa, Hall-Mark Elctrns. Corp.	918-665-3200
OR	Wilsonville, Zepher-Ragon	503-682-2929
TX	Austin, Hall-Mark Elctrns. Corp.	512-258-8848
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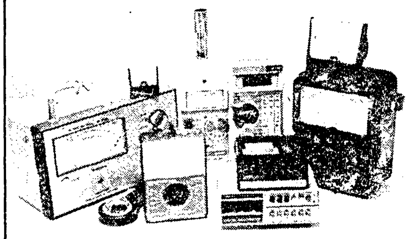

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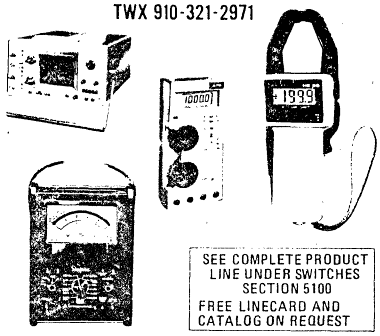

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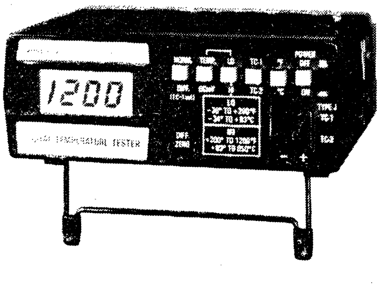

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IL	Northbrook, Wm. M. Linz Assocs.	312-498-9600
MD	Silver Spring, David S. Linz Co.	301-593-2477
MA	Scituate, K. J. Walsh & Assocs.	617-545-3145
MI	Southfield, Robert Milsk Co.	313-354-3310
MN	Minneapolis, Hei-Lite Sls.	612-861-6051
MO	Blue Springs, Kathrinus-Kelly-Baumhauer	816-229-0001
MO	St. Louis, Kathrinus-Kelly-Baumhauer	314-627-2400
NM	Albuquerque, C. T. Carlberg & Assocs.	505-888-3883
NY	Rochester, Warren Kaufman & Assocs.	716-266-2728
NY	Whitestone, Jack Brown Sls.	212-769-1979
NC	Kernersville, Hollingsworth & Still	919-996-4622
OH	Beachwood, Elctrn. Salesmasters	216-831-9555
OR	Beaverton, Wm. J. Purdy Co.	503-641-9373
PA	Philadelphia, David S. Linz Co.	215-379-0734
PA	Pittsburgh, Covert & Newman Co.	412-531-2002
WA	Redmond, Wm. J. Purdy Co.	206-882-3144

Local Distributors

AL	Huntsville, Mock Elctrns.	205-539-2401
AZ	Phoenix, Parts Elctrn.	602-258-6476
AZ	Tucson, Inland Elect.	602-889-5301
AR	Little Rock, Carlton Bates Co.	501-562-9100
CA	Berkeley, Al Lasher's Dealer Elect.	415-843-5915
CA	Canoga Park, Sandy's Elctrn. Supp.	213-346-8353
CA	Costa Mesa, MarVac Elctrns.	714-540-3280
CA	El Monte, Claude Michael	213-696-0141
CA	Fullerton, Orvac Elctrns.	714-871-1020
CA	Gardena, California Switch & Signal	213-770-2330
CA	Glendale, Western Elctrns.	213-246-4861
CA	Hollywood, Pacific Radio Exch.	213-462-1393
CA	Hollywood, Yale Radio	213-465-3186
CA	Mountain View, Abacus Elctrns.	415-961-1500
CA	Oakland, Brill Elctrns.	415-834-5888
CA	Palo Alto, Zack Elctrns.	415-326-5432
CA	Pasadena, Dow Radio	213-793-1195
CA	Riverside, Electronic Supp.	714-836-7300
CA	San Diego, Shanks & Wright	714-239-0176
CA	San Francisco, Zack Elctrns.	415-626-1444
CA	San Jose, Quement Elctrns.	408-998-5900
CA	Sunnyvale, Com-Kyl	408-734-9660
CO	Denver, Denver Wintronics	303-934-2406
CO	Denver, Elctrn. Parts	303-744-1992
CT	Stamford, Mar Le Co.	203-348-2645
CT	Waterbury, Suburban Supp.	203-757-1251
FL	Miami, Elctrn. Equip.	305-871-3500
FL	Miami, ESL Elctrn. Distrs.	305-633-6973
FL	Orlando, Hammond Elctrns.	305-849-6060
FL	Pensacola, Grice Elctrns.	904-434-2481
GA	Atlanta, Ack Radio Supp.	404-351-6340
GA	Atlanta, Specialty Distrib.	404-873-2521
IL	Chicago, Newark Elctrns.	312-638-4411
IL	Elk Grove Village, GBL Elctrns.	312-593-3220
IL	Niles, Joseph Elctrns.	312-297-4200
IL	Northbrook, Classic Comps.	312-272-9650
IL	Palatine, Ohm Elctrns.	312-359-5500
IL	Peoria, Klaus Radio & Elctrns.	309-691-4840
IL	Rockford, Mid-West Associated	815-962-8036
IN	East Chicago, Acro Elctrns.	312-357-1269
IN	Ft. Wayne, Ft. Wayne Elctrns.	219-423-3422
IN	Indianapolis, Graham Elctrns.	317-634-8202
IN	Indianapolis, Meunier Elect.	317-635-3511
IN	Indianapolis, Radio Distrib.	317-257-2231
IN	Terre Haute, Midwest Supp. Elec.	812-232-0187
KY	Lexington, Radio Elctrn. Equip.	606-255-6661
KY	Louisville, P.I. Burks Co.	502-589-3960
KY	Louisville, Peerless Elctrn. Equip.	502-637-7674
LA	Lafayette, Ralphs of Lafayette	318-234-4507
LA	Shreveport, Industrial Elect.	318-222-9459
MD	Baltimore, ASI Elctrns.	301-265-5100
MD	Baltimore, Radio Elctrn. Svc. Co.	301-823-0700
MD	Gaithersburg, Pioneer/Wash. Elect.	301-948-0710
MD	Rockville, Capitol Radio Whlsrs.	301-881-2270
MA	Hingham, Sager Elec. Supp.	617-749-6700
MA	Lynn, Land Elec. Supp.	617-592-2220
MA	Needham, You-Do-It Elctrns.	617-449-1005
MA	Newton Upper Falls, In-Stock Prods. Co.	617-964-6200
MA	Norwood, Gerber Elctrns.	617-769-6000
MA	W. Newton, A. W. Mayer Co.	617-965-1111
MI	Ann Arbor, Wedemeyer Elect. Supp.	313-665-8611
MI	Detroit, RS Elctrns.	313-491-1012
MN	Minneapolis, Electronics Ctr.	612-371-5200
MN	Minneapolis, Stark Elctrns.	612-332-1325
MS	Jackson, Ellington Elect. Supp.	601-355-0561
MO	Kansas City, Electronic Supp. Co.	816-921-0250
MO	Kansas City, Walters Radio Supp.	816-531-7015
MO	St. Louis, Olive Indl. Elect.	314-863-7800
MO	St. Louis, Van Sickle Radio	314-621-5000
NE	Lincoln, Scott Elec. Supp.	402-466-8221
NE	Omaha, Radio Equip.	402-341-7700
NH	Hudson, C & H Elctrns.	603-882-1133
NJ	Camden, General Radio Supp.	609-964-8560
NJ	Hanover, State Elctrn. Parts	201-887-2550
NJ	Springfield, Federated Purchaser	201-376-8900
NJ	Springfield, Route Elctrns.	201-467-0166
NM	Albuquerque, Electronic Parts	505-293-6161
NM	Albuquerque, Walker Radio Co.	505-247-2288
NY	Buffalo, Summit Distrib.	716-884-3450
NY	Farmingdale, Fordham Radio	516-752-0500
NY	Hauppauge, Broadline Elctrns.	516-420-8320
NY	Hempstead, Davis Elctrns.	516-483-9200
NY	Long Island City, H. L. Dalis, Inc.	212-361-1117
NY	New York, Argil Elctrns.	212-691-8111
NY	Portchester, Wise Comps.	203-531-4880
NY	Rochester, Masline Elctrns.	716-546-5373
NY	Rochester, Simcona Elctrns.	716-328-3230
NY	Rome, Rome Elctrns.	315-337-5400
NY	Schenectady, Adirondack Elctrns.	518-842-8350
NC	Raleigh, Southeastern Radio Supp.	919-828-2311
OH	Akron, Akron Elctrn. Supp.	216-762-8818
OH	Cincinnati, Hughes-Peters	513-351-2000
OH	Cincinnati, United Radio	513-662-2610
OH	Cleveland, Pattison Supp.	216-441-3000
OH	Cleveland, Pioneer-Standard Elect.	216-587-3600
OH	Columbus, Hughes-Peters	614-294-5351
OH	Dayton, Becker Elctrns.	513-226-1341
OH	Dayton, ESCO, Inc.	513-226-1133
OH	Dayton, Pioneer Elctrns.	513-236-9900
OH	Dayton, Stotts-Friedman	513-298-5555
OH	Solon, Repco	216-248-8900
OH	Toledo, Warren Radio	419-248-3364
OK	Oklahoma City, Trice Whlsl. Elect.	405-524-4411
OK	Tulsa, Radio, Inc.	918-587-9123
OR	Portland, EOFF Elec.	503-222-9411
PA	Allentown, A. A. Peters	215-434-5237
PA	Huntingdon Valley, Shap Elctrns.	215-322-7150
PA	Philadelphia, Almo Elctrns.	215-698-4000
PA	Philadelphia, Herbach & Rademan	215-426-1700
PA	Philadelphia, Philadelphia Elctrns.	215-568-7400
PA	Plymouth Meeting, Techni-Tool	215-825-4900
PA	Reading, Barbey Elctrns.	215-376-6116
RI	Providence, Wm. Dandreta & Co.	401-861-2800
SC	Charleston, Wholesale Radio Supp.	803-747-9672
TN	Chattanooga, Curle Elctrns.	615-266-4727
TN	Kingsport, Radio Elect. Supp.	615-247-8111
TN	Nashville, Electra Distrib.	615-329-3971
TN	Nashville, Randolph & Rice	615-255-5602
TX	Austin, Harrison Ind. Elctrns.	512-458-3555
TX	Corpus Christi, Douglas Elctrns.	512-883-5103
TX	Dallas, KA Elect. Sls.	214-634-7870
TX	Dallas, Wallace Elctrns.	214-340-0400
TX	Dallas, Wholesale Elect. Supp.	214-824-3001
TX	Ft. Worth, Sweico	817-335-6521
TX	Houston, City Electronic Supp.	713-621-1060
TX	Houston, Electrotex	713-941-7016
TX	Houston, Harrison Ind. Elctrns.	713-652-4700
TX	Houston, Lenert Co.	713-225-1465
TX	San Antonio, Sherman Elect. Supp.	512-224-1001
UT	Salt Lake City, Standard Supp.	801-486-3371
VA	Arlington, Arlington Elctrn.	703-524-2412
VA	Portsmouth, Distributors	804-399-2446
VA	Richmond, Avec Elctrns.	804-359-6071
VA	Roanoke, Peoples Radio & TV Supp.	703-342-8933
WA	Seattle, Radar Elect.	206-282-2511
WI	Madison, Satterfield Elctrns.	608-257-4801
WI	Milwaukee, Marsh Elctrns.	414-475-6000

SMC SOFTWARE SYS., Science Management Corp., P. O. Box 0600, Basking Ridge, NJ 07920, Tel: 201-647-7000; Empl.: 35; *Sls. Mgr.:* Edwin J. Schnell; *Dist. Mgr.:* Margaret Langsett

SMD TECHNOLOGY SVC. CTR., A North American Philips Co., 5855 N. Glen Pk. Rd., Milwaukee, WI 53209, Tel: 800-431-4444; *Sls. Mgr.:* F. Funk

HHSmith

KULKA SMITH, INC., 1913 Atlantic Ave., Manasquan, NJ 08736, Tel: 201-223-9400, TWX: 244536; FSC No.: 83330; Empl.: 500; *Sls. Mgr.:* S. Fleischman; *Dist. Mgr.:* S. Fleischman ...... **C•1509, 1693**

Local Sales Offices & Reps

AZ	Phoenix, Shefler-Kahn	602-257-9015
CA	Los Angeles, E.E. Strassner Co.	213-242-8823
CA	Santa Clara, Warren Assocs.	408-988-7762
CO	Denver, Lindberg Co.	303-758-9033
CT	North Haven, Coakley, Boyd & Abbett	203-239-6217
FL	Ft Lauderdale, Hollingsworth & Still	404-447-1700
FL	Miami, Hollingsworth & Still	404-447-1700
FL	Tampa, Hollingsworth & Still	404-447-1700
IL	Chicago, RMP/McBride Sls.	312-932-9090
IN	Indianapolis, Elctrn. Reps.	317-894-1414
KS	Shawnee Mission, Lowell Kangas & Assocs.	913-631-3515
TX	Dallas, J. Y. Schoonmaker	214-349-1650
MA	Needham Hgts, Coakley, Boyd & Abbett	617-444-5470
MA	Woburn, W&D Mktg.	617-935-5610
MI	Farmington Hills, R. C. Merchant	313-476-4600

MN	Minneapolis, Electric Comp. Sls.	612-933-2594
MO	St. Louis, Lowell Kangas & Assoc.	314-821-4050
NH	Plaistow, Coakley, Boyd & Abbett	617-444-5470
NM	Albuquerque, Shefler-Kahn	505-296-0749
NY	Buffalo, L.D. Allen	716-837-1955
NY	N. Syracuse, L.D. Allen	315-437-8387
NY	Rochester, Warren Kaufman	716-266-2728
NY	Whitestone, Jack Brown Elctrn.	212-767-1977
OH	Richfield, Bear Mktg.	216-659-3131
OR	Portland, Weber, Dale	503-234-7671
PA	Trevose, P.S.A., Inc.	215-245-0513
MA	Needham, Coakley, Boyd & Abbett	617-444-5470
TX	Dallas, J. Y. Schoonmaker	214-349-1650
WA	Seattle, Weber, Dale	206-623-5990

SMK ELCTRNS. CORP., U.S.A., 1901 Nancita Cir., Placentia, CA 92670, Tel: 714-996-0960, Telex: 18-3081; FSC No.: 637-7400; Empl.: 84; *Sls. Mgr.:* Charles Sochalec; *Dist. Mgr.:* Rudy Cicciarelli

SMOKE SIGNAL, 31336 Via Colinas, Westlake Vlg., CA 91362, Tel: 818-889-9340, Telex: 9104044065; Empl.: 20; *Sls. Mgr.:* Don Simonsen; *Dist. Mgr.:* Colleen Kirkpatrick

SOFTWARE DYNAMICS, 2111 W. Crescent Ave-G, Anaheim, CA 92801, Tel: 714-635-4760

SOHIO ENGINEERED MATERIALS CO., Unit of Sohio, P. O. Box 156, Niagara Falls, NY 14302, Tel: 716-278-2000; Empl.: 2000 ... **A•1172, 1944-1947; B•1772**

SOKOL CRYSTAL PRODS. DIV., 6050 N. 52nd Ave., Glendale, AZ 85301, Tel: 602-934-2108

SOKOL CRYSTAL PRODS., INC., 121 Water St., Mineral Point, WI 53565, Tel: 608-987-3363, Telex: 467581; FSC No.: 56187; Empl.: 150; *Sls. Mgr.:* Steven M. Sokol .... **A•1435-1437**

Local Sales Offices & Reps

CA	Pinole, Ron May	415-724-1203
FL	Clearwater, Brennan & Assocs.	813-446-5006
IL	Medinah, Wavan Assocs.	312-893-0210
IN	Fort Wayne, John Kilfoil Co.	219-436-7233
IA	Marion, Rep. Assocs.	319-373-0152
KS	Parker, S. W. Wollard Co.	913-898-6552
MA	Millis, Selmark Assocs.	617-376-2914
MN	Bloomington, V. J. Gensmer Assocs.	612-888-2492
MO	St. Louis, Abrams & Assocs.	314-569-0447
NJ	Flanders, K & R Engrg. Sls. Corp.	201-584-5235
TX	Dallas, Stevens Sls. Co.	214-350-2476
WA	Kirkland, Manon Engrg., Inc.	206-827-7449

SOLA, A Unit of General Sign., 1717 Busse Rd., Elk Grove Village, IL 60007, Tel: 312-439-2800, Telex: 280538; *Sls. Mgr.:* Fred Lemke ...... **D•1838-1839, 1964-1967**

Local Sales Offices & Reps

AL	Huntsville, Cartwright & Bean, Inc.	205-830-1540
AZ	Phoenix, Zeus Elctrns., Inc.	602-263-6022
AR	Little Rock, Erickson Sls., Inc.	501-225-7379
CA	Los Angeles, Wiley Co.	213-666-1611
CA	Pleasanton, Moulthrop Sls., Inc.	415-463-0450
CA	San Diego, Wiley Co.	619-571-2881
CT	Mystic, J.M.G., Inc.	203-599-5373
FL	Orlando, Cartwright & Bean, Inc.	305-422-4531
GA	Atlanta, Cartwright & Bean, Inc.	404-233-2939
IL	Chicago, Industrial Reps.	312-647-7755
IN	Indianapolis, Green-Wissler Sls.	317-872-9981
IA	Cedar Rapids, R. W. Kunz & Assocs.	319-396-5386
KS	Kansas City, R. W. Kunz & Assocs.	913-648-3535
LA	Chalmette, Erickson Sls., Inc.	504-271-1976
MI	Farmington Hills, R. C. Merchant	313-476-4600
MN	Minneapolis, Boerger & Assocs.	612-560-3435
NJ	Cherry Hill, Trinkle Sls.	609-795-4200
NJ	East Orange, Willgold Sls.	201-678-7700
NY	Rochester, LMar Assocs.	716-323-1000
NC	Raleigh, Cartwright & Bean, Inc.	919-876-4130
OH	Columbus, Baehr, Greenleaf & Assocs.	614-486-4046
OH	Dayton, Baehr, Greenleaf & Assocs.	513-439-0724
OH	Lakewood, Baehr, Greenleaf & Assocs.	216-221-9030
OK	Broken Arrow, Erickson Sls., Inc.	918-455-4276
TN	Knoxville, Cartwright & Bean, Inc.	615-693-7450
TX	Austin, Erickson Sls.	512-244-3068
TX	Dallas, Erickson Sls.	214-739-5833
TX	Houston, Erickson Sls.	713-266-1604
WI	Milwaukee, Industrial Reps.	414-259-0965

SOLARCON TECHNOLOGY, INC., P.O. Box 4715, Hayward, CA 94544, Tel: 415-489-3141; Empl.: 9; *Sls. Mgr.:* Rose Ferguson

Local Sales Offices & Reps

CA	Laguna Hills, Reese Riley & Assocs.	714-859-9827
CA	San Ramon, Reese Riley & Assocs.	415-961-0565
MI	Southfield, Infinity, Inc.	313-557-7230
OH	Solon, Infinity, Inc.	216-248-9377
PA	Pittsburgh, Infinity, Inc.	412-821-6389
WA	Belview, Reese Riley & Assocs.	206-462-8088

SOLAR ELCTRNS. CO., 901 N. Highland, Hollywood, CA 90038, Tel: 213-462-0806; FSC No.: 13222; Empl.: 15

SOLAREX CORP., 1335 Piccard Dr., Rockville, MD 20850, Tel: 301-948-0202, TWX: 710-828-9709; *Sls. Mgr.:* Ted Blumemstock

SOLARTRON INSTRUMENTS, Sangamo Weston, Inc., 2 Westchester Plaza, Elmsford, NY 10523, Tel: 914-592-9168, Telex: 145-487; FSC No.: 1T316; Empl.: 21; *Sls. Mgr.:* Malcolm J. Swanson

SOLATRON ENTERPRISES, 421 E. Beach Ave., Inglewood, CA 90302, Tel: 213-678-4981; Empl.: 20

SOLDER ABSORBING TECHNOLOGY (SAT), South End Bridge Circle, Agawam, MA 01001, Tel: 800-628-8862, TWX: 710-350-6466; Empl.: 8

SOLDER REMOVAL, P.O. Box 1678, Covina, CA 91722, Tel: 213-967-3681, TWX: 910-584-1820; FSC No.: 34605; *Sls. Mgr.:* Frank Hennessy; *Dist. Mgr.:* Frank Hennessy

SOLID STATE, INC., 46 Farrand St., Bloomfield, NJ 07003, Tel: 201-429-8700, TWX: 710-994-4780; Empl.: 110; *Sls. Mgr.:* T. King

SOLID STATE CIRCUITS, 3300 S. Golden, Springfield, MO 65807, Tel: 417-887-0823, TWX: 910-775-4762; Empl.: 260; *Sls. Mgr.:* Dennis Stead

SOLID STATE DEVICES, 14830 Valley View Ave., La Mirada, CA 90638, Tel: 213-921-9660, TWX: 910-583-4807; FSC No.: 30043; Empl.: 100; *Sls. Mgr.:* D. Peden

SOLID STATE ELCTRNS. CORP., 18646 Parthenia St., Northridge, CA 91324, Tel: 818-993-8257; FSC No.: 11911; Empl.: 15

SOLID STATE RELAYS, 213 Eisenhower Lane So., Lombard, IL 60148, Tel: 312-932-1660; *Sls. Mgr.:* D. E. Wienke

SOLID STATE SCIENTIFIC, 3900 Welsh Rd., Willow Grove, PA 19090, Tel: 215-657-8400, Telex: 476-1101, TWX: 510-661-7267; Empl.: 650

SOLID STATE SYSTEMS, 1990 Delk Industrial Blvd., Marietta, GA 30067, Tel: 404-952-9401; Empl.: 150; *Sls. Mgr.:* Jason Schloss; *Dist. Mgr.:* J. Schloss

SOLID STATE TESTING, INC., 56 Middlesex Tpke., Burlington, MA 01803, Tel: 617-272-0972, TWX: 710-332-1620; Empl.: 150; *Sls. Mgr.:* James Roberts; *Dist. Mgr.:* James DiGiacomo

SOLITRON DEVICES, 8808 Balboa Ave., San Diego, CA 92123, Tel: 619-278-8780, TWX: 910-335-1221; Empl.: 900

SOLITRON DEVICES, INC., Semiconductor Group, 1177 Blue Heron Rd., Riviera Beach, FL 33404, Tel: 305-848-4311, Telex: 51-3435, TWX: 510-952-7610

SOLITRON/MICROWAVE, Box 278, Port Salerno, FL 33492, Tel: 305-287-5000, TWX: 510-953-7500; FSC No.: 95077; Empl.: 300; *Sls. Mgr.:* James J. McCann

SOLTEC CORP., 11684 Pendelton St., Sun Valley, CA 91352, Tel: 818-767-0044, 800-423-2344, Telex: 494-3094; Empl.: 46; *Sls. Mgr.:* Gary A. Purser

SONIC INTERNATIONAL CORP., 2515 N.E. Riverside, Portland, OR 97211, Tel: 503-665-0187, Telex: 36-0325; Empl.: 130

Sonnenschein

SONNENSCHEIN BATTERIES INC., 300 E. Johnson Ave., P.O. Box 339, Cheshire, CT 06410, Tel: 203-271-0091, Telex: 510-100-7052; *Sls. Mgr.:* R. J. McCarthy .... **D•1438**

Local Sales Offices & Reps

AL	Huntsville, Raycom, Inc.	205-859-2017
CA	Anaheim, Impact Elctrns.	714-533-1351
CO	Golden, J. F. Hurlbut Co.	303-279-7796
CT	Manchester, G/M Assocs.	203-646-4443
IL	Park Ridge, Metcom Assocs. Corp.	312-696-1490
MA	Framingham, G/M Assocs.	617-872-4871
MI	Southfield, R. C. Merchant & Co.	313-354-4300
MI	St. Joseph, R. C. Merchant & Co.	616-983-7378
NH	Exeter, G/M Assocs.	603-778-7472
NC	Raleigh, Raycom, Inc.	919-847-8276
TX	Austin, Delta Comps.	512-458-4288
TX	Seagoville, Delta Comps.	214-287-6333
WA	Portland, Harry Levinson Co.	503-245-1902
WA	Seattle, Harry Levinson Co.	206-382-1300
WI	West Allis, Metcom Assocs. Corp.	414-476-1300

SONICOR INSTRUMENT CORP., 1365 Marconi Blvd., Copiague, NY 11726, Tel: 516-842-3344, Telex: 649494; FSC No.: 31605; *Sls. Mgr.:* Arthur Liers; *Dist. Mgr.:* Arthur Liers

SONOBOND, 200 E. Rosedale Ave., West Chester, PA 19380, Tel: 215-696-4710, Telex: 834511; Empl.: 50; *Sls. Mgr.:* John Harper

SONY CORP. OF AMERICA, Component Prods. Div., 15 Essex Road, Paramus, NJ 07652, Tel: 201-368-5000

SORENSEN CO., 676 E. Island Pond Rd., Manchester, NH 03103, Tel: 603-668-4500, Telex: 94-3459, TWX: 710-220-1339; Empl.: 850; *Sls. Mgr.:* Roy Allman

SORENSON LIGHTED CONTROLS, 75 Locust St., Hartford, CT 06114, Tel: 203-527-3092, TWX: 710-425-4093; Empl.: 100; *Sls. Mgr.:* Tom D'Allesantro .... **B•1102-1103**

Local Sales Offices & Reps

CA	Anaheim, Galaxie Sls.	714-752-1580
CA	Mt. View, Del Bucchia & Assoc.	415-965-8045
CT	Hartford, Atlantic Switch Co.	203-527-7705
FL	Lakeland, Switch Controls	813-644-7564
IL	Wheaton, Chadra-Schilke	312-653-8126
IN	Fort Wayne, Menze Sls.	219-747-5616
MA	Canton, Comtek Assoc.	617-828-2948
MI	Birmingham, Favco	313-644-0173
MN	Edina, Monroe/Hanna	612-566-1324
MO	Clayton, Mertens Co.	314-993-6600
NY	Great Neck, Pacent Eng. Co.	516-482-4678
NC	Raleigh, Rick Hadley	919-362-4099
TX	Dallas, Texaswitch	214-357-1768

Local Distributors

CA	Los Angeles, Electric Switches	213-660-1310
CA	Tustin, Western Switches	714-731-4333
CA	Van Nuys, Pacific Switch Controls	213-873-4802
CT	Hartford, Atlantic Switch Controls	203-527-7705
FL	Lakeland, Switch Controls	813-644-7564
GA	Augusta, Dixie Elctrns.	404-722-2055
IL	Wheaton, Conectrix	312-653-1460
MI	St. Clair Shores, Specialties Mfg.	313-771-2700
MN	Minneapolis, Carl Berquist	612-835-2322
NJ	Mt. Laurel, Jersey Switch	609-778-8190
NY	Woodside, Switches Unltd.	212-478-5000
NC	Charlotte, Dixie Elctrns.	704-377-5413
OH	Columbus, Ohio Switch	614-885-0319
SC	Columbia, Dixie Elctrns.	803-779-5332
TX	Dallas, Texaswitch	214-357-1768
WA	Seattle, Evergreen Mktg.	206-633-3160
EXP	NJ, Ft. Lee, Joseph Gross	201-944-3609

SOSHIN ELEC. CO., 1-18-18 Nakamagome, Ota-Ku, Tokyo, Japan, Tel: (03) 775-2111, Telex: 246-6377; Empl.: 800; *Sls. Mgr.:* N. Hiraide, Exp. & Imp. Dept.

SOUNDCOAT CO., INC., 1 Burt Dr., Deer Park, NY 11729, Tel: 516-242-2200, Telex: 12-5514; *Sls. Mgr.:* Mr. Carl Wolaver

SOUNDLIER, American Trading & Prod. Corp., 9380 Watson Ind'l. Pk., St. Louis, MO 63126, Tel: 314-962-9870, Telex: 910-760-1650; Empl.: 350; *Sls. Mgr.:* Paul Grote; *Dist. Mgr.:* Tony Dalba

SOURIAU, INC., 25158 Avenue Stanford, Valencia, CA 91355, Tel: 805-257-4830, Telex: 4720328, TWX: 910-336-1553; Empl.: 70; *Sls. Mgr.:* Richard Monstein; *Dist. Mgr.:* Alan Rubin

SOUTH AMERICAN DEV. CORP., Rte. 9, G.R.D. Box 413, Hyde Park, NY 12538, Tel: 914-229-8866, Telex: 4990035; Empl.: 80; *Sls. Mgr.:* L. Faber

SOUTHCO, INC., 210 N. Brinton Lake Rd., Concordville, PA 19331, Tel: 215-459-4000, Telex: 83-1485, TWX: 710-760-1715; *Sls. Mgr.:* R. W. Dougherty

SOUTHERN COMPUTER CORP., 3720 N. Stratford Rd. N.E., Atlanta, GA 30342, Tel: 404-231-5363, Telex: 317867; *Sls. Mgr.:* Redd N. Mann; *Dist. Mgr.:* Robert Morris

SOUTHERN ELECTRONICS, F-Dyne, 726 So. Flower St., Burbank, CA 91502, Tel: 213-845-2458, TWX: 910-498-5707; Empl.: 100; *Sls. Mgr.:* Ron Head

SOUTH SHORE METAL PRODS., 88 E Allen Blvd., Farmingdale, NY 11735, Tel: 516-249-3322; Empl.: 30; *Sls. Mgr.:* A. G. Bauer

SOUTHWEST TECH PRODS CORP., 219 W. Rhapsody, San Antonio, TX 78216, Tel: 512-344-0242; Empl.: 34

SPACE ELECTRONICS, INC., Box 2166, Meriden, CT 06450, Tel: 203-235-7755; Empl.: 16; *Sls. Mgr.:* Richard Boynton

SPACE POWER ELCTRNS., Jeffrey Lane, RD 1; Glen Gardner, NJ 08826, Tel: 201-537-2184

SP America, Inc.

SP AMERICA INC., Shin-Etsu Polymer, 1181 N. 4th St., San Jose, CA 95112, Tel: 408-947-0311, TWX: 910-338-2229; *Sls. Mgr.:* R. L. Bucholtz .... **B•1739; C•1510-1511**

Local Sales Offices & Reps

FL	Ft. Lauderdale, Tek-Rep	305-793-5334
GA	Atlanta, Tek-Rep Mktg.	404-963-1600
IN	Carmel, Technlg. Mktg. Corp.	317-844-8462
KY	Louisville, Technlg. Mktg. Corp.	502-499-7808
MA	Needham, Ray Perron & Co.	617-695-6179
MI	Plymouth, Jay Mktg. Assoc.	313-459-1200
PA	Broomall, TCA Assoc.	215-353-2022
TX	Dallas, TL Mktg.	214-357-1752

SPANTA, INC., Box 193, Franklin Lakes, NJ 07417, Tel: 201-337-0044, Telex: 13-6011; Empl.: 10; *Sls. Mgr.:* W. Phifer; *Dist. Mgr.:* W. Phifer

SPARKOMATIC, Rte. 6 & 209, Milford, PA 18337, Tel: 717-296-6444, TWX: 510-260-2682; Empl.: 300; *Sls. Mgr.:* Robert Schuler

SPATIAL DATA SYSTEMS, A DBA Systems Co., 508 S. Fairview, Goleta, CA 93117, Tel: 805-967-2383, Telex: 658-336; Empl.: 30; *Dist. Mgr.:* S. Schlosser

SPECIALIZED ELCTRN. MAGNETIC PRODS., INC., 272 Loudon Ridge Rd. Route 8, Loudon, NH 03301, Tel: (603) 267-6892; *Sls. Mgr.:* Eugene C. Avery

SPECIALTY CONNECTOR CO., 2620 Endress Place, Greenwood, IN 46142, Tel: 317-535-5353

SPECIALITY ELECTRONICS, INC., 208 E. Rutherford St., Landrum, SC 29356, Tel: 803-457-3824; Empl.: 10; *Sls. Mgr.:* Mary A. Galli

SPECO DIV., Components Specialties, Inc., P.O. Box 624, 1172 Rte. 109, Lindenhurst, NY 11757, Tel: 516-957-8700, 800-645-5516, Telex: 96-7754; Empl.: 33; *Sls. Mgr.:* Mel Hulkower; *Dist. Mgr.:* Stan Hulkower

SPECTRACOM, 101 Despatch Drive, East Rochester, NY 14445, Tel: 716-381-4827, Telex: 9103509587

SPECTRAGRAPHICS CORP., 10260 Sorrento Valley Rd., San Diego, CA 92121, Tel: 619-450-0611; Empl.: 100

SPECTRAL DYNAMICS DIV., Scientific-Atlanta, Box 671, San Diego, CA 92112, Tel: 619-268-7100, TWX: 910-335-2022; Empl.: 600; *Sls. Mgr.:* Robert N. Saunders

SPECTRA LUX CORP., 12840 N.E. 21 St. Pl., Bellevue, WA 98005, Tel: 206-747-0560; FSC No.: 51896; *Sls. Mgr.:* Ron Bustad

Local Sales Offices & Reps

AZ	Tempe, Cantec Sls., Inc.	602-829-0191

SPECTRAN CORP., 50 Hall Road, Sturbridge, MA 01566, Tel: 617-347-2261; FSC No.: 6V569; Empl.: 175

SPECTRAN INSTRUMENTS, INC., Box 891, La Habra, CA 90631, Tel: 213-694-3995

SPECTRA SONICS, 3750 Airport Rd., Ogden, UT 84403, Tel: 801-392-7531; Empl.: 35

SPECTRA-STRIP OPERATIONS, Ampheral Prods., 7100 Lampson Ave., Garden Grove, CA 92642-0415, Tel: 714-892-3361, TWX: 910-596-1314; Empl.: 300

SPECTRO EQUIPMENT, INC., 13821 Progress Pkwy., N. Royalton, OH 44133, Tel: 216-237-8910; Empl.: 25

SPECTROLAB, INC., 12500 Gladstone Ave., Sylmar, CA 91342, Tel: 213-365-4611, TWX: 910-496-1488; Empl.: 250

SPECTROL ELCTRNS., 17070 East Gale Ave., City of Industry, CA 91749, Tel: 818-964-6565, TWX: 910-584-1314; Empl.: 600; *Sls. Mgr.:* R. Shackelford .... **A•2039-2047**

Local Sales Offices & Reps

AL	Huntsville, Beacon Sls.	205-881-5031
AZ	Phoenix, Thom Luke Sls.	602-941-1901
CA	San Diego, Hadden Assocs.	619-565-9444
CA	Santa Clara, I2	408-988-3400
CA	Westlake Village, Astralonics	818-706-3936
CO	Denver, Spectrum Sls.	303-696-1601
CT	North Haven, Kitchen & Kutchin	203-239-0212
FL	Clearwater, Beacon Sls.	813-796-2378
FL	Ft. Lauderdale, Beacon Sls.	305-491-1054
IL	Downers Grove, Momak Sls.	312-963-6400
IA	Hiawatha, Gassner & Clark	319-393-5763
KS	Shawnee Mission, Lowell-Kangas	913-631-3515
MD	Baltimore, Component Sls.	301-484-3647
MA	Burlington, Kitchen & Kutchin	617-229-2660
MI	Livonia, Luebbe Sls.	313-477-3131
MN	St. Paul, Murnco	612-484-8200
MO	St. Louis, Lowell-Kangas	314-821-4050
NJ	Haddonfield, Sunday-O'Brien	609-429-4013
NY	Commack, E.R.A.	516-543-0510
NY	Liverpool, Gen Tech	315-451-3480
NY	Syracuse, L Mar	315-437-7779
NC	Raleigh, Beacon Sls.	919-787-0330
OH	Cincinnati, Luebbe Sls.	513-891-5770
OH	Cleveland, Luebbe Sls.	216-333-0425
OH	Columbus, Luebbe Sls.	614-431-0474
OH	Dayton, Luebbe Sls.	513-294-0426
OR	Beaverton, Eclipse Mktg.	503-642-1661
PA	Pittsburgh, R. F. Clark	412-242-9500
TX	Arlington, Pro Comp	817-640-4336
TX	Houston, Pro Comp	713-556-9622
WA	Redmond, Eclipse Mktg.	206-885-6991

SPECTRON CORP., 344 New Albany Rd., Moorestown, NJ 08057, Tel: 609-234-5700, Telex: 83-1488, TWX: 710-897-1359

SPECTRONICS CORP., 956 Brush Hollow Rd., Westbury, NY 11590, Tel: 516-333-4840, TWX: 510-222-5877; Empl.: 125; *Sls. Mgr.:* Henry K. Lee; *Dist. Mgr.:* James J. Weglarz

SPECTRONICS, DIV. HONEYWELL, See Honeywell Optoelctrns.

SPECTRUM CONTROL, INC., 8061 Avonia Rd., Fairview, PA 16415, Tel: 814-474-1571

SPECTRUM CONTROL, INC., 2185 W. 8th St., Erie, PA 16505, Tel: 814-455-0966, TWX: 510-699-6871; FSC No.: 33095;5733; Empl.: 450; *Sls. Mgr.:* R. Greer; *Dist. Mgr.:* C. Pirro .... **A•1635-1637; C•1513-1517**

Local Sales Offices & Reps

CA	Sunnyvale, Spectrum Control	408-735-9015
CA	Valencia, Spectrum Control	805-257-2280
FL	Melbourne, Spectrum Control	305-724-4900
IL	Elgin, Spectrum Control	312-888-8011
MA	Chelmsford, Spectrum Control	617-458-9079
NJ	Brielle, Spectrum Control	201-528-8420
NJ	Fairfield, Pantronics	201-575-1177
NY	New York, Landseas	212-265-8323
TX	Irving, Spectrum Control	214-251-1669
EXP	PA, Erie, Spectrum Control	814-455-0966

Local Distributors

CA	San Jose, Cypress Elctrns.	408-945-8400
CA	Torrance, Cypress Elctrns.	213-533-6005
FL	Dania, Summit Distrs.	305-920-6253
IL	Chicago, Newark Elctrns.	312-784-5100
NJ	Perth Amboy, Metuchen Capacitors	201-442-0500
NY	Buffalo, Summit Distrs.	716-887-2800
NY	Rochester, Summit Distrs.	716-334-8110
OH	Dayton, Aschbacher	513-252-7785
Intl	Australia, Rifa	03-480 1211
Intl	Denmark, E.V.J. Johanssen Elektronics	01-839022
Intl	Eng., Birmingham, Steatite Insulations	021 454-6961-2
Intl	France, Gentilly, Radio Television Franchise S.A.	664.11.01
Intl	Israel, Tel-Aviv, Landseas, Ltd.	247291-4
Intl	Japan, Tokyo, Stauffer Japan, Ltd.	Tokyo (81) 3239-0661
Intl	Netherlands, Zaandam, Bodamer Intl. BV	075-351521
Intl	Norway, H.C.A. Melbye/AS	02-106050
Intl	S. Africa, Bryanston, Taltronics Pty. Ltd.	618-2014/5
Intl	Sweden, Farsta, Traco AB	08-93-0960
Intl	Switzerland, Ebmatingen, EME, Ernst Egli	01-980-11-11
Intl	W. Germany, Ettlingen, Bodamer GmbH	(07243) 79263
Intl	W. Germany, Hamburg, Bodamer GmbH	(040) 7111091
Intl	W. Germany, Munchen, Bodamer GmbH	(089) 641801

SPECTRUM TECHNOLOGY, INC., 300 Lopez Rd., Goleta, CA 93116, Tel: 805-964-7791, TWX: 910-334-1163; FSC No.: 32464; Empl.: 100; *Sls. Mgr.:* Wm. L. Bishop .... **A•1438-1439**

Local Sales Offices & Reps

AZ	Tempe, Sedco Sls.	602-835-6281
AZ	Tucson, Sedco Sls.	602-298-1758
CA	San Jose, Frequency Control Assocs.	408-446-0200
CT	Milford, Todino Engrg. Sls.	203-874-6643
FL	Ft. Myers, Rainbow Sls.	813-332-2210
FL	Melbourne, Rainbow Sls.	305-727-3305
IL	Elgin, R.K. Elctrns.	312-695-8552
MA	Needham, Todino Engrg. Sls.	617-444-7925
NJ	Haddonfield, Mesa Tech. Assocs.	609-429-9531
NM	Albuquerque, I.M.E.C.	505-883-9010
NY	Huntington, Compar N.Y.	516-423-5660
OK	Tulsa, Ion Assocs.	918-664-0186
TX	Austin, Ion Assocs.	512-458-2108
TX	Grand Prairie, Ion Assocs.	817-640-8282
TX	Houston, Ion Assocs.	713-461-5311

Spellman
High Voltage Electronics Corporation

SPELLMAN HIGH VOLTAGE ELCTRNS. CORP., 7 Fairchild Ave., Plainview, NY 11803, Tel: 516-349-8686, TWX: 510-221-2155; Empl.: 200; *Sls. Mgr.:* Russell E. Posser .... **D•1840-1842**

Local Sales Offices & Reps

FL	Orlando, Gra-Mar, Inc.	305-894-3351
MA	Concord, Nortech Engrg. Sls.	617-259-0032
MA	Medfield, Nortech Engrg.	617-359-6063
MN	St. Paul, Knox Assocs.	612-488-5402

SPEMCO SWITCHES, 23425 Harper, Box 386, St. Clair Shores, MI 48080, Tel: 800-482-2828; Empl.: 9

SPERRY, A. W., INSTRS., P.O. Box 9300, Smithtown, NY 11787, Tel: 516-231-7050, Telex: 645104; Empl.: 40; *Sls. Mgr.:* Dennis W. Carroll

SPERRY UNIVAC, Mini-Computer Operations, Box C-19504, Irvine, CA 92713, Tel: 714-754-6900, TWX: 910-596-1358; Empl.: 500

SPIRICON, INC., 2600 North Main, Logan, UT 84321, Tel: 801-753-3729; Empl.: 5; *Sls. Mgr.:* Steve Teare

SPLIT BALL BEARING, MPB Corp., Highway 4, Lebanon, NH 03766, Tel: 603-448-3000, TWX: 710-366-1661; *Sls. Mgr.:* Lew Peterson; *Dist. Mgr.:* Jack F. Barker

SPRAGUE ELEC. CO., 481 Marshall St., No. Adams, MA 01247, Tel: 413-664-4411, Telex: 92-6415, TWX: 710-369-1360; FSC No.: 56289; Empl.: 10,500; *Dist. Mgr.:* J. J. Judge

SPRAGUE ELECTRIC COMPANY, Distribution Division, 481 Marshall St., No. Adams, MA 01247, Tel: 413-664-4481, TWX: 710-369-1363; FSC No.: 56289; *Sls. Mgr.:* J. Judge; *Dist. Mgr.:* Lyle Pirnie

SPRAGUE ELEC. CO., Integrated Circuit Div., 115 Northeast Cutoff, Worcester, MA 01606, Tel: 617-853-5000, TWX: 710-340-6304; FSC No.: 56289; Empl.: 700

SPRAGUE-GOODMAN ELCTRNS., INC., 134 Fulton Ave., Garden City Pk., NY 11040, Tel: 516-746-1385, Telex: 14-4533; FSC No.: 52769; Empl.: 80; *Sls. Mgr.:* David Taub; *Dist. Mgr.:* David Taub .... **A•1173**

Local Sales Offices & Reps

AZ	Phoenix, Sanford Sls. Assocs.	602-957-3570
CA	Burlingame, W. J. Purdy Co.	415-347-7701
CA	Garden Grove, Megacap	714-891-5176
CA	Garden Grove, National Capacitor	800-854-2451
CA	Los Angeles, R.F. Assocs.	213-478-1586
CA	San Diego, R. D. Miner, Inc.	619-566-9891
CO	Denver, W. J. Purdy Co.	303-753-6800
FL	Pompano Beach, Cole-Tek	305-781-8110
GA	Smyrna, Spartech	404-446-7300
IL	Chicago, B.N.I. Elctrns.	312-775-1717
IN	Ft. Wayne, Denton Mktg., Inc.	219-627-5515
IA	Marion, M.S.B. Assocs.	319-377-6261
KS	Shawnee Mission, M.S.B. Assocs.	913-432-2131
MD	Pikesville, Imagitron Sls.	301-521-2020
MA	Southboro, KSA of New England	617-485-9432
MI	Southfield, Fred H. Gehrke & Assocs.	313-559-5363
MN	Marion, M.S.B. Assocs., Inc.	319-377-6261
MO	St. Charles, M.S.B. Assocs.	314-946-5577
NJ	Wayne, Richman Salesco - Kagan	201-694-1115
NY	Commack, Richman Salesco	516-543-5532
NY	Utica, Sweetco Assocs.	315-797-6721
OH	Cincinnati, Stegman Blaine Mktg.	513-729-1969
TX	Austin, Delta Comps.	512-458-4288
TX	Seagoville, Delta Comps.	214-287-6333
WA	Seattle, Sprague Elec. Co.	206-632-7761
WA	Vancouver, Sprague Elec. Co.	206-892-0361

Local Distributors

CA	Garden Grove, National Capacitor	714-891-5179
CA	Santa Ana, Projections Unlimited	714-641-1472
MA	Burlington, T.L.C.	617-273-0140
MA	Needham, Cronin Elctrns.	617-449-5000
NY	Lynbrook, Varitech Elctrns.	516-593-9300
PA	State College, ALVO Elctrns.	814-238-0505
TX	Addison, Captronics	214-980-0123
TX	Garland, J & S Elctrns.	214-487-8808
WA	Seattle, KAM Elctrns.	206-382-1300

SPRINGFIELD MOULDERS, INC., See ITT Thermotech

SPRUCE PINE MICA CO., Mtn. Laurel Dr., Spruce Pine, NC 28777, Tel: 704-765-4241; Empl.: 45; *Sls. Mgr.:* Hugh M. Wiseman

SPS SOFTWARE PRODUCTS & SERVICES, INC., 14 E. 38th Street, 14th Fl., New York, NY 10016, Tel: 212-686-3790, Telex: 852616; *Sls. Mgr.:* Dr. Alex Rainer

SPUR PRODUCTS CORP., 13649 Beach Ave., Marina Del Rey, CA 90292, Tel: 213-822-7100; Empl.: 12; *Sls. Mgr.:* Ray Lorenz

SQUARE D CO., Executive Plaza, Palatine, IL 60067, Tel: 312-397-2600, Telex: 255274; Empl.: 21100; *Sls. Mgr.:* R. M. O'Neal; *Dist. Mgr.:* T. W. Wilbor

SR ENGINEERING, INC., 13961 Nautilus Dr., Dept. E, Garden Grove, CA 92643, Tel: 714-554-4200, Telex: 364412INTR-871; FSC No.: 21441; *Sls. Mgr.:* Coleman W. Conrad

S S A C, Box 395, Liverpool, NY 13088, Tel: 315-622-1000, Telex: 646221, TWX: SSAC LIPL; FSC No.: 16-0985719; Empl.: 220; *Sls. Mgr.:* G. Weeks

STACKBIN CORP., Albion Road, Lincoln, RI 02865, Tel: 401-333-1600; Empl.: 75; *Sls. Mgr.:* J. J. Patterson

STACKPOLE (THE STACKPOLE CORP.), Stackpole St., St. Marys, PA 15857, Tel: 814-781-1234, Telex: 914-514, TWX: 510-693-4511; FSC No.: 78488

STACKPOLE, CARBON DIV., 201 Stackpole St., St. Marys, PA 15857, Tel: 814-781-1234, Telex: 914-514, TWX: 510-693-4511; *Sls. Mgr.:* T. M. Eynon; *Dist. Mgr.:* B. E. Speedy

STACKPOLE, ELECTRONIC COMPONENTS DIV., 201 Stackpole St., St. Marys, PA 15857, Tel: 814-781-1234, Telex: 914-514, TWX: 510-693-4511; *Sls. Mgr.:* Ronald E. Braund

STACKPOLE, MAGNET DIV., 700 Elk Ave., Kane, PA 16735, Tel: 814-837-7000, TWX: 510-695-8360; *Sls. Mgr.:* V. D. Venigni

STACO, INC., See Staco Transpower

STACO ENERGY PRODS. CO., 301 Gaddis Blvd., Dayton, OH 45403, Tel: 513-253-1191, Telex: 288-032, TWX: 810-459-1798; FSC No.: 83008; Empl.: 146; *Sls. Mgr.:* Robert Simpson

STACOSWITCH, 1139 Baker St., Costa Mesa, CA 92626, Tel: 714-549-3041, TWX: 910-595-1507; FSC No.: 12522;Multiple; Empl.: 100; *Sls. Mgr.:* D. Sugg

Local Sales Offices & Reps

AL	Huntsville, 20th Century Mktg., Inc.	205-533-9281
CA	Los Altos, Recht Assocs.	415-964-6321
CO	Golden, J. F. Hurlbut Co.	303-279-7796
CT	Marion, Sands Co.	203-628-4363
FL	Orlando, EMA, Inc.	305-671-6800
GA	Stone Mountain, 20th Century Mktg., Inc.	404-292-7088
IL	Oak Brook, MSL Assocs.	312-655-8977
IN	Richmond, EMA, Inc.	513-433-2800
IA	Cedar Rapids, H. R. Brown Sls.	319-366-0635
KS	Kansas City, B-C Elctrn. Sls.	913-342-1211
MD	Silversprings, Youth & Nelson	301-598-5740
MA	Woburn, Sands Co.	617-935-7495
MI	Livonia, Lowell-Wendt Mktg. Co.	313-464-2722
MO	St. Louis, B-C Elctrn. Sls.	314-731-1255
NJ	Wayne, G.T. Assocs.	201-694-6040
NY	Syracuse, Lenard Co.	315-479-9191
OH	Cleveland, C.A. Robinson Co.	216-381-9049
OH	Dayton, C.A. Robinson	513-278-7969
OR	Portland, Frank Jackson Assocs.	503-292-2638
PA	Media, W. Reeves Assocs.	215-566-6709
TN	Knoxville, 20th Century Mktg., Inc.	615-690-1618
TX	Austin, Delta Comps.	512-458-4288
TX	Dallas, Delta Comp.	214-358-4288
TX	Houston, Delta Comps.	713-664-6777
UT	Salt Lake City, J. F. Hurlbut Co.	801-973-4443
WA	Redmond, Frank Jackson Assocs.	206-881-7277

STACO TRANSPOWER

STACO TRANSPOWER, 301 Gaddis Blvd., Dayton, OH 45403, Tel: 513-253-1191, Telex: 288-032, TWX: 810-459-1798; FSC No.: 83008; Empl.: 100; *Sls. Mgr.:* T. D. McNulty .... **A•2288**

Local Sales Offices & Reps

AL	Huntsville, Remco	205-533-3763
AZ	Scottsdale, Power Specialists	602-996-4100
CA	Buena Park, Chuck Cooper Co.	714-739-8526
CA	Los Altos, Frauman Assoc.	415-941-0660
CT	Natick, Benchmark Assoc.	617-899-3390
FL	Tampa, J R Controls	813-961-9478
GA	Atlanta, Remco	404-447-6937
IA	Cedar Rapids, Di-tronix, Inc.	319-377-8275
KY	Cinci, Tri-State Mktg.	513-761-7993
MA	Natick, Benchmark Assocs.	617-655-9333
MI	Southfield, Fred Gehrke & Assocs.	313-559-5363
MN	Arlington Hgts., Diethert-Angel	312-593-7600
MN	Minneapolis, Diethert Angel	612-546-6099
MO	Kansas City, Di-tronix, Inc.	816-356-6340
MO	St. Louis, Di-tronix, Inc.	314-291-4777
NJ	King of Prussia, Freeman-Malta Assoc.	215-337-9211
NJ	Mountain Lakes, Levison Sls. Co. Inc.	201-334-2921
NC	Raleigh, Remco	919-847-5079
OH	Cleveland, Marlow Assocs.	216-991-6500
OH	Columbus, Marlow Assocs.	614-885-7643
PA	Pittsburgh, Marlow Assocs.	412-367-8886
TX	Richardson, Jim D. Gray & Assocs.	214-699-9976
WI	Menomonee Falls, Walter M. Braun & Assocs.	414-251-8685

STAFFALL INC., 7 Woodland St., Providence, RI 02908, Tel: 401-351-8282, TWX: 710-381-6964; Empl.: 25

STAINLESS, INC., 3rd St., N. Wales, PA 19454, Tel: 215-699-4871, TWX: 510-661-8097; Empl.: 80; *Sls. Mgr.:* Jess C. Rodriguez

STANCOR/HAMILTON STANDARD CONTROLS, 131 Godfrey St., Logansport, IN 46947, Tel: 219-722-2244, TWX: 810-295-0699; FSC No.: 80089; *Sls. Mgr.:* Hubert Daubs .... **A•2289-2297; B•1447**

STANDARD CONDENSER CORP., 1065 W. Addison St., Chicago, IL 60613, Tel: 312-327-5440; FSC No.: 97419; *Sls. Mgr.:* B. P. McLean

STANDARD ENERGY, Div. WBH Scientific, Inc., Rte. 32, Greenville, NY 12083, Tel: 518-966-4197, Telex: 754180; *Sls. Mgr.:* Gary Hanington ...... **D•1844-1845**

Local Sales Offices & Reps

CT	Cheshire, Meco Co.	203-271-0026
TX	Dallas, P.J. Scanlon Co.	214-231-4661

STANDARD ENGRG., 44800 Industrial Dr., Fremont, CA 94538, Tel: 415-657-7555, TWX: 910-381-6048; Empl.: 40

STANDARD ENVIRONMENTAL SYSTEMS, INC., 383 Minnisink Rd., Totowa, NJ 07512, Tel: 201-256-2200, TWX: 710-988-5722; Empl.: 50

STANDARD GRIGSBY, INC., Gordos International Corp., 920 Rathbone Ave., Aurora, IL 60507, Tel: 312-844-4300, TWX: 910-232-3138; Empl.: 350; *Sls. Mgr.:* Lou Falco; *Dist. Mgr.:* Ed Barry .... **B•1568-1570**

Local Sales Offices & Reps

AZ	Tempe, Gassner & Clarke Co.	602-968-9037
CA	Laguna Hills, Jack Fitch & Assocs.	714-951-0196
CA	Milpitas, Maxim Elctrn. Sls.	408-946-6001
NJ	Mountain Lakes, Components for Elctrns.	201-334-2921
NC	Peachland, D. P. McDonald	704-272-8747
CT	East Haven, Eagle Assocs.	203-467-6542
FL	Casselberry, Southern Elctrn. Mktg.	305-831-2822
IN	Indianapolis, Wilson Tech. Sls.	317-298-3345
IA	Marion, Rep Assocs.	319-373-0152
KS	Parker, S. W. Wollard	918-898-6552
LA	Hammond, Design Mktg.	504-294-3076
MI	Ann Arbor, R. L. Rowe & Assocs.	313-995-8711
MI	Livonia, Luebbe Sls.	313-477-3131
MN	Bloomington, Murnco	612-854-4161
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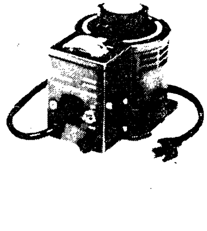

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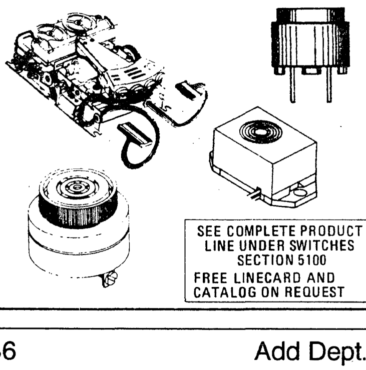

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IA	W. Des Moines, Jerry Skinner/Nevco	515-225-9866
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MO	N.Kansas City, Nevco, Inc.	816-421-1751
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NY	Utica, Doug Hendrick/Mitscher Co.	315-733-0171
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HI	Honolulu, J.C. Elctrns.	808-841-5526
IL	Chicago, Berndt Assocs.	312-283-0713
IN	Carmel, Berndt Assocs.	317-844-0114
MA	Needham, Ray Perron & Co.	617-449-6162, 800-225-4280
MN	Minneapolis, Berndt Assocs.	612-546-2021
MS	Hazelwood, Stone & Assocs.	314-895-4565
NH	Dover, Ray Perron & Co.	603-742-2321
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NJ	Wayne, G.T. Assocs.	201-694-6040
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TX	Houston, Barry Sls. Co.	713-784-5860
TX	Richardson, Barry Sls. Co.	214-234-0255
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CA	San Diego, Groh Assocs.	619-696-0054
CA	San Jose, G. R. McKnight Co.	408-942-0880
CO	Englewood, Martec Assocs.	303-741-2704
FL	Casselberry, Southern Elctrn. Mktg.	305-831-2822
FL	Ft. Lauderdale, Southern Elec. Mktg.	305-475-3686
GA	Atlanta, REMCO	404-447-6937
IL	Elk Grove Village, Parcom, Inc.	312-338-6360

IN	Indianapolis, Midstates Mktg.	317-639-9999
IA	Cedar Rapids, Elctrn. Innovators	319-362-2217
KS	Shawnee Mission, Microtronics	913-262-1444
MD	Baltimore, Adcour	301-521-3536
MA	Sharon, Adcour	617-784-8123
MI	Southfield, Component Assocs.	313-557-3232
MN	Eden Prairie, Elctrn. Innovators	612-941-0830
MO	St. Charles, Microtronics, Inc.	314-946-8500
NJ	Sparta, Instr. & Equip.	201-729-4293
NY	Rockaway Park, Metropolitan Sls.	718-634-3100
NC	Greensboro, Magaro & Assocs.	919-294-4783
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WV	Spokane, Controltek	509-922-2971
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Can	Calgary, Alberta, Lenbrook	403-252-3577

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CA	Los Angeles, Elect. Switches	213-660-1301
CA	San Diego, Tauber Elctrns.	619-274-7242
CA	Santa Clara, Waltronics Sls.	408-727-1200
FL	Davie, Arco Dist., Inc.	305-473-2550
IL	Chicago, NEP Elctrns.	312-625-8400
IL	Wheeling, Hawk Elctrns.	312-459-4030
MA	Sharon, Adcour	617-784-8123
MI	Brighton, AP Sls. Co.	313-229-6550
MI	Grand Rapids, S. F. Elec. Supp., Inc.	616-459-0126
NJ	Sparta, Instr. & Equip.	201-447-3525
NJ	Sparta, Instrument & Equip.	201-729-4293
NJ	Waldwick, Production Supp. & Equip.	201-447-3525
NY	Rockaway Park, Metropolitan Sls.	212-634-3100
OH	Cincinnati, United Radio Inc.	513-761-4030
OR	Portland, United Radio Supp.	503-233-7151
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TX	Dallas, Wholesale Elec. Supp.	214-824-3001
TX	Houston, Copper Alarm Supp. Co.	713-868-1794
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Can	Markham, Ont., Lenbrook Elctrns.	416-477-7722

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AL	Huntsville, MacKay Smith & Assocs.	205-539-8000
AZ	Phoenix, Eltron	602-266-2164
CA	El Toro, Martronix	714-858-0632
CA	Mountain View, Weseloh/Swanson & Assocs.	415-961-0565
CA	San Diego, Mesa Engrg. & Sls. Assocs.	619-278-8021
CO	Denver, Elcom	303-337-2300
FL	Madeira Beach, MacKay, Smith & Assocs.	813-393-7144
FL	Orlando, MacKay, Smith & Assocs.	305-423-4353
GA	Norcross, MacKay, Smith & Assocs.	404-449-7444
IL	Northbrook, Raines & Assocs.	312-498-0890
IN	Fort Wayne, M/S Sls. & Assocs.	219-436-3023
IN	Indianapolis, M/S Sls. & Assocs.	317-257-8916
KS	Overland Park, Thomas L. Dowell & Assocs.	913-648-7373
MD	Columbia, Professional Reps.	301-992-7460
MA	Woburn, Radian Assocs.	617-933-7386
MO	St. Louis, Thomas L. Dowell & Assocs.	913-648-7373
NJ	Bellmawr, TAI Corp.	609-933-2600
NJ	Manhasset, Win-Cor Elec. Sls. Corp.	516-627-9474
NY	Syracuse, PI' Tronics	315-455-7346
NC	Charlotte, MacKay, Smith & Assocs.	704-372-1188
NC	Raleigh, MacKay, Smith & Assocs.	919-851-5000
TX	Austin, Norcom	512-451-2757
TX	Dallas, Norcom	214-386-4888
TX	Houston, Norcom	713-778-0392
UT	Salt Lake City, Elcom	801-485-7415
WA	Redmond, Halbar Assocs.	206-882-0990
WA	Vancouver, Halbar Assocs.	206-696-0170

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CA	Mountain View, Target Elctrns.	415-961-1170
CA	San Diego, Ryno Elctrns.	619-453-8430
FL	Longwood, Intertec	305-834-7777
IL	Palatine, OHM Elctrns.	312-359-5500
IN	Indianapolis, Mar Elctrns., Inc.	317-875-4510
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MA	Woburn, First Frequency	617-935-3885
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MI	Ann Arbor, Elliott Sls.	313-662-4087
MN	St. Louis Park, Lestronix	612-926-8466
NH	Hancock, Eisenbeis Sls.	603-357-4892
NY	East Northport, Levison Sls. Co.	516-266-5020
NY	Manlius, Bowser & Sapecky Assocs.	315-682-8885
NC	Cary, Tom G. Santel	919-467-7595
OK	Tulsa, Jerry Robinson & Assocs.	918-492-0390
OR	Beaverton, Quest Mkgt.	503-641-7377
PA	Colmar, Eastern Scientific Mktg.	215-822-0157
PA	Sewickley, T. H. Stewart Co.	412-741-8665
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CA	San Marcos, Stettner California, Inc.	619-471-0124
CO	Aurora, Mountain View Mktg.	303-360-9641
CT	Ridgefield, Phoenix Sls. Co.	203-438-9644
FL	Orlando, Stettner Elctrns.-Florida	305-291-7756
IL	Rosemont, Stettner Central, Inc.	312-671-4208
IN	Fort Wayne, J & B Engrg. Sls.	219-483-2813
MA	Stow, Today Comp. Sls. Corp.	617-897-7500
MO	Kansas City, Delltron Co., Inc.	816-436-6445
MO	St. Louis, Delltron Co., Inc.	314-769-4779
NJ	Englewood, Sprung & Nussbaum, Inc.	201-569-5666
NJ	Medford, Champion Elctrn. Sls. Co.	609-983-0932
NM	Albuquerque, Western High Technlg. Mktg.	505-262-2461
NY	Cazenovia, S.T. Woolard Co.	315-655-8145
OR	Beaverton, Luscombe Engrg. Co., NW	503-636-6664
TN	Chattanooga, Stettner Elctrn Sls.	615-892-0291
TX	Richardson, Lelko-Paulsen Sls. Co.	213-680-9588
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Can	Concord, Ont., Stettner Canada, LTD.	416-661-5190

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CA	Garden Grove, National Capacitor Corp.	213-598-9611
CA	San Jose, Capacitors Comps.	408-946-7676
CA	San Marcos, California Comps.	619-471-0123
CA	Sunnyvale, Capsco Sls., Inc.	408-734-3020
CA	West Covina, Component Svc., Inc.	818-960-4761
CO	Englewood, Industrial Elctrns., Inc.	303-694-9444
FL	Orlando, South-East Comps.	305-298-0321
IL	Rosemont, Central Comps.	312-671-4787
MO	St. Louis, RIC-Tronics	314-576-9816
NJ	Garfield, B & R Elctrns., Inc.	201-825-1304
NJ	Rockaway, Tonar Inds., Inc.	201-586-9000
NY	Lynbrook, Varitech Elctrns.	516-593-9300
NY	Rochester, Masline Elctrns.	716-546-5373
PA	Norristown, Century Elctrn.-Comps., Inc.	215-631-5400
PA	York, Electronic Comps. for Inds.	717-843-8971
TX	McKinney, Prime Distrb. Co.	214-231-0170
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Local Sales Offices & Reps

AL	Huntsville, Par Marketing, Inc.	205-837-6534
CA	Chatsworth, Western Comp. Sls.	818-882-6226
CO	Wheatridge, Manufacturers Mktg.	303-425-9569
FL	St. Petersburg, Tech-Rep Assoc., Inc.	813-577-2779
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NY	Clark Mills, KLM-Garner, Inc.	315-853-6126
NY	New Hyde Park, SDP	516-328-3300
OH	Euclid, Rockford Controls Ohio, Inc.	216-731-5250
TX	Richardson, Zonk & Associates	214-238-7651
WA	Seattle, Northmar Inc.	206-524-5170

Local Distributors

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STOLZBERG RESEARCH, INC., 3 Seabrook Court, Stony Brook, NY 11790, Tel: 516-751-4277; Empl.: 4; *Sls. Mgr.:* Bruce Davis; *Dist. Mgr.:* Bruce Davis

STONE CITY PRODUCTS CO., 1206 Seventh Street, Bedford, IN 47421, Tel: 812-275-3373, Telex: 810-350-0321; FSC No.: 09166; Empl.: 85

STORM PRODUCTS CO., 116 Shore Drive, Hinsdale, IL 60521, Tel: 312-323-9121, TWX: 910-651-0850; *Sls. Mgr.:* John W. Holland

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STRATEGIC SYS. DIV. POWER SYS. OPERATIONS, GTE Prods. Corp. Sylvania Sys. Grp., 520 Winter St., Waltham, MA 02254, Tel: 617-466-3000, Telex: 951-953, TWX: 710-290-0376

STRAWBERRY TREE COMPUTERS, 949 Cascade Dr., Sunnyvale, CA 94087, Tel: 408-736-3083

STREET ELECTRONICS CORP., 1140 Mark Ave., Carpinteria, CA 93013, Tel: 805-684-4593; *Dist. Mgr.:* Rich Jenkins

STROBE, INC., 897 Independence Ave., Mountain View, CA 94043, Tel: 415-969-5130

STRONGBOX, P.O. Box 84508, Los Angeles, CA 90073, Tel: 213-204-0472; FSC No.: 2T043; Empl.: 3; *Sls. Mgr.:* Larry Martinek .... **C•1084-1085**

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NM	Albuquerque, Betatron	505-344-2381

STRUCTURED DESIGN, INC., 1700 Wyatt Dr. # 7, Santa Clara, CA 95054, Tel: 408-988-0725, Telex: 172931; *Sls. Mgr.:* Noel C. Hendricks; *Dist. Mgr.:* Noel C. Hendricks

STRUTHERS-DUNN, INC., Lamb's Rd., Pitman, NJ 08071, Tel: 609-589-7500, TWX: 510-686-7510; FSC No.: 78290;78290; Empl.: 700; *Sls. Mgr.:* W.L. Capewell; *Dist. Mgr.:* Walter Woodward .... **B•1449**

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AL	Huntsville, Rep, Inc.	205-881-9270
AZ	Phoenix, Hecht, Henscher & Assocs.	602-275-4411
AR	Little Rock, Controls & Power	501-851-3048
CA	Culver City, DeAngelo, Rothman & Co.	213-827-2202
CA	Palo Alto, Mollard Mktg.	415-961-0456
CA	San Diego, Struthers-Dunn	619-560-9922
CO	Denver, Lindberg Co.	303-758-9033
CT	Bloomfield, Zaslow Sls. Co.	203-242-7781
FL	Miami, Ludlum Assocs.	305-592-6524
FL	Orlando, Ludlum Assocs.	305-894-7761
GA	Tucker, Rep, Inc.	404-938-4358
IL	Glen Ellyn, Rockford Controls Co.	312-469-6016
IN	Indianapolis, Rockford Controls Co.	317-248-2518
IA	Bettendorf, BSI, Ltd.	319-355-5623
KS	Wichita, Avionics Engrg.	316-264-6201
LA	Lafayette, Kemp Engrg.	318-269-9452
MD	Baltimore, Struthers-Dunn, Inc.	609-589-7500
MI	Southfield, L. H. Dickelman Co.	313-353-8210
MN	Minneapolis, HMR, Inc.	612-888-2122
MO	Maryland Heights, Hitt & Assocs.	314-878-5404
NJ	Pitman, Struthers-Dunn, Inc.	609-585-7500
NJ	West Caldwell, Grimm, Siegel Assocs.	201-575-9300
NM	Albuquerque, Hecht, Henschen & Assocs., Inc.	505-821-3979
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NC	Charlotte, J. Rudisill Assocs.	704-377-6901
OH	Cincinnati, Struthers-Dunn	513-772-3108
OH	Strongsville, Struthers-Dunn	216-572-1333
PA	Pittsburgh, R. F. Clark Co.	412-242-9500
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TX	Houston, W. Pat Fralia Co	713-772-1572
WA	Seattle, Eicher-Richards Co.	206-523-7888
Can	Scarborough, Ont., Renfrew Elec. Co., Ltd.	416-752-4611

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AL	Decatur, Tenn Tech, Inc.	205-350-0630
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AZ	Tucson, Harris & Croy Sls.	602-575-5109
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CA	La Canada, K.C.P. Ent.	818-790-3939
CA	San Diego, Sun Harbor Mktg.	619-695-2994
CA	Sunnyvale, Schwerin & Merril, Inc.	408-735-7900
CO	Arvada, Cluff & Assocs.	303-423-9354
CT	New Canaan, Impact Sls.	203-972-1458
GA	Atlanta, Tenn Tech., Inc.	404-622-5784
IL	Elmhurst, Utronix Sls., Inc.	312-834-1100
IN	Indianapolis, Sukup & Cox	317-253-5501
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KS	Shawnee Mission, M-S-B Assoc.	913-432-2131
MD	Laurel, CSDS, Inc.	301-490-3800
MA	Canton, Impact Sls.	617-821-1500
MN	Minneapolis, RK Sls. Assocs., Inc.	612-786-5713
MO	St. Charles, M-S-B Assoc.	314-946-5577
NJ	Medford, Comp. Consultants	609-654-5300
NY	Lynbrook, HLJ Comp-Tech	516-599-2999
NC	Tenn Tech., Inc.	919-266-3610
OH	Beachwood, Elctrn. Salesmasters, Inc.	216-831-9555
OR	Portland, Electronic Mktg. Grp.	503-252-0610
TX	Austin, T.L. Mktg.	512-453-4586
TX	Dallas, T.L. Mktg.	214-357-1752
UT	Salt Lake City, Cluff & Assocs.	801-486-7297
WA	Redmond, Elctrn. Mktg. Grp.	206-882-0962
WI	Mequon, Artmor Ltd.	414-241-4040

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AL	Huntsville, Contact Elctrns., Inc.	205-881-9321
AL	Huntsville, RM Elctrns.	205-852-1550
AZ	Phoenix, Arizona Comps.	602-279-9446
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AZ	Scottsdale, Comp. Tech., Inc.	602-998-1484
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CA	San Diego, Sigma Elctrns.	619-565-2000
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CO	Arvada, Denver Wintronics	303-431-7161
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FL	Hialeah Gardens, Baron Elctrns. Sls. Co.	305-556-1300
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IN	Indianapolis, Graham Elctrns.	317-634-8202
IN	Indianapolis, RM Elctrns.	317-291-7110
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OH	Twinsburg, Schuster Elec. Co.	216-425-8134
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FL	Winter Park, Electrocraft	305-628-4705
GA	Atlanta, Electro-Mech	404-447-6478
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IL	Roselle, Omni Elctrns. Mktg.	312-351-2507
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MD	Timonium, Heller Sls.	301-252-4780
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MA	Braintree, R. F. Duffy & Assocs.	617-848-3550
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MI	E. Detroit, Jack M. Thorp	317-779-6363
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NM	Albuquerque, McDonald & Assoc.	505-883-0500
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NC	Raleigh, Electro-Mech	919-851-8165
OH	Cleveland, Arthur Baier Co.	216-461-6161
OH	Dayton, Arthur Baier Co.	513-276-4128
OK	Tulsa, Barry Sls.	918-749-7775
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CT	Bristol, Superior Elec.	203-582-9561
FL	Apopka, G. F. Bohman Assocs.	305-886-1882
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HI	Honolulu, B. F. Wittenberg Co.	808-833-1602
IL	Glen Ellyn, Superior Elec.	312-858-2960
IA	W. Des Moines, JPS Assoc. Ltd.	515-225-0607
MA	Wellesley Hills, Superior Elec.	617-237-0750
MI	Detroit, Superior Elec.	313-229-2381
NY	Rochester, R. L. Kistler, Inc.	716-436-1940
NY	Rochester, Ross Equip. Co. Inc.	716-271-5660
NY	Smithtown, Superior Elec.	516-361-9177
NC	Charlotte, Superior Elec.	704-535-7777
OH	Medina, Superior Elec.	216-725-8887
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TX	Dallas, Superior Elec.	214-350-1368
TX	Plano, B & R Elctrn. Sls. Corp.	214-985-0028
WA	Issaquah, Superior Elec.	206-392-8559
Can	Toronto, Ont., American Superior Elec. Co., Ltd.	416-255-2318

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CA	Los Altos, Ewing-Foley	415-941-4525
CA	San Diego, Earle Assocs.	619-278-5441
CA	Tustin, Orion Sls.	714-832-9687
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CT	Englewood, Ed Glass Assocs.	201-592-0200
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OH	Shaker Heights, Sai Mktg.	216-751-3633
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CT	Stamford, Unesco/Genex	203-322-9308
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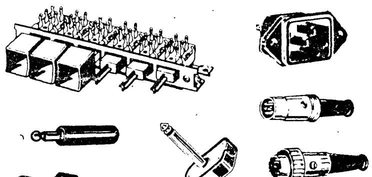

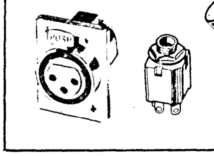

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HI	Honolulu, Ross Mktg. Assocs.	408-988-8111
IL	Park Ridge, Bob Burns & Assoc.	312-823-9360
IN	Carmel, Marketing Engrs.	317-872-5665
IA	Des Moines, Thomas L. Dowell & Assoc.	515-225-1620
KS	Overland Park, Thomas L. Dowell & Assoc.	913-648-7373
MA	Waltham, Unesco/Genex	617-890-1535
MI	Southfield, R. C. Merchant & Co.	313-354-4300
MI	St. Joseph, R. C. Merchant & Co.	616-983-7378
MN	Edina, Mel Foster Tech. Sls.	612-941-9790
MS	Jackson, Welch & Doby Mktg.	601-932-5534
MO	St. Louis, Thomas L. Dowell & Assoc.	314-849-4234
NJ	Cherry Hill, Trinkle Sls.	609-795-4200
NJ	Englewood Cliffs, Masin-Esco	201-569-8868
NM	Albuquerque, Moss Mktg.	505-292-7505
NY	E. Rochester, Ossmann Comp. Sls.	315-437-7052
NY	Syosset, Masin-Esco	201-569-8868
NY	Syracuse, Ossmann Comp. Sls.	716-424-4460
NY	Vestal, Ossmann Comp. Sls.	607-754-3264
NC	Raleigh, Rick Burns & Assocs.	919-876-2224
OH	Dayton, J. C. Hofstetter Co.	513-296-1010
OH	Medina, J. C. Hofstetter Co.	216-241-4880
OK	Tulsa, J. Y. Schoonmaker Co.	918-446-0373
TX	Dallas, J. Y. Schoonmaker Co.	214-349-1650
TX	Houston, J. Y. Schoonmaker Co.	713-738-2427
UT	Bountiful, Moss Mktg.	801-292-8660
WA	Bellevue, Comtec	206-453-1188

SWITCHES INC., 949 Stierlin Rd., Mountain View, CA 94043, Tel: 415-962-8649

Distributor

SWITCHES UNLIMITED, INC., 34-11 56th St., Woodside, NY 11377, Tel: 212-478-5000 .... **B•1682**

SWITCHING SYSTEMS INTL., 1827 No. Case St., Orange, CA 92665, Tel: 714-921-1153; Empl.: 35; *Sls. Mgr.:* Chris Edman

SYLVANIA CHEMICALS/METALS, Hawes St., Towanda, PA 18848, Tel: 717-265-2121; Empl.: 1400; *Sls. Mgr.:* J.F. Barnyak

SYLVANIA CONNECTOR PRODS. OPER., GTE Prods. Corp., Box 29, Titusville, PA 16354, Tel: 814-589-7071, TWX: 510-692-6763; *Sls. Mgr.:* R. Sanders

SYLVANIA GTE CONTROL DEVICES, Rte. 35, Standish, ME 04084, Tel: 207-642-4535, TWX: 710-365-0145; Empl.: Over 1,000; *Sls. Mgr.:* J. T. Dougherty; *Dist. Mgr.:* J. T. Dougherty .... **B•1773**

Local Sales Offices & Reps

AL	Huntsville, Rakes Engrg. & Mktg. Corp.	205-533-3763
CA	Hayward, Pacific Mktg. Inc.	415-887-1620
FL	Melbourne, Southeastern First Rep, Inc.	305-259-6373
GA	Atlanta, Rakes Engrg. & Mktg. Corp.	404-447-6937
IL	Arlington Heights, Thermek Inc.	312-577-6900
MD	Glen Burnie, Macrotech Assocs.	301-437-5588
MA	Hingham, Northeast Reps., Inc.	617-749-8700
MI	Dearborn	313-582-8754
NJ	Haddonfield, G. L. Williams Assocs.	609-428-6060
NJ	Manville, Dynorep Inc.	201-685-0135
NY	Albany, H. C. Johnson Agencies, Inc.	518-459-1239
NY	Buffalo, H. C. Johnson Agencies, Inc.	716-632-7880
NY	Rochester, H. C. Johnson Agencies, Inc.	716-586-0777
NC	Raleigh, Rakes Engrg. & Mktg. Corp.	919-847-5079
OH	Dayton	513-223-6227
OR	Portland, SPS Elctrns.	503-297-6919
PA	Glenshaw, H. C. Johnson Agencies, Inc.	412-961-0414
WA	Redmond, SPS Elctrns.	206-323-4140

SYLVANIA ELECTRONIC, Box 360, Muncy, PA 17756, Tel: 717-546-3191; Empl.: 395; *Sls. Mgr.:* A. M. Serang; *Dist. Mgr.:* S. R. Sisak

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SYLVANIA ELECTRONIC COMPONENTS, Philips ECG Inc., A North American Philips Co., 100 First Ave., Waltham, MA 02254, Tel: 617-890-6107; Empl.: 4213; *Sls. Mgr.:* D. R. Kronenwetter; *Dist. Mgr.:* E. H. Frost .... **A•2090-2091**

Local Sales Offices & Reps

CA	Costa Mesa, Philips ECG, Inc.	714-557-3100
CA	Pleasanton, Philips ECG, Inc.	415-846-2427
FL	Clearwater, Philips ECG, Inc.	813-446-8602
GA	Atlanta, Philips ECG, Inc.	404-491-6003
IL	Buffalo Grove, Philips ECG, Inc.	312-459-1180
MD	Ellicott City, Philips ECG, Inc.	301-531-6423
MO	Kansas City, Philips ECG, Inc.	816-741-4019
NJ	Norwood, Philips ECG, Inc.	201-768-3280
NY	Seneca Falls, Philips ECG, Inc.	315-568-5432
NC	Greensboro, Philips ECG, Inc.	919-299-6204
OH	Dayton, Philips ECG, Inc.	513-890-4421
OH	Rocky River, Philips ECG, Inc.	216-331-1088
TX	Dallas, Philips ECG, Inc.	214-239-9370

Local Distributors

AL	Albertville, Electronic Part & Supp. Co.	205-878-3041
AL	Andalusia, Wholesale Elctr. Supps. Co.	205-222-5100
AL	Anniston, Radio Dist. & Sup. Co.	205-236-8654
AL	Birmingham, Forbes Distributing Co.	205-251-4104
AL	Birmingham, JLS Indl. Elctrns., Inc.	205-322-2486
AL	Decatur, Forbes Distributing Co.	205-353-4762
AL	Dothan, Carmichael Elctrns. Inc.	205-793-7066
AL	East Gadsden, Radio Dist. & Supp. Co.	205-547-1636
AL	Huntsville, Forbes Distrbg. Co.	205-533-4150
AL	Mobile, Electronic Supp. Co.	205-478-0455
AL	Mobile, Forbes Elctrn. Distrs. Inc.	205-479-4535
AL	Mobile, Specialty Distributing Co.	205-344-0450
AL	Montgomery, Forbes-Godfrey TV Elctrns. Inc.	205-263-0283
AL	Muscle Shoals, Jones Elctrns.	205-383-1241
AL	Opelika, Southern Elctrns. Corp.	205-745-5298
AK	Anchorage, Alaska Elctrn. Supp.	907-563-3774
AK	Juneau, Juneau Elctrns.	907-586-2260
AZ	Phoenix, Dalis Elctrn. Supp.	602-275-2885
AZ	Phoenix, Elctrn. Parts Co. Inc.	602-277-7281
AZ	Phoenix, Electronic Distrs.	602-955-8303
AZ	Phoenix, Parts Elctrn. of AZ	602-258-6476
AZ	Tucson, Elliott Elctrns., Inc.	602-884-7394
AZ	Tucson, Inland Elctrn. Supp.	602-889-5301
AR	El Dorado, Electra Inc.	501-862-4901
AR	Ft. Smith, Carlton Bates Co.	501-646-8201
AR	Ft. Smith, Wise Wholesale Elctrns.	501-783-8925
AR	Hot Springs, Prince Elctrns. Co.	501-624-2825
AR	Little Rock, Bluff City Elctrns.	501-376-7044
AR	Little Rock, Carlton Bates Co.	501-562-9100
AR	Little Rock, David White Elctrns.	501-375-8887
AR	Little Rock, Lavender Elctrn. Supp. Inc.	501-372-0248
AR	Little Rock, Southern Elctrns. Co.	501-372-4196
AR	Mt. Home, Show-Me Elctrns., Inc.	501-425-8979
AR	Paragould, Martin Wholesale Radio Supp.	501-236-6049
AR	Pine Bluff, Carlton Bates Co.	501-535-1354
AR	Pine Bluff, David White Elctrns.	501-534-0612
AR	Springdale, Carlton Bates Co.	501-756-5012
AR	Springdale, Wise Wholesale Elctrns.	501-751-4814
AR	Texarkana, Lavender Elctrns. Inc.	501-773-4631
CA	Anaheim, Ball Elctrns.	714-828-1310
CA	Berkeley, Al Lasher Elctrns.	415-843-5915
CA	Calexico, Hurley Elctrns., Inc.	714-357-3148
CA	Canoga Park, Tri-Valley Elec. Supp.	213-348-6210
CA	Concord, Pacific Radio Supp. Inc.	415-682-4700
CA	Downey, Net Elctrns.	213-923-4591
CA	Dublin, Pacific Radio Supp. Inc.	415-829-5960
CA	Eureka, Redwood Elctrn. Supp.	707-443-3107
CA	Fresno, B. J. De Jarnatt Wholesale Co., Inc.	209-268-8544
CA	Fullerton, Orvac Elctrns.	714-871-1020
CA	Garden Grove, Sav-On	714-530-0555
CA	Huntington Park, Martin Distributing Co.	213-582-7111
CA	Inglewood, Hurley Elctrns., Inc.	213-678-7644
CA	Long Beach, Hurley Elctrns., Inc.	213-537-5375
CA	Los Angeles, Radio Equip. Distrs.	213-668-1100
CA	Modesto, Inland Elctrns.	209-524-7945
CA	Mtn. View, Associated Radio	415-968-1689
CA	Oakland, Cass Elctrns.	415-834-4225
CA	Oakland, Chuck Hurley Elctrns.	415-834-9185
CA	Oceanside, Hurley Elctrns., Inc.	619-722-7694
CA	Ontario, Hurley Elctrns., Inc.	714-986-6638
CA	Oxnard, Dow Radio, Inc.	805-486-6353
CA	Oxnard, Hurley Elctrns., Inc.	805-483-0133
CA	Pasadena, Dow Radio, Inc.	213-681-3416
CA	Redding, North Valley Elctrns.	916-222-1500
CA	Sacramento, Chuck Hurley Elctrns. Inc.	916-927-5891
CA	Sacramento, Dunlap Elctrns. Inc.	916-442-5801
CA	Sacramento, Popkey Distributing	916-448-8848
CA	Salinas, Ardco Elctrns. Supp.	408-422-5318
CA	San Bernadino, Hurley Elctrns., Inc.	714-885-0721
CA	San Diego, Hurley Elctrns.	619-235-6245
CA	San Diego, Steren Elctrns. Intl.	619-274-4120
CA	San Francisco, Associated Radio	415-431-0212
CA	San Jose, John E. Schad Inc.	408-275-6484
CA	San Jose, Peninsula Elec. Supp.	408-294-8781
CA	San Luis Obispo, Midstate Wholesale Elctrns.	805-543-2770
CA	San Rafael, Beaver Elctrns.	415-453-1130
CA	Santa Ana, Hurley Elctrns., Inc.	714-971-2203
CA	Santa Maria, Electronics Parts Supermart	805-925-8604
CA	Santa Rosa, Associated Radio Distrs.	707-527-6000
CA	Santa Rosa, Chuck Hurley Elctrns. Inc.	707-542-5423
CA	Stockton, Cal-Centron	209-942-2094
CA	Torrance, Cash Elctrns.	213-373-6333
CA	Vallejo, Associated Radio	707-552-2363
CA	Van Nuys, Hurley Elctrns., Inc.	818-781-8410
CO	Colorado Springs, Walker Colorado Springs Elect.	303-636-1661
CO	Denver, Elliott Elctrn. Supp. Inc.	303-778-0333
CO	Denver, Walker Denver Elctrns.	303-935-2401
CO	Englewood, Roth Distrbg. Co.	303-761-6531
CO	Grand Junction, Walker Grand Junction Elctrns.	303-242-4435
CO	Greeley, Walker Greeley Elctrns. Co.	303-353-3241
CO	Pueblo, Walker Pueblo Elctrns.	303-542-1924
CT	Greenwich, Wise Comps., Inc.	203-531-4880
CT	Hartford, Signal Center, Inc.	203-233-8551
CT	New London, Aikins Elctrn. Supp.	203-442-4406
CT	New London, Jan Elctrn. Supps., Inc.	203-442-4386
CT	South Windsor, Sceli Elctrns.	203-289-6853
CT	West Haven, Amerling Co.	203-934-7901
DE	Wilmington, Wholesale Elctrns.	302-656-9988
FL	Bradenton, Leader Elctrns.	813-756-9571
FL	Cocoa, Cape Elctrns.	305-636-6331
FL	Daytona Beach, C & S Elctrn. Supp. Co.	904-253-8131
FL	Ft. Lauderdale, Leader Dixie Elctrns., Inc.	305-561-2544
FL	Ft. Lauderdale, Southeastern Elctrns.	305-563-4131
FL	Ft. Lauderdale, Vance Baldwin Inc.	305-523-3461
FL	Ft. Myers, Dow Elctrns.	813-334-6577
FL	Ft. Walton Beach, Key Elctrn. Supp.	904-863-2191
FL	Gainesville, Dow Elctrns. Inc.	904-376-3231
FL	Homestead, United Elctrn. Supp. Inc.	305-245-0955
FL	Jacksonville, Mitchell Elctrns.	904-356-8427
FL	Jacksonville, The Bay Co.	904-255-2614
FL	Lakeland, Leader Elctrns.	813-686-8193
FL	Largo, Chester Elctrn. Supp. Co.	813-585-4736
FL	Melbourne, Leader Elctrn. Distributing Inc.	305-254-5274
FL	Miami, Central Elctrns. Distrs., Inc.	305-635-1080
FL	Miami, Elctrn. Equip. Co., Inc.	305-871-3500
FL	Miami, Gulf Elctrn. Supp., Inc.	305-592-6583
FL	Miami, Southeastern Wholesalers Inc.	305-634-6591
FL	Miami, Vance Baldwin Inc.	305-769-0225
FL	Miami, Walder Elctrn. Distr. Co.	305-379-9393
FL	Naples, Joe Coomes Distr. Inc.	813-775-4442
FL	Orlando, C & S Elctrn. Supp. Co., Inc.	305-299-4300
FL	Orlando, Dow Elctrns. Inc.	305-299-2771
FL	Panama City, Central Elctrn. Supp. Co.	904-785-0237
FL	Pensacola, Elctrn. Supp. Co.	904-432-6916
FL	Pensacola, Forbes Elctrn. Distributing Inc.	904-944-5551
FL	Pensacola, Pensacola Elctrns.	904-478-3771
FL	Sarasota, Dow Elctrns.	813-365-3393
FL	St. Petersburg, Dow Elctrns.	813-525-1131
FL	Tallahassee, Dell Elctrns. Inc.	904-224-5145
FL	Tallahassee, Fouraker Elctrns. Inc.	904-224-5101
FL	Tampa, Dow Elctrns., Inc.	813-626-5191
FL	Tampa, Leader Elctrns. Distrs.	813-870-3315
FL	Tampa, Sunex Elctrns. Supp., Inc.	813-885-4074
FL	Tampa, Vance Baldwin, Inc.	813-870-2606
FL	Venice, Ferguson Elctrns. Co.	813-493-0000
FL	W. Palm Beach, Dolphin Elctrn. Supp. Inc.	305-659-7166
FL	W. Palm Beach, Vance Baldwin Inc.	305-832-5671
GA	Albany, Specialty Distributing Co.	912-435-1711
GA	Athens, Specialty Distributing Co.	404-458-1334
GA	Atlanta, Specialty Distributing Co.	404-458-6341
GA	Atlanta, Specialty Distributing Co.	404-873-2521
GA	Atlanta, Wholesale Indl. Elctrns.	404-447-8431
GA	Augusta, Specialty Distributing Co.	404-722-1526
GA	Brunswick, Specialty Distributing Co.	912-265-1927
GA	College Park, Specialty Distributing Co.	404-763-3828
GA	Columbus, Specialty Distributing Co.	404-327-7414
GA	Macon, Specialty Distributing Co.	912-743-5421
GA	Marietta, Specialty Distributing Co.	404-422-4333
GA	Savannah, Specialty Distributing Co.	912-234-1684
GA	Valdosta, Specialty Distributing Co.	912-242-4910
HI	Honolulu, Admor Distr. Corp.	808-537-4501
HI	Honolulu, Electrical Equip. Co., Ltd.	808-533-3884
HI	Honolulu, Industrial Elctrns.	808-533-6095
HI	Honolulu, Precision Radio Ltd.	808-537-5291
ID	Boise, Kimball Elctrns.	208-342-3559
ID	Pocatello, Kimball Elctrns.	208-232-2201
IL	Alton, Ebinger Radio Co.	618-462-9783

IL	Belleville, Deltronics Distrbg. Co.	618-398-2183
IL	Benton, Lampley Radio Co.	618-435-8194
IL	Berwyn, B-B & W Inc.	312-749-1710
IL	Chicago, Alpha Elctrns.	312-561-0300
IL	Chicago, Howard Elctrn. Sls.	312-254-1777
IL	Chicago, Newark Elctrns. Corp.	312-638-4411
IL	Chicago, U. S. Electronics	312-925-4111
IL	Elgin, Mainline Supp. Co., Inc.	312-697-6746
IL	Evergreen, Beaty Elctrns. Inc.	312-423-5500
IL	Franklin Park, Richardson Elctrns.	312-456-0600
IL	Geneva, Melvin Elctrns., Inc.	312-232-8050
IL	Harrisburg, Standard Distrs.	618-252-1478
IL	Jacksonville, Baptist Elctrn. Supp. Co., Inc.	217-243-6464
IL	Joliet, Mainline Supp. Co., Inc.	815-436-3900
IL	Kankakee, S&S Elctrn. Supp. Co.	815-933-5595
IL	Mattoon, Mattoon Radio & TV Supp. Co.	217-235-5457
IL	Moline, Lofgren Distributing Co.	309-764-7436
IL	Niles, Joseph Elctrns. Inc.	312-297-4200
IL	Peoria, Warren Radio Co.	309-674-5998
IL	Quincy, Show Me Elctrns.	217-223-9880
IL	Rockford, Jay-tronics	815-965-8786
IL	Rockford, Midwest Associated	815-962-8036
IL	Salem, Laco Elctrns. Inc.	618-548-3150
IL	Springfield, Baptist Elctrn. Supp. Co., Inc.	217-753-0111
IL	Sterling, Warren Radio Co.	815-625-6253
IL	Waukegon, Chester Elctrn. Supp.	312-623-5000
IN	Angola, Lakeland Elctrn. Supp.	219-665-6311
IN	Bloomington, Stansifer Radio Co.	812-336-6339
IN	Chesterton, Chesterton Elctrn. Supp.	219-926-2109
IN	Elkhart, Warren Radio Co.	219-295-4205
IN	Evansville, Hutch & Son, Inc.	812-425-7201
IN	Evansville, Ohio Valley Sound	812-425-6173
IN	Ft. Wayne, Pembleton Elctrns.	219-426-1812
IN	Ft. Wayne, Warren Radio Co.	219-426-5344
IN	Gary, B&B Elctrn. Supp.	219-980-8200
IN	Gary, Calumet Elctrn. Supp. Inc.	219-887-4961
IN	Indianapolis, Elctrn. Svc. Parts	317-632-8586
IN	Indianapolis, Graham Elctrns. Supp. Inc.	317-634-8202
IN	Indianapolis, ROBCO Distrs., Inc.	317-788-0857
IN	Indianapolis, Warren Radio Co.	317-634-5566
IN	Jasper, Elex Mart	812-482-3535
IN	Kokomo, Television Radio Distr.	317-457-5942
IN	Logansport, Television Radio Distr., Inc.	219-753-2879
IN	Marion, J&W Elctrns. Inc.	317-662-1114
IN	Mishawaka, Television Supp., Inc.	219-255-4720
IN	Peru, Television Radio Distr., Inc.	317-472-2005
IN	Terre Haute, Mid West Supp.	812-232-0187
IN	Vincennes, Ohio Valley Sound, Inc.	812-882-3615
IA	Ames, Electronic Supp. Inc.	515-232-7020
IA	Ames, Mid-State Distrbg. Co.	515-232-2104
IA	Burlington, Union Supp. Co.	319-754-5745
IA	Burlington, Warren Radio Co.	319-752-1842
IA	Carroll, Mid-State Distrbg. Co.	712-792-2177
IA	Cedar Rapids, Deeco, Inc.	319-365-7551
IA	Cedar Rapids, Iowa Radio Supp. Co.	319-364-6154
IA	Cedar Rapids, Mid-State Distrbg. Co.	319-365-9411
IA	Clinton, Union Supp. Co., Inc.	319-242-4572
IA	Davenport, Union Supp. Co.	319-322-3531
IA	Davenport, Warren Radio Co.	319-322-5301
IA	Des Moines, Gifford-Brown of Des Moines	515-243-1257
IA	Des Moines, Mid State Distributing Co.	515-244-7231
IA	Dubuque, Warren Radio Co.	319-582-4300
IA	Iowa City, Union Supp. Co.	319-338-6165
IA	Mason City, Mid State Distributing Co.	515-423-8012
IA	Ottumwa, Mid-State Distrbg. Co.	515-682-5407
IA	Sioux City, Molstad Dist.	712-255-8023
IA	Waterloo, Gifford-Brown, Inc.	319-234-2603
KS	Great Bend, RSC Elctrns., Inc.	316-793-3507
KS	Kansas City, Video Elctrn. Supp. Co.	913-371-5731
KS	Salina, RSC Electronics	913-823-6353
KS	Wichita, RSC Electronics	316-267-5213
KY	Ashland, Electronic Supp. Inc.	606-325-1511
KY	Bowling Green, Randolph, Hale & Meredith	602-781-1460
KY	Hopkinsville, Randolph & Hale	502-885-5357
KY	Lexington, Service Elctrn. Supp.	606-254-5786
KY	Louisville, P. I. Burks & Co.	502-589-3960
KY	Newport, Holub Dist. Co.	606-431-4211
KY	Paducah, Warren Radio Co.	502-442-4367
LA	Alexandria, Elctrn. Svc. Supp.	318-443-8483
LA	Alexandria, Ralph's Indl. Elctrns.	318-443-8483
LA	Baton Rouge, Industrial Elec. Supp., Inc.	504-357-4249
LA	Baton Rouge, Menard Elctrns.	504-355-0232
LA	Baton Rouge, Ralph's of Baton Rouge	504-344-3761
LA	Baton Rouge, Southern Radio Supp. Co., Inc.	514-355-0396
LA	Broussard, Menard Elctrns., Inc.	318-837-9204
LA	Gretna, Pelican Elctrn. Supp. Inc.	504-361-4187
LA	Harahan, United Distrs., Inc.	504-733-7920
LA	Harvey, AFG Elctrn. Supp., Inc.	504-368-9696
LA	Houma, Pelican Elctrn. Supp. Inc.	504-868-1285
LA	Lafayette, Lafayette Radio Equip.	318-234-2364
LA	Lafayette, Ralph's of Lafayette	318-234-4507
LA	Lake Charles, Ralph's of Lake Charles	318-439-2493
LA	Lake Charles, Sparton Elctrns. Supp., Inc.	318-491-9223
LA	Lake Charles, Wholesale Radio Equip.	318-439-2431
LA	Metairie, Pelican Elctrn. Supp.	504-888-4720
LA	Monroe, Martin Elctrns. Inc.	318-388-4224
LA	Monroe, Tri-State Elctrns.	218-387-9711
LA	Morgan City, Ralph's of Morgan City	504-384-9831
LA	New Iberia, Ralph's of New Iberia	318-369-9861
LA	New Orleans, Radio Parts	504-581-5959
LA	New Orleans, Southern Radio Supp. Co.	504-524-2343
LA	New Orleans, Wm. B. Allen, Inc.	504-525-8222
LA	Opelousas, Opelousas Radio Equip.	318-942-5702
LA	Shreveport, Elctrn. Supp. of Shreveport	318-227-9080
LA	Shreveport, Indl. Elctrn. Supp. Inc.	318-222-9459
LA	Shreveport, Wholesale Elec. Supp., Inc.	318-422-2063
LA	West Monroe, Brooks Supp. of La	318-323-0344
ME	Lewiston, Stark Wholesale Elctrns.	207-784-6979
ME	Portland, LAD Elctrns. Distrs.	207-772-2174
MD	Baltimore, Fairway Elctrns. of MD Inc.	301-247-8383
MD	Baltimore, Modern Elctrns.	301-282-5300
MD	Baltimore, Tritronics	301-256-4400
MD	Beltsville, Radio Elec. Svc. Co.	301-937-5890
MD	Bethesda, Empire Elec. Supp.	301-656-3300
MD	Frederic, Hankey's Radio Inc.	301-662-1381
MD	Hagerstown, Fairway Elctrns. Inc.	301-791-0200
MD	Kensington, Fairway Elctrns. Inc.	301-564-1440
MD	Towson, Baynesville Elctrns.	301-823-0082
MD	White Marsh, Radio Elec. Svc. Co.	301-529-0500
MA	Billerica, A. W. Mayer Co.	617-667-6900
MA	Boston, Tee Vee Supp. Co.	617-522-9330
MA	Brockton, Ware Radio Supp. Corp.	617-583-0810
MA	Fall River, E. A. Ross Co.	617-673-0921
MA	Lawrence, Lawrence Elctrn. Distrs.	617-683-0257
MA	Lowell, Frank P. McCartin Co.	617-454-9101
MA	New Bedford, Burns Elctrn. Supp. Co.	617-998-3344
MA	New Bedford, C. E. Beckman Co.	617-994-9674
MA	New Bedford, E. A. Ross Co.	617-673-0921
MA	Norwood, Morrison Elctrn. Supp.	617-769-7280
MA	Peabody, Tee Vee Supp. Co.	617-531-5777
MA	Quincy, Electronic Dists. Corp.	617-328-7800
MA	Springfield, Signal Electr. Ctr. of Springfield	413-739-3893
MA	Waltham, MIL Elctrns. Inc.	617-891-6730
MA	Woburn, Abbott Elctrns., Inc.	617-935-2040
MA	Woburn, Semtex	617-935-2150
MA	Worcester, Stark Wholesale Elctrns. Inc.	617-756-7136
MI	Adrian, Wedemeyer Elctrn. Supp. Co.	313-263-2925
MI	Battle Creek, Warren Radio Co.	616-965-3338
MI	Bay City, Kinde Distributing	517-892-1594
MI	Dearborn, West Side Radio	313-933-6972
MI	Detroit, Elctrn. Parts Co.	313-891-7400
MI	Detroit, S & S Elctrns.	313-521-3610
MI	Detroit, Top Radio Supp. Corp.	313-366-9088
MI	East Detroit, Electronic Parts Co.	313-773-0030
MI	Flint, Electronic Parts Specialists	313-238-7311
MI	Flint, Shand Elctrns.	313-743-8940
MI	Grand Rapids, T & W Elctrns.	616-241-3645
MI	Grand Rapids, Warren Radio Co.	616-456-5385
MI	Kalamazoo, Warren Radio Co.	616-381-4203
MI	Lansing, Wedemeyer Elctrns.	517-489-9047
MI	Livonia, Norwest Elctrns.	313-261-4551
MI	Livonia, RS Electronics	313-525-1155
MI	Madison Hgts., Warren Radio Co.	313-588-3327
MI	Muskegon, T & W Elctrns., Inc.	616-759-7666
MI	Niles, Niles Radio Supp. Co.	616-684-0550
MI	Oak Park, Remcor Elctrns., Inc.	313-541-5666
MI	Owasso, Warren Radio Co.	517-723-5239
MI	Pontiac, Joe Coomes	313-334-1526
MI	Saginaw, Ryder Distributing	517-799-2411
MI	Traverse City, Traverse City Elctrns.	616-946-5153
MN	Minneapolis, Electronic Center	612-371-5200
MN	Minneapolis, Ness Elctrns. Inc.	612-824-2646
MN	Minneapolis, Stark Elctrn. Supp. Co.	612-332-1325
MN	Rochester, Pace Elctrns. Inc.	507-288-1853
MN	St. Cloud, Team Elctrns. #4	612-251-1335
MN	St. Paul, Electronics Ctr., Inc.	612-371-5260
MN	St. Paul, Ness Elctrns.	612-224-5411
MS	Biloxi, Electronic Parts Co.	601-435-3221
MS	Columbus, Bluff City Elctrns.	601-328-6212
MS	Greenville, Tri-State Elctrns. Co.	601-335-3594
MS	Hattiesburg, N & H Elctrn. Distr. Co.	601-582-5571
MS	Jackson, Tri-State Elctrns. Co.	601-355-3431
MS	McComb, Risher Radio Supp. Co.	601-684-3731
MS	Meridian, Hooper Elctrn. Supp. Co., Inc.	601-693-2668
MS	Pascagoula, Hooper Elctrn. Supp. Co.	601-762-9383
MS	Philadelphia, Risher Whls. Co.	601-656-8802
MS	Tupelo, Bluff City Elctrns.	601-842-6832
MO	Columbia, Show-Me Elctrns.	314-449-2944
MO	Flat River, Show-Me Elctrns.	317-431-4816
MO	Jefferson City, Central Missouri Distributing Co.	314-636-3149
MO	Jefferson City, Show-Me Elctrns.	314-636-2191
MO	Joplin, Show-Me Elctrns., Inc.	417-623-1608
MO	Kansas City, Elctrn. Supp. Co.	816-931-0250
MO	Kirkville, Mid State Distrbg. Co.	816-665-5625
MO	Rolla, Show-Me Elctrns.	314-364-1515
MO	Sedelia, Show-Me Elctrns., Inc.	816-826-3044
MO	Sikeston, Baileys Elect. Supp.	314-471-6142
MO	Springfield, Mason Elect. Supp.	417-865-5542
MO	Springfield, Show-Me Elctrns.	417-869-0752
MO	St. Charles, Deltronics Distrbg. Co.	314-723-0210
MO	St. John, Ralph Toler Radio Co.	314-426-3260
MO	St. Joseph, Show-Me Elctrns., Inc.	816-233-3118
MO	St. Louis, City Refrigeration Co., Inc.	314-427-3420
MO	St. Louis, Deltronics Distributing Co.	314-725-6060
MO	St. Louis, Ebinger Elctrns.	314-353-8818
MO	St. Louis, M C Distrs., Inc.	314-231-6350
MO	St. Louis, Olive Elctrns. Inc.	314-426-4500
MO	St. Louis, Show-Me Elctrns., Inc.	314-781-7643
MT	Billings, Television & Elec. Supp. Co.	406-252-7193
MT	Great Falls, The Source Inc.	406-761-2420
MT	Havre, Northern Elctrns.	406-265-5568
MT	Kalispell, Professional Elctrns. Ctr.	406-257-4545
NE	Hastings, Meyerson Distrbg. Co.	402-463-3145
NE	Lincoln, Leuck Radio Co.	402-476-2797
NE	Norfolk, Radio Equip. Co.	402-371-2728
NE	Omaha, Meyerson Distrbg. Co.	402-342-3088
NE	Omaha, Omaha Elctrns. Co.	402-341-3440
NE	Omaha, Radio Equip. Co.	402-341-7700
NE	Scottsbluff, D&H Elctrns. Supp. Inc.	308-632-2181
NV	Las Vegas, Hurley Elctrns.	702-384-5666
NV	Reno, Bennett Elctrn. Supp. Co.	702-322-2127
NV	Reno, Nevada Elctrns.	702-329-1308
NH	Dover, American Radio Corp.	603-742-6800
NH	Manchester, Stark Wholesale Elect. of N.H. Inc.	603-688-7611
NH	Nashua, Tee Vee Supp. Co.	603-889-4171
NJ	Eatontown, Atkinson & Smith Co.	201-542-2447
NJ	Edison, William Elctrn. Supp. Inc.	201-985-3700
NJ	Hillside, Leader Elctrn. Supp. Corp.	201-354-4200
NJ	Pleasantville, Kearns Elctrn. Prods. Co.	609-646-7010
NJ	Raritan, Masters Elctrn. Supp.	201-725-3583
NJ	Trenton, Service Parts & Supp. Co.	609-393-7135
NJ	Union City, NIDISCO, Inc.	201-863-2111
NM	Albuquerque, Elctrn. Parts Co.	505-293-6161
NM	Albuquerque, Southwest Elctrns.	505-345-8611
NM	Albuquerque, US Module	505-345-7968
NM	Farmington, Walker Farmington Elctrns. Inc.	505-327-9138
NM	Hobbs, Trice Wholesale Elctrns.	505-393-5107
NM	Las Cruces, Electronic Parts, Inc.	505-523-4578
NM	Roswell, R & R Elctrn. Supp. Co.	505-622-0670
NM	Santa Fe, Sepco Inc.	505-982-1621
NY	Albany, Troy Television of Albany	518-428-7801
NY	Amherst, Standard Elctrns. Inc.	716-691-3061
NY	Binghamton, Help Elctrns.	607-729-3528
NY	Bronx, CAM Elctrns. Distr. Co., Inc.	212-893-8300
NY	Brooklyn, Alpha Elctrns., Inc.	212-633-2800
NY	Brooklyn, Mill Elctrns. Supp. Co.	212-336-4575
NY	Brooklyn, Saco Elctrns.	212-783-7288
NY	Buffalo, Genesee Radio Parts Co.	716-873-9661
NY	Buffalo, Goldcrest Elctrn. Supp.	716-885-5878
NY	Buffalo, Summit Distrbg. Co., Inc.	716-884-3450
NY	Centereach, GTE Elctrn. Supp.	516-585-8111
NY	Commack, Spartan Elctrns. Inc.	516-499-9500
NY	Corning, Corning Elctrns., Inc.	607-962-0555
NY	Cortland, Cortland Elctrn. Supp.	607-756-2523
NY	East Rockaway, Temtron Elctrns.	516-599-6400
NY	Elmira, Brady Supp. Corp.	607-733-6591
NY	Freeport, Hygrade Elctrns., Inc.	516-379-8900
NY	Hempstead, Davis Elctrns. Corp.	516-483-9200
NY	Herkimer, Herkimer Elctrns., Inc.	315-866-1680
NY	Hicksville, Elctrn. City	516-938-8330
NY	Hornell, Hornell Elctrns., Inc.	607-324-2451
NY	Horseheads, Southern Tier Elctrns. Inc.	607-734-4138
NY	Jamaica, All Parts Elctrns. Whlers., Inc.	212-291-3388
NY	Jamestown, Warren Radio Co.	716-484-1141
NY	Johnson City, Goldcrest Elctrns. Supp.	607-797-2389
NY	Johnson City, Help Elctrns.	607-729-3528
NY	Kingston, Greylock Elctrn. Distrs.	914-338-5300
NY	Lackawanna, Metromill Distrs. Inc.	716-826-2600
NY	Long Island City, Avtech Elctrns.	212-937-9200
NY	Massapequa, A&P Elctrns. Corp.	516-541-4200
NY	Middletown, Greylock Elctrns.	914-343-7900
NY	New Hyde Park, Electronic City	516-352-7145
NY	New York, Consolidated Radio Sls.	212-865-4900

NY	New York, Dale Elctrns. Corp.	212-255-3660
NY	New York, State Labs, Inc.	212-807-9400
NY	New York, United Teletronic Parts Corp.	212-569-2330
NY	Olean, Standard Elctrns. Inc.	716-372-1800
NY	Plainview, ACI Elctrns. Corp.	516-293-6630
NY	Plattsburgh, Champlain Elctrns.	518-563-2323
NY	Port Chester, Wise Comps.	914-939-3940
NY	Poughkeepsie, Greylock Elctrns.	914-452-0550
NY	Richmond Hill, Anchor Elctrns. Distr. Co.	212-846-2421
NY	Rochester, Goldcrest Elctrns. Supp.	716-546-8464
NY	Rochester, Masline Elctrns. Inc.	716-546-5373
NY	Rochester, Standard Elctrns. Inc.	716-254-7590
NY	Rochester, Summit Distrs. of Rochester	716-334-8110
NY	Rome, Rome Security Dvcs., Inc.	315-336-0148
NY	Schenectady, Goldcrest Elctrns. Supp.	518-377-6424
NY	Syracuse, Goldcrest Elctrns. Supp.	315-471-7115
NY	Syracuse, Standard Elctrns. Inc.	315-422-0421
NY	Syracuse, Stewart W. Smith, Inc.	315-422-0323
NY	Troy, Troy Television	518-235-1521
NY	Utica, Grapac Elctrns. Co.	315-732-4674
NY	Watertown, Gateway Elctrns.	315-788-7251
NC	Burlington, Womack Elc. Supp.	919-227-7486
NC	Charlotte, United Elctrns. Supp.	704-372-2650
NC	Concord, Mac Victor Elctrns.	704-786-4175
NC	Durham, Knight Elctrns.	919-682-9371
NC	Fayetteville, Brantley Elctrns.	919-868-8038
NC	Fayetteville, Eastern Radio Supp.	919-485-2161
NC	Gastonia, JMT Elctrns.	704-867-4401
NC	Goldsboro, Womack Elctrns.	919-734-3221
NC	Greensboro, Guilford Elctrns.	919-275-1385
NC	Greenville, Pair Elctrns.	919-756-2291
NC	Highpoint, Guilford Elctrns.	919-889-8024
NC	Lumberton, Knight Elctrns.	919-739-2870
NC	Raleigh, Knight Elctrns.	919-833-6417
NC	Sanford, Knight Elctrns.	919-776-4249
NC	Statesville, Mills Elctrns. Inc.	704-872-8949
NC	Wilmington, Buck's Elctrns.	919-392-4262
NC	Winston Salem, Electronic Distributing Inc.	919-723-1097
NC	Winston Salem, Kirkman Elctrns.	919-722-9131
ND	Fargo, RSC Elctrns.	701-232-8993
ND	Fargo, S/S Elctrns., Inc.	701-237-5003
OH	Akron, Akron Elctrn. Supp., Inc.	216-762-8818
OH	Akron, Main TV Supp. Co.	216-253-8161
OH	Akron, Sun Radio	216-434-2171
OH	Akron, Warren Radio Co.	216-434-6668
OH	Alliance, Glasska Elctrns.	216-823-5780
OH	Canton, Canton Elctrn. Supp.	216-454-7048
OH	Canton, Electronic Ctr. Inc.	216-456-7133
OH	Canton, Srepco Elctrn. Div.	216-455-0271
OH	Canton, Srepco Elctrn. Div.	216-445-0271
OH	Cincinnati, United Radio Inc.	513-761-4030
OH	Cleveland, Warren Radio Co.	216-888-5225
OH	Cleveland, Winteradio Elctrn. Supp. Corp.	216-621-9383
OH	Columbus, Srepco Elctrn. Div.	614-486-9483
OH	Columbus, Thompson Elctrn. Supp., Inc.	614-228-6191
OH	Columbus, Whitehead's	614-224-1186
OH	Dayton, Srepco Electrns., Pioneer Std. Electrns.	513-293-0871
OH	Dover, TV Specialties, Inc.	216-364-6678
OH	Elyria, EL-A-Co	216-323-1805
OH	Fairfield, Srepco Elctrn. Div.	513-863-4301
OH	Fremont, J & B Elctrns.	419-332-9334
OH	Lancaster, Electronic Supp. Co.	614-653-9344
OH	Lima, LRP Elctrns., Inc.	419-228-1220
OH	Lima, Warren Radio Co.	419-228-1691
OH	Lorain, Srepco Elctrn. Div.	216-277-1228
OH	Marion, Mid Ohio Elctrns. Co.	614-383-1101
OH	Newark, Turner Wilson Co.	614-323-1340
OH	Parma, Superior Elctrn. Parts Co.	216-842-7940
OH	Piqua, Srepco Elctrn. Div.	513-773-5120
OH	Portsmouth, Fullers Sound Elctrn. Supplier	614-353-0965
OH	Steubenville, World Radio & Elctrns.	614-283-2051
OH	Willowick, Euclid Radio Parts Co.	216-585-5115
OH	Youngstown, Glen Elctrns.	216-743-1119
OH	Youngstown, Ross Radio Co.	216-746-8881
OK	Ada, Trice Whls. Elctrns.	405-332-3022
OK	Ardmore, Trice Wholesale Elctrns.	405-223-8540
OK	Enid, Enid Walker Elctrns.	405-234-2218
OK	Enid, Trice Wholesale Elctrns.	405-234-6078
OK	Lawton, Trice Wholesale Elctrns.	405-355-3953
OK	Lawton, Walker Lawton Elctrns. Inc.	405-355-0603
OK	McAlester, Trice Wholesale Elctrns.	918-423-6716
OK	McAlester, Wise Whls. Elctrns.	918-423-2282
OK	Muskogee, Sooner Radio & TV Supp.	918-682-1384
OK	Muskogee, Trice Wholesale Elctrns.	918-682-2457
OK	Oklahoma City, Miller-Jackson Co.	405-235-8426
OK	Oklahoma City, Radio Supp. Co.	405-232-6127
OK	Oklahoma City, Radio, Inc.	405-789-0741
OK	Oklahoma City, Trice Wholesale Elctrns.	405-232-2291
OK	Oklahoma City, Wholesale Elctrn. Supp. Co.	405-528-2391
OK	Okmulgee, Trice Whls. Elctrns.	918-756-2060
OK	Tulsa, Carlton Bates Co.	918-250-1626
OK	Tulsa, Radio, Inc.	918-587-9124
OK	Tulsa, Trice Wholesale Elctrns.	918-585-5718
OR	Pendleton, Round-Up Elctrns.	503-276-3152
OR	Portland, Radar Elec.	503-232-3404
OR	Portland, United Radio Supp., Inc.	503-233-7151
OR	Salem, JW Elctrns.	503-399-8565
PA	Allentown, A. A. Peters, Inc.	215-434-5237
PA	Allentown, Barbey Elctrns.	215-821-5551
PA	Altoona, Hollenback Radio Supp.	814-944-6171
PA	Ambridge, Television Parts Co.	412-266-7700
PA	Braddock, D & D Radio & Television Parts Co.	412-351-3600
PA	Braddock, M Leff Radio Parts Co.	412-351-5000
PA	Butler, Bacher Elctrns.	412-283-2095
PA	Carlisle, Cumberland Elctrns., Inc.	717-243-6169
PA	Clifton Heights, Lazar Elctrns.	215-284-2440
PA	Drexel Hill, Kass Elctrn. Distr.	215-449-2300
PA	Elkins Park, AG Radio Inc.	215-886-5100
PA	Erie, J. V. Duncombe Co.	814-454-5278
PA	Erie, Warren Radio Co.	814-454-5285
PA	Harrisburg, Cumberland Elctrns.	717-233-5883
PA	Hazelton, Moyer Elctrn. Supp. Co., Inc.	717-455-3631
PA	Lancaster, Barbey Elctrns.	717-393-5637
PA	Lancaster, Cumberland Elctrns.	717-393-8304
PA	Lewiston, Cumberland Elctrns.	717-248-9631
PA	Marcus Hook, Linwood Wholesale	215-485-0777
PA	New Brighton, Television Parts Co., Inc.	412-846-3000
PA	Philadelphia, Arlen Supply Co.	215-472-3810
PA	Philadelphia, HBF Elctrns. Inc.	215-338-1100
PA	Philadelphia, JEM Elctrns.	215-743-3030
PA	Philadelphia, Shap Elctrns.	215-969-3300
PA	Pittsburgh, CRS Elctrns.	412-431-7700
PA	Pittsburgh, Graybar Elec.	412-323-0600
PA	Pittsburgh, South Hills Elctrns.	412-281-6640
PA	Pittsburgh, South Hills Elctrns.	412-341-6200
PA	Pittsburgh, Triangle Elctrn. Co.	412-441-9659
PA	Pottsville, Moyer Elctrn. Supp. Co., Inc.	717-622-7866
PA	Reading, Barbey Elctrns.	215-376-7451
PA	Scranton, Key Radio & Supp. Co.	717-342-0161
PA	St. Marys, B & R Elec. Co.	814-834-2814
PA	State College, University Elctrns.	814-238-3093
PA	Sunbury, Moyer Elctrn. Supp. Co., Inc.	717-286-6707
PA	Tarentum, Huston Elctrn. Distrs.	412-224-8002
PA	Trevose, Trevose Elctrns.	215-357-1400
PA	Uniontown, State Elctrns.	412-437-6110
PA	Wayne, Peak Elctrns. Corp.	215-293-9000
PA	West Chester, West Chester Elec. Supp. Co.	215-696-7500
PA	Wilkes-Barre, Wallco Inc. Elctrn. Dist.	717-823-6181
PA	York, Cumberland Elctrns.	717-848-1511
RI	Providence, A&J Distrs. Inc.	401-421-0991
RI	Providence, Hope Elctrn. Supp.	401-521-5600
RI	Providence, William Dandreta & Co.	401-861-2800
RI	Woonsocket, Lectronic Supp. Co.	401-762-0131
SC	Charleston, Wholesale Indl. Elctrns.	803-747-9672
SC	Charleston, Wholesale Indl. Elctrns., Inc.	803-723-3626
SC	Columbia, Hesco Inc.	803-254-4575
SC	Columbia, Wholesale Indl. Elctrns.	803-256-0746
SC	Florence, J&M Supply Co.	803-662-7281
SC	Greenville, Sawyer Elctrns.	803-235-0438
SC	Greenville, Wholesale Indl. Elctrns.	803-235-8334
SC	Taylors, Cantrell Wholesale	803-268-1194
SD	Watertown, Burghardt Supp. Co.	605-886-5754
TN	Chattanooga, Specialty Distributing Co.	615-267-9460
TN	Columbia, Randolph & Williams	615-388-7566
TN	Cookeville, Randolph & Parks	615-526-6184
TN	Dyersburg, Warren Radio	901-285-3850
TN	Jackson, Bluff City Elctrns.	901-424-0236
TN	Jackson, Lavender Elctrns. Inc.	901-422-6585
TN	Johnson City, L & S Elctrns.	615-926-3021
TN	Knoxville, Bondurant Bros. Co.	615-573-9151
TN	Knoxville, Roden Electrical Supp. Co.	615-546-8755
TN	Memphis, Bluff City Elctrns.	901-345-9500
TN	Memphis, Frank G. Uffer Co.	901-725-6743
TN	Memphis, Warren Radio	901-274-2460
TN	Morristown, L & S Elctrns.	615-581-7983
TN	Nashville, Bluff City Elctrns.	615-242-8000
TN	Nashville, Curreys Inc.	615-242-4221
TN	Nashville, Randolph & Rice	615-255-5602
TN	Paris, Lavender Elctrns., Inc.	901-642-7354
TN	Tullahoma, Randolph Vandergriff Inc.	615-455-4531
TX	Abilene, R & R Elctrn. Supp. Co.	915-677-2974
TX	Amarillo, R & R Elctrn. Supp. Co.	806-374-2866
TX	Amarillo, Trice Wholesale Elctrns.	806-372-5668
TX	Austin, C&M Elctrns. Inc.	512-451-6595
TX	Austin, Harrison Equip. Co.	512-458-3555
TX	Austin, Wholesale Elctrn. Supp. Co.	512-478-9568
TX	Beaumont, Buddy's Wholesale Elctrn. Inc.	713-842-5019
TX	Beaumont, Covington Distr.	713-835-5392
TX	Borger, Trice Wholesale Elctrns.	806-274-5281
TX	Brownsville, Rio Radio Supp., Inc.	512-423-1959
TX	Bryan, Mid-State Elctrns.	713-822-0884
TX	Carrollton, Curtis Mathes Corp.	214-484-4941
TX	Corpus Christi, Elctrn. Suppliers Inc.	512-993-1303
TX	Corpus Christi, Leader Elctrn. Supp. Co.	512-884-5527
TX	Dallas, Banner TV Supp.	214-943-9742
TX	Dallas, Harrison Equip. Co., Inc.	214-239-2750
TX	Dallas, R & R Elctrn. Supp. Co.	214-742-1431
TX	Dallas, United Distr. of Texas, Inc.	214-631-3980
TX	Dallas, Wallace Elctrns. Co., Inc.	214-340-0400
TX	Dallas, Wholesale Elect. Supp. Co.	214-824-3001
TX	Denison, Denison Radio Supp.	214-465-2336
TX	El Paso, Midland Specialty Co.	915-533-9555
TX	El Paso, R & R Elctrn. Supp. Co.	915-566-9693
TX	Ft. Worth, Allied Elctrns.	817-336-5401
TX	Ft. Worth, Apollo Whls. Elctrns.	817-877-5854
TX	Ft. Worth, Wholesale Elctrn. Supp.	817-336-0461
TX	Greenville, Lavender Elctrns. Inc.	817-335-9515
TX	Harlingen, Elctrn. Suppliers, Inc.	512-423-5895
TX	Harlingen, Rio Radio Supp., Inc.	512-423-1959
TX	Houston, Angie Elctrn. Supp. Co.	713-659-8386
TX	Houston, Electronic Comps. Distrs.	713-528-1543
TX	Houston, Harrison Equip. Co.	713-652-4750
TX	Houston, Houston Wholesale	713-644-8320
TX	Houston, L & O Elctrn. Supp.	713-862-7454
TX	Houston, Lenert Co.	713-225-1465
TX	Houston, Ralph's Indl. Elctrns.	713-641-0267
TX	Irving, Apollo Whls. Elctrns., Inc.	214-399-8195
TX	Laredo, Guarantee Radio Supp. Co.	512-723-6913
TX	Longview, Texas Indl. Elctrn. Supp.	214-793-0919
TX	Longview, Wholesale Elctrn. Supp.	214-757-3961
TX	Lubbock, R & R Elctrns. Supp. Co.	806-765-7727
TX	Lubbock, Trice Wholesale Elctrns.	806-747-2888
TX	McAllen, Richards Elctrns.	512-682-6337
TX	McAllen, Rio Radio Supp. Inc.	512-682-5224
TX	Midland, Trice Wholesale Elctrns.	915-563-0666
TX	Odessa, R & R Elctrn. Supp. Co.	915-332-9166
TX	Paris, Lavender Elctrns. Inc.	214-785-1711
TX	Pasadena, Angie Elctrn. Supp.	713-473-4428
TX	Port Arthur, Diehl Radio & TV Supp.	713-985-8888
TX	Richardson, Martin Whls., Inc.	214-231-1826
TX	Richardson, Trice Wholesale Elctrns.	214-690-4646
TX	San Antonio, M-Tronics Inc.	512-736-2481
TX	San Antonio, Sherman Elctrns.	512-224-1001
TX	Sherman, Lavender Elctrns. Inc.	214-892-9155
TX	Sherman, Trice Wholesale Elctrns.	214-893-7421
TX	Stafford, Harrison Equip. Co.	713-879-2600
TX	Temple, L & M Wholesale Elctrns.	817-778-7679
TX	Texarkana, Carlton-Bates Co. of Texarkana	214-792-6923
TX	Texas City, Elctrn. Supp. Co.	713-945-4401
TX	Tyler, East Texas Elctrn. Inc.	214-593-8253
TX	Tyler, Lavender Elctrns. Inc.	214-597-6315
TX	Victoria, Lavender Elctrns. Inc.	512-575-4738
TX	Waco, L & M Wholesale Elect.	817-754-4644
TX	Wichita Falls, R & R Elctrns. Supp. Co.	817-322-0731
TX	Wichita Falls, Trice Wholesale Elctrns.	817-322-2151
TX	Wichita Falls, Wholesale Elect. Supp. Co.	817-723-8106
UT	Provo, Central Utah Elctrns.	801-373-7522
UT	Salt Lake City, Kimball Elctrns.	801-328-2075
VT	Burlington, Greylock Elctrns.	802-863-3100
VT	Burlington, Vermont Appliance Co.	802-864-9831
VT	Rutland, Rutland Elctrn.	802-775-4690
VT	White River Jct., Vermont Appliance	802-295-3143
VA	Alexandria, Certified Elctrns.	703-548-5115
VA	Arlington, Arlington Elctrn. Wholesale	703-524-2412
VA	Charlottesville, Graves Elctrns.	804-296-0125
VA	Charlottesville, Virginia Radio Supp. Co., Inc.	804-296-4184
VA	Danville, State Elctrns., Inc.	804-793-5131
VA	Lynchburg, State Elctrns., Inc.	804-845-5983
VA	Martinsville, State Elctrns., Inc.	703-638-2327
VA	Norfolk, Radio Parts Dist. Co.	804-461-8095
VA	Portsmouth, Distrs. Inc.	804-399-2446
VA	Richmond, Banner Elctrns. Inc.	804-321-7255
VA	Staunton, Southern Elec. Corp.	703-886-6218
WA	Bellingham, Shields Radio Supp.	206-734-3400
WA	Everett, JW Electronics	206-258-4339
WA	Seattle, Electronic Supp. Co.	206-632-2222
WA	Seattle, Pearl Elctrns.	206-622-6200
WA	Seattle, Radar Elec.	206-282-2511
WA	Seattle, Westlake Elctrn. Supp.	206-622-6600
WA	Spokane, Amfac Elec. Supp.	509-534-0611
WA	Spokane, JW Elctrns., Inc.	509-535-5800
WA	Spokane, Radar Elec., Inc.	206-282-2511
WA	Tacoma, C & G Elctrns.	206-272-3181
WA	Tumwater, JW Elctrns.	206-943-1071

WA	Yakima, JW Electronics	509-575-1234
WV	Beckley, Halley Elctrns.	304-253-2561
WV	Bluefield, Mason-Dixon Distrs.	304-325-8106
WV	Charleston, Elctrn. Materials	304-344-3577
WV	Fairmont, State Elctrns.	304-366-4520
WV	Huntington, Electronic Supp., Inc.	304-523-6443
WV	Morgantown, Electro Distributing Co.	304-296-5637
WV	Morgantown, State Elctrns.	304-292-1641
WI	Appleton, Appleton Radio	414-734-5767
WI	Eau Claire, Indianhead Elctrns.	715-834-3606
WI	Fond du Lac, Fedco Elctrns. Inc.	414-922-6490
WI	Green Bay, G. M. Popkey Co.	414-437-5445
WI	Kenosha, Chester Elctrn. Supp.	414-658-4616
WI	Madison, G. M. Popkey Co.	608-257-2266
WI	Madison, Superior Elctrn. Parts Co.	608-257-1477
WI	Milwaukee, G. M. Popkey Co.	414-444-4730
WI	Onalaska, Stark Elctrn. Supp. Co.	608-783-0800
WI	Racine, Superior Racine, Inc.	414-632-5142
WI	Wausau, G. M. Popkey Co.	715-845-4255
WY	Casper, Walker Casper Elctrn. Co.	307-237-1943

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AZ	Scottsdale, Bill Earl & Assocs.	602-994-3813
AR	Little Rock, Erickson Sls.	501-225-7379
CA	Laguna Hills, English/Damco	714-837-3801
CA	Sunnyvale, W.W. Posey Co.	408-746-0771
CO	Arvada, Cluff & Assocs.	303-425-6604
CT	No. Haven, Coakley, Boyd & Abbett	800-225-8402
FL	Brandon, Hutto, Hawkins, Peregoy	305-831-2474
FL	Clearwater, Hutto, Hawkins, Peregoy	813-797-4447
FL	Maitland, Hutto, Hawkins, Peregoy	305-831-2474
FL	Pompano Beach, Hutto, Hawkins, Peregoy	305-971-5750
GA	Atlanta, Millar Elctrns.	404-261-6160
IL	Chicago, I.R.I.	312-647-7755
IN	Ft. Wayne, R.O. Whitesell & Assocs.	219-432-5591
IN	Indianapolis, R.O. Whitesell & Assocs.	317-359-9283
IN	Kokomo, R. O. Whitesell	317-457-9127
IA	Cedar Rapids, R. W. Kunz	319-396-5386
KS	Prairie Village, R.W. Kunz	913-648-3535
KY	Louisville, R.O. Whitesell & Assocs.	502-426-7696
LA	Chalmette, Erickson Sls.	504-271-1976
LA	Covington, Cartwright & Bean	504-892-1780
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MI	Grand Rapids, R.O. Whitesell & Assocs.	616-942-5420
MI	Southfield, R. O. Whitesell	313-559-5454
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MN	Minneapolis, Stoss & Assocs.	612-925-2757
MS	Jackson, Cartwright & Bean	601-981-1170
MO	St. Louis, R.W. Kunz	314-966-4977
NJ	Long Valley, Paul A. Sweeney	201-852-1434
NY	Rochester, Electra Sls.	716-461-5252
NY	Syracuse, Electra Sls.	315-463-1248
NC	Raleigh, Millar Elctrns.	919-787-9585
OH	Cincinnati, R.O. Whitesell & Assocs.	513-521-2290
OH	Cleveland, R.O. Whitesell & Assocs.	216-447-9020
OH	Columbus, R.O. Whitesell & Assocs.	614-888-9396
OH	Dayton, R.O. Whitesell & Assocs.	513-298-9546
OR	Tigard, Electronic Sources Inc.	503-684-0040
PA	Pittsburgh, R.O. Whitesell & Assocs.	412-963-6161
PA	Trevose, P.S.A. Inc.	215-245-0513
TN	Knoxville, R. O. Whitesell	615-694-9476
TN	Memphis, Cartwright & Bean	901-276-4442
TX	Austin, Erickson Sls.	512-244-3068
TX	Dallas, Erickson Sales	214-739-5833
TX	Houston, Erickson Sales	713-266-1604
UT	Salt Lake City, Cluff & Assocs.	801-486-7297
WA	Bellevue, Electronic Sources Inc.	206-451-3500
WI	Milwaukee, F.C. DuBois & Assocs.	414-774-3100

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Local Sales Offices & Reps

AL	Huntsville, Elctrn. Sls.	205-533-1735
AZ	Tempe, Elctrn. Dev. and Sls.	602-438-1547
CA	Anaheim, West Rep.	714-527-2822
CA	Chico, Symbex Corp.	916-893-5010
CA	San Diego, Westrep, Inc.	619-566-6580
CA	Santa Clara, Westrep, Inc.	408-988-8833
CO	Littleton, Lange Sls., Inc.	303-795-3600
FL	Ft. Lauderdale, Interface Dynamics	305-565-5075
FL	Plant City, Interface Dynamics	813-754-1329
GA	Norcross, Elctrn. Sls.	404-448-6554
IL	Crystal Lake, Symbex Corp.	815-455-3362
IN	Angola, Waid & Assocs.	219-833-3522
IN	Indianapolis, M & L Elctrn. Sls.	317-359-4742
MA	Canton, Symbex Corp.	617-828-8114
MI	Franklin Village, I.E. Hampton & Assocs.	313-851-0820
MI	St. Joseph, I.E. Hampton & Assocs.	616-983-0862
MN	Chanhassen, Parker Shoap & Assocs.	612-934-8127
MN	Minneapolis, Parler, Shoap & Assocs.	612-755-6904
MO	Blue Springs, Kathrinus Kelly Baumhauer	816-229-0001
MO	St. Louis, Kathrinus Kelly Baumhauer	314-647-2400
NJ	Commack, Axelrod, Busch, Sullivan	201-871-0020
NJ	Englewood, Axelrod, Busch, Sullivan Assoc.	201-871-0020
NJ	Medford, Champion Elctrn. Sls.	609-983-0932
NJ	Sayreville, Axelrod, Busch, Sullivan	201-871-0020
NY	Bainbridge, R. W. Mitscher	607-967-7192
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NY	Lindenhurst, Axelrod, Busch, Sullivan	212-594-4090
NY	North Syracuse, R.W. Mitscher Co.	315-458-1321
NY	Pittsford, R.W. Mitscher Co.	716-586-4012
NY	Red Hook, R. W. Mitscher Co., Inc.	914-758-8375
NY	Rochester, R. W. Mitscher Co., Inc.	716-227-0839
NC	Cary, Elctrn. Sls.	919-467-8486
OH	Columbus, Norm Case Assocs.	614-863-5686
OH	Painesville, Symbex Corp.	216-354-0925
OH	Rocky River, Norm Case Assocs.	216-333-0400
OR	Falls City, Ecco Mktg.	503-787-3509
PA	Southampton, Symbex Corp.	215-322-8040
TX	Houston, Symbex Corp.	713-776-8468
UT	Salt Lake City, Lange Sls., Inc.	801-487-0843
WA	Seattle, Ecco Mktg.	206-364-0200
WI	Colgate, Rep. 1 & Assoc.	414-628-4016

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AZ	Phoenix, Arizona Comps.	602-269-5655
CT	Danbury, Pilgrim Elctrns	203-792-7274
MA	Danvers, Criterion	617-777-4725
MA	Middleboro, Glynn Elctrns.	617-947-4262
OK	Tulsa, Combined Tech. Comps.	918-665-3002
WI	Madison, Schrenk Sls.	608-255-7400
WI	Milwaukee, Marsh Elctrns.	414-475-6000

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CA	Huntington Beach, Scientific Dvcs.	714-840-3501
CA	San Diego, Scientific Dvcs.	619-268-9635
CA	San Jose, Scientific Dvs.	408-554-0455
CO	Broomfield, Scientific Dvcs.	303-469-5145
FL	Longwood, Richard Schoonover, Inc.	305-788-3344
GA	Marietta, MoRe	404-992-5172
MA	E. Longmeadow, System Sls.	413-525-3679
MA	Hudson, System Sls.	617-562-9777
NM	Albuquerque, Scientific Dvcs.	505-883-3668
NY	Valley Stream, Levison Sls.	516-266-5020
OH	Brecksville, WRR Assocs.	216-526-2023
TX	Richardson, Sym-Tek Sls.	214-680-3004
UT	W. Valley City, Scientific Dvcs.	801-966-0105
WA	Marysville, Scientific Dvcs.	206-653-6031
Can	Montreal, Interfax Sys., Inc.	514-336-0392

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SYNEKTRON CORPORATION, 12000 S. W. Garden Place, Portland, OR 97223, Tel: 503-684-3090, Telex: 517441; Empl.: 72

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SYNTEL DIV., Tegam, Inc., 7230 North Ridge Rd., Madison, OH 44057, Tel: 216-428-7505; Empl.: 15

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MD	Silver Spring, Source Assoc.	301-725-5330
MA	Waltham, Digital Assocs.	617-899-4300
NY	Canandaigua, Burt Mamula	716-394-5560
NY	White Plains, Cane Tech. Sls.	914-694-9240
PA	Newtown Square, SWR Assoc	215-356-8550
TX	Waller, Vital Process Sys.	713-463-6811

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SYRACUSE ELCTRNS., P.O. Box 4770, Syracuse, NY 13221, Tel: 315-488-4911, Telex: 937-232; Empl.: 150

SYSCON INTL., INC., 1108 So. High St., So. Bend, IN 46618-1096, Tel: 219-232-3900, 800-348-2993, TWX: 810-299-2523; Empl.: 40; *Sls. Mgr.:* Les Barney

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SYSTEMS FURNITURE CO., 2727 Maricopa St., Torrance, CA 90503, Tel: 213-533-1212, TWX: 910-349-7518; *Sls. Mgr.:* Rick Labowitz

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SYSTONICS, INC., Box 121, Winchester, MA 01890, Tel: 617-729-4439; Empl.: 11

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SYSTRON-DONNER INSTR. DIV., 2727 Systron Dr., Concord, CA 94518, Tel: 415-676-5000, Telex: 171996, TWX: 910-481-9472; FSC No.: 52542; Empl.: 1400; *Sls. Mgr.:* Howard W. Mette

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TAB BOOKS, Monterey & Pinola Aves., Blue Ridge Summit, PA 17214, Tel: 717-794-2191, Telex: 820562; Empl.: 175; *Sls. Mgr.:* Kevin Moran

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AL	Huntsville, BJR Mfg. Reps.	205-881-3569
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CA	San Diego, L.L. Stoakes, Inc.	619-452-1600
CO	Littleton, Omega Ltd.	303-798-7040
CT	Hartford, Sturgeon Co.	203-249-7800

FL	Orlando, Oem Mktg. Corp.	305-299-1000
FL	Walton Beach, BJR Mfg. Reps.	904-863-3315
IL	Chicago, Aktron Corp.	312-658-3538
IN	Fort Wayne, Aktron	219-747-3650
IA	Davenport, Ensco Rep., Inc. Iowa	319-386-6600
KS	Overland Park, Ensco Rep. - Kansas	913-381-7557
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KS	Wichita, Ensco Wichita	316-683-1070
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MA	Needham, Sturgeon Co.	617-444-6603
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NM	Albuquerque, C.T. Carlberg & Assocs.	505-888-3883
NY	Great Neck, F. & F. Metro, Inc.	516-482-4080
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NY	Rochester, Gislason Sls.	716-328-7400
OR	Aloha, Caruso & Northcutt	503-646-4973
PA	Blue Bell, Macron Dynamics	215-628-8000
TX	Arlington, Bell Comps.	817-461-5303
TX	El Paso, C.T. Carlberg & Assocs.	505-888-3883
WA	Bellevue, Caruso & Northcutt	206-454-9699
Intl	IS, Bnei Brak, Mono Elctrns.	011-44955-3606
Intl	ST, Wick, Osprey Elctrns.	011-44955-3606
Can	Ontario, Avotronics	416-475-2024
Can	Quebec, Avotronics	514-697-2135

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CA	Fullerton, Myco Sls.	714-546-9113
CA	Northridge, Myco Sls.	818-886-7101
CA	San Jose, Tom Haskins	415-964-0329
CA	Sunnyvale, Tom Haskins	415-964-0329
IL	Wheeling, Ed Joyner & Co.	312-520-1200
NV	Reno, Connie Dunning	702-849-0722
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OR	Portland, Frank Jackson Assocs.	503-292-2638
TX	Dallas, Cunningham Comps. Corp.	214-233-4303
TX	Houston, Cunningham Comps. Corp.	713-451-4197
WA	Redmond, Frank Jackson Assocs.	206-881-7277

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FL	Clearwater, Brennan Assocs.	813-446-5006

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MA	Westwood, Modtek	617-461-0620
MN	Minneapolis, D. A. Case Assocs., Inc.	612-869-3700
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Unique T-Bar multi-contact switching devices switch more circuits in less space. They have proven reliability in data processing, data and voice communications, test equipment and instrumentation applications. Available as standard and latching relays, and toggle and pushbutton switches. Used for restoral, reconfiguring, and line access applications in commercial, military and aerospace applications. T-Bar will custom design and build a wired assembly to meet your switching needs.

Local Sales Offices & Reps

AL	Huntsville, CSR Elctrns.	205-533-2444
CA	Arcadia, Van Gott & Assocs.	818-445-9728
CA	Palo Alto, Horne Electro Sls.	415-494-6777
CT	Wilton, T-Bar, Inc.	203-834-8227
FL	St. Petersburg, Tech-Rep Assocs.	813-577-2779
GA	Atlanta, CSR Elctrns.	404-396-3720
MD	Silver Spring, Carwithen Assocs.	301-589-9040
MA	Westwood, Apex Assocs.	617-326-5042
NY	Mount Vernon, Sonkin Assocs.	914-968-8282
NC	Raleigh, CSR Elctrns.	919-878-9200
TX	Richardson, McCoy Assocs. Co.	214-238-1017

Local Distributors

IL	Chicago, Newark Elctrns.	312-638-4411
MA	Hingham, Sager Elctrl. Supp. Co.	617-749-6700

TCL INCORPORATED, 41829 Albrae Street, Fremont, CA 94538, Tel: 415-657-3800; Empl.: 50

TDJ CO., INC., 1154 Morena Blvd., San Diego, CA 92110, Tel: 619-276-5920; Empl.: 6; *Sls. Mgr.:* R. Scherr .... **C•1088-1089**

TDK CORPORATION OF AMERICA, 4711 Golf Rd., Skokie, IL 60076, Tel: 312-679-8200; *Sls. Mgr.:* A. Otsuka .. **A•1176-1178, 1278, 1640-1641; D•1046-1047, 1849**

Local Sales Offices & Reps

AL	Birmingham, Robert Warnock Co.	205-879-0576
CA	Cupertino, Thresum Assocs.	408-996-9889
CA	Laguna Hills, English-Damco	714-837-3801
CA	Torrance, TDK Corp. of Amer.	213-539-6631
FL	St. Petersburg, Tech. Rep. Assocs.	813-577-2779
ID	Meridian, Intermountain Techn.	208-888-5708
IL	Palatine, Technology Sls.	312-991-6600
IN	Indianapolis, TDK Corp. of Amer.	317-872-0370
MA	Westwood, Comp. Rep. Assocs.	617-329-3454
MN	Bloomington, Smiley-Scott Assocs.	612-888-5551
NJ	Mount Laurel, Comtek, Inc.	609-235-8505
NY	East Syracuse, Nycom, Inc.	315-437-8343
NY	Port Washington, TDK Corp. of Amer.	516-625-0100, Ext. 2300
NC	Raleigh, Zucker Assoc.	919-782-8433
OH	Cincinnati, Luebbe Sls. Co.	512-871-4211
TN	Knoxville, Insul-Reps	615-691-7586
TX	Richardson, Logic I Sls.	214-234-0765
WA	Seattle, Harry Levinson Co.	206-285-5622

T.D.S. CIRCUITS, INC., 6290 Sunset Blvd., #1126, Los Angeles, CA 90028, Tel: 213-463-5170, TWX: 910-321-2903; *Sls. Mgr.:* Norman R. Sutherland

TEAC CORP. OF AMERICA, Indl. Prod. Div., 7733 Telegraph Rd., Montebello, CA 90640, Tel: 213-726-0303, Telex: 67-7014; Empl.: 200; *Sls. Mgr.:* Al Astor; *Dist. Mgr.:* Al Astor

TEC, 2727 N. Fairview, Box 5646, Tuscon, AZ 85703, Tel: 602-792-2230, TWX: 910-952-1377; Empl.: 600; *Sls. Mgr.:* Barry Hamilton; *Dist. Mgr.:* Barry Hamilton

TECA, THERMOELECTRIC COOLING AMERICA CORP., 448 N. Halsted St., Chicago, IL 60622, Tel: 312-666-1600; Empl.: 50 .... **C•1675-1677**

Local Sales Offices & Reps
.... 312-367-5700,800-572-1180

TECCOR SEMICONDUCTORS

TECCOR ELCTRNS., 1801 Hurd Dr., Irving, TX 75062, Tel: 214-252-7651, Telex: 79-1600, TWX: 910-860-5068; Empl.: 700; *Sls. Mgr.:* Gerry Wiley .... **A•2092-2093**

Local Sales Offices & Reps

AL	Huntsville, Interep Assocs.	205-533-1730
AZ	Tempe, System Sls. of Ariz.	602-829-9338
CA	San Diego, O'Donnell Assocs.	619-578-1645
CA	San Jose, O'Donnell Assocs.	408-263-6500
CA	Torrance, O'Donnell Assocs.	213-539-9664
CO	Castle Rock, Romulus	303-688-5127
CT	Cheshire, Scientific Comps.	203-272-2963
FL	Clearwater Beach, Perrott Assocs.	813-443-5214
FL	Orlando, Perrott Assocs.	305-298-7748
FL	Sunrise, Perrott Assocs.	305-482-6909
GA	Norcross, Interep Assocs.	404-449-8680
IL	Arlington Heights, MSI	312-956-1000
IN	Fort Wayne, Robert O. Whitesell & Assocs.	219-432-5591
IN	Indianapolis, Robert O. Whitesell & Assocs.	317-359-9283

IN	Kokomo, Robert O. Whitesell & Assocs.	317-457-9127
IA	Cedar Rapids, E. C. S.	612-933-2594
KS	Olathe, SPS Assocs.	913-764-4460
KY	Louisville, Robert O. Whitesell & Assocs.	502-426-7696
MD	Baltimore, Burgin-Kren Assocs.	301-265-8500
MA	Walpole, JEF Components	617-668-6695
MI	Detroit, Rathsburg Assocs.	313-882-1717
MN	Minneapolis, Electric Comp. Sls.	612-933-2594
MO	St. Louis, SPS	913-764-4460
NM	Albuquerque, Sys. Sls. of Arizona Inc.	505-881-8877
NY	Canandaigua, Bensman/Upstate Assocs.	716-396-2498
NY	Johnson City, Bensman/Upstate Assoc.	607-722-2242
NC	Raleigh, J & B Sls.	919-772-3546
OH	Cincinnati, Robert O. Whitesell Assocs.	513-521-2290
OH	Cleveland, Robert O. Whitesell & Assocs.	216-447-9020
OH	Columbus, Robert O. Whitesell & Assocs.	614-888-9396
OH	Dayton, Robert O. Whitesell & Assocs.	513-298-9546
PA	Flourtown, C. H. Newson & Assocs.	215-248-3377
PA	Philadelphia, S-J Assocs.	215-629-1025
PA	Pittsburgh, Robert O. Whitesell & Assoc.	412-963-6161
TX	Houston, Bonser Philhower Sls.	713-495-3115
UT	Salt Lake City, Electrodyne	801-486-3801
VA	Lynchburg, Burgin-Kren Assocs.	804-239-2626
WA	Redmond, Quadra Sls.	206-883-3550
WI	Wauwatosa, Larsen Assocs.	414-258-0529

Local Distributors

AL	Huntsville, RM Electronics	205-852-1550
AZ	Phoenix, Tri-Tek	602-995-9352
AZ	Tempe, Bell Inds.	602-966-7800
CA	Chatsworth, Integrated Elctrns.	213-998-2200
CA	Hayward, Electro Comp. Distrs.	415-783-5800
CA	Irvine, Integrated Elctrns.	714-540-5600
CA	San Jose, Rose Elctrns. Dist.	408-263-2934
CA	Santee, Mouser Elctrns.	619-449-2220
CO	Lakewood, Active Comp. Technlg.	303-233-4431
CO	Wheatridge, Bell Inds.	303-424-1985
CT	East Haven, JV Elctrns.	203-469-2321
CT	Hamden, Almo Elctrns.	203-288-6556
FL	Longwood, Intertec Distr.	305-834-7777
IL	Elk Grove, RM Elctrns.	312-364-6622
IL	Hoffman Estates, Inter Comp	312-843-2040
IL	Rosemont, Advent Elctrns.	312-298-4210
IN	Ft. Wayne, Graham Elctrns.	219-423-3422
IN	Indianapolis, Advent Elctrns.	317-872-4910
IN	Indianapolis, Graham Elctrns.	317-634-8202
IN	Indianapolis, RM Elctrns.	317-247-9701
IA	Cedar Rapids, Advent Elctrns.	319-363-0221
LA	Baton Rouge, Indl. Elctrns. Supp.	504-926-0513
LA	Shreveport, Indl. Elctrns. Supp.	318-222-9459
MD	Rockville, Almo Elctrns.	301-251-1161
MD	Savage, Pyttronic Inds.	301-792-0780
MA	Burlington, Zeus Comps.	617-273-0750
MA	Woburn, ACI Elctrns.	617-935-7230
MI	Farmington Hills, Advent Elctrns.	313-477-1650
MI	Wyoming, RM Elctrns.	616-531-9300
MN	Minneapolis, Stark Elctrns.	612-332-1325
NE	Lincoln, Scott Elctrns.	402-466-8221
NJ	Camden, Gen. Radio Supp.	609-964-8560
NM	Albuquerque, Bell Inds.	505-292-2700
NY	Buffalo, Summit Distrs.	716-884-3450
NY	Jamaica, Archer Indl. Distr.	212-291-3232
NY	Port Chester, Zeus Comps.	914-937-7400
NY	Rochester, Simcona Elctrns.	716-328-3230
NY	Rochester, Summit Distrs.	716-334-7376
NC	Greensboro, Hammond Elctrns.	919-275-6391
NC	Winston-Salem, Almo Elctrns.	919-760-0432
OH	Cincinnati, Graham Elctrns.	513-772-1661
OH	Columbus, Graham Elctrns.	614-895-1590
OH	Dayton, Stotts Friedman	513-298-5555
OR	Portland, Radar Elc. Co.	503-232-3404
PA	Enola, Almo Elctrns.	717-732-3681
PA	Mc Kean, Advacom	814-476-7774
PA	Montgomeryville, Pyttronic Inds.	215-643-2850
PA	Philadelphia, Almo Elctrns.	215-698-4000
PA	Pittsburgh, Almo Elctrns.	412-931-5990
SC	Greenville, Hammond Elctrns.	803-233-4121
TN	Chatanooga, Techni-Tronics	615-875-5449
TN	Nashville, Graham Elctrns.	615-242-2682
TX	Austin, Active Comp. Technlg.	512-452-5254
TX	Dallas, Active Comp. Technlg.	214-980-1888
TX	Dallas, RM Elctrns.	214-235-3100
TX	El Paso, ERA Elctrns.	915-592-4126
TX	Houston, Active Comp. Technlg.	713-496-4000
UT	Salt Lake City, Bell Inds.	801-972-6969
WA	Bellevue, Integrated Elctrns.	206-455-2727
WA	Seattle, Radar Elec. Co.	206-282-2511
WI	Milwaukee, Marsh Elctrns.	414-475-6000
WI	New Berlin, RM Elctrns.	414-784-4420

TECHCON SYSTEMS INC., 1059 E. Bedmar St., Carson, CA 90746, Tel: 213-603-8888; Empl.: 25; *Sls. Mgr.:* S. L. Morse

TECH-ETCH, INC., 45 Aldrin Rd., Plymouth, MA 02360, Tel: 617-747-0300; Empl.: 280; *Sls. Mgr.:* P. A. Thomas

TECH LABS., INC., Bergen & Edsall Blvds., Palisades Pk., NJ 07650, Tel: 201-944-2221; FSC No.: 83332; Empl.: 31 .... **B•1700-1701**

Local Sales Offices & Reps

CT	New Preston, NBS Assoc.	203-868-0501
GA	Atlanta, Grady Duckett Sls.	404-451-3529
IL	Glenview, Crimson Engrg. Co.	312-470-0024
KS	DeSoto, Midtec Assocs.	913-441-6565
MI	Jackson, N. Scroggs Co.	517-750-1170
MO	Florissant, Midtec Assocs.	314-837-5200
NJ	Haddonfield, Gray Assocs.	609-429-5300
NJ	Upper Saddle River, Bob Cameron, Inc.	201-825-1304
NY	Huntington Station, Haner Assocs.	516-242-7855
NY	Pittsford, Net Sls.	716-467-4538
OH	Cincinnati, Patco	513-931-3311
PA	Pittsburgh, VerHill Assocs.	412-241-5202
TX	Dallas, Southwest Elctrns.	214-690-9881
TX	Houston, Southwest Elctrns.	713-729-1670
WA	Seattle, SPS Elctrns.	206-323-4140

Local Distributors

CA	Granada Hills, C & W Comps. Sls.	818-368-4032
CA	Palo Alto, Mollard Mktg.	415-961-0456
NJ	Garfield, Bob Cameron Assocs.	201-470-0700
NY	Huntington Station, Haner Assocs., Inc.	516-242-7855

TECHLAND SYSTEMS, INC., 25 Waterside Plaza, New York, NY 10010, Tel: 212-684-7788, Telex: 961-134

TECHMAR

TECHMAR CORP., 2232 S. Cotner Ave., Los Angeles, CA 90064, Tel: 213-478-0046, 800-TECHMAR; Empl.: 12; *Sls. Mgr.:* Tom Cooper .... **C•1090-1091**

TECHNAR INC., 205 N. 2nd Ave., Arcadia, CA 91006, Tel: 818-445-1143; *Sls. Mgr.:* James Rhodes

TECHNIC, INC., Box 965, Providence, RI 02901, Tel: 401-781-6100, Telex: 927514; Empl.: 125; *Sls. Mgr.:* A. A. Amtos

TECHNICAL AIDS TO INDEPENDENCE, INC., 12 Hyde Road, Bloomfield, NJ 07003, Tel: 201-338-8826; Empl.: 2

TECHNICAL COMMUNICATIONS CORPORATION, 100 Domino Drive, Concord, MA 01742, Tel: 617-862-6035, Telex: 923407

TECHNICAL DEVICES, 560 Alaska Ave., Torrance, CA 90503, Tel: 213-618-8437; FSC No.: 04772; Empl.: 21; *Sls. Mgr.:* D. Murrin; *Dist. Mgr.:* D. Murrin

TECHNICAL MARKING SYS., P.O. Box 10, Lynnfield, MA 01940, Tel: 617-334-6940; Empl.: 20

TECHNICAL MATERIALS, INC., Sub. of Brush Wellman, Inc., 5 Wellington Rd., Lincoln, RI 02865, Tel: 401-333-1700, TWX: 710-384-0600; Empl.: 250; *Sls. Mgr.:* John S. Seligman

Local Sales Offices & Reps

CA	Los Angeles, E. J. Brookes Co.	213-722-8100
CA	Santa Clara, E. J. Brookes Co.	408-988-1201
IL	Elmhurst, Technical Materials	312-832-1263
IN	Carmel, Larry Woodling Co.	317-844-7365
SC	Greenville, B & B Sls.	803-297-1200

TECHNICAL PANELS, INC., 9162 La Rosa Dr., Temple City, CA 91780, Tel: 818-285-3105; Empl.: 13; *Sls. Mgr.:* Janlyn Prendiz

TECHNICAL RESEARCH & MFG., INC., R.F.D. #10, Manchester, NH 03103, Tel: 603-627-6000, TWX: 710-220-6765; Empl.: 25; *Sls. Mgr.:* A. Marin

TECHNIPOWER, A PENRIL CO., P.O. Box 222, Commerce Pk., Danbury, CT 06810, Tel: 203-748-7001, TWX: 710-456-9280; FSC No.: 13850; Empl.: 135; *Sls. Mgr.:* Ivan Bourgoin (Variac); *Dist. Mgr.:* James McCarty .... **A•2306; D•1850**

Local Sales Offices & Reps

CA	Thousand Oaks, Technipower	805-493-2244
FL	Maitland, EIR, Inc.	305-660-9600
MA	Sudbury, Technipower	617-443-7347
MN	Burnsville, Electromec Sls., Inc.	612-894-8200
MO	St. Louis, Rothkopf & Assocs.	314-961-4485
NY	Pennsauken, Ar-Jay Tech.	609-663-4260
TX	Richardson, Scientific Sls. Co.	214-231-6541
Can	Guelph, Ont., Victrix, Ltd.	518-836-1480

Local Distributors

CA	Hollywood, Yale Radio Elctrn.	213-465-3186, 800-421-4144
CA	Los Angeles, Cal-State Elctrns.	213-933-8187
CA	Oakland, N. A. D'Arcy	415-638-7773
CA	Santa Ana, Action Elctrns.	714-547-5169
IL	Chicago, Delta Tech. Prods. Co.	312-478-1134
MA	Woburn, Abbott Elctrns. Co.	617-935-2040
MI	Dearborn, Indl. Temperature & Control	313-278-2210
MN	St. Paul, Gopher Elctrns. Co.	612-483-3322
MO	St. Louis, Olive Elctrns., Inc.	314-426-4500
NY	Albany, Adirondack Elctrns., Inc.	518-456-0203
NY	Farmingdale, Midway Indl. Elctrns.	516-293-6800
NC	Charlotte, Jenkins Elec. Co.	704-392-7371
OH	Dayton, Esco Inc.	513-226-1133
OK	Tulsa, Inotek	918-627-1500
PA	Philadelphia, PEI/Genesis	215-568-7400
TX	Dallas, Inotek	214-243-7000
TX	Houston, Inotek	713-688-4494
Can	Guelph, Ont., Victrix, Ltd.	519-836-1480

TECHNIQUES, INC., 235 Jackson St., Englewood, NJ 07631, Tel: 201-569-5900; Empl.: 60

TECHNISERV INC., 1560 Teaneck Rd., Teaneck, NJ 07666, Tel: 201-837-0032; *Sls. Mgr.:* L. G. Mansoor

TECHNI-TOOL, 5 Apollo Rd., Box 368, Plymouth Meeting, PA 19462, Tel: 215-825-4990, Telex: 834-763; Empl.: 40

Technitrol, Inc.

TECHNITROL, 1952 E. Allegheny, Philadelphia, PA 19134, Tel: 215-426-9105, Telex: 834245; FSC No.: 90095; Empl.: 350; *Sls. Mgr.:* G. Shilling ...**A•1458, 1574-1579, 2307; B•1002, 1010**

Local Sales Offices & Reps

AL	Huntsville, Murcota	205-539-8476
AZ	Phoenix, Integrated Sys. & Dev. Sls.	602-971-6250
CA	San Rafael, Wright Assocs.	415-457-9940
CA	Torrance, Detomasi & Grupp, Inc.	213-327-1775
CO	Castle Rock, Romulus Elctrns., Ltd.	303-688-5127
GA	Norcross, Dixie Tech. Mktg.	404-447-6832
IL	Wauconda, Cudahy Sls.	312-526-2484
IA	Des Moines, The Beams Co.	515-255-1148
MD	Baltimore, Callas Elctrns.	301-744-7711
MA	Newton, Normell Assoc.	617-969-5478
NM	Albuquerque, Syntech	505-266-7951
NY	Fairport, TAC Assoc.	716-425-1070
NY	Jericho, J. Square Mktg.	516-935-3200
NY	Syracuse, Tac Sls.	315-637-9861
OH	Galion, Retronics	419-468-4568
PA	Easton, The Kendon Co.	215-253-3100
PA	Pittsburgh, Robert Kneip	412-823-0169
TX	Austin, Elctrns. Mktg. Assoc.	512-837-0893
TX	Grapevine, Elctrns. Mktg. Assoc.	817-481-7502
TX	Houston, Elctrns. Mktg. Assoc.	713-498-8120
WA	Redmond, General Technlg., Inc.	206-881-6456

TECHNO-COMPONENTS CORP., 7803 Lemona, Van Nuys, CA 91405, Tel: 818-781-1642, TWX: 910-495-2015; FSC No.: 17826;Multiple; Empl.: 135; *Sls. Mgr.:* Vivian Meranda

TECHNOLOGY DYNAMICS, 91 E. Carver Ave., Westwood, NJ 07675, Tel: 201-664-7636 ...... **D•1851**

Local Sales Offices & Reps

CA	Sunnyvale, Sourcetronics, Inc.	408-988-8801
CA	West Lake Village, Powerdyne Assocs.	818-991-0632
CO	Aurora, Butler Tech. Sls.	303-343-3787
FL	Orlando, Gramar, Inc.	305-894-3351
MD	Hagerston, Stinson Assocs., Inc.	301-790-1193
VA	Reston, Stinson Assocs., Inc.	703-620-0088

TECHNOLOGY PRODS., INC., 8900 Eton Ave., Canoga Park, CA 91304, Tel: 213-998-8555; FSC No.: 8K984; *Sls. Mgr.:* N. Lerman

TECHNO VATION, INC., 14 Crandall Ave., Pompton Lakes, NJ 07442, Tel: 201-839-0740; Empl.: 10; *Sls. Mgr.:* Fredric S. Miller

TECH SPRAY, INC., Box 949, Amarillo, TX 79105, Tel: 806-372-8523, Telex: 738450; Empl.: 40; *Sls. Mgr.:* R. G. Russell; *Dist. Mgr.:* Jack Swanson

TCI

TECHTROL CYCLONETICS, INC., 815 Market St., New Cumberland, PA 17070, Tel: 717-774-2746, TWX: 510-650-7003; FSC No.: 58792; Empl.: 25; *Sls. Mgr.:* Robert Nemeth .... **A•1446-1449**

Local Sales Offices & Reps

CA	Mountain View, Dimes Grp.	415-493-1885
CA	San Jose, MC Assocs.	408-446-4100
CA	Signal Hill, Thorson Co.	213-595-0361
MD	Ellicott City, Nelson Elctrns. Inc.	301-747-7887
NY	Brooklyn, Pensky Assocs.	212-763-4936
PA	Philadelphia, Eastern Instrmn.	215-245-6660
TX	Dallas, Airep Elctrns.	214-349-4360

TECKNIT®

TECKNIT (EASTERN FACILITY), 129 Dermody St., Cranford, NJ 07016, Tel: 201-272-5500, Telex: 6853079 TCKNT, TWX: 710-996-5961; FSC No.: 07700; Empl.: 300; *Sls. Mgr.:* Thomas McCreery .... **C•1530-1535, 1730-1737**

Local Sales Offices & Reps

AZ	Tempe, Tempe Assocs.	602-829-1901
CA	Granada Hills, C & W Comp. Sls.	818-368-4032
CA	San Diego, Cerco	619-450-1754
CA	Santa Barbara, Tecknit (Western Facility)	809-963-5811
CA	Santa Clara, Nova-Tronix	408-727-9530
CO	Denver, Tecknit Mid-West	303-733-8645
FL	Altamonte Springs, Lawrence Assocs.	305-339-3855
FL	Boca Raton, Lawrence Assocs.	305-368-7373
FL	Clearwater, Lawrence Assocs.	813-584-8110
FL	Maitland, EIR, Inc.	305-660-9600
FL	N. Lauderdale, EIR, Inc.	305-975-8718
FL	West Melbourne, Lawrence Assocs.	305-724-8294
IL	Arlington Hgts., Diethert/Angel	312-593-7600
IL	Chicago, Industrial Reps.	312-647-7755
IA	Davenport, Ensco-Rep, Inc.	319-386-6600
KS	Overland Park, Ensco-Rep, Inc.	913-381-7557
KS	Wichita, Ensco-Rep, Inc.	316-683-1070
MD	Rockville, Mechtronics	301-340-2130
MA	Wallingford, Com-Sale	203-269-7964
MI	Lavonia, Lowell-Wendt Mktg. Co.	313-464-2722
MN	Eden Prairie, Elctrn. Innovators, Inc.	612-941-0830
MN	St. Paul, Repco	612-642-2828
MO	Maryland Heights, Ensco-Rep, Inc.	314-423-3935
NH	Hudson, EMC Sales	603-889-5751
NJ	N. Plainfield, Brady Co.	201-753-7988
NJ	Union, Meridian Entprs.	201-687-6220
OH	Columbus, McFadden Sls.	614-459-1280
OH	Dayton, Jay Engrg.	513-253-2151
OH	N. Royalton, Jay Engrg.	216-237-4235
TX	Austin, P. J. Scanlon & Co.	512-255-2664
TX	Dallas, P. J. Scanlon & Co.	214-231-4661
TX	Houston, P. J. Scanlon & Co.	713-663-7779
WA	Bellevue, Quest Mktg.	206-747-9424

TECMAR, INC., 6225 Cochran Rd., Solon, OH 44139, Tel: 216-349-0600; Empl.: 600; *Sls. Mgr.:* Tim Mahoney

TECNETICS, Box 910, Boulder, CO 80306, Tel: 303-442-3837, TWX: 910-940-3246; Empl.: 225; *Sls. Mgr.:* V.L. Garrison

TECO CORP., Bay Rd., P. O. Box A, Winnisquam, NH 03289, Tel: 603-524-1998; Empl.: 80-100; *Sls. Mgr.:* Sandra Murphy

TECOM INDS., 9324 Topanga Canyon Blvd., Chatsworth, CA 91311, Tel: 818-341-4010, Telex: 69 8476; FSC No.: 59850001; Empl.: 107; *Sls. Mgr.:* Philip R. Poutre'

Local Sales Offices & Reps

AZ	Phoenix, J. Smith & Assocs.	602-267-0981
CA	Mountain View, Disman - Bakner	415-969-3010
CO	Colorado Springs, J. Smith & Assocs.	303-597-5343
FL	Ft. Lauderdale, The Snow Co.	305-563-2448
FL	Melbourne, Barkman Assocs.	305-254-1863
IL	Northfield, Feller Assocs.	312-446-8065
IA	Cedar Rapids, Feller Assocs.	319-364-0566
MD	Rockville, CLC Assocs.	301-340-1175
MD	Severna Pk., Delmarva Engrg.	301-647-8007
MA	Topsfield, R. F. Assocs.	617-887-9762
NM	Albuquerque, J. Smith & Assocs.	505-265-3406
NY	Hartsdale, Spectrum Sls.	914-472-8600
NY	Skaneateles, Robtron, Inc.	315-685-5731
OH	Dayton, GVT Assocs.	513-253-1356
PA	Lafayette Hill, M. Lader Co.	215-825-3177
TX	Arlington, John Houston Assocs.	817-265-2931
TX	San Antonio, John Casey	512-492-8154
WA	Bellevue, Thorson Co. Northwest	206-455-9180
Can	Ottawa, Ont., Gigatron Assocs.	613-225-4090

TECRON INDUSTRIAL PRODS., Crown Intl., Inc., 1718 W. Mishawaka Rd., Elkhart, IN 46517, Tel: 219-294-8300, Telex: 810-294-2160; Empl.: 335; *Sls. Mgr.:* Howard King .... **D•1018-1021, 1310-1311**

Local Sales Offices & Reps

CA	Milpitas, IFM Inc.	408-945-5920
CA	Thousand Oaks, HTEC	805-492-2889
CT	Woodbridge, Electronic Marketing Assoc.	203-397-1461
IL	Chicago, Berndt Assocs.	312-283-0713
IA	Cedar Rapids, MAI Assocs.	319-396-8030
MI	Livonia, Lowell-Wendt Mktg. Co.	313-464-2722
MN	St. Paul, Timewave Technlgy., Inc.	612-451-7575
NJ	Wayne, Ramapo, Inc.	201-839-6767
NY	Syracuse, Labtronics Inc.	315-455-7314
OH	Brecksville, Audio Mktg. Assoc.	216-526-2426
TX	Longview, Audex	214-758-9392
WA	Bellevue, Showalter Instrs., Inc.	206-746-7970

TECSTOR, INC., 16161 Gothard Street, Huntington Beach, CA 92647, Tel: 714-842-0077, TWX: 856305; Empl.: 100; *Sls. Mgr.:* Nancy Moren/Robert Whitegiver

TED CORP., 11415 Johnson Dr., Shawnee Mission, KS 66203, Tel: 913-631-6211; FSC No.: 05209; Empl.: 48

TEDEA USA

TEDEA USA, 7800 Deering Ave., Canoga Park, CA 91304, Tel: 818-884-8818, Telex: 67-3382, TWX: 910-494-1951; Empl.: 10; *Sls. Mgr.:* Tony Smalarz .... **B•1827**

Local Sales Offices & Reps

AZ	Tempe, Trembly Assocs.	505-266-8616
CA	Carlsbad, Elotek Sys.	714-438-4856
CA	Palo Alto, Gado Instr. Sls.	415-961-2222
CO	Littleton, Rado Elctrns.	303-794-4279
GA	Atlanta, Physimetrics	404-955-0155
KS	Shawnee Mission, Tech. Sls. Assocs.	913-888-3330
MA	Lexington, Jodan Technology	617-862-2354
MI	Trenton, I & C Sls.	313-671-1320
MN	Minneapolis, CMI	612-566-6930
MO	St. Louis, Tech. Sls. Assocs.	314-725-5361
NV	Las Vegas, Trembly Assocs.	702-739-6816
NJ	Hillsdale, C B Assocs.	201-664-6230
NM	Albuquerque, Trembly Assocs.	505-266-8616
OH	Cincinnati, I & C Sls.	513-772-3101
OR	Boring, Westerberg & Assocs.	503-667-8048
PA	Bethayres, Control Instr. Sls.	215-676-1808
UT	Bountiful, Rado Elctrns.	801-292-3248
WA	Bellevue, Westerberg & Assocs.	206-453-8881
Can	Rexdale, ON, SRP Control Sys. Ltd.	416-746-0117

TEGAM, 7230 N. Ridge Rd., Madison, OH 44057, Tel: 216-428-7505; Empl.: 25

TEGAL SCIENTIFIC, INC., Box 5905, Concord, CA 94524, Tel: 415-827-1054; *Sls. Mgr.:* L. Rigali

TEKA PRODS., 45 Salem, Providence, RI 02907, Tel: 401-785-4110, TWX: 710-582-4946; Empl.: 89; *Sls. Mgr.:* John Robertson; *Dist. Mgr.:* John Robertson

TEK-COM CORPORATION, 1887 O'Toole Avenue, C103, San Jose, CA 95131, Tel: 408-263-7400, Telex: 171617; Empl.: 23; *Sls. Mgr.:* Becki Huntington; *Dist. Mgr.:* Ms. Kimberly Swensen

TEKNATIONAL INDS., INC., 430 S. Clinton Ave., Rochester, NY 14620, Tel: 716-232-1291; FSC No.: 24227; Empl.: 15; *Sls. Mgr.:* J. D. Hochheimer

TEKTITE CORP., 4756 Platt Rd., Ann Arbor, MI 48104, Tel: 313-971-9379; *Sls. Mgr.:* Jose Padilla

TEKTONE SOUND & SIGNAL, 1331 S. Killian Dr., Lake Park, FL 33403, Tel: 305-844-2383, Telex: 51-3438; FSC No.: 59-1500771; Empl.: 50; *Sls. Mgr.:* Carlos Mira; *Dist. Mgr.:* Carlos Mira

TEKTRONIX, INC., P. O. Box 500, Y3-314, Beaverton, OR 97077, Tel: 800-547-1512, Oregon only 800-452-1877, TWX: 910-467-8708; FSC No.: 80009; Empl.: 20000

TELAUTOGRAPH, 8700 Bellanca Ave., Los Angeles, CA 90045, Tel: 213-641-3690, TWX: 910-328-6117; Empl.: 300

TELCOM INC., 8027 Leesburg Pike, Vienna, VA 22180, Tel: 703-893-7700, Telex: 89-2321

TELCO PRODUCTS CO., 44 Sea Cliff, Glen Cove, NY 11542, Tel: 516-759-0300; Empl.: 34

TELEBYTE TECHNOLOGY, INC., Remark Datacom Div., 270 East Pulaski Road, Greenlawn, NY 11740, Tel: 516-423-3232, TWX: 510-226-0449; Empl.: 40; *Sls. Mgr.:* Curt DeForest

TELECOMMUNICATIONS DEVICES, 2320 Wisconsin Ave., Downers Grove, IL 60515, Tel: 312-971-3460, TWX: 910-695-3222; Empl.: 45; *Sls. Mgr.:* Joel Peterson; *Dist. Mgr.:* Theresa Kanaga

TELECOMMUNICATIONS TECHNIQUES CORP., 444 N. Frederick Ave., Gaithersburg, MD 20877, Tel: 301-258-5011, Telex: 908736; Empl.: 100; *Sls. Mgr.:* John Farrell

TELECTRO SYS., 96-18 43rd Ave., Corona, NY 11368, Tel: 212-651-8900; Empl.: 75; *Sls. Mgr.:* H. Sussman

TELEDYNE AEROSPACE SYS., 1007 E. 10th St., Fairmont, MN 56031, Tel: 507-235-3355, 507-235-9712, TWX: 910-565-2120; FSC No.: 24600; Empl.: 150; *Sls. Mgr.:* Robert L. Johnson

TELEDYNE ANSONIA, One Riverside Dr., Ansonia, CT 06401, Tel: 203-735-9311, Telex: 963408; *Sls. Mgr.:* Frank J. Stvebbe

TELEDYNE CAMERA SYS., 131 N. Fifth Ave., Arcadia, CA 91006, Tel: 818-359-6691, Telex: 675-423; FSC No.: 14440; Empl.: 96; *Sls. Mgr.:* Roy Larson

TELEDYNE-CRYSTALONICS, 147 Sherman St., Cambridge, MA 02140, Tel: 617-491-1670, TWX: 710-320-1196; FSC No.: 12498;Multiple; Empl.: 185; *Sls. Mgr.:* A. H. Pauk; *Dist. Mgr.:* W. J. Kilgarriff

TELEDYNE/GEOTECH, 3401 Shiloh Rd., Garland, TX 75041, Tel: 214-271-2561, Telex: 73-2394; FSC No.: 99019; Empl.: 440

TELEDYNE GURLEY, 514 Fulton St. P.O. Box 88, Troy, NY 12181, Tel: 518-272-6300, TWX: 710-443-8156; *Sls. Mgr.:* G. S. Gordon

Local Sales Offices & Reps

CA	Los Altos, Servo Data	415-964-1325
CA	Montebello, Tucul Engrg.	213-728-7397
CO	Longmont, Piper Sls.	303-443-5337
CT	Hamden, JBL Assocs.	203-281-3161
FL	Melbourne, R-Rep Co.	305-725-6993
IL	Berkeley, Cadre Tech. Reps.	312-449-3900
IN	Indianapolis, Ron Schafer & Assocs.	317-848-2702
MD	Columbia, Stein Instr.	301-596-3748
MA	Holbrook, McLellan Assocs.	617-767-4771
MI	Livonia, Lowell-Wendt Mktg.	313-464-2722
MN	St. Paul, Northstar Motion & Control	612-770-5311
NJ	Union, Friedman Assocs.	201-964-6200
NY	Buffalo, Good Comps.	716-634-4400
OH	Cleveland, Geotronix	216-526-2535
OH	Trotwood, Geotronix	513-854-5939
OK	Tulsa, Spectra Sls.	918-633-7188
OR	Portland, Tech. Comp.	503-292-1518
PA	Cheltenham, Stein Instr.	215-379-1990
TX	Houston, Spectra Sls.	713-747-2798
TX	Richardson, Spectra Sls.	214-234-3600
UT	Salt Lake City, Piper Sls.	801-466-9336
Can	Ottawa, Ont., Intrade	613-727-1272

TELEDYNE INET, 2750 W. Lomita Blvd., Torrance, CA 90509, Tel: 213-325-5040, Telex: 67-7228; Empl.: 600

TELEDYNE KINETICS, Div. of Teledyne, Inc., 410 S. Cedros Ave., Solana Beach, CA 92075, Tel: 619-755-1181, TWX: 910-322-1135; Empl.: 110; *Sls. Mgr.:* John Schuler

TELEDYNE MECCA, Box 36393, Houston, TX 77236, Tel: 713-772-2811, TWX: 913-881-7039; Empl.: 75; *Sls. Mgr.:* J. M. Barrow

TELEDYNE MICROELECTRONICS, 12964 Panama St., Los Angeles, CA 90066, Tel: 213-822-8229, 213-870-9831, TWX: 910-343-7436; FSC No.: 16170; Empl.: 1500; *Sls. Mgr.:* W. Kennedy

TELEDYNE MICRONETICS, 7155 Mission Gorge Rd., San Diego, CA 92120, Tel: 619-583-3525, TWX: 910-335-2085; Empl.: 120; *Sls. Mgr.:* S. Amarillas

TELEDYNE MICROWAVE, 1290 Terra Bella Ave., Mountain View, CA 94043, Tel: 415-968-2211, TWX: 910-379-6939; FSC No.: 24022; Empl.: 325

TELEDYNE PHILBRICK, Allied Dr. Rte 128, Dedham, MA 02026, Tel: 617-329-1600, TWX: 710-348-6726; Empl.: 250

TELEDYNE RELAYS, 12525 Daphne Ave., Hawthorne, CA 90250, Tel: 213-777-0077, TWX: 910-321-4610; *Sls. Mgr.:* Tom Garland

Local Sales Offices & Reps

AL	Huntsville, Montgomery Mktg.	205-830-0498
AZ	Scottsdale, Arcom Sls.	602-947-5745
CA	Saratoga, Teledyne Relays	408-996-9944
CO	Denver, Quorum 3	303-696-8480
CT	Stratford, G. Rosen Co.	203-375-5456
FL	Clearwater, Hutto, Hawkins & Peregoy	813-797-4447
FL	Maitland, Hutto, Hawkins & Peregoy	305-831-2474
FL	Pompano Beach, Hutto, Hawkins & Peregoy	305-971-5750
GA	Norcross, Montgomery Mktg.	404-447-6124
IL	Glen Ellyn, Teledyne Relays	312-858-1090
IN	Kokomo, Schillinger Asso.	317-452-4057
IA	Cedar Rapids, Stan Clothier Co.	319-395-0245
KS	Olathe, C-Tron	913-829-0073
MD	Towson, Arbotek Assocs.	301-825-0775
MA	Framingham, G. Rosen Co.	617-879-5505
MN	Minneapolis, S. Clothier Co.	612-944-3456
MO	St. Louis, Rothkoph & Assocs.	314-961-4485
NJ	Cranford, Teledyne Relays	201-272-0020
NM	Albuquerque, Reptronix	505-292-1718
NY	Mount Vernon, Friedman-Smith Elctrns.	914-664-4866
NY	Syracuse, I.A. Hotze Co.	315-479-6641
NC	Cary, Montgomery Mktg.	919-467-6319
OH	Dayton, J.C. Hofstetter Co.	513-296-1010
OH	Medina, J.C. Hofstetter Co.	216-241-4880
OR	Beaverton, B & P Sls.	503-641-3486
PA	Hickory, J. C. Hofstetter Co.	412-356-2305
PA	Pennsauken, Vantage Sls.	609-663-6660
TX	Austin, Kruvand Assocs.	512-441-6777
TX	Dallas, Kruvand Asso.	214-437-3355
TX	Houston, Kruvand Asso.	713-780-9710
UT	Sandy, Quorum 3	801-943-9227
WA	Bellevue, B & P Asso.	206-454-6571
Can	Calgary, Alb., Deskin Sls.	403-466-2106
Can	Edmonton, Alb., Deskin Sls.	403-466-2106
Can	Markham, Ont., Deskin Sls.	416-475-1412
Can	Ottawa, Ont., Deskin Sls.	613-729-1099
Can	Richmond, B.C., Deskin Sls.	604-273-4963
Can	St. Laurent, Que., Deskin Sls.	514-331-2860
Can	Transcona, Man., Deskin Sls.	403-466-2106

Local Distributors

AL	Huntsville, Pioneer Elctrns.	205-837-9300
AZ	Phoenix, Wyle	602-249-2232
AZ	Tempe, Time-Arizona	602-967-2000
CA	Anaheim, Time-Anaheim	714-937-0911
CA	Chatsworth, Time	818-998-7200
CA	El Segundo, Wyle Dist. Grp.	213-322-8100
CA	Irvine, Wyle Dist. Grp.	714-863-9953
CA	Rancho Cordova, Wyle	916-638-5282
CA	San Diego, Time	619-586-1331
CA	San Diego, Wyle Dist. Grp.	619-565-9171
CA	Santa Clara, Wyle Dist. Grp.	408-727-2500
CA	Sunnyvale, Time-N. Cal.	408-734-9888
CA	Torrance, Time-West	213-320-0880
CO	Englewood, Time-Colorado	303-850-7701
CO	Thornton, Wyle Dist. Grp.	303-457-9953
CT	Cheshire, Time	203-271-3200
CT	Orange, Milgray/Conn.	203-795-0711
FL	Altamonte Springs, Pioneer Elctrns.	305-834-9090
FL	Dania, Summit	305-920-6253
FL	Deerfield Beach, Pioneer	305-428-8877
FL	Ft. Lauderdale, Time-Florida	305-974-4800
FL	Winter Pk., Milgray/Fla.	305-647-5747
GA	Atlanta, Electro-Air-Georgia	404-351-3545
GA	Atlanta, Milgray	404-393-9666
GA	Norcross, Pioneer	404-448-1711
IL	Bensenville, Milgray	312-350-0490
IL	Elk Grove Village, Pioneer/Chicago	312-437-9680
IN	Indianapolis, Pioneer/Indianapolis	317-849-7300
KS	Overland Pk., Milgray/Kansas City	913-236-8800
MD	Columbia, Time-Maryland	301-964-3090
MD	Gaithersburg, Pioneer/Wash.	301-921-0660
MD	Rockville, Milgray/Wash.	301-468-6400
MA	Burlington, Milgray/New England	617-272-6800
MA	Woburn, Time-New England	617-935-8080
MI	Livonia, Pioneer/Mich.	313-525-1800
MN	Bloomington, Time	612-944-9192
MN	Minnetonka, Pioneer	612-935-5444
MO	St. Louis, Time-Mid West	314-391-6444
NJ	Marlton, Milgray/Delaware Valley	609-983-5010
NY	Buffalo, Summit Dist.	716-887-2800
NY	Farmingdale, Milgray Elctrns.	516-420-9800
NY	Hauppauge, Time-NY	516-273-0100
NY	Pittsford, Milgray	716-385-9330
NY	Rochester, Summit Dist.	716-334-8110
NC	Charlotte, Pioneer	704-527-8188
OH	Cleveland, Milgray/Cleveland	216-447-1520
OH	Cleveland, Pioneer/Cleveland	216-587-3600
OH	Dayton, Pioneer/Dayton	513-236-9900
OR	Hillsboro, Wyle Dist. Grp.	503-640-6000
PA	Horsham, Pioneer/Delaware Valley	215-674-4000
PA	King of Prussia, Time-Mid Atlantic	215-337-0900
PA	Pittsburgh, Pioneer/Pittsburgh	412-782-2300
TX	Austin, Pioneer	512-835-4000
TX	Austin, Wyle	512-834-9957
TX	Dallas, Electro-Air-Southwest	214-385-0566
TX	Dallas, Milgray	214-248-1603
TX	Dallas, Pioneer Std.	214-386-7300
TX	Houston, Pioneer Elctrns.	713-988-5555
TX	Houston, Wyle	713-879-9953
TX	Richardson, Wyle-Dallas	214-235-9953
UT	Salt Lake City, Wyle Dist. Grp.	801-974-9953
WA	Bellevue, Electro-Air-Northwest	206-641-3640
WA	Bellevue, Wyle Dist. Grp.	206-453-8300
Can	Calgary, Alb., Deskin Sls.	403-466-2106
Can	Edmonton, Alb., Deskin Sls.	403-466-2106
Can	Markham, Ont., Deskin Sls.	416-475-1412
Can	Ottawa, Ont., Deskin Sls.	613-729-1099
Can	Richmond, B.C., Deskin Sls.	604-273-4963
Can	St. Laurent, Que., Deskin Sls.	514-331-2860
Can	Transcona, Man., Deskin Sls.	403-466-2106

TELEDYNE ROTOLITE, 150 Mt. Bethel Rd., Warren, NJ 07060, Tel: 201-647-1040, TWX: 710-986-3017; *Sls. Mgr.:* J. F. Stickel

TELEDYNE SEMICONDUCTOR, 1300 Terra Bella Ave., PO Box 7267, Mountain View, CA 94039-7267, Tel: 415-968-9241, TWX: 910-379-6494; FSC No.: 15818; Empl.: 2000; *Sls. Mgr.:* Ralph Granchelli

TELEDYNE SOLID STATE PRODUCTS, 12525 Daphne Ave., Hawthorne, CA 90250, Tel: 213-777-0077, TWX: 910-321-4610; *Sls. Mgr.:* Tom Garland

Local Sales Offices & Reps

AL	Huntsville, Montgomery Mktg.	205-830-0498
AZ	Scottsdale, Arcom Sls.	602-947-5745
CA	Saratoga, Teledyne Relays	408-996-9944
CO	Denver, Quorum 3	303-696-8480
CT	Stratford, G. Rosen Co.	203-375-5456
FL	Clearwater, Hutto, Hawkins & Peregoy	813-797-4447
FL	Maitland, Hutto, Hawkins & Peregoy	305-831-2474
FL	Pompano Beach, Hutto, Hawkins & Peregoy	305-971-5750
GA	Norcross, Montogmery Mktg.	404-447-6124
IL	Glen Ellyn, Teledyne Relays	312-858-1090
IN	Kokomo, Schillinger Assocs.	317-452-4057
IA	Cedar Rapids, Stan Clothier Co.	319-395-0245
KS	Olathe, C-Tron	913-829-0073
MD	Towson, Arbotek Assocs.	301-825-0775
MA	Framingham, G. Rosen Co.	617-879-5505
MN	Minneapolis, S. Clothier Co.	612-944-3456
MO	St. Louis, RothKopf & Assocs.	314-961-4485
NJ	Cranford, Teledyne Relays	201-272-0020
NM	Albuquerque, Reptronix	505-292-1718
NY	Mount Vernon, Friedman-Smith Elctrns.	914-664-4866
NY	Syracuse, I. A. Hotze Co.	315-479-6641
NC	Cary, Montgomery Mktg.	919-467-6319
OH	Dayton, J. C. Hofstetter Co.	513-296-1010
OH	Medina, J. C. Hofstetter Co.	216-241-4880
OR	Beaverton, B & P Sls.	503-641-3486
PA	Hickory, J. C. Hofstetter Co.	412-356-2305
PA	Pennsauken, Vantage Sls.	609-663-6660
TX	Austin, Kruvand Assocs.	512-441-6777
TX	Dallas, Kruvand Assocs.	214-437-3355
TX	Houston, Kruvand Assocs.	713-780-9710
UT	Sandy, Quorum 3	801-943-9227
WA	Bellevue, B & P Assocs.	206-454-6571
Can	Calgary, Alb., Deskin Sls.	403-466-2106
Can	Edmonton, Alb., Deskin Sls.	403-466-2106
Can	Markham, Ont., Deskin Sls.	416-475-1412
Can	Ottawa, Ont., Deskin Sls..	613-729-1099
Can	Richmond, B.C., Deskin Sls.	604-273-4963
Can	St. Laurent, Que., Deskin Sls.	514-331-2860
Can	Transcona, Man., Deskin Sls.	403-466-2106

Local Distributors

AL	Huntsville, Pioneer Elctrns.	205-837-9300
AZ	Phoenix, Wyle	602-249-2232
AZ	Tempe, Time/Arizona	602-967-2000
CA	Anaheim, Time/Anaheim	714-937-0911
CA	Chatsworth, Time/Chatsworth	818-998-7200
CA	El Segundo, Wyle Dist. Grp.	213-322-8100
CA	Irvine, Wyle Dist. Co.	714-863-9953
CA	Rancho Cordova, Wyle	916-638-5282
CA	San Diego, Time/San Diego	619-586-1331
CA	San Diego, Wyle Dist. Grp.	619-565-9171
CA	Santa Clara, Wyle Dist. Grp.	408-727-2500
CA	Sunnyvale, Time/N. Cal.	408-734-9888
CA	Torrance, Time/West	213-320-0880
CO	Englewood, Time/Colorado	303-850-7701
CO	Thornton, Wyle Dist. Grp.	303-457-9953
CT	Cheshire, Time/Connecticut	203-271-3200
CT	Orange, Milgray/Conn.	203-795-0711
FL	Altamonte Springs, Pioneer Elctrns.	305-834-9090
FL	Dania, Summit	305-920-6253
FL	Deerfield Beach, Pioneer/Florida	305-428-8877
FL	Ft. Lauderdale, Time/Florida	305-974-4800
FL	Winter Pk., Milgray/Fla.	305-647-5747
GA	Atlanta, Electro-Air/Georgia	404-351-3545
GA	Atlanta, Milgray	404-393-9666
GA	Norcross, Pioneer	404-448-1711
IL	Bensenville, Milgray/Chicago	312-350-0490
IL	Elk Grove Village, Pioneer/Chicago	312-437-9680
IN	Indianapolis, Pioneer/Indianapolis	317-849-7300
KS	Overland Pk., Milgray/Kansas City	913-236-8800
MD	Columbia, Time/Maryland	301-964-3090
MD	Gaithersburg, Pioneer/Wash.	301-921-0660
MD	Rockville, Milgray/Wash.	301-468-6400
MA	Burlington, Milgray/New England	617-272-6800
MA	Woburn, Time/New England	617-935-8080
MI	Livonia, Pioneer/Mich.	313-525-1800
MN	Bloomington, Time/Minnesota	612-944-9192
MN	Minnetonka, Pioneer	612-935-5444
MO	St. Louis, Time/Mid-West	314-391-6444
NJ	Marlton, Milgray/Delaware Valley	609-983-5010
NY	Buffalo, Summit Dist.	716-887-2800
NY	Farmingdale, Milgray Elctrns.	516-420-9800
NY	Haupauge, Time/NY	516-273-0100
NY	Pittsford, Milgray	716-385-9330
NY	Rochester, Summit Dist.	716-334-8110
NC	Charlotte, Pioneer	704-527-8188
OH	Cleveland, Milgray/Cleveland	216-447-1520
OH	Cleveland, Pioneer/Cleveland	216-587-3600
OH	Dayton, Pioneer/Dayton	513-236-9900
OR	Hillsboro, Wyle Dist. Grp.	503-640-6000
PA	Horsham, Pioneer/Delaware Valley	215-674-4000
PA	King of Prussia, Time/Mid Atlantic	215-337-0900
PA	Pittsburgh, Pioneer/Pittsburgh	412-782-2300
TX	Austin, Pioneer	512-835-4000
TX	Austin, Wyle/Austin	512-834-9957
TX	Dallas, Electro-Air-Southwest	214-385-0566
TX	Dallas, Milgray/Dallas	214-248-1603
TX	Dallas, Pioneer Std.	214-386-7300
TX	Houston, Pioneer Elctrns.	713-988-5555
TX	Houston, Wyle/Houston	713-879-9953
TX	Richardson, Wyle/Dallas	214-235-9953
UT	Salt Lake City, Wyle Dist. Grp.	801-974-9953
WA	Bellevue, Electro-Air/Northwest	206-641-3640
WA	Bellevue, Wyle Dist. Grp.	206-453-8300
Can	Calgary, Alb., Deskin Sls.	403-466-2106
Can	Edmonton, Alb., Deskin Sls.	403-466-2106
Can	Markham, Ont., Deskin Sls.	416-475-1412
Can	Ottawa, Ont., Deskin Sls.	613-729-1099
Can	Richmond, B.C., Deskin Sls.	604-273-4963
Can	St.Laurent,Que., Deskin Sls.	514-331-2860
Can	Transcona, Man., Deskin Sls.	403-466-2106

TELEDYNE WESTERN WIRE & CABLE, 2425 E. 30th St., Los Angeles, CA 90051, Tel: 213-587-7103, Telex: 67-7110; Empl.: 250; *Sls. Mgr.:* W. Drolet, Jr.; *Dist. Mgr.:* M. Ibrahim

TELEFACE CORP., 111 Rivington St., New York, NY 10002, Tel: 212-477-6802, Telex: 125126; Empl.: 4; *Sls. Mgr.:* Richard W. Gans

TELEFUNKEN, See AEG Telefunken

Telemecanique

TELEMECANIQUE, INC., Allied Control Products, 100 Relay Rd., Plantsville, CT 06479, Tel: 203-621-6771; FSC No.: 5945; Empl.: 1200; *Sls. Mgr.:* Mark Freyermuth .... **B•1450-1459**

Local Sales Offices & Reps

AZ	Tempe, Delta Elctrns. Sls. Corp.	602-244-1601
CA	Cerritos, El-Com, Inc.	213-404-2961

CA	Milpitas, Maxim Elec. Sls.	408-946-6001
CO	Denver, Electronic Sls., Inc.	303-771-6300
CT	Clinton, Selmark Assocs., Inc.	203-573-9088
FL	Melbourne, Raycom, Inc.	305-259-7988
FL	Melbourne Beach, Raycom, Inc.	305-725-4558
FL	Orlando, Raycom, Inc.	305-859-5504
FL	Plantation, Raycom, Inc.	305-741-6690
FL	Wellborn, Raycom, Inc.	904-963-5023
GA	Atlanta, Electro-Rep Assocs.	404-320-1134
IL	Chicago, Industrial Reps., Inc.	312-647-7755
IN	Indianapolis, M & L Elctrn. Sls.	317-359-4742
MD	Columbia, Delta III Assocs., Inc.	301-730-4700
MA	Millis, Selmark Assocs., Inc.	617-376-2914
MI	Livonia, Electronic Salesmasters, Inc.	313-421-2520
MN	Minneapolis, Giefer Sls.	612-884-2395
NH	Hopkinton, Selmark Assocs., Inc.	603-746-3299
NJ	Medford, Component Consultants	609-654-5300
NJ	Oakland, CRG Grp., Inc.	201-337-8149
NY	Marcellus, Noeth-Honsinger Assocs.	315-673-1052
NY	Pittsford, Noeth-Honsinger Assocs.	716-586-9002
NC	Charlotte, Electro-Rep Assocs.	704-527-2530
OH	Beachwood, Electronic Salesmasters, Inc.	216-831-9555
OR	Aloha, Huntley Assocs.	503-649-5388
PA	Champhill, Process Engrg. Co.	717-761-5083
PA	Pittsburgh, Process Engrg. Co.	412-561-5050
TX	Austin, Delta Comps., Inc.	512-458-4288
TX	El Paso, Alexander Entprs.	915-591-3142
TX	Seagoville, Delta Comps., Inc.	214-287-6333
VA	Midlothian, Delta III Assocs., Inc.	804-379-1816
WA	Everett, Huntley Assocs.	206-353-1833
WI	Milwaukee, Industrial Reps., Inc.	414-259-0965
Can	Don Mills, R. D. Assocs.	416-444-0959

Local Distributors

AL	Birmingham, Newark Elctrns.	205-942-4044
AL	Huntsville, Newark Elctrns.	205-837-9091
AZ	Pheonix, Newark Elctrns.	602-957-0085
AZ	Phoenix, Newark Elctrns.	602-957-0085
AZ	Tempe, AnJon Elctrns.	602-894-1332
AZ	Tempe, Newark Elctrns.	602-968-7441
AZ	Tucson, Newark Elctrns.	602-628-7891
AR	Little Rock, Newark Elctrns.	501-225-8130
CA	Buena Park, Control Design	714-521-5040
CA	Cerritos, El-Com, Inc.	213-404-2961
CA	Chula Vista, Newark Elctrns.	619-585-1023
CA	Corona, Inter-Conn Elctrns.	714-735-8200
CA	Covina, Newark Elctrns.	213-339-9027
CA	Foster City, Newark Elctrns.	415-572-8300
CA	Hayward, KEA Elctrns.	415-887-2900
CA	Hayward, Newark Elctrns.	415-632-7522
CA	Inglewood, Newark Elctrns.	213-671-7066
CA	Long Beach, Newark Elctrns.	213-427-7408
CA	Los Angeles, Master Distrs.	213-452-1229
CA	Monrovia, Erik-A Elctrns.	818-574-1020
CA	Orange, Newark Elctrns.	714-634-8224
CA	Reseda, Newark Elctrns.	213-344-2686
CA	Riverside, Newark Elctrns.	714-784-1101
CA	Sacramento, Newark Elctrns.	916-971-9555
CA	San Carlos, Control Design	415-952-4808
CA	San Diego, Newark Elctrns.	619-272-9480
CA	San Jose, Newark Elctrns.	408-995-6255
CA	San Jose, Newark Elctrns.	408-554-1616
CA	San Mateo, Newark Elctrns.	415-571-5300
CA	Sunnyvale, Newark Elctrns.	408-720-8755
CA	Torrance, Newark Elctrns.	213-212-6161
CA	Tustin, Newark Elctrns.	714-549-3004
CO	Arvada, Newark Elctrns.	303-423-7941
CO	Colorado Springs, Newark Elctrns.	303-576-2644
CO	Denver, Newark Elctrns.	303-757-3351
CO	Denver, Newark Elctrns.	303-373-4540
CO	Englewood, Electronic Sls.	303-771-6300
CT	Bloomfield, Newark Elctrns.	203-243-1731
CT	East Hartford, R & S Elctrn. Distrs.	203-528-9901
CT	East Haven, J V Elctrns.	203-469-2321
CA	Orange, Newark Elctrns.	714-634-8224
CT	Stamford, Bond Elctrns.	203-348-2663
FL	Altamonte Springs, Control Design	305-788-3220
FL	Clearwater, Newark Elctrns.	813-443-0661
FL	Cocoa, Newark Elctrns.	305-631-2017
FL	Ft. Lauderdale, Newark Elctrns.	305-587-2372
FL	Ft. Lauderdale, Peerless Radio	305-973-4141
FL	Ft. Walton Beach, Newark Elctrns.	904-862-2157
FL	Jacksonville, Newark Elctrns.	904-399-5041
FL	Orlando, Newark Elctrns.	305-896-8350
FL	Tampa, Newark Elctrns.	813-872-5618
GA	Fayetteville, Frankland, Inc.	404-461-4026
GA	Forest Park, Newark Elctrns.	404-366-4050
GA	Norcros, Newark Elctrns.	404-448-1300
GA	Savannah, Newark Elctrns.	912-355-0457
HI	Pearl City, Newark Elctrns.	808-456-5933
ID	Boise, Newark Elctrns.	208-342-4311
ID	Pocatello, Kimball Elctrns.	208-232-2201
ID	Spirit Lake, A-I Elctrn. Supp.	208-623-3111
IL	Chicago, Newark Elctrns.	312-784-5100
IL	Downers Grove, Newark Elctrns.	312-969-9440
IL	Genoa, Control Design	815-784-6515
IL	Hickory Hills, Newark Elctrns.	312-430-4370
IL	Hillside, Newark Elctrns.	312-544-8340
IL	Mt. Prospect, Newark Elctrns.	312-259-9090
IL	Northbrook, Newark Elctrns.	312-480-1300
IL	Oak Park, Newark Elctrns.	312-524-1800
IL	Rockford, Newark Elctrns.	815-229-0225
IL	Schaumburg, Newark Elctrns.	312-843-0700
IL	Springfield, Newark Elctrns.	217-787-9972
IN	Ft. Wayne, Graham Elctrns.	219-423-3422
IN	Ft. Wayne, Newark Elctrns.	219-484-0766
IN	Indianapolis, Control Design	317-788-4559
IN	Indianapolis, Graham Elctrns.	317-634-8202
IN	Indianapolis, Newark Elctrns.	317-872-7070
IN	Indianapolis, Newark Elctrns.	317-926-7050
IN	Merrillville, Newark Elctrns.	312-768-5059
IA	Bettendorf, Newark Elctrns.	319-359-3711
IA	Cedar Rapids, Newark Elctrns.	319-362-1171
IA	Des Moines, Newark Elctrns.	515-278-0670
KS	Overland Park, Newark Elctrns.	913-341-1121
KS	Wichita, Newark Elctrns.	316-267-8755
KS	Wichita, RSC, Inc.	316-267-5213
KY	Louisville, Newark Elctrns.	502-423-0280
LA	Metarie, Newark Elctrns.	504-838-9771
LA	New Orleans, Newark Elctrns.	504-364-1031
MD	Beltsville, Newark Elctrns.	301-937-9540
MD	Cheverly, Newark Elctrns.	301-773-1333
MD	Columbia, Aztech Elctrns.	301-995-1760
MD	Ellicott City, Newark Elctrns.	301-461-2300
MD	Gaithersburg, Axis Elctrns.	301-840-9640
MA	Methuen, Newark Elctrns.	617-688-1837
MA	Newton, Greene-Shaw	617-969-8900
MA	Sharon, Newark Elctrns.	617-784-4061
MA	Springfield, Newark Elctrns.	413-785-5851
MA	Waltham, Newark Elctrns.	617-894-8050
MA	Wilmington, J V Elctrns. of Boston	617-657-6523
MA	Woburn, Newark Elctrns.	617-935-8350
MA	Worcester, Newark Elctrns.	617-757-4515
MI	Grand Rapids, Newark Elctrns.	616-241-6681
MI	Oak Park, Newark Elctrns.	313-968-2950
MI	Oak Park, Newark Elctrns.	313-967-0600
MI	Saginaw, Newark Elctrns.	517-799-0480
MN	Burnsville, Newark Elctrns.	612-890-7362
MO	Crestwood, Newark Elctrns.	314-821-7466
CT	East Haven, J V Elctrns.	203-469-2321
MN	Minneapolis, Control Design	612-721-1628
MN	Minneapolis, Newark Elctrns.	612-331-6350
NH	Nashua, Newark Elctrns.	603-883-9010
MO	St. Louis, Newark Elctrns.	314-521-5066
NJ	Bordentown, Newark Elctrns.	609-298-4450
NJ	Edison, Newark Elctrns.	201-572-2103
MO	Independence, Newark Elctrns.	816-478-0561
MN	Minneapolis, Industrial Comps.	612-831-2666
MO	St. Louis, Control Design	314-426-3150
MO	St. Louis, Interstate Industrial	314-423-4322
MN	Crystal, Newark Elctrns.	612-561-7541
NE	Omaha, Newark Elctrns.	402-392-1221
MO	Blue Springs, Newark Elctrns.	816-228-3170
NJ	Fairfield, Newark Elctrns.	201-882-0300
MS	Jackson, Newark Elctrns.	601-956-3834
NJ	Kenilworth, Federated Purchaser	201-272-0505
NJ	Medford, Component Consultants	609-654-5300
NJ	Pennsauken, Newark Elctrns.	609-663-9490
NJ	Springfield, Newark Elctrns.	201-376-9500
MN	St. Paul, Newark Elctrns.	612-631-2683
NM	Albuquerque, International Elctrns.	505-345-8127
NM	Albuquerque, Newark Elctrns.	505-883-6181
NY	Amherst, Standard Elctrns.	716-691-3801
NY	Buffalo, Newark Elctrns.	716-892-4321
NY	Buffalo, Summit Distrbg.	716-884-3450
NY	Farmingdale, Pride Elctrns.	516-293-4020
NY	Hauppauge, Sherburn Elctrns.	516-231-4300
NY	Latham, Newark Elctrns.	518-783-0983
NY	Newburgh, Newark Elctrns.	914-564-2700
NY	Rochester, Newark Elctrns.	716-427-8220
NY	Rochester, Summit Distrbg.	716-334-8110
NY	Rome, Rome Elctrns.	315-337-5400
NY	Syracuse, Newark Elctrns.	315-437-6611
NY	Valley Stream, Newark Elctrns.	516-825-6200
NC	Charlotte, Control Design	704-588-4410
NC	Charlotte, Newark Elctrns.	704-535-5650
NC	Greensboro, Newark Elctrns.	919-292-7240
NC	Raleigh, Newark Elctrns.	919-781-7677
NC	Winston Salem, Kirkman Elctrns.	919-722-9131
OH	Akron, Akron Elctrns.	216-762-8818
OH	Akron, Newark Elctrns.	216-374-9987
OH	Bedford Heights, Newark Elctrns.	216-439-4383
OH	Cincinnati, Graham Elctrns.	513-772-1661
OH	Cincinnati, Newark Elctrns.	513-771-9700
OH	Cleveland, Newark Elctrns.	216-391-9330
OH	Columbus, Newark Elctrns.	614-481-8141
OH	Columbus, Newark Elctrns.	614-451-0002
OH	Dayton, Newark Elctrns.	513-294-8980
OH	Dayton, Stotts Friedman	513-298-5555
OH	North Canton, Newark Elctrns.	216-497-7713
OH	Solon, Target Elctrns.	216-248-7930
OH	Toledo, Newark Elctrns.	419-866-0404
OH	Warrensville Heights, Newark Elctrns.	216-587-1700
OH	Wickliffe, Gateway Megatech	216-944-5801
OH	Youngstown, Newark Elctrns.	216-793-6134
OK	Oklahoma City, Electro Entprs.	405-427-6591
OK	Oklahoma City, Newark Elctrns.	405-495-5000
OK	Tulsa, Newark Elctrns.	918-832-7004
OR	Portland, Carlyle Tech. Sls.	503-244-1375
OR	Portland, Newark Elctrns.	503-257-0741
PA	Allentown, Federated Purchaser	215-437-4481
PA	Allentown, Newark Elctrns.	215-434-7171
PA	Cornwells Heights, Newark Elctrns.	215-245-7300
PA	Erie, Newark Elctrns.	814-453-5726
PA	Erie, Wettekin Elctrns.	814-838-9184
PA	Johnstown, Bird Elec. & Supp.	814-535-3574
PA	King of Prussia, Newark Elctrns.	215-265-0933
PA	Malvern, Control Design	215-296-0150
PA	Malvern, Newark Elctrns.	215-296-5522
PA	McKees Rocks, Newark Elctrns.	412-331-2400
PA	McKeesport, Barno Radio	412-751-5966
PA	North Versailles, Newark Elctrns.	412-824-8504
PA	Philadelphia, Philadelphia Elctrns.	215-568-7400
PA	Philadelphia, Shap Elctrns.	215-969-3300
PA	Pittsburgh, Newark Elctrns.	412-367-2790
RI	Warwick, Newark Elctrns.	401-738-4010
SC	Greenville, Newark Elctrns.	803-288-9610
TN	Knoxville, Newark Elctrns.	615-588-6493
TN	Memphis, Newark Elctrns.	901-365-8060
TN	Nashville, Electra Distrbg. Co.	615-329-3971
TN	Nashville, Newark Elctrns.	615-883-2482
TX	Dallas, Control Design	214-358-1441
TX	Dallas, Newark Elctrns.	214-340-3585
TX	Dallas, Sterling Elctrns.	214-243-1600
TX	Dallas, Trevino Sls.	214-357-5446
TX	El Paso, International Elctrns.	915-598-3406
TX	El Paso, Midland Specialty	915-533-9555
TX	El Paso, Newark Elctrns.	915-778-5322
TX	Ft. Worth, Newark Elctrns.	817-589-1295
TX	Garland, Newark Elctrns.	214-494-5911
TX	Houston, Geophysical Supp.	713-666-4100
TX	Houston, Newark Elctrns.	713-782-4800
TX	Houston, Newark Elctrns.	713-688-6846
TX	Houston, Sterling Elctrns.	713-623-6600
TX	Pasadena, Newark Elctrns.	713-477-0286
TX	San Antonio, Newark Elctrns.	512-349-2641
UT	Salt Lake City, Kimball Elctrns.	801-328-2075
UT	Salt Lake City, Newark Elctrns.	801-484-8611
VA	Arlington, Newark Elctrns.	703-522-0880
VA	Richmond, Newark Elctrns.	804-282-5671
VA	Virginia Beach, Newark Elctrns.	804-499-0719
WA	Bellevue, Newark Elctrns.	206-641-9809
WA	Bellevue, Newark Elctrns.	206-641-4676
WA	Bellevue, Newark Elctrns.	206-641-9900
WA	Seattle, Carlyle Tech. Sls.	206-575-6750
WA	Spokane, Newark Elctrns.	509-922-5007
WV	Charleston, Newark Elctrns.	304-345-6505
WI	Green Bay, Newark Elctrns.	414-494-1400
WI	Madison, Newark Elctrns.	608-221-4738
WI	Milwaukee, Newark Elctrns.	414-463-1000
WI	Milwaukee, Newark Elctrns.	414-351-6031
WI	New Berlin, Control Design	414-784-1015
Can	Downsview, Ont., Future Elctrns.	416-638-4771
Can	Ottawa, Ont., Future Elctrns.	613-820-9471
Can	Pointe Claire, Que., Future Elctrns.	514-694-7710
Can	Vancouver, B.C., Future Elctrns.	604-438-5545

TELEMET, 185 Dixon Ave., Amityville, NY 11701, Tel: 516-842-2300, TWX: 510-227-9850; Empl.: 60

TELEPACIFIC ELECTRONICS CO., INC., 772 N. Twin Oaks Valley Road, San Marcos, CA 92069, Tel: 619-744-4415; Empl.: 25; *Sls. Mgr.:* Vernon P. Cooke

TELEPHONICS, 770 Park Ave., Huntington, NY 11743, Tel: 516-549-6000, Telex: 96-7815, TWX: 510-226-6983; Empl.: 800; *Sls. Mgr.:* R. H. Collopy

TELERAM COMMUNICATIONS, 2 Corporate Park Dr., White Plains, NY 10604, Tel: 914-694-9270, Telex: 64-6658; Empl.: 50; *Sls. Mgr.:* R. R. Ansell

TELESENSORY SPEECH SYS., Telesensory Sys., Inc., 3408 Hillview Ave., Palo Alto, CA 94304, Tel: 415-856-8255, Telex: 348352; *Sls. Mgr.:* David Giblon

TELESIS LABORATORY, Box 1972, Chillocothe, OH 45601, Tel: 614-642-5000, Telex: 24-5451; Empl.: 22; *Sls. Mgr.:* John Robertson

TELETERMINAL CORP., Greenland, NH 03840, Tel: 603-431-1200; Empl.: 13

TELETYPE, 5555 Touhy Ave., Skokie, IL 60076, Tel: 312-982-2000, Telex: 25-4051, TWX: 910-223-3611; FSC No.: 5815; Empl.: 6,000; *Sls. Mgr.:* D. M. Printz

TELEVIDEO SYS., INC., 1170 Morse Ave., Sunnyvale, CA 94086, Tel: 408-745-7760, TWX: 910-338-7633; *Sls. Mgr.:* Steve Tatum (VDT Div.)

TELEVISION EQUIP. ASSOCS., Box 393, So. Salem, NY 10590-0393, Tel: 914-763-8893, TWX: 710-575-2600; Empl.: 10

TELEVISION MICROTIME, INC., 1280 Blue Hills Ave., Bloomfield, CT 06002, Tel: 203-242-4242, TWX: 710-425-2390; Empl.: 80

TEL LABS, INC., 154 Harvey Rd., PO Box 375, Londonderry, NH 03053, Tel: 603-625-8994, TWX: 710-220-1844; FSC No.: 94322;Multiple; Empl.: 180 .... **A•1952-1953**

Local Sales Offices & Reps

AL	Huntsville, Beacon Elctrn. Sls.	205-881-5031
AZ	Tempe, Gassner & Clark	602-968-9037
CA	La Mirada, Select Elec.	714-739-8891
CA	Mountain View, Serra Assocs.	415-964-4300
CO	Aurora, Sage Sls.	303-750-3501
FL	Clearwater, Beacon Elec. Sls.	813-796-2378
FL	Ft. Lauderdale, Beacon Elec. Sls.	305-491-1054
FL	Maitland, Beacon Elec. Sls.	305-647-3498
FL	Melbourne, Beacon Elec. Sls.	305-724-8010
GA	Atlanta, Beacon Elec. Sls.	404-256-9640
IL	Downers Grove, Richmar Elec. Corp.	312-968-0118
IN	West Lafayette, Richmar Elec. Corp.	317-846-6383
MD	Randallstown, Precision Mktg.	301-521-5353
MA	Topsfield, RFC Assocs.	617-887-8545
NJ	Clifton, Ossmann	201-778-8888
NY	Rochester, Ossmann Comps.	716-424-4460
NY	Syracuse, Ossmann Comps.	315-455-6611
NC	Greensboro, Beacon Elec. Sls.	919-275-9997
NC	Raleigh, Beacon Elec. Sls.	919-787-0330
OH	Akron, Augnat Assocs.	216-535-4396
OH	Dayton, Augnat Assocs.	513-298-1507
OK	Tulsa, ION Assocs.	918-664-0186
OR	Aloha, Caruso & Northcutt	503-624-1606
PA	Ardmore, Precision Mktg.	215-649-6301
PA	Pittsburgh, Augnat Assocs.	412-281-8283
TN	Johnson City, Beacon Elec. Sls.	615-282-2421
TX	Austin, ION Assocs.	512-458-2108
TX	Grand Prairie, ION Assocs.	214-647-8225
TX	Houston, ION Assocs.	713-681-6266
UT	Salt Lake City, Sage Sls.	801-467-5451
WA	Bellevue, Caruso & Northcutt	206-454-9699
WI	Butler, Richmar Elec. Corp.	414-781-1730

TELONIC/BERKELEY, 2825 Laguna Canyon Rd., Laguna Beach, CA 92652, Tel: 714-494-9401, Telex: 182720; FSC No.: 04423; Empl.: 75; *Sls. Mgr.:* H. Elmes

TELPAR, INC., 4137 Billy Mitchell Rd., P.O. Box 796, Addison, TX 75001, Tel: 214-233-6631, Telex: 73-2561; Empl.: 28; *Sls. Mgr.:* Wm. Konrad .... **D•1075**

TELTONE, 10801-120 Ave. NE, Kirkland, WA 98033, Tel: 206-827-9626, TWX: 910-449-2862; Empl.: 450; *Sls. Mgr.:* D. E. Johnson; *Dist. Mgr.:* Mike Arndt

TEMESCAL, 2850 Seventh St., Berkeley, CA 94710, Tel: 415-841-5720, TWX: 910-366-7366; Empl.: 300

TEMPIL DIV., Big Three Inds., Hamilton Blvd., S. Plainfield, NJ 07080, Tel: 201-757-8300, Telex: 138-662; Empl.: 38; *Sls. Mgr.:* A. P. Jeanguenin

TEMPO INSTRUMENT, INC., 87 Modular Ave., Commack, NY 11725, Tel: 516-864-3700, TWX: 510-226-3787; FSC No.: 07031; Empl.: 205

TEMPOSONICS, MTS Sys. Corp., 111 East Ames Ct., Plainview, NY 11803, Tel: 516-349-1950, TWX: 510-226-3787; *Sls. Mgr.:* W. Brenner

TEMPTRONIC, 55 Chapel St., Newton, MA 02158, Tel: 617-969-2501, Telex: 200-119 TEMP UR; Empl.: 100+; *Sls. Mgr.:* Frank Healy

TENCOR INSTR., 2400 Charleston Road, Mountain View, CA 94043, Tel: 415-969-6767; *Sls. Mgr.:* Barry Hart

TENNELEC, 601 Turnpike, Oak Ridge, TN 37830, Tel: 615-483-8405, TWX: 810-572-1018; Empl.: 80

TENNEY ENGRG., 109 Springfield Rd., Union, NJ 07083, Tel: 201-686-7870, TWX: 710-985-4725; Empl.: 204; *Sls. Mgr.:* Jerome Perlstein .... **D•1173**

Local Sales Offices & Reps

AL	Huntsville, Equipment Sales Co., Inc.	205-536-5399
AZ	Phoenix, Jayson Co.	602-867-1964
CA	Sunnyvale, Tenney Engrg., Inc.	408-745-6232
CA	Van Nuys, Environment Assocs.	818-997-3791
CO	Englewood, Tenney Engrg.	303-798-0955
CT	Hamden, Equip. Sls.	203-281-4578
FL	Altamonte Springs, Equip. Sls.	305-339-2972
FL	Delray Beach, Equip. Sls.	305-243-0709
IL	Des Plaines, Marsland Assocs.	312-298-2620
IN	Indianapolis, Marsland Assocs.	317-293-5437
MD	Wheaton, Brimberg Sls.	301-946-2670
MA	Lowell, Equip. Sls. Co.	617-459-7000
MI	Warren, Dietrich & Assoc.	313-751-4990
MO	Blue Springs, Tenney Engrg., Inc.	816-229-7667
NJ	Mt. Laurel, Tan-Mar, Inc.	609-235-4345
NJ	Union, Tenney Engrg., Inc.	201-686-7870
NY	Fayetteville, M. P. Andrews	315-637-3144
NC	Raleigh, Equip. Sls.	919-872-8376
OH	Cleveland, Dietrich & Assocs.	216-781-1855
OH	Dayton, Dietrich & Assoc.	513-223-6042
PA	Pittsburgh, Dietrich & Assoc.	412-892-2992
TX	Austin, Carey, McMahill & Zerbe Co.	512-255-1663
TX	Garland, Carey, McMahill & Zerbe Co.	214-681-1414
TX	Houston, Carey, McMahill & Zerbe Co.	713-771-1500
WI	New Berlin, Marsland Assocs., Inc.	414-786-6611

TENOR, 17020 W. Rogers Dr., New Berlin, WI 53151, Tel: 414-782-3800, Telex: 26-706; Empl.: 30; *Sls. Mgr.:* P. Yoblin; *Dist. Mgr.:* P. Yoblin

TENSOLITE, Old Post Rd., Rte. 9A, Buchanan, NY 10511, Tel: 914-737-5600, TWX: 710-573-2341; Empl.: 300; *Sls. Mgr.:* David Yellin

TENSOR, Box 14843, Austin, TX 78761, Tel: 512-251-4131, Telex: ITT 4940124; Empl.: 15

TEN-TEC, INC., Industrial Park, Sevierville, TN 37862, Tel: 615-453-7172, Telex: 261337 ACTAUR; Empl.: 110; *Sls. Mgr.:* Joe Redwine

TEPRO OF FLORIDA, 2608 Enterprise Rd., Clearwater, FL 33575, Tel: 813-796-1044; FSC No.: 15915; Empl.: 97; *Sls. Mgr.:* Roger C. Mayo; *Dist. Mgr.:* Beverly Mayer

Local Sales Offices & Reps

CA	Burbank, MODCO	818-848-2215
CA	San Mateo, Melvin Sls.	415-349-7445
FL	Clearwater, Tepro of Florida	813-796-1044
IL	Glencoe, Howard Benjamin	312-835-0150
MA	Hopkinton, Berkshire Elctrns.	617-435-9356
NY	Great Neck, Pacent Engrg.	516-482-4678
OH	Cleveland, Components, Inc.	216-243-9200
TX	Dallas, Elctrn. Prods. Reps.	214-341-2666

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TERADYNE, INC., 183 Essex St., Boston, MA 02111, Tel: 617-482-2700, TWX: 710-321-1055; Empl.: 3200; *Sls. Mgr.:* D. O'Connell

TERADYNE CONNECTION SYS., 44 Simon St., Nashua, NH 03060, Tel: 603-889-5156, TWX: 710-228-1431; FSC No.: 31413; Empl.: 1,400; *Sls. Mgr.:* D. Murphy

TERMINAL DATA CORP., 15733 Crabbs Branch Way, Rockville, MD 20855, Tel: 301-921-8282; Empl.: 12

TERMINAL SYS., See A & B Technical Services

TERRA TECHNLG. CORP., 3860 148th Ave. N.E., Redmond, WA 98052, Tel: 206-883-7300, Telex: 15-2070; *Sls. Mgr.:* Irl Davis

TEST & MEASUREMENT SYSTEMS, INC., 349 Cobalt Way, Ste. 301, Sunnyvale, CA 94086, Tel: 408-720-8877, Telex: 297584 TEAM UR; *Sls. Mgr.:* Bill Nicklin

TESTLINE, See Fairchild Test Sys. Grp., Testline Instrs.

TESTOTERM, P.O. Box 111509, Nashville, TN 37211, Tel: 615-834-5082, Telex: 55-5112

TEST PROBES, INC., Box 2113, La Jolla, CA 92038, Tel: 619-459-4197, Telex: 697192; *Sls. Mgr.:* Hal Wardein; *Dist. Mgr.:* Hal Wardein

TESTRONICS, 1810-102 N. Glenville Dr., Richardson, TX 75081, Tel: 214-238-8378, Telex: 469602; Empl.: 21

TETRAGENICS, Box 1338, Butte, MT 59701, Tel: 406-782-8606; Empl.: 40; *Sls. Mgr.:* Jack Dunn

TETTEX INSTRUMENTS, INC., P.O. Box 281, Fairview Village, PA 19409-0281, Tel: 215-539-6050, Telex: 753-899 TETTEX; Empl.: 100; *Sls. Mgr.:* Charles Prievys .... **D•1312**

TEXAS INSTRS., INC., Box 225012-MS-84, Dallas, TX 75265, Tel: 214-995-6611, TWX: 910-867-4702; Empl.: 85,000

TEXAS INSTRS., Data Sys. Group, P. O. Box 809063, Dallas, TX 75380-9063, Tel: 1-800-527-3500, Telex: 73324 TEXINS DAL, TWX: 910-867-4702; Empl.: 80,696

TEXAS INSTRS., Matls. & Controls Grp., 34 Forrest St., Attleboro, MA 02703, Tel: 617-699-3800, Telex: 92-7708, TWX: 710-346-0566

TEXAS INSTRUMENTS OPTOELECTRONICS, P.O. Box 225012 MS12, Dallas, TX 75265, Tel: 214-995-3821, Telex: 910-867-4702; Empl.: 89,000 world wide; *Sls. Mgr.:* Glenn Snyder; *Dist. Mgr.:* Rudy Profaizer .... **B•1216-1219**

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CA	Sacramento	916-929-1521
CA	San Diego	619-278-9601
CA	Santa Clara	408-980-9000
CA	Torrance	213-217-7010
CA	Woodland Hills	213-704-7759
CO	Aurora	303-368-8000
CT	Wallingford	203-269-0074
FL	Ft. Lauderdale	305-973-8502
FL	Maitland	305-660-4600
FL	Tampa	813-870-6420
GA	Norcross	404-662-7900
IL	Arlington Heights	312-640-2925
IN	Ft. Wayne	219-424-5174
IN	Indianapolis	317-248-8555
IA	Cedar Rapids	319-395-9550
MD	Baltimore	301-944-8600
MA	Walthman	617-895-9100
MI	Farmington Hills	313-553-1500
MN	Eden Prairie	612-828-9300
MO	Kansas City	816-523-2500
MO	St. Louis	314-569-7600
NJ	Iselin	201-750-1050
NM	Albuquerque	505-345-2555
NY	East Syracuse	315-483-9291
NY	Endicott	607-754-3900
NY	Melville	516-454-6600
NY	Pittsford	716-385-6770
NY	Poughkeepsie	914-473-2900
NC	Charlotte	704-527-0930
NC	Raleigh	919-876-2725
OH	Beachwood	216-464-6100
OH	Dayton	513-258-3877
OK	Tulsa	918-250-0633
OR	Beaverton	503-643-6758
PA	Coraopolis	412-771-8550
PA	Ft. Washington	215-643-6450
TX	Austin	512-250-7655
TX	Houston	713-778-6592
TX	Richardson	214-680-5082
TX	San Antonio	512-496-1779
UT	Murray	801-266-8972
VA	Fairfax	703-849-1400
WA	Redmond	206-881-3080
WI	Brookfield	414-785-7140
PR	Hato Ray	809-753-8700
Can	Neapean, Ont.	613-726-1970
Can	Richmond Hill, Ont.	416-884-9181
Can	St. Laurent, Que.	514-334-3635

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AL	Huntsville, Arrow Elctrns.	205-837-6955
AL	Huntsville, Kierulff Elctrns.	205-883-6070
AL	Huntsville, Marshall Elctrns.	205-881-9235
AZ	Phoenix, Kierulff Elctrns.	602-437-0750
AZ	Phoenix, Wyle Elctrns.	602-249-2232
AZ	Tempe, Arrow Elctrns.	602-968-4800
AZ	Tempe, Marshall Elctrns.	602-968-6181
CA	Anaheim, R.V. Weatherford Elctrns.	714-634-9600
CA	Canoga Park, Marshall Elctrns.	213-999-5001
CA	Chatsworth, Arrow Elctrns.	818-701-7500
CA	Commerce, Kierulff Elctrns.	213-725-0325
CA	Cypruss, Kierulff Elctrns.	714-220-6300
CA	El Segundo, Wyle Elctrns.	213-322-8100
CA	Elmonte, Marshall Elctrns.	818-442-7204
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CA	San Diego, Wyle Elctrns.	619-565-9171
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CA	Sunnyvale, Arrow Elctrns.	408-745-6600
CA	Sunnyvale, Marshall Elctrns.	408-732-1100
CA	Tustin, Arrow Elctrns.	714-838-5422
CA	Tustin, Kierulff Elctrns.	714-731-5711
CO	Denver, Arrow Elctrns.	303-696-1111
CO	Englewood, Kierulff Elctrns.	303-790-4444
CO	Thornton, Wyle Elctrns.	303-457-9953
CT	Danbury, Diplomat Elctrns.	203-797-9674
CT	Orange, Milgray Elctrns.	203-795-0714
CT	Wallingford, Arrow Elctrns.	203-265-7741
CT	Wallingford, Kierulff Elctrns.	203-265-1115
CT	Wallingford, Marshall Elctrns.	203-265-3822
FL	Ft. Lauderdale, Arrow Elctrns.	305-429-8200
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FL	Ft. Lauderdale, Kierulff Elctrns.	305-486-4004
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FL	Orlando, Milgray Elctrns.	305-647-5747
FL	Tampa, Arrow Elctrns.	813-576-8995
FL	Tampa, Diplomat Elctrns.	813-443-4514
FL	Tampa, Kierulff Elctrns.	813-576-1966
GA	Atlanta, Kierulff Elctrns.	404-447-5252
GA	Norcross, Arrow Elctrns.	404-449-8252
GA	Norcross, Marshall Elctrns.	404-923-5750
IL	Bensenville, Diplomat Elctrns.	312-595-1000
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IL	Chicago, Newark Elctrns.	312-784-5100
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IN	Ft. Wayne, Graham Elctrns.	219-423-3422
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IN	Indianapolis, Graham Elctrns.	317-634-8202
IA	Cedar Rapids, Arrow Elctrns.	319-395-7230
KS	Lenexa, Marshall Elctrns.	913-492-3121
KS	Wichita, LComp	316-265-9507
MD	Columbia, Arrow Elctrns.	301-995-0003
MD	Columbia, Diplomat Elctrns.	301-995-1226
MD	Linthicum, Kierulff Elctrns.	301-636-5800
MD	Rockville, Milgram Elctrns.	301-793-3993
MA	Billerica, Kierulff Elctrns.	617-667-8331
MA	Burlington, Marshall Elctrns.	617-272-8200
MA	Woburn, Arrow Elctrns.	617-933-8130
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MA	Woburn, Time Elctrns.	617-935-8080
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MI	Detroit, Marshall Elctrns.	313-525-5850
MI	Detroit, Newark Elctrns.	313-967-0600
MI	Grand Rapids, Arrow Elctrns.	616-243-0912
MN	Edina, Kierulff Elctrns.	612-941-7500
MN	Minneapolis, Arrow Elctrns.	612-830-1800
MN	Minneapolis, Marshall Elctrns.	612-559-2211
MO	Kansas City, LComp	816-221-2400
MO	St. Louis, Arrow Elctrns.	314-567-6888
MO	St. Louis, Kierulff Elctrns.	314-739-0855
NH	Manchester, Arrow Elctrns.	603-668-6968
NM	Albuquerque, Milgram Elctrns.	609-983-5010
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NJ	Camden, General Radio	609-964-8560
NJ	Fairfield, Arrow Elctrns.	201-575-5300
NJ	Fairfield, Kierulff Elctrns.	201-575-6750
NJ	Fairfield, Marshall Elctrns.	201-882-0320
NJ	Marlton, Arrow Elctrns.	215-928-1800
NJ	Marlton, Arrow Elctrns.	609-596-8000
NJ	Mt. Laurel, Kierulff Elctrns.	609-235-1444
NJ	Mt. Laurel, Marshall Elctrns.	609-234-9100
NJ	Totawa, Diplomat Elctrns.	201-785-1830
NM	Albuquerque, Arrow Elctrns.	505-243-4566
NM	Albuquerque, International Elctrns.	505-345-8127
NY	Farmingdale, Milgray Elctrns.	516-420-9800
NY	Hauppauge, Arrow Elctrns.	516-231-1000
NY	Hauppauge, Jaco	516-273-5500
NY	Hauppauge, Marshall Elctrns.	516-272-2053
NY	Melville, Diplomat Elctrns.	516-454-6400
NY	Rochester, Arrow Elctrns.	716-275-0300
NY	Rochester, Marshall Elctrns.	716-235-7620
NY	Rochester, Rochester Radio Supp.	716-454-7800
NY	Syracuse, Arrow Elctrns.	315-652-1000
NY	Syracuse, Diplomat Elctrns.	315-652-5000
NY	Syracuse, Marshall Elctrns.	607-754-1570
NC	Raleigh, Arrow Elctrns.	919-876-3132
NC	Raleigh, Kieroff Elctrns.	919-872-8410
NC	Winston-Salem, Arrow Elctrns.	919-725-8711
OH	Cincinnati, Graham Elctrns.	513-772-1661
OH	Cleveland, Arrow Elctrns.	216-248-3990
OH	Cleveland, Kierulff Elctrns.	216-587-6558
OH	Cleveland, Marshall Elctrns.	216-248-1788
OH	Columbus, Graham Elctrns.	614-895-1590
OH	Dayton, Arrow Elctrns.	513-435-5563
OH	Dayton, Esco	513-226-1133
OH	Dayton, Kierulff Elctrns.	513-439-0045
OH	Dayton, Marshall Elctrns.	513-236-8088
OK	Tulsa, Arrow Elctrns.	918-665-7700
OK	Tulsa, Kierulff Elctrns.	918-252-7537
OR	Beaverton, Marshall Elctrns.	503-644-5050
OR	Hillsboro, Wyle Elctrns.	503-640-6000
OR	Portland, Arrow Elctrns.	503-684-1690
PA	Monroeville, Arrow Elctrns.	412-856-7000
TX	Austin, Arrow Elctrns.	512-835-4180
TX	Austin, Kierulff Elctrns.	512-835-2090
TX	Austin, Marshall Elctrns.	512-458-5654
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TX	Dallas, Arrow Elctrns.	214-380-6464
TX	Dallas, International Elctrns.	214-233-9323
TX	Dallas, Kierulff Elctrns.	214-343-2400
TX	Dallas, Marshall Elctrns.	214-233-5200
TX	Dallas, Wyle Elctrns.	214-235-9953
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TX	Houston, Arrow Elctrns.	713-530-4700
TX	Houston, Harrison Equip.	713-879-2600
TX	Houston, Kierulff Elctrns.	713-530-7030
TX	Houston, Marshall Elctrns.	713-789-6600
TX	Houston, Wyle Elctrns.	713-879-9953
UT	Salt Lake City, Diplomat Elctrns.	801-486-4134
UT	Salt Lake City, Kierulff Elctrns.	801-973-6913
UT	Salt Lake City, Wyle Elctrns.	801-974-9953
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WA	Bellevue, Wyle Elctrns.	206-453-8300
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Can	Montreal, Que., Future Elctrns.	514-694-7710
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Can	Ottawa, Ont., ITT Comps.	613-226-7406
Can	Ottawa, Ont., Varah Elctrns.	613-726-8884
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Can	Toronto, Ont., Future Elctrns.	416-638-4771
Can	Toronto, Ont., ITT Comps.	416-630-7971
Can	Toronto, Ont., Varah Elctrns.	416-516-9311
Can	Vancouver, B.C., Future Elctrns.	604-438-5545
Can	Vancouver, B.C., ITT Comps.	604-270-7805
Can	Vancouver, B.C., Varah Elctrns.	604-873-3211
Can	Winnepeg, Man., Varah Elctrns.	204-633-6190

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CA	Santa Clara	408-748-2220
GA	Norcross	404-662-7945
IL	Arlington Heights	312-640-2909
MA	Waltham	617-890-6671
TX	Richardson	214-680-5066

Technical Support Center

Can	214-995-2171

TEXAS TRANSFORMER CORP., P.O. Box 220, Plano, TX 75074, Tel: 214-424-1581; FSC No.: 1181; Empl.: 75; *Sls. Mgr.:* Felix Smith

TEXASWITCH, INC., 2512 Program Dr., # 108, Dallas, TX 75220, Tel: 214-357-1768

TEXET SEMICONDUCTORS, 301 Texet Dr., Allen, TX 75002, Tel: 214-727-1111, TWX: 203943 TEXET UR; *Sls. Mgr.:* Kent Paris; *Dist. Mgr.:* Bill Bamsch

TEXMATE INC

TEXMATE, INC., 348 S. Cedros Ave., P.O. Box 2000, Solana Beach, CA 92075, Tel: 619-481-7177, TWX: 910-322-1738; Empl.: 36 .... **D•1378-1379**

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Intl	Germany, Dusseldorf	02 11/66 61 45
Intl	Germany, Hanover	05 11/88 6086
Intl	Germany, Munich	089-47 3023
Intl	Germany, Quickborn	041 06/612-1
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Intl	India, Bangalore	812-58227
Intl	Spain, Barcelona	(93) 692-35-19
Intl	Sweden, Stockholm	08-710 06 20
Intl	Taiwan, Taipei	595-3509,591-9651
Intl	United Kingdom, Walsall	(0922)640003
Can	Edmonton	403-432-7746
Can	Montreal	514-337-0425
Can	Ottawa	613-238-7077
Can	Toronto	416-661-3193

TEXSCAN INSTRUMENTS, 3169 N. Shadeland, Indianapolis, IN 46226, Tel: 317-545-4196, Telex: 810-341-3184, TWX: 27-2110; FSC No.: 23042; Empl.: 765; *Sls. Mgr.:* Alan Whitlock; *Dist. Mgr.:* Rob Shenlot

TEX-TECHS, INC., 10021 Cayuga, Dallas, TX 75228, Tel: 214-328-6200, Telex: 73-0796 TEX TECH DAL; Empl.: 50; *Sls. Mgr.:* Jackie Miller

TEXTOOL PRODUCTS, Electronic Products Division/3M, 1410 W. Pioneer Dr., Irving, TX 75061, Tel: 214-259-2676; *Sls. Mgr.:* Dick Evans

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Local Sales Offices & Reps

CA	Santa Ana, Wayne Champa Assocs.	714-662-2228
CA	Santa Clara, Con-Cab Sls.	408-727-4771
CO	Englewood, Cablex	303-792-5760
CT	Tolland, TMR Corp.	203-872-3624
DC	Ellicott City, Marketing Tech., Inc.	301-465-8944
FL	Longwood, CBC Elctrns.	305-831-5380
MD	Ellicott City, Marketing Tech. Inc.	301-465-5944
MA	Tewksbury, Sequel Assocs., Inc.	617-851-4010
NY	Commack, MTR Tech.	516-543-1200
SC	Mauldin, Carl Hart	803-288-2323

T-F ELCTRNS., 9415 Neils Thompson Dr., Austin, TX 78759, Tel: 512-836-7323, Telex: 77-6427; FSC No.: 50307; Empl.: 55

TGM DETECTORS, INC., 166 Bear Hill Rd., Watham, MA 02154, Tel: 617-890-2090

THALER CORP., 10940 N. Stallard Pl, Tucson, AZ 85704, Tel: 602-742-5572; Empl.: 5

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Local Sales Offices & Reps

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CA	San Diego, Interstate Mktg. Assocs.	818-883-7606
CA	Woodland Hills, Interstate Mktg. Assocs.	818-883-7607
CO	Denver, Lindberg Co.	303-758-9033
FL	Altamonte Springs, V. G. Sls., Inc.	305-831-8688

FL	Largo, V. G. Sls., Inc.	813-584-2246
FL	Pompano Beach, V. G. Sls., Inc.	315-971-0900
GA	Norcross, Montgomery Mktg., Inc.	404-447-6124
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IL	Elk Grove Village, The John G. Twist Co.	312-593-0200
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KS	Overland Park, PMR Corp.	913-381-0004
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MI	Southfield, R.O. Whitesell & Assocs.	313-559-5454
MI	St. Josephs, R.O. Whitesell & Assocs.	616-983-7337
MN	Bloomington, The John G. Twist Co.	612-835-2120
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NH	Salem, Sales Engrg. Co., Inc.	603-893-5521
NJ	Cherry Hill, Trinkle Sls., Inc.	609-795-4200
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NY	Ithaca, Bob Dean, Inc.	607-257-1111
NY	Melville, Comtronic Assocs.	516-249-0505
NY	Wappinger Falls, Bob Dean, Inc.	914-297-6406
NC	Cary, Montgomery Mktg., Inc.	919-467-6319
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OH	Cleveland, R.O. Whitesell & Assocs.	216-447-9020
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TX	Austin, Ion Assocs.	512-331-7251
TX	Grand Prairie, Ion Assocs.	214-647-8225
TX	Houston, Ion Assocs.	713-977-4354
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Can	Ottawa, Ont., Deskin Sls.	613-729-1099
Can	Richmond, B.C., Deskin Sls.	604-273-4963

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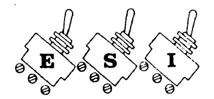

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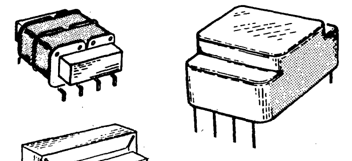
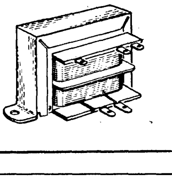

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TORELCO, INC., 14 Paine Ave., P.O. Box 108, Irvington, NJ 07111, Tel: 201-374-8641; Empl.: 20; *Sls. Mgr.:* Stewart H. Cook

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TOROID CORP. OF MARYLAND, 6000 Laurel-Bowie Rd., Bowie, MD 20715-4037, Tel: 301-464-2100, TWX: 710-826-0414; *Sls. Mgr.:* Marshall Sorenson ..... **A•2318-2319**

Local Sales Offices & Reps

CA	Seal Beach, Texel	213-596-9411
IL	Wheeling, Ed Joyner & Co.	312-520-1200
PA	Hatboro, Electro Rep Engrg.	215-674-4421

TOROTEL
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INC.

TOROTEL PRODS. INC., 13402 S. 71 Hwy., Grandview, MO 64030, Tel: 816-761-6314, TWX: 910-777-7037; Empl.: 275; *Sls. Mgr.:* H. Foland ..... **A•1280-1295, 2320-2325**

Local Sales Offices & Reps

AL	Huntsville, L & D, Inc.	205-837-1469
AL	Westlake, OH, JN Bailey & Assocs.	216-892-1513
AZ	Tempe, Gassner & Clark Co.	602-968-9037
CA	Aurora, Hi Tech. Assocs.	303-696-7403
CA	Redwood City, Hickey Ind. Sls.	415-368-3849
CA	San Diego, California Elctrn. Mktg.	619-692-3551
CA	Santa Ana, California Elctrn. Mktg.	714-835-2702
FL	Orlando, Perrott Assocs.	305-298-7748
GA	Atlanta, L & D, Inc.	404-395-7079
IL	Schaumburg, Gassner & Clark Co.	312-882-8608
IA	Hiawatha, Gassner & Clark Co.	319-393-5763
MD	Towson, Dickison Sls. Co.	301-823-0923
MA	Weston, John Goode Assocs.	617-235-3900
NY	Manhasset, Win-Cor Elctrns.	516-627-9474
NY	Syracuse, Rep, Tech, Inc.	315-437-2845
NC	Greensboro, L & D, Inc.	919-292-3201
NC	Raleigh, L & D, Inc.	919-876-5301
OH	New Lebanon, J. N. Bailey & Assocs.	513-687-1325
OH	Westlake, J. N. Bailey & Assocs.	216-892-1513
PA	Birchrunville, Jadelectronic Assocs.	215-296-3800
PA	Philadelphia, Jadelectronic Assocs.	215-455-0664
TN	Seymour, L & D, Inc.	615-577-1549
TX	Austin, Oeler & Menelaides	512-453-0275
TX	Dallas, Oeler & Menelaides	214-361-8876
TX	Houston, Oeler & Menelaides	713-772-0730

TOROTRON CORP., 519 South Fifth Ave., Mt. Vernon, NY 10550, Tel: 914-664-2050; Empl.: 14; *Sls. Mgr.:* Lee Abramson ..... **D•1315**

TORQ CORP., 32 W. Monroe St., Bedford, OH 44146, Tel: 216-232-4100; Empl.: 135

TORRINGTON CO., 59 Field St., Torrington, CT 06790, Tel: 203-482-9511

TORWICO
ELECTRONICS INC.

TORWICO ELCTRNS. INC., 410 Oberlin Ave. South, Lakewood, NJ 08701, Tel: 201-364-1800, TWX: 710-723-8343; Empl.: 240 ..... **A•2328-2329**

Local Sales Offices & Reps

CA	El Cajon, KCE Corp.	619-588-1198
CA	Menlo Park, Long and Assocs.	415-327-1300
FL	Orlando, Gra-Mar	305-894-3351
IN	Noblesville, Patco & Assocs.	317-877-5986
IA	Davenport, Ensco Rep	319-386-6600
KS	Overland Park, Ensco Rep	913-381-7557
KS	Wichita, Ensco Rep	316-683-1070
MD	Riderwood, W. S. Warrington & Assoc.	301-823-8759
MA	Hingham, N.E. Reps.	617-749-8700
MO	Maryland Heights, Ensco Rep	314-423-3935
NJ	Marlton, BGR Assocs.	609-983-1020
NY	Albany, Lynn Assocs.	518-459-1239
NY	Buffalo, Lynn Assocs.	716-631-0054
NY	Great Neck, Trionic	516-466-2300
OH	Copley, Eljay Assoc.	216-666-3774
OR	Portland, Abacus Sls.	503-777-8111
PA	Pittsburgh, Lynn Assocs.	412-341-5155
TX	Irving, Kite Elctrns. Sls. Co.	214-438-9336

TOSHIBA CORPORATION, See General Products Corp.

TOUCH TECHNOLOGY, INC., 107 Gibralter Street, Annapolis, MD 21401, Tel: 301-269-6181; Empl.: 19

TOWNSEND INDUSTRIES, 51 Carl Rd., Orange, CT 06477, Tel: 203-795-0241, TWX: 710-465-1898; *Sls. Mgr.:* Charles Dorsa

TOYO COMM. EQUIP. CO., LTD., No. 8 Mori Bldg., 20-4, Nichi-Shimbashi, 3-Chome Minato-Ku, Tokyo, Japan 105, Tel: 03-459-7320/03-459-7310, Telex: 02423115 Toyocoj.; Empl.: 1800; *Sls. Mgr.:* T. Nagai/S. Nakagome

TRACEWELL ENCLOSURES, 7032 Worthington Galena Rd., Columbus, OH 43085, Tel: 614-846-6175, 800-848-4525; Empl.: 30 ..... **C•1092-1093**

TRA-CON, INC., 55 North St., Medford, MA 02155, Tel: 617-391-5550; Empl.: 55

TRACOR INSTRUMENTS, 6500 Tracor La., Bldg. 27, Austin, TX 78725, Tel: 512-929-2051, TWX: 910-874-1366; Empl.: 9100; *Sls. Mgr.:* William R. Murphy; *Dist. Mgr.:* Will Hoover

TRACOR PAKTRONICS, 2441 Northeast Pkwy., Ft. Worth, TX 76106, Tel: 817-625-2311, Telex: 758-273; Empl.: 10; *Sls. Mgr.:* Harold Whittenton

TRAK MICROWAVE CORP., 4726 Eisenhower Blvd., Dept. E5, Tampa, FL 33614, Tel: 813-884-1411, Telex: 52-827, TWX: 810-876-9140; FSC No.: 12855; *Sls. Mgr.:* Toby Gant ..... **A•1782-1783**

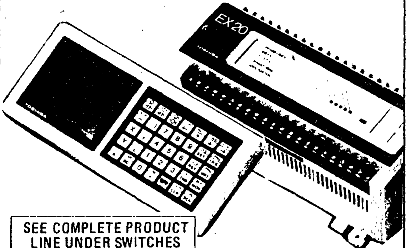
Local Sales Offices & Reps

AL	Huntsville, Magaro & Assocs.	205-882-0827
AZ	Phoenix, J. Smith Assocs.	602-267-0981
CA	Malibu, RL Comps.	213-456-9021
CA	Mountain View, Disman Bakner	415-969-3010
CO	Colorado Springs, J. Smith Assocs.	303-597-5343
CO	Greely, W. H. Howard Assocs.	303-426-3499
FL	Melbourne, Jerry Williams, Inc.	305-259-7700
GA	Atlanta, Magaro & Assocs.	404-451-8862
IL	Franklin Park, Dekotech	312-455-5100
IN	Ft. Wayne, TX Sls. Indiana	219-489-4447
IA	Cedar Rapids, J.R. Sls. Engrg.	319-393-2232
MD	Columbia, M. Lader Co.	301-730-1550
MD	Conowingo, M. Lader Co.	301-378-3449
MA	Andover, Bee Assoc.	617-475-2124
MN	Minneapolis, Deerland Distrs.	612-331-6433
NJ	Belford, Ascor Elctrns.	201-787-6011
NM	Albuquerque, J. Smith Assocs.	505-265-3406
NY	Liverpool, R&D Assocs.	315-457-0100
NY	New Rochelle, Ascor Elctrns.	914-235-8838
NC	Raleigh, M. Lader Co.	919-848-3231
PA	Lafayette Hill, M. Lader Co.	215-825-3177
TX	Dallas, Cain & Co.	214-247-3901
UT	Salt Lake City, Effective Sls.	801-266-9617
WA	Seattle, Datacom Assocs.	206-285-2525

TRAK MICROWAVE, Western Division, 735 Palomar Ave, Dept. E-5, Sunnyvale, CA 94086, Tel: 408-735-9660, TWX: 910-339-9309; FSC No.: 29111; *Sls. Mgr.:* Thomas L. Roberts ..... **A•1782-1783**

Local Sales Offices & Reps

AL	Huntsville, Magaro & Assocs.	205-882-0827
AZ	Scottsdale, Territorial Mktg.	602-994-8665
CA	Malibu, RL Comps.	213-456-9021
CA	Mountain View, Disman-Bakner	415-969-3010
CO	Colorado Springs, J. Smith Assocs.	303-597-5343
FL	Melbourne, Jerry Williams, Inc.	305-259-7700
GA	Altanta, Magaro & Assocs.	404-451-8862
IL	Franklin Park, Dekotech, Inc.	312-455-5100
IN	Ft. Wayne, TX Sls. Indiana	219-489-4447
IA	Cedar Rapids, J. R. Sls. Engrg.	319-393-2232
MD	Conowingo, M. Lader Co.	301-378-3449
MA	Andover, Bee Assocs.	617-475-2124
MN	Minneapolis, Deerland Dists., Inc.	612-331-6433
NM	Albuquerque, J. Smith Assocs.	505-265-3406
NY	Hartsdale, Spectrum Sls.	914-472-8600
NY	Liverpool, R&D Assocs.	315-457-0100
NC	Raleigh, M. Lader Co.	919-848-3231
PA	Lafayette Hill, M. Lader Co.	215-825-3177
TX	Dallas, Cain & Co.	214-247-3901
UT	Salt Lake City, Effective Sls.	801-266-9617
WA	Seattle, Datacom Assocs.	206-285-2525



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Local Sales Offices & Reps

AL	Huntsville, Magaro & Assocs.	205-882-0827
AZ	Phoenix, J. Smith Assocs.	602-267-0981
CA	Mountain View, Disman-Bakner	415-969-3010
CA	San Diego, L. L. Stoakes, Inc.	619-452-1600
CO	Greely, W. H. Howard Assocs.	303-426-3499
FL	Sarasota, Bass Assocs.	813-922-9538
GA	Atlanta, Magaro & Assocs.	404-451-8862
IN	Ft. Wayne, TX Sales	219-489-4447
MD	Annapolis, Blackwood Assocs.	301-261-1904
MA	Cochituate, High-Tech Sls., Inc.	617-653-3838
NM	Albuquerque, J. Smith Assocs.	505-265-3406
NC	Greensboro, Magaro & Assocs.	919-294-4783
PA	Huntingdon Valley, Rabal Assocs.	215-947-4825
TX	Arlington, J. T. Houston Assocs.	817-265-2931
WA	Bellevue, Tasco, Inc.	206-453-1414

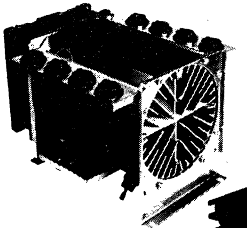
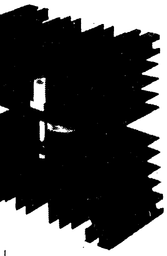
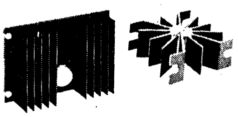
TRANSAMERICA DELAVAL, Gems Sensors Div., Cowles Rd, Plainville, CT 06062-9990, Tel: 203-677-1311, Telex: 99-306; Empl.: 203; *Sls. Mgr.:* M. W. Brown; *Dist. Mgr.:* M. W. Brown

TRANS AMERICAN TRANSFORMER, 142 Peconic Ave., Medford, NY 11763, Tel: 516-654-1880; Empl.: 23

TRANSCO PRODUCTS, INC., 4241 Glencoe Ave., Marina del Rey, CA 90295, Tel: 213-822-0800, Telex: 65-2448, TWX: 910-343-6469; FSC No.: 82152; Empl.: 400; *Sls. Mgr.:* T. G. Katter

Local Sales Offices & Reps

CA	Marina del Rey, Michael Robinson	213-822-0800
CA	San Jose, Jon Walker	408-244-6150
CA	San Juan Capistrano, Bruce Toffelmier	714-643-0506
MD	Ellicott City, VPI, Inc.	301-461-2525
MO	Ellisville, Hi Grant Wilson	314-227-0737
NY	Bayside, R. L. Diamond Inc.	212-423-7330
TX	Richardson, Ronald B. Patton	214-669-1951
WA	Bellevue, Poggi Assocs., Inc.	206-454-2026

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Local Sales Offices & Reps

CA	Huntington Beach, Transducer Sys.	714-840-5357
CA	Palo Alto, Gado Instr. Sls.	415-961-2222
CT	Washington, Tri-Com Assocs.	203-563-2241
FL	Indian Rocks Beach, PAR Assocs.	813-596-8841
GA	Atlanta, PAR Assocs.	404-391-9117
IL	Des Plaines, Marsland Assocs.	312-298-2620
IN	Indianapolis, Marsland Assocs., Inc.	317-293-5437
IA	Cedar Rapids, Marsland Assocs.	319-396-8030
MA	Burlington, Tri-Com Assocs.	617-272-8163
MI	Mt. Clemens, O'Hara Assocs.	313-791-7140
MN	Minneapolis, Marsland Assocs.	612-545-4481
MO	St. Louis, Marsland Assocs.	314-991-1399
NJ	Cherrry Hill, Markey Instrmn.	609-667-3809
NJ	Hillsdale, CB Assocs., Inc.	201-644-6230
NY	Rochester, TAE-REP	716-586-8710
NY	Whitney Point, TAE-REP, Inc.	607-692-3705
OH	Dayton, RIXAN Assocs.	513-278-4216
OH	Stow, Rixan Assocs., Inc.	216-686-2909
TX	Lewisville, Electric Control Assocs.	214-221-3143
WI	New Berlin, Marsland Assocs., Inc.	414-786-6611

TRANSDUCER SYSTEMS, INC., 1510 Delp Dr., Kulpsville, PA 19443, Tel: 215-256-4611, Telex: 846078; Empl.: 310

Local Sales Offices & Reps

CA	Santa Clara, Nelson Elctrn. Sls.	408-980-1950
IN	Indianapolis, Electro Dev. Engrg.	317-547-5274
MI	Madison Heights, L. C. Nyman & Co.	313-543-6520
MN	Mendota, GII Sls.	612-454-3086

TRANSDUKTOR, INC., See Ulveco, Inc.

TRANSENE, Rte. 1, Rowley, MA 01969, Tel: 617-948-2501; Empl.: 21; *Sls. Mgr.:* J. Doucette

TRANSFORMATION ELCTRNS. CORP., 170 Wilbur Pl., Bohemia, NY 11716, Tel: 516-563-1117, TWX: 510-222-0972; *Sls. Mgr.:* David Baum .... **D•1857**

Local Sales Offices & Reps

CA	Pasadena, EMI	818-795-7193
CA	Sunnyvale, Schwerin & Merrill	408-735-7900
CO	Englewood, Elctrn. Comp. Sys.	303-781-5904
FL	Longwood, Boetto Corp.	305-331-1771
GA	Norcross, New South Mktg. Ltd.	404-887-7254
KS	Kansas City, BC Elctrns.	913-342-1211
MD	Pikesville, Imagitron Sls. Co.	800-638-3592
MA	Wakefield, Kentronics	617-246-0245
NY	New York, Livera-Polk	516-759-9300
TX	Arlington, Hite Elctrn. Sls. Co.	817-861-8627
WA	Bellevue, Elctrn. Mktg. Grp.	206-882-0962

TRANSFORMER & COIL PRODUCTS, TRW Electronic Assemblies Division, 150 Varick St., New York, NY 10013, Tel: 212-255-3500, TWX: 710-581-2722; Empl.: 325; *Sls. Mgr.:* A. Profeta

TRANSFORMER DESIGN, INC., 78th & Clinton, Milwaukee, WI 53223, Tel: 414-358-5300

TRANSICOIL, INC., Trooper Rd., P.O. Box 99, Worcester, PA 19490-9990, Tel: 215-277-1300, TWX: 510-660-0132; FSC No.: 82686; Empl.: 220; *Sls. Mgr.:* P. Schoenacker

TRANSISTOR DEVICES, 274 S. Salem St., Randolph, NJ 07869, Tel: 201-361-6622; Empl.: 350; *Sls. Mgr.:* J. A. Gilson .... **D•1316-1317**

Local Sales Offices & Reps

CA	Costa Mesa, FLW Inc.	714-751-7512
CA	Los Altos, Cain-White Co.	415-948-6533
GA	Atlanta, Magaro & Assocs.	404-252-6609
IL	Elmhurst, Scott Assocs.	312-279-5681
MD	Ellicott City, Dyna-Rep Co.	301-992-4350
MA	Lexington, E. F. Delfino, Inc.	617-862-1118
NJ	Ridgewood, Hansen Assocs.	201-652-7055
NY	North Syracuse, Advance Components	315-699-2671
OH	Medina, McShane Inc.	216-725-4568
OR	Hillsboro, Controlek Sls.	503-640-8444
PA	Fort Washington, GCM Inc.	215-646-7535
TX	Lewisville, J. Hughes Co.	817-430-1683
VA	Alexandria, Dyna-Rep Co.	703-354-1222
EXP	NY, New York, Singer Prods.	212-432-1400

TRANSKINETIC SYS., 110 Shawmut Rd., Canton, MA 02021, Tel: 617-828-3000; Empl.: 7

TRANSMAGNETICS, 210 Adams Blvd., Farmingdale, NY 11735, Tel: 516-293-3100, TWX: 510-224-6420; FSC No.: 17755; Empl.: 40; *Sls. Mgr.:* Fred Haber ...**D•1162-1163**

Local Sales Offices & Reps

TX	Bellaire, Seaton Corp.	713-731-2649
TX	Carrollton, Seaton Corp.	214-380-0414

TRANSMET CORP., 4290 Perimeter Dr., Columbus, OH 43228, Tel: 614-276-5522, 800-245-5253, TWX: 810-482-1016; *Sls. Mgr.:* Ronald A. Crossman; *Dist. Mgr.:* Robert M. Simon

TRANS-MET ENGRG., 601 S. Palm St., La Habra, CA 90631, Tel: 213-691-2266; Empl.: 25; *Sls. Mgr.:* Robert J. Powers

TRAN-SPECTRA, INC., Rte. 1-Box 27A, Greenfield, TN 38230, Tel: 901-235-2218; Empl.: 25; *Sls. Mgr.:* D. Cole

TRANS-TECH, 12 Meem Ave., Gaithersburg, MD 20760, Tel: 301-948-3800, Telex: 898-303, TWX: 710-828-0549; FSC No.: 14591; Empl.: 74; *Sls. Mgr.:* Blair W. Stiles; *Dist. Mgr.:* Blair W. Stiles

TRANS-TECH, INC., Alpha Inds., Inc., 20 Sylvan Rd., Woburn, MA 01801, Tel: 617-935-5150, Telex: 949436, TWX: 710-396-1236; FSC No.: 17540; *Sls. Mgr.:* Blair Stiles

TRANS-TEK, P.O. Box 338, Rte. 83, Ellington, CT 06029, Tel: 203-872-8351, Telex: 99207; FSC No.: 27109; Empl.: 40; *Sls. Mgr.:* William R. Padin

TRAN-TEC, Box 1044, Columbus, NE 68601, Tel: 402-564-2748; Empl.: 46; *Sls. Mgr.:* Cliff Schroeder

Local Sales Offices & Reps

CA	Redwood City, Woodworth Co.	415-365-0252
CA	Tustin, Sierra-Pacific Engrg. Co.	714-731-3411
CO	Golden, Pierce-Robbins Assocs.	303-399-6618
FL	Winter Park, Russell Assocs.	813-526-1134
GA	Atlanta, Russell Assocs.	404-225-8422
IN	Indianapolis, Scott Elctrns, Inc.	317-897-9976
IA	Cedar Rapids, Ard Sls. Co.	319-366-8733
MD	Bel Air, Russell Assocs.	301-879-9180
MA	Wakefield, H.C. Jappe Co.	617-245-9359
NJ	Fair Haven, Russell Assocs.	201-747-0600
NY	Bay Shore, Russell Assocs.	516-666-6500
NY	Cazenovia, Naylor Elec. Co.	315-655-8174
OH	Cleveland, D. Steffen & Assocs.	216-461-8333
TX	Dallas, Russell Assocs.	214-699-0383
WA	Bellevue, Russell Assocs.	206-455-3694

TRAN-TROL CO., 2525 N. Alvernon Way, C-6, Tucson, AZ 85712, Tel: 602-795-8008

TRENDATA/STANDARD MEMORIES, 3400 W. Segerstrom, Santa Ana, CA 92704, Tel: 714-540-3605, TWX: 910-595-1596; Empl.: 200; *Sls. Mgr.:* M.S. Efron

TRENT, INC., 201 Leverington Ave., Philadelphia, PA 19127, Tel: 215-482-5000; Empl.: 55

TRIAC ELECTRONIC SYSTEMS, INC., 87-27 Myrtle Ave., Glendale, NY 11385, Tel: 718-441-4759, TWX: 221500 ASAS ATT TRIAC; Empl.: 35; *Sls. Mgr.:* Victor Botnick .... **D•1132-1133**

TRIAD POWER SYSTEMS, 10362 Miller Road, Dallas, TX 75238, Tel: 214-341-8700; FSC No.: 214-341-1804; *Sls. Mgr.:* Jack Conn

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Standard Products

TRIAD-UTRAD, 1124 E. Franklin St., Huntington, IN 46750, Tel: 219-356-6500, TWX: 810-333-1532; Empl.: 750; *Dist. Mgr.:* Dave N. Miller ...... **A•2330-2337; D•1970-1971**

Local Sales Offices & Reps

AK	Anchorage, H.J. Lang & Assocs.	907-279-5741
AZ	Phoenix, Steve Fisher Assocs.	602-247-7865

AR	Little Rock, J. Y. Schoonmaker Co.	501-375-2168
CA	Chino, Tracy Elec. Sls.	714-591-4736
CA	Santa Clara, Logan Sls.	408-496-0660
CO	Denver, West Inc.	303-692-0131
FL	Maitland, Hutto-Hawkins-Peregoy	305-831-2474
GA	Atlanta, Effective Mktg. Force	404-948-6023
HI	Honolulu, Hawaii Elctrn. Svc.	808-845-8207
IL	Wilmette, J. Wasserman Assocs.	312-256-3566
KS	Overland Park, T.L. Dowell, Inc.	913-648-7373
LA	Little Rock, J. Y. Schoonmaker	501-375-2168
MA	Framingham, Bay Colony	617-620-0607
MN	Minneapolis, Elec. Comp. Sls.	612-933-2594
MO	St. Louis, T.L. Dowell, Inc.	314-849-4234
NJ	Medford, Champion Elctrn. Sls.	609-654-0475
NY	Rochester, Marchese, Marsey, Barden	716-544-4300
NY	Rockville Centre, Schmitt Indl. Mktg.	516-486-3510
OH	Cincinnati, F.E. Kahsar Sls.	513-922-3133
OH	Hudson, F.E. Kahsar Sls.	216-650-1089
OR	Portland, J. J. Backer Co.	503-297-3777
OR	Salem, J. J. Backer Co.	503-362-0717
TX	Dallas, J. Y. Schoonmaker Co.	214-349-1650
WA	Seattle, J. J. Backer Co.	206-285-1300
EXP	Westbury, N.Y., Minthorne Int'l.	516-546-4700

Local Distributors

AL	Birmingham, Forbes Distrbg.	205-251-4104
AZ	Phoenix, Dalis Elctrn. Supp.	602-275-2885
AR	Little Rock, Carlton Bates Co.	501-562-9100
CA	Glendale, R. V. Weatherford	213-849-3451
CA	Mountain View, Abacus Elctrns.	415-961-1500
CA	Palo Alto, Zack Elctrns.	415-326-5432
CA	Riverside, Electronic Supp.	714-683-7300
CO	Denver, Integrated Elctrns.	303-534-6121
FL	Ft. Lauderdale, Peerless Radio Corp. of Fla.	305-973-4141
GA	Atlanta, Ack Radio Supp.	404-351-6340
IL	Chicago, Bell Inds.	312-982-9210
IL	Chicago, Newark Elctrns.	312-638-4411
IN	Lafayette, CWY Elctrns.	317-448-1611
IA	Cedar Rapids, Deeco, Inc.	319-365-7551
KY	Louisville, P. I. Burks Co.	502-589-3960
LA	New Orleans, William B. Allen Co.	504-525-8222
MD	Rockville, Capitol Radio Whls.	301-881-2270
MA	Burlington, Marshall Wilshire Elctrns.	617-272-8200
MA	Wilmington, Cronin Elctrns.	617-449-0500
MI	Grand Rapids, S-F Elctrns.	616-459-0216
MI	Livonia, R. S. Elctrns.	313-525-1155
MN	St. Paul, Gopher Elctrns.	612-483-4450
MO	St. Louis, Olive Indl. Elctrn.	314-426-4500
NE	Lincoln, Scott Elctrn. Supp. Corp.	402-466-8221
NH	Hudson, C & H Elctrns.	603-882-1133
NJ	Camden, General Radio Supp.	215-922-7037
NJ	Springfield, Route Elctrns.	201-379-7710
NM	Albuquerque, Electronic Parts Co.	505-293-6161
NY	Hauppauge, Broadline Elctrn. Distr.	516-231-4100
NY	Rochester, Simcona	716-328-3230
NY	Rockville Centre, Midway Indl. Elctrns.	516-764-2400
NY	Rome, Rome Elctrns.	315-337-5400
NC	Greensboro, Hammond Elctrns.	919-275-6391
OH	Cleveland, Pioneer Std. Elctrns.	216-587-3600
OH	Dayton, Pioneer/Dayton	513-236-9900
OK	Tulsa, Combined Tech.	918-582-8242
OR	Portland, United Radio Supp.	503-233-5346
PA	Philadelphia, Almo Elctrns.	215-698-4000
RI	Warwick, W. H. Edwards Elctrns.	401-781-8000
SC	Greenville, Hammond Elctrns.	803-233-4121
TN	Memphis, Bluff City Elctrns.	901-345-9500
TX	Dallas, Sterling Elctrns.	214-243-1600
TX	Houston, Altair Co.	713-462-3029
UT	Provo, Omega Elctrns.	801-375-4664
WA	Seattle, Almac	206-643-9992
WI	New Berlin, RM/Wisconsin	414-784-4420

TRI-COM, INC., 7304 Grove Rd., Frederick, MD 21701, Tel: 301-694-6666, Telex: 64828 TRICOM; Empl.: 35; *Sls. Mgr.:* Marc Vivori

TRIDAK, 1120 Federal Rd., Brookfield, CT 06804, Tel: 203-775-1287, TWX: 710-456-1372; Empl.: 20; *Sls. Mgr.:* F. C. Herot

TRI-DATA CORP., 505 E Middlefield Rd., Mountain View, CA 94043, Tel: 415-969-3700, Telex: 910-379-6978; Empl.: 173

TRILOBYTE COMPUTER CORPORATION, 801 W. Grand Ave., Oakland, CA 94607, Tel: 415-839-1100, TWX: 910-350-0171; Empl.: 15; *Sls. Mgr.:* Barbara Ulfeldt

TRILOG, 17391 Murphy Ave., Irvine, CA 92714, Tel: 714-549-4079, TWX: 910-595-2798; Empl.: 35; *Sls. Mgr.:* Jack Rice

TRIMM, INC., Div. of Newton Instr. Co., 400 W. Lake St., Box 489, Libertyville, IL 60048, Tel: 312-362-3700; Empl.: 90; *Dist. Mgr.:* H. Lewis

TRIM-TRONICS, INC., 67 Albany St., Cazenovia, NY 13035, Tel: 315-655-9528, TWX: 710-541-1530; Empl.: 20; *Sls. Mgr.:* James E. Dowd

TRINETICS

TRINETICS INC., 55807 Currant Rd., Mishawaka, IN 46545-4899, Tel: 219-259-8535; Empl.: 100; *Sls. Mgr.:* T. J. Dawson

Local Sales Offices & Reps

AZ	Phoenix, Bill Earl & Assocs.	602-994-3813
CA	Pasadena, Western Comp.	818-791-9794
CA	San Rafael, Wright Assocs.	415-457-9940
CT	Clinton, Berkshire Elctrns.	203-669-0752
IL	Chicago, Jerry Golten Co.	312-792-1991
IN	Ft. Wayne, Walter W. Bieberich	219-432-2537
IN	New Albany, Walter W. Bieberich	812-945-3187
AR	Hot Springs, Automation Supp.	501-767-5444
MA	Hopkinton, Berkshire Elctrns.	617-435-9356
MI	Sturgis, Kesler Assocs.	616-651-7619
MO	St. Louis, Hill & Co.	314-432-1136
NH	Gonic, Berkshire Elctrns.	603-335-1897
NJ	Burlington, V.D.E. Elctrn. Sls.	609-387-9331
NY	Rochester, V.D.E. Elctrn. Sls.	716-473-5015
OH	Cincinnati, Stegman Blaine Mktg.	513-729-1969
OH	Cleveland, Stegman Blaine Mktg.	216-871-0520
OH	Vandalia, Stegman Blaine Mktg.	513-890-7975
PA	Philadelphia, V.D.E. Elctrn. Sls.	215-524-0591

TRIO LABS., 80 Dupont St., Plainview, NY 11803, Tel: 516-349-0400, TWX: 510-221-1861; FSC No.: 00638; Empl.: 60; *Sls. Mgr.:* John Crawford

TRIO-TECH INTL., 2040 N. Lincoln St., Burbank, CA 91504, Tel: 818-846-9200, Telex: 194811; Empl.: 266; *Sls. Mgr.:* Ted Mezo

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Local Sales Offices & Reps

AZ	Phoenix, Shefler-Kahn	602-257-9015
CA	Burlingame, Polach & Bensinger	415-697-2525
CA	Costa Mesa, Berman-Gravley, Inc.	714-549-2122
CO	Aurora, R & R Instrmn.	303-364-8325
CO	Denver, IW Strong & Assocs.	303-292-6900
FL	Lighthouse Pt., Jack Krutek & Assocs.	305-941-6544
FL	Maitland, Jack Krutek & Assocs.	305-628-4837
GA	Atlanta, Millar Elctrns.	404-261-6160
IL	Berkeley, G. Petitt Co.	312-449-8000
IN	Ft. Wayne, W. Bieberich	219-432-2537
IN	New Albany, W. Bieberich	812-945-3187
KS	Olathe, SPS Assocs., Ltd.	913-764-4460
MD	Baltimore, Sunshine Sci. Inst.	301-661-5900
MI	Grosse Point Woods, A & D Elctrn. Sls.	313-884-1956
MN	Minneapolis, Hei-Lite Sls.	612-861-6051
NJ	Englewood Cliffs, Masin Esco	201-569-8868
NY	Hauppauge, Masin Esco	516-273-3500
NY	Rochester, Marchese, Marsey & Barden	716-544-4300
NC	Charlotte, Brownell-Electro, Inc.	704-597-1270
NC	Raleigh, Millar Elctrns.	919-787-9564
OH	Centerville, Dolfuss-Root	513-433-6776
OH	Strongsville, Dolfuss-Root	216-238-0300
OR	Portland, J.J. Backer	503-297-8744
PA	Bridgeville, Dolfuss-Root	412-221-4420
PA	Trevose, PSA	215-245-0513
RI	Lincoln, Adams-McGregor	401-726-1300
RI	West Warwick, Adams McGregor, Inc.	401-821-1320
TX	Dallas, Elcom Mktg. Inc.	214-241-2166
WA	Seattle, J.J. Backer	206-285-1300

Local Distributors

AL	Birmingham, Brownell-Electro	205-323-4761
AL	Mobile, Brownell-Electro	205-479-8581
AZ	Phoenix, Metermaster Div.	602-437-1425

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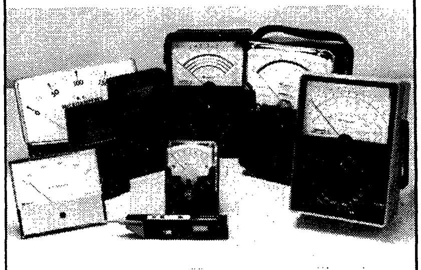

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8019 Belair Road/Baltimore, MD 21236
(301) 661-5900 in MD, VA

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(203) 773-3441 in New Haven, CT

(302) 652-8585 in Wilmington, DE
(301) 621-5077 in Wash., DC Area

(804) 627-4388 in Norfolk, VA
(804) 649-1159 in Richmond, VA

CA	Glendale, Western Elctrn. Supp.	213-245-1226
CA	Irvine, Meter Craft/Larson	714-261-7135
CA	Los Angeles, E.I.L. Instrs.	213-685-7020
CA	Los Angeles, Metermaster Div.	213-685-4340
CA	Palo Alto, Metermaster Div.	415-968-0313
CA	San Diego, Metermaster Div.	619-560-4841
CA	Santa Clara, Dynametron	408-727-6531
CA	Santa Clara, Fisher/Brownell	408-988-6041
CO	Denver, Meter-master	303-722-5766
CT	Middletown, E. I. L. Instr.	203-346-6646
FL	Hialeah, Kimball Elctrn. Lab.	305-822-5792
FL	Miami, Brownell-Electro	305-884-3072
FL	Orlando, Brownell-Electro	305-843-6770
GA	Atlanta, Brownell-Electro	404-762-5181
GA	Atlanta, Process Meas. Control	404-696-7481
HI	Honolulu, Kems, Inc.	808-845-6402
IL	Bridge View, E.I.L. Instrs.	312-430-2292
IL	Countryside, Pacific Indicator	312-352-3500
IL	Elk Grove Village, Meter-Makers	312-439-5050
IL	Elk Grove Village, Metermaster	312-593-8650
IN	Evansville, Electro-Lab Svcs.	812-423-5211
IN	Indianapolis, E.I.L. Instrs.	317-545-1373
KS	Overland Park, Brooks Elec.	913-648-3131
KY	Louisville, E. I. L. Instr.	502-454-3432
LA	New Orleans, Indl. Instr. Works	504-733-8355
MD	Gaithersburg, Pioneer/Instrmn.	301-921-0660
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MD	Sparks, E.I.L.	301-771-4800
MA	Burlington, E. I. L. Instr.	617-272-9450
MA	Waltham, Calibron	617-894-6440
MI	Ferndale, Ram Meter	313-697-6911
MN	Minneapolis, Instr. Control	612-871-2514
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NY	Clarence, Trott Elctrns.	716-634-8500
NY	L.I.C., Metermod Instr.	212-726-4850
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NC	Raleigh, Brownell-Electro, Inc.	919-876-6524
NC	Raleigh, Meter-Meterics, Div. of I.T.R.	919-872-5456
NC	Raleigh, Speed Instr. Div. Owen-Barbot	919-876-4919
OH	Cleveland, Pioneer/Instrmn.	216-587-3600
OH	Cleveland, Weschler Elec.	216-238-2550
OH	Dayton, Pioneer/Dayton	513-236-9900
OK	Tulsa, Tri-State Instr.	918-836-0286
PA	Philadelphia, Sunshine Sci.	215-673-5600
PA	Pittsburgh, CAM/RPC	412-963-1885
PA	Pittsburgh, E.I.L.	412-731-5230
TN	Knoxville, Brownell-Electro	615-966-3441
TN	Memphis, Brownell-Electro	901-795-8487
TN	Memphis, Instrument Repair Svc.	901-278-0762
TN	Nashville, Brownell-Electro	615-889-8230
TX	Beaumont, Straughn Elec.	409-838-4563
TX	Dallas, Ultra Instr.	214-357-0297
TX	Garland, Metermaster	214-271-5671
TX	Houston, Meters & Instrs.	713-644-1631
TX	Houston, Quality Instr.	713-524-0528
TX	Odessa, Whitlock Instr.	915-337-3412
VA	Richmond, Meter Metrics (I.T.R.)	804-275-1431
WA	Seattle, E. I. L. Instrs., Inc.	206-762-0880
WA	Seattle, Eicher-Richards	206-523-7888
WI	Milwaukee, E-M Instrs.	414-272-7799

TRIPP-LITE, 500 No. Orleans, Chicago, IL 60610, Tel: 312-329-1777; Empl.: 80; *Sls. Mgr.:* Priscilla Galgan; *Dist. Mgr.:* Priscilla Galgan

TRI-STAR ELCTRNS., INC., 362 Main Street #2, Venice, CA 90291, Tel: 213-823-5779, Telex: 182058 Tristarel Vnce, TWX: 910-343-7448; FSC No.: 5935, 5999, 5120, 5280; *Sls. Mgr.:* Tom Magdalik

TRITON MFG. CO., P.O. Box 361, East Haddam, CT 06423, Tel: 203-838-4666, Telex: 955439; FSC No.: 54195; *Sls. Mgr.:* Jack Spangler

TRI-TRONICS CO. INC., 13420 Wright Cir., Tampa, FL 33624, Tel: 813-855-4453; Empl.: 27; *Sls. Mgr.:* Robert A. Warner

TRIVEX, 3180 Redhill Ave., Costa Mesa, CA 92626, Tel: 714-546-7781, TWX: 910-595-2589; Empl.: 180; *Sls. Mgr.:* R. Martin

TRO DYNE CORP., 900 Corporate Dr., Mahwah, NJ 07430, Tel: 201-529-1800, TWX: 710-988-2138; FSC No.: 17346; Empl.: 55; *Sls. Mgr.:* T. Mazzaccaro

TROMPETER ELECTRONICS, INC., 8936 Comanche, Chatsworth, CA 91311, Tel: 818-882-1020, TWX: 910-494-1210; FSC No.: 14949; Empl.: 110; *Sls. Mgr.:* Paul Cox; *Dist. Mgr.:* Hap Gladish

Local Sales Offices & Reps

AL	Huntsville, Currie, Peak and Frazier	205-536-1506
AZ	Phoenix, Aztec Entprs.	602-944-9185
CA	Los Angeles, Knight Co.	213-670-2833
CA	San Diego, Knight Co.	619-571-7903
CA	Santa Clara, DC Elctrns.	408-980-1199
CO	Denver, Aztec Entprs.	303-779-5285
CT	Wethersfield, Underwood Sls.	203-563-3046
FL	Orlando, Currie, Peak & Frazier	305-855-0843
GA	Norcross, Currie, Peak & Frazier	404-449-7662
IL	Schaumburg, Engineering Prods.	312-882-7640
IN	Indianapolis, Engrg. Prods. Assoc.	317-894-7156
IA	Iowa City, Engineering Prods. Assoc.	319-354-5344
MD	Silver Spring, Sel-Tronics	301-589-3391
MA	Lowell, Underwood Sls.	617-256-8191
MN	Edina, Engineering Prods. Assoc.	612-835-9022
NJ	Elmwood Park, L & M Assoc. Eng. Rep.	201-797-0441
NM	Albuquerque, Aztec Entprs.	505-262-1688
NY	New York, L & M Assocs. Eng. Rep.	212-243-6155
NY	Rochester, T A E Reps.	716-586-8710
NY	Whitney Point, T.A.E. Reps.	607-692-3705
NC	Greensboro, Currie, Peak & Frazier	919-373-0380
NC	Raleigh, Currie, Peak & Frazier	919-787-0808
OH	Cleveland, Geotronix	216-526-2535
OH	Trotwood, Geotronix	513-252-6700
PA	Andalusia, L & M Assocs.	215-245-6658
PA	Reading, L & M Assocs.	215-775-9559
TX	Lewisville, Milestek	214-436-1597
UT	Ogden, Aztec Entprs.	801-621-1655
WA	Lynnwood, Blum & Assocs.	206-775-6656

TRUE DATA, 17092 Pullman St. #B, Irvine, CA 92714, Tel: 714-979-4842, TWX: 910-595-1917; Empl.: 37

TRULINE CORP., P.O. Box 1469, Visalia, CA 93279, Tel: 209-625-3237; *Sls. Mgr.:* Charlie Torres

TRW CAPACITOR DIV., 301 West "O" St., Ogallala, NE 69153, Tel: 308-284-3611, TWX: 910-620-0321; *Sls. Mgr.:* Dennis Lienemann .... **A•1179-1185**

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CA	Los Angeles, ISDS	213-478-0183
CA	Mountain View, Straube Assocs.	415-969-6060
CA	Orange County, Hamilton	714-641-4100
CA	Sacramento, Hamilton Avnet	916-925-2216
CA	San Diego, Hamilton Avnet	619-571-7510
CA	San Diego, ISDS	619-571-1544
CA	San Francisco, Hamilton Avnet	408-743-3355
CA	San Gabriel, Hamilton Avnet	714-989-4602
CA	Santa Ana, ISDS	714-973-2162
CA	Woodland Hills, ISDS	213-883-7130
CO	Westminster, Straube Assocs.	303-426-0890
CT	Rowayton, TRW/ECG	203-853-4466
FL	Ft. Lauderdale, TRW/ECG	305-772-3000
FL	Melbourne, Hamilton Avnet	305-725-2700
FL	Orlando, TRW/ECG	305-857-3650
GA	Norcross, TRW/ECG	404-447-6154
IL	Chicago, TRW/ECG	312-693-7730
IN	Ft. Wayne, R. O. Whitesell & Assocs.	219-432-5591
IN	Indianapolis, R. O. Whitesell & Assocs.	317-359-9283
IN	Kokomo, R. O. Whitesell & Assocs.	317-457-9127
IA	Cedar Rapids, C. H. Horn & Assocs.	319-393-8703
KS	De Soto, Midtec Assocs.	913-441-6565
KS	Wichita, Hamilton Avnet	800-532-6720
KY	Lexington, Hamilton Avnet	800-543-4783
KY	Louisville, R. O. Whitesell & Assocs.	502-426-7696
MD	Baltimore, Hamilton Avnet	301-995-3500
MD	Columbia, TRW/ECG	301-964-9110
MA	Boston, Hamilton Avnet	617-273-7500
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MI	Southfield, R. O. Whitesell & Assocs.	313-559-5454
MI	St. Joseph, R. O. Whitesell & Assocs.	616-983-7337
MN	Minneapolis, TRW/ECG	612-854-6616
MO	St. Louis, John G. Macke Co.	314-432-2830
NE	Panama, Norris Stricker	402-788-2700
NY	Fairport, TRW/ECG	716-425-3775
NC	Greensboro, TRW/ECG	919-852-4676
OH	Cincinnati, R. O. Whitesell & Assocs.	513-521-2290
OH	Cleveland, R. O. Whitesell & Assocs.	216-447-9020
OH	Columbus, R. O. Whitesell & Assocs.	614-888-9396
OH	Dayton, Hamilton Avnet	513-433-0610
OH	Dayton, R. O. Whitesell & Assocs.	513-298-9546
OR	Tigard, TRW/ECG	503-620-5032
PA	Bala Cynwyd, TRW/ECG	215-667-3400
PA	Pittsburgh, Hamilton Avnet	800-321-6890
PA	Pittsburgh, R. O. Whitesell & Assocs.	412-963-6161
TN	Greeneville, R. O. Whitesell & Assocs.	615-639-6154
TX	Austin, Hamilton Avnet	512-837-8911
TX	Austin, Technlg. Sls. Co.	512-346-9940
TX	Dallas, TRW/ECG	214-248-8000
TX	El Paso, TRW/ECG	915-594-8259
TX	Houston, TRW/ECG	713-772-5541
UT	Salt Lake City, Straube Assocs.	801-263-2640
VA	Richmond, TRW/ECG	804-288-8334
WA	Bellevue, TRW/ECG	206-641-9996
WV	Huntington, Hamilton Avnet	800-543-4783
WI	Brookfield, TRW/ECG	414-784-7773
EXP	NY, New York, Hamilton Avnet	516-997-6868
Can	Calgary,Alb., Hamilton Avnet	403-230-3586
Can	Montreal, Que., Hamilton Avnet	514-335-1000
Can	Ottawa, Ont., Hamilton Avnet	613-226-1700
Can	Vancouver, B.C., Hamilton Avnet	604-272-4242

Local Distributors

AL	Huntsville, Hall-Mark Elctrns.	205-837-8700
AL	Huntsville, Hamilton Avnet	205-837-7210
AZ	Phoenix, Hall-Mark Elctrns.	602-437-1200
AZ	Phoenix, Hamilton Avnet	602-231-5100
AZ	Phoenix, R. V. Weatherford Co.	602-272-7144
AZ	Tempe, Arrow Elctrns.	602-968-4800
CA	Chatsworth, Arrow Elctrns.	818-701-7500
CA	Garden Grove, Bell Inds.	714-220-0681
CA	Gardena, Bell Inds.	213-515-1800
CA	Glendale, R. V. Weatherford Co.	213-849-3451
CA	Los Angeles, Avnet	213-558-2345
CA	Los Angeles, Hamilton	213-558-2121
CA	Orange County, Avnet	714-754-6111
CA	San Fernando Valley, Avnet	818-700-2600
CA	San Fernando Valley, Hamilton	818-700-6500
CA	San Jose, Hall-Mark Elctrns.	408-946-0900
CA	Sunnyvale, Arrow Elctrns.	408-745-6600
CA	Sunnyvale, Bell Inds.	408-734-8570
CA	Thousand Oaks, Bell Inds.	805-499-6821
CO	Aurora, Arrow Elctrns.	303-696-1111
CO	Denver, Hamilton Avnet	303-779-9998
CO	Denver, R. V. Weatherford Co.	303-428-6900
CT	Danbury, Hamilton Avnet	203-797-2800
CT	Wallingford, Arrow Elctrns.	203-265-7741
FL	Clearwater, Hall-Mark Elctrns.	813-530-4543
FL	Ft. Lauderdale, Arrow Elctrns.	305-776-7790
FL	Miami, Hamilton Avnet	305-971-2900
FL	Orlando, Hall-Mark Elctrns.	305-855-4020
FL	Orlando, Hamilton Avnet	305-628-3888
FL	Palm Bay, Arrow Elctrns.	305-725-1480
FL	Pompano Beach, Hall-Mark Elctrns.	305-971-9280
FL	St. Petersburgh, Hamilton Avnet	813-576-3930
GA	Atlanta, Hamilton Avnet	404-447-7507
GA	Norcross, Arrow Elctrns.	404-449-8252
GA	Norcross, Hall-Mark Elctrns.	404-447-8000
IL	Bensenville, Hall-Mark Elctrns.	312-860-2678
IL	Champaign, Hamilton Avnet	800-625-8654
IL	Chicago, Hamilton Avnet	312-860-7700
IL	Schaumburg, Arrow Elctrns.	312-397-3440
IN	Indianapolis, Arrow Elctrns.	317-243-9353
IN	Indianapolis, Hamilton Avnet	317-844-9333
IA	Cedar Rapids, Hamilton Avnet	319-362-4757
KS	Kansas City, Hamilton Avnet	913-888-8900
KS	Lenexa, Hall-Mark Elctrns.	913-888-4747
KY	Louisville, Hamilton Avnet	800-428-6012
MD	Columbia, Arrow Elctrns.	301-995-0003
MD	Columbia, Hall-Mark Elctrns.	301-988-9800
MA	Billerica, Hall-Mark Elctrns.	617-935-9777
MA	Norwood, Gerber Radio Supp. Co.	617-769-6000
MA	Woburn, Arrow Elctrns.	617-933-8130
MI	Ann Arbor, Arrow Elctrns.	313-971-8220
MI	Detroit, Hamilton Avnet	313-522-4700
MI	Grand Rapids, Hamilton Avnet	616-243-8805
MN	Bloomington, Hall-Mark Elctrns.	612-854-3223
MN	Edina, Arrow Elctrns.	612-830-1800
MN	Minneapolis, Hamilton Avnet	612-932-0600
MO	Maryland Hgts., Hall-Mark Elctrns.	314-291-5350
MO	St. Louis, Arrow Elctrns.	314-567-6888
MO	St. Louis, Hamilton Avnet	314-344-1200
NE	Lincoln/Omaha, Hamilton Avnet	800-255-6702
NH	Manchester, Arrow Elctrns.	603-668-6968
NJ	Cherry Hill, Hall-Mark Elctrns.	609-424-7300
NJ	Cherry Hill, Hamilton Avnet	609-424-0100
NJ	Fairfield, Arrow Elctrns.	201-575-5300
NJ	Fairfield, Hall-Mark Elctrns.	201-575-4415
NJ	Fairfield, Hamilton Avnet	201-575-3390
NJ	Marlton, Arrow Elctrns.	609-596-8000
NM	Albuquerque, Arrow Elctrns.	505-243-4566
NM	Albuquerque, Hamilton Avnet	505-765-1500
NY	Hauppauge, Arrow Elctrns.	516-231-1000
NY	Liverpool, Arrow Elctrns.	315-652-1000
NY	Long Island, Hamilton Avnet	516-231-9800
NY	Lynbrook, Peerless Radio	516-593-2121
NY	Rochester, Arrow Elctrns.	716-427-0300
NY	Rochester, Hamilton Avnet	716-475-9130
NY	Syracuse, Hamilton Avnet	315-437-2641
NC	Charlotte, Elctrns. Mktg. Corp.	704-394-6195
NC	Raleigh, Arrow Elctrns.	919-876-3132
NC	Raleigh, Hall-Mark Elctrns.	919-872-0712
NC	Raleigh, Hamilton Avnet	919-878-0810
NC	Winston-Salem, Arrow Elctrns.	919-725-8711
OH	Centerville, Arrow Elctrns.	513-435-5563
OH	Cleveland, Hamilton Avnet	216-831-3500
OH	Columbus, Elctrn. Mktg.	614-299-4161
OH	Columbus, Hamilton Avnet	614-882-7004
OH	Solon, Arrow Elctrns.	216-248-3990
OH	Solon, Hall-Mark Elctrns.	216-349-4632
OH	Westerville, Hall-Mark Elctrns.	614-891-4555

OR	Portland, Arrow Elctrns.	503-684-1690
OR	Portland, Hamilton Avnet	503-635-8831
PA	Monroeville, Arrow Elctrns.	412-856-7000
PA	Philadelphia, Hamilton Avnet	215-831-1300
PA	Philadelphia, Phila. Elctrn.	215-568-7400
SC	Columbia, Hamilton Avnet	800-334-1579
TX	Austin, Arrow Elctrns.	512-835-4180
TX	Austin, Hall-Mark Elctrns.	512-258-8848
TX	Carrollton, Arrow Elctrns.	214-380-6464
TX	Dallas, Hall-Mark Elctrns.	214-341-1147
TX	Dallas, Hamilton Avnet	214-659-4111
TX	Houston, Arrow Elctrns.	713-530-4700
TX	Houston, Hall-Mark Elctrns.	713-781-6100
TX	Houston, Hamilton Avnet	713-780-1771
UT	Salt Lake City, Arrow Elctrns.	801-539-1135
UT	Salt Lake City, Hamilton Avnet	801-972-2800
WA	Seattle, Hamilton Avnet	206-453-5844
WA	Seattle, R. V. Weatherford Co.	206-575-1340
WV	Charleston, Hamilton Avnet	800-543-4783
WI	Milwaukee, Hamilton Avnet	414-784-4510
WI	New Berlin, Hall-Mark Elctrns.	414-797-7844
WI	Oak Creek, Arrow Elctrns.	414-764-6600
EXP	Los Angeles, Hamilton Avnet	213-558-2441
Can	Toronto, Hamilton Avnet	416-677-7432

TRW/CINCH-GRAPHIK, 200 S. Turnbull Canyon Rd., City of Industry, CA 91744, Tel: 213-333-1201, TWX: 910-584-1861; *Sls. Mgr.:* James Kirby

TRW CONNECTOR DIV., TRW Electronic Components Grp., 1501 Morse Ave., Elk Grove Village, IL 60007, Tel: 312-981-6000, TWX: 910-222-1796; *Sls. Mgr.:* B. Walthall; *Dist. Mgr.:* Jim Hartranft Jr. .... **B•1126-1127; C•1536-1565**

Local Sales Offices & Reps

AL	Huntsville, TRW/ECG	205-533-7600
AZ	Scottsdale, TRW/ECG	602-994-0441
CA	Mountain View, Straube Assocs.	415-969-6060
CO	Westminster, Straube Assocs.	303-426-0890
CT	Rowayton, TRW/ECG	203-853-4466
FL	Ft. Lauderdale, TRW/ECG	305-772-3000
FL	Orlando, TRW/ECG	305-857-3650
GA	Norcross, TRW/ECG	404-447-6154
IL	Chicago, TRW/ECG	312-693-7730
IN	Fort Wayne, R. O. Whitesell & Assocs.	219-432-5591
IN	Indianapolis, R. O. Whitesell & Assocs.	317-359-9283
IN	Kokomo, R. O. Whitesell & Assocs.	317-457-9127
IA	Cedar Rapids, C. H. Horn & Assocs.	319-393-8703
KS	De Soto, Midtec Assocs.	913-441-6565
KY	Louisville, R. O. Whitesell & Assocs.	502-426-7696
MA	Framingham, TRW/ECG	617-620-0625
MI	Grand Rapids, R. O. Whitesell & Assocs.	616-942-5420
MI	Southfield, R. O. Whitesell & Assocs.	313-559-5454
MI	St. Joseph, R. O. Whitesell & Assocs.	616-983-7337
MN	Minneapolis, TRW/ECG	612-854-6616
MO	St. Louis, J. G. Macke Co.	314-432-2830
NM	El Paso, Straube Assocs.	915-594-8259
NY	Fairport, TRW/ECG	716-425-3775
NC	Greensboro, TRW/ECG	919-852-4676
OH	Cincinnati, R. O. Whitesell & Assocs.	513-521-2290
OH	Cleveland, R. O. Whitesell & Assocs.	216-447-9020
OH	Columbus, R. O. Whitesell & Assocs.	614-888-9396
OH	Dayton, R. O. Whitesell & Assocs.	513-298-9546
OR	Tigard, TRW/ECG	503-620-5032
PA	Bala Cynwyd, TRW/ECG	215-667-3400
PA	Pittsburgh, R. O. Whitesell & Assocs.	412-963-6161
TN	Greeneville, R. O. Whitesell & Assocs.	615-639-6154
TX	Austin, TRW/ECG	512-345-2331
TX	Dallas, TRW/ECG	214-248-8000
TX	El Paso, TRW/ECG	915-594-8259
TX	Houston, TRW/ECG	713-772-5541
UT	Salt Lake City, Straube Assocs.	801-263-2640
WA	Bellevue, TRW/ECG	206-641-9996
WI	Brookfield, TRW/ECG	414-784-7773

Local Distributors

AL	Huntsville, Hall-Mark Elctrns.	205-837-8700
AL	Huntsville, Hamilton/Avnet Elctrns.	205-837-7210
AZ	Phoenix, Hall-Mark Elctrns.	602-243-6601
AZ	Phoenix, Kierulff Elctrns.	602-243-4101
AZ	Phoenix, R. V. Weatherford Co.	602-272-7144
AZ	Tempe, Arrow Elctrns.	602-968-4800
AZ	Tempe, Fisher-Brownell	602-967-1464
AZ	Tempe, Hamilton/Avnet Elctrns.	602-231-5100
AR	Ft. Smith, Carlton Bates Co.	501-646-8201
AR	Little Rock, Carlton Bates Co.	501-562-9100
CA	Alhambra, Fisher-Brownell	213-289-0255
CA	Anaheim, R. V. Weatherford Co.	714-634-9600
CA	Costa Mesa, Avnet Elctrns.	714-754-6088
CA	Costa Mesa, Hamilton Electro Sls.	714-641-4100
CA	Culver City, Hamilton Electro Sls.	213-558-2121
CA	El Segundo, Hallmark Elctrns.	213-643-9101
CA	Glendale, R. V. Weatherford Co.	213-849-3451
CA	Los Angeles, Kierulff Elctrns.	213-725-0325
CA	Los Angeles, Newark Elctrns.	213-671-7066
CA	Newport Beach, Arrow Elctrns.	714-851-8961
CA	Palo Alto, Kierulff Elctrns.	415-968-6292
CA	Pomona, R. V. Weatherford Co.	714-623-1261
CA	Riverside, Elctrn. Supp.	714-787-9220
CA	Sacramento, Hamilton/Avnet Elctrns.	916-920-3150
CA	San Diego, Arrow Elctrns.	619-565-4800
CA	San Diego, Fisher-Brownell	619-560-8545
CA	San Diego, Hall-Mark Elctrns.	619-268-1201
CA	San Diego, Hamilton/Avnet Elctrns.	619-571-7510
CA	San Diego, Kierulff Elctrns.	619-278-2112
CA	San Diego, R. V. Weatherford Co.	619-695-1700
CA	San Francisco, Zack Radio Supp.	415-626-1444
CA	San Jose, Hall-Mark Elctrns.	408-946-0900
CA	Santa Clara, Fisher-Brownell	408-988-6041
CA	Santa Clara, Wyle Dist. Grp.	408-727-2500
CA	Sunnyvale, Arrow Elctrns.	408-745-6600
CA	Sunnyvale, Bell Inds.	408-734-8570
CA	Sunnyvale, Hamilton/Avnet Elctrns.	408-743-3355
CA	Tustin, Kierulff Elctrns.	714-731-5711
CO	Denver, Arrow Elctrns.	303-758-2100
CO	Denver, Kierulff Elctrns.	303-371-6500
CO	Denver, Newark Elctrns.	303-757-3351
CO	Englewood, Hall-Mark Elctrns.	303-790-1662
CO	Englewood, Hamilton/Avnet Elctrns.	303-779-9998
CO	Englewood, R. V. Weatherford Co.	303-770-9762
CO	Thornton, Wyle Dist. Grp.	303-457-WYLE
CT	Danbury, Hamilton/Avnet Elctrns.	203-797-2800
CT	Wallingford, Arrow Elctrns.	203-265-7741
FL	Ft. Lauderdale, Arrow Elctrns.	305-776-7790
FL	Ft. Lauderdale, Hall-Mark Elctrns.	305-971-9280
FL	Ft. Lauderdale, Hamilton/Avnet Elctrns.	305-971-2900
FL	Ft. Lauderdale, Kierulff Elctrns.	305-463-4940
FL	Largo, Lodan Elctrns.	813-586-2851
FL	Orlando, Hall-Mark Elctrns.	305-855-4020
FL	Palm Bay, Arrow Elctrns.	305-725-1480
FL	St. Petersburg, Hamilton/Avnet Elctrns.	813-576-3930
FL	St. Petersburg, Kierulff	813-576-1966
GA	Norcross, Arrow Elctrns.	404-449-8252
GA	Norcross, Hall-Mark Elctrns.	404-447-8000
GA	Norcross, Hamilton/Avnet Elctrns.	404-447-7507
GA	Norcross, Kierulff Elctrns.	404-447-5252
HI	Honolulu, Precision Radio Ltd.	808-537-5291
IL	Bensenville, Hall-Mark Elctrns.	312-860-3800
IL	Bensenville, Hamilton/Avnet Elctrns.	312-860-7780
IL	Champaign, Klaus Radio	217-356-1896
IL	Chicago, Bell Elctrns.	312-982-9210
IL	Chicago, Electronic Connector	312-767-2200
IL	Chicago, Newark Elctrns.	312-638-4411
IL	Elk Grove Village, Pioneer/Chicago	312-437-9680
IL	Itasca, Kierulff Elctrns.	312-250-0500
IL	La Salle, Klaus Radio	815-223-7400
IL	Palatine, Ohm Elctrns.	312-359-5500
IL	Peoria, Klaus Radio	309-691-4840
IL	Quincy, Klaus Radio	217-223-7560
IL	Schaumburg, Arrow Elctrns.	312-397-3440
IN	Ft. Wayne, Graham Elctrn.	219-423-3422
IN	Indianapolis, Arrow Elctrns.	317-243-9353
IN	Indianapolis, Graham Elctrns.	317-634-8202
IN	Indianapolis, Hamilton/Avnet Elctrns.	317-844-9333
IN	Indianapolis, Pioneer/Ind.	317-849-7300
IA	Cedar Rapids, Arrow Elctrns.	319-395-7230
IA	Cedar Rapids, DEECO, Inc.	319-365-7551
IA	Eldridge, Klaus Radio	319-285-8484
KS	Lenexa, Hall-Mark Elect.	913-888-4747
KS	Overland Park, Hamilton/Avnet Elctrns.	913-888-8900
LA	Baton Rouge, Indl. Elctrn. Supp.	504-926-0513
LA	Lafayette, Ralph's of Lafayette	318-234-4507
LA	Shreveport, Indl. Elctrn. Supp.	318-222-9459
MD	Baltimore, Arrow Elctrns.	301-247-5200
MD	Baltimore, Hall-Mark Elctrns.	301-796-9300
MD	Columbia, Hamilton/Avnet Elctrns.	301-995-3500
MD	Columbia, Powell Elctrn.	301-621-4070
MD	Gaithersburg, Pioneer/Washington	301-948-0710
MD	Rockville, Capitol Radio Whlsrs.	301-881-2270
MD	Timonium, Zebra Elctrns.	301-252-6576
MA	Billerica, Kierulff Elctrns.	617-935-5134
MA	Hingham, Sager Elec. Supp.	617-749-6700
MA	Norwood, Gerber Radio Supp.	617-329-2400
MA	Woburn, Arrow Elctrns.	617-933-8130
MA	Woburn, Hall-Mark Elctrns.	617-935-9777
MA	Woburn, Hamilton/Avnet Elctrns.	617-935-9700
MI	Ann Arbor, Arrow Elctrns.	313-971-8220
MI	Ann Arbor, Wedemeyer Elec. Supp.	313-665-8611
MI	Grand Rapids, Hamilton/Avnet Elctrns.	616-243-8805
MI	Livonia, Hamilton/Avnet Elctrns.	313-522-4700
MI	Livonia, Pioneer/Michigan	313-525-1800
MI	Livonia, R.S. Elect. Corp.	313-525-1155
MI	Oak Park, Newark Elctrns.	313-967-0600
MN	Bloomington, Hall-Mark Elect.	612-854-3223
MN	Edina, Arrow Elctrns.	612-830-1800
MN	Edina, Kierulff Elctrns.	612-941-7500
MN	Minneapolis, Newark Elctrns.	612-331-6350
MN	Minnetonka, Hamilton/Avnet Elctrns.	612-932-0600
MN	St. Paul, Gopher Elctrns.	612-483-3322
MO	Earth City, Hamilton/Avnet Elctrns.	314-344-1200
MO	Maryland Hgts., Hall-Mark Elect.	314-291-5350
MO	Maryland Hgts., Kierulff Elctrns.	314-739-0855
MO	St. Louis, Arrow Elctrns.	314-567-6888
MO	St. Louis, Olive Indl. Elctrns.	314-426-4500
NE	Lincoln, Scott Elctrn. Supp.	402-466-8221
NE	Omaha, Scott Elctrn. Supp.	402-734-6750
NH	Manchester, Arrow Elect.	603-668-6968
NJ	Cherry Hill, Hall-Mark Elctrns.	609-424-0880
NJ	Cherry Hill, Hamilton/Avnet Elctrns.	609-424-0100
NJ	Fairfield, Arrow Elctrns.	201-575-5300
NJ	Fairfield, Hall-Mark Elctrns.	201-575-4415
NJ	Fairfield, Hamilton/Avnet Elctrns.	201-575-3390
NJ	Fairfield, Kierulff Elctrns.	201-575-6750
NJ	Hanover, State Elec. Parts Corp.	201-887-2550
NJ	Marlton, Arrow Elctrns.	609-596-8000
NM	Albuquerque, Arrow Elctrns.	505-243-4566
NM	Albuquerque, Hamilton/Avnet Elctrns.	505-765-1500
NM	Albuquerque, Intl. Elctrns.	505-345-8127
NY	Binghamton, Pioneer Elctrns.	607-748-8211
NY	East Syracuse, Hamilton/Avnet Elctrns.	315-437-2641
NY	Hauppauge, Arrow Elctrns.	516-231-1000
NY	Liverpool, Arrow Elctrns.	315-652-1000
NY	Lynbrook, Peerless Radio	516-593-2121
NY	Melville, Hamilton/Avnet Elctrns.	516-454-6060
NY	Rochester, Arrow Elctrns.	716-275-0300
NY	Rochester, Hamilton/Avnet Elctrns.	716-475-9130
NY	Rochester, Rochester Radio Supp.	716-454-7800
NY	Rochester, Simcona Elctrns. Corp.	716-328-3230
NY	Ronkonkoma, Conco Elctrns. Corp.	516-467-8200
NY	Ronkonkoma, Hall-Mark Elctrns.	516-737-0600
NC	Cary, Powell Elctrns.	919-467-1212
NC	Greensboro, Kierulff Elctrns.	919-852-9440
NC	Raleigh, Arrow Elctrns.	919-876-3132
NC	Raleigh, Hall-Mark Elect.	919-872-0712
NC	Raleigh, Hamilton/Avnet Elctrns.	919-829-8030
NC	Winston-Salem, Arrow Elect.	919-725-8711
OH	Centerville, Arrow Elctrns.	513-435-5563
OH	Cincinnati, Hughes Peters, Inc.	513-351-2000
OH	Cleveland, Hamilton/Avnet Elctrns.	216-831-3500
OH	Cleveland, Newark Elctrns.	216-447-8860
OH	Cleveland, Pioneer/Cleveland	216-587-3600
OH	Columbus, Elctrns. Mktg. Corp.	614-299-4161
OH	Columbus, Hughes Peters, Inc.	614-294-5351
OH	Dayton, Hamilton/Avnet Elctrns.	513-433-6010
OH	Dayton, Pioneer/Dayton	513-236-9900
OH	Dayton, Stotts-Friedman	513-298-5555
OH	Highland Hgts., Hall-Mark Elctrns.	216-473-2907
OH	Solon, Arrow Elctrns.	216-248-3990
OH	Solon, Hall-Mark Elctrns.	216-349-4632
OH	Westerville, Hall-Mark Elctrns.	614-891-4555
OK	Oklahoma City, Trice Wholesale Elctrns.	405-524-4411
OK	Tulsa, Hall-Mark Elctrns.	918-665-3200
OR	Lake Oswego, Hamilton/Avnet Elctrns.	503-635-8157
OR	Portland, Kierulff Elctrns.	503-641-9150
OR	Tigard, Arrow Elctrns.	503-684-1690
PA	Monroeville, Arrow Elctrns.	412-856-7000
PA	Philadelphia, Almo Elctrns. Corp.	215-698-4000
PA	Philadelphia, Powell Elctrns.	215-365-1900
PA	Pittsburgh, CAM/RPC	412-782-3770
PA	Pittsburgh, Pioneer/Pittsburgh	412-782-2300
PA	Wayne, Peak Elect.	215-293-9000
TX	Austin, Arrow Elctrns.	512-835-4180
TX	Austin, Hall-Mark Elect.	512-258-8848
TX	Austin, Hamilton/Avnet Elctrns.	512-837-8911
TX	Dallas, Arrow Elctrns.	214-386-7500
TX	Dallas, Hall-Mark Elctrns.	214-341-1147
TX	Dallas, Intl. Elctrns.	214-233-9323
TX	Dallas, Kierulff Elctrns.	214-343-2400
TX	Dallas, R. V. Weatherford Co.	214-980-1110
TX	El Paso, Intl. Elctrns.	915-778-9761
TX	Garland, Newark Elctrns.	214-494-5911
TX	Houston, Hall-Mark Elctrns.	713-781-6100
TX	Houston, Hamilton/Avnet Elctrns.	713-780-1771
TX	Houston, R. V. Weatherford Co.	713-688-7406
TX	Irving, Hamilton/Avnet Elctrns.	214-659-4111
TX	Richardson, Fisher Brownell	214-235-3177
TX	Stafford, Arrow Elctrns.	713-491-4100
TX	Stafford, Harrison Equip.	713-879-2729
UT	Salt Lake City, Arrow Elctrns.	801-539-1135
UT	Salt Lake City, Hamilton/Avnet Elctrns.	801-972-4300
UT	Salt Lake City, Kierulff Elctrns.	801-973-6913
UT	Salt Lake City, Standard Supp. Co.	801-486-3371
WA	Bellevue, Arrow Elctrns.	206-643-4800
WA	Bellevue, Hamilton/Avnet Elctrns.	206-643-3950
WA	Bellevue, Wyle Dist. Grp.	206-453-8300
WA	Seattle, R. V. Weatherford Co.	206-243-6340
WA	Tukwila, Kierulff Elctrns.	206-575-4420
WI	Milwaukee, Elctrn. Expeditors	414-228-8100

WI	Milwaukee, Marsh Elctrns.	414-475-6000
WI	New Berlin, Hamilton/Avnet Elctrns.	414-784-4510
WI	Oak Creek, Arrow Elctrn.	414-764-6600
WI	Oak Creek, Hall-Mark Elctrns.	414-761-3000

TRW CYLINDRICAL CONNECTOR DIV., TRW Electronic Components Grp., 8821 Science Center Dr., Minneapolis, MN 55428, Tel: 612-537-1010, TWX: 910-576-2748; *Sls. Mgr.:* Gene Schmidt; *Dist. Mgr.:* Gene Schmidt **C•1566**

Local Sales Offices & Reps

AL	Huntsville, TRW/ECG	205-533-7600
AZ	Scottsdale, TRW/ECG	602-994-0441
CA	Los Angeles, ISDS	213-478-0183
CA	Mountain View, Straube Assocs.	415-969-6060
CO	Westminster, Straube Assocs.	303-426-0890
CT	Rowayton, TRW/ECG	203-853-4466
FL	Ft Lauderdale, TRW/ECG	305-772-3000
FL	Orlando, TRW/ECG	305-857-3650
GA	Norcross, TRW/ECG	404-447-6154
IL	Chicago, TRW/ECG	312-693-7730
IN	Ft. Wayne, R. O. Whitesell & Assocs.	219-432-5591
IN	Indianapolis, R. O. Whitesell & Assocs.	317-359-9283
IN	Kokomo, R. O. Whitesell & Assocs.	317-457-9127
IA	Cedar Rapids, C. H. Horn & Assocs.	319-393-8703
KS	De Soto, Midtec Assocs.	913-441-6565
KY	Louisville, R. O. Whitesell & Assocs.	502-426-7696
MA	Framingham, TRW/ECG	617-620-0625
MI	Grand Rapids, R. O. Whitesell & Assocs.	616-942-5420
MI	Southfield, R. O. Whitesell & Assocs.	313-559-5454
MI	St. Joseph, R. O. Whitesell & Assocs.	616-983-7337
MN	Minneapolis, TRW/ECG	612-854-6616
MO	St. Louis, J. G. Macke Co.	314-432-2830
NY	Rochester, TRW/ECG	716-424-2830
NC	Greensboro, TRW/ECG	919-852-4676
OH	Cincinnati, R. O. Whitesell & Assocs.	513-521-2290
OH	Cleveland, R. O. Whitesell & Assocs.	216-447-9020
OH	Columbus, R. O. Whitesell & Assocs.	614-888-9396
OH	Dayton, R. O. Whitesell & Assocs.	513-298-9546
PA	Bala Cynwyd, TRW/ECG	215-667-3400
PA	Pittsburgh, R. O. Whitesell & Assocs.	412-963-6161
TN	Greeneville, R. O. Whitesell & Assocs.	615-639-6154
TX	Austin, TRW/ECG	512-345-2331
TX	Dallas, TRW/ECG	214-248-8000
TX	El Paso, Straube Assocs.	915-594-8259
TX	El Paso, TRW/ECG	915-594-8259
TX	Houston, TRW/ECG	713-772-5541
UT	Salt Lake City, Straube Assocs.	801-263-2640
VA	Richmond, TRW/ECG	804-288-8334
WA	Bellevue, TRW/ECG	206-641-9996
WI	Brookfield, TRW/ECG	414-784-7773

Local Distributors

CA	Brea, Aeroflite	714-773-4251
CA	Chatsworth, Arrow Elctrns.	213-701-7500
CA	Newport Beach, Arrow Elctrns.	714-851-8961
CA	San Diego, Arrow Elctrns.	619-565-4800
CA	Sunnyvale, Arrow Elctrns.	408-745-6600
CO	Denver, Arrow Elctrns.	303-758-2100
CT	Wallingford, Arrow Elctrns.	203-265-7741
FL	Ft. Lauderdale, Arrow Elctrns.	305-776-7790
FL	Palm Bay, Arrow Elctrns.	305-725-1480
GA	Norcross, Arrow Elctrns.	404-449-8252
IL	Chicago, Electronic Connector	312-767-2200
IL	Schaumburg, Arrow Elctrns.	312-397-3440
IN	Indianapolis, Arrow Elctrns.	317-243-9353
IA	Cedar Rapids, Arrow Elctrns.	319-395-7230
MD	Baltimore, Arrow Elctrns.	301-247-5200
MA	Woburn, Arrow Elctrns.	617-933-8130
MI	Ann Arbor, Arrow Elctrns.	313-971-8220
MN	Edina, Arrow Elctrns.	612-830-1800
MO	St. Louis, Arrow Elctrns.	314-567-6888
NH	Manchester, Arrow Elctrns.	603-668-6968
NJ	Fairfield, Arrow Elctrns.	201-575-5300
NJ	Moorestown, Arrow Elctrns.	609-235-1900
NM	Albuquerque, Arrow Elctrns.	505-243-4566
NY	Hauppauge, Arrow Elctrns.	516-231-1000
NY	Liverpool, Arrow Elctrns.	315-652-1000
NY	Rochester, Arrow Elctrns.	716-275-0300
NY	Ronkonkoma, Conco	516-467-8200
NC	Raleigh, Arrow Elctrns.	919-876-3132
NC	Winston-Salem, Arrow Elctrns.	919-725-8711
OH	Centerville, Arrow Elctrns.	513-435-5563
OH	Dayton, Pioneer/Dayton	513-236-9900
OH	Solon, Arrow Elctrns.	216-248-3990
PA	Monroeville, Arrow Elctrns.	412-856-7000
TX	Austin, Arrow Elctrns.	512-835-4180
TX	Dallas, Arrow Elctrns.	214-386-7500
TX	Dallas, Hall-Mark	214-341-1147
TX	Houston, Hall-Mark	713-781-6100
TX	Stafford, Arrow Elctrns.	713-491-4100
UT	Salt Lake City, Arrow Elctrns.	801-539-1135
WA	Bellevue, Arrow Elctrns.	206-643-4800
WI	Madison, Arrow Elctrns.	608-273-4977
WI	Oak Creek, Arrow Elctrns.	414-764-6600

TRW, Dynalco Controls Div., 5200 NW 37th, P.O. Box 8187, Ft. Lauderdale, FL 33310, Tel: 305-739-4300, Telex: 514833; Empl.: 125; *Sls. Mgr.:* Kurlin Wilson; *Dist. Mgr.:* Joe Stephens

TRW ELECTRONIC COMPONENTS GRP., 2525 E. El Segundo Blvd., El Segundo, CA 90245, Tel: 213-536-0600

TRW FIBER OPTIC PRODS., CONNECTOR DIV., TRW Elctrn. Comps. Grp., 401 N. Broad St., Philadelphia, PA 19108, Tel: 215-922-8900, TWX: 710-670-2286; *Sls. Mgr.:* Harry Saleker

TRW LSI PRODUCTS, PO Box 2472, La Jolla, CA 92038, Tel: 619-457-1000, Telex: 697957, TWX: 910-335-1571; Empl.: 400; *Sls. Mgr.:* Doug Turnage; *Dist. Mgr.:* Ron Courtois

TRW MICROWAVE, 825 Stewart Dr., Sunnyvale, CA 94086, Tel: 408-732-0880, TWX: 910-339-9207; FSC No.: 21847; Empl.: 600; *Sls. Mgr.:* R. J. Roy

TRW MOTOR DIVISION, Industrial/Commerical Products, Napierfield Road, Postal Route 6, Box M-30A, Dothan, AL 36303, Tel: 205-983-3542, Telex: 810-744-1000; *Sls. Mgr.:* Dave Hall **B•1194**

TRW MOTOR DIV. (MILITARY), 2275 Stanley Ave., Dayton, OH 45404, Tel: 513-228-3171, Telex: 288-224, TWX: 810-459-1642; Empl.: 580; *Sls. Mgr.:* Bill Pelfrey; *Dist. Mgr.:* Tom Coyle **B•1195**

Local Sales Offices & Reps

AL	Huntsville, TRW/ECG	205-533-7600
AZ	Scottsdale, TRW/ECG	602-994-0441
CA	Los Angeles, Integrated Sls.	213-478-0183
CA	Mountain View, Straube Assocs.	415-969-6060
CA	San Diego, Integrated Sls.	619-571-1544
CA	Santa Ana, Integrated Sls.	714-973-2162
CA	Woodland Hills, Integrated Sls.	213-883-7130
CO	Westminster, Straube Assocs.	303-426-0890
CT	Rowayton, TRW	203-853-4466
FL	Ft. Lauderdale, TRW/ECG	305-772-3000
FL	Orlando, TRW/ECG	305-857-3650
GA	Norcross, TRW/ECG	404-447-6154
IL	Chicago, TRW/ECG	312-693-7730
IN	Ft. Wayne, R. O. Whitesell & Assocs.	219-432-5591
IN	Indianapolis, R. O. Whitesell & Assocs.	317-359-9283
IN	Kokomo, R. O. Whitesell & Assocs.	317-457-9127
IA	Cedar Rapids, C. H. Horn & Assocs.	319-393-8703
KS	De Soto, Midtec Assocs.	913-441-6565
KY	Louisville, R. O. Whitesell & Assocs.	502-426-7696
MD	Baltimore, TRW/ECG	301 964-9110
MA	Framingham, TRW/ECG	617-620-0625
MI	Grand Rapids, R. O. Whitesell & Assocs.	616-942-5420
MI	Southfield, R. O. Whitesell & Assocs.	313-559-5454
MI	St. Joseph, R. O. Whitesell & Assocs.	616-983-7337
MN	Minneapolis, TRW/ECG	612-854-6616
MO	St. Louis, John G. Macke Co.	314-432-2830
NY	Fairport, TRW/ECG	716-425-3775
NC	Greensboro, TRW	919-852-4676
OH	Cincinnati, R.O. Whitesell	513-521-2290
OH	Cleveland, R.O. Whitesell	216-447-9020
OH	Columbus, R.O. Whitesell	614-888-9396
OH	Dayton, R.O. Whitesell	513-298-9546
OR	Tigard, N. R. Schultz Co.	503-620-5032
PA	Bala Cynwyd, TRW/ECG	215-667-3400
PA	Pittsburgh, R. O. Whitesell & Assocs.	412-963-6161
TN	Greeneville, R. O. Whitesell & Assocs.	615-639-6154
TX	Austin, Technlg. Sls.	512-346-9940
TX	Dallas, TRW/ECG	214-248-8000
TX	El Paso, TRW/ECG	915-594-8259
TX	Houston, TRW/ECG	713-772-5541
UT	Salt Lake City, Straube Assocs.	801-263-2640
VA	Richmond, TRW/ECG	804-288-8334
WA	Bellevue, TRW/ECG	206-641-9996
WI	Brookfield, TRW/ECG	414-784-7773

Local Distributors

AL	Huntsville, Arrow Elctrns.	205-882-2730
AL	Huntsville, Hallmark Elctrns.	205-837-8700
AL	Huntsville, Hamilton/Avnet Elctrns.	205-837-7210
AZ	Phoenix, Hallmark Elctrns.	602-243-6601
AZ	Tempe, Arrow Elctrns.	602-968-4800
AZ	Tempe, Fisher Brownell	602-967-1464
AZ	Tempe, Hamilton/Avnet Elctrns.	602-231-5100
CA	Alhambra, Fisher Brownell	213-289-0255
CA	Chatsworth, Arrow Elctrns.	213-701-7500
CA	Chatsworth, Avnet Elctrns.	213-700-2600
CA	Costa Mesa, Avnet Elctrns.	714-754-6111
CA	Culver City, Hamilton/Avnet Elctrns.	213-558-2252
CA	El Segundo, Hallmark Elctrns.	213-643-9101
CA	Sacramento, Hamilton/Avnet Elctrns.	916-925-2216
CA	San Diego, Arrow Elctrns.	619-565-4800
CA	San Diego, Fisher Brownell	619-560-8545
CA	San Diego, Hallmark Elctrns.	619-268-1201
CA	San Diego, Hamilton/Avnet Elctrns.	619-571-7510
CA	San Jose, Hallmark Elctrns.	408-946-2575
CA	Santa Clara, Fisher Brownell	408-988-6041
CA	Sunnyvale, Arrow Elctrns.	408-745-6600
CA	Sunnyvale, Hallmark Elctrns.	408-773-9990
CA	Sunnyvale, Hamilton/Avnet Elctrns.	408-743-3355
CA	Tustin, Arrow Elctrns.	714-838-5422
CO	Aurora, Arrow Elctrns.	303-696-1111
CO	Englewood, Hallmark Elctrns.	303-790-1662
CO	Englewood, Hamilton/Avnet Elctrns.	303-740-1000
CT	Danbury, Hamilton/Avnet Elctrns.	203-797-2800
CT	Wallingford, Arrow Elctrns.	203-265-7741
FL	Clearwater, Hallmark Elctrns.	813-530-4543
FL	Ft. Lauderdale, Arrow Elctrns.	305-776-7790
FL	Ft. Lauderdale, Hallmark Elctrns.	305-971-9280
FL	Ft. Lauderdale, Hamilton/Avnet Elctrns.	305-971-2900
FL	Orlando, Hallmark Elctrns.	305-855-4020
FL	Palm Bay, Arrow Elctrns.	305-725-1480
FL	St. Petersburg, Hamilton/Avnet Elctrns.	813-576-3930
FL	Winter Park, Hamilton/Avnet Elctrns.	305-628-3888
GA	Norcross, Arrow Elctrns.	404-449-8252
GA	Norcross, Hallmark Elctrns.	404-447-8000
GA	Norcross, Hamilton/Avnet Elctrns.	404-447-7507
IL	Bensenville, Hallmark Elctrns.	312-860-3800
IL	Bensenville, Hamilton/Avnet Elctrns.	312-860-7700
IL	Elk Grove Village, Pioneer/Chicago	312-437-9680
IL	Schaumburg, Arrow Elctrns.	312-397-3440
IN	Carmel, Hamilton/Avnet Elctrns.	317-844-9333
IN	Indianapolis, Arrow Elctrns.	317-243-9353
IN	Indianapolis, Pioneer/Indiana	317-849-7300
KS	Lenexa, Hallmark Elctrns.	913-888-4747
KS	Overland Park, Hamilton/Avnet Elctrns.	913-888-8900
MD	Baltimore, Arrow Elctrns.	301-247-5200
MD	Bethesda, Arrow Elctrns.	301-564-3000
MD	Columbia, Hallmark Elctrns.	301 988-9800
MD	Columbia, Hamilton/Avnet Elctrns.	301-995-3500
MA	Woburn, Arrow Elctrns.	617-933-8130
MA	Woburn, Hallmark Elctrns.	617-935-9777
MA	Woburn, Hamilton/Avnet Elctrns.	617-273-7500
MI	Ann Arbor, Arrow Elctrns.	313-971-8220
MI	Grand Rapids, Hamilton/Avnet Elctrns.	616-243-8805
MI	Livonia, Hamilton/Avnet Elctrns.	313-522-4700
MI	Livonia, Pioneer/Michigan	313-525-1800
MN	Bloomington, Hallmark Elctrns.	612-854-3223
MN	Edina, Arrow Elctrns.	612-830-1800
MN	Minnetonka, Hamilton/Avnet Elctrns.	612-932-0600
MN	Minnetonka, Pioneer/Twin Cities	612-935-5444
MO	Earth City, Hamilton/Avnet Elctrns.	314-344-1200
MO	Maryland Heights, Hallmark Elctrns.	314-291-5350
MO	St. Louis, Arrow Elctrns.	314-567-6888
NH	Manchester, Arrow Elctrns.	603-688-6968
NJ	Cherry Hill, Hallmark Elctrns.	609-424-7300
NJ	Cherry Hill, Hamilton/Avnet Elctrns.	609-424-0100
NJ	Fairfield, Arrow Elctrns.	201-575-5300
NJ	Fairfield, Hallmark Elctrns.	201-575-4415
NJ	Fairfield, Hamilton/Avnet Elctrns.	201-575-3390
NJ	Marlton, Arrow Elctrns.	609-596-8000
NM	Albuquerque, Arrow Elctrns.	505-243-4566
NM	Albuquerque, Hamilton/Avnet Elctrns.	505-765-1500
NY	E. Syracuse, Hamilton/Avnet Elctrns.	315-437-2641
NY	Hauppauge, Arrow Elctrns.	516-231-1000
NY	Hauppauge, Hamilton/Avnet Elctrns.	516-434-7421
NY	Hauppauge, Jaco Elctrns.	516-273-5500
NY	Liverpool, Arrow Elctrns.	315-652-1000
NY	Rochester, Arrow Elctrns.	716-427-0300
NY	Rochester, Hamilton/Avnet Elctrns.	716-475-9130
NY	Ronkonkoma, Hallmark Elctrns.	516-737-0600
NC	Raleigh, Arrow Elctrns.	919-876-3132
NC	Raleigh, Hallmark Elctrns.	919-872-0712
NC	Raleigh, Hamilton/Avnet Elctrns.	919-878-0819
NC	Winston-Salem, Arrow Elctrns.	919-725-8711
OH	Centerville, Arrow Elctrns.	513-435-5563
OH	Cincinnati, Hallmark Elctrns.	513-563-2980
OH	Cleveland, Hamilton/Avnet Elctrns.	216-831-3500
OH	Cleveland, Pioneer/Cleveland	216-587-3600
OH	Dayton, Hamilton/Avnet Elctrns.	513-433-0610
OH	Dayton, Pioneer/Dayton	513-236-9900
OH	Solon, Arrow Elctrns.	216-248-3990
OH	Solon, Hallmark Elctrns.	216-349-4632
OH	Westerville, Hallmark Elctrns.	614-891-4555
OK	Tulsa, Hallmark Elctrns.	918-665-3200
OR	Lake Oswego, Hamilton/Avnet Elctrns.	503-635-8157
OR	Tigard, Arrow Elctrns.	503-684-1690
PA	Monroeville, Arrow Elctrns.	412-856-7000
PA	Pittsburgh, Pioneer/Pittsburgh	412-782-2300

TX	Austin, Arrow Elctrns.	512-835-4180
TX	Austin, Hallmark Elctrns.	512-258-8848
TX	Dallas, Arrow Elctrns.	214-386-7500
TX	Dallas, Hall-Mark Elctrns.	214-343-5000
TX	Houston, Arrow Elctrns.	713-530-4700
TX	Houston, Hallmark Elctrns.	713-781-6100
TX	Houston, Hamilton/Avnet Elctrns.	713-780-1771
TX	Irving, Hamilton/Avnet Elctrns.	214-659-4111
TX	Richardson, Fisher Brownell	214-235-3177
UT	Salt Lake City, Hamilton/Avnet Elctrns.	801-972-2800
WA	Bellevue, Arrow Elctrns.	206-643-4800
WA	Bellevue, Hamilton/Avnet Elctrns.	206-643-3950
WI	New Berlin, Hamilton/Avnet Elctrns.	414-784-4510
WI	Oak Creek, Arrow Elctrns.	414-764-6600
WI	Oak Creek, Hallmark Elctrns.	414-761-3000

TRW OPTOELECTRONICS DIV., 1207 Tappan Circle, Carrollton, TX 75006, Tel: 214-323-2200, TWX: 910-860-5958; Empl.: 2200; *Sls. Mgr.:* Ron Komatz; *Dist. Mgr.:* Robert Linker .... **A•2094; B•1221-1223**

Local Sales Offices & Reps

AL	Huntsville, TRW/ECG	205-533-7600
AK	Dallas, TRW/ECG	214-248-8000
AZ	Scottsdale, TRW/ECG	602-994-0441
AZ	Scottsdale, TRW/Phoenix	602-994-0441
CA	Los Angeles, Integrated Sys. & Device Sls.	213-478-0183
CA	Mountain View, Straube Assocs.	415-969-6060
CA	San Diego, Integrated Sys. & Device Sls.	619-571-1544
CA	Santa Ana, Integrated Sys. & Device Sls.	714-973-2162
CA	Woodland Hills, Integrated Sys. & Device Sls.	818-883-7130
CO	Westminster, Straube Assocs.	303-426-0890
CT	Rowayton, TRW/ECG	203-853-4466
DE	Richmond, TRW/ECG	804-288-8334
DC	Richmond, TRW/ECG	804-288-8334
FL	Ft. Lauderdale, TRW/ECG	305-772-3000
FL	Orlando, TRW/ECG	305-857-3650
GA	Norcross, TRW/ECG	404-447-6154
ID	Boise, N.R. Schultz/Idaho	801-263-2640
IL	Cedar Rapids, C. H. Horn & Assocs.	319-393-8703
IL	Chicago, TRW/ECG	312-693-7730
IL	St. Louis, John G. Macke Co.	314-432-2830
IN	Ft. Wayne, Robert O. Whitesell	219-432-5591
IN	Indianapolis, Robert O. Whitesell	317-359-9238
IN	Kokomo, Robert O. Whitesell	317-457-9127
IA	Cedar Rapids, C. H. Horne & Assocs.	319-393-8703
KS	DeSoto, MIDTEC Assocs.	913-441-6565
KY	Louisville, Robert O. Whitesell	502-426-7696
LA	Dallas, TRW/ECG	214-248-8000
ME	Framingham, TRW/ECG	617-620-0625
MD	Columbia, TRW/ECG	301-964-9110
MA	Framingham, TRW/ECG	617-870-0745
MA	Maynard, Byrne Assoc.	617-897-3131
MI	Farmington Hills, TRW/ECG	313-478-7210
MI	Grand Rapids, Robert O. Whitesell	616-942-5420
MI	Southfield, Robert O. Whitesell	313-559-5454
MI	St. Joseph, Robert O. Whitesell	616-983-7337
MN	Minneapolis, TRW/ECG	612-854-6616
MS	Norcross, TRW/ECG	404-447-6154
MO	DeSoto, MIDTEC Assoc.	913-441-6565
MO	St. Louis, John G. Macke Co.	314-432-2830
MT	Salt Lake City, Straube Assoc.	801-263-2640
NE	DeSoto, MIDTEC Assoc.	913-441-6565
NV	Scottsdale, TRW/ECG	602-994-0441
NH	Framingham, TRW/ECG	617-870-0745
NJ	Bala Cynwyd, TRW/ECG	215-667-3400
NJ	Rowayton, TRW/ECG	203-853-4466
NM	Albuquerque, S.W. Sales	505-883-1388
NY	Fairport, TRW/ECG	716-425-3775
NY	Rowayton, TRW/ECG	203-853-4466
NC	Greensboro, TRW/ECG	919-852-4676
OH	Cincinnati, TRW/ECG	513-521-2290
OH	Cleveland, Robert O. Whitesell	216-447-9020
OH	Columbus, Robert O. Whitesell	614-888-9396
OH	Dayton, Robert O. Whitesell	513-298-9546
PA	Bala Cynwyd, TRW/ECG	215-667-3400
PA	Pittsburg, Robert O. Whitesell	412-963-6161
RI	Westborough, TRW/ECG	617-870-0745
SC	Greensboro, TRW/ECG	919-852-4676
SD	Minneapolis, TRW/ECG	612-854-6616
TN	Knoxville, Robert O. Whitesell	615-694-9476
TX	Austin, Technology Sls. Co.	512-346-9940
TX	Dallas, TRW/ECG	214-248-8000
TX	El Paso, S.W. Sls.	915-594-8259
TX	Houston, TRW/ECG	713-772-5541
UT	Salt Lake City, Straube Assocs.	801-263-2640
VT	Westborough, TRW/ECG	617-870-0745
VA	Richmond, TRW/ECG	804-288-8334
WA	Bellevue, TRW/ECG	206-641-9996
WV	Dayton, Robert O. Whitesell	513-298-9546
WI	Brookfield, TRW/ECG	414-784-7773
WY	Salt Lake City, Straube Assocs.	801-263-2640
WY	Westminster, Straube Assocs.	303-426-0890
Intl	Rio Piedras, Electronics Sls. Assocs.	809-769-2911
Can	Carleton Place, ONT, Renmark Elctrns. Ltd.	613-257-1490
Can	Toronto, ONT, Renmark Elctrns. Ltd.	416-494-5445

Local Distributors

AL	Huntsville, Arrow Elctrns.	205-882-2730
AL	Huntsville, Hall-Mark Elctrns.	205-837-8700
AL	Huntsville, Hamilton-Avnet	205-837-7210
AL	Huntsville, Pioneer Elctrns.	205-837-9300
AZ	Phoenix, Hall-Mark Elctrns.	602-437-1200
AZ	Tempe, Arrow Elctrns.	602-968-4800
AZ	Tempe, Fisher/Brownell	602-967-1464
AZ	Tempe, Hamilton-Avnet	602-231-5100
CA	Alhambra, Fisher/Brownell	818-289-0255
CA	Anaheim, Pacesetter Elctrns.	714-777-4711
CA	Chatsworth, Arrow Elctrns.	818-701-7500
CA	Chatsworth, Avnet Elctrns.	818-700-2600
CA	Costa Mesa, Avnet Elctrns.	714-754-6111
CA	Costa Mesa, Hamilton Electro Sls.	714-641-4100
CA	Culver City, Hamilton Electro Sls.	818-558-2121
CA	El Segundo, Hall-Mark Elctrns.	213-643-9101
CA	Garden Grove, Bell Inds.	714-220-0681
CA	Gardena, Bell Inds.	213-515-1800
CA	Manhattan Beach, Prime Electro	213-379-3642
CA	Sacramento, Hamilton-Avnet	916-925-2216
CA	San Diego, Arrow Elctrns.	619-565-4800
CA	San Diego, Fisher/Brownell	619-560-8545
CA	San Diego, Hall-Mark Elctrns.	619-268-1201
CA	San Diego, Hamilton-Avnet	619-571-7510
CA	San Jose, Hall-Mark Elctrns.	408-946-0900
CA	Santa Clara, Fisher/Brownell	408-988-6041
CA	Sunnyvale, Arrow Elctrns.	408-745-6600
CA	Sunnyvale, Bell Inds.	408-734-8570
CA	Sunnyvale, Hamilton-Avnet	408-743-3355
CA	Sunnyvale, Pacesetter Elctrns.	408-734-5470
CA	Tustin, Arrow Elctrns.	714-838-5422
CO	Aurora, Arrow Elctrns.	303-696-1111
CO	Englewood, Hall-Mark Elctrns.	303-790-1662
CO	Englewood, Hamilton-Avnet	303-740-1000
CO	Wheatridge, Bell Inds.	303-424-1985
CT	Danbury, Hamilton-Avnet	203-797-2800
CT	Wallingford, Arrow Elctrns.	203-265-7741
FL	Altamonte Spring, Pioneer Elctrns.	305-834-9090
FL	Clearwater, Hall-Mark Elctrns.	813-530-4543
FL	Deerfield Beach, Pioneer Elctrns.	305-428-8877
FL	Orlando, Chip Supp. Co.	305-298-7100
FL	Orlando, Hall-Mark Elctrns.	305-855-4020
FL	Palm Bay, Arrow Elctrns.	305-725-1480
FL	Winter Park, Hamilton-Avnet	305-628-3888
GA	Norcross, Arrow Elctrns.	404-449-8252
GA	Norcross, Hall-Mark Elctrns.	404-447-8000
GA	Norcross, Hamilton-Avnet	404-447-7507
GA	Norcross, Pioneer Elctrns.	404-448-1711
IL	Bensenville, Hall-Mark Elctrns.	312-806-3800
IL	Bensenville, Hamilton-Avnet	312-860-7700
IL	Elk Grove Vlg., Pioneer Elctrns.	312-437-9680
IL	Elk Grove Vlg., R M Elctrns.	312-364-6122
IL	Schaumburg, Arrow Elctrns.	312-397-3440
IN	Carmel, Hamilton-Avnet	317-844-9333
IN	Indianapolis, Pioneer Elctrns.	317-849-7300
IN	Indianapolis, R M Elctrns.	317-291-7110
IA	Cedar Rapids, Arrow Elctrns.	319-395-7230
KS	Lenexa, Hall-Mark Elctrns.	913-888-4747
KS	Overland Park, Hamilton-Avnet	913-888-8900
MD	Columbia, Arrow Elctrns.	301-995-0003
MD	Columbia, Hall-Mark Elctrns.	301-988-9800
MD	Columbia, Hamilton-Avnet	301-995-3500
MD	Gaithersburg, Pioneer Elctrns.	301-921-0660
MA	Billerica, Hall-Mark Elctrns.	617-667-0902
MA	Newton, Greene-Shaw Elctrns.	617-969-8900
MA	Norwood, Gerber Elctrns.	617-769-6000
MA	Woburn, Arrow Elctrns.	617-933-8130
MA	Woburn, Hamilton-Avnet	617-935-9700
MI	Ann Arbor, Arrow Elctrns.	313-971-8220
MI	Grand Rapids, Hamilton-Avnet	616-243-8805
MI	Livonia, Hamilton-Avnet	313-522-4700
MI	Livonia, Pioneer Elctrns.	313-525-1800
MI	Wyoming, R M Elctrns.	616-531-9300
MN	Bloomington, Hall-Mark Elctrns.	612-854-3223
MN	Edina, Arrow Elctrns.	612-830-1800
MN	Minnetonka, Hamilton-Avnet	612-932-0600
MN	Minnetonka, Pioneer Elctrns.	612-935-5444
MO	Earth City, Hamilton-Avnet	314-344-1200
MO	Maryland Hts., Hall-Mark Elctrns.	314-291-5350
MO	St. Louis, Arrow Elctrns.	314-567-6888
NH	Manchester, Arrow Elctrns.	603-668-6968
NJ	Cherry Hill, Hall-Mark Elctrns.	609-424-7300
NJ	Cherry Hill, Hamilton-Avnet	609-424-0100
NJ	Fairfield, Arrow Elctrns.	201-575-5300
NJ	Fairfield, Hall-Mark Elctrns.	201-575-4415
NJ	Fairfield, Hamilton-Avnet	201-575-3390
NJ	Marlton, Arrow Elctrns.	609-596-8000
NM	Albuquerque, Arrow Elctrns.	505-243-4566
NM	Albuquerque, Bell Inds.	505-292-2700
NM	Albuquerque, Hamilton-Avnet	505-765-1500
NM	Albuquerque, Intl. Elctrns.	505-345-8127
NY	Hauppauge, Arrow Elctrns.	516-231-1000
NY	Hauppauge, Hamilton-Avnet	516-231-9800
NY	Liverpool, Arrow Elctrns.	315-652-1000
NY	Melville, Arrow Elctrns.	516-694-6800
NY	Port Chester, Zeus Comps.	914-937-7400
NY	Rochester, Arrow Elctrns.	716-275-0300
NY	Rochester, Hamilton-Avnet	716-475-9130
NY	Rochester, Rochester Radio Supp.	716-454-7800
NC	Charlotte, Pioneer Elctrns.	704-527-8188
NC	Raleigh, Arrow Elctrns.	919-876-3132
NC	Raleigh, Hall-Mark Elctrns.	919-872-0712
NC	Raleigh, Hamilton-Avnet	919-878-0819
NC	Winston-Salem, Arrow Elctrns.	919-725-8711
OH	Centerville, Arrow Elctrns.	513-435-5563
OH	Cincinnati, Hall-Mark Elctrns.	513-563-5980
OH	Cleveland, Hamilton-Avnet	216-831-3500
OH	Cleveland, Pioneer Elctrns.	216-587-3600
OH	Dayton, Hamilton-Avnet	513-439-6700
OH	Dayton, Pioneer Elctrns.	513-237-9900
OH	Solon, Arrow Elctrns.	216-248-3990
OH	Westerville, Hall-Mark Elctrns.	614-891-4555
OK	Tulsa, Hall-Mark Elctrns.	918-665-3200
OK	Tulsa, Quality Comps.	918-664-8812
OR	Lake Oswego, Bell Inds.	503-241-4115
OR	Lake Oswego, Hamilton-Avnet	503-635-8157
OR	Tigard, Arrow Elctrns.	503-684-1690
PA	Horsham, Pioneer Elctrns.	215-674-4000
PA	Monroeville, Arrow Elctrns.	412-856-7000
PA	Pittsburgh, Pioneer Elctrns.	412-782-2300
TX	Addison, Quality Comps.	214-733-4300
TX	Austin, Arrow Elctrns.	512-835-4180
TX	Austin, Hamilton-Avnet	512-837-8911
TX	Austin, Pioneer Elctrns.	512-835-4000
TX	Austin, Quality Comps.	512-835-0220
TX	Dallas, Hall-Mark Elctrns.	214-553-4300
TX	Dallas, Intl. Elctrns.	214-233-9323
TX	Dallas, Pioneer Elctrns.	214-386-7300
TX	El Paso, Intl. Elctrns.	915-598-3406
TX	Houston, Arrow Elctrns.	713-530-4700
TX	Houston, Hall-Mark Elctrns.	713-781-6100
TX	Houston, Hamilton-Avnet	713-780-1771
TX	Houston, Pioneer Elctrns.	713-988-5555
TX	Irving, Hamilton-Avnet	214-659-4111
TX	Richardson, Fisher/Brown	214-235-3177
TX	Sugarland, Quality Comps.	713-240-2255
UT	Salt Lake City, Arrow Elctrns.	801-539-1135
UT	Salt Lake City, Bell Inds.	801-972-6969
UT	Salt Lake City, Hamilton-Avnet	801-972-2800
VA	Richmond, Arrow Elctrns.	804-282-0413
WA	Bellevue, Arrow Elctrns.	206-653-4800
WA	Bellevue, Bell Inds.	206-747-1515
WA	Bellevue, Hamilton-Avnet	206-643-3950
WI	New Berlin, Classic Comps.	414-786-5300
WI	New Berlin, Hall-Mark Elctrns.	414-797-7844
WI	New Berlin, Hamilton-Avnet	414-784-4510
WI	Oak Creek, Arrow Elctrns.	414-764-6600
Can	Calgary, Future Elctrns.	403-259-6408
Can	Calgary, Alberta, Hamilton-Avnet	403-230-3586
Can	Edmonton, Future Elctrns.	403-486-0974
Can	Mississauga, Ontario, Hamilton-Avnet	416-677-7432
Can	Nepean, Ontario, Hamilton-Avnet	613-226-1700
Can	Ottawa, Future Elctrns.	613-820-8313
Can	Pointe Clair, Quebec, Future Elctrns.	514-694-7710
Can	St. Laurent, Quebec, Hamilton-Avnet	514-331-6443
Can	Toronto, Future Elctrns.	416-663-5563
Can	Vancouver, Future Elctrns.	604-438-5545
Can	Willowdale, Ontario, Electrosonic	416-494-1555

TRW RESISTIVE PRODUCTS DIV., TRW Electronic Components Grp., 401 N. Broad St., Philadelphia, PA 19108, Tel: 215-923-8230, TWX: 710-670-3370; Empl.: 600; *Dist. Mgr.:* Hugh Bolen .... **A•1954-1957**

Local Sales Offices & Reps

AL	Huntsville, TRW/ECG	205-533-7600
AZ	Scottsdale, TRW/ECG	602-994-0441
CA	Los Angeles, TRW/ECG	213-535-6175
CA	Mountain View, Straube Assocs.	415-969-6060
CA	San Diego, TRW/ECG	619-279-3990

CA	Santa Ana, TRW/ECG	714-550-1101
CA	Woodland Hills, TRW/ECG	818-703-1771
CO	Westminster, Straube Assocs.	303-426-0890
CT	Rowayton, TRW/ECG	203-853-4466
FL	Ft. Lauderdale, TRW/ECG	305-772-3000
FL	Orlando, TRW/ECG	305-857-3650
GA	Norcross, TRW/ECG	404-447-6154
IL	Chicago, TRW/ECG	312-693-7730
IN	Ft. Wayne, R. O. Whitesell & Assocs.	219-432-5591
IN	Indianapolis, R. O. Whitesell & Assocs.	317-359-9283
IN	Kokomo, R. O. Whitesell & Assocs.	317-457-9127
KS	De Soto, Midtec Assocs.	913-441-6565
KY	Louisville, R. O. Whitesell & Assocs.	502-426-7696
MD	Columbia, TRW/ECG	301-964-9110
MA	Westborough, TRW/ECG	617-870-0745
MI	Grand Rapids, R. O. Whitesell & Assocs.	616-942-5420
MI	Southfield, R. O. Whitesell & Assocs.	313-559-5454
MI	St. Joseph, R. O. Whitesell & Assocs.	616-983-7337
MN	Minneapolis, TRW/ECG	612-854-6616
MO	St. Louis, Jack Macke Co.	314-432-2830
NY	Fairport, TRW/ECG	716-425-3775
NC	Greensboro, TRW/ECG	919-852-4676
OH	Cincinnati, R. O. Whitesell & Assocs.	513-521-2290
OH	Cleveland, R. O. Whitesell & Assocs.	216-447-9020
OH	Columbus, R. O. Whitesell & Assocs.	614-888-9396
OH	Dayton, R. O. Whitesell & Assocs.	513-298-9546
OR	Portland, TRW/ECG	503-620-5032
PA	Bala Cynwyd, TRW/ECG	215-667-3400
PA	Pittsburgh, R. O. Whitesell & Assocs.	412-963-6161
TN	Greeneville, R. O. Whitesell & Assocs.	615-639-6154
TX	Austin, Technlg. Sls. Co.	512-345-2331
TX	Dallas, TRW/ECG	214-248-8000
TX	El Paso, S. W. Sales	915-594-8259
TX	Houston, TRW/ECG	713-772-5541
UT	Salt Lake City, Straube Assocs.	801-263-2640
VA	Richmond, TRW/ECG	804-288-8334
WA	Bellevue, TRW/ECG	206-641-1996
WI	Brookfield, TRW/ECG	414-784-7773

Local Distributors

AL	Huntsville, Arrow Elctrns.	205-882-2730
AL	Huntsville, Hamilton/Avnet	205-837-7210
AZ	Tempe, Arrow Electronics	602-968-4800
AZ	Tempe, Bell Inds.	602-966-7800
AZ	Tempe, Fisher Brownell	602-967-1464
AZ	Tempe, Hamilton/Avnet	602-231-5100
CA	Alhambra, Fisher Brownell	818-289-0255
CA	Chatsworth, Arrow Elctrns.	213-701-7500
CA	Chatsworth, Avnet Elctrns.	818-700-2600
CA	Chatsworth, Hamilton Electro Sls.	818-700-6500
CA	Costa Mesa, Avnet Elctrns.	714-754-6111
CA	Costa Mesa, Hamilton Electro Sls.	712-641-4100
CA	Culver City, Hamilton Electro Sls.	213-558-2121
CA	Gardena, Bell Inds.	213-515-1800
CA	Glendale, R. V. Weatherford	213-849-3451
CA	Hayward, Arrow Elctrns.	415-487-4600
CA	Ontario, Hamilton/Avnet	714-989-4602
CA	Sacramento, Arrow Electronics	916-925-7456
CA	Sacramento, Hamilton/Avnet	916-925-2216
CA	San Diego, Arrow Elctrns.	619-565-4800
CA	San Diego, Fisher Brownell	619-560-8545
CA	San Diego, Hamilton/Avnet	619-571-7510
CA	Santa Clara, Fisher Brownell	408-988-6041
CA	Sunnyvale, Arrow Elctrns.	408-745-6600
CA	Sunnyvale, Bell Inds.	408-734-8570
CA	Sunnyvale, Hamilton/Avnet	408-743-3355
CA	Tustin, Arrow Electronics	714-838-5422
CO	Aurora, Arrow Elctrns.	303-696-1111
CO	Englewood, Hamilton/Avnet	303-779-9998
CT	Danbury, Hamilton/Avnet	203-797-2800
CT	Wallingford, Arrow Elctrns.	203-265-7741
CT	Wallingford, Midan Elctrns.	203-265-2077
FL	Clearwater, Arrow Elctrns.	813-576-8995
FL	Deerfield Beach, Arrow Elctrns.	305-429-8200
FL	Ft. Lauderdale, Hamilton/Avnet	305-971-2900
FL	Palm Bay, Arrow Elctrns.	305-725-1480
FL	St. Petersburg, Hamilton/Avnet	813-576-3930
FL	Tampa, Impala Elctrns.	813-885-4747
FL	Winter Park, Hamilton/Avnet	305-628-3888
GA	Norcross, Arrow Elctrns.	404-449-8252
GA	Norcross, Hamilton/Avnet	404-447-7507
IL	Bensenville, Hamilton/Avnet	312-860-7700
IL	Chicago, Newark Elctrns.	312-638-4411
IL	Elk Grove Village, Bell Inds.	312-640-1910
IL	Schaumburg, Arrow Elctrns.	312-397-3440
IN	Carmel, Hamilton/Avnet	317-844-9333
IN	Indianapolis, Arrow Elctrns.	317-243-9353
IN	Indianapolis, Graham Elctrns.	317-634-8202
IA	Cedar Rapids, Arrow Elctrns.	319-395-7203
IA	Cedar Rapids, Deeco	319-365-7551
IA	Cedar Rapids, Hamilton/Avnet	319-362-4757
KS	Overland Park, Arrow Electrns.	913-642-0592
KS	Overland Park, Hamilton/Avnet	913-888-8900
MD	Columbia, Arrow Elctrns.	301-995-0003
MD	Columbia, Hamilton/Avnet	301-995-3500
MD	Timonium, Zebra Elctrns.	301-252-6576
MA	Norwood, Gerber Elctrns.	617-769-6000
MA	Wilmington, R.C. Components	617-273-1860
MA	Woburn, Arrow Elctrns.	617-933-8130
MA	Woburn, Hamilton/Avnet	617-273-7500
MI	Ann Arbor, Arrow Elctrns.	313-971-8220
MI	Grand Rapids, Arrow Elctrns.	616-243-0912
MI	Grand Rapids, Hamilton/Avnet	616-243-8805
MI	Livonia, Hamilton/Avnet	313-522-4700
MI	Livonia, R.S. Elctrns.	313-525-1155
MN	Edina, Arrow Elctrns.	612-830-1800
MN	Minnetonka, Hamilton/Avnet	612-932-0600
MO	Earth City, Hamilton/Avnet	314-344-1200
MO	St. Louis, Arrow Elctrns.	314-567-6888
NH	Manchester, Arrow Elctrns.	603-668-6968
NH	Manchester, Hamilton/Avnet	603-624-9400
NJ	Cherry Hill, Hamilton/Avnet	609-424-0100
NJ	Fairfield, Arrow Elctrns.	201-575-5300
NJ	Fairfield, Hamilton/Avnet	201-575-3390
NJ	Hanover, State Elctrns.	201-887-2550
NJ	Marlton, Arrow Elctrns.	609-596-8000
NJ	Mountainside, Enox Resistors	201-654-7600
NM	Albuquerque, Arrow Elctrns.	505-243-4566
NM	Albuquerque, Hamilton/Avnet	505-765-1500
NM	Albuquerque, Intl. Elctrns.	915-778-9761
NY	Hauppauge, Arrow Elctrns.	516-231-1000
NY	Hauppauge, Hamilton/Avnet	516-231-9800
NY	Hauppauge, Jaco Elctrns.	516-273-5500
NY	Liverpool, Arrow Elctrns.	315-652-1000
NY	Rochester, Arrow Elctrns.	716-275-0300
NY	Rochester, Hamilton/Avnet	716-475-9130
NY	Rochester, Rochester Radio	716-454-7800
NC	Charlotte, Elctrn. Mktg. Corp.	704-394-6195
NC	Raleigh, Arrow Elctrns.	919-876-3132
NC	Raleigh, Hamilton/Avnet	919-878-0819
NC	Raleigh, Resco/Raleigh	919-781-5700
NC	Winston-Salem, Arrow Elctrns.	919-725-8711
OH	Cleveland, Hamilton/Avnet	216-831-3500
OH	Columbus, Arrow Elctrns.	614-885-8362
OH	Columbus, Electronic Mktg.	614-299-4161
OH	Dayton, Arrow Elctrns.	513-435-5563
OH	Dayton, Bell Inds.	513-434-8231
OH	Dayton, Elctrn. Mktg. Corp.	513-439-4711
OH	Dayton, Hamilton/Avnet	513-439-6700
OH	Highland Hgts, Elctrn. Mktg. Corp.	216-442-3441
OH	Solon, Arrow Elctrns.	216-248-3990
OH	Westerville, Hamilton/Avnet	614-882-7004
OK	Tulsa, Arrow Elctrns.	918-665-7700
OR	Lake Oswego, Hamilton/Avnet	503-635-8157
OR	Tigard, Arrow Elctrns.	503-684-1690
PA	Monroeville, Arrow Elctrns.	412-856-7000
PA	Philadelphia, Philadelphia Elctrns.	215-568-7400
PA	Pittsburgh, Hamilton/Avnet	412-281-4150
PA	Wayne, Peak Elctrns.	215-293-9000
TX	Austin, Arrow Elctrns	512-835-4180
TX	Austin, Hamilton/Avnet	512-837-8911
TX	Carrollton, Arrow Elctrns.	214-380-6464
TX	Dallas, Intl. Elctrns.	214-233-9323
TX	El Paso, Intl. Elctrns.	915-778-9761
TX	Houston, Arrow Elctrns.	713-530-4700
TX	Houston, Hamilton/Avnet	713-780-1771
TX	Irving, Hamilton/Avnet	214-659-4100
TX	Richardson, Fisher Brownell	214-235-3177
TX	Richardson, Jaco Elctrns.	214-235-9575
UT	Salt Lake City, Arrow Elctrns.	801-972-0404
UT	Salt Lake City, Hamilton/Avnet	801-972-2800
VA	Richmond, Arrow Elctrns.	804-282-0413
WA	Bellevue, Arrow Elctrns.	206-643-4800
WA	Bellevue, Hamilton/Avnet	206-643-3950
WA	Bellevue, Priebe Elctrns.	206-821-4695
WI	Milwaukee, Marsh Elctrns.	414-475-6000
WI	New Berlin, Hamilton/Avnet	414-784-4510
WI	Oak Creek, Arrow Elctrns.	414-764-6600

TRW, RF Devices Div., 14520 Aviation Blvd., Lawndale, CA 90260, Tel: 213-536-0888, TWX: 910-325-6206; Empl.: 1000; *Dist. Mgr.:* G. Vegvari

TRW UTC TRANSFORMERS, See TRW Inductive Products Div.

TS PRODUCTS, INC., 12455 Branford St., Bldg. 22, Arleta, CA 91331, Tel: 818-896-6676; Empl.: 20; *Sls. Mgr.:* Jon Thomasson; *Dist. Mgr.:* Jon Thomasson .... **D•1990**

Local Sales Offices & Reps

CA	Los Angeles, TS Products, Inc.	818-896-6676
CA	San Marino, Motion Control, Inc.	818-796-0189

TTE, INC., 11650 W. Olympic Blvd., Los Angeles, CA 90064, Tel: 213-478-8224; FSC No.: 07766; *Sls. Mgr.:* S. J. Sodaro .... **A•1644-1655**

Local Sales Offices & Reps

CA	Culver City, Sodaro	213-478-7733

TTS-TELECOM TERMINAL SYSTEMS, 621 Hindry Ave, Inglewood, CA 90301, Tel: 213-641-8111, Telex: 182405, TWX: 3715831; Empl.: 18; *Sls. Mgr.:* L. Winters

TUCKER ELCTRNS., Box 461966, Garland, TX 75046, Tel: 214-348-8800, 800-527-4642, Telex: 79-1726; Empl.: 51; *Sls. Mgr.:* Clay Aclin

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TUNGSTONE BATTERIES, INC., 18 Billings St., Sharon, MA 02067, Tel: 617-784-2000, Telex: 951908; Empl.: 8; *Sls. Mgr.:* J. McMahon

TURNER DESIGNS, 2247 Old Middlefield Way, Mountain View, CA 94043-2489, Tel: 415-965-9800; Empl.: 16; *Sls. Mgr.:* John Griffin

Local Sales Offices & Reps

CA	Garden Grove, Advanced Digital Grp.	714-897-0319
CA	Santa Clara, MANCO	408-496-6611
CO	Wheat Ridge, Active Component Tech.	303-422-9229
MD	Baltimore, Rep-Tron, Inc.	301-799-7490
MA	North Reading, Martindale Assocs.	617-942-0514
NY	Fayetteville, Martin P. Andrews	315-637-5291
TX	Addison, Active Component Tech.	214-980-1888
TX	Austin, Active Component Tech.	512-452-5254

TUSONIX

TUSONIX, INC., 7741 N. Business Park Drive, P. O. Box 37144, Tucson, AZ 85740-7144, Tel: 602-744-0400, Telex: 102-299640, TWX: 310-299640; FSC No.: 59660; Empl.: 800; *Sls. Mgr.:* Robert H. Jones; *Dist. Mgr.:* John H. Ohlrich .... **A•1187-1193, 1656-1657**

Local Sales Offices & Reps

AZ	Tucson, Tusonix, Inc.	602-744-0400
CA	N. Hollywood, Tusonix, Inc.	213-509-0449
CA	Redwood City, James S. Heaton Co.	415-367-9000
FL	Winter Park, Tusonix	305-647-2936
IA	Cedar Rapids, J.R. Sls. Engrg.	319-393-2232
MA	Andover, Richard Purinton, Inc.	617-475-7055
NY	Webster, Tusonix, Inc.	716-671-4073
NC	Greensboro, Tusonix, Inc.	919-292-4286
OR	Portland, Tusonix, Inc.	503-297-1555
TX	Ft. Worth, P.T.I.	817-831-0441

Local Distributors

FL	Ft. Lauderdale, Newark Elctrns.	350-587-2372
IL	Chicago, Newark Elctrns.	312-638-4411
MD	Beltsville, Resco	301-937-9100
MD	White Marsh, Resco	301-529-0500
MN	Minneapolis, Newark Elctrns.	612-331-6350
NY	Hauppauge, Fairmont Elctrn. Sls.	516-231-3313
NY	Melville, Arrow Elctrns.	516-694-6800
NC	Raleigh, Resco	919-781-5700

TUSTIN ELCTRNS. CO., 1431 E. Saint Andrews Pl., Santa Ana, CA 92705, Tel: 714-549-0391; FSC No.: 7025-0010; *Sls. Mgr.:* Saul Tunkelrott

TWP, INC., 2133 4th St., Berkeley, CA 94710, Tel: 415-548-4434, Telex: 171-267; Empl.: 10; *Sls. Mgr.:* R. Moreno

TYCO INSTR. DIV., See Data Instrs.

TYTON CORP., Box 23055, 7930 N. Faulkner Rd., Milwaukee, WI 53223, Tel: 414-355-1130, TWX: 910-262-3094; *Sls. Mgr.:* Tom Bednar

UBER GRAFIC INSTRS., Box 4, Palo Alto, CA 94302, Tel: 415-327-4732; Empl.: 2

UCCEL CORPORATION, UCCEL Tower Exchange Park, Dallas, TX 75235, Tel: 214-353-7100, TWX: 910-861-4990; Empl.: 1381 (U.S.) 644 (Foreign)

UCE, INC., 24 Fitch St, Norwalk, CT 06855, Tel: 203-838-7509; Empl.: 20; *Sls. Mgr.:* Richard Eicher

Local Sales Offices & Reps

CA	Fullerton, Electronic Comp. Mkt.	714-879-9460
CA	Mountain View, Leddy Assocs.	415-969-6313
CO	Denver, Butler Tech. Sls.	303-343-3787
IA	Cedar Rapids, Coombs Assocs.	319-362-4116
TX	Richardson, Eagle Mktg.	214-238-5383

UID SWITCHES INC., Sub. of ITW, 6615 W. Irving Park Rd., Chicago, IL 60634, Tel: 312-282-4040, Telex: 4330130, TWX: 910-221-0275; Empl.: 250; *Sls. Mgr.:* A. Steiner; *Dist. Mgr.:* A. Steiner

ULTRA CARBON, Box X-924, Bay City, MI 48707, Tel: 517-894-2911, TWX: 810-265-1222; Empl.: 200; *Sls. Mgr.:* R. J. Anthony

ULTRAPAR, 90 Liberty Corner Road, Warren, NJ 07060-6709, Tel: 201-647-6650; Empl.: 1; *Sls. Mgr.:* Chris Parkinson

Local Sales Offices & Reps

CT	Northford, Indeco	203-484-0093
GA	Norcross, Alup America	404-446-3614
PA	Wallingford, Eled	215-566-7595
RI	Smithfield, Alcom	401-232-0119

ULTRONIX, INC., P.O. Box 1090, Grand Junction, CO 81502, Tel: 303-242-0810, TWX: 910-929-6965; FSC No.: 05347; Empl.: 260; *Sls. Mgr.:* Gerald Krebill; *Dist. Mgr.:* Gerald Krebill .... **A•1958-1965**

Local Sales Offices & Reps

AZ	Phoenix, Howe & Howe Sls.	602-264-7971
CA	Anaheim, Westrep	714-527-2822
CA	San Diego, Westrep	619-566-6580
CA	Santa Clara, Westrep	408-988-8833
CO	Denver, West Inc.	303-773-8180
IL	Elk Grove Village, Parcom	312-228-6360
IA	Cedar Rapids, Stan Clothier Co.	319-395-0245
KS	Parker, S. W. Wollard Co.	913-898-6552
MA	Newton Upper Falls, Anchor Engrg.	617-964-6205
MN	Minneapolis, S. Clothier Co.	612-944-3456
MO	St. Louis, Abrams & Assoc.	314-569-0447
NJ	Cherry Hill, Danco Corp.	609-424-5590
NM	Albuquerque, West, Inc.	505-822-8901
NY	Jericho, J-Square Mktg.	516-935-3200
NY	Rochester, Apex Assocs.	716-254-6050
TX	Austin, O. M. Sls.	512-452-1838
TX	Houston, O. M. Sls.	713-789-4426
TX	Richardson, O. M. Sls.	214-690-6746
EXP	CT, Stamford, Dage Corp.	203-324-3123

Local Distributors

CA	North Hollywood, T.T.I., Inc.	213-982-0201
CA	San Fernando, Petell Electronics	213-365-3984
FL	Orlando, Hammond Elctrns.	305-849-6060
FL	Orlando, T.T.I-2	305-859-1000
FL	Tampa, Impala Elctrns.	813-885-4747
MD	Columbia, Azteck Elctrns.	301-995-1760
MA	Burlington, TLC Elctrns.	617-273-0140
MA	Woburn, T.T.I., Inc.	617-938-8800
NY	Farmingdale, SAI, Inc.	516-293-2710
OH	Dayton, Electro-Line	513-461-5683
TX	Fort Worth, Allied Elctrns.	817-336-5401
TX	Fort Worth, T.T.I., Inc.	800-433-7092
WA	Kent, Shannon Ltd.	206-763-0545

ULVAC NORTH AMERICA, P.O. Box 799, 105 York Street, Kennebunk, ME 04043, Tel: 207-985-2973, Telex: 94-4344, TWX: 510-299-0007; Empl.: 35; *Sls. Mgr.:* Susan Zilaro; *Dist. Mgr.:* Harold Baum

ULVECO, INC., 323 Vintage Park Drive, Foster City, CA 94404, Tel: 415-574-1100, TWX: 856446 ULVECO .... **A•2338-2339**

Local Sales Offices & Reps

CA	Foster City, Ulveco, Inc.	415-574-1100
CT	Avon, Ulveco, Inc.	203-678-7711
MI	Detroit, CMP	313-477-7700
NJ	Cherry Hill, Power2	609-424-6737
NY	Rochester, KLM Garner	716-381-8350
NY	Rochester, Ulveco, Inc.	716-381-4673
NY	Syracuse, KLM Garner	315-458-6214
OH	Cleveland, CMP	216-779-5100
OH	Dayton, CMP	513-836-0951
PA	Pittsburgh, CMP	412-372-4415
Can	Toronto, Ont., Stetron Intl.	416-475-6202

UNARCO-ROHN, See UNR-Rohn

UNDERWRITERS SAFETY DEVICE, Allied Amphenol Prods., 7300 W. Wilson Ave., Chicago, IL 60656, Tel: 312-867-4600, TWX: 910-221-3474; Empl.: 200; *Sls. Mgr.:* J. A. VanCura; *Dist. Mgr.:* R. S. Heyne

UNGAR, Div. Eldon Inds., Inc., 100 W. Manville St., Compton, CA 90224-6005, Tel: 213-774-5950, Telex: 4720750 Eldon; FSC No.: 78976; Empl.: 140; *Sls. Mgr.:* George Mellevold

UNHOLTZ-DICKIE CORP., 6 Brookside Dr., Wallingford, CT 06492, Tel: 203-265-3929, Telex: 643802; Empl.: 49

UNIBOX, Div. of Amerex, P.O. Box 2815, Riverside, CA 92516, Tel: 714-686-1400; *Sls. Mgr.:* Roger Orton

UNICO, 3725 Nicholson Rd., Franksville, WI 53126-0505, Tel: 414-886-5678, TWX: 910-271-2385; Empl.: 175; *Sls. Mgr.:* Eric Hogse

UNICORN ENGRG. CO., Membrane Keyboard Div., 6201 Harwood Ave., Oakland, CA 94618, Tel: 415-428-1626; *Sls. Mgr.:* Steve Gensler

UNICORP, 291 Cleveland St., Orange, NJ 07050, Tel: 201-674-1700; FSC No.: 04729; Empl.: 82; *Sls. Mgr.:* B. Levine .... **C•1696**

Local Sales Offices & Reps

AL	Tuscumbia, MSC Corp.	205-383-6850
CA	South Gate, James E. Fitch	213-563-2336
IL	Palatine, Claeson Assocs.	312-359-7230
MA	Shrewsbury, Nordstrom Assocs.	617-842-8646
MI	Farmington, Amtech Rep.	313-474-8300
MN	Bloomington, Termatech	612-854-2001
OH	Centerville, EMA, Inc.	513-433-2800
PA	Media, The Balwin Co.	215-565-6044

UNIDOT, INC., 602 Park Point Dr., Golden, CO 80401, Tel: 303-526-9263, Telex: RCA-296621

UNILATOR TECHNICAL CERAMICS INC., 6290 Sunset Blvd., Ste. 1126, Los Angeles, CA 90028-8770, Tel: 213-463-5618, TWX: 910 321-2903; *Sls. Mgr.:* Norman R. Sutherland

UNIMAX SWITCH CORP., Ives Rd., Wallingford, CT 06492, Tel: 203-269-8701, Telex: 96-3485, TWX: 710-476-1397; FSC No.: 80207; Empl.: 300; *Dist. Mgr.:* Neil Gould .... **B•1702**

Local Sales Offices & Reps

AZ	Phoenix, Mercury Engrg. Sls., Inc.	602-244-0123
CA	Brea, MASCO	714-529-0866
CA	Los Altos, Ewing-Foley	415-941-4525
CA	Los Angeles, MASCO	213-295-7781
CO	Englewood, CompuTech Mktg.	303-773-2981
CT	Ansonia, Zaslow Sls.	203-735-9581
CT	Bloomfield, Zaslow Sls.	203-242-7781
FL	Tampa, J. R. Controls	813-961-9478
IL	Lisle, Wasson-Gallagher	312-963-5954
IN	Ft. Wayne, O. H. Bromberg & Assocs.	219-744-1636
KY	Louisville, O. H. Bromberg & Assocs.	502-245-8916
MD	Silver Spring, L. G. White & Co.	301-434-1555
MD	Silver Spring, NKA, Inc.	301-585-6141
MA	Norton, Zaslow Sls.	617-285-3992
MA	Westboro, Zaslow Sls.	617-393-8150
MI	Grosse Pointe Park, Greiner Assocs.	313-499-0188
MN	Minneapolis, Jos-Co. Sls. Engrg.	612-861-3343
MO	St. Louis, Hill & Co.	314-432-1136
NH	Londonderry, Zaslow Sls.	603-432-8907
NJ	West Caldwell, Grimm, Siegel Assocs.	201-575-9300
NY	E. Syracuse, Nycom	315-437-8343
NY	Williamsville, Nycom	
NC	Winston-Salem, L. G. White & Co.	919-725-3612
OH	Cincinnati, O. H. Bromberg & Assocs.	513-771-9333
OH	Dayton, O. H. Bromberg & Assocs.	513-434-8788
OH	Medina, J. C. Hofstetter Co.	216-241-4880
PA	Edgemont, White-Whiddett	215-353-6343
PA	Hickory, J. C. Hofstetter Co.	412-356-2305
SC	Greenville, L. G. White & Co.	803-271-0630
SC	Greenville, Sunbelt Sls.	803-877-0771
TN	Taft, Sunbelt Sls.	615-425-6164
TX	Bedford, W. Pat Fralia Co.	817-267-3577
VA	Richmond, L. G. White & Co.	804-740-7093
WA	Mercer Island, J. H. Andersen	206-232-0484

Local Distributors

AL	Decatur, Forbes Distr. Co.	205-353-4762
AL	Montgomery, Southern Controls	205-277-5030
AK	Anchorage, Alaska Elctrns.	907-563-3774
AZ	Phoenix, Continental Light & Supp.	602-263-6000
AZ	Phoenix, Electro Comps.	602-258-2665
AZ	Tempe, Electronic Supp.	602-258-4769
AR	Fort Smith, Southern Elec.	501-646-5500
CA	Belmont, Arndt Elctrns.	415-592-6718
CA	Belmont, Lo Dan Elctrns.	415-592-4600
CA	Covina, Selecta Switch	213-915-3409, 213-967-4123
CA	Fountain Valley, Components Ctr.	213-582-0667
CA	Gardena, California Switch & Signal	213-538-9830
CA	Inglewood, Newark Elctrns.	213-671-7066
CA	Los Angeles, Master Distrs.	213-829-4656
CA	Riverside, Electronic Supp.	714-683-7300
CA	Sacramento, Dunlap Elctrns.	916-442-5801
CA	San Diego, Electronic Supp.	619-693-8222
CA	San Jose, Cypress Elctrns.	408-945-8400
CA	Santa Monica, Master Distrs.	213-452-1229, 213-829-4656
CA	Torrance, Cypress Elctrns.	213-533-6005
CA	Van Nuys, Pacific Switch	213-873-4802
CO	Denver, Fistell's Elec. Supp.	303-629-1312
CO	Denver, Newark Elctrns.	303-757-3351
CO	Wheat Ridge, Cypress	303-431-2622
CT	East Haven, J.V. Elctrns.	203-469-2321
CT	Hartford, Atlantic Switch Controls	203-525-6907
CT	Taftville, Atlantic Switch	203-887-1639
CT	Wallingford, Sager Elect.	203-265-4600
FL	Hialeah, Atlas Elec. Supp.	305-885-8941
FL	Lakeland, Switch Controls	813-644-7564
FL	Largo, Lodan Elctrns.	813-586-2851
FL	Miami, Electronic Equip.	305-871-3500
GA	Macon, Quality Bearing Co.	912-746-5655
IL	Arlington Hgts., Lo Dan Elctrns.	312-398-5311
IL	Carol Stream, Connectrix	312-653-1460, 800-323-9431
IL	Carol Stream, Lectro Comps.	312-690-0520
IL	Chicago, Newark Elctrns.	312-638-4411
IA	West Des Moines, Ramco	515-225-6933
KS	Emporia, Emporia Elec., Inc.	316-342-2965
KY	Louisville, Main Elect. Equip.	502-587-6511
LA	Harvey, AFG Elctrns.	504-368-9696
LA	New Orleans, William B. Allen Supp.	504-525-8222
ME	Portland, Rockingham Elect. Supp.	207-772-4614
MA	Hingham, Sager Elec. Supp.	617-749-6700
MI	Battlecreek, Great Lakes Elctrns.	616-731-4156
MI	Oak Park, Newark Elctrns.	313-967-0600
MI	St. Claire Shores, Specialties Mfg. Co.	313-771-2700
MN	Hopkins, Joel Co.	612-935-6202
MN	Minneapolis, Newark Elctrns.	612-331-6350
MO	Maryland Hgts., Western Extralite	314-432-4560
NH	Nashua, Atlantic Switch	603-732-8500
NH	Salem, Sager Elec.	603-898-1348
NJ	Audubon, Universal Elctrn. Supp.	215-627-4646, 609-547-3430
NJ	Fair Lawn, Relay Specialities	201-797-3313
NJ	Mt. Laurel, Jerseyswitch	609-778-8190
NJ	Paterson, Feldman Bros. Elec. Supp.	201-742-7330
NY	Bohemia, Key Comps.	516-567-7500
NY	Buffalo, Summit Distrs.	716-884-3450
NY	Geneva, Gersh	315-789-4505
NY	Hempstead, Elctrn. Equip.	516-538-5510
NY	Rochester, Summit Elctrns.	716-334-8110
NY	Sodus, AED Distrs.	315-483-6561
NY	Woodside, Switches Unltd.	212-478-5000
NC	Charlotte, Dixie Elctrns.	704-377-4348
NC	Winston-Salem, Kirkman Elect.	919-722-9131
OH	Cincinnati, Cartessa Corp.	513-385-7700
OH	Cincinnati, Institutional Svc. Parts	513-242-3139
OH	Cincinnati, Rilco	513-474-5400
OH	Columbus, Ohio Switch	614-885-0319
OH	Valley View, Trexon Elctrns.	216-447-1050
OK	Tulsa, Radio, Inc.	918-587-9123
OR	Portland, Johnstone	503-231-4833
PA	Allentown, Lehigh Elctrns.	215-433-3045
PA	Drexel Hill, Kass Elctrn. Dist.	215-789-7700
PA	Philadelphia, Herbach & Rademan	215-426-1700
PA	Pittsburgh, Alder-tronics	412-821-5565
SC	Columbia, Dixie Elctrns.	803-779-5332
TX	Dallas, Cypress Elctrns.	214-869-1435
TX	Dallas, Texaswitch	214-357-1768
TX	Dallas, Watson Elec. Supp. Co.	214-742-8441
TX	Dallas, Wilkinson Bros.	214-941-9963
TX	El Paso, Ideal Indl. Elctrn. Supp.	915-779-6647
TX	Garland, Newark Elctrns.	214-494-5911
TX	Houston, Newark Elctrns.	713-782-4800
TX	San Antonia, Purvis Bearing	512-299-1010
TX	Waco, Hargis Co.	817-754-5667
TX	Waco, Purvis Bearing	817-753-6477
VA	Alexandria, Techn. Distrs.	703-971-8979
VA	Roanoke, Peoples Elctrn. Supp.	703-342-8933
WI	Mequon, Taylor Elec.	414-241-4321
Can	Burlington, Ont., Motion Controls	416-637-9369
Can	Vancouver, B.C., Canadian Dynamics	604-872-8106

EVEREADY ENERGIZER®

UNION CARBIDE CORPORATION

UNION CARBIDE CORPORATION, Battery Prods. Div., 39 Old Ridgebury Road, Danbury, CT 06817-0001, Tel: 203-794-7548 .... **D•1440-1441**

Local Sales Offices & Reps

CA	San Francisco	415-875-2800
CT	Danbury, Military & Govt. App. Only	203-794-7547
GA	Norcross	404-446-2400
IL	Itasca	312-773-3444
NJ	Saddle Brook	201-845-5400
OH	Middleburg Hgts.	216-826-4444
TX	Dallas	214-241-9100

UNION CARBIDE CORP., ELCTRNS. DIV., Component Dept., Box 5928, Greenville, SC 29606, Tel: 803-963-6348, Telex: 57-0496, TWX: 810-287-2536; FSC No.: 31433; *Sls. Mgr.:* Robert Taylor; *Dist. Mgr.:* Dan Manly .... **A•1106-1107**

Refer to Kemet, Union Carbide Corp., Elctrns. Div. for sales office information and for distributor listings.

UNION CARBIDE CORPORATION, Elctrns. Div., Crystal Prods. Dept., 9320 Chesapeake Dr., Ste. 104, San Diego, CA 92123, Tel: 619-279-4500, Telex: 695-465; Empl.: 125; *Sls. Mgr.:* J. J. Beeman

UNION ETCHANTS INTL., INC., 8-10 Green St., Bldg. G, Woburn, MA 01801, Tel: 617-935-8878

UNIQ DIGITAL TECHNOLOGIES, 28 S. Water Street, Batavia, IL 60510, Tel: 312-879-1008, Telex: 721467; Empl.: 50

UNIQUE OPTICAL CO., Diversified Optical Corp., P.O. Box 585, Farmingdale, NY 11735, Tel: 516-420-0288, TWX: 510-224-6598; Empl.: 20

UNITED CHEMI-CON UNITED CHEMI-CON

UNITED CHEMI-CON INC., 9801 W. Higgins Rd., Rosemont, IL 60018, Tel: 312-696-2000, Telex: 28-3557, TWX: 910-253-2964; Empl.: 50; *Sls. Mgr.:* Dick Keats; *Dist. Mgr.:* Peter Ishu .... **A•1194-1197**

Local Sales Offices & Reps

NJ	Medford, Jack McCoy, Inc.	609-953-0770
AL	Huntsville, R. D. Whitesell	205-883-5110
CA	Culver City, DeAngelo, Rothman Co.	213-827-2202
CA	Mountain View, Straube Assocs.	415-969-6060
CO	Westminster, Straube Assocs. Mountain States, Inc.	303-426-0890
CT	Connecticut, John E. Boeing	203-723-2355
FL	Altamonte Springs, Semtronic Assocs., Inc.	305-831-8233
FL	Clearwater, Semtronic Assocs., Inc.	813-461-4675
FL	Ft. Lauderdale, Semtronic Assocs., Inc.	305-731-2484
GA	Norcross, Twentieth Century	404-446-1999
ID	Boise, Cascade Comps., Inc.	208-343-9886
IL	Chicago, M. Gottlieb Assocs.	312-775-1151
IL	Elk Grove Village, John G. Twist Co.	312-593-0200
IN	Fort Wayne, R. O. Whitesell	219-432-5591
IN	Indianapolis, M. Gottlieb Assocs.	314-846-5788
IN	Indianapolis, R. O. Whitesell	317-359-9283
IN	Kokomo, M. Gottlieb Assocs.	317-455-0444
IN	Kokomo, R. O. Whitesell	317-457-9127
KS	Shawnee Mission, Lowell Kangas & Assocs., Inc.	913-631-3515
KY	Louisville, R. D. Whitesell	502-426-7696
MD	Baltimore, Pro-Rep, Inc.	301-653-3600
MA	Lexington, John E. Boeing Co., Inc.	617-862-2500
MI	Grand Rapids, R. O. Whitesell	616-942-5420
MI	Southfield, M. Gottlieb Assocs.	313-569-5501
MI	Southfield, R. O. Whitesell	313-559-5454
MI	St. Joseph, R. O. Whitesell	616-983-7337
MN	Bloomington, Twist Co.	612-835-2120
NM	Albuquerque, Straube Assocs. Mountain States, Inc.	303-426-0890
NY	Jamaica, S-J Assocs., Inc.	212-291-3232
NY	New York, Caravan Sls., Corp.	212-734-5800
NY	Pittsford, Franklin Sls. Corp.	716-248-8251
NC	Greensboro, Caravan Sls.	919-294-1500
NC	Raleigh, Tingen Tech Sls., Inc.	919-878-4440
OH	Cincinnati, Makin Assoc.	513-871-2424
OH	Columbus, Makin Assoc.	513-871-2424
OK	Tulsa, ION Assocs., Inc.	918-664-0186
OR	Portland, Earl & Brown	503-245-2283
PA	Dowington, Jack McCoy Inc.	215-363-0350
PA	Pittsburgh, R. O. Whitesell	412-963-6161
TN	Knoxville, M. Gottlieb Assocs.	615-966-1314
TN	Knoxville, R. O. Whitesell	615-694-9476
TX	Austin, ION Assocs., Inc.	512-331-7251
TX	Grand Prairie, ION Assocs., Inc.	214-647-8225
TX	Houston, ION Assocs., Inc.	713-977-4354
UT	Salt Lake City, Straube Assocs. Mountain States, Inc.	801-263-2640
WA	Seattle, Earl & Brown	206-284-1121
WI	Brookfield, Twist Co.	414-782-2670
Can	Oakville, Ont., Haltronics, Ltd.	416-844-2121

Local Distributors

AL	Huntsville, Contact Elctrn. Inc.	205-881-9321
AZ	Tempe, Bell Inds.	602-966-7800
CA	Chatsworth, QC Comps.	818-700-2622
CA	Garden Grove, National Capacitor Corp.	714-892-7749
CA	San Diego, Bell Inds.	619-268-1277
CA	Santa Ana, Nesco	714-541-6181
CA	Santa Ana, Projections Unltd., Inc.	714-621-2323
CA	Van Nuys, Nesco	818-781-0505
CO	Wheatridge, Bell Inds.	303-424-1985
CT	Pawcatuck, Glynn Elctrns.	203-599-5373
FL	Fort Lauderdale, Hammond Elctrns., Inc.	305-973-7103
FL	Tampa, Reptron Elctrns.	813-855-4656, 813-441-2893
GA	Norcross, Hammond Elctrns., Inc.	404-869-2080
IL	Chicago, NEP Elctrns.	312-625-8400
IL	Elk Grove, RM Elctrns.	312-449-1996
IL	Northbrook, Classic Comps. Supp., Inc.	312-272-9650
IN	Indianapolis, Classic Comps.	317-872-4777
IN	Indianapolis, RM Electronics	317-291-7110
IA	Arlington Hgts., Reptron Elctrns.	312-593-7070
MA	Burlington, TLC Elctrns.	617-273-0140/0141
MA	Hopkinton, Interface Elctrns. Corp.	617-435-6858
MA	Middleboro, Glynn Elctrns.	617-947-4262
MA	Westford, Electronic's Specialties	617-486-8495
MI	Grand Rapids, RM Elctrns.	616-531-9300
MI	Lavonia, Reptron	313-525-2700
MN	Hopkins, Joel Co.	612-935-6202
NH	Salem, Glynn Elctrns.	603-893-8313
NJ	Clifton, J-Mar Elctrns., Inc.	201-772-6400
NM	Albuquerque, Bell Ind.	505-292-2700
NY	Glen Cove, Jacques Ebert Assocs.	516-671-6123
NY	Rochester, Masline Elctrns.	716-546-5373
NY	Ronkonkoma, Prime Comps.	516-737-1730
NC	Greensboro, Hammond Elctrns., Inc.	919-275-6391
OH	Worthington, Reptron	614-436-6675
OR	Lake Oswego, Bell Inds.	503-241-4115
OR	Lake Oswego, Moore Elctrns.	503-684-3100
PA	Exton, VSH	215-363-2250
PA	Philadelphia, Philadelphia Elctrns.	215-568-7400
PA	York, E.C.I.	717-846-5334
SC	Greenville, Hammond Elctrns., Inc.	803-233-4121
TX	Austin, Captronics, Inc.	512-459-4328
TX	Austin, Kent Elctrns.	512-834-1900
TX	Dallas, Captronics, Inc.	214-340-3592
TX	Fort Worth, Patco Supp. Co.	817-429-8596
TX	Houston, Kent Elctrns.	713-780-7770
TX	Richardson, Jaco Elctrns.	214-235-9575
TX	Richardson, Kent Elctrns.	214-669-2600
WA	Bellevue, Bell Inds.	206-747-1515
WI	New Berlin, Classic Comps. Supp., Inc.	414-786-5300
WI	New Berlin, NEP Elctrns.	414-785-9100
WI	New Berlin, RM Elctrns.	414-784-4420
Can	Pointe Claire, Future Elctrns.	514-694-7710
Can	Willowdale, Electro Sonic, Inc.	416-494-1616

UNITED DETECTOR TECH., 12525 Chadron Ave., Hawthorne, CA 90250, Tel: 213-978-0516, Telex: 18-2458; FSC No.: 50486; Empl.: 200; *Sls. Mgr.:* Michael Feeney

UNITED ELEC. CONTROLS, 85 School St., Watertown, MA 02172, Tel: 617-WA6-1000, Telex: 92 2445; Empl.: 420; *Dist. Mgr.:* Jim Dever

UNITED FOAM PLASTICS, 172 E. Main St., Georgetown, MA 01833, Tel: 617-352-2200, TWX: 710-347-0315; FSC No.: 55900; Empl.: 163

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UNITED SOLDER WRAP INC., 2608 Electronic La., Ste 509, Dallas, TX 75220, Tel: 214-350-4978, Telex: 79-1535; Empl.: 80; *Sls. Mgr.:* Perry L. Gross

UNITED STATES CRYSTAL CORP., 3605 McCart St., Fort Worth, TX 76110, Tel: 817-921-3014, TWX: 910-893-4084; FSC No.: 52847; Empl.: 75; *Sls. Mgr.:* Jan Henderson

UNITED STATES SOFTWARE CORP., 5470 N.W. Innisbrook Place, Portland, OR 97229, Tel: 503-645-5043, TWX: 4993875 U S SOFTWARE; *Sls. Mgr.:* Donald L. Dunstan

UNITED STATES TESTING CO., INC., 1415 Park Ave., Hoboken, NJ 07030, Tel: 800-631-3096, 201-792-2400, Telex: 126493, TWX: 219504; FSC No.: 93282; *Sls. Mgr.:* R. Donohue

UNITED TECHNOLOGIES AUTOMOTIVE, 1230 Sabine St., Huntington, IN 46750, Tel: 219-356-2700, Telex: 23-2461, TWX: 810-332-1519; Empl.: 465; *Sls. Mgr.:* R. Michael Gibson

UNITED WIRE & CABLE, 425 Shrewsbury St., Worcester, MA 01604, Tel: 617-757-3872, TWX: 710-340-0635; FSC No.: 51348; Empl.: 10; *Sls. Mgr.:* T. P. Andrews

UNIT INDS., 1140 E. Valencia Dr., Fullerton, CA 92631, Tel: 714-871-4161; Empl.: 40

UNITRACK DIV., Calabro Inds., Inc., Goshen Corp. Pk., P.O. Box 1927, 1372 Enterprise Dr., West Chester, PA 19380, Tel: 215-692-0800, TWX: 510-663-0000; Empl.: 25 .... **C•1094**

Local Sales Offices & Reps

AZ	Phoenix, Finn-Pat Co.	602-954-0301
CA	Agoura, Robert A. Borden	818-991-1940
CA	San Jose, Ruby Sls.	408-224-0881
CO	Aurora, Delltron Co.	303-373-0300
FL	Coral Springs, H.A., Inc.	305-752-7520
GA	Atlanta, Magaro & Assocs.	404-451-8862
IL	Des Plaines, Lincoln, Hodges & Assocs.	312-297-3810
IN	Ft. Wayne, Aktron Corp.	219-747-3650
MA	Northboro, Henik Assocs.	617-393-3127
MI	Kentwood, C.A. Geer Co.	616-534-9449
MN	St. Paul, Countrymen Assocs.	612-645-9151
MO	Blue Springs, Chesco	816-229-1404
NJ	Clinton, Churchill Assocs.	201-735-8971
NY	Larchmont, Hingston Walsh Assocs., Inc.	914-834-5781
NY	Syracuse, Lenard Co.	315-479-9191
OH	Akron, Augnat Assocs.	216-273-1211
PA	Norristown, Rivco January	215-631-1414
TX	Wylie, Air Quip/Robleyco	214-442-3573
MD	Timmonium, Eastern Comps.	301-561-5811
Can	Guelph, Ont., Hammond Mfg. Co., Ltd.	519-822-2960

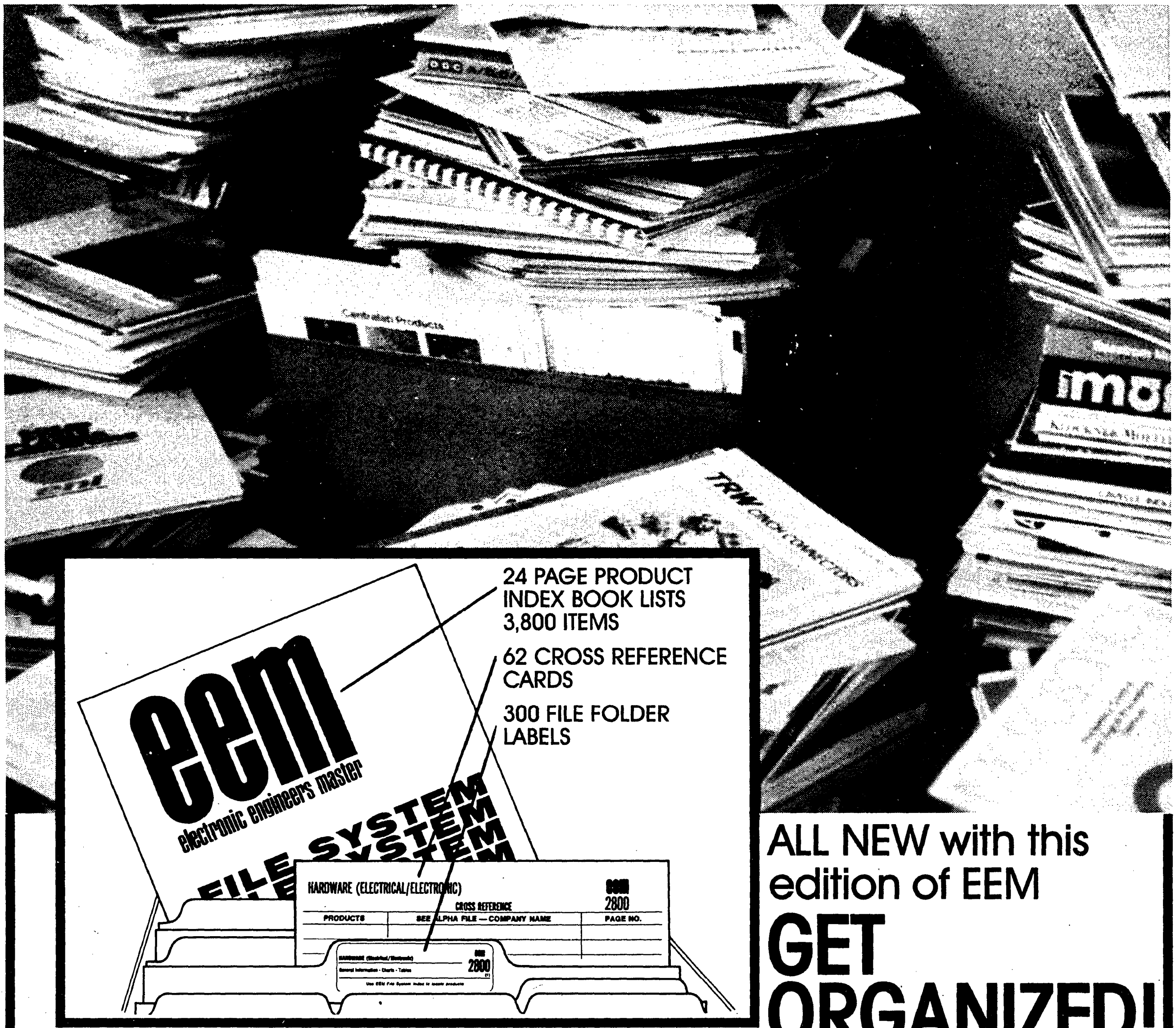
Local Distributors

CA	Cerritos, El-Com	213-404-2961
CO	Denver, Integrated Elctrns.	303-534-6121
GA	Atlanta, Trans Southern	404-451-4425
MA	Northboro, Papi Supp.	617-393-3127
MA	Winchester, Rush Inds.	617-729-5800
MI	Grand Rapids, S-F Elctrn. Supp. Co.	616-459-0216
NC	Winston-Salem, Kirkman Elctrns.	919-722-9131
OH	Dayton, Televox, Inc.	513-294-4499
OH	Warren, Rem Elctrns. Supp. Co., Inc.	216-373-1300
PA	Erie, Rem Elctrns. Supp. Co., Inc.	814-453-5625
TX	Wylie, Air Quip/Robleyco	214-442-3573
Can	Guelph, Ont., Hammonds Mfg. Co., Ltd.	519-822-2960

UNITRODE CORP., 5 Forbes Rd., Lexington, MA 02173, Tel: 617-861-6540, Telex: 95-1064, TWX: 710-326-6509; Empl.: 2,000; *Sls. Mgr.:* Frederick Myers; *Dist. Mgr.:* John Flannery .... **A•1697-1699**

Local Sales Offices & Reps

AL	Huntsville, Advanced Comp. Mktg.	205-881-5495
AZ	Phoenix, Compass Mktg. & Sls., Inc.	609-996-0635
AZ	Tucson, Compass Mktg. & Sls., Inc.	602-293-1220
CA	Irvine, Centaur Corp.	714-261-2123
CA	San Diego, Centaur Corp.	619-571-7871
CA	San Jose, Unitrode Corp.	408-294-4210
CA	Santa Ana, Unitrode Corp.	714-261-1546
CA	Santa Clara, I2, Inc.	408-988-3400
CA	Tarzana, Unitrode Corp.	818-705-8085
CA	Woodland Hills, Centaur Corp.	818-704-1655
CO	Denver, Component Sls. Co.	303-779-8060
CO	Littleton, Unitrode Corp.	303-972-2693
CT	Yalesville, Kanan Assocs.	203-265-2404
FL	Clearwater, Delmac Sls., Inc.	813-447-5192
FL	Orlando, Delmac Sls., Inc.	305-898-4688
FL	Palm Bay, Delmac Sls., Inc.	305-724-8377
FL	Talmarac, Delmac Sls., Inc.	305-726-1330
FL	Tampa, Unitrode Corp.	813-932-5807
IL	Arlington Heights, Unitrode Corp.	312-394-5240
IL	Elk Grove Village, Oasis Sls. Corp.	312-640-1850
IN	Carmel, Shamrock Assocs.	317-848-5265
IA	Davenport, Rush & West Assocs.	319-326-3091
KS	Olathe, Rush & West Assocs.	913-764-2700
MD	Columbia, Unitrode Corp.	301-995-0994
MD	Severna Park, New Era Sls., Inc.	301-544-4100
MA	Maynard, Byrne Assocs.	617-897-3131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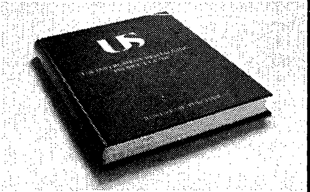

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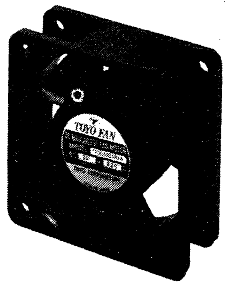

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TX	Austin, Ammon & Rizos Co.	512-454-5131
TX	Dallas, Ammon & Rizos Co.	214-644-5591
TX	Houston, Ammon & Rizos Co.	713-781-6240
UT	Salt Lake City, Technology Mktg. Assocs.	801-483-1009
WA	Bellevue, Western Tech. Sls.	206-641-3900
WA	Spokane, Western Tech. Sls.	509-922-7600
WI	Milwaukee, D. Dolin Sales Co.	414-482-1111

Local Distributors

AL	Huntsville, Resistacap	205-883-4270
AZ	Tempe, Anthem Elctrns.	602-966-6600
AZ	Tempe, Bell Inds.	602-966-7800
CA	Chatsworth, Anthem Elctrns.	818-700-1000
CA	Garden Grove, Bell Inds.	714-220-0681
CA	Gardena, Bell Inds.	213-515-1800
CA	Hayward, Allied Elctrns.	415-487-5250
CA	San Diego, Anthem Elctrns.	619-453-9005
CA	San Diego, Bell Inds.	619-268-1277
CA	San Jose, Anthem Elctrns.	408-946-8000
CA	Sunnyvale, Bell Inds.	408-734-8570
CA	Thousand Oaks, Bell Inds.	805-499-6821
CA	Tustin, Anthem Elctrns.	714-730-8000
CO	Denver, Integrated	303-292-6121
CO	Wheat Ridge, Bell Inds.	303-424-1985
CT	Cheshire, Time Elctrns.	203-271-3200
CT	Orange, Milgray Elctrns.	203-795-0711
FL	Winterpark, Milgray Elctrns.	305-647-5747
GA	Atlanta, Milgray Elctrns.	404-393-9666
IL	Bensonville, Milgray Elctrns.	312-350-0490
IL	Chicago, Bell Inds.	312-982-9210
IL	Elgin, Allied Elctrns.	312-697-8200
IL	Elk Grove Village, Pioneer Std.	312-437-9680
IL	Palatine, OHM Elctrns.	312-359-5500
IL	Peoria, Klaus Radio	309-691-4840
IN	Fort Wayne, Graham Elctrns.	219-423-3422
IN	Indianapolis, Graham Elctrns.	317-634-8202
IN	Indianapolis, Pioneer	317-849-7300
IA	Cedar Rapids, Deeco	319-365-7551
KS	Overland Park, Milgray Elctrns.	913-236-8800
MD	Rockville, Milgray Elctrns.	301-468-6400
MA	Burlington, Milgray Elctrns.	617-272-6800
MA	Woburn, Time Elctrns.	617-935-8080
MI	Livonia, Pioneer	313-525-1800
MN	Minnetonka, Pioneer Std.	612-935-5444
MO	St. Louis, Time Elctrns.	314-391-6444
NJ	Marlton, Milgray Elctrns.	609-983-5010
NM	Albuquerque, Bell Inds.	505-292-2700

NY	Buffalo, Summit Distrs.	716-887-2800
NY	Farmingdale, Milgray Elctrns.	516-391-3000
NY	Pittsford, Milgray Elctrns.	716-385-9330
NY	Rochester, Summit Distrs.	716-334-8110
NC	Greensboro, Hammond Elctrns.	919-275-6391
OH	Cincinnati, Graham Elctrns.	513-772-1661
OH	Cleveland, Milgray Elctrns.	216-447-1520
OH	Cleveland, Pioneer Std.	216-587-3600
OH	Dayton, Pioneer Std.	513-236-9900
OH	Dayton, Stotts Friedman	513-298-5555
OK	Tulsa, Altair	918-252-5781
OR	Lake Oswego, Bell Inds.	503-241-4115
PA	Pittsburgh, Pioneer Std.	412-782-2300
SC	Greenville, Hammond Elctrns.	803-233-4121
TN	Memphis, Bluff City Elctrns.	901-345-9500
TX	Dallas, Pioneer Std.	214-386-7300
TX	Fort Worth, Allied Elctrns.	817-336-5401
TX	Houston, Altair Co.	713-462-3029
TX	Richardson, Altair Co.	214-231-5166
TX	San Antonio, Sherman Elctrns.	512-224-1004
UT	Salt Lake City, Bell Inds.	801-972-6969
UT	Salt Lake City, Standard Supp.	801-486-3371
WA	Bellevue, Bell Inds.	206-747-1515
WA	Seattle, Priebe Elctrns.	206-821-4695
WI	Milwaukee, Marsh Elctrns.	414-475-6000
WI	Waukesha, Bell Inds.	414-547-8879

VARTA BATTERIES, INC., 300 Executive Blvd., Elmsford, NY 10523, Tel: 914-592-2500, Telex: 996-548; *Sls. Mgr.:* Dominick Isola .... **D•1442**

Local Sales Offices & Reps

AL	Huntsville, 20th Century Mktg.	404-446-1999
CA	Norwalk, Ed Rivers Assocs.	213-868-1471
CO	Denver, Moss Mktg.	303-455-7205
FL	Fern Park, EIR, Inc.	305-660-9600
KS	Shawnee Mission, Microtronics	913-262-1444
MI	Brighton, Elctronic Sources	313-227-3598
NY	Glen Head, Livera-Polk	201-377-3239
PA	Broomall, TCA Assocs.	215-353-2022
WA	Bellevue, Gene Stout Assocs.	503-649-9074
Can	Mississauga, Ont., Nikon Power Battery Corp.	

Local Distributors

CA	La Mirada, Energy Devices	213-921-8775
CA	San Diego, Tauber Elctrns.	619-274-7242
CA	Van Nuys, Nesco, Inc.	818-781-0505
GA	Atlanta, Falcon Batteries	404-953-3500
IL	Downers Grove, Telecommunications Dvcs.	312-971-3460
IL	Morton Grove, Power Pak	312-966-6000
MA	Sharon, Adcour	617-784-8123
NJ	Clifton, Engineered Assemblies	201-772-6400
NY	Commack, Brentronics	516-499-5155
TX	Stafford, Southwest Elctrns.	713-491-4900

VECTOR CABLE CO., 555 Industrial Rd., Sugarland, TX 77478, Tel: 713-240-9196

VECTOR ELECTRONIC CO., INC., 12460 Gladstone Ave., Dept. EP, Box 4336, Sylmar, CA 91342, Tel: 818-365-9661, TWX: 910-496-1539; FSC No.: 82893; Empl.: 140; *Sls. Mgr.:* F. L. Hill ....**C•1095, 1098, 1102-1103; D•1103-1104**

Local Distributors

AL	Huntsville, Mock Elctrns.	205-539-2401
AZ	Phoenix, Dalis Elctrns.	602-275-2626
CA	Buena Park, RPS, Inc.	714-521-5230
CA	Canoga Pk., Sandy's Elec. Supp.	818-346-8353
CA	Chatsworth, Priority I Elctrns.	818-709-5464
CA	Inglewood, Newark Elctrns. Co.	213-671-7066
CA	Mountain View, Abacus Elctrns. Co.	415-961-1500
CA	Oakland, Brill Elctrns.	415-834-5888
CA	Palo Alto, Zack Elctrns.	415-326-5432
CA	Pasadena, Dow Radio	213-793-1195
CA	Pasadena, Empire Elctrns. Distr.	213-681-2711
CA	Riverside, Elctrn. Supp.	714-787-9220
CA	San Diego, RPS Elctrns.	619-292-5611
CA	San Diego, Shanks & Wright	619-239-0176
CA	San Francisco, Zack Elctrns.	415-626-1444
CA	San Jose, Quement Elctrns.	408-998-5900
CO	Denver, Electronic Parts-Ragon	303-744-3601
CO	Denver, Newark-Denver Elctrn. Supp.	303-757-3351
CT	Wallingford, Sager Elec.	203-265-4600
FL	Ft. Lauderdale, Powell-Florida Elctrns.	305-972-4300
FL	Miami, Elctrn. Equip.	305-871-3500
GA	Atlanta, Jack Spears Elctrns.	404-237-4531
IL	Chicago, Newark Elctrns. Corp.	312-638-4411
IL	Elgin, Allied Elctrn. Corp.	312-697-8200
IL	Niles, Joseph Elctrns.	312-297-4200
IL	Palatine, Ohm/Elctrns.	312-359-5500
IL	Peoria, Klaus Radio	309-691-4840
IN	Indianapolis, Graham Elctrn. Supp.	317-634-8202
MD	Baltimore, A S I Elctrns.	301-265-5100
MD	Rockville, Capitol Radio Whlsrs.	301-881-2270
MA	Hingham, Sager Elec. Supp.	617-749-6700
MA	Lynn, Land Elctrn. Supp.	617-592-2220
MA	Needham, Cronin Elctrns.	617-449-0500
MA	Norwood, Gerber Elctrns.	617-329-2400
MI	Ann Arbor, Wedemeyer Elctrn. Supp.	313-665-8611
MI	Livonia, RS Elctrns.	313-525-1155
MI	Oak Park, Newark - Detroit Elctrns.	313-967-0600
MN	St. Paul, Gopher Elctrns. Co.	612-483-3322
MO	St. Louis, Olive Indl. Elctrns.	314-426-4500
NE	Lincoln, Scott Elctrn. Supp. Corp.	402-466-8221
NJ	Camden, General Radio Supp.	609-964-8560
NJ	E. Hanover, State Elctrn. Parts Corp.	201-887-2550
NJ	Kenilworth, Federated Purchaser	201-272-0505
NM	Albuquerque, Elctrn. Parts Co.	505-293-6161
NY	Buffalo, Summit Distrs.	716-884-3450
NY	Hauppauge, Broadline Elctrn. Dist.	516-231-4100
NY	Hempstead, Davis Elctrns.	516-483-9200
NY	Lynbrook, Peerless Radio Dist.	516-593-2121
NY	Rochester, Rochester Radio Supp. Co.	716-454-7800
NY	Rochester, Simcona Elctrns.	716-328-3230
NC	Raleigh, Southeastern Elctrns.	919-828-2311
OH	Akron, Akron Elctrns. Supp.	216-762-8818
OH	Cleveland, Pioneer/Cleveland	216-587-3600
OH	Columbus, Hughes Peters Co.	614-294-5351
OH	Dayton, Stotts Friedman Co.	513-298-5555
OK	Tulsa, Radio, Inc.	918-587-9123
OR	Beaverton, Almac Elctrns.	503-629-8090
PA	Drexel Hill, Kass Elctrn. Distr.	215-449-2300
PA	Philadelphia, Powell Elctrns.	215-365-1900
PA	Pittsburgh, CAM/RPC	412-782-3770
TN	Memphis, Bluff City Distrb. Co.	901-345-9500
TX	Dallas, Harrison Equip.	214-239-2750
TX	Dallas, Whls. Elctrn. Supp.	214-824-3001
TX	Fort Worth, Allied Elctrns.	817-336-5401
TX	Fort Worth, Whls. Elctrn. Supp.	817-336-0461
TX	Garland, Newark-Dallas Elctrns. Corp.	214-494-5911
WA	Seattle, Almac Elctrns.	206-643-9992
WA	Seattle, Radar Electric Co.	206-282-2511
WI	Milwaukee, Marsh Elctrns.	414-475-6000
EXP	CA, Los Angeles, Trans-World Trade	213-476-8406

VECTROL, Division of Westinghouse Elec. Corp., 110 Douglas Rd, Oldsmar, FL 33557, Tel: 813-855-4621, Telex: 803784; Empl.: 120; *Sls. Mgr.:* G. Lierman

VECTRONICS MICROWAVE CORP., 276 Lincoln Blvd., Middlesex, NJ 08846, Tel: 201-356-2377, Telex: 833560; FSC No.: 32846; *Sls. Mgr.:* John G. Vogler

VECTRON LABS., 166 Glover Ave., Norwalk, CT 06850, Tel: 203-853-4433, TWX: 710-468-3796; FSC No.: 27802; Empl.: 325; *Sls. Mgr.:* Larry Jawitz .... **A•1450-1454**

Local Sales Offices & Reps

AL	Huntsville, Saber Assocs.	800-327-0853
AZ	Glendale, Fetty/Schoenduve	602-241-9009
CA	El Segundo, Fetty/Schoenduve	213-322-4991
CA	Mountain View, Fetty/Schoenduve	415-962-8330
CA	San Diego, Fetty/Schoenduve	619-292-5136
CO	Parker, Techn. Mktg. Assocs.	303-841-3435
CT	Cheshire, Meco	800-225-3409
FL	Melbourne, Saber Assocs.	800-432-6288
FL	Pensacola, Saber Assocs.	800-327-0853
GA	Norcross, Saber Assocs.	800-327-0853
IL	Bannockburn, Heth, Inc.	312-295-8440
IN	Indianapolis, Ihrig Assocs.	317-783-7630
KS	OLATHE, C-Tron, Inc.	913-829-0073
AR	Hot Springs, Automation Supp.	501-767-5444
MA	Reading, Meco	617-944-6660
MI	Detroit, R. P. Urban Assocs.	313-535-2355
MI	Grand Rapids, R. P. Urban Assocs.	616-245-0511
MN	Burnsville, Allied Comp. Reps.	612-435-7876
KS	Olathe, C-Tron	913-829-0073
NJ	Woodcliff Lake, J. Freid & Assocs.	201-391-6792
NM	Albuquerque, J. Smith & Assocs.	505-265-3406
NY	Great Neck, F & F Metro	516-482-4080
NY	Syracuse, Rep Tech	315-437-2845
NC	Clayton, Saber Assocs.	800-327-0853
OH	Englewood, A. Nace Co.	513-836-0931
OH	Richfield, A. Nace Co.	216-659-7178
PA	Allison Park, A. Nace Co.	412-487-1217
PA	Newtown Sq., SWR Assocs.	215-356-8550
TX	Dallas, Texas Avionics	214-363-6324
UT	Salt Lake City, Techn. Mktg. Assocs.	801-483-1009
VA	Springfield, Tech-Reps	703-569-6868
WA	Seattle, Datacom	206-285-2525
Can	Montreal, Ont., Soquelec, Ltd.	514-482-6427
Can	Nepean, Que., Soquelec, Ltd.	613-226-1696

VEECO INSTRS. INC., 370 San Aleso Ave., Sunnyvale, CA 94086, Tel: 408-733-3700, TWX: 910-339-9263; Empl.: 95; *Sls. Mgr.:* T. McKee

VEECO INSTRUMENTS INC., Terminal Dr., Plainview, NY 11803, Tel: 516-349-8300; *Sls. Mgr.:* Tony Carrozzo

VEEDER-ROOT, 70 Sargeant St., Hartford, CT 06102, Tel: 203-527-7201, Telex: 9-9219; Empl.: 1200; *Sls. Mgr.:* J. R. Garrison; *Dist. Mgr.:* K. Boyle

VEETRONIX, INC., Sub. Reach Electronics, Box 480, Lexington, NE 68850, Tel: 308-324-4600; Empl.: 25; *Sls. Mgr.:* Robert M. Wallace .... **B•1703**

Local Sales Offices & Reps

CA	Arcadia, Van Gott & Assocs., Inc.	213-445-9728
CA	San Jose, Ruby Sls.	408-224-0881

VEGA PRECISION LABS., 800 Follin La., Vienna, VA 22180, Tel: 703-938-6300, Telex: 89-2521; Empl.: 350; *Sls. Mgr.:* W. E. Kinsley

VELONEX, 560 Robert Ave., Santa Clara, CA 95050, Tel: 408-727-7370, Telex: 756562; Empl.: 60; *Sls. Mgr.:* Customer Service .... **D•1324-1325, 1383**

VELONEX, 560 Robert Ave., Santa Clara, CA 95050, Tel: 408-727-7370, Telex: 756562; Empl.: 45

VEMALINE PRODS. DIV., P.O. Box 6267, Providence, RI 02940, Tel: 401-739-7600, Telex: 927573; FSC No.: 08730; Empl.: 35; *Sls. Mgr.:* Paul Vamvaketis; *Dist. Mgr.:* Paul Vamvaketis

VENABLE INDUSTRIES, INC., 3555 Lomita Blvd., Torrance, CA 90505, Tel: 213-539-2522, Telex: 752421; Empl.: 20; *Sls. Mgr.:* Wayne H. Tuttle; *Dist. Mgr.:* Shelley Scott

VENT-RAK DIV., P.O. Box 39100, Indianapolis, IN 46239-9632, Tel: 317-897-7000, Telex: 27-2169; Empl.: 61; *Sls. Mgr.:* Glenn Feest .... **C•1064-1065**

Local Sales Offices & Reps

AZ	Phoenix, Synder Eng.	602-279-2010
CA	Fullerton, Groh Assocs.	714-738-7105
CA	Mountain View, G. C. Woempner Co.	415-964-5454
CO	Boulder, R. F. Mayo Assocs.	303-499-2155
CT	North Haven, Coakley, Boyd & Abbett	203-481-2828
FL	Maitland, J. Krutek & Assocs.	305-628-4837
FL	North Miami, J. Krutek & Assocs.	305-941-6544
IL	Glencoe, Howard Benjamin Assocs.	312-835-0150
IN	Noblesville, Century Elctrns.	317-849-2026
KS	Shawnee Mission, Lowell-Kangas & Assocs.	913-631-3515
MA	Needham, Coakley, Boyd & Abbett	617-444-5470
MO	St. Louis, Lowell-Kangas & Assocs.	314-821-4050
NH	Plaistow, Coakley, Boyd & Abbett	617-444-5470
NJ	Mountainside, H. G. Richter	201-233-4615
NY	Fayetteville, H. G. Richter	315-637-6713
OH	Cleveland, Electronic Comp., Inc.	216-261-4103
OH	Miamisburg, Electronic Comp., Inc.	513-866-3340
OK	Tulsa, Advance Tech. Sls.	918-664-0482
PA	Doylestown, Monteiro & Assocs.	215-345-5855
TX	Austin, Advance Tech. Sls.	512-440-7677
TX	Dallas, Advance Tech. Sls.	214-340-1300
TX	Houston, Advance Tech. Sls.	713-440-3888
WA	Olympia, Bergford & Assocs.	206-866-2001
EXP	IN, Indianapolis, General Devices Co.	317-897-7000

VENUS SCIENTIFIC, INC., 399 Smith St., Farmingdale, NY 11735, Tel: 516-293-4100, TWX: 510-224-6492; Empl.: 450; *Sls. Mgr.:* Mike Maletta .... **D•1863**

Local Sales Offices & Reps

AZ	Scottsdale, Venus Scientific Inc.	602-991-9684
MA	Norwood, MPS Electronics Inc.	617-769-8700

VERBATIM CORP., 323 Soquel Way, Sunnyvale, CA 94086, Tel: 408-245-4400, Telex: 940-692, TWX: 910-339-9381; Empl.: 1800; *Sls. Mgr.:* S.P. Cochran; *Dist. Mgr.:* Earl Liebich

VERMONT AUTOMATION CO., INC., 18 Morse Dr., Essex Junction, VT 05452, Tel: 802-879-7571; Empl.: 7; *Sls. Mgr.:* J. Littlefield

VERMONT PRECISION RESISTOR, Codeco Corp. of Vermont, Box 1170, Stowe, VT 05672, Tel: 802-253-8567; Empl.: 8

VERMONT RESCH. CORP., Precision Pk., N. Springfield, VT 05150, Tel: 802-886-2256, TWX: 710-363-6533; Empl.: 175; *Sls. Mgr.:* Richard Simmons

VERNAY LABORATORIES, INC., S. College St., Yellow Springs, OH 45387, Tel: 513-767-7261; Empl.: 600; *Sls. Mgr.:* Alex Le Pera

VERNITECH
DIVISION

VERNITECH, 300 Marcus Blvd., Deer Pk., NY 11729, Tel: 516-586-5100, TWX: 510-227-6079; FSC No.: 30223; Empl.: 300; *Sls. Mgr.:* S. Wexler .... **A•2048-2049; B•1011, 1196-1197, 1830-1831; D•1991**

Local Sales Offices & Reps

AL	Huntsville, Remco	205-883-9260
AZ	Fountain Hills, Halbar Assocs.	602-837-2464
CA	Glendale, Halbar Assocs.	213-246-8263
CA	San Mateo, Halbar Assocs.	415-349-4700
CO	Parker, Techn. Mktg. Assocs.	303-841-3435
CT	Cheshire, Selmark Assocs.	203-272-8764
FL	Orlando, E.P.M. Corp.	305-425-6149
GA	Atlanta, Remco	404-447-6937
IL	Glencoe, Howard Benjamin Assocs.	312-835-0150
IA	Cedar Rapids, Dytronix	319-377-8275
MD	Baltimore, R.P. Luce & Co.	301-752-8200
MA	Millis, Selmark Assocs.	617-376-2914
MA	Norwell, Bordewieck Eng. Sls.	617-659-4915
MN	St. Paul, Mikeland Sls.	612-645-4747
MO	Bridgeton, Dytronix	314-731-5799
MO	Independence, Dytronix	816-373-6600
NH	Concord, Selmark Assocs.	603-623-5774
NM	Albuquerque, Technology Mktg.	505-265-5661
NY	Endicott, Tech-Mark	607-748-7473
NY	Melville, Comtronic Engrg. Sls.	516-249-0505
NY	Pittsford, Net Sls. Co.	716-467-4538
NC	Raleigh, Remco	919-847-5079
OH	Dayton, George Lessis	513-294-1551
OH	Dayton, J. C. Hofstetter Co.	513-296-1010
OH	Dayton, Rixan Assocs.	513-278-4216
OH	Medina, J. C. Hofstetter Co.	216-241-4880
OR	Beaverton, Halbar Assocs.	503-226-0451
PA	Philadelphia, R.P. Luce & Co.	215-884-8365
TX	Bellaire, Seaton Corp.	713-731-2649
TX	Dallas, Seaton Corp.	214-380-0414
UT	Sandy, TMA, Inc.	801-254-6410
VA	Powhatan, R.P. Luce & Co.	804-598-4804
WA	Redmond, Halbar Assocs.	206-882-0990
WA	Seattle, G.M. Gillette & Assocs.	206-284-3344
WA	Vancouver, Halbar Assocs.	206-696-0170

VERNITRON CORP., Control Comps. Div., 1601 Precision Park La., San Diego, CA 92073, Tel: 619-428-5581, TWX: 910-322-1862; FSC No.: 10112; *Sls. Mgr.:* S. J. Rado .... **B•1199-1202**

Local Sales Offices & Reps

AZ	Fountain Hills, Halbar Assocs.	602-837-2464
CA	Glendale, Halbar Assocs.	818-246-8263
CA	Santa Clara, Comtronics	408-773-9800
CT	North Haven, Kitchen & Kutchin	203-239-0212
FL	Orlando, Mackay Smith & Assocs.	305-423-4353
IL	Glencoe, Howard Benjamin Assocs.	312-835-0150
MA	Burlington, Kitchen & Kutchin	617-229-2660
MN	Minneapolis, SMC	612-545-3618
NJ	Cherry Hill, Lanson Assocs.	609-424-4670
NJ	Harrington Park, Metro Tech. Sls.	201-768-8495
NY	Fairport, NET Sls.	716-467-4538
NY	Jericho, Metro Tech. Sls.	516-935-3330
OH	Dayton, Rixan Assocs.	513-222-0011
TX	Dallas, Norcom, Inc.	214-386-4888
TX	Houston, Norcom, Inc.	713-778-0392
VA	Fredericksburg, Vernitron	703-752-4499

VERNITRON ELEC. COMPS., See Beau Prods. Div.

VERNITRON PIEZOELECTRIC DIV., 232 Forbes Rd., Bedford, OH 44146-5478, Tel: 216-232-8600, TWX: 810-427-2274; Empl.: 120; *Sls. Mgr.:* William K. Dorn .... **A•1455**

Local Sales Offices & Reps

CA	Fullerton, GRU Assocs.	714-738-0903

VERSALOGIC, 87070 Dukhobar Rd., Eugene, OR 97402, Tel: 503-485-8575

VERTEX INDS., INC., Vertel Div., P.O. Box 1123, 23 Carol St., Clifton, NJ 07014, Tel: 201-472-1331, TWX: 710-989-7021; Empl.: 85; *Sls. Mgr.:* Ron Byer

Local Sales Offices & Reps

AL	Huntsville, Electrn. Mfgrs. Agts.	205-830-4030
CA	Santa Ana, California Elctrn. Mktg.	714-835-2702
FL	Melbourne, Reynolds & Assocs.	305-259-7000
IL	Elk GRove Village, Quad Data, Inc.	312-228-1722
KS	Shawnee Mission, Panatek	913-362-3349
NJ	Haddonfield, G.L. Williams Assocs.	609-428-6060
NY	New York, Daner Hayes, Inc.	201-889-4515
TX	Dallas, IBL Engrg. & Sls.	214-363-2921
WA	Seattle, SJI Corp.	206-763-8981
Can	Lachine, Quebec, Electrodesign Ltd.	514-636-4838

VERTOX CO., 9252 Garden Grove Blvd. #22, Garden Grove, CA 92644, Tel: 714-530-4541, Telex: 678401 TAB IRIN; FSC No.: 53688; Empl.: 12; *Sls. Mgr.:* Steve Hacker; *Dist. Mgr.:* Steve Hacker

VESTA TECHNOLOGY, INC., 7100 W. 44th Ave. Ste. 101, Wheat Ridge, CO 80033, Tel: 303-759-4988; Empl.: 10

VIABLE SYSTEMS INC., Box 438, Needham, MA 02192, Tel: 617-449-4570; Empl.: 15

VIA WEST INC., 534 N. Stone Ave., Tucson, AZ 85705, Tel: 602-623-5716, Telex: 165025; Empl.: 25; *Sls. Mgr.:* David C. Troupe

VIBRAC, 1 Columbia Dr., Amherst, NH 03031, Tel: 603-882-6777, Telex: 312698 VIBRAC; Empl.: 50; *Sls. Mgr.:* R. Searle

VIBRA-METRICS, 1014 Sherman Ave., Hamden, CT 06514, Tel: 203-288-6158, 1-800-352-2001, TWX: 710-465-0169; Empl.: 25 .... **B•1832**

Local Sales Offices & Reps

CA	Long Beach, Saber Enterprises	213-595-5646
CA	Mountain View, Saber Enterprises	415-968-0427
CA	San Diego, Saber Enterprises	619-271-1523
CT	North Haven, International Sls.	203-288-1638
FL	Ft. Lauderdale, Elctrn. Devices & Controls	305-974-2500
IL	Chicago, Comtel-Midwest	312-539-4838
IN	Indianapolis, Comtel Corp.	317-253-1681
IA	Cedar Rapids, Comtel Corp.	319-377-9434
KS	Shawnee Mission, Comtel Corp.	913-722-1030
MI	Southfield, Comtel Instrs.	313-358-2505
MN	Wayzata, Comtel Corp.	612-476-1551
MO	St. Louis, Comtel Corp.	314-428-5508
NH	Chester, Compline	603-887-3515
NJ	Basking Ridge, Blejwas Assocs.	201-221-1440
NY	Baldwinsville, Oshex Assocs., Inc.	315-635-6027
NC	Raleigh, Lee-Carolinas	919-848-8818
OH	Cleveland, Comtel Instrs.	216-442-8080
OH	Dayton, Comtel Instrs.	513-298-7573
OH	Hilliard, Comtel Instrs.	614-876-8305
PA	Pittsburgh, Comtel Instrs.	412-922-5720
TN	Knoxville, Mace Instr. Co.	615-938-3773
TX	Houston, Techsas, Inc.	713-578-3750
UT	West American Fork, Highland Tech. Mktg.	801-756-3744
WI	New Berlin, Comtel Corp.	414-544-6042
Can	Montreal, Que., Predictive Mtce.	514-374-8720
Can	N. Vancouver, B.C., Interworld Elctrns.	604-984-4171

VIBRATION INSTRS. CO., 1614 Orangethorpe Way, Anaheim, CA 92801, Tel: 714-879-6085, Telex: 692433; FSC No.: 32102; Empl.: 21; *Sls. Mgr.:* L. Rothberg

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VICKERS INST., INC., Vickers Instruments, P.O. Box 99, Malden, MA 02148, Tel: 617-324-0350, Telex: 949913; Empl.: 20; *Sls. Mgr.:* Phill Truckle

VICLAN, 7373A Engineers Rd., San Diego, CA 92138, Tel: 619-292-1411, TWX: 910-335-1264; FSC No.: 51959; Empl.: 250; *Sls. Mgr.:* Bob Goodman

VICOM SYSTEMS, INC., 2520 Junction Avenue, San Jose, CA 95134, Tel: 408-946-5660, Telex: 171-603; Empl.: 85; *Sls. Mgr.:* R. P. LaJeunesse

VICON INDUSTRIES, INC., 525 Broad Hollow Rd., Melville, NY 11747, Tel: 516-293-2200, Telex: 144581; Empl.: 500; *Sls. Mgr.:* Ronald Klein

VICTOREEN, INC., Component Div., 10101 Woodland Ave., Cleveland, OH 44104, Tel: 216-795-8200, TWX: 810-421-8287 .... **A•1968-1971**

Local Sales Offices & Reps

CA	Santa Cruz, Brenda Costa	408-438-2110
MD	Gaithersburg, Axis Elctrns.	800-368-2815
MA	Boston, Com Serve, Inc.	617-862-3080
OH	Cleveland, Pruitt Energy Sources	216-566-1545
WA	Edmonds, EDCO Sls.	206-776-8922
WA	Edmonton, Edco Sls.	206-776-8922

Local Distributors

MD	Gaithersburg, Axis Elctrns.	800-368-2815
MA	Boston, Com Serve, Inc.	617-969-4905
OH	Cleveland, Pruitt Energy Sources	216-566-1545
WA	Edmonton, Edco Sls. Inc.	206-776-8922

VICTOR ELEC. WIRE & CABLE, 618 Main St., W. Warwick, RI 02893, Tel: 401-821-1700, SALES 401-821-7800, Telex: 952122, TWX: 710-382-1534; Empl.: 900; *Sls. Mgr.:* E. M. Colasanto

VICTOR WIRE & CABLE CORP., 3601 Holdrege Ave., Los Angeles, CA 90016, Tel: 213-870-9933; Empl.: 30

VICTORY ENGRG. CORP., Victory Rd., Springfield, NJ 07081, Tel: 201-379-5900, TWX: 710-983-4430; Empl.: 300; *Sls. Mgr.:* J. Bacek

VIDAIRE ELECTRONICS MFG. CORP., P. O. Box 788, Freeport, NY 11520, Tel: 516-623-6696; Empl.: 20

VIDCO, 8323 S.W. Cirrus Drive, Beaverton, OR 97005, Tel: 503-641-1804; Empl.: 8; *Sls. Mgr.:* Bradley Cohen

VIDEO AUTOMATION SYSTEMS, Upper Shad Rd., Pound Ridge, NY 10576, Tel: 914-764-4613; Empl.: 5

VIDEO LOGIC CORP., 597 No. Mathilda Ave., Sunnyvale, CA 94086, Tel: 408-245-8622, Telex: 35-7400

VIDEO MONITORS, INC., 3833 N. White Ave., Eau Claire, WI 54703, Tel: 715-834-7785; *Sls. Mgr.:* J. Carpentier

VIDEX INC., 1105 NW Circle Blvd., Corvallis, OR 97330, Tel: 503-758-0521, Telex: 469570

VIKING CASES, 10480 Oak St. N.E., St. Petersburg, FL 33702, Tel: 813-577-1216; *Sls. Mgr.:* Robert D. Stemler

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VIKING ELECTRONICS, Industrial St., Hudson, WI 54016, Tel: 715-386-8861; Empl.: 24; *Sls. Mgr.:* Bill Wiese

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VIKING LABS/HONEYWELL, Operation of Test Instruments Div. of Honeywell, Inc., 440 Bernardo Ave., Mountain View, CA 94043, Tel: 415-969-5500, TWX: 910-379-6555; Empl.: 140; *Sls. Mgr.:* Jack Eagan, Prod. Reliability; *Dist. Mgr.:* M. J. Marchman, Comp. Test .... **B•1013; D•1327**

Local Sales Offices & Reps

CA	Irvine, Centaur Corp.	714-556-5420
FL	Orlando, Donato & Assocs.	
FL	Palm harbor, Donato & Assocs.	
FL	Tampa, Donato & Assocs.	
MD	Baltimore, Stemler Assocs.	301-944-8262

VILLARREAL ELECTRONICS, Box 43A, RD 2, South Rd., Millbrook, NY 12545, Tel: 914-677-3447

V.I.P. INDS., INC., 246 Knickerbocker Ave., Paterson, NJ 07503, Tel: 201-345-5800; Empl.: 30; *Sls. Mgr.:* John M. Sonatore

VIRGINIA PANEL, 1400 New Hope Rd., Waynesboro, VA 22980, Tel: 703-949-8376, TWX: 710-839-0406; Empl.: 225; *Sls. Mgr.:* Jeff Stowers

VIRGINIA PLASTICS CO., P.O. Box 4577, Roanoke, VA 24015-0577, Tel: 703-985-3811, TWX: 710-870-0440; FSC No.: 59608; Empl.: 120; *Sls. Mgr.:* Charles Bogese; *Dist. Mgr.:* Carl Bump .... **C•1567-1569, 1909-1911**

Local Sales Offices & Reps

AZ	Tempe, General Comps. Grp.	602-829-8124
CA	Granada Hills, C&W Comps.	213-368-4032
CA	San Jose, Pitts Sls. Assocs.	408-252-6177
CO	Parker, Mikro Sls. Co.	303-841-4131
CT	Middletown, Gerber Sls.	204-346-3000
FL	Altamonte Springs, APM Assocs.	305-869-6831
FL	Ft. Lauderdale, APM Assocs.	305-565-0056
FL	Merritt Island, APM Assocs.	305-453-4322
FL	Tampa, APM Assocs.	813-886-2457
GA	Stone Mountain, H & H Mktg.	404-296-9830
IL	Palatine, Claeson Assocs.	312-359-7230
MD	Silver Spring, Carwithen Assocs.	301-589-9040
MA	Monson, Gerber Sls.	413-267-5051
MA	Waltham, Gerber Sls.	617-890-3334
MN	Minneapolis, Northstar Comps.	612-553-1888
NJ	Haworth, Kay Sls.	201-384-3261
NY	Syracuse, Canavan-Scanlon Assocs.	315-437-1271
OH	Worthington, Roc Assocs., Inc.	614-885-1057
PA	Southampton, Campbell Assocs.	215-322-6630
TX	Dallas, MGR Elctrns., Inc.	214-238-5246
TX	El Paso, El Paso Elctrn. Comps.	919-593-8481
TX	Houston, AID Elctrns.	713-955-6204

Local Distributors

MN	Minneapolis, K & H Elctrn. Distrbg.	800-328-8515

VIRTIS CO., Rte. 208, Gardiner, NY 12525, Tel: 914-255-5000, Telex: 926474; Empl.: 92; *Sls. Mgr.:* J. D. Schmidt

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Local Sales Offices & Reps

AL	Huntsville, REMCO	205-533-3763
AZ	Phoenix, Howe & Howe	602-264-7971
CA	Cupertino, Vishay Resistive Sys. Grp.	408-730-1292
CA	Fullerton, Vishay Resistive Sys. Grp.	714-738-1581
CO	Englewood, Comps. Sls. Inc.	303-779-8060
CT	Wallingford, Comp Rep Assocs.	203-269-1145
FL	Altamonte Springs, Semtronic Assocs.	305-831-8233
FL	Clearwater, Semtronic Assocs.	813-461-4675
FL	Ft. Lauderdale, Semtronic Assocs.	305-731-2484
GA	Atlanta, REMCO	404-447-6937
ID	Boise, N. R. Schultz Co.	208-377-8686
IL	Rolling Meadows, Eagle Tech. Sls.	312-991-0700
IN	Carmel, Shamrock Elctrn. Sls.	317-848-5265
KS	Shawnee Misson, Technical Sls. Assocs.	913-888-3330
MD	Lutherville, J. A. Dougherty Sls. Co.	301-321-7890
MA	Westwood, Comp Rep Assocs.	617-329-3454
MI	Bloomfield Hills, Enco Mktg.	313-642-0203
MN	St. Paul, Proud Inds.	612-646-9428
MO	Ferguson, Technical Sls. Assocs.	314-725-5361
NJ	Flanders, K & R Engrg. Sls. Co.	201-584-5235
NM	Albuquerque, Compass Mktg. & Sls.	505-888-0800
NY	E. Syracuse, L-Mar Assocs.	315-437-7779
NY	Rochester, L-Mar Assocs.	716-323-1000
NC	Raleigh, REMCO	919-847-5079
OH	Aurora, EMA, Inc.	216-562-6104
OH	Centerville, EMA, Inc.	513-433-2800
OR	Beaverton, N. R. Schultz Co.	503-643-1644
PA	Malvern, Vishay Resistive Sys. Grp.	215-644-1300
TX	Houston, Vishay Resistive Sys. Grp.	713-550-0568
UT	Salt Lake City, Component Sls., Inc.	801-268-8440
WA	Bellevue, N. R. Schultz Co.	206-454-0300
WI	Brookfield, Oasis Sls. Corp.	414-782-6660
EXP	Mayaguez, Comp Rep Assocs.	809-832-9529

Local Distributors

AZ	Phoenix, TTI, Inc.	602-966-1616
AZ	Tempe, Bell Inds.	602-966-7800
AZ	Tempe, Shelley Elctrns.	602-894-2058
CA	Chatsworth, Passive Comps., Inc.	818-341-1745
CA	Chatsworth, Shelley Elctrns., Inc.	213-998-3333
CA	Irvine, Hi-Rel Elctrns.	714-768-6656
CA	Los Alamitos, Semi-Dice, Inc.	213-594-4631
CA	San Diego, Shelley Elctrns., Inc.	619-453-7133
CA	San Fernando, Petel Elctrns., Inc.	818-365-9841
CA	San Jose, Shelley Elctrns., Inc.	408-942-9111
CA	San Jose, TTI, Inc.	408-943-9155
CA	Santa Clara, Semi-Dice, Inc.	408-980-9777
CO	Boulder, Shelley Elctrns., Inc.	303-442-2718
FL	Orlando, TTI, Inc.	305-859-1000
FL	Tampa, Impala Elctrns., Inc.	813-885-4747, 800-237-7777
FL	Tampa, Shelley Elctrns.	813-884-0946
GA	Norcross, TTI, Inc.	404-662-0911
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MD	Whitemarsh, RESCO/Baltimore	301-529-0500, 800-638-1242
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MA	Framingham, Cavalier Comps., Inc.	617-875-2000
MA	Woburn, TTI, Inc.	617-938-8800
NJ	Fairfield, CHPS, Inc.	201-882-0997
NJ	Flanders, VKR Svcs., Inc.	201-584-5235, 800-631-9362
NY	Bohemia, Justin Elctrns., Inc.	516-589-4000
NY	Bohemia, Shelley Elctrns.	516-567-7751
NY	Bohemia, TTI, Inc.	516-567-1500
NY	Farmingdale, Command Elctrns. Corp.	516-293-1212
NY	Hauppauge, Mast Distrs., Inc.	516-273-4422
OH	Cleveland, Specialized & Comps. Sls.	216-464-0404
OH	Dayton, Micro Mil Div.	513-434-8231
PA	Royersford, Hybrid Service Lab	215-948-6880
TX	Carrollton, Ohm Elctrns.	214-620-2230
TX	Fort Worth, TTI, Inc.	817-831-0441
TX	Houston, Texas Comp., Inc.	713-468-3882
WA	Kirkland, Priebe Elctrns.	206-821-4695

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VISHAY ANGSTROHM, 1 Precision Pl., Hagerstown, MD 21740, Tel: 301-739-8722, TWX: 710-853-6834; FSC No.: 17745; Empl.: 250; *Sls. Mgr.:* John Kinnaw; *Dist. Mgr.:* Jeff Reed

VISIONARY ELECTRONICS, 141 Parker Avenue, San Francisco, CA 94118, Tel: 415-751-8811

VISION ENGRG., INC., 570 Danbury Rd., New Milford, CT 06776, Tel: 203-355-3776, Telex: 643769; Empl.: 15; *Sls. Mgr.:* S. Phillips

VISTAR CORP., 13740 McCormick Dr., Tampa, FL 33625, Tel: 813-855-6611, Telex: 522434; Empl.: 20; *Sls. Mgr.:* Ron Rooks

VISUAL COMMUNICATIONS CO., INC., P.O. Box 986, El Segundo, CA 90245, Tel: 213-822-4727; Empl.: 9; *Sls. Mgr.:* J. Savage .... **B•1113-1115**

Local Sales Offices & Reps

AL	Huntsville, Remco	205-553-3763
AZ	Phoenix, Bob Anderson Co.	602-266-2070
CA	Mountain View, Westech Sls.	415-961-1422
CA	San Diego, Harvey King, Inc.	619-566-5252
CA	Torrance, Assoc Reps.	213-328-6708
FL	Boca Raton, Beacon Elctrns.	305-392-3500
GA	Atlanta, Remco	404-447-6937
IL	Elmhurst, Utronix Sls.	312-834-1100
MA	Sharon, Adcour	617-784-8123
MI	Jenison, R. C. Nordstrom & Co.	616-457-5762
MI	Lathrup Village, R. C. Nordstrom & Co.	313-559-7373
MN	Eden Prairie, Bohlig & Assocs.	612-944-8404
NY	New York, Robert Smith Assocs.	212-541-4885
NY	Plainview, Robert Smith Assocs.	516-681-3155
NC	Raleigh, Remco	919-847-5079
OH	Worthington, Dynel Co.	513-434-6467
OK	Tulsa, J. B. Guenther	918-587-3801
OR	Portland, Electronic Mktg. Grp.	206-882-0962
PA	Penndel, Rayco Sls.	215-757-1899
TX	Austin, J. B. Guenther	512-472-3825
TX	Dallas, J. B. Guenther	214-691-8500
TX	Houston, J. B. Guenther	713-974-0383
VA	Fairfax, Beacon No.	703-591-1300
VA	Forest, Beacon North	804-239-8486
WA	Redmond, Elctrn. Mktg. Grp.	206-882-0962
EXP	CT, Litchfield, Intrade	203-567-5901

Local Distributors

AL	Huntsville, Component Distr.	205-883-7501
AZ	Tempe, Anjon Entprs.	602-894-1332
AR	Little Rock, Component Distr.	501-227-6278
CA	Costa Mesa, Orange County Comps.	714-979-3597
CA	Los Angeles, Electric Switch	213-660-1310
CA	San Jose, Cypress Elctrns.	408-945-8400
CA	Torrance, WBC Electro Supp.	213-328-6871
CO	Englewood, Industrial Elctrns. Inc.	303-694-9444
FL	Ft. Lauderdale, Component Distr.	305-971-4950
GA	Norcross, Component Distrs.	404-441-3320
MA	Lynn, Land Elctrn. Supp.	617-592-2220
MI	Grand Rapids, S. F. Elctrns. Supp.	616-459-0216
MN	New Brighton, Chris Elctrn. Distr.	612-631-2647
NJ	Bellmawr, Midatlantic Elctrns.	609-931-5303
NY	Elmsford, Ancar Elctrn. Supp.	914-592-7100
NY	Plainview, Plainview Elctrns.	516-249-6677
NC	Raleigh, Component Distr.	919-834-9465
OH	Aurora, IPD	216-562-8113
OH	Centerville, IPD	513-435-2086
TX	Houston, Force Elctrns.	713-772-8483
TX	Irving, Force Elctrns.	214-438-5700
VA	Falls Church, Component Distr.	703-241-8227
WA	Redmond, Paccom	206-883-9200
EXP	CT, Litchfield, Intrade	203-567-5901

VISUAL INFO. INSTITUTE, Box 33, Xenia, OH 45385, Tel: 513-376-4361, Telex: 501031 VIS INFO INST; FSC No.: 27432; Empl.: 45

Local Sales Offices & Reps

CA	San Diego, DRF Assocs.	619-292-9431
CA	San Diego, Perspective Meas.	619-259-8000
CA	San Jose, Fox Marketing	408-984-2221
CO	Bailey, Scientific Sys.	303-838-4615
MA	Clemsford, Meritron Corp.	617-250-1774
NC	High Point, EME, Inc.	919-869-3335
VA	Williamsburg, EME IV, Inc.	804-253-0171

VITEK ELCTRNS., 4 Gladys Ct., Edison, NJ 08817, Tel: 201-287-3200; *Sls. Mgr.:* Joe Griffin

VITRAMON N.A., P. O. Box 544, Bridgeport, CT 06601, Tel: 203-268-6261, TWX: 710-450-3640; Empl.: 606; *Sls. Mgr.:* Paul Davis; *Dist. Mgr.:* S. Judt

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Local Sales Offices & Reps

CA	Laguna Hills, English/Damco Sls. Assocs.	714-837-3801
CA	Sunnyvale, W. W. Posey	408-746-0771
CO	Denver, Mountain Reps.	303-623-0972
FL	Ft. Lauderdale, Unirep, Inc.	305-587-7481
GA	Roswell, Henry W. Phillips Co.	404-992-3070

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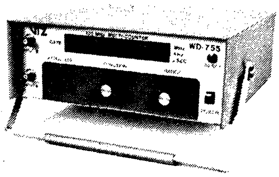

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IN	Zionsville, Midwest Reps. & Assocs.	317-844-4555
MD	Monrovia, K & D Sls.	301-865-5262
MA	Milford, Jonel Sls.	617-478-4650
MI	Ferndale, Hilltronics	313-398-5556
MN	White Bear Lake, Yore Co.	612-770-9760
MO	Raytown, Marty Taraski Sls. Co.	816-358-1442
NJ	Fort Lee, TMC Sls. Corp.	201-944-8340
NY	Grand Island, L. J. McTaggart Assocs.	716-773-9222
OH	Cincinnati, John O. Olson Co.	513-574-7711
OR	Portland, Joseph V. Belusko	503-222-4279
PA	Phildelphia, Instrumentation Spec.	215-742-0898
PA	Pittsburgh, John O. Olson Co.	412-341-8391
TX	Dallas, Crockett Sls. Co.	214-350-3377

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Local Sales Offices & Reps

CA	Los Angeles, KT Elctrns.	714-432-8465
CO	Denver, Andale	303-693-4331
MA	Framington, Bay Colony Reps	617-620-0607

VLSI TECHNOLOGY, INC., 1101 McKay Dr., San Jose, CA 95131, Tel: 408-942-1810, Telex: 278807; Empl.: 450; *Sls. Mgr.:* Ronald C. Kasper

VOICE IDENTIFICATION, Box 714, Somerville, NJ 08876, Tel: 201-526-3408; Empl.: 7

VOICE MACHINE COMMS., INC., KTI, 1000 S. Grand Ave., Santa Ana, CA 92705, Tel: 714-541-0454; *Sls. Mgr.:* Rod Runge; *Dist. Mgr.:* Rod Runge

VOLITION SYSTEMS, P.O. Box 99628, San Diego, CA 92109, Tel: 619-270-6800, Telex: 695241 COMEX SDG; Empl.: 7

VOLTAGE MULTIPLIERS, INC., 8711 W. Roosevelt Ave., Visalia, CA 93291, Tel: 209-651-1402, Telex: 530484; FSC No.: 60211; Empl.: 70; *Sls. Mgr.:* Ken Haag .... **A•2097**

VOLTAMPERE CORP., 146 Horton Ave., Lynbrook, NY 11563, Tel: 516-887-9443; FSC No.: 64196; Empl.: 30; *Sls. Mgr.:* Jesse Stitzer

VOLTARC TUBES, 176 Linwood Ave., Fairfield, CT 06430, Tel: 203-255-2633, Telex: 96-4337; Empl.: 180; *Sls. Mgr.:* Albert H. Katz

VOLTEX, 3460 Great Neck Rd., Amityville, NY 11701, Tel: 516-842-2772; Empl.: 55; *Sls. Mgr.:* S. Vogel ... **D•1865**

Local Sales Offices & Reps

NJ	Oxford, Malin Assocs.	201-689-7398

VOLTRONICS, West St., P.O. Box 476, E. Hanover, NJ 07936, Tel: 201-887-1517, TWX: 710-986-8253; FSC No.: 18736;Multiple; Empl.: 70; *Sls. Mgr.:* Richard J. Newman

Local Sales Offices & Reps

AL	Huntsville, Beacon Elctrns.	205-881-5031
AZ	Glendale, Fetty/Schoenduve, Inc.	602-241-9009
AR	Little Rock, Beacon Elctrns.	501-224-5449
CA	El Segundo, Fetty/Schoenduve, Inc.	213-322-4991
CA	Mountain View, Fetty/Schoenduve, Inc.	415-962-8330
CA	San Diego, Fetty/Schoenduve, Inc.	619-292-5136
CO	Boulder, Herb Bass Assocs.	303-530-7509
FL	Boca Raton, Beacon Elctrns.	305-392-3500
FL	Clearwater, Beacon Elctrns.	813-796-2378
FL	Maitland, Beacon Elctrns.	305-647-3498
FL	Melbourne, Beacon Elctrns.	305-724-8010
GA	Atlanta, Beacon Elctrns.	404-256-9640
IL	Palatine, R-Tek Central	312-991-4404
IA	Cedar Rapids, Howard R. Brown Sls.	319-366-0635
KS	Parker, S. W. Wollard Co.	913-898-6552
MD	Mt. Airy, Beacon North	703-591-1300
MD	Randallstown, Beacon North	703-591-1300
MA	Malden, JK Assocs.	617-321-2922
MN	St. Paul, Countryman Assocs.	612-645-9151
MO	St. Louis, Harold Abrams & Assocs.	314-569-0447
NY	Melville, RF Elctrn. Sls. Grp.	516-420-8890
NY	Utica, B. D. Hummel Co.	315-736-7821
NC	Raleigh, Beacon Elctrns.	919-787-0330
OH	Chesterland, K-T/DEPCO	216-729-3588
PA	Newton Square, SWR Assocs.	215-353-6711
PA	Pittsburgh, K-T/DEPCO	412-367-1011
TX	Dallas, Talo Prod. Inc.	214-644-6010
UT	Bountiful, Herb Bass Assocs.	801-292-8991
VA	Fairfax, Beacon North	703-591-1300
VA	Forest, Beacon North	804-239-8486

VOTAN, 4487 Technology Dr., Fremont, CA 94538, Tel: 415-490-7600; *Sls. Mgr.:* Robert Russo

VOYAGER TECHNOLOGIES, INC., 2250 Cabot Blvd. W. Bldg. 40M, Langhorne, PA 19047, Tel: 215-750-0270; Empl.: 15; *Sls. Mgr.:* Roger J. Peirce

VRN INTERNATIONAL, Div. Vernitron, 2801 72nd St. N., Box 44000, St. Petersburg, FL 33743, Tel: 813-347-2181, Telex: 6815306, TWX: 310-681-5306; FSC No.: 84048; Empl.: 500; *Sls. Mgr.:* R. Fielder; *Dist. Mgr.:* R. Fielder .... **A•2054-2055; D•1056**

Local Sales Offices & Reps

AZ	Tempe, System Sls. of Az.	602-829-9338
CA	Alhambra, MW Riedel & Co.	213-283-7694
CA	Campbell, Kottmeier Assocs.	408-371-8700
CA	San Diego, M.W. Riedel & Co.	619-272-2359
CO	Englewood, Omega, Ltd.	303-762-1921
CT	Stratford, Gerald Rosen Co.	203-375-5456
FL	Boca Raton, Lawrence Assocs.	305-368-7373
FL	Clearwater, Lawrence Assocs.	813-584-8110
IL	Downers Grove, Circuit Sls.	312-833-2242
IN	Fort Wayne, Ro Whitesell & Assocs.	219-432-5591
IN	Indianpolis, Ro Whitesell & Assocs.	317-359-9283
IN	Kokomo, Ro Whitesell & Assocs.	317-457-9127
KS	Merriam, MTS	913-236-8557
KY	Louisville, Ro Whitesell & Assocs.	502-426-7696
MA	Framingham, Gerald Rosen Co.	617-879-5505
MI	Grand Rapids, Ro Whitesell & Assocs.	616-942-5420
MI	Southfield, Ro Whitesell & Assocs.	313-559-5454
MI	St. Joseph, Ro Whitesell & Assocs.	616-983-7337
MN	Minneapolis, PSI	612-944-8545
NM	Albuquerque, Sys. Sls. of Alb.	505-881-8877
NY	Buffalo, Quality Comps.	716-837-5430
NY	Great Neck, Mos Assocs.	516-487-3966
NY	Manlius, Quality Comps.	315-682-8885
OH	Cincinnati, Ro Whitesell & Assocs.	513-521-2290
OH	Cleveland, Ro Whitesell & Assocs.	216-447-9020
OH	Columbus, Ro Whitesell & Assocs.	614-888-9396
OH	Dayton, Ro Whitesell & Assocs.	513-298-9546
OK	Broken Arrow, Genzel Sls.	918-258-8656
PA	Broomall, LD Lowery	215-528-5170
PA	Hummelstown, LD Lowery	717-533-7095
PA	Pittsburg, Ro Whitesell & Assocs.	412-963-6161
TX	Dallas, TL Mktg.	214-357-1752
UT	Salt Lake City, Omega, Ltd.	801-277-8061
VA	Charlottesville, LD Lowery	804-973-6672
Can	Rexdale, Ont., Source Elec., Ltd.	613-592-5392

Local Distributors

AR	Little Rock, Carlton-Bates	501-562-9100
CA	Gardena, Bell Inds.	213-515-1800
CA	Manhattan Beach, Prime Electro Prods.	213-772-1724
CA	San Fernando, Petell Elec.	213-365-9841
CA	San Jose, Cypress Elctrns.	408-945-8400
CA	San Jose, Future	408-945-9100
CA	Sunnyvale, Bell Inds.	408-734-8570
CA	Thousand Oaks, Bell Inds.	818-340-1940
CO	Denver, Denver-Wintronics	303-431-7161
CO	West Minster, Future	303-650-0123
CT	Danbury, Future	203-743-9594
CT	Norwalk, Cobra Comps.	203-847-6442
CT	Wallingford, Sager Elctrl. Supp.	203-265-4600
FL	Clearwater, Future	813-441-4771
FL	Ft. Lauderdale, Dielco	305-973-8700
FL	Ft. Lauderdale, NRC Elctrns.	305-772-4500
FL	Orlando, TTI Inc.	305-849-1000
FL	Tampa, Impala Elctrns.	813-885-4747
GA	Norcross, TTI	404-662-0911
IL	Addison, Lectro Comps.	312-543-1680
IL	Northbrook, Classic	312-272-9650
IN	Indianapolis, Classic	317-872-4777
IA	Cedar Rapids, Deeco	319-365-7551
ME	Woburn, TTI Inc.	617-938-8800
MD	Columbia, Future	301-995-1222
MD	Rockville, M S Elctrns.	301-340-6400
MA	Framingham, NOW	617-872-5876
MA	Hingham, Sager Elctrl. Supp.	617-749-6700
MA	Westboro, Future	617-366-2400
MI	Farmington Hills, Advent Elctrns.	313-477-1650
MN	Minneapolis, Aero-Space	612-884-4725
MN	Minneapolis, Merit Elctrns.	612-546-5383
MO	St. Louis, Olive	314-426-4500
NJ	Berlin, GCI	609-768-6767
NJ	East Hanover, State Elctrns.	201-887-2550
NJ	Mt. Laurel, Future	609-778-7600
NJ	New Brunswick, Brothers Elctrns.	201-238-2200
NJ	Whippany, Tonar Ind.	201-884-1400
NM	Albuquerque, Sterling	505-884-1900
NY	Bohemia, TTI Inc	516-567-1500
NY	E. Syracuse, Add Elctrns. Corp.	315-437-0300
NY	Farmingdale, Command Elctrns. Corp.	516-293-1212
NY	Farmingdale, Pride Elctrns.	516-293-4020
NY	Hauppauge, Fairmont Elec. Sls.	516-231-3313
NY	Hauppauge, Jaco Elctrns.	516-273-5500
NY	Huntington Station, Sherburn Elctrns.	516-231-4300
NY	Liverpool, Future	315-451-2371
NY	Rochester, Rochester Radio Supp.	716-454-7800
NY	Valley Stream, L & S Elctrns.	516-561-2474
NC	Charlotte, Elctrns. Mktg.	704-394-6195
NC	Raleigh, Southeastern	919-828-2311
OH	Columbus, Elctrns. Mktg.	614-299-4161
OH	Dayton, Bell Micro-Mil	513-434-8231
OK	Tulsa, Radio	918-587-9123
PA	Philadelphia, Philadelphia Elctrns.	215-568-7400
PA	Philadelphia, TRW Elctrn. Supp.	215-923-8230
PA	Reading, Barbey	215-376-7451
TX	Ft. Worth, TTI Inc.	817-831-0441
TX	Houston, Sterling	713-627-9800
TX	Richardson, Altair	214-231-5166
UT	Salt Lake City, Bell	801-972-6969
UT	Salt Lake City, Future	801-972-8489
VA	Charlottesville, Virginia Radio	804-296-4184
WA	Bellevue, Future	206-881-8199
WA	Seattle, Robert E. Priebe Co.	206-682-8242
WI	Milwaukee, Marsh Elctrns.	414-475-6000
WI	New Berlin, Classic	414-786-5300

VTM MICROWAVES, INC., 4975 W. 80 Ave., Westminster, CO 80030, Tel: 303-426-6866; Empl.: 15

V-TRON ELCTRNS. CORP., 10 Venus Way, P.O. Box 297-S, S. Attleboro, MA 02703, Tel: 617-761-9100; Empl.: 250; *Sls. Mgr.:* Richard E. French

Local Sales Offices & Reps

CA	Cerritos, Don Lumpkin & Assocs.	213-402-4589
CT	Wallingford, Com-Sale	203-269-7964
FL	Juniter, Southern Elctrns. Sls. Corp.	305-744-0028
MA	Waltham, Com-Sale	617-890-0011
NH	Manchester, Com-Sale	603-668-1440
NJ	Haworth, Kay Sls. Assocs.	201-384-3261
TX	Fort Worth, Diversified Comps.	817-249-5818
VA	Portsmouth, FDB Sls. Corp.	804-484-3162

VU-DATA, 7122 Convoy Ct., San Diego, CA 92111, Tel: 619-279-6572, TWX: 910-335-1586; FSC No.: 34160; Empl.: 15

WABASH ELECTRICAL COMPONENTS GROUP, A Kearney-National Co., 1375 Swan Street, Huntington, IN 46750, Tel: 219-356-8300, TWX: 810-333-1533; Empl.: 1000

WABASH RELAY & ELCTRNS., First & Webster Sts., Wabash, IN 46992, Tel: 219-563-2191, TWX: 810-290-2722; Empl.: 250; *Sls. Mgr.:* David L. Snodgrass .... **B•1460-1461**

Local Sales Offices & Reps

Midtec Assocs., Ltd.

AL	Huntsville, Hughes Assocs., Inc.	205-533-9108
AZ	Fountain Hills, Halbar Assocs., INc.	602-837-2464
CA	Glendale, Halbar	818-246-8263
CA	San Mateo, Halbar	415-349-4700
CO	Aurora, Mountain View Mktg.	303-699-1665
DE	Medford, Comp. Conslt.	609-654-5300
FL	Altamonte Springs, APM Assocs.	305-869-6831
FL	Ft. Lauderdale, APM Assocs.	305-565-0056
FL	Tampa, APM Assocs.	813-886-2457
GA	Huntsville, Hughes Assocs., Inc.	205-533-9108
ID	Redmond, Halbar Assocs., Inc.	206-882-0990
IL	Arlington Hgts., M. J. Petersen Assocs.	312-577-8200
IN	Fort Wayne, M/S Sls.	219-436-3023
KS	De Soto, Midtec Assoc.	913-441-6565
MD	Glen Burnie, Macrotech Assocs., Ltd.	301-437-5588
MA	Andover, Crawford Assocs.	617-470-2122
MI	Novi, Lektronics	313-349-3304
MN	Edina, PWC, Inc.	612-831-5999
MS	Huntsville, Hughes Assocs., Inc.	205-533-9108
MO	Florissant, Midtec Assocs.	314-837-5200
NV	San Mateo, Halbar Assocs., INc.	415-349-4700
NJ	Watchung, Dolan Assocs.	201-753-2671
NM	Fountain Hills, Halbar Assocs., Inc.	602-837-2464

NY	Penfield, Upstate Comp. Sls.	716-381-6070
NC	Raleigh, Tingen Tech. Sls.	919-781-1100
OH	Dayton, KW Elctrn. Sls.	513-890-2150
OH	Shaker Heights, KW Elctrn. Sls.	216-491-9177
OH	Worthington, KW Elctrn. Sls.	614-888-0483
OR	Vancouver, Halbar Assocs., Inc.	206-696-0170
PA	Medford, Comp. Conslts.	609-654-5300
TX	Dallas, Stevens Sls. Co.	214-350-2476
VA	Glen Burnie, Macrotech Assocs., Ltd.	301-437-5588
WA	Redmond, Halbar Assocs., Inc.	206-882-0990
WA	Vancouver, Halbar Assocs., Inc.	206-696-0170

Local Distributors

CA	Fullerton, Pyramid Elctrn. Supp.	714-773-0781
CA	Santa Clara, Pyramid Elctrn. Supp.	408-727-9810
CT	Wallingford, Cronin Elctrns., Inc.	203-265-3134
FL	Palm Bay, Action Elctrns., Inc.	305-725-4920
IL	Elk Grove Village, Nu-Way Elctrn. Distrs.	800-323-7957
MA	Needham, Cronin Elctrns., Inc.	617-449-5000
NH	Salem, Cronin Elctrns., Inc.	603-898-4440
WA	Kent, Pyramid Elctrn. Supp., Inc.	206-872-5800

WABER ELECTRIC, See SL Waber Electric.

THE WADSWORTH ELEC. MFG. CO., INC., 20 W. 11th St., Covington, KY 41012, Tel: 606-431-0900; *Sls. Mgr.:* D. W. Phillips

WAGNER ELECTRIC CORP., Tung-Sol Div., 100 Misty Lane, Parsippany, NJ 07054, Tel: 201-386-9300

WAGO CORP., 6657 N. Sidney Pl., Milwaukee, WI 53209-3217, Tel: 414-352-1035, Telex: 260123; *Sls. Mgr.:* Michael A. Lane

WAHL INSTRUMENTS, INC., 5750 Hannum Ave., Culver City, CA 90230, Tel: 213-822-6144, TWX: 910-343-6867; Empl.: 48

WALDES KOHINOOR, 47-16 Austel Pl., Long Island City, NY 11101-4478, Tel: 718-392-3100, Telex: 126-829; Empl.: 450

WALDOM ELCTRNS., 4301 W. 69th St., Dept. EEM, Chicago, IL 60629, Tel: 312-585-1212, Telex: 25-4604; FSC No.: 92219; Empl.: 143; *Sls. Mgr.:* E. R. Beutler

WALKER SCIENTIFIC, Rockdale St., Worcester, MA 01606, Tel: 617-852-3674, Telex: 92-0489; Empl.: 83; *Sls. Mgr.:* B. Langley

WALL, A. T., CO., 55 Service Ave., Warwick, RI 02886, Tel: 401-739-0740, TWX: 710-382-1535; Empl.: 75; *Sls. Mgr.:* Carl Gibbs; *Dist. Mgr.:* R. Huntsman

WALL-ABLE MANUFACTURING CORP., 1800 N. Clybourn Ave., Chicago, IL 60614, Tel: 312-440-1000, Telex: 312288; Empl.: 150; *Sls. Mgr.:* Dennis O'Brien .... **C•1570-1571**

Local Sales Offices & Reps

IL	Wheeling, AL&W Sls. Co.	312-541-9080
NY	Dobbs Ferry, L. J. Valle, Inc.	914-693-5089

WALL INDS., 2 Franklin, Lawrence, MA 01840, Tel: 617-688-1287; Empl.: 55; *Sls. Mgr.:* Mark P. Aiello

WALL LENK, Box 3349, Dept. EEM-71, Kinston, NC 28501, Tel: 919-527-4186; Empl.: 60; *Sls. Mgr.:* Richard W. Cooper

WALMOR DATA SYSTEMS, INC., 300 E. Irving Park Rd., Wood Dale, IL 60190, Tel: 312-350-0625; Empl.: 10; *Sls. Mgr.:* Wayne D. Pickette

WAMCO, INC., 11555-A Coley River Cir., Fountain Valley, CA 92708, Tel: 714-545-5560, Telex: 678-459; *Sls. Mgr.:* Gordon R. Calvert; *Dist. Mgr.:* Sheila A. Sherman

WARD LEONARD ELEC., 31 South St., Mt. Vernon, NY 10550, Tel: 914-664-1000, TWX: 710-562-0144; FSC No.: 63743;15109; Empl.: 450; *Dist. Mgr.:* Barry Daly .... **A•1986-1987**

Local Sales Offices & Reps

KY	Louisville, Goldschmidt Elec. Sls.	502-241-0303
MD	Glen Burnie, Faion Lott & Co.	301-744-4611
MA	Framingham, KSA of New England	617-235-8940
MN	Edina, Hallock Co.	612-835-7100
NY	Buffalo, Rudell-Merrifield Assoc.	716-634-4300
OH	Cincinnati, Goldschmidt Elec. Sls	513-641-1708
OH	Painesville, Ward Leonard	216-951-2262
OH	Westlake, Assoc. Elec. Comps.	216-835-9960
OK	Tulsa, Hammond Elec.	918-582-4104
OK	Tulsa, Mac's Elec.	918-583-3101
OR	Beaverton, Steve Bryan & Assoc.	503-644-5729
PA	Harrison City, Rudell-Merrifield Assoc.	412-327-0858
PA	Philadelphia, S. K. MacDonald	215-545-1205
TX	Dallas, Ward Leonard	214-458-8511
WA	Federal Way, Ward Leonard	206-941-8888
WA	Spokane, K & N Elec. Motors	509-328-3260
WI	Appleton, Langstadt	414-733-3791

Local Distributors

CA	Emeryville, Beck Elec. Supp.	415-652-5665
CA	Sunnyvale, Independent Elec.	408-732-7101
CT	E. Hartford, R & S Elctrn. Distrs.	203-528-9901
CT	Naugatuck, S.C.R. Electric	203-729-8274
CT	Norwalk, Park Distrs.	203-853-2010
NY	Buffalo, CMH Indl. Sls.	716-684-5250
NY	Buffalo, Glauber & Carpenter	716-681-1234
NY	Rochester, Preferred Elec. Motors	716-342-5080
OH	Cleveland, Fordes Elec. & Control	216-229-4700
OH	Cleveland, Specialized Comp. Sls.	216-464-0405
OH	Columbus, Columbus Elctrn.	614-294-4651
OH	Dayton, Summit Inds.	513-434-8192
PA	Philadelphia, Capital Elctrl. Supp.	215-225-7850
WI	Milwaukee, Hunt Co.	414-383-1781
WI	Milwaukee, Tech. Elec. Co.	414-353-4383

WARREN COMMS., 101 Okner Pkwy., Livingston, NJ 07039, Tel: 201-992-6200, Telex: 139-384, TWX: 710-994-4852; Empl.: 200; *Sls. Mgr.:* William Vandertulip

WARREN-KNIGHT INSTR. CO., Warren Inds., Inc., 2045 Bennett Rd., Philadelphia, PA 19116, Tel: 215-464-9300; Empl.: 50; *Sls. Mgr.:* Richard M. Marron

WAVETEK ROCKLAND SCI., 245 Livingston St., Northvale, NJ 07647, Tel: 201-767-7100, TWX: 710-991-9619; Empl.: 200; *Sls. Mgr.:* Howard Siegerman

WASATCH HIGH VOLTAGE, P.O. Box 9027, Salt Lake City, UT 84109, Tel: 801-265-9561; Empl.: 9; *Sls. Mgr.:* T. J. Bruzenak

WATERS MFG., Longfellow Ctr., Wayland, MA 01778, Tel: 617-358-2777, Telex: 948441; FSC No.: ;Multiple; Empl.: 125; *Sls. Mgr.:* Ralph Pietro

WATKINS-JOHNSON CO., 3333 Hillview Ave., Palo Alto, CA 94304, Tel: 415-493-4141, Telex: 34-8415, TWX: 910-373-1253; FSC No.: 14482; Empl.: 2800

WATKINS-JOHNSON CO., Stewart Div., 440 Mount Herman Road, Scotts Valley, CA 95060, Tel: 408-438-2100

WATT-CLOCK CORP., P.O. Box 697, Stratford, CT 06497, Tel: 203-378-2500; Empl.: 5; *Sls. Mgr.:* M. Dee

WAVECOM, 9036 Winnetka Ave., Northridge, CA 91324, Tel: 818-882-3010, TWX: 910-493-2172; FSC No.: 28979; Empl.: 93

WAVELINE, Box 718, W. Caldwell, NJ 07006, Tel: 201-226-9100, TWX: 710-734-4324; FSC No.: 00443; Empl.: 95; *Sls. Mgr.:* J. F. Harty

WAVETEK INDIANA, INC., 5808 Churchman, Beech Grove, IN 46107, Tel: 317-787-3332, TWX: 810-341-3226; FSC No.: 34280; Empl.: 900; *Sls. Mgr.:* Dick Koerner

WAVETEK ROCKLAND SCIENTIFIC, INC., 10 Volvo Dr., Rockleigh Indl. Pk., Rockleigh, NJ 07647, Tel: 201-767-7900, TWX: 710-991-9852; Empl.: 100

WAVETEK CORPORATION, 9191 Towne Centre Drive, San Diego, CA 92122, Tel: 619-450-9971, TWX: 910-335-2007; Empl.: 1206; *Sls. Mgr.:* Sam Lewis

WAYNE KERR, INC., W.K.R. Ltd., 400 West Cummings Pk., Woburn, MA 01801, Tel: 617-938-8390, Telex: 6817257 WKERR WOBN; *Sls. Mgr.:* Ken Berquist

WAYNE TRANSFORMER CO., INC., 99 Hazel St., Paterson, NJ 07503, Tel: 201-278-7674; *Sls. Mgr.:* Fred Demauro .... **A•2340-2341**

WECKESSER CO. INC., 4444 W. Irving Park Rd., Chicago, IL 60641, Tel: 312-282-8626; Empl.: 90

WEBER, 147 W. Cedan St., Norwalk, CT 06854, Tel: 203-866-8474

WECO

WECO ELECTRICAL CONNECTORS, INC., Rt. 11, Mooers, NY 12958, Tel: 518-298-4810, Telex: 05-821840; Empl.: 15; *Sls. Mgr.:* Heiner Kammann; *Dist. Mgr.:* Heiner Kammann .... **C•1572-1578**

Local Sales Offices & Reps

CO	Englewood, Protronics Grp.	303-781-6050
FL	Coral Springs, HAI Elctrns.	305-752-7520
MI	Brooklyn, Engineered Comps., Inc.	517-592-3236
OH	Cincinnati, Engineered Comps., Inc.	513-471-2949
OR	Portland, SPS Elctrns.	503-297-6919
WA	Redmond, SPS Elctrns.	206-323-4140
Can	Montreal, QC., WECO Elec. Connectors, Inc.	514-457-3640
Can	Rexdale, Ont., WECO Elec. Connectors, Inc.	416-674-1084

Local Distributors

CA	Fullerton, ISI Mktg. Co.	714-773-0411
CA	Santa Clara, Glynn Elctrns., Inc.	408-748-1666
CA	Union City, Interwest Sys., Inc.	415-489-1820
CT	Pawcatuck, Glynn Elctrns., Inc.	203-599-5373
IL	Carol Stream, Lectro Comps.	312-690-0520
MA	Middleboro, Glynn Elctrns., Inc.	617-947-4262
NH	Salem, Glynn Elctrns., Inc.	603-893-8313
NJ	South River, Kon-Tac, Inc.	201-254-5100
WA	Seattle, H.D. Campvelle	206-433-1900
Can	Concord, Ont., Ziereck, Ont.	416-669-1429
Can	Manitoba, Winnepeg, WES Elctrns.	204-632-1260
Can	Mississauga, Ont., Prelco Ltd.	416-678-0401
Can	Montreal, Que., Prelco Ltd.	514-389-8051
Can	Montreal, Que., Taylor Ind. Controls	514-334-5900
Can	Nepean, Ont., Prelco Ltd.	613-726-1800
Can	St. Laurent, Que., De-Taylec, Ltd.	514-331-7460
Can	St. Laurent, Que., Taylor Indl. Controls, Ltd.	514-334-5900

WEED INSTR. CO., INC., 707 Jeffrey Way, P.O. Box 300, Round Rock, TX 78664-0300, Tel: 512-255-7043, Telex: 776492; Empl.: 110; *Sls. Mgr.:* Frank Ofner

WEI CORP., 1405 S. Village Way, Santa Ana, CA 92705, Tel: 714-834-9333, TWX: 910-595-1709; FSC No.: 51272; Empl.: 50; *Sls. Mgr.:* R. H. Thomason

WEIDMULLER TERMINATIONS, 821 Southlake Blvd., Richmond, VA 23236, Tel: 804-794-2877, Telex: 828376; Empl.: 31; *Sls. Mgr.:* James G. Dunn; *Dist. Mgr.:* Mort Gelfand

WEINSCHEL ENGRG., One Weinschel La., Gaithersburg, MD 20877, Tel: 301-948-3434, 800-638-2048, Telex: ITT 440702, TWX: WU 89-8352; FSC No.: 93459; Empl.: 325; *Sls. Mgr.:* Ron Bastien

WELLMAN THERMAL SYS., 1 Progress Rd, Shelbyville, IN 46176, Tel: 317-398-4411, TWX: 810-260-2616; FSC No.: 4S017; Empl.: 600; *Sls. Mgr.:* E. W. Abel; *Dist. Mgr.:* W. L. McNamee

WELLS ELCTRNS., 1701 S. Main St., South Bend, IN 46613, Tel: 219-287-5941, Telex: 25-8325; FSC No.: 219-287-0356; Empl.: 200; *Sls. Mgr.:* Michael Myers .... **C•1580-1587**

Local Sales Offices & Reps

AL	Huntsville, Southeastern Mktg.	205-882-1633
AZ	Scottsdale, Luscombe Engrg. Co.	602-949-9333
CA	Los Angeles, EESCO	818-242-8823
CA	San Jose, Western Indl. Network	408-559-8118
CO	Boulder, Luscombe Engrg. Co.	303-772-3342
CT	Wethersfield, Com/Pak, Inc.	203-563-4784
FL	Lighthouse Point, Jack Krutek & Assocs.	305-941-6544
GA	Atlanta, L & D, Inc.	404-395-7079
IL	Glencoe, Howard Benjamin Assocs. Inc.	312-835-0150
IN	Greenfield, France Entprs., Inc.	317-462-6098
MD	Phoenix, Phoenix Elctrn. Sls.	301-628-2066
MA	Woburn, Com/Pak, Inc.	617-938-8580
MI	Brighton, Michigan Mktg. & Sls.	313-229-6218
MN	Minneapolis, RK Sls., Inc.	612-786-5713
MO	St. Louis, Reptronics	314-576-9816
NJ	Berkeley Heights, Cambridge Allen and Assocs.	201-464-0203
NJ	Medford, Component Conslts.	609-654-5300
NY	Syracuse, T-Squared Elctrns. Co., Inc.	315-463-8592
NC	Greensboro, L & D, Inc.	919-292-3201
OR	Tigard, El Tech, Inc.	503-684-3458
TN	Knoxville, L & D, Inc.	615-573-6511
TX	El Paso, EPEC, Inc.	915-593-8481
TX	Irving, AID Elctrns., Inc.	214-790-4761
VA	Centerville, Phoenix Elctrns. Sls.	703-631-2924
WA	Bellevue, El Tech, Inc.	206-643-4330
WI	Colgate, Rep 1 & Assocs.	414-628-4016

Local Distributors

AZ	Tempe, Waltronic Sls.	602-967-1020
CA	Anaheim, A To Z Elctrns., Inc.	714-634-3620
CA	San Jose, Cypress Elctrns., Inc.	408-945-8400
CO	Wheat Ridge, Cypress Elctrns., Inc.	303-431-2622
FL	Pompano Beach, Comps. South	305-971-0350
GA	Atlanta, Prehler Elctrns.	404-447-5540

IL	Chicago, Semiconductor Specialists, Inc.	312-279-1005
IN	Indianapolis, Graham Elctrns.	317-634-8202
MD	Gaithersburg, MS Elctrns., Inc.	301-921-0200
MA	Mendon, Add Elctrn. Corp.	617-429-7945
MI	Southfield, L.S.I. Mktg.	313-474-4400
MN	St. Paul, Gopher Elctrns.	612-483-3322
MO	Kansas City, Semiconductor Specialists, Inc.	816-452-3900
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TX	Richardson, Kent Elctrns., Inc.	214-669-2600
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WELTEK INTL., INC., 760 W. Cotter St., South Bend, IN 46613, Tel: 219-232-5400, Telex: 23-3131; Empl.: 28; *Sls. Mgr.:* Tom Gerschoffer

WESCO ELECTRICAL CO., 201 Munson St., Greenfield, MA 01301, Tel: 413-774-4358; FSC No.: 12673; Empl.: 190; *Sls. Mgr.:* James R. DeSanty .... **A•1198-1203**

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FL	Fern Park, EIR Inc.	305-830-9600
IL	Addison, Banner Tech. Sls.	312-279-6070
IN	Columbus, J. H. Weaver Co.	812-372-3625
MA	Framingham, Bengal Assocs.	617-877-2639
MA	Randolph, Bengal Assocs.	617-961-4120
MN	Bloomington, Electronic Sls. Agcy.	612-884-8291
NJ	Madison, Livera-Polk Assocs.	201-377-3220
NY	Glen Head, Livera-Polk Assocs.	516-759-9300
NC	Raleigh, Leigh Sls.	919-872-1484
OH	Wickliffe, W. Brauer & Assoc.	216-943-0601
OR	Beaverton, L-D Elctrns.	503-649-6177
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WA	Snohomish, L-D Elctrns.	206-568-0511

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GA	Atlanta, Conley & Assocs.	404-447-6992
IL	Chicago, Berndt & Assocs.	312-283-0713
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TECHNICAL INFORMATION

WHERE TO FIND THEM IN THE 85/86 EDITION OF EEM

Abbreviations/Acronyms **A**•1166, **B**•1012, **C**•1028, **D**•1016
ASCII Code **D**•1087
Batteries, Product Selection Guide **D**•1413
Batteries & Fuel Cells, Characteristics **D**•1430
Cabinets, Enclosures, Racks, & Chassis, Product Selection Guide **C**•1003
Capacitors, Basic Formulas **A**•1093
Capacitors, Miniglossary **A**•1066
Capacitors, Product Selection Guide **A**•1003
Circuit Boards (Printed) Product Selection Guide **C**•1099
Coils, Chokes, Inductors, Product Selection Guide **A**•1205
Conductors, Maximum Current Capacity of Copper & Aluminum **C**•1863
Connectors, Miniglossary **C**•1129
Connectors, Terminals, & Sockets, Product Selection Guide **C**•1105
Crystals, Oscillators, Crystal & Piezoelectric Filters, Product Selection Gude **A**•1309
Delay Lines, Product Selection Guide **A**•1459
Discrete Semiconductors, Product Selection Guide **A**•2067
Displays, Readouts, Lamps, & Lights, Product Selection Guide **B**•1015
EBCDIC Code **D**•1092
Encapsulation, Miniglossary **C**•1086
Fans, Blowers, Cooling Equipment, & Heat Exchangers, Product Selection Guide **C**•1623
Filters, Product Selection Guide **A**•1583
Instruments, Graphic Recording Product Selection Guide **D**•1401
Instruments, Panel Meters, Product Selection Guide **D**•1329
Instruments, Test & Measuring Product Selection Guide **D**•1175
Interconnection Systems, Product Selection Guide **C**•1699
Keyboards & Keypads, Product Selection Guide **B**•1705
Logofinder & Trademark Directories **B**•901
Microwave Components, Product Selection Guide **A**•1701
Military Qualified Products Lists **B**•1003
Motors, Drives, & Rotating Components, Product Selection Guide **B**•1129
Opto Semiconductors, Miniglossary **B**•1214
Oscilloscopes, Product Selection Guide **D**•1385
Panel Hardware, Product Selection Guide **C**•1589
Potentiometers, Trimmers, Controls, & Rheostats, Product Selection Guide **A**•1991
Power Supplies, Miniglossary **D**•1462
Power Supplies, AC, Product Selection Guide **D**•1877
Power Supplies, DC, Product Selection Guide **D**•1447
Protective Components (Fuses, Circuit Breakers, etc.), Product Selection Guide **B**•1225
Relay Contact Forms **B**•1317
Relays, Electromechanical, Miniglossary **B**•1308
Relays, Product Selection Guide **B**•1261
Resistor Color Codes **A**•1828
Resistors, Product Selection Guide **A**•1785
Servo Components, Miniglossary **D**•1985
Solenoids, Product Selection Guide **B**•1463
Switches, Product Selection Guide **B**•1477
Thermal Components, Product Selection Guide **B**•1741
Thermal Conductivity of Dielectrics at Room Temperature **B**•1744
Thyristors/High Power Diodes, Miniglossary **A**•2076
Transducers & Encoders, Product Selection Guide **B**•1777
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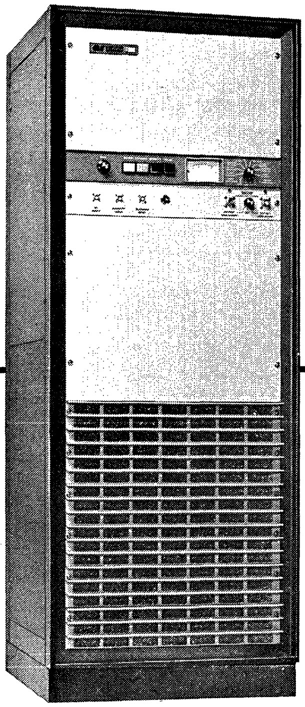


MODEL 2000L

For rfi susceptibility testing, NMR spectroscopy, plasma physics, rf heating, and general rf lab requirements, Amplifier Research offers the depth of design experience and the breadth of line to fulfill even the most unusual demands.

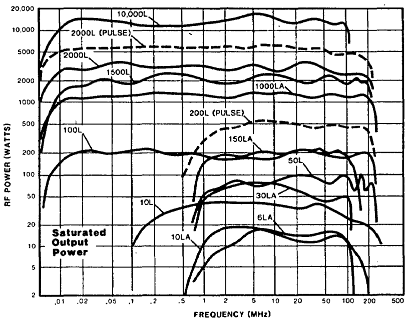
If the rf power amplifier you wish *you* had designed—with instantly available bandwidth, total immunity to load mismatch, pulse and blanking capability—is not already in these pages, the chances are very good that it can be designed and meticulously built for you at Amplifier Research, singly or in OEM quantities.

Series L

6-10,000 watts, 10 kHz-300 MHz

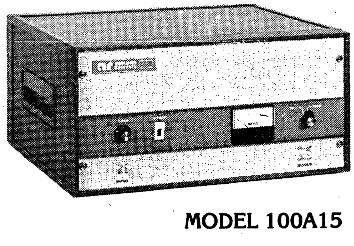
Our original, and largest series, these broadband, Class A linear amplifiers give you the option of low, moderate, and high power over five decades of bandwidth. Series L models, both solid state and tube, deliver up to 10,000 watts of stable RF power in the 10 kHz to 300 MHz frequency range.

Solid State		
Model	*RF Power (watts)*	*Frequency*
6LA	8	2-150 MHz
10LA	10	1-110 MHz
10L	10	150 kHz-300 MHz
30LA	30	1-110 MHz
Solid State/Tubes Medium Power		
Model	*RF Power (watts)*	*Frequency*
50L	50	1-240 MHz
100L	150	10 kHz-220 MHz
100LM8	150	1-220 MHz
100LM9	200	1-200 MHz
150LA	150	1-150 MHz
200L	200	1-200 MHz
High Power		
Model	*RF Power (watts)*	*Frequency*
1000LA	1000	10 kHz-220 MHz
1000LAM8	1000	1-220 MHz
1500L	1600	10 kHz-220 MHz
1500LM8	1600	1-220 MHz
2000L	2000	10 kHz-220 MHz
2000LM8	2000	1-220 MHz
10,000L	10,000	10 kHz-100 MHz



Series A

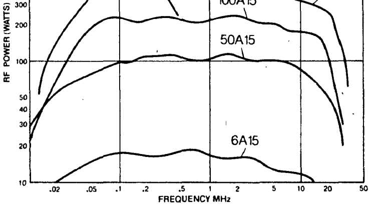
6-700 watts, 10 kHz to 15 MHz



MODEL 100A15

If it's low to moderate RF power over three decades of bandwidth that you need, turn to Series A, where standard models deliver up to 700 watts. Frequencies for these all solid state amplifiers range from 10 kHz to 15 MHz.

Model	*RF Power (watts)*	*Frequency*
6A15	6	20 kHz-15 MHz
50A15	50	20 kHz-15 MHz
100A15	100	35 kHz-15 MHz
200A15	200	40 kHz-15 MHz
700A	700	10-250 kHz



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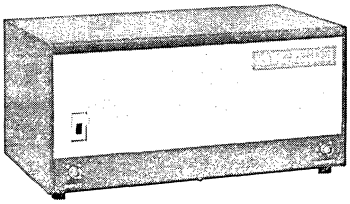
Series W

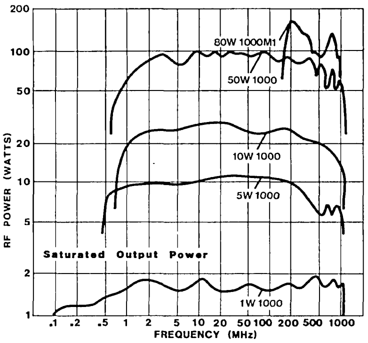


MODEL 5W1000

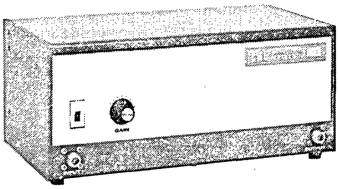
1-80 watts, 100 kHz-1000 MHz

These versatile, ultra-broadband, solid-state linear amplifiers provide RF power over more than four decades of bandwidth from 100 kHz to 1 GHz. Our newest line, Series W includes standard models rated up to 80 watts. Special or modified units are available to provide even higher useful power.

Model	*RF Power (watts)*	*Frequency*
1W1000	1	100 kHz-1000 MHz
5W1000	5	500 kHz-1000 MHz
10W1000	10	1-1000 MHz
50W1000	50	1-1000 MHz
80W1000M1	80	200-1000 MHz



Series H

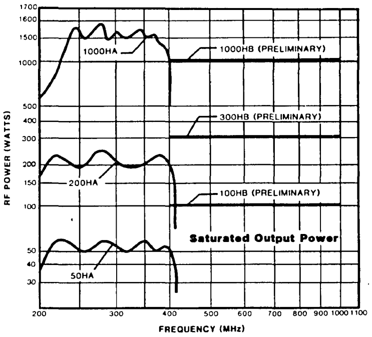


MODEL 50HA

50-1250 watts, 220 MHz-1000 MHz

Series H amplifiers are an economical solution where a narrower bandwidth will provide adequate performance. They cover the bandwidth range from 220 MHz to 1000 MHz. Up to 1250 watts output power.

Solid State		
Model	*RF Power (watts)*	*Frequency*
50HA	50	220-400 MHz
200HA	200	220-400 MHz
100HB	100	400-1000 MHz
300HB	300	400-1000 MHz
1000HB	1000	400-1000 MHz
Solid State/Tubes		
Model	*RF Power (watts)*	*Frequency*
1000HA	1250	220-400 MHz



Accessories and Related Equipment

Model 777

LEVELING PREAMPLIFIER

• 5 kHz to 300 MHz • 40 dB gain control up to 200 MHz • ±0.5 dB flatness • Low harmonic distortion • Input rf attenuator

The Model 777 leveling preamplifier accepts a monitor input voltage of any polarity—positive, negative, or differential—and provides up to 40 dB of electronic gain control. Model 777 is ideal for use in constant-field rfi susceptibility testing, power output control, modulation envelope feedback, and simulation of current or voltage sources.

Front panel rf attenuation and threshold adjust range of up to 5 volts make Model 777 versatile enough to fit almost any application, and suitable for use with a wide range of signal sources and amplifiers.

Model 999

GATED LEVELING PREAMPLIFIER

• 1 MHz-1 GHz • Pulse circuit for amplifier blanking

The Model 999 is similar to the Model 777 in its basic functions. In addition, its bandwidth extends to 1 GHz, and its gated pulse circuit makes it particularly suited for use with amplifiers (such as the Models 150LA and 200L) having blanking capability.

AT Series

ANTENNAS (200 V/m testing)

- AT1000
  150-1000 MHz; 2000 W; 91 cm x 102 cm x 13 cm log-periodic.
- AT2000
  30-1000 MHz; 3500 W; 117 cm x 61 cm x 51 cm. The AT2000 CAVITENNA® antenna is designed specifically for shielded-room testing.
- AT3000
  10 kHz-30 MHz; 1600 W; 188 cm x 72 cm x 7.0 cm E-field generator. 100 V/m at 1 meter centerline, 1000 V/m between elements.

DC Series

DIRECTIONAL COUPLERS
for interconnection of amplifiers with meters, scopes, or spectrum analyzers in power monitoring and leveling.

- DC2000 Dual Directional Coupler
  - 10 kHz to 220 MHz • 2000 W
  - Handles forward and reflected power
- DC3000 Directional Coupler
  - 100 kHz to 1 GHz • 50 W
- DC3001 Dual Directional Coupler
  - Similar to DC3000, plus ability to handle both forward and reflected power.
- DC4000 Dual Directional Coupler
  - 10 kHz to 100 MHz • 15,000 watts cw
  - Handles forward and reflected power

Broadband RF Telemetry Link

- Fiber-optic coupling • 1 kHz-1000 MHz, 10 kHz-500 MHz • 40 dB S/N
- 200 µV input sensitivity
- Return link for machine control

These broadband rf telemetry links, sold and serviced in the U.S. by Amplifier Research, are for EMI and EMC testing, antenna mapping, and use in noisy environments. Shielded for fields up to 100 kV/m, they are ideal for EMP and pulsed rf applications.

Field Strength Monitor

- Isotropic response • Fiber-optic coupling
- 20 Hz-500 MHz
- 1-1000 V/m • 0.1-10 A/m

The Aeritalia monitor, sold and serviced in the U.S. by Amplifier Research, senses E or H field strength and transmits the reading to a remote repeater via fiber-optic link. The unique sensor probes respond to all incident fields, regardless of polarization.

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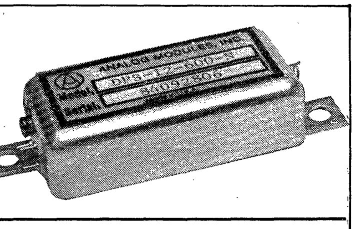


SHORT FORM CATALOG

	MODEL	SPECIFICATIONS
AMPLIFIERS Miniature surface mounted plug-in boards for low cost/multichannel applications. From $50.	110-115	Bipolar transimpedance virtual ground preamps up to 200 MHz. Gains 2K to 100K V/A. Noise 1-3 pA/$\sqrt{Hz}$.
	200+	Low-noise voltage amplifiers down to 0.4nV/$\sqrt{Hz}$.
High performance amplifier modules in RF shielded aluminum boxes. Choice of BNC, or pins for low-profile PCB mount.	300+	Electrometer and super low-input current amplifiers. Gains to 100G ohms. Input current noise to 0.5 fA/$\sqrt{Hz}$. Available with UV and other detectors (see model 700).
Useful for instrumentation, ultrasound, sonar, laser measurements, pulse processing, and optical receivers. From $150.	310+	Low-noise current input amplifiers, AC and DC coupled to 450 MHz. Noise down to 0.5 pA/$\sqrt{Hz}$ at 10 MHz.
	320+	Low-noise voltage input amplifiers AC and DC coupled to 450 MHz. Noise down to 250 pV/$\sqrt{Hz}$.
	330+	2" x 2" PC mount amplifier building blocks. Precision, for sonar; instrumentation. Hi-input impedance and gain-switched amplifiers; filters, and differential stages.
	360+	Variable-gain amplifiers. 0-60 dB/1 MHz and 30 dB/50 MHz.
LOGARITHMIC AMPLIFIERS Specialists in wideband true log amps for electro-optics lidar, and signal processing. From $385.	380	DC coupled zero-offset, for RF, DC, or video. Drift correction loop. DC to 10 nS risetime, 90 dB dynamic range, 100 μV to ±6V. 0.5 dB accuracy.
	385	High speed, 200 Hz to 3 nS risetime for low duty cycle pulses. 80 dB ±1 dB, −200 μV to −2V.
PACKAGED MODULES Amplifiers and analog function modules packaged in NIM, CAMAC, and EFP racks.	400+	Current and voltage amplifiers, low-drift DC amps, log amps, pulse stretchers, ultrasound and sonar receivers, laser diode pulser modules.
POWER SUPPLIES From $100. We also build to OEM specs for military and commercial applications.	520+	Low-power, miniature (1 cu. in.), programmable low-noise power supplies for photodiode biassing, ionization chambers, etc. 0 to 300 and 0 to 600V out, negative and military. 12/15 or 24/28V input. Miniature fixed 600 volt model.
	530+	Low power miniature modules to 3 KV. Low input current versions.
	540+	PMT power supply. Adjustable; low-noise; isolated.
	550+	Image intensifier power supplies. Independently programmable voltages. Low power and gated types.
560+ series are designed to charge capacitors for laser power supplies with high efficiency.	562	6W; 12/15V or 24/28V in; 0 to 1 KV out. 2" x 2" x 0.7" PCB mount.
	564	25W; 12/15V or 24/28V in; 0 to 1 KV out. 5.2" x 2.4" x 1.3" inc. base.
Inhibit and "charged" features are provided. Fixed DC loads may be driven with the addition of a capacitor.	565	60W; 12/15, or 24/28V in: 0 to 1 KV out; 4.7" x 3.7" x 2.3".
	568+	150 to 1500W miniature modules for laser designators, etc. military versions.
576+ series are isolated stackable capacitor charging converters providing add-on power capability.	576	170W; IP 135 VDC, OP to 2.3 KV; isolated. 577-340W. 578-670W.
PEAK SENSE AND HOLD	600+	Measures peak value of a single pulse down to 10 nS and stretches to DC. One or two stages with individual resets. Input gating and scaling preamplifiers available.
VF AND FV CONVERTERS	610+	To 500 KHz; 0.01% linearity, 2" x 2" x 0.7" PCB mount module.
OPTICAL TRANSMITTERS AND RECEIVERS For fiber optics, rangefinding, lidar, training and aiming. Quadrant detectors.	700+	Transimpedance amplifier with PIN or avalanche detectors; fiber interface available.
	720	Bootstrapped FET plug-in surface mount board with silicon or Ge detector. Low cost.
	740	Complete fiber optic receiver, 1.3 μm. 1.5 pW/$\sqrt{Hz}$; High BW; to 30 MV/A.
	750	Laser rangefinder receivers. Time variable gain. Short minimum range
	770	Protected laser diode current source .0-250mA.
LASER ELECTRONICS Power and energy modules give DC output proportional to energy/shot. Used for medical lasers, safety, energy monitoring and built-in test.	800	0.5 nJ for 10V out. 5 nS to 5 μS pulse width. 2.6" x 1.3" x 0.9" box.
	801	800 module temperature compensated for 1.06 μm.
	802	800 module modified for long pulses to 10 mS.
	803	800 module with UV detector.
	810	Peak power monitor with LED or relay output.
High voltage switches for EO crystals.	820	50 Hz; 3 KV, 70 nS rise, 120 nS width, 700-1 KV power. 821-fast risetime.
	831/2/3	600 to 5 KV, 5 nS risetime, step, pulse, and double pulse OP.
Flashlamp series or parallel trigger.	850	115 VAC input, adjustable O/P to 12 KV, external trigger.
Flashlamp simmer supply.	860	1.1 KV open circuit, to 80 mA lamp current. 24/28V input.
Complete Laser Power Supplies.	880	Lab. Power Supply, 3ϕY, 1 KW and 3 KW. Displays energy in, energy out, 1-99 Hz rep rate, Q-Sw delay, shot counter.
OEM models on request.	884	Industrial power supply, digital switch programs shots, rep rate to 199 pps, PFN volts to 1500V. 115 VAC.

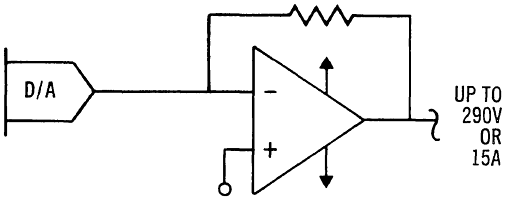
126 BAYWOOD AVENUE, LONGWOOD, FLORIDA 32750 • (305) 339-4355/6 • TELEX ANALOG MOD 467617

APEX μ tech

POWER OP AMPS

INDUSTRY'S MOST COMPLETE SELECTION
EVALUATION QUANTITIES FROM STOCK

I/V CONVERSION



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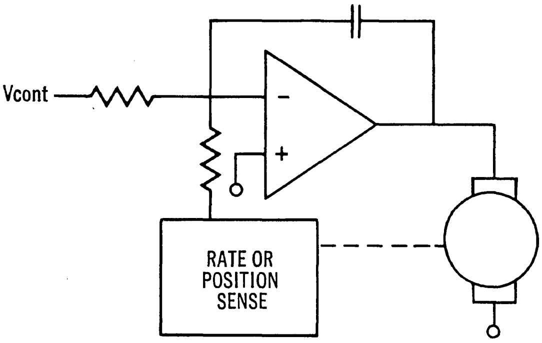
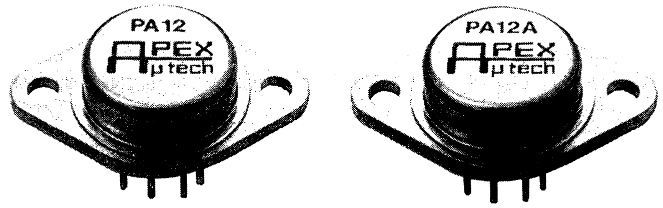




DESCRIPTION

APEX MICROTECHNOLOGY CORP. offers the industry's largest selection of high voltage, high current operational amplifiers designed for resistive, inductive and capacitive loads. The output of high current models is protected against inductive kickback or back EMF. For optimum linearity, most output stages are biased for class A/B operation. These devices are housed in hermetically sealed 8 pin TO-3 packages.

APPLICATION

These hybrid integrated circuits allow the designer to achieve the precision associated with Op Amps and the power associated with discrete multi-component boosters all in one device. This improves factors of reliability, performance and cost. Some of the prime applications for High current Models include: Motor Drives controlling rate or position, magnetic CRT Deflection, Programmable Power Supplies for constant voltage or current, Valve control, Pin drivers for ATE equipment and compact audio amplifiers. High voltage models often share some of the above applications and also take on tasks such as Electrostatic CRT Deflection and driving piezoelectric transducers.

SELECTOR GUIDE

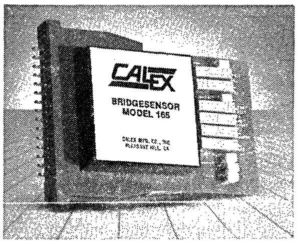
Model	Output Current ±A Pk Min	Output Voltage ±V Pk Min	V_S-Out Delta V Max	Supply Range ±V Max	Internal Power Watts Max	V_{offset} Initial mV Max	V_{offset} vs Temp μV/°C Max	I Bias nA Max	I_q mA Max	PWR BW @ Nom V_{out} KHz[2] Typ	Slew Rate Vμs Typ	Unity GBW MHz Typ	V_{OS} Adj	Current Limit	Thermal Shutdown	Input Stage	Temp Range Max	Second Source[1]
HIGH CURRENT MODELS																		
PA03	30	72	3	15/75	170	3	30	.05	100		50	5		Thermal	Yes	FET	-55/125	No
PA12A	15	44	6	10/50	125	3	40	20	35	20	4	4	No	Ext Adj	No	Bipolar	-55/125	No
PA12M	10	39	*	10/45	*	6	65	30	*	*	*	*	*	*	*	*	*	*
PA12	*	*	*	*	*	*	*	*	50	*	*	*	*	*	*	*	-25/85	*
PA51A[3]	10	32	8	10/40	97	5	40	20	10	16	2.8	1	No	Ext Adj	No	Bipolar	-55/125	Direct
PA51M	*	*	*	*	*	10	65	40	*	*	*	*	*	*	*	*	*	*
PA51	*	28	*	10/36	*	*	*	*	*	*	*	*	*	*	*	*	-25/85	*
PA07A	5	45	5	12/50	67	.5	10	.01	30	18	5	1.3	Yes	Ext Adj	Yes	FET	-25/85	Similar
PA07	*	*	*	*	*	2	30	.05	*	*	*	*	*	*	*	*	*	
PA07M	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	-55/125	*
PA10A	5	44	6	10/50	67	3	40	20	25	23	5	6	No	Ext Adj	No	Bipolar	-55/125	Limited
PA10M	*	37	8	10/45	*	6	65	30	*	*	*	*	*	*	*	*	*	*
PA10	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	-25/85	*
PA11	5	22	8	10/30	67	10	65	40	25	23	2.6	1	No	Ext Adj	No	Bipolar	-25/85	Sim/Lim
PA73[3]	5	22	8	10/30	67	10	65	40	5	23	2.6	1	No	Ext Adj	No	Bipolar	-25/85	Direct
PA01	5	18	10	10/28	67	12	65	50	50	23	2.6	1	No	Ext Adj	No	Bipolar	-25/85	Sim/Lim
PA02A	5	15	4	7/19	48	3	25	.1	37	350	20	4.5	No	Ext Adj	No	FET	-55/125	Similar
PA02M	*	*	*	*	*	10	50	.2	*	*	*	*	*	*	*	*	*	*
PA02	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	-25/85	*
PA09A	2	32	8	10/40	78	.5	10	.02	85	2500	400	150	Yes	4A	Yes	FET	-25/85	No
PA09M	*	*	*	*	*	3	30	.1	*	*	*	*	*	*	*	*	-55/125	*
PA09	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	-25/85	*
HIGH VOLTAGE MODELS																		
PA08A	.150	134	10	15/150	26	.5	10	.01	6.5	90	30	5	Yes	Ext Adj	Yes	FET	-25/85	No
PA08M	*	*	*	*	*	2	30	.05	*	*	*	*	*	*	*	*	-55/125	*
PA08	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	-25/85	*
PA83A	.075	140	10	15/150	26	1	10	.01	8.5	60	30	5	Yes	.1A	Yes	FET	-25/85	Limited
PA83M	*	*	*	*	*	3	25	.05	*	*	*	*	*	*	*	*	-55/125	*
PA83	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	-25/85	*
PA84A	.04	143	7	15/150	26	1	10	.01	7.5	250	200	75	Yes	.05A	Yes	FET	-25/85	Limited
PA84M	*	*	*	*	*	3	25	.05	*	*	*	*	*	*	*	*	-55/125	*
PA84	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	-25/85	*
PA84S	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	No

APEX MICROTECHNOLOGY CORP. • 2895 West Rudasill • Tucson, AZ 85741

APPLICATIONS HOTLINE: (800) 421-1865 **LITERATURE AND ORDERS: (602) 742-8600**

CALEX

CALEX MFG. CO., INC., 3355 Vincent Road, Pleasant Hill, CA 94523-4389
Telephone: (415) 932-3911 Telex: 338 506



BRIDGESENSORS are complete power sources and amplifiers for strain gages, load cells, and transducers. The 165 and 465 have analog outputs. The 166 and 167 have frequency outputs designed for digital readouts or microprocessor inputs. The Model 465 operates directly from the AC line.

SPECIFICATION	MODEL 165	MODEL 166	MODEL 167	MODEL 465
Gain	10–1000	10–1000	10–1000	10–1000
Output	±10V @ 10mA	0 to 10kHz	0 to 100kHz	±10V @ 5mA
Drift	±3uV/°C	±0.5uV/°C	±0.5uV/°C	±2uV/°C
Bridge Supply	+4 to +10V @ 100mA			+4 to 15V @ 150mA
Price	$139	$155	$155	$245

CALEX
INSTRUMENTATION AMPLIFIER MODEL 178

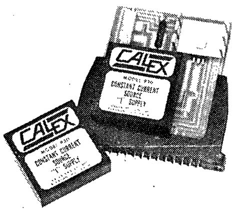
INSTRUMENTATION AMPLIFIERS for data acquisition systems, strain gages, transducers, instruments, scope preamps, laboratory use and control systems. Mounting kits shown with adjust. pots. and conn. available.

SPECIFICATION	MODEL 176J	MODEL 176K	MODEL 176L	MODEL 178
Gain	10–1000	10–1000	1-1000	10–1000
Input Impedance	10M			1000M
Drift @ 1000 Gain	±3uV/°C	±1uV/°C	±0.25uV/°C	±2uV/°C
CMRR @ 100 Gain	100dB min.			
Freq. Resp.	10kHz			5kHz
Size	1.5" X 1.5" X 0.5"H.			
Price	$64	$69	$77	$104

CALEX
MULTIFUNCTION VOLTSENSOR MODEL 546
CALEX MFG. CO., INC.
PLEASANT HILL, CA

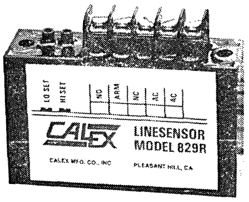
VOLTSENSORS are precision level detectors for OEM instruments and in-house test equipment. Mounting kits (pictured) are available for ease of system assembly. Contact factory for details.

SPECIFICATION	MODEL 540	MODEL 545	MODEL 546
No. of Trip Points	1	2	2
No. of Outputs	1	3 (HI, GO, LO)	
Trip Point Range	±14.5V	±10mV to ±1V	±100mV to ±10V
Trip point stability	±40uV/°C	±5uV/°C	±50uV/°C
Input Impedance	1M	10M	10M
Output (can source or sink)	100mA		
Size	1.4" X 0.6" X 0.5"		2" X 2" X 0.6"
Price	$44	$139	$110

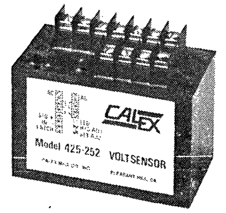


"I" SUPPLY MODEL 930 Programmable constant current source. For component, contact resistance, semiconductor, coil, motor, connector, and cable testing. Used to power strain gages, for slip ring instrumentation and RTDs.

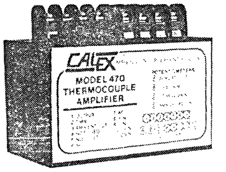
Output 0.5 to 50mA (up to 500 mA with special mtg. kit.). Output voltage or resistance programmable. Can be used as a voltage to current converter (4 to 20mA). Compliance voltage 0 to 27V. Size 1.5" X 1.5" X 0.5". Price $94.



LINSENSOR The **MODEL 829** monitors the AC line voltage to detect brown-outs, overvoltages, or line dropouts. Protects against motor burnout, instrument malfunction. Prevent computer memory loss or assure continued power by starting up or switching to auxiliary power sources. Available for domestic and all foreign voltages. Relay contact output 0.5A @ 115VAC. Ave. response time 100msec and 20msec on dropout. Accuracy 0.5VAC rms. Size 3.8" X 1" X 2.2". Price $116. OEM prices avail.

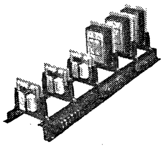


The **MODELS 425-252 and 415-215 VOLTSENSORS** are complete AC line powered DC voltage detectors for process control, computer backup, quality control, and manufacturing equipment. Trip point adjustable by internal pot. LED shows output relay state. Range ±100mV (415-215) and ±14V (425-252). Stability ±5uV and ±100uV/°C. Size 3.75" X 2" X 3". Relay contacts 3 Amps @ 115 VAC. Price $265 (415) and $198 (425).

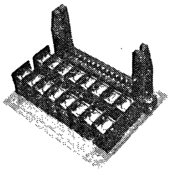


The **MODEL 470** Thermocouple amplifier is an AC line powered amplifier for use with type E, J, T, or K Thermocouples. Completely encapsulated for use in rugged environments. It has built-in cold junction compensation. Gain adjustable 175 to 650. Output ± 10 Volts. CMRR 120 dB. Zero stability 2 uV/°C. Linearity better than 0.005%. Size 3.75" X 2" X 3". Price $175.

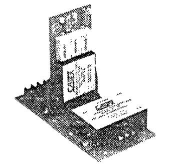
PACKAGING HARDWARE to conveniently mount and wire the module and/or mounting kit selected into a small mini-system. Quick & easy to use and professional looking.



MODEL 8100 MOUNTING RAILS for mounting kit connectors. Size 16" X 1" H. can be cut to size. 32 holes on 1/2" Ctrs. Price $25/Pair.



MODEL 2005 INTERFACE MOUNTING KIT converts 15 pin p.c. card to barrier strip allowing system wiring with a screwdriver. Price $29.

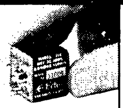


MODEL 22-100 POWER SUPPLY INTERFACE KIT allows a single card system to be powered up in minutes. ±15V at 100mA. Price $138.

Ectron®
CORPORATION

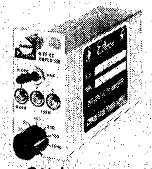
- **Differential DC Amplifiers**
- **Strain Gage Signal Conditioners**
- **Thermocouple Signal Conditioners**
- **Signal Conditioning Systems**
- **Transducer Amplifiers**
- **Thermocouple/MV Calibrators**

MODEL 314B



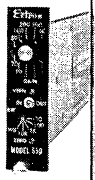
Miniature airborne amplifier occupies less than one cubic inch. Contains differential amplifier, strain gage excitation and power supply to operate from 28V dc. 20 kHz Bandwidth. Bulletin 2007

400 ENVIRONMENTAL SERIES



- Intrinsically Safe
- 100G Shock
- −25 to +71°C
- 0.5 μV/°C Stability
- Small Size 1″w × 2″h × 3″d
- Bridge Excitation and Balance
- Thermocouple Conditioning
- RFI protection
- 120 db CMR • 100V CMV
- Rack or Stud Mounting
- 12 or 28 V dc Power • 8 oz's.
- Bulletin 2001

500 ECONOMY SERIES



- 1 μV/°C
- 114 dB CMR
- Gains x.01 to x2500
- 16 Amps per 3.5′ high rack
- 80 kHz bandwidth
- Filtered output
- 10 ma, 100 ma, dual outputs
- Bridge Bal., Completion, CAL
- Bulletin 2004 and 2013

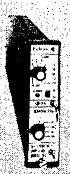
540 SERIES LOW COST MULTI-CHANNEL "FRONT END" FOR DATA SYSTEMS

- 4 Independent Channels Per Card
- 64 Channels in 7-inch Rack Enclosure
- True Differential Input
- 20 Meg Ohm Input Impedance
- 110 dB CMR
- Independent Fixed Gains x1 to x1000
- Independent Fixed Filter 10Hz to 1KHz
- Optional Excitation Power Supply
- Optional Bridge Calibration
- Optional Bridge Completion
- Bulletin 2011

680 INDUSTRIAL SERIES

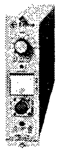
- Auto Zero
- Strain Gage Conditioning
- Thermocouple Linearization
- Reference Junctions
- Multifunction Amplifiers
- Bridge Excitation and Bipolar Cal.
- .5 μV/°C Zero Stability
- 120 dB CMR and 300V CMV
- 12V dc, 28V dc or 115V ac power
- Bulletin 2005

700 WIDEBAND SERIES



- 100 kHz Bandwidth
- Manual or Programmable Gain
- Digital Storage
- Local Readout
- 1 μV/°C Zero Stability
- .003%/°C Gain T.C.
- .01% Gain Accuracy
- 300V CMV • 126 dB CMR
- 3-pole filters • Dual outputs
- Bulletin 2003

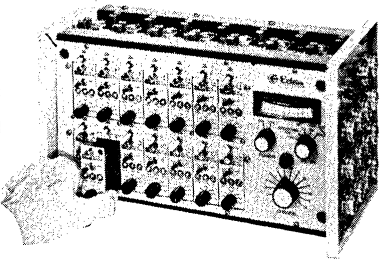
776 SERIES HIGH PERFORMANCE SIGNAL CONDITIONING UNIT



- CMV ± 1200 Volts DC or Equiv. AC
- CMR 125dB DC to 50KHz, 85dB to 1MHz
- 10 Meg Ohm Input Impedance
- Selectable Gain x1 to x1000 with Vernier
- 0.1% Gain Accuracy, 0.01% Stability
- 100KHz Bandwidth
- Selectable Filter
- Constant Voltage or Dual Tracking Constant Current Excitation
- Internal Calibration Source
- AC Powered
- Bulletin 2014

4000 SERIES, SIGNAL CONDITIONING SYSTEMS

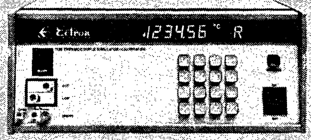
The typical 4000 series system shown below is designed for Airborne or Vehicular service involving moderately high G forces. It includes 14 stable 400 series amplifiers, a monitor meter and monitor selection switch, individual CAL switches, bridge excitation, bridge balance and conditioning.



Other 4000 series systems are designed for operation during shocks up to 100 G's. Features available in these systems include integral VCO's, FET Calibration, Channel ID signals, Rechargeable Battery Pack and others. (See Bulletin 2010)

MODEL 1120 THERMOCOUPLE SIMULATOR CALIBRATOR

IEEE-488



CALIBRATES . . .

Digital Thermometers
Temperature Recorders
Thermocouple Transmitters

- 8 TC Types: E,J,K,T,R,S,B,C
- 0.005% of Reading Accuracy
- IEEE - 488 Interface
- Key in temperature directly in C or F
- Microprocessor based
- DC Calibration capability
- Bulletin 2012

8159 Engineer Road, San Diego, California 92111-1980
Phone (619) 278-0600/TWX 910-335-1259

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Specialists in Airborne, Vehicular and Industrial Instrumentation

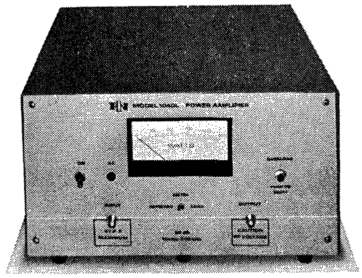
Ectron®
CORPORATION

The Ultimate in RF Power.

Solid State Reliability with Incredible Versatility.

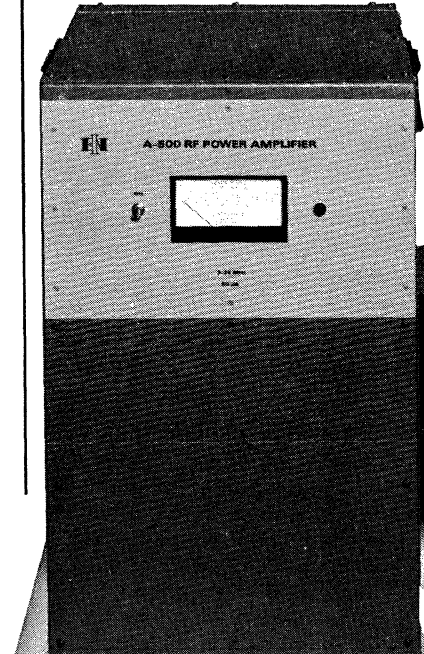
400 Watts/1040L

- 10 kHz to 500 kHz
- Up to 700 watts output
- Useful power up to 1 MHz
- Built-in true average power meter


MODEL 1040L POWER AMPLIFIER

500 Watts/A-500

- 300 kHz to 35 MHz
- Up to 1000 watts pulse and CW
- No bandswitching
- Works into any load impedance


A-500 RF POWER AMPLIFIER

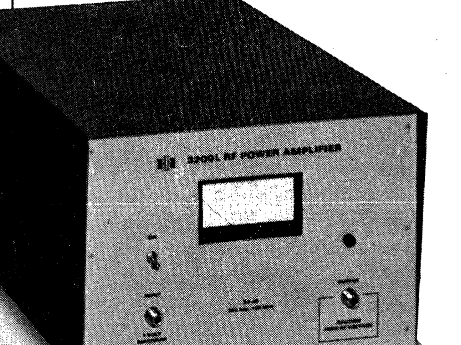
100 Watts/2100L

- 10 kHz to 12 MHz coverage
- 100 watts linear Class A power
- Up to 250 watts saturated

MODEL 2100L RF POWER AMPLIFIER

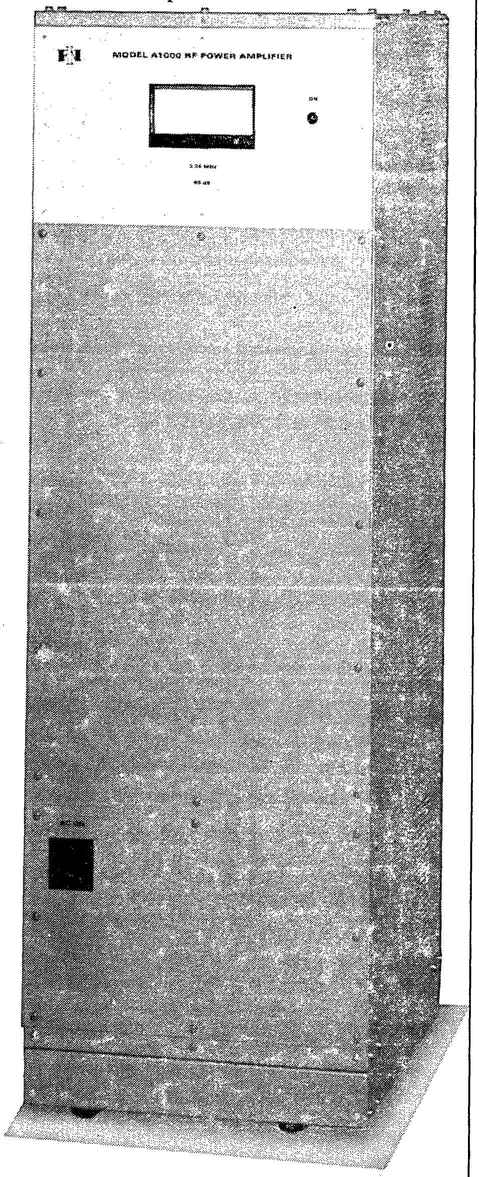
200 Watts/3200L

- 250 kHz to 150 MHz
- 200 watts linear power to 120 MHz
- 175 watts to 150 MHz
- Operates from 115/230V receptacle


3200L RF POWER AMPLIFIER

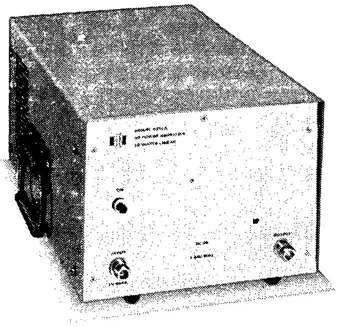
1000 Watts/A1000

- 300 kHz to 35 MHz
- 1000 watts linear Class A
- Ruggedly built
- Operates from 230 VAC, 3 phase



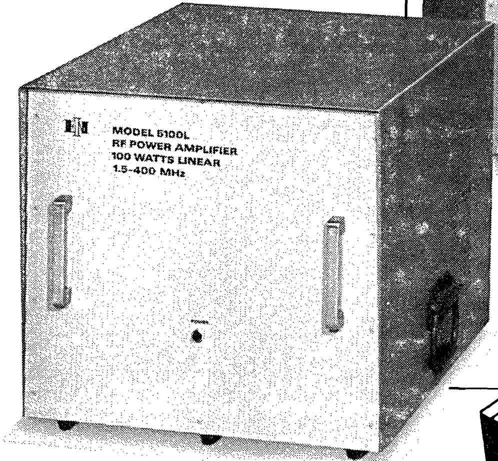
25 Watts/525LA

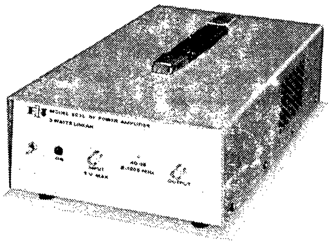
- Flat 1 to 500 MHz
- 25 watts linear output
- Up to 40 watts pulse and CW
- No bandswitching



100 Watts/5100L

- Flat 1.5 to 400 MHz
- 100 watts linear power
- 200 watts to 200 MHz
- No bandswitching



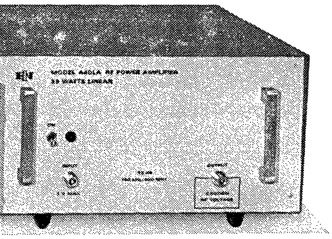


3 Watts/603L

- 0.8 to 1000 MHz
- 3 watts of linear power
- Flat 37 dB gain
- Up to 5 watts saturated

40 Watts/440LA

- 150 kHz to 300 MHz
- 40 watts Class A linear
- State-of-the-Art
- Up to 75 watts CW and pulse



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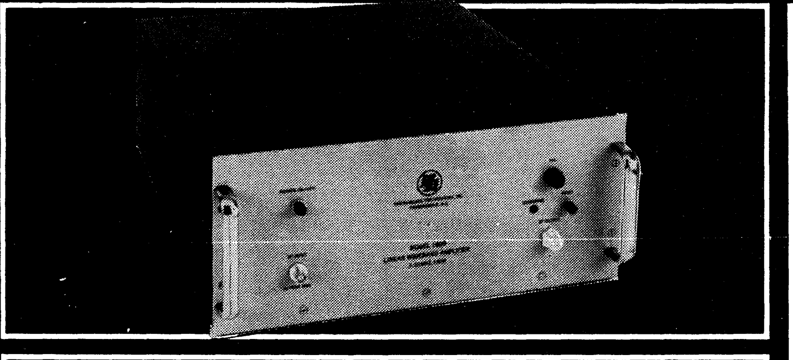

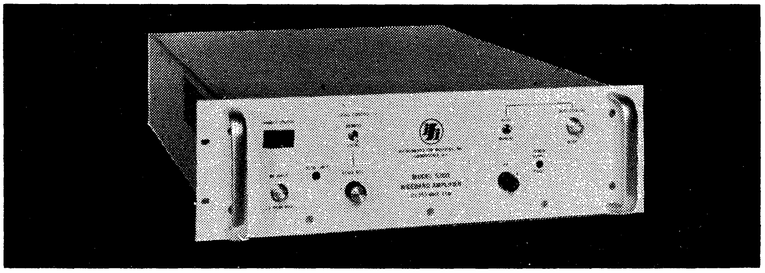

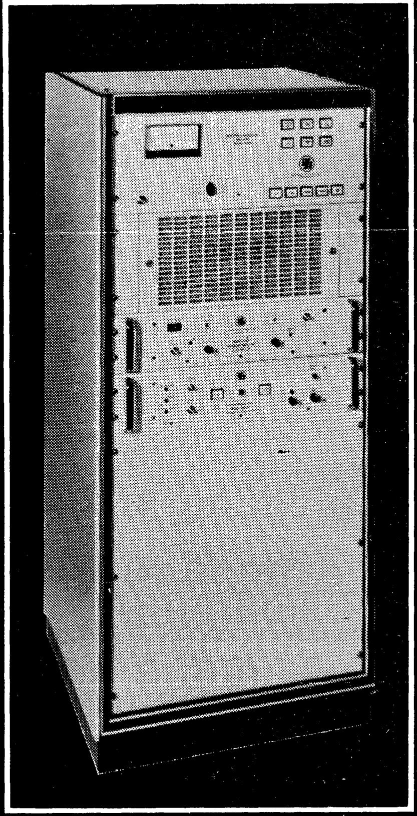

depend on ifi: High gain, High power, High quality, Wideband power amplifiers

400 SERIES
Ultra Wideband RF Power Amplifiers

Model	Rated Output (Watts)	Frequency
402	100	.01 to 220 MHz
412	100	1 to 220 MHz
422	200	1 to 220 MHz
404	400	.01 to 220 MHz
414	400	1 to 220 MHz
406	1000	.01 to 220 MHz
416	1000	1 to 220 MHz
410	2000	.01 to 220 MHz
430	2000	1 to 220 MHz
469	5000	1 to 100 MHz
489	15000	1 to 100 MHz

5300 SERIES
Broadband Solid State Power Amplifiers

Model	Rated Output(Watts)	Frequency
5300	15	.01 to 250 MHz
5301	10	.01 to 500 MHz
5311	10	1 to 500 MHz
5360	50	.01 to 250 MHz
5361	35	.01 to 500 MHz
5362	40	1 to 500 MHz
5400	10	500 to 1000 MHz
5500	10	.01 to 1000 MHz

1600 SERIES
Solid State Broadband HF Power Amplifiers

Model	Rated Output(Watts)	Frequency
1660	5, Class A	.2 to 35 MHz
1560	5, Class A	.01 to 20 MHz
1670	35, Class A	.2 to 35 MHz
1570	35, Class A	.01 to 20 MHz
1680	70, Class A	.2 to 35 MHz
1580	70, Class A	.01 to 20 MHz
1600	130, Class A	.2 to 35 MHz
1500	130, Class A	.01 to 20 MHz
1690	150, Class AB	.5 to 30 MHz
1700	280, Class AB	.5 to 30 MHz
1610	500, Class AB	.5 to 30 MHz
3220	1000, Class AB	.5 to 30 MHz

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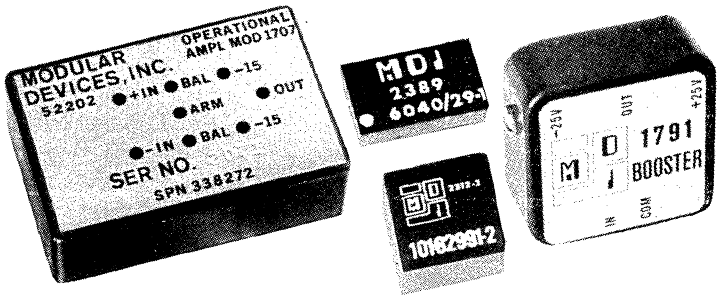
- AC Servo Accessories: Booster, AGC, Quadrature and Summing Amplifiers Modulators and Demodulators.
- DC and PWM Servo Amplifiers to 1 KVA


MODULAR DEVICES, INC.
OPERATIONAL AMPL MOD 1707
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BAL
-15
ARM
OUT
-IN
BAL
-15
SER NO.
SPN 338272
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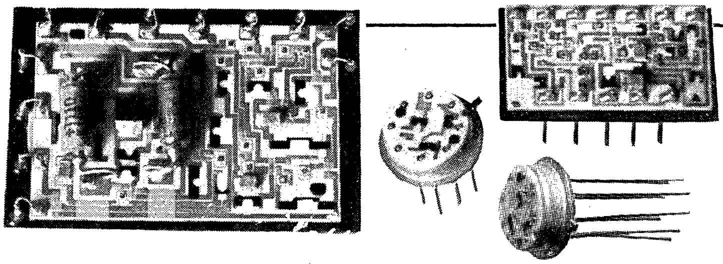
- 48 Standard Operational Amplifier Modules: High Voltage, Wide Band, High Slew Rate, Fast Recovery, Low Offset Voltage/Current, etc.
- Ultra Low Noise Audio Operational Amplifiers.
- Replacement Modules for discontinued encapsulated units.



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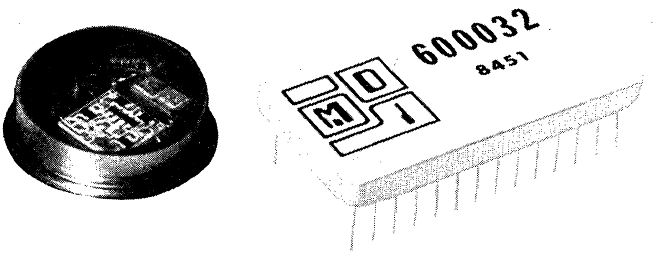
- Power Hybrids: Power Control, DC/DC Converters, PWM Modulators.
- Quick Reaction Custom Hybrid Capability.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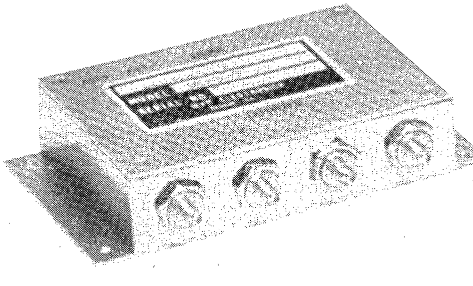
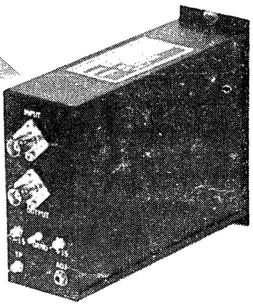
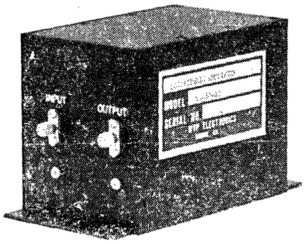
WIDEBAND AMPLIFIERS

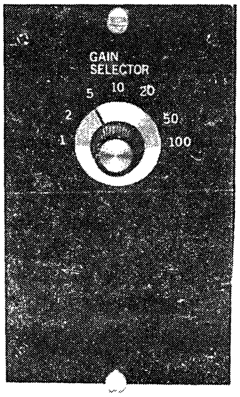
LOG VIDEO AMPLIFIERS

LINEAR AMPLIFIERS









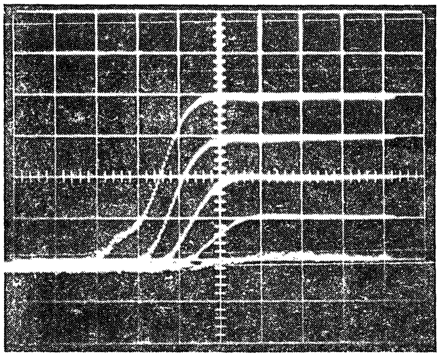
LOGARITHMIC VIDEO AMPLIFIERS

FEATURES:

Bandwidth: To 50 MHz
Dynamic Range: To 100 DB
Log Linearity: To ±0.5 DB
Drift Coefficients: To 1 μV/Deg. C

DESCRIPTION:

These units feature constant rise time and other dynamic characteristics as a function of input level (see photo at right). DC Coupled, DC Coupled with drift correction loop, and AC coupled designs are available. Designs for special purposes are available. These include designs for sinusoidal inputs. Both high performance and low cost units can be provided. Prices start at $195.



Dynamic response of Model DCLD-80-20. Response shown is for 0, 20, 40, 60, and 80 DB below maximum input. Vertical scale is 0.5 volts/cm. Horizontal scale is 10 nanoseconds/cm.

LINEAR AMPLIFIERS

DISTRIBUTION:

Modules or Systems
Bandwidths: To 30 MHz
Gain and Level Adjust
Differential Input Options
Radar Trigger Amplifiers

INSTRUMENTATION:

Bandwidth: 10 MHz
Input Impedance: 10 Megohms
Gain: To 46 DB

MULTIPLEXER:

4 Input Channels
Bandwidth: 10 MHz
Gains: To 40 DB
Programmable Gain Option

GENERAL PURPOSE:

DC and AC Coupled
Bandwidths: To 50 MHz
Gains: To 60 DB
Differential Input Options
Selectable/Adjustable Gain Options

PROGRAMMABLE GAIN:

Digital Input
Bandwidths: To 40 MHz
Gain: To 40 DB/Up to 16 Gains

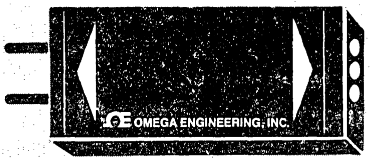
DESIGN SERVICES:

OEM Designs
Custom Designs
Consulting

AMPLIFIER ASSEMBLIES

Signal Conditioners for Temperature, Flow, Pressure and Strain

CJ High Accuracy Cold Junction Compensation for Thermocouples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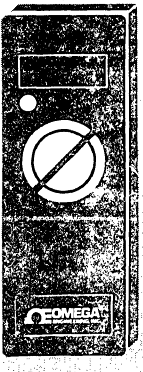
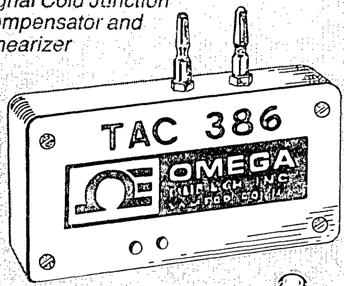
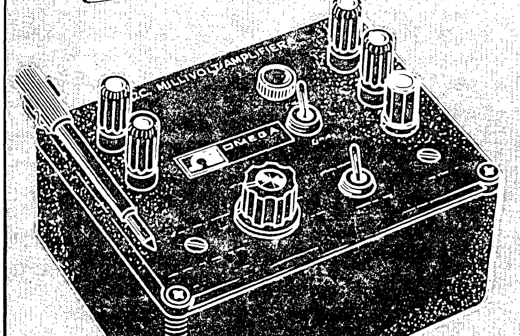


MCJ Miniature Cold Junction Compensator for Thermocouples

TAC-386 Thermocouple Signal Cold Junction Compensator and Linearizer


TAC 386
OMEGA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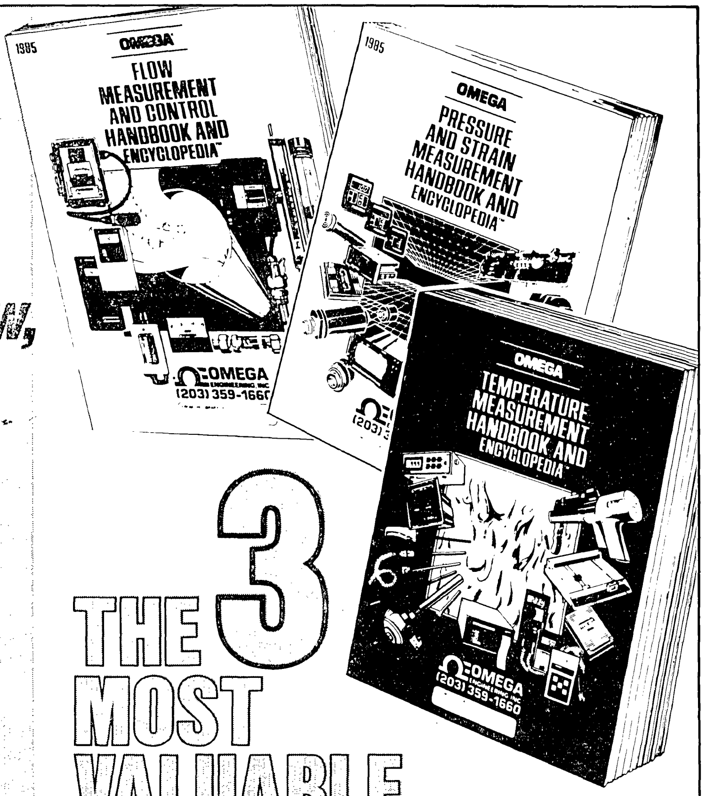
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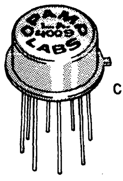
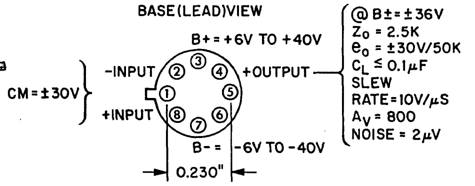
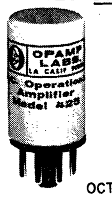
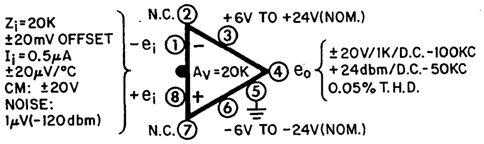
MODEL 4009 MEDIUM VOLTAGE D.C. OPERATIONAL AMPLIFIER



BASE (LEAD) VIEW
B+ = +6V TO +40V
CM = ±30V
-INPUT
+INPUT
+OUTPUT
B- = -6V TO -40V
0.230"
① ② ③ ④ ⑤ ⑥ ⑦ ⑧
@ B± = ±36V
Zo = 2.5K
eo = ±30V/50K
CL ≤ 0.1µF
SLEW RATE = 10V/µS
AV = 800
NOISE = 2µV

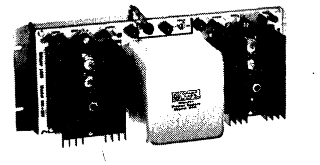
SIZE: TO-5 8-LEAD WT: 0.1 OZ. PRICE: **$12**

MODEL 425 D.C. OPERATIONAL AMPLIFIER



Zi = 20K
±20mV OFFSET
Ii = 0.5µA
±20µV/°C
CM: ±20V
NOISE:
1µV(-120dbm)
N.C. ②
+6V TO +24V(NOM.)
-ei ①
+ei ⑧
AV = 20K
④ eo
N.C. ⑦
-6V TO -24V(NOM.)
±20V/1K/D.C.-100KC
+24dbm/D.C.-50KC
0.05% T.H.D.

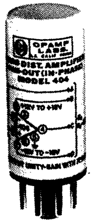
OCTAL PLUG-IN
SIZE: 1" DIA x 1-5/8" H WT: 2 OZ PRICE: **$35**

MODEL SM-100 DUAL 50W. OR MONO 100W. D.C. THRU AUDIO OPERATIONAL POWER AMPLIFIER

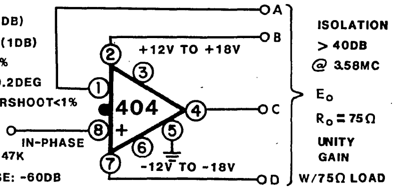


DESCRIPTION: PANEL-CHASSIS WITH HARDWARE, TWO 440KR POWER AMPLIFIER KITS, ONE WIRED AND TESTED 536 POWER SUPPLY, PC-SM 100 CONVERTIBLE STEREO, 50W OR MONO 100W PRINTED CIRCUIT BOARD AND ALL NECESSARY COMPONENTS.
SIZE: 7"H x 19"W x 7"D
WT: 15 LBS PRICE: **$240/KIT** **$320/WIRED**

MODEL 404 VIDEO DISTRIBUTION AMPLIFIER (1-IN/4-OUT)

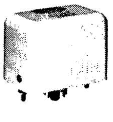
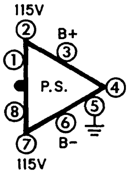


DC TO 8MC (2DB)
DC TO 4.2MC (1DB)
DIFF GAIN: 0.1%
DIFF PHASE: 0.2DEG
TILT AND OVERSHOOT<1%


+12V TO +18V
404
Ei
IN-PHASE
Ri = 47K
-12V TO -18V
A
B
C
D
ISOLATION > 40DB @ 3.58MC
Eo
Ro = 75Ω
UNITY GAIN
W/75Ω LOAD

HUM AND NOISE: -60DB
OCTAL PLUG-IN: 1"DIA x 2"H WT: 2oz PRICE: **$35**

POWER SUPPLIES (REPAIRABLE)

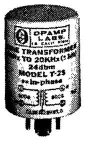


115V
B+
P.S.
B-
115V

MODEL	DESCRIPTION	SIZE (INCHES)	PR-EA
*515P	± 15V @± 50mA	2x3x2 H	$40
522	± 24V @± 150mA	2x3x2 H	40
523	± 24V @± 2A	3.25x5.25x4.25 H	55
*524P	± 24V @± 40mA	2x3x2 H	40
525	± 24V @± 1A	3x4x3.25 H	50
526	± 24V @± 4A	5x5.50x4.25 H	60
536	± 36V @± 3A	5x5.50x4.25 H	60
*523R	± 24V @± 1.5A	3.25x5.25x4.25 H	70
54	+ 24V @+700mA	3x4x1.75 H	35

*REGULATED

OCTAL PLUG-IN
WITH BOLT-DOWN PROVISIONS

AUDIO TRANSFORMERS

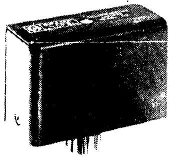
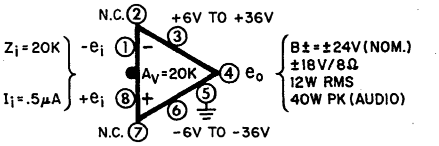


OCTAL
PLUG-IN
T-25 Shown

MODEL	DESCRIPTION	SIZE (INCHES)	PRICE
T-10K	10K/10K INPUT	1-3/8 DIA x 2 H	$30
T-18	600Ω/600Ω +18dbm	1 DIA x 2 H	15
T-25	600Ω/600Ω +24dbm	1-5/8 DIA x 2 H	25
T-26	150Ω/600Ω +24dbm	1-5/8 DIA x 2 H	25
T-28	150Ω/600Ω +24dbm	1-5/8 x 1-5/8 x 2-1/4 H	30
T-30	150Ω/150Ω/600Ω +30dbm	1-5/8 x 1-5/8 x 2-1/2 H	35
T-40	8Ω & 16Ω/600Ω C-T +39dbm	2 x 2-3/8 x 3 H	40
422	Electronic Trans +24dbm	1 DIA x 2 H	35

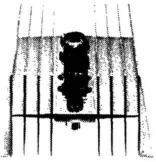
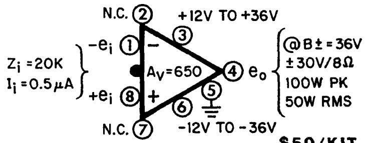
MODEL 423 D.C. OPERATIONAL AMPLIFIER (REPAIRABLE)

- D.C. TO 150KC
- ± 20mV OFFSET
- ±10µV/°C DRIFT
- 2µV (-115dbm) NOISE
- 0.1% T.H.D.



Zi = 20K
Ii = .5µA
-ei ①
+ei ⑧
N.C. ②
+6V TO +36V
AV = 20K
④ eo
N.C. ⑦
-6V TO -36V
B± = ±24V (NOM.)
±18V/8Ω
12W RMS
40W PK (AUDIO)

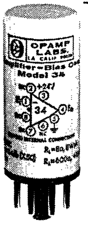
OCTAL PLUG-IN
SIZE: 1-1/2" x 3-1/4" x 2-1/2" H. WT: 7 OZ. PRICE: **$40**

MODEL 440C 50W. D.C. THRU AUDIO OPERATIONAL POWER AMPLIFIER



Zi = 20K
Ii = 0.5µA
-ei ①
+ei ⑧
N.C. ②
+12V TO +36V
AV = 650
④ eo
N.C. ⑦
-12V TO -36V
@ B± = 36V
±30V/8Ω
100W PK
50W RMS

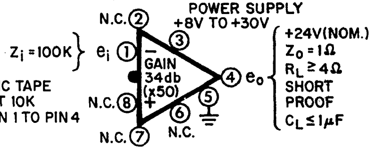
OCTAL PLUG-IN
SIZE: 4-3/4" x 5-1/2" x 2-5/8" H WT: 20 OZ PRICE: **$50/KIT** **$65/WIRED**

MODEL 34 AMPLIFIER-BIAS OSCILLATOR



20CY TO 20KC (±1db) 0.25% T.H.D. (+18dbm)
50CY TO 10KC (±3db) 1% T.H.D. (8W PK) SINGLE POLARITY POWER SUPPLY

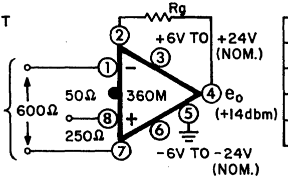
AS 100KC MAGNETIC TAPE BIAS OSC. CONNECT 10K RESISTOR FROM PIN 1 TO PIN 4
e_o = 20V/1K LOAD


Zi = 100K
ei ①
N.C. ②
+8V TO +30V
GAIN 34db (x50)
④ eo
N.C. ⑧
N.C. ⑦
N.C.
+24V (NOM.)
Zo = 1Ω
RL ≥ 4Ω
SHORT PROOF
CL ≤ 1µF

OCTAL PLUG-IN SIZE: 1"DIA x 2"H WT: 2 OZ PRICE: **$25**

MODEL 360M MICROPHONE PREAMPLIFIER

- INTERNAL INPUT TRANSFORMER
- 20CY TO 20KC
- 0.25% T.H.D.
- -125dbm NOISE

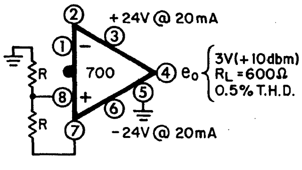

Rg
+6V TO +24V (NOM.)
ei
600Ω
50Ω
250Ω
360M
④ eo (+14dbm)
-6V TO -24V (NOM.)

GAIN	Rg
60db	NONE
50db	15K
40db	3.3K
30db	1K

OCTAL PLUG-IN SIZE: 1"DIA x 2"H WT: 2 OZ PRICE: **$35**

MODEL 700 AUDIO OSCILLATOR (EXTERNALLY ADJUSTABLE)

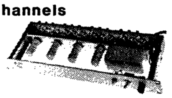
FREQ	R(±5%)	FREQ	R(±5%)
16CY	NONE	1KC	1.6K
50CY	43K	2KC	800Ω
100CY	20K	5KC	320Ω
200CY	9.1K	10KC	160Ω
440CY	3.6K	12KC	130Ω
500CY	3.2K	15KC	100Ω


+24V @ 20mA
R
R
700
④ eo
-24V @ 20mA
3V(+10dbm)
RL = 600Ω
0.5% T.H.D.

OCTAL PLUG-IN SIZE: 1"DIA x 2"H WT: 2 OZ PRICE: **$35**

MODEL V-44 VIDEO DISTRIBUTION AMPLIFIER

4-Channels

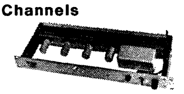


SPECIFICATION (per channel)
DC to 8 MC (±1DB)
DIFF. GAIN: 0.1%
DIFF. PHASE: 0.2 DEG.
TILT & OVERSHOOT: <1%
HUM & NOISE: -60 DB
ISOLATION: >40 DB at 3.58 MC

SIZE: 1-3/4"H x 19"W x 6"D WT: 5lbs PRICE: $400

MODEL A-44 AUDIO DISTRIBUTION AMPLIFIER

4-Channels



SPECIFICATION (per channel)
BAL. (ELECTRONIC) INPUT IMP: 20K OHMS
FREQ. RESP: 20CY TO 20KC (±1DB)
GAIN: UNITY (0 DBM)/THD: 0.05%
OUTPUT IMP: (600Ω) FOR 600Ω LOAD
OUTPUT LEVEL: +24 DBM

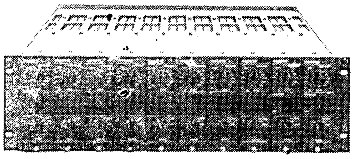
SIZE: 1-3/4"H x 19"W x 6"D WT: 5lbs PRICE: $440

PACIFIC

TRANSDUCER SIGNAL CONDITIONING

SERIES 8200

- Mainframe/Plug-in Transducer Conditioners
- Transducer Calibration and Balance
- Isolated Excitation and Output
- Differential Instrumentation Amplifier
- Optically Isolated Remote Control
- Self-Contained, Line-Operated
- Compact-10 Channels in 5¼" High Rack



MODEL 8210 TRANSDUCER CONDITIONER

- Conditions 1, 2 and 4-Arm Resistive Transducers
- Voltage/Current Excitation
- Four Step Bipolar Single/Double Shunt Calibration
- Plug-in Completion/Calibration Card
- Remote Control

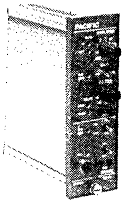
MODELS 8260/8265 INSTRUMENTATION AMPLIFIER

- Wideband Differential Instrumentation Amplifier
- Gains 1 to 2500
- 10 Volt or 300 Volt Common Mode
- Full Scale Output Offset
- Switch Selectable 2 or 4 Pole Filter
- AC or DC Input Coupling
- Dual Outputs, ±10 Volts at 100mA

MODEL 8270 CARRIER AMPLIFIER/DEMODULATOR

- LVDT, Variable Reluctance, Strain Gage Transducers
- Adjustable 1 to 5 Volts, 3kHz Excitation
- Gains from 2 to 1000
- Remote 5-Step Calibration
- 6-Pole (36db/octave) Filter
- Data, Tape and Recorder Outputs

TRANSDUCER AMPLIFIERS



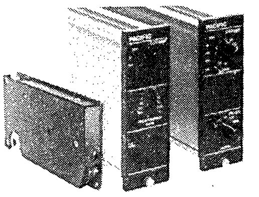
MODELS 8250/8255

- Strain Gage; 1, 2, or 4-Arm Bridges; RTD's and Potentiometers
- Isolated Voltage/Current Excitation
- Automatic Balance, Remote Calibration
- Instrumentation Amplifier, Gains 1 to 2500
- Switch Selectable 2 and 4-Pole Filters
- 10 or 300 Volt Common Mode
- Data, Tape and Recorder Outputs, ±10 Volts at 100mA

MODELS 3210/3215

- Strain Gage or Bridge Transducers
- Computer Addressable Calibration and Multiplexed Outputs
- Differential Amplifier, Gains 1 to 2500
- 10 or 300 Volt Common Mode
- Low Cost - $390 per Channel

INSTRUMENTATION AMPLIFIERS



MODELS 60A/70A

- Gains from .01 to 5000, Switch Selectable or Programmable
- High Accuracy and Stability
- 130db Common Mode Rejection, 10 or 300 Volts
- Selectable Filter; 2, 4 or 6 Poles
- Multiple Outputs with Independent Gain and Zero
- Self-Contained, Line-Powered
- Compact, 10-Channels in 5¼" High Rack

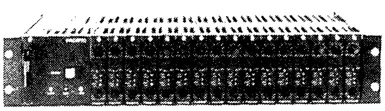
MODELS 3100/3150

- Gains from .01 to 2500, Continuously Adjustable
- 10 or 300 Volt Common Mode
- Computer Addressable Multiplexed Outputs
- Lowest Cost - $250 per Channel

DATA ACQUISITION SYSTEM

SERIES 3000

- Computer Interfaced, Mainframe Plug-in
- DEC, IBM, and Others
- 100kHz Acquisition
- Programmable Gain and Calibration
- Uses Series 3000 Modular Signal Conditioning
- Low Cost/16 channels in 3½" high rack



The 3000 Series Transducer Conditioning System provides a user with the ability to process signals from diverse types of transducers. It combines the convenience of computer controlled data acquisition with the flexibility of hands-on local control.

Interface address buffers store multiple scan lists including programmable gain. High speed data acquisition is routine with "personal" or "mini/micro" computers. Acquisition software and system drivers are available.

TRANSIENT DATA RECORDER

SERIES 9800

- Analog Input, 12-Bit Resolution
- 500 kHz Sample Rate
- Pre-Trigger and Post-Trigger Data
- Non-Volatile Memory, Battery Back-up
- Computer Interface, Software Drivers
- 10-Channels in 7" High Rack

The Transient Data Recorder will condition, sample, digitize and store in CMOS memory, high speed transient analog signals. Data acquisition, recording and playback control functions are structured for direct computer interface.

Two hundred channels may be controlled by a single interface. Battery back-up assures data integrity in severe environmental applications.

PACIFIC
INSTRUMENTS

215 Mason Circle, Concord, California 94520 • (415) 827-9010 • TWX (910) 481-9977

eem

COMMONLY USED ELECTRICAL/ELECTRONIC ABBREVIATIONS AND ACRONYMS

A

AC alternating current
A/D analog to digital
ADC analog to digital converter
ADP automatic data processing
AF audio frequency
AFC automatic frequency control
ALGOL algorithmic language
AM amplitude modulation
AND a logical operator
AQL acceptable quality level
ASCII American national standard code for information interchange
AWG American wire gauge

B

BALUN balanced to unbalanced
BASIC beginners' all-purpose symbolic instruction
BCD binary-coded decimal
BNC baby "N" connector
BUS basic utility system

C

CAD computer aided design
CAM computer aided manufacture
CATV cable television or community antenna television
CERMET ceramic metal element
Comm. communications
CMOS complementary metal-oxide semiconductor
CPS characters per second
CPU central processing unit

D

D/A digital to analog
DAC digital to analog converter
DC direct current
DIAC bidirectional trigger diode
DIL dual in-line
DIN Deutsche Industrie Normenausschuss
DIP dual in-line package
DPM digital panel meter
DTL diode transistor logic

E

EDP electronic data processing
EBCDIC extended binary coded decimal interchange code
EEPROM electrically erasable PROM
EMC electromagnetic compatibility
EMI electromagnetic interference
EMP electromagnetic pulse
EPROM electrically programmable ROM
ESR equivalent series resistance

F

FEP fluorinated ethylene propylene Copolymar, 200° Teflon
FET field-effect transistor
FM frequency modulation
FORTRAN formula translator

G

GaAsFET gallium arsenide field effect transistor
GPIB general purpose interface bus

H

HF high frequency (3 to 30 MHz)
HIPOT test, measurement and diagnostic equipment
HLL high level language
HV high voltage
Hz Hertz

I

IC integrated circuit
IDC insulation displacement contact
IF intermediate frequency
IO input/output (devices)
IR insulation resistance (or) infrared

J

JFET junction field effect transistor
JMOS junction metal oxide semiconductor

K

kHz kilohertz (10^3 hertz)
KSR keyboard send receive

L

LC inductance capacitance
LCD liquid crystal display
LED light-emitting diode
LF low frequency (30 to 300 kHz)
LIF low insertion force
LNA low noise amplifier
LNB low noise band
LSI large scale integration
LVDT linear velocity displacement transformer

M

MASER microwave amplification by stimulated emission of radiation
MATV master antenna television
μF microforad
MHz megahertz
MIPS million instructions per second
MIB microcomputer interface board
MOS metal oxide semiconductor
MOSFET metal cxide semiconductor field effect transistor
MOSIGT metal-oxide semiconductor insulated-gate transistor
MOV metal oxide varistor
MPU microprocessor unit
MSI medium scale integration

N

NBS National Bureau of Standards
NEMP nuclear electromagnetic pulse
NIM nuclear instrumentation module
NOR not OR
NTC negative temperature coefficient

O

OCR optical character reader
OEM original equipment manufacturer
OR a logical operator

P

PC printed circuit
PCB printed circuit board
pF picofarad
PGA pin grid array
PIN positive-intrinsic-negative (transistor)
PLA programmable logic array
PLL phased lock loop
PPI plan position indicator
PROM programmable read only memory
PTC positive temperature coefficient
PUT programmable unijunction transistor

Q

QAM quadrature amplitude modulation
Q (meter) quality-factor meter

R

RAM random access memory
RC resistance-capacitance
RFI radio frequency interference
RMS root mean square
ROM read only memory
RF radio frequency
RFC radio-frequency choke
RFI radio-frequency interference
RTD resistance-temperature detector
RTL resistor transistor logic
RTV room temperature vulcanizing
RW read/write

S

SAS silicon asymmetrical switch
SBC single board (micro) computer
SBS silicon bilateral switch
SCR silicon-controlled rectifier
SCS silicon controlled switch
SDA source & detector assemblies
SIDAC bidirectional voltage-triggered switch
SIP single in-line package
SSI small scale integration
SSR solid state relay
STL Schottky transistor logic
SUS silicon unilateral switch

T

TC temperature coefficient
TCXO temperature compensated crystal oscillator
TFE tetrafluoride ethylene propylene Copolymer, 250° Teflon
TRIAC bidirectional AC switch
TTL transistor-transistor logic
TTY teletypewriter

U

UHF ultra high frequency (300 MHz to 3 GHz)
UJT silicon unijunction transistor
UL Underwriters Laboratory
UPS uninterruptible power supply

V

VAC volts (of) alternating current
VAR volt-ampere reactive
VCR video cassette recorder
VDC volts (of) direct current
VHF very high frequency
VHSIC very high speed integrated circuit
VLF very low frequency (3 to 30 kHz)
VLSI very large scale integration
VME virtual machine environment
VRM voice recognition module
VTVM vacuum tube volt meter
VU volume unit
VSWR voltage standing wave ratio

W

WPS word processing software

Y

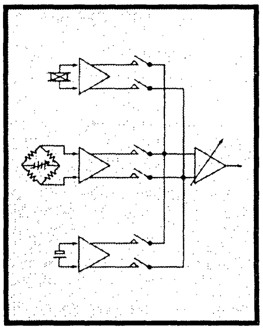
YIG yttrium iron garnet

Z

ZIF zero insertion force

**PRECISION
316/416**

THE MULTIMODE CONDITIONER



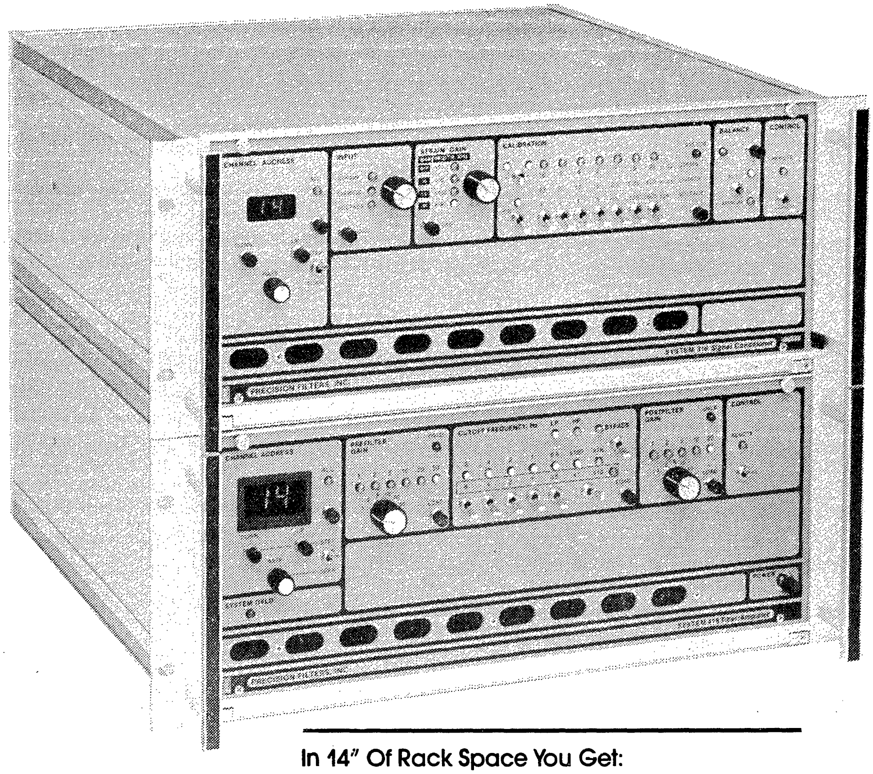
The Precision 316 gives you 16 channels, each with a choice of three types of conditioners—strain, charge and voltage.

To that, we add the Precision 416, which is 16 channels of filter-amplifier. (Detailed information on pages 3-5.)

With the combined Precision 316/416, you have what you need at your fingertips: calibration, signal selection, autobalance of strain gages, as well as filter and gain settings.

Human error is prevented and the setup goes quickly, because all these functions are programmable.

Precision 316/416 Conditioners are at work on ballistic ranges, vehicle proving grounds, as well as in structural and vibration testing for large equipment.



In 14" Of Rack Space You Get:

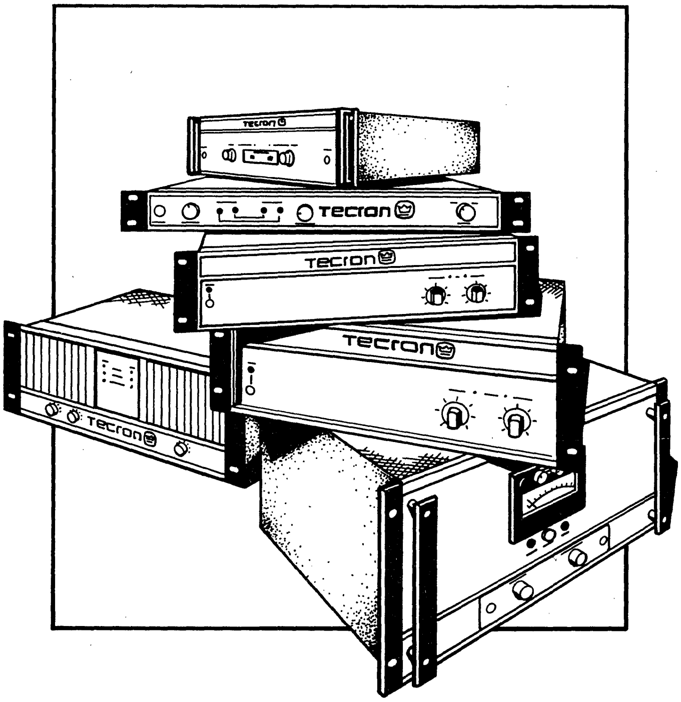
- 16 programmable charge amplifiers with calibration.
- 16 programmable strain gage amplifiers with autobalance and calibration: 255 calibration states, which cover numerous gage resistances.
- 16 isolated strain gage excitation supplies: ± 15 V @ 100 mA.
- 16 programmable voltage amplifiers: gain 1-1000.
- 16 programmable anti-alias filters: 80 dB/octave attenuation.
- Programmable calibration for every function.
- 16 programmable 1-of-4 balanced input switches that permit selection of charge, strain, voltage or cal signals.

† See other products in Section 2700.

PRECISION FILTERS, INC.
240 Cherry Street, Ithaca, New York 14850, Tel. 607-277-3550

Tecron®

POWER SUPPLIES/AMPLIFIERS AND ACCESSORIES DC-ULTRASONIC



- **Power ratings up to 20 KVA**
- **Proven reliability**
- **19″ EIA rack mount**
- **Designed for continuous full-power operation**
- **Field-mountable accessories**
- **110, 120, 200, 220, or 240 V.A.C. operation**
- **Customizing services offered**
- **Made in U.S.A.**

NOTE: Specifications and prices shown in this catalog were in effect April 15, 1983, and are subject to change without notice.

Crown International is a privately owned U.S. corporation located in Elkhart, Indiana. Its business during the last several decades has been the design and manufacture of power supplies/amplifiers for applications in the DC to ultrasonic band. Crown also manufactures instrumentation for the audio and semiconductor fields.

Founded in 1947, Crown today markets products for a wide range of uses: industrial research and manufacturing; professional broadcast and recording studio monitor systems; and home audio systems.

The technology built-in to the Tecron industrial power supplies/amplifiers offered in these pages has been proven in the most rugged service. They provide reliable power for applications in automotive, medical, communication, simulation, chemical process, aerospace, nuclear, computer and other industries. Tecron amps are designed to work with any load, from fully reactive to fully capacitive.

Tecron products can also be modified at the factory to meet any special requirements you may have. Call us for a discussion of your needs.

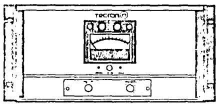
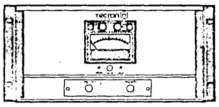
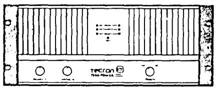
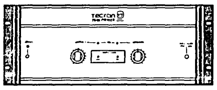
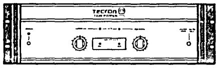
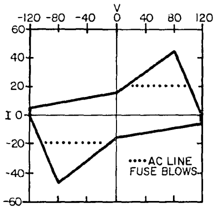
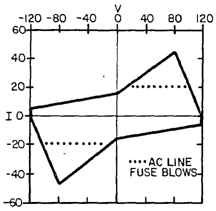
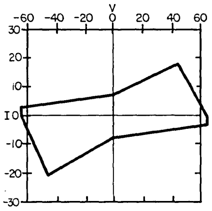
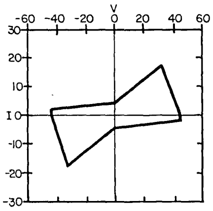
Tecron®
CROWN INTERNATIONAL, INC.
1718 W. MISHAWAKA ROAD, ELKHART, IN 46517
(219) 522-1274

Tecron®

SERIES 7500 POWER SUPPLIES/AMPLIFIERS

Tecron Series 7500 Power Supplies/Amplifiers offer an unmatched reliability record, furnishing full-level, all-day power to meet the most stringent needs. In addition, 7500 series amplifiers can be modified with a number of options or modules that will adapt them for various special applications (see descriptions on opposite page). All of these amplifiers will develop maximum power output with loads from 2 to 4 ohms, but will operate into any load, from purely reactive to purely capacitive.

Rear-panel input connections on the 7500 series are BNC co-axial and terminal strips (7550 is BNC only); output connections are binding posts on ¾" centers for banana plugs (all models) and terminal strips (7550, 7540, 7520).

Catalog Number	**7560**	**7570**	**7550**	**7540**	**7520**
Description	A single-channel constant-voltage amplifier featuring a front-panel plug-in circuit board which allows user construction of special signal sources or conditioners.	A constant *current* amplifier, with performance and construction specifications generally equivalent to Model 7560. Both 7570 and 7560 units can be cascaded with supplied cables to create systems with output power up to 20KVA.	Features unique output control circuitry with on-board computers. With difficult loads, 7550 amps will *limit* output only as necessary, returning to full output automatically when load clears.	These amps include the Crown MULTI-MODE™ circuit, a new three-stage output that produces ultra linear output signals at any power level.	
Channels	one	one	two	two	two
Power Response per channel into 4 ohms	1000W ±1dB DC-40KHz	1000W ±1dB DC-40KHz	375W ±1dB DC-25KHz	265W ±1dB DC-25KHz	160W ±1dB DC-50KHz
Power Response bridged, 8 ohm load	N.A.	N.A.	750W ±1dB DC-25KHz	530W ±1dB DC-50KHz	320W ±1dB DC-50KHz
Front View					
Limits of V-I Output			V-I curve is temperature, time and frequency dependent. Contact Tecron for full information.		
DC Output One channel driven	20A max. @ 100V (2KVA)	20A max. @ 100V (2KVA)	N.A.	23.8A max. @ 42V (1KVA)	12A max. @ 30V (360VA)
Phase Response @ 1 watt into 8 ohms	+0°-15° DC-20KHz	Load Dependent	+0°-15° DC-20KHz	+0°-15° DC-20KHz	+0°-15° DC-20KHz
Frequency Response @1 watt into 8 ohms					
dB, DC-20KHz	±.1	Load Dependent	±.1	±.1	±.1
dB, DC-100KHz	±1.0	Load Dependent	+0, −1.5	±1.0	±1.0
Voltage Gain	20 ±1% (26dB)	20 ±1% (26dB)	20 ±2% (26dB)	20.6 + 2% (26.3dB)	20.6 ±2% (26.3dB)
Slew Rate, volts per microsecond	32	32	30	16	12
Input sensitivity volts RMS at rated power into 8 ohms	3.46 ±1%	3.46 ±1%	2.1 ±2%	1.76 ±2%	1.30 ±2%
Rated Output Power into 8 ohms watts/channel	600	600	220	165	90
Input Impedance, ohms	25K	25K	25K	30K	30K
Weight, lbs.	92	92	57	55	25
Dimensions, inches					
Width	19.0	19.0	19.0	19.0	19.0
Height	8.75	8.75	7.0	7.0	5.25
Length	16.5	16.5	14.75	10.5	10.125
Price, U.S. dollars (subject to change without notice.)	$2,970.00	$2,760.00	$1,775.00	$1,355.00	$895.00

CROWN INTERNATIONAL, INC.
1718 W. MISHAWAKA RD.
ELKHART, IN 46517
(219) 294-5571

7500 OPTIONS/MODULES

Options are factory installed only, modules can be field installed.

VU Meter
VU meter, peak catch and hold, with red over-level indicator (selectable level) and green range indicator (selectable level). Module for 7560 and 7570.

Dual Fans
Provide forced air cooling to prevent thermal damage to amps. Recommended for enclosed installations, or continuous service at high power levels.
Option for 7560, 7570
Module for 7540, 7520
(Single fan is standard on 7550, 7560 and 7570.)

Constant Current Output
A circuit modification that monitors output to maintain a constant current level.
Option for 7550, 7540, 7520

GPIB Gain Control
Provides for computer adjustment of input attentuation.
Module for 7560, 7550, 7540, 7520

Standard Input
Unless otherwise specified, this input module is supplied as standard equipment with the Model 7560 power supply. It contains an input attentuator and an AC/DC coupling switch mounted on a mostly blank-PC board, which can be modified to create signal-shaping circuits to fit a specific need. (Not available on 7570.)

Balanced Active Input
Isolates input to eliminate ground loops and hum pickup.
Module for 7550, 7540, 7520
Option for 7560, 7570

Balanced Transformer Input
Isolates input with transformer. Eliminates ground loops and hum pickup.
Module for 7550, 7540, 7520

tecron®

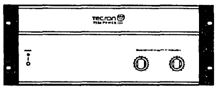
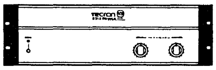
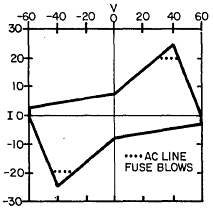
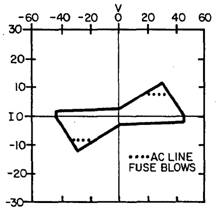
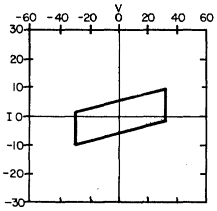
SERIES 5500 POWER SUPPLIES/AMPLIFIERS

Tecron Series 5500 Power Supplies/Amplifiers are off-the-shelf products, offered without options or add-on modules. They are performance proven, capable of all-day operation at full power without interruption (in closed cabinets or stacked in racks, forced-air cooling is recommended). All are dual channel amps, rear-panel switchable to single-channel operation.

These amplifiers include an AB+B output circuit developed by Crown for improved reliability and high linearity of the output signal. The amplifiers also include the IOC™ circuit, a unique distortion indicator which reports any variance from input of output waveform, regardless of the cause. The IOC™ sensitivity enables users to accurately set the gain controls just below clip level.

All input connections are BNC; output connections are binding posts on ¾" centers for banana-plugs.

All 5500 amplifiers develop maximum power with 2 to 4 ohm loads, but can handle any load from pure reactive to pure capacitive.

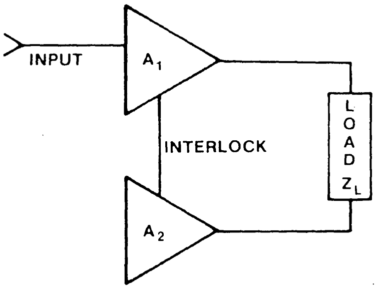
Catalog Number	**5530**	**5515**	**5507**
Channels	two	two	two
Power Response dual channel into 4 ohms	250W ±1dB DC-35KHz	130W ±1dB DC-35KHz	50W ±1dB 20Hz-20KHz
Power Response bridged, 8 ohm load	500W ±1dB DC-35KHz	260W ±1dB DC-35KHz	100W ±1dB 20Hz-20KHz
Front View			
Limits of V-I Output			
DC Output One channel driven	10A max. @50V (500VA)	8A max. @32V (256VA)	AC coupled
Phase Response @1 watt into 8 ohms	+0°-15° DC-20KHz	+0°-15° DC-15KHz	+0°-15° 20Hz-20KHz
Frequency Response at 1 watt into 8 ohms:			
dB, DC-20KHz	±.1	±.1	±.1 (20Hz-20KHz)
dB, DC-100KHz	±1.0	±1.0	±1.2 (5Hz-100KHz)
Voltage Gain	10.6 ±2% (26.3dB)	20.6 ±2% (26.3dB)	20.6 ±2% (26.3dB)
Slew rate, volts per microsecond	8	6	6
Input sensitivity volts RMS at rated power into 8 ohms	1.75 ±2%	1.19 ±2%	.812 ±2%
Rated Output power into 8 ohms, watts/channel	155	80	35
Input Impedance, ohms	25K	25K	25K
Weight, lbs.	45	24	10
Dimensions, inches			
Width	19.0	19.0	19.0
Height	7.0	5.25	1.75
Length	9.75	8.75	9.0
Price, U.S. dollars (subject to change without notice.)	$1,290.00	$805.00	$580.00

tecron

POWER SUPPLIES/AMPLIFIERS

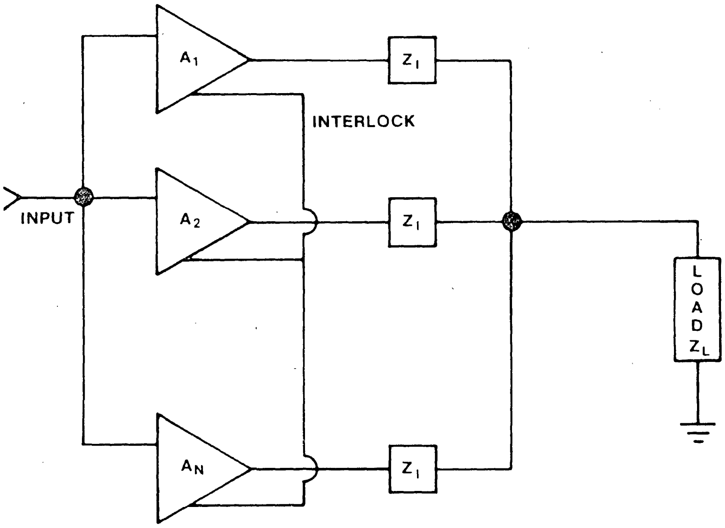
APPLICATION NOTES

Various system configurations of Tecron power supplies are possible to obtain greater voltage or current ratings. A few of the more common such configurations are shown here.



$I_L = I_A$
$V_L = 2V_A$
Load on each amplifier: $Z_A = \frac{Z_L}{2}$

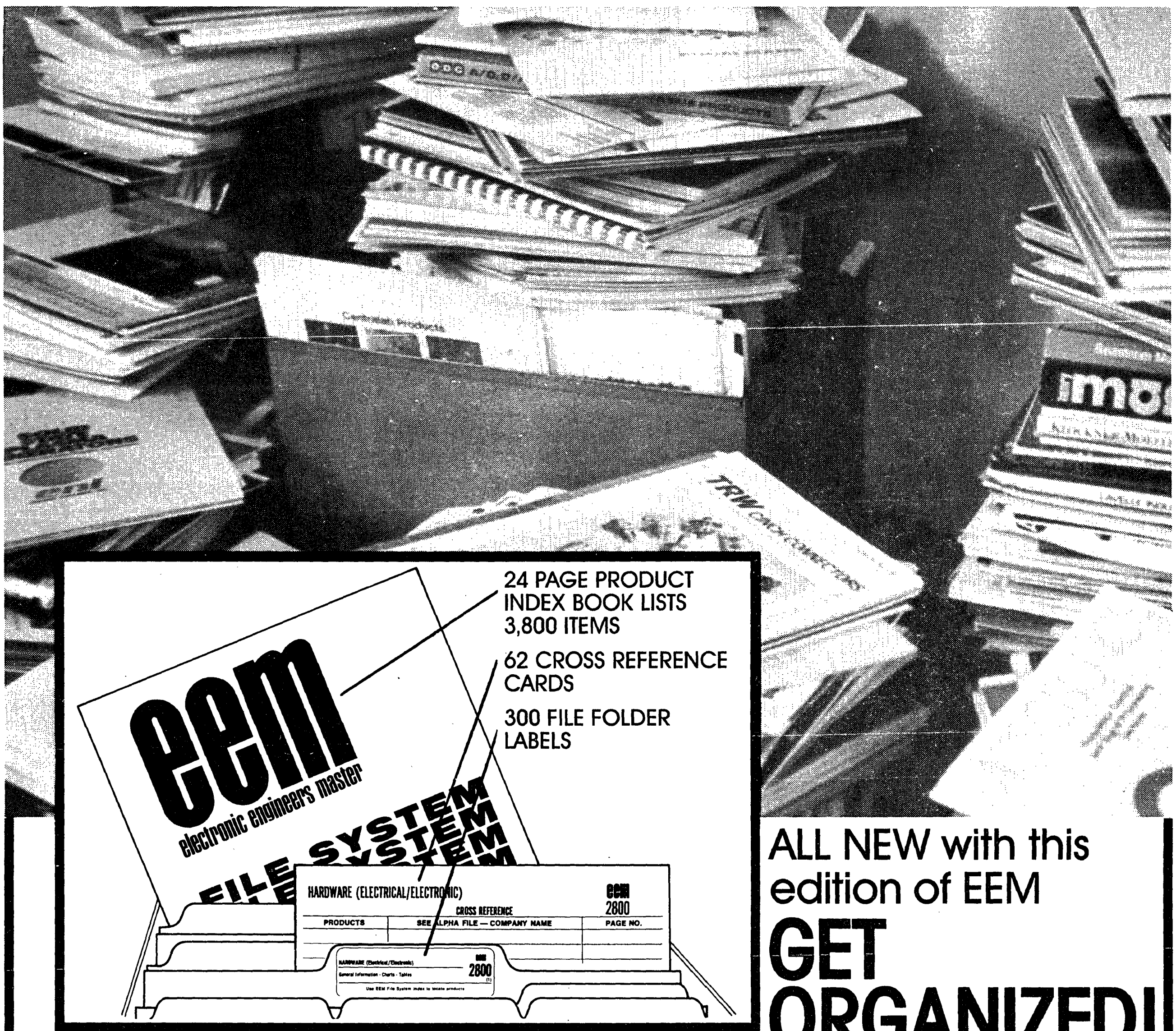
7560 Push-Pull Connection



$I_L = I_{A_1} + I_{A_2} + \cdots + I_{AN} = NI_A$
$V_L = V_A$
Load on each amplifier: $Z_A = NZ_L + Z_I$

7560 Parallel Connection

As noted above, some of the interconnects needed for these systems are standard Tecron accessories. Special interconnects, either control or load, can be entirely user designed and built, or Tecron will be pleased to quote on design and/or fabrication. Since user modifications to Tecron amplifiers may invalidate the warranty, we suggest you review new or unusual applications with Tecron.


24 PAGE PRODUCT INDEX BOOK LISTS 3,800 ITEMS
62 CROSS REFERENCE CARDS
300 FILE FOLDER LABELS
eem
electronic engineers master
FILE SYSTEM
HARDWARE (ELECTRICAL/ELECTRONIC)
CROSS REFERENCE
2800
PRODUCTS
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PAGE NO.
TRW

ALL NEW with this edition of EEM

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Are your catalog files organized? Can you find any given catalog in a matter of seconds? If your answer is "Yes," you probably already have the EEM File System. But, if you said "No," you really ought to look into this simple system. It will save hours of time and tons of aggravation.

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The EEM File System is shipped in one neat package. The package contains everything you need to set up your very own filing system. Best of all, it's easy to get and very affordable. Send a check or money order for $25.00 and EEM will pay the postage and sales tax. If you must use a purchase order, please add $5.00 for postage and handling. An invoice will accompany your System.

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MANUFACTURER OF QUALITY PIEZOELECTRIC ALARMS SINCE 1972

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AudioLarm® II Series

ENGINEERED ALARMS WITH EXCLUSIVE DESIGN FEATURES—MANUFACTURED IN U.S.A.

- Largest selection of alarms in the industry
- Ultra high sound output
- Durable high temperature glass-filled polester case
- Four sound output levels (extra loud, loud, medium and soft)
- Three beep rates (fast, medium, slow)
- Two chime tone rates
- Exclusive warble tone
- Exclusive acoustic volume control
- Wide operating voltage range—1 to 30 volts DC—AC models to 220V
- Five types of termination
- Four mounting configurations

Solid State Piezoelectric design offers low voltage and current consumption, no R.F. interference, no moving parts for high reliability and long life.

CONTINUOUS TONE

FREQUENCY = 2900 ±500Hz

CIRCUIT NUMBER	LOUDNESS	OPERATING VOLTAGE (VDC, unless noted)	TYPICAL SPL (dB(a) @ 2 ft) at min. V to max. V	TYPICAL OPERATING Current (mA) at min. V to max. V
XC-212	Extra Loud	2-12	82-103	8-50
XC-330	Extra Loud	3-30	82-103	6-50
XC-210	Extra Loud	30-120 VAC	82-103	—
XC-301	Extra Loud	130-220 VAC	82-103	—
LC-212	Loud	2-12	76-97	8-50
MC-116	Medium	1-16	68-93	1-24
MC-130	Medium	1-30	68-95	1-13
MC-201	Medium	30-120 VAC	68-95	—
MC-301	Medium	130-220 VAC	68-95	—
SC-130	Soft	1-30	55-80	1-7

WARBLE TONE

CENTER FREQUENCY = 2200 ±500Hz

MW-616	Medium	6-16	80-95	8-18
MW-550	Medium	15-50 VAC/DC	75-95	3-6
MW-201	Medium	40-120 VAC	75-95	3-8
MW-301	Medium	140-120 VAC	75-95	3-8

INTERMITTENT TONE

FREQUENCY = 2900 ±500Hz

When ordering specify Fast (F), Medium (M), or Slow (S)
Fast: 3 Beeps per Second @ 30% Duty Cycle
Medium: 2 Beeps per Second @ 30% Duty Cycle
Slow: 1 Beep per Second @ 30% Duty Cycle
Beep rate constant through all operating voltages.

CIRCUIT NUMBER	LOUDNESS	OPERATING VOLTAGE (VDC, unless noted)	TYPICAL SPL (dB(a) @ 2 ft) at min. V to max. V	TYPICAL OPERATING Current (mA) at min. V to max. V
XB-312	Extra Loud	3-12	90-104	5-30
XB-630	Extra Loud	6-30	95-104	8-40
XB-201	Extra Loud	30-120 VAC	90-104	—
XB-301	Extra Loud	130-220 VAC	90-104	—
LB-312	Loud	3-12	84-97	5-30
MB-325	Medium	3-25	75-95	2-20
MB-201	Medium	30-120 VAC	75-95	—
MB-301	Medium	130-120 VAC	75-95	—
SB-325	Soft	3-25	55-75	1-15

CHIME TONE

FREQUENCY = 2900 ±500Hz

When ordering, specify Fast (F) or Moderate (M)
Fast: Two Chimes per Second
Moderate: One Chime per Second
Chime rate constant through all operating voltages.

CH-325	Medium	3-25	70-93	2-20
CH-201	Medium	30-120 VAC	70-93	—
CH-301	Medium	130-220 VAC	70-93	—

TO ORDER

Arrange information into the format of the following Sample Model Number.

CIRCUIT NUMBER (from above)
TERMINATION (from below left)

X B - 0 9 - 3 1 2 - Q (F)

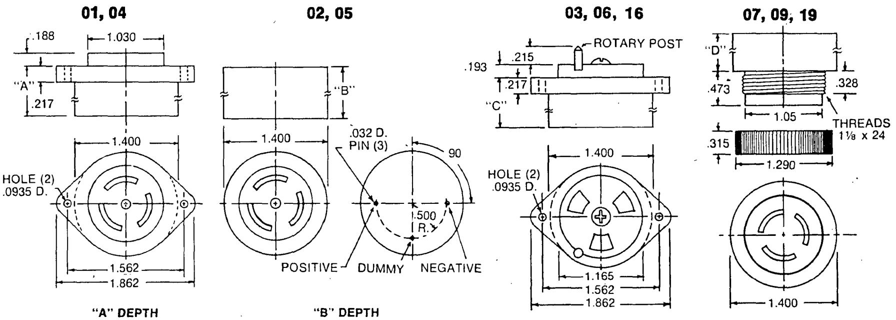
CASE STYLE (from below right)
RATE (for Chime and Intermittent Tones only)

TERMINATIONS

W— Leads: 2 wires 24AWG (7 x 32) tinned copper, vinyl insulated, 2″ long, 1/4″ end stripped, color coded.
P— PC Pins: 3 PC pins, 90° apart on a .500″ R from center, .032″ diameter.
T— .110 quick connect terminals: .110″ width, .020 thickness, brass solder plated for push on (quick connect) attachment or direct solder.
Q— .250 quick connect terminals: .250″ width, .033″ thickness, steel electro-tin plated for push-on (quick connect) attachment or direct solder.
S— Screw terminals: 6/32 1/4″ long plated screw for wires with lug attachments.

GENERAL SPECIFICATIONS

OPERATING TEMPERATURE: −20°C to +65°C.
STORAGE TEMPERATURE: −40°C to +85°C.
REVERSE VOLTAGE: Protected to the maximum operating voltage (some models may sound softly when connected to reverse polarity).
SURGE VOLTAGE: 20% over maximum rated voltage for less than 5 minutes.
LIFE EXPECTANCY: 10 years under normal operating conditions.
CONSTRUCTION MATERIALS: Case—glass filled polyester. Potting—epoxy.



"A" DEPTH
01 = .667
04 = 1.067

"B" DEPTH
02 = .667
05 = 1.067

"C" DEPTH
03 = .667
06 = 1.067
16 = 1.35

"D" DEPTH
07 = .500
09 = .890
19 = 1.390

CASE DIMENSIONS **Tolerances are ±.010** **All dimensions in inches**
MANUAL VOLUME CONTROL (CASE STYLES 03, 06 & 16) OFFERS VARIABLE ATTENUATION FROM 0 TO 20 db FROM SOUND PRESSURE LEVELS SHOWN

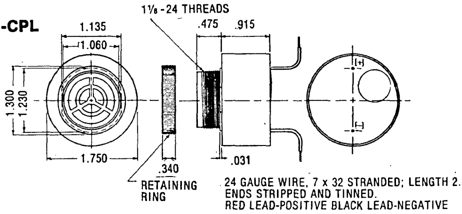
WARNING SIREN TONE

The Model AL-612 Audiolarm® is a miniature panel or PC mounted alarm that emits a very loud siren-like tone when power is applied. The output tone varies from approximately 2500 to 3500 Hz at a 2.5 Hz rate. The audible output level peaks at about 106 dB(a) when operated from a 12 VDC source; the unit also works well from a heavy-duty alkaline 9V transistor radio battery. Our most attention-getting alarm!!

SPECIFICATIONS

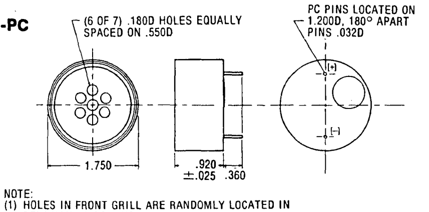
Operating Voltage: 6 to 12 VDC
Operating Current: Up to 100 mA (Voltage Dependent)
Sound Output: Up to 106 dB(a) @ 2 ft with 12 VDC supply; strongly harmonic police-like siren tone.
Operating Frequency: Sweeps from 2500 to 3500 Hz @ 2.5 Hz rate.
Operating Mode: Apply power = ON; Remove power = OFF
Operating Temperature: −20°C to +65°C
Storage Temperature: −40°C to +80°C
Terminals: Wire or PC pins (see drawings)
Material: Black ABS—KJB thermoplastic case
Mounting: Rear-panel mount in 1⅛″ dia. hole
Mounting: PC—Printed circuit board mount (see drawing)
CPL—Rear panel mount in 1⅛″ dia. hole, panel thickness .250″ max.
Weight: Two (2) ounces

AL-612-CPL



24 GAUGE WIRE, 7 x 32 STRANDED; LENGTH 2.25″ ENDS STRIPPED AND TINNED.
RED LEAD-POSITIVE BLACK LEAD-NEGATIVE

AL-612-PC


(6 OF 7) .180D HOLES EQUALLY SPACED ON .550D
PC PINS LOCATED ON 1.200D, 180° APART PINS .032D
(+)
(−)
1.750
.920
±.025
.360

NOTE:
(1) HOLES IN FRONT GRILL ARE RANDOMLY LOCATED IN RELATION TO PC PINS.

CORD ELECTRONICS
INCORPORATED (Formerly the OEM Division of MURA)

177 Cantiague Rock Road, Westbury, N.Y. 11590 U.S.A.
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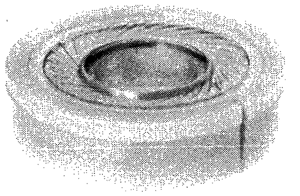
MICROPHONE, TELEPHONE RECEIVER & TRANSMITTER CARTRIDGES

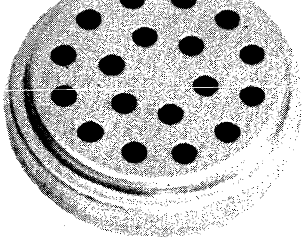
ELECTRET CONDENSER MICROPHONES

Available in 6 different physical configurations and a variety of sensitivities. Most types are available with or without insulated leads and some models are suitable for PCB mounting. The electret microphone is an economic, compact and lightweight alternative to the other microphones and telephone transmitters displayed herein.
Typical specifications are:
Sensitivity: −63 ± 3dB (0dB = 1V/μ bar @ 1Khz)
Frequency Range: 20 ~ 12,000 hz
Operating Voltage: 1.5 to 15 VDC
Current Consumption: >0.5mA (@6V)
Directionality: Omnidirectional



DYNAMIC MICROPHONE CARTRIDGES

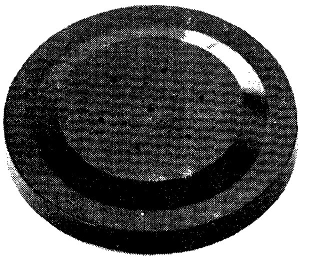
In many different sizes and impedances, either enclosed in a plastic housing or open.
Sensitivity is typically −65 to −80dB (@1Khz) depending on the model.



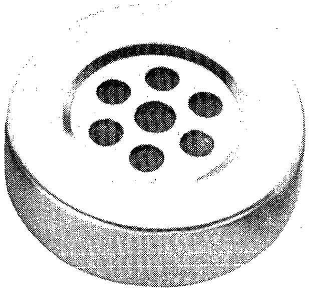
CERAMIC MICROPHONE CARTRIDGES

Available in diameters ranging from 25 to 46mm as well as 22 x 15mm unit. The ceramic cartridges offered provide excellent performance under extreme climatic conditions.

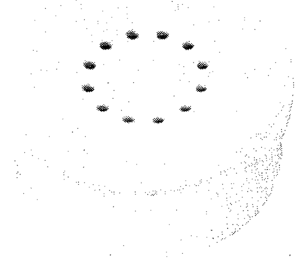
TELEPHONE TRANSMITTER AND RECEIVER CARTRIDGES



**EM-95
ELECTRET
TRANSMITTER**



**DT-70C
RECEIVER**



**38RFO5T
RECEIVER**

Cord offers a broad selection of telephone transmitters, receivers and transmitter/receivers. Transmitters are available with electret, dynamic and carbon elements, suitable for use in any telecommunications application. Receiver types range from paper or mylar cone speakers with alnico or ceramic magnets to the standard dynamic type. All receivers and transmitters offered are suitable for use in standard G and H style telephone handsets.

the heart
of good sound

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SPEAKERS

General Purpose Miniature *

TYPE NUMBER	CONE DIAMETER & SHAPE	RATED POWER (Watts)	VOICE COIL IMPEDANCE (Ohms)	FREQUENCY RESPONSE (Hz)	MAGNET MATERIAL	MAGNET WEIGHT (Oz.)	DEPTH	REMARKS
S150RA	1½" Round	0.1	8±15%	770∿ 4,000	Alnico V	0.34	.705"	
S175RA	1¾" Round	0.1	8±15%	550∿ 4,000	Alnico V	0.34	.705"	
S200RA	2" Round	0.2	8±15%	450∿ 4,000	Alnico V	0.34	.705"	
S200SA	2" Square	0.2	8±15%	450∿ 5,000	Alnico V	0.34	.740"	
S225RA	2¼" Round	0.2	8±15%	400∿ 4,000	Alnico V	0.34	.740"	
S250RA	2½" Round	0.3	8±15%	330∿ 4,000	Alnico V	0.34	.830"	
S275RA	2¾" Round	0.3	8±15%	280∿ 4,000	Alnico V	0.34	.840"	
S300RA	3" Round	0.5	8±15%	250∿ 5,000	Alnico V	0.34	.915"	
S300SA	3" Square	0.5	8±15%	250∿ 5,000	Alnico V	0.34	.975"	
S350RA	3½" Round	0.8	8±15%	220∿ 5,000	Alnico V	0.34	1.100"	
S350SA	3½" Square	0.8	8±15%	220∿ 5,000	Alnico V	0.34	1.100"	
S2X3VA	1.77"x2.76" Oval	0.5	8±15%	280∿ 5,000	Alnico V	0.35	1.03"	

*Voice Coil Impedances from 3.0 ohms - 100 ohms available on special order.

Low Profile Samarium Cobalt Magnet**

TYPE NUMBER	CONE DIAMETER & SHAPE	RATED POWER (Watts)	VOICE COIL IMPEDANCE (Ohms)	FREQUENCY RESPONSE (Hz)	MAGNET MATERIAL	MAGNET WEIGHT (Oz.)	DEPTH	REMARKS
S150RL	1½" Round		8±15%	350∿ 7,000		.056	.250"	
S150RLS	1½" Round		8±15%	450∿ 8,000		.056	.327"	
S175RL	1¾" Round		8±15%	400∿ 7,000		.056	.334"	
S200RL	2" Round		8±15%	300∿ 5,000		.056	.350"	
S225RL	2¼" Round		8±15%	200∿ 5,000		.056	.445"	

**Waterproof Mylar Cones and Moisture Proof Paper Cones available on special order.

Commercial

TYPE NUMBER	CONE DIAMETER & SHAPE	RATED POWER (Watts)	VOICE COIL IMPEDANCE (Ohms)	FREQUENCY RESPONSE (Hz)	MAGNET MATERIAL	MAGNET WEIGHT (Oz.)	DEPTH	REMARKS
S400S3	4" Square	3	8	150∿11,000	Ceramic	3		
S400S6	4" Square	4	8	140∿15,000	Ceramic	6		
S4X6V3	4"x6" Oval	3	8	110∿ 9,000	Ceramic	3		
S4X6V6	4"x6" Oval	4	8	110∿ 9,000	Ceramic	6		
S4X10V3	4"x10" Oval	3	8	90∿ 8,000	Ceramic	3		
S4X10V6	4"x10" Oval	6	8	90∿ 8,000	Ceramic	6		
S500P3	5" Pin Cushion	3	8	135∿10,000	Ceramic	3		
S500P6	5" Pin Cushion	6	8	135∿12,000	Ceramic	6		
S525P3	5.25" Pin Cushion	4	8	105∿10,000	Ceramic	3		
S525P6	5.25" Pin Cushion	6	8	120∿13,000	Ceramic	6		
S525P10	5.25" Pin Cushion	10	8	120∿13,000	Ceramic	10		
S650P3	6.5" Pin Cushion	4	8	70∿14,000	Ceramic	3		
S650P6	6.5" Pin Cushion	6	8	70∿14,000	Ceramic	6		
S6X9V3	6"x9" Oval	3	8	80∿10,000	Ceramic	3		
S6X9V6	6"x9" Oval	6	8	70∿15,000	Ceramic	6		
S6X9D10	6"x9" Oval	15	8	70∿15,000	Ceramic	10		Dual Cone
S6X9C20	6"x9" Oval	25	8	60∿18,000	Ceramic	20		Co-Axial
S6X9T20	6"x9" Oval	25	8	60∿20,000	Ceramic	20		3-Way
S800R3	8" Round	3	8	70∿10,000	Ceramic	3		
S800R6	8" Round	6	8	70∿10,000	Ceramic	6		
S800C10	8" Round	15	8	70∿13,000	Ceramic	10		Co-Axial
S800D10	8" Round	15	8	70∿12,000	Ceramic	10		Dual

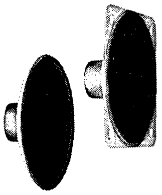
Horns

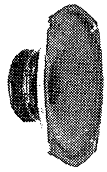
TYPE NUMBER	CONE DIAMETER & SHAPE	RATED POWER (Watts)	VOICE COIL IMPEDANCE (Ohms)	FREQUENCY RESPONSE (Hz)	MAGNET MATERIAL	MAGNET WEIGHT (Oz.)	DEPTH	REMARKS
5"		10W	8	180∿13,000				
5" x 8"		25W	8	170∿13,000				
8"		25W	8	160∿13,000				
12"		35W	8	130∿15,000				

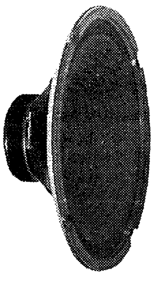
BUZZERS

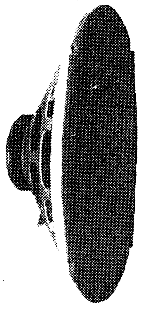
Shape Round, Rectangular, P.C. Mount and Wire Lead Construction
DC Voltage Range 1.1V-30V
Current Range 16mA-30mA

SPEAKERS

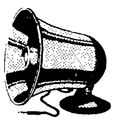




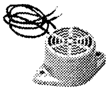




HORNS



BUZZERS

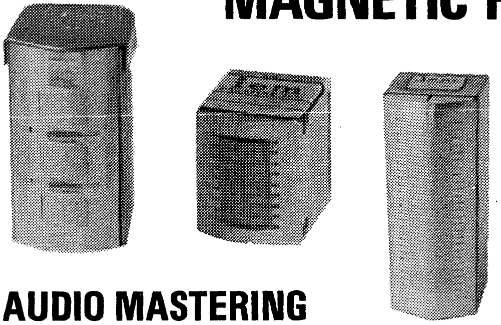


iem®

INTERNATIONAL ELECTRO MAGNETICS, INC.

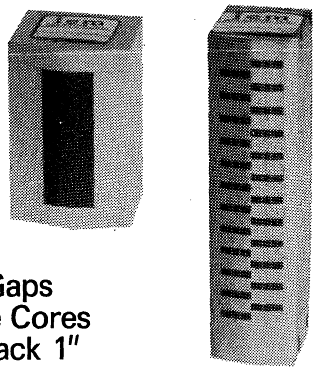
ERIC DRIVE AND CORNELL AVENUE, PALATINE, ILLINOIS 60067 (312) 358-4622

MAGNETIC RECORDING HEADS



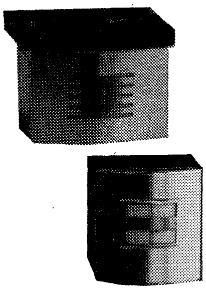
AUDIO MASTERING

- All Formats Available
- Standard Replacements in Stock
- Improved Channel Isolation
- Flattened Low Frequency Response



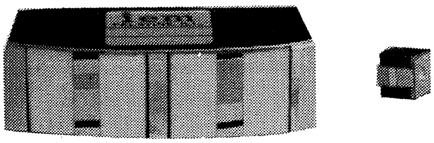
ERASE

- Dual Gaps
- Ferrite Cores
- Full Track 1"
- Multi-track Interlace



SMPTE Control Stacks

- Neo Pilot for ¼" Mono
- FM for ¼" Stereo
- VCR/VTR Formats
- Ceramic Wear Shoes

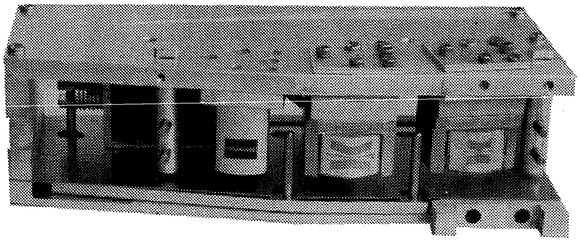


MAGNETIC STRIPE/MINIATURE

- Read After Write
- Hand Held Readers
- ¼" Cube

CUSTOM DESIGN

We have manufactured over 5,000 different head designs. If we don't have one to suit your requirements, we will design and prototype it quickly and economically. Our toolroom is well equipped to produce precision parts, and our design projects have included optical alignment systems, microfiche cameras, and electronic test equipment.



HEAD ASSEMBLY

- Quick Change ¼" to ½"
- Solenoid Tape Lifter
- Non-Resonant Head Spacing

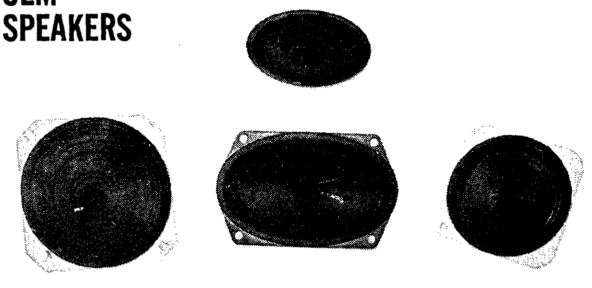
HEAD RELAPPING

- Electrical Test
- Granite Flat Polishing
- Microscopic Inspection
- 24 Hour Service

OUR
25th YEAR

SPEAKERS & HORNS — FOR OEM OR DISTRIBUTOR

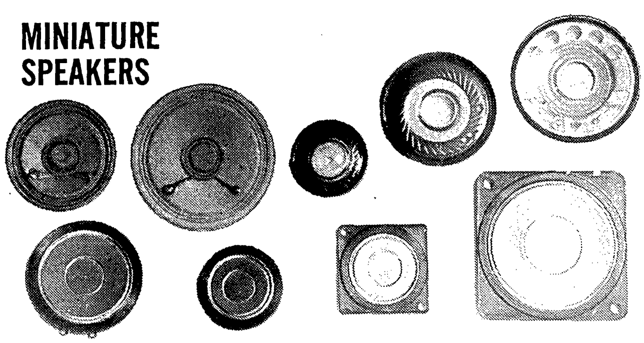
OEM SPEAKERS



☐ COMMUNICATIONS
☐ COMPUTER APPLICATIONS
☐ INTERCOM SYSTEMS
☐ ELECTRONIC TOYS AND GAMES

MG's wide range of miniature speakers are available in sizes from 1″ to 4″, round or square. Voice coil impedances range from 3.2 to 100 ohms. Magnets are available in ferrite and alnico V.

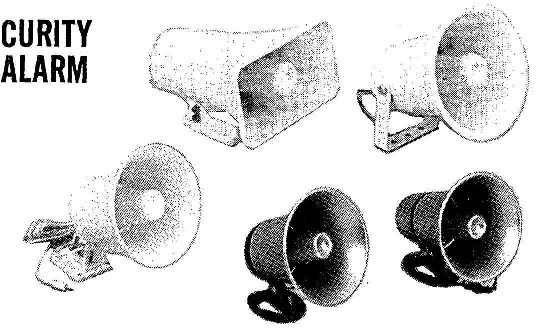
MINIATURE SPEAKERS



☐ TELEPHONE SYSTEMS
☐ MODEMS
☐ ALARMS
☐ KEYBOARD APPLICATIONS

These miniature thin line speakers produce a clean and natural sound. The wide frequency response make these speakers ideal for a broad range of O.E.M. applications.

SECURITY & ALARM



☐ HORNS AND SIRENS FOR PROTECTION AND SIGNAL SYSTEM APPLICATIONS

MG's paging, signaling horns, and electronic sirens all designed with built in drivers and available in sizes from 5″ to 12″. All constructed with heavy duty ABS or aluminum housings.

MG offers a wide range of high quality loudspeaker products for hundreds of industrial and commercial applications at competitive pricing. Speakers are "manufactured to your specifications" and available in OEM quantities. A broad range of options in configuration, voice coil impedance, magnet type and weight, and cone finish can be specified.

We also maintain a huge "off the shelf" raw speaker inventory of hundreds of assorted speaker types and sizes from 1″ to 18″. — Call us for availability.

GENERAL PURPOSE & COMMERCIAL SOUND SPEAKERS

☐ BACKGROUND MUSIC
☐ PUBLIC ADDRESS AND PAGING
☐ SOUND COLUMNS
☐ AUTOMOTIVE
☐ COMMUNICATIONS AND GENERAL REPLACEMENT APPLICATIONS

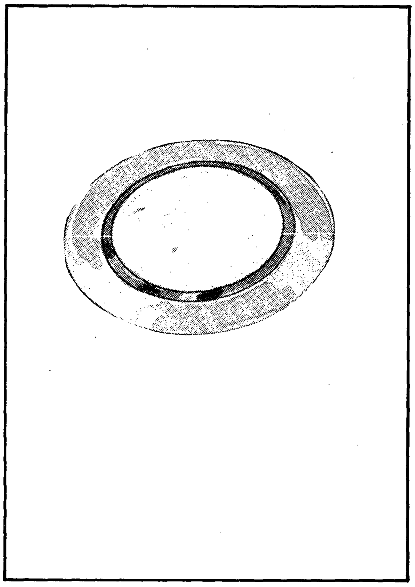
Paging horns are available in a wide range of sizes from 5″ to 12″, in plastic or aluminum housings. Speakers are available in single cone, dual cone and coaxial types in sizes from 4″ to 8″. All 8″ speaker baskets are prestamped for easy transformer mounting. A wide variety of voice coil sizes and magnet weights are available.

MG ELECTRONICS

32 RANICK ROAD • HAUPPAUGE, N.Y. 11788
(516) 582-3400 Telex: 64-5113

piezoelectric audio alarms

muRata ERIE
MURATA ERIE NORTH AMERICA, INC.



Piezoelectric Elements

Both leaded and unleaded Piezoelectric discs are supplied for specific application requirements and custom mounting. Listed below are typical performance characteristics.

FEATURES

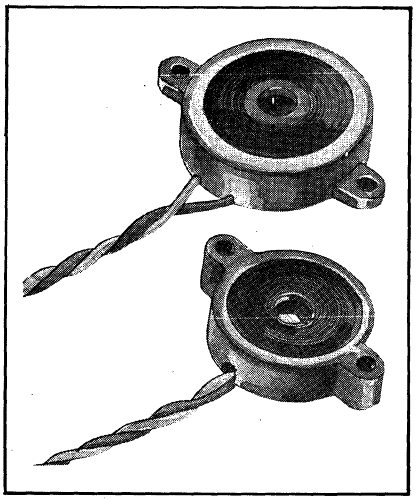
- Extremely clear penetrating sound
- Completely solid state
- One tenth the power consumption of a comparable electromechanical buzzer
- No electronic noise generation
- Compact size and light weight
- Variety of models for various tone functions

APPLICATIONS

- Fire alarms
- Gas detectors
- Calculators
- Medical electronics
- Appliances
- Burglar alarms
- Automobiles
- Aircraft
- Clocks
- Watches
- Communications systems
- Data processing
- Instrument and control systems
- Restaurant equipment
- Recreational equipment

TYPICAL SPECIFICATIONS

Diameter (mm)	Resonant Frequency	Resonant Impedance	Capacitance (pF)	Input Voltage
20	6.3 KHz	350 Max.	10,000	30 Vp-p
27	4.6 KHz	200 Max.	20,000	
35	2.8 KHz	200 Max.	30,000	
41	1.7 KHz	1000 Max.	30,000	



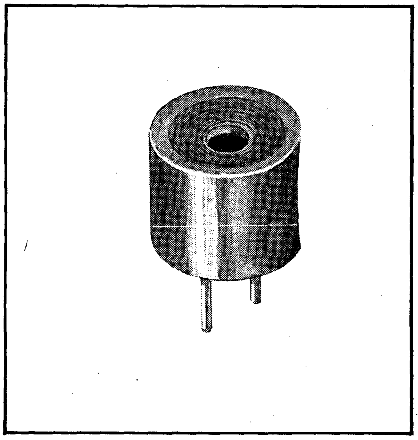
Encased Piezoelectric Alarms (No Internal Circuitry)

The alarms feature a resonant case to increase the audio output level of the piezoelectric disc mounted within them for maximum audio output vs electrical power input ratios. These alarms contain no integral circuitry, are for external drive applications and are offered with/without a feedback tab. Typical performance is illustrated below.

TYPICAL PERFORMANCE

Diameter (mm)	Oscillating Frequency	Sound Pressure Level (Min.)	Part No.	Input Volt (Max.)
22	4 KHz	75 db*	PKM24-4AO	25 Vp-p
25	7 KHz	85 db*	PKM25-6AO	20 Vp-p
24	4 KHz	75 db*	PKM11-4AO	25 Vp-p
33	100 Hz-20 KHz	70 db****	PKM33EP-1001	30 Vp-p
44	100 Hz-10 KHz	75 db**	PKM44EW-1001A	30 Vp-p
39	3.4 KHz	85 db***	PKM29-3AO	30 Vp-p

* @ 10 cm ** @ 30 cm *** @ 1 meter **** @ 50 cm



Encased, Self-Contained Piezoelectric Alarms with Integral Circuitry

These units are completely self-contained alarms requiring only a DC voltage source for operation. They are compatible with most pc board assembly and flow soldering procedures. Some typical performance characteristics are shown below.

TYPICAL PERFORMANCE

Diameter (mm)	Oscillating Frequency	Sound Pressure Level	Part No.	Input Voltage
24	3.8 KHz	80 db*	PKB8-4AO	12 VDC
30	2.7 KHz	80 db*	PKB9-3AO1	17 VDC
34	4.7 KHz	85 db**	PKB6-5AO	9 VDC
42	2.8 KHz	85 db**	PKB5-3AO	9 VDC
42	2.8 KHz	95 db**	PKB5-3BO	6 VDC
43	2.8 KHz	85 db**	PKB7-3AO	9 VDC

* @ 1 meter ** @ 30 cm

muRata ERIE
MURATA ERIE NORTH AMERICA, INC. 1148 Franklin Rd., S.E. Marietta, Georgia 30067 Tel: (404) 952-9777 Telex: 54-2329 TWX: 810-766-1531

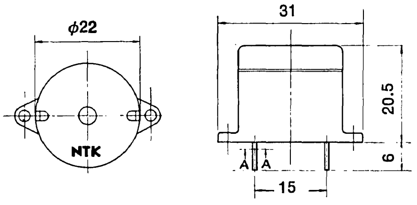
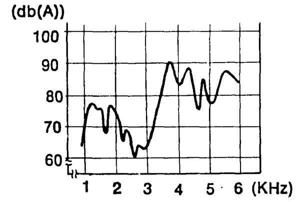
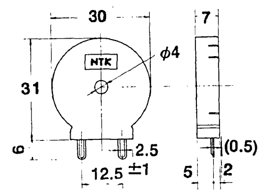
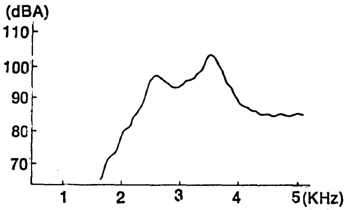
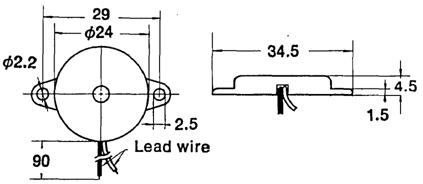
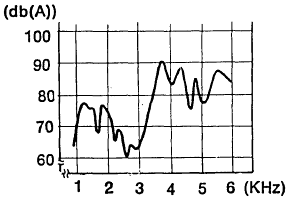
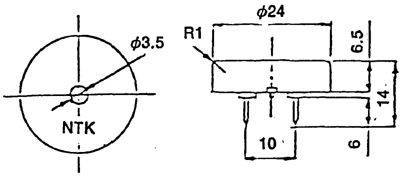
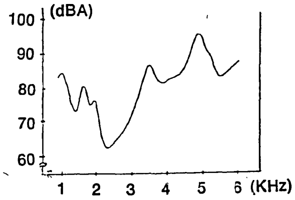
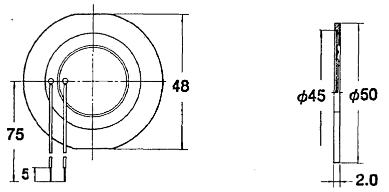
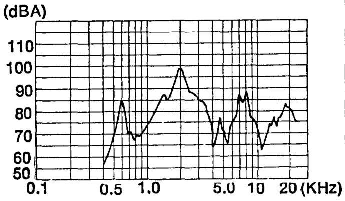
NTK

TECHNICAL CERAMICS

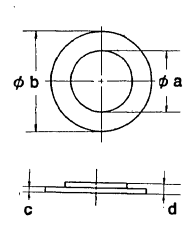
NGK SPARK PLUGS (U.S.A.), INC.
1701 North Greenville Ave., #205 Richardson, TX 75081,
Phone: (214) 235-8332. TELEX: 170547UT

NTK PIEZO SPEAKERS

Applications: Fire Alarms • Burglar Alarms • Communication Systems • Automobiles • etc.

MODEL NO.	DIMENSION Unit: mm	CHARACTERISTICS	SPECIFICATIONS	
PC BOARD MOUNT MODEL #PZB-20L12 DC VOLTAGE OPERATION			Sound Pressure dBA Current Consumption Frequency Operating Voltage	75 Min. 20 mA Max. 4.0 KHz 10-14V
PC BOARD MOUNT MODEL #PZS-22A	 30 7 φ4 NTK 31 6 2.5 (0.5) 12.5 ±1 5 2		Sound Pressure dBA Current Consumption Frequency Operating Voltage	80 Min. 10 mA Max. 2.5 KHz 30V Max.
FLEXIBLE LEADS MODEL #PZS-22A	 29 φ24 φ2.2 34.5 4.5 1.5 2.5 Lead wire 90		Sound Pressure dBA Current Consumption Frequency Operating Voltage	75 Min. 1 mA Max. 3.0 KHz 30V Max.
PC BOARD MOUNT MODEL #PZS-22YP			Sound Pressure dBA Current Consumption Frequency Operating Voltage	75 Min. 15 mA Max. 2.5 KHz 30V Max.
VOICE SYNTHESIZER SPEAKER MODEL #PZS-R45			Sound Pressure dBA Current Consumption Frequency Operating Voltage	70 Min. 15 mA Max. 1.0 KHz 30V Max.

PIEZOCERAMIC AUDIO TONE TRANSDUCERS

	Item Model No.	a (mm)	b (mm)	d (mm)	c (mm)	Capacitance	Resonant Frequency	Resonant Impedance
	EC-120H$_2$-30BA	12 ±0.2	30 ±0.1	0.43	0.2 ±0.02	21,000 ±30% PF	7.7 ±0.8 KHz	200Ω >
	EC-150H$_2$-40BA	15 ±0.2	40 ±0.1	0.43	0.2 ±0.02	33,000 ±30% PF	4.3 ±0.5 KHz	200Ω >
	EC-R150H$_2$-20BA	15 ±0.3	20 ±0.1	0.48	0.2 ±0.02	20,000 ±30% PF	6.6 ±0.6 KHz	400Ω >
	EC-R200H$_2$-27BA	20 ±0.3	27 ±0.1	0.48	0.2 ±0.02	38,000 ±30% PF	3.6 ±0.5 KHz	200Ω >
	EC-R200H$_2$-40BA	20 ±0.3	40 ±0.1	0.48	0.2 ±0.02	38,000 ±30% PF	4.5 ±0.5 KHz	200Ω >
	EC-R250H$_2$-50BA	25 ±0.3	50 ±0.1	0.48	0.2 ±0.02	63,000 ±30% PF	2.9 ±0.5 KHz	200Ω >

* Feed back types are also available.

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looked to us last year.

Oaktron routinely builds and stocks speakers within these design features. If you don't see what you want...Send us your specs.

SPEAKER SIZES: 1″ to 18″ diameter in round, square, pin-cushion, rectangular and special shapes to design specifications.

VOICE COILS: ½″ to 3″ diameter; all wound on heat-dissipating, moisture-proof aluminum forms.

VOICE COIL LAYERS: 2 to 6, single or dual windings.

IMPEDANCE: 1.5 to 200 ohms, or any impedance as specified; multi-impedance taps.

CONNECTORS: Screw post, spade lug, solder eye, or as specified.

ALNICO V MAGNETS: 0.18 oz. to 20.0 oz., in yoke and/or high-energy cup housings.

CERAMIC MAGNETS: 2.35 oz. to 108 oz. Barium ferrite; single and stacked mountings with extended pole piece.

POWER CAPACITIES: ½ to 200 watts, true RMS ratings; 150% transient peak.

CONE MATERIALS: Polypropylene, acrylic or phenolic impregnated cloth, aluminum, paper; moisture-resistant, weather-proof, fire-retardant, and fungus-resistant treatments.

CONE CONSTRUCTION: Butyl rubber, foam rubber, and cloth free-edge surrounds; ½ roll up or down, multiple roll edge; molded, seamed, ribbed, curvilinear, deep, shallow, twin-cone "whizzer."

FREE AIR RESONANCE: Designed to specifications.

BASKETS: Precision formed steel, electrostatically coated in standard and special design shapes: shallow, deep-draw, perforated, solid back; with and without mounting holes and transformer emboss. Front and rear mounting with vinyl gasket ring, clip fasteners.

ENTERTAINMENT SPEAKERS: High response twin-cone, free-edge, musical instrument, woofers, tweeters, mid-range, color TV, co-axial, weather-proof patio speakers; three-way systems; automotive stereo, multi-impedance, and dual voice coil; general and automotive replacement; GM, Ford, and tractor type.

UNDERWATER SPEAKERS: Designed to specifications for deep-submergence, reactive measurement, and underwater communications.

COMMUNICATIONS: Voice range speakers, designed to reduce unwanted high and low frequency interference. Replacements to match original specs, for aircraft, industrial, military, and personal systems.

ARCHITECTURAL SOUND: Sound masking, music, paging, public address, dual voice coil, intercom, alarm; interior, exterior, waterproof, weather-and-fungus-resistant, explosion-or flame-proof; architectural enclosures.

HIGH TEMPERATURE SPEAKERS: Designed for life safety applications, these speakers will operate at full specs in temperatures over 400°F.

ACCESSORIES: Baffles, L-pads, transformers, ceiling rings, mounting brackets.

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supplies, ac · relays ·
solenoids · rs/trimmers
controls/rhe · rs ·
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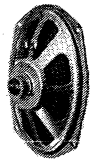
tors · connectors, electronic · sockets,/terminals

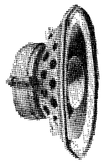
Quam Loudspeakers: The Sound Decision

For Industrial Applications

8 ohm impedances

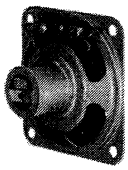
MODEL NUMBER	SIZE (Inches) AND SHAPE	FREQUENCY RESPONSE (Hertz)	POWER HANDLING CAPACITY (Watts)	VOICE COIL IMPEDANCE (Ohms)	VOICE COIL DIAMETER (Inches)	MAGNET MATERIAL AND WEIGHT (Ounces) AV—Alnico V BF-Ceramic	DEPTH (Inches)	SHIPPING WEIGHT (Lbs.)
2A05Z8	2 RD	300 Hz to 6K Hz	1	8-10	9/16	.52AV	7/8	1/4
22A05Z8	2-1/4 RD	300 Hz to 10K Hz	1	8-10	9/16	.52AV	1	1/4
23A05Z8	2x3 Oval	250 Hz to 15K Hz	1	8-10	9/16	.52AV	1-1/8	1/4
25A05Z8R	2-1/2 RD	150 Hz to 12K Hz	1-1/2	8-10	9/16	.52AV	1-1/8	1/4
25A07Z8	2-1/2 SQ	150 Hz to 12K Hz	1-1/2	8-10	9/16	.65AV	1-1/4	1/4
26A07Z8	2x6 Oval	130 Hz to 16K Hz	2	8-10	9/16	.65AV	1-19/32	1/2
27A05Z8	2-3/4 RD	150 Hz to 8K Hz	1	8-10	9/16	.52AV	1-3/16	1/4
30A05Z8	3 SQ	150 Hz to 12K Hz	2	8-10	9/16	.52AV	1-9/32	1/4
30A05Z8R	3 RD	250 Hz to 12K Hz	2	8-10	9/16	.52AV	13/16	1/4
30C1Z8	3 SQ	150 Hz to 12K Hz	4	8-10	9/16	1.1BF	1-3/16	1/2
30C25Z8	3 SQ	150 Hz to 14K Hz	5	8-10	9/16	2.35BF	1-3/16	3/4
3A05Z8	3-1/2 SQ	130 Hz to 12K Hz	2	8-10	9/16	.52AV	1-5/16	1/4
3A05Z8R	3-1/2 RD	150 Hz to 11K Hz	2	8-10	9/16	.52AV	1-3/8	1/4
3C1Z8	3-1/2 SQ	130 Hz to 12K Hz	4	8-10	9/16	1.1BF	1-5/16	1/2
35A05Z8	3x5 Oval	130 Hz to 14K Hz	2	8-10	9/16	.52AV	1-1/2	1/4
35A2Z8	3x5 Oval	130 Hz to 12K Hz	4	8-10	3/4	1.2AV	1-11/16	1/2
35C1Z8	3x5 Oval	130 Hz to 12K Hz	4	8-10	9/16	1.1BF	1-1/2	1/2
35C3Z8	3x5 Oval	130 Hz to 12K Hz	5	8-10	3/4	3BF	1-11/16	3/4
4A05Z8R	4 RD	200 Hz to 12K Hz	2-1/2	8-10	9/16	.52AV	1-1/2	1/2
4A1Z8	4 SQ	200 Hz to 12K Hz	3	8-10	9/16	.65AV	1-5/8	3/4
4C1Z8	4 SQ	200 Hz to 12K Hz	4	8-10	9/16	1.1BF	1-1/2	1/2
4C25Z8	4 SQ	200 Hz to 12K Hz	5	8-10	9/16	2.35BF	1-5/8	3/4
4C5Z8	4 SQ	120 Hz to 15K Hz	7	8-10	3/4	4.8BF	1-5/8	1
46A1Z10	4x6 Oval	150 Hz to 9K Hz	3-1/2	8-10	9/16	.65AV	1-11/16	3/4
46C3Z8	4x6 Oval	130 Hz to 10K Hz	6	8-10	3/4	3.0BF	1-3/4	1
48C3Z8	4x8 Oval	120 Hz to 12K Hz	6	8-10	3/4	3BF	2-1/16	1-1/2
410A2Z10	4x10 Oval	120 Hz to 12K Hz	6	8-10	3/4	1.2AV	2-11/16	1
5A1Z8	5 PC	125 Hz to 12K Hz	3-1/2	8-10	9/16	.65AV	1-13/16	3/4
5C1Z8	5 PC	130 Hz to 12K Hz	4	8-10	9/16	1.1BF	1-11/16	1/2
5C3Z8	5 PC	130 Hz to 14K Hz	5	8-10	3/4	3.0BF	1-7/8	1
52A1Z8	5-1/4 PC	100 Hz to 12K Hz	3-1/2	8-10	9/16	.65AV	1-7/8	3/4
52C10Z8	5-1/4 PC	125 Hz to 9K Hz	10	8-10	1	10BF	2-1/4	2-1/4
57C3Z8	5x7 Oval	75 Hz to 10K Hz	7	8-10	3/4	3BF	2-5/16	1
6A2Z8	6-1/2 PC	70 Hz to 14K Hz	6	8-10	3/4	1.2AV	2-5/8	1
6C5Z8	6-1/2 PC	70 Hz to 14K Hz	7	8-10	3/4	4.8BF	3	1-3/4
69A2Z10	6x9 Oval	70 Hz to 15K Hz	8	8-10	3/4	1.2AV	2-3/4	1-1/4





Miniature speakers

MODEL NUMBER	SIZE (Inches) AND SHAPE	FREQUENCY RESPONSE (Hertz)	POWER HANDLING CAPACITY (Watts)	VOICE COIL IMPEDANCE (Ohms)	VOICE COIL DIAMETER (Inches)	MAGNET MATERIAL AND WEIGHT (Ounces) AV—Alnico V BF-Ceramic	DEPTH (Inches)	SHIPPING WEIGHT (Lbs.)
2A05	2 RD	300 Hz to 6K Hz	1	3-4	9/16	.52AV	7/8	1/4
2A05Z8	2 RD	300 Hz to 6K Hz	1	8-10	9/16	.52AV	7/8	1/4
2A05Z45	2 RD	300 Hz to 6K Hz	1	45	9/16	.52AV	7/8	1/4
2A05Z100	2 RD	300 Hz to 6K Hz	1	100	9/16	.52AV	7/8	1/4
22A05Z8	2-1/4 RD	300 Hz to 10K Hz	1	8-10	9/16	.52AV	1	1/4
2205Z100	2-1/4 RD	300 Hz to 10K Hz	1	100	9/16	.52AV	1	1/4
23A05	2x3 Oval	250 Hz to 15K Hz	1	3-4	9/16	.52AV	1-1/8	1/4
23A05Z8	2x3 Oval	250 Hz to 15K Hz	1	8-10	9/16	.52AV	1-1/8	1/4
25A05Z8R	2-1/2 RD	150 Hz to 12K Hz	1-1/2	8-10	9/16	.52AV	1-1/8	1/4
25A07	2-1/2 SQ	130 Hz to 14K Hz	1-1/2	3-4	9/16	.65AV	1-1/4	1/4
25A07Z8	2-1/2 SQ	150 Hz to 12K Hz	1-1/2	8	9/16	.65AV	1-1/4	1/4
25A07Z45	2-1/2 SQ	150 Hz to 12K Hz	1-1/2	45	9/16	.65AV	1-1/4	1/4
25C1Z80T	2-1/2 SQ	200 Hz to 8K Hz	4	8-10	9/16	1.1AV	1-1/16	1/2
27A05Z8	2-3/4 RD	150 Hz to 8K Hz	1	8-10	9/16	.52AV	1-1/16	1/4
27A05Z45	2-3/4 RD	130 Hz to 6K Hz	1	45	9/16	.52AV	1-1/16	1/4



For more than 50 years,

Quam-Nichols Company has been making speakers that make good sound, and supplying them in ways that make good sense. Our product line currently includes more than 3,000 standard models with thousands of others that can be manufactured to meet specific requirements.

Quam speakers are available off-the-shelf through our nationwide distributor network, with a backup inventory of 70,000 standard units at our factory warehouse.

Engineering assistance is available for special applications. Such special designs can be produced in quantities as small as 100.

Quam-Nichols Company

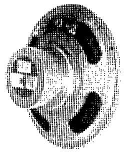
234 East Marquette Road • Chicago, Illinois 60637
(312) 488-5800

Quam Loudspeakers: The Sound Decision

For Communications Applications

Intercom

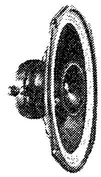
MODEL NUMBER	SIZE (Inches) AND SHAPE	FREQUENCY RESPONSE (Hertz)	POWER HANDLING CAPACITY (Watts)	VOICE COIL IMPEDANCE (Ohms)	VOICE COIL DIAMETER (Inches)	MAGNET MATERIAL AND WEIGHT (Ounces) AV—Alnico V BF-Ceramic	DEPTH (Inches)	SHIPPING WEIGHT (Lbs.)
2A05Z45	2 RD	300 Hz to 6K Hz	1	45	9/16	.52AV	7/8	1/4
25A07Z16	2-1/2 SQ	150 Hz to 12K Hz	1-1/2	16	9/16	.65AV	1-1/4	1/4
25A07Z45	2-1/2 SQ	150 Hz to 12K Hz	1-1/2	45	9/16	.65AV	1-1/4	1/4
27A05Z45	2-3/4 RD	130 Hz to 6K Hz	1	45	9/16	.52AV	1-1/16	1/4
30A05Z45	3 SQ	130 Hz to 14K Hz	2	45	9/16	.52AV	1-3/16	1/4
30C1Z450T	3 SQ	170 Hz to 12K Hz	4	45	9/16	1.1BF	1-3/16	1/2
3A07Z450T	3-1/2 SQ	150 Hz to 10K Hz	2-1/2	45	9/16	.65AV	1-7/16	1/2
35A05Z16	3x5 Oval	100 Hz to 12K Hz	2	16	9/16	.52AV	1-1/2	1/4
4A1Z16	4 SQ	180 Hz to 15K Hz	3	16	9/16	.65AV	1-5/8	3/4
4A1Z45	4 SQ	180 Hz to 12K Hz	3.0	45	9/16	.65AV	1-13/16	3/4
5A1Z45	5 PC	130 Hz to 9K Hz	3-1/2	45	9/16	.65AV	1-13/16	3/4
5C1Z450T	5 PC	130 Hz to 9K Hz	4	45	9/16	1.1BF	1-11/16	1/2
8C6Z45	8 PC	70 Hz to 12K Hz	12	45	1	6.0BF	3	2-1/2



For Sound System Applications

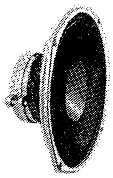
Outdoor

25C1Z80T	2-1/2 SQ	200 Hz to 8K Hz	4	8-10	9/16	1.1BF	1-1/16	1/2
30C1Z450T	3 SQ	170 Hz to 12K Hz	4	45	9/16	1.1BF	1-3/16	1/2
3A070T	3-1/2 SQ	150 Hz to 10K Hz	2-1/2	3-4	9/16	.65AV	1-7/16	1/2
3A07Z450T	3-1/2 SQ	150 Hz to 10K Hz	2-1/2	45	9/16	.65AV	1-7/16	1/2
3C1Z80T	3-1/2 SQ	180 Hz to 15K Hz	4	8-10	9/16	1.1BF	1-1/4	1/2
4A20T	4 SQ	130 Hz to 9K Hz	4	3-4	3/4	1.2AV	1-5/8	3/4
4A2Z80T	4 SQ	130 Hz to 9K Hz	4	8-10	3/4	1.2AV	1-5/8	3/4
5C1Z450T	5 PC	130 Hz to 9K Hz	4	45	9/16	1.1BF	1-11/16	1/2
8C6PA0T	8 PC	80 Hz to 8K Hz	12	8-10	1	6.0BF	2-7/8	2-1/2



Background music and public address

4C10PA	4 PC	65 Hz to 15K Hz	18	8-10	1	10BF	3-1/2	2-1/4
8C5PAX	8 PC	70 Hz to 18K Hz	8	8-10	3/4	4.8BF	2-3/4	2
8C6PAX	8 PC	75 Hz to 19K Hz	12	8-10	1	6BF	3	2-1/2
8C10DVFR	8 PC	70 Hz to 12K Hz	15	8-10	1	10BF	3-1/8	3
8C10FEPAX	8 RD	40 Hz to 20K Hz	18	8-10	1	10BF	3-1/8	3
8C10PA	8 RD	70 Hz to 12K Hz	15	8-10	1	10BF	3	3
8C10PAX	8 PC	75 Hz to 20K Hz	15	8-10	1	10BF	3	2-3/4
8C12PA	8 RD	65 Hz to 9K Hz	20	8-10	1-1/4	12BF	3-1/8	3-1/4
10C10PA	10RD	70 Hz to 12K Hz	15	8-10	1	10BF	3-7/8	4-1/4
12C6PAS	12RD	75 Hz to 20K Hz	15	8-10	1	6BF	3-5/8	4
12C10PAX	12RD	60 Hz to 14K Hz	18	8-10	1	10BF	4-3/8	4-1/4
12C12PAX	12RD	50 Hz to 12K Hz	25	8-10	1-1/4	12BF	4-1/2	5-1/2

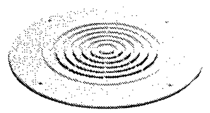


Transformers

MODEL NUMBER	POWER RATING	PRIMARY VOLTS	PRIMARY TAPS	INSERTION LOSS (Db)	MOUNTING CENTERS	CORE SIZE	SECONDARY LOAD (OHMS)	SHIPPING WEIGHT
TBL25	4W	25	1/4-1/2-1-2-4W	1.2	2"	1/2x5/8	8	1/2 lb.
TCL25	8W	25	1/2-1-2-4-8W	1.6	2-3/8"	5/8x5/8	8	3/4 lb.
TBL70	4W	70.7	1/4-1/2-1-2-4W	1.2	2"	1/2x5/8	8	1/2 lb.
TCL70	8W	70.7	1/2-1-2-4-8W	1.0	2-3/8"	5/8x5/8	8	3/4 lb.
TBLU	5W	25/70	5/16-5/8-1-1/4-2-1/2-5W	1.3 & 1.2	2"	1/2x5/8	8	1/2 lb.

Ceiling baffles

MODEL NUMBER	TYPE	SPEAKER SIZE (Inches)	BAFFLE DIAMETER (Inches)	MATERIAL	FINISH	CEILING PROJECTION (INCHES)	SHIPPING WEIGHT
BR8W	One-step contour	8	12-7/8	22-ga. steel (Zincrometal)	White semi-gloss powdered epoxy	3/8	1-1/2 lb.
BR8A	One-step contour	8	12-7/8	22-ga. aluminum	Brushed aluminum	3/8	1 lb.
BR8WC	Two-step contour	8	12-3/4	22-ga. steel (Zincrometal)	White semi-gloss powdered epoxy	5/16	1-1/2 lb.
BR8WP	Louvered two-step contour	8	12-3/4	White plastic	—	5/16	1 lb.



Complete speaker assemblies, including speaker, baffle and line matching transformer, are available completely assembled at the factory at no extra charge. Pre-assembled units with volume controls also are available.

Quam-Nichols Company

234 East Marquette Road • Chicago, Illinois 60637
(312) 488-5800

CASSETTE MECHANISMS

OEM QUANTITIES OR LOW QUANTITY PROTOTYPES

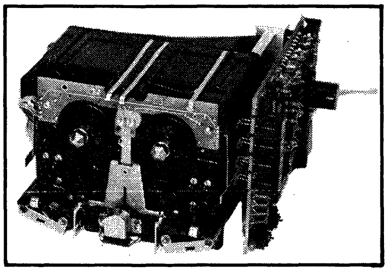
GENERAL SPECIFICATIONS

General cassette recorders
(Hi-Fi & Professional models significantly better.)
S/N: better than 45dB
Output Level: 250 MV ±3 dB
Frequency Response: ±4 dB 50 Hz-10 KHz
Crosstalk: better than 35 dB
WOW & Flutter: .35% NAB
Tape Speed: ±2.5%
Temperature: −10°C to +70°C
Fast Winds: 140 seconds
Distortion: better than 3%
Extensive Life testing for shock, vibration, temperature & humidity

CUSTOM DESIGNS

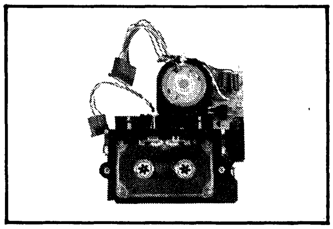
Tape Concepts, Inc./Reproduction Technologies will manufacture to your requirements specialized control and audio circuitry for any of our standard format recorders. Our engineering staff has 45 years of electronic and mechanical experience in tape recorders.

9800 professional five motor, cmos IEEE 488, cassette transport



Excellent specifications in wow and flutter, timing and control. Full CMOS electronics, local and remote control functions, bi-directional operation, record, play, erase heads, precision head blocks and precise tape control. Four motor tape control. 3½″ vertical panel space, 4″ deep.

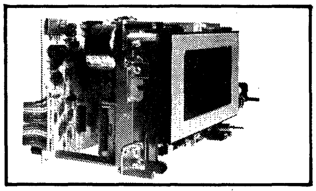
mini cassette, hub drive model 8801



Inexpensive mini (not micro) cassette drive with hub motor drive, optical Tac, erase and record/play heads and solenoid puck control. Available with or without drive and control electronics. 3½″ W x 3½″ D x 2″ high.

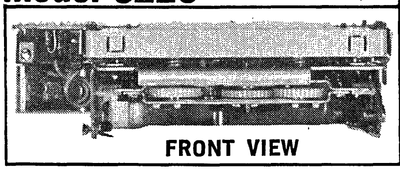
These precision German mechanisms and other more inexpensive mechanisms are available for immediate sampling and in production quantities from Tape Concepts, Inc. Tape Concepts, Inc. is an engineering orientated importer and manufacturers' representative.

front-door loader-model 8501

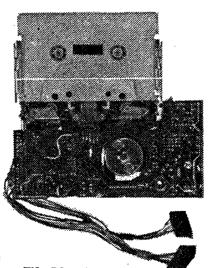


Tip down door model with erase, record and play head, dual motor, single direction, four function soft touch controls, good design 5¼″ of vertical rack space. Standard cassette specifications. Die cast frame.

slot loader-model 8220



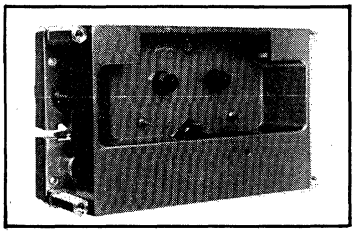
FRONT VIEW



FLAT VIEW

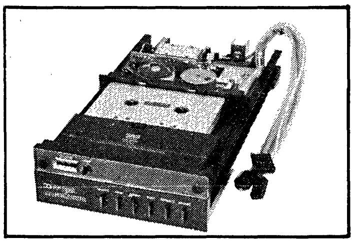
Cassette inserted "long way" into hole of the front panel. Requires the least vertical panel space of all models. Bi-directional, playhead and electronics provided, recording optional. Full function soft touch control, remotely located from transport. Logic level control. One motor, rugged design. Automatic cassette eject.

micro-cassette-model 8601



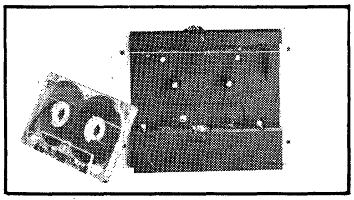
Dictation style, cassette format transport with die cast frame and full CMOS, six function soft touch control. Complete with mounting Bezel. Available also without control.

drawer loader-model 8030



"Works in a drawer." Slide tracks allow the deck to be pulled in and out of front panel mount for cassette insertion and removal. Momentary soft touch mechanical controls are mounted on the front of the drawer. Single direction, three motor, deluxe transport with hi-fi specification. Record, play, erase. 1¾″ or 3½″ vertical panel space.

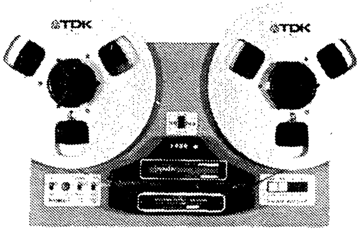
free access front loader-model 8701



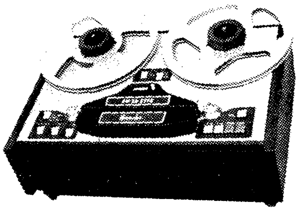
Direct drive, three speed transport with no belts and full logic tape control. 4.35 inches in height, 4.8 inches wide, 3.75 inches deep.

TAPE CONCEPTS, INC.
P.O. Box 815, 110 E. Vistula St.
Bristol, IN 46507
(219) 848-5234

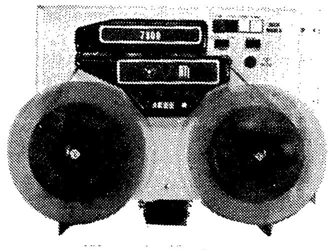
OEM RECORDER SYSTEMS MANUFACTURED BY RTI



10.5" Reel Transport with Heads & Mono R/P Electronics



120 IPS Cassette Duplicator Transport



7" Reel Transport with Heads Replaces Telex Model 67

RTI

Reproduction Technologies Inc.

OEM TAPE TRANSPORTS

- Data Logging
- Voice Logging
- Tape Search
- Random Access Search
- Security Listening
- Broadcast Automation
- Language Lab
- Aircraft Voice Simulator
- FM Recording
- Seismographic Recording
- High Speed Tape Copying
- Voice Print Recording
- Biomedical Recording

CONTACT

M. STOLL / D. BADKE
BOX 815
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(219) 848-5233

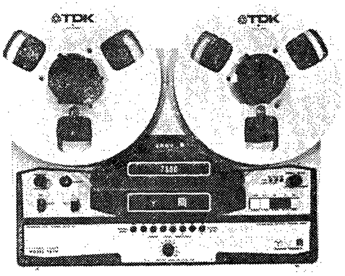
VOICE LOGGING EQUIPMENT

(Three models available)

- **8 Ch Rack Mounted Logger (R/P)**
- **1 Ch Portable Logger (R/P)**
- **1-8 Ch Portable Playback Unit**

Single Channel Portable Logger with 1-8 Channel Playback

- Airport control tower monitoring
- Security system monitoring
- Court room recording
- Facsimile recording
- Data transmission logging
- Conference room recording



Multi Channel Logger with 8 Channels and Monitor Speaker.

Eight secure channels with all channel monitoring of recording process, remote controllable transport, tone emergency monitor, super-long life construction, servo control, fully electronic transport, WWV or time code recording. Telephone, line & microphone inputs, cassette recorder outputs. Built-in monitor speaker. Automatic level control.

RTI

MANUFACTURERS OF HIGH
QUALITY PROFESSIONAL
AUDIO TAPE RECORDERS

REPRODUCTION TECHNOLOGIES INC.
P.O. Box 815
Bristol, Indiana 46507
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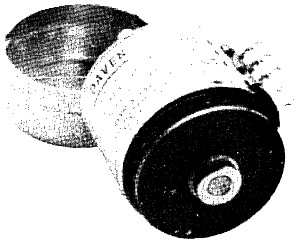
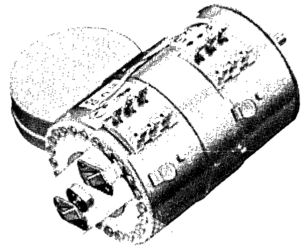
SHALLCO, INC.

PRECISION ELECTRONIC COMPONENTS

SMITHFIELD INDUSTRIAL PARK • P.O. BOX 1089 • SMITHFIELD, N.C. 27577 • 919/934-3135





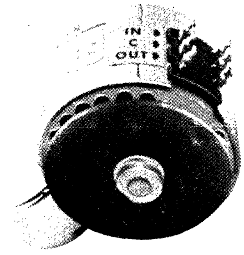
"T" AND BALANCED "H" ATTENUATORS

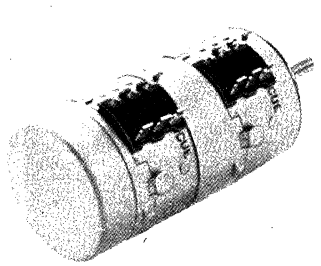
DEFINITION: Under this group we list those types which have zero insertion loss for 1:1 impedance ratios and constant impedance, both in and out on all steps of control. These networks may be inserted in a transmission system without introducing insertion losses. For unequal impedance ratio controls an insertion loss greater than zero is necessary. The amount depends upon the impedance ratio. The "T" control is used where one side of the line is grounded and the "H" where neither side of the line is grounded. They will not operate properly otherwise.

DESCRIPTION: Shallco offers two types of "T" attenuators, the "Bridged T" and the "T". Since both types are electrically and mechanically interchangeable, in the circuit, we list them all as "T" controls. The "Bridged T" consists of two variable and two fixed resistors and requires two rows of contacts. Over a certain range of attenuation and impedance, due to its electrical simplicity, this type offers advantages over the "T". The "T" employs three variable resistors and requires three rows of contacts. In the case of the "H" type network, we also offer the "Bridged H" and "H" form employing two or three sets of variable resistors, and a corresponding number of rows of contacts for each section.

CUEING: These networks may be obtained with a built-in cueing circuit. In these controls provision is made at the extreme attenuation position for connecting the incoming signal to a cue circuit before "FADING IN" the signal. By this means, a program can be smoothly "BROUGHT IN" at the right time without the operation of any additional switches. A lug on the terminal board is provided for connecting to the cueing system.

USE: These networks may be used as volume controls in low and high level multi-channel mixers and all types of measuring equipment where precision control is required.





DECADE ATTENUATORS—AUDIO

SERIES 2500

The Series 2500 Decade Attenuator units are step type precision networks, designed for use in measuring equipment. These units are particularly adaptable for use in noise meters, audiometers, transmission measuring sets and attenuation networks.

All the controls in this series have ten steps of attenuation. The frequency characteristics are essentially flat from zero to 50 kc. Positive, accurate detents are supplied on all units. The mechanical construction of these networks is the same high quality as supplied on all Shallco attenuators.

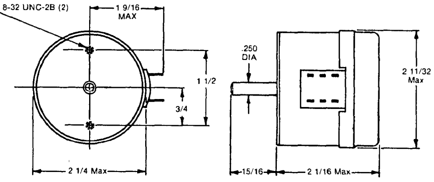
Electrically, these units are offered in three circuit types—Potentiometers, "T" and Balanced "H". Resistors are calibrated to an accuracy of ±1%. For best results, it is recommended that the power input be limited to 0.5 watt or less. If a higher level input is required, please specify this information when ordering.

10 DB STEPS 100 DB TOTAL	1.0 DB STEPS 10 DB TOTAL	0.1 DB STEPS 1 DB TOTAL	CIRCUIT	IMPEDANCE
2506	2503	2500	Potentiometer	50,000
2507	2504	2501		100,000
2508	2505	2502		200,000
2513	2511	2509	"T"	600
2514	2512	2510		500
2523	2522	2521		150
2519	2517	2515	Balanced "H"	600
2520	2518	2516		500
2526	2525	2524		150

Special impedances or decibel steps other than those shown are available

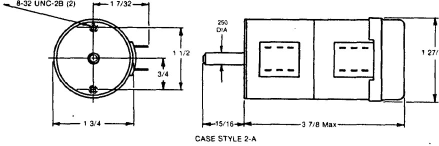
CONTACT SPACING: 15° between centers
TOTAL DEGREE OF ROTATION: 150°

"T" & Potentiometer



CASE STYLE B

Balanced "H"



CASE STYLE 2-A

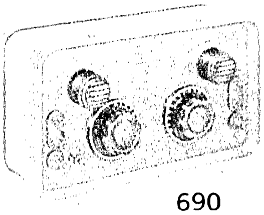
Shallco

SHALLCO, INC.
PRECISION ELECTRONIC COMPONENTS
SMITHFIELD INDUSTRIAL PARK • P.O. BOX 1089 • SMITHFIELD, N.C. 27577 • 919/934-3135

ATTENUATION NETWORKS

AUDIO FREQUENCY / MODEL NO. 690 & 693 SERIES

- **Decade Type—Direct Reading** • **Selectable Input and Output Impedance** • **Usable to 50 KC**
- **0 to 111 DB in 1 DB Steps or 0 to 110 DB in 0.1 DB Steps** • **"T" and Balanced "H" Versions Available**
- **Portable or Rack Mounted**



690

Models 690 and 693 Series Attenuation Networks are decade type, direct reading units providing reliable performance throughout the audio frequency spectrum.

Used as secondary attenuation standards, they are especially useful in the performance of general laboratory or production tests where extreme accuracy is secondary. They are used for low level testing at audio frequencies, and can be used at frequencies up to 50,000 cycles with very little decrease in accuracy.

An outstanding feature of these attenuation networks is flexibility; input and output impedances may be changed by means of convenient plug-in pads, available in a broad range of values. Both "T" and Balanced "H" versions of the 690 and 693 series are available as standard units.

They are available as portable or rack mounted units.

Input and output impedance adjusting pads are conveniently located and removable from the front panel.

Series 690 networks come with either balanced (Balanced "H") or unbalanced ("T") networks. The two dial models have a range of 0 to 110 db in steps of 1 db. The three dial models have a range of 0 to 111 db in steps of 0.1 db. The models with balanced networks are arranged so they may be used as unbalanced networks with the same attenuation range, but with one-half the base impedance.

SPECIFICATIONS:

Specifications shown are standard. Variations to fit individual customer requirements are available on request.

MODEL DESCRIPTION					STANDARD IMPEDANCE MATCHING PADS					
					INPUT		OUTPUT		IMPED	LOSS
Portable	Rack Mounting	Basic Imped.	Circuit	Range	T	Bal H	T	Bal H	(ohms)	(db)
T-690-C	T-690-CR	600/600	T	0-110 db in 1 db steps	6811	6831	6851	6871	500	3.77
					6812	6832	6852	6872	500	5.00
H-690-D	H-690-DR	600/600	Bal. H	0-110 db in 1 db steps	6813*	6833**	6853*	6873**	600	0
					6814	6834	6854	6874	250	8.74
					6815	6835	6855	6875	250	10.00
T-693	T-693-R	600/600	T	0-111 db in 0.1 db steps	6816	6836	6856	6876	200	9.98
					6817	6837	6857	6877	200	10.00
H-693	H-693-R	600/600	Bal. H	0-111 db in 0.1 db steps	6820	6840	6860	6880	50	16.63
					6821	6841	6861	6881	50	20.00

*Standard in "T" models unless otherwise specified. **Standard in Balanced "H" models unless otherwise specified.
Other impedances available upon request.

	Model 690	Model 693
Attenuation Range:	0-110 db	0-111 db

Impedance: 600/600 ohms
Input and output impedances may be changed by changing plug-in pad.
±1% at 1,000 cps ±2% 0 to 20,00 cps
Range may be extended to 50,000 cps with small decrease in accuracy

Power Input: 28 dbm (0.6 watt)

Switches: Heavy duty silver alloy contacts, multi-leaf rotor and slip ring return, positive wiping with individually sprung switch arm leaves

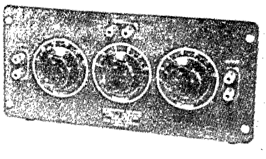
Terminals: Jack-top binding posts

Construction: All metal, two-tone cabinet. Also available for rack mounting

---

AUDIO VIDEO FREQUENCY / MODEL NO. 790 & 795

- **Decade Type—Direct Reading** • **Wide Frequency Range: 0 to 10 MC** • **600 Ohms Impedance**
- **0 to 111 DB in 1 DB Steps or 0 to 110 DB in 0.1 DB Steps** • **Positive Detent—Silver Alloy Switch Contacts**
- **Portable—Rugged** • **Both "T" and Balanced "H" Units Available**



795

Model 790 and 795 Attenuation Networks are portable, ruggedly constructed, decade type, direct reading units providing accurate performance into the low radio frequency spectrum.

The instruments cover a range from 0 to 10 mc. They have positive detent action and mechanical stops incorporated into each decade.

Stray capacitance and frequency discrimination are minimized through precision design. Silver alloy switch blades and contacts guarantee reliable long term operation.

These attenuator networks are general purpose instruments for use in laboratories, quality control departments and test facilities. They are particularly useful for making accurate measurements of gain or loss on filters, transformers, amplifiers and other equipment.

Both models are equipped with jack-top binding posts.

SPECIFICATIONS:

Variations to fit individual customer requirements are available on request.

	Model 790	Model 795
Attenuation Range:	0-110 db in 1 db steps	0-111 db in 0.1 db steps
Weight:	10¾ lbs	15½ lbs
Impedance:	600 ohms	600 ohms
Resistor Accuracy:	±0.25%	±0.25%

Attenuation Accuracy: ±0.1 db at 1000 cps when terminated in a resistive load

Frequency Characteristics: 0.1 db per step and 1 db for step decades—±0.2 db, 0 to 10 mc
10 db per step—±0.5 db, 0 to 0.5 mc (with 90 db setting ± 0.5 db at 1 mc
Lower values within this tolerance up to 10 mc

Power Input: 30 dbm (1 watt)

Switches: Heavy duty solid silver alloy contacts and multi-leaf switch rotor. Each leaf of the switch arm is individually sprung to provide self alignment and equalized pressure, assuring low and uniform contact resistance

Terminals: Jack-top binding posts, ¾″ spacing. Common terminal of "T" units grounded to chassis
Common terminal of "H" units floating

Construction: All metal two-tone cabinet

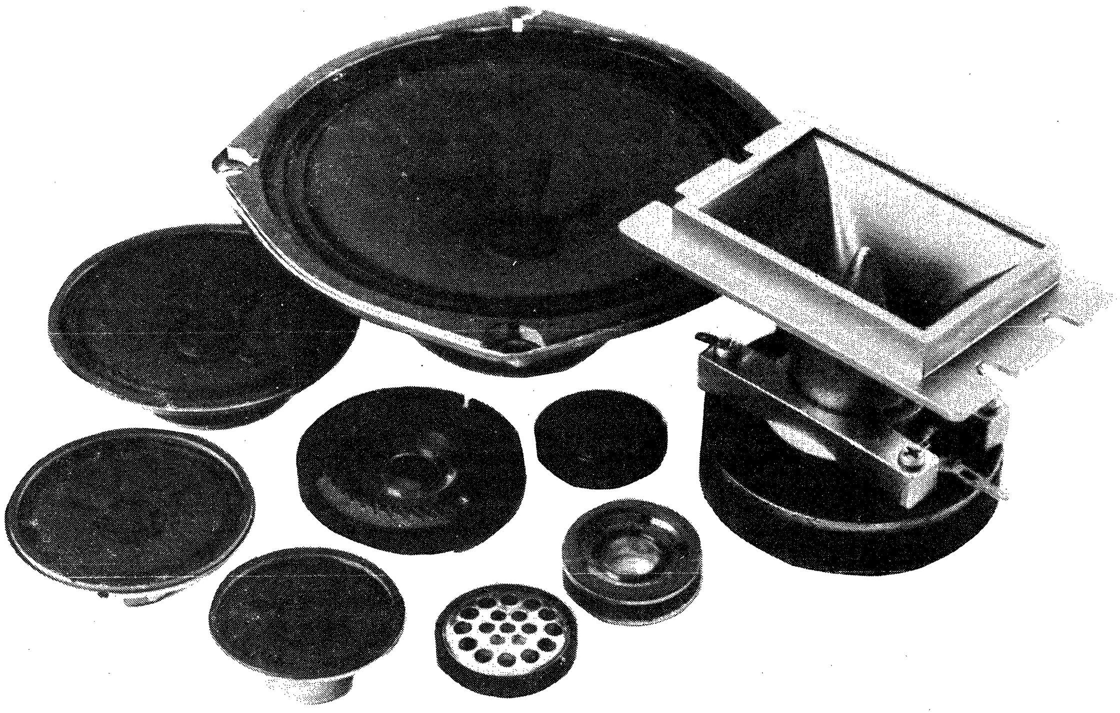
Rack mounting available on special order

SHOGYO
INTERNATIONAL CORPORATION

DEPT. EM, 287 NORTHERN BOULEVARD
GREAT NECK, NEW YORK 11021
(516) 466-0911
CABLE: "SHOGYONEWYORK"
TELEX: 12218 + 4758024
FAX: (516) 466-0922

SPEAKERS

Highest quality speakers, manufactured to leading OEM specifications, provide the finest sound reproduction at the lowest cost. Experience, unsurpassed workmanship and the finest materials are ingredients Shogyo builds into its products. The speakers illustrated and listed are only a small representation of the full range of items available. All speakers are available in water-resistant mylar cones or standard paper cones.



LOW PROFILE SPEAKERS

Available from ¾" dia. to 5" dia. Depth ranges from .33" to .85". Also available in alnico, ferrite and samarium rare earth magnets. Especially suitable for headphone and telephone applications or wherever a compact requirement exists.

GENERAL PURPOSE SPEAKERS

Available in a range of sizes from 1" to 8", in either round, square, or super thin shapes. Alnico, ferrite, or samarium cobalt magnets can be specified.

MID RANGE SPEAKERS

Sizes range from 4" to 12" in diameter with either Alnico or ferrite magnets.

OVAL SPEAKERS

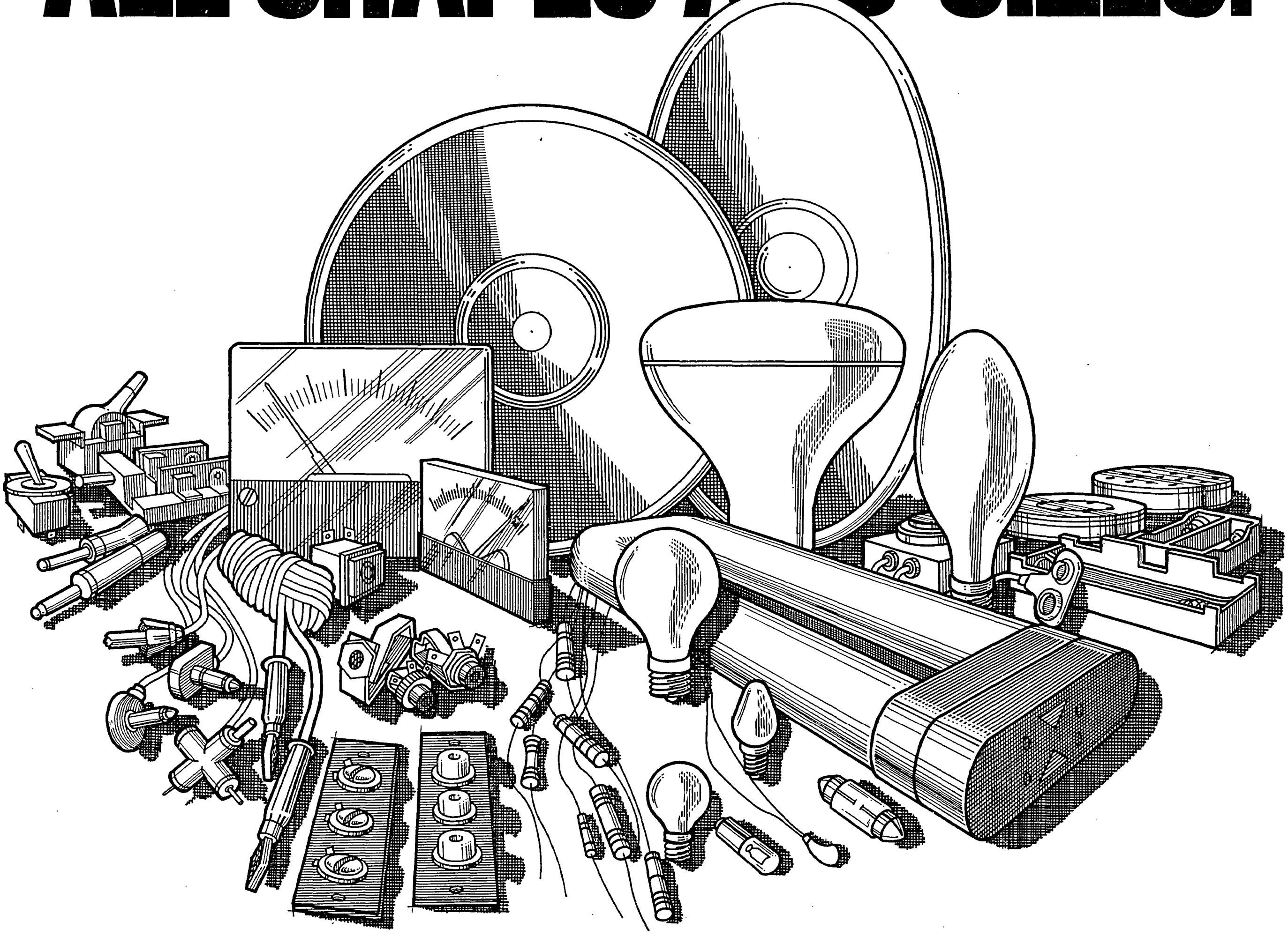
Sizes available: 2¾" x 2"; 3" x 1¾"; 3" x 2"; 3½" x 2½"; 4½" x 3¾"; 5" x 3"; 6" x 2"; 6" x 4"; 7" x 4"; 5½" x 3"; 7" x 5"; and 9" x 6". Alnico or ferrite magnets can be specified.

TWEETERS

Sizes range from 2" to 4" in shapes of either round, square or round with mounting tabs. Alnico or ferrite magnets can be specified.

SEE OUR OTHER CATALOG PAGES IN EEM SECTIONS 2100/2450/2950/4750/5600/6000

SHOKAI VALUES COME IN ALL SHAPES AND SIZES.



When you need OEM quality components at the best possible price, specify SHOKAI. The name you can depend on!

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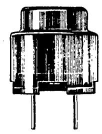
BUZZERS, TRANSDUCERS, PIEZOCERAMIC, MYLAR SPEAKERS AND MORE.

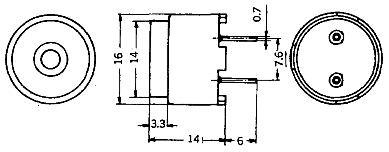
TRANSDUCERS MINIATURE AUDIO

NEW! SEALED VERSION FOR WAVE SOLDERING.
ASK FOR SPECIFICATIONS.

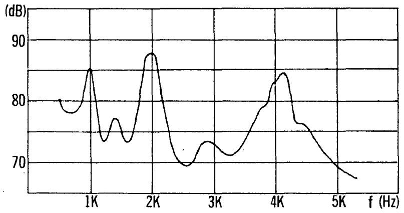
SERIES QMB



DIMENSIONS: mm



OPERATING CHARACTERISTICS
Sound Output vs. Frequency (At 4 in)



FEATURES

- Pleasing but penetrating "Pure tone" signal
- Available in 3 pin-types rated @ 1, 5, 6 and 12 volts DC
- Wide operating voltage and temperature range
- Pins conform to standard DIP sockets or may be soldered directly to PC board
- Low power consumption

The Star Series QMB is a miniature audio transducer designed to replace bulkier and more expensive speakers and piezoceramic crystals. It is especially economical for applications in which an audio signal and driving circuitry or a microprocessor clock already exists.

Unlike piezoceramic crystals, which require a minimum of 3 volts and provide poor sound output below 2000 Hz, the QMB functions at only 1 volt and generates loud sound output at frequencies as low as 1000 Hz. Another advantage is the fact that the QMB is mounted in a housing: piezoceramic crystals normally must be enclosed.

APPLICATIONS

The Star Series QMB may be used in a variety of consumer, industrial and military products:

- Pocket pagers and other telecommunications equipment
- Automobile and aircraft systems
- Medical instruments
- Computer peripherals
- Quartz-battery alarm clocks
- Microwave ovens
- Electronic toys and games

SPECIFICATIONS

	QMB-01	QMB-06	QMB-12
Rated Voltage	1.5V	6V	12V
Operating Voltage	1~3V	3~12V	6~18V
Maximum Rated Current*	15 mA	40 mA	40 mA
Sound Output*	Min. 70 dB at 8″ (20 cm) at 2048 Hz		
Recommended Frequency Range	1000-4200 Hz		
Operating Temperature	−6°F to 159°F (−20°C to 70°C)		
Weight	7g		

* Value applying rated voltage (2048 Hz, half-duty, half-wave pulse).

THREE NEW SERIES OF SPECIALITY AUDIO TRANSDUCERS

QMB-A

QMB-111

QMB-D

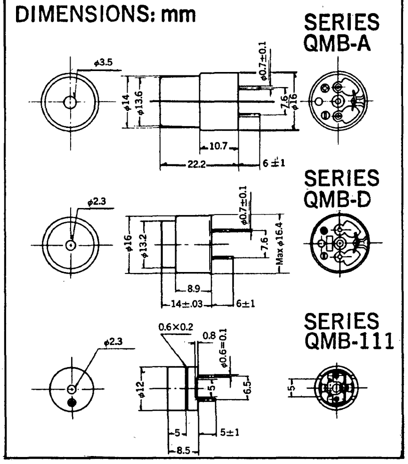
FEATURES

QMB-A SERIES — Electrically similar to standard QMB Series as shown above with flatter frequency response.

QMB-06D & 12D SERIES — Extremely high operating temperature up to 100°C.

QMB-111 SERIES — Ultraminiature, only 12 mm in diameter, 8.5 mm in height (not including pins).

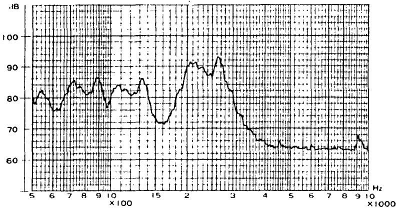
DIMENSIONS: mm



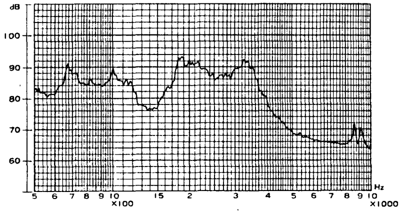
	QMB-01A	QMB-06A	QMB-12A	QMB-06D	QMB-12D	QMB-111
Rated Voltage (V)	1.5	6	12	6	12	1.5
Operated Voltage (V)	1~3	3~12	6~18	3~12	6~18	1~2
Max. Rated Current (mA)*	12	40	40	40	40	10
Coil Impedance (Ω)	100	135	270	120	220	140
Sound Output at 10 cm (dB)*	80	85		85		80
Rated Frequency	2048			2048		2048
Operating Temperature (°C)	−20~+70			−20~+100		−20~+60
Weight (g)	7			7		2

* Value applying rated voltage (2048 Hz, half-duty, half-wave pulse)

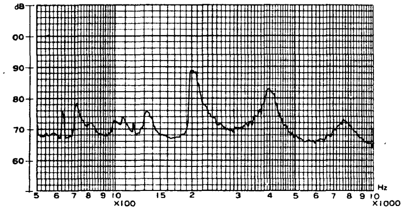
TYPICAL SOUND OUTPUT vs. FREQUENCY (at 4 in.)
MODEL QMB-01A



MODEL QMB-12D



MODEL QMB-111



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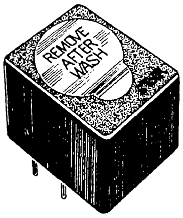
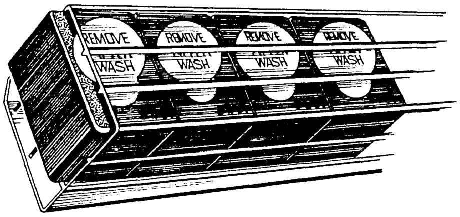
BUZZERS, TRANSDUCERS, PIEZOCERAMIC, MYLAR SPEAKERS AND MORE.

TRANSDUCERS

NEW! SEALED FOR CONTAMINATION-FREE WAVE SOLDERING AND PACKAGED FOR AUTOMATIC INSERTION.

SERIES SMX





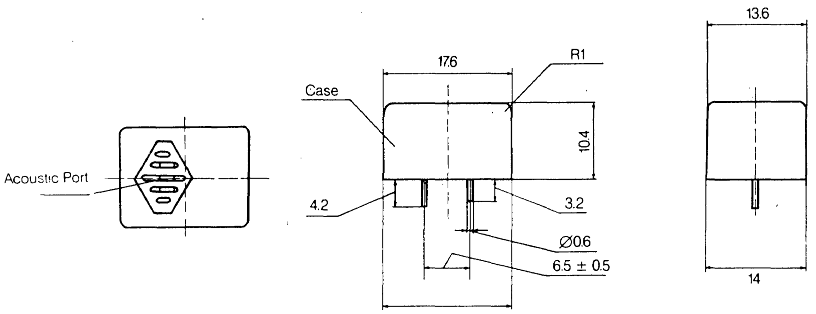
40 TRANSDUCERS PER MAGAZINE

FEATURES
- Packaged in magazines for automatic insertion
- Sealed against contamination during wave solder washing
- Wide frequency response curve for consistent output
- Different pin lengths for polarity notation
- Wide operating voltage and temperature range
- Low power consumption
- Small size
- Low cost

The SMX series is a totally new type of audio transducer. Designed with 2 resonant chambers for a wider frequency response curve, it's the first audio component to meet the market needs for automated PC board production.

Packaged in magazines, the SMX is compatible with automatic insertion equipment. The base is epoxy sealed and the sound hole is covered with a removable adhesive-backed foil. This protects the SMX series from contamination during washing and drying in automatic wave solder operations, and also eliminates the extra step of manual insertion, saving both production time and expense.

APPLICATIONS
- Telephone tone ringer
- Feedback for keyboards
- Toys and alarm clocks
- Medical instruments
- Automotive safety equipment
- Battery operated equipment
- Computer peripheral equipment
- Microwave ovens and other household appliances

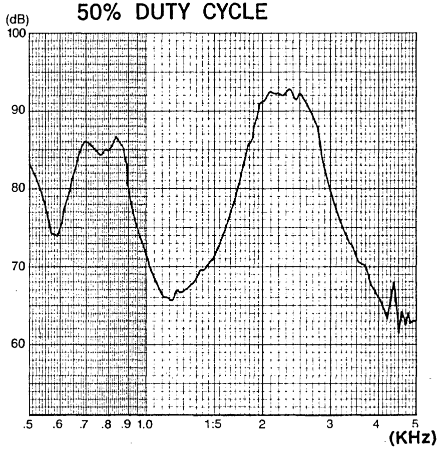


SPECIFICATIONS

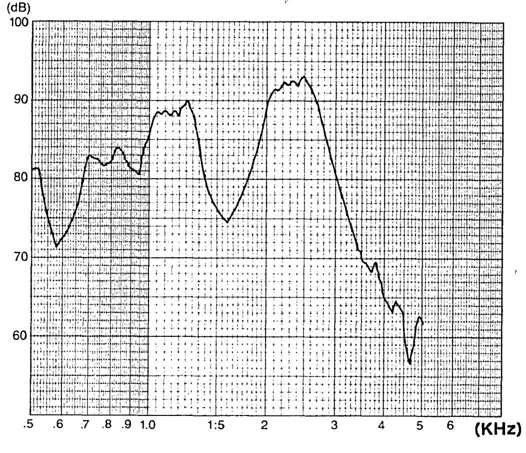
	SMX-06	SMX-12
Rated Voltage (VDC)	6	12
Operating Voltage (VDC)	3~10	6~15
Max. Rated Current (mA)*	40	
Coil Impedance (Ω)*	90	170
Sound Output (dB)*	Min. 85 (at 10 cm)	
Recommended Frequency Range (Hz)	2000 — 2500	
Operating Temp. (°F)	−6° — +159°	
(°C)	−20° — +70°	
Weight (g)	4	

* Measured at rated voltage 2048 Hz, square wave (50% duty cycle).

FREQUENCY RESPONSE
50% DUTY CYCLE



25% DUTY CYCLE



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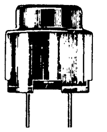
COMPLETE LINE OF ELECTRONIC AUDIO DEVICES

BUZZERS, TRANSDUCERS, PIEZOCERAMIC, MYLAR SPEAKERS AND MORE.

TRANSDUCERS

SERIES HMB



DRIVE ELECTRONICS INCLUDED IN PACKAGE. ON-BOARD ELECTRONICS ALLOW THESE UNITS TO OPERATE DIRECTLY FROM A 6 OR 12 VOLT POWER SUPPLY.

The Star Series HMB is a solid-state electronic buzzer with a pleasantly penetrating "pure tone" signal. This model is totally sealed to prevent contamination during the wave soldering process. The base is epoxy-filled and the sound hole on top is covered with a removable foil tape.

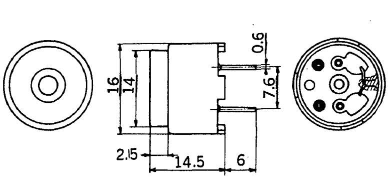
Designed as a stand-alone sound generator, the HMB is an audio transducer with a transistor oscillator circuit built in, and can be driven by straight D.C. voltage. It is an ideal replacement for low frequency "make and break" buzzers.

The reliability and long-life features of the new HMB Series make it especially suitable for battery-operated medical and scientific instruments, as well as for telecommunications equipment, police radar detectors, warning and monitoring systems in gas detector and security systems, appliance controllers, computer peripherals, and numerous other applications.

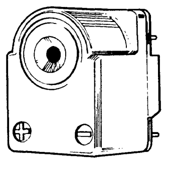
SPECIFICATIONS

	HMB-06	HMB-12
Rated Voltage	6 VDC	12 VDC
Current	Max. 30 mA	
Sound Output	85 dB @ 10 cm	
Resonant Frequency	2,200 Hz	
Operating Voltage	4-7 VDC	8-16 VDC
Temperature Range	−30 +85°C	
Dimensions	16 mm Dia. × 14.5 mm h	
Weight	4.8 g	

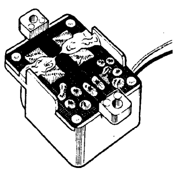
DIMENSIONS: mm



SERIES KMB/AMB



SERIES KMB



SERIES AMB

FEATURES

- Pleasing but pentrating "pure tone" signal
- Low current drain
- No "make and break" contact points
- Cost effective
- Precision engineered and manufactured for reliability and long life

The Star Series KMB and AMB are miniature, solid state electronic buzzers designed to provide an aesthetically pleasing "pure tone" signal. Both are available in 6 and 12-volt models that combine an audio transducer and a transistor oscillator circuit with electro-magnetic feedback.

KMB-06 is TTL compatible; KMB-12 is CMOS compatible.

Series AMB, with 2 wires is available in 6 and 12 volt rated DC models.

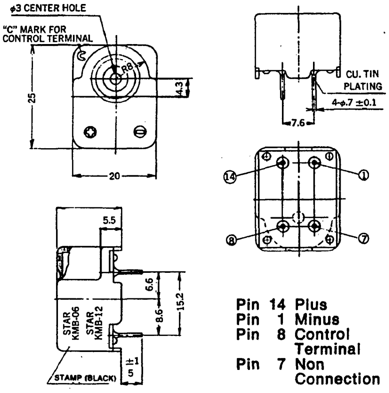
APPLICATIONS

- Appliance controllers
- Battery-operated medical and scientific instruments
- Electronic cash registers
- Police radar detectors
- Telecommunications equipment
- Warning and monitoring systems in aircraft and automotive vehicles
- Gas detector and security systems
- Computer peripherals
- Electronic toys and games
- Keyboard data entry verification

SPECIFICATIONS

		AMB-06/ KMB-06	AMB-12/ KMB-12
Rated Voltage (V)		6	12
Operating Voltage (V)		4~8	8~16
Max. Rated Current (mA)		20	
Operating Temperature (°C)		−20~+70	
Sound Output (dB)		85 (at 10 cm)	
Fundamental Frequency (Hz)		2150	
Weight (g)		10	
Connection of lead wires AMB only	+	Orange	Red
	−	White	White
Trigger Terminal KMB only		3.5V at 0.4 mA	6.0V at 0.4 mA

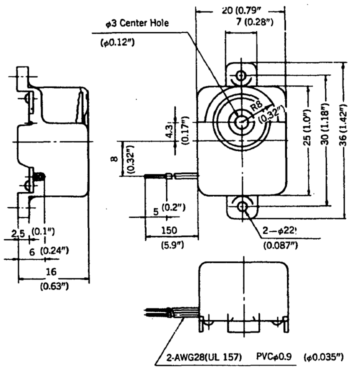
DIMENSIONS: mm
SERIES KMB



Pin 14 Plus
Pin 1 Minus
Pin 8 Control Terminal
Pin 7 Non Connection

Note: The above pin numbers are in accordance with 14 pin I.C. DIP sockets.

SERIES AMB



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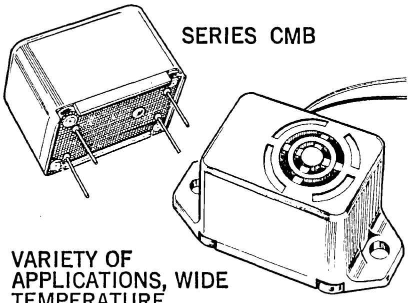
BUZZERS MINIATURE SOLID STATE ELECTRONIC

SERIES CMB/SMB


SERIES CMB
SERIES SMB

VARIETY OF APPLICATIONS, WIDE TEMPERATURE OPERATING RANGE

Star series CMB pin-type electronic buzzers fit standard DIP sockets or may be wave-soldered. Model CMB-06 is TTL compatible; Model CMB-12 is CMOS compatible.

Series SMB, with 2 wires is available in 1.5, 6, 12, and 24-volt rated DC models.

APPLICATIONS

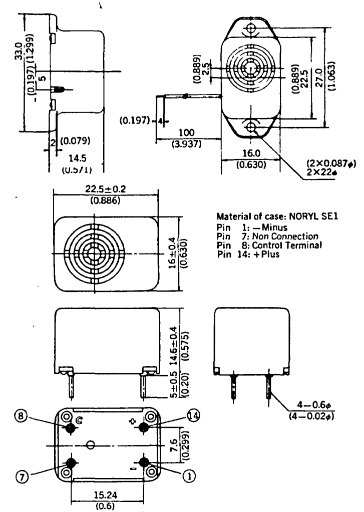
Star series CMB and SMB may be used in a variety of warning or monitoring systems. These include:

- Computer peripherals
- Automotive and aircraft systems
- Communications systems
- Microwave oven and other timing controls
- Instrumentation systems

SPECIFICATIONS

		SMB-01	CMB-06 & SMB-06	CMB-12 & SMB-12	CMB-24 & SMB-24
Operating Voltage (VDC)		1.1≈2	3≈7	7≈17	16≈30
Max Current (mA)		17	23	14	16
Temperature Range (°C)		−20≈ +60	−30°C∼70°C		
Sound Output at 20 cm (dB)		70			
Weight (g)		10			
Connections (SMB Only)	Pos. (+)	Red	Orange	Red	Orange
	Neg. (−)	Black	White	White	Black
Trigger Terminal (CMB Only)			1 mA Vt≥3	1 mA Vt≥8	1 mA Vt≥18

DIMENSIONS mm (in.)


33.0
(1.299)
(0.197)
5
2 (0.079)
14.5
(0.571)
(0.889)
2.5
(0.889)
22.5
27.0
(1.063)
(0.197)
4
100
(3.937)
16.0
(0.630)
(2×0.087ϕ)
2×22ϕ
22.5±0.2
(0.886)
16±0.4
(0.630)
Material of case: NORYL SE1
Pin 1: −Minus
Pin 7: Non Connection
Pin 8: Control Terminal
Pin 14: +Plus
14.6±0.4
(0.575)
5±0.5
(0.20)
4−0.6ϕ
(4−0.02ϕ)
⑧
⑭
⑦
①
7.6
(0.299)
15.24
(0.6)

ACOUSTIC GENERATOR ELEMENTS

SERIES SE PIEZOCERAMIC AUDIO GENERATOR ELEMENTS

FEATURES

- High sound output with minimum power drain
- Wide voltage range
- Low cost
- Unaffected by harsh environments
- Available in a variety of sizes and types

APPPILCATIONS

- Annunciators
- Equipment alarms
- Appliance controllers
- Automotive warning devices
- Security systems
- Gas detectors
- Medical Devices
- Instrumentation
- Tone Ringers

DIMENSIONS (mm)

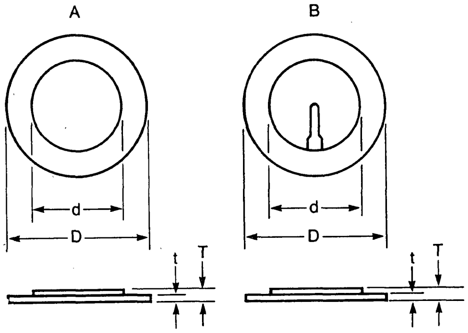
	SE-2063	SE-2075S	SE-2739	SE-2740S	SE-3530F
Configuration	A	A	A	A	B
Vibration Plate (D)	20	20	27	27	35
Ceramic (d)	14	14	19	19	25
Thickness (T)	0.43	0.43	0.48	0.43	0.58
Thickness of Vibration Plate (t)	0.2	0.2	0.25	0.2	0.3
Vibration Plate Material	Brass	Stainless Steel	Brass	Stainless Steel	Brass

SPECIFICATIONS

	SE-2063	SE-2075S	SE-2739	SE-2740S	SE3530F*
Resonant Frequency (KHz)	6.3 ±0.6	7.5±0.6	3.9 ±0.5	4.0±0.5	3.0±.015
Resonant Resistance (ohm)	300 max.	300 max.	200 max.	200 max.	200 max.
Electrostatic Capacitance (pF)	10,000 ±30%	10,000 ±30%	20,000 ±30%	20,000 ±30%	20,000 ±30%
Max. Input Voltage (Vp-p)	30 max.	30 max.	30 max.	30 max.	30 max.
Operating Temperature (°C)	−20∼ +60	−20∼ +60	−20∼ +60	−20∼ +60	−20∼ +60

* Feedback electrode model.

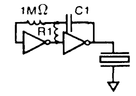
ELEMENT CONFIGURATIONS


A
B
d
D
t
T
d
D
t
T

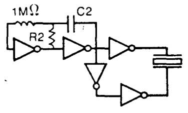
SUGGESTED DRIVE CIRCUITS

EXTERNAL DRIVE
(Two Terminal)

#1 Nominal Driver



#2 Optimal Driver



To determine value of R1, R2, C1 and C2:

1) determine frequency of oscillation required by Piezo element in your application

2) R1 or R2 should be 200K ohms or less.

3) frequency of oscillation $\approx \frac{1}{2.2\,R.C.}$ or $\frac{1}{2.2\,R2\,C2}$

Ref: RCA ICAN 6466 and ICAN 6883

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COMPONENTS DIVISION
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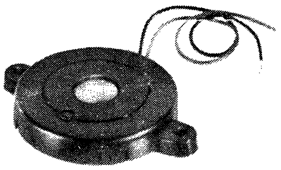
star™

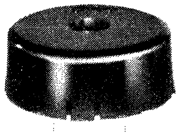
COMPLETE LINE OF ELECTRONIC AUDIO DEVICES

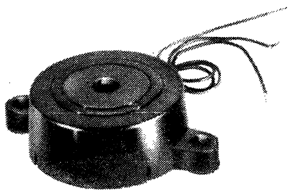
BUZZERS, TRANSDUCERS, PIEZOCERAMIC, MYLAR SPEAKERS AND MORE.

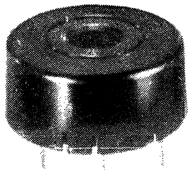
ACOUSTIC GENERATOR

PIEZOCERAMIC AUDIO GENERATOR SERIES SEC-2437, 3038 & 3109F









FEATURES SEC-2437, 3038, 3109F
- Greater design flexibility, pin mount or lead wire versions
- Low cost
- Housing design optimizes sound output of element

SEC-2437
- Sound output — more than 75 dB, at 10 cm (4.09 KHz resonant frequency)
- Low current drain — less than 1.5 mA
- Wave soldered

SEC-3038
- Sound output — more than 75 dB at 30 cm
- Minimal current usage — less than 4 mA
- Hand or wave solderable

SEC-3109F
- Sound output — more than 85 dB, at 30 cm (approx. 1 ft.)
- Feedback electrode for simple drive circuitry
- Low current consumption — less than 1.5 mA
- Wave solderable

APPLICATIONS SEC-2437, 3038, 3109F
- Battery powered medical equipment
- Electrical home appliances

SEC-2437
- Radar detectors
- Alarm and digital clocks
- Keyboard feedback machines
- Timer alarms

SEC-3038
- Fire and burglar alarms
- Smoke and gas detectors
- Electronic games, calculators, business machines
- Tone ringers

SEC-3109F
- Fire and burglar alarms
- Cameras, strobes
- Measuring instruments
- Radar detectors
- Smoke and gas detectors

Star Audio Generator Elements are designed with a piezoceramic element enclosed in a high-impact ABS housing. A pin mount model for direct insertion onto a PC board with lead wires and flanges for screw mounting are available.

These generators are ideally suited for wide range of applications which require high sound pressure level with low power consumption and simple drive circuitry with few components.

Star Audio Generators are recommended for commercial and consumer applications where a high frequency clearly audible signal with minimal current drain, and low profile mounting are critical.

SPECIFICATIONS

	SEC-2437P		**SEC-3038P**		**SEC-3109FP**	
Item	**Specification**	**Condition**	**Specification**	**Condition**	**Specification**	**Condition**
Sound Output	More than 75 dB	Distance at 10 cm (A-range) 3V p-p Square Wave 4,096 Hz	More than 75 dB	Distance at 30 cm (A-range) 9V p-p Square Wave 2,500 Hz	More than 85 dB	Distance at 30 cm (A-range) 9 VDC
Oscillation					4.6 KHz ±0.5 KHz	9 VDC
Current Consumption	Less than1.5 mA	3V p-p Square Wave 4,096 Hz	Less than 2.5 mA	9V p-p Square Wave 2,500 Hz	Less than 1.5 mA	9 VDC
Operating Voltage					3~20 VDC	
Electrostatic Capacitance	11,000 pF ±30%	1 KHz	18,000 pF ±30%	1,000 KHz		
Max. Input Voltage	30V p-p		30V p-p			
Operating Temperature	−30°C~+70°C		−30°C~+70°C		−20°C~+70°C	
Storage Temperature	−40°C~+80°C		−40°C~+80°C		−30°C~+80°C	
Weight	2.0 grams		5.0 grams		5.4 grams	

	SEC-2437L		**SEC-3038L**		**SEC-3109FL**	
Sound Output	More than 75 dB	Distance at 10 cm (A-range) 3V p-p Square Wave 4,096 Hz	More than 75 dB	Distance at 30 cm (A-range) 9V p-p Square Wave 3,800 Hz	More than 85 dB	Distance at 30 cm (A-range) 9 VDC
Oscillation					4.4 KHz ±0.5 KHz	9 VDC
Current Consumption	Less than 1.5 mA	3V p-p Square Wave 4,096 Hz	Less than 4 mA	9V p-p Square Wave 3,800 Hz	Less than 1.5 mA	9 VDC
Operating Voltage					3~20 VDC	
Electrostatic Capacitance	11,000 pF ±30%	1 KHz	18,000 pF ±30%	1,000 KHz		
Max. Input Voltage	30V p-p		30V-p-p			
Operating Temperature	−20°C~+60°C		−20°C~+60°C		−20°C~+60°C	
Storage Temperature	−30°C~+70°C		−30°C~+70°C		−30°C~+70°C	
Weight	2.3 grams		4.2 grams		5.6 grams	

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COMMONLY USED ELECTRICAL/ELECTRONIC ABBREVIATIONS AND ACRONYMS

A
AC alternating current
A/D analog to digital
ADC analog to digital converter
ADP automatic data processing
AF audio frequency
AFC automatic frequency control
ALGOL algorithmic language
AM amplitude modulation
AND a logical operator
AQL acceptable quality level
ASCII American national standard code for information interchange
AWG American wire gauge

B
BALUN balanced to unbalanced
BASIC beginners' all-purpose symbolic instruction
BCD binary-coded decimal
BNC baby "N" connector
BUS basic utility system

C
CAD computer aided design
CAM computer aided manufacture
CATV cable television or community antenna television
CERMET ceramic metal element
Comm. communications
CMOS complementary metal-oxide semiconductor
CPS characters per second
CPU central processing unit

D
D/A digital to analog
DAC digital to analog converter
DC direct current
DIAC bidirectional trigger diode
DIL dual in-line
DIN Deutsche Industrie Normenausschuss
DIP dual in-line package
DPM digital panel meter
DTL diode transistor logic

E
EDP electronic data processing
EBCDIC extended binary coded decimal interchange code
EEPROM electrically erasable PROM
EMC electromagnetic compatibility
EMI electromagnetic interference
EMP electromagnetic pulse
EPROM electrically programmable ROM
ESR equivalent series resistance

F
FEP fluorinated ethylene propylene Copolymar, 200° Teflon
FET field-effect transistor
FM frequency modulation
FORTRAN formula translator

G
GaAsFET gallium arsenide field effect transistor
GPIB general purpose interface bus

H
HF high frequency (3 to 30 MHz)
HIPOT test, measurement and diagnostic equipment
HLL high level language
HV high voltage
Hz Hertz

I
IC integrated circuit
IDC insulation displacement contact
IF intermediate frequency
IO input/output (devices)
IR insulation resistance (or) infrared

J
JFET junction field effect transistor
JMOS junction metal oxide semiconductor

K
kHz kilohertz (10^3 hertz)
KSR keyboard send receive

L
LC inductance capacitance
LCD liquid crystal display
LED light-emitting diode
LF low frequency (30 to 300 kHz)
LIF low insertion force
LNA low noise amplifier
LNB low noise band
LSI large scale integration
LVDT linear velocity displacement transformer

M
MASER microwave amplification by stimulated emission of radiation
MATV master antenna television
μF microforad
MHz megahertz
MIPS million instructions per second
MIB microcomputer interface board
MOS metal oxide semiconductor
MOSFET metal oxide semiconductor field effect transistor
MOSIGT metal-oxide semiconductor insulated-gate transistor
MOV metal oxide varistor
MPU microprocessor unit
MSI medium scale integration

N
NBS National Bureau of Standards
NEMP nuclear electromagnetic pulse
NIM nuclear instrumentation module
NOR not OR
NTC negative temperature coefficient

O
OCR optical character reader
OEM original equipment manufacturer
OR a logical operator

P
PC printed circuit
PCB printed circuit board
pF picofarad
PGA pin grid array
PIN positive-intrinsic-negative (transistor)
PLA programmable logic array
PLL phased lock loop
PPI plan position indicator
PROM programmable read only memory
PTC positive temperature coefficient
PUT programmable unijunction transistor

Q
QAM quadrature amplitude modulation
Q (meter) quality-factor meter

R
RAM random access memory
RC resistance-capacitance
RFI radio frequency interference
RMS root mean square
ROM read only memory
RF radio frequency
RFC radio-frequency choke
RFI radio-frequency interference
RTD resistance-temperature detector
RTL resistor transistor logic
RTV room temperature vulcanizing
RW read/write

S
SAS silicon asymmetrical switch
SBC single board (micro) computer
SBS silicon bilateral switch
SCR silicon-controlled rectifier
SCS silicon controlled switch
SDA source & detector assemblies
SIDAC bidirectional voltage-triggered switch
SIP single in-line package
SSI small scale integration
SSR solid state relay
STL Schottky transistor logic
SUS silicon unilateral switch

T
TC temperature coefficient
TCXO temperature compensated crystal oscillator
TFE tetrafluoride ethylene propylene Copolymer, 250° Teflon
TRIAC bidirectional AC switch
TTL transistor-transistor logic
TTY teletypewriter

U
UHF ultra high frequency (300 MHz to 3 GHz)
UJT silicon unijunction transistor
UL Underwriters Laboratory
UPS uninterruptible power supply

V
VAC volts (of) alternating current
VAR volt-ampere reactive
VCR video cassette recorder
VDC volts (of) direct current
VHF very high frequency
VHSIC very high speed integrated circuit
VLF very low frequency (3 to 30 kHz)
VLSI very large scale integration
VME virtual machine environment
VRM voice recognition module
VTVM vacuum tube volt meter
VU volume unit
VSWR voltage standing wave ratio

W
WPS word processing software

Y
YIG yttrium iron garnet

Z
ZIF zero insertion force

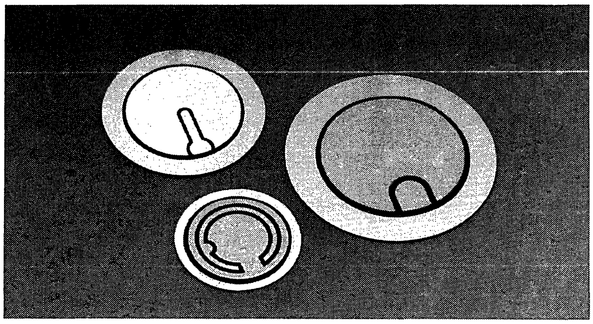
PIEZOELECTRIC PRODUCTS

TDK CORPORATION OF AMERICA 4711 West Golf Road, Suite 300, Skokie, Illinois 60076, U.S.A. Phone: (312) 679-8200 **CHICAGO SALES OFFICE** (312) 679-8200 **LOS ANGELES SALES OFFICE** (213) 539-6631 **SAN FRANCISCO SALES OFFICE** (408) 943-9325 **NEW YORK SALES OFFICE** (516) 625-0100 **INDIANAPOLIS SALES OFFICE** (317) 872-0370 **DETROIT BRANCH** (313) 353-9393 **ALABAMA BRANCH** (205) 539-4551 **TDK CORPORATION** Tokyo, Japan

UNIMORPH PIEZOELECTRIC TRANSDUCERS FOR ELECTRONIC BUZZERS

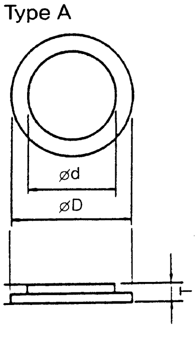
Separately excited oscillation drive Unimorph

Part No.	Resonant frequency Fr (kHz)	Resonant resistance Ro (Ω) max.	Electrostatic capacity Cd (nF)	Dimensions (mm) øD	ød	T
UN13BP120A1	12.5±1.0	300	5±30%	13.0±0.3	10.0±0.3	0.37±0.15
UN18BP50A1	5.0±1.0	200	17±30%	18.0±0.3	13.3±0.3	0.28±0.10
UN20BP60A2	6.0±1.0	200	17±30%	20.0±0.3	16.8±0.3	0.40±0.10
UN23BP45A1	4.5±1.0	300	12±30%	22.5±0.3	15.0±0.3	0.42±0.10
UN27BP40A1	4.0±1.0	200	20±30%	27.0±0.3	20.0±0.3	0.50±0.15
UN27BP45A1	4.5±1.0	200	18±30%	27.0±0.3	20.0±0.3	0.55±0.15
UN27BP38A2	3.8±1.0	350	13±30%	27.0±0.3	15.0±0.3	0.52±0.15
UN35BP29A1	2.9±1.0	200	30±30%	34.7±0.3	25.0±0.3	0.50±0.10
UN16SP75A1	7.5±1.0	250	14±30%	16.0±0.3	13.3±0.3	0.25±0.10
UN20SP68A1	6.8±1.0	200	12±30%	20.0±0.3	15.0±0.3	0.41±0.15
UN27SP50A1	5.0±1.0	200	18±30%	27.0±0.3	20.0±0.3	0.55±0.15
UN27SP35A1	3.5±1.0	350	13±30%	27.0±0.3	15.0±0.3	0.42±0.15
UN27BP40A1	4.1±1.0	200	20±30%	27.0±0.3	20.0±0.3	0.42±0.15
UN50BC20A1	2.0±1.0	500	100±30%	50.0±0.3	42.0±0.3 30.0±0.3	$0.23^{+0.1}_{-0.05}$

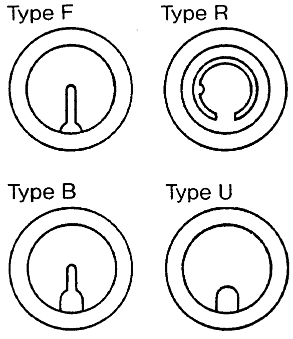


Self-oscillation drive Unimorph

Part No.	Resonant frequency Fr (kHz)	Resonant resistance Ro (Ω) max.	Main electride electrostatic capacity Cd (nF)	Dimensions (mm) øD	ød	T
UN20BP60R1	6.0±1.0	450	10±30%	20.0±0.3	16.8±0.3	0.40±0.15
UN27BP45F1	4.5±1.0	200	16±30%	27.0±0.3	20.0±0.3	0.55±0.15
UN35BP29F1	2.9±1.0	250	25±30%	34.7±0.3	25.0±0.3	0.55±0.10
UN35BP29B1	2.9±1.0	200	22±30%	34.7±0.3	25.0±0.3	0.55±0.10
UN35BP29U1	2.9±1.0	200	23±30%	34.7±0.3	25.0±0.3	0.55±0.10
UN40BP24F1	2.4±1.0	200	36±30%	40.0±0.3	30.0±0.3	0.66±0.10
UN35SP30B2	3.2±1.0	200	21±30%	34.7±0.3	25.0±0.3	0.52±0.10



Separately-excited transducer



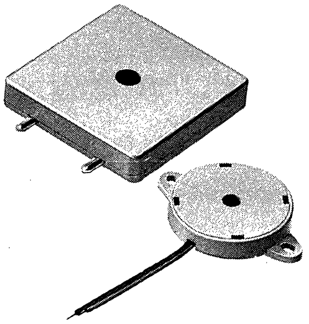
Self-oscillation transducer

PIEZOCERAMIC BUZZERS, PIEZOELECTRIC LOUDSPEAKERS

Typical electrical characteristics

Drive method	Part No.	Resonant frequency (Hz)	Sound pressure (dB/cm) min.	Test frequency (Hz)	Measuring applied voltage (Vp-p) squarewave	Max. operating voltage (Vp-p)	Dimensions (mm)	Terminal construction
Separately excitation	PS3520P02	2,300±0.5	70/10	2,000	3	30	35×35×7	Pin terminal
	PS3125P02	3,000±0.5	75/10	2,500	3	30	30×31.5×6	Pin terminal
	PS2440L30	4,400±0.5	70/10	4,000	3	30	ø24.0×4.7	Lead wire
	PS2440P02	4,400±0.5	75/10	4,000	3	30	ø24.0×5.5	Pin terminal
	PS1520L25	4,000±0.5	70/10	4,000	3	30	ø14.7×4.8	Lead wire
Self-excitation	PS2335P03	3,400±0.6	90/10	3,400	12 V.d.c.	30 V.a.c.	26×10.6	Pin terminal
	PS2135L30S3	3,400±0.6	80/10	3,400	12 V.d.c.	15 V.a.c.	ø21.4×4.4	Lead wire

**Measured at 25°C. Operating temperature –10°C to 60°C. Resonant frequencies shown for separate excitation are estimates based on excitation frequencies.*

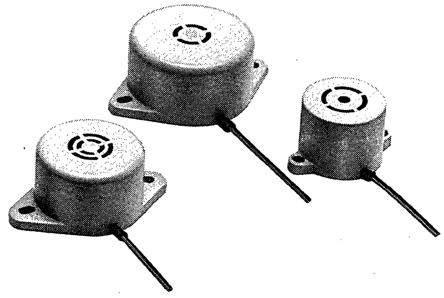


PIEZOELECTRIC BUZZERS

Electrical characteristics

Part No.	Resonant frequency (kHz)	Terminal construction	Operating voltage (V.d.c.)	Sound pressure (dB/100cm) min.	Measuring input voltage (V.d.c.)
PB2130UP002A	3.3±0.8	Pin terminal	4 to 15	75	12
PB2130UL100A	3.3±0.8	Lead wire	4 to 15	75	12
PB2130UP002B	3.3±0.8	Pin terminal	5 to 24	75	24
PB2625UP002A	2.5±0.7	Pin terminal	5 to 15	75	12
PB2625UL100A	2.5±0.7	Lead wire	5 to 15	75	12
PB3120UP002A	2.0±0.5	Pin terminal	5 to 18	75	12
PB3120UL100A	2.0±0.5	Lead wire	5 to 18	75	12

**Measured at 25°C. Operating temperature –10°C to 60°C.*



SOUNDUCERS

TDK®

TDK CORPORATION OF AMERICA 4711 West Golf Road, Suite 300, Skokie, Illinois 60076, U.S.A. Phone: (312) 679-8200 CHICAGO SALES OFFICE (312) 679-8200 LOS ANGELES SALES OFFICE (213) 539-6631 SAN FRANCISCO SALES OFFICE (408) 943-9325 NEW YORK SALES OFFICE (516) 625-0100 INDIANAPOLIS SALES OFFICE (317) 872-0370 DETROIT BRANCH (313) 353-9393 ALABAMA BRANCH (205) 539-4551 **TDK CORPORATION** Tokyo, Japan

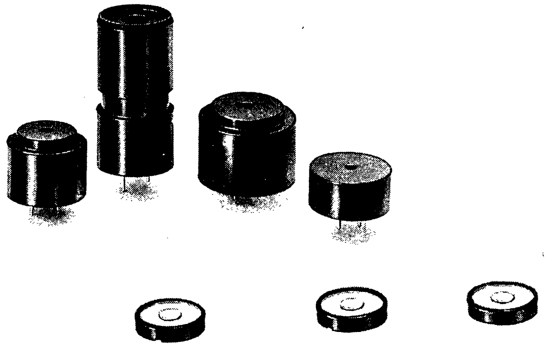
TDK Sounducers are magnetic type sound producing devices having excellent sound quality due to the use of high performance magnets and precision manufacturing technology. These Sounducers can be used in a wide range of produces including not only general household electrical appliances but also industrial equipment.

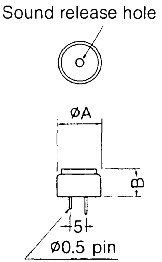
Features

1) Input impedance is low to allow producing sound using a very low voltage.
2) No moving parts to guarantee outstanding reliability for many years.
3) Excellent sound quality because sound is produced using the resonant vibrations of the circular vibration plate and the cavity.
4) Consistently high product quality and reliable delivery dates thanks to a streamlined and highly automated manufacturing process.

Applications

TDK Sounducers are compact, inexpensive acoustic transducers that are, in principle, similar to magnetic loudspeakers. They are suitable for producing single tones, melodies and for speech synthesis.





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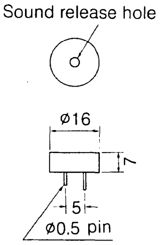
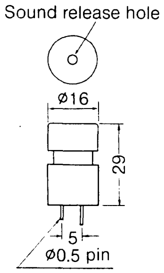
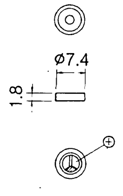


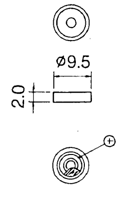
SD160701
SD160708
SD160709
SD160710



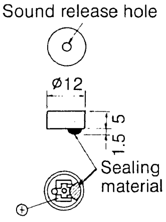
SD162901
SD162904
SD162905
SD162910



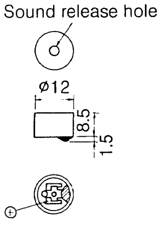
MSD741801



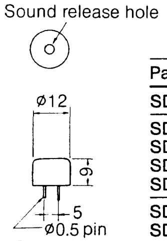
MSD952001



SD120502



SD120802



SD120901
SD120904

Dimensions in mm

Part No.	A	B
SD141001	14	10
SD161201 SD161210 SD161215 SD161216	16	12
SD201401 SD201406 SD201409 SD201410	14	20

Part No.	Size (mm)	Operating signal voltage (Vo-p)	Frequency (Hz)	Sound* pressure (dB(A)/10cm)	Test voltage (Vo-p)	Current (mAp-p) typ	DC resistance (Ω)	Terminal construction
MSD741801	7.4 × 1.8	1 to 3	4096	68	1.5	12	110	Printed circuit board
MSD952001	9.5 × 2	1 to 3	4096	72	1.5	15	90	
SD120502	12 × 5	1 to 3	4096	75	1.5	30	46	
SD120802	12 × 8.5	1 to 3	4096	85	1.5	30	46	
SD120901	12 × 9	1 to 4	2048	80	3	60	50	Pin terminal
SD120904		1 to 4	4096	80	3	80	25	
SD141001	14 × 10	1 to 5	2048	80	3	60	50	
SD160710	16 × 7	1 to 3	4096	80	1.5	80	15	
SD160701		1 to 5	4096	80	3	60	50	
SD160709		3 to 9	4096	80	5	70	70	
SD160708		6 to 15	4096	80	12	80	120	
SD161210	16 × 12	1 to 3	2048	80	1.5	80	15	
SD161201		1 to 5	2048	80	3	60	50	
SD161216		3 to 9	2048	85	5	70	70	
SD161215		6 to 15	2048	85	12	80	120	
SD162910	16 × 29	1 to 3	2048	90	1.5	85	15	
SD162901		1 to 5	2048	90	3	60	50	
SD162904		3 to 9	2048	95	5	70	70	
SD162905		6 to 15	2048	95	12	85	120	
SD201410	20 × 14	1 to 3	2048	80	1.5	80	15	
SD201401		1 to 5	2048	80	3	60	50	
SD201409		3 to 9	2048	85	5	70	70	
SD201408		6 to 15	2048	85	12	80	120	

*Square wave, duty 5%.

MINIGLOSSARIES
FORMULAS • CHARTS
PRODUCT SELECTION GUIDES
FORMS
CODES

TECHNICAL INFORMATION

WHERE TO FIND THEM IN THE 85/86 EDITION OF EEM

Abbreviations/Acronyms .... **A**•1166, **B**•1012, **C**•1028, **D**•1016
ASCII Code .... **D**•1087
Batteries, Product Selection Guide .... **D**•1413
Batteries & Fuel Cells, Characteristics .... **D**•1430
Cabinets, Enclosures, Racks, & Chassis, Product Selection Guide .... **C**•1003
Capacitors, Basic Formulas .... **A**•1093
Capacitors, Miniglossary .... **A**•1066
Capacitors, Product Selection Guide .... **A**•1003
Circuit Boards (Printed) Product Selection Guide .... **C**•1099
Coils, Chokes, Inductors, Product Selection Guide .... **A**•1205
Conductors, Maximum Current Capacity of Copper & Aluminum .... **C**•1863
Connectors, Miniglossary .... **C**•1129
Connectors, Terminals, & Sockets, Product Selection Guide .... **C**•1105
Crystals, Oscillators, Crystal & Piezoelectric Filters, Product Selection Gude .... **A**•1309
Delay Lines, Product Selection Guide .... **A**•1459
Discrete Semiconductors, Product Selection Guide .... **A**•2067
Displays, Readouts, Lamps, & Lights, Product Selection Guide .... **B**•1015
EBCDIC Code .... **D**•1092
Encapsulation, Miniglossary .... **C**•1086
Fans, Blowers, Cooling Equipment, & Heat Exchangers, Product Selection Guide .. **C**•1623
Filters, Product Selection Guide .... **A**•1583
Instruments, Graphic Recording Product Selection Guide .... **D**•1401
Instruments, Panel Meters, Product Selection Guide .... **D**•1329
Instruments, Test & Measuring Product Selection Guide .... **D**•1175
Interconnection Systems, Product Selection Guide .... **C**•1699
Keyboards & Keypads, Product Selection Guide .... **B**•1705
Logofinder & Trademark Directories .... **B**•901
Microwave Components, Product Selection Guide .... **A**•1701
Military Qualified Products Lists .... **B**•1003
Motors, Drives, & Rotating Components, Product Selection Guide .... **B**•1129
Opto Semiconductors, Miniglossary .... **B**•1214
Oscilloscopes, Product Selection Guide .... **D**•1385
Panel Hardware, Product Selection Guide .... **C**•1589
Potentiometers, Trimmers, Controls, & Rheostats, Product Selection Guide .... **A**•1991
Power Supplies, Miniglossary .... **D**•1462
Power Supplies, AC, Product Selection Guide .... **D**•1877
Power Supplies, DC, Product Selection Guide .... **D**•1447
Protective Components (Fuses, Circuit Breakers, etc.), Product Selection Guide .... **B**•1225
Relay Contact Forms .... **B**•1317
Relays, Electromechanical, Miniglossary .... **B**•1308
Relays, Product Selection Guide .... **B**•1261
Resistor Color Codes .... **A**•1828
Resistors, Product Selection Guide .... **A**•1785
Servo Components, Miniglossary .... **D**•1985
Solenoids, Product Selection Guide .... **B**•1463
Switches, Product Selection Guide .... **B**•1477
Thermal Components, Product Selection Guide .... **B**•1741
Thermal Conductivity of Dielectrics at Room Temperature .... **B**•1744
Thyristors/High Power Diodes, Miniglossary .... **A**•2076
Transducers & Encoders, Product Selection Guide .... **B**•1777
Transformers, Product Selection Guide .... **A**•2099
Wire & Cable, Product Selection Guide .... **C**•1743
Wire Gauges—Diameter, Area, Copper Weight .... **C**•1844

Hold the 16-Card Hand

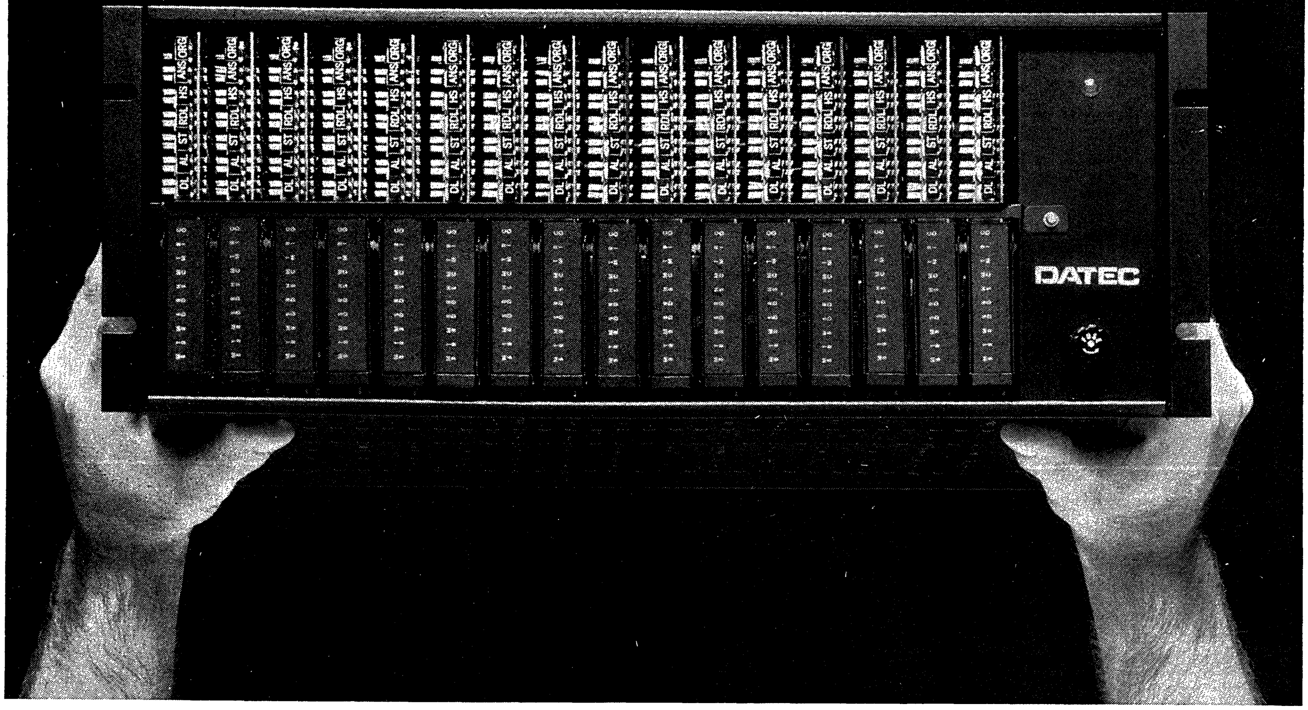
The Datec 212S Modem Rack System

You get more than twice the power in the same space when you hold the Datec 16-card hand. The 212S Modem Rack System single card construction allows changes from rack to stand-alone operation. It adapts to standard 19" or 23" racks and will mount from end or center. Modem operation includes 100% upgradeable firmware, too. The 212S Modem Rack System is specifically designed for upward compatibility and easy modification for OEM or custom installations. Operating program changes just snap in and out. Want to hold the 16-card hand? Your Best Connection is waiting for you.

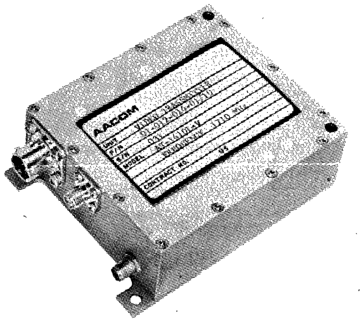
DATEC®
Your Best Connection™

Datec, Incorporated
200 Eastowne Drive, Suite 116
Chapel Hill, NC 27514
800-334-7722 In NC 919-929-2135

Datec, Your Best Connection® Datec, Inc.

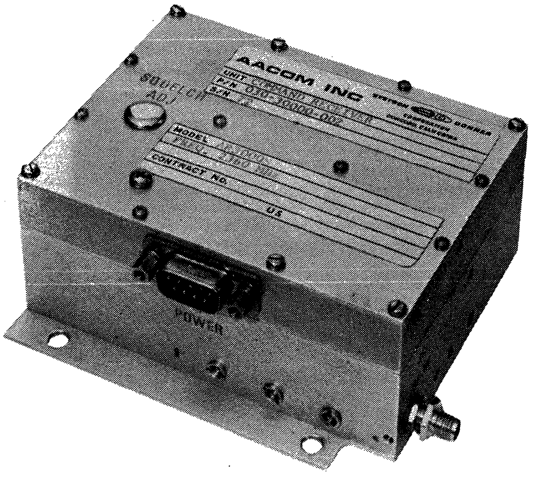


DATUM|AACOM ADVANCEMENTS IN TELEMETRY AND VIDEO DATA TRANSMITTERS AND RECEIVERS AND COMMAND CONTROL SYSTEMS



MINIATURE RF TRANSMITTERS

- Reliable operation in very severe environmental conditions.
- Transmission frequencies from 135 to 6000 MHz.
- Output power ratings up to 50 watts.
- All solid state electronics with output isolators.
- Up to 10 MHz information bandwidth.

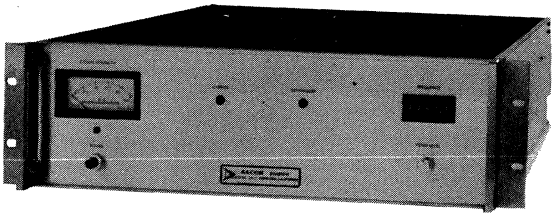


PORTABLE COMMAND RECEIVERS

- Minimum size and weight for mobile applications.
- Reliable operation in severe environmental conditions.
- Receiving frequencies up to 6000 MHz.
- Remote frequency selection capability.
- All solid state construction with input polarity reversal protection

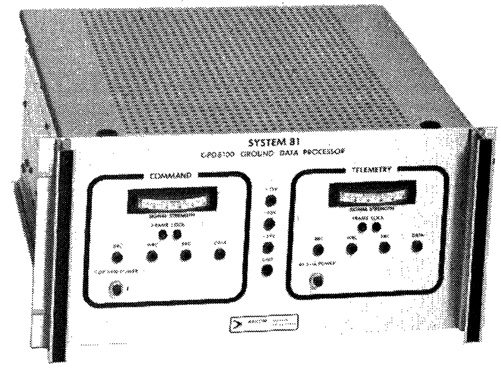
OTHER AACOM PRODUCTS

- RF transmitters and receivers specifically designed for distribution of standard IRIG time code signals.
- FM television transmitters and receivers.
- Synthesized RF signal generators with wideband modulation characteristics.



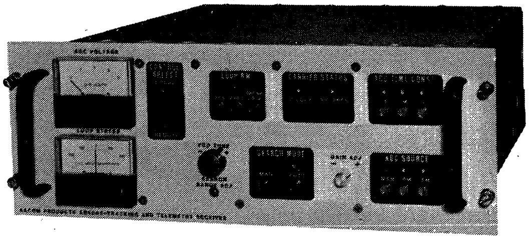
GROUND STATION TELEMETRY RECEIVERS

- State-of-the-art performance.
- Excellent frequency stability.
- User frequency channel selection capability.
- Optional AM demodulator for operation with single channel monopulse autotracker.
- Modular, mechanically rugged, solid state construction.



COMMAND CONTROL SYSTEMS

- Uplink and downlink components for complete remote control systems.
- Air-to-air, ground-to-air and ground-to-ground control applications.
- Functional, solid state, modules available.



SATELLITE EARTH STATION RECEIVER

- 2 Hz tuning resolution in 2200-2300 MHz band.
- Automatic search-lock functions for carrier acquisition and tracking.
- Simultaneous AM, PM and/or FM demodulation.
- Automatic bandwidth switching for fast signal acquisition.

Datum inc AACOM DIVISION

2430 STANWELL DRIVE, SUITE 190, CONCORD, CALIFORNIA 94520
(415) 827-4784 TWX 910-592-1289

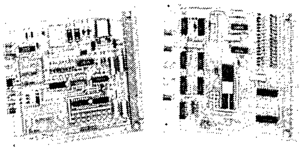
AD101

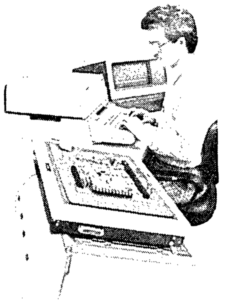
Voice Communications Subsystems

Intercom

Remote Control

Technical Control





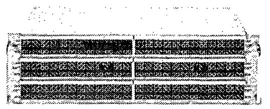
GRIMES CORP

AN INDUCTOTHERM COMPANY

Triangle Industrial Center Medford, New Jersey 08055
609-267-7950

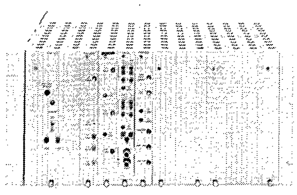
DATA TRANSCEIVER SET (DTS-300)

A pair of circuit cards which sense/generate DC levels and provide buffering and data communications over voice-grade communications facilities (full or half-duplex) at modulation rates to 300 bauds. Ask for brochure 80-0119.



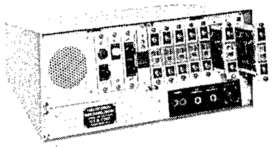
RUGGEDIZED PATCH PANELS

In addition to our standard miniature jack panels, we supply a wide range of custom voice and data patch panels for use in military transportable communications shelters world-wide. Ask for brochure 82-0924.



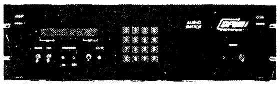
VO DATA COMM 80

A family of products which provide simultaneous transmission of speech and multiplexed digital control words over voice-grade communications facilities. Ask for VDC-80 brochure.



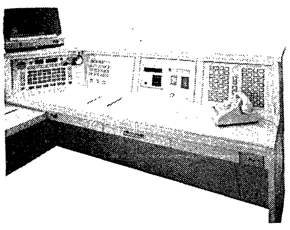
AIR TRAFFIC RADIO CHANNEL CONTROL (ATRCC) SYSTEMS

The highly-modularized and solid state ATRCC-2400A system provides for operator interface and control of radio transmitters/receivers via a distributed matrix. Within the same system, dedicated telephone channels can be accommodated. Ask for ATRCC-2400A brochure and PIB 81-0202.



AUDIO SWITCHING SYSTEMS

A variety of audio switches can be configured from a flexible microprocessor controller (GPS) and associated solid-state audio crosspoint matrix (ACM). GPS permits both local and remote control of the ACM, the latter by a system CPU with an RS-232/422 interface. Switch sizes to 96 x 96 can be provided. Switches may be interconnected for redundancy and flexibility. Applications include audio distribution and intercom systems. Ask for PIB 83-0902A.



COMMUNICATIONS CONSOLES AND PANELS

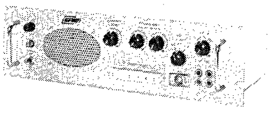
Customized communications consoles and operator control panels for use in air traffic control, air defense and ground traffic control systems. In development is a flexible microprocessor-based console equipment group which can be used with various CPU-switch combinations. We'd like to hear about your application. Ask for PIB 83-0125.

TEST MESSAGE GENERATOR

Model TMG-75/2400 is a self-contained code generator (ASCII/BAUDOT) for testing data transmission lines, etc. Sends a standard test message plus a user programmable 7 character identifier. Ask for PIB 83-0309.

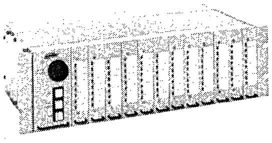
MANUFACTURING AND TEST SERVICES

We offer design-to-specification and build-to-print services for systems integrators and original equipment manufacturers (OEMs). Production services include purchasing, assembly, conformal coating and potting. Test and inspection services include burn-in, computerized automatic testing (ATE) and quality assurance per MIL-I-45208 and MIL-Q-9858A. Ask for an OEM literature package.



INTERCOM UNITS AND SYSTEMS

We are providing a wide range of intercom units and systems for use in industrial and defense-related applications. Ask for brochure 82-0930.



MODULAR ALARM SYSTEM

MAS-96 is a rack-mountable modularized, optically-coupled circuit monitor and alarm system for up to 96 circuits, in increments of 8. Ask for MAS-96 brochure.

Phi Deck®

HEAVY-DUTY CASSETTE TAPE TRANSPORT

The stamina of diecast metal...the gentle touch of precision.

Phi Deck... from Phi Technologies, Inc., a world leader in cassette tape transport technology.

Phi Deck... strong zinc diecast metal construction for maximum reliability and dependability, even in hostile environments.

Phi Deck... four-motor design for dependable accuracy, fast operation and remote controllability... ideal for computer controlled operations.

Phi Deck... unique pivotal head bar system eliminates solenoids for improved reproduction and MTBF (meets or exceeds hard disk!).

Phi Deck... order the bare bones transport with or without motion control, analog/digital electronics and/or custom electronics.

Phi Deck... from 0.125 ips to 30 ips... on standard compact cassettes!

Phi Deck... exceptionally easy to integrate into your design, with or without Phi Tech's engineering design & custom manufacturing support.

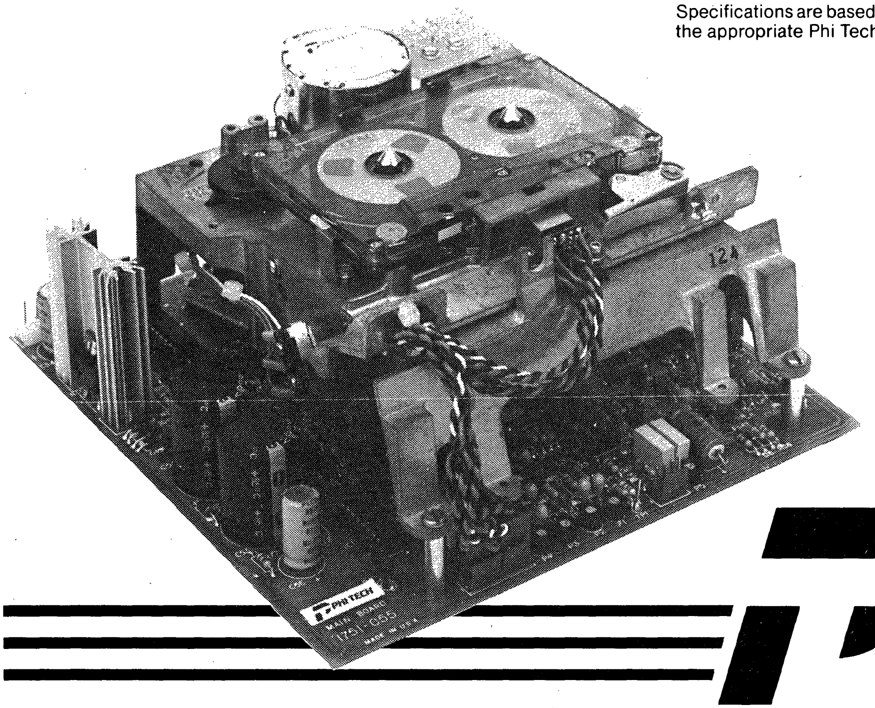
Phi Deck... rapid delivery on any size order... from one to one million units.

Phi Deck... protected by an extended warranty & supported by Phi Tech's repair services and complete parts inventory.

Common specifications for all Phi Deck cassette transports.

Structure:	Zinc diecast chassis, head bar & capstan rest.
Drive motors:	Two shielded, filtered reel DC drive motors, optional ironless core types; one DC head bar operate motor; one capstan drive motor (AC or DC options).
Capstan:	.0937 precision ground with textured end.
Capstan bearing:	Oil impregnated sintered bronze, removable.
Capstan flywheel:	Precision dual machined brass drive surfaces.
Capstan drive belt:	Polyether urethane flat belt, .007"T x .150"W.
Motor drive pulley:	Machined aluminum, crowned, hard anodized.
Pinch roller pressure:	275-325 grams (measured at corner of housing).
Tape start time:	100 to 120 milliseconds.
Tape stop time:	100 to 200 milliseconds (speed dependent).
Rewind time:	Less than 30 seconds for quality C-60 tapes.
Dimensions:	6.20"D x 5.40"W x 2.55"H.
Weight:	2 lbs., 10 oz. (typical).
Temperature range:	-20 to +65 degrees C.

Specifications are based on using the Phi Deck with the appropriate Phi Technologies electronics.



World Leader In Commercial Tape Deck Technology

PhiTech®
4605 North Stiles
Oklahoma City, OK 73105
405-521-9000
TWX 910-831-3286

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Phi Deck®

HEAVY-DUTY CASSETTE TAPE TRANSPORT

New! **The only building-block OEM tape drive in the world!**

PHI-CON™

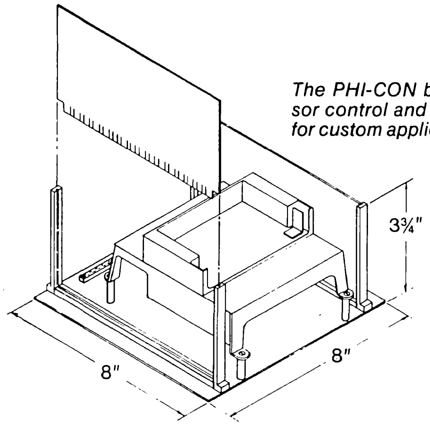
PHI-CON Phi Tech's newest addition to cassette deck technology mates microprocessor control and a buss system with the proven Phi Deck.

PHI-CON A packaging concept designed to provide maximum functions with minimum hardware complexity and few or no cable harnesses/connectors.

PHI-CON Rugged modular design insures reliability in extreme conditions.

PHI-CON Microprocessor control keeps hardware costs at a minimum, with OEM manufacturers realizing the savings.

PHI-CON Dependable tape deck control with user-defined features and system configurations in an optimized physical arrangement.



The PHI-CON buss gives you microprocessor control and three card-edge connectors for custom applications & maximum flexibility.

PHI-CON Perfect for a stand-alone product or as a cost-effective interface with other OEM system components.

PHI-CON Fully supported with all Phi Deck electronic circuitry...plus all standard Phi Deck accessories, including standard enclosures and power supplies.

Consider these features:

- Full motion control provisions addressable through software!
- Multiple lines from microprocessor to auxiliary buss!
- Simple packaging: bare bones, rack mount or enclosure!
- Compact assembly, 8" square x 4" deep, mount vertical or horizontal. Single or dual mount on 19" rack panel!
- RS232C & parallel port are standard!
- Wireless construction (excepting deck)... no cables! Front panel and rear panel components mountable directly to boards!
- Plug-in EPROM for system functions!
- Simple power requirements, 12 VAC or 12 VDC with back-up battery provisions!
- Custom motion control & software available!

Phi Deck *Fixed Speed*™

The most economical Phi Deck offers a single speed and proven motion control circuits, logic level interfacing, rewind/forward boost circuits, power-up stabilization circuit, added I/O control features and a single 12-Volt power source.

Power input:
12-13 Volts DC @ 1 amp; .5% regulation.
Tape speeds:
.5 ips to 6 ips.
Tape speed regulation:
Within 2%.
Wow and flutter:
Dependent on speed (typically 0.10 WRMS @ 1⅞ ips).

Phi Deck *Opto-Tach*™

The flexibility of the Opto-Tach Capstan System is ideal for those applications requiring two selectable speeds. The Opto-Tach gives you 3:1 tape speed range, logic level selection of two speeds, power-up stabilization boost circuits and a single 12-Volt power source.

Power input:
12-13 Volts DC @ 1.2 amps; .5% regulation.
Tape speeds:
.468 ips to 20 ips (depending on motor and pulley).
Tape speed regulation:
Within 1%.
Wow and flutter:
Dependent on speed (typically 0.16-0.17 WRMS @ .468 ips and 0.013-0.017 WRMS @ 20 ips).

Phi Deck *Selecto-Sync*™

Selecto-Sync, the most sophisticated Phi Deck capstan drive system, provides the widest range of control (the slowest and highest speeds) and the greatest accuracy. Selecto-Sync gives you 15:1 tape speed range and logic level selection of 15 speeds.

Power input:
+15 Volts DC @ .75 amp,
-15 Volts DC @ .65 amp.
Tape speed range:
Dependent on pulley size, from .125 ips to 30 ips.
Tape speed regulation:
Within 1%.
Wow and flutter:
Dependent on pulley size and tape speed. From .50 @ .125 ips to .03 WRMS @ 30 ips.

Phi Deck *Quadio*™

The Quadio, a high-performance, four-channel audio record/playback electronic circuit board for the Phi Deck, is perfect for critically demanding applications. Quadio offers full remote control, microprocessor interfacing, low noise and distortion, quick equalization conversion and increased head room.

Tape speed:
15/16 ips, 1⅞ ips, 3¾ ips.
Wow and flutter:
Dependent upon deck and options. Typically, 0.16 WRMS @ 15/16 ips; 0.10 WRMS @ 1⅞ ips; 0.09 WRMS @ 3¾ ips.
Audio facilities:
4 channels, record/play.
Line inputs:
Nominal 1.0 V P-P for 0 Lvl VU @ Approx. 8K impedance.

Phi Deck Standard Options

Cassette in place switch • Beginning of tape sensor • End of tape sensor • Clear leader sensor • Tape position signal generator • Record lockout tab sense • Side "A" sense • Precision reel motors • AC power kit • Various magnetic heads.

Plus...Phi Tech has Phi Deck electronics for:

- One or two channel digital read/write
- Stereo record/play
- Motion control with one channel digital read/write or stereo record/play
- Opto-Tach motion control and one channel digital read/write or stereo record/play
- An addressable search system with keypad or computer interfacing
- Ultra-Sync...the ultimate in absolute timing control (option for Selecto-Sync)
- Customized to your application with complete engineering support, from engineering design through manufacturing

World Leader In Commercial Tape Deck Technology

PhiTech®
4605 North Stiles
Oklahoma City, OK 73105
405-521-9000
TWX 910-831-3286

SEE NEXT PAGE

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We solve problems!

Give us your toughest, meanest electrical or mechanical engineering problem and we'll solve it...faster and for less than you expect. One of our two OEM services will provide the solution! If it's a problem others want to run from...Phi Tech will tackle it!

TechDesign

CREATORS OF CUSTOM ELECTRONIC DESIGN

TechDesign...a unique group of engineering design experts...can create any custom system to answer your specific needs. All you have to do is call and talk it over!

Nobody matches TechDesign's turnaround time...from concept to a working prototype in 6 weeks...at a fraction of the cost you'd expect!

TechDesign works with all or part of your custom design...in electrical or mechanical engineering. From specs to the final product, TechDesign's experienced creators save you time and money by relying on proven techniques.

Small start-up companies & large manufacturing firms find TechDesign perfectly suited to their needs. TechDesign provides the engineering design support necessary to bring a new product to market. Phi Tech customers rely on TechDesign, having found TechDesign more cost effective and efficient than internal operations.

TechCraft

START TO FINISH MANUFACTURING SERVICES

TechCraft offers you a complete temporary or permanent manufacturing service for your entire system. TechCraft eliminates the high overhead required to bring a new product to market by teaming extensive manufacturing facilities with experienced management.

TechCraft's considerable manufacturing experience gives you a way to market your product without the enormous capitalization required to do it in-house. For start-up companies, money saved on initial production can substantially increase the marketing budget, improving sales and profits. For large firms with small volume jobs, TechCraft can turn them around quickly and efficiently...at very low cost.

With TechCraft, your manufacturing management worries disappear. Quality control is as good as any available...internationally.

TechCraft...the cost effective, efficient solution to initial custom manufacturing ...can begin your project today!

New!

Voicelog II™

Audio logging with all the features, on standard cassettes!

Phi Technologies VOICELOG II Dual Cassette Data Logging System gives you versatility, high capacity & long term reliability.

- 60 hours of recordings...up to 4 channels recorded simultaneously
- Continuous recording, VOX or remote start
- Current time & date continuously stored on tape & displayed in playback
- Random access search
- Operation & packaging customization available for your application
- Patented Phi Deck™ cassette tape transports for reliable, long-term operations & gentle tape handling

New!

Digi-Voice 25™

Digitized audio for reliable, cost-effective, high-frequency message delivery!

DIGI-VOICE 25 stores messages up to 25 seconds long in a digital format...within RAM for instant playback...without moving parts.

- Line & microphone inputs...record live or from pre-recorded sources
- Line output plays messages into any standard audio amplifier
- Terminal contacts for remote message start
- Push button switches & LED status indication for Power, Record & Play
- Operation & packaging customization available for your application

DIGI-VOICE 25 uses a sophisticated analog/digital conversion method to maximize audio quality while minimizing storage requirements.

New!

Search 400MP™

You get complete random access audio... on standard cassettes!

SEARCH 400 opens new doors of opportunity for fast random access audio. Stand-alone, or interfaced with a computer, or other external sources...SEARCH 400 finds any position on a cassette tape repeatedly & accurately.

- Searches at speeds in excess of 250 ips!
- 4 different messages accessed simultaneously...stores up to 400 messages
- High-quality, full spectrum audio on 4 tracks...stereo or mono
- Parallel & RS-232 serial interface connectors
- Operation & packaging customization available for your application
- Patented Phi Deck™ cassette tape transports for reliable, long-term operations & gentle tape handling

New!

Timtrol MP-7™

Gives you total timing control!

Phi Technologies designed the **new** TIMTROL MP-7, a computerized 7-day programmable timer/controller, to independently start & stop up to 8 different functions at present times. Repeat functions each day or set them to occur only on specific days. Program TIMTROL MP-7 for up to 500 different times, each repeated on a daily or weekly basis.

- Continuous 24-hr time display
- Displays day of week, next function & time of next event
- Small, slimline, rack-mountable PC board
- Numeric keypad to program memory, set clock & review times/events
- 8 output function lines
- Operation & packaging customization available for your application

World Leader In Commercial Tape Deck Technology

PhiTech®

4605 North Stiles
Oklahoma City, OK 73105
405-521-9000
TWX 910-831-3286

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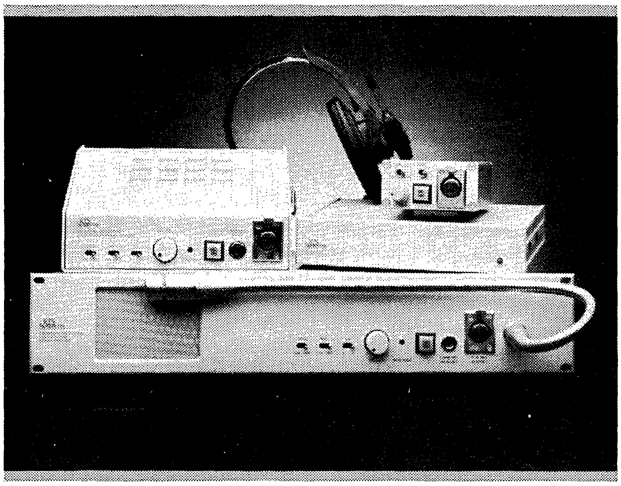
PROFESSIONAL AUDIO PRODUCTS

RTS Systems INC.

PROFESSIONAL INTERCOMMUNICATIONS SYSTEMS



TW INTERCOM SYSTEM

A high performance two-wire conference-line (party-line) intercommunications system designed for use in teleproduction, broadcast, industrial and commercial applications.

User Stations

- Eight different packages available
- Headset and headset/speaker stations available
- Each station (10,000 ohms) bridges the line (200 ohms)
- Up to 75 units on a line without loading
- Two channels on three-conductor cable
- Full-duplex operation: simultaneous talk and listen to and from each station
- Powerful headphone amplification
- Dynamic and/or carbon headset capability
- Mic-level limiting
- 12-volt power operation
- Many options available

Power Supplies

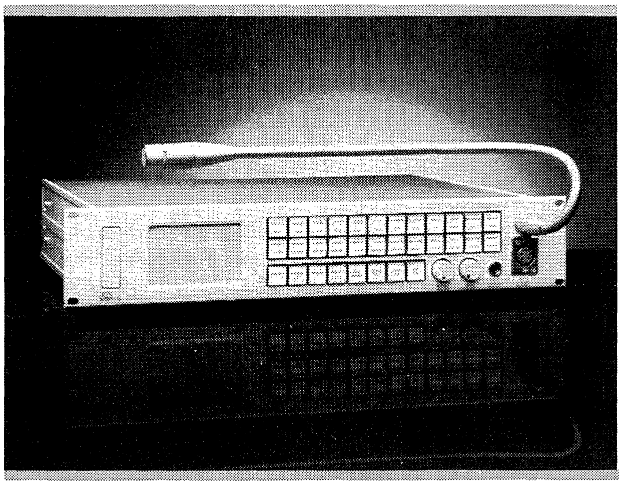
- PS8 powers 12 user stations
  Two channels-one dry channel at 200 ohms audio impedance-one powered channel at 32 volts at 200 ohms audio impedance
- PS30 powers 30 user stations
  Six channels-three dry channels at 200 ohms audio impedance-three powered channels at 32 volts at 200 ohms audio impedance

System Interface Units

- Interface between two-wire, three-wire, and four-wire lines
- Works with virtually any impedance, level, or type of line

Special Designs

- A number of standard products are available for special applications including station-isolate, source assignment, retrofit user stations, etc.
- Modified standard product and custom products available to customer specifications



Model 802 MASTER STATION

The 802 Master Station is a unique microprocessor-assisted communications network providing 22 independent signal paths operating in up to six separate modes.

Features

- Up to twelve full-duplex intercom channels
- Conference-line or dedicated-line mode
- Two-wire, three-wire, or four-wire operation
- One-way (simplex) announce/page functions
- Program audio monitoring
- Multi-source audio assignment to headset or speaker
- Front panel programmability
- Easy system expandability
- Unique momentary/latching front panel switch operation
- Individual channel listen levels
- Six programmable relays for auxiliary switching
- Wide range of options available
- Transformer-balanced audio lines
- Convenient interface to external equipment
- Programming safeguards
- Custom software available
- Each station self-contained
- Full-range high-quality audio
- Non-volatile user memory
- RS232 access to Z80-type microprocessor

ADDITIONAL PRODUCTS

Series 4000 IFB System

A one-way "program-interrupt" communications system used primarily for cuing "on-air talent." A modular building block format allows a system to be custom configured to user requirements. A combination of user stations, central electronics, and control stations make up a system.

Series 400 Amplifiers

- Model 405 Professional Stereo Phono Preamplifier
- Model 410 10-Watt Monitor Amplifier
- Model 414 1 x 4 Audio Distribution Amplifier
- Model 416 1 x 6 Audio Distribution Amplifier
- Model 444 Dual Two-Channel Buffer Amplifier
- Model 465 Microphone Preamplifier

Model HPM41 Microphone Mixer with 4 inputs and 1 output
Model 1400 Battery Powered Microphone Preamplifier

RTS Systems INC.

1100 West Chestnut Street □ Burbank, California 91506 USA □ TEL 213/843-7022 TWX 910-498-4987 TELEX 194855
A SUBSIDIARY OF COMPACT VIDEO, INC.

VRN INTERNATIONAL
A DIVISION OF VERNITRON CORPORATION

BRIDGE-T ATTENUATORS

SPECIFICATIONS

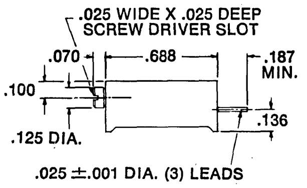
ELECTRICAL

Power rating: .25W @ 50°C 0W @ 125°C
Impedance: 75Ω std. (50Ω and 600Ω available)
Tolerance: ±20%
Attenuation range: .25dB max. CW to 20dB min. CCW
Attenuation vs frequency: 1dB max. variation 50-400MHz
Insulation resistance: 100MΩ min. @ 500VDC
Dielectric strength: 1000VAC

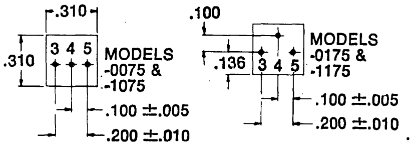
MECHANICAL

Rotation: 9958/59 295° ±5°, 9950/55 1800° (clutches both ends)
Stop strength: 10 in-oz. min. (9958/59 only)
Operating torque: 0.5 to 5.0 in.-oz.

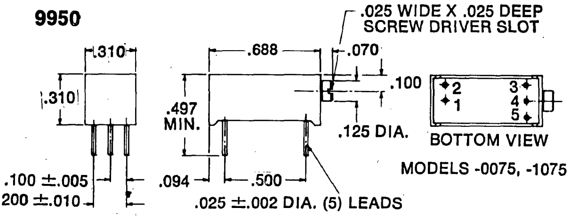
9950/9955


.025 WIDE X .025 DEEP SCREW DRIVER SLOT
.070
.688
.187 MIN.
.100
.136
.125 DIA.
.025 ±.001 DIA. (3) LEADS

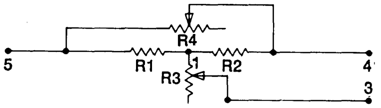
9955


.310
.310
3 4 5
MODELS -0075 & -1075
.100 ±.005
.200 ±.010
.100
.136
3 4 5
MODELS -0175 & -1175
.100 ±.005
.200 ±.010

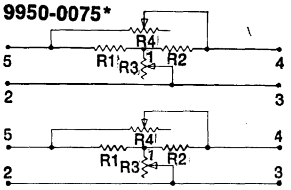
9950


.025 WIDE X .025 DEEP SCREW DRIVER SLOT
.310
.310
.688
.070
.100
.497 MIN.
.125 DIA.
2 3
1 4
5
BOTTOM VIEW
MODELS -0075, -1075
.100 ±.005
.200 ±.010
.094
.500
.025 ±.002 DIA. (5) LEADS

9955-1075, 1175

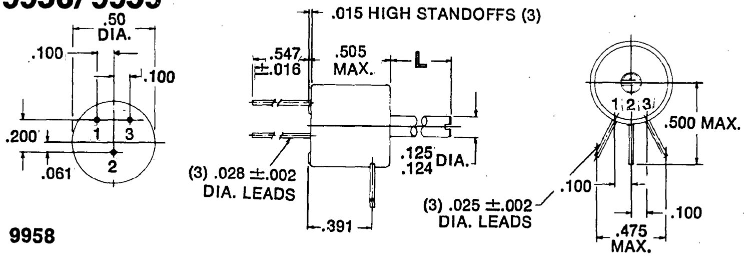

R4
5
R1
1
R2
4
R3
3

9950-0075*

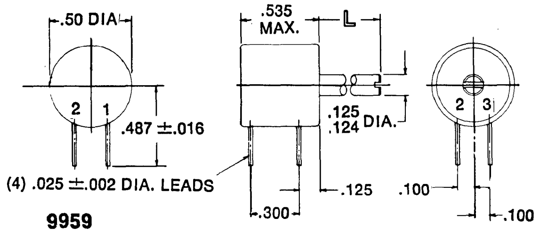

R4
5
R1
1
R3
R2
4
2
3
5
R4
4
R1
1
R3
R2
2
3

9950/9955		
TYPE	DESCRIPTION	FIXED RESISTORS
9950-0075	Side Adjust — Horizontal Mounting	None
9950-1075	Side Adjust — Horizontal Mounting	Two (2) 75Ω
9955-0075	Top Adjust — Vertical Mounting	None
9955-1075	Top Adjust — Vertical Mounting	Two (2) 75Ω
9955-0175	Top Adjust — TO5 Mounting	None
9955-1175	Top Adjust — TO5 Mounting	Two (2) 75Ω

9958/9959

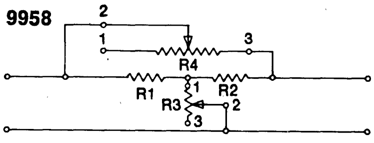

.50 DIA.
.100
.100
.200
1 3
.061
2
.015 HIGH STANDOFFS (3)
.547 ±.016
.505 MAX.
L
.125 .124 DIA.
(3) .028 ±.002 DIA. LEADS
.391
1 2 3
.500 MAX.
.100
(3) .025 ±.002 DIA. LEADS
.100
.475 MAX.

9958

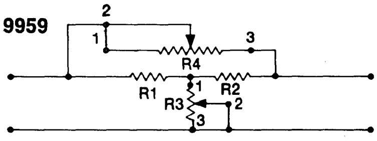

.50 DIA
2 1
.487 ±.016
(4) .025 ±.002 DIA. LEADS
.535 MAX.
L
.125 .124 DIA.
.300
.125
2 3
.100
.100

9959

9958

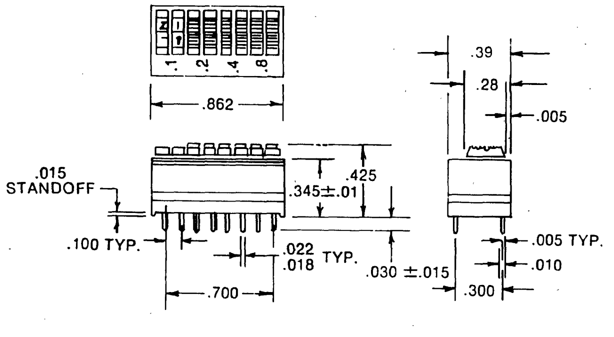

2
1
3
R4
R1
1
R2
R3
2
3

9959


2
1
3
R4
R1
1
R2
R3
2
3

SHAFT LENGTH L ±.02"	HOW TO ORDER			
	9958		9959	
	75Ω		75Ω	
	PLASTIC	METAL	PLASTIC	METAL
.031	-1752	—	-1750	—
.125	-2752	-6752	-2750	-6750
.250	-3752	-7752	-3750	-7750
.375	-4752	-8752	-4750	-8750
.500	-5752	-9752	-5750	-9750

SERIES 7010-
Switchable DIP Attenuator


1
2
4
8
.862
.39
.28
.005
.015 STANDOFF
.425
.345±.01
.100 TYP.
.022 .018 TYP.
.030 ±.015
.005 TYP.
.010
.700
.300

SPECIFICATIONS

ELECTRICAL

Impedance tolerance: ±2%
Power rating: 25W
Insertion loss: .02dB

MECHANICAL

Operating temperature range: 0° to 75°C
Lead temperature: (solder 10 sec.) 300°C maximum
Pin configuration: Standard 16 pin dual in-line (.300" x .100")

OPTION VAR.	ATTENUATOR SECTION			
	A (dB)	B (dB)	C (dB)	D (dB)
01	.1	.2	.4	.8
02	1	2	4	8
03	1.6	3.2	6.4	12.8
04	2	4	8	16
05	.25	.5	1	2
06	1.5	3	6	12

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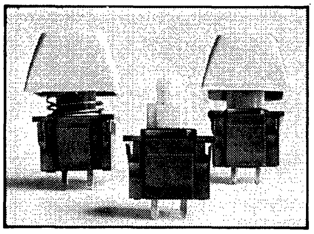
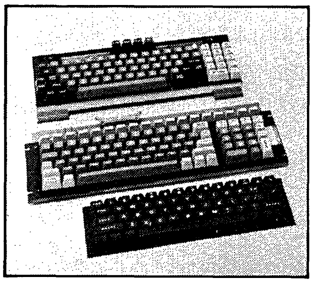
- •World-Wide Reputation



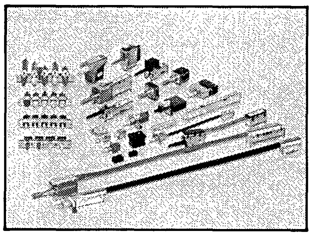
KEY SWITCHES

Choose from several contact types: mechanical, conductive rubber or tactile feedback. Snap-in mounting. Double-shot molded keytops in many colors, shapes, legends. Fully automated assembly assures maximum reliability, with ratings up to 20-million operating cycles.



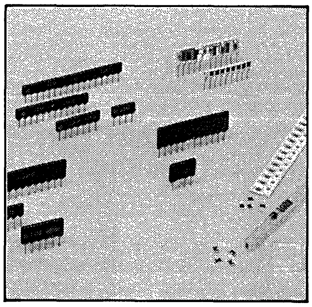
KEYBOARDS

Standard and custom keyboards, fully assembled including switches, keytops, PC board, matrix circuit, encoder circuit. NEW!—Series KCL Low Profile Keyboards meet all the latest European DIN standards for full-travel key switches with reduced profile dimensions.



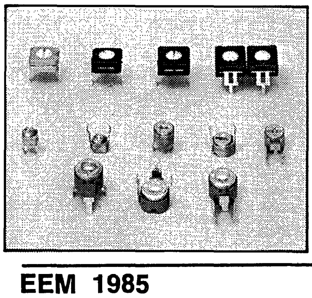
SWITCHES

Alps produces more than 900,000,000 switches per year, including some of the world's smallest, in a variety of types—rotary, push, slide, lever, power, flex and digital—all noteworthy for their unsurpassed smooth-action performance, built-in quality and long-life reliability.



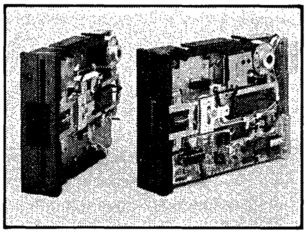
RESISTOR NETWORKS & CHIP RESISTORS

Thick film cermet element on alumina substrate, for extremely high stability. Networks in SIP configuration, from 4 to 17 pins, with resistance values from 10 ohms to 1 megohm. Chips are international standard size, 1.6 × 3.2 × .55 mm, with values from 10 ohms to 10 megohms. Available in bulk, reel tape, or plastic magazine for automatic chip placement machines.



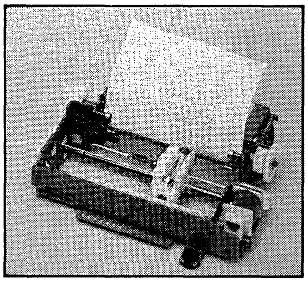
TRIMMER CAPACITORS

Ceramic or film elements, trimmer ranges from 2.5–6 pF to 10–150 pF. Snap-in terminals, with standard, reverse or side mounting—front or rear adjustment. Minimum drift, with virtually linear temperature characteristics. Precision structure protects dielectric from contamination by flux or wax.



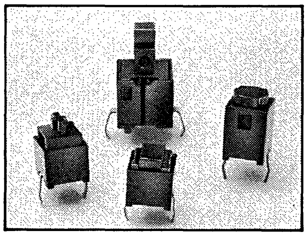
FLOPPY DISK DRIVES

New design units, for 5¼" disks, offers super-slim profile—only 1.69" thick, half the conventional thickness. Standard features include fast access time, automatic eject, long-life ceramic head, and surprisingly low price! Available with or without built-in electronics control board.



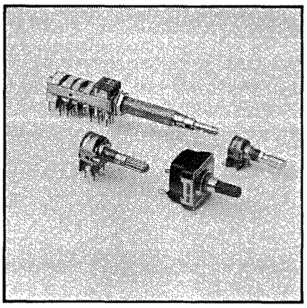
MICROMINIATURE PRINTERS

An incredible example of "The Alps Advantage" in technical innovation, Series DPG printers handle Alpha-Numeric-Graphic requirements, actually *writing* with microminiature ball point pens (1 or 4 colors!) invented by Alps using exclusive ink technology. Available for 2¼" or 4½" ordinary plain paper. Their small size and small price will astound you!



TACT SWITCHES

Tactile key switches with a "snap" (conductive rubber) or "click" (metal contacts) feeling to signal when contact is made. Available in a wide range of life cycle ratings, shapes, sizes, and "feelings"—ideal for many types of mini-keyboard applications.



VARIABLE RESISTORS

Rotary and slide types, ranges from 500 ohms to 2 megohms, with a wide variety of diameters, strokes, tapers, mounting, shafts, levers, etc. Exclusive lubricants for high quality smooth action. Miniature trimmer pots, sizes from 4mm to 16mm, with cermet, carbon film or carbon composition elements—ranges from 100 ohms to 2.2 megohms. Stick controls packaged with 2, 3 or 4 pots.

OTHER PRODUCTS now available from Alps include: telephone keypads, liquid crystal displays, magnetic heads, cassette mechanisms, RF modulators, switchers, TV tuners.

ALPS

NEW GENERAL CATALOG
20 pages of products with "The Alps Advantage"—
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ALPS ELECTRIC (USA), INC.

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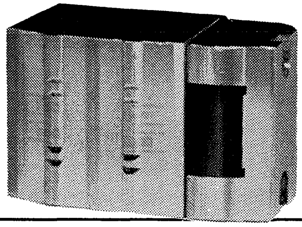
1810 So. Lynhurst Dr. X, Indianapolis, IN 46241 Tel. 317-248-2577

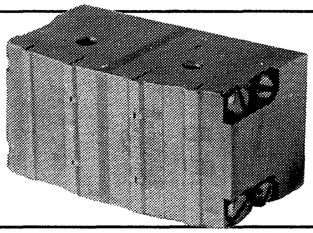
APOLLO MAGNETICS

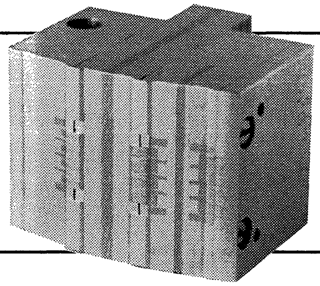
As a recognized leader in the field, Apollo is the innovator and developer of many new techniques resulting in digital heads with greater range and capability than previously possible.



Series SSI heads are designed for ¼" streaker/streamer cartridge drives and are available in 2 channel 4, 9, 12 and 16 track configurations to QIC standard formats, operating at or beyond 10K FRPI at 90IPS. Series SSI heads can use high coercivity 600′ tapes or standard 300′ tapes without compensation.

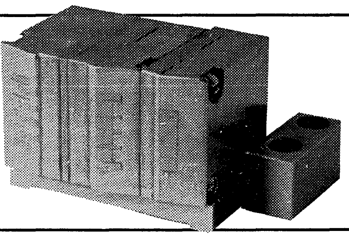
Series BDS heads are utilized on ¼" cartridge drives operating in bi-directional serpentine modes to 10K FRPI. Shown is the 4 channel, 7 track with selective erase. Other serpentine configurations are available.

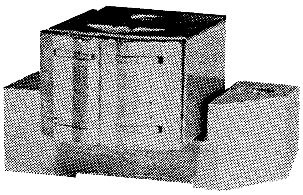




Series EWR head stacks are parallel read after write assemblies with selective erase. The 4 channel head shown is available with optional mounting and cable connectorization. Other track formats can be provided. Recording densities of 3200 or 6400 FRPI are standard.

Series WR/E heads perform at densities of 3200 or 6400 FRPI's in parallel or series Erase, Write, Read modes. Shown is the 4 track with optional erase head and base plate.





Series MCD heads, designed for mini-cartridge drives, operate at 1600 or 3200 FRPI and are available with most standard base/mounting configurations. Higher recording densities and militarized versions are available.

Depending on configuration, the above heads are available with **Apolco I™** or **Apolco II™***long life* cores and optional hard face chrome or plasma coatings.

Apollo Magnetics has extensive Ferrite and Ceramic capabilities including *Winchester* sliders and assemblies, both monolithic and composite, and Floppy tape ferrite/ceramic indexing heads.

Whether your needs are an adaptation of one of our current series of digital heads or converting your design concepts into reality, Apollo cares about your ideas. Our design laboratory, exhaustive test programs, complete manufacturing facilities and quick turnaround are devoted to serving you.

With Apollo Magnetics you are guaranteed "**state of the art**" by a company that performs.

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Designing new equipment that features thermal printing? Work with us.

Not only can we keep things quiet, chances are we've already solved some of your design problems on paper. Appleton Thermal Paper, of course.

As leaders in thermal paper research, our chemists have developed a wide range of thermal paper grades with various temperature sensitivities. In fact, the design problems you're seeing on paper might be eliminated by using one of our papers.

So, if your new model hasn't left the drawing board yet, work with us. We can keep your project as quiet as the paper it uses.

APPLETON PAPERS INC.
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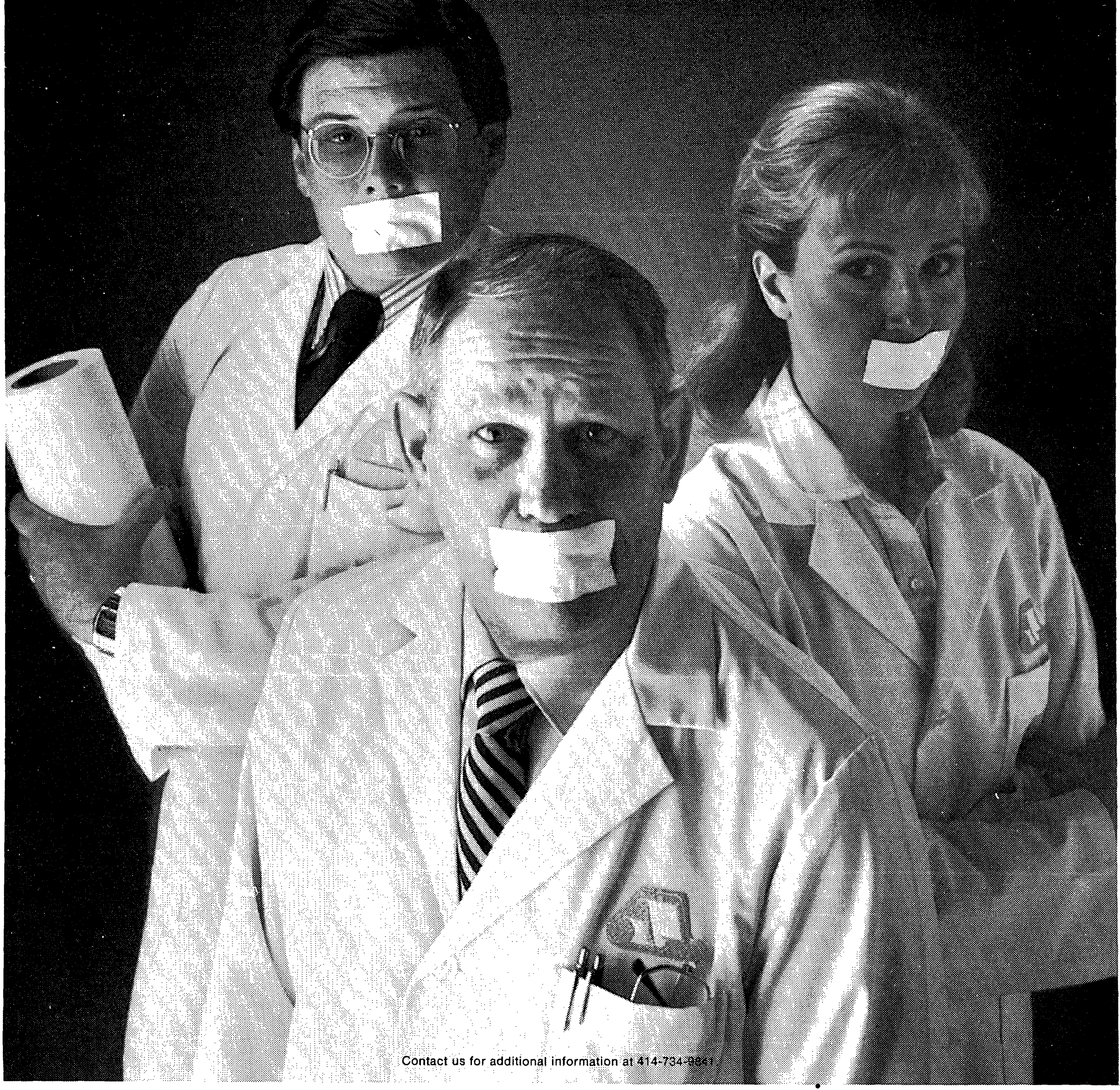

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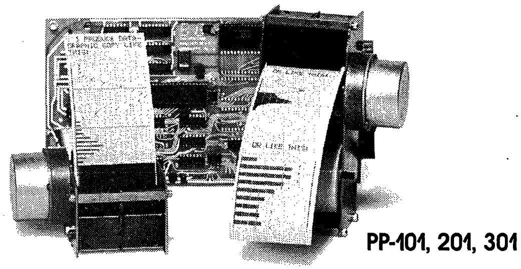
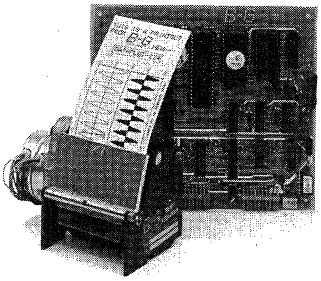
Smart 2¼ and 4½ inch printer/plotters.

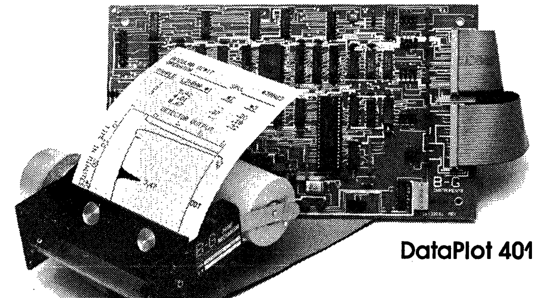
Feature on-board microprocessing and custom programming
for OEM data-recording applications.



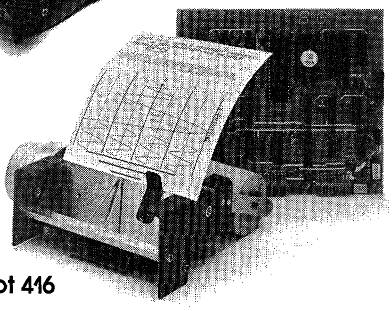
PP-101, 201, 301



DataPlot 224



DataPlot 401



DataPlot 416

Model Number	Paper Width (inches)	Columns	Graphics Resolution (dots/line)	Printing Speed (lines/second)	Vertical Printing	Input Data Format	*Price Range
PP-101	2.25	17	101	2.2	No	Parallel BCD and analog	$350 to $600
PP-201	2.25	17	101	2.2	No	Parallel or serial ASCII	$350 to $560
PP-301	2.25	17	101	2.2	No	Parallel ASCII	$310 to $460
DataPlot 224	2.6	18 to 37	224	3 to 8	Yes	Parallel or serial ASCII and/or analog	$320 to $500
DataPlot 401	4.5	34	202	1.1	Yes	Parallel or serial ASCII and/or analog	$550 to $970
DataPlot 416	4.5	34 to 68	416	2 to 5	Yes	Parallel or serial ASCII and/or analog	$600 to $1100

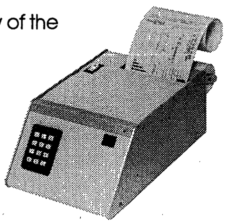
*Exact price depends on quantity ordered and options specified.

Reliable. All B-G Instruments' printers use fixed-dot, thick-film thermal printheads to achieve fast, quiet operation, long life and reliable performance.

Powerful. B-G's standard DataPlot software makes it easy to print across the paper, print down the paper, and print while you plot data. Simple plotting commands produce curves, grids and bar graphs directly from the input data.

Versatile. For a moderate one-time fixed charge, any B-G printer can quickly be reprogrammed to meet the special requirements of a specific application. Custom character sets, printing stored forms with inserted data, clock/calendar functions, special calculations, conditional operations—these are but a few of the many features that have been included in specially programmed B-G printers. In some cases, a custom-programmed B-G printer serves as the entire logic system for a fairly complex instrument.

For more information. Detailed brochures, a price list and application notes will be mailed to you as soon as we receive your inquiry. If you have an upcoming OEM application, we would be pleased to discuss it with you in detail and arrange a demonstration.



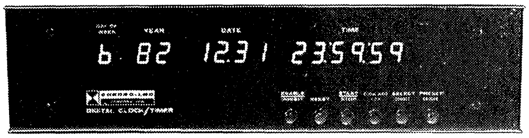
Most B-G Instruments' printer/plotters are also available with cabinets and power supplies.

B-G Instruments P.O. Box 67, Alta Loma, CA 91701
(714) 989-4802, (714) 980-2826 TLX 517 174 (B-G INSTRUMENT)

DIGITAL TIMING INSTRUMENTS

CHRONO-LOG
CORPORATION

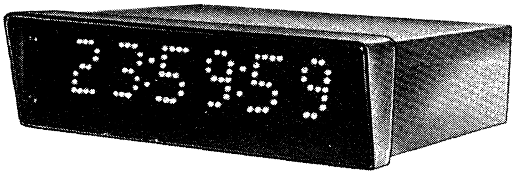
K-SERIES
MULTI-SYSTEM CLOCK/TIMER



- Provides time to as many as five independent computers and data systems
- Serial bidirectional channel for timesetting & control
- Five types of interfaces (may be intermixed)
  - — bidirectional RS-232C/20 ma current loop
  - — bidirectional RS-422 channel
  - — bidirectional RS-423 channel
  - — byte serial, 4-bit, 8-bit, or 16-bit, TTL or tristate
  - — parallel BCD, TTL or tristate
- Remote display driver output
- Operates as real time clock or up-down timer
- Simple program commands
- User configured for various date-time ranges and outputs
- Time resolutions to 0.1 seconds, 0.01 minutes, or 0.0001 hours
- Internal battery back-up for 4 or 30 days
- Front panel LED display and timesetting controls (optional)
- Data format can be set and changed by user system

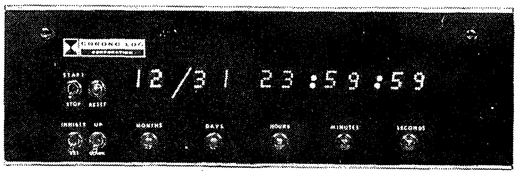
NEW

K-SERIES
TIME DISPLAY SYSTEMS



- Three wire transmission from Master Clock or K-Series Multisystem Clock to Remote Displays
- Master Display Clock with optional battery backup
- 1.5″ LED dot matrix characters visible for 50 feet
- Each Remote Display can drive 5 additional Remote Displays
- Up to 4000 feet between Displays
- Can offset HOURS to display other Time Zones
- 24 and 12 Hour Displays can be intermixed

SERIES 70,000 DIGITAL CLOCK/CALENDARS



Large variety of time ranges and resolutions. Include gate controlled BCD outputs at TTL levels, open collector outputs, high voltage or current outputs, or relay closures for wide flexibility in interfaces. Standard features include pulse rate outputs at 1 pps, 0.1 pps and 1 ppm. Options include various time bases, power sources and battery back-up. Can also provide RS232C/20 ma current loop interface. Available as a Real Time Clock and as a Remote Display which accepts BCD inputs at TTL levels.

VIDEO GENERATORS

CHRONO-LOG VIDEO CHARACTER GENERATORS accept up to 16 BCD characters at TTL levels from Chrono-log instruments or other sources and insert the data into a video signal. Fixed alpha-numeric characters, stored in a PROM in the Series 90,000 Character Generator, can be included as part of the display. Up to 31 characters can be displayed on one line, or 15 characters each on two lines.

TIME CODE INSTRUMENTS

CHRONO-LOG TIME CODE GENERATORS and READERS generate and read IRIG A, B and E time codes for analog tape recorders and serial data transmission systems.

Single and multicode units are offered as Generators, Readers, and combination Generator/Readers. Buffered and gated parallel BCD outputs at TTL levels are available with resolutions to 1 millisecond. Semi-automatic synchronization to WWV is a standard feature.

CHRONO-LOG CORPORATION

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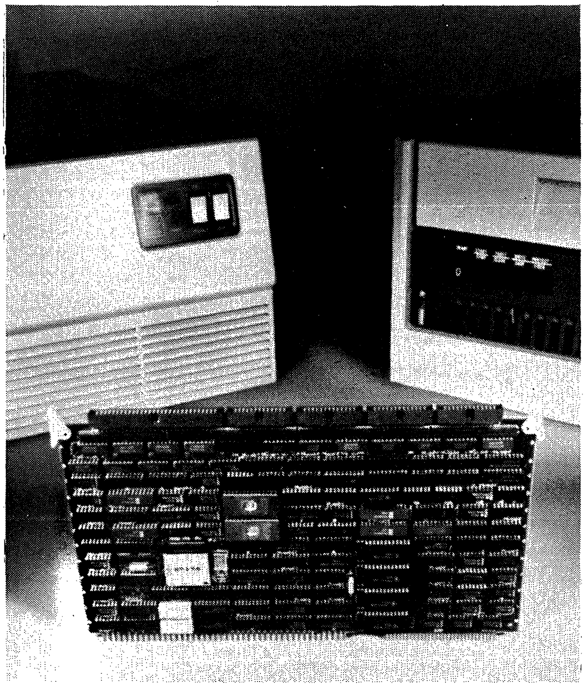
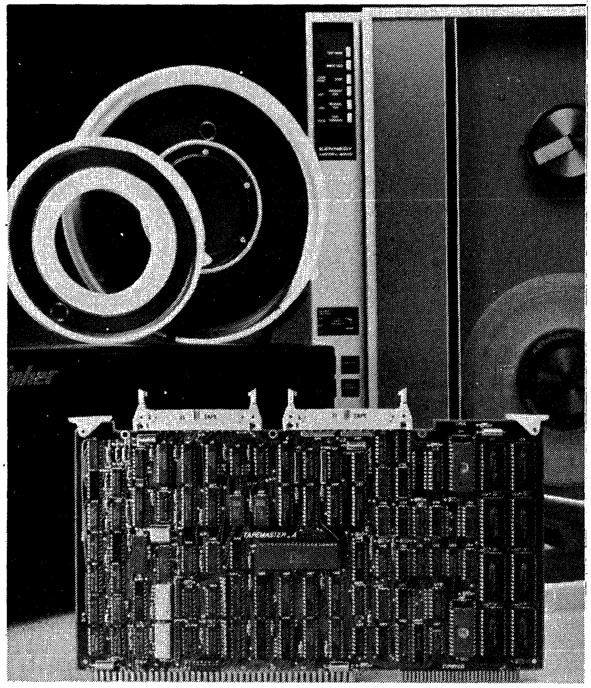
CPC CIPRICO
Multibus® Disk and Tape Controllers



Rimfire 50 SMD Disk Controller

FEATURES

- ☐ Controls up to four SMD compatible disk drives.
- ☐ Multibus compatible, with unrestricted 24-bit addressing, 8/16-bit data bus, serial or parallel priority.
- ☐ Proprietary dual-function ECC circuit with a 48-bit data ECC word and a 16-bit ID CRC word.
- ☐ Independent Command Complete and Status Change Interrupts.
- ☐ 16 MHz disk interface with non-interleaved capability.
- ☐ System Gate option for multimaster systems.
- ☐ Absolute or offset memory addressing.
- ☐ Defect mapping and transparent alternate selection of either tracks or sectors.
- ☐ Automatic dump and restore capability using the CPC Tapemaster ½-inch tape drive adaptor.
- ☐ Many programmable options, including DMA throttle, linked Parameter Blocks and separate ECC/Retry disables.
- ☐ Executes user-written 80186 code from system memory.



Tapemaster ½-inch Tape Adaptor

FEATURES

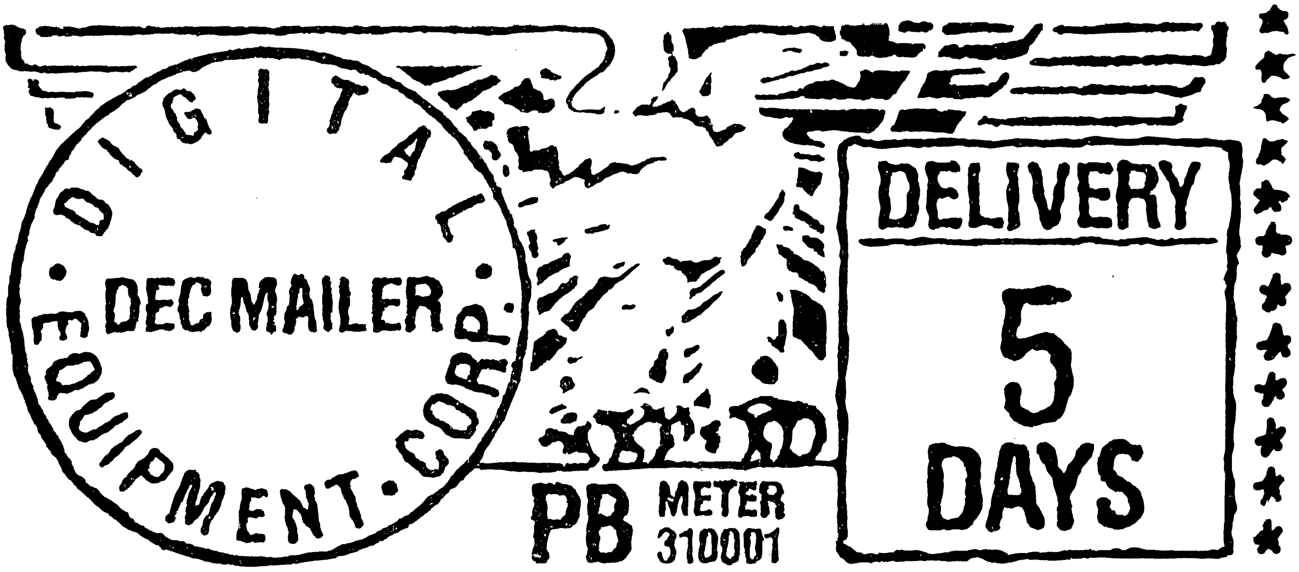
- ☐ Controls any combination of up to eight start/stop or streaming, NRZI, GCR, PE or dual density drives.
- ☐ Data can be read or written in three modes: Direct, Buffered, or Ring Buffered.
- ☐ 64 byte FIFO in line with the data path demands on the system bus.
- ☐ Programmable for 8 or 16-bit systems.
- ☐ DMA Master with 24-bit addressing.
- ☐ Many programmable options including Bus Lock, Linked Commands and Multibus or Mailbox Interrupts.
- ☐ Single or Multimaster environments.
- ☐ Powerful Block Move capability with Search and Translate options.
- ☐ Executes user-written 8089 programs.
- ☐ Single 5 VDC operation.

Ciprico Inc. also manufactures the following Disk Controller boards:

Rimfire 44 — ANSI Disk plus ¼″ tape
Rimfire 45 — ANSI Disk plus ½″ tape
Rimfire 75 — ANSI Disk plus 3M ¼″ cartridge tape
Rimfire 38A — Priam Disk plus ½″ tape
Picomate — ¼″ Kennedy Cartridge tape

FOR COMPLETE INFORMATION:

CIPRICO, INC.
2955 Xenium Lane
Plymouth, MN 55441
612-559-2034



DECMAILER PUTS TIME ON YOUR SIDE

When your chips are down you need the fastest board repair service available. And you need to be sure it's good.

Fast, quality service at a competitive price has put DECmailer at the top of the industry.

DECmailer provides replacement service for over 2,000 Digital boards. Just mail us your faulty board and within 5 days of receipt a replacement board will be on its way to you. That means you'll have a working board on hand when you need it.

DECmailer has even planned for the unexpected with an Emergency Dispatch Service. Just call us and we will locate a board and mail it to you within 24 hours.

We only mail replacement boards that have passed our rigorous tests and met Digital's standards for quality. After all, our reputation is riding on the performance of your Digital system.

So, the next time you need board service try DECmailer. Because in business some things just can't wait. To find out how DECmailer can put time on your side, call 1-800-225-5385.* In Massachusetts, Alaska & Hawaii, 617-938-2280 (collect).

EXTENDED
WARRANTY
SERVICE

DETAILS ON PAGES 1064 & 1065 ► ► ► ►

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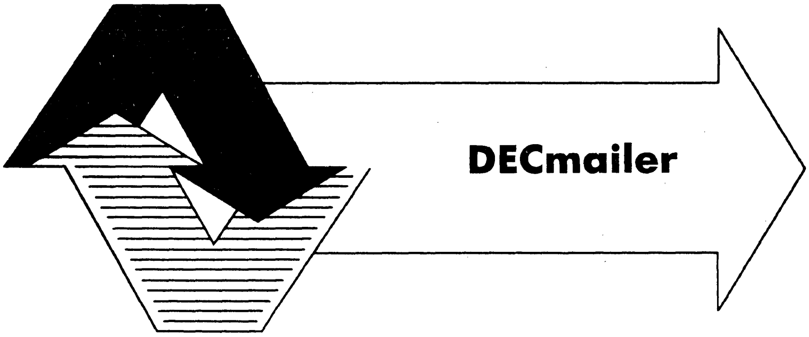
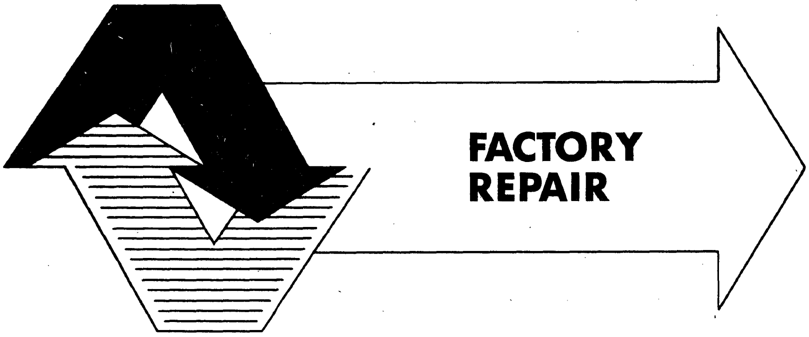
DIGITAL'S COMPUTER RESOURCES WHEN AND WHERE YOU NEED THEM

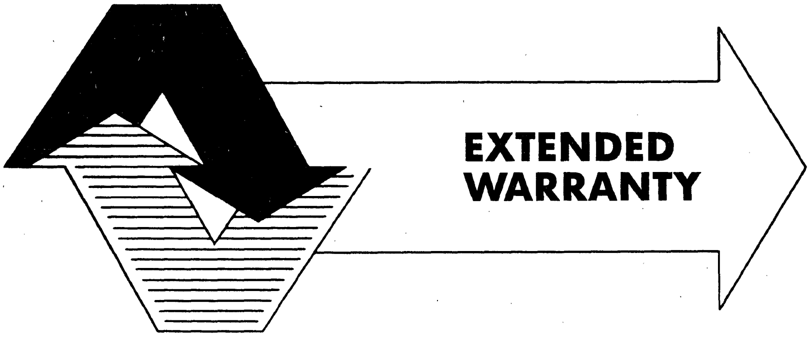
Digital's maintenance resources are always nearby when you choose one of these mail-in services:
- DECmailer
- Factory Repair
- Extended Warranty



DECmailer is the fast, reliable and economical system to help you stretch your computer maintenance dollars. The menu of replacement parts is exceptionally large with over 2,000 items and more being added monthly. You can choose between monthly or transaction billing. You get quarterly activity reports and reference tracking. All parts are upgraded to the latest DEC specs with a 90 day warranty, fast turnaround and emergency dispatch availability.



Factory repair provides for a complete repair and upgrading service for *your* parts with a six to eight week turnaround time. The menu for repairable parts service is less than that for DECmailer service and Digital reserves the right to substitute DECmailer parts if delivery will exceed eight weeks. Prices for the *same* part are generally 5% below those for the DECmailer service.



The new Extended Warranty Service allows you to extend the one year warranty on KXT11-AB, KDJ11-AA and KXT11-CA modules for up to five more years at very low cost. This service may be purchased at any time prior to the normal warranty expiration. Defective parts are upgraded to current specs and returned within five days of receipt. This valuable service is a wise investment.

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CALL TOLL FREE
800-225-5385*

*Alaska, Hawaii & Massachusetts, Call Collect **617-938-2280**

Digital Equipment Corporation wants to help you get the best and fastest service possible on genuine DEC parts. There are three excellent ways to get this superb service.

DECmailer...This service has earned a reputation for excellence since its inception in 1982. It is of particular value to owners of large numbers of DEC equipment, as well as OEM customers and Authorized Service Organizations. It is a highly flexible service, designed to hold your maintenance costs to the lowest realistic levels.

It's easy to get started with the DECmailer service. Call toll free for an application and a copy of the DECmailer price schedule. Complete the application, issue a purchase authorization, return the package and start enjoying the superior service only DEC can offer.

Your replacement parts are shipped within five days and DEC pays the freight for normal two day delivery. You get complete documentation in the form of reference numbers and your choice of transactional or monthly billing. DEC even provides quarterly activity reports to help you with your inventory planning.

Best of all, each DECmailer part is completely upgraded to the latest specifications and warranted to be free from all defects for 90 days.

Got an emergency situation? DEC can solve it within 24 hours under normal conditions. Yes, there's an extra charge, but it's reasonable.

There are over 2,000 part numbers in the current DECmailer inventory and more are added on a regular basis. The chances of an out of stock situation are minimal.

You owe it to yourself to investigate this superb service more completely. All it takes is a toll free phone call during normal working hours from 8:30 AM until 8:00 PM Eastern Time, Monday through Friday.

FACTORY REPAIR...Ask yourself these questions. Who knows best how to repair DEC equipment? Who knows best how to upgrade older DEC parts to current specs? Who can supply the most reliable service on DEC equipment?

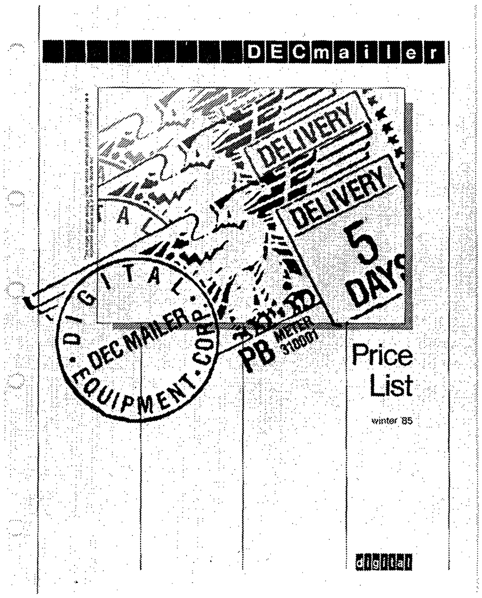
The answer is simple. It's Digital Equipment. Nobody knows more about DEC equipment than DEC. But, nobody.

Although the roster of parts available for complete DEC Factory Repair is more limited than the DECmailer menu, you may find that the average 5% cost savings makes the service worthwhile for certain situations. Want to know more? All it takes is a toll free call to the number shown at the top of this page. Standard calling time appears above under DECmailer.

EXTENDED WARRANTY...Your XKT11-AB, KDJ11-AA and KXT11-CA DEC modules are warranted for a full year. But, now, you can extend the warranty period for one, two or up to five years at a surprisingly low investment. For example, a one year extension on a KXT11-AB is only $28.00 and five years is only $119.00 Can you afford to be without this protection?

Even if you didn't purchase extended warranty with the original modules, there's still time providing, of course, the parts are still in warranty.

Defective parts returned to DEC are repaired and/or replaced at DEC's option and returned within five days of receipt by DEC.



FREE COPY

Call or write for your free copy of the latest Price List of DECmailer, Factory Repair and Extended Warranty Services. There is no cost or obligation.

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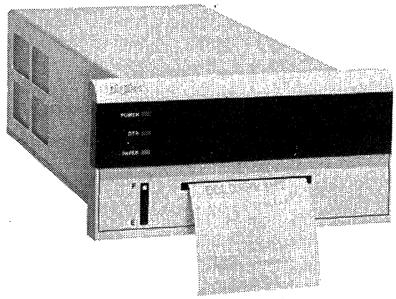
Digitec Printers

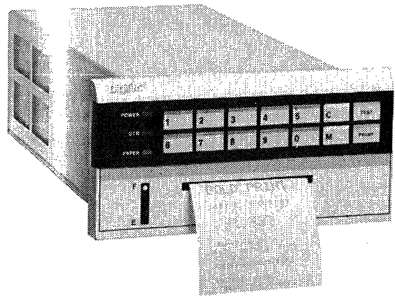
Panel-Mount & Desktop Printers – Bulletin 4400
Affordable microprocessor-based 21-32 column dot-matrix printers are mechanically reliable and easy to apply. The wide selection of buffered input types and data rates simplifies interface with computer-based equipment and panel instrumentation. For remote message printing, program listing, data logging and recording – anywhere hardcopy is desired. Standard word wrap on some models handles even long lines of output in a readable format. Choose from models for panel, office, lab, and industrial applications.

All Digitec printers can be custom-designed and programmed for OEM applications. Contact us with your requirements.



6600 Series

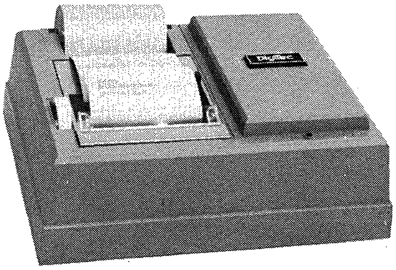
OEM Panel-mount Printers with clock panel
- Use plain paper.
- Serial and parallel inputs.
- Optional 2K nonvolatile buffer.
- Optional real time clock.
- Graphics and keyboard data entry capability.
- Common 4.50″ x 2.78″ cutout, DIN adaptable.



6600 Series with optional keyboard

Digital Panel Printer
- Plain paper impact printer.
- Parallel BCD input, TTL compatible.
- Program clock option.
- Lowest price DPI printer.

Desktop Printers
- Thermal or electrosensitive.
- Compact size – just 3″ x 5″ x 7″.
- Widest selection of inputs.
- Internal clock models.
- Optional 12V DC power.



6400 Series

Printers	Cols	Printing	Inputs	Internal Clock
Panel-mount 6600 Series	24	impact	RS-232-C/20mA byte serial	opt.
Digital panel 6600 Series	16-22	impact	parallel BCD	opt.
Desktop 6400 Series	21-32	thermal, electro- sensitive	serial or parallel serial & parallel IEEE-488 Centronics comp.	opt. — — —
Panel/rack 6500 Series	21-32	thermal, electro- sensitive	serial parallel	— —
Benchtop 6300 Series	21	electro- sensitive	serial parallel	std. std.
Digital recorder 6100 Series	10-18	impact	parallel BCD	std.

Digitec Corporation, 918 Woodley Road, P.O. Box 458,
Dayton, Ohio 45401, Tel. (513) 254-6251. Telex (310) 687-4219.

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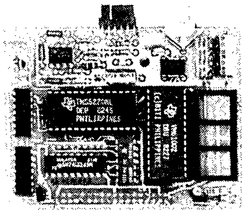
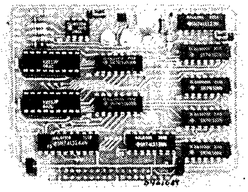
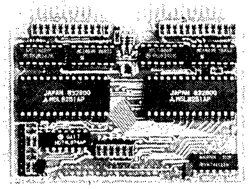


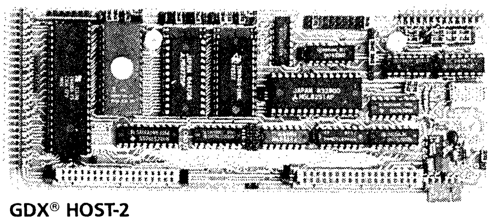
GDX® SPEECH-TI
Speech module using LPC-10 and the TI-5220 chip $215 *



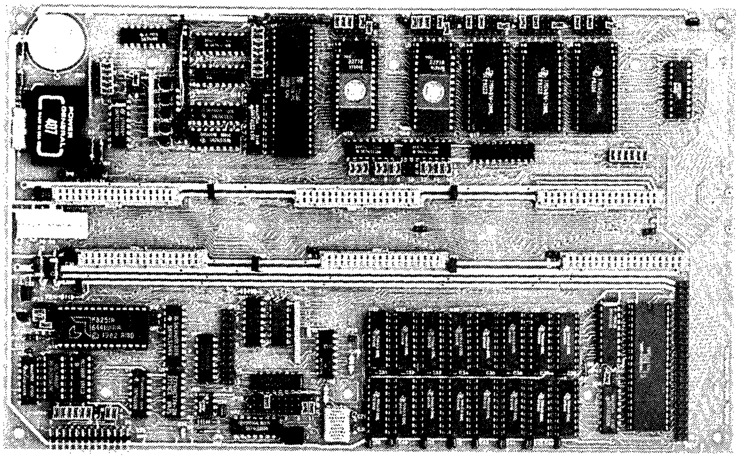
GDX® NVRAM-256
256 byte non-volatile RAM module $180



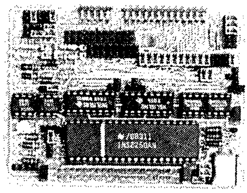
GDX® SERIAL-2S
Dual channel serial I/O module $160



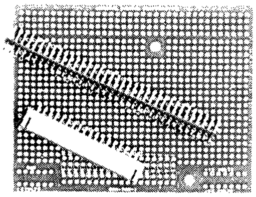
GDX® HOST-2
8-bit Z80A, Single-Board System with 2 expansion connectors $175



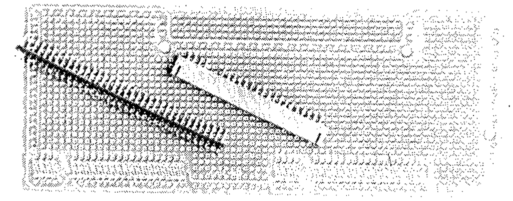
GDX® HOST-6
8-bit Z80A, Single-Board System with 6 expansion connectors $475



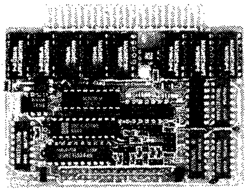
GDX® SERIAL-1E
Extended programmable serial I/O $195



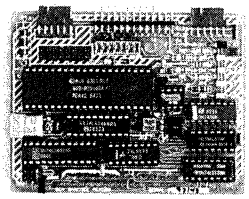
GDX® PROTO-1 Single-width prototyping kit with 8-bit expansion bus connector $60



GDX® PROTO-2
Double-width prototyping kit with 16 bit expansion bus connector $80



GDX® RELAY-8
8-bit isolated relay port for 8 relays $120



GDX® BARCODE-1
Code 39, 2-of-5 bar code reader module $300

GDX® AUDIO-1
Digital speech record/playback module $375

GDX® AUDIO-2
Digital speech playback module $150

GDX® AUDIO-3
Digital speech playback module (with memory) $190

GDX® PAR-3P
Three channel parallel I/O module equivalent to industry 350 module $115

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GDX® Expansion modules for all requirements.

GDX® – The expanding line of innovative products that expands your options for product design. Now you can save on design time by flexible, off-the-shelf modules that perform functions as innovative as digital speech, non-volatile RAM and bar-code reading. Or, choose from more traditional products such as two-channel serial interface and parallel I/O.

General Digital® offers the designer a full line of ISBX† (IEEE P 959) – compatible modules. You'll find the exact GDX® module designed for your application, or we'll custom-design one to your particular specifications. You'll even find two Single-Board Systems, one with six expansion sockets and the other with two expansion sockets for your modules. Both boards employ a Z-80A microprocessor, and permit fast, inexpensive implementation of small systems.

GDX® and General Digital®. The micro products from the micro pros.

General Digital Corporation is in its second decade of providing microprocessor-based products to industrial automation, aerospace, military, communications, CAD/CAM and other OEM markets. In addition to the GDX® line of board level products, the company manufactures the VuePoint™ line of gas-plasma, touch-interactive display systems for OEM and end-user applications. Call or write for the mini-catalog of GDX® and VuePoint™ products.

General Digital Corporation

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*All prices single quantity. Quantity discounts available.
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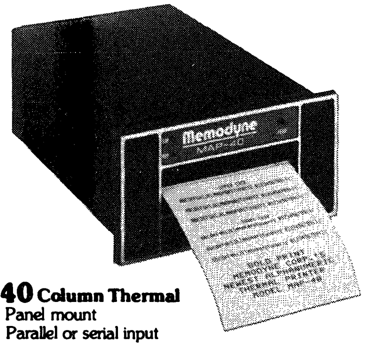
Meet another NEW member of our family!

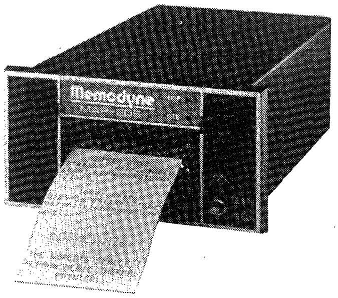
Alphanumeric Printers

Memodyne
MPI-24
FEED

24 Column Impact
- Parallel or serial input
- 1.9"H X 4"W X 3.7"D
- Operates from a single 5 volt supply.



40 Column Thermal
- Panel mount
- Parallel or serial input
- Real time clock
- Built-in power supply and self test program
- Weighs only 3.75 lbs.

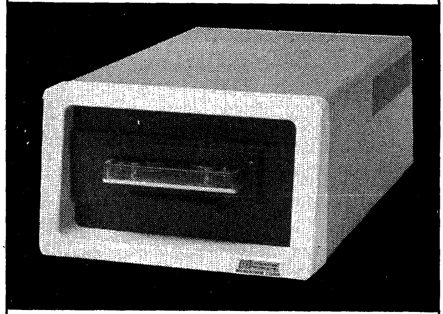


20 Column Thermal
- Serial RS232C TTY
- Parallel 8 Bit
- IEEE-488 Interface

All are panel-mount and have microprocessor compatible electronics, built-in power supplies and self-test programs. Serial and parallel models are available in DC and low temperature versions.

Streaming Tape Back-Up Systems NEW!

Long a leader in Tape Drives and Systems Memodyne Corporation introduces a stand alone Streaming Tape Back-up System for the IBM PC/PC-XT and compatible computers



Model MS-1000 "Q" Tape Streaming Tape Back-Up System

The Memodyne MS-1000 cartridge tape system was designed specifically for IBM PC-XT and compatible computers that have the expansion floppy port. The MS-1000 is a complete instrument with all the necessary hardware and software to back up the hard disk and to restore all the data on the hard disk. Software is menu-driven and includes HELP prompts to make it user-friendly. The hardware has the standard SA-450 floppy disk interface.

FEATURES:
- **Formatted Capacity >10M Bytes**
- **Menu-Driven Software**
- **Better Than Image Back-Up**
- **High Speed File by File**
- **Recreates Directory**
- **Uses External Floppy Port**
- **Portable, Lightweight, Small, Stand Alone**
- **FCC Part A Approved**
- **Uses Standard 3M DC-1000 Mini-Cartridge**

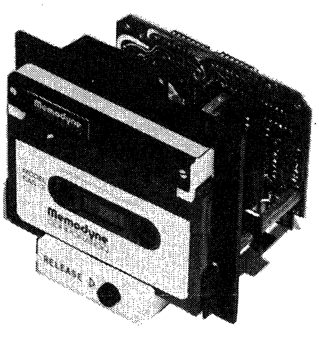
Low-Power Cassette Recorders

On ocean buoys . . . on weather balloons. . . . on off-shore oil rigs . . . unmanned spacecraft. Our low power incremental digital cassette recorders end up doing the damndest jobs in the damndest places.

We've got thousands of them everywhere you can imagine. On the ocean floor. In the atmosphere. Even on ice floes. They're doing boring, unexciting jobs like measuring underwater currents, wind velocities, and all kinds of other activity.

And they stay there unattended for days, weeks, even months, reliably acquiring data in digital form from transducers, converters, computers and all kinds of automated specialized devices. Once it's collected, you can transmit it, process and analyze it or store it for future use.

So, if you have to measure and collect data in some god-forsaken place, or even in your lab, you will find it worthwhile to write for our literature about low power, high density incremental recorders. Also request our brochures on data loggers, high speed microprocessor controlled recorders and thermal printers.



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NES SLIMLINE® MINI-PERIPHERALS

DIGITAL METERS WITH SERIAL ASCII

METERING WITH SERIAL ASCII & SETPOINTS

Counts, Temp, Current, Time, Etc.
278542
GALLONS/MINUTE
Serial ASCII
Alarms or Controls

These meters feature serial ASCII output and full message formatting. Setpoint outputs provide alarm or control capabilities. Microprocessor-based Ratemeter measures DC pulses from one per hour to 3 kHz.

• Full 6-digit display • Scale factor .000000001 to 59999 • Baud rates 110-9600 • Non-volatile memory • Full instrumentation input • Threshold adjustment • Setpoint outputs • 3-year warranty • Price: $295 - $425

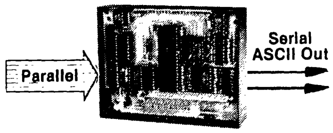
SERIAL/PARALLEL CONVERTERS

Serial ASCII In
Parallel

Convert serial ASCII data to common parallel data (such as BCD) with the Receiver Bustle®. These converters can provide an input to your PC's, computers, printers, terminals, etc.

• Convert ASCII data up to 6 digits of BCD data or 24 bits • 100 unit addressing capability • 2-digit switch-selectable ID number • 110-9600 baud rate • RS232, RS422, 20/60 mA formats • Price: $296 - $303

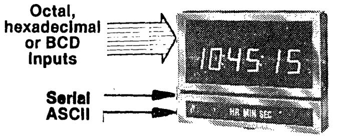
PARALLEL/SERIAL CONVERTERS


Parallel
Serial ASCII Out

Convert common parallel data to serial ASCII with the Transmitter Bustle®. Transmit data to your computer, printer, programmable controller, etc.

• Convert BCD data to up to 6 digits of serial ASCII data or 24 bits • 100 units addressing capability • 2-digit switch-selectable ID number • 110-9600 baud rate • RS232, RS422, 20/60 mA formats • Price: $340 - $352

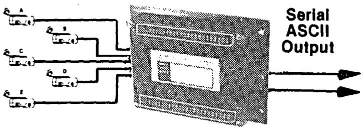
LOCAL & DISTANT READOUTS


Octal, hexadecimal or BCD Inputs
Serial ASCII
10:45:15
HR MIN SEC

Meters accept BCD, octal, hexadecimal or 2-wire serial ASCII inputs. Display up to 6 digits with LCD's or LED's. ASCII command switches provide remote control or alarm capabilities. Displays are easily read even in bright light.

• Parallel, octal, hexadecimal or BCD inputs • Serial ASCII inputs • Latch capability • 2 to 6 digit models • Buad rates 110-9600 • Flexible addressing capability • Surface mounting • Easy wiring • 3-year warranty • Price: $156 - $500

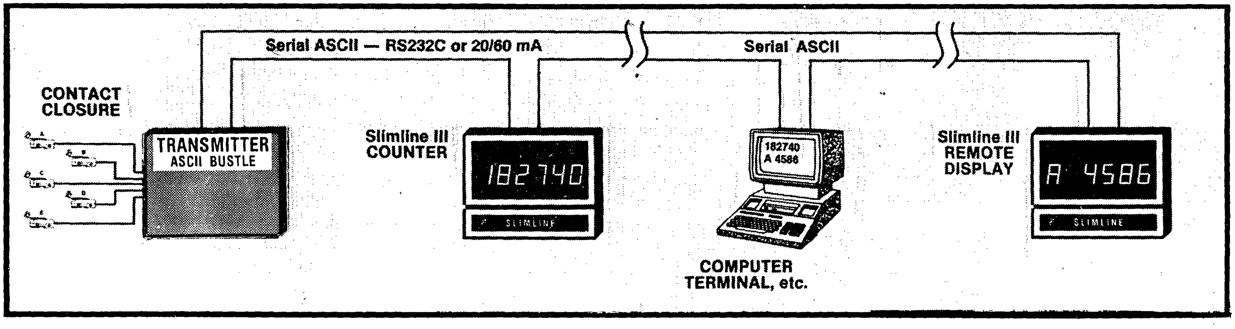
CONTACT STATUS MONITORING


Serial ASCII Output

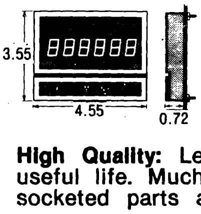
These monitors accept up to 25 individual contact closures at up to 24 VDC. These units are all self-contained and built rugged and reliable These monitors provide standard serial ASCII output.

• Directly compatible with CRT's, printers, etc. • Self-contained • CMOS, TTL compatible • Accepts up to 25 contact contact closures • Accepts up to 24 VDC; others available • RS232, RS422, 20/60 mA formats • Price: $290 - $350

APPLICATION EXAMPLE:


Serial ASCII — RS232C or 20/60 mA
Serial ASCII
CONTACT CLOSURE
TRANSMITTER
ASCII BUSTLE
Slimline III COUNTER
182740
SLIMLINE
182740
A 4586
COMPUTER TERMINAL, etc.
Slimline III REMOTE DISPLAY
A 4586
SLIMLINE

SLIMLINES' UNIQUE FEATURES


3.55
888888
4.55
0.72

Size: 4.55" x 3.55" x 0.72". Panel surface mounting means easy & fast installation. Also fast wiring – no soldering needed.

High Quality: Less downtime, long useful life. Much better investment: socketed parts and highest quality components. Conservative design; works well in harsh factory environments, not like other meters that are made to only work in a laboratory.

Who Uses: With over 1 million meters shipped, NES is recognized as the leader in high quality industrial meters. Some users are: the Space Shuttle, Air Force 1, virtually all of the Fortune 1000's and tens of thousands of others.

Other Products: NES designs & manufactures over 3,000 different products from Broadcast Automation Computers to the broadest range of panel meters available.

Please call us. It is easy to talk to one of our expert Application Engineers. They care about your problem and will do all they can to assure your success.

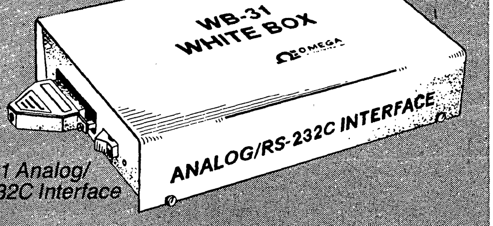
Call: ***(312) 426-5900***

NES, Inc. *NATIONWIDE ELECTRONIC SYSTEMS*
3003 Wakefield Drive, Carpentersville, IL 60110 • (312) 426-5900

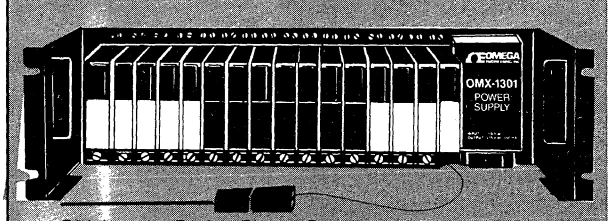
For other products in EEM from NES, see Sections 2200, 2325, 2450 & 2950.

COMPUTER INTERFACE

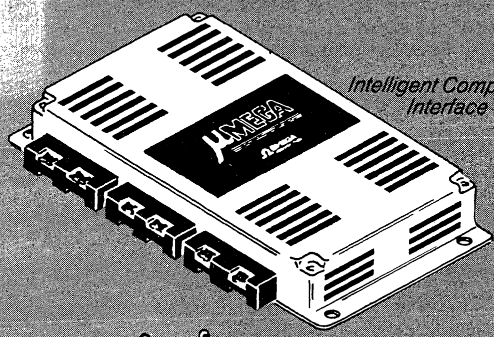
A Complete Line of White Box™ Signal Conditioners That Link the Real World with Any Computer!


WB-31
WHITE BOX
OMEGA
ANALOG/RS-232C INTERFACE

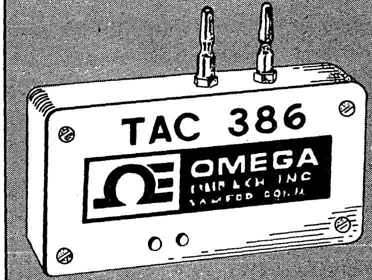
WB-31 Analog/ RS-232C Interface


OMEGA
OMX-1301
POWER
SUPPLY

OM-3 and 4 Series Signal Conditioners
• Condition • Record • Alarm • Control



Intelligent Computer Interface


TAC 386
OMEGA

TAC-386 Thermocouple Signal Cold Junction Compensator and Linearizer

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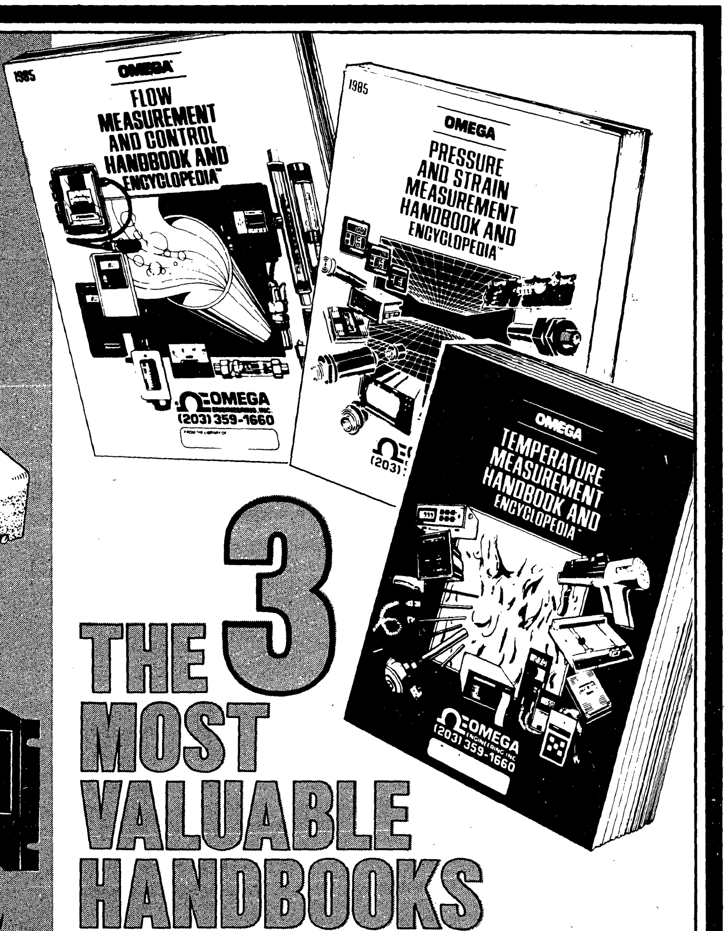
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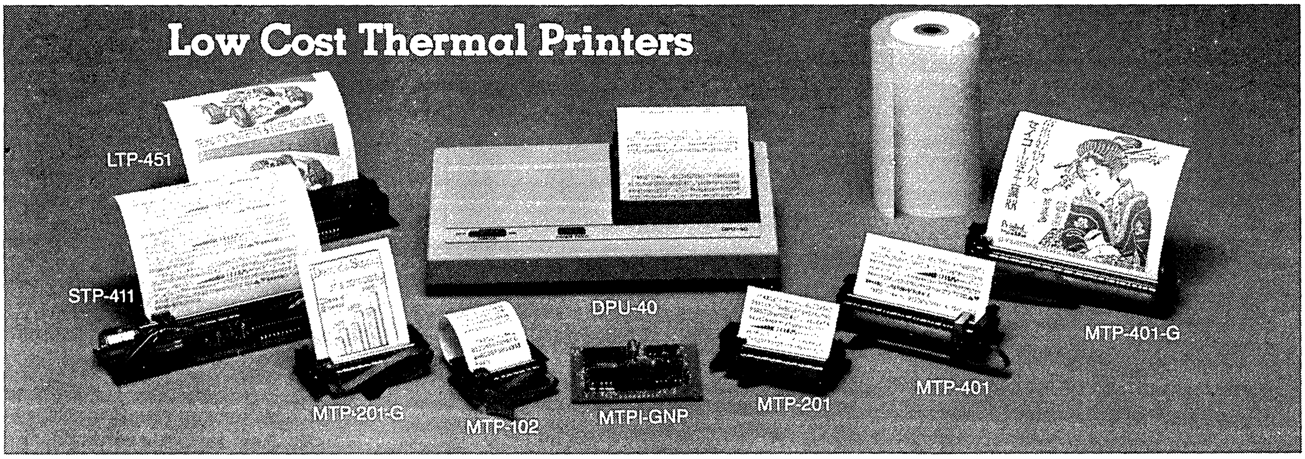
SEIKO INSTRUMENTS

Low Cost Thermal Printers



MTP Series Printers

Character Printers

Graphic Printers

Model / Item	MTP102		MTP201		MTP401		MTP201		MTP401
	13BM	16BM	20BN	24BN	32BN	40BN	G128	G166	G280
Printing Method	Thermal serial dot						Thermal serial dot		
Printing Direction	Left to right						Left to right		
Paper Width (mm)	38^{+0}_{-1}		58^{+0}_{-1}		80^{+0}_{-1}		58^{+0}_{-1}		80^{+0}_{-1}
Number of Columns	13	16	20	24	32	40	—		
Character Size (H x W) (mm)	2.4 x 1.4	2.4 x 1.1	2.4 x 1.5	2.4 x 1.3	2.4 x 1.4	2.4 x 1.1	2.4 x 1.6	2.4 x 1.3	2.4 x 1.1
Character Construction	7 x 5 dot matrix						7 x 5 dot matrix		
Print Timing	Tacho-generator synchronized system						Tacho-generator synchronized system		
Home Position Detection Method	Mechanical switch						Mechanical switch		
Dot composition (Columns x rows)	91 x 7	112 x 7	140 x 7	168 x 7	224 x 7	280 x 7	128 x 8	166 x 8	280 x 8
Dot Pitch (vertical) (mm)	—						0.35	0.35	0.35
Dot Pitch (horizontal) (mm)	—						0.35	0.277	0.24
Printing Width (mm)	—						44.8	46.0	67.2
Printer Supply Voltage (v)	DC 5.0 ± 1						DC 5.0 ± 1		
Printing Speed (room temperature, 5.0V) (lines/sec)	Approx. 1.5		Approx. 0.8		Approx. 0.6		Approx. 0.9	Approx. 0.8	Approx. 0.6
Dimensions (W x D x H) (mm)	48 x 31 x 13.8		70 x 34 x 14.4		91.5 x 35.5 x 20		7[illegible] x 34 x 14.4		91.5 x 35.5 x 20
Weight (g)	Approx. 35		Approx. 40		Approx. 50		Approx. 40		Approx. 50
Operating Temperature Range (°C)	0–50°C								
Reliability (5.0V rated energy, normal temperature, "8" full columns printing)	MTBF 500,000 Lines								
Recommended Heat-sensitive Paper	Seiko Thermal Paper								

STP Series Printers

Model / Item	STP411-256	STP411-320
Printing Method	Thermal serial dot method	
Print Direction	Character: bi-directional logic seeking Graphics: uni-directional logic seeking	
Print timing	Synchronization of step motor	
Character Construction	7 x 5 dots	9 x 7 dots
Number of Columns (one dot space)	42	40
Print dot size (H x W) (mm)	0.3 x 0.2	0.23 x 0.2
Print width (mm)	89.6	
Character size (H x W) (mm)	2.4 x 1.6	2.47 x 1.88

Model / Item	STP411-256	STP411-320	Comments
Print speed Uni-Directional (LPS) Bi-Directional (LPS)	approx. 0.5 approx. 1.0	approx. 0.4 approx. 0.8	Total dot print (Motor: 250 pps)
Paper feeding force (at 5.0V)	more than 50 g		(Motor: 300 pps)
Paper holding force	more than 100 g		Paper feeding motor not magnetized
Life MTBF Min. 500,000 lines			at 5.0V, rated energy
Outline Dimension (W x D x H) (mm)	153 x 44.5 x 20		
Weight (g)	135		
Printer supply voltage	D.C. 5.0 ± 0.5V		
Operation temp. range Storage temp. range	0°C 50°C – 20°C 60°C		

LTP Series Printers

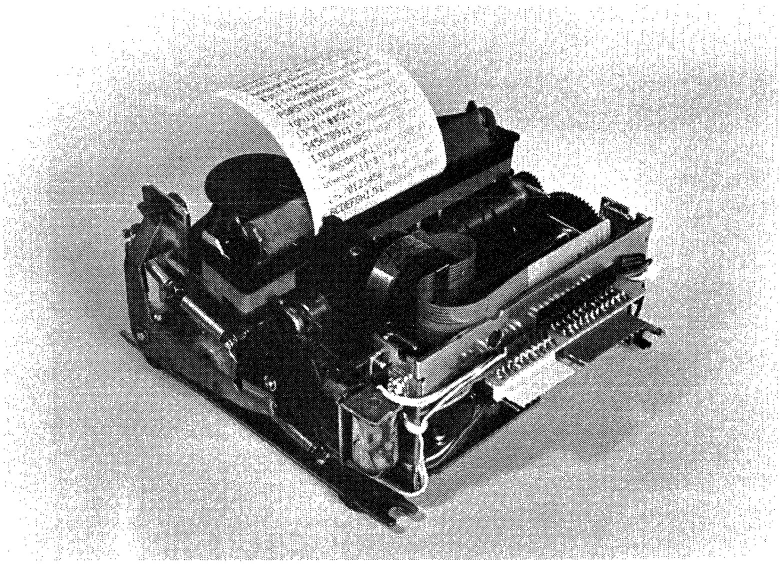
Model / Item	LTP-451	Comments:
Printing Method	Thermal Line Printing	
Input Interface	1) Parallel Input Centronics Compatible TTL Level 8-Bit Code 2) Serial Input RS232C Suitable 300–9600 Selectable Baud Rate	
Character Construction	256	
Character Font	7 x 5 Dot Matrix	
Number of Columns	40	
Dot Size	0.35 mm (H) x 0.35 mm (W)	
Printing Width	89.6 mm	
Character Size	2.45 mm (H) x 1.75 mm (W)	
Printing Speed	1) Text Mode—240 Characters/Second Max 2) 15 m sec/1 dot line max	Choice of 1) or 2) Depends on external switch

Model / Item	LTP-451	Comments:
Dimensions:	156 mm (W) x 56 mm (D) x 30 mm (H)	
Weight	500 g	
Output Interface:	1) Paper Feed 2) Test Mode 3) White and Black Reverse 4) Magnified Print 5) Inverted Print	Controlled by external switch
DC Power Supply	24VDC 3.5A Max 5VDC 1.0A Max	

SEIKO INSTRUMENTS U.S.A., INC., 2990 W. Lomita Blvd., Torrance, CA 90505 • (213) 530-8777

COMPLETE LINE OF IMPACT PRINTER MECHANISMS

21, 22 & 40 COLUMNS, IMPACT DOT-MATRIX



FEATURES
DP822, DP824

- Low cost
- Disposable printing head
- Simple interface
- Handles any type font
- Needs only one DC power supply
- DP-822 uses standard 2¼" adding tape or carbonless paper
- Easy to install and maintain
- Print head life of over 50 million characters
- Requires only one 12 volt power supply

DP-832

- High speed, 22 columns printer
- Prints red and black on the same line
- Easy to read characters with true descenders

APPLICATIONS

- Medical and scientific instruments
- Industrial measurement, process and control systems
- Mini-microcomputers: business professional and hobby
- Point-of-sale (POS) terminals
- Security monitoring systems
- Emergency vehicle data receivers
- Fast-food kitchen printers
- Telecommunications equipment

. . . and many more!

Star printer mechanisms are all guaranteed for 100% reliability. They're compact, easy to install and inexpensive to maintain.

822-20 column dot matrix printer mechanism has a 7 wire head that enables it to print 2½ lines every second. It prints on standard 2½" adding machine tapes and provides unusually strong printing impact.

824-40 column dot matrix printer mechanism has a 5 x 7 standard matrix array. It prints 60 cps and can provide a variety of printouts. These include standard 4½" adding machine tapes and double stock carbonless tapes. For fanfold and labels, all that's needed is an optional tractor feed.

832-22 column dot matrix printer mechanism has a 9 wire head to produce characters with true descenders. Its two color bidirectional printing make it ideal for applications requiring print speeds of 3 LPS.

834-40 column dot matrix printer has 5 x 9 or 9 x 9 dot array. It prints on carbonless two copy (1 original plus 1 copy) paper as well as 4½" stock. Models with sprocket feed are also available.

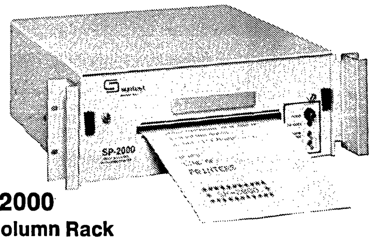
Plus, there's a selection of replacement print heads, control boards, ribbon and paper supplies available. All with the Star name on them and behind them.

SPECIFICATIONS

	DP-822	DP-824	DP-832
Number of characters/line of print	21 columns standard	40 columns standard at 12 cpi 34 columns standard at 10 cpi	22 (12 cpi)
Standard matrix array	5 dots wide by 7 dots high	5 dots wide by 7 dots high 7 x 7 and 9 x 7 available with special software	5 x 9
Character height	Up to .114" (2.9mm)	Up to .114" (2.9mm)	1.71mm (Horiz.) x 2.42mm (Vert.)
Direction of printing	Left to right	Left to right	Bidirectional
Speed of printing	2.5 lines/sec. @ 12 VDC	Approximately 1.0 line/sec. @ rated voltage	3 lines/sec.
Printing area	1.77" (45mm) @ 21 col.	3.3" (84.4mm) @ 40 col.	46.16mm @ 22 col.
Paper advance/line of print	1/6" (4.24mm)	1/6" (4.24mm)	
Paper slew speed	Up to 10 lps during continuous paper advance	Up to 10 lps during continuous paper advance	Up to 12 lps during continuous paper advance
Dimensions	Width: 4.173" (106mm) Length: 5.710" (145mm) Height: 2.067" (52.5mm)	Width: 6.221" (158mm) Length: 5.787" (147mm) Height: 2.244" (57mm)	Width: 5.334" (135.5mm) Length: 5.433" (138mm) Height: 2.322" (59mm)
Weight	1.25 lbs. (570 grams)	1.8 lbs. (820 grams)	1.4 lbs. (680 grams)
Operating temperature	5°C to 45°C (Note: Temperature and relative humidity affect ribbon ink viscosity)	Operating: 5°C to 45°C 80% Storage: −20°C to +75°C 90% (Note: Parameters affect ribbin ink viscosity)	+5°C to +45°C

micronics·inc
COMPONENTS DIVISION
70-D ETHEL ROAD WEST, PISCATAWAY, NJ 08854 (201) 572-9512

syntest CORPORATION

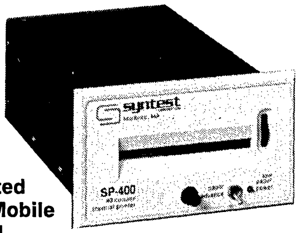


SP-2000
80 Column Rack Mounted Printer

The Syntest SP-2000 is a low cost microprocessor controlled intelligent printer, which performs functions not available on standard printers. These functions include multiple size printing, tabs, and multiple line feeds. The SP-2000 is rack mounted saving valuable bench or floor space.

SPECIFICATIONS
Input
- 5 x 7 dot matrix
- Impact printing
- 80 columns
- 12 characters per inch
- 122 inch character height
- 100 characters per second print speed
- Multiple copy capability
- XTAL baud rate 110-9600 baud with dip swtich

Input
- Serial RS-232C and 20 ma. current loop internal jumper selectable
- RS-232C busy signal
- Rear EIA connector
- Mating connector Cinch DB25-P

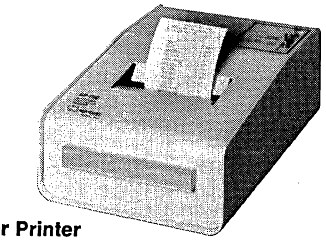


SP-400
Panel Mounted or 12 VDC Mobile Use Thermal Printer

The SP-400 is a low cost miniature 40 column thermal printer. This printer provides very quiet operation on 115 VAC or 12 VAC or DC input. A 40 character buffer along with RS-232 and 20 ma loop input make this unit very easy to interface. A standard EIA connector and busy line are also provided.

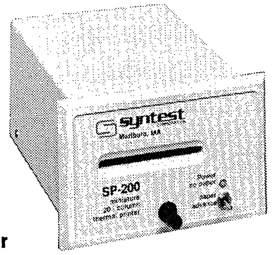
SPECIFICATIONS
Printing
- 5 x 7 dot matrix
- Thermal printing
- 40 columns
- 15 characters per inch
- .08 inch character height
- 24 characters per second print speed
- XTAL baud rate 50-9600 baud with dip switch

Input
- Serial RS-232C and 20 ma. current loop internal jumper selectable
- RS-232C busy signal
- Rear EIA connector
- Mating connector Cinch DB25-P
- 24 VDC optional



SP-700
Two Color Printer

The newest addition to Syntest's printer line has features and prices that make this your logical choice for your O.E.M. requirements.
- 40 column output
- 2 color printing, red and black
- 40 character buffer
- 115/230, 12 VAC standard, 12 VDC also standard
- RS-232C or 20 mA loop
- 1.5 lines per second thruput
- Under $300 in O.E.M. quantities

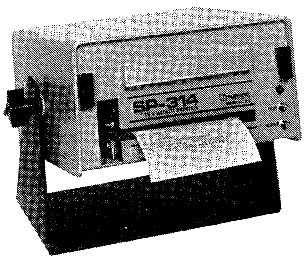


SP-200
Miniature 20-column Thermal Printer

The SP-200, the world's smallest low cost 20 column printer. This printer provides very quiet operation on 115 VAC or 12 VAC or DC input. A 20 character buffer along with RS-232 and 20 ma loop input make this unit very easy to interface. A standard EIA connector and busy line are also provided. Centronics parallel interface is also available.

SPECIFICATIONS
Printing
- 5 x 7 dot matrix
- Thermal printing
- 20 columns
- 11 characters per inch
- .08 inch character height
- 16 characters per second print speed
- XTAL baud rate 50-9600 baud with dip switch

Input
- Serial RS-232C and 20 ma current loop internal jumper selectable
- Centronics parallel input (optional)
- RS-232C busy signal
- Rear EIA connector
- Mating connector Cinch DB25-P

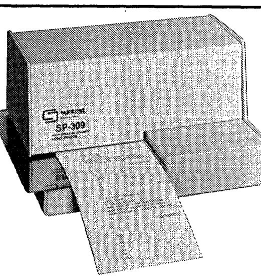


SP-314
12 VDC Alpha Numeric Printer

The Syntest SP-314 is specifically designed for applications where only 12 VDC is available as a power source. This hard copy device features an extra rugged aluminum enclosure allowing it to withstand the rigor of operating in harsh environments. With horizontal elongation and graphics capability the SP-314 has the versatility to perform the most demanding printing job.

SPECIFICATIONS
Printing
- 5 x 7 dot matrix
- Impact printing
- 40 columns
- 10 characters per inch
- .130 inch character height
- 2 L.P.S. print speed
- Multiple copy capability

Input
- Serial TTL and RS-232
- Parallel TTL
- Crystal baud rate
- TTL and RS-232 Busy



SP-309
High Speed Ticket Printer

A new high speed low cost ticket printer, with the ability to print on card stock and credit card slips and is also very fast. With a thru-put of 120 characters per second, the SP-309 provides the user with a large character buffer and programmable baud rate.

Having a dedicated EPROM for its internal program, this new unit can be modified to its users specifications. Outline dimensions are 12″ W x 9.75″ D x 6.5″ H. Input voltage is 115/230V 50-60 Hz, RS-232, 20 mA inputs are standard as data inputs.

- 3 lines per second print rate.
- Ability to print on almost any document or card stock, multipart forms etc.
- Internal PROM to provide customer custom feature programmability
- 2 K RAM standard to use as a large character buffer or other options.
- Stepper motor paper drive for graphics and X2, X3, X4 character size as standard.

SYNTEST CORP. / 40 LOCKE DR., MARLBORO, MA 01752 U.S.A. / 617-481-7827 / TWX 710 390 7659

Punched Card Readers

Serial... Serial/Parallel... Static/Parallel

High Reliability Heavy Duty Card & Badge Readers– for industrial use since 1956

A complete line of readers for OEM, system and industrial applications

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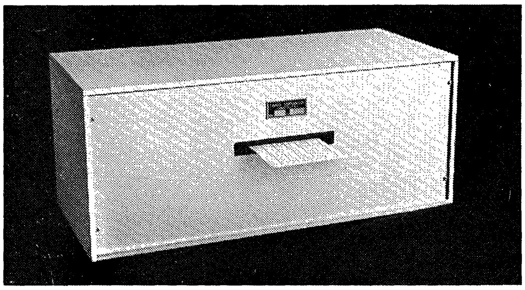
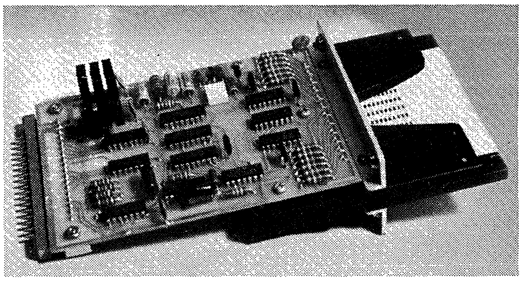


Serial Readers—Micro Processor Controlled

RS 232 or Current Loop
Easily Field Modified—with socketed proms
Flexible Application—card handling modes and read out rates in BAUD are jumper selectable
Self Contained—cabinet or rack models
Thorough Documentation

Designed for industrial environments, these devices are very rugged and usable in conditions that are not suitable for ordinary card readers. They are ideal for a multitude of uses including OEM and systems applications in warehousing, data handling, industrial and process control, and manufacturing. They are microprocessor controlled so operation and read out are flexible. Field reconfiguration is simple and inexpensive.

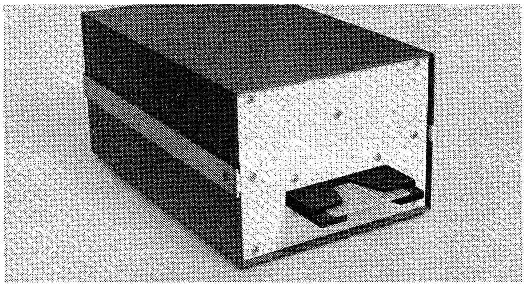


Badge/Card Readers... Series H

Read cards/badges of up to 12 rows and 10 to 68 columns. Optical reading with no moving parts, error-free readout, long life, minimum maintenance. Completely self-contained. To operate, insert badge or card fully and withdraw. Readout is character (column) serial, bit (row) parallel.

Can easily replace less satisfactory readers in existing installations. Designed for OEM and system applications. Custom-feature models can be supplied.

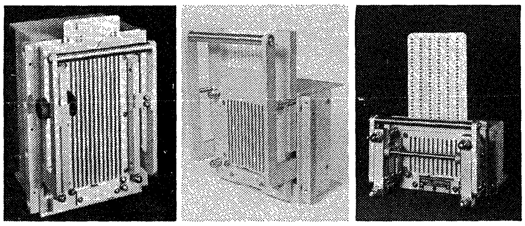
The 10-column Model H-10 is pictured. For complete details on our complete badge/card reader line, request Series H Catalog. Patent No. 4,132,352



Series H Readers with RS232C or 20ma Loop Interface

Series HT are complete, self-contained manual Card or Badge Reader terminals designed for industrial applications in factory data collection systems, warehousing assembly floors, and the like.

Completely and thoroughly documented, they are particularly well suited for system developers who require an inexpensive, flexible terminal for low to moderate usage, or where a manual terminal is suitable. Because the terminals are micro-processor based, their application is extremely flexible, and modifications to meet particular system requirements are simple and straightforward.



Model M-4A (left)
up to 80 columns

Model JM-4A (center)
up to40 columns

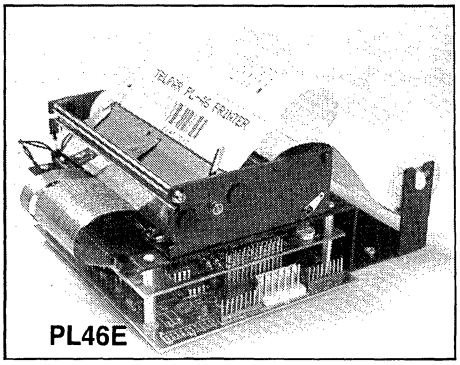
Model CM-20 (right)
up to 20 columns

Static or Parallel Readers... 3 Models

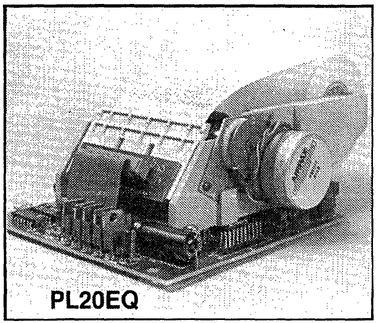
Read all or part of an IBM card in parallel. Insert card, push handle. HOLE...closed switch. NO HOLE...open switch. Contacts not through the card. Reliable indirect switching. All switching at one time. Thousands in use since 1956.

TAURUS CORPORATION
P.O. Box 278
Lambertville, NJ 08530
Telephone: (609) 397-2390

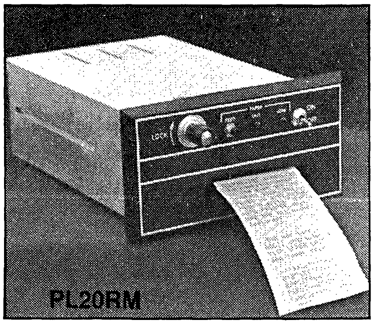
OEM PRINTERS
THERMAL-IMPACT-12 TO 46 COLUMNS


PL46E

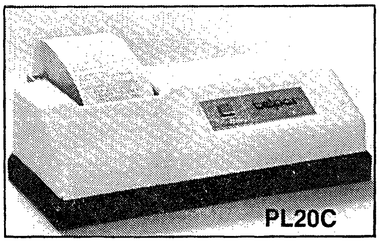
- **46 COLUMN** ... 96 ASCII characters, double High, and/or double Wide, invert modes.
- **GRAPHICS** ... Dot addressable, 70 dots per inch, fixed printhead.
- **BAR CODE CAPABILITY** ... UPC, 2 of 5 and 3 of 9
- **INTERFACES** ... RS232, RS422, Centronics parallel, 20 Ma Loop
- **PRINT SPEED** ... 92 characters/second standard, optional up to 5 lines/second
- **BUFFER** ... Up to 7 K
- **BAUD RATE** ... Up to 19,200
- **REAL TIME CLOCK OPTION**
- **RACK MOUNTING**
- **PAPER BACK-UP CAPABILITY**
- **CUSTOM DESIGNS**


PL20EQ

- OEM Configuration

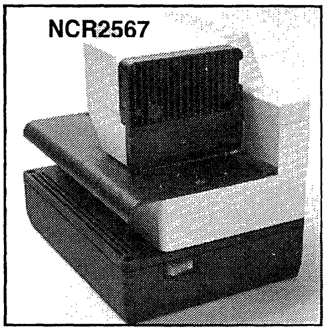

PL20RM

- Rack Mount Design

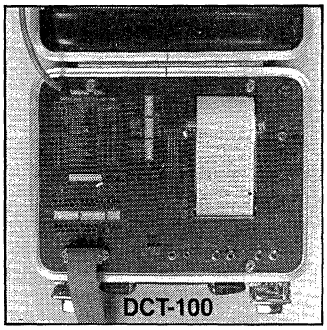

PL20C

- Desk Top Standalone

Models available with parallel or serial interfaces, AC or 12V DC input power. Mechanisms alone also available.


NCR2567

- Telpar is a stocking distributor for NCR's line of 40 column P.O.S. printers.
- Stand-alone receipt, journal and slip printers available with RS232 or RS422 interfaces.


DCT-100

- DataComm Tester consists of industry standard RS232 breakout box with a 20 column integral printer.
- Gives hard copy printout of the RS232 data stream.
- Prints, ASCII, ASCII plus control codes or hexidecimal.

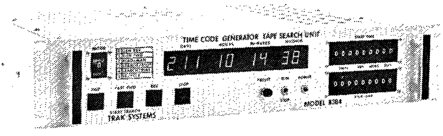
telpar, inc.

For applications assistance or other information contact:
Telpar, Inc. • P.O. Box 796 • Addison, Texas 75001 • Telephone: 214/233-6631 / Telex: 73-2561 (TELSERV) DAL

TRAK® SYSTEMS DIVISION OF **TRAK® MICROWAVE**

Timing Instruments

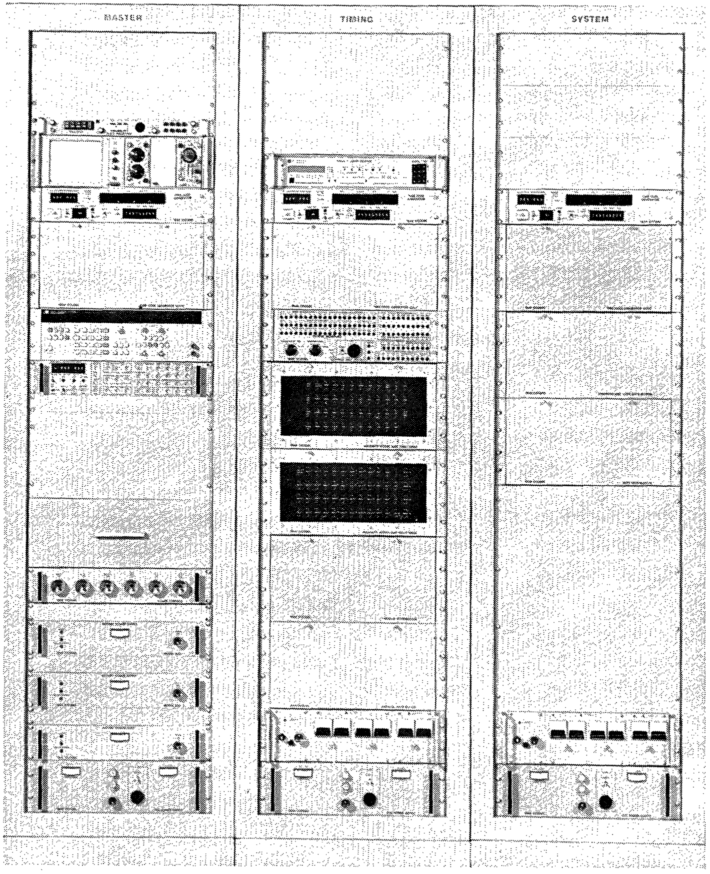
Precision Timing Instruments For Your Application



- COMPLETE TIMING SYSTEMS
- TIME CODE PROCESSORS
- COMPUTER CONTROL TAPE SEARCH
- SATELLITE CONTROLLED TIME CODE GENERATORS
- TIME CODE GENERATORS
- TIME CODE READERS
- TIME CODE TRANSLATORS
- TIME CODE DISTRIBUTION

Custom Service is our specialty

TRAK Systems' Master Timing Systems are specifically designed to meet the accuracy and reliability required by primary timing stations. The Model 8407 Master Timing System contains three complete time code generators and provides multi outputs with time coherency of 50 nanoseconds. An integral majority voting and fault sensing subsystem assures continuous outputs with visual fault isolation to the card level in the event of a single time code generator failure. Redundant and external battery backup provisions are in the power supply system. Built-in test with indicators permit rapid system checkout. Many variations and options are available for specialized requirements.



MASTER TIMING SYSTEM

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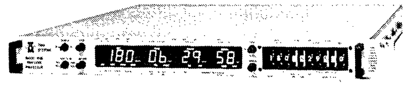
TRAK® SYSTEMS DIVISION OF **TRAK® MICROWAVE**

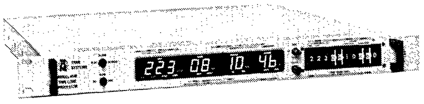
Timing Instruments 8500 Series



TIME CODE PROCESSOR MODEL 8500

- MICROPROCESSOR CONTROLLED
- TRANSLATOR
- SYNCHRONIZED GENERATOR
- TAPE SEARCH AND CONTROL
- HOST COMPUTER I/O
- SINGLE RUGGEDIZED 1-3/4" UNIT
- HEARTBEAT CLOCK OPTION

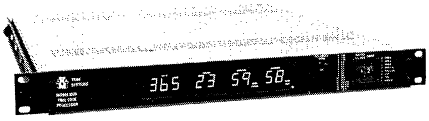
The Model 8500 Time Code Processor is a full-function time code data processing instrument featuring both time code generation and time code translation functions under control of a built-in micro processor subsystem. The unit combines all of the best features of TRAK Systems' field proven time code instruments. Fully automatic search and control of a tape transport is a standard option. Included as a standard feature is a host computer interface providing for both remote setup and operation of the Model 8500and for status output to the host computer. Available interfaces include RS-232, IEEE-488 and 16-bit/DR11C parallel.
A unique battery-powered heartbeat clock option is also available. For high-precision timekeeping applications, an external frequency source and internal slew controls may be used to obtain microsecond accuracy. Optionally available are an internal tracking oscillator that may be locked to the external frequency source and an oven-controlled precision oscillator.
An internal clock continuously provides a serial time code output (normally IRIG B). The translator section of the instrument reads either an externally-supplied time code (XLATE mode) or the internal clock (GEN mode) and provides a variety of standard and optional code, rate, and parallel outputs. All outputs are phase locked to the input time code for playback ratios ranging from 1/32 to times 32 speed-up. The front-end code reader circuits feature wide dynamic amplitude and frequency range, full range search and playback, analog filtering, digital filtering, and errol bypass.
Automatic search and control is fully supervised by the internal microprocessor. With this approach, many features too complex to be implemented with hardware logic circuits are provided under program control.
The front panel parameter-setup system features a minimum number of controls to set up a full range of operating parameters (Start Time, Stop Time, modes, filter parameters, etc.). Operator feedback is provided by the front-panel display group. Default setup values are used to minimize setup complexity and time.



TIME CODE PROCESSOR MODEL 8510

- MICROPROCESOR CONTROLLED
- TRANSLATOR
- SYNCHRONIZED GENERATOR
- HOST COMPUTER I/O OPTION
- SINGLE RUGGEDIZED 1-3/4" UNIT

The Model 8510 Time Code Processor is a full-function time code data processing instrument featuring both time code generation and time code translation functions under control of a built-in microprocessor. Available as an optional feature is a host computer interface providing for both remote setup operation, and for status output to the host computer. Optional interfaces include RS-232, IEEE-488 and 16-bit/DR11C parallel. For high-precision timekeeping applications, an external frequency source and internal slew controls may be used to obtain microsecond accuracy. Optionally available are an internal tracking oscillator that may be locked to the external frequency souce and an oven-controlled precision oscillator.
The internal clock continuously provides a serial time code output (normally IRIG B). The translator section of the instrument reads either an externally-supplied time code (XLATE mode) or the internal clock (GEN mode) and provides a variety of standard and optional code, rate, and parallel outputs. All outputs are phase locked to the input time code for playback ratios ranging from 1/32 to times 32 speed-up. The front-end code reader circuits feature wide dynamic amplitude and frequency range, full range search and playback analog filtering, digital filtering, and error bypass.
The front panel parameter-setup system features a minimum number of controls to set up a full range of operating parameters (Start Time, Stop Time, modes, filter parameters, etc.). Operator feedback is provided by the front-panel display group. Default setup values are used to minimize setup complexity and time.



TIME CODE PROCESSOR MODEL 8520

- READER/PRECISION TRANSLATOR
- AUTOMATIC FORWARD/REVERSE
- MULTICODE INPUT & OUTPUT
- AUTOMATIC ERROR BYPASS
- PHASE LOCKED LOOP

TRAK Systems' Model 8520 Time Code Processor combines a forward/reverse time code reader and a precision time code translator in a single instrument. Precision translation with all outputs phase locked to the input time code is provided for playback ratios between 1/64 and 32 times speed-up. Forward/reverse time code reading is provided over the frequency range of 30 Hz to 1 MHz. The front-end code reader circuits feature wide dynamic amplitude and frequency range, full-range analog filtering, digital filtering, and error bypass.
A variety of multicode input options are offered. Included are IRIG family, NSA family, NASA 36-Bit, and combinations of these codes.
For controlled playback ratios, input filter frequency selection for each selected code is automatic. For example, when IRIG B (1 KHz carrier) is played back at a 2:1 speed-up ratio, a 2 KHz filter is selected. For high speed playback (beyond 32:1 speed-up) four filter frequencies between 160 KHz and 1 MHz may be manually selected.
The Model 8520 has standard rate outputs of 1, 10, 100, and 1000 PPS on BNC connectors and parallel BCD outputs of hundreds-microseconds through hundreds-days on a multipin connector. Included in the BCD output connector are 1 PPS, 1K PPS, and 10K PPS delayed strobes. The instrument may also be ordered with a variety of special rate, parallel, and code outputs. All commonly used parallel binary codes, are available. A Universal Computer Interface (UCOI) option features a freeze buffer and word-length selection of 4, 8, or 16 bits.

TIME CODE GENERATOR MODEL 8530

- MICROPROCESSOR CONTROLLED
- HOST COMPUTER I/O
- MICROSYNCHRONIZATION
- FULL THUMBWHEEL PRESET

The Model 8530 Time Code Generator is a microprocessor-supervised unit incorporating all of the features required of a precision time generating instrument. The unit is designed to operate from a precision external frequency standard and may be ordered with one of several optional internal oscillators. Automatic start from a WWV tick or an external start pulse is provided. Slew and propagation delay controls are provided to permit synchronization to within one microsecond of an external time standard.
Included as a standard feature is host computer I/O providing for remote setup, status monitoring, and time data output from Model 8530. Available interfaces include RS-232, IEEE-488, and 16-bit/DR11C parallel.

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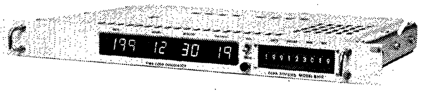
TRAK® SYSTEMS DIVISION OF **TRAK® MICROWAVE**

Timing Instruments Slimline Series

- FULL THUMBWHEEL RESET
- HIGH-STABILITY INTERNAL STANDARD
- HIGH-INTENSITY LED DISPLAY
- PLUG-IN CIRCUITS
- BATTERY BACKUP PROVISION

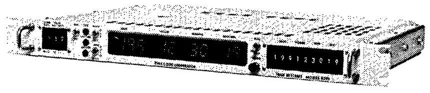
TRAK Systems' Model 8390 Time Code Generator is specifically designed for applications requiring a low cost time signal source and can be ordered with a variety of time code and rate outputs. A high-stability internal oscillator assures maintenance of time accuracy of one second for periods of up to one month. Available outputs include serial time codes, parallel BCD or binary time, precision DC rates, and sinewave rates.



TIME CODE GENERATOR MODEL 8390

- MICROSYNCHRONIZATION PACKAGE
- FULL THUMBWHEEL PRESET
- HIGH-INTENSITY LED DISPLAY
- PLUG-IN CIRCUITS
- BATTERY BACKUP PROVISION

TRAK Systems' Model 8391 Time Code Generator incorporates all of the features required in a precision time generating instrument and can be ordered with a variety of time code rate outputs. The unit is designed to operate from a precision external frequency standard and may be optionally ordered with a high-stability internal oscillator. Automatic start from a WWV tick or an external start pulse is provided. Resynchronization to WWV to compensate for oscillator drift can be accomplished using only the front-panel ON TIME indicator and SLEW controls. With an external atomic frequency standard, outputs remain within microseconds of a primary synchronizing source for periods of many months. Parallel and rate signal output coherence is 50 nanoseconds or less and serial code coherence is 200 nanoseconds or less.



TIME CODE GENERATOR MODEL 8391

- AUTOMATIC FORWARD/REVERSE
- AUTOMATIC ERROR BYPASS
- READS DISTORTED CODES
- HIGH-INTENSITY LED DISPLAY
- PLUG-IN CIRCUITS
- BATTERY BACKUP PROVISION

TRAK Systems' Model 8392 Time Code Reader incorporates all of the features required for reading time codes from magnetic tape recorders. Analog and digital filtering combined with automatic error bypass provide for reading of distorted codes. Codes are coherently read in both the forward and reverse directions and, for most commonly used codes, direction detection is automatic. With automatic error bypass and automatic direction detection, no operating front-panel controls are required and operation time is minimized. Codes can be read over a wide dynamic input amplitude and frequency range. A variety of parallel outputs can be provided as options.

TIME CODE READER MODEL 8392

- TWO MODES OF OPERATION
- HIGH-STABILITY INTERNAL STANDARD
- FULL THUMBWHEEL PRESET
- HIGH-INTENSITY LED DISPLAY
- PLUG-IN CIRCUITS
- BATTERY BACKUP PROVISION

TRAK Systems' Model 8393 Time Code Translator/Generator is specifically designed for applications that require a reliable low cost time signal source capable of being synchronized to an incoming time code and can be ordered with up to three serial time code outputs and/or a variety of parallel and rate outputs. The basic unit incorporates a high-stability internal oscillator. Time can be manually preset to within one second of a local time standard in the generate mode.

In the translate mode, the instrument fully synchronizes to a serial time code (normally IRIG B) input and is designed for operation with time code inputs having a frequency precision close to that of the time base being used as a basic countdown input. For operation with less precise sources (such as instrumentation tape recorders), a code-lock option is available.

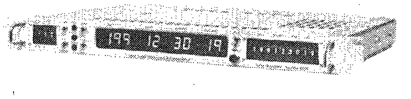
TIME CODE TRANSLATOR/GENERATOR MODEL 8393

- TWO MODES OF OPERATION
- INCLUDES MICROSYNCHRONIZATION PACKAGE
- FULL THUMBWHEEL PRESET
- HIGH-INTENSITY LED DISPLAY
- PLUG-IN CIRCUITS
- BATTERY BACKUP PROVISION

TRAK Systems' Model 8394 Time Code Translator/Generator incorporates all of the features required in a time code generating instrument and can be ordered with a variety of time code and rate outputs. The unit is designed to operate from a precision external frequency standard and may be optionally ordered with a high-stability internal oscillator. In the Generate mode, the unit may be manually synchronized with either a WWV transmission or an external start pulse.

When synchronizing with WWV, only the front-panel ON TIME indicator and SLEW controls are needed to maintain the outputs to within one millisecond of WWV. With an external atomic frequency standard, outputs are maintained to within 0.5 microseconds of the synchronizing source. Parallel and rate signal output coherence is 50 nanoseconds or less and serial code coherence is 200 nanoseconds or less.

In the Translate mode, the Model 8394 fully synchronizes to a serial time code (normally IRIG B) input, and is designed for operation with time codes having a frequency precision close to that of the time base being used for internal clocking. For operation with less-precise sources (such as tape recorders), a code-lock option is available.



TIME CODE TRANSLATOR/GENERATOR MODEL 8394

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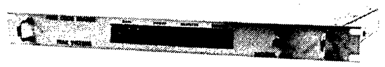
TRAK® SYSTEMS DIVISION OF **TRAK® MICROWAVE**

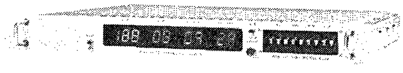
Timing Instruments Slimline Series



TIME CODE READER MODEL 8395

- INPUT SIGNAL FILTERING
- READS DISTORTED CODES
- HIGH-INTENSITY LED DISPLAY
- PLUG-IN CIRCUITS FOR EASE OF MAINTENANCE
- 115 OR 230 VAC OPERATION (RFI FILTERED)

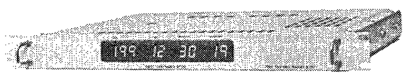
TRAK Systems' Model 8395 reads serial time code outputs from time code generators or tape reproducters, displays time in days, hours, minutes, and seconds, and optionally provides serial and parallel outputs to other equipment. The Model 8395 may be ordered to read all commonly used time codes and with multiple-code inputs. The Model 8395 is also ideal as a remote display in systems where the cost of long multi-conductor cables is prohibitive.



TIME CODE GENERATOR/READER MODEL 8396

- TWO INSTRUMENTS IN ONE
- AUTOMATIC ERROR BYPASS
- READS DISTORTED CODES
- HIGH-INTENSITY LED DISPLAY
- PLUG-IN CIRCUITS

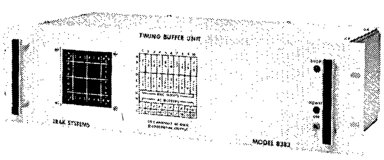
TRAK Systems' Model 8396 Time Code Generator/Reader functions either as a time code generator or as a time code reader. In the Generate mode, the Model 8396 may be used to record a time code, and in the Read mode, time may be read from tape at on-line and fast forward speeds. In the standard configuration, the unit generates and reads IRIG B in days, hours, minutes, and seconds. A unique error bypass circuit allows the unit to produce correct and coherent outputs for any number of frames containing coding errors. Reliable reading is assured by power line and signal input filtering, error bypass circuits, and a decoder which reads through single-cycle dropouts and extra pulses on coded bits.



TIME CODE TRANSLATOR MODEL 8397

- AUTOMATIC ERROR BYPASS
- PHASE LOCKS TO CODE
- HIGH-INTENSITY LED DISPLAY
- PLUG-IN CIRCUITS

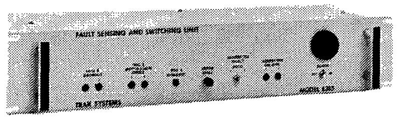
TRAK Systems' Model 8397 Time Code Translator provides precision translation of serial time code inputs from range devices and instrumentation tape recorders. The Model 8397 can be ordered with up to three serial time code outputs and/or a variety of parallel and rate outputs. A code-lock circuit phase locks the instrument to the carrier frequency of the incoming code to assure precision translation.



TIMING BUFFER UNIT MODEL 8383C

- REPLACEABLE PC ASSEMBLIES
- UP TO 40 SERIAL OR 120 PARALLEL OUTPUTS
- DC TO 5 MHz SERIAL CHANNELS
- SINGLE & DIFFERENTIAL PARALLEL CHANNELS
- OPTIONAL PATCHBOARDS

TRAK Systems' Model 8383C Timing Buffer Unit accepts time code and rate inputs and provides multiple outputs capable of driving long lines and low impedance loads. Typically, voltage gain is unity or less. This unit is designed to meet the requirements of timing systems having a moderate number of serial time code, rate, and parallel outputs. Space is provided for up to four buffer card assemblies, with each assembly having 10 linear buffers or 30 TTL buffers. Combinations of linear and TTL driver cards may be ordered. A variety of patching variations are available using the optional 100-position patchboard or by fixed internal programming.



FAULT SENSING/SWITCHING UNIT MODEL 8385

- TRIPLE-REDUNDANT SENSING
- AUTOMATIC SOURCE SENSING
- FAILSAFE DETECTORS AND POWER SUPPLY
- FAULT ISOLATION INDICATORS

TRAK Systems' Model 8385 Fault Sensing/Switching Unit (FSSU) accepts time code and rate inputs from three time code generating sources (TCG A, TCG B, and TCG C), compares these inputs, and provides a single set of outputs from TCG A or TCG B. TCG A normally provides the outputs, with TCG B providing a backup in the event of TCG A failures. TCG C provides the capability to isolate signal and phase disagreements to a specific souce (TCG A, TCG B, or TCG C) and to automatically switch from TCG A to TCG B in the event of a failure. All signal disagreements and dropouts are individually indicated on front panel lamps and a common audible alarm sounds for any fault.
To assure proper fault sensing even when one source has failed, all signals critical to signal comparison are derived from voting circuits having inputs from all three sources.

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TRAK® SYSTEMS DIVISION OF **TRAK® MICROWAVE**

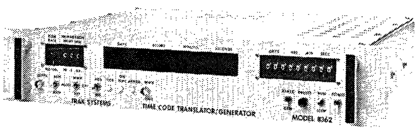
Timing Instruments Custom Line Series

TIME CODE TRANSLATOR/GENERATOR MODEL 8362

- TWO MODES OF OPERATION
- FULL THUMBWHEEL PRESET
- MICROSYNCHRONIZATION PACKAGE
- PLANAR GAS DISCHARGE DISPLAY
- PLUG-IN CIRCUITS
- BATTERY BACKUP PROVISION

TRAK Systems' Model 8362 Time Code Translator/Generator incorporates all of the features required in a time code generating instrument and can be ordered with a variety of time code and rate outputs. The unit is designed to operate from a precision external frequency standard and may be optionally ordered with a high-stability internal oscillator.

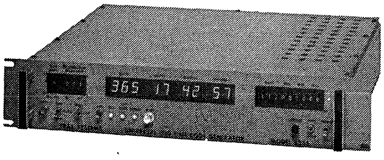
In the Generate mode, the unit may be manually synchronized with either a WWV transmission or an external start pulse.
When synchronizing with WWV, only the front-panel ON TIME indicator and SLEW controls are needed to maintain the outputs to within one millisecond of WWV. With an external atomic frequency standard, outputs are maintained to within 0.5 microseconds of the synchronizing source. Parallel and rate signals output coherence is 50 nanoseconds or less and serial code coherence is 200 nanoseconds or less.
In the Translate mode, the Model 8362 fully synchronizes to a serial time code (normally IRIG B) input, and is designed for operation with time codes having a frequency precision close to that of the time base being used for internal clocking. For operation with less-precision sources (such as tape recorders), a codelock option is available.



UNIVERSAL TIME CODE GENERATOR MODEL 8365

- GENERATES SIX IRIG CODES
- MICROSYNCHRONIZATION
- FULL THUMBWHEEL PRESET
- GAS PLANAR DISPLAY
- PLUG-IN CIRCUITS FOR EASE OF MAINTENANCE
- BATTERY BACKUP PROVISION

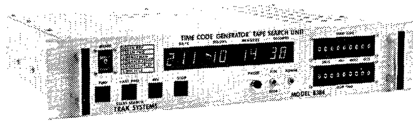
TRAK Systems' Model 8365 Universal Time Code Generator incorporates all of the features required in a time-code generating instrument. This truly universal instrument simultaneously generates all six IRIG standard codes in DC level-shift form. Modulated code outputs can be ordered with the unit or can be added by you later simply by inserting plug-in modules. A variety of output options are available.
The unit is designed to operate from a precision external frequency standard and may be optionally ordered with a high-stability internal oscillator. Automatic start from a WWV tick or an external start pulse is provided. Resynchronization to WWV to compensate for oscillator drift can be accomplished using only the front-panel ON TIME indicator and SLEW controls. With an external atomic frequency standard, outputs remain within microseconds of a primary synchronizing source for periods of many months. Parallel and rate signal output coherence is 50 nanoseconds or less and serial code coherence is 200 nanoseconds or less.



TIME CODE GENERATOR/TAPE SEARCH UNIT MODEL 8384

- THREE INSTRUMENTS IN ONE
- FORWARD AND REVERSE GENERATE MODES
- AUTOMATIC TAPE TRANSPORT CONTROL
- AUTOMATIC DIRECTION DETECTION AND ERROR BYPASS
- READS DISTORTED CODES

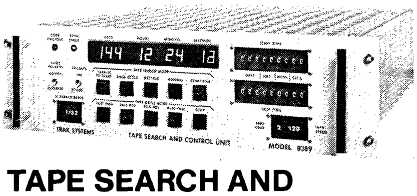
TRAK Systems' Model 8384 Time Code Generator/Tape Control Unit combines three instruments in a single chasis. In the Generate mode, the Model 8384 may be used to record a time code on magnetic tape. Forward and reverse generate modes are provided. During tape playback, the unit automatically reads the time code over a wide range of amplitudes and tape speeds while automatically controlling the tape transport in several modes of operation. Fully coherent reverse reading and automatic error bypass are featured. A unique error bypass circuit allows the unit to produce correct and coherent outputs, once in synchronization, for any number of frames containing errors. Reliable reading is assured by power line and input signal filtering, error bypass circuits, and digital noise rejection circuits.



TAPE SEARCH AND CONTROL UNIT MODEL 8389

- MICROPROCESSOR CONTROLLED
- REMOTE COMPUTER I/O
- AUTOMATIC SEARCH/PLAYBACK FILTER SELECTION
- AUTOMATIC ERROR BYPASS
- PLUG-IN FUNCTIONAL CARDS AND PLUG-IN IC'S
- BCD, BINARY, AND SERIAL OUTPUTS

TRAK Systems' Model 8389 Tape Search and Control Unit provides fully automatic tape search of magnetic tape recorders. Both manual and remote computer control of all set-up parameters are provided. Operation of the unit is under control of an internal microprocessor. The time code translator front-end of the unit features a wide dynamic amplitude and frequency range, full range of search and playback analog filtering, digital filtering, and error bypass.



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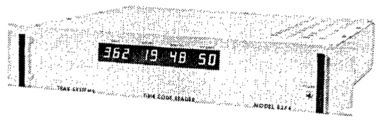
TRAK® SYSTEMS DIVISION OF TRAK® MICROWAVE

Timing Instruments

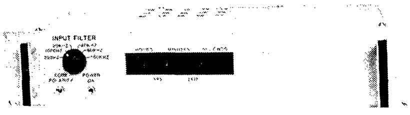


TIME CODE READER MODEL 8374

- SERIAL CODE READER
- GAS PLANAR DISPLAY
- ONE-INCH DISPLAY OPTIONAL
- PLUG-IN CIRCUITS FOR EASE OF MAINTENANCE
- MANY OPTIONS AVAILABLE

TRAK Systems' Model 8374 reads serial time code outputs from time code generators or tape reproductors, displays time in days, hours, minutes, and seconds, and optionally provides serial and parallel outputs to other equipment.

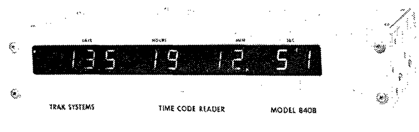
The Model 8374 may be ordered to read all commonly used time codes and with multiple-code inputs. The Model 8374 is also ideal as a remote display in systems where the cost of long multi-conductor cables is prohibitive. The high reliability of the instrument is assured by employing the design and workmanship standards specified in MIL-STD-454 to incorporate TRAK Systems' field-proven circuits. Reliability is further enhanced by using low-power TTL Schottky integrated circuits to minimize power consumption and to lower the operating temperature. Digital and analog circuits plug into wire-wrapped backplanes for ease of maintenance.



TIME CODE READER MODEL 8408N

- READS XR3 AND 2137 CODES
- AUTOMATIC FORWARD/REVERSE
- AUTOMATIC CODE RECOGNITION
- AUTOMATIC ERROR BYPASS
- READS DISTORTED CODES
- FUNCTIONALLY IDENTICAL TO ID-2234/U

TRAK Systems' Model 8408N Time Code Reader decodes and displays serial modulated XR3 and 2137 time codes at on-line speeds and during high-speed forward and reverse tape playback. Code format and direction detection is automatic, eliminating the need for operator intervention when processing tapes. A front panel switch selects the optimum low pass filter frequency for processing noisy tapes. A buffered output of the input code provides for "daisy chaining" many units.

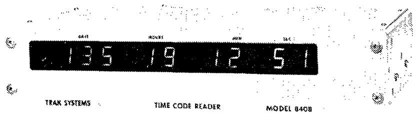


TIME CODE READER MODEL 8408A

- MULTIPLE-CODE READER
- INPUT FILTER AND AGC
- AUTOMATIC ERROR BYPASS
- LARGE INDICATORS
- AUTOMATIC CODE RECOGNITION

TRAK Systems' Model 8408A Time Code Reader decodes serial modulated time codes and displays the encoded time on a 0.8-inch LED display readable at 30 feet minimum.

With the one-inch gas discharge display option, viewing distance is 55 to 65 feet. The universal time display provides for viewing of special countdown and elapsed time formats as well as standard time of year. A variety of multicode input options are offered. Included are IRIG family, NSA family, NASA 36-Bit, FDME (BUDX), MILA, and combinations of these codes. The IRIG code reader automatically recognizes IRIG A, B, or G, without switch selection, and the NSA reader automatically recognizes XR3 and 2137 without switch selection. Parallel BCD time of year in seconds through days at TTL logic levels is provided.

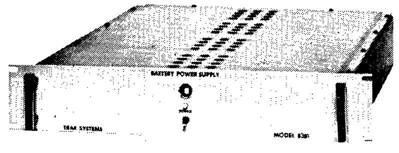


TIME CODE READER MODEL 8408B

- MULTIPLE-CODE READER
- INPUT FILTER AND AGC
- AUTOMATIC ERROR BYPASS
- GAS PLANAR INDICATORS
- AUTOMATIC CODE RECOGNITION

TRAK Systems' Model 8408B Time Code Reader decodes serial modulated time codes and displays the recorded time on a 1" Gas Planar display readable at 60 feet minimum.

The universal time display provides for viewing of special countdown and elapsed time formats as well as standard time of year. A variety of multicode input options are offered. Included are IRIG family, NSA family, NASA 36-Bit, FDME (BUDX), MILA, and combinations of these codes. The IRIG code reader automatically recognizes IRIG A, B, or G without switch selection, and the NSA reader automatically recognizes XR3 and 2137 without switch selection. Parallel BCD time of year in seconds through days at TTL logic levels is provided.



BATTERY POWER SUPPLY MODEL 8381

The Model 8381 Battery Power Supply is designed to smoothly and instantaneously supply all of the necessary DC voltages to TRAK Timing Equipment in the event of loss of primary AC power. The unit has the capacity to power the Slimline and Custom series of Generators for up to 36 hours, depending on the number of options in the Generator.

The salient specifications of the unit are as follows:

ELECTRICAL	
Output voltage:	11 to 14 VDC
Capacity:	36 ampere-hours
PHYSICAL	
Weight:	55 pounds
Mounting:	Standard 19 inch rack
Size:	19 inches wide x 3.47 inches high x 22 inches deep

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ΞXICO

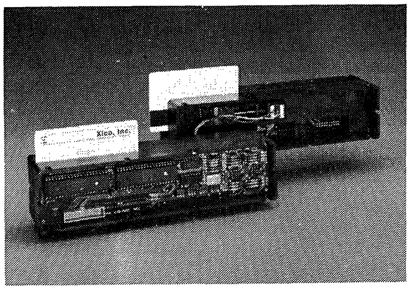
MAGNETIC STRIPE CARD PRODUCTS

READERS • ENCODERS • SYSTEMS

Electronic Features
- Microcomputer accuracy & reliability
- Broad range of speed & acceleration
- Exceeds ANSI/ISO jitter specs
- Digital E/M transient filter
- Reformat to ASCII characters

Mechanical Features
- Quality digital card head
- Full gimbal head assembly
- Precision engineering plastic body
- Low card wear, long module life
- Rugged, virtually immune to damage

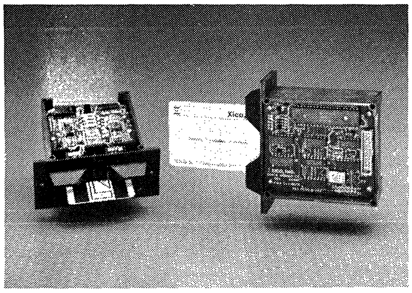
Output Features
- EIA standard interfaces
- Real-time or buffered
- Serial or 8-bit parallel
- Direct connect to host I/O
- Multidrop addressable



SERIES 6000 SWIPE READER MODULES
SERIES 6500 SWIPE READER/ENCODER MODULES

Hand swipe module. **Series 6000** for reading magnetically encoded data from cards, badges and passbooks, with either high or low coercivity magnetic stripes. Available in all ANSI/ISO track combinations, for both standard and custom encoding densities. Eight standard body configurations offer end or top card entry, swipe-thru or swipe-to-stop, and swipe in either direction, to fit any system orientation. Exceptionally rugged and human factors tolerant. Performs reliably for over a million passes. Easy mounting. **Series 6500** for both reading and encoding of low coercivity cards & badges with auto-verification read during encode. **Series 6600** for reading and encoding of high coercivity cards & badges. The industry standard Swipe Module.

- See **Standard I/O Options** for available TTL interfaces



SERIES 7000 INSERTION READER MODULES
SERIES 7500 INSERTION READER/ENCODER MODULES

Manual insertion & withdrawal module; reads/encodes 2⅜ inches of card length. **Series 7000** for reading data on cards & badges with single or dual magnetic stripes, either high or low coercivity. All ANSI/ISO track combinations, standard or custom encoding densities; dual read heads yield six data tracks. Removable bezel available in color. **Series 7500** for both reading & encoding, e.g., read on insertion and encode on withdrawal, on dual stripe low coercivity cards & badges. ANSI/ISO Tracks #1 and #2 for data, Track #3 for encode timing. Standard or custom encoding density; auto-verification read during encode. The industry standard Insertion Module for access, debit, and data collection applications.

- See **Standard I/O Options** for available TTL interfaces

SERIES 4700 READER TERMINALS
SERIES 4750 READER/ENCODER TERMINALS

Integrated magnetic stripe card terminal, designed as a smart peripheral ready for direct connection to data communications equipment. Immediate magnetic stripe card read and read/encode capability. Employs **Series 7000** Reader or **Series 7500** Reader/Encoder Module. Reads/Encodes 2⅜ inches of card length on insertion/withdrawal. Transforms ANSI/ISO or custom data formats into ASCII. Monitors 2 external sense circuits. Controls 2 external device circuits. Has 2 status LEDs and integral alarm. All Terminal resources under Host program control. EIA RS-232C, RS-422A, or RS-485 multipoint communications port, with selectable baud rate. Attractive, compact case for counter or bracket mounting. Companion plug-in power supply. Optional features include:

- Suffix **AP**—Switched Auxiliary RS-232C Port for associated device
- Suffix **SH**—Registered Secure Header algorithm for proprietary data protection
- Suffix **HF**—Hex Format algorithm for encoding arbitrary data patterns

Designed for OEM, System Integration, and Industrial Applications, including:

CREDIT AND DEBIT CARDS
Point of sale terminals
Credit authorization terminals
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DATA COLLECTION CARDS
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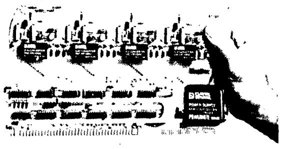
COMPUTER A/D-D/A SUBSYSTEMS

FOR MULTIBUS

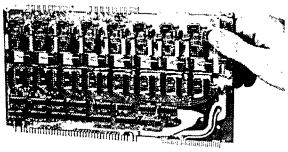
INDUSTRY STANDARD 12-BIT A/D-D/A



- Runs directly from Intel RMX-80 software
- 12 binary bits, 20μS A/D conversion
- Differential PGA
- Crystal Pacer interrupt clock
- 4-20 mA loop I/O

ST-711: 32S 16D A/D In
ST-732: 32S 16D A/D In plus 2 D/A Out
ST-724: 4 D/A Out

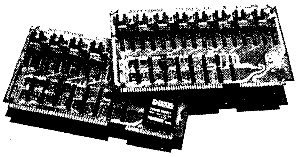
8 LOOP DAC's INDUSTRIAL



- 4 or 8 D/A channels with selectable 4-20 mA loops
- 8/16-bit data transfer, 16/20-bit addressing (8086-series compatible)
- Runs directly from Intel RMX-80 software
- Floppy disk diagnostic program and listing available
- 12-bit resolution, .05% accuracy
- Optional DC/DC power converter

ST-728 SERIES

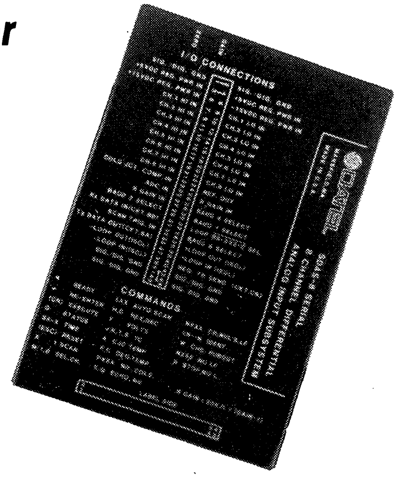
HIGH RESOLUTION, 14-BIT DAC'S



- 4 or 8 D/A channels
- 8/16-bit data transfer, 16/20-bit addressing (8086-series compatible)
- Accuracy .005% of FSR
- Optional DC/DC power converter
- Floppy disk diagnostic program and listing available

ST-716 SERIES

Without a Passport, your digital computer won't be welcome in an analog world.



- Passport is Datel's SDAS-8 miniature Data Acquisition Microsystem
- 8 Differential A/D Channels
- Measures only 4″ x 6″ x 0.4″
- Simple ASCII RS-232-C connection to personal and microcomputers
- Includes thermocouple software
- Includes PGA, real-time clock, auto-scan start clock
- Multidrop 32D channels thousands of feet between isolated stations.

SDAS-8

Send for your free brochures

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Everything for FROM

SYSTEM ENCLOSURES— 4 to 15 slots

MC-7512
MC-6015
MC-604
SE-607DM
MC-6010
SE-607

All you need to add are the boards! Here's everything ready to go—floor standing, rack mountable and tabletop enclosures, 4 to 15 slot low-noise backplanes, multiple-output power supply, dual fan cooling and control panel. All are designed to meet FCC Part 15 Class A EMI/RFI.

Choose from 3 different styles: The all-new SE-607DM DeskMate™ System Enclosure has a front-access 7-slot card cage with room for two 5¼" half-height peripherals as well as a full height hard disk inside. Plenty of power for floppys, Winchesters or tape drives.

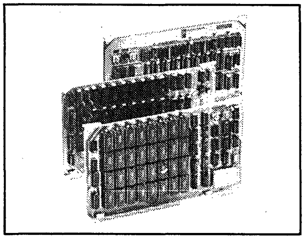
The SE-607 is a tabletop or rack mountable version of the DeskMate, with the same rugged 7-slot cage and capacity for peripherals.

The 4, 10, 12 and 15-slot models feature modular design with provision for multiple rear I/O connections, and a choice of tabletop or rack mounting. The slim-line MC-604 and MC-6010 offer a choice of front or rear card access. The 12 and 15 slot models have top card access to cards, with rear I/O access connections and a wide choice of power supply sizes.

All have RFI filtering and transient voltage suppression, overload and short circuit protection for all outputs, and ACLO signal for power fail software execution.

Model	No. of Slots	Card Loading	Card Center Spacing	Vertical Rack Height
MC-604	4	front/rear	0.6"	3½"
SE-607	7	front	0.6	7
SE-607DM	7	front	0.6	—
MC-6010	10	front/rear	0.6	7
MC-7512	12	top	0.75	10½"
MC-6015	15	top	0.6	10½"

NON-VOLATILE MEMORY



Add non-volatile, low power read/write memory with Electronic Solutions' EEPROM and battery-backed CMOS memory cards. Also PROM/EPROM boards to match your firmware perfectly into your system.

Battery-backed RAM-C series. Up to 64K of non-volatile CMOS RAM with on-board NiCd battery for up to 170 hr data retention. Power fail detection signals are supported. Unused sockets are fully compatible with 2716 type EPROM and allow full read/write operation of X2816A (5V) EEPROM.

RAM-S series: RAM-64S versions are without battery backup.

RAM64C-64K	64K CMOS RAM Board with battery backup
RAM64C-xxK	Partially populated: x=4(K) to 60(K) CMOS RAM
RAM64C-0K	Unpopulated Board
RAM64S-64K	64K Static RAM Board
RAM64S-xxK	Partially populated: x=4(K) to 60(K) Static RAM
RAM64S-0K	Unpopulated Board

ROM/PROM/EPROM Boards. Up to 256K of read-only memory. Easy hex-switch address selection and versatile address deselection.

PROM64/256	(16) 27128,2764 or 2732

EEPROM-32 supports all currently available 16K-bit EEPROM devices, has on-board +21Vpp supply for read/write operation. 2716 EPROMs may be used on the same board.

EEPROM32	32K EEPROM Board (unpopulated)
EEPROM32-32K	32K EEPROM Board with 2816-type EEPROMs

For more information call TOLL FREE
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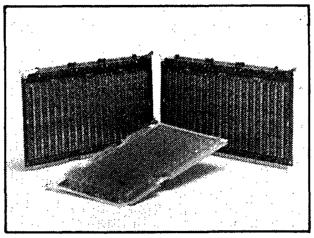
All Electronic Solutions enclosures, cards and card cages

LIMITED **3 Year** WARRANTY

SYSTEM DEVELOPMENT BOARDS

PR-100A SLAVE INTERFACE/ PROTOTYPING BOARD

Save development time with this prototyping board that has all the bus logic already built in. The interface circuitry supports up to eight I/O devices, each with eight registers, and with full 8-level interrupt support.



PROTOTYPING BOARDS

Hole Pattern, 0.1" spacing, with 34 undedicated bus strips, 3 I/O connectors.

PR-100H	Prototyping card with hole pattern

Wire Wrap, 36 columns x 50 pins.

PR100WTGH	Tin wirewrap leads with header I/O connectors
PR100WGH	Gold wirewrap leads with header I/O connectors
PR100WTGE	Tin wirewrap leads with edge connectors
PR100WGE	Gold wirewrap leads with edge connectors

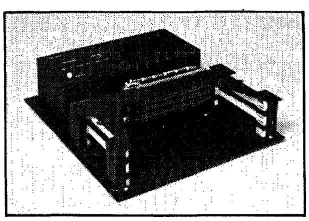
High Density Wire Wrap, 44 columns x 53 pins.

PR200WTGH	Tin wirewrap leads with header I/O connectors
PR200WGH	Gold wirewrap leads with header I/O connectors

Extender Card

80EX-3	Universal Multibus extender card

MULTIBUS BENCH TEST BED SET



Get your Multibus system up and running with a minimum of cost and effort with this combination 4-slot card cage and 75W switching power supply. Includes power switch, fan and line cord.

Model TS-604 Four slot test set

the Multibus
ELECTRONIC SOLUTIONS.

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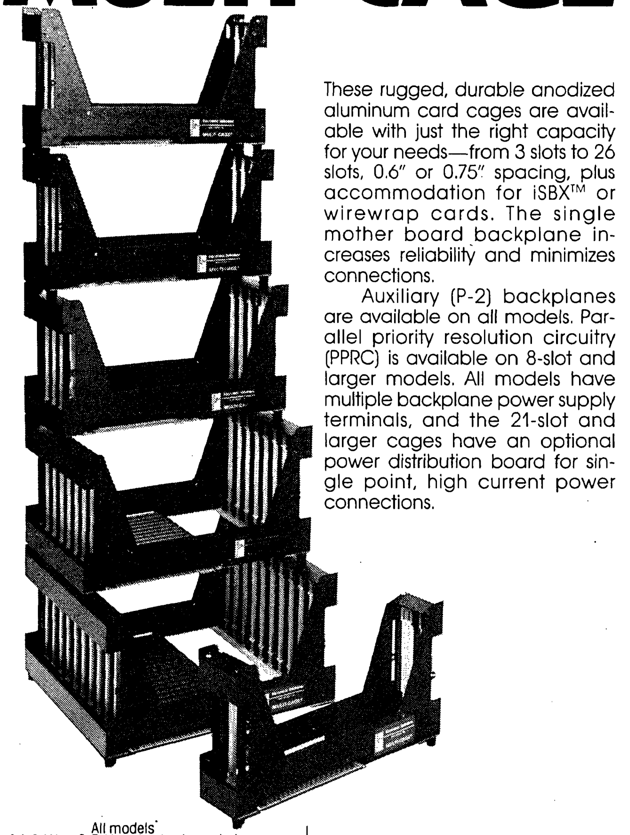
Electronic Solutions

MULTI-CAGE® CARD CAGES



These rugged, durable anodized aluminum card cages are available with just the right capacity for your needs—from 3 slots to 26 slots, 0.6" or 0.75" spacing, plus accommodation for iSBX™ or wirewrap cards. The single mother board backplane increases reliability and minimizes connections.

Auxiliary (P-2) backplanes are available on all models. Parallel priority resolution circuitry (PPRC) is available on 8-slot and larger models. All models have multiple backplane power supply terminals, and the 21-slot and larger cages have an optional power distribution board for single point, high current power connections.

All models*
14.2"W × 8.5"H × depth shown below

Models with .6 inch Card Centers

Model	No. of Slots	No. of iSBX slots available*	No. of w-w slots available*	Depth (in.)
ESBC 604	4	0	1	3.34
SBC 604A	4	1	0	3.34
ESBC 614G	4	0	1	3.34
SBC 605	5	0	1	3.94
SBC 606	6	0	1	4.54
SBC 608	8	2	2	6.68
SBC 609	9	1	1	6.68
SBC 619	9	0	1	6.68
SBC 6012	12	3	4	10.02
SBC 6012B	12	0	1	8.04
SBC 6013B	13	0	1	8.69
SBC 6014	14	1	2	10.02
SBC 6015	15	0	1	10.02
SBC 6016	16	5	5	13.36
SBC 6020	20	1	1	13.36
SBC 6024	24	2	3	16.7
SBC 6026	26	0	1	16.7

Models with .75 inch Card Centers

Model	No. of Slots:	No. of iSBX slots available*	No. of w-w slots available*	Depth (in.)
SBC 753	3	0	1	3.34
SBC 754	4	0	1	3.94
SBC 755	5	0	1	4.54
SBC 757	7	1	1	6.68
SBC 7512	12	0	1	10.02
SBC 7516	16	1	1	13.36
SBC 7521	21	0	1	16.7

*Without using additional slots.

CARD CAGE/ ENCLOSURE ACCESSORIES

P2 BUS:
Backplanes for implementation of the Multibus P2 bus (x = no. of slots) 4-26 slots at 0.6" spacing, 3-21 slots at 0.75" spacing

P2-60x-P	PC board only, 0.6" spacing
P2-75x-P	PC board only, 0.75" spacing
P2-60x-C	Board w/connectors, 0.6" spacing
P2-75x-C	Board w/connectors, 0.75" spacing

PARALLEL PRIORITY RESOLUTION CIRCUITRY

PPRC8	For up to 8 masters
PPRC16	For up to 16 masters

CAGES WITH POWER DISTRIBUTION BOARDS
Piggyback board to Multibus backplane, simplifies power connections. Add "-PDB" suffix to models in table (21 slots & up)

FANS FOR CARD CAGES

A30390-10	4.5" 68cfm
A30769-10	4.5" 50cfm
A30473-10	3" 35cfm

RACK MOUNT CARD CAGES

Choose from a selection of models with either horizontal (3-15 slots) or vertical (12-26 slots) card mounting. All are ready for standard 19" rack mounting, in the vertical rack space shown in the tables. Horizontal mount versions include removable front cover and mounting area for fan. Vertical mount versions have hinged front cover. All have optional parallel priority resolution circuitry and P-2 (auxiliary) backplane or connectors.

VERTICAL RACK MOUNTS

Vertical rack space for all models 15-3/4"

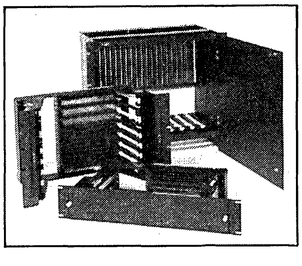
Models with .6 inch Cord Centers

Model	No. of Slots	No. of iSBX slots available*	No. of w-w slots available*
SBC 6012V	12	4	4
SBC 6014V	14	2	2
SBC 6015V	15	1	1
SBC 6016V	16	5	5
SBC 6020V	20	1	1
SBC 6024V	24	3	3
SBC 6026V	26	0	1

Models with .75 inch Cord Centers

Model	No. of Slots	No. of iSBX slots available*	No. of w-w slots available*
SBC 7512V	12	0	1
SBC 7516V	16	1	1
SBC 7521V	21	0	1

*Without using additional slots.



HORIZONTAL RACK MOUNTS

Models with .6 inch Cord Centers

Model	No. of Slots	No. of iSBX slots available*	No. of w-w slots available*	Vertical Rack Space
ESBC 604H	4	0	1	3.5
SBC 604AH	4	1	0	3.5
SBC 605H	5	0	1	5.25
SBC 606H	6	0	1	5.25
SBC 608H	8	2	2	7.0
SBC 609H	9	1	1	7.0
SBC 6012H	12	3	4	10.47
SBC 6014H	14	1	2	10.47
SBC 6015H	15	0	1	10.47

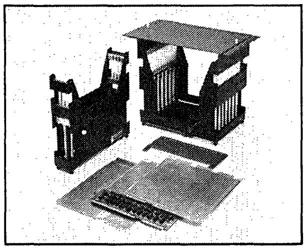
Models with .75 inch Cord Centers

Model	No. of Slots	No. of iSBX slots available*	No. of w-w slots available*	Vertical Rack Space
SBC 753H	3	0	1	3.5
SBC 754H	4	0	1	5.25
SBC 755H	5	0	1	5.25
SBC 757H	7	1	1	7.0
SBC 7512H	12	0	1	10.47

DOUBLE HEIGHT
CAGE AND CARD SYSTEMS.

The Electronic Solutions 2X Multibus system uses 12x12 inch cards, offering double the useful circuit area of a standard size card. Or even more than double, considering the bus interface "overhead" on each card.

Double Height cards are particularly useful for batch I/O processing, configured with the I/O ports and memory on the same card. An on-board μC can process large blocks of data without the delays of bus arbitration and data transfer.



CARD CAGES

All card cages and rack mounting card cages are available in double height versions. Add "2X" before model number.

DEVELOPMENT CARDS

2XPR100	Double Height Prototyping Card
2XPR100A	Double Height Slave Interface/Prototyping Card
2XPR100M	Double Height Master Interface/Prototyping Card
2X80EX	Double Height Extender Card
DHA80	Single Height to Double Height Card Adapter

VMEbus System Components ⇨

VME:

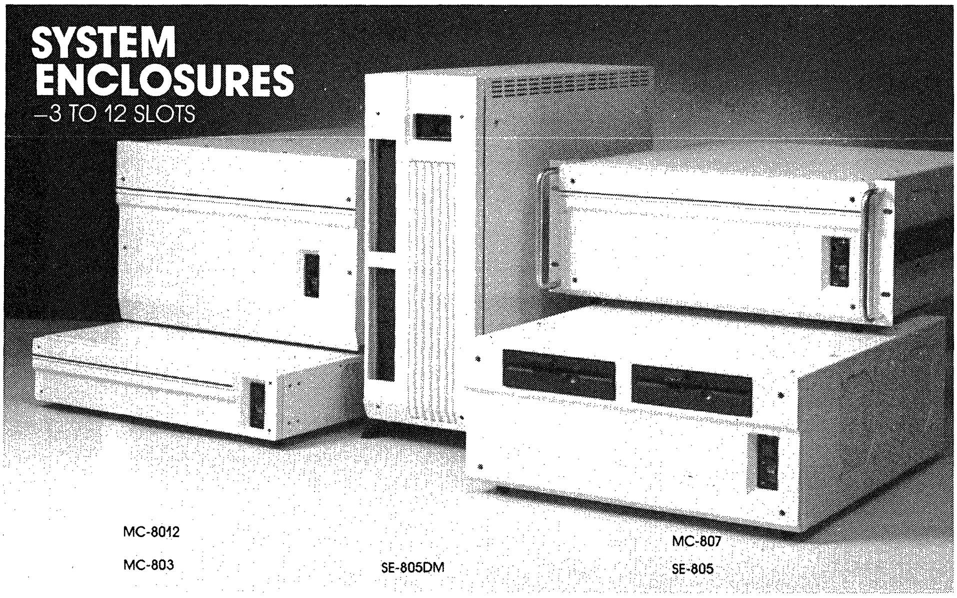
Electronic Solutions Makes it Easy

9255 Chesapeake Drive
San Diego, CA 92123
(619) 292-0242/(800) 854-7086
In Calif. (800) 772-7086
Telex II (TWX): 910-335-1169

Electronic Solutions

SYSTEM ENCLOSURES

–3 TO 12 SLOTS



Just add VME boards to make a complete system with one of these full featured system enclosures. Select from floor standing, rack mountable and tabletop models with 3 to 12 slot low-noise backplanes, multiple-output power supply, dual fan cooling and control panel. All are designed to meet FCC Part 15 Class A EMI/RFI.

Choose from 3 different styles: The all-new SE-805DM DeskMate™ System Enclosure has a front-access 5-slot card cage with room for two 5¼" half-height peripherals as well as a full height hard disk inside. Plenty of power for floppys, Winchesters or tape drives.

The SE-805 is a tabletop or rack mountable version of the DeskMate, with the same rugged 5-slot cage and capacity for peripherals.

The 3, 7 and 12-slot models feature modular design with provision for multiple rear I/O connections, and a choice of tabletop or rack mounting. The slim-line MC-803 and MC-807 offer a choice of front or rear card access. The 12 slot model has top card access to cards, with rear I/O access connections and a wide choice of power supply sizes.

All have RFI filtering and transient voltage suppression, overload and short circuit protection for all outputs, and ACLO signal for power fail software execution.

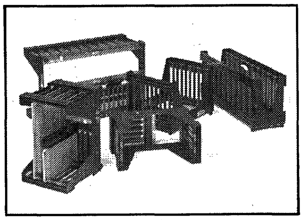
Model	No. of Slots	Card Loading	Vertical Rack Height
MC-803	3	front/rear	3½"
SE-805	5	front	7
SE-805DM	5	front	
MC-807	7	front/rear	7
MC-8012	12	top	10½

CARD CAGES

Electronic Solutions VME cages are ideal for system development and OEM applications. It's easy to match OEM mounting configurations, since each card cage can be mounted on the bottom or any side. Unique center adapters convert double size slots into two single size slots, making it easy to configure systems with both slot sizes.

Electronic Solutions' single size VME card cages are ideal for I/O expansion applications in VME systems, as well as for complete single size VME or Eurocard systems.

All cages are constructed of sturdy, durable anodized aluminum with a single mother board backplane for the VME bus and separate connectors for the I/O channel. Fans and fan mounting hardware are available for each cage.



No. of Slots	Double Size Model	Single Size Model
3	VME–803D	VME-803S
5	VME-805D	VME-805S
7	VME-807D	VME-807S
9	VME-809D	VME-809S
12	VME-8012D	VME-8012S
16	VME-8015D	VME-8015S
20	VME-8020D	VME-8020S

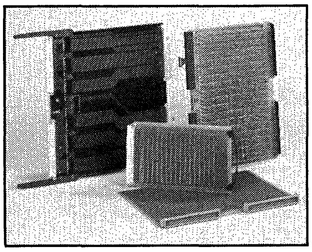
ACCESSORIES

VME-CA	Center Adapter: Converts double size slot to two single size slots
FMB-3	Standard fan mounting bracket kit
A30390-10	Torin Fan: 68 cfm
A30769-10	Torin Fan: 50 cfm
I/O Channel Connectors:	
VME9-123	1-level wire wrap
VME8-123	3-level wire wrap
VME1-224	IDC (for cable connection)

Multibus Packaging, Enclosures and Cages.

DEVELOPMENT CARDS

Electronic Solutions VME designer's cards make your VME system easier to design and test. Three prototyping boards and two extender card sizes are available to meet nearly any requirement.



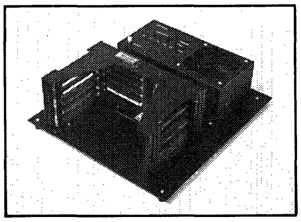
PROTOTYPING BOARDS

VME68HD	Double size, 57 × 86 hole pattern with 0.1" spacing.
VME68PD-G	(Gold Connectors)
VME68PD-TG	(Tin Gold Connectors) Double size, 2-level wire wrap. Provided with 20 columns of 81 pins.
VME-68PD-GS	(Gold Connectors)
VME-68PD-TGS	(Tin Gold Connectors) Double size Shottky board, 2-level wire wrap. Provided with 20 columns of 81 pins.
VME68HS	Single size, 57 × 34 hole pattern with 0.1" spacing.

EXTENDER CARDS

VME68ED	Double size VME/Eurocard Extender Card
VME68ES	Single size VME/Eurocard Extender Card

VMEbus BENCH TEST SET



Get your VME system up and running with a minimum of cost and effort with this combination 5-slot card cage and 75W switching power supply. Includes power switch, fan and line cord.

Model TS805 Five slot test set

MINIGLOSSARY
BASIC
ASCII CODE

Bit positions 4, 3, 2, 1
Second Hexadecimal Digit

First Hexadecimal Digit
Bit Positions 6, 5
Bit Positions 8, 7

		00				01				10				11			
		00	01	10	11	00	01	10	11	00	01	10	11	00	01	10	11
		0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0000	0	NUL	DLE			SP	0					@	P			`	P
0001	1	SOH	DC1			!	1					A	Q			a	q
0010	2	STX	DC2			″	2					B	R			b	r
0011	3	ETX	DC3			#	3					C	S			c	s
0100	4	EOT	DC4			$	4					D	T			d	t
0101	5	ENQ	NAK			%	5					E	U			e	u
0110	6	ACK	SYN			&	6					F	V			f	v
0111	7	BEL	ETB			′	7					G	W			g	w
1000	8	BS	CAN			(	8					H	X			h	x
1001	9	HT	EM			)	9					I	Y			i	y
1010	A	LF	SUB			*	:					J	Z			j	z
1011	B	VT	ESC			+	;					K	[			k	{
1100	C	FF	FS			,	<					L	\			l	¦
1101	D	CR	GS			-	=					M	]			m	}
1110	E	SO	RS			.	>					N	^			n	~
1111	F	SI	US			/	?					O	_			o	DEL

Control Character Representations

NUL	Null
SOH	Start of Heading (CC)
STX	Start of Text (CC)
ETX	End of Text (CC)
EOT	End of Transmission (CC)
ENQ	Enquiry (CC)
ACK	Acknowledge (CC)
BEL	Bell
BS	Backspace (FE)
HT	Horizontal Tabulation (FE)
LF	Line Feed (FE)
VT	Vertical Tabulation (FE)
FF	Form Feed (FE)
CR	Carriage Return (FE)
SO	Shift Out
SI	Shift In

(CC)	Communication Control
(FE)	Format Effector
(IS)	Information Separator

DLE	Data Link Escape (CC)
DC1	Device Control 1
DC2	Device Control 2
DC3	Device Control 3
DC4	Device Control 4
NAK	Negative Acknowledge (CC)
SYN	Synchronous Idle (CC)
ETB	End of Transmission Block (CC)
CAN	Cancel
EM	End of Medium
SUB	Substitute
ESC	Escape
FS	File Separator (IS)
GS	Group Separator (IS)
RS	Record Separator (IS)
US	Unit Separator (IS)
DEL	Delete

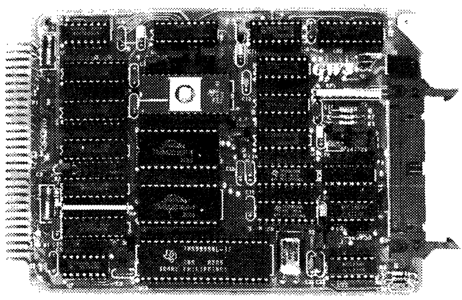
Special Graphic Characters

SP	Space
!	Exclamation Point
|	Logical OR
"	Quotation Marks
#	Number Sign
$	Dollar Sign
%	Percent
&	Ampersand
'	Apostrophe
(	Opening Parenthesis
)	Closing Parenthesis
*	Asterisk
+	Plus
,	Comma
-	Hyphen (Minus)
.	Period (Decimal Point)
/	Slant
:	Colon
;	Semicolon

<	Less Than
=	Equals
>	Greater Than
?	Question Mark
@	Commercial At
[	Opening Bracket
\	Reverse Slant
]	Closing Bracket
^	Circumflex
¬	Logical NOT
_	Underline
`	Grave Accent
{	Opening Brace
¦	Vertical Line (This graphic is stylized to distinguish it from Logical OR)
}	Closing Brace
~	Tilde

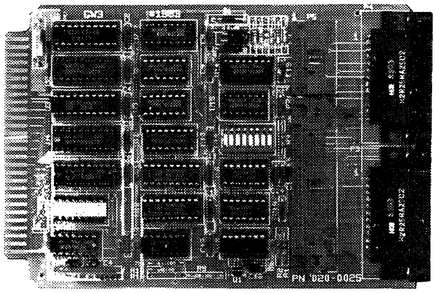
GW3 *High Performance STD Bus Products*

Model	*Order by Part Number*



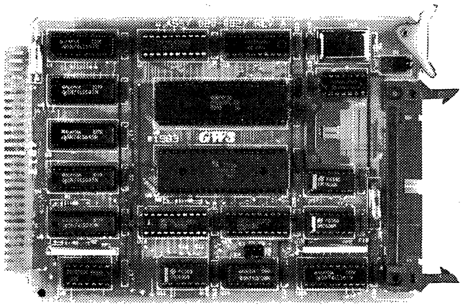
SBC 95/1 w/DBG-3 decode Map	**020-0020-C**
SBC 95/1 w/PDOS decode Map	**020-0020-D**

OEM Microcomputer Board with 8/16 bit TMS9995. Two Serial ports, RS-232 or RS-422. Two software-selectable memory maps. Sockets for up to 16K EPROM, 4K RAM. No memory populated. 5 TTL output, 8 TTL input bits. Clocked Serial Output Channel, STD Bus interface for memory and I/O expansion. Available with various decode PROMs.



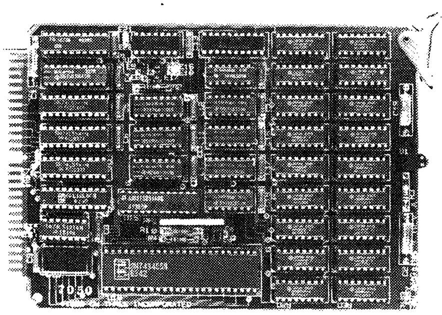
SSB-1: System Support Board	**020-0025**

System Support Board for SBC 95/1. Power-up Reset, Single-Step logic, LED driver, dipswitch, and two additional serial ports for fully expanded "mini-computer" applications of the SBC 95/1.



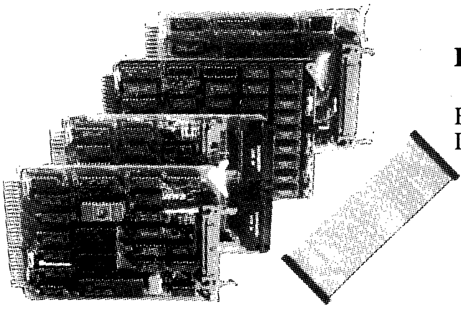
FDC-2: Floppy Disk Controller	**020-0027**

Features 8-inch, 5-inch, or 3.5-inch drive support with single or double density and single or double sided, all software selectable. Up to four 8″ or three 3.5″/5″ and/or 8″ mixed drives on same cable. Digital Data Separator and high speed DMA channel.



DRAM-128: Dynamic RAM 128K bytes	**020-0188**
DRAM-512: Dynamic RAM 512K bytes	**020-0036**

128K/512K byte Dynamic RAM Board. On-board Page Register allows address extension to 2M bytes. Memory-mapping PROM allows allocation of 4K blocks anywhere in total address space. Directly supports PDOS/STD memory paging. Parity Error checking logic.



PROTOKIT I: STD-PDOS Board Set	**020-0032**

Board set for low cost evaluation of STD/9995 PDOS system. Includes:

- SBC 95/1 High Performance CPU
- SSB-1 System Support Board
- FDC-2 Floppy Disk Controller
- DRAM-128 Dynamic RAM Card
- CBL-41 Cable Assembly

1 of 3

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GW3 *High Performance STD Bus Products*

Order by
Part Number

NEW PRODUCT SBC 95/2: High Performance Micro Computer 020-0040

The SBC 95/2 offers improved capability over the SBC 95/1. Designed for use with the companion SSB-2 System Support Board, the SBC 95/2 allows greatly increased on-board memory density and variety. Three JEDEC compatible memory sockets support various RAM/EPROM mixtures. High speed zero-wait access to on-board RAM is fully supported. Features include:

CPU Functions
- 3 JEDEC sockets: 2 RAM/EPROM, 1 RAM only.
- Memory may be battery-backed via SSB-2.
- Supports DMA to on-board memory.
- Flexible PAL-based memory and I/O decoding.
- Interrupt sources may be assigned to level 1 or 4.
- 256-bit NOVRAM for configuration control.

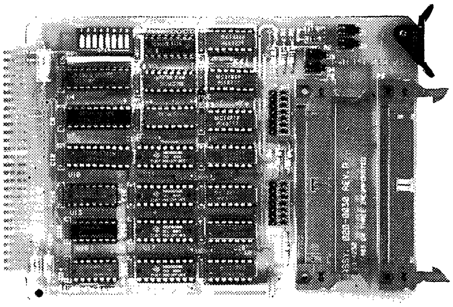
I/O Functions
- 8-bit TTL input port.
- 8-bit LED driver output port.
- 2 RS-232-C Serial Interface ports, one configurable to RS-485 (RS-422).

NEW PRODUCT SBC 95/3: Large Board Controller 020-0037

This TMS 9995 based computer board serves as a high performance controller engine for low-cost applications. Significant on-board memory and I/O are included on this non-STD Bus form factor card. An expansion connector allows ribbon cable connection to one or two STD Bus I/O boards for total system flexibility.

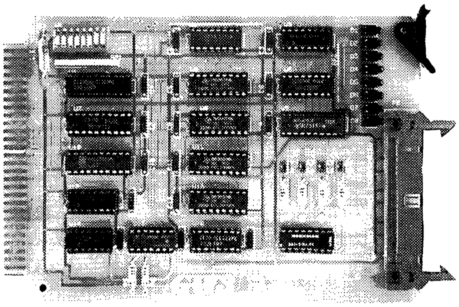
CPU Functions
- High Performance TMS 9995 CPU
- 5 JEDEC memory sockets: 1 EPROM only, 1 EPROM/RAM, 3 RAM only
- Memory paging to over 64k supported.
- Zero-wait operation with on-board RAM.
- All RAM sockets supported for CMOS battery-backed operation.
- On-board SuperCap for no-battery non-volatile storage over several hours.
- 256 bit NOVRAM equivalent to 32 eight-position Dipswitches.
- Flexible memory and I/O maps decoded in Programmable Logic.

I/O Functions
- 2 RS-232 Serial I/O ports, software programmable baud rates.
- 1 RS-485 Serial I/O port for multidrop networks.
- 24-bit Input/Output port for OPTO-22 or equivalent.
  - ✓ Each bit individually selectable for input or output.
  - ✓ GW3's exclusive Interlocked I/O on all output bits.
  - ✓ Each bit individually addressable.
- 24-bit Input-Only port compatible with OPTO-22 or equivalent.



SIO-4/232: RS-232 Serial I/O Board 020-0030

4 Channel RS-232 Serial Communications Board with 4 TMS9902A UART devices. Each channel has independent software controlled baud-rate generator, and auxilliary interval timer. An LED for each port may be used to indicate channel activity or fault status.



SIO-4/422: RS-422 Serial I/O Board 020-0031

RS-422 version of SIO-4. The RS-422 interface allows high speed connection over very long distances. Each transmitter may be individually tri-stated for party-line operation. Two LED's indicate "transmit active" and activity or fault status for each port.

2 of 3

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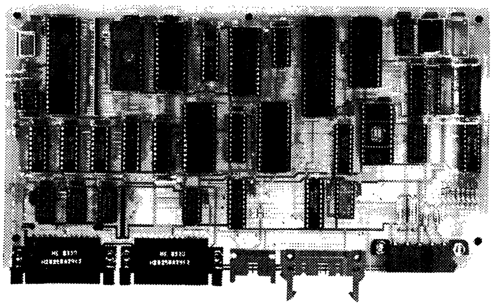
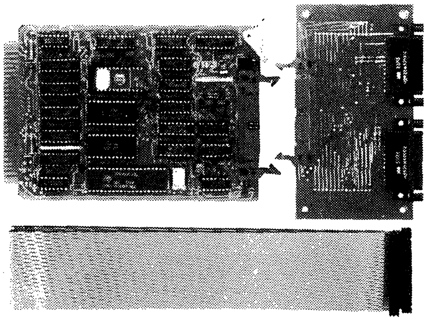
GW3 *High Performance STD Bus Products*

Model	*Order by Part Number*



VDT-1: Video Display Terminal Board **020-0028**
VDT-1 Reference Manual including firmware Source Code **020-0138**

Video Display Terminal Board serves as stand-alone terminal electronics package. Various terminal emulation software available including ANSI protocol. Supports 80x24, 132x24, other formats. 4-16K EPROM, 4-16K RAM. Host, printer, and keyboard serial ports. (Board size 5.5 x 10 inches, not STD Bus.)



EVM-1: Evaluation Kit for SBC 95/1 **020-0022**

Evaluation Kit comes with an SBC 95/1, 4K RAM and 4K DBG-3 debug monitor EPROM. Includes 40 conductor cable assembly, dual DB-25 connector adaptor PC, and documentation including DBG-3 source listings.

Accessories

Model		*Order by Part Number*
ADKPC	Adaptor PC with 2 DB-25 female connectors and 40 pin male header.	**020-0131**
ADKB	*Bare* adaptor PC with no connectors, etc.	**020-0089**
CBL-40	1 meter long 40-conductor cable assembly with female connector each end.	**020-0132**
CBL-41	6-inch 40-conductor cable assy for use between SBC 95/1 and SSB-1.	**020-0133**
CBL-50	Used with SIO-4/232 board. 1-meter long 50-conductor cable assembly with 50 contact female at one end and 2 DB-25S connectors at other end.	**020-0117**
DBG-3	Debug Monitor EPROM. Includes PAXASM patch assembler and disassembler. Requires 4K RAM @ 0. Source listings included.	**020-0185**

WARRANTY. The Seller warrants that the parts and services furnished pursuant to this agreement will be free from defects in material and workmanship under normal use and operation and, with respect to such parts, will conform with the Seller's published specifications at the time of delivery to the Customer. The obligation of the Seller under this warranty is limited to the repair or replacement, at the Seller's option, of any nonconforming product, part or component thereof, which within one year after installation or acceptance of delivery is established by the Seller to be nonconforming or defective. The foregoing warranty and conditions shall apply to any repaired or replaced product, part, or component thereof, supplied by the Seller. The Customer's remedies are limited to the Seller's obligations herein expressly stated. This warranty extends only to the Customer and not to the clientele of the Customer or the users of the Customer's services.

IN NO EVENT SHALL THE SELLER BE LIABLE TO THE CUSTOMER OR ANYONE ELSE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES, HOWEVER OCCASIONED.

THIS WARRANTY IS EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES EXPRESSED OR IMPLIED, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS.

3 of 3

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FOR THE MICROCOMPUTER OEM OR END-USER HEURIKON IS THE CHOICE

Make Heurikon your choice for Multibus™ and VME™ microcomputers and system components.

For 12 years, Heurikon has supplied thousands of computers to help its customers find economical solutions for their microcomputer applications.

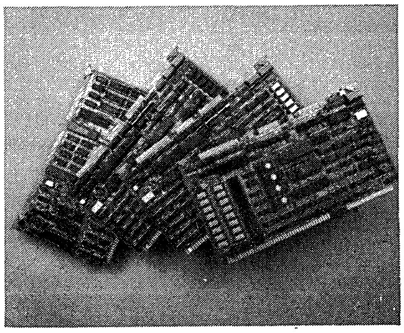
8-Bit Multibus Microcomputers

MLZ-90A single board microcomputer with nine byte-wide memory sockets for use with RAM or ROM (AM9511 and floppy disk drive controller optional).

MLZ-91A single board CP/M™ system with on-card floppy disk drive controller, Winchester interface, optional AM9511, streamer tape interface, two serial ports, one parallel port, 64K or 128K bytes RAM with parity, two EPROM sockets, and GPIB CONTROLLER.

MLZ-92A single board CP/M™ with four serial ports on-card, floppy disk drive controller, Winchester interface, optional AM9511, Centronics printer interface, 64K or 128K bytes of RAM with parity, and two EPROM sockets.

MLZ-93A single board CP/M™ system with 128K bytes of dual ported RAM, four EPROM sockets, floppy disk drives controller, optional AM9511 and powerful serial port features including SDLC and HDLC protocol support and modem controls.



16-Bit Multibus™ Microcomputers

HK68/M™ family of powerful and versatile single board UNIX™ or real-time systems with no wait-state 68010 CPU (8, 10, 12.5 MHz), quad-channel DMA, up to 1 MB of on-card DRAM, up to 128K of EPROM, optional MMU, full SCSI parallel interface, optional MC68881 floating point processor, four serial ports, 2 iSBX™ connectors, iLBX high speed memory expansion bus and direct interface to Multibus™ with 24 bit addressing and 16 bit data path.

Heurikon can also supply a full line of iSBX I/O expansion modules including quad-channel serial port module, floppy disk drive controller, A/D converter and others.

16-Bit VMEbus Microcomputers

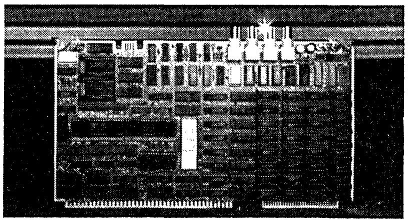
HK68/V™ family of powerful and versatile VME processors ideal for UNIX™ and real time systems. Features include no wait-state 68010 CPU (8, 10, 12.5 MHz), quad-channel DMA, up to 1 MB of on-board DRAM, up to 128K of EPROM, optional MMU, full SCSI parallel interface on some models, optional MC68881 floating point processor, two serial ports and direct access to VMEbus accessing up to 64 MB of memory with 32 bit data path.

Software Products

Heurikon provides UNIX™ (Version V) as well as a variety of UNIX™ drivers, VRTX™ real time executive, various languages and applications packages. UNIX™ includes Berkeley enhancements csh, vi, yacc and lex among others. Languages include Pascal, Fortran, Basic, ADA, Cobol and 68000/68010 Assembler. Applications software includes UNIPLEX (office automation), UNIFY (database manager), Ultracalc (spreadsheet), GKS Graphics support, Gossling EMACS and others.

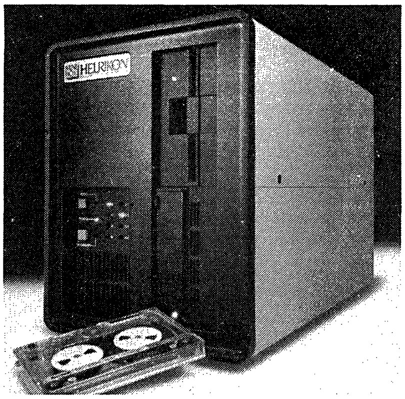
Graphics Controllers

MLZ-VDC intelligent 640 x 480 x 4 color graphics controller based on the NEC 7220 controller chip with on-board Z-80 CPU, DMA controller, and user definable FIFO interface to Multibus™. Users may display up to 16 colors from a 4K palette. Up to 1024 x 1024 x 3 interlaced also available.



Microcomputer Systems

Heurikon provides completely integrated Multiuser UNIX™ workstations based upon the HK68™/M single board microcomputer family and Uniplus+™ System V operating system. Included within its frame is a 200 or 400 watt power supply, four or six slot Multibus™ card cage (4-5 available for user), single double density floppy disk drive, streamer tape drive, 30 or 65 MB Winchester drive expandable to 280 MB within the same cabinet. Optional interactive on-line streamer tape drive supporting 1-16 users also available.



Microcomputer System Components

In addition to microcomputer boards and systems, Heurikon also provides a line of system components including rack mountable Multibus enclosures (4, 6, 10, 14 slot) as well as floppy, Winchester and streamer drives in rack mountable enclosures.

HEURIKON CORP.

3201 LATHAM DRIVE
MADISON, WI 53713
TELEX 469532
1-800-356-9602

MINIGLOSSARY BASIC EBCDIC CODE

Bit Positions 4, 5, 6, 7	Second Hexadecimal Digit	Digit Punches	00				01				10				11				Bit Positions 0, 1
			00	01	10	11	00	01	10	11	00	01	10	11	00	01	10	11	Bit Positions 2, 3
			0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	First Hexadecimal Digit
			12				12	12		12	12	12		12	12				Zone Punches
				11				11	11	11		11	11	11		11			
					0		0		0	0	0		0	0			0		
			9	9	9	9	9	9	9	9									
			①	②	③	④	⑤	⑥	⑦	⑧					⑨	⑩	⑪	⑫	Digit Punches
0000	0	8-1	NUL	DLE	DS		SP	&	-									0	8-1
0001	1	1	SOH	DC1	SOS				⑬		a	j			A	J	⑭	1	1
0010	2	2	STX	DC2	FS	SYN					b	k	s		B	K	S	2	2
0011	3	3	ETX	TM							c	l	t		C	L	T	3	3
0100	4	4	PF	RES	BYP	PN					d	m	u		D	M	U	4	4
0101	5	5	HT	NL	LF	RS					e	n	v		E	N	V	5	5
0110	6	6	LC	BS	ETB	UC					f	o	w		F	O	W	6	6
0111	7	7	DEL	IL	ESC	EOT					g	p	x		G	P	X	7	7
1000	8	8		CAN							h	q	y		H	Q	Y	8	8
1001	9	8-1		EM							i	r	z		I	R	Z	9	9
1010	A	8-2	SMM	CC	SM		¢	!	⑮	:									8-2
1011	B	8-3	VT	CU1	CU2	CU3	.	$	,	#									8-3
1100	C	8-4	FF	IFS		DC4	<	*	%	@									8-4
1101	D	8-5	CR	IGS	ENQ	NAK	(	)	_	'									8-5
1110	E	8-6	SO	IRS	ACK		+	;	>	=									8-6
1111	F	8-7	SI	IUS	BEL	SUB	|	¬	?	"									8-7
			12				12				12	12		12	12	12		12	Zone Punches
				11				11				11	11	11		11	11	11	
					0				0		0		0	0	0		0	0	
			9	9	9	9									9	9	9	9	

Card Hole Patterns

①	12-0-9-8-1	⑤	No-Punches	⑨	12-0	⑬	0-1
②	12-11-9-8-1	⑥	12	⑩	11-0	⑭	11-0-9-1
③	11-0-9-8-1	⑦	11	⑪	0-8-2	⑮	12-11
④	12-11-0-9-8-1	⑧	12-11-0	⑫	0		

Control Character Representations

ACK	Acknowledge
BEL	Bell
BS	Backspace
BYP	Bypass
CAN	Cancel
CC	Cursar Control
CR	Carriage Return
CU1	Customer Use 1
CU2	Customer Use 2
CU3	Customer Use 3
DC1	Device Control 1
DC2	Device Control 2
DC4	Device Control 4
DEL	Delete
DLE	Data Link Escape
DS	Digit Select
EM	End of Medium
ENQ	Enquiry

EOT	End of Transmission
ESC	Escape
ETB	End of Transmission Block
ETX	End of Text
FF	Form Feed
FS	Field Separator
HT	Horizontal Tab
IFS	Interchange File Separator
IGS	Interchange Group Separator
IL	Idle
IRS	Interchange Record Separator
IUS	Interchange Unit Separator
LC	Lower Case
LF	Line Feed
NAK	Negative Acknowledge
NL	New Line
NUL	Null

PF	Punch Off
PN	Punch On
RES	Restore
RS	Reader Stop
SI	Shift In
SM	Set Mode
SMM	Start of Manual Message
SO	Shift Out
SOH	Start of Heading
SOS	Start of Significance
SP	Space
STX	Start of Text
SUB	Substitute
SYN	Synchronous Idle
TM	Tape Mark
UC	Upper Case
VT	Vertical Tab

Special Graphic Characters

¢	Cent Sign
.	Period, Decimal Point
<	Less-than Sign
(	Left Parenthesis
+	Plus Sign
|	Logical OR
&	Ampersand
!	Exclamation Point
$	Dollar Sign
*	Asterisk
)	Right Parenthesis
;	Semicolon
¬	Logical NOT
-	Minus Sign, Hyphen
/	Slash
,	Comma
%	Percent
_	Underscore
>	Greater-than Sign
?	Question Mark
:	Colon
#	Number Sign
@	At Sign
'	Prime, Apostrophe
=	Equal Sign
"	Quotation Mark

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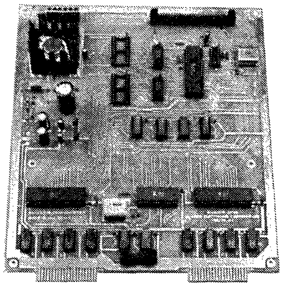

6502 CPU • 1 MHz X'TAL OSC • 8K ROM, 1K RAM or 4K ROM, 3K RAM • Serial Port • RS232 • RS232C • Control Signals • 15 Baud Rates • 32 Parallel I/O Lines • Four Sixteen Bit Timer/Counters • Two Serial Data Ports • Expandable via a 50 Pin Connector.

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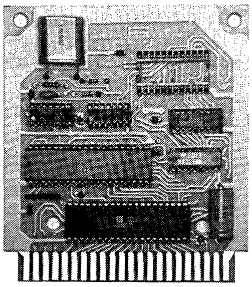
6502GP-CMOS-2	2 MHz CMOS 6502GP μC
6502LG-CMOS-3	3 MHz CMOS 6502 μC
6502LG-CMOS-4	4 MHz CMOS 6502 μC

6502LB MICROCOMPUTER



6052 CPU
1 MHz X'TAL OSC.
1K RAM
2K, 4K, 8K ROM, EPROM
16 I/O Lines
Latched I/O Registers
Serial Data Port
Handshake Capability
Two 16 Bit Timer Counters
Size: 4 x 4½ Inches

6502LB-2	2 MHz 6502LB μC
6502LB-CMOS-1	CMOS 6502LB μC
6502LB-CMOS-2	2 MHz CMOS 6502 LB μC
6502SM-CMOS-3	3 MHz 6502, 16 I/O, 2K RAM, 4-8K ROM
6502SM-CMOS-4	4 MHz 6502, 16 I/O, 2K RAM, 4-8K ROM

6500LS SERIES

6500LS-1-2K	6502 Instruction Set
6500LS-1-3K	1 MHz, 2 MHz Crystal OSC.
6500LS-2-3K	32 I/O Lines, Timer/Counter
	2K, 3K ROM, 64 Bytes RAM

DISP-6	6 Digit 7 Segment Display with Decoder Driver
PE-4-15	Expands 4 Parallel Output Lines to 15 Parallel Output Lines
PE-8-30	Expands 8 Parallel Output Lines to 30 Parallel Output Lines

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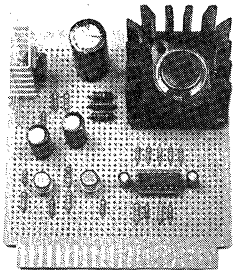

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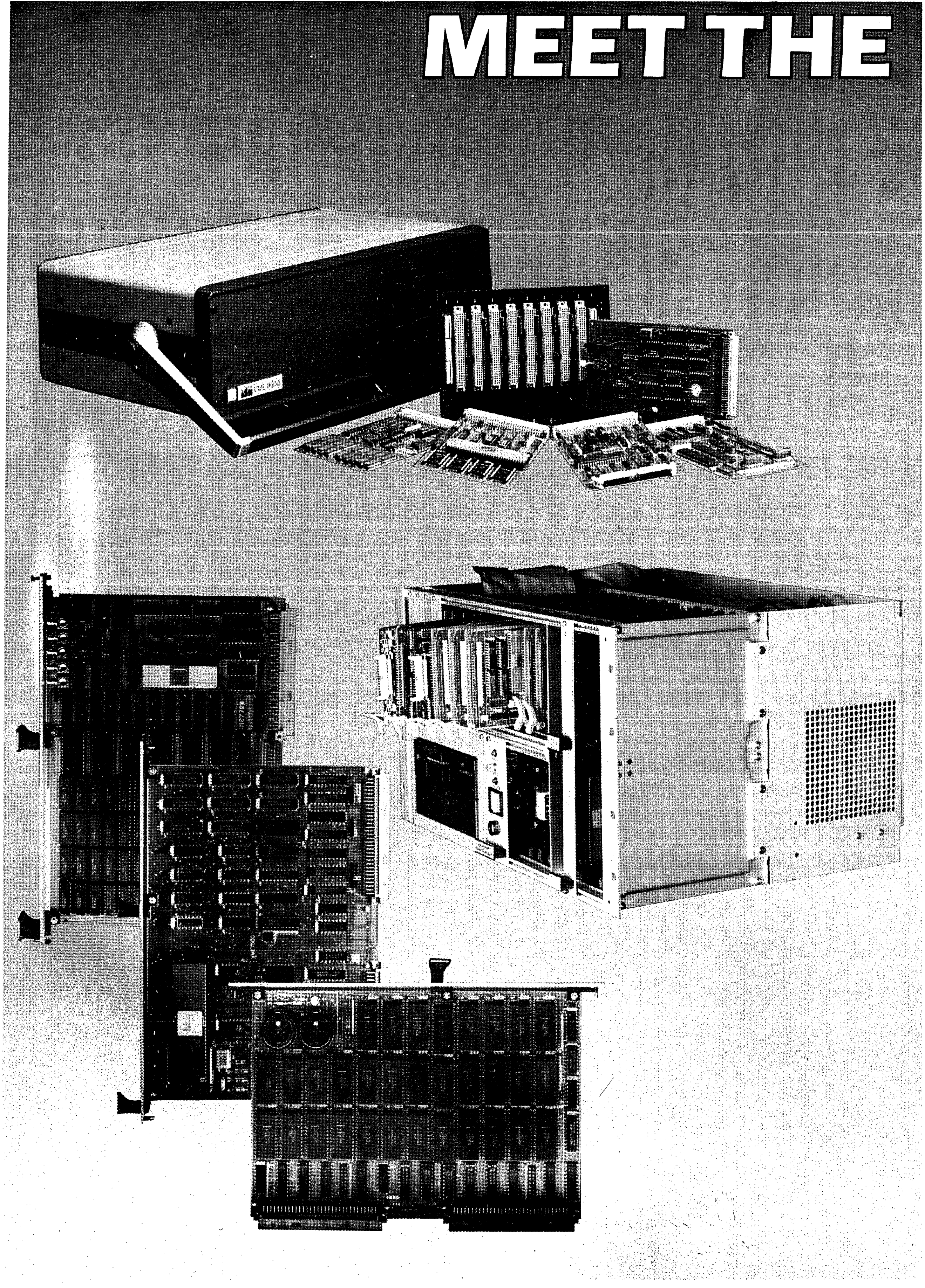
MEET THE

WHOLE VMEBUS FAMILY modules and systems from MIZAR INC.

Since the initial release of the VMEbus spec, Mizar has been designing, building and improving its VMEbus modules and systems. In use throughout the United States, Canada and Europe, Mizar's boards have proven highly reliable, helping our customers get new products to market more quickly with fewer technical problems.

Mizar's single height modules (100mm x 160mm) have proven ruggedly reliable in tough environments. These single-function boards enable you to custom build a system without the expense of features not wanted.

Mizar's double height boards (233mm x 160mm) allow more functions per board, giving you the capability of implementing a high performance computer system configured to the user's needs

System Modules

The VME8000 System Controller provides all the system control functions necessary for a VMEbus based system. The VME8058 module is an 8 slot motherboard, fully terminated, and a terminal block connector for +5VDC, +5VDC standby, ±12VDC, GND and ACFAIL.

CPU Modules

The single height VME8100 has one RS232 serial port and sockets for two EPROM's. The VME8105 has two sockets for either 2K x 8 or 8K x 8 static RAM's and two sockets for 8K x 8, 16K x 8 or 32K x 8 EPROM's. The double height VME7100 includes an 8 MHz 68010 (upgradable to 10 or 12.5 MHz) and an optional 68451 MMU. It provides two serial ports, two parallel ports, 128K or 512K of RAM, and 4 EPROM sockets.

Memory Modules

Single height modules include the VME8200 128K Byte RAM which offers 128K bytes of dynamic RAM configured as 64K sixteen bit words. The VME8205 Byte Wide Memory provides eight 28-pin sockets and capacity for up to 64K bytes of static RAM or 256K bytes of EPROM or any combination of both. Double height modules include the VME7200 Dynamic RAM module that provides one Mbyte (expandable to 4 Mbytes) of dynamic RAM. The VME7205 offers either 64K or 256K bytes of CMOS static memory which is backed up by on- board batteries in case of power failure.

Interface Modules

Mizar's single height interface modules include the VME8300 Quad Serial Port, which provides four serial ports for asynchronous/synchronous operations. The VME8305 Quad Parallel Port offers 32 bits of parallel input/output. The VME8500 SCSI bus controller is designed to provide the VMEbus user with the ability to add Winchester discs to a VMEbus system. The VME8505 is a low cost GPIB interface that permits the user to interface to a wide range of instruments over the GPIB. The VME8510 is a high performance GPIB interface with direct memory access. The VME8605 analog input module provides 12 bit resolution on 16 single ended or 8 differential input channels with expansion to 32 single or 16 double ended channels. The VME8610 analog output module provides the user with 4 channels of 12 bit analog data.

The double height VME7300 Serial Communications Processor is an intelligent serial communications center for the VMEbus. The VME7500 Dual GPIB Controller is a high performance dual channel GPIB controller with full talker, listener and controller functions. Two independent channels are provided with a seperate DMA channel for each GPIB channel.

Disk Controllers

Using the single height VME8400, up to four floppy disks can be controlled. The double height VME7400 is a high performance controller for handling both floppy disks and Winchester drives.

Video Modules

The VME8700, Mizar's single height Video Control Module is an embedded controller with display memory consisting of 4K bytes of character memory and 4K bytes of attribute memory. The double height VME7700 Color Graphics Module provides up to 8 colors with 3 plane display memory, each containing 1024 x 1024 pixels.

Rack Mount System

Mizar's Rack Mount system consists of a 19-inch chassis, complete with power supply and a twenty slot backplane. Standard models are configured to hold half single height and half double height boards or three quarters of one size and one quarter of the other size. It can also be custom built to meet your needs.

Software Development Systems

Two software development systems are available from Mizar Inc. The VME9000 contains two 5 1/4 inch floppy disks. The VME9100 contains one 5 1/4 inch floppy and one 5 1/4 inch Winchester 10MB drive. Both systems are compact (18 3/4″ w x 6″ h x 12 1/2″ d) single height VME module based systems for software development and general system applications. Both systems come with CP/M-68K operating system. All standard CP/M commands and utilities are provided. Applications for the systems include 68000 software development in assembler and C, real-time data acquisition, data processing, and process control.

Software

CP/M-68K™ is a single user system for the VME9000 or the VME9100 based on Digital Research's 8-bit CP/M series software. CP/M-68K has been written to run on the 68000 microprocessor.

Idris is a comprehensive operating system that provides a uniform operating environment across a broad spectrum of computers. Modelled closely after the highly successful UNIX™ operating system developed by Bell Labs, it is valuable for both experienced and inexperienced users.

OS9/68K™ is an advanced high performance, multitasking operating system similar to UNIX for low cost, high performance applications in personal computers, industrial control systems and general purpose multi user systems.

Software Debug Monitor

The VME8900 uses a host system that can produce assembled code in Motorola format. The user downloads to the debug monitor, which monitors its execution. The VME8900 consists of two 2532 or 2764 EPROM's. Only the first 2K of each EPROM is used, leaving the rest free for user EPROM code.

FOR MORE INFORMATION WRITE OR CALL TODAY

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302 Chester Street, St. Paul, MN 55107
Phone (612) 224-8941 • Telex 469542

CP/M is a trade name of Digital Research
OS9/68000 is a trade name of Microware Systems Corp.
UNIX is a trade name of Bell Labs

THE MIZAR PRODUCT LINE

CPU Modules

VME7100 CPU. This double-height high performance CPU board supports either the 68000 or the 68010 at processors speeds of 8, 10, and 12.5 MHz. The 7100 has two asynchronous serial ports, two 8-bit parallel ports, and two timers—one 16-bit and the other 24-bit. All I/O functions are brought out via the P2 connector. On-board memory includes four 28 pin sockets for up to 128K bytes of EPROM and either 128K or 512K of dynamic RAM dual ported with the VMEbus. In addition the 7100 has provisions for the 68451 memory management unit and a full function system controller that can be disabled in multiple 7100 applications.

VME7105 CPU. This double-height CPU module has all the features of the 7100 but replaces the parallel port capability with a floating point processor for high speed arithmetic applications.

VME8100 CPU. A single-height board, this 68000-based CPU module provides one serial port and two 28 pin EPROM sockets for 16K, 32K, or 64K of on-board EPROM. The 8100 can handle any one of the seven VMEbus interrupt levels and can request the bus on any one of the four VMEbus request levels.

VME8105 CPU. A single-height board, the 8105 can support the 8 or 10 MHz 68000. Four 28 pin sockets are provided for local memory. Two sockets are dedicated for EPROM—16K, 32K, or 64K, and two sockets are dedicated for static RAM—4K or 16K. Bus requests on any one of the four bus request levels plus a full interrupt handler are also provided.

Memory

VME8210/Dynamic RAM. This single-height module holds up to 512K of 150 nsec dynamic RAM on 256K memory chips. This module resides on any 128K boundary in the VME 16Mbyte address range and supports 8- and 16-bit data transfers. Parity is jumper selectable. This module comes with either 128K of memory or 512K.

VME8205/Byte-wide Memory. Eight 28 pin sockets on this single-height module can hold 64K static RAM, 256K EPROM, or any combination of both. Sockets are jumper-configurable for 24 or 28 pin chips. Access time is jumper-selectable from 62.5 to 500 nsec.

VME7200/Dynamic RAM. Leaded-plastic chip carrier technology provides one full megabyte of dynamic RAM on this double-height board. The module responds to 24-bit addresses and transfers data in bytes or words. Parity is jumper-selectable. The board uses 64K dynamic RAM chips and holds four megabytes of RAM when 256K parts are used.

VME7205/CMOS RAM. This double-height board provides 64K or 256K of CMOS static memory protected by on-board batteries. Data is accessed by 24 or 32 address lines and can be transferred in bytes, words, or long words.

Controllers

VME8400/Floppy Disk Controller. A set of five read/write registers on this single-height module control up to four floppy disk drives. Registers issue commands, read status, read/write data, enable and disable interrupts, and signal end-of-data-transfer. Polled or interrupt-driven. Jumper-configurable for use with most SS, DS, SD, DD, 8-inch or 5¼-inch drives.

VME8500/SCSI Bus Interface. This single-height module serves as an interface between the VMEbus and the SCSI bus. The 8500 is a single host non-arbitrating interface and can be used to talk to controllers for handling floppy disks, hard disks, and tape peripherals in polled or interrupt-driven mode.

VME8505/GPIB Interface. A wide range of instruments can be economically connected to a VMEbus system with this single-height module. Full GPIB talker, listener, and controller capability is provided. Polled or interrupt-driven. Interrupt handling is optimized with dual vectored interrupts.

VME8510/GPIB TLC w/DMA Interface. This single-height module includes all VME8505 features plus DMA mode. DMA transfer rates up to 280K per second.

VME7500/Dual GPIB Controller. This double-height board provides all VME8510 features for two GPIB channels. A 68450 controls the two separate DMA channels. Memory-to-memory DMA transfers are executed without affecting GPIB functions. A comparator permits DMA transfer termination based on a software-controlled character match.

VME7400/Disk Controller. Both floppy and hard disk drives can be controlled with this double-height module. The need for an SCSI Winchester interface is eliminated due to a combination of DMA and on-board buffering.

VME8700/Video Controller. Directed at applications that require a CRT controller embedded in a VMEbus system, this single-height module generates 128 ASCII and 128 block graphics characters. Dual ported RAM (128 bytes) provides VMEbus communication. A 68121 with 8K EPROM and 2K RAM provides local intelligence. Module display memory consists of 4K character memory and 4K of attribute memory.

VME7700/Color Graphics Controller. An NEC 7220 video display controller on this double-height board provides up to eight colors with 3-plane display memory (1024x1024 pixels each). A light pen register is included, and the controller supports panning and screen zoom factors of one to 16. Figure drawing of line, arc/circle and graphics characters are executed at one megapixel per second. Screen resolution: 1024x800.

Auxiliary Hardware

VME7000/VMEbus Prototype Module. This double-height board includes a complete VMEbus slave interface and high-density wire wrapping prototype area. The module interface is configurable for VME A23:D16, A23:D8, A15:D16, or A15:D8. Two interrupts are supported and each interrupt can be jumpered to operate on any of the seven VMEbus interrupt levels. Interrupt vectors are software-programmable.

VME8000/System Controller. This single-height module is equipped with all the system control functions needed in a VMEbus system: bus arbitration, jumper-selectable bus time-outs, power-on reset, ACFAIL line monitoring, and ACFAIL reset timing. The module also provides an on-board reset switch, remote reset switch connector, 16MHz system clock, and SYSFAIL line monitor.

VME8058/Eight-Slot Motherboard. This single-height multilayered motherboard can accommodate eight VME boards, and is fully equipped with internal power and ground planes. Terminal block connections are provided for +5VDC, +5VDC standby, ±12VDC, GND, and ACFAIL. Daisy chained lines are jumper-selectable to permit open backplane slots.

VME8315/Battery-Backed Clock/Memory. This single-height module is equipped with a real-time clock and up to 32K of static CMOS memory. Both clock and memory are powered by a lithium battery if +5VDC system power is lost.

VME9200/Rack-Mount Enclosure. This 20-slot card cage mounts in a standard 19-inch rack and can accommodate both single- and double-height VME boards. The power supply features output overload protection plus single-line short circuit protection.

VME4000 Series Disk Drive Accessories. Mizar provides both floppy and hard disk accessories for 9200 based systems to fit a variety of user applications. The 4200 consists of two 5¼-inch DSDD 48 tpi floppy disk drives while the 4210 consists of one 5¼-inch DSDD 48 tpi floppy disk and a 10 MB 5¼-inch half high Winchester disk drive. Other sizes and configurations are available upon request.

I/O Modules

VME8300/Quad Serial Port. Four serial ports supporting software-controlled sync/async operation at up to 880K baud are provided on this single-height module. Signal lines can be configured for RS-232 or RS-422 levels and bisync, HDLC, and SDLC modes are supported. Modem control lines for DTR and CTS are available.

VME8305/Quad Parallel Port. This single-height module provides four 8-bit ports with a pair of handshaking signals per port. The ports can be programmed as inputs or outputs and are buffered with 48mA drivers. In addition two 24-bit timers are available for a variety of timing applications.

VME8605/Analog Input Module. This single-height board can accommodate eight double-ended or 16 single-ended analog input channels. The number of inputs can be doubled as an option. The board provides 12-bit resolution with a 25 khz throughput rate, and completion of A/D conversion is determined by polling or a vectored interrupt. Gain is jumper-selectable for 1, 10, 100, or 1000; any value in between can be resistor-programmed.

VME8610/Analog Output Module. This single-height module accommodates four 12-bit analog output channels. Data is latched in registers, and typical conversion time is three microseconds.

VME8310/Counter-Timer. Ten configurable 16-bit counter-timers are provided on this single-height module. Each counter-timer is equipped with a gate control line, source control line, and an output line. Four separate VMEbus interrupts can be generated with software-programmable interrupt vectors.

VME7300/Serial Communications Processor. This double-height board is an intelligent self-contained VMEbus serial communication center. A 32K dual port memory buffer is used for bus communications and an on-board 68000 processor with DMA reduces host CPU communications processing time. Simultaneous data transfer on eight independent serial channels is executed at speeds up to 1M baud. Signal lines can be configured for RS-232 or RS-422 levels; synchronous, asynchronous, HDLC, and SDLC modes are supported.

Operating Systems & Application Software

CP/M-68K™. This single user operating system is based on the popular Digital Research 8-bit CP/M. Standard built-in commands include DIR, DIRS, ERA, REN, SUBMIT, TYPE, and USER. Standard utilities include DDT-68K™, ED, PIP, STAT, archive (AR68), DUMP, relocate (RELOC), SIZE68, and SENDC68. Programming tools include AS68 (68000 assembler), LO68 (object file linker), and a "C" compiler.

CP/M-68K and DDT-68K are trademarks of Digital Research.

MINCE. Based on the large system EMACs screen editor, Mince was developed by Mark of the Unicorn and is available for CP/M-68K™ and OS9/68K™ operating systems. Mince supports multiple file buffers and split screen operation. It can be configured for almost any CRT that has basic cursor positioning capability.

CP/M-68K is a trademark of Digital Research. OS9/68K is a trademark of Microware Systems Corp. and Motorola.

OS-9/68000™. OS9/68K is a compact, highly efficient UNIX™-like operating system. Based on the popular OS9 for the 6809, OS9/68K provides real-time functions modular design, a hierarchical directory structure, and multi-user/multitasking capability. Available languages include C, BASIC09™, and PASCAL.

OS-9 and BASIC09 are trademarks of Microware Systems Corp. and Motorola. UNIX is a trademark of Bell Labs.

PolyFORTH™. Developed by FORTH, Inc., this package is a combined operating system, programming language, and editor ideal for the development of real-time applications. FORTH programs are created by using built-in functions to construct words that become part of the programmer's dictionary. These words can be used to construct more complex words until the final application is defined. Because FORTH is an interpreter, functions can be tried immediately without compiling, linking, and loading.

PolyFORTH is a trademark of FORTH, Inc.

Mizar Debug Monitor. Available for all of Mizar's CPU modules, the Mizar Debug Monitor is a ROM-based programming tool that supports downloading of code in Motorola "S" format. In addition, commands are provided to display memory, examine and modify registers and memory, start a program and set a breakpoint, move memory blocks, and test memory.

Complete Hardware Systems

VME9000/System w/Dual 340K Floppy Disk Drives. This complete hardware package with dual floppy drives can be mounted on a standard 19-inch rack or housed in a compact cast aluminum case with carrying handle. Internal components include an 8-slot motherboard, system controller, CPU module, 128K or 512K dynamic RAM module, quad serial port module, floppy disk controller, two 5¼-inch DSDD 340K floppy disk drives, and three single-height expansion slots. The unit is powered by a 130 watt line-filtered switching power supply.

VME9100/System w/10MB Hard Disk Drive. This complete hardware package with one floppy drive and a Winchester hard disk can be mounted on a standard 19-inch rack or housed in a compact cast aluminum case with carrying handle. Internal components include an 8-slot motherboard, system controller, CPU module, 128K or 512K dynamic RAM module, quad serial port module, floppy disk controller, one 5¼-inch DSDD 340K floppy disk drive, SCSI interface, hard disk controller, one Winchester 10MB hard disk drive, and two single-height expansion slots. The unit is powered by a 130 watt line-filtered switching power supply.

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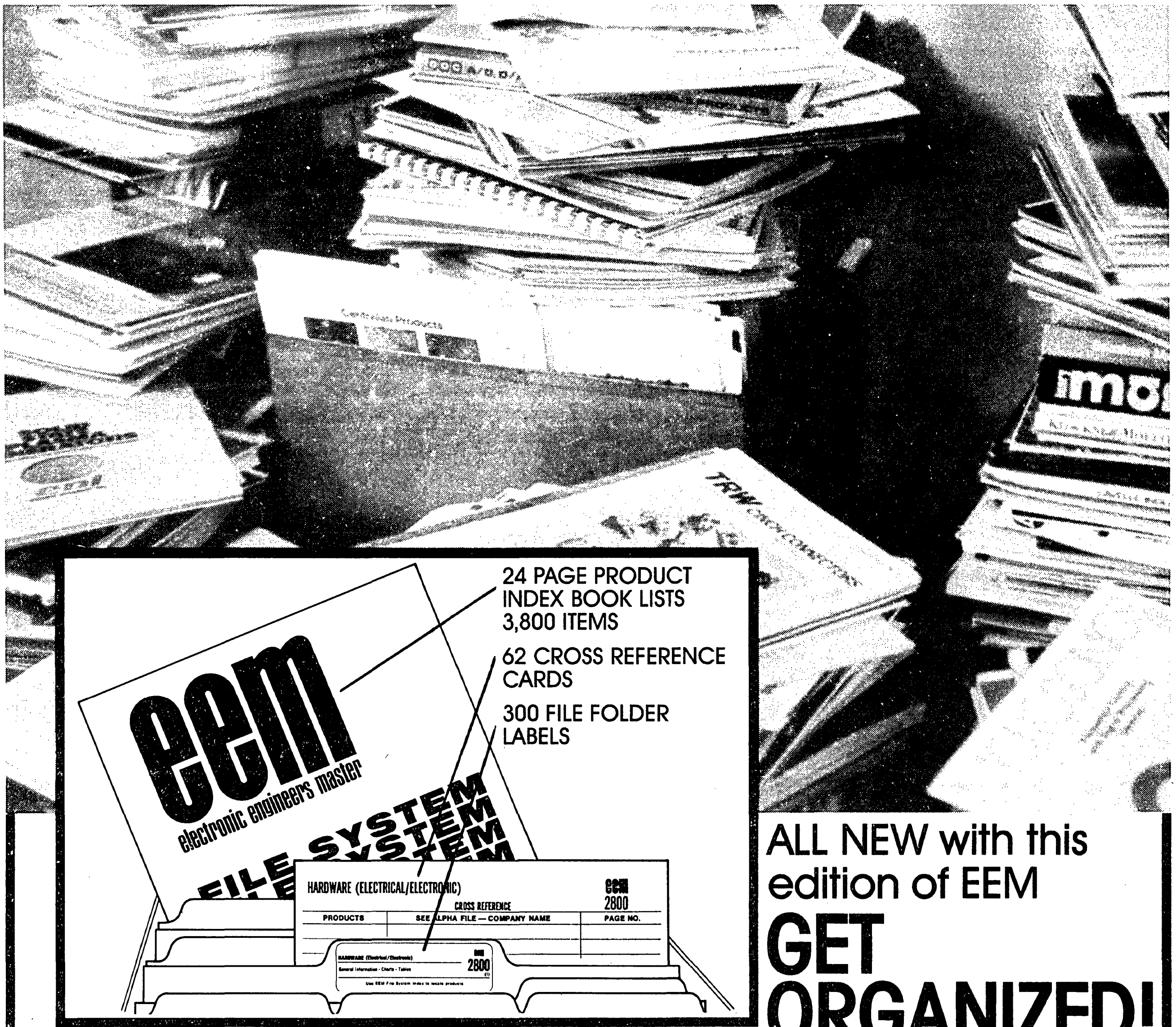
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MICROCOMPUTER PRODUCTS

Chips, subsystems, and systems . . . that's the natural progression of microcomputer building blocks that the semiconductor products manufacturer offers the equipment manufacturer. Each provides a different integration level from which the designer begins his system implementation.

Chips are the most cost effective and offer the greatest latitude for design optimization — but they also demand the most intensive engineering effort and the longest design time.

Subsystems (board-level products), the second entry level for system integration, require some sacrifice in ultimate design efficiency, but the wide variety of board-level products reduces this "sacrifice" while providing the benefits of relatively simple implementation, quick entry into the marketplace and minimal investment in engineering effort.

Systems refers to complete, packaged microcomputers for OEM systems integrators who combine them with dedicated software and I/O to implement systems for specific applications.

In each of these product categories, Motorola is an internationally recognized frontrunner in technological leaderships, product reliability and production capability.

CHIPS

Since the beginning of the microcomputer era, Motorola has been in the forefront of the technology. Its initial monolithic microprocessor (MPU), the 8-bit MC6800, quickly captured a major share of the MPU market. In the intervening years, the initial offering has exploded to an **MPU/MCU repertoire of nearly 50 individual type numbers** encompassing **all levels of processing power** (8-, 16-, and 32-bits), **all major technologies** (NMOS, HMOS, CMOS, HCMOS), and **a wide variety of on-chip architectures.** These fill specific system requirements with a chip complement that corresponds to the "ideal" as closely as the current state-of-the-art permits.

While MPUs and MCUs constitute the "heart" of a microcomputer system, they represent, in fact, only a small portion of the total microcomputer chip requirements. The "peripheral" chips (memory, I/O, etc.) that adapt the processors to the ultimate requirements of the final systems application constitute the bulk of the system.

The presentation here does not attempt to describe and define all the available parts. Rather, it defines the major component families and lists the various documents that are available to help you make a considered selection of components for your specific design. These documents are available free from your nearest Motorola Semiconductor Sales Office or Distributor.

The MC68000 Microprocessor Family 8/16/32-Bit Selection

Advances in semiconductor technology and computer science now yield single-chip microprocessors whose power rivals that of today's more advanced minicomputers, approaching even that of many mainframe machines.

Among the most advanced microprocessor lines is the M68000 Family whose offerings encompass 8-bit, 16-bit and 32-bit capability, with a common instruction set that insures upward compatability. A wide range of VLSI peripheral chips provides system design efficiency.

The Processors

The MC68000 — The first of the M68000 Family, the 16-bit MC68000 combines advanced circuit design with state-of-the-art chip processing to achieve the following user-significant features:

- 32-bit Data and Address Registers
- 16 Megabyte Direct Addressing Range
- 56 Powerful Instruction Types
- Operations on Five Main Data Types
- Memory Mapped I/O
- 14 Addressing Modes

The MC68010 — An M68000 Family member that incorporates all the features of the MC68000, plus enhancements that make it ideal for virtual memory and virtual machine systems.

The MC68012 — Incorporates all the capabilities of the MC68010, but adds seven more address lines, allowing for a 2 gigabyte linear address range.

The MC68020 — The first complete 32 bit microprocessor providing unexcelled processing power, instruction set enhancements, coprocessor operation and innovative techniques to improve bus efficiency. HCMOS manufacturing process reduces internal power dissipation to less than 1.5 watts in a system.

The MC68008 for 8-bit applications — Allows the design of cost-effective systems using 8-bit data busses while providing the benefits of 32-bit internal architecture plus upward compatibility with all 16- and 32-bit family members.

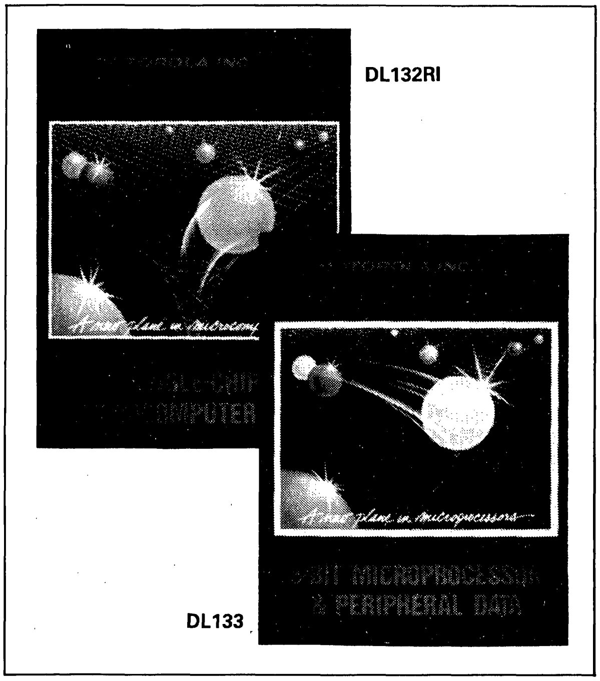
The MC68881 Floating Point Coprocessor — Provides full support for the IEEE specified floating point high-level math functions and for all transcendental functions.

Available Literature

Individual MPU Data Sheets — Order by product type number — These data sheets offer complete technical data on the M68000 family members including external and internal architecture.

MC68020UM/AD — The MC68020 32-Bit Microprocessor User's Manual offers the latest information on the MC68020 along with a full definition of the instruction set and complete timing diagrams and specifications for the part.

This information is available free from your local Motorola Sales Office or Distributor.



The M6800 Family — MPUs

The M6800 Family was conceived and designed to encompass an array of LSI components which, in various combinations, provide low-cost solutions to most eventual microcomputer applications. The choice of microprocessor chips, together with the selection of the right memory and the most suitable peripheral interface circuits, often results in the most effective and least expensive system that can be configured.

The MC6809

The MC6809 is the latest member of the Motorola M6800 Family and is the most powerful 8-bit MPU in existence today. By permitting 16-bit internal bit manipulation, it has 50 percent more throughput than the basic MC6800. But in addition, it adds new addressing modes, utilizes an expanded instruction set with high-level language capability, and features a host of other refinements that add functional expansion to, while maintaining compatibility with, the M6800 Family.

Family Variations

MC6809 — Processor with on-chip clock
MC6809E — Has external clock inputs for multiprocessor operation.

Both units are available with operating frequencies of 1-, 1.5- and 2 MHz, and with operating temperature ranges of 0 to 70°C and −40 to 85°C.

The Basic M6800 Family

These MPUs were the first of the M6800 Family and still remain highly cost-effective for a great many process-control and data-communications applications.

Family Variations

MC6800 — Basic Processor, needs external clock.
MC6808 — Adds on-chip clock.
MC6802NS — Adds on-chip clock and 128 x 8 bit RAM.
MC6802 — Adds on-chip clock and 128 x 8 bit RAM. Has 32-byte RAM retainability through "VCC Standby" function.

The M6800 Family — MCUs

Take a basic MPU, add an on-chip clock oscillator and timer, put in enough Read-Only Memory (ROM) to handle the program routines for a dedicated application, and enough Read/Write Memory (RAM) capacity to handle the associated data manipulations; cap it off with sufficient input/output capability to interface with a number of parallel and serial oriented peripherals and you have a single-chip microcomputer (MCU). Motorola offers four distinct MCU Families, each filling a niche in the price/performance ranges demanded by the vast variety of applications in today's marketplace.

The MC68HC11

At the top of the Motorola MCU list is the recently introduced MC68HC11 HCMOS member. Utilizing new design techniques, it matches the highest (2.1 MHz) nominal bus rate of its fastest NMOS counterpart. On-chip memory includes RAM and ROM as well as 512 bytes of electrically erasable EEPROM. Additional highly sophisticated on-chip peripheral functions include A-D conversion, serial communications and serial peripheral interface subsystems and a large array of I/O lines.

The M6801 Family

One of the most powerful 8-bit NMOS lines available, this 6-member family offers a wide selection of on-chip memory and I/O configurations.

The M6805 Family

Offering both CMOS and HMOS processors, this family consists of more than 20 individual device types to permit a close match to the user's on-chip memory and I/O requirements. Low-cost options make this family attractive for high-volume applications.

The M6804 Family

This lowest-cost 6-member MCU family utilizes internal program-controlled serial processing to reduce register requirements and reduce chip size. Somewhat slower than the M6805 family, it is nevertheless attractive for upgrading functions formerly served by 4-bit MPUs, with little or no cost penalty.

Available Literature

DL133/D — The 8-Bit Microprocessor and Peripheral Data Book provides thorough coverage of Motorola's 8-bit microprocessor families, including the M6800 and M6809 families. Included is information on reliability and technical training, support products, development systems, peripheral interfaces and controllers.

DL132R1/D — The Single-Chip Microcomputer Data Book is a compilation of data covering the entire range of Motorola's single-chip 8-bit microcomputers (MCUs). Over 1000 pages of detailed data sheets are provided in some of the industry's most popular 8-bit MCUs. Also included are selector guides for memories, logic products and special function products with descriptions of associated development systems and board-level products.

BR261/D — The 8-Bit MPU and MCU Families brochure provides an overview of Motorola's 8-bit MPUs and MCUs including features and options, development support, and new product highlights.

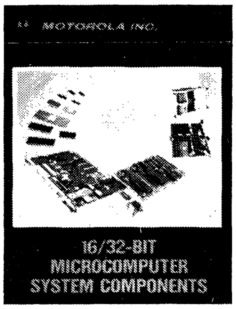
This literature is available free from your local Motorola Sales Office or Distributor.

MOTOROLA

SEMICONDUCTORS

P.O. BOX 20912 • PHOENIX, ARIZONA 85036

MICROCOMPUTER PRODUCTS

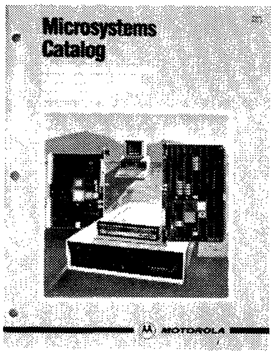


MOTOROLA INC.

16/32-BIT MICROCOMPUTER SYSTEM COMPONENTS

DL127

SG95



Microsystems Catalog

MOTOROLA

BOARD LEVEL PRODUCTS

As the use of computers proliferates, so do the number of equipment manufacturers that are choosing board-level products as their basic entry into the equipment manufacture field. These families of bus-compatible modules comprise fully tested, functional subassemblies that take much of the basic engineering effort out of equipment design.

Motorola supplies three principal lines of modules, each adapted to a specific level of ultimate performance. Each is headed by one or more monoboard microcomputers that offer a choice of on-board peripherals to most nearly conform to a variety of specific requirements; each encompasses a line of peripheral memory and I/O modules for potential systems expansion.

VMEmodules

M68000 processing power, Eurocard mechanical format, VME(bus) system versatility and multiple, worldwide sourcing have made VMEmodules one of the most popular product lines in the industry.

VMEmodules utilize the latest M68000 Family microprocessors that assure state-of-the-art performance now, and compatibility with the most advanced products of the future.

The Eurocard format offers two board sizes (160 x 100 mm and 160 x 233.4 mm) that have become standard in Europe and have received widespread acceptance worldwide.

The VMEsystem is designed for multi-processing applications. It allows mixing of 8-, 16- or 32-bit processors, operating asynchronously at high speeds, while providing seven interrupt levels and four levels of bus priority arbitration.

Micromodules

Micromodules provide solutions for control applications requiring 8-bit processing power. This family is based on a selection of differently configured single-board microcomputers which vary in capabilities as a result of differences in on-board microprocessors, as well as memory and I/O content.

The Motorola line of Micromodules is supplemented by a sophisticated library of development software with high-level language interface to simplify man-machine interaction. An array of packaging accessories provides the proper physical environment for the system assembly.

VERSAmodules

With a mechanical form factor giving approximately 2½ times the area of the double-high VMEmodules, Motorola's VERSAmodule Family is particularly effective in complex systems demanding extraordinary memory and I/O capacity. A unique I/O Channel feature (as in VMEmodules) permits each master of a multiprocessor system to work with dedicated I/Os thereby greatly increasing the traffic potential of the main system bus.

M68000 processing power? Of course. Monoboards are available with both the MC68000 and MC68010 MPUs. That, plus a full complement of modular subsystems and extensive software support makes the VERSAmodules prime candidates for systems with the most demanding requirements.

Available Literature

DL127/D — The 16/32-Bit Microcomputer System Components Data Book contains complete technical documentation for current VMEmodules, VERSAmodules and I/Omodules with additional chapters on operating systems and technical summaries.

SG95/D — The Microsystems Catalog contains valuable information on modular system components including VMEmodules, VERSAmodules, I/Omodules and Micromodules. Also included are sections on development systems, development instrumentation and software support.

BR164/D — This VMEsystem brochure provides a detailed overview of VME board level products and related bus and system level information.

BR103/D — The Motorola VERSAmodules brochure gives an overview of VERSAmodules and related bus and system level information to show the VERSAtility and flexibility of VERSAmodule systems.

BR108/D — This 8-Bit Micromodules brochure contains both general and specific information on Motorola's line of 8-bit micromodules.

This information is available free from your local Motorola Sales Office or Distributor.

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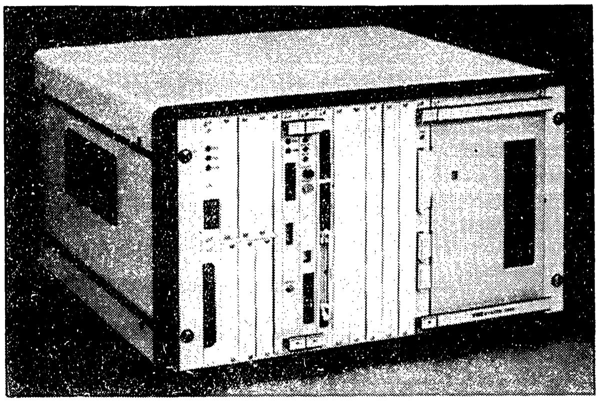
VMEsystem — FOR OEMs



The Motorola VMEsystem capability is designed to address the needs of OEMs who desire pre-configured VME-based systems to meet demanding end-use requirements. Inspired by an "Open System" philosophy, VMEsystems are engineered to provide a logical starting point from which to tailor high-performance, application-specific products using technologically superior M68000-based VMEmodules. These products can be applied to a wide variety of uses in Industrial Automation, Communications/Networking, and Factory Control Systems. Choosing from a wide selection of industry-standard VMEmodules, original equipment manufacturers can use the VMEsystem line to develop equipment that meets a rigorous array of custom requirements.

To provide this type of sturdy foundation, VMEsystems begin with a VME chassis with card cage, a 400-watt power supply, a Winchester disk drive, and a floppy disk drive. Other features of this product line include:

- Multi-user Capability
- VERSAdos and SYSTEM V/68 Support
- VERSAdos-supported Terminal-independent Editor Available
- VME Backplane
- Sufficient Slots and Power to allow OEM Configurations for Graphics, Memory, and Local/Wide Area Networking
- Optional Terminal/Keyboard Available

BASIC CONFIGURATION

VMEsystems utilize an MVME121 Microprocessor Module in the basic configurations. These versions also incorporate a system controller and a disk controller as standard features. Specifically, MVME121-based VMEsystems are equipped with the following VMEmodules:

MVME121 Microprocessor Module — The MVME121 Microprocessor Module is designed to offer the performance required for high-speed data processing, data management and industrial control. Components of the MVME121 include:

- 10 MHz MC68010 Microprocessor
- MC68451 Memory Management Unit
- 512 Kbyte Dynamic RAM
- 4 Kbyte No-Wait-State Instruction Cache
- A24, D16 VMEbus Interface
- RS-232C Serial Port

MVME050 System Controller — The MVME050 System Controller Module is a combination system controller, system utility, and debug/diagnostic board. The MVME050 performs functions such as bus arbitration, bus time-out, system clock generation, and time-of-day clock; therefore, these functions do not require duplication on every processor module in a specific system. Other features include:

- Centronics-compatible Printer Port
- Eight 28-pin JEDEC Sockets for EPROM/RAM
- Two RS-232C Serial Ports
- Global Interrupter for Processor-to-Processor Interrupts

MVME320 Winchester/Floppy Disk Controller — The MVME320 Winchester/Floppy Disk Controller is used to add mass storage capacity in applications having intensive real-time disk I/O or multiprocessing structures designed to reduce VMEbus traffic and increase system throughput. The MVME320 provides high-performance direct memory access between system memory and Winchester hard disk drivers and/or floppy disk drives. This device controls mixed 5¼" and 8" drives which can consist of up to four floppy disk drives. In addition, the MVME320 offers:

- Support of Serial Data Rates up to 5 Megabits/Second
- Use of IBM Formats along with FM/MFM Recording
- 16-Bit Cyclic Redundancy Check
- 32-Bit Error Checking and Correction

Other modules from Motorola's line of over 50 VMEmodules can be added to the open slots of the basic card cage to give the system its custom capabilities. And additional basic systems are in development. Contact your Motorola Sales Office or Distributor for the latest details.

enclosures · capacitors · circuit boards · coils,
chokes, inductors · connectors, electronic · sockets/
terminals · crystals · oscillators · crystal filters
delay lines · panel hardware · displays · lamps/
lights · cooling equipment · filters · generators ·
multimeters · panel meters · oscilloscopes · gra
phic recorde … nnections · microwave
components … ators/
drives · ba
supplies, ac · … · relays ·
solenoids · … ers/trimmers
controls/rhe … s ·
switches · … ers/en
coders · transformers · wire & cable · enclosures
capacitors · circuit boards · coils, chokes, induc
tors · connectors, electronic · sockets/terminals

EEM PRODUCT SELECTION GUIDES

Use the EEM Product Selection Guides.
There are 34 Guides in this edition of EEM.
See page 2 (A•2, B•2, C•2, D•2) of each
volume to locate the Product Selection Guides
that pertain to your needs.

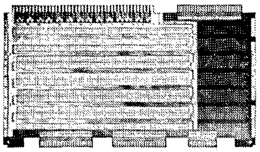
MICROCOMPUTER PRODUCTS

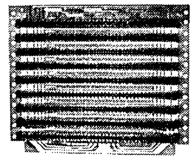
Prototyping Boards • Rack Mount Card Cages • Mother Boards • Connectors • Drop-In Card Racks • Extenders • Enclosures

Vector

MULTIBUS PLUGBORDS, MOTHERBOARDS, AND RACKS

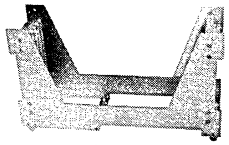
4608 Plugboard: Series 80 size, shape, and connectors. Solder or wrap wire. .042" dia. holes on 0.1" grid. Prewired for regulator. Dual bus for power & ground.
4608-1: Same size and connectors as 4608 but no etched circuitry.


4608-1

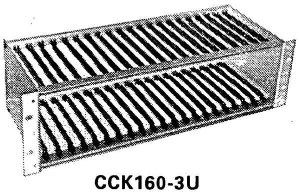

4608-9-1

4608 Motherboards: • Termination resistors on bus lines. • Solder pads to wire up reset switch. • Accepts iSBX cards in one position. • Gold plated card connectors on 0.6" spacing. • Available in -4, -6, and 9-positions.

Multibus Card Racks: Available with fully assembled and tested motherboards. Sturdy brushed black anodized aluminum. All models have one iSBX position. Suitable for horizontal mounting in chassis. Card locks. Plastic guides-riveted on 0.6" centers.
CCK20MB4: Card Rack with 4-position motherboard. **CCK20:** Rack Only.
CCK20MB6: Card Rack with 6-position motherboard. **CCK20-6:** Rack Only.
CCK20MB9; Card Rack with 9-position motherboard. **CCK20-9:** Rack Only.

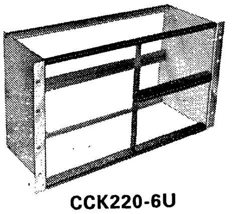

CCK20

CARD RACKS FOR VME AND EUROCARDS


CCK160-3U

CCK160-3U: Accepts 3U single height 100 mm × 160 mm (3.937" × 6.299") circuit boards. Vector 21-slot J1 or shorter backplanes, and discrete DIN connector when optional adapter strips are added. Rack is brushed aluminum and includes assembly and backplane mounting hardware. Order card guides and adapter strips separately.
CCK160-6U: Accepts 6U double height circuit boards 233.4 mm × 160 mm (9.187 × 6.299"). Will accept single height (3U) circuit boards with the addition of Vector's divider kits. Also accepts 21-slot or shorter backplanes; DIN connector may be mounted when optional threaded adapter strips are added. Rack is brushed aluminum and includes mounting hardware for two 21-slot or shorter backplanes and all assembly hardware. Order card guides, divider kits and adapter strips separately.

CARD RACKS FOR VME, EUROCARDS & MULTIBUS II


CCK220-6U

CCK220-6U: 6U double height 233.4 mm h × 220 mm d (9.187 × 8.661") VME, Eurocards or Multibus II cards and matching backplanes. Discrete DIN connector may be mounted when adapter strips are added. Rack is brushed aluminum and includes all hardware for assembly and backplane mounting. Order card guides, divider kits, and adapter separately.

VME BACKPLANES, EXTENDERS

These high performance 6-layer backplanes meet the VME specification and have two, 2 ounce copper power plane layers and two, 2 ounce copper ground plane layers. Boards have been designed with controlled impedance and for low crosstalk. Mounted 96-contact female receptacles are pressfit type, mounted on 0.8-inch centers with 0.025-inch square tails. Termination is provided by two plug-on terminators provided with each backplane. Terminators may be plugged onto the back of any backplane receptacle. Power supply connections are provided at multiple positions across the board length by furnished AMP Mate and Lock connectors.

VMEBP2J1: J1, 2-slot backplane
VMEBP5J1: J1, 5-slot backplane
VMEBP9J1: J1, 9-slot backplane
VMEBP21J1: J1, 21-slot backplane

J1, 21-SLOT BACKPLANE WITH TERMINATORS

VMEBP21J1

VMEBP5J2: J2, 5-slot backplane
VMEBP9J2: J2, 9-slot backplane
VMEBP21J2: J2, 21-slot backplane

Extender Cards: Vector VME extender cards move the backplane connections to the very front of a rack so that a functional VME circuit board, when plugged into the extender, is completely outside the rack for easy testing access. Three layer construction using FR-4 material is utilized with a controlled impedance and low crosstalk design. Usable for 160 for 220 mm long boards, all signal and voltage lines are interruptable with jumpers. For actual backplane performance simulation, each extender has a mounted male DIN connector for plugging in Vector's bus termination board, and pads (providing mounting of another DIN connector or test points for logic analyzer.
VMEEJ1: J1 extender card
VMEEJ2: J2 extender card

CARD GUIDES FOR VME AND MULTIBUS II CARD RACKS

Vector plastic guides are "snap in" type and mounted without hardware on 0.1-inch increments along the cross bars of the aluminum rack. They can be easily moved without breaking or special tools.
CG1-160: Card guide for 160 mm deep rack
CG1-220: Card guide for 220 mm deep rack

DIVIDER KITS AND ADAPTER STRIPS FOR VME/ MULTIBUS II RACKS

Divider kits allow the mixing of single height cards, 100 mm × 160 mm (3.937" × 6.299") and double height cards, 233.4 mm h × 160 mm d (9.187" h × 6.299" d) within the same double high rack unit. Divider kits consist of two guide position marked aluminum struts with guide mounting holes, one vertical bracket, and attachment hardware. Divider kits allow installation of single height cards in any portion of the total space available—21, 24, 42, 60, 63 or 84 hole pitches. Type "L" series divider kits have card guide mounting struts which are position-marked to indicated the division beginning at the left side of the rack; "R" type markings begin from the right side of the rack.

"L" Series		"R" Series	
DK42L	DK84L	DK42R	DK63R
DK24L	DK63L	DK24R	DK60R
DK21L	DK60L	DK21R	

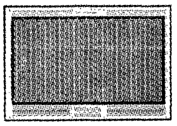
AS1: These are 17-inch long metal adapter strips with threaded holes located on a 0.2" pitch and are used for mounting individual DIN connectors instead of backplanes at the rear of the racks. Strips may be cut down if a shorter length is required. Two strips are required per single height full width (5¼ × 19") rack.

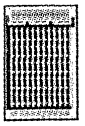
DIN CONNECTORS

DIN connectors may be attached to the rack cross bars with Vector's optional adapter strips. The 96 contact female connectors have 0.025-inch square wrap post tails for interconnection. 96 pin male connectors are also listed for bolting onto circuit board edges. These have 0.032-inch diagonal square tails which must be connected by soldering to board circuitry.
RE96FW: 96 socket female contacts, rack mounting
RE96MS: 96 pin male contacts, board mounting

EURO/VME CARDS

These epoxy glass cards fit into single height and double height racks. Useful in prototyping and short production runs, the boards have etched circuit patterns for soldering or wirewrapping, pads for connector attachment and connection to the bus patterns, and a drilled 0.043" dia. holes on a 0.1" grid for mounting DIPs, sockets and discrete components.


4615


4614-2

Single size: 3.94" × 6.3" × .062"
4614: 3-hole pad and bus board
4614-2: Wire wrapping bus board
4614-3: Pad-per-hole board (.080" dia. solder pads around each hole).
Double size: 9.19" × 6.3" × .062"
4615: 3-hole pad & bus board
4615-2: Wire wrapping bus board
4615-3: Pad-per-hole board (.080" dia. solder pad around each hole).

Many other models available -- contact your local distributor or factory. For wiring terminals and tools, see Sec. 1700, P.IC•1102.

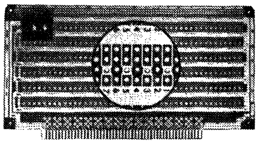
VECTOR ELECTRONIC COMPANY, 12460 Gladstone Avenue, P.O. Box 4336, Sylmar, CA 91342-0336 Phone (818) 365-9661

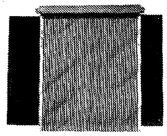
MICROCOMPUTER PRODUCTS

Prototyping Boards • Rack Mount Card Cages • Mother Boards •
Connectors • Drop-In Card Racks • Extenders • Enclosures

Vector

S100 AND IEEE 696 SYSTEM PACKAGING


8804


3690-12

Plugbords for interface, memory expansion, breadbording. Nickel/gold plated contacts, 50 each side on 0.125" centers. 0.042" holes on 0.10" grid for DIP sockets, push-in terminals and socket pins. Fire retardant epoxy glass composite material.

8804: "ANY DIP" -- full power and ground planes back-to-back on opposite board sides with offset pads. Two regulator positions provided, one heat sink furnished. Holds 70 16-pin DIPs.

8800V: Power distributed to each DIP location by heavy copper tinned power and ground planes on opposite board sides for low impedance. Prewired regulator circuit and two heat sink provisions. Holds 36 16-pin DIPs.

8801: Individual tinned square pads surround most holes. Heavy tinned power and ground buses are provided and prewired regulator position. Pads for mounting I/O connectors. Holds 82 14-pin DIPs.

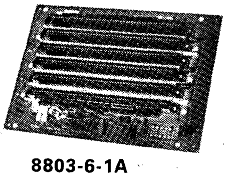
8801-1: No etched circuitry except plug contacts. Holds 121 14-pin DIPs.

3690-12: Provides 7.5" long extension to facilitate testing. Mounted connector.

Connectors with 50/50 gold/nickel plated contacts on .125" centers:

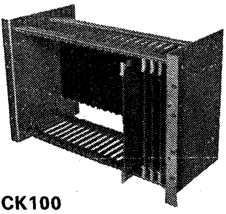
R681 Dip Solder Tail. **R681-1** Wrap Post Tail. **R681-2** for mother board use.

MOTHER BOARDS


8803-6-1A

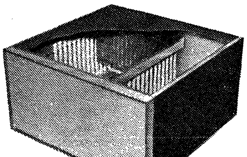
Hi speed - up to 10MHz, shielded, two-sided, plated thru holes, FR4 epoxy glass, .000050" gold plated connector contacts, liberal decoupling capacitors, "reset" switch wiring pads, fully assembled.

8803-6-1A 6-position **8803-18-1A** 18-position.



CCK100 Rack Mounting Cage

Especially designed to accommodate S100, Exorciser and Micromodule Plugbords. 19" w. x 12.2" h. x 8.9" d. Furnished with 21 pairs of guides. Adjustable rear struts mount mother boards or connectors.



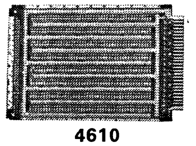
VP2 Assembled Case

Sturdy blue vinyl finished aluminum, fully assembled, with card guides, mounting for mother board or connectors. Power supply chassis plate, and I/O rear connector panel with 10 cutouts for DB25S connectors included.

STD BUS

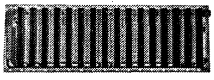
Plugboards for interface, memory expansion, experimentation. Flame retardant epoxy glass composite .062" × 4.5" × 6.5" with 2 oz. tinned copper buses and pads. 28/56 nickel/gold plated contacts on .125" centers. Power and ground bus terminations per STD Bus .042" dia. holes on 0.1" grid. I/O connector pads.

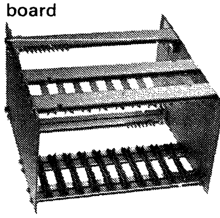
4610: for soldering or wire wrapping
4610-2: for wire wrapping
4610-1: no etched circuitry except for plug contacts
3690-12: extender board has nickel/gold contacts to mounted receptacle.


4610

STD BUS MOTHER BOARDS - RACKS

Hi speed—up to 10MHz, shielded, 2-sided, plated thru holes, FR4 epoxy glass, .000050" gold plated connector contacts, liberal decoupling capacitors, • **4610-8-1** 8-position board • **4610-16-1** 16-position board

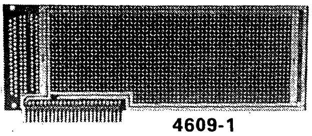

4610-16-1A


CCK19S

CCK19S "drop in" card rack, all aluminum 5¼" h. × 8¼" × 8½" d. 20 nylon card guides supplied for card mounting on .250" increments, rear cross members for mother board or connector mounting.

CCK19SMB8: CCK19S rack with 4610-8-1 motherboard.

APPLE II, IIe


4609-1

4609 Plugbord: Hi capacity, mounts 22 16-pin DIPs. .1" grid of .042" holes. 7.7" × 3.06". Two sets of gold plated I/O card edge contacts wrap wire or solder. Tinned 2 oz. copper, power and ground buses.

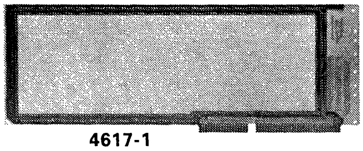
4609-1: +5V & ground—no pads. Mounts 46 16-pin DIPs. One set of edge contacts; also dual purpose pattern on board edge for up to 40-pin .1 × .1 header, or 37-pin "D" sub connector.

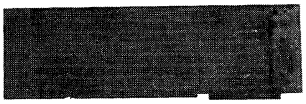
IBM AT, PC PROTOTYPING PLUGBOARDS

COMMON FEATURES • Gold plated edge contacts on 0.1" centers • Power & ground buses terminated to connectors. • Pads on board & bracket accepts DB9-, 15, 25 or 37-pin I/O connector • Accepts Vector's press-in terminals for wiring or soldering. **FEATURES UNIQUE TO IBM AT ONLY** • Plugs into any IBM AT slot with dual connectors. • Pads for mounting a dual row 0.1" spaced header.

IBM AT PLUGBOARDS

4617: 3-hole solder pads & buses
4617-1: Peripheral buses
4617-2: Voltages Planes
4617-3: Pad-Per-Hole
3690-26: Extender board


4617-1

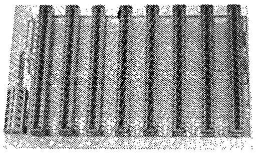

4613

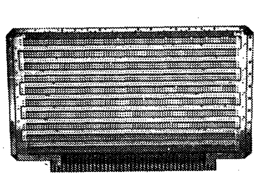
IBM PC PLUGBOARDS

4613: 3-hole pad and bus board
4613-1: Bare board with Peripheral buses
4613-2: Wire wrapping bus board
4613-3: Pad-Per-Hole, Plated through
3690-22: Extender board

44-LINE BUS SYSTEM MOTHERBOARD

4616-8: • RCA Cosmac compatible. • Connectors on 0.75" centers with 22/44 contacts spaced 0.156" centers. • 6.75" × 4.33" × .062" • 6-pin quick disconnect connector installed for external power. • Pads provided for decoupling capacitors between each connector.

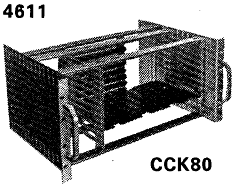

4616-8


4611

MOTOROLA EXORCISOR MICROMODULE

4611 Plugbord: 3-hole pads + 2 buses per Motorola standard, 43/86 nickel/gold contacts on .156" centers. Epoxy glass composite with .042" dia. holes on 0.1" grid for solder or wrap pins.

4611-1: Same as 4611 except no etched circuitry except plug contacts.


CCK80

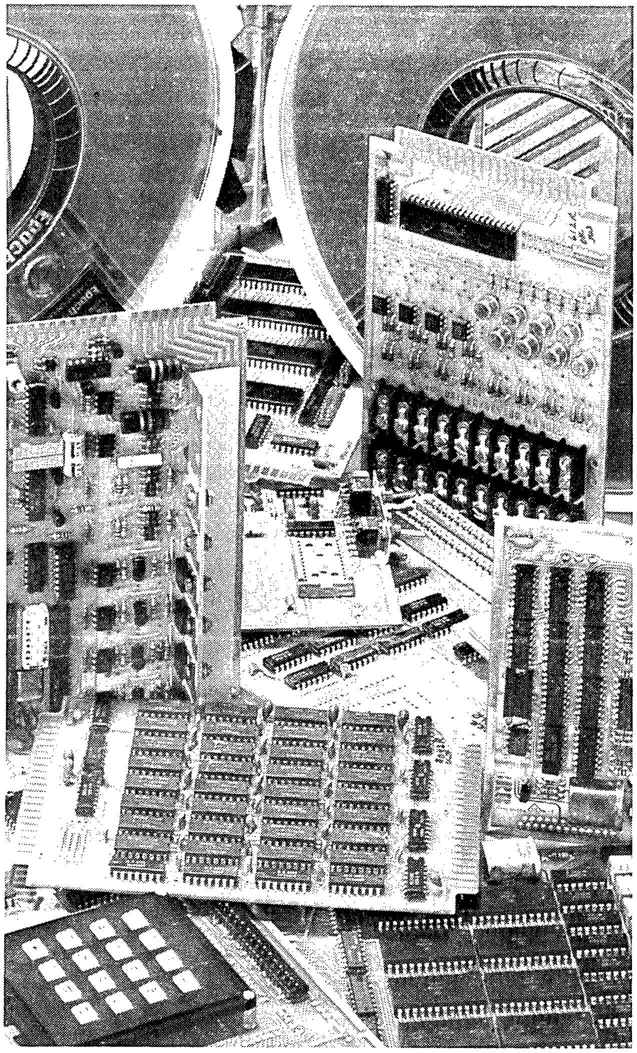
HORIZONTAL CARD CAGE

CCK80: Horizontal card cage for S100 Bus—Multibus—Motorola Exorcisor, Micromodule
10 adjustable card positions. Fully assembled.

Many other models available -- contact your local distributor or factory. For wiring terminals and tools, see Sec. 1700, P. C•1102.

VECTOR ELECTRONIC COMPANY, 12460 Gladstone Avenue, P.O. Box 4336, Sylmar, CA 91342-0336 Phone (818) 365-9661

WINTEK



Wintek Corporation—your complete source of microcomputer hardware and software products for the 6800, 6801, 6805, and 6809 microprocessor families:

- *Micro Modules for R & D efforts and for the OEM*
- *Software Development Tools*
- *Computer-Aided-Design Software*

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MCH68	6809 MPU, 24K RAM, 1 ROM socket, 2 RS-232 serial ports, 4 parallel ports, watchdog timer, real-time clock	$585
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Computer-Aided-Design Software

smARTWORK lets you create and revise printed-circuit-board artwork on your IBM-PC. Sold with a 30-day money-back guarantee.

PSW00	smARTWORK for the IBM-PC	$895

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THE MIZAR PRODUCT LINE

CPU Modules

VME7100 CPU. This double-height high performance CPU board supports either the 68000 or the 68010 at processors speeds of 8, 10, and 12.5 MHz. The 7100 has two asynchronous serial ports, two 8-bit parallel ports, and two timers—one 16-bit and the other 24-bit. All I/O functions are brought out via the P2 connector. On-board memory includes four 28 pin sockets for up to 128K bytes of EPROM and either 128K or 512K of dynamic RAM dual ported with the VMEbus. In addition the 7100 has provisions for the 68451 memory management unit and a full function system controller that can be disabled in multiple 7100 applications.

VME7105 CPU. This double-height CPU module has all the features of the 7100 but replaces the parallel port capability with a floating point processor for high speed arithmetic applications.

VME8100 CPU. A single-height board, this 68000-based CPU module provides one serial port and two 28 pin EPROM sockets for 16K, 32K, or 64K of on-board EPROM. The 8100 can handle any one of the seven VMEbus interrupt levels and can request the bus on any one of the four VMEbus request levels.

VME8105 CPU. A single-height board, the 8105 can support the 8 or 10 MHz 68000. Four 28 pin sockets are provided for local memory. Two sockets are dedicated for EPROM—16K, 32K, or 64K, and two sockets are dedicated for static RAM—4K or 16K. Bus requests on any one of the four bus request levels plus a full interrupt handler are also provided.

Memory

VME8210/Dynamic RAM. This single-height module holds up to 512K of 150 nsec dynamic RAM on 256K memory chips. This module resides on any 128K boundary in the VME 16Mbyte address range and supports 8- and 16-bit data transfers. Parity is jumper selectable. This module comes with either 128K of memory or 512K.

VME8205/Byte-wide Memory. Eight 28 pin sockets on this single-height module can hold 64K static RAM, 256K EPROM, or any combination of both. Sockets are jumper-configurable for 24 or 28 pin chips. Access time is jumper-selectable from 62.5 to 500 nsec.

VME7200/Dynamic RAM. Leaded-plastic chip carrier technology provides one full megabyte of dynamic RAM on this double-height board. The module responds to 24-bit addresses and transfers data in bytes or words. Parity is jumper-selectable. The board uses 64K dynamic RAM chips and holds four megabytes of RAM when 256K parts are used.

VME7205/CMOS RAM. This double-height board provides 64K or 256K of CMOS static memory protected by on-board batteries. Data is accessed by 24 or 32 address lines and can be transferred in bytes, words, or long words.

Controllers

VME8400/Floppy Disk Controller. A set of five read/write registers on this single-height module control up to four floppy disk drives. Registers issue commands, read status, read/write data, enable and disable interrupts, and signal end-of-data-transfer. Polled or interrupt-driven. Jumper-configurable for use with most SS, DS, SD, DD, 8-inch or 5¼-inch drives.

VME8500/SCSI Bus Interface. This single-height module serves as an interface between the VMEbus and the SCSI bus. The 8500 is a single host non-arbitrating interface and can be used to talk to controllers for handling floppy disks, hard disks, and tape peripherals in polled or interrupt-driven mode.

VME8505/GPIB Interface. A wide range of instruments can be economically connected to a VMEbus system with this single-height module. Full GPIB talker, listener, and controller capability is provided. Polled or interrupt-driven. Interrupt handling is optimized with dual vectored interrupts.

VME8510/GPIB TLC w/DMA Interface. This single-height module includes all VME8505 features plus DMA mode. DMA transfer rates up to 280K per second.

VME7500/Dual GPIB Controller. This double-height board provides all VME8510 features for two GPIB channels. A 68450 controls the two separate DMA channels. Memory-to-memory DMA transfers are executed without affecting GPIB functions. A comparator permits DMA transfer termination based on a software-controlled character match.

VME7400/Disk Controller. Both floppy and hard disk drives can be controlled with this double-height module. The need for an SCSI Winchester interface is eliminated due to a combination of DMA and on-board buffering.

VME8700/Video Controller. Directed at applications that require a CRT controller embedded in a VMEbus system, this single-height module generates 128 ASCII and 128 block graphics characters. Dual ported RAM (128 bytes) provides VMEbus communication. A 68121 with 8K EPROM and 2K RAM provides local intelligence. Module display memory consists of 4K character memory and 4K of attribute memory.

VME7700/Color Graphics Controller. An NEC 7220 video display controller on this double-height board provides up to eight colors with 3-plane display memory (1024x1024 pixels each). A light pen register is included, and the controller supports panning and screen zoom factors of one to 16. Figure drawing of line, arc/circle and graphics characters are executed at one megapixel per second. Screen resolution: 1024x800.

Auxiliary Hardware

VME7000/VMEbus Prototype Module. This double-height board includes a complete VMEbus slave interface and high-density wire wrapping prototype area. The module interface is configurable for VME A23:D16, A23:D8, A15:D16, or A15:D8. Two interrupts are supported and each interrupt can be jumpered to operate on any of the seven VMEbus interrupt levels. Interrupt vectors are software-programmable.

VME8000/System Controller. This single-height module is equipped with all the system control functions needed in a VMEbus system: bus arbitration, jumper-selectable bus time-outs, power-on reset, ACFAIL line monitoring, and ACFAIL reset timing. The module also provides an on-board reset switch, remote reset switch connector, 16MHz system clock, and SYSFAIL line monitor.

VME8058/Eight-Slot Motherboard. This single-height multilayered motherboard can accommodate eight VME boards, and is fully equipped with internal power and ground planes. Terminal block connections are provided for +5VDC, +5VDC standby, ±12VDC, GND, and ACFAIL. Daisy chained lines are jumper-selectable to permit open backplane slots.

VME8315/Battery-Backed Clock/Memory. This single-height module is equipped with a real-time clock and up to 32K of static CMOS memory. Both clock and memory are powered by a lithium battery if +5VDC system power is lost.

VME9200/Rack-Mount Enclosure. This 20-slot card cage mounts in a standard 19-inch rack and can accommodate both single- and double-height VME boards. The power supply features output overload protection plus single-line short circuit protection.

VME4000 Series Disk Drive Accessories. Mizar provides both floppy and hard disk accessories for 9200 based systems to fit a variety of user applications. The 4200 consists of two 5¼-inch DSDD 48 tpi floppy disk drives while the 4210 consists of one 5¼-inch DSDD 48 tpi floppy disk and a 10 MB 5¼-inch half high Winchester disk drive. Other sizes and configurations are available upon request.

I/O Modules

VME8300/Quad Serial Port. Four serial ports supporting software-controlled sync/async operation at up to 880K baud are provided on this single-height module. Signal lines can be configured for RS-232 or RS-422 levels and bisync, HDLC, and SDLC modes are supported. Modern control lines for DTR and CTS are available.

VME8305/Quad Parallel Port. This single-height module provides four 8-bit ports with a pair of handshaking signals per port. The ports can be programmed as inputs or outputs and are buffered with 48mA drivers. In addition two 24-bit timers are available for a variety of timing applications.

VME8605/Analog Input Module. This single-height board can accommodate eight double-ended or 16 single-ended analog input channels. The number of inputs can be doubled as an option. The board provides 12-bit resolution with a 25 khz throughput rate, and completion of A/D conversion is determined by polling or a vectored interrupt. Gain is jumper-selectable for 1, 10, 100, or 1000; any value in between can be resistor-programmed.

VME8610/Analog Output Module. This single-height module accommodates four 12-bit analog output channels. Data is latched in registers, and typical conversion time is three microseconds.

VME8310/Counter-Timer. Ten configurable 16-bit counter-timers are provided on this single-height module. Each counter-timer is equipped with a gate control line, source control line, and an output line. Four separate VMEbus interrupts can be generated with software-programmable interrupt vectors.

VME7300/Serial Communications Processor. This double-height board is an intelligent self-contained VMEbus serial communication center. A 32K dual port memory buffer is used for bus communications and an on-board 68000 processor with DMA reduces host CPU communications processing time. Simultaneous data transfer on eight independent serial channels is executed at speeds up to 1M baud. Signal lines can be configured for RS-232 or RS-422 levels; synchronous, asynchronous, HDLC, and SDLC modes are supported.

Operating Systems & Application Software

CP/M-68K™. This single user operating system is based on the popular Digital Research 8-bit CP/M. Standard built-in commands include DIR, DIRS, ERA, REN, SUBMIT, TYPE, and USER. Standard utilities include DDT-68K™, ED, PIP, STAT, archive (AR68), DUMP, relocate (RELOC), SIZE68, and SENDC68. Programming tools include AS68 (68000 assembler), LO68 (object file linker), and a "C" compiler.

CP/M-68K and DDT-68K are trademarks of Digital Research.

MINCE. Based on the large system EMACs screen editor, Mince was developed by Mark of the Unicorn and is available for CP/M-68K™ and OS9/68K™ operating systems. Mince supports multiple file buffers and split screen operation. It can be configured for almost any CRT that has basic cursor positioning capability.

CP/M-68K is a trademark of Digital Research.
OS9/68K is a trademark of Microware Systems Corp. and Motorola.

OS-9/68000™. OS9/68K is a compact, highly efficient UNIX™-like operating system. Based on the popular OS9 for the 6809, OS9/68K provides real-time functions modular design, a hierarchical directory structure, and multi-user/multitasking capability. Available languages include C, BASIC09™, and PASCAL.

OS-9 and BASIC09 are trademarks of Microware Systems Corp. and Motorola. UNIX is a trademark of Bell Labs.

PolyFORTH™. Developed by FORTH, Inc., this package is a combined operating system, programming language, and editor ideal for the development of real-time applications. FORTH programs are created by using built-in functions to construct words that become part of the programmer's dictionary. These words can be used to construct more complex words until the final application is defined. Because FORTH is an interpreter, functions can be tried immediately without compiling, linking, and loading.

PolyFORTH is a trademark of FORTH, Inc.

Mizar Debug Monitor. Available for all of Mizar's CPU modules, the Mizar Debug Monitor is a ROM-based programming tool that supports downloading of code in Motorola "S" format. In addition, commands are provided to display memory, examine and modify registers and memory, start a program and set a breakpoint, move memory blocks, and test memory.

Complete Hardware Systems

VME9000/System w/Dual 340K Floppy Disk Drives. This complete hardware package with dual floppy drives can be mounted on a standard 19-inch rack or housed in a compact cast aluminum case with carrying handle. Internal components include an 8-slot motherboard, system controller, CPU module, 128K or 512K dynamic RAM module, quad serial port module, floppy disk controller, two 5¼-inch DSDD 340K floppy disk drives, and three single-height expansion slots. The unit is powered by a 130 watt line-filtered switching power supply.

VME9100/System w/10MB Hard Disk Drive. This complete hardware package with one floppy drive and a Winchester hard disk can be mounted on a standard 19-inch rack or housed in a compact cast aluminum case with carrying handle. Internal components include an 8-slot motherboard, system controller, CPU module, 128K or 512K dynamic RAM module, quad serial port module, floppy disk controller, one 5¼-inch DSDD 340K floppy disk drive, SCSI interface, hard disk controller, one Winchester 10MB hard disk drive, and two single-height expansion slots. The unit is powered by a 130 watt line-filtered switching power supply.

MIZAR INC.
302 Chester St., St. Paul, MN 55107
Ph. (612) 224-8941 • TELEX 460542

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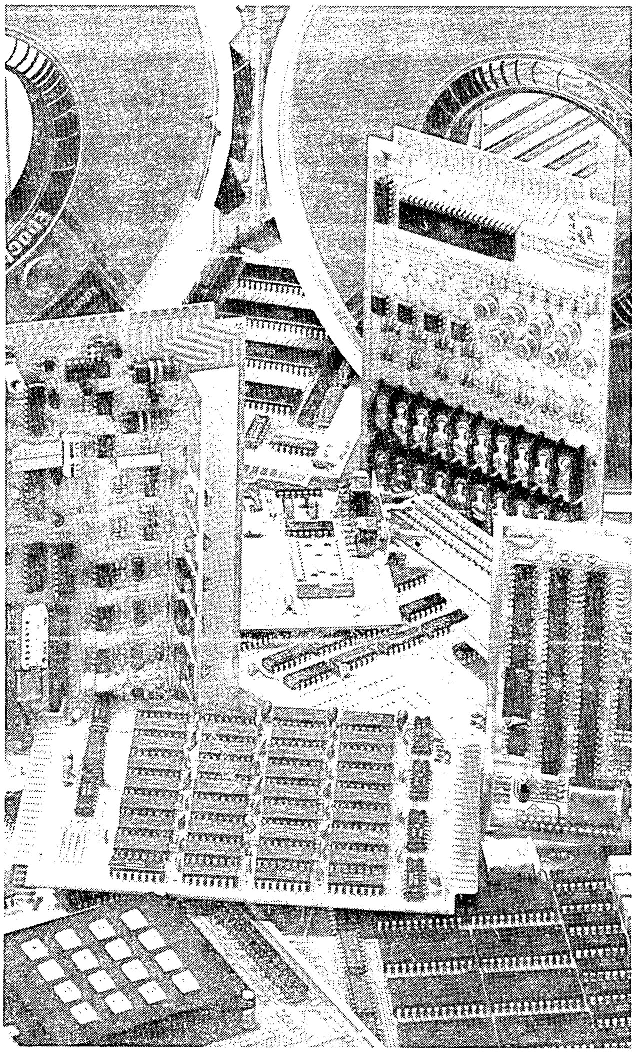

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COMMONLY USED ELECTRICAL/ELECTRONIC ABBREVIATIONS AND ACRONYMS

A
AC alternating current
A/D analog to digital
ADC analog to digital converter
ADP automatic data processing
AF audio frequency
AFC automatic frequency control
ALGOL algorithmic language
AM amplitude modulation
AND a logical operator
AQL acceptable quality level
ASCII American national standard code for information interchange
AWG American wire gauge

B
BALUN balanced to unbalanced
BASIC beginners' all-purpose symbolic instruction
BCD binary-coded decimal
BNC baby "N" connector
BUS basic utility system

C
CAD computer aided design
CAM computer aided manufacture
CATV cable television or community antenna television
CERMET ceramic metal element
Comm. communications
CMOS complementary metal-oxide semiconductor
CPS characters per second
CPU central processing unit

D
D/A digital to analog
DAC digital to analog converter
DC direct current
DIAC bidirectional trigger diode
DIL dual in-line
DIN Deutsche Industrie Normenausschuss
DIP dual in-line package
DPM digital panel meter
DTL diode transistor logic

E
EDP electronic data processing
EBCDIC extended binary coded decimal interchange code
EEPROM electrically erasable PROM
EMC electromagnetic compatibility
EMI electromagnetic interference
EMP electromagnetic pulse
EPROM electrically programmable ROM
ESR equivalent series resistance

F
FEP fluorinated ethylene propylene Copolymar, 200° Teflon
FET field-effect transistor
FM frequency modulation
FORTRAN formula translator

G
GaAsFET gallium arsenide field effect transistor
GPIB general purpose interface bus

H
HF high frequency (3 to 30 MHz)
HIPOT test, measurement and diagnostic equipment
HLL high level language
HV high voltage
Hz Hertz

I
IC integrated circuit
IDC insulation displacement contact
IF intermediate frequency
IO input/output (devices)
IR insulation resistance (or) infrared

J
JFET junction field effect transistor
JMOS junction metal oxide semiconductor

K
kHz kilohertz (10^3 hertz)
KSR keyboard send receive

L
LC inductance capacitance
LCD liquid crystal display
LED light-emitting diode
LF low frequency (30 to 300 kHz)
LIF low insertion force
LNA low noise amplifier
LNB low noise band
LSI large scale integration
LVDT linear velocity displacement transformer

M
MASER microwave amplification by stimulated emission of radiation
MATV master antenna television
μF microforad
MHz megahertz
MIPS million instructions per second
MIB microcomputer interface board
MOS metal oxide semiconductor
MOSFET metal oxide semiconductor field effect transistor
MOSIGT metal-oxide semiconductor insulated-gate transistor
MOV metal oxide varistor
MPU microprocessor unit
MSI medium scale integration

N
NBS National Bureau of Standards
NEMP nuclear electromagnetic pulse
NIM nuclear instrumentation module
NOR not OR
NTC negative temperature coefficient

O
OCR optical character reader
OEM original equipment manufacturer
OR a logical operator

P
PC printed circuit
PCB printed circuit board
pF picofarad
PGA pin grid array
PIN positive-intrinsic-negative (transistor)
PLA programmable logic array
PLL phased lock loop
PPI plan position indicator
PROM programmable read only memory
PTC positive temperature coefficient
PUT programmable unijunction transistor

Q
QAM quadrature amplitude modulation
Q (meter) quality-factor meter

R
RAM random access memory
RC resistance-capacitance
RFI radio frequency interference
RMS root mean square
ROM read only memory
RF radio frequency
RFC radio-frequency choke
RFI radio-frequency interference
RTD resistance-temperature detector
RTL resistor transistor logic
RTV room temperature vulcanizing
RW read/write

S
SAS silicon asymmetrical switch
SBC single board (micro) computer
SBS silicon bilateral switch
SCR silicon-controlled rectifier
SCS silicon controlled switch
SDA source & detector assemblies
SIDAC bidirectional voltage-triggered switch
SIP single in-line package
SSI small scale integration
SSR solid state relay
STL Schottky transistor logic
SUS silicon unilateral switch

T
TC temperature coefficient
TCXO temperature compensated crystal oscillator
TFE tetrafluoride ethylene propylene Copolymer, 250° Teflon
TRIAC bidirectional AC switch
TTL transistor-transistor logic
TTY teletypewriter

U
UHF ultra high frequency (300 MHz to 3 GHz)
UJT silicon unijunction transistor
UL Underwriters Laboratory
UPS uninterruptible power supply

V
VAC volts (of) alternating current
VAR volt-ampere reactive
VCR video cassette recorder
VDC volts (of) direct current
VHF very high frequency
VHSIC very high speed integrated circuit
VLF very low frequency (3 to 30 kHz)
VLSI very large scale integration
VME virtual machine environment
VRM voice recognition module
VTVM vacuum tube volt meter
VU volume unit
VSWR voltage standing wave ratio

W
WPS word processing software

Y
YIG yttrium iron garnet

Z
ZIF zero insertion force

A
C
I

ACTIVE CONTROL INSTRUMENTATION

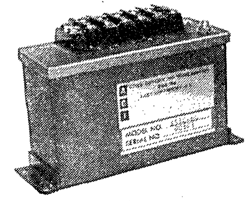
P.O. BOX 243, KEY LARGO, FLORIDA 33037
(305) 451-1000

MEASUREMENT AND CONTROL

"an advanced line of transducer and sensor instrumentation utilizing state-of-the-art techniques providing high performance economically . . ."

PHASE ROTATION/PHASE LOSS MONITOR/CONTROLLER

Model 4331: 3φ Voltage — 50-400 Hz
Temperature: −20°C to +71°C
Size: 7½" x 1½" x 3"
Output Relay: DPDT 1 Amp



FREQUENCY TRANSDUCER/CONTROLLER

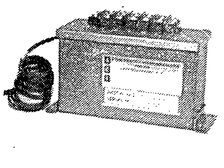
Model 3750: 50 - 60 - 400 Hz
Output 1: 0-1 or 0-5 VDC
Output 2: Solid State or Relay adjustable Hi and Lo limits
Time Delay: Adjustable 0 to 2½ SEC.
Accuracy: 1%
Linearity: .05% center frequency
Temperature: −20°C to +71°C
Size: 6½" x 1½" x 3"

D.C. CURRENT SENSOR/CONTROLLER

Model 4502

Current Ranges: 0-10 MA **Thru** 0-100 Amp
Excitation: 28 VDC ±4 VDC
Output 1: 0-5 VDC
Output 2: Solid State or Relay
Accuracy: 0.5%
Size: 4½" x 1½" x 3"

Undercurrent
or
Overcurrent



A.C. CURRENT SENSOR/CONTROLLER

Model 4025: 50-400 Hz
Excitation: 115 or 220 VAC
Output 1: 0-1 or 0-5 VDC
Output 2: Solid State or Relay adjustable Hi and Lo limits
Time Delay: Adjustable 0 to 2½ SEC.
Temperature: −20°C to +71°C
Size: 6½" x 1½" x 3"

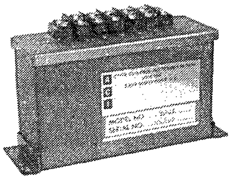
A.C. CURRENT MONITOR — ECONOMY

Current Ranges: 0-1 Amp **Thru** 0-100 Amp

Model 4101	**Model 4210**
Output: 0-5 VDC	**Output Relay:** SPDT

Temperature: −20°C to +71°C
4½" x 1½" x 3" 6½" x 1½" x 3"

50-400 Hz



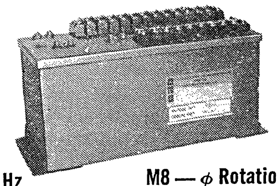
A.C. VOLTAGE TRANSDUCER/CONTROLLER

Model 9601: 50-400 Hz
Input: 90-140 VAC
Output 1: 0-1 or 0-5 VDC
Output 2: Solid State or Relay adjustable Hi and Lo limits
Accuracy: 1%
Response: Less than 0.25 Hz
Time Delay: Adjustable 0 to 2½ SEC.
Size: 6½" x 1½" x 3"

POWER LINE MONITOR/CONTROLLER

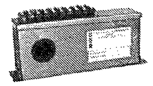
Model 4301: 1φ Voltage and Frequency
Model 4302: 2 or 3φ Voltage and Frequency
Voltage Band: 95 - 135 VAC
Frequency Band: ±10% center frequency
Hi-Lo Limits: Adjustable to any points within Band
Output Relay: SPDT or 3PDT 10 Amp
Time Delay: Adjustable 0 to 2½ SEC.
Temperature: −20°C to +71°C
Size: 7½" x 3" x 3½"

50-60-400 Hz



M8 — φ Rotation
MS — mil qual

WATTS/TRUE POWER TRANSDUCER CONTROLLER



Model 9401 **50-60-400 Hz**
Input: 90-150 & 160-250 VAC — 0-500 W to 0-100 kW
Output 1: 0-1, 0-2 or 0-5 VDC
Output 2: Solid State or Relay adjustable Hi and Lo limits
Size: 6½" x 1½" x 3"
Watts Ranges: 0-500 W, 0-1 kW, 0-2 kW, 0-5 kW, 0-10 kW, 0-20 kW, 0-50 kW, 0-100 kW

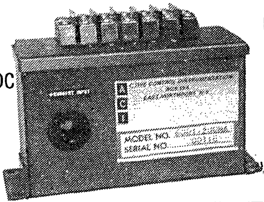
D.C. CURRENT SENSORS

Pass-Thru

Model 6001 — Model 6002 Bi-Directional

Thru-Current Ranges:		0-5 Amp
0-10 MA	0-200 MA	0-10 Amp
0-20 MA	0-500 MA	0-20 Amp
0-50 MA	0-1 Amp	0-50 Amp
0-100 MA	0-2 Amp	0-100 Amp

Excitation: 28 VDC ±4 VDC
Output: 0-5 VDC
Accuracy: 0.5%
Response: 1 MSEC
Temp.: −20°C to +71°C
Size: 4½" x 1½" x 3"



CURRENT SENSOR

Model 7101
Excitation: ±15 VDC
Output: 0 to ±5 VDC
Response: DC to 10 KHz

Thru-Current Ranges:	**Bi-Directional:**
0-10 Amp	0-100 Amp
0-20 Amp	0-200 Amp
0-50 Amp	0-500 Amp

Size: 4½" x 1½" x 3"

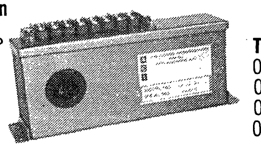
D.C. CURRENT SENSOR

Pass-Thru
50 KV Isolation

Model 6011

Thru-Current Ranges:		0-5 Amp
0-10 MA	0-200 MA	0-10 Amp
0-20 MA	0-500 MA	0-20 Amp
0-50 MA	0-1 Amp	0-50 Amp
0-100 MA	0-2 Amp	0-100 Amp

Excitation: 115 VAC ±10% 50 - 400 Hz
Output: 0-5 VDC
Accuracy: 1%
Response: 0.5 Sec.
Temp.: −20°C to +71°C
Size: 6½" x 1½" x 3"



D.C. CURRENT SENSOR/CONTROLLER

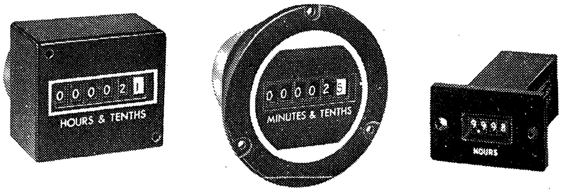
Model 4560

Thru-Current Ranges:		0-5 Amp
0-10 MA	0-200 MA	0-10 Amp
0-20 MA	0-500 MA	0-20 Amp
0-50 MA	0-1 Amp	0-50 Amp
0-100 MA	0-2 Amp	0-100 Amp

Excitation: 115 VAC ± 10% 50-400 Hz
Output 1: 0-5 VDC
Output 2: Solid State or Relay adjustable Hi and Lo limits
Accuracy: 1%
Temp.: −20°C to +71°C
Size: 6½" x 1½" x 3"

Telephone or write for individual detail sheets, prices and applications assistance.

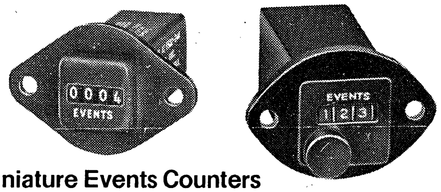
Indicators



Commercial Elapsed Time Indicators

Maintain record of equipment on/off time and provide utilization time information for maintenance, billing, etc. Many different models and mounts. Up to 6-digit readouts.

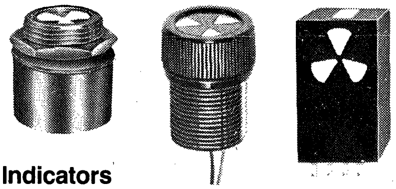
Type	Series No.	Operating V ac	Styles
Standard Commercial	K42200	6-230, 50 or 60 Hz	Round and rectangular
Microminiature Commercial	K49200	115 60 or 400 Hz	End or side readout



Microminiature Events Counters

Meet MIL-I-8974 environmental requirements. Up to 6-digit display, depending on model. Non-resettable and resettable types. Many standard mountings.

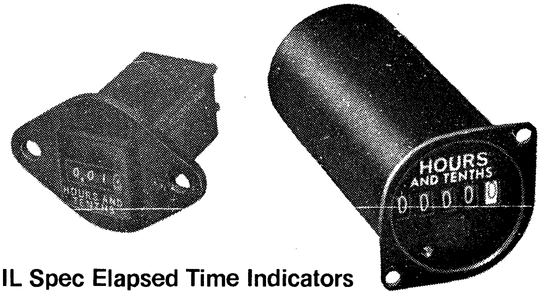
		Series No.		
Type	Digits	28V dc	115V 60 Hz	115V 400 Hz
Non-resettable	4	K19502	K19511	K19501
	5	K19504	K19513	K19503
	6	K19506	K19515	K19505
Resettable	3	LM19502	LM19511	LM19501
	4	LM19504	LM19513	LM19503



Fault Indicators

Monitor circuits and systems for operation beyond design parameters. Contrasting flag indicates fault condition. Magnetically latched until manually or electrically reset. Units with internal switches for remote signalling.

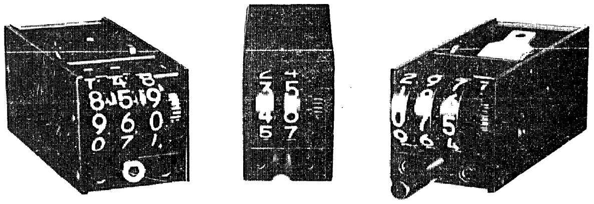
Type	Series	MIL Ref.	Vdc	Operating Time
Round-Manual Reset. Internal Sw.	A21682	MIL-I-83287	0-30	50ms
Round-Electric Reset	K21600	MIL-M-83287	17-29	50ms
Round-Manual Reset	L21603/01	MIL-M-83287	3-30	50ms
Round-Electric Reset	L21603/02	MIL-M-83287	10-30	50ms
Rectangular-Electric Reset	K21500	MIL-E-5400J	17-29	50ms



MIL Spec Elapsed Time Indicators

Meet MIL-M-7793 environmental requirements. In either subminiature (5-digit) or microminiature (4-digit) sizes. White numerals on black, "tenths" digit red on white. Hermetically sealed.

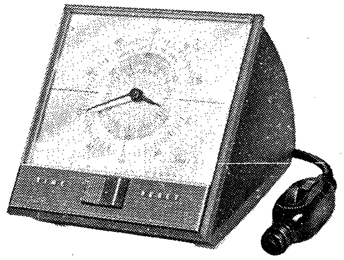
Type	Series No.	Operating Voltage
Subminiature	K4200	28V dc
	K23200	115V ac, 60 Hz
	K25200	115V ac, 400 Hz
Microminiature	K19200 (Square) K19220 (Round)	24 or 120V ac 400 Hz
	K19760 (Square) K19780 (Round)	28V dc



Subtractive and Additive Events Counters

Two- and three-digit military grade counters. Meet MIL-STD-202C. Maximum count rate 1000 pulses per minute. Additive (count up) and subtractive (countdown) models. Presettable. Operates on 21-29 Vdc pulses.

Type	Digits	Serial No.	Operating Voltage
Subtractive	2	K-4702-P1	21-29V dc
	3	K-4701-P1	
	3	K-4703-P1	
Additive	2	K-4702-P2	
	3	K-4701-P2	
	3	K-4703-P2	



Laboratory Stop Clocks

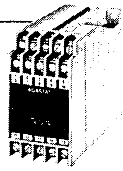
Provide a wide selection of timing ranges, voltages and mountings. Operate from panel switch or by remote control. All models have timed outlets. Write for information.

AIRPAX®

A North American Philips Company
Cheshire Division
Cheshire Ind. Park, Cheshire, CT USA 06410
Telephone: (203) 272-0301

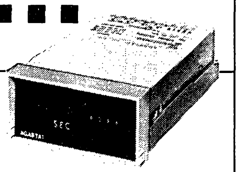
AGASTAT® SOLID-STATE TIME-DELAY RELAYS...

DSC Surface mount

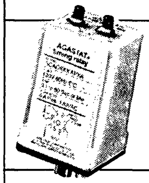


DIGITAL QUARTZ TIMER/COUNTERS

Employ microcomputer and digital-timing technology to provide every essential TDR function in a single compact unit with unprecedented accuracy and stability. Solid-state pulse-counting circuit. Crystal-controlled pulse-generator. Thumbwheel switches set delay. 4-digit optional display shows time remaining or counting progress. Six timing, five counting modes and four timing ranges field-selectable. Instantaneous plus timed 10 amp. output relays.

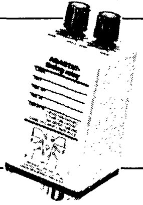


DPC Panel mount



SCA

Series SCA provide dual timing ranges, field-convertible from seconds to minutes, and AC/DC operation with reverse-polarity protection, plus "Coarse" and "Fine" delay-setting knobs.

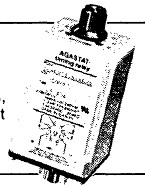


SRC

Series SRC are repeat-cycle timers for applications requiring high-accuracy repetitive ON/OFF cycles of independently variable durations, permitting industrial-control designers to simplify and cost-reduce their systems.

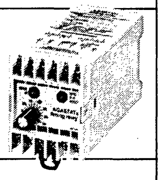
SCB

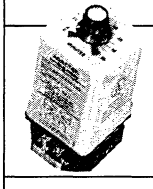
Series SCB may be used directly, without external contactors, to control solenoids and other inductive loads to 345 VA at 120 VAC, meeting a broad range of industrial requirements.



SSA

Series SSA use MSI-chip IC logic to achieve the highest reliability and long-term accuracy in its moderate price class. Fits in a single space on a standard 300V machine-tool relay channel.





SCC

Series SCC with mating socket (supplied) are UL-listed under Standard 508 (Ind'l. Control Equip.) for "pilot duty" in the Auxiliary Devices category (the most stringent) whether field or factory wired.

SSC

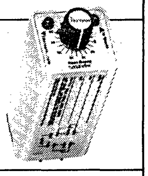
Series SSC are highly reliable TDRs with transient protection circuitry that achieves exceptional immunity to noise and transients. These low-cost TDRs combine premium components with high-quality workmanship.

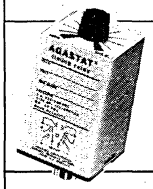
SCD

Premium quality in one of the lowest-cost timers in their class. UL-recognized, available for on-delay or interval timing applications, with DPDT load switching.

STA

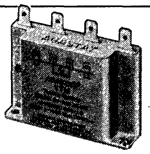
Series STA provide all of the performance features of the UL-Listed Series SCC plus maximum contact density. They occupy 1/3 less panel space than most solid-state TDR's and plug into popular tab-style sockets.





SCE

Features "True off-Delay" timing, with no operating voltage required during the timing cycle, with delays up to ten minutes and competitive pricing.



VTM-1

Model VTM-1 is a compact in-line timing module of exceptional simplicity and unprecedented application flexibility. Wired in series in a load circuit, it will control inductive loads of up to 1A, RMS or DC at power circuit voltages from 24V to 240V RMS AC or DC.

Type	Operating Mode Options	Operating Voltages DC	Operating Voltages AC (50 — 60Hz)	Number of Timing Ranges
DSC/DPC	01, 02, 03, 04, 09, 11, 50, 51, 52, 53, 54*	12, 24, 125**	120, 240	4 (see below)*
SCB	01, 02, 03	12, 24, 48, 125	24, 48, 120, 240	13 (0.1 sec. to 60 min.)
SCC	01, 02, 03	12, 24, 48, 125	24, 48, 120, 240	13 (0.1 sec. to 60 min.)
SCD	01, 03	24, 120	24, 120	3 (0.1 sec. to 300 sec.)
SCE	22	24, 48	24, 48, 120	6 (0.1 sec. to 10 min.)
SSA	01, 02, 03, 04, 09	12, 24	24, 48, 115/120, 230/240	12 (0.1 sec. to 60 min.)
STA	01, 02, 03, 09	12, 24, 48, 125	24, 48, 120	13 (0.1 sec. to 48 hr.)
SSC	1. 2. 3	12, 24, 48, 125	24, 48, 120, 240	13 (0.1 sec. to 60 min.)
SCA	01, 02	24, 120	24, 120, 240	2 (0.1 to 60* sec. or min.)
SRC	7	12, 24, 48, 125	24, 48, 120, 240	13 (0.1 sec. to 60 min.)
VTM-1	1	24 to 240	24 to 240	infinite (see below)

*field-selectable **125V — DSC only

Operating Mode

Code	
01	On-Delay
02	Off-Delay
03	Interval
04	Latching Interval
07	Repeat Cycle
09	Accumulating On-Delay
11	Latching On-Delay
22	True Off-Delay
50	Count down ext. reset
51	Count down auto reset
52	Count up ext. reset
53	Count up auto reset
54	Count up-down, reset by removal of power

Standard Timing Ranges

0.1 to 3 sec.	10.0 to 300 sec.
0.1 to 10 sec.	0.33 to 10 min.
0.5 to 15 sec.	0.5 to 15 min.
1.0 to 30 sec.	1.0 to 30 min.
2.0 to 60 sec.	2.0 to 60 min.
4.0 to 120 sec.	2.0 to 48 hrs.
6.0 to 180 sec.	6.0 to 180 cycles

(All ranges not available in all models. Request specific series catalogs.)

Series SCA Timing Ranges

0.1 to 60 sec. or 0.1 to 60 min. field convertible

Model VTM-1 Timing Ranges

Infinite @ 10kΩ/sec. (1.0 to 1,000 sec.)

Series DSC/DPC Timing Ranges

(field-selectable)

0.01 — 99.99 sec.
0.10 — 999.9 sec.
1.00 — 9999 sec.
10 — 99,990 sec.

Available through your local distributor.

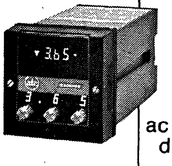
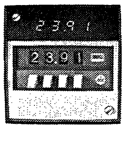
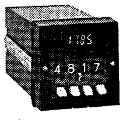
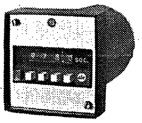
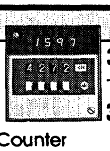
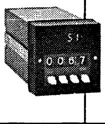
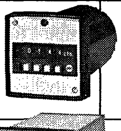
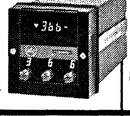
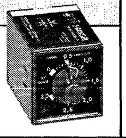
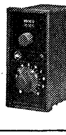
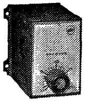
All specifications, dimensions, and photographs subject to change without notice.

amerace AMERACE CORPORATION

Amerace Corporation, Hackettstown, NJ 07840 U.S.A.
AGASTAT® Time-Delay Relays, Control Relays, & Programmable Switches.
BUCHANAN® Terminal Blocks, Barrier Strips, & I/O Connectors.
AGASTAT™ Proximity Sensors, Undervoltage Relays, and Power Quality Monitors

125D

atc® TIMERS, COUNTERS, TDRs

	Input Voltage	Ranges	Operating Mode	Load Relay	Temp. Range	Repeat Accuracy	Cycle Indicator	
TIMERS							Ind.	Non Ind.
365 **LONG-RANGER** Computing Timer 	ac or dc	Switch selectable: 0-9.99, 99.9 or 999 seconds, minutes or hours	Interval, Delay or Pulse	DPDT, 1 Instant 1 Delayed 7A at 120, 240 or 24V ac 3A at 240V dc 1½ A at 48V dc ½A at 125V dc	32-140°F	±0.01 second on all ranges	X	
335 **SHAWNEE** IC Digital GP Reset Timer  **335B**	ac	0.01-99.99 seconds or minutes. Field convertible.	Interval, Delay or Pulse	DPDT, 1 Instant 1 Delayed 5 A at 120V ac 2 A at 240V ac 0.1 A at 125V dc	32°-140°F	±0.01 second		X
335D		0.01-99.99 seconds or minutes. 0.1-999.9 seconds or minutes. Field convertible.					X	
355 **SHAWNEE II** Compact IC Digital GP Reset Timer 	ac	0.01-99.99 seconds or minutes. 0.1-999.9 seconds or minutes. Field convertible.	Interval, Delay or Pulse	DPDT, 1 Instant 1 Delayed 5 A at 120V ac 2 A at 240V ac 0.1 A at 125V ac	32°-140°F	±0.01 second	X	X
325 **TANKARD** Digital Motor-Driven Reset Timer 	ac	0-999.9 seconds, minutes or hours.	Interval or Delay	Two SPDT's 10 A at 125V ac 5 A at 250V ac 0.5 A at 125V dc 0.25 A at 250V dc	32°-120°F	±0.005% of range	X	
COUNTERS								
336 **SHAWNEE** IC Digital GP Predetermining Counter  **336B**	ac	1 to 9999.	Interval, Delay or Pulse	DPDT 5 A at 120V ac 2 A at 240V ac 0.1 A at 125V dc	32°-140°F	100% (±0 count)		X
336D		1 to 9999 or 10 to 99,990 in 10 count increments.					X	
356 **SHAWNEE II** Compact IC Digital GP Predetermining Counter 	ac	1 to 9999 or 10 to 99,990 in 10 count increments.	Interval, Delay or Pulse	DPDT 5 A at 120V ac 2 A at 240V ac 0.1 A at 125V dc	32°-140°F	100% (±0 count)	X	X
326 **TANKARD** Digital Predetermining Counter 	ac	1 to 9999.	Interval or Delay	Two SPDT's 10 A at 125V ac 5 A at 250V ac 0.5 A at 125V dc 0.25 A at 250V dc	32°-120°F	100% (±0 count)	X	
366 **LONG-RANGER** Computing Counter 	ac or dc	Switch selectable; 1 to 999 10 to 9990 100 to 99900	Interval, Delay, or Pulse	DPDT, 1 instant 1 Delayed 7 A at 120, 240 or 24V dc 3 A at 240V dc 1½ A at 48V dc ½ A at 125V dc	32° - 140°F	100% (±0 count)	X	
TDRs								
319D Multi-range Octal base TDR 	ac or dc	Multi-range Five ranges from 0.3 sec. to 30 min. Three ranges from 1 sec. to 100 sec. & 1 min. to 100 min.	On Delay	DPDT 7 A at 120V ac, 240V ac, 24V ac, 24V dc	32°F-158°F	Varies with changes in line voltage & ambient temperature but not with reset time — from ±1% to ±6%		X
328 **MOS TDR** Multi-Range TDR 	ac or dc	Multi-range. Six switch-selectable ranges from 1 second to 10 hours.	On Delay, Off Delay, Interval	DPDT 7 A at 120/240V ac 1/10 hp at 120V ac 7 A at 24V ac	0°-150°F	Varies with changes in line voltage & ambient temperature but not with reset time— from ±1% to ±5%.		X
322 TDR Motor-Driven Cycle Progress TDR 	ac	12 ranges from 5 seconds to 5 hours.	Interval, Delay or Pulse	Two SPDT's 10 A at 120V ac 5 A at 240V ac	32°-120°F	±2% of range	X	

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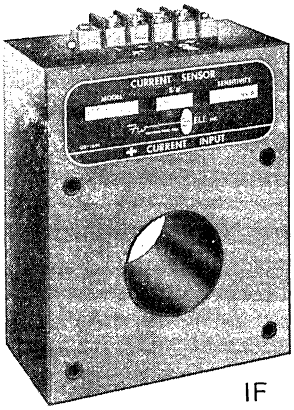
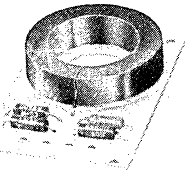
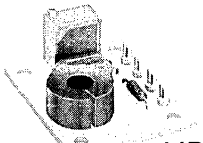
dc & ac Current Sensors *(Solid-state Shunts)*



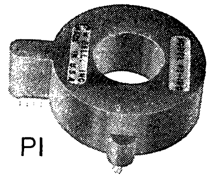
IF



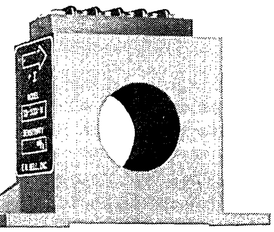
IB



MB



PI



ID

CURRENT SENSOR
MODEL
S/N
BELL INC.
+ CURRENT INPUT

IA

DESCRIPTION

Bell Current Sensors are small, lightweight, inexpensive devices for non-contact current measurements to 3000 A dc or peak ac up to 1 kHz.

The sensors are non-contact, Hall-effect devices, offering no dc insertion loss, power loss, isolation or heating problems.

The Hall-effect sensor is a four-pole, magneto-sensitive device mounted in the core gap, and reads the magnetic field surrounding the conductor passing through the gap. The field is proportional to the unknown current, and the output voltage of the Hall generator is proportional to this magnetic field, thus proportional to the current.

Various units in the broad line of F.W. Bell current sensors find applications in the automotive, aerospace, industrial and power generation fields.

FEATURES

- **Fast-responding**
- **Non-contact operation**
- **Output voltage isolation from input**
- **Very low insertion impedance**
- **Minimal distortion from adjacent conductors**
- **Amplified and non-amplified models available**
- **Models for mounting directly on PCBs**

TYPICAL APPLICATIONS

- **Monitoring and control of dc motor circuits**
- **Overload sensor in dc power supplies**
- **Control of dc motor-driven machine tools**
- **Replacements for shunts, particularly in hostile environments, in airborne circuits and when isolation is required**
- **Monitoring and control of battery load and charge circuits**
- **Current sensing element in feedback circuits, on interlocks and on dc circuit breakers**
- **Process control element in dc-operated processes**
- **Power measurement in dc power circuits**

F.W. BELL

An Allegheny International Company

6120 Hanging Moss Rd., Orlando, FL 32807
Phone: 305/678-6900 TWX: 810-853-3115

SPECIFICATIONS

MODEL	RATED CURRENT dc & ac	RATED OUTPUT	ACCURACY
ID-5001M	350 A	0.5—1.1 mV/A	±2% RO
ID-5101M	100 A	0.5—1.1 mV/A	±2% RO
ID-5011M	350 A	0.5 mV/A	±2% RO
ID-5111M	100 A	0.5 mV/A	±2% RO
ID-5021M	350 A	0.5 mV/A	±2% RO
ID-5031M	350 A	0.5 mV/A	±2% RO
IB-5001M	350 A	0.5—1.1 mV/A	±2% RO
IB-5101M	100 A	0.5—1.1 mV/A	±2% RO
IB-5011M	350 A	0.5 mV/A	±2% RO
IB-5111M	100 A	0.5 mV/A	±2% RO
IA-5023P	250 A dc	10 V dc	±0.5% RO
IA-5022P	500 A dc	10 V dc	±0.5% RO
IA-5021P	1000 A dc	10 V dc	±0.5% RO
IA-5020P	2000 A dc	10 V dc	±0.5% RO
IA-5024P	3000 A dc	10 V dc	±0.6% RO
IA-5025P	100 A dc	10 V dc	±0.5% RO
IF-5003M	250 A	0.3—0.6 mV/A	±0.5% RO
IF-5002M	500 A	0.15—0.3 mV/A	±0.5% RO
IF-5001M	1000 A	0.15—0.3 mV/A	±0.5% RO
IF-5000M	2000 A	.05—10 mV/A	±0.5% RO
IF-5004M	3000 A	.05—10 mV/A	±0.6% RO
IF-5023P	250 A	10 V dc	±0.5% RO
IF-5022P	500 A	10 V dc	±0.5% RO
IF-5021P	1000 A	10 V dc	±0.5% RO
IF-5020P	2000 A	10 V dc	±0.5% RO
IF-5024P	3000 A	10 V dc	±0.6% RO
IF-5025P	100 A	10 V dc	±0.5% RO
PI-100	0-100 A	0.5—1.1 mV/A	±1.5% RO
PI-350	0-350 A	0.5—1.1 mV/A	±1.5% RO
PI-600	0-600 A	0.25—5.5 mV/A	±2% RO
MB-1020	0-20 A	0.5 mV/A	±1% RO
MB-1050	0-50 A	0.5 mV/A	±1% RO
MB-1120	0-20 A	0.5 mV/A	±1% RO
MB-1150	0-50 A	0.5 mV/A	±1% RO
MB-1220	0-20 A	0.5—1.1 mV/A	±1% RO
MB-1250	0-50 A	0.5—1.1 mV/A	±1% RO

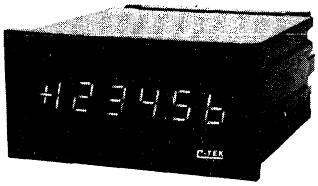
C-TEK
INCORPORATED

ELECTRONIC COUNTERS AND DISPLAYS
COUNTING SYSTEMS—DIGITAL COMPARATORS
NUMERICAL POSITION READOUTS—DIGITAL CLOCKS
DATA LOGGING PRINTERS—RATE METERS
TOTALIZERS—DIGITAL PANEL METERS
SPECIAL SYSTEMS TO YOUR SPECIFICATIONS

PRODUCT GUIDE

C-TEK, Inc. 617-246-1720
4 Railroad Avenue, Wakefield, Mass. 01880

PANEL MOUNTED COUNTERS AND DISPLAYS



DIN/NEMA CASE 3.78" x 1.89" x 3.75", Cutout 3.6" x 1.8"

Series 2020 Digital Displays
Accepts parallel BCD, up to six full digits or 5½ digits with ± sign. With or without internal power supply. Latch input to hold display. Digit height .56" Standard, .8" height optional (4 digits or less).

Series 2120 Digital Displays
Same as Series 2020, except that 2120 accepts bit parallel, character serial information.

Series 2220 Digital Displays
Accepts up to six full digits of parallel BCD from 3 to 48 volts DC logic level. Can be configured for normal or complementary BCD code. Designed for use with programmable controllers with relay or O.C. type outputs. Otherwise similar to Series 2020.

Series 3020 Up Counter
Five, six or seven digit up-counter, up to 5 MHZ count rate. Input filter standard for slow count rate or noisy inputs. Optional internal line power supply, optional internal battery backup to hold count in event of line power loss. Applications include event counting, batch counting, mechanical counter replacement. Optional BCD outputs. Digit height .56" Red LED, except .3" LED digits in seven digit model.

Series 3120 Up-Counter
Two to four and one-half digit up-counter, up to 300 KHZ input rate, input filter standard for slow count rates. Internal line power supply and bit parallel, character serial, BCD outputs standard. .56" LED displays. .8" LED displays optional.

Series 3320 Presettable Up-Down Counter/Comparator
Two to six digit field selectable up or down counter with front panel thumbwheel presets. Internal comparators allow selection of two setpoints, plus zero detect. Optional line power supply. Optional time base card allows use as presettable interval timer. Many other useful features. .56" LED displays.

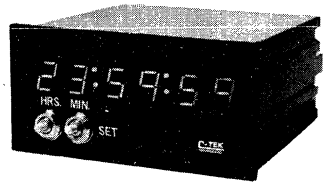
Series 3920 Totalizer (BCD Adder)
Accepts parallel BCD and converts to total counts. Upon command, present BCD input is added to existing reading. Useful in weighing systems or any application where it is desired to convert successive BCD signals into total counts. 5, 6 or 7 digits. .56" or .3" LED display. Internal line power supply. BCD outputs and battery backup optional.

Series 4020 Up-Down Counter
For count rates to 1 MHZ, or with input filter for slower signals. Requires separate count line and up-down control line, or can have separate up and down count lines. With option card can have quadrature inputs. Optional internal line power supply. Tri-State parallel BCD outputs for control applications. .56" LED digits, up to 6½ digits.

Series 4120 Up Counter
Similar to 4020 Series Up-Down Counter except factory set for up counting only. Two to six digits. Tri-State parallel BCD output standard.

Series 5720 Rate Meters
Two to six digits. Internal line derived or optional crystal controlled time base can be scaled to display measurement in engineering units. Standard input requires logic level signals, low level input amplifier optional. .56" LED digits, optional internal supply and BCD outputs. For rate measurement, tachometers, RPM, speedometers, flow measurement.

DIGITAL CLOCKS AND INTERVAL TIMERS



DIN/NEMA CASE 3.78" x 1.89" x 3.75", Cutout 3.6" x 1.8"

Series 8020-A Digital Clock
12 or 24 hour clock, reads in hours and minutes or minutes and seconds. Line derived or crystal time base, optional internal supply and/or battery backup. BCD outputs standard. Front panel and rear connector time sets. .56" LED digits. .8" height digits available on 4 digit clocks.

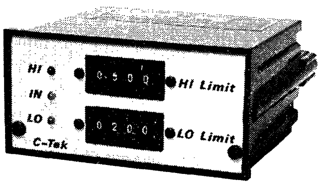
Series 8120-A Interval Timer
Similar to Series 8020 Digital Clock except that it is set up as interval timer with Reset and Hold inputs. Reads in Hours and Minutes; Minutes and Seconds; or Hours, Minutes, and Seconds.

Series 8220 Calendar Clock
Dual display digital clock. Top row .3" LED digits display month, day, year. Bottom row .56" LED digits display hours-minutes-seconds. Parallel BCD output, bus compatable output and RS-232 output available as options. Crystal time base, Standard, line power supply and battery backup options.

Series 8320 Interval Timers
Two to six digit interval timers with start-stop and reset inputs. Crystal controlled time base. Field settable options allow resolutions of .1, .01, .001 seconds, to 1 micro second. Also can be supplied with minutes or hours time base. Optional Tri-State BCD outputs. .56" LED digits. Optional line power supply.

Series 8520 Timer Controllers
Digital Clock combined with one or more digital comparators to provide control outputs at preset times or preset intervals. Can be configured for many different applications.

PANEL MOUNTED DIGITAL COMPARATORS SET POINT CONTROLLERS



DIN/NEMA CASE 3.78" x 1.89" x 3.75", Cutout 3.6" x 1.89"

Series 6620 Digital Comparator
Two to six digits, thumbwheel switches for setpoint, parallel BCD input with or without ± sign, 3 front panel LED lamps for "Below", "Equals", and "Above". Relay drive outputs standard, other outputs optional. Mates with most panel meters, useful with any parallel BCD source.

Series 6720 Digital Comparator
Same as Series 6620, except that 6720 accepts bit parallel character serial BCD data.

Series 6820 Dual Comparator
Two channel comparator, two to six digits each channel, with or without ± sign. Can be set up as two independent comparators, or as one "window" comparator, with "Low", "In Band", and "High" relay drive outputs and front panel indicator lamps.

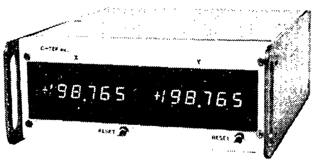
C-TEK, Inc. • 4 Railroad Avenue • Wakefield, MA 01880 • (617) 246-1720

ELECTRONIC COUNTERS AND DISPLAYS
COUNTING SYSTEMS—DIGITAL COMPARATORS
NUMERICAL POSITION READOUTS—DIGITAL CLOCKS
DATA LOGGING PRINTERS—RATE METERS
TOTALIZERS—DIGITAL PANEL METERS
SPECIAL SYSTEMS TO YOUR SPECIFICATIONS

C-TEK INCORPORATED

PRODUCT GUIDE

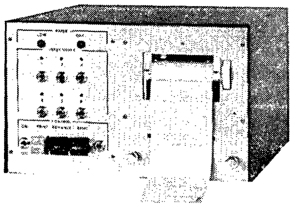
C-TEK, Inc. 617-246-1720
4 Railroad Avenue, Wakefield, Mass. 01880



Series ACR-101 Counter Controller
Series LIN-101 Single and Multi-Axis Counters

The LIN and ACR Series are C-Tek instruments packaged into one system. The LIN 101 and 102 Series are single and dual axis bi-directional counter displays, based on the 4020 Series Up-Down counters and a CTP power supply, enclosed in an attractive aluminum case 8" x 8" x 3". For use with X-Y stages and tables, supplied complete with encoders and cables.

The ACR-101 Controllers are similarly packaged and combine counters, comparators and power supplies for system application. Send for details.



SERIES 1601 PRINTER— MULTIPLEXER

FOR DATA LOGGING APPLICATIONS

Series 1601 Printer-Multiplexer

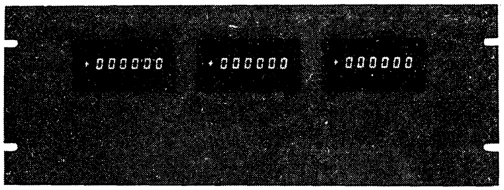
Accepts up to six channels of parallel BCD data. Quiet, non-impact; alpha characters available. 5 x 7 dot matrix, 16 columns, uses aluminized paper.

Series 1670 Weighing System Totalizer-Printer

Printer-Totalizer-Event Counter combination for electronic scales with BCD output. Serializes and prints each weight measurement, accumulates total weight and prints on command.

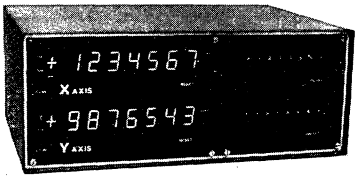
Series MR 19" Rack Mount Panels

Various combinations of C-Tek instruments and power supplies mounted on standard EIA 19" panels for inclusion into your system console. Typical system is six Series 4025 up-down counters with quadrature input mounted on 10" x 19" panel. Power supply for counters and encoders mounted behind panel. Tri-State BCD output is bus-able for communicating with users' computer. Many combinations of various C-Tek instruments possible. Send us your requirements.



Series 6060 Timer

Hand held digital timer for shop, lab or school use. Up to 99 minutes or 99 seconds, switch selectable. Set time with miniature thumbwheels. Loud buzzer at time-out. Battery operated.



Series DDC Bi-Directional Counter

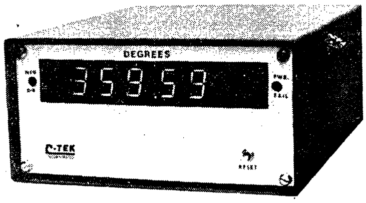
Intended for high quality machine tool readout applications, for use with rotary or linear optical encoders. 4 to 8½ digits, ± sign. One to three axis, with or without preset. Full floating zero, optional BCD outputs, many other standard or optional features. .8" LED digits.

Series MPC Micro Processor Controlled Bi-Directional Counter

Up to 8½ digits. Can be configured for linear or angle counting. Dual Real-Time digital comparators and zero detect. Bi-directional data bus and RS-232 outputs. Keyboard selection of parameters and features. One to six axis.

Series MPD Numerical Digital Display Terminal

Multi-Axis display with RS-232 full duplex data port. Can be used as remote display terminal for Series MPC counter-controller or as a specialized computer terminal.



Series DAC Angle Counter

For use with rotary optical encoders, 3 to 7 digits, degrees, minutes and seconds, or decimal degrees. Many standard and optional features. .8" LED digits.

Series CTP Power Supplies

Type 20 - Card type 2.5 watt and 5 watt output linear supplies compatable with C-Tek panel mounted counters and displays. Can be used separately or can be mounted in plastic counter/display case. 110-220 volt 50-60 Hz selectable input. Output 5 volts at 500 ma or 1 amp, 0.5% regulated. Other voltages or multiple voltage outputs available.

Type 101 - Open frame type 10 watts and 25 watt output linear supplies, single or multiple outputs, 110-220 volt 50-60 Hz inputs, up to 5 amps at 5 volts output. Fused, screw terminal connectors.

Series SYM-101 Gauge Wheel Encoders

High resolution Bi-directional encoder-Pulse generators, for linear measurement of sheet and film materials and textiles. Resolutions to .010 inch. When used with C-Tek counters and input processors measurement can be in inches, feet, yards, MM, CM, meters or switchable English-metric, or switchabel resolution, single or dual wheel models, accurate metal wheels with or without rubber friction surface. Easy turning ball bearings. TTL, CMOS (10V, 15V or 24V) or line driver outputs.

Specials

C-Tek has designed and manufactured many special systems involving measurement, counting, and control, including interfacing to computers and programmable controllers. Many of these systems were modifications to existing C-Tek products, others were completely new designs. Consult C-Tek on your next requirement.

C-TEK, Inc. • 4 Railroad Avenue • Wakefield, MA 01880 • (617) 246-1720

SOLID STATE•AIR FLOW SWITCHES•LOW PRESSURE SWITCHES•MASS FLOW SWITCHES•DC FAN/BLOWER NOISE CONTROL

CAMBRIDGE

SOLID-STATE AIRFLOW SWITCHES

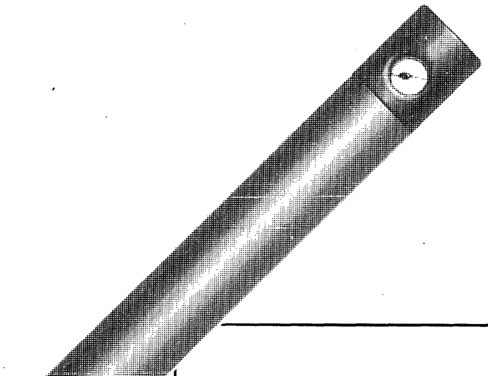
Series 300A Uni-Directional Standard / Series 300B Uni-Directional Precision
Series 300A Bi-Directional Standard / Series 300B Bi-Directional Precision

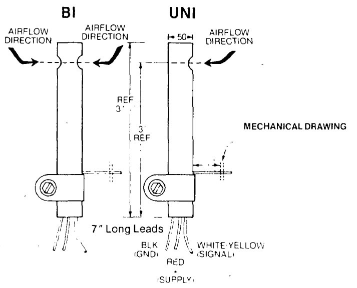
The Cambridge Airflow Switch is an all Solid-State device designed to sense cooling airflows and protect valuable and sensitive equipment from damage in the event of a cooling system degradation or failure.

The Cambridge Bi-Directional Switch will equally sense airflows from either of two opposite directions. The Uni-Directional Switch allows more directional selectivity by sensing airflows from one unique direction only. (See Figure 1.)

With a normal airflow sensing range from under 250 FPM to over 1300 FPM, depending on setting, the Series 300 offers compact size, high reliability, and resistance to mechanical shock and vibration.

The output of the Series 300 Airflow Switch is logic compatible, or can switch alarms, relays, or other circuits. Normally-open (N.O.) and Normally-closed (N.C.) versions are available.





For suggested electrical arrangements, see Application Note AN-2.

Fig 1.

Standard Calibration Table

Code	Fault Flow Velocity @ 30°C	No Fault Flow Velocity @ 30°C
A1	Less than 160 FPM	Greater than 450 FPM
A2	Less than 450 FPM	Greater than 800 FPM
A3	Less than 800 FPM	Greater than 1400 FPM
B1	Less than 150 FPM	Greater than 300 FPM
B2	Less than 300 FPM	Greater than 400 FPM
B3	Less than 400 FPM	Greater than 540 FPM
B4	Less than 540 FPM	Greater than 650 FPM
B5	Less than 650 FPM	Greater than 840 FPM
B6	Less than 840 FPM	Greater than 1050 FPM
B7	Less than 1050 FPM	Greater than 1300 FPM
	Custom Calibration, Contact Factory	
	Additional Calibrations May Be Available. Contact Factory.	

Electrical Specifications

	300A	300AH	300B	300
Supply Voltage	11.4-12.6 VDC	11-27 VDC	11-27 VDC	11-27 VDC
Power Dissipation	Less than 0.4 Watts	Less than 0.7 Watts	Less than 0.7 Watts	Less than 0.7 Watts
Output Switch SPST Open Collector Transistor	N.O. or N.C.	N.O. or N.C.	N.O. or N.C. or N.O. Manual Reset	N.O. or N.C. or N.O. Manual Reset
Max. Output Sink Current	6 m/a Max. @ 30V	100 m/a @ 30V	100 m/a @ 30V	100 m/a @ 30V
Thermal Response	Less than 3 secs.	Less than 3 secs.	Less than 3 secs.	Less than 3 secs.
Calibrations	A1, A2, A3	A1, A2, A3	B1-B7	Custom*

*Discuss with Factory

Ordering Information

300X — X — X — X

Calibration Code From Calibration Table

O—Normally Open, N.O.
N—Normally Closed, N.C.
M—Manual Reset, N.O., on 300B, 300 only.

B—Bidirectional
U—Unidirectional

A
AH
B
CUSTOM
see specifications

CONTACT FACTORY FOR APPLICATION NOTES AND OTHER DATA.

CAMBRIDGE

Cambridge Aero Instruments, Inc.
6A Dunham Road, Billerica, MA 01821 USA Tel. (617) 275-0889 Telex 948503 CAI BLRC

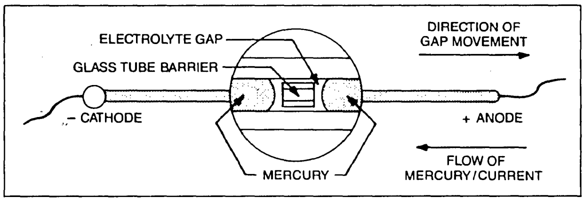
SOLID STATE•AIR FLOW SWITCHES•LOW PRESSURE SWITCHES•MASS FLOW SWITCHES•DC FAN/BLOWER NOISE CONTROL

CURTIS

ANALOG ELAPSED TIME INDICATORS

Smallest-size, Lightest-weight, Lowest-cost AC or DC at any Voltage

HOW THEY WORK


ELECTROLYTE GAP
GLASS TUBE BARRIER
– CATHODE
DIRECTION OF GAP MOVEMENT
+ ANODE
MERCURY
FLOW OF MERCURY/CURRENT

Two columns of mercury in a capillary glass tube separated by an electrolytic gap containing a barrier of glass tube. In the presence of pure or pulsed DC signal at the terminals, mercury electrochemically crosses the gap at a time rate proportional to the current. The gap travels the tube's length as a function of the current-time integral.

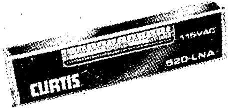
TYPICAL APPLICATIONS FOR CURTIS

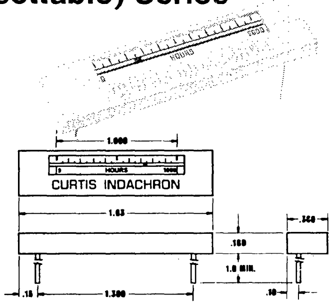
WARRANTY & P/M SCHEDULING—Provides a low-cost means of monitoring actual use time of equipment.

RELIABILITY ENGINEERING—Provides MTBF data or subsystem replacement-time data without costly, unreliable logging.

TEST EQUIPMENT UTILIZATION/CALIBRATION—Provides utilization data for savings in capital investment for test instruments, tools, etc., as well as a means for calibration scheduling.

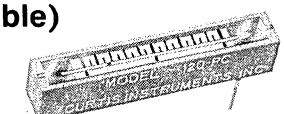
LNA & LC (non-resettable) Series

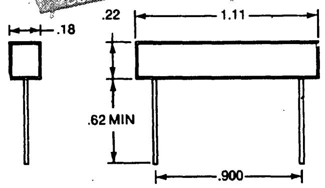

115VAC
520-LNA
CURTIS


HOURS
1.000
0
HOURS
1000
CURTIS INDACHRON
1.63
.160
.180
1.0 MIN.
.15
1.300
.10

Easily-readable, very low-cost units used by OEM for warranty-by-use and P/M scheduling in office equipment, test instruments, etc. AC and DC with various time scales and electrical ratings. LNAs are adhesive-mounted, LCs via circuit board pins.

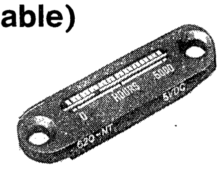
120PC (non-resettable) Series


MODEL 120-PC
CURTIS INSTRUMENTS, INC.


.18
.22
1.11
.62 MIN
.900

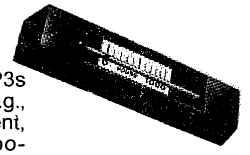
Specially designed with circuit board pins for PC cards, components and subassemblies, 120PCs are totally encapsulated in epoxy for optimum reliability. Run from DC current with customer-supplied series resistor to achieve desired time frame.

620PC, 620N (non-resettable) MIL Series


0
HOURS
5000
5VDC
620-NT

CURTIS MIL spec units in two configurations: 620Ns meet MS-90386 and are provided with voltages available in the box—5VDC—as well as 28VDC and 115 VAC. 620PCs meet MS-3311 (AS), are designed for repairable modules and subassemblies, and run from DC current.

CP3 (resettable) Series

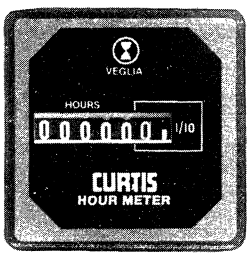

0 HOURS 1000

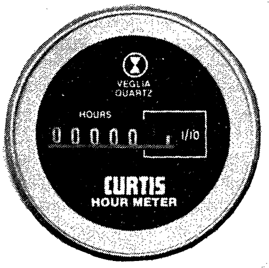
Instantly resettable in the field, CP3s are suitable for P/M scheduling, e.g., contract field servicing of equipment, replacement of life-limited components. Scales for any type of scheduling. Available in AC and DC.

CURTIS' ARE UNSHOCKABLE

After 23 years of use-time monitoring for warranties, P/M scheduling, MTBF testing, etc., CURTIS Analog ETIs have come of age. *No longer vulnerable to careless handling.* Gap loss due to carelessness in shipping, receiving and stocking is prevented.

NEW AC & QUARTZ DC CURTIS VEGLIA HOUR METERS


VEGLIA
HOURS
0 0 0 0 0 0
1/10
CURTIS
HOUR METER


VEGLIA QUARTZ
HOURS
0 0 0 0 0
1/10
CURTIS
HOUR METER

AC units employ a high-efficiency, low-power synchronous motor for low-power consumption and instantaneous response with no rundown error. Low voltage 6V and 12V units reduce shock hazard. Also 24V and 115V, 230V units, all UL listed.

Quartz DC units employ electronic quartz circuitry for fail-proof operation and instantaneous response with no rundown error. When possible, use of DC, rather than AC, hour meters facilitates monitoring of actual use time rather than simply power-on time. Permits standardization on one meter without concern for voltage or frequency when product is exported.

CURTIS INSTRUMENTS, INC.

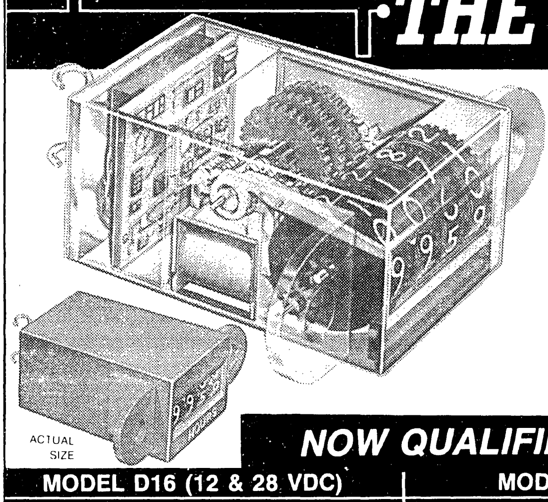
200 Kisco Avenue • Mt. Kisco, N.Y. 10549
(914) 666 2971 TLX II 710-571-2163
Curtis Instruments (UK) Ltd., Northampton NN1 2NT, England.

MINIGLOSSARIES • FORMULAS • CHARTS PRODUCT SELECTION GUIDES FORMS CODES TECHNICAL INFORMATION

WHERE TO FIND THEM IN THE 85/86 EDITION OF EEM

Abbreviations/Acronyms	**A**•1166, **B**•1012, **C**•1028, **D**•1016
ASCII Code	**D**•1087
Batteries, Product Selection Guide	**D**•1413
Batteries & Fuel Cells, Characteristics	**D**•1430
Cabinets, Enclosures, Racks, & Chassis, Product Selection Guide	**C**•1003
Capacitors, Basic Formulas	**A**•1093
Capacitors, Miniglossary	**A**•1066
Capacitors, Product Selection Guide	**A**•1003
Circuit Boards (Printed) Product Selection Guide	**C**•1099
Coils, Chokes, Inductors, Product Selection Guide	**A**•1205
Conductors, Maximum Current Capacity of Copper & Aluminum	**C**•1863
Connectors, Miniglossary	**C**•1129
Connectors, Terminals, & Sockets, Product Selection Guide	**C**•1105
Crystals, Oscillators, Crystal & Piezoelectric Filters, Product Selection Gude	**A**•1309
Delay Lines, Product Selection Guide	**A**•1459
Discrete Semiconductors, Product Selection Guide	**A**•2067
Displays, Readouts, Lamps, & Lights, Product Selection Guide	**B**•1015
EBCDIC Code	**D**•1092
Encapsulation, Miniglossary	**C**•1086
Fans, Blowers, Cooling Equipment, & Heat Exchangers, Product Selection Guide	**C**•1623
Filters, Product Selection Guide	**A**•1583
Instruments, Graphic Recording Product Selection Guide	**D**•1401
Instruments, Panel Meters, Product Selection Guide	**D**•1329
Instruments, Test & Measuring Product Selection Guide	**D**•1175
Interconnection Systems, Product Selection Guide	**C**•1699
Keyboards & Keypads, Product Selection Guide	**B**•1705
Logofinder & Trademark Directories	**B**•901
Microwave Components, Product Selection Guide	**A**•1701
Military Qualified Products Lists	**B**•1003
Motors, Drives, & Rotating Components, Product Selection Guide	**B**•1129
Opto Semiconductors, Miniglossary	**B**•1214
Oscilloscopes, Product Selection Guide	**D**•1385
Panel Hardware, Product Selection Guide	**C**•1589
Potentiometers, Trimmers, Controls, & Rheostats, Product Selection Guide	**A**•1991
Power Supplies, Miniglossary	**D**•1462
Power Supplies, AC, Product Selection Guide	**D**•1877
Power Supplies, DC, Product Selection Guide	**D**•1447
Protective Components (Fuses, Circuit Breakers, etc.), Product Selection Guide	**B**•1225
Relay Contact Forms	**B**•1317
Relays, Electromechanical, Miniglossary	**B**•1308
Relays, Product Selection Guide	**B**•1261
Resistor Color Codes	**A**•1828
Resistors, Product Selection Guide	**A**•1785
Servo Components, Miniglossary	**D**•1985
Solenoids, Product Selection Guide	**B**•1463
Switches, Product Selection Guide	**B**•1477
Thermal Components, Product Selection Guide	**B**•1741
Thermal Conductivity of Dielectrics at Room Temperature	**B**•1744
Thyristors/High Power Diodes, Miniglossary	**A**•2076
Transducers & Encoders, Product Selection Guide	**B**•1777
Transformers, Product Selection Guide	**A**•2099
Wire & Cable, Product Selection Guide	**C**•1743
Wire Gauges—Diameter, Area, Copper Weight	**C**•1844

THE DYNATIME® Series



SUBMINIATURE ELAPSED TIME INDICATORS

The NEW INDUSTRY STANDARD in ETI technology . . . with CMOS microelectronics that delivers precisely controlled power to the patented stepper drive module. Summarily, a remarkably efficient system that has proven its versatility. For example, Models D76 and TTL-compatible D46 are proven performers from logic buss or low-voltage DC power. Or take advantage of Model D16's stability between 10 and 34 VDC. It is now qualified to new MIL-M-7793E, as is the down-sized 60 Hz Model D92. All are POWER MISERS, with expanded voltages to match today's tougher equipment specs. And the SHORT CASES will SAVE SPACE, too. That's DYNATIME versatility . . . you can rely on it.

NOW QUALIFIED TO NEW MIL-M-7793E

MODEL D16 (12 & 28 VDC)	MODEL D92 (115V/60 Hz)	MODEL D95 & D25 (400 Hz)
New M7793/1 & /2, Short New MS21341A (Short) & B (Long) New M7793/5, Long (was MS17321)	New M7793/3 & /4, Short	New M7793/6 (was MS17322) D95 to MS27651 (115V) D25 to MS27650 (26V)

BASIC MODEL	DYNATIME FEATURES	INPUT VOLTAGE RANGE	INPUT VOLTAGE NOMINAL	NOMINAL POWER, MW	MAX. CASE LENGTH, IN.	TYPICAL MODEL NO.'S	FIG. NO.	TYPICAL MILITARY NO.'S
D16	The SHORT CASE, EXPANDED VOLTAGE RANGE, VERY LOW POWER, QUARTZ ACCURACY . . . All these proven features are now requirements for the new MS21341A, M7793/1 and /2 meters. And Model D16 is fully qualified!	10/34 VDC	12VDC & 28 VDC	13 (AVG) & 85 (AVG)	1.094 SHORT	D16C8C2 D16C8C*-136 D16C8C*-16 D16D8A	1 2 2 3	M7793/1-001 M7793/1-** MS21341A-** NONE
16	Delivers Model D16 performance, but is qualified in the traditional long case per MS21341B and M7793/5 specs.				2.062	16C8C2 16C8C*-16	1 2	M7793/5-002 (was MS17321-10) MS21341B-**
D46	Proven performance from your TTL buss or other regulated low-voltage DC power, and needs only 3 MW (Avg)!	4.5/6.5 VDC	5 VDC	3 (AVG)	1.094 SHORT	D46C8C2 D46C8C* D46D8A	1 2 3	NONE
D76	Another POWER MISER, keeps accurate time from 12 VDC or other logic buss power down to 6.5 VDC.	6.5/13 VDC	9VDC	8 (AVG)		D76C8C2 D76C8C* D76D8A	1 2 3	NONE
D92	MICROELECTRONICS ACCURACY, EXPANDED VOLTAGE RANGE, VERY LOW POWER—All packed into a SUBMINIATURE CASE, and now qualified to new M7793/3 and /4 specs.	75/150 60 Hz	115	300		D92C8C2 D92C8C*-136 D92D8A	1 2 3	M7793/3-001 M7793/3-** NONE
			NOTE: FOR 50 Hz METER, REPLACE D92 ABOVE WITH D91.					
D95	A new choice, with improved MICROELECTRONICS ACCURACY, EXPANDED VOLTAGE RANGES, and VERY LOW POWER compared to our motor-driven meters—D95 saves 50 percent, while D25 saves 90 percent! Both meters are now qualified to existing MS27650, 27651 and M7793/6 specs, but you can reply on the DYNATIME performance ratings you see here.	75/150 400 Hz	115	300	1.094 SHORT	D95C8C2 D95C8C*-16	1 2	M7793/6-002 (was MS17322-10) MS27651-**
D25		15/40	26	40		D25C8C*-16	2	MS27650-**

NOTES: 1. Also available—Other 4 & 5 DIGIT READOUTS, MOUNTS, ROUND CASE per M7793/2, /4, /5, /6.
2. *Denotes "X" Dim.; A = Flush, B thru T in .031″ steps, then U thru Z in .062″ steps.
3. **Denotes Mount setback & type. See applicable Military Drawings.
4. Code "-136" in Model No. defines tin-plate mount face; "-16" is same plus added testing.

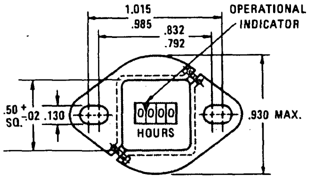


FIG. 1 ADJUSTABLE "C2"

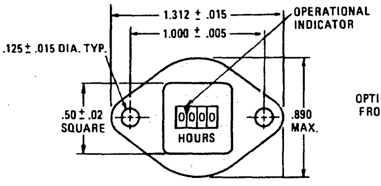


FIG. 2 "C" MOUNT

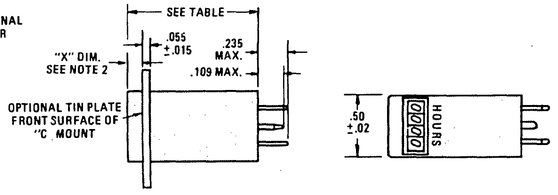


FIG. 3 SIDE-READING

ELECTRODYNAMICS, INC.

28 VDC EVENTS COUNTERS

REPLACES MS21228 M8974/2-		M8974/1A-	
CASE LENGTH 1.094″ MAX.		CASE LENGTH 1.333″ MAX.	
CATALOG NO.	DASH NO.	CATALOG NO.	DASH NO.
B16C8A-245	-001	B16C8A-312	-001
B16C8CE-245	-002	B16C8CE-312	-002
B16C8A-232	-003	B16C8A-313	-003
B16C8CE-232	-004	B16C8CE-313	-004

a TALLEY INDUSTRIES Company
1200 T Hicks Road
Rolling Meadows, Illinois 60008
Telephone (312) 259-0740
Telex 28-1070

ETI SYSTEMS

POSITION CONTROLS

WITH SELF-CONTAINED SERVO CONTROLLED MOTORIZED POTENTIOMETER.

TYPICAL APPLICATIONS:

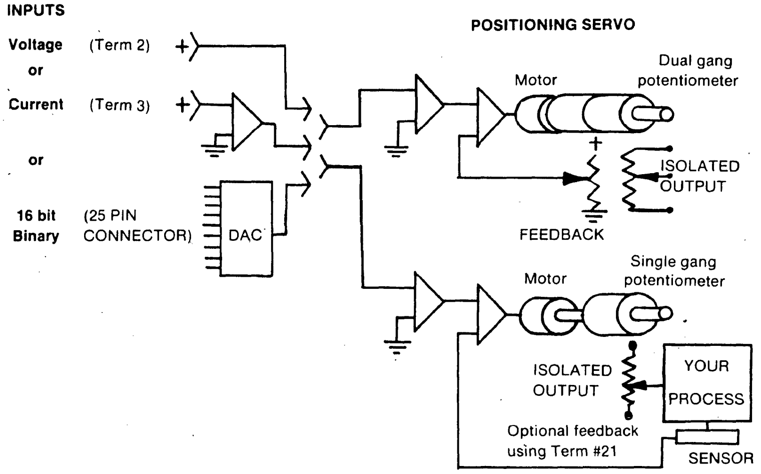
- Process Control
- Valve Positioner
- Speed Controls
- Tensions Motors
- Remote Adjustment Station
- Air Conditioning and Temperature Units
- Oven & Burn-in Controls
- Industrial Automation

FEATURES: A full range of motorized potentiometers are available, and a large selection of R.P.M.'s. Positioning accuracy is better than 2%. Precision made gear heads and sub-fractional HP motors are used, along with the highest quality potentiometers. The motor pot may be mounted off the board and operated remotely. All position controls offer Voltage or Current inputs. The 6000 Series additionally offers 8 bit binary code digital input and the 6500 Series offers a 16 bit binary code digital input with 14 pin accuracy for control by your computer or programmable controller.

A regulated power supply is a part of all models. A safety switch may be connected to servo inhibit circuit from a remote station. Feedback is built into the board. Factory calibrated and burned in prior to shipment. Full calibration procedure is furnished with each unit.

Surprisingly economical, many of ETI Systems position controls offer stepper control accuracy without the problems of steppers, and at at much lower cost.

TYPICAL OPERATIONAL DIAGRAMS


INPUTS
Voltage (Term 2)
or
Current (Term 3)
or
16 bit Binary (25 PIN CONNECTOR)
DAC
POSITIONING SERVO
Motor
Dual gang potentiometer
ISOLATED OUTPUT
FEEDBACK
Motor
Single gang potentiometer
ISOLATED OUTPUT
YOUR PROCESS
Optional feedback using Term #21
SENSOR

HOW TO ORDER: SPECIFY

MODEL NO —	INPUT —	POT RESIS —	POT RPM
6500	0 TO 5 VDC	10K	10 RPM

Note: upon ordering, each model will have its own number. (i.e., 6501 = voltage input, 6502 = current, etc.)

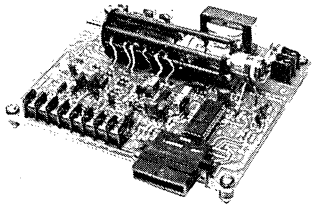
WHEN SELF-CONTAINED CIRCUITRY IS NOT REQUIRED, SEE SECTION 3500 Vol B, PAGES 1150, 1151, 1152.
(Motors and Drives) for ETI SYSTEMS full line of motorized potentiometers.
For specifications on potentiometers used in ETI SYSTEMS Position Controls, see Section 4750, Vol A, PAGES 2016, 2017.

ETI SYSTEMS
DEPT EM, 215 VIA DEL NORTE • OCEANSIDE, CA 92054
TEL: (619) 757-7770 • TWX: 910-322-1396
DIV: POLARIS ENTERPRISES, INC.

ETI
SYSTEMS

POSITION CONTROLS

SERIES 6500

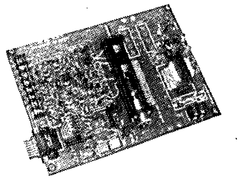


SIZE: 7″ x 6″

THE 6500 SERIES IS AN ADVANCED DESIGN

The newest of our line will accept 16 bit binary code input Voltage or Current input. 16 bit Digital to Analog Converter installed on board has 14 bit accuracy. Three LED's are installed on board to indicate power, motorpot running and circuit inhibited. Terminal #9 allows access to servo amplifier stage for positioning confirmation from your process feedback device.

SERIES 6000

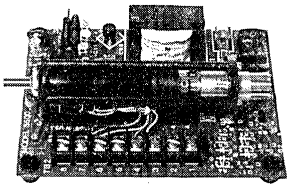


SIZE: 9″ x 6½″

THE 6000 SERIES IS SELF CONTAINED

The Model 6000 will accept an 8 bit binary code, Voltage or Current input. Three LED's are installed on board, same as Model 6500. All circuit boards with motorpots are burned in at 60 °C and fully cycled for a minimum of 4 hours prior to shipment.

SERIES 5500

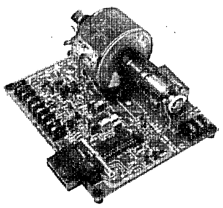


SIZE: 5½″ x 4″

THE 5500 SERIES IS ECONOMICAL

Voltage or Current input only, allows smaller compact board at a lower cost than 6000 Series. The 5500 Series utilizes same power supply and positioning accuracy as larger boards. Includes servo inhibit feature. Does not have run output indicator.

MODEL 6570



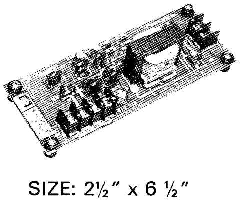
SIZE: 9″ x 6½″

THE 6570 MODEL OFFERS VARIABLE A.C. VOLTAGE

Same circuity as 6000 Series except motorpot offers a variable A.C. Voltage output. Utilizes a variable transformer 10C, 0 to 132 VAC at 2.25 amps.

Contact ETI SYSTEMS for assistance in choosing the right unit for your application. Custom and special designs available.

MODEL SPD15 POWER SUPPLY



SIZE: 2½″ x 6 ½″

THE MODEL SPD15

This regulated, 115 VAC power supply is available as part of the Series 6000 and Series 5500 Position Control Systems, but may be purchased separately to run a 12 VDC motorpot. The unit is capable of operating up to 5 motorpots simultaneously.
INPUT: 110/120 VAC
OUTPUT: + 5 DC, − 15 DC, + 15 DC. Common (or ground).
MAX. OUTPUT: 100 Milliamps.

ETI SYSTEMS

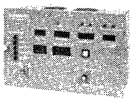
DEPT. EM, 215 VIA DEL NORTE • OCEANSIDE, CA 92054
TEL: (619) 757-7770 • TWX: 910-322-1396
DIV: POLARIS ENTERPRISES, INC.

HARREL

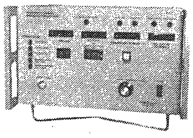
MICROPROCESSOR CONTROLS • DISTRIBUTED CONTROL SYSTEMS • TEMPERATURE CONTROLS & SENSORS

MULTI-ZONE TEMPERATURE CONTROLLERS

- 16 or 32 channels in one convenient drop-in mount.
- Proportional plus auto reset plus rate with overshoot limiting. Heating and cooling.
- Individual high and low alarms for each channel.
- Large savings over Comparable Analog Controllers
- Microprocessor based-Computer Compatible.



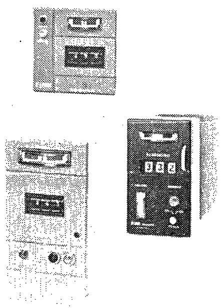
CP-641 — 16 Channel



CP-640 — 32 Channel

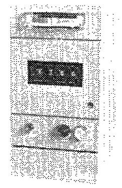
SINGLE-ZONE TEMPERATURE CONTROLLERS

- Proportional plus automatic reset plus rate with overshoot limiting. Eliminates temperature 'droop' and ensures close temperature control.
- Reliable. Latest integrated circuitry ensures highest reliability and long life.
- Any temperature range. Heating or cooling from −200° to 1100°C using either resistance sensors or thermocouples



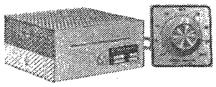
ENVIRONMENTAL EQUIPMENT CONTROL

A complete line of controllers for temperature and humidity in environmental test equipment.



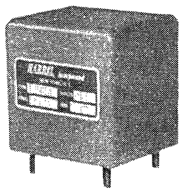
LOW COST TEMPERATURE CONTROLS

Proportional plus auto reset plus rate Controllers at Low Cost. For built-in OEM Applications.



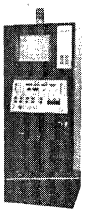
HIGH RELIABILITY MILITARY CONTROLLERS

Precision temperature control to a single selected temperature. Ideal for gyros, delay lines, and similar equipment. True proportional or RFI-free.



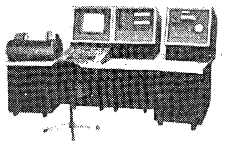
MICROPROCESSOR-BASED 'DIGIPANEL' CONTROL SYSTEMS

Total Control of industrial processes. Includes transducers, interfaces, programming and application Engineering.



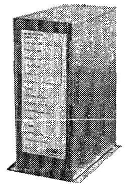
DISTRIBUTED DIGITAL CONTROL AND MANAGEMENT SYSTEMS

Plant-wide Control and Management Systems. Control of machine parameters, control of process, and complete management reporting.



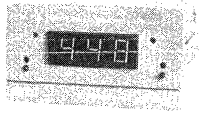
COMPUTER INTERFACE SIGNAL CONDITIONER

A complete line of interface modules for Computer Control and monitoring of temperatures, pressures, alarms, etc.



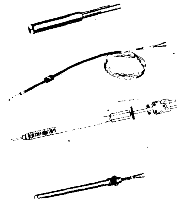
TEMPERATURE, PRESSURE, OF RPM INDICATORS & ALARMS

Display temperature, pressure, or RPM digitally. One or two process alarms for high, low, or dual stage alarm.



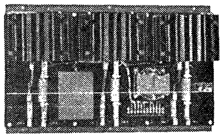
TEMPERATURE SENSORS

A complete line of temperature sensors. Patch type for surface measurement, tubular, bayonet mount, air sensing, etc.



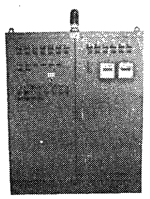
SOLID STATE POWER UNITS

Reliable long life control of heater power. Power to 300KW. Single phase or 3 phase. 115 to 550 volts.



COMPLETE CONTROL PANELS

Complete panels for industrial processes. Includes temperature, pressure and closed loop controls. Computer control optional.



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ION PHYSICS CORPORATION

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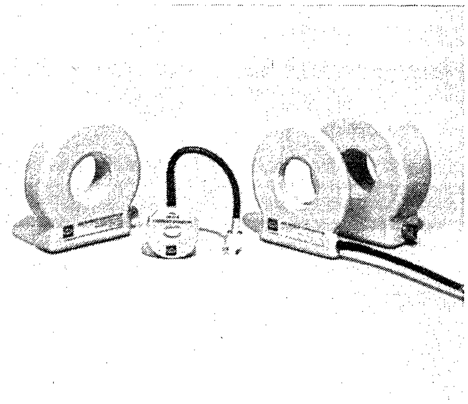
Tel. (617) 658-6030



IPC Current Monitor

The IPC Current Monitor will monitor AC and pulsed currents in a beam of charged particles or any current carrying conductor without physical connection, thus eliminating ground loops and troublesome interference noise.

As current passes through the monitor, an output voltage is observed through a properly terminated oscilloscope, recorder or other equivalent device. This output voltage is proportional to the current times the sensitivity of the monitor.

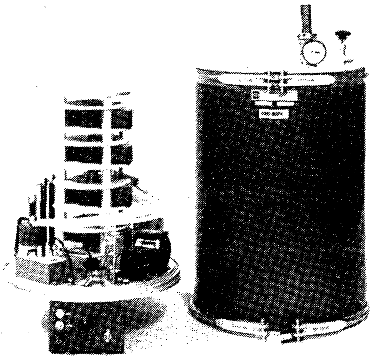
The sensitivity of the monitor is expressed in output volts per amp passing through the monitor. Models are available over a wide range of sensitivities from 1V/amp to .01V/amp into a standard 50Ω termination.

IPC Current Monitor Electrical Characteristics

Model No.	Sensitivity Output V/Input Amp.*	Maximum Peak Current kA	Maximum RMS Current Amp.	Monitor Droop % per μsec	Width Limit ∫Idt A sec	Max. Allowable Ratio RMS Current to Frequency	Low Frequency −3 db Hz	Type Connector **
CM-100-S	1.0	0.5		1.0	0.002	0.008	1400	BNC (Female)
CM-10-S	0.1	5	100	0.02	0.1	0.8	60	BNC (Female)
CM-1-S	0.01	50	1000	0.003	1	4.0	12	BNC (Female)
CM-100-L	1.0	0.5		0.035	0.0015	0.04	50	BNC (Female)
CM-10-L	0.1	5	100	0.0015	0.1	0.8	5	BNC (Female)
CM-1-L	0.01	50	1000	0.0002	0.7	3.0	1	BNC (Female)
CM-100-T	1.0	0.5		3.0	0.0007	0.003	5000	BNC (Male)
CM-10-T	0.1	5		0.08	0.03	0.2	110	BNC (Male)
CM-1-T	0.01	50		0.01	0.3	1.0	14	BNC (Male)
CM-100-M	1.0	0.5		1.0	0.0005	0.002	1300	BNC (Male)
CM-10-M	0.1	5	50	0.1	0.01	0.1	100	BNC (Male)

*Sensitivity when signal from monitor is terminated into 50 ohms.
**Also available with triax connector or twinax at additional cost.

Specials can be made on request.
Other sensitivities and impedance levels are possible.



IPC Mini Marx Pulse Generators

The Mini Marx generates fast rising and exponentially decaying pulses. The output voltage is continuously variable up to a maximum voltage of 100KV into a 50 ohm load. Two electrical inputs, a trigger voltage of 10V and 110V AC power are required.

The generators are housed in a compact, aluminum tank and are constructed in standardized modular stages designed to provide long operating life with minimal maintenance. The tank is pressurized with nitrogen gas to retain compactness and superior electrical characteristics.

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Totalizers — 2 - 8 digits

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- Slave Displays
- L.C.D.'s
- Clocks
- Specials
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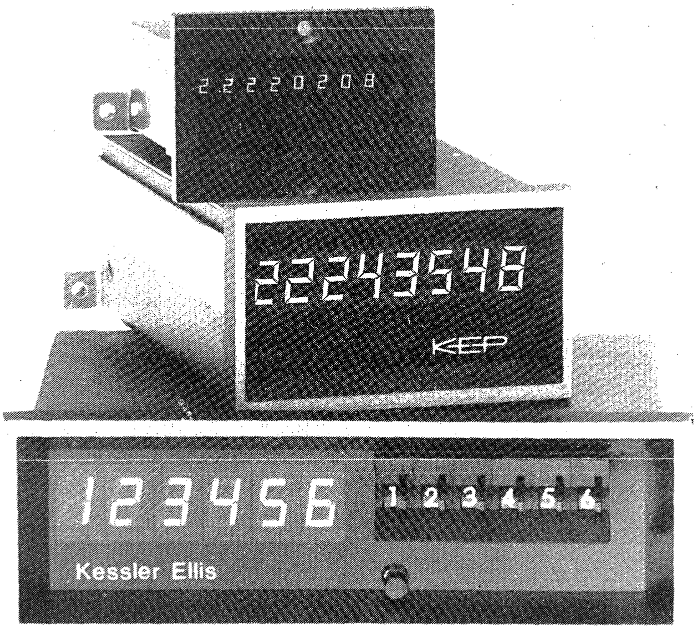
  - photoelectric
  - proximity
  - magnetic
  - encoders



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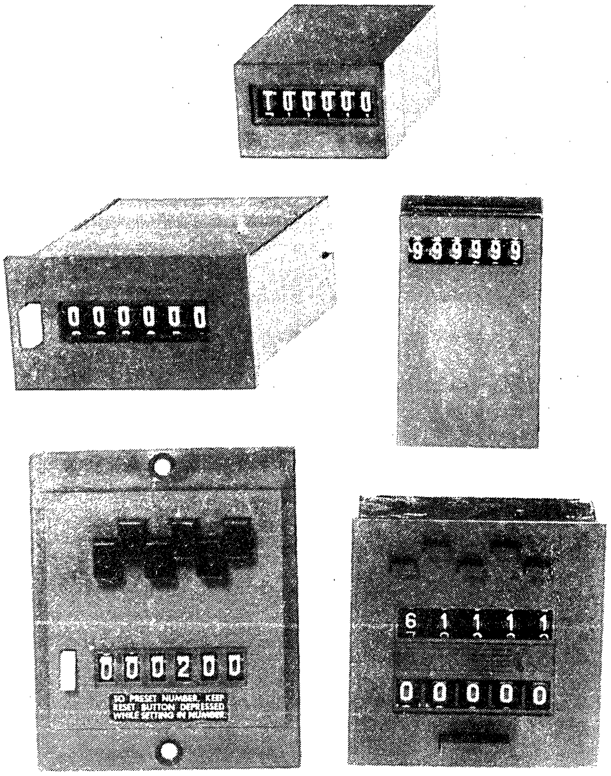
000000
999999
000200
TO PRESET NUMBER, KEEP RESET BUTTON DEPRESSED WHILE SETTING IN NUMBER
61111
00000

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- PRESET COUNTERS — 3-6 digits, countup/countdown, electric reset
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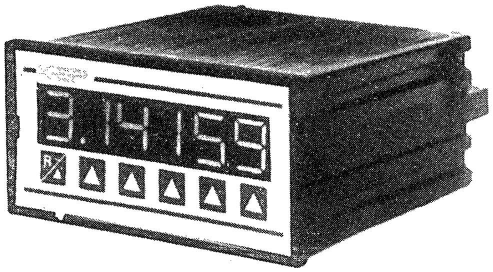
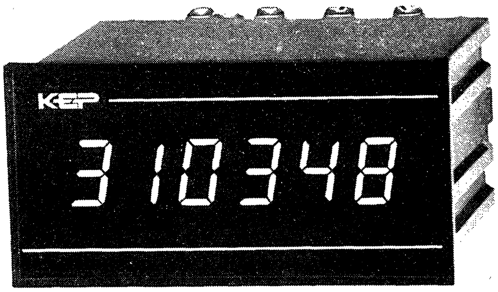
Electronics

The Intellect . . . the most versatile low cost control instrument ever made for counting, timing and rate monitoring.



PCA 9000 . . . send for our free folder on programmable controller peripherals.



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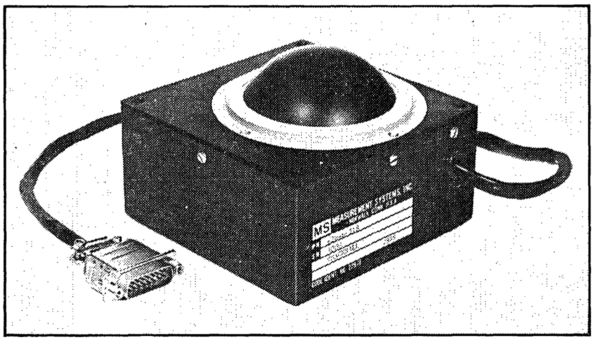
Positioning and Tracking Controls For the Human Operator



Model 636 3 Axis Trackball

- ☐ Joysticks - Force Operated, Miniature (Finger Operated) to Large (Hand Operated)
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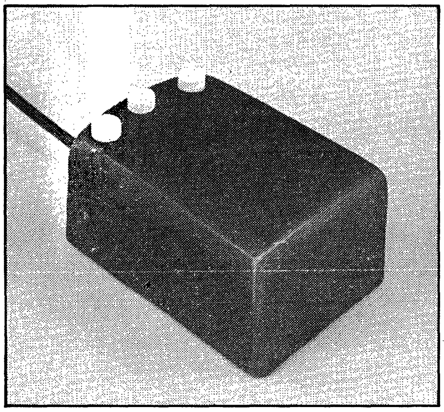
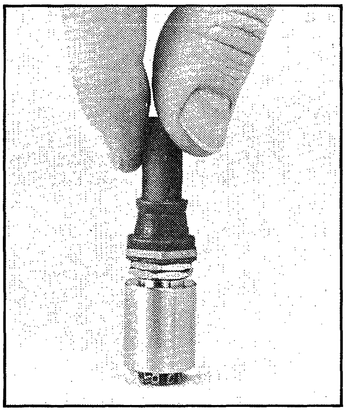
- ☐ Control Grips
- ☐ Analog or Digital Interfaces

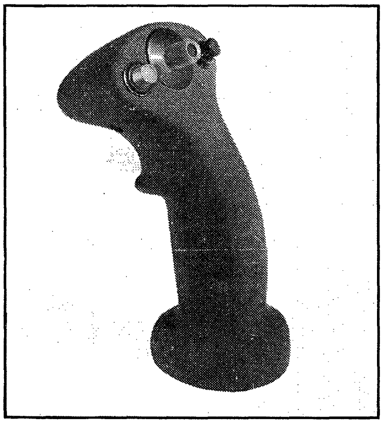


Model 122 Mouse

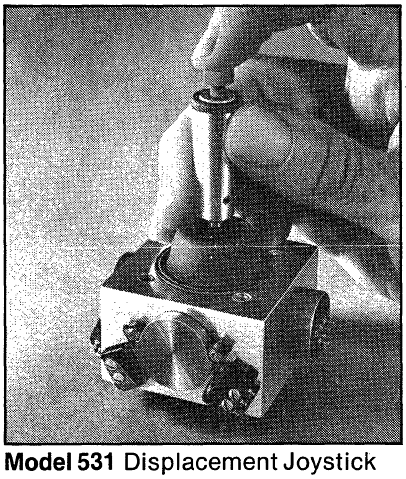


Model 469B Miniature Joystick

Model 544 Gimbal Joystick



Model 1500 Control Grip with Thumb Operated Joystick



Model 531 Displacement Joystick

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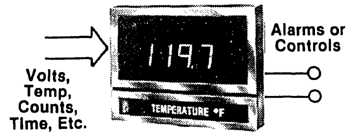
SLIMLINE® COMPONENTS

METER RELAYS TO COMPUTER INTERFACE

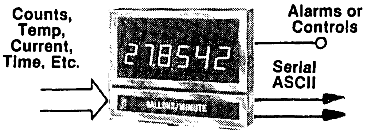
METERING WITH SETPOINTS


Volts, Temp, Counts, Time, Etc.
1 19.7
TEMPERATURE °F
Alarms or Controls

These meters accept a wide range of inputs such as volts, amps, watts, temp, counts, etc. Setpoint outputs allow alarm or control capability. Serial ASCII outputs are also featured.

• 2 to 6 digit models • Preset models available • Colons and decimal points available • Baud ratges 110-9600 • Non-volatile memory • Large, bright LED or LCD display • Surface mounting • 3-year warranty • Price: $150 - $395

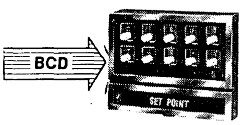
METERING WITH SETPOINTS & SERIAL DATA


Counts, Temp, Current, Time, Etc.
278542
GALLONS/MINUTE
Alarms or Controls
Serial ASCII

These meters feature serial ASCII output and full message formatting. Setpoint outputs provide alarm or control capabilities. Microprocessor-based Ratemeter measures DC pulses from one per hour to 3 kHz.

• Full 6-digit display • Scale factor .000000001 to 59999 • Baud rates 110-9600 • Non-volatile memory • Full instrumentation input • Threshold adjustment • Setpoint outputs • 3-year warranty • Price: $295 - $425

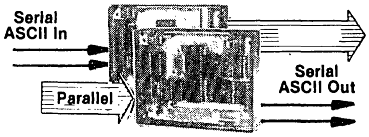
COMPARATOR WITH BCD INPUTS


BCD
SET POINT

These units take standard BCD outputs, compares it against built-in switches and gives output status signals. Less than, equal to and greater than outputs allow extreme versatility and more powerful output signals than normally found.

• Single or dual limit models • Polarity switches • Removable front knobs for manual setting • Uncommitted red and green LED indicators • Cascade output for unlimited number of digits • 3-year warranty • Price: $207 - $290

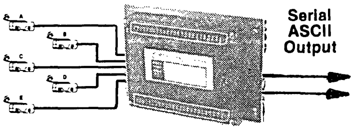
SERIAL / PARALLEL CONVERTERS


Serial ASCII In
Parallel
Serial ASCII Out

Convert common parallel data (such as BCD) to serial ASCII with the Transmitter Bustle® or convert serial ASCII to parallel data with the Receiver Bustle®. Transmit data or provide input to PC's, computers, printers, terminals, etc.

• Convert ASCII data to up to 6 digits BCD data or 24 bits • 100 unit addressing capability • 2-digit switch-selectable ID number • 110-9600 baud rate • RS232, RS422, 20/60 mA formats • Price: $296 - $303

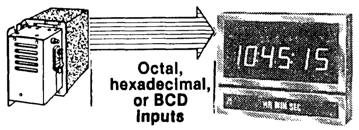
CONTACT STATUS TRANSMITTER


Serial ASCII Output

These transmitters accept up to 25 individual contact closures at up to 24 VDC. These units are all self-contained and built rugged reliable. These transmitters provide standard serial ASCII output.

• Directly compatible with CRT's, printers, etc. • Self-contained • CMOS, TTL compatible • Accepts up to 25 contact closures • Accepts up to 24 VDC; others available • RS232, RS422, 20/60 mA formats • Price: $290 - $350

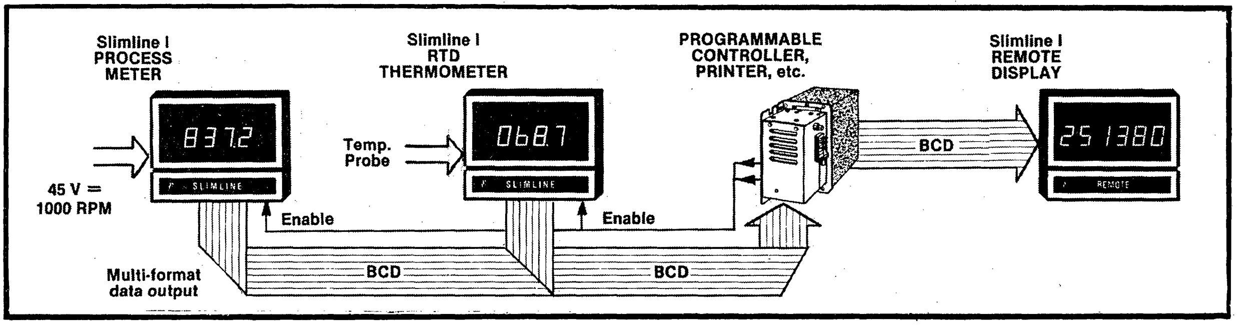
LOCAL & DISTANT READOUT


Octal, hexadecimal, or BCD Inputs
1045:15

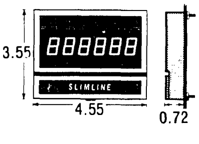
Meters accept BCD, octal, hexadecimal or 2-wire serial ASCII inputs. Display up to 6 digits with LCD's or LED's. ASCII command switches provide remote control or alarm capabilities. Displays are easily read even in bright light.

• Parallel, octal, hexadecimal or BCD inputs • Serial ASCII inputs • Latch capability • 2 to 6 digit models • Baud rates 110-9600 • Flexible addressing capability • Surface mounting • Easy wiring • 3-year warranty • Price: $156 - $500

APPLICATION EXAMPLE:


Slimline I PROCESS METER
8372
SLIMLINE
45 V = 1000 RPM
Enable
Multi-format data output
Slimline I RTD THERMOMETER
Temp. Probe
068.7
SLIMLINE
Enable
BCD
BCD
PROGRAMMABLE CONTROLLER, PRINTER, etc.
BCD
Slimline I REMOTE DISPLAY
251380
REMOTE

SLIMLINES' UNIQUE FEATURES


3.55
888888
SLIMLINE
4.55
0.72

Size: 4.55" x 3.55" x 0.72". Panel surface mounting means easy & fast installation. Also fast wiring – no soldering needed.

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Who Uses: With over 1 million meters shipped, NES is recognized as the leader in high quality industrial meters. Some users are: the Space Shuttle, Air Force 1, virtually all of the Fortune 1000's and tens of thousands of others.

Other Products: NES designs & manufactures over 3,000 different products from Broadcast Automation Computers to the broadest range of panel meters available.

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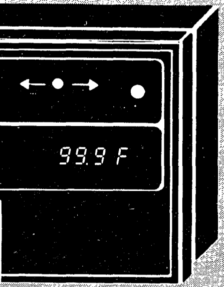
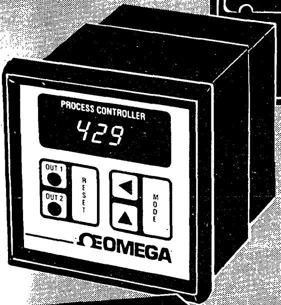
For other products in EEM from NES, see Sections 2000, 2325, 2450 & 2950.

CONTROL SYSTEMS For

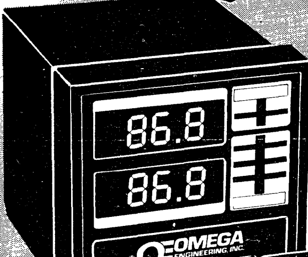
- ✓ Temperature
- ✓ Pressure and Strain
- ✓ Flow



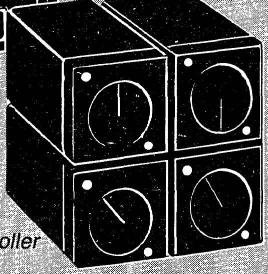
4000 SERIES
High Accuracy
Digital Controller



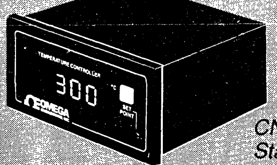
CN-25 Microprocessor
Based Controllers for
a Wide Variety of
Input Types



CN-6000
Programmable
Multi-Setpoint
Controller



CN-6100 Miniature
Non-Indicating Controller



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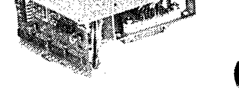
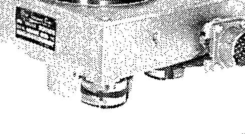
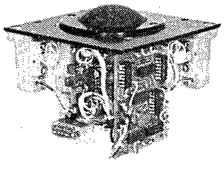
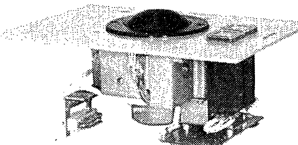
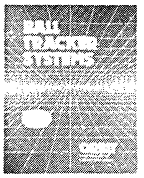
- Custom Protocals Can Be Furnished











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BALL TRACKER SYSTEMS

Orbit Part No.	Approx. Dimensions L	W	D	Unit Connector	Nature of Pulses	Pulses/ Revolution	Push Button	General Remarks
BALL TRACKERS — 2-INCH DIAMETER BALL								
OPTICAL ENCODER — LAMPS								
55713**	3.00	3.80	4.90	Direct to Board	Square	120 ±10%	–	
55749*°†	6.94	6.31	3.31	348-40E14-37P1	Square	256-275	5 P.B.	Single Ended Line Driver
55751‡	3.95	3.61	3.00	MM-11-22PGDSLB	4 Ind. Pulse Trains	480 ±10%	–	Pulses Approximately 40 µs Wide +, −Dir. "X", +, −Dir. "Y"
55782*°†	6.50	6.50	2.70	MRAC-34P-G7	Square	256-275	2 P.B.	With 10 Bit Up-Down Counter
55784*°†	4.30	3.80	3.00	MS18174-1	Square	64	–	
55795*°†	4.12	6.12	2.30	DAMM-15P	Square	256-275	2 P.B.	
55800*°	5.00	4.80	3.12	Direct Wire	Square	200 ±20	–	Single Axis
55829*°†	4.12	5.60	2.30	65692-007	Square	256-275	2 P.B.	Single Ended Line Driver
OPTICAL ENCODER — L.E.D.								
55815*°†	4.30	3.86	3.00	MS18174-1	Square	64	–	
55832†	3.50	3.50	2.06	MS24308/8-1	4 Ind. Pulse Trains	267 ±10%	–	+, −Direct Pulse Lines Per Axis/Pulse 40 µs
55847**†‡	3.59	3.61	2.31	WTB-20PCSY	Square	384 ±10%	2 P.B.	
BRUSH ENCODER								
57147	3.80	3.80	5.50	MS3116E 22-55P	Square	1 Rev. of Ball = 2 Revs. Comp.	2 P.B.	12-Bit V-Scan Binary
POTENTIOMETER								
55752	5.00	4.88	2.70	Direct to Pot	Linear	1 Rev. of Ball = 1.5 Revs. of Pot	–	10 Turn, 5000 Ohm
BALL TRACKERS — 2½-INCH DIAMETER BALL								
OPTICAL ENCODER — LAMPS								
55731**	4.50	5.25	2.90	Screw Term.	Square	2048 ±10%	–	4 Revolutions of Encoder
BRUSH ENCODER								
55728	5.75	5.75	3.25	DAMM-15P	4 Phase	100 NOM	3 P.B.	1 Rev. of Ball = 1.87 Rev. Component Size 23 Encoder
55831	6.40	5.60	2.70	88023-1	4 Phase 4 Pulse	115 ±15P	4 P.B.	Each Track Has 32 "On" Segments in 360°
55841	4.50	4.00	2.70	MS3112E14-19PX	4 Phase	115 ±15P	–	86-128 Pulses/Channel
57400	4.50	4.50	2.87	MS3112E14-19PX	4 Phase 4 Pulse	115 ±15P	–	1 Rev. of Ball = 1.76 Revs. of Component
POTENTIOMETER Tracking Ratio Ball to Pot = 1:2; 1.5 Rev. of Ball = 1 Rev. of Pot								
55753	4.50	4.50	3.00	Direct to Pot	Linear		–	Single Turn of Pot = 2000 Ohms ±5%
55760	4.50	4.50	4.25	Direct to Pot	Linear		–	Pot, Clutch Spring Center
MAGNETIC ENCODER								
55720	5.75	5.75	2.90	MS3112E14-19PV	4 Phase	100 NOM	3 P.B.	1 Rev. Ball = 1.87 Rev. Component ±10%, Size 23 Encoder
57025	4.50	4.50	2.90	Dir. to Encoder	4 Phase	240	–	3 Revolutions of Encoder
BALL TRACKERS — 3-INCH DIAMETER BALL								
OPTICAL ENCODER — LAMPS								
55743**	6.30	6.30	3.20	MRAC-14PG7	Square	512-580	1 P.B.	With or Without Adjustment Pots
55778**†	5.00	5.00	3.19	M28748/3-C00F 2A	Square	512-580	–	Differential Line Drives
55817*°†‡	6.19	9.00	3.50	M28748/3-D00F 2A	Square	512-580	2 or 4 P.B.	100,000 MTFB MIL-STD-810B
55826**	4.91	4.29	3.65	P.C. Board Terms	Square	512-580	–	Pot Adjustable 75,000 Hour MTBF
55845**	6.20	7.20	3.53		Square	512-580	2 P.B.	With or Without Swivel Caster Ball Support
OPTICAL ENCODER — L.E.D.								
55848**†‡	4.29	4.91	3.09	MS18268-2	Square	288 ±25P	–	Differential Line Driver Airborne Qualified
BRUSH ENCODER								
55712	7.60	7.40	3.30	MRAC-20-PGV	4 Phase	262 ±5%	2 P.B.	4 Brushes Common Output
55714	7.90	7.90	3.20	Terminal Block	4 Phase	6-7 Revs. = 2048P	–	4 Brushes Common Output
55719	6.00	5.00	3.30	MS3112E14-19PX	4 Phase	250-350	–	4 Brushes Common Output
SYNCHRO ENCODER								
55727	6.60	5.20	3.30	MS3112E14-19PX	–	1 Rev. of Ball = 1.64 Revs. ±10%	–	3 Wire Synchro Output
POTENTIOMETER								
55715	7.90	7.90	3.75	Terminal Block	Linear	6-7 Revs. of Ball = 1 Rev. of Pot	–	500 Ohms, 10 Turn Pot

* SINGLE PULSE ** 2-90° PULSES ° DIRECTION CODE
† HYSTERESIS ‡ ANTIDITHER

24 PAGE PRODUCT INDEX BOOK LISTS 3,800 ITEMS
62 CROSS REFERENCE CARDS
300 FILE FOLDER LABELS
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electronic engineers master
FILE SYSTEM
HARDWARE (ELECTRICAL/ELECTRONIC)
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PRODUCTS
SEE ALPHA FILE — COMPANY NAME
PAGE NO.
2800
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ALL NEW with this edition of EEM

GET ORGANIZED!

Are your catalog files organized? Can you find any given catalog in a matter of seconds? If your answer is "Yes," you probably already have the EEM File System. But, if you said "No," you really ought to look into this simple system. It will save hours of time and tons of aggravation.

The EEM File System was invented over twenty-five years ago to help people who specify, buy, or work with electronic products and equipment. It is upgraded on a constant basis to reflect the current state of the art. It's easy to use and easy to customize to your particular needs.

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RENCO CORPORATION

DIVISION OF ELECTRO-CRAFT CORPORATION
26 COROMAR DRIVE, GOLETA, CA 93117 • (805) 968-1525 TWX 910-334-1180

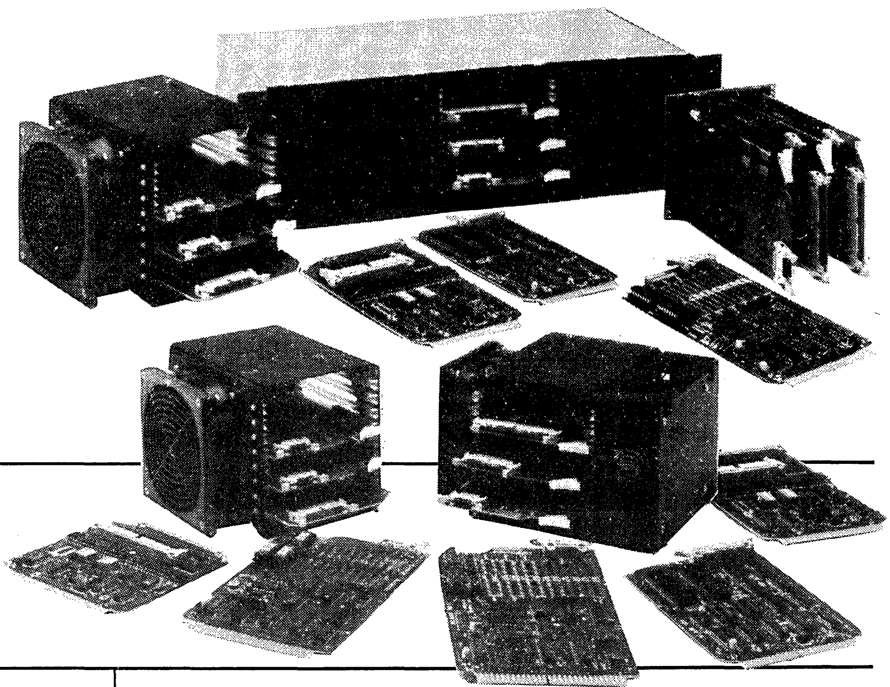
STD BUS MODULES FOR INDUSTRIAL AUTOMATION

The STD BUS is used by over 100 card manufacturers to standardize the physical and electrical aspects of 8-bit microprocessor systems. The bus is dedicated to internal communications; all external communications are through I/O interface connectors on the outer edge of the card. The STD BUS is used for both independent devices and as an I/O subsystem for larger computers.

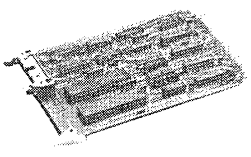
Ideally suited for factory automation in many industries, benefits provided by the STD BUS include:

- Modularity by function and physical specification
- Card slot independence
- Separate buses for power, data address and control signal

Renco Corporation offers the industrial automation engineer a wide selection of STD BUS card modules and accessories which include: Quad 12-bit digital-to-analog convertors; Quad TTL encoder interface; communications interface with IEEE-488, RS-232 and parallel I/O; intelligent servo control. Additional motion control related modules and systems are soon to be released.



STD BUS SERIES RSTD-ENCODE4 QUAD ENCODER INPUT



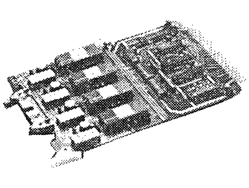
FEATURES

- Full STD BUS compatibility
- Four 16-bit or two 32-bit counters
- X1, X2, or X4 encoder count multiplier
- Direction sensing
- Error detection
- Binary or BCD counting
- Count rates up to 2 MHz
- Time of day clock option
- 5 volt operation
- Switch selectable addressing

The RSTD-ENCODE4 provides direction sensing and error detection for up to four quadrature encoder signals. Count rate may be 1, 2, or 4 times the encoder line count, software selectable or jumpered. Separate 16-bit count registers are provided for forward and reverse counts of each encoder.

TTL input signals may be strobed with the system clock, or an optional crystal oscillator may be used to obtain clock rates up to 5 MHz. When using three encoders, the unused count registers may be configured as a time of day clock.

STD BUS SERIES RSTD-DAC4 QUAD DIGITAL TO ANALOG CONVERTER

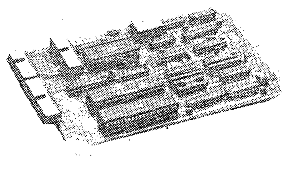


FEATURES

- Full STD BUS compatibility
- 12-bit accuracy
- ±10V, ±5V, or 0-10V output voltage range
- Switch selectable addressing
- Memory mapped, or I/O select
- 3×10^{-6} sec settling time
- $13 \times 10^{+6}$ volt/sec slew rate

The Renco RSTD-DAC4 board provides four independent analog control signal outputs each with a range of ±10 volts, ±5 volts, or 0 to 10 volts at the user's option. Command word is 12 bits. Switch selectable addressing. Optional use of IORQ, MEMEX, IOEXP, or MEMRQ. Timing is user selectable for Z80, 8085, 6800, or 6809 microprocessors. The unit is assembled on a single STD BUS compatible card. The analog outputs are presented through a 20 pin IDC connector at the front of the card.

STD BUS SERIES RSTD-COM IEEE-488, RS-232, 16 BIT PARALLEL, TIMER

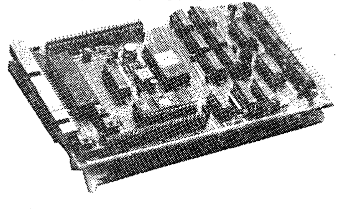


FEATURES

- IEEE-488
  Listener/Talker/Controller
  8-bit address switch port
  6809 assembly language
  Utilities
- RS-232 ACIA
  Programmable 50-19, 200 baud
- VIA
  16-bit parallel I/O
  Two timers
  Serial port
- SWITCH SELECTABLE BOARD ADDRESS
  8- or 16-bit address, MEM or IOREQ

One economical communications card handles multiple I/O tasks for STD BUS systems. T.I. TMS9914 IEEE-488 interface handles listener, talker and controller functions. Assembly language 488 utilities for 6809 are provided as programming examples. An 8-bit switch port is provided to input the 488 device address and RS-232 baud rate. A 6551 ACIA provides programmable baud rate for RS-232. The RS-232 port may be configured as needed with wire wrap jumpers. The 6522 VIA provides 16 I/O lines, two timers and another serial port. Signal connectors are standard ribbon cable headers.

RSTD PROPOS PROGRAMMABLE POSITIONER AND MACHINE CONTROL MODULE



FEATURES

- Non-volatile memory of user programs and parameters
- Program position, velocity, acceleration
- Time delays, conditional waits
- Looping and branching
- Program with RS-232 terminal 300, 1200, 9600 baud STD BUS Interface with 128 bytes dual port RAM
- Dual STD BUS card set
- Optically coupled encoder inputs A, B, Index up and down 1x, 2x, 4x direction sensing, 16-bit counter, 12-bit DAC provides ±10V output ot motor amplifier, Forward and reverse limit switch, home switch
- 8 user input/output lines
- Programmed outputs
- Conditional branching on input state
- Low cost machine controller
- Rotary tables
- Cut to length
- Point to point positioning

The RSTD-PROPOS is a broad level programmable position controller for DC Servo motors, providing high performance motion profile control and eight user programmable input/output lines for control of external machine function.

RSTD-PROPOS can be easily installed in an STD BUS computer, several PROPOS cards can be combined with a STD CPU CARD to configure an intelligent multi-axis controller. ANY personal computer can be interfaced with this intelligent multi-axis controller through the RSTD-COM CARD.

Triac ELECTRONIC SYSTEMS, INC.

87-27 MYRTLE AVE., GLENDALE, N.Y. 11385 (718) 441-4759

Triac ELECTRONIC SYSTEMS, INC. manufactures a comprehensive line of THYRISTOR SYSTEMS, SUB SYSTEMS and ANCILLARY DEVICES derived from a broad range of thyristors, used alone or in combination with other solid state components (discrete and/or I.C.), and some hybrid electro-mechanical devices, to provide a variety of A.C. power control and D.C. specialized control from the milliwatt range to 600 amps at 1200 volts.

These products are reliable, versatile and low in cost, and directed towards OEM consumption in industry, agriculture, commerce and entertainment, where economy is essential.

The technology is available today to provide sophisticated functions not available yesterday because of cost or state of the art. We invite you to explore with us the exciting world of the thyristor (TRIAC, SCR, UJT, CUJT, SUS, SCS, DIAC, SBS, CSCR, LASCR and LASCS) as it may pertain to your applications and our product line as follows:

- Power Supplies, Constant VAC, Auto Transformers
- Solid State Relays, Sensitive Relays
- High Current Static Switches
- Zero Voltage Controls
- Phase Controls
- Soft Start and/or Stop (Up ramp, down ramp)
- Over Voltage Crowbars
- Transient Suppressors, Snubber Networks
- Threshold Detectors
- Over Current Breakers
- Motor Speed Controls
- Welding Controls and Timers
- Electronic Precision Timers
- Latching Switches, Memories, Logic Boards
- Shift Registers, Counters, Ring, Preset
- Converters, Inverters, Cyclo-Converters
- Pulse Modulators, Transformers, Triggers
- Lighting Controls
- Traffic Appliances
- Automotive
- Alarm Logic, Boiler Water Level Controls
- Electro Mechanical Hybrids
- Temperature, Pressure Controls
- Steam, Hydraulic, Pneumatic Flow Systems
- Sensors, Probes, Thermistors, Transducers
- Proximity Controls, Sensors

Whatever your requirements, we possess the capacity to innovate, design, develop and manufacture large or small orders, and are equipped to supply prototypes or samples quickly. We would welcome the opportunity to quote on your requirements or merely to discuss your applications and make your acquaintance.

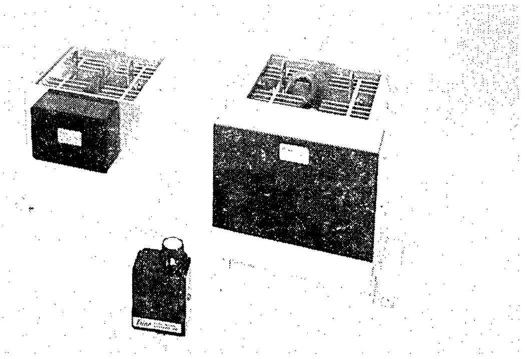
Triac ELECTRONIC SYSTEMS,INC. 87-27 MYRTLE AVE., GLENDALE, N.Y. 11385 (718) 441-4759

AC/DC THYRISTOR POWER SYSTEMS: HIGH; MEDIUM; LOW

Available 110 amps to 1,700 amps and 2,500 volts. Peak one-cycle surge inrush forward current up to 17,000 amps. Protected from forward voltage destruction. Transient protected, control voltage 6 to 240 AC, or DC. Available cooling: convection, forced draft or water. Rated for continuous or intermittent duty cycle.

Complete packages ready to use alone or in combination with thyristor controls, such as temperature sensors, light sensors, motor speed transducers, phase control, soft start, zero voltage switch, etc.

Typical Applications: Motor Speed Control, DC Motor Control, Battery Vehicles, Heater Control, Replacements for Mechanical Contactors such as Spot Welders or other severe arcing applications, Light Dimmers, Transformer Switching, Inverters, Transportation Equipment, Military Induction Heaters, Replacements for Ignitrons, etc. Assymetrical Systems.



POWER ELECTRONICS—"BUILDING BLOCKS"
VERSATILITY—ECONOMY—RELIABILITY
1 TO 2000 AMPS, 2200 VOLTS, TO 40 KHz.

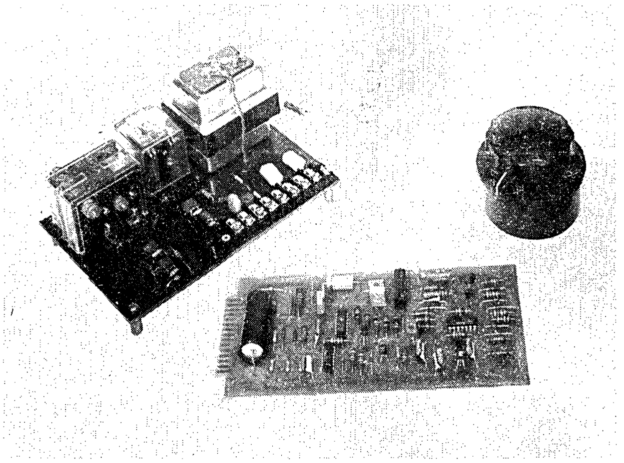
THYRISTOR SYSTEMS: CONTROL

Available for virtually every electronic control function from simple unijunction low cost timer module to the most complex control functions for automation and interface with computer control. These systems are complete or supplied in combination with other solid state art (discrete and/or I.C.) and electro-mechanical devices.

Controlled from primary sensors and transducers the Thyristor System Control in turn controls the Power Thyristor. This provides an almost limitless application versatility to meet your exact design requirements at low cost.

The technology is available today to provide sophisticated functions not available yesterday becase of cost or state of the art. Even mundane mechanical devices such as thermostat, for example, can be replaced by lower cost, smaller more reliable thyristor systems in many applications. Whatever your control requirements are, give consideration to Thyristor Control Sytems.

Available in a variety of packages and configuration including plug-in, panel mount or P.C. boards. Also available packaged in combination with Sensors and Power Thyristor Systems.



CONTROLS: RUGGED, SIMPLE, EFFICIENT

SOLID STATE RELAYS & HYBRID RELAYS

Triac Electronic Systems specializes in the design and manufacture of Solid State Relays & Hybrid Relays. The genuine thyristor is the heart of all such devices.

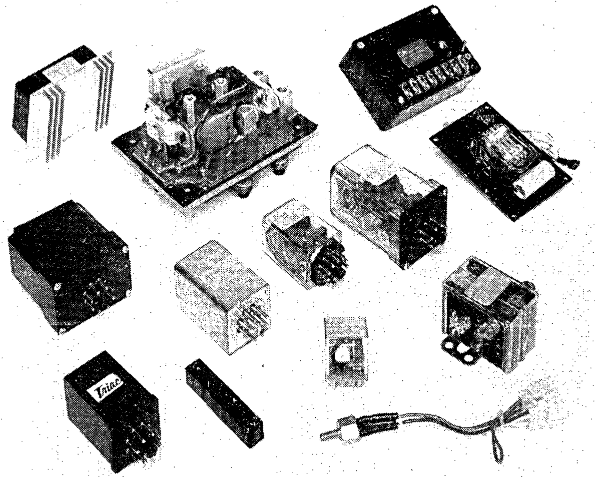
Solid State Relays are indicated in applications where long life cycling or high inrush currents, or speeds or sophisticated design such as zero voltate, phase control or soft start is required.

It is essential when choosing a solid state relay to work closely with a knowledgeable supplier. Solid state relay design is an area of expertise unto itself.

Triac truly majors in this field, providing the most advanced state of the art and OEM design at low cost. A solid state relay should be designed for your exact application to avoid unnecessary "extras." Perhaps a hybrid would better suit your requirements?—A relay with electro-mechanical input, such as a reed relay to gate the triac? Or should the output be shunted with mechanical switching closure? Or perhaps both? These are some of the questions to be answered.

Triac is prepared to assist you in these design questions, makes available to you their diversification and field experience and welcomes your inquiry.

You can choose from a broad line of designs, sizes, mountings, configuration, speed, termination and specialized applications. Solid State Relays are available for phase control, soft start and zero voltage switching.



A BEST DEVICE/SYSTEM FOR EACH NEED

enclosures · capacitors · circuit boards · coils,
chokes, inductors · connectors, electronic · sockets/
terminals · crystals · oscillators · crystal filters
delay lines · panel hardware · displays · lamps/
lights · cooling equipment · filters · generators ·
multimeters · panel meters · oscilloscopes · gra
phi recorde ections · microwave
co onents tors/
drives · ba power
supplies, ac · relays
solenoids · s/trimmers
controls/rhe ·
switches · s/en

EEM PRODUCT SELECTION GUIDES

Use the EEM Product Selection Guides. There are 34 Guides in this edition of EEM. See page 2 (A•2, B•2, C•2, D•2) of each volume to locate the Product Selection Guides that pertain to your needs.

coders · transformers · wire & cable · enclosures
capacitors · circuit boards · coils, chokes, induc
tors · connectors, electronic · sockets,/terminals

adac ...THE COMPLETE SELECTION OF Q-BUS MEASUREMENT AND CONTROL PRODUCTS.

ADAC Corporation has established a reputation for quality high-performance products to supplement and enhance the usability of LSI-II and MicroVAX computers for measurement and control applications.

BASYS SYSTEMS: Complete measurement and control systems with DIGITAL EQUIPMENT CORP. processors, a wide range of I/O interfaces, and a "real-time BASIC" language, I/OBASIC. These units can function in a stand-alone mode or as part of a distributed processing system.

I/OBASIC LANGUAGE: ADAC offers a real-time BASIC language running under the DEC RT²-11 operating system. Extensions to the typical instruction complement allow for direct reading and control of both analog and digital, input and output signals.

DISKBASYS is a complete disk system (floppy or winchester) with the RT-11, run-time operating system. It is capable of being the control processor, the host in a network, or a satellite to another host.

PROMBASYS features a run-time RT²-11 operating system in PROM memory, with battery-backed-up RAM for data and program integrity. It is an excellent selection for use in harsh environments.

MICROBASYS is specifically designed for remote satellite applications, although it will function effectively as a stand-alone unit as well.

INPUT/OUTPUT INTERFACES: A complete selection of interfaces allow connection directly to: thermocouples, strain gauges, load cells, pressure transducers, switch contacts, indicator lights, relays, 120 V AC signal 48 V DC signals, stepper motors, flow meters, RS-232/422 devices, etc.

BASYS COMMUNICATIONS: All BASYS products can operate as satellite processors in a network. Software support is offered for DIGITAL's "11" series of computers or the VAX.

IBM PC/XT FRONT-END: MICROBASYS is available fully supported as a remote, intelligent, measurement and control system for the IBM PC/XT, or compatible computer.

FASTRAK SYSTEM: Complete computer based data collection system optimized for VERY HIGH SPEED DATA ACQUISITION directly to hard disk.

PACKAGED LSI-11 SYSTEMS: These offer measurement and control configurations with DEC RT-11 or RSX-11M, FORTRAN, and complete "real-time I/O."

Q-BUS ENCLOSURES AND BACKPLANES provide complete flexibility for each customer's needs in 6, 12 and 22 half-quad slots.

Q-BUS MODULES: These boards will function within an ADAC system, or any Q-BUS computer, to give a wide selection of real-time I/O functions, memory, etc., such as:

- Analog to digital converters (12 or 14 bits) low level or wide range
- Analog to digital converter with silo buffer (100khz conversion rate)
- Digital to analog converters (12-bit)
- Digital I/O TTL levels
- Digital I/O optically isolated
- CMOS battery-backed-up RAM memory (up to 128 Kbyte)
- PROM memory (up to 512 Kbyte on a half-quad size module)
- High density RAM memory (up to 2 Mbyte on a board)
- Multiple-interrupts
- Clock/Timer module
- Multi-channel communications interfaces for RS232, RS422, RS423
- Bus repeaters (Q-BUS)
- Unibus to Q-BUS converters
- DMA interfaces (18- or 22-bit addressing)
- Graphics controller module with on-board processor
- Contact closure interfaces
- Pulse output controller/generator
- Pulse input counter

BASYS
adac
SYSTEM

2200CR 7″ CRT: This half-rack unit provides alpha/numerics and graphics in a compact package with optional removable keyboard.

FORTRAN/BASIC DEVICE HANDLERS are available for all ADAC Q-BUS modules under RT-11, RSX-11, and VAX/VMS.

Q-BUS PERIPHERALS:
Floppy disk subsystems
TU-58 compatible tape subsystems
Winchester disk subsystems
Tape/floppy disk/winchester disk combination subsystems

MULTIBUS, UNIBUS, NOVABUS, TM-990, OMNIBUS: Analog I/O modules are available for these computer buses.

Let ADAC help you meet your specific needs with quality products, prompt delivery, and competitive prices.

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COMMONLY USED ELECTRICAL/ELECTRONIC ABBREVIATIONS AND ACRONYMS

A
AC alternating current
A/D analog to digital
ADC analog to digital converter
ADP automatic data processing
AF audio frequency
AFC automatic frequency control
ALGOL algorithmic language
AM amplitude modulation
AND a logical operator
AQL acceptable quality level
ASCII American national standard code for information interchange
AWG American wire gauge

B
BALUN balanced to unbalanced
BASIC beginners' all-purpose symbolic instruction
BCD binary-coded decimal
BNC baby "N" connector
BUS basic utility system

C
CAD computer aided design
CAM computer aided manufacture
CATV cable television or community antenna television
CERMET ceramic metal element
Comm. communications
CMOS complementary metal-oxide semiconductor
CPS characters per second
CPU central processing unit

D
D/A digital to analog
DAC digital to analog converter
DC direct current
DIAC bidirectional trigger diode
DIL dual in-line
DIN Deutsche Industrie Normenausschuss
DIP dual in-line package
DPM digital panel meter
DTL diode transistor logic

E
EDP electronic data processing
EBCDIC extended binary coded decimal interchange code
EEPROM electrically erasable PROM
EMC electromagnetic compatibility
EMI electromagnetic interference
EMP electromagnetic pulse
EPROM electrically programmable ROM
ESR equivalent series resistance

F
FEP fluorinated ethylene propylene Copolymar, 200° Teflon
FET field-effect transistor
FM frequency modulation
FORTRAN formula translator

G
GaAsFET gallium arsenide field effect transistor
GPIB general purpose interface bus

H
HF high frequency (3 to 30 MHz)
HIPOT test, measurement and diagnostic equipment
HLL high level language
HV high voltage
Hz Hertz

I
IC integrated circuit
IDC insulation displacement contact
IF intermediate frequency
IO input/output (devices)
IR insulation resistance (or) infrared

J
JFET junction field effect transistor
JMOS junction metal oxide semiconductor

K
kHz kilohertz (10^3 hertz)
KSR keyboard send receive

L
LC inductance capacitance
LCD liquid crystal display
LED light-emitting diode
LF low frequency (30 to 300 kHz)
LIF low insertion force
LNA low noise amplifier
LNB low noise band
LSI large scale integration
LVDT linear velocity displacement transformer

M
MASER microwave amplification by stimulated emission of radiation
MATV master antenna television
μF microforad
MHz megahertz
MIPS million instructions per second
MIB microcomputer interface board
MOS metal oxide semiconductor
MOSFET metal oxide semiconductor field effect transistor
MOSIGT metal-oxide semiconductor insulated-gate transistor
MOV metal oxide varistor
MPU microprocessor unit
MSI medium scale integration

N
NBS National Bureau of Standards
NEMP nuclear electromagnetic pulse
NIM nuclear instrumentation module
NOR not OR
NTC negative temperature coefficient

O
OCR optical character reader
OEM original equipment manufacturer
OR a logical operator

P
PC printed circuit
PCB printed circuit board
pF picofarad
PGA pin grid array
PIN positive-intrinsic-negative (transistor)
PLA programmable logic array
PLL phased lock loop
PPI plan position indicator
PROM programmable read only memory
PTC positive temperature coefficient
PUT programmable unijunction transistor

Q
QAM quadrature amplitude modulation
Q (meter) quality-factor meter

R
RAM random access memory
RC resistance-capacitance
RFI radio frequency interference
RMS root mean square
ROM read only memory
RF radio frequency
RFC radio-frequency choke
RFI radio-frequency interference
RTD resistance-temperature detector
RTL resistor transistor logic
RTV room temperature vulcanizing
RW read/write

S
SAS silicon asymmetrical switch
SBC single board (micro) computer
SBS silicon bilateral switch
SCR silicon-controlled rectifier
SCS silicon controlled switch
SDA source & detector assemblies
SIDAC bidirectional voltage-triggered switch
SIP single in-line package
SSI small scale integration
SSR solid state relay
STL Schottky transistor logic
SUS silicon unilateral switch

T
TC temperature coefficient
TCXO temperature compensated crystal oscillator
TFE tetrafluoride ethylene propylene Copolymer, 250° Teflon
TRIAC bidirectional AC switch
TTL transistor-transistor logic
TTY teletypewriter

U
UHF ultra high frequency (300 MHz to 3 GHz)
UJT silicon unijunction transistor
UL Underwriters Laboratory
UPS uninterruptible power supply

V
VAC volts (of) alternating current
VAR volt-ampere reactive
VCR video cassette recorder
VDC volts (of) direct current
VHF very high frequency
VHSIC very high speed integrated circuit
VLF very low frequency (3 to 30 kHz)
VLSI very large scale integration
VME virtual machine environment
VRM voice recognition module
VTVM vacuum tube volt meter
VU volume unit
VSWR voltage standing wave ratio

W
WPS word processing software

Y
YIG yttrium iron garnet

Z
ZIF zero insertion force

Advanced Systems Concepts, Inc.

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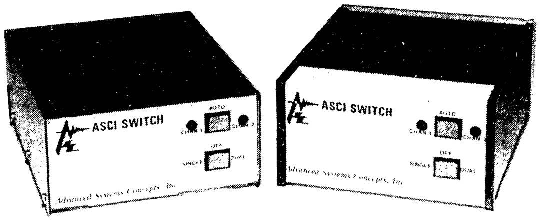
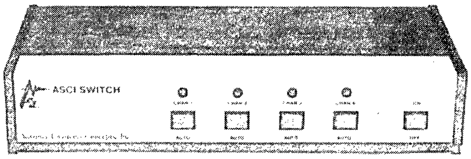
Two Port Switches



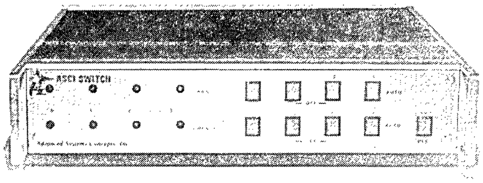
ASCI has peripheral switches that allow any two peripherals to communicate with the same input device. Our 20 models are differentiated by the type of transmission desired (serial or parallel), number of lines switched per connector, and the method of control (manual, in-line data, master port, back-up through handshaking or data and remote control).

Four Port Switches



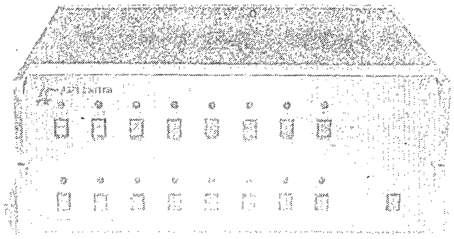
ASCI offers a complete line of four port switches for all kinds of peripherals. Current models include four output port expanders and four input sharers for serial or parallel transmission. We have models for intelligent handshaking, software controllable selection, and manual switching of devices.

Multiport Switches



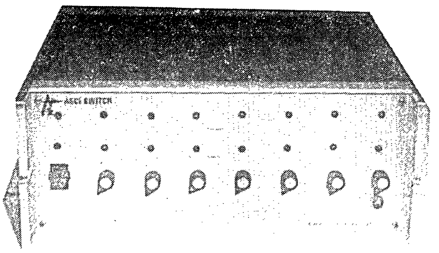
ASCI's multiport switches allow anywhere from one to 32 inputs to communicate with one to 32 outputs. Devices supported range from printers and plotters up to mag tape drives. Control can either be using the in-line data stream, manual operation, remote control signals, handshaking or through a master port. Over 32 models are available.

Rack Mounted Switches



Any of our two or four port switches can be placed in rack mountable enclosures. Our standard racks can hold 4 of the four port modules or 8 of our two port modules. In addition, configurations are available that allow bank control of all modules in the same enclosure simultaneously.

Custom Configurations



In addition to our standard line ASCI also designs custom units. These units can consist of simply one of our standard products with special connectors or cabling or a complete configuration with special protocol and handshaking requirements. Since our specialty is peripheral interfacing we're sure to be able to provide the unit that will satisfy your needs.

ASCI can also satisfy your data transmission needs. Call us for information on cabling, line drivers and protocol converters.

For more information call TOLL FREE 1-800-824-7080, TELEX 701-215 (ASCI)

ANALOGIC®

HIGH-PERFORMANCE DATA CONVERSION PRODUCTS

Our product line includes both standard and custom A/Ds and D/As, signal conditioning amplifiers, distortion suppressors, and custom signal conditioning/data acquisition subsystems. A representative sampling is included in the listing on these pages.

Integrating A/D Converters

Product	Notes, Features, Characteristics	Resolution	Conversion Rate	Relative Accuracy	Input Ranges	Size
MP8037	Fastest, most accurate and stable integrating ADC.	17 Bits Binary	250/sec	± 1 LSB	± 10V	2" x 4" x 0.44" (51 x 102 x 11 mm)
MP2344	Versatile (BC/Binary), highly isolated, line-synchronous integration.	± 39,999 counts (16 bits binary, 4¾ decimal digits)	3/sec to 30/sec	± 1 count	± 4V	2" x 3" x 0.45" (51 x 76 x 11 mm)
MP2321	Highest performance/ratio in a premium, balanced input, 12-bit ADC.	± 1999 (3½ digits decimal)	100/sec	0.05% rdg. ± 1 count	± 1.999V or ± 199.9mV	2" x 4" x 0.49" (51 x 102 x 12 mm)
MP2322		12 Bits Binary	100/sec	0.05% rdg. ± 1 count	± 100mV ± 200mV ± 1V, ± 2V	2" x 4" x 0.49" (51 x 102 x 12 mm)
MP2316	Universal, Floating Point Programmable-Gain Converter Processor	16 Bits	37/sec	± .006% FSR.	Selectable ± 10mV to ± 50V	2" x 3" x 0.5" (51 x 78 x 13 mm)

Successive-Approximation A/D Converters

Product	Notes, Features Characteristics	Resolution Binary Bits	Conversion Time	Relative Accuracy of FSR	Input Ranges	Size
MP8016	Most advanced ADCs currently available in this speed range; truly "state-of-the-art" designs, at modest prices.	16	32 μs	± 0.0015%	+ 10V, ± 10V	3" x 4.6" x 0.375" (76 x 117 x 10 mm)
MP8015		15	15 μs	± 0.003%		
MP8014		14	10 μs	± 0.006%		
MP2734	Improved performance at higher speed, yet at lower cost.	14	7 μs	± 0.006%	+ 5V, + 10V ± 5V, ± 10V	2" x 4" x 0.44" (51 x 102 x 11 mm)
MP2735-2	High speed, accurate, superb linearity around zero crossing. Low power.	15	5 μs	± 0.005%	± 5V	3" x 4" x 0.44" (76 x 102 x 11 mm)

Sampling ADCs (Successive-Approximation with Built-In S/H)

A/D/A/M-812	Two channel simultaneously sampling 12-bit ADC, 5ns skew max. between channels	12	19.5 μs/2 ch. 11.0 μs/1 ch.	± 0.012%	± 5V, ± 10V 0-10V	2" X 3" X 0.375" (50.8 X 76.2 X 9.53 mm)
A/D/A/M-822	Two channel simultaneously sampling 12-bit ADC; 5ns skew max. between channels	12	39 μs/2 ch. 21 μs/1 ch.	± 0.012%	± 5V, + 10V ± 10V	2" x 3" x 0.375" (50.8 x 76.2 x 9.53 mm)
A/D/A/M-826-1 -2 -3	Extremely high-speed A/D with Sampling (-1), Buffered (-2) and Unbuffered (-3) versions	16	2.3 μs (-1) 2.0 μs (-2) 1.5 μs (-3)	± 0.0015% ± 0.0015% ± 0.0015%	± 10V, 0 to 10V	3" x 5" x 0.44" (76 x 127 x 11 mm)
A/D/A/M-825	Highly stable sampling ADCs. Include S/H, tri-state buffers, in fully shielded case, tested as a complete sampled-data subsystem.	15	18 kHz	± 0.003%	+ 5V, + 10V ± 5V, ± 10V	2" x 4" x 0.44" (51 x 102 x 11 mm)
A/D/A/M-824		14	20 kHz	± 0.005%		
A/D/A/M-724		14	6.8 μs (100 kHz throughput)	± 0.006%		3" x 4.6" x 0.375" (76 x 117 x 10 mm)
A/D/A/M-834	Highly stable sampling converters featuring low noise, low power, and tri-state output buffered extended temperature range − 25° to + 85°C.	14	60 μs 16.6 kHz throughput	± 0.005%	+ 5V, + 10V ± 5V, ± 10V	2" x 4" x 0.39" (51 x 102 x 10 mm)
A/D/A/M-835		15	60 μs 16.6 kHz throughput	± 0.003%	+ 5V, + 10V ± 5V, ± 10V	2" x 4" x 0.39" (51 x 102 x 10 mm)
MP2735-1	High speed, accurate, superb linearity around zero crossing. Low Power.	15	8 μs (125 kHz throughput)	± 0.005%	± 5V	3" x 4" x 0.44" (76 x 102 x 11 mm)
SHAD-2	High speed simultaneous dual channel sampling, ultra low noise and distortion, audio digitizing board product.	15	57 kHz (dual channel)	± 0.005%	± 5V	4.62" x 5.78" x 0.55" (117 x 147 x 14 mm)

Sample & Hold Amplifiers

Product	Notes, Features, Characteristics	Acquisition Time for 20V Step	Aperture Uncertainty Time	Sample-Mode Non-Linearity, ± 10V range	Pedestal Non-Linearity, ± 10V range	Hold Mode Droop Rate	Size
MP272	Very high speed inclusive of input buffer settling time.	350ns max. to 0.01%	± 50 ps	± 0.005% max.	± 0.005% max.	5 μ V/μ s max.	2" x 2" x 0.44" (50.8 x 50.8 x 11.2mm)
MP271	Fastest, most accurate S/H in high-throughput class.	1.0 μ max. to 0.01%	± 0.2 ns	± 0.003% max.	± 0.002% max.	2 μ V/μ s	2" x 2" x 0.39" (51 x 51 x 10 mm)
MP270	Same high speed as MP271.	1.0 μ max. to 0.01%	± 0.2 ns	± 0.005% max.	± 0.005% max.	2 μ V/μ s	2" x 2" x 0.39" (51 x 51 x 10 mm)
MP260	Moderate speed, most accurate, small size.	5.0 μ s max. to 0.003%	± 0.5 ns	± 0.002% max.	± 0.003% max.	0.2 μ V/μ s max.	1" x 2" x 0.44" (25 x 51 x 11 mm)
MP261	Optimized for simultaneous S/H high-accuracy systems.	15 μ s max. to 0.003%	± 0.5 ns	± 0.002% max.	± 0.002% max.	20 μ V/ms max.	1" x 2" x 0.44" (25 x 51 x 11 mm)
MP282A	High speed, dual channel internal MUX and gain ranging amplifier designed as audio/PCM front end.	3.5 μ s max. to 0.005% for 10V step	± .2 ns	± 0.002% max. (± 5V range)	± 0.002% max.	0.4 μ V/μ s max.	2" x 2" x 0.44" (51 x 51 x 11 mm)

Digital-to-Analog Converters

Product	Notes, Features, Characteristics	Resolution Binary Bits	Relative Accuracy of FSR	Full Scale Maximum Settling Time Voltage Output	Output Ranges	Size
MP8116	State-of-the-Art accuracy, stability, linearity	16	± 0.00023% typ. ± 0.00037% max. (3 σ)	25 μ s to ½ LSB	± 10V, + 10V ± 5V, ± 1mA	3.9" X 7.1" X 0.5" (99 X 180 X 13 mm)
MP1916TC	Ultra-high stability, accuracy, and speed. Temperature-controlled.	16	± 0.001%	20 μ s to 1 LSB	± 10V, ± 5V + 5V, + 10V ± 2mA – 4mA	2" X 4" X 0.44" (51 X 102 X 11 mm)
MP1915TC		15	± 0.0015%	17 μ s to 1 LSB		
MP1914TC		14	± 0.003%	15 μ s to 1 LSB		
MP1926A	Sign/magnitude internal architecture, excellent linearity and stability near zero.	16	± 0.0015% max below ± ⅛ FSR ± 0.004% max above ± ⅛ FSR	3 μ s to 0.01% for a 5V step	± 5V, ± 10V – 5V magnitude output	2" X 4" X 0.44" (51 X 102 X 11 mm)
MP1926S	Ultra-stable	16	± 0.0015% max below ± ⅛ FSR ± 0.004% max above ± ⅛ FSR	40 μ s to 0.01% for a 5V step	± 5V, ± 10V – 5V magnitude output	2" X 4" X 0.44" (51 X 102 X 11 mm)
MP1936	16-bit DAC with Ultra-low harmonic distortion, with integrated distortion suppressor	16	± 0.0015% max above ± ⅛ FSR ± 0.0004% max below ± ⅛ FSR	Time Constant Response 3.4 μ s	± 5V	2" X 4" X 0.44" (51 X 102 X 11 mm)

Video Digital-to-Analog Converters (RS330/343 Compatible)

Product	Notes, Features, Characteristics	Resolution (Bits)	Relative Accuracy of FSR	Update Rate	Input Logic Rate	Size
AH8308E	Fastest available, lowest power (1.0 watt max.)	8	± 0.2%	150MHz	ECL	0.79" X 1.305" X 0.3" (33.14 x 20.06 X 7.62 mm)
AH8308T	Lowest power available (1.1 watt max.)	8	± 0.2%	65MHz	TTL	0.79" X 1.305" X 0.3" (33.14 x 20.06 X 7.62 mm)
AH8304TM	Triple 4-bit DAC with 32 word LUT memory	3 x 4	± 3%	20MHz	TTL	1.0" x 1.3" x 0.3" (25 x 33 x 7mm) 24 pin TDIP
AH8304TC	Triple 4-bit DAC	3 x 4	± 3%	100MHz	TTL	1.0" x 1.3" x 0.3" (25 x 33 x 7mm) 24 pin TDIP
MP8308	Very fast, glitchless, low-cost design generates full composite video signal.	8	± 0.2%	40MHz	TTL	2" X 3" X 0.35" (51 X 76 X 9 mm)
MP8308ECL	Ultra-fast, glitchless, low-cost design generates full composite video signal.	8	± 0.2%	100MHz	ECL	2" X 3" X 0.35" (51 X 76 X 9 mm)
MP8318	Very fast, glitchless, low-cost video DAC; 40MHz update	8	± 0.2%	40MHz	TTL	2" X 3" X 0.35" (51 X 76 X 9 mm)
MP8318ECL	Ultra-fast, glitchless, low-cost video DAC; 100MHz update	8	± 0.2%	100MHz	ECL	2" X 3" X 0.35" (51 X 76 X 9 mm)

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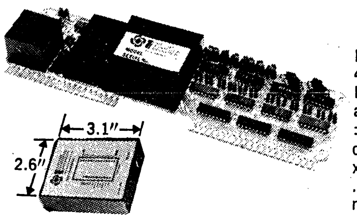
SYNCHRO CONVERTERS/DISPLAYS/ENCODERS

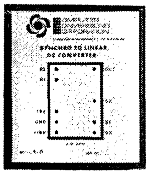
STANDARD LOW COST UNITS TO SATISFY ALMOST ANY SYNCHRO/RESOLVER OR SHAFT INTERFACING REQUIREMENT

SYNCHRO/RESOLVER TO DIGITAL Series SDC40/60



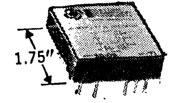
INPUT: 11.8/90 vrms L-L, 60 or 400 Hz. Ref: 26/115 vrms. **OUTPUT:** 16, 14, 12, or 10 Bits parallel binary or BCD. **ACCURACY:** ±1, ±4, ±6 or ±30 minutes of arc. **PACKAGE:** (A) 2.6" x 3.1" x .42"h Module (B) 2.6" x 3.1" x .82"h or (C) 4.5" x 6.5" x .75"h repairable PC card.

SYNCHRO/RESOLVER TO LINEAR DC Series SLD200



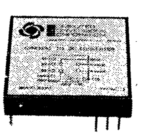
INPUT: 11.8/90vrms L-L, 60 or 400 Hz., Ref: 26/115vrms. **OUTPUT:** (A) −10 to +10 vdc linear with angles from −180° to +180° (standard) (B) 0 to +10V DC linear with angle from 0° to 360° (special) (C) −10 to +10 vdc linear with angles from −90° to +90°. **ACCURACY:** ±6 minutes of arc at input speeds up to 1440°/sec, or ±15, ±30, ±60 minutes of arc. **PACKAGE:** (A) 2.6" x 3.1" x .82" Module; (B) 3.06" x 2.6" x 3.18"H Can; (C) 4.5" x 6.5" x .75"H repairable PC card.

SYNCHRO/RESOLVER TO SINE-COSINE DC Series SD100



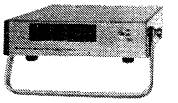
INPUT: 11.8/90 vrms L-L, 60 or 400 Hz. Ref: 26/115 vrms. **OUTPUT:** ±10 sin θ vdc; ±10 cos θ vdc. **ACCURACY:** ±2 or ±4 minutes of arc. **PACKAGE:** 1.75" x 1.75" x .6"h or 3" x 3" x .625"h Module.

INVARIANT SYNCHRO/RESOLVER TO SINE-COSINE Series SD100 I



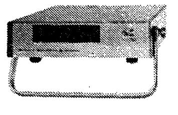
INPUT: 11.8/90 vrms L-L, 60 or 400 Hz. Ref: 26/115 vrms. **OUTPUT:** ±10 sin θ vdc, ±10 cos θ vdc. **ACCURACY:** ±4 minutes of arc. **INVARIANCY:** A ±10% change in the input or reference voltage results in a ±.5% change in the individual DC outputs. **PACKAGE:** 3" x 3" x .625"h Module.

SYNCHRO ANGLE INDICATOR Series AI400



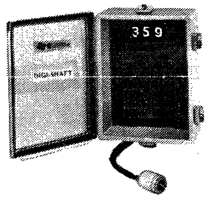
INPUT: 11.8V/90 vrms L-L, 60 or 400 Hz, Ref: 26/115 vrms. Single speed or multispeed (1x36) (2x36). **OUTPUT:** 5 or 6 Digit Display + BCD data. **ACCURACY:** ±.01°, ±.03°, ±.05° or ±.1°. **PACKAGE:** 9.5"w x 1.75"h x 12" deep-Bench or Rack Mounting.

BINARY ANGLE INDICATOR (BINARY TO BCD) Series BAC100



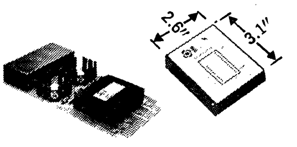
INPUT: Up to 16 bits of parallel binary data, TTL compatable. **OUTPUT:** 5 digit display of angle (0° to 359.99°) OR ANY OTHER SCALE FACTOR DESIRED FROM 0 TO 99999 REPRESENTING ENCODER POSITION, RANGE, PRESSURE, WEIGHT, ETC. **ACCURACY:** ±.01° (±1 lsb). **PACKAGE:** A) 7.0"w x 1.75"h x 8.25" deep — Bench or Rack Mounting B) 4.5" x 6.5" x 1.8"h PC Board requiring +5 vdc at 1 amp C) 2.6" x 3.1" x .82h Module.

PROGRAMMABLE LIMIT SWITCHES Series DLS



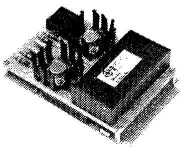
INPUT: Shaft angle position.
LIMITS: (A) Dwell (From-to): 8 per unit
(B) Set Point — 16 per unit
(C) Closure — 16 per unit
OUTPUTS: (A) Logic Levels
(B) Power Transistor
(C) Relay
(D) Display (LED)
ACCURACY: Up to ±.1°
PICKOFF: Resolver (size 15 or 11)
PACKAGE: (A) 19" x 12" x 8.75"h
(B) NEMA 12 — 16" x 12" x 8"

DIGITAL TO SYNCHRO/RESOLVER Series DSC40/60



INPUT: 14, 12 or 10 bits parallel binary and 26/115 vrms reference. **OUTPUT:** 11.8/90 vrms L-L, 60 or 400 Hz capable of driving 1VA, 2VA, 5VA (up to 3 TRS) or 25VA loads. **ACCURACY:** ±4, ±15 or ±30 minutes. **PACKAGE:** A) 2.6" x 3.1" x .6"h. B) 2.6" x 3.1" x .82"h module. C) PC card with edge connector (5VA and 25VA units).

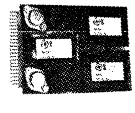
DC ANGLE TO SYNCHRO/RESOLVER Series LDS500



INPUT: ±10 vdc or ±100 vdc representing ±180° of angle. **OUTPUT:** 11.8/90 vrms L-L, 60 or 400 Hz capable of driving up to three size 11 T.R.'s (75 ohms L-L). **ACCURACY:** ±15 or ±30 minutes of arc.

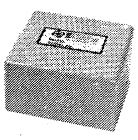
PACKAGE: (2) 4.5" x 9.25" x 2.0"h repairable PC Board with 22 pin edge connector.

DC SIN COS TO SYNCHRO DRIVERS Series DCS400



INPUT: ±10 vdc representing sin θ and cos θ. **OUTPUT:** 11.8/90 vrms L-L, 60 or 400 Hz capable of driving up to three size 11 T.R.'s (75 ohms L-L). **ACCURACY:** ±6, ±15, ±30 minutes of arc. **PACKAGE:** A) 4.5" x 6.5" x .8"h repairable PC Card. B) 4.5" x 9.25" x 1"h PC Card.

RECTANGULAR TO POLAR Series RP600



INPUT: R sin θ and R cos θ from 50 mv to 10 vdc. **OUTPUT:** R and θ. **ACCURACY:** θ: ±15 minutes at R = 10, R: ±.1% F.S. **PACKAGE:** 3.2" x 3.4" x 1.8"h Module.

ADDITIONAL PRODUCTS

- Hi Speed Multiplexed Synchro to Digital
- Multiplexed Encoders
- Multiplexed Synchro to Linear DC
- Digital Sine/Cosine to Synchro
- Modular Encoders
- Two Speed Digital to Synchro
- Synchro Reference Supply
- Selsyn to Digital/DC
- Azimuth Change Pulse Conv.
- BCD to Binary Converters

ALL SYNCHRO INPUT/OUTPUT UNITS

- Available in 0°C to 70°C or −55°C to +85°C temperature range
- TTL compatable output and inputs or CMOS, or LP Shottky
- Operate from ±15 v, or ±15 and +5 vdc
- Transformer isolated inputs/outputs
- Solid State construction — 883 Level B Available
- CAN BE MADE FIELD OR FACTORY REPAIRABLE
- Available hermetically sealed and to MIL SPECS (E-5400)
- Delivery: Stock to 4 weeks (small quantity)

SPECIAL UNITS AND PACKAGES AVAILABLE ON REQUEST

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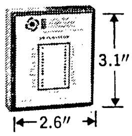
SYNCHRO CONVERTERS/DISPLAYS/ENCODERS

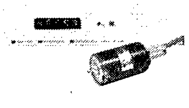
STANDARD LOW COST UNITS TO SATISFY ALMOST ANY SYNCHRO/RESOLVER OR SHAFT INTERFACING REQUIREMENT

SYNCHRO/RESOLVER TO BCD Series SBC



INPUT: 11.8/90vrms L-L, 60 or 400 Hz. Ref. 26/115vrms **OUTPUT:** 3 or 4 decade BCD — scaleable unipolar or bipolar. **ACCURACY:** ±30 or ±6 minutes of arc ±1 LSB. **PACKAGE:** 2.6″ x 3.1″ x .82″ H Module. **OPTIONS:** Choice of Scale factors, Zero offset adjustments (±5%).

MULTITURN ABSOLUTE ENCODERS Series MDS90

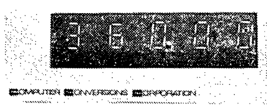


INPUT: MULTI-TURN Shaft angle position. **OUTPUT:** 4, 5, or 6 Digit LED Display + BCD or Binary Data. **ACCURACY:** Up to ±1 pt. in 100,000. **PACKAGE:** Size 23 Pickoff with full or half rack electronics. **OPTIONS:** Zero Offset, NEMA 12 Housings, Presets, power supplies.

TYPICAL UNITS

Multiturn Encoders	Output Code	Resolution Counts/360°	Revolution for Full Count	Data Range
MDS90-DBC-16	Binary	2^{10}	64	2^{16}
MDS90-DBC-10	BCD	1000	10	10,000
MDS90-DBC-100	BCD	1000	100	100,000

LOW COST ANGLE INDICATOR Series AI540

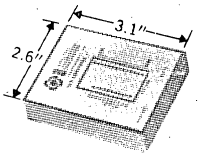


INPUT: 11.8/90vrms L-L, 60 or 400 Hz, Ref: 26/115vrms +115V 60 Hz power: **OUTPUT:** 4 digit or 3 digit, .5″H LED DISPLAY (unipolar or bipolar). **ACCURACY:** ±6 or ±30 minutes of arc ±1 LSB: **PACKAGE:** (A) 5.5″W x 7.5″L x 2.0″H PANEL MOUNT (DC supplies included): (B) 9½″W x 1¾″H, half rack mounting (DC supplies included. **OPTIONS:** Choice of scale factors, Zero offset adjustment (±5°).

MULTIPLEXED SYNCHRO TO DIGITAL Series MSH

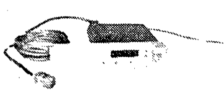
INPUT: 11.8/90vrms L-L, 60 or 400 Hz., Ref: 26/115v rms, up to 128 channels; **OUTPUT:** 12 bit parallel binary or 4 decade BCD (unipolar or bipolar: **ACCURACY:** ±6 minutes of arc ±1 LSB: **PACKAGE:** (A) Central converter — 2.6″ x 3.1″ x .82″H module, (B) Input Module — 1.5″ x 2.0″ x .6″H, (C) Transformer Module — 1.5″ x 13/16″ x .6″H (Scott "T" — 400 Hz) +1″ x 1″ x .8″H (Ref.). **OPTIONS:** (A) choice of scale factor on BCD output, (B) Linear DC output, (C) Systems mounted on PC boards and/or racks.

MULTISPEED SYNCHRO TO DIGITAL Series TSD



INPUT: 11.8/90 vrms L-L, 60 or 400 Hz., Ref: 26/115 vrms: **SPEEDS:** 8, 16, 32, 9, 18, and 36: **OUTPUTS:** 16 to 19 bits parallel binary: **ACCURACY:** ±.02, ±.01 or ±.005 degrees: **PACKAGE:** One, Two or Three 2.6 x 3.1 x .82″H or .42″H modules. **OPTIONS:** (A) Systems packaged on PC Cards or in racks; (B) 5 digit display.

ABSOLUTE ENCODERS Series DS90



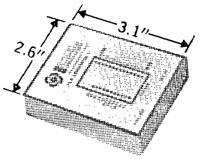
INPUT: Shaft angle position coupled to "DIGI-SHAFT" system: **OUTPUT:** four digit (.5″H) LED display (0 to 9999) +BCD or Parallel binary data (ANY SCALE FACTOR DESIRED): **ACCURACY:** ±1 part in 3600 (single turn) From shaft input to digital output: **PICKOFF:** Resolver (Size 8, 11, or 15): **PACKAGE:** (A) 5.44″W x 7.00″ x 1.75″H: (B) Full or half rack: **OPTIONS:** Multichannels, Zero offset, Presets, DC output, Multiturn units with 5 digit (99999) output, NEMA 12 Housings.

TYPICAL UNITS (single Turn)

Pt. No.	Output	Counts/360°
DS90-DB-12	Binary Data	2^{12}
DSR90-36-BC	0-3599 display +BCD data	3600
DSR90-10	0-999 display	1000
DSR90L-25-BC	0 to ±2500 display +BCD data	±2500

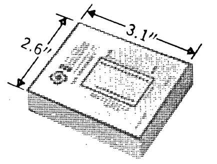
FULL SCALE OUTPUTS OF UP TO 9999 AVAILABLE
MULTITURN UNITS WITH UP TO 999999 FULL SCALE OUPUTS AVAILABLE

SOLID STATE CONTROL TRANSFORMER Series SCT



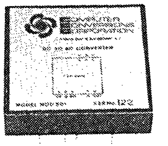
DIGITAL INPUT ANGLE (ϕ): 14, 12, or 10 bits parallel binary. **SYNCHRO/RESOLVER INPUT ANGLE (θ):** 11.8/90vrms L-L, 60 or 400 Hz. **OUTPUT:** E out=(V ref ±7%) sin (θ-ϕ) Sin wt: **GRADIENT:** .4 or 1vrms/degree. **RANGE:** ±7 or ±12.5 degrees: **ACCURACY:** ±4, ±15, or ±30 minutes of arc. **PACKAGE:** 2.6″ x 3.1″ x .82″H Module.

SOLID STATE CONTROL DIFFERENTIAL TRANSFORMER Series SCDX



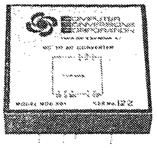
DIGITAL INPUT ANGLE (ϕ): 14, 12, or 10 bits parallel binary. **SYNCHRO/RESOLVER INPUT ANGLE (θ):** 11.8/90vrms L-L, 60 or 400 Hz. **OUTPUT:** (1) 9.2K (ϕ) Sin (θ-ϕ) Sin wt. [7vrms.] (2) 9.2K (ϕ) Cos (θ-ϕ) Sin wt. [7vrms.] **ACCURACY:** ±4, ±15 or ±30 minutes of arc. **PACKAGE:** 2.6″ x 3.1″ x .82″H.

MODULATORS Series MOD500



INPUT: 0 to ±10 or ±100 VDC and 26V/115Vrms reference: **OUTPUT:** 0 to 7vrms (other voltages available. **ACCURACY:** ±.2% F.S.: **NULL:** ±.1% F.S. **PACKAGE:** 2.6″ x 3.1″ x .625″ Module. **OPTIONS:** Gain+Zero Adjust, external output transformers.

DEMODULATORS Series D400



INPUT: 0 to 5, 10, 25 or 100vrms, 400 to 5000 Hz, 5/26vrms reference. **OUTPUT:** 0 to ±5 or ±10VDC. **ACCURACY:** ±.2, .3 or .5% F.S. **NULL:** ±.1% F.S. **PACKAGE:** (A) 1.75″ x 1.75″ x .6″H Module. (B) 2.75″ x 1.4″ x .75″H Module.

COMPUTER
CONVERSIONS
CORPORATION

DEPT. EM
6 DUNTON COURT, EAST NORTHPORT, NEW YORK 11731
(516) 261-3300 TWX 510-226-0448

CSI synchro/resolver/inductosyn™ to digital converters

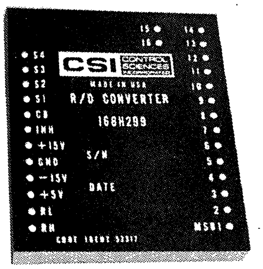
SINGLE SPEED TRACKING SYNCHRO/RESOLVER/INDUCTOSYN™ CONVERTERS

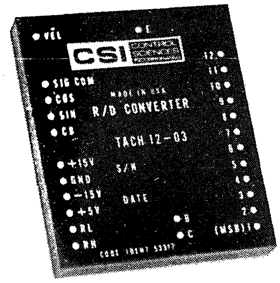
GENERAL DATA

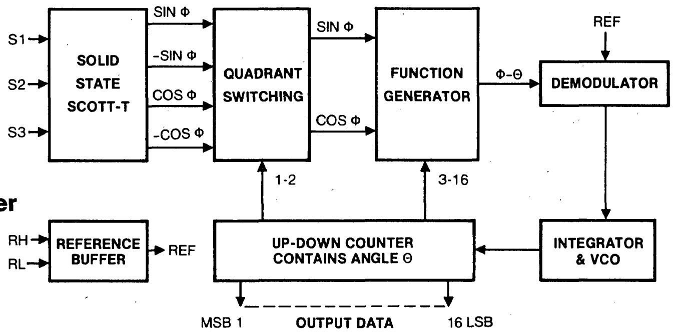
The series 168 is a family of synchro, resolver, inductosyn™ tracking converters which feature no velocity errors and only minor acceleration errors. The output digital angle θ is continuously updated to agree with the input angle ϕ through the use of a type II servo loop. Since the analog input signals are treated in a ratiometric fashion, accuracy is maintained even when large distortion, harmonics and voltage variations are encountered. CSI tracking converters will operate with either sine or square wave excitation with no degradation in performance. Most units will withstand 1000% overvoltage indefinitely without damage.

By design, units may be supplied to fit non-standard requirements without impacting price or delivery. No cost options include non-standard input voltages, non-standard tracking rates and dynamic responses, plus dc output proportional to velocity. Typical delivery is four to six weeks ARO.

CSI
S/D CONVERTER
168T300
S/N
DATE


CSI
R/D CONVERTER
168H299
S/N
DATE
MSB 1


CSI
R/D CONVERTER
TACH 12-03
S/N
DATE
(MSB)1


S1
S2
S3
SOLID STATE SCOTT-T
SIN Φ
-SIN Φ
COS Φ
-COS Φ
QUADRANT SWITCHING
SIN Φ
COS Φ
FUNCTION GENERATOR
Φ-Θ
REF
DEMODULATOR
1-2
3-16
RH
RL
REFERENCE BUFFER
REF
UP-DOWN COUNTER CONTAINS ANGLE Θ
INTEGRATOR & VCO
MSB 1
OUTPUT DATA
16 LSB

Block Diagram — Tracking Converter

GENERAL PURPOSE TRACKING

Series	Resolution	Accuracy	Tracking	Package¹	Input²	Remarks
168F200	10 Bits	±30 Minutes	To 70 RPS	A	S,R 3-130 Vrms 50-1200 Hz	Industry standard broadband series. 1000% input overvoltage protection. Optional velocity output.
168F300	12 Bits	±8.5 Minutes	To 30 RPS			
168F100	14 Bits	±5.3 Minutes	To 10 RPS			
168L200	10 Bits	±30 Minutes	To 360 RPS	A	S,R 3-130 Vrms 2600-5000 Hz	Ultra-fast tracking series. 1000% input overvoltage protection. Optional velocity output.
168L300	12 Bits	±8.5 Minutes	To 120 RPS			
168T300	12 Bits	±8.5 Minutes	To 50 RPS	A	S,R 3-130 Vrms 50-2600 Hz	Outputs have three-state latches. Single word or two byte read.
new 168E700	1°	±1°	To 36 RPS	B	S,R 3-130 Vrms 50-1200 Hz	BCD converter features ultra-low power consumption. 1000% input overvoltage protection.
new 168E600	0.1°	±0.2°	To 36 RPS			
900B101S	4¼ x 6¼ inch card for most above units including sockets.					
SCB-24	4¼ x 6¼ inch system card accepts most tracking converters. Includes oscillator, optional 3-state latches or encoder (A quad B) output.					

1. A = 3.125" x 2.625" x 0.42" maximum module B = 3.125" x 2.625" x 0.82" maximum module
2. S = Synchro, R = Resolver

™Farrand Controls - Valhalla, New York

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synchro/resolver/inductosyn™ to digital converters CSI

HIGH ACCURACY/FAST TRACKING

Series	Resolution	Accuracy	Tracking	Package¹	Input²	Remarks
168H100	16 Bits	±1.3 Minutes	To 3 RPS	B	S,R 3-130 Vrms 50-440 Hz	Synthesized reference corrects up to 70° phase shift.
168H200	16 Bits	±3.5 Minutes (±1.8 Minutes Repeatability)	To 5 RPS	A	S,R 3-130 Vrms 50-2600 Hz	Low cost 16 bit series with high repeatability.
new 168H600	14 Bits	±2.6 Minutes	To 30 RPS	A	R 2.5-130 Vrms 360-2600 Hz	High accuracy/fast tracking series. Optional velocity output.
new 168H700	15 Bits	±1.6 Minutes	To 17 RPS			
new 168H800	16 Bits	±1.3 Minutes	To 8 RPS			
900B115S	4¼ x 6¼ inch mounting card for above units including sockets.					

INDUCTOSYN™/RESOLVER CONVERTERS

Series	Resolution	Accuracy	Tracking	Package¹	Input²	Remarks
168L400	4000 Counts	±2 Counts	100 RPS	A	R,I 2.5 Vrms 5000 Hz	Serial data plus zero crossing and direction outputs.
168L500	12 Bits	±8.5 Minutes	67, 87 170 RPS	A	R,I 2.5 Vrms 400-10k Hz	Ripple carry and direction outputs, velocity output.
TACH-12	12 Bits	±8.5 Minutes	50, 75 100 RPS	A	R 2.5-130 Vrms 400-5000 Hz	Features 1% precision velocity to replace tachometers. Flat response to 200 Hz.

1. A = 3.125″ x 2.625″ x 0.42″ maximum module B = 3.125″ x 2.625″ x 0.82″ maximum module
2. S = Synchro, R = Resolver, I = Inductosyn™

MULTIPLEXED CONVERTERS

GENERAL DATA

Designed to be the lowest per channel cost available, the 160B100 series is a complete 4-channel multiplexed S/D or R/D converter contained in a single low profile module. Any synchro or resolver line-to-line voltage between 2.5 and 130 volts can be specified at frequencies from 57 Hz to 5 KHz.

Up to 40 input channels can be accommodated by the addition of external input modules. Twelve bits of parallel binary angle are converted in less than 100 microseconds per channel. All channels are simultaneously sampled on negative carrier peaks.

Signal and reference inputs are differential solid state with high common mode rejection and inherent transient protection.

Series	Resolution	Accuracy	Package	Input²	Remarks
160B100	12 Bits	±8.5 Minutes	3.4 x 4.0 x 0.42 inch	S,R,I 4 Channels 2.5-130 Vrms 47-5000 Hz	Sample and hold each input. 100 microseconds conversion per channel. Expandable to 40 channels.
160B400	—	±3.0 Minutes	2.0 x 3.0 x 0.42 inch		4 channel expander with sample and hold each input.
new MUX-4	4¼ x 6¼ inch, 4 channel 160B100 board assembly with output three state latches, manual address switch for test/evaluation.				
new MUX-8	4¼ x 7½ inch, 8 channel 160B100 + 160B400 board assembly with output three state latches, manual address switch for test/evaluation.				

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2. S = Synchro, R = Resolver, I = Inductosyn™

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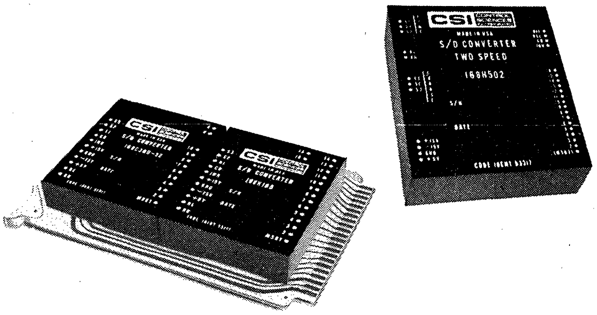
CSI synchro/resolver/inductosyn™ to digital converters

TWO SPEED TRACKING CONVERTERS

GENERAL DATA

CSI offers a broad line of modular and card mounted two speed S/D and R/D converters with resolutions to 22 bits and accuracies to ±3 seconds of arc. All are type II tracking converters featuring no velocity error and only minor acceleration errors. Inputs withstand 1000% overvoltage without damage. Models available for multi-pole resolvers with up to 70° phase shifts.



Series	Resolution	Accuracy	Tracking	Package[1]	Input[2]	Remarks
168F500	16 Bits	±20 Seconds	2 RPS	A (2 modules)	S,R 1:36, 2:36 1:16, 1:32 3-130 Vrms 50-1200 Hz	Two module set includes coarse and fine converter plus combiner. "Stick-off" voltage prevents false nulls.
168H500	16 Bits	±20 Seconds	To 3 RPS	B	S,R 1:36 1:16, 1:32 3-130 Vrms 50-3000 Hz	Low cost single module version of above unit.
new 168K500	20 Bits	±7 Seconds	½ RPS	B	R 1:16, 1:32 3-130 Vrms 400-5000 Hz (Designed for multi-pole resolvers.)	Low cost, high accuracy, single module coarse, fine plus combiner with auto-correction for phase shifts to ±80°, ambiguity correction and "stick-off" voltage.
168C300	10 Bits	±30 Minutes	30 RPS	B	S,R Binary Ratios 3-130 Vrms 50-1200 Hz	Coarse converter includes combiner for operation with 12 to 16 bit std. fine converter to form a 2 module, 2 speed set.(See also SCB-15.)
167B100	19 Bits	±½ LSB	—	B	Input from two std. S/D, R/D	Combiner for 36:1, 18:1, 9:1 speed ratios from two R/D, S/D converters to form a 3 module, 2 speed set.
SCB-15	4¼ x 6¼ inch, circuit board accepts 168C300 plus std. 12, 14, 16 bit S/D, R/D to form complete two speed system.					
new SCB-12	4¼ x 6¼ inch, circuit board accepts 168F500 S/D, R/D to form complete two speed system.					

1. A = 3.125″ x 2.625″ x 0.42″ maximum module B = 3.125″ x 2.625″ x 0.82″ maximum module
2. S = Synchro, R = Resolver

SOLID STATE CONTROL TRANSFORMERS

Series	Resolution	Accuracy	Package[1]	Input[2]	Output	Remarks
180A200	10 Bits	±15 Minutes	A	S,R 11.8 V or 90 Vrms	0.4 V/Deg (11.8 V In) 1.0 V/Deg (90 V In)	Output represents difference between input S(R) angle and digital angle. Output range ±7° from null.
180A300	12 Bits	±6 Minutes				
180A100	14 bits	±4 Minutes				

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2. S = Synchro, R = Resolver

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digital to synchro/resolver converters CSI

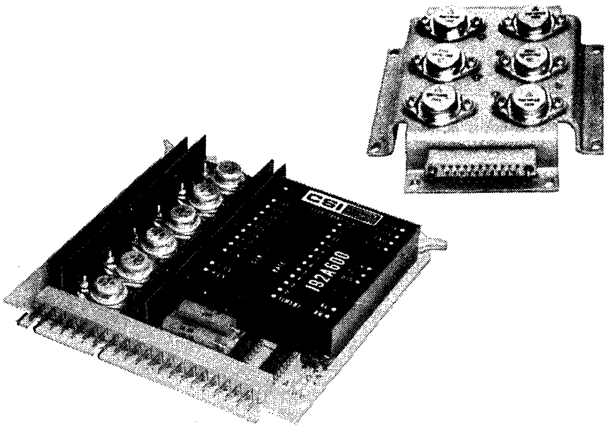
DIGITAL TO SYNCHRO/RESOLVER CONVERTERS

GENERAL DATA

The series 192 is a family of TTL/LSTTL/CMOS compatible digital to synchro/resolver converters with 1.5 VA to 125 VA output power ratings. Natural parallel binary angle data is continuously converted to analog AC form. . . either as 3-wire synchro or 4-wire resolver signals capable of driving most control transformers or torque receivers. All models are short circuit and overload protected.

Higher power units feature a variety of extra protection such as overtemperature cutoff, automatic overcurrent shutdown and recovery and/or "locked rotor" prevention.

Card mounted units are also available as kits for custom mechanical configurations.



Series	Resolution	Output Drive	Output[2] Level	Accuracy	Package[1]	Remarks
192B200	14 Bits	5 ma	R, ±10 V DC-2600 Hz	±3 Minutes	A	High accuracy vector generator with 0.1% scale factor variation.
192B500	14 Bits	1.5 VA	S,R 11.8 or 90 Vrms 60 or 400 Hz	±4 Minutes	B	Logic voltage +5 to +10 V DC.
192B700	14 Bits	1.5 VA	S,R 11.8 or 90 Vrms 60 or 400 Hz	±4 Minutes	B	Internal +5V logic voltage.
192B800	12 Bits	1.5 VA		±8 Minutes		
192E500	12 Bits	5 VA	S,R 11.8 or 90 Vrms 60 or 400 Hz	±6 Minutes (CT) ±12 Minutes (TR)	B	Built in heat sink with integral overtemperature cutoff, automatic "locked rotor" prevention. Loss of one ±15 V DC supply will not damage unit.
192E600	14 Bits	5 VA		±4 Minutes (CT) ±12 Minutes (TR)		
new SCB-22	4¼ × 6¼ inch card includes 192B700, 192B800, 192E500 or 192E600, 400 Hz models and features input data latches					
new SCB-25	4¼ × 6¼ inch card includes 192B700, 192B800, 192E500 or 192E600, 60 Hz models with transformers and input data latches.					
192A600	12 Bits	25 VA	S, 11.8 or 90 Vrms 60 or 400 Hz	±10 Minutes (CT) ±21 Minutes (TR)	5¼ × 5⅜ inch card	Board mounted unit features input data latches, output disable, overtemperature cutoff, external transformers. Kits available.
192A650	12 Bits	125 VA	S, 11.8 or 90 Vrms 60 or 400 Hz	±6 Minutes No Load ±21 Minutes Full Load	5¼ × 5⅜ inch card	Board mounted unit as above 192A600 plus automatic "locked rotor" prevention, automatic overload shutdown and recovery. External transformers and power buffer. Kits available.
new SCC-10	5¼ × 5⅜ inch transformer card for 192A600 series, one or two pair per card assy.					

1. A = 3.125″ × 2.625″ × 0.42″ maximum module B = 3.125″ × 2.625″ × 0.82″ maximum module
2. S = Synchro, R = Resolver

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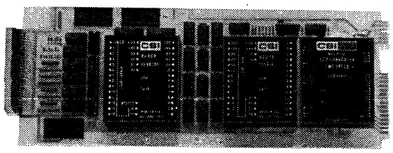
CSI synchro/resolver/encoder systems/related products

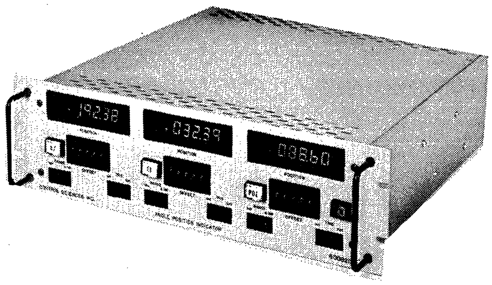
ANGLE POSITION INDICATORS

GENERAL DATA

The 800B200 is a series of 1, 2, or 3 channel, single or two-speed synchro or resolver angle position indicators which also can accept absolute encoder inputs. Each channel is displayed on its own 5 or 6 decade, 7-segment LED display with 0.56 inch high characters. Displays are switch selectable for 0-360 or ±180 degree ranges. Up to 360 degrees of offset is provided by thumbwheel switches. Includes user selectable lighted channel identification. Binary outputs are virtually real time for control applications.

Each channel is self-contained on a single board assembly including the display. Single or dual-speed converter boards and/or encoder are interchangeable and may be mixed in a single unit. Modular tracking converters are featured which eliminate the need for any calibration to maintain full accuracy.





AVAILABLE API BOARD ASSEMBLIES

Series	Input	Display	Accuracy	Remarks
Single speed synchro	3-130 Vrms L-L, 50 To 440 Hz	0-359.99 or ±180.00	±0.03°	Accepts input signals and 5 or 6 digit offset from thumbwheel switches. Provides 5 or 6 digit display plus binary digital outputs (virtual realtime).
Dual speed synchro 1:36 1:16, 1:32	3-130 Vrms L-L, 50 To 3000 Hz	0-359.99 or ±180.00	±0.01°	
new Absolute encoder to 19 Bits	+5V Pos. True Logic	0-359.999 or ±180.00	±0.001°	

BINARY/BCD, BCD/BINARY CONVERTERS

Series	Input	Output	Accuracy	Package[1]	Conversion Time	Remarks
169A107	16 Bits	359.99°	±.01°	B	2.5 μs	5 Decade Binary/BCD
new 169A108	19 Bits	359.999°	±.0009°	B	75 ms	6 Decade Binary/BCD
196A100	359.99°	16 Bits	±.003°	B	300 ns	5 Decade BCD/Binary
new 196A102	359.999°	19 Bits	±.0006°	B	600 ms	6 Decade BCD/Binary

1. B = 3.125″ × 2.625″ × 0.82″ maximum module

AVAILABLE OPTIONS

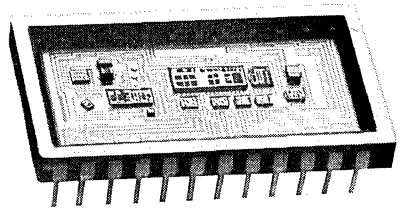
Product temperature range, Processing options	
Standard temperature range:	0 to +70° C
Intermediate temperature range:	−25 to +85° C
Extended temperature range:	−55 to +105° C (S/D) −55 to +85° C (D/S)
Burn-in (per MIL-STD-883):	168 hours at +85° C with all DC power applied.

Call or write for detailed data sheets or immediate applications engineering assistance, or contact your local representative listed for most areas.

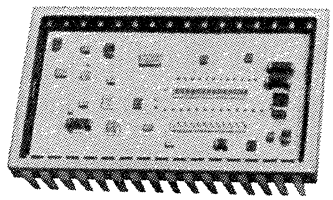
CSI CONTROL SCIENCES INCORPORATED

9509 VASSAR AVENUE • CHATSWORTH, CA 91311-4199
(818) 709-5510 TELEX 4970496-CSI

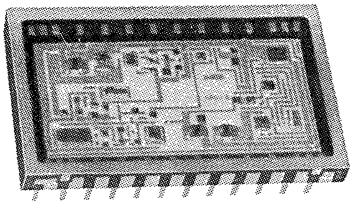
HYBRID DATA ACQUISITION COMPONENTS



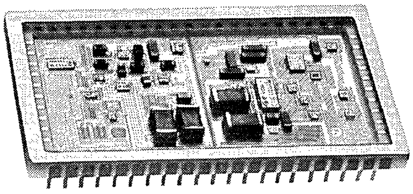
16 BIT D/A WITH 0.003% LINEARITY
15 μsec max. Output Voltage Settling
15 ppm/°C Max. Gain Tempco
Internal Output Amplifier
Binary or BCD Models
DAC-HP16BGC



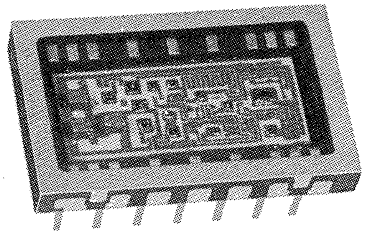
HIGH SPEED 12-BIT A/D CONVERTER
2 μS Conversion Time
Internal Input Buffer
Industry Standard Pin-Out
ADC-810MC



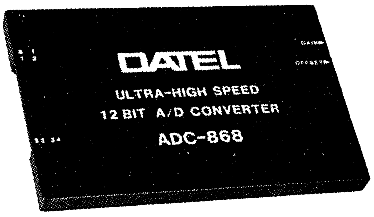
HIGH SPEED 0.01% SAMPLE-HOLD
200 nsec. max.
Acquisition Time
16 MHz Bandwidth
24 Pin — DIP Package
SHM-4860MC



12 BIT DATA ACQUISITION SYSTEM
16 Single Ended or
8 Differential Channels
50 kHz Throughput Rate
3-State Byte-Organized Outputs
HDAS-16MC



ULTRA HIGH SPEED WIDEBAND OPERATIONAL AMPLIFIER
70 nS Settling to 0.01%
1GHz Gain Bandwidth Product
80 dB Minimum CMRR
AM-1435MC

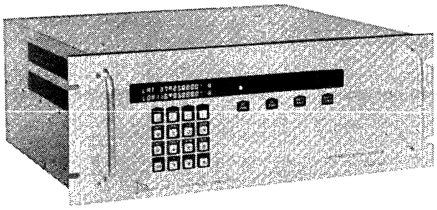


ULTRA HIGH SPEED 12-BIT A/D CONVERTER
- 500 nSEC Conversion Time
- 3-State Output
- No Missing Codes Over Full Operating Temp. Range

ADC-868

DATEL
11 CABOT BOULEVARD, MANSFIELD, MA 02048/TEL. (617)339-9341/TWX 710-346-1953/TLX 951340
- Santa Ana, CA (714) 835-2751 • Sunnyvale, CA (408) 733-2424
- OVERSEAS: DATEL (UNITED KINGDOM) TEL. BASINGSTOKE (256)469085 • DATEL (FRANCE) TEL. 602 57 11
- DATEL(GERMANY)TEL.(89)530741 • DATEL(JAPAN)TOKYO TEL. 793-1031 • DATEL(JAPAN)OSAKA TEL. 06-3542025

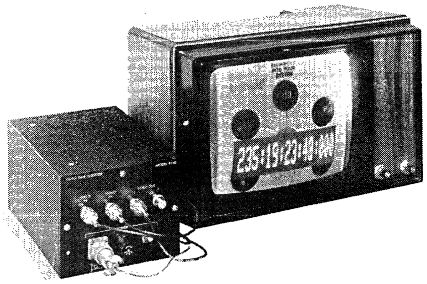
DATUM'S PRECISION TIMING AND VIDEO DATA INSTRUMENTATION



GPS TIME/FREQUENCY MONITOR

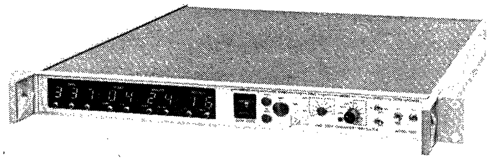
The Model 9390 monitors code transmissions from NAVSTAR satellites in the Global Positioning System (GPS) to provide precision time and frequency reference data.

- Time accurate to within ± 100 nsec of UTC — frequency accurate to 5×10^{-12}
- Automatic fixed-platform positioning
- RS232C I/O port — IEEE 488 optional
- AC and external DC operation
- Completely self contained in a single chassis



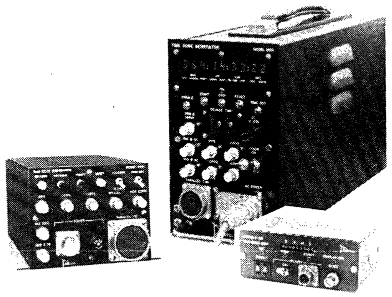
TIME AND DATA INSERTION IN THE VIDEO RASTER

- Inserts a time word with optional second line alphanumeric message in standard video signals for recording and display.
- Up to 16 characters per row with serial or parallel data input.
- Multiple independent video signal inputs and outputs.



COMBINATION TIME CODE TRANSLATOR/GENERATORS

These instruments can process all standard time codes. Many variations are available.



AIRBORNE/PORTABLE TIME CODE GENERATORS

Configurations range from miniature to standard ATR packaging. Designed for operation in hostile environments.

AUTOMATIC MAGNETIC TAPE SEARCH SYSTEMS

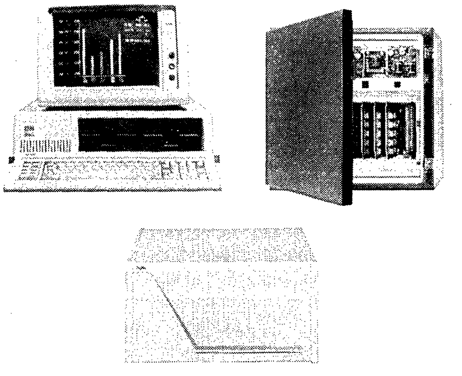
- Connect to and control most instrumentation magnetic tape recorders/reproducers.
- Occupy as little as 3½ inch panel height in a standard 19 inch wide equipment cabinet.
- High speed, automatic searching and playback of pre-recorded magnetic tapes at selected start and stop times.
- Standard computer compatible digital interfaces available for complete remote control of search operations.

TD 119

datum inc TIMING DIVISION

1363 S. STATE COLLEGE BLVD., ANAHEIM, CA 92806
(714) 533-6333 TWX (910) 592-1289

Digitec Data Loggers

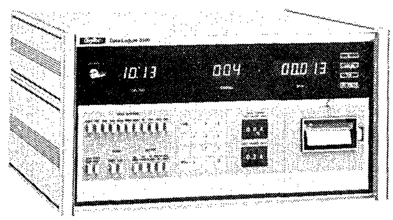


Model 7500 MagnumPC™ DAC

Model 7500 MagnumPC System – Bulletin 7500-1

The IBM Personal Computer becomes a powerful data acquisition and control system with Digitec's new MagnumPC system. The MagnumPC's own microprocessor makes it easy to scan, process, and send reduced data up to 1000 feet to memory for further manipulation or storage.

- MagnumPC enhancement board plugs directly into IBM PC mainframe.
- Easy fill-in-the-blanks setup of inputs, control and data outputs.
- 500V isolation between computer and inputs and outputs.
- I/O processing is transparent to user.
- System capability from 10 to 1000 analog and digital I/Os.
- Inputs: TC, RTD, AC/DC volts & current, strain gage, resistance, and more.
- 0-10V and 4-20mA analog outputs.
- Digital outputs: open collectors, relays, zero crossing opto-relays.
- NEMA 12 I/O enclosures for industrial applications.

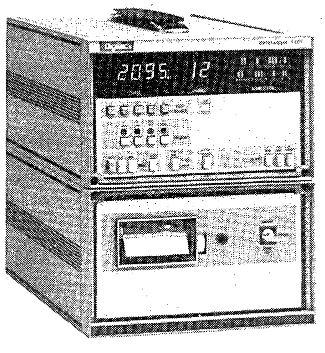


Model 2500 Commander

Model 2500 Commander – Bulletin 5025

Monitor, display, and record analog or digital signals from transducers, transmitters, temperature sensors or switch contacts. The 2500 offers relay control and low-cost flexibility.

- Easy setup – no complex programming.
- Built-in printer. Optional independent RS-232-C/20mA port.
- Four prioritized limits per channel with messages and optional relays.
- From 10 to 1000 channel capacity. 37 different input types.



Model 1101 Data Logger

Series 1100 Data Loggers – Bulletin 5000-1

Portable data loggers packed with value. Four models handle a wide range of applications. All scan at 40 channels/second, and can be configured for 20 or 40 channels. Series 1100 data loggers accept all common input types including TC, RTD, and process transmitters and transducers.

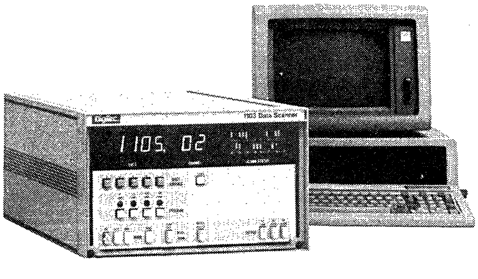
For versatile alarming, each input channel can be assigned a high and low setpoint. Front panel LEDs indicate channels in alarm. Standard alarm relay output included; per channel relay outputs optional. Front panel pushbuttons simplify setup, and provide versatile data output selection.

Model 1101 Data Logger

- Built-in printer.
- Selectable formats and parameters.
- Optional 9-35V DC input power.

Model 1102 Alarm Sentinel

- Alarm scanning and monitoring.
- Choice of I/O ports: IEEE-488 or RS-232-C.
- Optional columnized data output.



Model 1103 Data Scanner

Model 1103 Data Scanner

- Smart A/D computer front end.
- Completely remote-programmable.
- Standard RS-232-C/20mA port.

Digitec Corporation, 918 Woodley Road, P.O. Box 458,
Dayton, Ohio 45401, Tel. (513) 254-6251.

DigiTec®

DDC A/D, D/A, SYNCHRO

1553 DATA BUS PRODUCTS

MODEL	TYPE	PACKAGE	DESCRIPTION/FEATURES
BUS-63102	Transceiver	1.26 x 1.26 x .17" Hybrid	Universal transceiver conforms to MIL-STD-1553 A/B and McDonnell Douglas A3818, A-5232, A-4905 and A-5690.
BUS-63105 SERIES	Transceiver	24 Pin DDIP Hybrid	LSI transceiver. Conforms to MIL-STD-1553 A/B. High S/N ratio, internal filtering. Drives Harris 15530 or MCE (Smiths) set directly.
BUS-63125	Dual Transceiver	36 Pin DDIP Hybrid	Dual redundant LSI transceivers. Conforms to MIL-STD-1553 A/B. High S/N ratio, internal filtering.
BUS-8559	Transceiver	24 Pin DDIP Hybrid	Conforms to MIL-STD-1553. Has variable output level for use in test applications. Receiver has internal filtering for high S/N ratio.
BUS-64100	Bit Processor	1.15 x 2.15 x .2" Hybrid	LSI based Manchester II encoder/decoder. Wrap-around self-test, 16 bit parallel tri-state output, mode codes, address recog, time out.
MT32008	Encoder/Decoder	48 Pin DIP 48 Pin FP, 48 Pin LCC	MIL-STD-1553 Encoder/Decoder interfaces between a transmitter/receiver and a 16 bit parallel highway. Operates as either a remote terminal or bus controller. Flags valid command sync, valid address, valid word and broadcast commands.
MT32007 32008	RTU LSI Chip Set	DIP, FP and LCC	A complete (less transceivers) dual redundant RTU implemented in 3 packages. Conforms to MIL-STD-1553 B and features all mode codes, wrap around self test and a 32 word by 16 bit FIFO. Printed circuit evaluation board is available as BUS-65400.
BUS-65101	Dumb RTU	1.8 x 1.6 x .2" Hybrid	MIL-STD-1553 dumb RTU with transceiver, encoder/decoder, control logic dual rank I/O registers and internal clock oscillator. Provides all interface functions between the Data Bus and a subsystem parallel data highway. May operate as an RTU, BC or Bus Monitor.
BUS-65112	Dual Redundant RTU	2.1 x 1.9 x .25" Hybrid	MIL-STD-1553 dual redundant RTU hybrid including dual transceivers, dual encoder/decoder and RTU protocol. Supports 13 mode codes and transfers data with DMA type handshake.
BUS-65201	MACAIR and 1553 Dumb RTU	1.8 x 1.6 x .2" Hybrid	MIL-STD-1553 and MACAIR compatible dumb RTU with functions to interface between the MUX data bus and a subsystem 3-state parallel data highway. Sufficient handshaking, control and data lines for operation as RTU, BC or Bus Monitor.
BUS-65122	Dual Redundant RTU	2.1 x 1.9 x .25" Hybrid	Complete dual redundant, monolithic RTU (Remote Terminal Unit) including transceivers. Conforms to MIL-STD-1553 B and features all mode codes, wrap around test, terminal fail safe time out and 32 word FIFO.
BUS-65500	Bus Controller & RTU	9.2 x 6.3 x .4" VME Eurocard	Dual redundant Bus Controller and Remote Terminal Unit with VME interface. Supports all MIL-STD-1553 message formats, 11 Mode Codes, and provides built-in-test capability. Its 4K x 16 bit dual port RAM and four types of interrupts minimize CPU overhead.
BUS-65505	Bus Controller, RTU, and Bus Monitor	15.6 x 8.4" Unibus® Hex Card	Dual redundant Bus Controller, Remote Terminal Unit, and Bus Monitor with Unibus interface. Supports all MIL-STD-1553 message formats, 12 Mode Codes, and provides built-in-test capability. 4K x 16 bit dual access RAM and command registers.
BUS-65508	Bus Controller, RTU, and Bus Monitor	6.75 x 12" Multibus® Card	Dual redundant Bus Controller, Remote Terminal Unit, and Bus Monitor with Multibus® interface. Supports all MIL-STD-1553 message formats, 12 Mode codes and provides built-in-test. 4K x 16 bit dual access RAM and command registers.
BUS-65600	Bus Controller/ RTU Hybrid	2.1 x 1.9 x 0.25" Hybrid	Dual redundant MIL-STD-1553 Bus Controller and RTU hybrid with error detection and complete mode code capability. Includes encoder/decoder, dual bit processor, RTU protocol, BC protocol and DMA subsystem interface.
BUS-68003	Data Bus Exerciser	17 x 9 x 3.5" Instrument	Low cost unit for testing and troubleshooting MIL-STD-1553 Systems. Capable of generating and detecting errors. Programmable parameters are single or repeat messages, variable message gap and transmitter amplitude.
BUS-68010	Data Bus Tester	8.5 x 3.5 x 9.3" Instrument	Low cost instrument for functional testing of MIL-STD-1553 Data Bus systems.
BUS-25679,-27765, -29854	Transformer	.63 x .63 x .3" Module	Interface transformer designed to couple MIL-STD-1553 A/B compatible transceivers to the bus.

ANALOG TO DIGITAL (A/D) CONVERTERS

MODEL	RESOL.	CONVERSION TIME	LINEARITY ERROR	PACKAGE	OPERATING TEMP. RANGE	POWER DISSIPATION	DESCRIPTION/FEATURES
ADC-4450	12 Bit	1.5 sec	±½ LSB	2x4x0.4" Module	0°C to +70°C	1.7 W	−72 dB THD and IMD. With or without internal clock. Lowest cost.
ADC-00401	12 Bit	2µsec	±½ LSB	32 Pin TDIP Hybrid	−25°C to +85°C	2.4 W	Low cost, high speed, ADC85 pin out.
ADC-00403	12 Bit	2µsec	±½ LSB	32 Pin TDIP Hybrid	−55°C to +125°C	2.4 W	Military, low cost, high speed, ADC87 pin out.
DDC ADC87	12 Bit	10µsec	±½ LSB	32 Pin TDIP Hybrid	−55°C to +125°C	1.2 W	Pin for pin replaces ADC87 and ADC85.
DDC-5210 SERIES	12 Bit	13µsec	±½ LSB	24 Pin DDIP Hybrid	−55°C to +125°C	670 mW	Pin for pin replaces MN5210 series.

DIGITAL TO ANALOG (D/A) CONVERTERS

MODEL	RESOL.	F.S. SETTLING TIME		LINEARITY ERROR	PACKAGE	OPERATING TEMP. RANGE	POWER DISSIPATION	DESCRIPTION/FEATURES
		VOLTAGE	CURRENT					
DDC DAC 87	12 Bit	3µsec	100 nsec	±½ LSB	24 Pin DDIP Hybrid	−55°C to +125°C	650 mW	Pin for pin replaces DAC87 & DAC85.
DDC-1250	12 Bit	—	35 nsec	±½ LSB	24 Pin DDIP Hybrid	−55°C to +125°C	750 mW	Low glitch energy. Pin for pin replaces HDS-1250.
DAC-8528	12 Bit	1µsec	60 nsec	±½ LSB	24 Pin DDIP Hybrid	−55°C to +125°C	525 mW	Low glitch energy.
ADH-030 II	12 Bit	—	35 nsec	±½ LSB	24 Pin DDIP Hybrid	−55°C to +125°C	1.2 W	Low glitch energy. ECL
SDAC/2615	13 Bit	500 nsec	50 nsec	±0.012% FSR	24 Pin DDIP Hybrid	−55°C to +105°C	925 mW	SDAC has V_{OUT}, 2615 has I_{OUT}.
DAC-02310	14 Bit	1.5µsec	—	±0.01% FSR	32 Pin TDIP	−55°C to +125°C	1.7 W	14 bit deglitched D/A converter with 10MHz update rate, and 50mV•nsec differential glitch energy.
DAC-02701	12 Bit	25µsec	—	±0.05% FSR	24 Pin DDIP Hybrid	−55°C to +125°C	300 mW	Double latched. 4 quadrant multiplying.
DAC-02900	16 Bit	15µsec	—	±0.0008% FSR	24 Pin DDIP	−55°C to +125°C	1.1 W	16 bit D/A converter with internal ref. and 10V full scale voltage output. Replaces DAC-HP 16 & DAC72 types.

SAMPLE/HOLD and TRACK/HOLD AMPLIFIERS

MODEL	ACQUISITION TIME (F.S. CHANGE)	LINEARITY ERROR	PACKAGE	APERTURE JITTER	DROOP RATE	OPERATING TEMP. RANGE	DESCRIPTION/FEATURES
TH-8530	15 nsec	±0.1% F.S.R.	24 Pin DDIP Hybrid	20 psec	1.0mV/µs	−55°C to +85°C	buffer ampl. 50 MHz sample rate. −60 dB feedthru.
SH-8518	25 nsec	±0.1% F.S.R.	24 Pin DDIP Hybrid	20 psec	0.2mV/µs	−55°C to +85°C	buffer amplifier. −66 dB feedthrough.
ADH-050	100 nsec	±0.012% F.S.R.	24 Pin DDIP Hybrid	500 psec	1.0mV/µs*	−55°C to +105°C	buffer amplifier. −80 dB feedthrough.
THA-05203	150 nsec	±0.01% F.S.R.	24 Pin DDIP Hybrid	100 psec	1.0mV/µs	−55°C to +125°C	−74 dB feedthrough.

AND 1553 BUS PRODUCTS

SYNCHRO TO DIGITAL (S/D) CONVERTERS

MODEL	RESOLUTION	ACCURACY	PACKAGE	TRACKING RATE	DESCRIPTION/FEATURES
RDC-1919X SERIES**	10-16 Bit	±21′ to ±1.3′	2x2x0.2″ Hybrid	6.3 to 400 rps	Provides resolver (sine and cosine) to digital conversion. Features velocity output with 1% linearity, which eliminates the need for electromechanical tachometers in most applications.
SDC-14520	16 Bit	to ±1.3′	36 Pin DDIP	2.5 rps	Small, low power S/D. 3 state output, tracks during inhibit. All common inputs.
SDC-191XX	10,12,14, & 16 Bit	From ±1.3′ to ±21′	2x2x0.2″ Hybrid	from 6.3 to 250 rps	Low cost LSI based industrial fast tracking synchro and resolver to digital converter for industrial applications. Low power, small size. µP interface.
HSDC-8915	14 Bit	to ±2.6′	36 Pin DDIP	10 rps	Low power S/D. 3 state, tracks during output inhibit. LSI based hi rel. All common inputs. Can operate as CT
SDC-14510	14 Bit	to ±4′ + 1 LSB	36 Pin DDIP	7 rps	Transformer isolated, low power S/D. 10 TTL load 3 state output. Tracks during output inhibit.
SDC-634	14 Bit	to ±2.6′	2.6x3.1x.4″ Module	10 rps	Low profile (.4) industry standard. All common inputs. Transformer isolated.
SDC-632	12 Bit	±8.5′	2.6x3.1x.4″ Module	40 rps	Low profile (.4) industry standard. All common inputs. Transformer isolation.
SDC-630	10 Bit	±21′	2.6x3.1x2.6″ Module	50 rps	Low profile, transformer isolated, industry standard pin out. 47 Hz to 1000 Hz.
SDC-14700	.01°	to ±.03°	2.6x3.1x.8″ Module	180°/sec	5 decade BCD output for use in high accuracy display systems or instruments. Transformer isolated.
HMSDC-8700	14 Bit	±4.6′ +½ LSB	36 Pin DDIP (x2)		Two hybrids are used for a multiplexed system. Simultaneous sampling and random accessing.
HSDC-360	16-20 Bit	Varies with speed ratio	36 Pin DDIP (x3) plus parts	±2.5 rps	A two speed S/D or R/D tracking converter composed of two hybrid control transformers, a hybrid data processor, plus discrete components.
SDC-361	16 Bit	±1 LSB	2.6x3.1x.8″ Module	1000°/sec	1x, 36x 2 speed S/D. Broadband 47 Hz to 3000 Hz. 1x, 18x Available.

DIGITAL TO SYNCHRO (D/S) CONVERTERS

MODEL	RESOLUTION	ACCURACY	PACKAGE	OUTPUT DRIVE	DESCRIPTION/FEATURES
DRC-10520	16 Bit	±4′	32 Pin TDIP Hybrid	1.5 VA	High power hybrid D/R with µP compatible latched input. AC or DC power amps. Protected output. BIT output.
DSC-11520	16 Bit	±4′	36 Pin DDIP Hybrid	5 mA	Pin programmable synchro or resolver. Direct coupled for DC SIN/COS or rotating PPI applications, low ±.2% scale factor variation.
DSC-644	14 Bit	±4′	2.6x3.1x.5″ Module	1.5 VA	Low profile industry standard pin-out. Metal heat sink, current limited and transient protected. Internal 400 Hz transformers. Low scale factor variation.
DSC-544	14 Bit	±4′	2.6x3.1x.8″ Module	4.5 VA	Powered from ref, metal heat sink, all internal transformers. Short circuit proof & transient protected. Thermal cutoff.
MDRC	14 Bit	±4′	2.6x3.1x.4″ Module	5 mA	Low cost low power D/S for use with SBA series booster amplifier. Low 0.05% scale factor variation.
TD-100	12 Bit	±10′	5.4x5.3x.7″ PC Card	25 VA	Hi power torque receiver synchro driver. Options to 115 VA with external booster amp. Short circuit protected, thermal cutout, sequenced turn on, input registers.

SYNCHRO INSTRUMENTS

MODEL	FUNCTION	RESOLUTION	ACCURACY	PACKAGE	DESCRIPTION/FEATURES
SR-103/203	Synchro indicator	to .001°	to ±.005°	1.7″ High (103) 3.5″ High (203) ½ Rack	Wideband 47-1000 Hz, automatic gain ranging, bit fault monitor, synthesized reference, programmable 0-360° or ±180°, IEEE-488 option
API-30602	Synchro indicator	.01°	to ±.03°	3.8x2x7.5″ Panel Meter	Low cost, pin programmable for all common inputs, bright .43″ display, tristate output, offset adjust for system zeroing. 47-1200 Hz.
MSR-236	2 Spd Synchro indicator	.01°	±.01°	12x9.6x4.8″ Combination Case	1x, 36x 2 speed synchro indicator. Single and dual speed modes, transformer isolation. MIL-T-21200 case.
SIM-31200	Angle Simulator	.001°	±.003°	14.5x8.12x3.47″ Instrument	Synchro or resolver angle simulator with high accuracy, wide band operation (47 Hz to 11 kHz). Front panel keyboard or remote I/O.

SPECIAL FUNCTIONS

FUNCTION	RESOLUTION	MODEL	ACCURACY	PACKAGE	DESCRIPTION/FEATURES
Synchro Booster Amplifier	—	**SBA-SERIES Amplifier**	±3′	7.4x5.1x1.8″ Chassis	25 VA drive (6 Ω active load). Kick circuit prevents 180° hang-up. Powered from reference. Short circuit, transient and overload protected.
Inductosyn† To Digital Converter	12 Bit	**IDC-35300**	±8.5′	2.6x3.1x.4″ Module	12 Bit and 400 count versions. Fast tracking 150 rps and wide bandwidth to 22 kHz.
LSI-11 Compatible I/O Card	12 Bit	**DDC-5525**	±2 LSB	10.5x8.4″ Card	Q-Bus® compatible multichannel synchro/resolver and Inductosyn axis control board.
Multibus I/O Card	12 Bit	**DDC-35500**	±2 LSB	12x6.8″ Card	I/O Multibus** compatible interface card with resolver or Inductosyn† to digital capability. Provides turns counting.
Inductosyn† to Digital Converter	12 Bit and 14 Bit	**IDC-14542**	±8.5′	36 Pin DDIP Hybrid	Military grade Inductosyn to digital converter with tracking to 100 rps. 3-state latched data outputs. Operates at up to 20 kHz and available in 14 bit resolution, screened to MIL-STD-883B.

Unibus and Q-Bus are trademarks of Digital Equipment Corporation. **Multibus is a registered trademark of Intel Corporation. †Inductosyn is a trademark of Farrand Controls Corporation.

NOTE: Most hybrid products are available screened to MIL-STD-883C.

*0.2 V/µs optional.

**Resolver input only.

Representatives worldwide. See Volume 1A, Yellow Pages, or call:

DDC

ILC DATA DEVICE CORPORATION

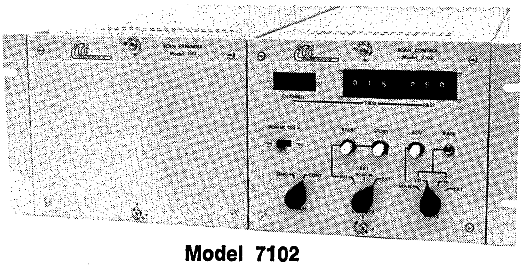
105 Wilbur Place, Bohemia, New York 11716 • 516·567·5600, TWX 510·228·7324

Information Transfer Industrial, Inc.

"The Switching Company"

7100 SERIES SCANNER/MULTIPLEXERS

Proven reliable in field use since 1971.



Model 7102

MODEL 7102 STAND ALONE SCANNER

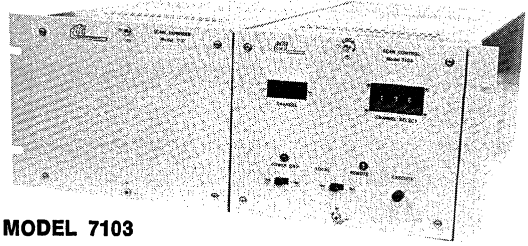
- Interfaces for IEEE-488 (GPIB) bus, RS-232-C port and Parallel BCD address
- IEEE-488 and RS-232-C interfaces control multiple scanner
- Expandable to 1000 channels
- Seven-inch rack-mounting enclosure

GENERAL INFORMATION

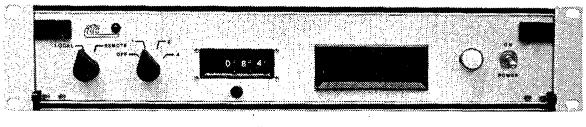
- Available for 1, 2, 3, and 4 wire switching
- Number of Poles can be Program Selectable (option)
- Expandable in 10-channel increments with plug-in cards
- Variety of switch contacts available: low-level signal to high-current requirements
- Switch contacts intermixed in same scanner
- Interfaces for IEEE-488 (GPIB) bus, RS-232-C port and Parallel BCD address
- IEEE-488 and RS-232-C interfaces control multiple scanners
- First & last channel and scan rate programmed within interface
- Custom I/O panels available (option)
- Guarded models available (option)
- Closures complete signals available

MODEL 7103 COMPUTER CONTROLLED SCANNER

- Interfaces available — See General Information
- Manual backup with front panel controls
- Expandable to 10,000 channels
- Seven-inch rack-mounting enclosure
- Pole selection available (option)



MODEL 7103



Model 7108

MODEL 7108 MINI SCANNER

- Interfaces available — See General Information
- Manual backup with front panel controls
- 120 one-wire, 60 two-wire or 40 four-wire switching capacity
- Pole selection available (option)
- 3.5 inch rack-mounting enclosure

REQUEST BULLETIN 7100

REPLACEMENTS FOR CUNNINGHAM AND HP 2911 CROSSBAR SCANNERS

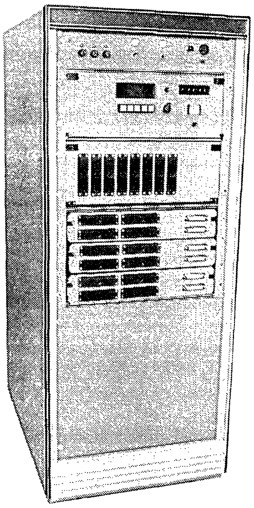
Information Transfer Industrial, Inc.
"The Switching Company"
P.O. Box 357 • Holcomb, NY 14469 • (716) 657-7074

Information Transfer Industrial, Inc.

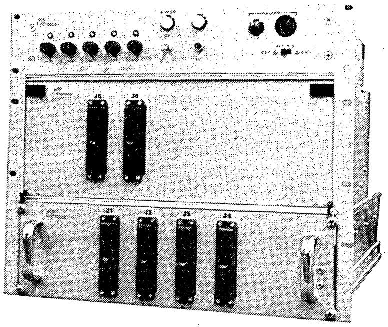
"The Switching Company"

8000 SERIES ATE SWITCHING SYSTEMS

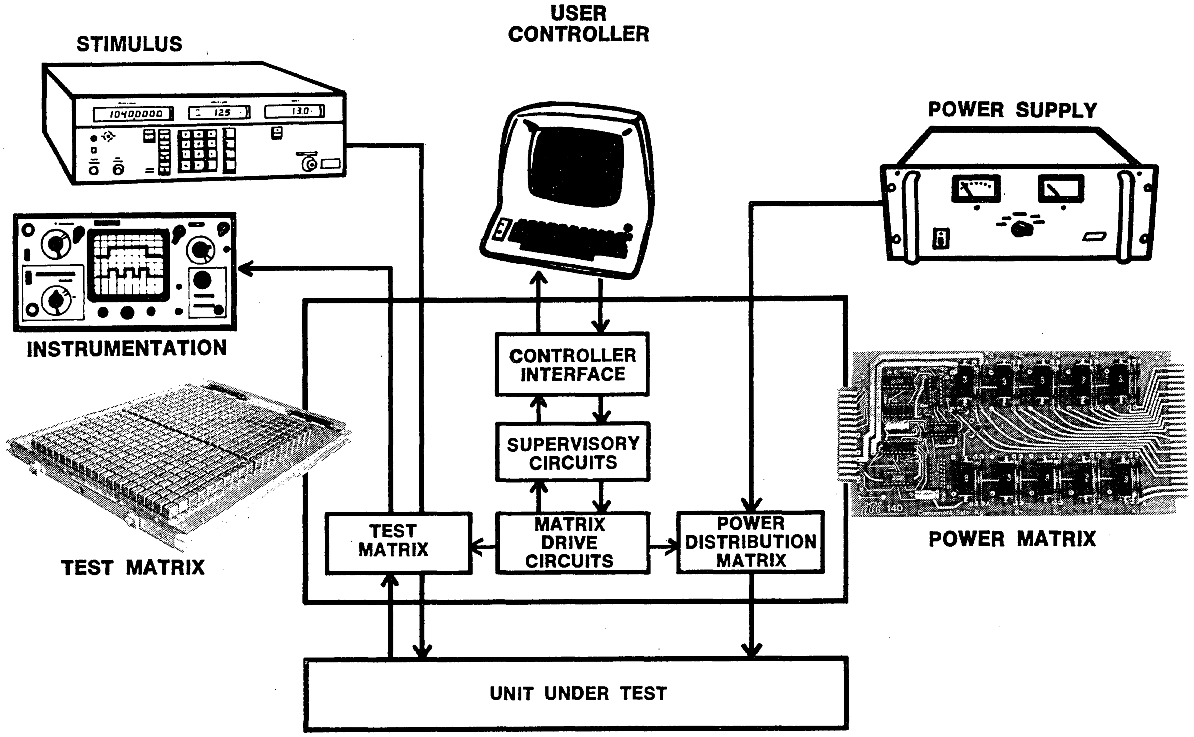
Custom ATE Switching Systems from Standard "OFF-THE-SHELF" ITI products.



- Switch contacts from microvolts to kilovolts — milliamps to 20 Amps
- Latching and non-latching crosspoints
- IEEE-488 (GPIB) — RS-232-C — Parallel BCD Interfaces
- Manual controls
- Fast connect and disconnect through use of ZIF connectors
- Multipole switching
- Forms A, B and C switches
- Front and/or rear panel access for fixtures and instruments



REQUEST BULLETIN 8000


STIMULUS
USER CONTROLLER
POWER SUPPLY
INSTRUMENTATION
CONTROLLER INTERFACE
SUPERVISORY CIRCUITS
TEST MATRIX
TEST MATRIX
MATRIX DRIVE CIRCUITS
POWER DISTRIBUTION MATRIX
POWER MATRIX
UNIT UNDER TEST

Information Transfer Industrial, Inc.

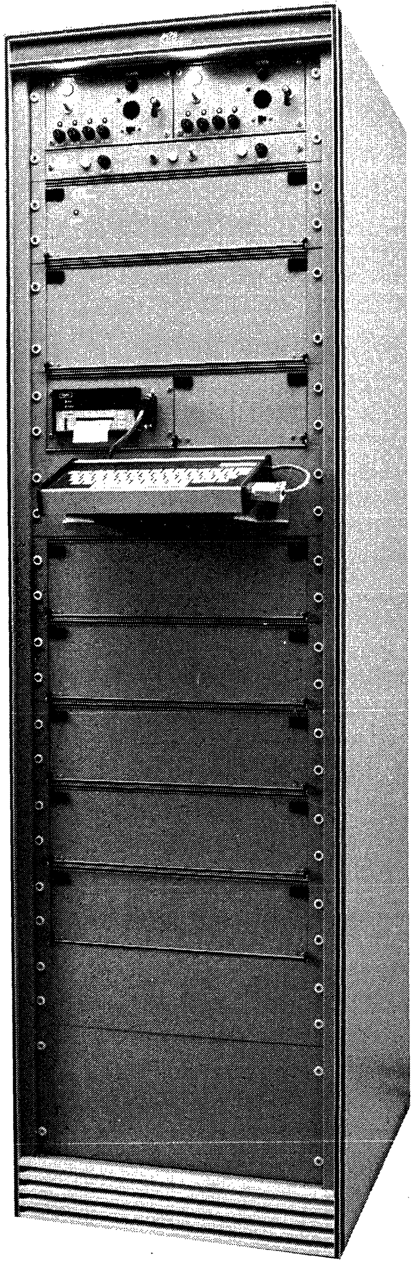
"The Switching Company"

P.O. Box 357 • Holcomb, NY 14469 • (716) 657-7074

Information Transfer Industrial, Inc.

"The Switching Company"

8500 SERIES AUTOPATCH MATRIX SWITCHING SYSTEMS



Unique is the word that describes the AUTOPATCH MULTI-STAGE MATRIX SWITCHING SYSTEMS.

THEY:

- Provide multiple paths for any input to get to any output
- Automatically reroute signals in the event of a switch path failure
- Provide positive switch path verification
- Reduce the number of crosspoints by as much as 60%
- Perform complete and abbreviated switch path tests
- Report faults to Host controller and Maintenance terminal
- Provide operating instructions from menu-driven "HELP" command
- Locate and identify faulty crosspoints via "WHERE" command
- Store current status reports
- Report and record major and minor fault conditions
- Use popular STD Bus front end

THEY ARE AVAILABLE IN:

- Sizes up to 1000 inputs to 1000 outputs
- Models from DC to 12 MHz
- IEEE-488 (GPIB), RS-232-C and Parallel BCD Interfaces
- Models with built-in Maintenance terminals
- Models with redundant power supplies
- Models with redundant controllers
- Magnetically latched crosspoints
- Models that switch from 1 to 16 poles per crosspoint
- Models with custom designed I/O panels

REQUEST BULLETIN 8500

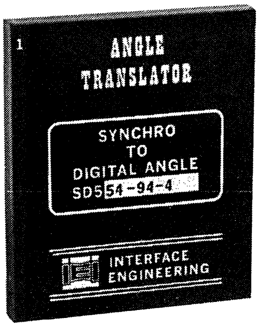
Information Transfer Industrial, Inc.
"The Switching Company"
P.O. Box 357 • Holcomb, NY 14469 • (716) 657-7074

MINIGLOSSARIES
FORMULAS & CHARTS
PRODUCT SELECTION GUIDES
FORMS
CODES
TECHNICAL INFORMATION
WHERE TO FIND THEM IN THE 85/86 EDITION OF EEM

Abbreviations/Acronyms	**A**•1166, **B**•1012, **C**•1028, **D**•1016
ASCII Code	**D**•1087
Batteries, Product Selection Guide	**D**•1413
Batteries & Fuel Cells, Characteristics	**D**•1430
Cabinets, Enclosures, Racks, & Chassis, Product Selection Guide	**C**•1003
Capacitors, Basic Formulas	**A**•1093
Capacitors, Miniglossary	**A**•1066
Capacitors, Product Selection Guide	**A**•1003
Circuit Boards (Printed) Product Selection Guide	**C**•1099
Coils, Chokes, Inductors, Product Selection Guide	**A**•1205
Conductors, Maximum Current Capacity of Copper & Aluminum	**C**•1863
Connectors, Miniglossary	**C**•1129
Connectors, Terminals, & Sockets, Product Selection Guide	**C**•1105
Crystals, Oscillators, Crystal & Piezoelectric Filters, Product Selection Gude	**A**•1309
Delay Lines, Product Selection Guide	**A**•1459
Discrete Semiconductors, Product Selection Guide	**A**•2067
Displays, Readouts, Lamps, & Lights, Product Selection Guide	**B**•1015
EBCDIC Code	**D**•1092
Encapsulation, Miniglossary	**C**•1086
Fans, Blowers, Cooling Equipment, & Heat Exchangers, Product Selection Guide	**C**•1623
Filters, Product Selection Guide	**A**•1583
Instruments, Graphic Recording Product Selection Guide	**D**•1401
Instruments, Panel Meters, Product Selection Guide	**D**•1329
Instruments, Test & Measuring Product Selection Guide	**D**•1175
Interconnection Systems, Product Selection Guide	**C**•1699
Keyboards & Keypads, Product Selection Guide	**B**•1705
Logofinder & Trademark Directories	**B**•901
Microwave Components, Product Selection Guide	**A**•1701
Military Qualified Products Lists	**B**•1003
Motors, Drives, & Rotating Components, Product Selection Guide	**B**•1129
Opto Semiconductors, Miniglossary	**B**•1214
Oscilloscopes, Product Selection Guide	**D**•1385
Panel Hardware, Product Selection Guide	**C**•1589
Potentiometers, Trimmers, Controls, & Rheostats, Product Selection Guide	**A**•1991
Power Supplies, Miniglossary	**D**•1462
Power Supplies, AC, Product Selection Guide	**D**•1877
Power Supplies, DC, Product Selection Guide	**D**•1447
Protective Components (Fuses, Circuit Breakers, etc.), Product Selection Guide	**B**•1225
Relay Contact Forms	**B**•1317
Relays, Electromechanical, Miniglossary	**B**•1308
Relays, Product Selection Guide	**B**•1261
Resistor Color Codes	**A**•1828
Resistors, Product Selection Guide	**A**•1785
Servo Components, Miniglossary	**D**•1985
Solenoids, Product Selection Guide	**B**•1463
Switches, Product Selection Guide	**B**•1477
Thermal Components, Product Selection Guide	**B**•1741
Thermal Conductivity of Dielectrics at Room Temperature	**B**•1744
Thyristors/High Power Diodes, Miniglossary	**A**•2076
Transducers & Encoders, Product Selection Guide	**B**•1777
Transformers, Product Selection Guide	**A**•2099
Wire & Cable, Product Selection Guide	**C**•1743
Wire Gauges—Diameter, Area, Copper Weight	**C**•1844

ANGLE TRANSLATORS (617) 344-7383

MODULES



UNITS CONVERSION

CODE CONVERSION

ANGLE COMBINERS COMPARATORS

TRIG FUNCTIONS

DIGITAL SERVOS

SYNCHRO TO DIGITAL

SYNCHRO TO DC

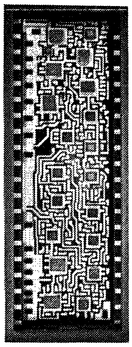
DIGITAL TO SYNCHRO

COORDINATE CONVERSION

SERIAL-OPTICAL DATA LINKS

FAST MATH OPERATORS

ANGLE DISPLAYS



HYBRIDS

ANGLE CODE CONVERTERS

Function	Model	Input	Output	FS/Rate	Accuracy	Size	Bulletin
Binary Angle to BCD Degrees	DD107-4 to -7	12,16,20,21 bits	4 to 7 digits	359.9° to 359.9995°	±0.6 LSD	C A	570115 370226
Binary Angle to BCD Radar Mils	DD124-4 to -7	12,16,20,21 bits	4 to 7 digits	6399 to 6399.997	±0.6 LSD	A	370630
BCD Degree to Arcmin. + Sec.	DD132	.999° BCD	4 digit BCD	59′57″	±1 arcsec	A	371204
Binary Angle to Bipolar Angle	DD117-16-21	17 or 21 bits	±17 or 21 bits	±180° — .3 µs	±0	C	370607
Binary Angle Combiner	DD118	16 bit θ & 16 bit ϕ	16 bit $\theta + \phi$ or $\theta - \phi$	.35 µs	±0	C	470221
Binary Angle Comparator	DD119	16 bit θ & 16 bit $\theta \pm \phi$	±16 bit ϕ shortest path	.4 µs	±0	A	370815
BCD Degrees to Binary Angle	DD127-4, 5	4, 5 digit BCD	13, 16 bits	359.9° to 359.99°	±.6 LSD	A	370915
BCD Degrees to Binary Angle	DD227-6	6 digit BCD	20 bit angle	359.999°	±.7 LSD	B X	180314
Dual Speed Combiner	DD115A	X1 — 7 its X36 — 14 bits	19 bit angle	0.25 µs	±.0013°	E	471120
Dual Speed Expanders	DD113B	17-21 bits	X36-12/16 bits	0.2 µs	±1 LSB—X36	D	471215
TRIG FUNCTIONS							
Binary Angle to Sin and Cos	DD108/109	12, 15, 18 bits	±16 bit sine and cosine	360°, .9 to 1.5 µs	±.005° to .001°	A BX	270928 570812
Binary Angle to Sin and Cos	DD175	12 bits	±12 bit sine and cosine	360°, .1 µs	.007°	A	870317
Binary Tan to Angle	DD130A, B	10 or 13 bits	16 bit angle	45°, 1.2 µs	±.0025°	A BX	371105 371105
Arcsin or Arccos	DD108/137	16 bits S or C	16 bit angle	90°, 20 µs	±.001°	A/BX	670915
Binary Angle to Tan.	DD130/137	16 bit angle	16 bit tan.	45°, 20 µs	±.0025°	A/BX	670915
DC Angle to S & C	SA840A,B,C	+10 v = 360°	10 sinθ, 10 cosθ	500/sec	±.3° to ±.1°	A	371214
DC S & C to Angle	SA880A,B,C	10 sinθ, 10 cosθ	+10 v = 360°	500/sec	±.3° to ±.1°	A	770320
SYNCHRO-DIGITAL							
Synchro to Digital	SD552/566	synchro	10 bit angle	4800 RPM	±22′	F1	770522
Synchro to Digital	SD553/567	synchro	12 bit angle	1800 RPM	±8″	F1	870317
Synchro to Digital	SD554/568	synchro	14 bit angle	480/720 RPM	±4′	F1	770415
Synchro to Digital	SD555	synchro	16 bit angle	75 RPM	±1′	F	980522
S-D Multichannel	SD532	to 64 channels	13 bit angle	100 µs min.	±5′	D-A	770318
S-D 4 Channel	SD528	4 ch. synchro	13 bit angle	0.2 µs access	±4′	D/BX	671120
S-D Dual Speed	SD556/560	X1, X36 synchro	16-19 bit angle	X1 — 20 RPM	±.01 to .002°	F1	770715
Synchro to BCD	SD570	synchro	3 or 4 digit	ext. scaling	to ±0.1° ±1 LSD	F	970815
Synchro to BCD	SD575/576	synchro	3 or 4 digit	359,359.9	1° and .1°	FX/F	870220
Synchro to BCD and Binary	SD580/581	synchro	3 or 4 digit & 10/14 bit binary	359,359.9 to 80/10	.1° and ±4′	FX/F	871018
DIGITAL-SYNCHRO							
Digital to Synchro	DS340/341	14 bit angle	1-2 vA	360°	±4′	F	761215
Digital to Synchro	DS350	14 bit angle	4 or 10 VA	360°	6′ to 10′	F/H	770212
Digital to Resolver	DR320-A to E	10 to 20 bits	7 v resolver	360°	10′ to 10″	C	670815
Digital to TR	TD355/356	12 bit angle	250 VA pk.	360°	6′ to 20′	—	970730
Solid State CT	DS360/361	synchro vs 14 bit angle	null/error .4 to 1 vac/°	±7 vac	±4′	F/F1	770324
Solid State CDX	DS370	14 bit angle	resolver	±7 vac	±4′	F	970515
SYNCHRO-ANALOG							
Synchro to Linear DC	SA810A,B,C	synchro	+10 or ±10 vdc	0-360°, ±180°	±.25° to ±.1°	A	370612
Synchro to DC Sin & Cos Abs	SA820A,B,C SA822	synchro	10 sin θ 10 cos θ	60 or 400/sec	±.35° to ±.15°	B/F	371114
Synchro to DC Sin & Cos-Ref. scaled	SA830	synchro	10 sin θ 10 cos θ	60 or 400/sec	±.1°	C	371123

INTERFACE ENGINEERING

Function	Model	Input	Output	FS/Rate	Accuracy	Size	Bulletin
Binary Add/Subtract	DD129	16 bit A & B	16 bit A ±B	.4 μs	±0	C	370726
Binary Multiply	DD123/DP	16 bit A & B	18/32 bit AB	10 μs	±0	A	470515
Binary Divide	DD163/DP	16/32A & 16B	18/32 bit A/B	10 μs	±0	A	570719
Square Root	DD123/137	16 bit A	16 bit √A	160 μs	±0	A/A	670915
Floating Point	DD154	16A + 4 bit X	8 modes	.3 μs/shift	±0	A	570622
Complements	DD112	12-20 bit A	ones, two's, direct-thru	.25 μs	±0	C	370918
Inverse Function	DD137	16 bit X	16 bit f (X)	16 X slave	tol. of slave	A	470303
Inverse Function	DD141-20-28	20 or 28 bit X	16 or 24 bit f (X)	.3 μs/count	tol. of slave	C	570210
COORDINATE CONVERTERS							
DC Polar to Rectangular	SA850A,B,C	.1 to 10 v R 0 to 10 v θ	Rsin θ Rcos θ	500/sec	.125 to .5° .1 to .4%	A	371222
DC Rectangular to Polar	SA860A,B,C	.1 to 10 Rsin θ & Rcos θ	+10 v = 360° abs. .1 to 10 R	500/sec	.125 to .5° .1 to .4%	A	371224
Polar to Analog Rectangular	DR320-A to E	10 to 20 bits θ ±10 v R	Rsin θ Rcos θ	2 μs	10′ to 10″ .1 and .3%	C	571022
Optically Isolated Serial Data Link	DD128T & DD128R	Accepts and delivers 24 bit parallel data at up to 20K words/sec. Serial transmission via low cost twisted pair up to 1 mile.				C C	371115 371115
Panel Display Kits	DD120-4 to -6	4 to 6 digit .55″ numerals, complete with bezels, decoders, etc.				PI	371019

Notes: 1) Synchro translators Interface 90 v/60 Hz (-96), 2) Cases: 90 v/400 Hz (-94), and 11.8 v/400 Hz (-114) synchros. Contact IEI for resolver interfaces.

A) 3″x4″x.4″
B) 3″x4″x.8″
Bx) 3″x4″x.675″
C) 2″x4″x.4″
D) 2″x3″x.4″
E) 2″x4″x.8″
F) 2.625″x3.125″x.8″
Fx) 2.625″x3.125″x1.0″
F1) 2.625″x3.125″x.4″

FAST 16 BIT MATH

- Add
- Subtract
- Multiply
- Divide
- Square Root
- Sine
- Arc Sine
- Cosine
- Arc Cosine
- Tangent
- Arctan
- Inverse Functions
- Floating Point
- Complements

COORDINATE CONVERSION

SERIAL DATA LINKS

PANEL DISPLAYS

MAINFRAME SUBSYSTEMS

MAINFRAMES are integrated modular subsystems optimized by the selection of functions, resolutions, and speeds for the specifics of each application. Typical groups are outlined below. Serial, parallel, bidirectional, IEC, and IEEE-488 interface options available. Contact IEI for additional information.

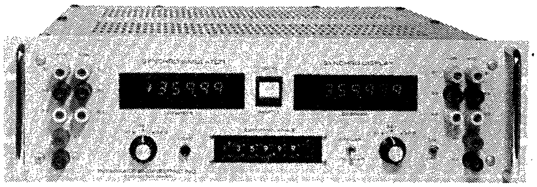
ANGLE DISPLAYS: The DD135 series accepts, converts, displays, and delivers angles in a variety of forms including binary, BCD, synchro, resolver, dual speed, mils, degrees, arc-minutes and seconds and distance in any unit of linear measure at resolutions to 21 bits and accuracies to ±.0003°. Options include bipolar operation and programmable offsets and scaling factors.

CONTROLLERS: Integrated Interface-Controllers complete with motor drive providing manual or computer control of rate and position.

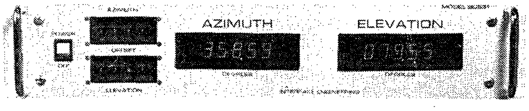
STABILIZATION COMPUTERS: Satellite microcomputer controllers converting Space to Ship and Ship to Space Coordinates. Feature 16 bit floating point precision, computing speed, and dynamic accuracy.

RADAR REMOTERS: Up-link control of Remote radar. Down link reporting of radar trigger, video, Az, El, rate, and status.

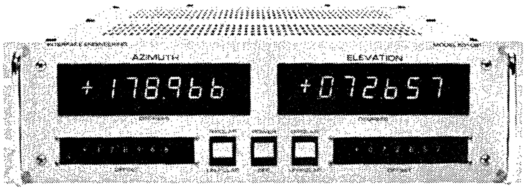
SYNCHRO-RESOLVER: Instruments, displays, simulators.

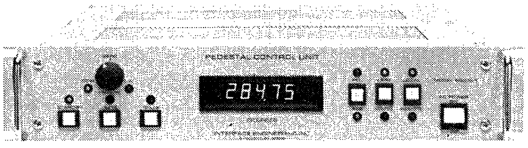


SYNCHRO SIMULATOR/DISPLAYS

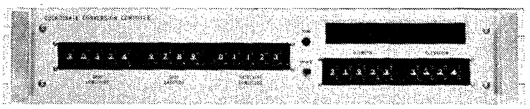


ANGLE DISPLAY - INTERFACES

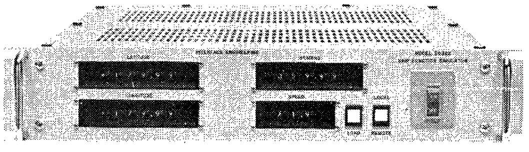




SERVO CONTROLLERS



STABILIZATION COMPUTERS



SHIP FUNCTION SIMULATORS

APPLICATION ASSISTANCE

FOR IMMEDIATE SERVICE CALL
(617) 344-7383

INTERFACE ENGINEERING INC.

386 Lindelof Ave., Stoughton, MA 02072, USA
Phone (617) 344-7383 Telex 940-848

LOW LEVEL ANALOG, DIGITAL and PNEUMATIC SCANNERS by MATRIX CORPORATION

Low Level General Instrumentation

MODEL 1701 SCANNER

Random access: Channels selected by manual front panel switch, remotely by parallel BCD, IEEE-488 or RS-232C.

GENERAL: Scan voltages from microvolts to 300 volts. Microprocessor based interface provides two-way communications with a computer via IEEE-488, RS-232C or parallel BCD.

COMPUTER INTERFACE: parallel BCD std., optional IEEE-488 or RS-232C

CAPACITY: 10 to 999 channels - master 10 to 100 channels, slave units add 10 to 200 channels each. Master and slave require 3½″ std. rack space.

NUMBER of POLES: 3 to 100 per channel.

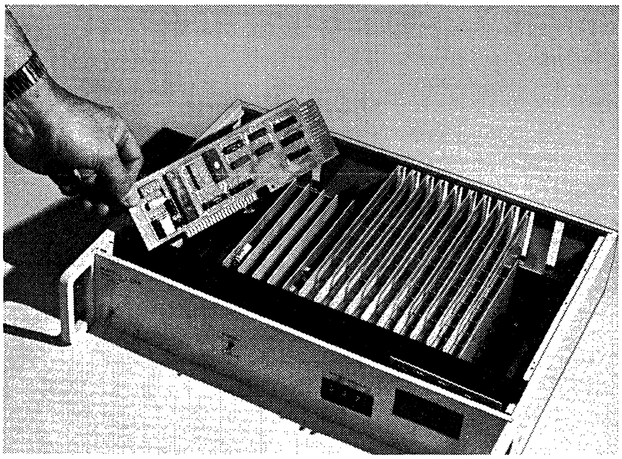
SWITCHING RATE: to 200 channels per second

CONTACT RATINGS: Microvolts to 300 volts

DISPLAY: 7 segment LED - 3 digits for channel, 4½ digits for data

DIMENSIONS: 3½″ high × 17″ wide × 10″ deep

USES: Reading tranducers, thermocouples, RTD's, switch positions, BCD and binary data lines

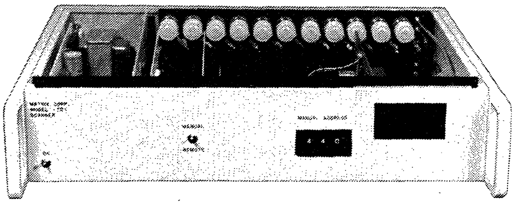


Shown with the Model 1701 Scanner is the Computer Interface Board.

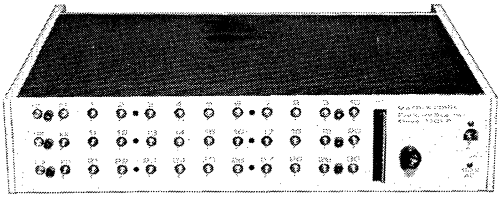
OPERATION FROM A COMPUTER: Commands such as SELECT CHANNEL and SEND DATA are accomplished by two-way communications between a terminal or controller and the Model 1701 using ASCII. Send "25C" to select channel 25. Send "I" to have the scanner respond with 4½ digits of data, sign and decimal point.

LITERATURE: Write for Bulletin 1701-MIB

PNEUMATIC SCANNER READS 10 TO 990 PRESSURE LINES CONVERTS PRESSURE DIRECTLY TO DIGITAL DATA



Front View Model 1701-P



Back View Model 1701-P

COMPUTER INTERFACE: Read 10 to 990 pressures under control from a computer or controller via IEEE-488 or RS-232C using simple ASCII commands. (EXAMPLE: "25C" selects line 25; "I" causes pressure data to be sent.)

PRESSURE RANGE: 0 to 100 psi standard.

CAPACITY: 10 to 990 lines. Main frame 10 to 30 lines; slave adds 10 to 30 lines each.

DISPLAY: 4½ Digits for data: 3 digits for line number.

LINE SELECTION: Manual and remote BCD standard. Optional IEEE-488 or RS-232C.

DATA OUTPUT: Parallel BCD standard. Optional IEEE-488 or RS-232C. (4½ digits, sign, decimal point and line number.)

PRESSURE READING ACCURACY: to 0.5% (Determined by tranducer specified.)

PNEUMATIC FITTINGS: 10-32 to ¼ NPT

DIMENSIONS: 3½″ high × 17½″ wide × 10″ deep.

LITERATURE: write for Bulletin 1701-P

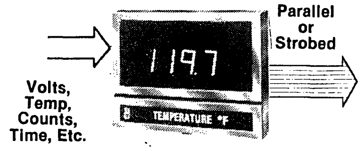
MATRIX CORPORATION

Dept. EM, 2260 Distributors Drive, Indianapolis, Indiana 46241
Telephone: (317) 248-2036

SLIMLINE® PRODUCTS

DISPLAY TO TELEMETRY

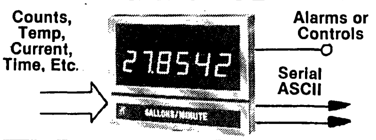
METERING WITH PARALLEL DATA


Parallel or Strobed
Volts, Temp, Counts, Time, Etc.
1197
TEMPERATURE °F

These meters accept a wide range of inputs such as process signals, counts, temperature, time, etc. The data is then displayed and outputted in either full parallel or digit strobed. Large, bright displays are highly visible, even in bright light.

• 2, 3½, 4, 5 or 6 digits in either analog or digital models • Input conditioning • Tri-state and open collector outputs • Scaling factor • Large LED display • Panel surface mounting • Easy wiring • 3-year warranty • Price: $156 - $400

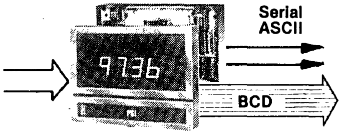
METERING WITH SERIAL DATA & SET POINTS


Counts, Temp, Current, Time, Etc.
Alarms or Controls
Serial ASCII
278542
GALLONS/MINUTE

These meters feature serial ASCII output and full message formatting. Setpoint outputs provide alarm or control capabilities. Microprocessor-based Ratemeter measures DC pulses from one per hour to 3 kHz.

• Full 6-digit display • Scale factor .000000001 to 59999 • Baud rates 110-9600 • Non-volatile memory • Full instrumentation input • Threshold adjustment • Setpoint outputs • 3-year warranty • Price: $295 - $425

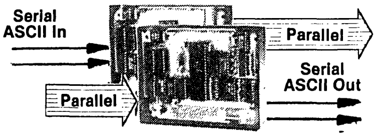
METERING WITH SERIAL & PARALLEL DATA


Serial ASCII
9736
BCD

Slimline meter in combination with the ASCII Bustle® accept a wide range of inputs and provide serial ASCII and parallel data outputs. Full parallel, tri-state parallel, tri-state multiplexed and open collector data outputs for any application.

• Variable noise filtering • 0.2 - 80 VDC threshold adjustment • Open collector (up to 48 VDC maximum) or tri-state outputs • High transient, high electrical noise immunity • 110-9600 baud rate • Price: $410 - $650

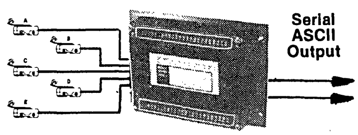
SERIAL/PARALLEL CONVERTERS


Serial ASCII In
Parallel
Serial ASCII Out
Parallel

Convert common parallel data (such as BCD) to serial ASCII with the Transmitter Bustle® or convert serial ASCII to parallel data with the Receiver Bustle®. Transmit data or provide input to PC's, computers, printers, terminals, etc.

• Convert ASCII up to 6 digits of BCD data or 24 bits • 100 unit addressing capability • 2-digit switch-selectable ID number • 110-9600 baud rate • RS232, RS422, 20/60 mA formats • Price: $296 - $303

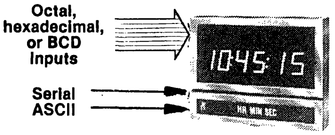
CONTACT STATUS TRANSMITTER


Serial ASCII Output

These transmitters accept up to 25 individual contact closures at up to 24 VDC. These units are all self-contained and built rugged and reliable. These transmitters provide standard serial ASCII output.

• Directly compatible with CRT's, printers, etc. • Self-contained • CMOS, TTL compatible • Accepts up to 25 contact closures • Accepts up to 24 VDC; others available • RS232, RS422, 20/60 mA formats • Price: $290 - $350

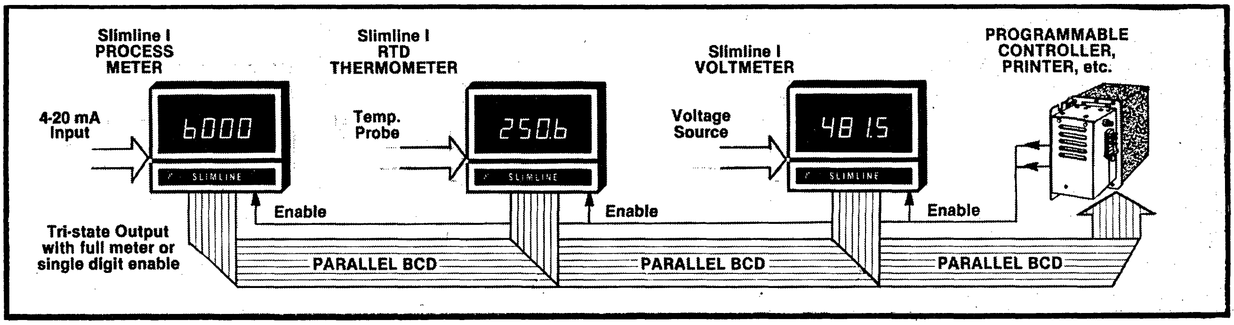
LOCAL & DISTANT READOUT


Octal, hexadecimal, or BCD Inputs
Serial ASCII
10:45:15
HR MIN SEC

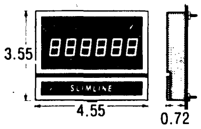
Meters accept BCD, octal, hexadecimal or 2-wire serial ASCII inputs. Display up to 6 digits with LCD's or LED's. ASCII command switches provide remote control or alarm capabilities. Displays are easily read even in bright light.

• Parallel, octal, hexadecimal or BCD inputs • Serial ASCII inputs • Latch capability • 2 to 6 digit models • Baud rates 110-9600 • Flexible addressing capability • Surface mounting • Easy wiring • 3-year warranty • Price: $156 - $500

APPLICATION EXAMPLE:


Slimline I PROCESS METER
Slimline I RTD THERMOMETER
Slimline I VOLTMETER
PROGRAMMABLE CONTROLLER, PRINTER, etc.
4-20 mA Input
6000
Temp. Probe
250.6
Voltage Source
48 1.5
SLIMLINE
SLIMLINE
SLIMLINE
Enable
Enable
Enable
Tri-state Output with full meter or single digit enable
PARALLEL BCD
PARALLEL BCD
PARALLEL BCD

SLIMLINES' UNIQUE FEATURES


3.55
888888
SLIMLINE
4.55
0.72

Size: 4.55" x 3.55" x 0.72". Panel surface mounting means easy & fast installation. Also fast wiring – no soldering needed.

High Quality: Less downtime, long useful life. Much better investment: socketed parts and highest quality components. Conservative design; works well in harsh factory environments, not like other meters that are made to only work in a laboratory.

Who Uses: With over 1 million meters shipped, NES is recognized as the leader in high quality industrial meters. Some users are: the Space Shuttle, Air Force 1, virtually all of the Fortune 1000's and tens of thousands of others.

Other Products: NES designs & manufactures over 3,000 different products from Broadcast Automation Computers to the broadest range of panel meters available.

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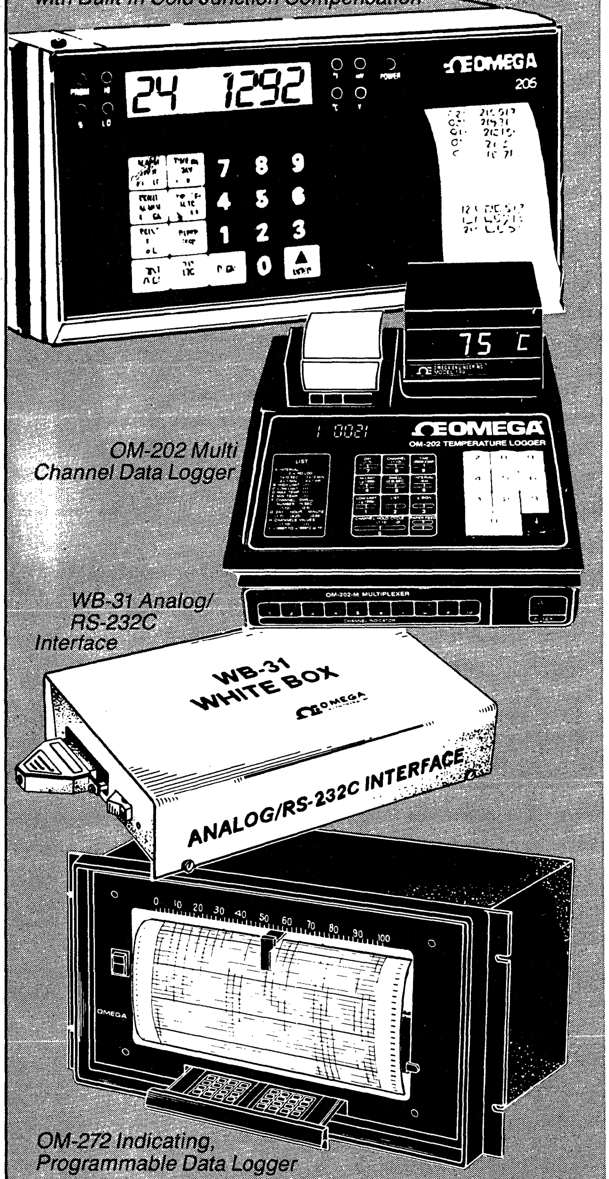
For other products in EEM from NES, see Sections 2000, 2200, 2450 & 2950.

DATA ACQUISITION

For Temperature, Flow Pressure and Strain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OM-202-M MULTIPLEXER
WB-31 WHITE BOX
OMEGA
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OM-205 Programmable, Multichannel Data Logger with Built-In Cold Junction Compensation

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OM-272 Indicating, Programmable Data Logger

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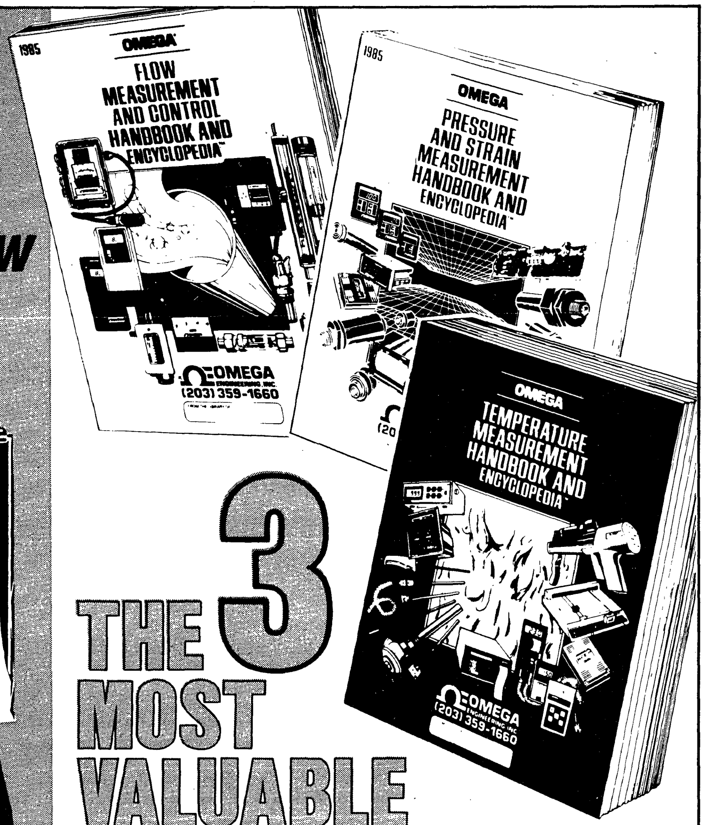
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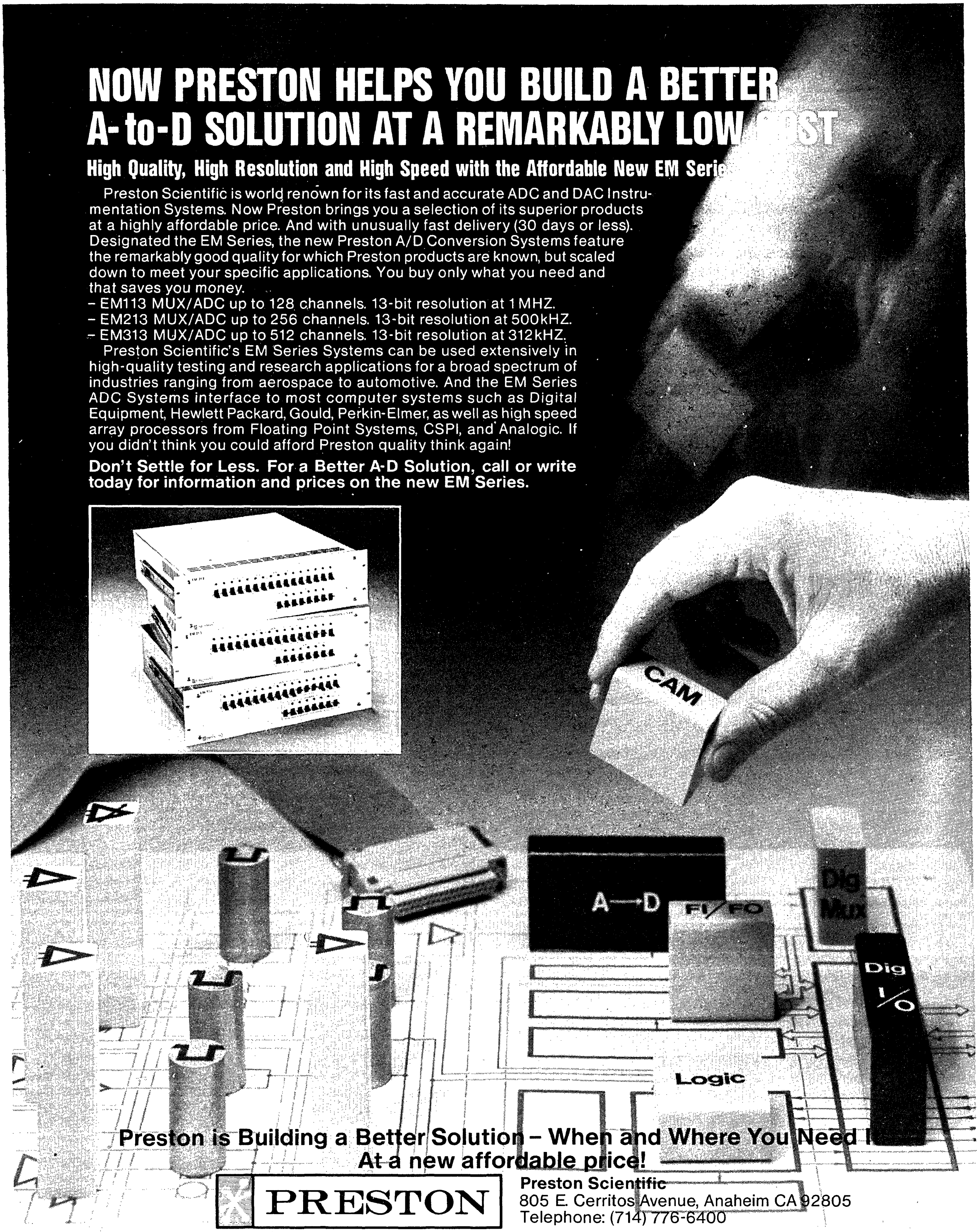

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SYNCHRO AND RESOLVER DATA CONVERTERS

MODULES • MUX S/D SYSTEMS • IEEE-488 & RS232C ANGLE METERS AND SIMULATORS
MULTIBUS, STD & VME BUS COMPATIBLE BOARDS

DESCRIPTION	Input Availability	Output	Static Accuracy	Size
ANGLE POSITION INDICATORS: Dual channel, RS232C or IEEE-488 compatible.	Autoranging 10-90 V L-L 50-10KHz	To 6 Decade BCD	To ±.003°	19″ x 1¾″ x 11″
SYNCHRO/RESOLVER SIMULATORS: Dynamic mode, RS232C or IEEE-488 compatible.	5 Decade BCD	11.8/26/90 V L-L	±.01°	19″ x 3½″ x 13″
MULTIBUS, VME BUS, STD BUS, RS232C D/S and S/D. Two-speed or multiplexed.	As required	As required	±.01°	PC 12″ x 6.75″
TRACKING SYNCHRO/RESOLVER TO DIGITAL: Full transformer isolated units with jitter free output. NO-15VDC required. Valid data immediately available at trailing edge of CB.	Freq.: 50 to 1600Hz L-L V_{RMS}: 5 to 90 Ref. V_{RMS}: 10 to 115	Model 1663: 18 bits Model 1661: 16 bits Model 1651: 14 bits Model 1651B: 12 bits Model 1652: 10 bits	±.005° ±.01° ±4.0′ ±8.5′ ±21′	3.1″ x 5.1″ x 1.0″ 3.1″ x 2.6″ x 0.82″ 3.1″ x 2.6″ x 0.82″ 3.1″ x 2.6″ x 0.82″ 3.1″ x 2.6″ x 0.82″
AUTORANGING TRACKING S/D. Model 1653: Transformer isolated. Reference and L-L voltages may vary independently of each other.	Ref.: 44-1500Hz Ref. V_{RMS}: 5-125 L-L V_{RMS}: 5-115	12 bits	±ILSB	3.1″ x 2.6″ x 0.82″
TRACKING S/D WITH BCD OUTPUT. Model 1662: Transformer isolated units with jitter free output. 036° or ±179.9°	Ref.: 50-1500Hz Ref. V_{RMS}: 10-115 L-L V_{RMS}: 5-90	4 Decade BCD	±0.1°	3.1″ x 2.6″ x 0.82″
14 BIT SAMPLING SYNCHRO OR SIN/COS TO DIGITAL. Series 1623F: Includes ±5° offset capability.	Freq.: 50Hz to 10KHz L-L V_{RMS}: 5 to 90 Ref. V_{RMS}: 10 to 115	14 bit parallel binary or 4 decade BCD. TTL, DTL compatible.	±4′	3.125″ x 2.625″ x 0.82″
TWO SPEED SYNCHRO/RESOLVER TO DIGITAL. Series 1512 Single module combines binary or non-binary gear ratios from a two-speed system. Velocity output. Ratios: 9:1, 16:1, 18:1, 32:1, 36:1, 64:1, etc.	Freq: 50-1500Hz L-L V_{RMS}: 1.3-90 Ref. V_{RMS}: 5-115	16 bits binary parallel	±0.005°	3.125″ x 6.0″ x .82″
MULTIPLEXED SYNCHRO TO DIGITAL. Series MUX: Simple, noise immune, small and inexpensive Modular system, up to 128 channels.	Any combination of Synchros and Resolvers.	14 bits binary parallel to 75 μs conversion.	±5′	3.125″ x 2.65″ x 0.82″ + 1.85″ x 0.85″ x 0.82″ per channel
ANGLE POSITION INDICATOR, SOLID STATE. Series 2623: Includes ±5° offset capability. Rugged, compact, accurate and economical. With or without built-in power supplies. Internal reference available.	Freq.: 50Hz to 10KHz L-L V_{RMS}: 5 to 90 Ref. V_{RMS}: 10 to 115	Readout: 359.9, ±179.9 or 9999. Others available.	±0.1°	5.5″ x 1.75″ x 5.5″ deep
SYNCHRO OR SIN/COS TO LINEAR DC. Series K678-1637: Converts synchro or resolver inputs to linear DC output proportional to the angle. Connector termination available. Output voltage may be offset.	Freq.: 50Hz to 10KHz L-L V_{RMS}: 5 to 90 Ref. V_{RMS} 10 to 115	±10VDC for angles −180° to +180°	6′, 15′, 30′ or 1°	**K678:** 3.1 x 2.6 x .42 **K6678:** 3.1 x 2.6 x .42 **1637:** 2.5″ x 3.2″ x 0.78″
SYNCHRO/RESOLVER TO SINE/COSINE DC. Series 655/697: Generates sine and cosine DC outputs proportional to the angle.	Freq.: 60 or 400Hz L-L V_{RMS}: 11.8 or 90 Ref. V_{RMS}: 26 or 115	−10 volts to +10VDC, representing the sine and cosine of the input angle.	±6′	**400Hz:** 1.85″ x .85″ x .82″
SYNCHRO TO SINE/COSINE DC (non-variant). Series 655NV: Generates sine and cosine DC outputs proportional to the input angle. Insensitive to synchro reference and line voltage. Ideal for displays.	Freq.: 60 or 400Hz L-L V_{RMS}: 11.8 or 90 Ref. V_{MRS}: 26 or 115	−10 volts to +10VDC representing the sine and cosine of the input angle.	±6′	3.44″ x 3.19″ x 0.82″
DIGITAL TO SYNCHRO/RESOLVER. Series 1667:	16 bits TTL, levels binary coded angle.	Freq.: 50Hz to 10KHz L-L V_{RMS}: 5 to 90	±1′	3.125″ x 3.625″ x 1″
DIGITAL TO SYNCHRO/RESOLVER. Series 1673: Miniaturized, 1.5 VA, short circuit proof. 0.1% Max. amplitude variation.	14 bits, TTL levels binary coded angle.	Freq.: 50Hz to 10KHz L-L V_{RMS}: 5 to 90	±4′ ±8′	3.125″ x 2.625″ x 0.82″
BCD TO SYNCHRO/RESOLVER Series F1673:	4 Decade BCD	50Hz-10KHz 5-90 V L-L	±.1°	3.1″x3.6″x.82″
DC TO SYNCHRO/RESOLVER. Series D1673	±10VDC ±180°	400Hz 26-90VL-L	±12′	3.12″ x 3.625″ x .82″
DIGITAL TO SYNCHRO/RESOLVER. Series 1680: Low cost, medium resolution version of our popular Model 1673.	10 bits, TTL levels binary coded angle.	Freq.: 50Hz to 10KHz L-L V_{RMS}: 5 to 90	±21′	3.125″ x 2.625″ x 0.82″
DIGITAL TO SYNCHRO/RESOLVER. Series B1670: Drives 3 TR's High power, solid state device converts a 14 bit input into a 3 wire synchro or 4 wire resolver output. Overload and short circuit protected.	14 lines representing angles 0 to 360°	L-L V_{RMS}: 11.8 or 90 Ref. V_{RMS}: 26 or 115 Freq.: 60Hz or 400Hz	±4′	**PC:** 4.5″ x 8″ x .68″ above PC
SYNCHRO AMPLIFIERS. 15, 25, 100 VA. Series 5179M: For either passive loads or torque receivers.	As required	11.8/90 VL-L Synchro	±6′	7.4″ x 4.4″ x 1.45″
DIGITAL TO SINE/COSINE DIGITAL. Series 1500: Model 1500-1 has tristate outputs and MUX sine and cosine over 12 lines.	14 lines representing angles 0 to 360°	12 bits sine and cosine, also quadrant signs.	±2′	3.0″ x 4″ x 0.4″
DIGITAL TO SINE/COSINE DC (non-variant). Series 1501: 0.05% max. amplitude variation.	14 lines representing angles 0 to 360°	±10VDC, as the sine and cosine.	±4′ or ±15′	3.125″ x 2.625″ x 0.42″
DIGITAL VECTOR GENERATOR. Model 1504: High speed multiplying trigonometric D/A. Converts 14 bits of digital input and analog R into R sin θ and R cos θ.	14 lines representing angles 0 to 360°	±10V max. Reference will accept any wave form.	±4′	3.125″ x 2.625″ x 0.42″
DIGITAL TO RESOLVER. Series 1503: 0.035% max. amplitude variation.	14 lines representing angles 0 to 360°	2 AC voltages, 20V P-P, as the sine and cosine.	±4′	3.125″ x 2.65″ x 0.42″
CONTROL TRANSFORMER, SOLID STATE. Series 1682: Fully transformer isolated unit. 1.0% max. amplitude variation.	Synchro and 16 bits Natural parallel binary.	±5 V_{RMS} representing ±12.5°	±1′	3.125″ x 2.626″ x 0.42″
CONTROL DIFFERENTIAL TRANSMITTER, SOLID STATE. Series 1681: Model 1685 offers Synchro or Resolver output	Synchro and 14 bits Natural parallel binary.	6.5 V_{RMS}, sine/cosine or synchro/resolver	±4′	3.125″ x 2.625″ x 0.82″
SINE/COSINE TO SYNCHRO DRIVERS. Series B676: Solid state device designed to handle large current surges of TR's. Will drive three 11TR4s to a low null. Overload and short circuit protected.	±10VDC, representing the sine and cosine of the required angle.	L-L V_{RMS}: 11.8 or 90 Ref. V_{RMS}: 26 or 115 Freq.: 60Hz to 400Hz	±10′	**PC:** 4.5″ x 8.0″ x 1″
LINEAR DC TO SINE/COSINE DC. Series C670: Converts a DC voltage, representing an angle, into two output voltages that are proportional to the sine and cosine of that angle.	±10VDC representing angles from −180° to +180°	K sin θ and K cos θ K = 10VDC	±10′	3.44″ x 3.19″ x 0.82″
COORDINATE ROTATOR. Series A689: Rotates (X-Y) coordinates proportional to a linear DC input.	$Y = R \cos\theta$ $Y = R \sin\theta$ R = ±10VDC	$R \sin(\theta + \beta)$ $R \cos(\theta + \beta)$	±10′	3.19″ x 3.44″ x 0.82″
POLAR TO RECTANGULAR. Series A1618: Converts polar coordinates (R, θ) into rectangular (X, Y).	R: ±10VDC θ: ±10VDC	$X = R \cos\theta$, $Y = R$ sine θ R = ±20MV to ±10VDC	±10′	3.19″ x 3.44″ x 0.82″
RECTANGULAR TO POLAR. Series 695: Converts rectangular coordinates (X, Y) into polar (R, θ).	$X = R \cos\theta$ $Y = R \sin\theta$	$R = \sqrt{X^2 + Y^2}$ $\theta = \tan^{-1} Y/X$	±10′	3.19″ x 3.44″ x 1.78″
DEMODULATORS: Phase Sensitive Transformer isolated, single or dual channel.	840: 0 to 5 V_{RMS} 9318: To cust. spec	0 to ±4.3VDC As requested	.1% .1%	3.1″ x 1.9″ x 0.5″ 1.63″ x 1″ x 1″

Other frequencies and voltages available. Units available for either 0 to +70°C or −55°C to +105°C operation. Most units are hermetically sealed for extra protection.

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SYNCHRO AND RESOLVER DATA CONVERTERS

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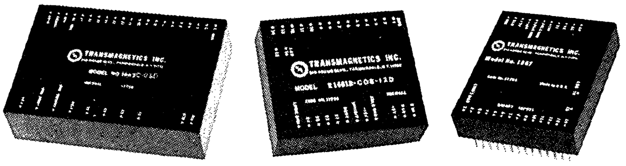
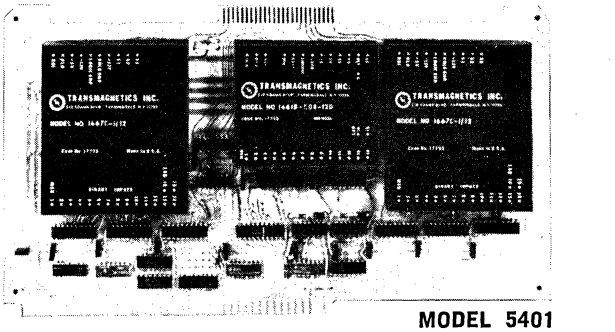


MODEL 1663:
18 BIT S/D OR R/D ±20 ARC SECONDS ACCURACY.

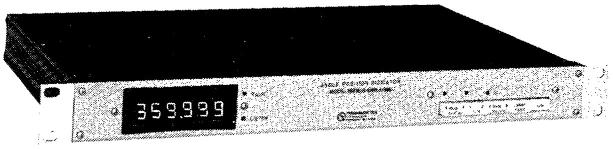
MODEL E1661:
16 BIT S/D OR R/D ±40 ARC SECONDS ACCURACY.

MODEL 1667:
16 BIT D/S OR D/R 1.3 VA ±30 ARC SECONDS ACCURACY.



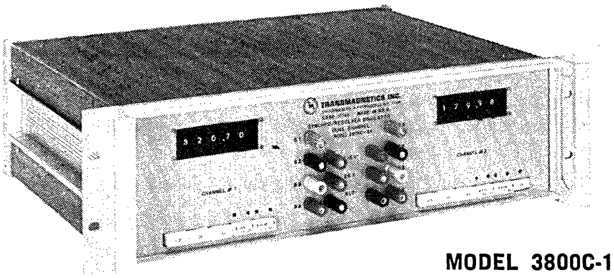
MODEL 5401

MULTIBUS COMPATIBLE SYNCHRO/RESOLVER-TO-DIGITAL AND DIGITAL-TO-SYNCHRO/RESOLVER. SINGLE OR TWO SPEED. ±30 ARC SECONDS ACCURACY.



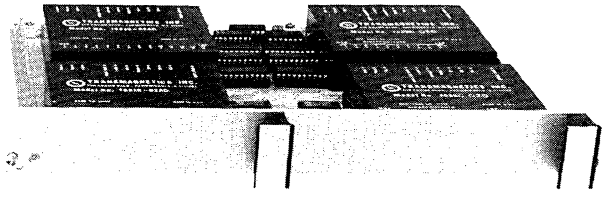
MODEL 2623CC-43H/488

TWO-CHANNEL INPUT SYNCHRO/RESOLVER, AUTORANGING, IEEE-488 COMPATIBLE ANGLE POSITION INDICATOR. 47 Hz TO 10 KHz ±0.003° ACCURACY



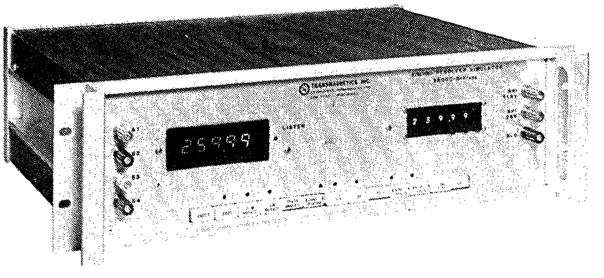
MODEL 3800C-1

DUAL CHANNEL SYNCHRO/RESOLVER SIMULATOR. 50-2045 Hz. ±30 ARC ACCURACY.



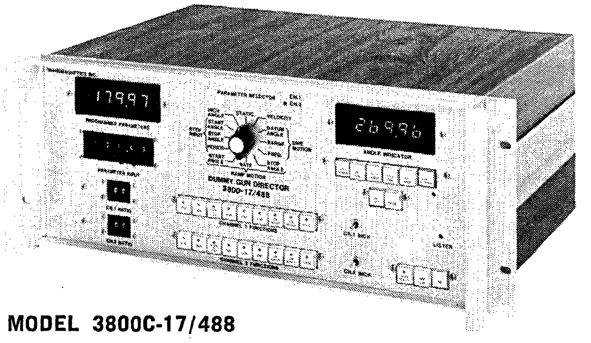
MODEL 5410C

VME BUS COMPATIBLE. THREE 16 BIT SYNCHRO/RESOLVER-TO-DIGITAL OR DIGITAL-TO-SYNCHRO/RESOLVER, SINGLE OR TWO-SPEED. ±45 ARC SECONDS ACCURACY.



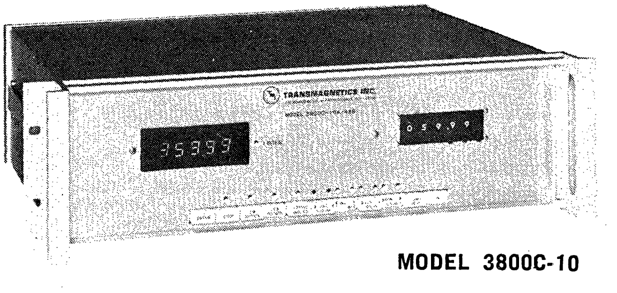
MODEL 3800C-6V/488

SYNCHRO/RESOLVER SIMULATOR WITH ROTATOR. IEEE-488 PROGRAMMABLE. 50-2045 Hz ±30 ARC SECONDS ACCURACY.



MODEL 3800C-17/488

DUMMY GUN DIRECTOR. DUAL TWO-SPEED SIMULATORS. SELECTABLE GEAR RATIO TO 99:1. ROTATION, SINE, STEP AND INCH MOTION. IEEE-488 PROGRAMMABLE. 50-2045 Hz. ACCURACY TO 30 ARC SECONDS.



MODEL 3800C-10

SINGLE OR TWO-SPEED (18:1/36:1) SYNCHRO/RESOLVER SIMULATOR, IEEE-488 PROGRAMMABLE, DYNAMIC MODE, 50-2045 Hz ±30 ARC SECONDS ACCURACY.

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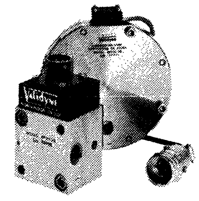
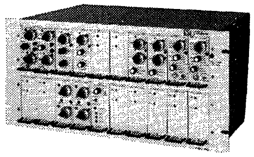


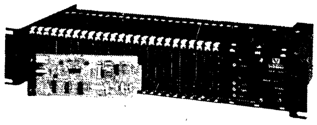
MC1 Signal Conditioning Systems



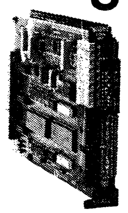
- Up to 20 Plug-in Units per Module Case
- Broad Range of Module Types for All Common Transducers
- Built in Excitation Source for Transducer Systems
- Digital Display Plug-in Unit Available

MC170 Signal Conditioning Systems

- High Density—Up to 50 channels in 3½" of Panel Space
- Plug-in Modules for All Common Transducers
- Front Panel Test Points and Adjustments
- Low Cost per Channel—Easy to Install



STD500 Signal Conditioning Modules



- Fully STD BUS Compatible Signal Conditioning for Popular Transducers
- Eight Channels per Module, ±12 Bit Conversion
- Two Programmable Alarms per Channel
- Built in Transducer Excitation and on Board Linearzation When Required

DA380 Data Acquisition System

- Dual Microprocessors Offer Complete Operational Flexibility, Including Internal Data Manipulation and Calculation
- Data Display and Identification in Engineering Units
- Optional Real Time Clock, RS-232C and/or IEEE 488 I/O Ports
- Up to 64 Programmable Alarms, 12 bit Analog-to-Digital Conversion

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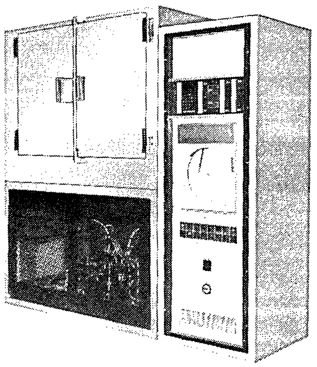


FULL RANGE TEMPERATURE/HUMIDITY CABINETS

Feature PRO-STAR Microprocessor-Based Programmer-Controller providing: dry bulb entry and digital display in °F. or °C. with 0.1° accuracy; direct R.H. input; zero crossover firing; split range control with dual P.I.D.; 98% R.H. truly obtainable; automatic refrigeration function; energy-efficient design. RS-232C computer interface, printer and wattage dissipation capability optional. Range: −18°C. to +93°C. (+200°F.) Popular sizes. Representative of a complete line of temperature/humidity chambers including exclusive air-cooled models.

MICROPROCESSOR CONTROLLED CHAMBERS

State-of-the-art instrumentation makes fully automated programmed operation a matter of pushing buttons. The only limitations in programming flexibility are the inherent capabilities of the chambers, and they, in turn, have been engineered to be completely compatible with the instrumentation. These facilities thus represent perfectly matched systems providing the finest, most reliable performance available today.

The list below shows the variety of Blue M chambers now available with this remarkable instrumentation. The Full Range Temperature/Humidity, described in detail above, is another, and typifies the quality of them all. Full information on them is available from your local Blue M Branch Office or from our headquarters.

VERSA-RANGE® TEST CHAMBERS— Standard and High-Powered high-low cabinets.

DUAL THERMAL SHOCK TEST CABINETS

INERT GAS OVENS— Standard (to +316°C.) and Ultra-Temp® (to +593°C.)

ULTRA-TEMP OVENS— to +704°C.

MECHANICAL CONVECTION HIGH-POWERED OVENS— to +343°C.

HIGH-POWERED INDUSTRIAL BATCH OVENS— to +316°C.

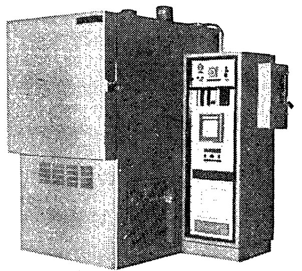
PHOTOELASTICITY OVENS

STABIL-GLOW® INDUSTRIAL BOX TYPE FURNACES— to +1177°C.

RAD-O-GLOW®
GLOBAR® FURNACES—to +1450°C.

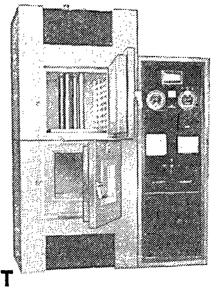
TEMP-O-LOY
ANNEALING OVENS— to +704°C.

STABIL-THERM® LN_2 CONSTANT TEMPERATURE ENVIRONMENTAL CABINETS— from −120°C. to +300°C.



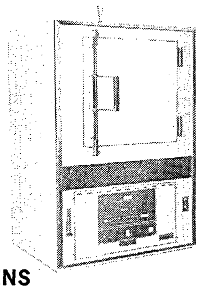
VERSA-RANGE REFRIGERATED TEST CHAMBERS

Two versatile ranges: −73°C. to +204°C. and −40°C. to +121°C. Sizes from 3 to 64 cu. ft. Also high powered microprocessor models, chest type chambers, and LN_2 units.



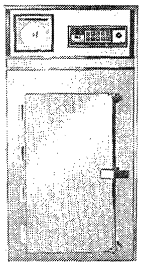
THERMAL SHOCK TEST CHAMBERS

Dual cabinets for Mil 202 and 883. Work chamber moves automatically between hot and cold chambers for in-spec performance. Also baths for liquid-to-liquid shock tests.



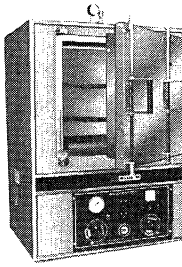
CLEAN ROOM OVENS

Provide Class 100 — or better — first air; 99.97% filtering of particles to 0.3 microns. Push-button operation. Also new Step Curing Epoxy Ovens for semiconductor industry processing.



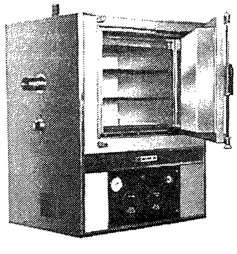
REDESIGNED BURN-IN OVENS

Ready for fixturing with all needed engineering, operational, and safety features built-in. Exclusive Digital Setpoint SCR Control has zero crossover SCR firing, balanced 3-phase operation.



INERT GAS OVENS

Complete line — from manual to fully automated control. To +593°C., sizes to 24 cu. ft. Also Life Test Ovens — manual or programmed, and Class A Batch Ovens.



FRICTION-AIRE, OVENS WITHOUT HEATERS

Air turbulence heats to +260°C. Three models U.L. Listed for Class 1, Group D service have +150°C. range. Others built to N.E. Code for Class 1, Group D locations.

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Built for Performance. Competitively Priced.

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Ovens
Burn-In
Refrigerated

Humidity Chambers
Commercial Temperature/Humidity
Military Temperature/Humidity
Bench Top Humidity Chambers
Panel Walk-In
Standard Construction Walk-In
Steady State High Humidity
Low Relative Humidity

Physical Test Chambers
Tensile Test Chambers
Impact Test Chambers
Wire Test Chambers
Insulated Wire Cold Bend
Freeze - Thaw Chambers

Remote Conditioners
Direct Expansion Modules
Air Temperature
Air Temperature/Humidity
Process Condensing Units
Hot & Cold Fluids
Equipment Cooling Air Units

Cold Traps
U.F.6 Processing Stations
Evacuation Processes
-120ºF Mechanically Refrigerated Systems

Walk-Ins
Calrimeters
Burn-In Chambers, Panel & Std. Construction
Temperature Chambers, Panel & Std. Construction
Automotive Cold Start
Drive-In Temperature/Humidity
Material Storage
Package Testing

Thermal Shock
2 Zone Air-to-Air, Military & Commercial
3 Zone Air-to-Air, Military & Commercial
2 Zone Liquid-to-Liquid, Military & Commercial
Multi-Zone Liquid-to-Liquid

Calibration Stands
Liquid
Air

Liquid Baths
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Military
Fluoro - Inert Systems
Production Chilling

Automotive Test Systems
Combustion Air Units
Sensor Stands
Carburetor Stands
Clutch Test Stands
Temperature/Altitude
Voltage Regulator Tester
Brake Test Systems

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Light Duty Production Chilling (-120°F)
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Mechanically Cooled Co_2 and Ln_2
Liquid Production Chilling

Custom Designs
High Temperature to + 1000°F
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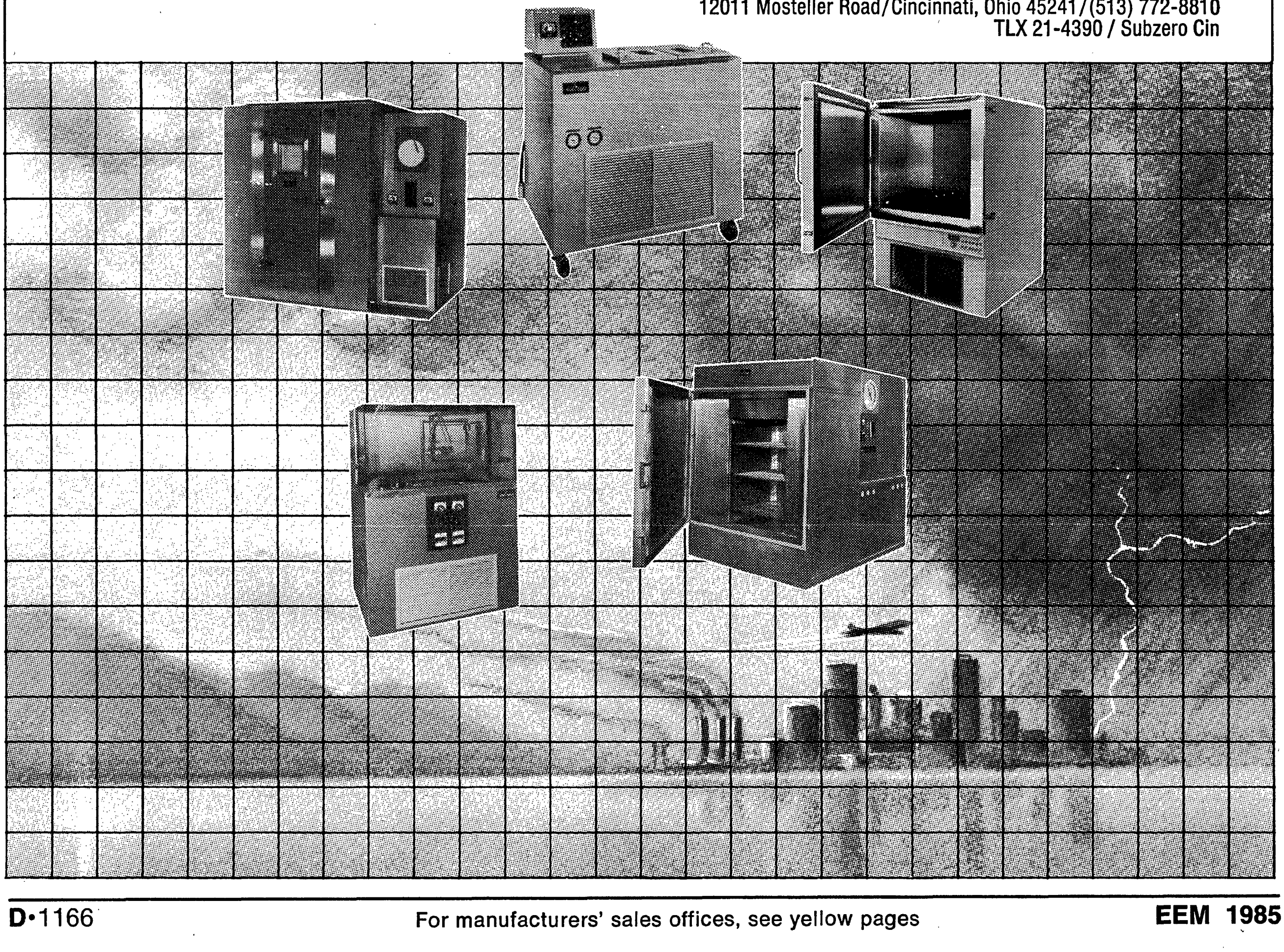
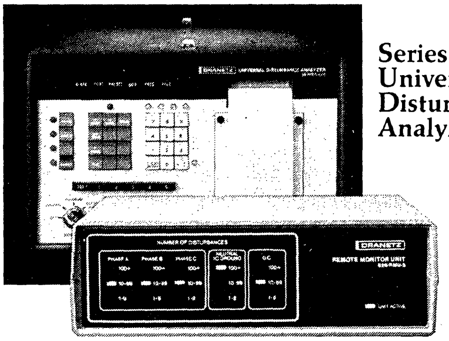


DRANETZ SERIES 626 UNIVERSAL DISTURBANCE ANALYZER

An extremely valuable tool for analyzing power transients and other environmental conditions that affect:

- Computers
- Word Processors
- Telephone/Telecommunications Equipment
- Automated Production Systems
- Medical Instrumentation
- Military and Avionics Systems



Series 626 Universal Disturbance Analyzer

Remote Monitor Unit (RMU)

The **Series 626 Universal Disturbance Analyzer** is a modularly expandable system for measuring environmental disturbances that affect the proper operation of computers and other sensitive electronic equipment. The Series 626 detects, measures, and records an extensive range of variations in AC power, DC voltage, temperature, humidity, and other environmental factors. For example, the AC power module records transient impulses, both in amplitude and duration, sags, surges, undervoltages, overvoltages and frequency variations with accurate time and date correlation. Up to five individual monitoring modules can be added to the mainframe, which provides the operating controls, alphanumeric printer, time base, and power supply. Each monitoring module can be user-programmed with the precise limits beyond which disturbance detection occurs.

A system check facility activates an automatic calibration and diagnostic routine to verify proper operation. An RS232 port is provided for data output and remote programmability.

The Series 626 is packaged in a rugged portable case. AC powered, the 626 is protected from power outages by internal, rechargeable batteries that provide 10 to 40 minutes of full operation. A separate battery supply protects the time clock, data, and program memories for 1 to 3 months.

Remote Monitor Units (RMU's)

RMU's are low cost additions for the Series 626 that extend its monitoring capabilities to multiple remote locations. RMU's rely on the 626 mainframe, equipped with 626-PA-6036 Interface Adapter, for programming and data readout. Once programmed, each RMU monitors power line disturbances independently, without connection to the 626. Data may be collected by connecting the RMU directly to the 626 mainframe, or remotely to the 626 through the optional plug-in RMU modem (DM-C15).

MONITORING MODULES (Plug-In)

Plug-in/PN	Inputs
1ϕ AC 626-PA-6001	Line Voltage: 50-600 VAC, 45-65 Hz Impulse Peak Voltage: 25-4000 V, 1-2000 μs, optional Impulse direction
Low Range DC 626-PA-6002A	Voltage Level: 0.5-80 VDC Impulse Peak Voltage: 0.5-80 V, 1-2000 μs
High Range DC 626-PA-6002C	Voltage Level: 25-600 VDC Impulse Peak Voltage: 25-4000 V, 1-2000 μs
3ϕ AC 626-PA-6003	Line Voltage: 50-600 VAC, 45-65 Hz Impulse Peak Voltage: 25-4000 V, 1-2000 μs
AC Current Monitor 626-PA-6005	Full Scale Ranges: 5-300 ARMS, 45-65 Hz Impulse Peak Current: 25-2000 A 1-2000 μS
AC Neutral-Ground 626-PA-6006	Line Voltage: 2-50 VAC, 45-65 Hz Impulse Peak Voltage, 25-4000 V, 1-2000 μs
Sequential Events 626-PA-6007	8 inputs, change-of-state times 2 VDC (nominal) trip point
Temperature/Humidity 626-PA-6008	Temperature: 0-100°C Relative Humidity: 0-100%
3ϕ 400 Hz AC 626-PA-6009	Line Voltage: 50-600 VAC, 370-450 Hz Impulse Peak Voltage: 50-4000 V, 1-100 μs
Event Time Accumulator 626-PA-6011	8 inputs, elapsed and on/off times 2 VDC (nominal) trip point
Communications 626-PA-6012A 626-PA-6013	Accepts data from 626 RS-232 port. Stored data (900 disturbances) available via integral auto-answer/auto-dial modem (-6012A) or RS-232 port (-6013)
8-Point Temperature 626-PA-6014	8 separate probes, −50° to +150°C
3-Channel Transducer 626-PA-6015	0-10 VDC, 0.2% accuracy, programmable full scale value and Engineering units
Impulse Energy Analyzer 626-PA-6018	Input Ranges: 0-600 VRMS, 0-300 ARMS, 45-450 Hz Impulse Peak Voltage: 25-2000 V, 1-1000 μS Impulse Peak Current: 12-1000 A
RF Field Strength Monitor 626-PA-6020	Freq. Response: 1.0 MHz-1.0 GHz ±6 dB Field Strength Range: 0.5-8.0 V/M Response Time: CW to 1 μS
Remote Interface Adapter 626-PA-6036	Connects directly to any RMU, optional auto-dial modem available
1ϕ AC Remote Monitor 626-RMU-1	Line Voltage: 90-140 VAC or 180-250 VAC, 47-63 Hz Impulse Peak Voltage: 50-2000 V, 1-1000 μs
3ϕ AC, DC Remote Monitor 626-RMU-3	Line Voltage: 50-320 VAC, 47-63 Hz Impulse Peak Voltage: 50-2000 V, 1-1000 μs DC Voltage Level: 1-25 V
3ϕ AC Remote Monitor 626-RMU-3A	Line Voltage: 50-320 VAC, 47-63 Hz (isolated neutral-to-ground monitoring) Impulse Peak Voltage: 50-2000 V, 1-1000 μs

For full specifications, call or write for Bulletin 626.

DRANETZ
COMPUTER PRODUCTS DIVISION
DRANETZ TECHNOLOGIES, INC.

1000 New Durham Road, Edison, NJ 08818
TEL: (201) 287-3680/1-(800)—DRANTEC
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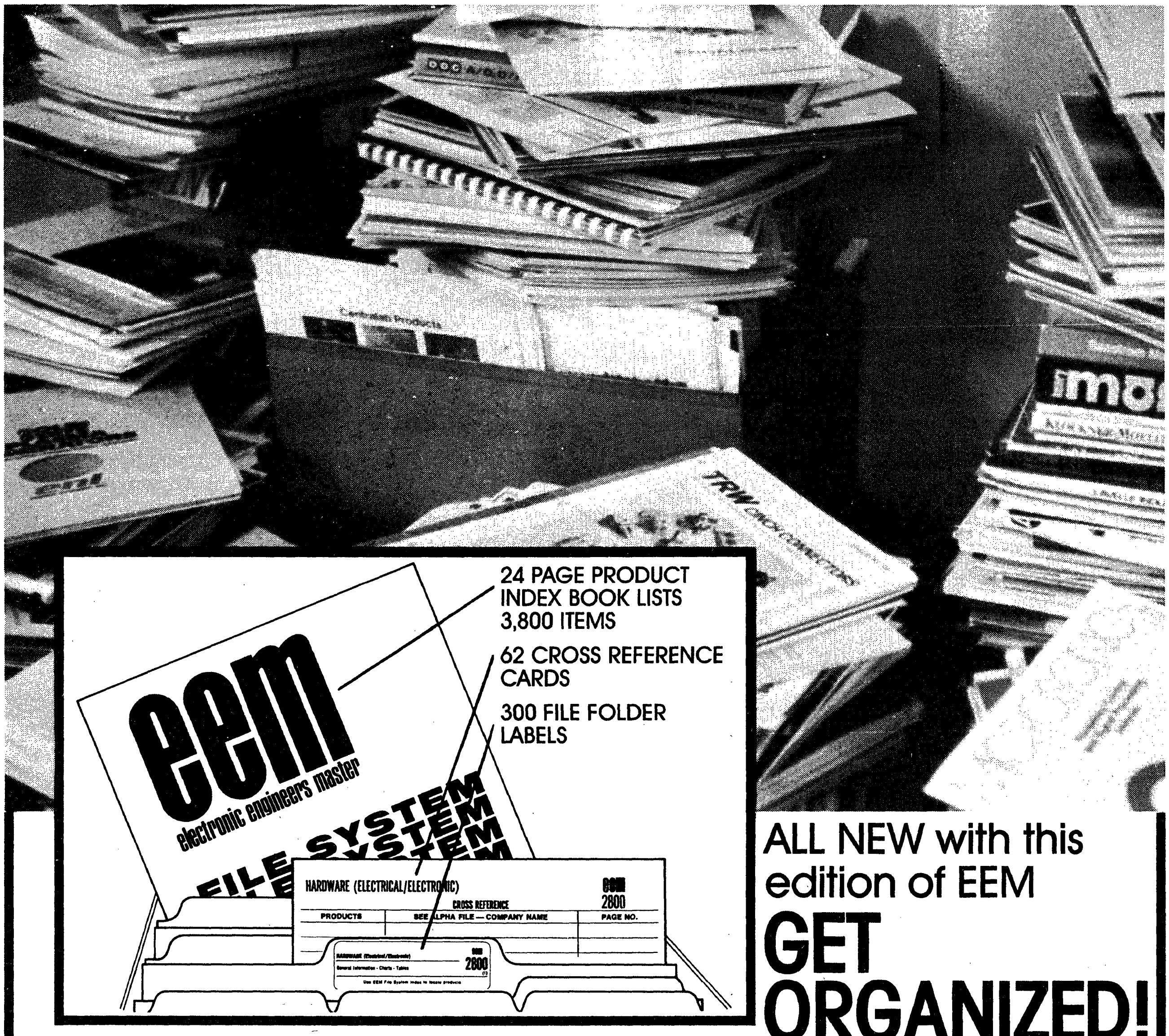
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HT-300 SATELLITE CO_2 RESERVOIRS

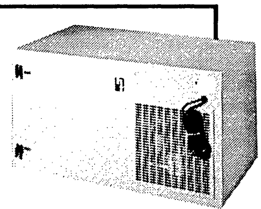
- **Improve chamber performance**
- **Improves computer control of chambers**
- **Reduces CO_2 consumption 50% to 90%**

By performing the function of a refrigerant condenser, uniform saturated liquid CO_2 is delivered to chambers when HT-300 Satellite Reservoirs are interfaced to any CO_2 distribution system including:

1- Bulk liquid CO_2 circulating systems
2- One way bulk liquid CO_2 lines
*3- Room temperature regulated CO_2 cylinders
4- Bulk CO_2 dewars
*5- Bulk CO_2 vapor one way lines

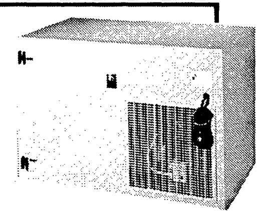
*Results in super clean "bone-dry" liquid CO_2 for chambers

HT-300-4 CO_2 Satellite Reservoir



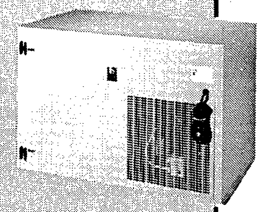
The HT-300-4 is designed to fit under laboratory benches. With a reservoir capacity of 100 pounds and a recovery rate of 15 lbs/hr, the HT-300-4 can supply liquid CO_2 to several small environmental test chambers. Suitable for quiet environment.
Dimensions: Height 24", Width 25", Length 40"
Electrical: 8.22 amperes, 115 volts, 60 Hz, single phase.
Shipping weight 300 pounds.

HT-300-7 CO_2 Satellite Reservoir



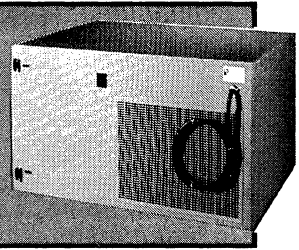
The HT-300-7 with a 150 pound reservoir capacity and a 20 lbs/hr recovery rate can supply liquid CO_2 to several medium size temperature chambers (4 to 6 cubic feet working volumes). Suitable for quiet environment.
Dimensions: Height 30", Width 25", Length 40"
Electrical: 8.22 amperes, 115 volts, 60 Hz single phase.
Shipping weight 350 pounds.

HT-300-8 CO_2 Satellite Reservoir



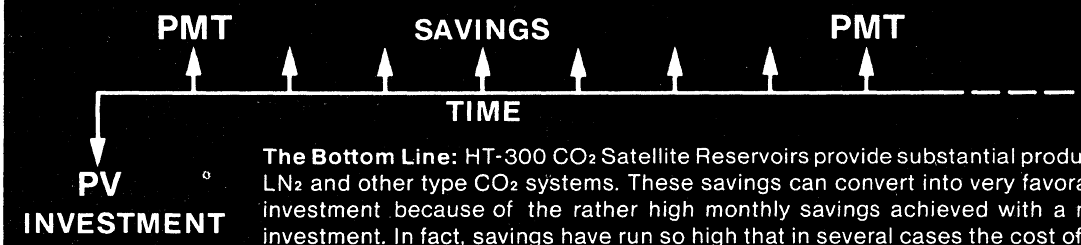
The HT-300-8 with a 150 pound reservoir capacity and a 35 lbs/hr recovery rate is designed to supply liquid CO_2 to larger chambers (8 to 10 cubic feet) and to vapor stripped extended liquid CO_2 lines as long as 45 feet.
Dimensions: Height 30", Width 25", Length 40"
Electrical: 12.4 amperes, 115 volts, 60 Hz single phase.
Shipping weight 400 pounds.

HT-300-12 CO_2 Satellite Reservoir



The HT-300-12 with a 300 pound reservoir capacity and a 75 lbs/hr recovery rate is designed to supply liquid CO_2 to large test chambers and vapor stripped extended liquid CO_2 lines.
Dimensions: Height 30", Width 36", Length 46.5"
Electrical: 11.0 amperes, 230 volts, 60 Hz single phase.
Shipping weight 800 pounds.

THE BOTTOM LINE



The Bottom Line: HT-300 CO_2 Satellite Reservoirs provide substantial product savings over LN_2 and other type CO_2 systems. These savings can convert into very favorable returns on investment because of the rather high monthly savings achieved with a rather modest investment. In fact, savings have run so high that in several cases the cost of the necessary HT-300 equipment has been recovered in under twelve weeks!

Call or write for information and list of satisfied users.

HAFSTROM TECHNICAL PRODUCTS Inc.
P.O. Box 9829
San Diego, California 92109-0286
(619) 274-8822

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MODEL 810 TEST-BENCH THERMO-PROBE

Puts exact heat where you want it for your IC tests

Model 810 Thermo-Probe lets you heat-test integrated circuit components with constant ease and accuracy. No ovens; no heat chambers. Everything's out in the open, where you're in control, where you can prevent damage to circuitry.

With Thermo-Probe you apply heat that is ±2°C accurate — or better — to integrated circuits, diodes, resistors, capacitors, and transistors, or any other kinds of components. You pinpoint heat-drift and thermo-electric problems. In just 60 seconds you have precise heat from +25 to +250°C right on your test bench.

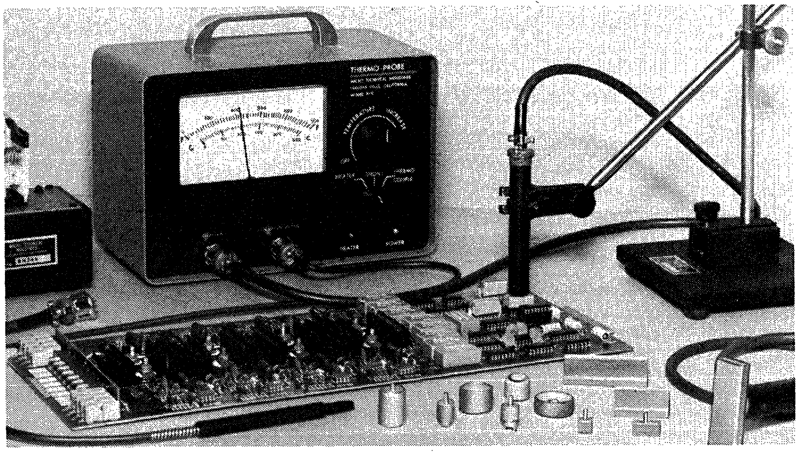
A reliable solid-state controller continuously monitors the probe temperature and regulates it to your setting on the control knob. You monitor the feedback circuit right on the direct-reading 4 x 4½-inch pyrometer. This analog readout lets you fine-tune the tip temperature when there's a difference between it and the overall probe.

The meter, by the way, has a shunt across the terminals to protect the instrument in transit, or any time there's no probe in place.

A separate thermocouple circuit can be used to read temperatures at the heat probe tip or at any spot along the thermal path. Or it can be used simply as a separate temperature-reading tool.

Tips are available for nearly any electronic component. Custom tips can be supplied to meet your special requirements.

All probes and tips are ordered separately.



SPECIFICATIONS: MODEL 810 THERMO-PROBE

AVAILABLE PROBES: C8229A (9 watt) and C8230A (35 watt). TC831 thermocouple sensing probe.

PROBE TEMPERATURE: +25 to +250°C.

ACCURACY: ± 2° Centigrade or better.

ELECTRICAL: 9 or 35 watts, 120 volts AC. (240V on request.)

CASE SIZE: 5 inches high, 6 inches wide, 9 inches deep (127.0 x 152.4 x 228.6 mm).

SHIPPING WEIGHT: 9 pounds (4.082 kg).

MODELS 35B & 35AB PRODUCTION-LINE THERMO-PROBES

Heat-test integrated circuits without production slowdown

Now you can heat-test semiconductor and individual electronic components right on the production line. And you can do it without expensive, cumbersome ovens or heat chambers.

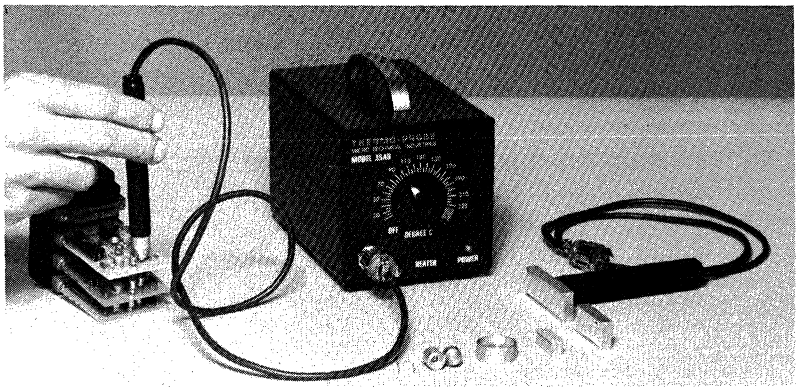
Thermo-Probe — Model 35B or 35AB — puts heat where you want it, right now. And it does so without risking oven-heat damage to expensive components.

Let Thermo-Probe go to work for you. Apply heat that is ±2°C accurate — or better — direct to integrated circuits, diodes, resistors, capacitors, and transistors to pinpoint heat-drift and thermo-electric problems. You now have accurate heat from +25 to +225°C (Model 35AB) right on your bench.

A reliable solid-state controller continuously monitors the probe temperature and regulates it to the temperature you set on the control knob. It takes no more than 60 seconds to bring the probe to this setting from ambient temperature (for Model 35AB; 40 seconds for 35B).

Tips are available for nearly any electronic component. Custom tips can be supplied to meet your special requirements.

All probes and tips are ordered separately.



SPECIFICATIONS: THERMO-PROBE MODELS 35B & 35AB

AVAILABLE PROBES: C229A (9 watt) and C230A (35 watt)

PROBE TEMPERATURE, MODEL 35B: +25 to +150°C.

PROBE TEMPERATURE, MODEL 35AB: +25 to +225°C.

ACCURACY: ±2° Centigrade or better.

ELECTRICAL: 9 or 35 watts, 120 volts AC. (240V on request.)

CASE SIZE: 4 by 4 by 6 inches deep (101.6 x 101.6 x 152.4 mm).

SHIPPING WEIGHT: 7 pounds (3.175 kg).

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SPECIAL TIPS FOR THERMO-PROBE COMPONENT HEATERS

TIPS FOR TRANSISTOR CASES

Case	Max. Case Dimensions inches (millimeters)	Part No.*	Case	Max. Case Dimensions inches (millimeters)	Part No.*
TO-1	.240 Dia. x .410 L (6.09 x 10.40)	01-109	TO-54	.200 Dia. x .010 L (5.08 x 0.25)	54-109
TO-2	.135 Dia. x .255 L (3.42 x 6.48)	02-109	TO-55	.340 Dia. x .195 L (8.64 x 4.95)	55-109
TO-3	.800 Dia. x .125 L (20.30 x 3.18)	03-135	TO-56	.195 Dia. x .140 L (4.95 x 3.56)	56-109
TO-5	.335 Dia. x .260 L (8.51 x 6.60)	05-109	TO-57	.425 Dia. x .155 L (10.80 x 3.94)	57-109
TO-7	.360 Dia. x .375 L (9.14 x 9.53)	07-109	TO-58	.245 Dia. x .290 L (6.22 x 7.37)	58-109
TO-8	.524 Dia. x .170 L (13.30 x 4.32)	08-135	TO-66	.505 Dia. x .215 L (12.80 x 5.46)	66-135
TO-9	.335 Dia. x .100 L (8.51 x 2.54)	09-109	TO-70	.240 Dia. x .020 L (6.09 x 0.51)	47-109
TO-11	.375 Dia. x .300 L (9.53 x 7.62)	11-109	TO-73	.335 Dia. x .185 L (8.51 x 4.70)	73-109
TO-12	.335 Dia. x .260 L (8.51 x 6.60)	05-109	TO-74	.335 Dia. x .185 L (8.51 x 4.70)	73-109
TO-16	.335 Dia. x .260 L (8.51 x 6.60)	05-109	TO-75	.335 Dia. x .185 L (8.51 x 4.70)	73-109
TO-18	.195 Dia. x .210 L (4.95 x 5.33)	18-109	TO-76	.335 Dia. x .185 L (8.51 x 4.70)	73-109
TO-22	.340 Dia. x .190 x .320 L (8.64 x 4.83 x 8.13)	22-109	TO-77	.335 Dia. x .185 L (8.51 x 4.70)	73-109
TO-23	.115 Dia. x .100 L (2.92 x 2.54)	23-109	TO-78	.335 Dia. x .105 L (8.51 x 2.67)	78-109
TO-24	.187 Dia. x .250 L (4.75 x 6.35)	24-109	TO-79	.335 Dia. x .105 L (8.51 x 2.67)	78-109
TO-28	.195 Dia. x .350 L (4.95 x 8.89)	28-109	TO-84 (Flat Pak)	.330 L x .240 W (8.38 x 6.10)	84-109
TO-29	.322 Dia. x .360 L (8.18 x 9.14)	29-109	TO-85 (Flat Pak)	.330 L x .240 W (8.38 x 6.10)	84-109
TO-33	.335 Dia. x .260 L (8.51 x 6.60)	05-109	TO-86 (Flat Pak)	.330 L x .240 W (8.38 x 6.10)	84-109
TO-36	1.000 Dia. x .187 L (25.40 x 4.75)	36-135	TO-88 (Flat Pak)	.330 L x .240 W (8.38 x 6.10)	84-109
TO-37	.320 Dia. x .260 L (8.13 x 6.60)	37-109	TO-89 (Flat Pak)	.330 L x .240 W (8.38 x 6.10)	84-109
TO-38	.500 Dia. x .375 L (12.70 x 9.53)	38-135	TO-90 (Flat Pak)	.330 L x .240 W (8.38 x 6.10)	84-109
TO-39	.335 Dia. x .260 L (8.51 x 6.60)	05-109	TO-92	.205 Dia. x .210 L (5.21 x 5.33)	92-109
TO-40	.240 Dia. x .459 L (6.10 x 11.60)	40-109	TO-95 (Flat Pak)	.330 L x .240 W (8.38 x 6.10)	84-109
TO-41	.880 Dia. x .300 L (22.40 x 7.62)	41-135	TO-96	.335 Dia. x .185 L (8.51 x 4.70)	73-109
TO-42	.335 Dia. x .260 L (8.51 x 6.60)	05-109	TO-97	.335 Dia. x .105 L (8.51 x 2.67)	78-109
TO-43	.335 Dia. x .260 L (8.51 x 6.60)	05-109	TO-98	.195 Dia. x .055 L (4.95 x 1.40)	98-109
TO-44	.240 Dia. x .459 L (6.09 x 11.60)	40-109	TO-99	.335 Dia. x .105 L (8.51 x 2.67)	78-109
TO-45	.360 Dia. x .375 L (9.14 x 9.53)	07-109	TO-100	.335 Dia. x .105 L (8.51 x 2.67)	78-109
TO-46	.200 Dia. x .030 L (5.08 x 0.76)	46-109	TO-101	.335 Dia. x .105 L (8.51 x 2.67)	78-109
TO-47	.240 Dia. x .020 L (6.09 x 0.51)	47-109	TO-116 (Flat Pak)	.660 L x .220 W (16.80 x 5.59)	116-109
TO-52	.200 Dia. x .085 L (5.08 x 2.16)	52-109	TO-126 (Flat Pak)	.330 L x .240 W (8.38 x 6.10)	84-109
TO-53	.685 Dia. x .300 L (17.40 x 6.85)	53-135	TO-220 (Flat Pak)	.500 L x .405 W (12.7 x 10.29)	220-109

TIPS FOR INTEGRATED CIRCUITS

Case	Max. Case Dimensions inches (millimeters)	Part No.*
Dual Inline 8 Pin	.500 L x .275 W (12.7 x 6.98)	DIC 8-109
Dual Inline 14-16 Pin	.750 L x .260 W (19.10 x 6.60)	DIC 14-16-109 DIC 14-16-135
Dual Inline 18 Pin	.875 L x .275 W (22.23 x 6.99)	DIC 18-109 DIC 18-135
Dual Inline 24 Pin	1.300 L x .600 W (33.00 x 15.20)	DIC 24-135
Dual Inline 40 Pin	2.00 L x .625 W (50.8 x 15.87)	DIC 40-135

TIPS FOR DIODE CASES

Case	Max. Case Dimensions inches (millimeters)	Part No.*
Tophat DO-1	.280 Dia. x .260 L (7.11 x 6.60)	01-209
DO-2	.280 Dia. x .260 L (7.11 x 6.60)	01-209
DO-3	.280 Dia. x .260 L (7.11 x 6.60)	01-209
Subminiature DO-7	.107 Dia. x .300 L (2.72 x 7.62)	07-209

TIPS FOR MISCELLANEOUS COMPONENTS

Case	Max. Case Dimensions inches (millimeters)	Part No.*
¼W Resistor		07-209
½W Resistor		1R-309
1W Resistor		2R-309
2W Resistor		3R-309
Submin. Xtal	.172 x .422 x .516 (4.36 x 10.72 x 13.10)	1C-309
Min. Xtal	.530 x .220 x .574 (13.50 x 5.60 x 14.60)	2C-309 2C-335

PROBES

Model	Probe	Part Number	Temperature
810	9-Watt Probe	C8229A	+25°C to +250°C
810	35-Watt Probe	C8230A	+25°C to +250°C
810	Thermocouple	TC831	+25°C to +250°C
35B	9-Watt Probe	C229A	+25°C to +225°C
35B	35-Watt Probe	C230A	+25°C to +225°C
35AB	9-Watt Probe	C229A	+25°C to +225°C
35AB	35-Watt Probe	C230A	+25°C to +225°C

*Last two digits indicate wattage of probe best suited for this tip.

Tips to fit many components not listed can also be supplied, per your sketch or drawing. If the desired size is not listed or if case type is unknown, order by component manufacturer's part number or describe as fully as possible giving maximum sizes.

MTI MICRO-TECHNICAL INDUSTRIES

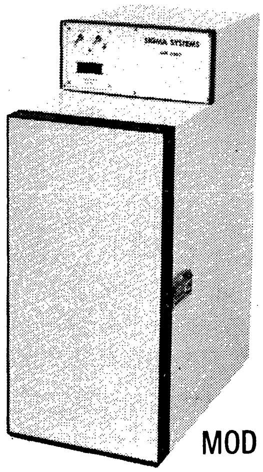
23666 BIRTCHER DRIVE, SUITE B, LAKE FOREST, CA 92630 • (714) 855-4326 • TLX 371-9688 • MICROTECH

TEMPERATURE
BURN-IN/CYCLING
LIFE TEST

CHAMBERS

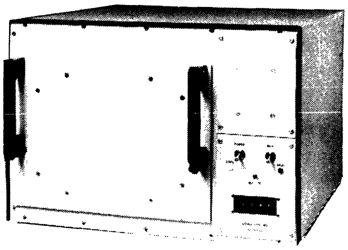
THERMAL
PLATFORMS
"COLD PLATES"

PROGRAMMABLE BY: DIGITAL THUMBWHEEL-RESISTANCE-VOLTAGE-CYCLE TIMER

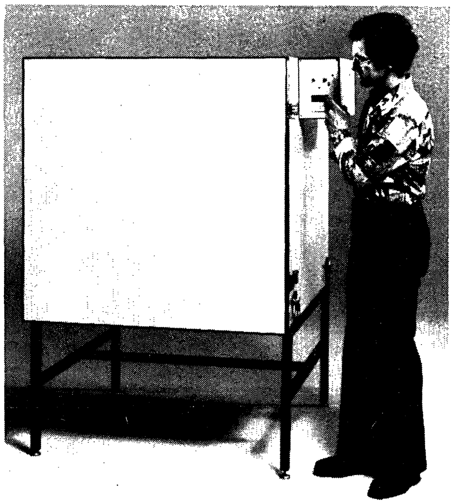

MOD 52

BENCH MODELS
42, 1.48 ft^3
52, 1.83 ft^3
100, 3.5 ft^3
170, 6.0 ft^3

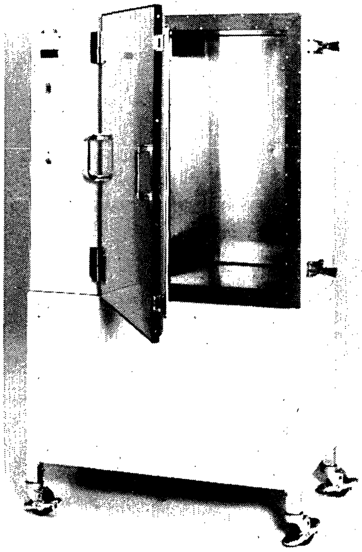
IEEE 488
or
RS232

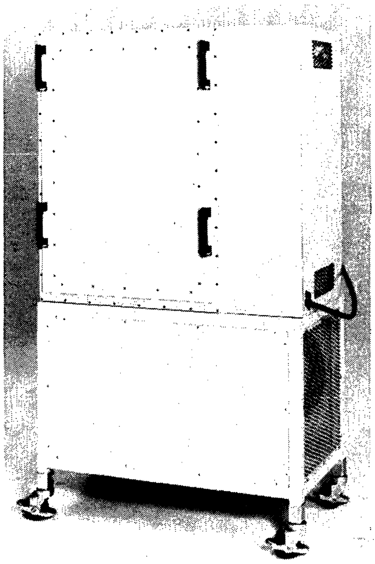

MOD 18

PORTABLES
10, .46 ft^3
18, .64 ft^3
26, .92 ft^3


MOD 170

FLOOR MODELS
100, 3.5 ft^3
170, 6.0 ft^3
600, 21.0 ft^3

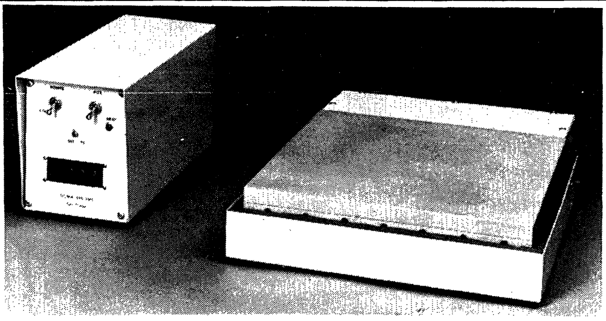

M-173 FRONT


M-173 REAR

DUAL ACCESS
173, 6 ft^3
369, 13 ft^3

With hinged lift-off doors and interchangeable snap-off rear panels

FLOOR MODELS & DUAL ACCESS
Front and Rear Door Types-Cooled Mechanically, by CO$_2$, LN$_2$, Air, or Mechanically with LN$_2$ boost.


TP781

"COLD PLATE"

A conveniently open temperature control system for small components with a conductive surface.(11"x11")

RANGE:-65°C TO 200°C

SIGMA SYSTEMS CORPORATION

Leaders in the Chamber Industry since 1958
3163 ADAMS AVE., SAN DIEGO, CA 92116 (619) 283-3193

SIGMA SYSTEMS CORPORATION
(FORMERLY DELTA DESIGN ENGINEERS, INC.)

Tenney
ENGINEERING, INC.

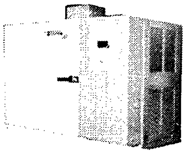
ENVIRONMENTAL TEST EQUIPMENT

The Largest and Most Experienced Manufacturer of High Technology Environmental Test Equipment

109 Springfield Rd., Union, New Jersey 07083 • (201) 686-7870

BENCHTOP TEMPERATURE CHAMBERS

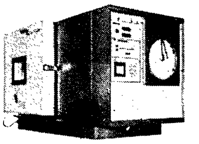
Work space:
1¼ and 5 cubic feet.
Temperature range:
−80°C to +200°C



Bulletins 108 and 123

BENCHTOP TEMPERATURE-HUMIDITY CHAMBERS

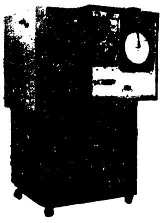
Workspace:
3 and 5 cubic feet
Temperature range:
−73°C to +200°C
Humidity capabilities:
20% RH to 98% RH



Bulletins 101 and 123

TENNEY SERIES HIGH-LOW TEMPERATURE AND TEMPERATURE HUMIDITY TEST CHAMBERS

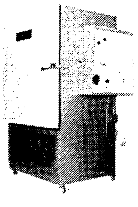
Workspace:
6 cubic feet
64 cubic feet
Temperature range:
−80°C to +200°C
Humidity: Optional



Bulletins 104 and 144

TH & T SERIES MODERATE RANGE TEMPERATURE-HUMIDITY CHAMBERS

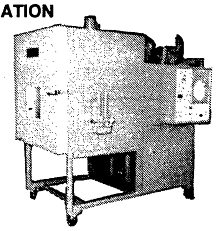
Workspace:
27 cubic feet and
65 cubic feet
Temperature range:
Low to −18°C
High to +93°C
Humidity: Optional



Bulletin 139

MIL-STD 781 AGREE TEMPERATURE- VIBRATION CHAMBERS

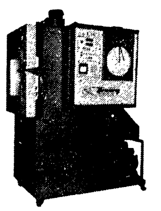
Size:
Available in sizes for mating with vibrator units having table tops from 4 square feet to 40 square feet
TennTrol™ Standard



Bulletin 105

TENNEYSTRAT ALTITUDE- TEMPERATURE CHAMBERS

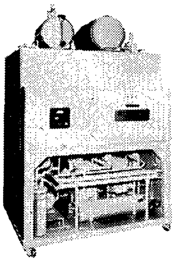
Workspace:
3.2 cubic feet thru 64 cubic feet
Temperature range:
−73°C to +177°C
Altitude: to 200,000 feet
Humidity: Optional



Bulletin 141

LOW TEMPERATURE PROCESS EQUIPMENT

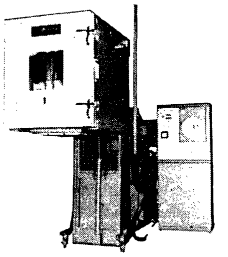
Packaged
Refrigeration Systems
Temperature range:
Low to −73°C
High to +121°C



Bulletin 114

VIBRATION/ TEMPERATURE CHAMBERS

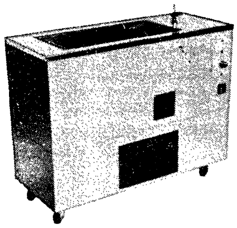
Workspace:
Standard from 5 cubic feet to 64 cubic feet
Temperature range:
−73°C to +200°C
Humidity: Optional



Bulletin 102

MULTI-RANGE PRECISION TEMPERATURE BATHS

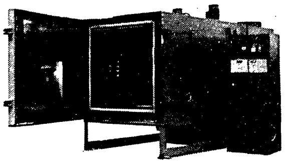
Workspace:
One gallon and nine gallon
Temperature range:
−73°C to +120°C



Bulletin 146

CERT SYSTEMS

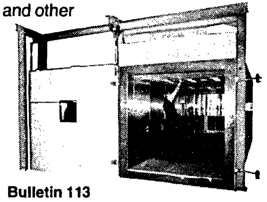
Combined Environment Reliability Testing Systems provide temperature, humidity, altitude, random vibration and cooling air simulation. Permits simulation of mission profile environments.



Bulletin 134

WALK-IN ROOMS

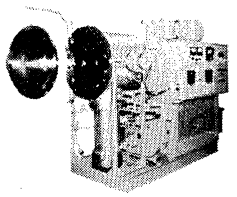
For burn-in, temperature, humidity, altitude and other controlled environment testing. Custom-engineered in unitized or semi-unitized packages as well as modular panels.



Bulletin 113

THERMAL VACUUM SPACE SIMULATORS

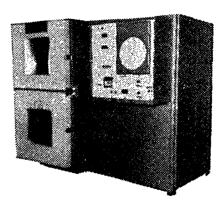
Workspace:
Standard 1½ feet to 6 feet diameters
Vacuum capability:
to 2×10⁻⁸ Torr.
Temperature range: From −196°C to +177°C



Bulletin 120

THERMAL SHOCK CHAMBERS

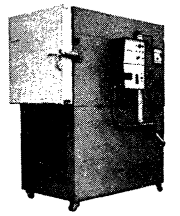
Two zone, three zone and dual loading capabilities. Vertical or horizontal configurations. Designed for MIL-STD 883/202 shock testing. Workspace: 2, 8 and 10 cubic feet. Microprocessor controls standard.



Bulletin 121

VACUUM CHAMBERS AND VACUUM OVENS

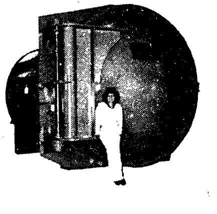
Workspace:
4 cubic feet thru 27 cubic feet
Temperature range:
to +150°C
Vacuum capability:
to 169 microns
(200,000 feet)



Bulletin 110

AUTOCLAVE SYSTEMS

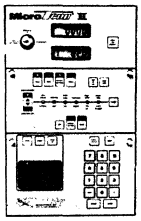
Sizes:
Small laboratory models to large production units
Temperature range:
+400°C
Pressure to 800 psig.
Vacuum: Optional



Bulletin 122

MICROTENN®II

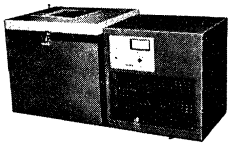
Microprocessor Programmer-Controller automatically signals chamber to perform programs entered via the keyboard or by the Command Cartridge. Computer interfaces are available.



Bulletin 137

TENNEY SUB-ARCTIC INDUSTRIAL CABINETS AND COLD STORAGE CHESTS

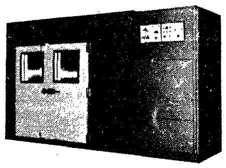
Workspace:
6 cubic feet thru 12 cubic feet
Temperature range:
Low to −80°C
High to +177°C



Bulletin 115

BURN-IN CHAMBERS

Size and number of doors may be specified to meet any burn-in requirement
Typical temperature range:
0°C to +60°C



Bulletin 133

©Tenney Eng. Inc. 1982

ENTER

CABLE LENGTH CHECKER

NEW! Model 1500

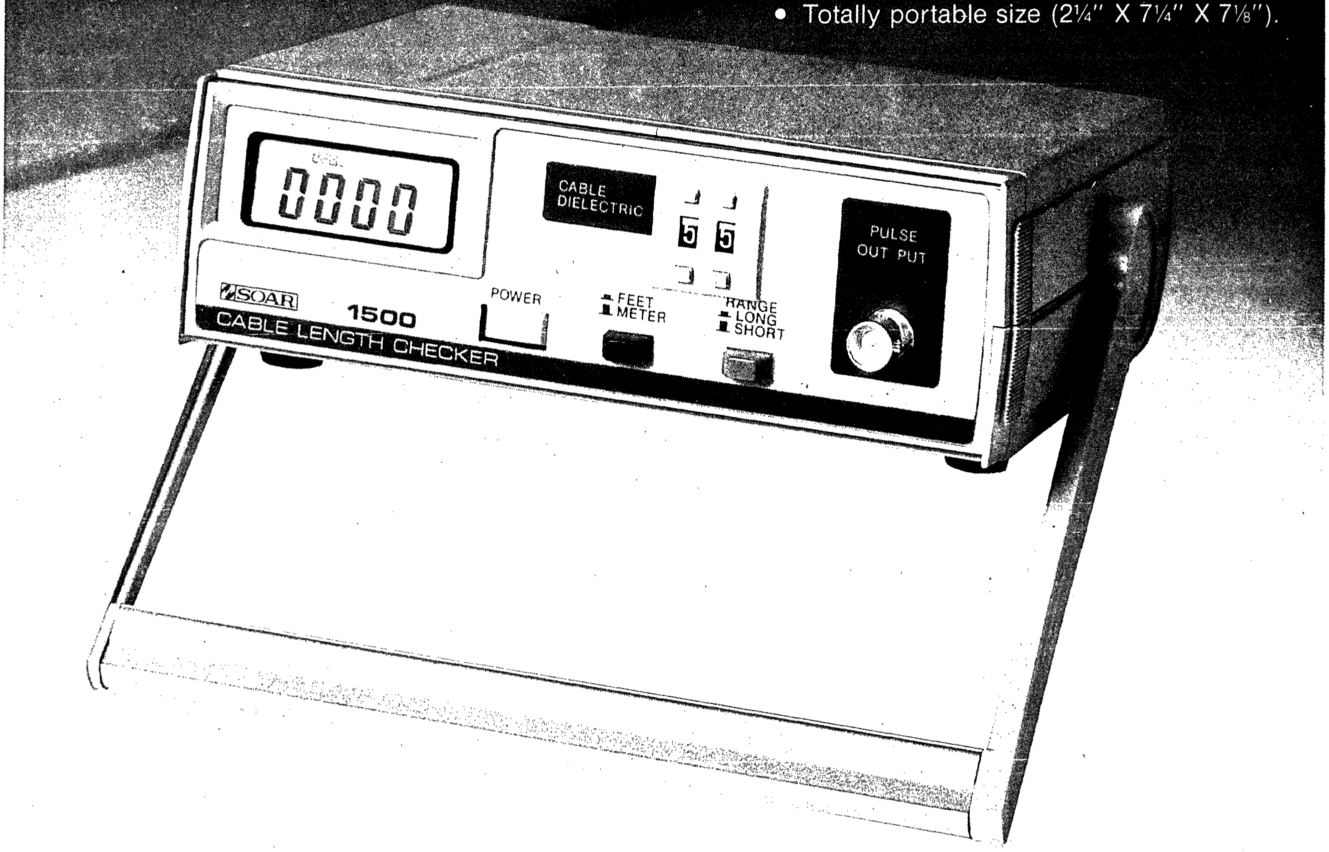
$499.00

Come SOAR with us!

SOAR corporation

Features

- 4 digit LCD display can measure coax or twisted pairs from 15 to 6500 feet on 2 ranges ±1% and indicate whether the cable termination is "OPEN" or "SHORT" (A TRUE TDR).
- Convenient front panel switch allow selection of "Feet" or "Meter".
- Two digital switches allow easy operation for the cable nominal velocity propagation setting from 0.01 to 0.99.
- Supplied with rechargeable Ni-Cad batteries, AC adaptor, and cigarette lighter attachment, BNC to dual banana plug adaptor, 1 year warranty.
- Totally portable size (2¼" X 7¼" X 7⅛").


0000
CABLE DIELECTRIC
5 5
PULSE OUT PUT
SOAR
1500
CABLE LENGTH CHECKER
POWER
FEET
METER
RANGE
LONG
SHORT

NORTH AMERICAN SOAR corporation

1126 CORNELL AVENUE
CHERRY HILL, NJ 08002
PHONE (609) 488-1060

eem selection guide

multimeters-2900

HANDHELD DIGITAL MULTIMETERS

Manufacturer	EEM Page No.	Model/ Series	No. of Digits	Maximum Readings					DC Accuracy (% Rdng.)	True RMS	Type Display
				Voltage (V)		Current (A)		Resistance MΩ			
				AC	DC	AC	DC				
Ballantine	D•1185	3100A									
BBC-Metrawatt/Goerz	D•1192	M2011	3½	650	650	2	2	20	0.5		LCD
		M2012	3½	650	650	10	10	20	0.25		LCD
F. W. Bell	D•1195	CG100A	—	600	600	100	100	—	2.0		
		CG100D	3½	600	1800	200	200	—	3.0		LCD
		PG200D	3½	600	600	300	300	—	1.0		LCD
North American Soar	D•1270	3025	3½								LCD
		3030/3050	3½								LCD
	D•1271	ME530	3½			10	10				LCD
		ME540	3½	750	1000	10	10	20	0.7		LCD
		ME550	3½	750	1000	20	20	20	0.8		LCD
	D•1272	8050	3½	750	1000	10	10	20	0.5		LCD
		3100	3½								LCD
		3430	4½	1000	1000	10	10	25	0.04	●	
Simpson	D•1308	470	3½	25	25	10	10		0.15		
		474	4½	25	25	10	10		0.03		
Triplett	D•1319	3400	3½	200	0.2	2	2	20	0.15		LCD
		3525	3½	500	200			200K	0.75		LCD
	D•1320	3550	3½	200	1000	20 mA	20 mA	200	0.5		LCD
		3560	3½	200	1000	200 mA	20 mA	200	0.25		LCD
		3565	3½	750	1000	200 mA	200 mA	2000K	0.8		LCD
		4700	4½	750	1000	10	10	20	0.5	●	LCD

DIGITAL MULTIMETERS, NOT HANDHELD

Manufacturer	EEM Page No.	Model/ Series	No. of Digits	Maximum Readings					DC Accuracy (% Rdng.)	True RMS	Type Display	Battery Operated	Plug-in
				Voltage (V)		Current (A)		Resistance MΩ					
				AC	DC	AC	DC						
Associated Research	D•1181	1000D, 1001D	3½					200	0.2		LED	●	●
Ballantine	D•1185	Var.	3½	—	300	—	—	—	—	●	LED	●	
B&K Precision	D•1186	2817/18	3½	750	1000	10	10	20	0.1	●	LCD	●	
	D•1187	2830/31	3½	750	1000	10	10	10	0.1		LED	●	
		2807	3½	750	1000	10	10	10	0.5		LCD	●	
		2816	3½	750	1000	10	10	10	0.25		LCD	●	
		2806	3½	750	1000	10	10	10	0.7		LCD	●	
		2804	3½	750	1000	10	10	10	0.7		LCD	●	
BBC-Metrawatt/Goerz	D•1192	M2030/ 31/32	3½	600	600	20	20	20	0.1	●	LCD	●	
	D•1193	MA5D	4½	1000	1000	30	30	20	0.05	●	LCD	●	
Clarke-Hess	D•1200	258	3½	1000	1000	7	7		0.1		LED		●
		255/56	3½	1000	1000	7	7		0.6	●	LED		●
	D•1201	259	3½	340	650	7	7		0.25	●	LED		●
Coaxial Dynamics	D•1203	83500	Ask Mfr.										
IET Labs	D•1242	IMF-600	3½	750	1000	2	2	1000	0.5	●	LED		●
North American Soar	D•1270	5025	3½									●	●
Ohio Semitronics	D•1288	EM-3	3½	150	—	10	—	—	0.5		LCD		●

HANDHELD ANALOG MULTIMETERS

Manufacturer	EEM Page No.	Model/ Series	Maximum Readings					DC Accuracy (% Rdng.)
			Voltage (V)		Current (A)		Resistance MΩ	
			AC	DC	AC	DC		
BBC-Metrawatt/Goerz	D•1192	MA/1H	500	1000	5	5	1	5
			500	1000	15	15	1	2.5
North American Soar	D•1280	SX-220	1000	1000		10	1K	3
		SX-200	1000	1000		250 mA	1K	
		SX-100	1000	1000		250 mA	1K	
		SX-120	1000	1000		250 mA	1K	
Simpson	D•1308	16979	1000	1000			1K	3
Triplett	D•1318	310-5	1200	1200		0.6	20	0.3
		60-2	1000	1000		1	10	2.0
		60-NA-2	1000	1000		1	100	1.5
	D•1319	310-1	600	600		1.2 mA	5000	3.0
		64		1000			1000	3.0

ANALOG MULTIMETERS, NOT HANDHELD

Manufacturer	EEM Page No.	Model/ Series	Maximum Readings					DC Accuracy (% Rdng.)	Battery Operated	Plug-in
			Voltage (V)		Current (A)		Resistance MΩ			
			AC	DC	AC	DC				
Ballantine	D•1185	3440A		300					●	
Coaxial Dynamics	D•1203	81000A	Ask Mfr.							
IET Labs	D•1245	MV800		300					●	
Millivac	D•1266	MV-973A	300	1000	1	1	5000		●	●
Simpson	D•1308	260/7	1000	1000		10	2000	0.2	●	

FUNCTION GENERATORS

Manufacturer	EEM Page No.	Model/ Series	Frequency Range (Hz)		Functions	Sweep
			From	To		
B&K Precision	D•1189	3030	0.001	5M	sine, square, triangle, pos. square, neg. square, pos. ramp, neg. ramp	●
		3025	0.005	5M	sine, square, triangle, haversine	●
		3020	0.02	2M	sine, triangle, square, TTL square wave, pulse, tone-burst	●
	D•1190	3015	2	200K	sine, square, triangle	●
		3010	1	1M	sine, triangle, square, TTL square wave	
Krohn-Hite	D•1258	1000A	0.2	3M		
		1200A	0.2	3M		●
		1400	0.2	3M		●
		1600	0.2	3M		●
		2000	0.003	30M		
		2200	0.003	30M		●
		2400	0.003	30M		●
		5100B	0.002	3M		
		5200A	0.002	3M		●
		5300A	0.002	3M		●
		5400B	0.002	5M		
		5600	0.002	2M		
		5700	0.002	2M		
		5500AR	0.0001	5M		
		5900	0.0001	5M		
		5910	0.0001	5M		

SIGNAL GENERATORS

Manufacturer	EEM Page No.	Model/ Series	Frequency Range (Hz)		Modulation (Hz)		Features	
			From	To	From	To	IEEE-488 Compatible	Program-mable
B&K Precision	D•1189	3020	.02	2M				
Boonton	D•1197	1020/21	150K	540M				●
		1030	150K	180M				●
		102E/F	450K	520M	15	15K		
		103C/D	125K	175M				
Industrial Test Equipment	D•1247	5900	45	19.99K				
Marconi	D•1262	2017	10K	1024M			●	●
		2018	80K	520M			●	
		2019	80K	1040M			●	
RE Instruments	D•1295	RE107	100K	150M	20	20K	●	●
		RE104	150K	130M			●	●
		RE101	150K	130M				

DIGITAL DELAY GENERATORS

Manufacturer	EEM Page No.	Model/ Series	Time Increments (ns)	Time Range (ns)	Trigger Rate (MHz)	Input Sensitivity (V)	Features IEEE-488 Compatible	Features Program-mable	Features BCD Output
Berkeley Nucleonics	D•1196	7095	100 ps	0-100 μs	0-5	200 mV	●	●	●
		7030A	1	0-.01	0-10	250 mV	●	●	●
		7065	1	0-1.0	0-5	200 mV	●	●	●
		7075	1	0-1.0	0-5	200 mV	●	●	●
		7085	1	0-100	0-5	200 mV	●	●	●
		7050	10	0-10	0-5	200 mV	●	●	●
		7055	10	0-10	0-5	200 mV	●	●	●
		7020	100	0-10	0-1	100 mV	●	●	●
		7010	100-10^3	0-107	0-1	2	●	●	●
California Avionics Labs.	D•1198	201AR	1 μs	1 μs-100s				●	
		101AR	100	100 ns-10s				●	
		111AR	10	100 ns-1s				●	
		101CR	100	100 ns-10s				●	
		111CR	10	100 ns-1s				●	
		131BR	100 ps	50-1599.9				●	
		103BR	100	100 ns-10s			●	●	
		113BR	10	100 ns-1s			●	●	
		103CR	100	100 ns-10s			●	●	
		113CR	10	100 ns-1s			●	●	
		103DR	100	100 ns-10s			●	●	
		113DR	10	100 ns-1s			●	●	

PULSE GENERATORS

Manufacturer	EEM Page No.	Model/ Series	Frequency Range (Hz) From	Frequency Range (Hz) To	Optical Peak Power μW Pulse Amplitude (V)	Elec-tronic	Optical
B&K Precision	D•1190	3300	5M	1		●	
Berkeley Nucleonics	D•1196	6010A	20M	500K	50 μW		●
		6010B	20M	500K	200 μW		●
		6010C	2M	250K	3 μW		●
		6020	—	150M	2 mW		●
		6010D	2M	150K	300 nW		●
		6010E	20M	200K	200 μW		●
North American Soar	D•1278	PG-905	1	10M	10	●	
Velonex	D•1324	345	—	—	11.4K	●	
		350	—	—	24K	●	
		360	—	—	30K	●	
		380	—	—	1K	●	
		660	—	—	30K	●	

CALIBRATORS, REFERENCES, STANDARDS, SOURCES

			Device Type				Parameters												Parameter Range	Readout		Features	
Manufacturer	EEM Page No.	Model/ Series	Calibrator	References, DC Voltage	Standards	Sources	Current, AC	Current, DC	Frequency	Phase Angle	Power	Resistance	Signal, Audio	Signal, Test	Thermal Voltage, AC/DC	Voltage (AC)	Voltage AC (RMS)	Voltage (DC)	From - To Units	Analog	Digital	Programmable	IEEE-488 Compatible
Astrosystems	D•1183		●		●	●	●		●	●				●		●			Ratio: 0-180°		●	●	●
Ballantine Labs.	D•1185	4003A	●		●	●	●	●	●	●	●	●		●	●	●						●	●
Comstron•Adret	D•1204	730A				●			●				●						300 Hz-180 MHz		●	●	●
Comstron	D•1205					●													0.1-1300 MHz		●	●	●
Deak Technology	D•1208	PACS-50K/AZI	●		●					●									2 Hz-50 KHz		●	●	●
		PACS-50K/PGI	●		●					●									2 Hz-50 KHz		●	●	●
Electronic Development	D•1213	520A			●			●										●	100 mV-1000V		●	●	●
		501J			●		●	●										●	100 mV		●	●	●
		4500	●				●		●							●			100 µV-111 VAC		●	●	●
	D•1214	MV116-J		●	●	●												●	11V-100 mV				
		MV216A			●	●										●			±10V to ±100 mV				
		3210	●				●												100A, 10A, 1A				
		3200B	●				●	●											10A-1 mA				
	D•1215	CR103J			●			●										●	110 mA-11 mA				
		WMC-32	●				●	●								●			Watt/ Hour	●			
		4600			●											●			1000V-100 mV				
Elgenco	D•1219	1600				●													Noise				
	D•1223	1800				●													Noise				
Frequency & Time Systems	D•1230	Cesium, Quartz			●				●														
General Resistance	D•1233					●	●	●				●			●				to 100V				
IET Labs.	D•1244					●	●	●											200 µA, 2 mA, 20 mA		●	●	●
Julie Research	D•1252	Locost	●				●	●								●		●	Ratio		●	●	
	D•1254	AVS/DVS				●												●		●		●	
		SCO-106		●											●								
		ZVR		●																			
		GTX				●																	
		TNB			●												●	●					
	D•1255	DMR/MRS/ PRO		●								●							.001 Ohms-100,000 Ohms				
		NB			●							●											
	D•1256	AC/CS/QC/ PA/RCD				●													10 Hz-100 KHz			●	
		PA	●																10 Hz-1 MHz			●	
Koep Precision Standards	D•1257			●	●													●	Ratio		●		
North Atlantic Instrument	D•1283	530/20, 532			●				●										50 Hz-11 KHz		●		
Programmed Test Sources	D•1292					●			●										0.1 MHz-500 MHz				
Ryan International	D•1303	311RT			●					●									30 Hz to 10,000 Hz	●			
Sensitive Resch. Instrs./Electrical Instr. Svc.	D•1305	C/S/N		●	●			●	●									●		●			
		D/MI		●	●		●	●	●								●	●		●			

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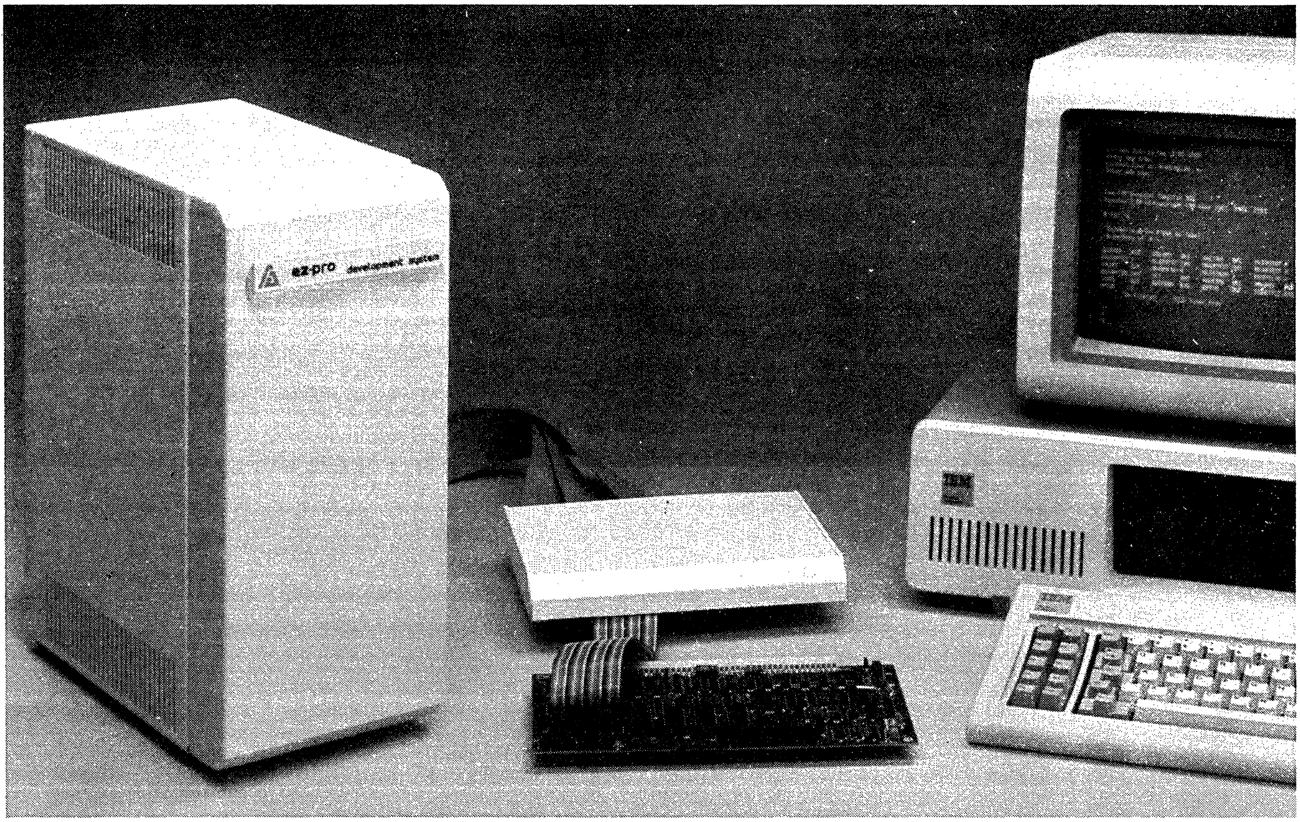
automation



EZ-PRO 2.1 + IBM PC = WINNER

Complete Development Station. EZ-PRO 2.1 connects to your personal computer via RS232 and supports the widest selection of in-circuit emulators. Check the tabulation for the microprocessors you're planning to use.

Single-Vendor Responsibility. Each In-Circuit Emulator is supplied by American Automation with cross assembler, linker, and symbolic debugger.

C-Cross Compiler. Proprietary C-cross compilers are available for selected processors.

EZ-PRO 2.1 SUPPORTS:

Intel:

8031	CMOS, NMOS
8032	NMOS
8035	CMOS, NMOS
8039	CMOS, NMOS
8040	NMOS
8044	
8048	CMOS, NMOS
8748	CMOS, NMOS
8049	CMOS, NMOS
8050	NMOS
8051	CMOS, NMOS
8085A	NMOS
8085A-2	NMOS
8086	NMOS
8088	NMOS
80186	NMOS

Harris:

80C86	CMOS

Zilog:

Z80A	NMOS
Z80B	NMOS
Z80H	NMOS 8Mhz
Z8001	NMOS
Z8002	NMOS

Motorola:

6800	NMOS
6801	NMOS
68B00	NMOS
6802	NMOS
68B02	NMOS
146805E2	CMOS
6803	NMOS
6808	NMOS
68B08	NMOS
6809	NMOS
6809E	NMOS
68B09	NMOS
68B09E	NMOS
68000	NMOS, 12.5 Mhz
68008	NMOS, 12.5 Mhz
68010	NMOS, 12.5 Mhz

Hitachi:

6301	CMOS
6303	CMOS

National:

NSC800	CMOS

Rockwell:

6502	CMOS, NMOS
6503	CMOS, NMOS
6504	CMOS, NMOS
6505	CMOS, NMOS
6506	CMOS, NMOS
6507	CMOS, NMOS
6512	CMOS, NMOS
6513	CMOS, NMOS
6514	CMOS, NMOS
6515	CMOS, NMOS

RCA:

1802	CMOS
1805	CMOS
1806	CMOS

Signetics:

8X300	Bipolar
8X305	Bipolar

. . . and more

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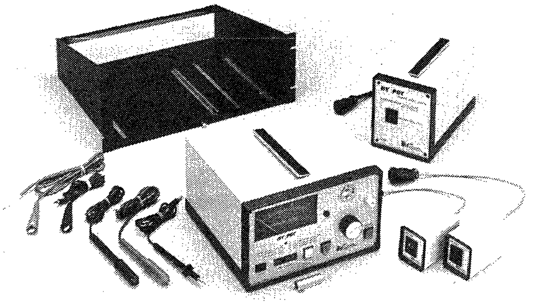
ASSOCIATED RESEARCH, INC.

HIGH VOLTAGE SOLUTIONS

HY POT® JR.

For dielectric strength testing to U.L., CSA, VDE, BSI and IEC specifications where dielectric withstand and ground continuity tests are specified. Meets new 120K OHM requirement.



FEATURES

- **ALL METAL CABINETRY** For rugged plant and field use.
- **TEST VOLTAGES** To 5,000 volts AC, 6000 volts DC.
- **LARGE METERS** For easy viewing.
- **POWER LINE SAFETY MONITOR** Insures correct hookup.
- **OPTIONAL ACCESSORIES AVAILABLE** To build the system to meet your needs: ramp and dwell, auto reset, electronic dwell timer, IEEE-488 interface (GPIB), leakage current meters.

Model 4040A
0-3KV AC
Model 5040A
0-4KV DC

Model 4050A
0-5KV AC
Model 5060A
0-6KV DC

SPECIFICATIONS

INPUT:
120 volts AC, 50/60 Hz., Single phase, through 7½ ft., three conductor detachable line cord, terminated in three prong grounding type plug.

HYPOT JR. OUTPUT:
Continuously adjustable. Essentially sinusoidal. Frequency same as input. Maximum current 25 mA (Adjustable from .5 to 25 mA).* No transients exceeding 120% or peak value. Peak value between 1.3 and 1.5 times RMS Value.

SENSITIVITY:
Factory preset at 1240 volts at 5 mA. May be reset if necessary. When properly adjusted, response time is 0.5 seconds or less.

METERING:
Analog with 50 volt reading resolution, connected directly across the output terminations. Voltmeter input impedance exceeds 14.7 megohms.

*DC units—(adjustable .75-5 mA, with automatic output shorting).

ACCURACY:
2% of full scale, with 2% tracking.

FAILURE DETECTION SYSTEM:
Audible and visual indication of unacceptable performance and auxiliary relay contacts (SPDT) which transfer when failure is detected. Indicators remain active and conspicuous until reset manually.

HIGH VOLTAGE & RETURN/CONTINUITY TERMINATIONS:
High voltage three prong isolated grounding type receptable. Also equipped with detachable 5 ft. (grey) high voltage and (black) return/continuity test leads.

SIZE:
11″ × 11″ × 6.6″ (279.4 × 279.4 × 167.64mm)

WEIGHT:
Approximately 14½ lbs (6.58 kilograms).

HYPOT® jr.—AC, DC & AC/DC

For dielectric strength testing of electronic components, appliances, tools, motors, etc.

SPECIFICATIONS

Model	Output	Visual Ind.	Audible Ind.	Manual Reset	Current Meter	Cont.	Dim. (inches)	Wght.
403A	0-3KV AC	•	•	•			10¾ x 9 x 5¾	13 Lbs.
404A	0-4000VAC	•					6 x 9 x 8½	20 Lbs.
411A	0-2500VAC	•					6 x 9 x 8½	20 Lbs.
412A	0-1500VAC	•					6 x 9 x 8½	20 Lbs.
414A	0-6000VAC	•					6 x 9 x 8½	20 Lbs.
422A	0-10000VAC	•					9¾ x 9½ x 12½	33 Lbs.
4030A	0-4000VAC				•		13½ x 13½ x 8 1/16	23 Lbs.
4045A	0-5000VAC/DC	•					6 x 9 x 8½	20 Lbs.
4253A	0-2.5KV AC/ 0-3KV DC	•	•	•			10¾ x 9 x 5¾	13 Lbs.
5220A	0-15KV DC				•		13½ x 13½ x 18 1/16	27 Lbs.
5205A	0-5KV DC				•		13½ x 13½ x 8 1/16	27 Lbs.

FEATURES

- **ALL METAL CABINETRY** For rugged plant and field use.
- **SAFETY** Automatically shuts off output voltage in the event of failure.
- **FAST — SAVE PRODUCTION TIME** Preset test voltages.
- **TEST VOLTAGES** AC or DC up to 15,000 volts, AC/DC to 5 kV.

[FOR TECHNICAL ASSISTANCE CALL 1-800-858-TEST]

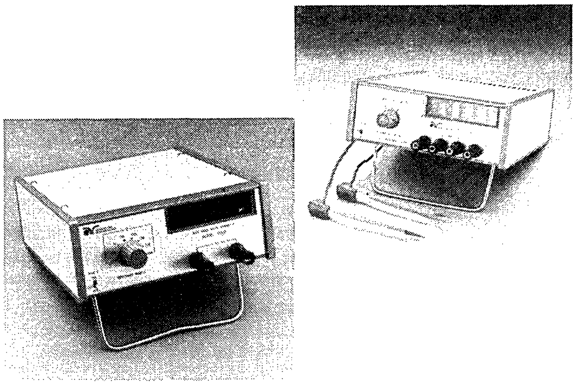
8221 N. KIMBALL AVE., SKOKIE, IL 60076 U.S.A. • PH. 312/647-7850 • TELEX: 28-3511

ASSOCIATED
RESEARCH, INC.

HIGH VOLTAGE SOLUTIONS

DIGITAL OHMMETERS AND MILLIOHMMETERS

For measuring contact and conductor resistance.



FEATURES

- **PORTABLE** Line/rechargeable nicad operated.
- **REGULATED CURRENT SUPPLY** Insures measurment assuracy.
- **METERING** Easy to read 3½ digit LED display.
- **TEST RANGES** From 1 milliohm to 200 megohms.

SPECIFICATIONS

Model — 1000D & 1001D

Ranges/Current:
0-199.9 milliohms/1 amp
0-1.999 ohms/100 milliamps
0-19.99 ohms/10 milliamps

Resolution:
± 1% ± 1 digit (199.9 milliohm)
± 0.5% ± 1 digit (1.999 milliohm & 19.99 milliohm)

Input:
110 volts AC 50/60 Hz (Model 1000D)
230 volts AC 50/60 Hz (Model 1000DA)
Battery operated: same specs as above
(Model 1001D)

Operating Temperature Range:
50° – 40° C (15° – 30° C for guaranteed accuracy)

Weight:
5 lbs. (2.3 kg).

SPECIFICATIONS
MODEL 1010D

RANGE	DISPLAY	RESOLUTION	CURRENT	ACCURACY
20Ω	0-19.99Ω	10 mΩ	10 mA	±0.3% RDG ±0.2% of full scale
200Ω	0.199.9Ω	100 mΩ	1 mA	"
2K	0-1.99 KΩ	1 Ω	100 μA	"
20K	0-19.99 KΩ	10 Ω	10 μA	"
200K	0-199.9 KΩ	100 Ω	1 μA	"
2 M	0-1.999 MΩ	1 KΩ	0.1 μA	"
20 M	0-19.99 MΩ	10 KΩ	0.01 μA	±0.5% RDG ±0.2 % of full scale
200 M	0-199.9 MΩ	100 KΩ	0.001 μA	±10% of full scale

PHASE SEQUENCE INDICATOR

Indicator lights instantly and provides positive phase sequence indentification or open phase. No moving parts or batteries to replace.

MOTOR ROTATION INDICATOR

Positive indication for shaft rotation in unmarked multi-phase motors and identify phasing of transformer windings.

COMPACT • PUSH BUTTON OPERATED • INSTANT READING

SPECIFICATIONS MODEL 146

For use on 3 phase, 90-700 volt 60 Hz circuits.

Size: 1⅝″ (4.1cm) deep, 2⅞″ (7.2cm) wide, 4″ (10.3cm) long.

Leads: 39″ (1m) long, color coded, and terminated in insulated clips. 26″ (67.1cm) sheathing from instrument case restricts free lead drop to 13″ (33.5cm) to protect operator if lead detached.

Weight: 13 oz. (385gms)

Carrying Case: Included with Model 146.

SPECIFICATIONS MODEL 150A

Size: 1⅝″ (4.1cm) deep, 2¾″ (7.2cm) wide, 4″ (10.3cm) long.

Leads: 34″ (55.6cm) long, terminated in insulated clips.

Weight:1 lb. (454 grams)

Carrying Case: Included with Model 150A.

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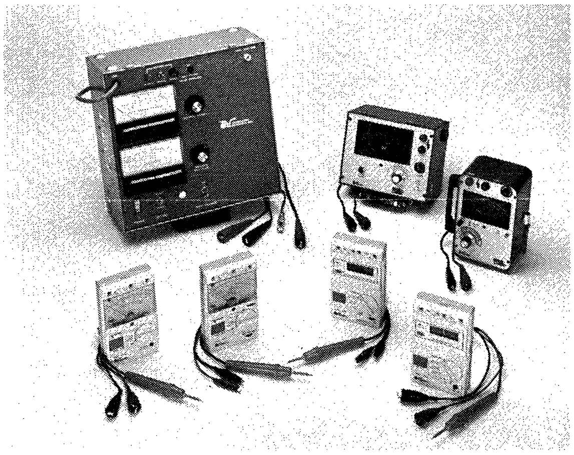
ASSOCIATED RESEARCH, INC.

HIGH VOLTAGE SOLUTIONS

MEG-CHEK —DUAL HANDCRANK/LINE, BATTERY/ LINE, DIGITAL, LINE OPERATED

Instruments to measure insulation resistance.



FEATURES

- **ALL METAL OR ABS CABINETRY** For rugged field use.
- **SOPHISTICATED SOLID STATE CIRCUITRY** For stability and superior accuracy.
- **AUTOMATIC OUTPUT SHORTING** To assure operator safety.
- **AUTOMATIC METER ZEROING** All ohm and megohm ranges.
- **POSI-TEST™** An exclusively low battery or low RPM monitoring system which continuously monitors input voltage to avoid erroneous test results.
- **TEST VOLTAGES** Up to 10,000 volts.
- **MEGOHM** Ranges to 200,000 megohms.
- **TESTS** AC volts, DC volts & Kohms on some models.

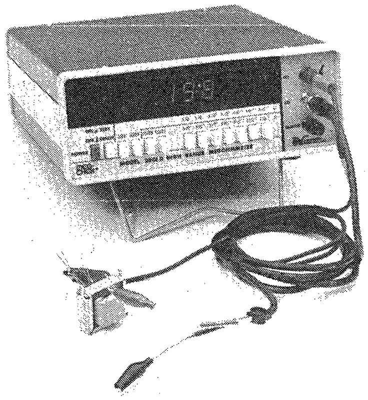
SPECIFICATIONS

MODEL	2003A	2100A	2101A	2125A	2120A	2021A	2095A	2025D*	2026D*	2955A	2956A	2957A
MEASURING RANGE												
MegOhm	200	200/500/1000/2000	200	100/1000	200/500/1000/2000	100/1000	500/1000/2000	2/20/200/2000	20/2000	50,000	100,000	200,000
Respecetive Test Voltage	500	100/250/500/1000	500	400	100/250/500/1000	500	250/500/1000	500	500	0-2.5KV	0-5 KV	0-10 KV
Ohms	200	20,000	20,000	10,000	20,000	20,000	2000	—	2000K	—	—	—
Volts (Measuring)	600 AC rms		150/300/600 AC rms & DC	—	600 AC rms	600 AC rms	600 AC rms	600 AC rms	600 AC rms 1000 DC	—	—	—
POWER SOURCE												
Battery	X(C)	X(B)	X(B)	X(B)	—	—	X(C)	X(A)	X(A)	—	—	—
Hand Crank Generator	—	—	—	—	X (Dual)	X	—	—	—	—	—	—
Line Voltage	—	115V	115V	115V	115V	—	—	—	—	115/230	115/230	115/230
CABINETRY												
(H/W/L—inches)	6.4/3.9/1.9	6.38/7.75/6.25	6.38/7.75/6.25	6.38/7.75/6.25	6.5/4.75/7.25	6.5/4.75/7.25	6.4/3.9/1.9	6.4/3.9/1.9	6.4/3.9/1.9	13½/13½/8$\frac{1}{16}$	13½/13½/8$\frac{1}{16}$	13½/13½/8$\frac{1}{16}$
(H/W/L-MM)	163/100/48	162/197/159	162/197/159	162/197/159	165/121/184	165/121/184	163/100/48	163/100/48	163/100/48	340/340/205	340/340/205	340/340/205
WEIGHT												
Lbs	1	7	7	7	5	5	1	1	1	27	27	27
KG	.47	3.17	3.17	3.17	2.27	2.27	.47	.47	.47	12.2	12.2	12.2

(A) 6 AA Cells (B) 8 D Cells (C) 4 AA Cells *Digital 3½ Digit Display

MEG-CHEK —TERAOHMMETER

Instruments to measure high insulation resistance of electrical apparatus and electronic components. Volume and surface resistivity can also be measured. Test to ASTM specs.



FEATURES

- **SOPHISTICATED SOLID STATE CIRCUITRY** Assures stability and superior accuracy.
- **METERING** Easy to read 3½″ digit display.
- **TEST VOLTAGES** from 50 to 1,000 volts. Push button selectable.
- **TEST RANGES** To 10^{13} ohms.
- **LIGHT WEIGHT** and portable.

SPECIFICATIONS

MODELS: 2801D
2802D

INPUT: 115 V AC 50/60 Hz .5A

TEST VOLTAGES:
Model 2801D 50V/100V 250V/500V } ±0.1% under open circuit conditions.
Model 2802D 100V/ 250V/500V/1000V } ±4% when measuring low resistance.

RESISTANCE RANGES: 25 k ohms to 20x10^{13} ohms.

USEFUL RESISTANCE RANGE AND ACCURACY:
50V(2801D only), 100V:10^{8}-10^{10} 1% F.S.; 10^{11} 5% F.S.; 10^{12} 10% F.S.
240V, 500V, 1000V (2802D only): 10^{7}-10^{11} 1% F.S.; 10^{12} 5% F.S.; 10^{13} 10% F.S.

CALIBRATION INTERVAL: 6 months

OUTPUT CURRENT: Limited to 5mA maximum

WARMUP TIME: ½ hour to rated accuracy

MEASUREMENT TIME: Varies with range, test voltage and item being tested, especially capacitive items.

OPERATING TEMPERATURE & HUMDITY RANGE: 15° to 30° C, 50% R.H.

DIMENSIONS: 8.46″ (215mm)W x 3.62″ (92mm)H x 10.25″ (260mm)D

WEIGHT: 4.7 lbs. (2.13 Kilograms)

[FOR TECHNICAL ASSISTANCE CALL 1-800-858-TEST]

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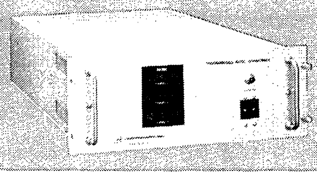
asi PRECISION INSTRUMENTATION
SYNCHRO/AC RATIO/POWER SUPPLIES

Programmable Ratio Transformer

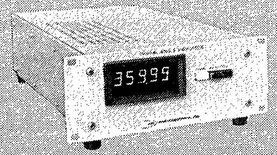


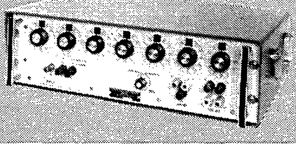
Astrosystems Programmable Ratio Transformer Model #PRT101 provides from one to three independent ratio transformers in a single unit. Each of the ratio transformers provides 6 decades of voltage resolution with a range of zero to 1.099999. Typical ratio accuracy is better than 1 PPM. Voltage range is 0 to 130 volts AC for both inputs and outputs with a current rating of 500 ma.

Each ratio transformer can be connected with a common return or in the isolated mode. Output can be utilized in phase with the reference or 180° out of phase. A seven decade front panel LED readout is provided for each channel indicating programmed ratio.

The Programmable Ratio Transformer is designed for rack mounting with a 19" front panel and a panel height of 7". The unit features full Built-in Test (BIT) capability.

Synchro/Resolver/ Instrumentation



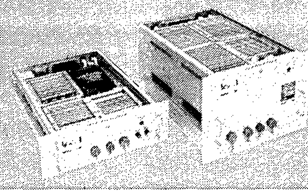


Astrosystems Synchro/Resolver Instrumentation is designed for test and calibration of synchros, resolvers, servos and similar devices. All units utilize high precision toroidal ratio transformers to generate and measure AC signals. Typical accuracies are better than 2 seconds of arc traceable to NBS.

Synchro/Resolver Standards—Synchro/Resolver Standards provide precise output voltage simulating synchro signals to an accuracy of 2 arc seconds. Standard resolutions are .0001°, .001° and 5°. Models are available to cover a full 60Hz to 10KHz frequency range.

Synchro/Resolver Bridges—Synchro/Resolver bridges are designed for high accuracy measurement of synchro/ resolver signals. Typical accuracy is 2 seconds of arc. Input and output are fully isolated and the output error signal features a constant null gradient. Input impedance is nominally 500K. Frequency range is 60Hz to 10KHz depending upon model selected. Standard resolutions are .0001°, .001° and 5°.

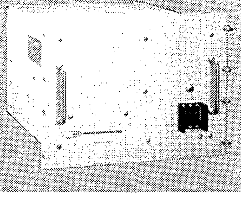
Programmable Synchro Simulators/Converters



Astrosystems programmable synchro units provide precision test and measurement signals for synchros and synchro based devices. These devices are primarily designed for use in ATE systems. The stimulus and measurement sections are fully programmable over a wide range of angles, voltages, frequencies and impedances.

Typical synchro resolver outputs are programmable over a full 360° range with a .01° resolution. Voltages are programmable from 5V to 140V and a frequency range of 60Hz to 10KHz. Input and output impedances are programmable from 0.1 ohms to 10 kilohms in increments of 0.1 ohms. Measurement and simulation is based on high accuracy tapped toroidal transformers which maintain their performance integrity over long periods without the need for field adjustment or recalibration. Modular construction allows for customizing to specialized ATE requirements.

Programmable Power Supplies



Astrosystems Programmable Power Supplies provide a variable source of AC and DC voltage and power. These devices are ideal for automatic test equipment and other applications where power inputs must be precisely computer controlled and varied.

AC Sources—Series A2100 and A5500 programmable AC power supplies provide AC power programmable in amplitude and phase. A unique switching autotransformer design eliminates the need for high drive amplifiers resulting in reduced power dissipation and size. 1Ø , 2Ø and 3Ø models are available.

DC Sources—Series A1100 programmable DC power supplies provide a variable source of precisely controlled DC voltage, programmable over a 0-200 volt DC range. Units are fully protected by short current and over-voltage protection circuitry. Supplies and control circuitry are modular in design so that a custom multiple output chassis can be readily implemented.

IEEE-488 Bus MATE Compatible

Programmable Instrumentation is implemented with an IEEE-488 GPIB bus using the latest version of the Control Intermediate Interface Language (CIIL). Overall control is exercised by an embedded Test Module Adapter (TMA) incorporating an 8088 processor.

asi astrosystems, inc.

6 Nevada Drive • Lake Success, N.Y. 11042
516/328-1600 TWX: 510-223-0411

CALL TOLL-FREE
1-800-645-8454

EEM PRODUCT SELECTION GUIDES

Use the EEM Product Selection Guides. There are 34 Guides in this edition of EEM. See page 2 (A•2, B•2, C•2, D•2) of each volume to locate the Product Selection Guides that pertain to your needs.

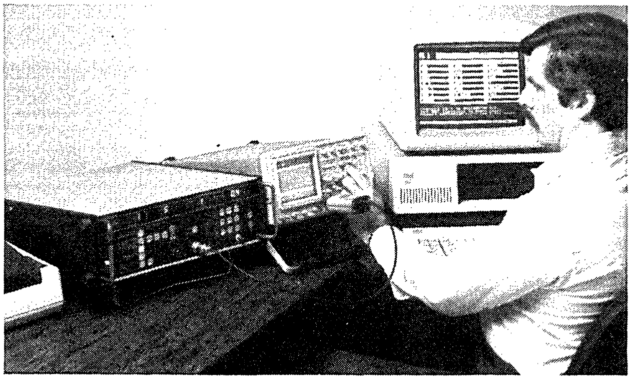
enclosures · capacitors · circuit boards · coils, chokes, inductors · connectors, electronic · sockets/terminals · crystals · oscillators · crystal filters delay lines · panel hardware · displays · lamps/lights · cooling equipment · filters · generators · multimeters · panel meters · oscilloscopes · graphic recorde nections · microwave components motors/drives · batteries · power supplies, dc · power supplies, ac · protective equipment · relays · solenoids · resistors · potentiometers/trimmers controls/rheostats · discrete semiconductors · switches · keyboards/keypads · transducers/encoders · transformers · wire & cable · enclosures capacitors · circuit boards · coils, chokes, inductors · connectors, electronic · sockets/terminals

Ballantine Instrumentation... A Generation Jump Ahead

AUTOMATED CALIBRATION SYSTEMS

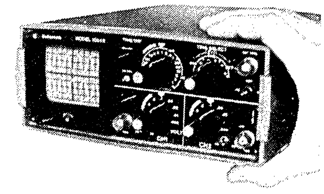
Fully configured turn key Ballantine COMPUTEST® Automated Calibration systems make fast, high quality checks and calibrations of all major functions and modes of oscilloscopes up to state of the art 1 GHz bandwidth units. The systems provide full documented calibration certificate printouts. Calibration throughput can be improved up to 5 times compared with conventional manual methods. Operation is totally user-friendly and requires no programming experience. Three scope cal systems are available offering performance exceeding that of any competitive equipment and at savings up to 70 percent.

The Ballantine COMPUTEST® 4003E System employs a Ballantine 6127B Programmable Oscilloscope Calibrator, designed and used in the U.S. Navy's MECCA automated oscilloscope calibration system, and computer control and interface is provided by an IBM PC computer, and high resolution color display to optimize system ergonomics. Ballantine's powerful software package drives the system to provide maximum versatility and simplicity of use. The COMPUTEST® 4050E System is configured for automated calibration of voltmeters, ammeters, ohmmeters and multimeters using the same IBM PC and peripherals supplied with the 4003E Scope Cal System. CALCART™ versions of these systems are also available to provide mobile automated calibration systems for on-site testing.



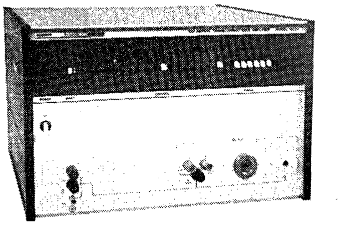
TRAVELSCOPES

For the engineer on the move who wants to lighten his workload, Ballantine's Series 1020 Travelscopes offer the smallest, lightest, toughest group of portable miniscopes available. Less than 5 pounds in weight, these instruments provide full professional 15 and 25 MHz oscilloscope performance in a unit the size of a bench multimeter. Designed specifically for rugged field applications in computer service, communications, process plants, on shipboards, indoors or outdoors ... anywhere. The full 4 x 5 cm CRT provides bright, high resolution displays in single or dual trace models. Rechargeable battery options allow complete off-line use. Compact and convenient, they can tuck in a tool kit, or sling on your shoulder, ready to provide reliable service without coddling.



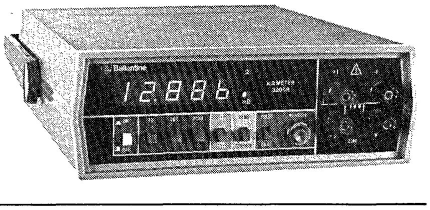
AC & DC CALIBRATION STANDARDS

Ballantine provides metrologists a wide selection of AC/DC thermal transfer standards, coaxial thermal converters, micropotentiometers, and RF comparators. Automated AC/DC transfer measurements at high speed rates are achievable with the unique Ballantine 1605A Autobalance Bus Programmable Transfer Standards. All units are NBS calibratable and traceable. A new precision AC and DC current source, the Ballantine 1620A Transconductance Amplifier, converts signal input voltages into proportional output current in the same phase and frequency as the input. Ranges are provided from 200 microamperes full scale, to 100 amperes full scale, at frequencies from DC to 10 kHz. IEEE 488 bus option can be supplied. The new 1625A AC-DC Active Current Shunt covers the same ranges. Both the 1620A and 1625A are traceable to NBS.



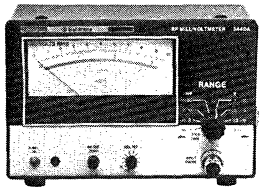
DIGITAL MICRO-OHMETER

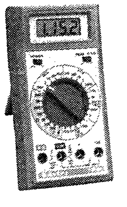
The 4½ digit Ballantine 3205B makes high accuracy, high resolution measurements of low resistance values by a true 4-wire method. Full scale ranges are provided from 20 milli-ohms to 2000 Ohms with resolution to 1 micro-ohm. A pulse mode of operation minimizes self-heating errors, and allows non-destructive measurements of devices not rated for steady state currents. Push button operation and highly stable test circuitry makes for easy rapid testing. The 3025B is ideal for checks of switch and relay contacts, low resistance "wirewounds," PCB tracks, critical grounds and current paths, weld and bond quality, motor, generator and transformer coils, and more. BCD output of reading is optionally available. Pricing is substantially less than comparable units.



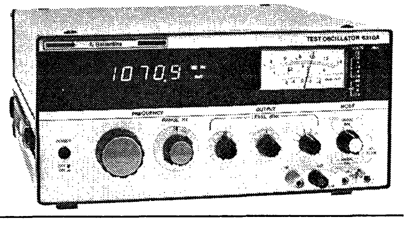
RF MILLIVOLTMETERS

Ballantine's 3440A 1.25 GHz Programmable RF Millivoltmeter features true rms response and NBS traceability for sine and non-sine waveforms. Ranges from 100 microvolts to 3 volts full scale, extendable to 300 volts by a probe divider. Basic accuracy is 0.1%. DB levels can be measured from −60 dBm to +60 dBm. An adjustable reference control eases gain/loss measurement. Unique circuitry and temperature stabilized probe assures stable, precise measurements, and negligible zero-drift. All ranges are programmable. Off-line operation is offered by an internal rechargeable battery option.





Ballantine also offers a wide selection of frequency counters, and portable digital multimeters, including a hand-held dmm with peak-hold capability — the 3100A. A new test oscillator, the 6310A, is also available to provide low distortion, sine wave signals from 2 Hz to 1.05 MHz at levels up to 14V rms into 600 Ohms. For full details on all products, contact Ballantine or your local representative.



Ballantine Laboratories, Inc.

P.O. Box 97, Boonton, New Jersey 07005, U.S.A., Telephone: 201-335-0900, TWX: 710-987-8380

FIVE DECADES OF INNOVATION IN ELECTRONIC INSTRUMENTATION

B+K PRECISION DYNASCAN CORPORATION /
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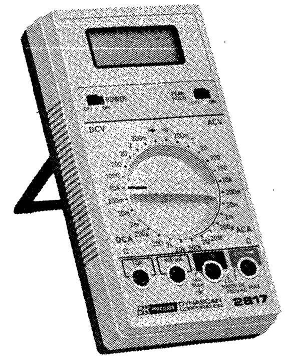
DIGITAL MULTIMETERS

3½ DIGIT TRUE RMS PEAK HOLD DIGITAL MULTIMETER
Model 2818 / $215.00
3½ DIGIT PEAK HOLD DIGITAL MULTIMETER
Model 2817 / $175.00



FEATURES

• 0.1% DCV accuracy • 1000 hours continuous battery life • True rms-sensing AC volt and amp ranges on 2818 • Peak hold on volt and amp scales • 10 A AC and DC ranges • 3½ digit LCD display with annunciators • Single rotary switch operation • Low-battery indicator • Diode check • Audible continuity check • Transient and overload protected • High energy fuse • Ruggedized case with safety-designed test lead system.

The Models 2817 and 2818 are full function digital multimeters that provide 0.1% VDC accuracy, True rms AC voltage and current readings, peak hold for measuring current and voltage surges, audible continuity check, diode check, overload and transient protection, and convenient single rotary switch to meet a wide variety of applications.

The Models 2817 and 2818 provide manual range selection of all functions. DC voltage measurement ranges include 200 mV, 2 V, 20 V, 200 V, and 1000 V.

AC voltage ranges include 200 mV, 2 V, 20 V, 200 V, and 750 V.

Input impedance is 10 MΩ.

Ohm ranges include 200Ω, 2 kΩ, 20 kΩ, 200 kΩ, 2 MΩ, and 20 MΩ.

AC and DC current ranges include 200 µA, 2 mA, 20 mA, 200 mA, and 10 A.

A diode test measures the forward voltage drop of a semiconductor junction at approximately 0.6 mA. Reverse drop reads approximately 1400 counts. Continuity checks are annunciated by an audible tone.

The 2818 is overload and transient protected. A high energy fuse is incorporated in the unit.

Power is provided by a 9 V battery (NEDA 1604) type.

SPECIFICATIONS

(+18°C to +28°C at relative humidity up to 80% unless noted.)

DC VOLTAGE

Range	Maximum Indication	Input Resistance	Overload Protected to (DC+Pk. AC)
200 mV	±199.9 mV	10 MΩ	±1100 V
2 V	±1.999 V	10 MΩ	±1100 V
20 V	±19.99 V	10 MΩ	±1100 V
200 V	±199.9 V	10 MΩ	±1100 V
1000 V	±1000 V	10 MΩ	±1100 V

Accuracy: ± (0.1% of input + 1 count)

Sensitivity: 100 µV on 200 mV Range.

Full Range Step Response: 1 second maximum to rated accuracy). Normal Mode Rejection: 55 dB minimum at DC, 50 Hz, & 60 Hz. Common Mode Rejection: 100 dB minimum at DC, 50 Hz & 60 Hz (with 1 kΩ unbalance).

AC VOLTAGE (True rms — sensing; AC coupled. Average Sensing, rms calibrated sinewave on 2817)

Accuracy:

Range	Maximum Indication	40 Hz-1 kHz	1 kHz-2 kHz	2 kHz-5 kHz	5 kHz-10 kHz
200 mV	199.9 mV	±(0.5% +5)*	±(0.75% +5)*	±(2.5% +5)*	±(5.0% +7)*
2 V	1.999 V				
20 V	19.99 V				
200 V	199.9 V		—	—	—
750 V	750 V		—	—	—

* (% of Input + No. of Counts)

Input Resistance: 10 MΩ and <50 pF.

Overload Protected to: ±1100 V (DC + Peak AC); except 200 mV range ±400 V (DC + Peak AC).

Sensitivity: 100 µV on 200 mV Range. Crest Factor: 3. Full Range Step Response: 3 seconds maximum (to rated accuracy).

RESISTANCE

Range	Maximum Indication	Test Current	Open Circuit Voltage	Overload Protected to
200 Ω	199.9 Ω	1 mA	1.25 V	250 VRMS
2 KΩ	1.999 KΩ	0.4 mA	0.75 V	250 VRMS
20 KΩ	19.99 KΩ	75 µA	0.75 V	250 VRMS
200 KΩ	199.9 KΩ	7.5 µA	0.75 V	250 VRMS
2 MΩ	1999 KΩ	0.75 µA	0.75 V	250 VRMS
20 MΩ	19.99 MΩ	75 nA	0.75 V	250 VRMS

Accuracy: ±(0.25% of input + 3 counts): 200Ω. ±(0.25% of input + 1 count): 2 kΩ-200 kΩ. ±(0.5% of input + 1 count): 2 MΩ. ± (1.0% of input + 2 counts): 20 MΩ.

Sensitivity: 0.1Ω on 200Ω range. Full Range Step Response: 1 sec., except 3 sec. on 2 MΩ range, and 8 sec. on 20 MΩ range.

DC CURRENT

Range	Maximum Indication	Burden Voltage (Max.)	Overload Protected to
200 µA	±199.9 µ	.25 V	±.5A (Fuse)*
2 mA	±1.999 mA	.25 V	±.5A (Fuse)*
20 mA	±19.99 mA	.25 V	±.5A (Fuse)*
200 mA	±199.9 mA	.7 V	±.5A (Fuse)*
10 A	±10.00 A	.25 V	±10A (None)

* Includes High Energy Fuse

Accuracy: ±(0.5% of input + 1 count) exception 200 mA and 10 A ranges, ±(1% of input + 1 count). Sensitivity: 100 nA on 200 µA range.

AC CURRENT (True rms-Sensing: AC coupled on 2818)

Accuracy: (Average Sensing, RMS calibrated sinewave on 2817)

Range	Maximum Indication	40 Hz-1 kHz	1 kHz-5 kHz	Overload Protected to
200 µA	199.9 µA	±(1.0% +5)*	±(2.5% +5)*	.5 A (Fuse)**
2 mA	1.999 mA			.5 A (Fuse)**
20 mA	19.99 mA			.5 A (Fuse)**
200 mA	199.9 mA	±(1.5% +3)*		.5 A (Fuse)**
10 A	10.00 A		—	10 A (None)

* (% of input + No. of counts)

** Includes High Energy Fuse

Burden Voltage: 0.25 V max. all ranges, except 200 mA (0.7 V max.). Sensitivity: 100 nA on 200 µA range.

Full Range Step Response: 3 seconds maximum.

PEAK HOLD (For all functions except resistance)

Accuracy: DC ±(1% + 7). AC ±(2% + 7) 40 Hz-1 kHz.

Acquisition Time: DC: 5 ms minimum duration. AC: 200 ms minimum duration.

Display Decay Rate: 0.2 count per second.

DIODE TEST

Measures forward voltage drop at approx. 0.6 mA. Open V. approx. 2.8 V.

CONTINUITY CHECK

Audible tone and symbol with 20Ω ±10Ω. 50 µs response time.

MAXIMUM COMMON MODE VOLTAGE

1000 V (DC + PEAK AC) between any input terminal and power line (earth) ground.

DISPLAY

Numerical Display: 3½ digit; 7 segment, Liquid Crystal Display (LCD) type with "Low Battery" indication and annunciators.

DC Polarity Selection: Automatic "−" sign indicated, "+" sign implied.

Overrange Indication: Most significant digit on, others off.

Transient Protection: 6 kV for 10 µSec max. (all voltage and resistance ranges).

POWER

Battery Type/Life: One 9-Volt "transistor" battery. Alkaline: NEDA 1604 A/ 1000 hrs. nominal. Carbon Zinc: NEDA 1604/600 hrs. nominal.

TEMPERATURE RANGE

Operating: 0°C to +50°C.

Storage: −20°C to +60°C.

TEMPERATURE COEFFICIENT

(from +0°C to +18°C and from +28°C to +50°C). Less than 0.1 times the accuracy of the function and range being used per °C.

HUMIDITY RANGE

+0°C to +35°C, 90% max. non-condensing. +35°C to +50°C, 70% max. non-condensing.

Dimensions (HxWxD): 39 x 88 x 168 mm (1.54 x 3.46 x 6.61").

Weight: Approx. 1 lb. (454 gm).

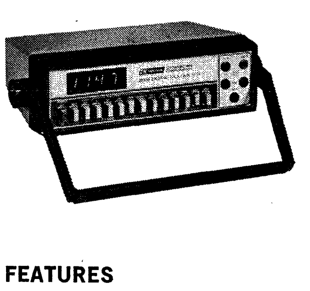
ACCESSORIES SUPPLIED

Test leads, spare fuse, 9V battery, and instruction manual.

OPTIONAL ACCESSORIES

Carrying Case LC-110, Demodulator Probe PR-32, Isolation Direct Probe PR-21, Replacement Test Leads FP-30, Temperature Probe TP-28, Thermocouple Temperature Probe TP-30.

NEW 3½ DIGIT DMMS WITH 0.01Ω RESOLUTION
Model 2830 / 0.5% VDC accuracy / $210.00
Model 2831 / 0.1% VDC accuracy / $255.00



FEATURES

• 100 µV, 100 nA, .01 ohm resolution • 100 mV AC and DC ranges • All 33 ranges and functions are push-button selectable • Selectable high-/low-power ohms • Autozeroing • Completely overload protected • AC operation standard with DC power pack optional • 0.43" LED display • Built-in 10 amp current shunt • Protected against RF interference • High energy fuse.

SPECIFICATIONS

DC VOLTAGE

Ranges: ±100.00 mV, 1 V, 10 V, 100 V, 1000 V.

Input Impedance: 10 megohms.

Circuit Protection: ±1000 VDC or AC peak, all ranges.

Overrange: 100% to 1999, except 1000 V range.

AC VOLTAGE

Note: Average-responding circuitry calibrated to read RMS value of pure sine wave.

Ranges: 100.0 mV. 1 V. 10 V, 100 V, 1000 V (Max. AC reading 750 VAC).

Input Impedance: 10 megohms.

Frequency: See accuracy.

Circuit Protection: ±1000 VDC or AC peak, all ranges (50 Hz-1 kHz).

Overrange: 100% to 1999 except 1000 V range.

DC AND AC CURRENT

Ranges: 100 µA, 1 mA, 10 mA, 100 mA, 1000 mA, 10 A.

Circuit Protection: Diodes and externally accessible fuse, all ranges, except 10 A.

Nominal Voltage Drop (full scale): 200 mV, on 100 µA, 1 mA, 10 mA; 300 mV on 100 mA range: 1.9 V on 1 A, 0.6 V on 10 A ranges.

AC Frequency Response: 50-1000 Hz.

Overrange: 100% to 1999.

RESISTANCE

Ranges: 10Ω 100Ω, 1 kΩ, 10 kΩ, 100 kΩ, 1000 kΩ, 10 MΩ. High- or low-power ohms on 1 kΩ, 10 kΩ, 100 kΩ, 1000 kΩ ranges.

Circuit Protection: No component failure other than a fuse with application of +1000 VDC or −450 VDC or 300 VAC RMS to input with Ohms function selected. All ranges protected against accidental direct connection to AC line (117 V nom.).

Polarity: Plus (+) jack is positive.

Overrange: 100% to 1999.

2831 ACCURACY

DC Volts: ±0.1% of reading ±1 least significant digit (LSD) on 1 V, 100 V and 1000 V ranges; 0.5% of reading ±4 LSD on 100 mV range.

DC Current: ±1% of reading, ±4 LSD, 1 mA, 10 mA, 100 mA ranges; ±1.5% of reading ±4 LSD on 100 µA, 1000 mA, 10 A ranges.

AC Current: ±1.5% of reading, ±2 LSD on 1 mA, 10 mA, 100 mA ranges; ±2.0% of reading, ±2 LSD on 100 µA, 1000 mA, 10 A ranges.

AC Volts	50-500 Hz	500 Hz-1 kHz	1-5 kHz	5-10 kHz
100 mV	±0.8% Rdg.	±1.5% Rdg.	±5% Rdg.	±1 db
1 V	±0.3% Rdg.	±0.3% Rdg.	±5% Rdg.	±1 db
10 V	±0.5% Rdg.	±1% Rdg.	±5% Rdg.	±1 db
100 V	±1% Rdg.	±1.5% Rdg.	—	—
1000 V	±0.6% Rdg.	—	—	—

Add ±3 LSD to all accuracy specifications in table. Accuracy specifications apply from 5% of range to full scale for 100 mV range.

Resistance: ±0.25% of reading, ±1 LSD on 1, 10, 100 and 1000 kΩ ranges in HI OHMS; ±0.6% of reading, ±3 LSD on 10Ω, 100Ω 10 MΩ ranges and on 1, 10, 100 and 1000 kΩ in LO OHMS.

2830 BASIC ACCURACY

Similar to 2831 at reduced accuracy.

DC Volts: ±0.5%; 1% on 100 mV, 1000 V ranges.

DC Current: ±1%.

AC Current: ±1.5%.

Resistance: ±1%.

GENERAL

Power Requirements: 105-130 VAC or 210-260 VAC, 50/60 Hz, CSA Listed.

Dimensions (HxWxD): 3.25x11.6x7.5" (8.1x29x19 cm)

Weight: 3 lbs. (1.5 kg)

Models 2830 and 2831 include test leads, spare fuses, line cord and manual.

ACCESSORIES AVAILABLE

Rechargeable battery pack BP-20.

Test Probe Assembly PR-21.

Demodulator Probe PR-23.

High Voltage Probe PR-28.

Carrying Case LC-50.

Temperature Probe TP-28.

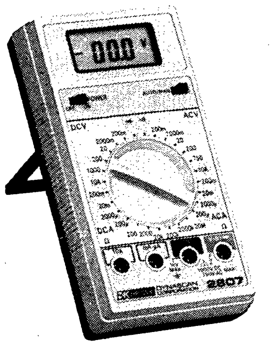
Thermocouple Temperature Probe TP-30.

See pages 49-51 for specifications.

B+K PRECISION DYNASCAN CORPORATION / DIGITAL MULTIMETERS

Dept. EM, 6460 West Cortland Avenue, Chicago, Illinois 60635 • (312) 889-9087 • Telex: 25-3475

HIGH-ACCURACY 3½ DIGIT AUTO/MANUAL RANGING DMM



Model 2807 / $115.00
0.5% DCV accuracy
Model 2816 / $150.00
0.25% DCV accuracy

FEATURES

• 500 hours continuous battery life • Auto-ranging/manual ranging on volt and ohm scales • 10A AC and DC ranges • Convenient single rotary switch • 3½ digit LCD display with annunciators • • Low-battery indicator • Diode check • Audible continuity check • Transient and overload protected • High energy fuse • Ruggedized case with safety-designed test lead system.

SPECIFICATIONS

(+18°C to +28°C at up to 80% R.H. unless noted.)

DC VOLTAGE (AUTO/MANUAL RANGING)

Range	Maximum Indication	Input Resistance (MΩ)	Overload Protected to (DC+Pk. AC)
200 mV	±199.9 mV	1000	±1100 V
2000 mV	±1999 mV	11	±1100 V
20 V	±19.99 V	10	±1100 V
200 V	±199.9 V	10	±1100 V
1000 V	±1000 V	10	±1100 V

Model 2816
Accuracy: ±(0.25% of input + 1 count , exc. for 200 mV range, ±(0.25% of input + 2 counts).
Model 2807
Accuracy: ±(0.5% of input + 1 count), exc. for 200 mV range, ±(0.5% of input + 2 counts).
Full Range Step Resp.: 1 sec. max. (to rated accur.). Normal Mode Rej.: 55 dB min. at DC, 50 Hz, & 60 Hz. Comfl. Mode Rej.: 100 dB min. at DC, 50 Hz, & 60 Hz (with 1kΩ unbal.).

AC VOLTAGE (AUTO/MANUAL RANGING)

Range	Maximum Indication	Input Resistance (<50 pF)	Overload Protected to (DC+Peak AC)
200 mV*	199.9 mV	1000 MΩ	±550 V
2000 mV	1999 mV	11 MΩ	±1100 V
20 V	19.99 V	10 MΩ	±1100 V
200 V	199.9 V	10 MΩ	±1100 V
750 V	750 V	10 MΩ	±1100 V

* Manual Ranging Only.

Model 2816
Accuracy: ±(0.8% of input + 5 counts) 40 Hz to 500 Hz.
Model 2807
Accuracy: ±(1.0% of input + 5 counts) 40 Hz to 500 Hz.
Sensitivity: 100 μV on 200 mV range.

RESISTANCE (AUTO/MANUAL RANGING)

Range	Maximum Indication	Test Current	Open Circuit Voltage	Overload Protected to (VRMS)
200 Ω	199.9 Ω	0.7 mA	1.65 V	250
2000 Ω	1999 Ω	0.1 mA	0.65 V	250
20 kΩ	19.99 kΩ	30 μA	0.65 V	250
200 kΩ	199.9 kΩ	4 μA	0.65 V	250
2000 kΩ	1999 kΩ	0.4 μA	0.65 V	250
20 MΩ	19.99 MΩ	0.04 μA	0.65 V	250

Model 2816
Accur.: 200Ω to 200 kΩ ±(0.25% of input + 2 counts). 2000 kΩ ±(0.5% of input + 2 counts). 20 MΩ ±(1% of input + 2 counts).
Model 2807
Accur.: 200Ω to 2000 kΩ ±(0.5% of input + 2 counts). 20 MΩ ±(1% of input + 2 counts).

DC/AC CURRENT (MANUAL RANGING)
Ranging: Same as 2817.
Model 2816
DC Accuracy: ±(0.75% of input + 1 count).
Model 2807
DC Accuracy: ±(1% of input + 1 count).
Model 2816
AC Accur.: ±(1.2% of input + 5 counts) 40 Hz to 500 Hz.
Model 2807
AC Accur.: ±(1.5% of input + 5 counts) 40 Hz to 500 Hz.

DIODE TEST
Measures forward voltage drop at approx. 0.6 mA.

CONTINUITY CHECK
Audible tone 20Ω ± 10Ω.

MAX. COMMON MODE VOLTAGE
1000V (DC + PEAK AC) between any input terminal and power line (earth) ground.

DISPLAY
Display: 3½ digit; 7-segment, LCD with "Low Battery" indication and annunciators.
DC Pol. Selection: Automatic "—" sign indicated. "+" sign implied.
Overrange Indication: Most significant digit on, others off.

TRANSIENT PROTECTION
6 kV for 10 μSec. max. (all volt. & res. ranges).

POWER
Battery: 2 "AA" type Cells; 1.5 V ea.
Battery Life: 500 hrs., nominal (total operation time).

TEMPERATURE COEFFICIENT
(+0°C to +18°C and +28°C to +50°C) 0.1 times the accur. of the function and range being used per °C.

HUMIDITY RANGE
+0°C to +35°C: 90% max. non-condensing. +35°C to +50°C: 70% max. non-condensing.

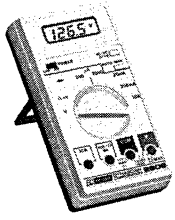
DIMENSIONS (HxWxD): 39 x 88 x 168 mm (1.54 x 3.46 x 6.61").

WEIGHT: Approx. 454 gm (1 lb.).

ACCESSORIES SUPPLIED
Test leads, spare fuse, 2 "AA" batteries, and instruction manual.

OPTIONAL ACCESSORIES
Carry Case LC-110, Demod. Probe PR-23, Isolation Direct Probe PR-21, Repl. Test Leads FP-30, Temp. Probe TP-28, Termocouple Temp. Probe TP-30.

3½ DIGIT 0.7% AUTO/MANUAL RANGING DMM



Model 2806 / $75.00
0.7% DCV accuracy

FEATURES

• 0.7% DCV accuracy • 500 hours continuous battery life • Auto-ranging/manual ranging on Volt and Ohm • 3½ digit LCD display with annunciators • Single rotary switch operation • Low-battery indicator • Diode check • Audible continuity check • Transient and overload protected • High energy fuse • Ruggedized case with safety-designed test lead system.

SPECIFICATIONS

(+18°C to +28°C at up to 80% R.H. unless noted).

DC VOLTAGE (AUTO/MANUAL RANGING
Ranging: Same as Model 2807.
Accuracy: ±(0.7% of input + 2 counts).

Other DCV Specs.: Same as 2807.

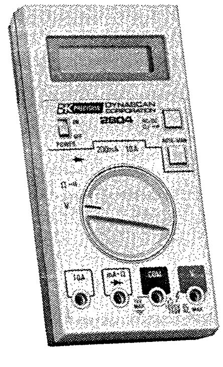
AC VOLTAGE (AUTO/MANUAL RANGING)
Ranging: Same as Model 2807.
Accuracy: ±1.0% of input +5 counts, 40 Hz to 500 Hz. Sensitivity: 1 mV on 2000 mV range.

RESISTANCE (AUTO/MANUAL RANGING)
Ranging: Same as Model 2807.
Accuracy: 200Ω to 200 kΩ ±(0.75% of input + 2 counts). 2000 kΩ ±(1% of input + 2 counts). 20 MΩ ±(2% of input + 2 counts).

DC/AC CURRENT (MANUAL RANGING)
Ranging: Same as Model 2817.
DC Accuracy: ±(1% of input + 2 counts).
AC Accuracy: ±(1.5% of input + 5 counts) from 40 Hz to 500 Hz.

ALL OTHER SPECIFICATIONS
Same as Model 2807.

3½ DIGIT AUTO/MANUAL RANGING DIGITAL MULTIMETER



Model 2804 / $60.00

FEATURES

• 0.7% DCV accuracy • 500 hours continuous battery life • Auto-ranging/manual ranging on Volt and Ohm scales • 3½ digit LCD display with annunciators • 10A AC and DC ranges • Single rotary switch operation • Low-battery indicator • Diode check • Audible continuity check.

SPECIFICATIONS

(+18°C to +28°C at up to 80% R.H.).

DC VOLTS (AUTO/MANUAL RANGING)

Range	Maximum Reading	Input Resistance (MΩ)	Overload Protected to
200 mV	±199.9 mV	1000	DC 1100 V AC 800 VRMS
2000 mV	±1999 mV	11	
20 V	±19.99 V	10	
200 V	±199.9 V	10	
1000 V	±1000 V	10	

Accuracy: 0.7% of input + 1 count.
Resolution: 0.1 V on 2000 mV range.

AC VOLTS (AUTO/MANUAL RANGING)
Average resp. cal. to read rms value of sine wave.

Range	Maximum Reading	Input Impedance (50 pF)	Overload Protected to
2000 mV	1999 mV	11 MΩ	DC 1100 V AC 800 VRMS
20 V	19.99 V	10 MΩ	
200 V	199.9 V	10 MΩ	
750 V	750 V	10 MΩ	

Accuracy: ±(1.0% of input + 5 counts), 40 Hz to 500 Hz. Resolution: 1 mV on 2000 mV range.

RESISTANCE (AUTO/MANUAL RANGING)
Ranging: Same as Model 2807.
Accuracy: 200Ω range ±(0.8% of input + 3 counts). 2000Ω thru 200 kΩ range ±(0.8% of input + 1 count).

DC/AC CURRENT (MANUAL RANGING)

Range	Maximum Reading	Burden Voltage (Max.)	Overload Protected to
200 mA	±199.9 mA	0.7 V	±0.2 A (Fuse)
10 A	±10.00 A	0.25 V	±10 A (None)

DC Accuracy: ±(1.25% of input + 1 count).

AC Accuracy: ±(1.5% of input + 5 counts) 40 Hz to 500 Hz.

ALL OTHER PERFORMANCE SPEC
Same as Model 2807 except no transient protection.

DIMENSIONS (HxWxD): 32 x 80 x 168 mm (1.34 x 3.15 x 6.61").

WEIGHT: Approx. 225 g (8 oz.)

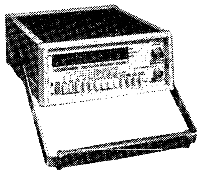
ACCESSORIES SUPPLIED
Test leads, spare fuse, instruction manual, schematic diagram and parts list.

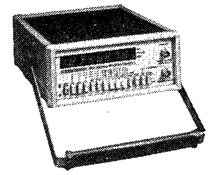
OPTIONAL ACCESSORIES
Demodulator Probe PR-32, Isolation Direct Probe PR-21, Replacement Test Leads FP-30, Temperature Probe TP-28, Thermocouple Temperature Probe TP-30.

B+K PRECISION DYNASCAN CORPORATION / FREQUENCY COUNTERS

Dept. EM, 6460 West Cortland Avenue, Chicago, Illinois 60635 • (312) 889-9087 • Telex: 25-3475

1.2 GHz AND 520 MHz MULTIFUNCTION COUNTERS





Model 1855 / $750.00

Model 1851 / $575.00

FEATURES

• 5 Hz to 1.2 GHz range (Model 1855) • 5 Hz to 520 MHz range (Model 1851) • Frequency, period, period average and totalize functions • Selectable resolution • 8 digit 0.43″ LED display • Low pass filter • Display hold • Switchable X1/X10 attenuator • Remote start-stop.

SPECIFICATIONS

(Common to each model except as noted)

FREQUENCY

Range: (Sinewave). Ch A: kHz Mode: 5 Hz to 5 MHz. MHz Mode: 5Hz to 80 MHz. Model 1855 Prescale: 75 MHz to 1.2 GHz. Model 1851 Prescale: 10 MHz to 520 MHz. Accuracy: ±t.b. accur., ±1 count. RESOLUTION Ch A: kHz Mode: 0.1 Hz to 100 Hz. Ch A: MHz Mode: 1 Hz to 1000 Hz. Prescale: 10 Hz to 10 kHz.

PERIOD

Range: 0.5 µs to 200,000 µs. Frequency: 5 Hz to 2 MHz sinewave. Resol.: 100 ps to 100 ns. Display: µs with dec. point. Min. Pulse Width: 250 ns.

TOTALIZE

Range: 5 Hz to 15 MHz sinewave. Capacity: 0 to 99,999,999. Control: Man. reset and hold.

INPUT

Ch A: Bandwidth: 5 Hz to 80 MHz. Sensitivity: 30 mVrms, 5 Hz to 30 MHz. 50 mVrms, above 30 MHz. Impedance: 1 MΩ (<40 pF). Coupling: AC. Filter: 100 kHz. Max. Input: 200 V (peak AC + DC) DC to 500 Hz (peak AC + DC at 80 MHz. Model 1855 PRESCALE: Bandwidth: 75 MHz to 1.2 GHz. Sensitivity: 25 mVrms, 75 MHz to 1.0 GHz. 50 mVrms, 1.0 GHz to 1.2 GHz. Model 1851 PRESCALE: Bandwidth: 10 MHz to 520 MHz. Sensitivity: 50 mVrms, 10 MHz to 520 MHz. Impedance: 50 ohms. Max. Input: 5 Vrms.

TOTALIZE START/STOP INPUT

Logic Levels: Low TTL level inhibits totalizing, high level enables it. Loading: One standard TTL gate.

TIME BASE

Standard Type: 10 MHz TCXO. Setability: ±0.1 ppm (±1 Hz). Temp. Stability: <±.0001% (±1 ppm, 0°C to +50°C). Max. Aging Rate: ±1 ppm/year.

DISPLAY

TOTALize Mode: Continuous.

GENERAL

Power: AC, 100 V, 120 V, 220 V, 240 V, 50/60 Hz, 21 W. Dimensions (HxWxD): 9.5 x 24 x 32 cm (3.75 x 9.5 x 12.6″). Weight: Model 1855 2.47 kg (5.44 lbs.); Model 1851 2.41 kg (5.31 lbs.).

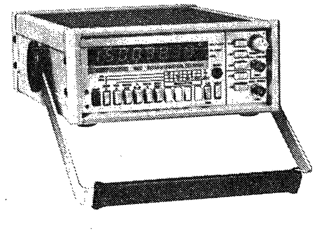
ACCESSORIES SUPPLIED

Instruction manual, schematic diagram and parts list.

OPTIONAL ACCESSORIES

Deluxe 10:1/Direct Probe PR-37, Deluxe X10 Probe PR-45.

175 MHz UNIVERSAL COUNTER



Model 1822 / $450.00

FEATURES

• 5 Hz to 175 MHz range • Frequency, period, period average, totalize, frequency ratio, and time interval functions • Selectable resolution • 8 0.43″ digit LED display • Self-test mode • Trigger level and slope switch signal controls • Switchable low pass 10 kHz filter • Switchable X1/X10 input attenuator • Display hold and reset feature.

SPECIFICATIONS

FREQUENCY

Ch A: Range: 5 Hz to 175 MHz. Resolution: 0.1 Hz to 1 kHz. Accuracy: ±1 count ± t.b. error.

PERIOD

Ch A: Range: 0.5 µs to 200,000 µs. Freq. Range: 5 Hz to 2 MHz sinewave. Resol.: 100 ps to 100 ns. Accuracy: ±1 count ± t.b. error ± trigger error. Min. Pulse Width: 250 ns.

RATIO

Ch A/B: Freq. Range A: 5 Hz to 10 MHz sinewave. Freq. Range B: 5 Hz to 2 MHz sinewave. Display: Ratio with dec. point.

TIME INTERVAL CHARACTERISTICS

Ch A to B: Range: 0.5 µs to 200,000 µs. Freq. Range: 5 Hz to 2 MHz, sinewave. Resolution: 100 ps to 100 ns. Minimum Pulse Interval (A to B): 250 ns.

TOTALIZE

Ch A: Range: 5 Hz to 10 MHz sinewave. Count Capability: 0 to 99,999,999. Control: Man. reset and hold.

SELF TEST

Display: 10 MHz with select. MHz, kHz. Gates Times: 10 ms, 100 ms, 1 s, or 10 s accum. times. Resolution: 0.1 Hz to 100 Hz.

INPUT

Ch A: Bandwidth: 5 Hz to 175 MHz, AC coup. Sensitivity: kHz FREQ. mode: 20 mV rms, 5 Hz to 5 MHz. 100 mV rms, 150 MHz to 175 MHz. Impedance: 1 MΩ, <40 pF. Slope: +, − switchable. LP Filter: 10 kHz, nominal. Max. Input: 250 V rms., Ch B: Bandwidth: 5 Hz to 2 MHz, AC coup. Sensitivity: 30 mV rms. Impedance: 1 MΩ, <40 pF. Slope: +, − switchable. Max. Input: 125 V rms.

TOTALIZE START/STOP INPUT

Logic Levels: Low TTL level inhibits totalizing, high level enables it. Loading: One standard TTL gate.

TIME BASE

Type: Crystal. Frequency: 10 MHz. Setability: ±0.1 ppm (±1 Hz). Temperature Stability: <±.001% (±10 ppm) from 0°C to +50°C ambient. Max. Aging Rate: ±10 ppm/yr. TCXO Option: Temp. stability: <±.0001% var. (±1 ppm) from 0°C to +50° ambient.

TOTALize Mode: Continuous.

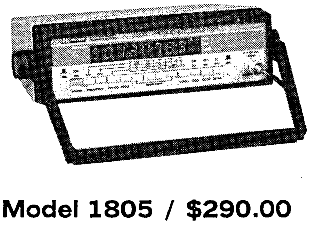
GENERAL

Power: 108 to 132 VAC, or 100, 120, 220, 240 VAC. 50/60 Hz. Dimensions: 9.5 x 24 x 32 cm (3.75 x 9.5 x 12.6″). Weight: 2.55 kg (5.6 lbs.).

ACCESSORIES AVAILABLE

PR-37-X10/Direct Probe, PR-45-X10 Probe. Optional TCXO can be ordered through B&K-PRECISION Service Dept.

80 MHz MULTIFUNCTION COUNTER



Model 1805 / $290.00

FEATURES

• 5 Hz to 80 MHz range • Frequency, period, period average and totalize functions • Selectable resolution • 8 digit 0.43″ LED display • Switchable low pass 100 kHz filter • X1/X10 input attenuator • Display hold and reset feature.

SPECIFICATIONS

FREQUENCY

Range: 5 Hz to 80 MHz. 10 MHz max. in kHz mode. Accuracy: ± Time Base Accuracy, ±1 count. Resolution: 0.1 Hz to 1000 Hz selectable.

PERIOD

Frequency Range: 5 Hz to 2 MHz 200,000 ms to 0.5 µs). Pulse Width: 250 ns min.

TOTALIZE

Capacity: 0 to 99,999,999 plus overflow. Control: Man. reset and hold.

INPUT

Impedance: 1 MΩ (<40 pF). Coupling: AC. Sinewave Sensitivity: 30 mVrms, 5 Hz to 30 MHz. 50 mVrms, above 30 MHz. Max. Input: 200 V (peak AC + DC) DC to 500 Hz. Attenuator: X1/X10, switch sel. Filter: Low pass, 100 kHz cutoff.

TIME BASE

Type: Crystal. Freq: 10 MHz. Setability: ±0.1 ppm (±1 Hz). Temp. Stability: <±.001% (±10 ppm) from 0°C to +50°C ambient. Max. Aging Rate: ±10 ppm/year.

GENERAL

Power: 108 V to 132 VAC, or 100 V, 120 V, 220 V, 240 VAC. 50/60 Hz. Dimensions (HxWxD): 8.25 x 29.4 x 19 cm (3.25 x 11.57 x 7.5″). Weight: 1.25 kg (2.75 lbs.).

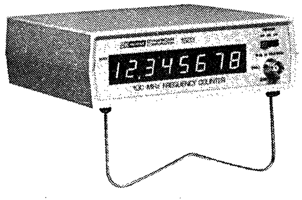
ACCESSORIES SUPPLIED

Includes power cord, instruction manual, schematic diagram and parts list.

OPTIONAL ACCESSORIES

Deluxe 10:1/Direct Probe PR-37, Carrying Case LC-50.

100 MHz FREQUENCY COUNTER



Model 1803 / $169.00

FEATURES

• 5 Hz to 100 MHz range • 8 digit 0.43″ LED display • Leading zero blanking • Low pass filter • BNC connector input • Overflow indicator • Battery or AC powered • Charger/AC adapter included • Integral tilt stand.

SPECIFICATIONS

FREQUENCY

Range: 5 Hz to 100 MHz. Accuracy: ± Time Base Accuraccy. ±1 count. Resolution: 1 Hz.

INPUT

Impedance: 1 MΩ (<40 pF). Coupling: AC. Sinewave Sensitivity: 30 mV rms, 5 Hz to 30 MHz, 50 mVrms, 30 MHz to 80 MHz. 100 mVrms, 80 MHz to 100 MHz. Maximum Input: 200 V (peak AC + DC) DC to 500 Hz; 100 V (peak AC + DC). 15 V (peak AC + DC) at 100 MHz. Filter: Low pass, 100 kHz (approx.), −3 dB.

TIME BASE

Type: Crystal. Freq.: 2.097152 MHz. Setability: ±0.1 ppm. Temp. Stability: >±.001% (10 ppm) from 0°C to +50°C. Max. Aging Rate: ±10 ppm/year.

GENERAL

Power: Six type AA batteries, or 7.5 to 10 VDC at 400 mA from ext. supply or bat. eliminator. Dimensions (HxWxD): 5 x 16.5 x 17.1 cm (2 x 6.5 x 6.75″). Weight: 680 g (24 oz. approx.), with batteries.

ACCESSORIES SUPPLIED

AC adapter/charger, instruction manual, schematic diagram, and parts list.

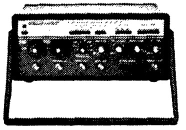
OPTIONAL ACCESSORIES

AC Adapter/Charger (120 VAC) — BC-18, AC Adapter/Charger (230 VAC) — BC-19, Deluxe X10/Direct Probe — PR-37, X10/Direct Probe — PR-40, X10 Probe — PR-45.

B+K PRECISION DYNASCAN CORPORATION / SWEEP/FUNCTION GENERATORS

Dept. EM, 6460 West Cortland Avenue, Chicago, Illinois 60635 • (312) 889-9087 • Telex: 25-3475

5 MHz SWEEP/FUNCTION GENERATOR WITH LIN/LOG SWEEP



Model 3030 / $699.00

FEATURES

• Generates sine, square, triangle, positive square, negative square, positive ramp and negative ramp waveforms • Covers .001 Hz to 5 MHz • 4 decade, 10,000:1 log sweep range • 3 decade, 1000:1 linear sweep range • High-accuracy Kelvin-Varley frequency sweep start/stop controls • Wide range variable symmetry control for virtually any wave shape • Calibrated output attenuation from 10 dB to 60 dB.

The model 3030 is B&K-PRECISION's highest-performance sweep/function generator. It provides frequency coverage from .001 Hz to 5 MHz in eight ranges.

For highest accuracy, Kelvin-Varley dividers are used as start/stop controls to set the low and high end limits of the desired frequency sweep. Sweep times are also selectable, from 10 milliseconds to 100 seconds.

For test applications requiring an unusual wave sweep, the variable symmetry control can be used to alter the shape of any waveform selected. The symmetry control is continuously variable from 5% to 95% duty cycle.

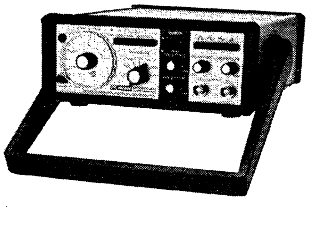
All seven of the most commonly needed waveforms are generated by the 3030. Sine, square and triangle waves are pushbutton selectable. Positive square, negative square and positive and negative going ramps can also be selected by using a combination of the three function pushbuttons and the variable symmetry control.

In addition to conventional function generator applications, the instrument can be used to generate tone-burst signals for audio speaker tests, TIM distortion tests in amplifiers, communications systems tone-burst decoder alignment, audio compressor/expander attack/decay time measurement and many other specialized applications.

SPECIFICATIONS

Waveforms: Sine, square, triangle, sweep ramp, sweep pulse, TTL pulse, DC.
Modes: Continuous, linear sweep, logarithmic sweep, tone-burst, single cycle.
Frequency Range: 0.001 Hz to 5 MHz in 8 ranges, 1000:1 freq. control.
Accuracy: ±(1.5% setting +1% full scale) from 0.001 Hz to 1 MHz, ±(2% setting +2% full scale) from 1 MHz to 5 MHz.
Amplitude Stability: 0.25% of setting after 15 minutes.
Frequency Stability: 0.25% of setting after 15 minutes.
Main Generator Output: Sine, square, triangle.
Output Amplitude: 20 Vp-p into open circuit max., 10 Vp-p into 50Ω, 50Ω output impedance.
Attentuation: Amplitude control provides 20 dB variable atten. Calibrated attenuator provides 60 dB atten. in 10 dB steps.
DC Offset and DC Output: (50Ω output)
Cont. variable ±10 VDC into open circuit, ±5 VDC into 50Ω.
Variable Symmetry: Adjusts main generator output. Cont. variable from 5:95 to 95.5. Freq. divided by approx. 10.
Internal Sweep: Lin. or log., sweep limit set by precision Kelvin-Varley dividers.
Internal Sweep Rate: 10 ms to 10 s in four calibrated steps with variable X10 multiplier for up to 100 s.
Internal Sweep Width: 1000:1 lin., 3 decades; 10,000:1 log, 4 decades.
Internal Sweep Output (f:V): Approx. 0 to +5 V output for 1000:1 linear (10,000:1 log) freq. sweep range.
External Sweep Input (V:f): Approx. 0 to +5 V input for 1000:1 linear 10,000:1 log) sweep.
Triggered Modes: 1.6V trigger input threshold or man. pushbutton. Single cycle — one complete cycle output per pulse trigger input. Tone-burst — sustained output while trigger input applied (last cycle completed when trigger removed).
Square Wave Symmetry: >99% from 1 Hz to 5 MHz.
Square Wave Rise/Fall Time: <50 ns.
Square Wave Overshoot: <5% of peak voltage.
Sinewave Distortion: <0.5% from 1 Hz to 100 kHz. All harmonics >30 dB down from 100 kHz to 5 MHz.
Amplitude Flatness: <±0.1 dB to 100 kHz, <±1 dB to 5 MHz.
Triangle Wave Linearity: >99%, 0.1 Hz to 100 kHz.
Sweep Pulse Output: TTL compatible square wave.
Operating Environment: Specifications valid from 25° ±5°C to 50°C after 30 minutes.
Hz, 30 W.
Power: 100/120/220/240 VAC, 50/60
Dimensions (HxWxD): 12.7 x 31.8 x 27.9 cm (5 x 12.5 x 11″).
Weight: 4.5 kg (10 lbs.).
ACCESSORIES SUPPLIED
Power cord, instruction manual, schematic and parts list.
OPTIONAL ACCESSORIES
BNC to BNC Cable CC-41. BNC to UHF Cable CC-42.

LOW-DISTORTION 5 MHz SWEEP/FUNCTION GENERATOR



Model 3025 / $475.00

FEATURES

• Generates sine, square, triangle and haversine waveforms • Covers 0.005 Hz to 5 MHz • Four decade, 10,000:1 log sweep range; 1000:1 linear sweep range • Tone-burst or single cycle operation • Sweeps up or down in frequency • Independent start and stop frequency controls for setting sweep limits • Variagle DC offset • Separate high and low amplitude outputs, plus variable amplitude control.

B&K-PRECISION's Model 3025 sweep/function generator is a versatile signal source with a very wide frequency coverage. The high-frequency limit extends to 5 MHz, allowing the 3025 to be a useful aid in evaluating many rf and i-f circuits.

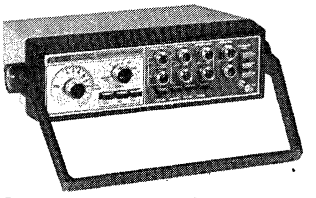
Like other B&K-PRECISION function generators, the 3025 generates sine, square and triangle waveforms, but also offers haversine for more specialized applications. Linear and logarithmic sweep capabilities are front-panel selectable. Sweep rates are continuously adjustable from 10 milliseconds to 1 minute. Linear sweeps of 1000:1 for 3 decades and, logarithmic sweeps of 10,000:1 for 4 decades may be set.

Because of its exceptionally wide sweep-range capability, the 3025 is ideally suited for sweep testing broadband amplifiers used to carry video, data and multiplexed audio communication signals. It is also an excellent signal source for sweep testing audio components and systems. Another feature of the 3025, useful in evaluating audio systems, is its tone-burst capability.

SPECIFICATIONS

Waveforms: Sine, square, triangle, haversine.
Modes: Continuous, linear sweep, logarithmic sweep, tone-burst, single cycle.
Frequency Range: 0.005 Hz to 5 MHz in 7 ranges, 1000:1 freq. control.
Accuracy: ±5% of full scale.
Amplitude Stability: 0.25% after 15 minutes.
Frequency Stability. 0.25% after 15 minutes.
Main Generator Output: Sine, square, triangle, haversine; selectable.
Output Amplitude: 20 Vp-p into one circuit max., 10 Vp-p into 50Ω, 50Ω output impedance.
Attenuation: Amplitude control provides 20 dB variable atten. Separate low output jack provides 20 dB atten. of main output.
DC Offset and DC Output: (50Ω output) Cont. variable ±10 VDC into open circuit, ±5 VDC into 50Ω.
Internal Sweep: Lin. or log., sweep limit up to 3 decades linear (4 decades log).
Internal Sweep Rate: 10 ms to 1 minute cont. variable.
Internal Sweep Width: 1000:1 lin., 3 decades; 10,000:1 log, 4 decades.
Internal Sweep Output: (f-V) Approx. 0 to +5 V output for 1000:1 lin. (10,000:1 log) freq. sweep range.
External Sweep Input: (V:f) Approx. 0 to +5 V input for 1000:1 lin. (10,000:1 log) freq. sweep.
Triggered Modes: 1.6 V trigger input threshold or man. pushbutton. Single cycle — one complete cycle output per pulse trigger input. Tone-burst — sustained output while trigger input applied (last cycle completed when trigger removed).
Square Wave Symmetry: >99% from 1 Hz to 5 MHz.
Square Wave Rise/Fall Time: <50 ns.
Square Wave Overshoot: <5% of peak voltage (50Ω termination).
Sine Wave Distortion: <0.5% from 1 Hz to 100 kHz. All harmonics >30 dB down from 100 kHz to 5 MHz.
Amplitude Flatness: <0.2 dB to 500 kHz, <±1 dB to 5 MHz.
Triangle Wave Linearity: >99% from 0.1 Hz to 100 kHz.
Sweep Pulse Output: TTL compatible square wave.
Operating Environment: Specifications valid at 25° ±5°C after 30 minutes.
Power: 100/120/220/240 VAC, 50/60 Hz, 25 W.
Dimensions (HxWxD): 8.9 x 21 x 28 cm (3.5 x 8.3 x 11″).
Weight: 2.3 kg (5 lbs.).
ACCESSORIES SUPPLIED
Power cord, instruction manual, schematic and parts list.
OPTIONAL ACCESSORIES
BNC to BNC Cable CC-41. BNC to UHF Cable CC-42.

2 MHz SWEEP/FUNCTION GENERATOR



Model 3020 / $399.00

FEATURES

• Four instruments in one package — sweep generator, function generator, pulse generator, tone-burst generator • Covers 0.02 Hz-2 MHz • 1000:1 tuning range • Low-distortion high-accuracy outputs • Three-step attenuator plus vernier control • Internal linear and low sweeps • Tone-burst output is front-panel or externally programmable.

This one instrument can replace a function generator, sweep generator, pulse generator and tone-burst generator. Frequency coverage spans 0.02 Hz to 2 MHz in seven ranges, with each range providing linear 1000:1 frequency control. Operating frequency can be varied on each range by the front panel frequency control or the VCO external input.

SPECIFICATIONS

FREQUENCY CHARACTERISTICS
Range: .02 Hz to 2 MHz in 7 ranges. (Each range provides 1000:1 frequency control.)
External Control (rear panel input): VCO range >1000:1 (linear).
Accuracy: 5%.
Stability: .05% (after 15 min.)
Functions: Sine, triangle, square, TTL square wave, pulse, tone-burst.
Square Wave: Variable amplitude and fixed TTL output.
Symmetry: 99% to 100 kHz.
Rise/Fall Time: <100 ns at maximum output.
TTL Square Wave Response: <25 ns rise/fall time (logic 0<0.4; logic 1>2.4 V).
Sine Wave: Variable amplitude.
Distortion: <1% 0.2 Hz to 100 kHz, <0.5% typical.
Amplitude Flatness: >±0.3 dB to 2 MHz at max. output amplitude.
Triangle Wave: Variable amplitude.
Linearity: 99% at 100 kHz.
Variable Symmetry: 40:1 range, independent of frequency or output waveform.
AM Modulation: 0-1.5 V p-p external signal provides 100% modulation; continuously variable. Capable of suppressed carrier operation.
SWEEP CHARACTERISTICS
Internal Linear or log.
Sweep Rate: 0.5 Hz (2 SEC period) to 50 Hz (20 ms period).
Sweep Width: Variable from 10:1 to 1000:1.
Sweep Voltage Output: Proportional to sweep; at rear GCV connector.
External Sweep: Rear panel VCO input provided.
TONE-BURST CHARACTERISTICS
Burst Width: Adjustable from 5-90% of period of internal gating freqency. External gating, burst width determined by TTL gating pulse.
Repetition Rate: 0.5 Hz (2 SEC period), to 50 Hz (20 ms period) set by SWEEP RATE control.
OUTPUT
Amplitude: 20 V p-p open circuit; 10 V p-p into 50Ω.
Control: Continuously variable, >20 dB. Fixed attenuation, 0-40 dB in 3 steps. This, together with 30 dB variable, provides 60 dB total attenuation.
Impedance: 50Ω ±5%.
D.C. Offset: Continuously variable, maximum of ±10 V open circuit or ±5 V into 50Ω. (Maximum AC peak + VDC offset without clipping is ±20 V open circuit; ±10 V into Ω).
GENERAL
Rear Panel Jacks: (All phono) VCO (sweep) input, GCV voltage out (proportional to frequency), AM input; TTL output, tone-burst control external input.
Operating Environment: 0-50°C (Accuracy specified at 25°C ±5°C).
Power Requirements: 105-130 VAC, 60 Hz, 22 W. Three-wire cord.
Size (HxWxD): 8.1 x 29 x 20 cm (3.2 x 11.3 x 5″) including handle at rest position.
Weight: 1.35 kg (3.1 lbs.) CSA listed.

B+K PRECISION DYNASCAN CORPORATION / FUNCTION GENERATORS PULSE GENERATORS

Dept. EM, 6460 West Cortland Avenue, Chicago, Illinois 60635 • (312) 889-9087 • Telex: 25-3475

200 kHz AUDIO SWEEP/FUNCTION GENERATOR

Model 3015 / $289.00

FEATURES

• Sine, square and triangle output • 2 Hz to 200 kHz frequency coverage • Internal lin/log sweeps with selectable sweep rate • 1000:1 frequency ratio in 3 decades • Variable and fixed TTL outputs • 2 Hz to 200 kHz frequency coverage.

APPLICATIONS

Sweep frequency response tests . . . Amplifier square-wave evaluation . . . Graphic equalizer and tone-control evaluations . . . Speaker response tests . . . Signal source for digital and analog circuits . . . Check threshold levels for TTL and CMOS logic . . . Check resonant circuits for ringing inductors . . . Sweep-test any passive or active device up to 200 kHz.

DESCRIPTION

The 3015 sweep/function generator is an exceptionally compact instrument, designed principally for audio and ultrasonic applications.

The 3015 is an excellent signal source for most measurement and troubleshooting applications. Its built-in linear and log sweep capabilities may be operated at three different sweep rates. The sweep/rate may be further increased by adding an external ramp-timing capacitor or controlled by an external 0-1 volt signal. An output is provided for the internal sweep ramp voltage.

SPECIFICATIONS

Waveforms: Sine, triangle, square.
Modes: Continuous, linear sweep, log sweep.
Frequency Range: 2 Hz-200 kHz in 3 ranges.
Accuracy: ±5% full scale to 20 kHz.
Main Generfator Output: Sine, square, triangle 15 V p-p — open circuit; 7.5 V p-p — 600 ohms.
Attenuation 30 dB; continuously variable.
External Frequency Input: (V:f) approximately 0 to +1 V for 1000:1 frequency change.
Square Wave Symmetry: >99% to 100 kHz.
Sine Wave Distortion: <1% 2 Hz to 20 kHz.
Triangle Wave Linearity: >99% to 100 kHz.
Internal Sweep: Linear 1000:1; Log 10,000:1.
Internal Sweep Rate: Selectable: Slow — 25 s; Medium — 250 ms; Fast — 2.5 ms.
Auxiliary Outputs: (f:V) 1. Sweep — voltage proportional to frequency; 2. Ramp Sync — 1 V p-p minimum; 3. TTL — 3 V p-p — minimum.
Auxiliary Inputs: 1. Ramp timing — use ext. cap extended range; 2. V:f — 1 V for 1000: 1 change in frequency.
Operating Environment: 0° to +50°C.
Power Requirements: Supplied with 120 VAC or 220 VAC adapter.
Dimensions (HxWxD): 7.3 x 18.7 x 21.6 cm (2⅞ x 7⅜ x 8½″).
Weight: 0.96 kg (2 lbs.).

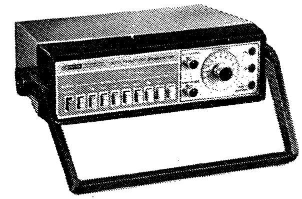
ACCESSORIES SUPPLIED

Model 3015 includes power cord, instruction manual, scematic diagram and parts list.

OPTIONAL ACCESSORY

RCA Phone Plug to Alligator Clip Cable CC-51.

1 MHz LOW DISTORTION FUNCTION GENERATOR



Model 3010 / $239.00

FEATURES

• Generates sine, square and triangle waveforms • Variable amplitude and fixed TTL square-wave outputs • 0.1 Hz to 1 MHz in six ranges • Push button range and function selection • Typical sine wave distortion under 0.5% from 1 Hz to 100 kHz • Variable DC offset for engineering applications • VCO external input sweep-frequency tests.

B & K-PRECISION's Model 3010 function generator offers convenience and excellent waveform accuracy at an affordable price. Frequency coverage is unusually wide, spanning 0.1 Hz to 1 MHz in six ranges, with each range providing linear 100:1 frequency control.

The 3010 features a variable DC offset control which provides up ±5 VDC (into 600Ω) combined with the selected audio output frequency. Engineering applications for this feature are many and varied. For square-wave operation, the 3010 offers a fixed TTL output level and a variable amplitude output. Variable output square wave rise or fall time is 100 nanoseconds or less; TTL square wave rise/fall time is 25 nanoseconds or less. Square-wave symmetry at 100 kHz is a near-perfect 99%. The 3010 generates a near-perfect triangle-wave output by providing 99% linearity at 100 kHz. As a sine-wave generator, the 3010 is conservatively rated at less than 1% distortion from 0.1 Hz to 100 kHz; less than 0.5% is typical.

SPECIFICATIONS

FREQUENCY CHARACTERISTICS

Range: 0.1 Hz to 1 MHz in six ranges. (Each range provides >100:1 frequency control.)
External Control (rear panel input): VCO ≥100:1 (linear) on any frequency range. (With dial setting at .1, a 0 to 5.5 V input ramp produces a frequency change of 100:1).
Accuracy: 5% of F.S. to 500 kHz, 8% F.S. 500 kHz to 1MHz.
Stability: 05% (after 15 min.).
Functions: Sine, Triangle, Square, TTL Square Wave.
Square Wave: Variable amplitude or fixed TTL output.
Symmetry: 99% to 100 kHz.
Rise/Fall Time: <100 ns at maximum output.
TTL Square-Wave Response: <25 ns rise/fall time (0 <.4 V: 1> 2.4 V).
Sine-Wave: Variable amplitude.
Distortion: <1% 1 Hz to 1000 kHz; <0.5% typical.
Amplitude Flatness: <.3 dB to 1 MHz at maximum output amplitude.
Triangle Wave: Variable amplitude.
Linearity: 99% at 100 kHz.

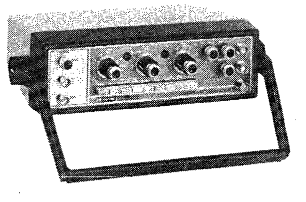
OUTPUT

Amplitude: 20 V p-p open circuit 10 V p-p into 600Ω.
Control: Continuously variable, >30 dB range.
Impedance: 600Ω ±5%.
D.C. Offset: Continuously variable, maximum of ±10 V open circuit or ±5 V into 600Ω. (Maximum VAC + VDC offset without clipping is ±10 V open circuit; ±5 V into 600Ω).

GENERAL

Operating Environment: 0-50°C (accuracy specified at 25°C ±5°C).
Power Requirements: 117/234 VAC, 50/60 Hz, 8 W. Three-wire cord.
Size (HxWxD): 8.1 x 29 x 20 cm (3.2 x 11.3 x 7.8″) including handle at rest position.
Weight: 1.3 kg. (2.9 lbs.). CSA listed.

5 MHz PULSE GENERATOR



Model 3300 / $399.00

FEATURES

• Pulse period range of 200 nanoseconds to 1 second; frequency range of 5 MHz to 1 Hz • Identical pulse width and delay ranges of 100 nanoseconds to 1 second • Can be used with an oscilloscope for adjustable sweep delay • Rise time is less than 15 nanoseconds for 50-ohm high-speed output • General purpose 600-ohm output offers adjustable DC offset • TTL output • LED overlap indicator reveals incorrect control settings • Adjustable input-trigger level for use with arbitrary waveforms and for pulse reconstruction • Pulse-burst capability allows convenient testing of counters and shift registers.

APPLICATIONS

Add sweep delay to any triggered-sweep oscilloscope . . . Test counter circuits and shift registers . . . IC logic testing of TTL, MOS, CMOS, HiNiL, HTL, RTL and ECL logic families . . . Determine transient and step response of amplifiers . . . "Single step" digital circuits for easy analysis . . . Use with the 3010 or 3020 for frequency-shift keying tests . . . High drive for testing opto-electronic devices . . . Substitute clock-pulse signals for microprocessor applications . . . Use one shot mode for activating circuits with a single pulse . . . Drive several instruments independently.

The new B&K PRECISION Model 3300 pulse generator is an essential instrument for anyone involved with digital circuitry. This versatile instrument generates a range of digital signals at three separate outputs.

SPECIFICATIONS

PULSE CHARACTERISTICS

Pulse Width Range: From 100 ns to 1 sec., linear adjust in 7 decade steps.
Trigger Delay or Pulse Delay: Same as pulse width.
Repetition Period Range: 200 ns to 1 sec. linear adjust in 7 decades.
Frequency Range: 1 Hz to 5 MHz.
Duty Cycle: Capable of 100% DC.
Trigger Input: Selectable threshold from −18 to +18 V.
Trigger Output: TTL Level.
Outputs: TTL, 50Ω, 600Ω.

OUTPUT CHARACTERISTICS

TTL. Standard.
50Ω: 0 to 10 V open circuit. 0 to 5 V with 50Ω load.
600Ω: −15 V to +15 V linear adjust with DC offset. Pulse amplitude peak to peak 30 V into open circuit 15 V into 600Ω.
Rise and Fall Times: TTL <25 nS; 50Ω outputs: less than 15 ns; 600Ω: less than 75 ns.

OPERATING MODES

Free Running: Continuous operation as selected.
Triggered: Operates only once per trigger input.
Pulse Amplifier: Operates once when input crosses selected threshold.
External Gate: Synchronous gating. Unit runs at selected frequency during time when TTL level is present at gate input. Last pulse is completed if gate signal is removed.
Trigger Delay (Post Trigger): Trigger output is a pulse variable in width independently of pulse output.
Pulse Delay: Output pulse is delayed by amount selected with delay setting.
Manual: One output pulse is produced when manual button is pushed (one shot mode).
Fixed Delay: Trigger pulse will be set at a fixed width of approx. 1 µs for easy set up.
Invert: All pulse outputs are inverted.
Square Wave: 50% duty cycle output. Frequency is automatically selected for a frequency of ½ the selected rep. rate.

GENERAL

Overlap Indicator: LED indicates when controls have been incorrectly set so that pulse width exceeds period.
Operating Environment: 0-50°C.
Power Requirements: 117/234 VAC, 50/60 Hz 28 W. Three-wire cord.
Size (HxWxD): 8.1 x 29 x 20 cm (3.2 x 11.3 x 7.8″) including handle at rest position.
Weight: 1.35 kg. (3.1 lbs.). CSA listed.

COMMONLY USED ELECTRICAL/ELECTRONIC ABBREVIATIONS AND ACRONYMS

A

AC alternating current
A/D analog to digital
ADC analog to digital converter
ADP automatic data processing
AF audio frequency
AFC automatic frequency control
ALGOL algorithmic language
AM amplitude modulation
AND a logical operator
AQL acceptable quality level
ASCII American national standard code for information interchange
AWG American wire gauge

B

BALUN balanced to unbalanced
BASIC beginners' all-purpose symbolic instruction
BCD binary-coded decimal
BNC baby "N" connector
BUS basic utility system

C

CAD computer aided design
CAM computer aided manufacture
CATV cable television or community antenna television
CERMET ceramic metal element
Comm. communications
CMOS complementary metal-oxide semiconductor
CPS characters per second
CPU central processing unit

D

D/A digital to analog
DAC digital to analog converter
DC direct current
DIAC bidirectional trigger diode
DIL dual in-line
DIN Deutsche Industrie Normenausschuss
DIP dual in-line package
DPM digital panel meter
DTL diode transistor logic

E

EDP electronic data processing
EBCDIC extended binary coded decimal interchange code
EEPROM electrically erasable PROM
EMC electromagnetic compatibility
EMI electromagnetic interference
EMP electromagnetic pulse
EPROM electrically programmable ROM
ESR equivalent series resistance

F

FEP fluorinated ethylene propylene Copolymar, 200° Teflon
FET field-effect transistor
FM frequency modulation
FORTRAN formula translator

G

GaAsFET gallium arsenide field effect transistor
GPIB general purpose interface bus

H

HF high frequency (3 to 30 MHz)
HIPOT test, measurement and diagnostic equipment
HLL high level language
HV high voltage
Hz Hertz

I

IC integrated circuit
IDC insulation displacement contact
IF intermediate frequency
IO input/output (devices)
IR insulation resistance (or) infrared

J

JFET junction field effect transistor
JMOS junction metal oxide semiconductor

K

kHz kilohertz (10^3 hertz)
KSR keyboard send receive

L

LC inductance capacitance
LCD liquid crystal display
LED light-emitting diode
LF low frequency (30 to 300 kHz)
LIF low insertion force
LNA low noise amplifier
LNB low noise band
LSI large scale integration
LVDT linear velocity displacement transformer

M

MASER microwave amplification by stimulated emission of radiation
MATV master antenna television
μF microforad
MHz megahertz
MIPS million instructions per second
MIB microcomputer interface board
MOS metal oxide semiconductor
MOSFET metal oxide semiconductor field effect transistor
MOSIGT metal-oxide semiconductor insulated-gate transistor
MOV metal oxide varistor
MPU microprocessor unit
MSI medium scale integration

N

NBS National Bureau of Standards
NEMP nuclear electromagnetic pulse
NIM nuclear instrumentation module
NOR not OR
NTC negative temperature coefficient

O

OCR optical character reader
OEM original equipment manufacturer
OR a logical operator

P

PC printed circuit
PCB printed circuit board
pF picofarad
PGA pin grid array
PIN positive-intrinsic-negative (transistor)
PLA programmable logic array
PLL phased lock loop
PPI plan position indicator
PROM programmable read only memory
PTC positive temperature coefficient
PUT programmable unijunction transistor

Q

QAM quadrature amplitude modulation
Q (meter) quality-factor meter

R

RAM random access memory
RC resistance-capacitance
RFI radio frequency interference
RMS root mean square
ROM read only memory
RF radio frequency
RFC radio-frequency choke
RFI radio-frequency interference
RTD resistance-temperature detector
RTL resistor transistor logic
RTV room temperature vulcanizing
RW read/write

S

SAS silicon asymmetrical switch
SBC single board (micro) computer
SBS silicon bilateral switch
SCR silicon-controlled rectifier
SCS silicon controlled switch
SDA source & detector assemblies
SIDAC bidirectional voltage-triggered switch
SIP single in-line package
SSI small scale integration
SSR solid state relay
STL Schottky transistor logic
SUS silicon unilateral switch

T

TC temperature coefficient
TCXO temperature compensated crystal oscillator
TFE tetrafluoride ethylene propylene Copolymer, 250° Teflon
TRIAC bidirectional AC switch
TTL transistor-transistor logic
TTY teletypewriter

U

UHF ultra high frequency (300 MHz to 3 GHz)
UJT silicon unijunction transistor
UL Underwriters Laboratory
UPS uninterruptible power supply

V

VAC volts (of) alternating current
VAR volt-ampere reactive
VCR video cassette recorder
VDC volts (of) direct current
VHF very high frequency
VHSIC very high speed integrated circuit
VLF very low frequency (3 to 30 kHz)
VLSI very large scale integration
VME virtual machine environment
VRM voice recognition module
VTVM vacuum tube volt meter
VU volume unit
VSWR voltage standing wave ratio

W

WPS word processing software

Y

YIG yttrium iron garnet

Z

ZIF zero insertion force

BBC BROWN BOVERI GOERZ METRAWATT

BBC-Metrawatt/Goerz
2150 W. 6th Avenue
Broomfield, Colorado 80020
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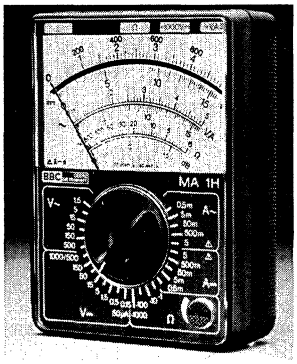
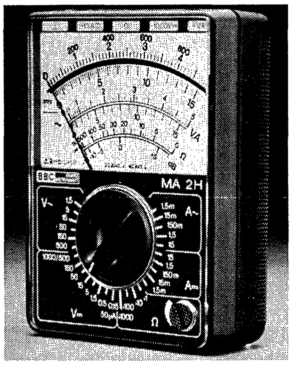
Analog and Digital Multimeters

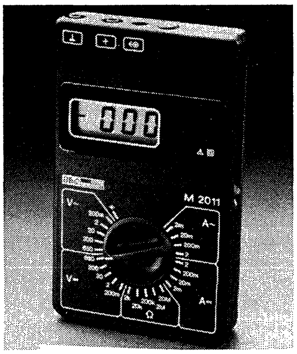
Rugged designs: High-impact cases are built for heavy-duty, "hands-free" operation. Extensive RF shielding insures top performance in high EMI environments. Recessed input jacks, safety-designed test leads and extensive input protection guard against accidental shock. All meters comply with tough VDE safety and DIN design standards for high-energy applications. Test leads and battery included. Analog meters warranteed for one year, digitals for two years.



◀ **MA 1H Analog Multimeter**
- Measures ac and dc current to 5A, voltage to 1000V and resistance to 1 MΩ
- −15 dB to +56 dB measurement range
- Large, easy-to-read 3.3 inch mirrored scale
- 2.5% basic accuracy
- **$ 49.00**

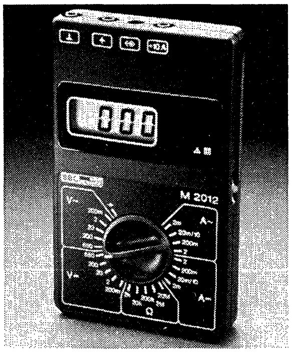
MA 2H Analog Multimeter ▶
- All the capabilities of the MA 1H plus:
- AC and dc current to 15A
- 2.5% basic accuracy
- **$ 79.00**





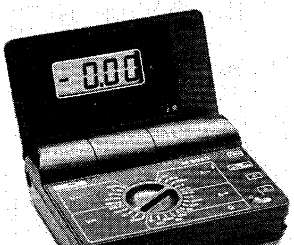
◀ **M 2011 Digital Multimeter**
- 23 measurement ranges for ac and dc volts, ac and dc current and ohms
- Basic dc accuracy: ± (0.5% + 1 digit)
- 15 Hz to 4 kHz frequency response with full RF shielding
- Extra large 1/2 inch LCD display
- 2000 hour battery operation
- **$ 134.00**

M 2012 Digital Multimeter ▶
- All the capabilities of the M 2011 plus:
- Current ranges to 10A ac/dc, 20A for 30 seconds
- Basic dc accuracy ± (0.25% of reading + 1 digit)
- **$ 149.00**



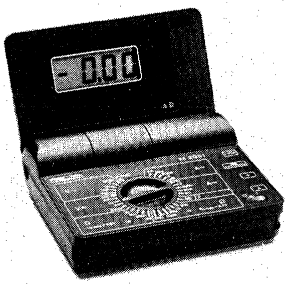
Unique Folding Multimeters

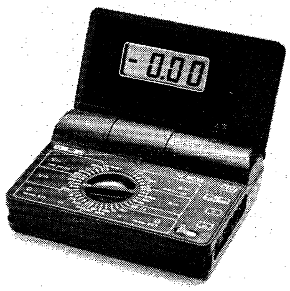
Ideal for both bench and field applications. Hinged analog or digital displays let the user select the optimum viewing angle. Adjustable neck strap free both hands for probing with the test leads. When closed, meters shut themselves off. All models meet tough VDE safety and DIN design standards. Heavy-duty carrying case and safety-designed test leads included. Two years parts and labor warranty.



◀ **M 2030 Folding Digital Multimeter**
- 25 measurement ranges for ac and dc voltage, current and resistance
- Basic dc accuracy: ± (0.1% of reading + 1 digit)
- 10A ac and dc current ranges (20A for 30 seconds)
- 2000 hour battery life
- **$ 219.00**

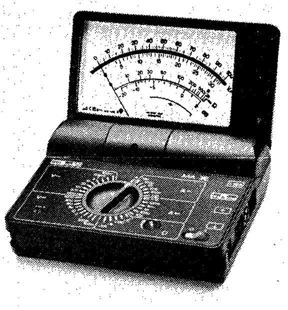
M 2031 Folding Digital Multimeter ▶
- All the features of the M 2030 plus:
- Diode, audible continuity and battery self-tests
- 4 low power (0.5V max. open circuit voltage) and 6 high power (2.3V max.) resistance ranges
- **$ 235.00**





◀ **M 2032 True RMS Folding Digital Multimeter**
- All of the features of the M 2031 plus:
- AC + DC coupled True RMS measurements of voltage and current
- Essential for measuring non-sinusoidal waveforms such as square waves, pulse trains and noise
- Basic ac accuracy: ± (0.75% of reading + 3 digits)
- **$ 269.00**

MA 3E Folding Analog Multimeter ▶
- 46 measuring ranges for ac and dc voltage and current, dB and ohms.
- DC voltage accuracy: 1.5%; AC accuracy: 2.5%
- 10 MΩ FET input accepts most DMM accessories including temperature, high voltage and current probes.
- Large, 4-inch mirrored scale with shock resistant movement
- **$ 199.00**



BBC GOERZ METRAWATT
BROWN BOVERI

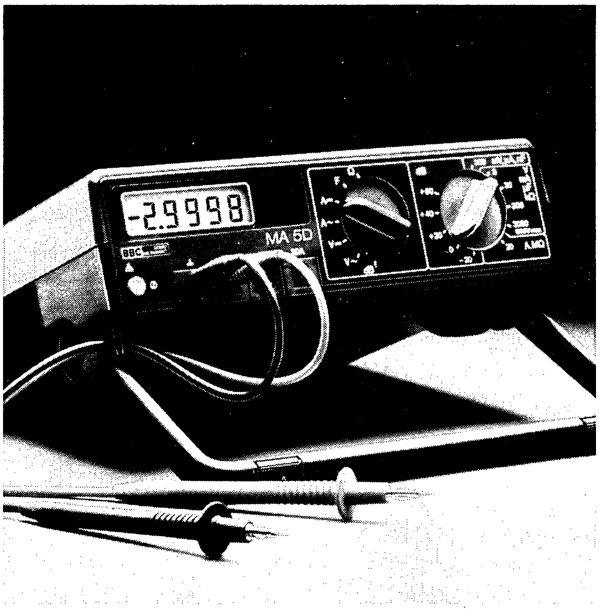
BBC-Metrawatt/Goerz
2150 W. 6th Avenue
Broomfield, Colorado 80020
Telex: 49-70869

1-800-821-6327
In CO: (303) 469-5231

30,000 Count Bench/Portable Multimeter

MA 5D Digital Multimeter

- 30,000 count display provides 50% more resolution than 4½ digit DMMs
- Resolution is equivalent to 5½ digit DMMs between 20000 counts and 30000 counts.
- Ideal for measuring 20 mA current loops and 24V aircraft power supplies
- 37 measuring ranges for ac and dc voltage and current, resistance, dB and capacitance
- High current (20A) range, 30A for 10 seconds.
- Basic dc accuracy: ± (0.05% of reading + 1 digit)
- True RMS measurements from 15 Hz to 20 kHz (ac coupled)
- Capacitance measurements from 0.01 nF to 3000 μF, 2 second settling time
- dB measurements from -60 dB to + 60 dB, referenced to 600Ω, 1 watt
- All functions and ranges selectable with two rotary switches
- Only two input jacks for all ranges except 20A
- Quick-clamping terminals for wire ends, components or cable lugs
- Rechargeable NiCad batteries with battery charger built in.
- **$ 595.00**



M 2050 Digital Scope Multimeter

A Digital Scope, Multimeter and Transient Recorder in One

- Lightweight, portable and battery-powered
- Scope and multimeter operate simultaneously
- Extremely easy to set up and use
- Make accurate DMM measurements, view trends and capture waveform data

Digital Storage Scope

- 50 kHz effective bandwidth, 500 kHz sample rate
- High-contrast 128 x 64 LCD dot matrix display
- Low power consumption delivers eight hours of continuous battery operation
- Eight time bases (0.1 ms/DIV to 6 min/DIV) with 4x memory zoom
- Ext/Int/Auto/Manual/Roll trigger selection
- Armed single-shot operation

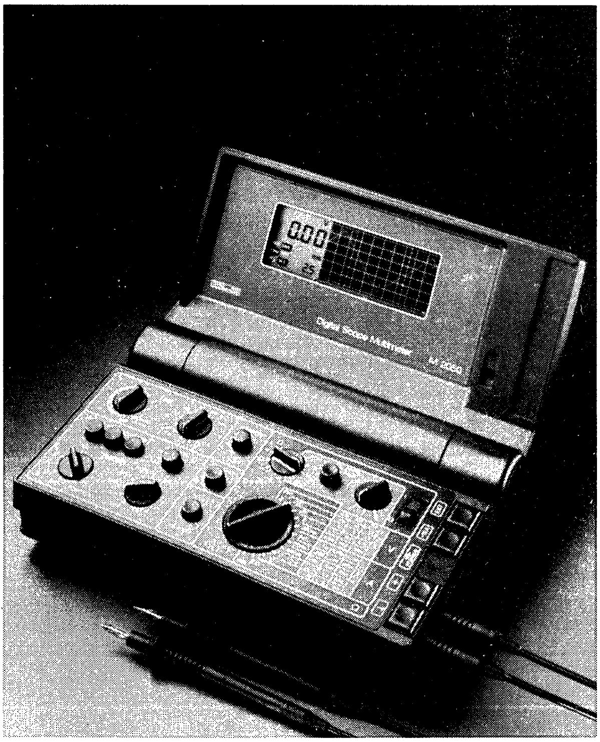
3½ Digit Multimeter

- 32 measurement ranges for voltage, current and resistance
- 0.2% basic dc voltage accuracy
- AC measurements as low as 15 Hz
- Large, easy-to-read ½ inch LCD display
- Complete display annunciation
- Meets tough DIN design and VDE safety standards

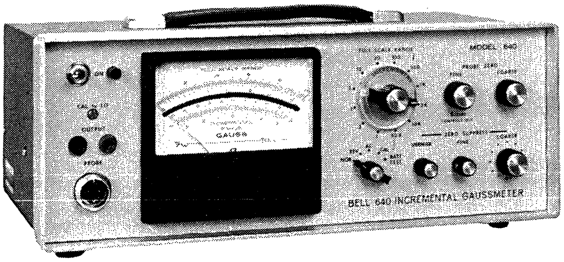
Transient Recorder

- 2 independent 0.5k x 8-bit memories
- Flexible trigger capabilities (−100% to + 100% trigger delay, selectable in five steps)
- Optional dc analog output for making permanent records with a strip-chart recorder
- SAVE function prevents accidental overwriting of stored information
- Long-term memory will store data for 3 months

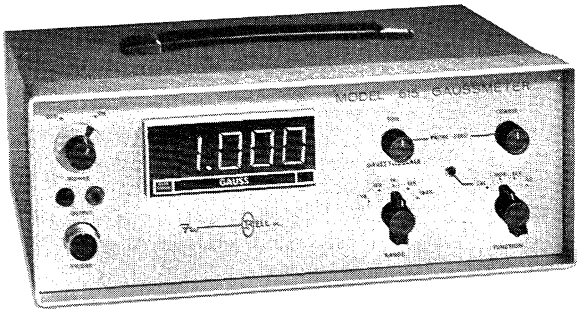
- **M 2050-01 DSM w/o analog output . . . $ 1,595.00**
- **M 2050-02 DSM with analog output . . . $ 1,995.00**

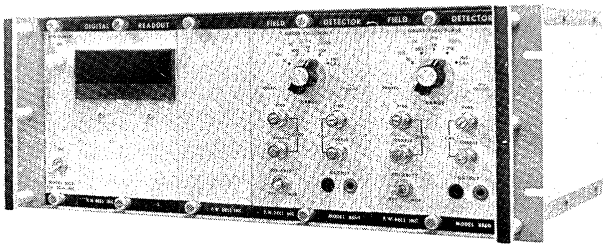


Hall Effect Gaussmeters


MODEL 640
GAUSS
BELL 640 INCREMENTAL GAUSSMETER

MODEL 620
GAUSS
BELL 620 GAUSSMETER


MODEL 615 GAUSSMETER
1.000
GAUSS
RANGE
FUNCTION


DIGITAL READOUT
FIELD DETECTOR
FIELD DETECTOR

DESCRIPTION

Bell Gaussmeters are designed to accurately measure magnetic flux density. Twenty-eight models and 110 standard field probes meet the demanding requirements of most applications.

Bell Gaussmeters provide four magnetic field measurement models: direct measurement of absolute magnetic field density, differential measurement of the difference in magnetic field density at two probe locations, incremental field measurements using an expanded scale and summation measurements.

There are 110 standard probe models for each gaussmeter model. Each is a precision, solid-state, magnetic field sensor built into a rugged package for accurate, repeatable, stable, field measurements. Models available for transverse, axial, differential, two-axis, and three-axis measurements with a variety of field ranges, field sensitivities, and configurations for each.

SPECIFICATIONS

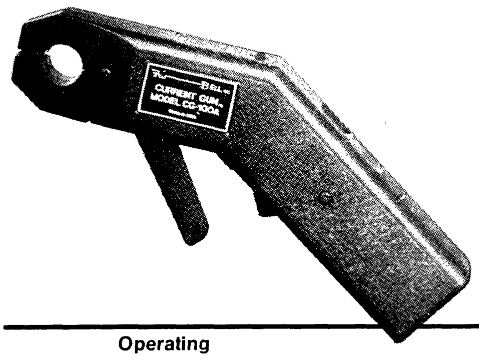
Gaussmeter Model	Ranges F.S. Gauss	Accuracy	dc Output Voltage F.S.
811 Digital	10 to 100,000	±0.1% F.S.	1 Volt
810 Field Monitor	10 to 100,000	±0.1% F.S.	1 Volt
660 Digital	1 to 100,000	±0.1% to 10 kG ±0.3% to 30 kG	1 Volt
640 Incremental	0.1 to 30,000	±0.25% F.S.	1 Volt/5 Volts
620 Precalibrated	0.1 to 30,000	±0.25% F.S.	1 Volt
615 Digital	10 to 100,000	±0.5% F.S.	100 mV BCD
610 Self-Calibrated	1 to 100,000	±0.5% F.S.	100 mV
600 General Purpose	100 to 30,000	±4% F.S.	1 Volt

F.W. BELL

An Allegheny International Company

6120 Hanging Moss Road • Orlando, Florida 32807 • Phone: 305-678-6900 • TWX: 810-853-3115

Hand-held Non-contact meters to measure Current•Power•Power Factor•Phase Angle

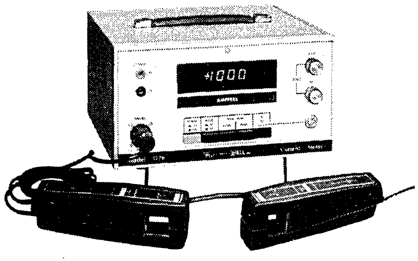


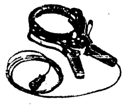
This broad line of hand-held, non-contact meters and probes includes models for measuring current, power, power factor, and phase angle. The meters have a digital readout located in the handle, while the probes are used in conjunction with multimeters, scopes, or recorders. Models in the line are: CG100A, Current-measuring Probe for use with multimeter or scope; CG100D, Digital Current Meter; PG200D, Digital Power Meter; PFG360D, Digital Power Factor/Phase Angle Meter.

SPECIFICATIONS

Model	Operating Range	Accuracy	Frequency Response	Output	Readout
CG100A	±10 A (dc or ac) ±100 A (dc orac)	±2.0% of rated output	dc to 1 kHz operable to 5.0 kHz	±1 V/10 A ±1 V/100 A	—
CG103A	±50 A (dc or ac) ±500 A (dc or ac)	±2.5% of rated output	dc to 1 kHz	±0.5 V/50 A ±0.5 V/500 A	—
CG100D	FS ±200 A (dc or ac)	dc & ac (15 Hz to 100 Hz) ±0.75% FS to 100 A (100 Hz to 1 kHz) ±1.5% FS to 100 A	dc to 1 kHz	±2 V/200 A	3½ digit LCD with 5-second readout hold
CG104D	FS ±500 A (dc or ac)	dc & ac (15 Hz to 100 Hz) ±2.5% FS ±3.0% of reading 100 A to 200 A	dc to 1 kHz	0.5 V/500 A	3½ digit LCD with 5-second readout hold
CG107D	FS ±1000 A (dc or ac)	dc & ac (15 Hz to 100 Hz) ±2.5% FS (100 Hz to 1 kHz) ±4.0% FS	dc to 1 kHz	1.0 V/1000 A	3½ digit LCD with 5-second readout hold
PG200D	Power 0.01 kW-19.99 kW 0.1 kW-199.9 kW Voltage 20-480 V ac, 20-600 V dc Current 2-150 A	<±1% of reading ±2 counts to 100 A <±1.75% of reading ±2 counts to 150 A	dc to 400 Hz	—	3½ digit LCD with 5-second readout hold
PFG360D	Power Factor 0.0 lag. 1.0-0.0 lead (4 quadrants) Voltage 85-480 V rms Current 1.5-200 A rms	Phase Angle ±4° (0-360°) @ 1.5 A-40 A rms 85 V-480 V rms	Power Factor 45-65 Hz sine wave Phase Angle same as power factor, including square and sinusodial wave forms	—	3½ digit, custom-formatted LCD

Current Meter





DESCRIPTION

The Bell Model 1776 digital current meter accurately measures ac, dc and ac-on-dc current with non-contact, clamp-on probes. No need to break the circuit to make a measurement. It's possible to obtain current measurements more easily and safely than voltage measurements, with complete isolation from the bus.

The 1776 digital current meter introduces virtually no resistance on dc readings and extremely small impedance on ac readings. Peak read-and-hold capability is standard. This permits you to read and hold the reading of the peak current appearing on the measured conductor. The 1776 is fully portable, operating from internal rechargeable batteries or 115/230 V, 50-60 Hz ac.

PROBES

Three standard probes are available. Others can be designed and supplied to meet special requirements. Each standard probe has a distinct full-scale range: 1000. 100 and 10 A. Probes are self-calibrating and interchangeable on any 1776 current meter. Special probes available upon request.

SPECIFICATIONS

Current Range (with applicable probe)	**4000 A F.S. • 2000 A F.S. 1000 A F.S. • 100 A F.S. 10 A F.S.**
Accuracy	
dc	**±1.0% F.S.**
ac (Sinusoidal)	**±1.0% F.S.**
Peak Detection (dc accuracy)	**±2.0% F.S.**
Frequency Response	**dc to 5 kHz**

F.W. BELL
An Allegheny International Company

6120 Hanging Moss Rd.
Orlando, FL 32807
Phone: 305-678-6900
TWX: 810-853-3115

BNC

Digital Delay Generators Light Pulse Generators

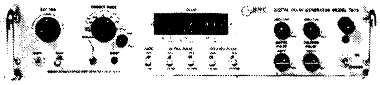
Digital Delay Generators provide accurate, repeatable control of time. DDGs are a source of stable intervals, pulses, impulses and gates produced as low-jitter outputs for precise triggering, gating, syncing, delaying, blanking, calibrating, etc. Remote IEEE-488 or BCD programmability is available.

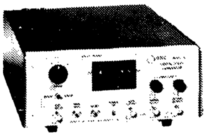
Internal or external triggering of a DDG produces a pair of fast risetime pulses, T_0 (Initial Pulse) and T_1 (Delayed Pulse), from separate outputs. The delay can be the selected interval between T_0 and T_1 or, by adding the insertion delay, T_1 can be timed from an external event trigger. A Gate is a third output equal to the delay. With the Model 7085, both T_1's delay and width are digitally selectable and can be auto-swept internally from RAM-stored time settings.

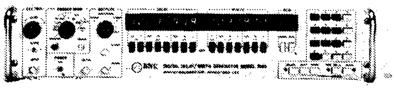
Accuracies and jitter of 100 ps or less are attainable. Pulse amplitudes of +5 V and −1 into 50Ω are standard; the 7085 and 7095 also have complement and ECL outputs. Trigger amplifiers can boost pulses to 250 V. Model AP-3 portable or TB-4 rack/bin power supply house the modular units. Key specs are below. Phone (415) 527-1121 to discuss your applications or get detailed literature.

MODEL	Time Resolution	Basic Time Range	Optional Time Range	Insertion Delay	Indeterminacy	Basic Jitter (RMS)	Trigger Rate	Input Sensitivity	Operating Modes	Power Requirements	Base Price (USA)
7095	50 ps	0-10 µs	0-10 ms^1	65 ns	None	30 ps	0-5 MHz	200 mV	D,G,I	115/230 VAC	$6900
7030A	1 ns	0-100 µs	—	80 ns	None	50 ps	0-10 MHz	250 mV	D,G	±6, ±12, −24V	$3670
7065	1 ns	0-1 ms	0-1 s^1	85 ns	None	50 ps	0-5 MHz	200 mV	D,G	115/230 VAC	$4970
7075	1 ns	0-1 ms	0-1 s^1	85 ns	None	50 ps	0-5 MHz	200 mV	D,G	115/230 VAC	$5685
7085	1 ns	0-100 ms^2	—	150 ns	None	50 ps	0-5 MHz	200 mV	D/W	115/230 VAC	$7500
7050	10 ns	0-10 ms	0-1 s^1	55 ns	±5 ns	100 ps	0-5 MHz	200 mV	D,G,P	±6V	$2565
7055	10 ns	0-10 ms	0-1 s^1	55 ns	±5 ns	100 ps	0-5 MHz	200 mV	D,G,P	115/230 VAC	$3250
7020	100 ns	0-10 ms	0-10 s^1	110 ns	±50 ns	100 ps	0-1 MHz	100 mV	D,G	±6, ±12V	$1735
7010	100 ns to 1 ms	0-10 ms to 0-100 s^3	—	120 ns	±50 ns	500 ps	0-1 MHz	2V	D,G,P, E,B^4	115/230 VAC	$1235

Operating Modes: D — Delay; G — Gate; I — Impulse; D/W — Delay/Width; P — Period; E — Events; B — Burst.
Notes: ^{1}Option A. ^{2}Width of Delayed Pulse also selectable in 1 ns steps to 10 ms. ^{3}Selectable in 5 decade steps. ^{4}With Option B.


MODEL 7075


MODEL 7010

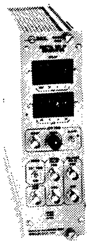

MODEL 7085

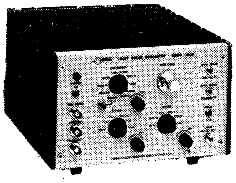
Light Pulse Generators are an optical waveform equivalent of electronic pulse generators. Blue, green, red or infrared outputs are available. LPGs serve as a basic tool for electro-optics work. Variable are the light output's rep rate, pulse width, delay and power. Features include fast transition times, adjustable peak amplitude control, CW output, external drive or modulation and more. See key specs below. Call (415) 527-1121 to talk about needs or for literature.

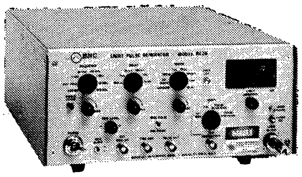
MODEL	Wavelength	Spectral Width	Peak Power	Power Range	Maximum Rate Hi-Spd	Maximum Rate Stabilized	Risetime Hi-Spd	Risetime Stabilized	Operating Modes	Price (USA)
6010A	660 nm	±30 nm	50 µW	20 dB	20 MHz	500 kHz	10 ns	900 ns	S,D,C,R	$2545
6010B	820 nm	±20 nm	200 µW	20 dB	20 MHz	500 kHz	10 ns	500 ns	S,D,C,R	$2545
6010C	560 nm	±30 nm	3 µW	20 dB	2 MHz	250 kHz	50 ns	900 ns	S,D,C,R	$2545
6010D	490 nm	±45 nm	300 nW	10 dB	2 MHz	150 kHz	75 ns	2 µs	S,D,C,R	$2950
6010E	850 nm	±20 nm	200 µW	20 dB	20 MHz	200 kHz	10 ns	500 ns	S,D,C,R	$2545
6020	830 nm	±1 nm	2 mW	20 dB	—	150 MHz	—	1 ns	S,D,C,R,M,Q,I	$8250
6030	1300 nm				Scheduled for 1986					

Operating Modes: S — Single Pulse; D — Double Pulse; C — CW; R — Ext. Drive; M — Ext. Modulation; Q — Square Wave; I — Impulse.

MODEL 7030A

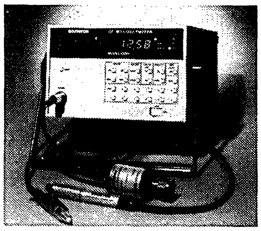

MODEL 7050


MODEL 6010


MODEL 6020

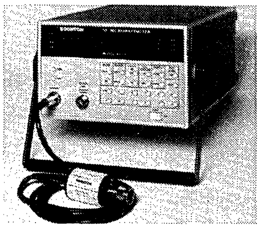
BERKELEY NUCLEONICS CORP. • 1198 Tenth St., Berkeley, CA 94710 • Telex 6771167 • **Phone (415) 527-1121**

BOONTON IS THE VALUE LEADER FOR...



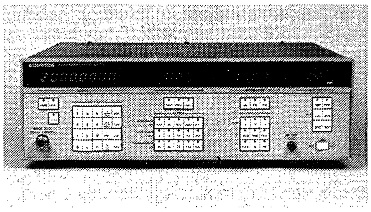
R.F. Millivoltmeters

The Model 9200A combines advanced microprocessor-controlled measuring circuits with a new series of r.f. probes and accessories to provide sensitive terminated and thru-line voltage measurements, in both 50-ohm and 75-ohm systems, to 1.2 GHz. A 50-ohm sensor is also available for voltage and power measurements to 2.5 GHz. An optional second input channel allows dual input gain and loss measurements. Full GPIB with SRQ is an option. A low cost, single channel, analog Model 92E is also available.



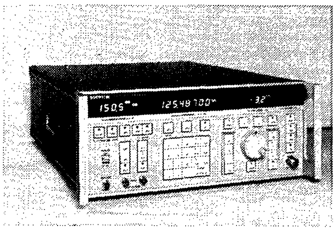
Microwattmeters

The dual-channel Model 4200 provides continuous frequency coverage from 100 kHz to 75 GHz. Four millimeter-wave sensors with −50 dBm sensitivity and 60 dB dynamic range cover K-band (18-26.5 GHz), Ka (26.5-40 GHz), Q (33-50 GHz), and V (50-75 GHz). A series of coaxial diode sensors with 70 dB dynamic range is available for measurements from −60 dBm to +30 dBm, 100 kHz-18 GHz. Three thermocouple sensors, each with 40 dB dynamic range, are available for levels from −30 dBm to +20 dBm, 1 MHz-18 GHz. Interpolated cal factors are automatically applied with entry of frequency. Stored calibration data allows interchangeability of sensors. Optional GPIB. Low cost, single channel Model 4210 also available.



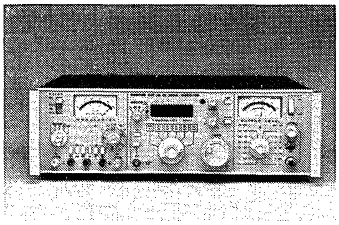
Modulation Meters

The Model 8200 is the definitive modulation analyzer that completely characterizes baseband and modulated carrier signals to 2 GHz. AM, FM, and øM, carrier frequency and level, and audio frequency and distortion are all displayed. True peak and true rms detection available. Four low-pass filters, four high-pass filters, and four de-emphasis networks are provided. Two lower cost models, 82AD and 8210, are also available.



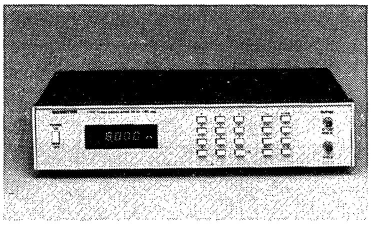
Programmable Signal Generators

Three models of low distortion, wideband f.m./a.m./ϕ.m. signal generators can function as manual instruments with pushbutton and spin knob control or as fast responding controller-operated generators with full talk and listen capability. They feature analog and digital sweeps, low distortion frequency and level programmable modulation oscillators, and are capable of storing and recalling from non-volatile memory up to 250 complete panel setups. The Model 1020 covers a frequency range from 150 kHz to 540 MHz. The Model 1021 adds an additional range to 1.08 GHz. The Model 1030 goes from 150 kHz to 180 MHz and features output power to +23 dBm (200 mW.)



Manual Signal Generators

Two models of manual f.m./a.m. signal generators provide outstanding performance at reasonable cost. The Model 102 E/F covers a range from 450 kHz to 520 MHz, with an optional range to 1 GHz. They are available with or without phase lock for 0.05 ppm/hour carrier frequency stability. Optional pulse modulation has superior specifications. The Model 103 C/D offers 125 kHz to 175 MHz coverage, output range to +23 dBm, five sweep ranges. Both models have external frequency counting capability.



Programmable Audio Oscillator

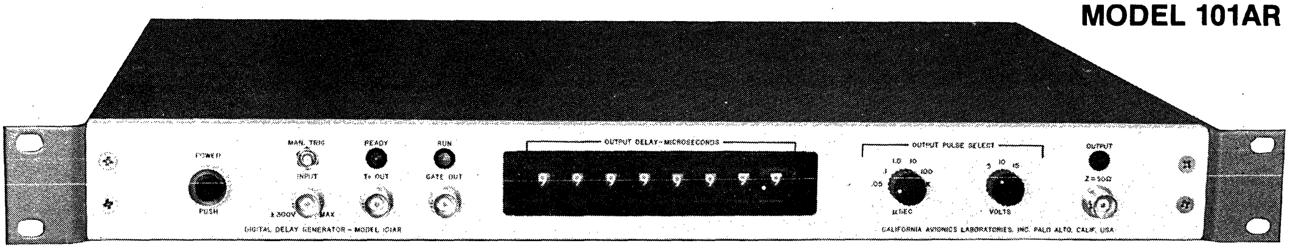
The new Model 1100 audio oscillator provides programmable sinewave frequencies from 20 Hz to 50 kHz with low distortion (typically less than 0.02%), levels programmable to 8 V e.m.f. with 2 mV resolution (1 mV below 4 V), and a separate fixed 1 V output. Full GPIB is standard and up to 190 complete panel setups can be stored in non-volatile RAM for instant recall.

Boonton Electronics Corporation
791 Route 10, Randolph, NJ 07869,
Telephone (201) 584-1077

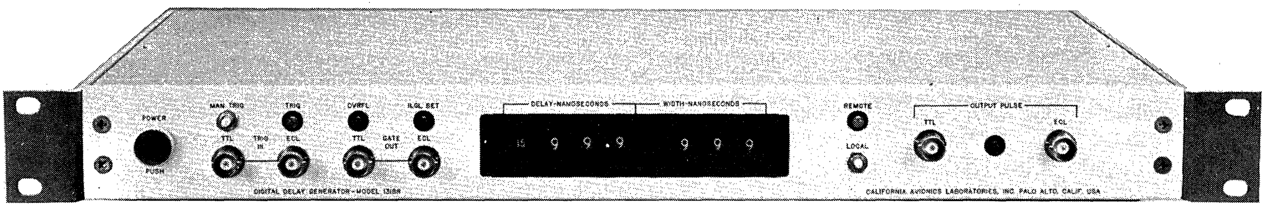
DIGITAL DELAY GENERATORS

FOR PRECISE EXPERIMENT TIMING AND SYNCHRONIZATION

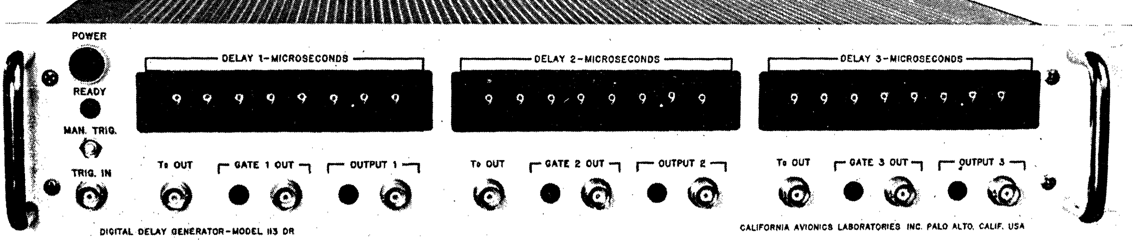
MODEL 101AR


POWER
PUSH
MAN. TRIG
INPUT
READY
T0 OUT
RUN
GATE OUT
OUTPUT DELAY-MICROSECONDS
OUTPUT PULSE SELECT
μSEC
VOLTS
OUTPUT
Z=50Ω
DIGITAL DELAY GENERATOR - MODEL 101AR
CALIFORNIA AVIONICS LABORATORIES, INC. PALO ALTO, CALIF. USA

MODEL 131BR


POWER
PUSH
MAN TRIG
TRIG
OVRFL
R.GL SET
TTL
TRIG IN
ECL
GATE OUT
DELAY-NANOSECONDS
WIDTH-NANOSECONDS
REMOTE
LOCAL
OUTPUT PULSE
DIGITAL DELAY GENERATOR - MODEL 131BR
CALIFORNIA AVIONICS LABORATORIES, INC. PALO ALTO, CALIF. USA

MODEL 113DR


POWER
READY
MAN. TRIG.
TRIG. IN
DELAY 1-MICROSECONDS
DELAY 2-MICROSECONDS
DELAY 3-MICROSECONDS
T0 OUT
GATE 1 OUT
OUTPUT 1
GATE 2 OUT
OUTPUT 2
GATE 3 OUT
OUTPUT 3
DIGITAL DELAY GENERATOR - MODEL 113 DR
CALIFORNIA AVIONICS LABORATORIES INC. PALO ALTO, CALIF. USA

MODEL	No. of Channels	Resolution	Delay Range	Delayed Output Pulse(s) (Into 50Ω)*		Height (19" Rack)	Power	Base Price (USA)
				Amplitude	Width-Nominal			
201AR	1	1μsec	1μsec-100sec	+5, +10, or +15V Minimum	0.5, 1, 10, 100, 1K or 10Kμsec	1-3/4"	115 VAC 50 Hz **	$995
101AR	1	100nsec	100nsec-10sec		0.05, 0.1, 1, 10 100 or 1Kμsec			$995
111AR	1	10nsec	100nsec-1sec					$1095
101CR	1	100nsec	100nsec-10sec	+70V Nominal ***	Capacitor Discharge T.C = 2.5μsec			$995
111CR	1	10nsec	100nsec-1sec					$1095
131BR NEW!	1	100psec	50-1599.9nsec Programmable	TTL & ECL ****	10-1000nsec Programmable	1-3/4"	115 VAC	$2495
103BR	3	100nsec	100nsec-10sec	+2.2V Minimum (TTL Line Driver)	500nsec Standard 50nsec Minimum	3-1/2"	115 VAC 50/60 Hz (Standard) or 230 VAC 50/60 Hz (Specify 230V Wiring)	$2395
113BR	3	10nsec	100nsec-1sec					$2595
103CR	3	100nsec	100nsec-10sec	+70V Nominal ***	Capacitor Discharge T.C. = 2.5μsec			$2595
113CR	3	10nsec	100nsec-1sec					$2795
103DR	3	100nsec	100nsec-10sec	+15V Minimum	10μsec Standard 100nsec Minimum			$2595
113DR	3	10nsec	100nsec-1sec					$2795

Indeterminacy ±50nsec all models except zero on 131BR; basic jitter <1nsec; trigger - coherent clock (no indeterminacy) available on 3-channel models. Internal pulser and remote programming available - all models; IEEE-488 programming available for 3-channel models. Consult factory.

*Initial pulse (T0) and gate pulse, +2.2V (Min.) into 50Ω (TTL Line Drivers), all models; higher voltage and/or pulse widths longer than standard 500nsec are available for T0(s).

**230 VAC 50/60 Hz optional.

***Optional output voltages of +150, +225 or +300V (into 50Ω) readily available; consult factory for negative, variable, and/or 20 to 500 volt outputs.

****Model 131BR delay and pulse width programmable by internal IEEE-488 and RS232 interface - standard feature.

For Full Details, Contact:

CALIFORNIA AVIONICS LABORATORIES, INC.

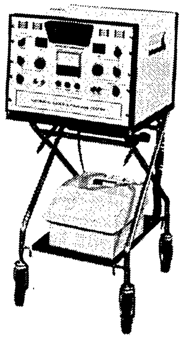
Since 1959

Box 701
Palo Alto, Calif. 94302
(415) 328-7999

CABLEMASTER DIVISION
(818) 341-9200

AUTOMATIC CABLE HARNESS AND CONNECTOR TESTERS

CABLEMASTER 400-C

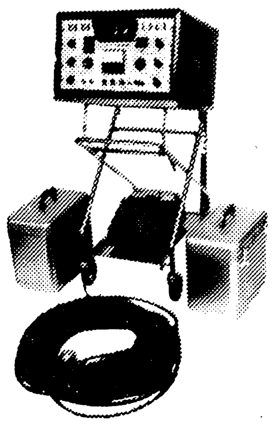


The Cablemaster Model 400-C is a 400 point sequential tester which measures continuity, insulation resistance and dielectric strength (hipot) quickly — accurately — economically. It is ideal for use in receiving inspection, production, quality control, laboratories, field maintenance, operational sites and in a wide range of applications where complete and reliable cable or connector testing is desired with one compact unit. It is equipped with a removable mobile carrier. The 400-C sequences thru the 400 points at a rate of up to 120 steps per minute checking each point for the parameter under test.

CHECK THESE OUTSTANDING FEATURES

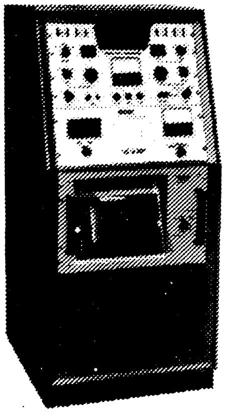
- Continuity to 59 ohms, and to 3 amps
- Insulation resistance to 5K meg variable voltage
- Dielectric strength (hipot) AC and DC to 3000 volt
- Simplified multiple circuit testing. (More than 2 ends to each wire)

CABLEMASTER 400S



The Model 400-S Cablemaster is a modified Model 400-C, designed to test long, installed cables in ships, aircraft, launch facilities and nuclear plants where test points may be hundreds of feet apart. It contains a scanning feature for finding crossed wires which is used in making retrofits and troubleshooting new systems.

CABLEMASTER 1200-C

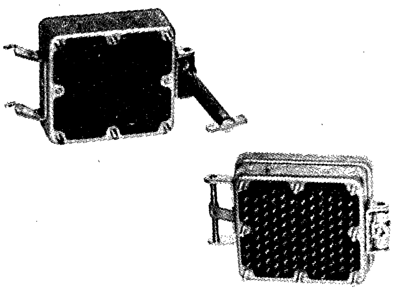


The Model 1200-C Cablemaster incorporates all of the features of the Model 400-C and functions identically except that it has the capability to test up to 1200 points. To accommodate the additional number of output modules it is mounted in a mobile console. When accessories such as a printer, low ohm analyzer, etc. are incorporated they are mounted within the same console. The 1200-C is modular in design and construction.

OPTIONS

- Printed record
- AC current monitor for actual current readings
- AC capacitance compensation
- Megohmmeter panel for exact resistance measurements
- Low ohms analyzer for discrete low resistance values
- Digital readout of discrete values for each of the above accessories
- Digital printout of measurement values
- Rise time control for application of high voltage
- 220 Volt units available

HIGH VOLTAGE CONNECTORS WITH QUICK DISCONNECT

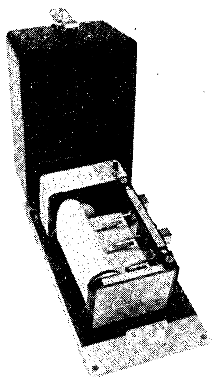


High voltage, high current connector with hinge action mating; comes in 50 pin and 100 pin configurations. Will accommodate 50 or 100 No. 16 wires, and is nominally rated at 2000 volts at RMS 60 Hz at sea level. Available with various types of contacts.

IMPACT-O-GRAPH DIVISION
(818) 341-3000

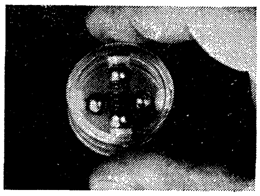
IMPACT & VIBRATION INDICATORS, ACCELEROMETERS AND RECORDERS

IMPACT-O-GRAPH RECORDER



Impact-O-Graph recorders are available in sensitivities of 2g to 300g full scale deflection. Recording period of various models is from (1) one minute to (6) six months. Independent styli record time, direction and magnitude of impacts in (3) three separate axes. Lightweight and compact. Self-contained — no outside power necessary. Used to monitor shipping and handling abuse and to design packaging.

IMPACT INDICATOR



Resettable and non-resettable impact indicators (accelerometers) are used to monitor impacts accurately from all directions to give a visual indication that a specific "g" level has been exceeded. Used to monitor shipping and handling abuse. Available up to 300g.

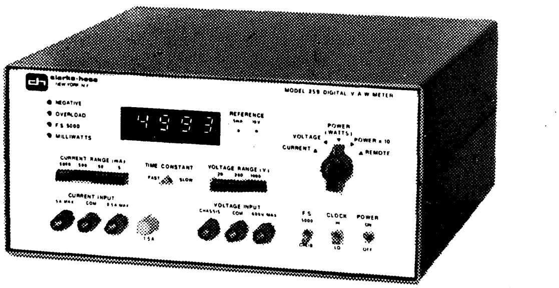
CHATSWORTH DATA CORPORATION

DEPT. EM, 20710 LASSEN STREET / CHATSWORTH, CALIFORNIA 91311 / (818) 341-9200
CABLEMASTER DIVISION (818) 341-9200 / IMPACT-O-GRAPH DIVISION (818) 341-3000
TWX 910-494-1244 CHATS DATA CHCA

VOLT-AMPERE WATTMETERS

IEEE-488

NEW!



A variety of Models to choose from . . .

- ALL are TRUE RMS reading.
- ALL are waveshape independent
- ALL are DC coupled.
- ALL are useable to zero power factor.
- ALL measure CURRENTS from 250 μAmperes to 7 Amperes directly.
- ALL have 12 POWER ranges including all VOLTAGE and CURRENT combinations as well as 12 POWER x 10 scales.
- ALL have options including isolated BCD, analog, and energy outputs and isolated REMOTE control inputs.
- ALL are capable of easy integration with range extending transformers, shunts, and/or capacitive voltage dividers.
- ALL have an isolated IEEE-488 bus as an option.

Model 258

1% accuracy from 10 Hz to over 1000 kHz. Variety of current transformer inputs. Full scale currents from 50.00 mA to 50.00 A. Full scale voltage inputs from 1.000 V to 200.0 V. Option offers complete control via IEEE-488 bus.

Price: $2330.00

Model 259

0.25% accuracy from DC thru 30 kHz. Calibrated to 50 kHz. Usable as AC/DC transfer instrument. 34 V, 340 V and 170 V or 650 V ranges. Remote control of both functions and ranges as an option.

Price: $2245.00

Model 255/256

0.6% accuracy from 30 Hz through 100 kHz. Calibrated to 300 kHz. 10 mW to 5000 W. 34 V, 340 V, and 1000 V ranges. (Model 256 has 170 V range instead of 1000 V range.)

Price: $1415.00

TYPICAL AREAS FOR MEASUREMENT INCLUDE:

Switching Power Supply Efficiency, Transformer and Motor Losses, Fluorescent Lamp Ballast Efficiency, Ultrasonic Power Losses, MOV (Varistor) Testing, Gyroscope and Servo System Testing, Television Set Testing and Ferrite Loss Measurements.

MODEL 273A

DIGITAL ESR METER

(Capacitor Loss Meter)

The industry standard for 100 kHz ESR measurements. The model 273A measures Equivalent Series Resistance values from 0.1 milliohm to 20 ohms. Handles any type of capacitance with values from 5000 pF up to 1 farad. In use by the world's leading capacitor manufacturers and users. The Model 273A allows production line monitoring in capacitor manufacture and 100% incoming inspection for capacitor users. BCD outputs standard. **Price: $1395.00**

POWER FACTOR/V-A-W METER

Portable, Auto-ranging, True RMS

The Model 263 measures the true POWER FACTOR in low power factor and/or highly distorted waveshapes (50-400 Hz).

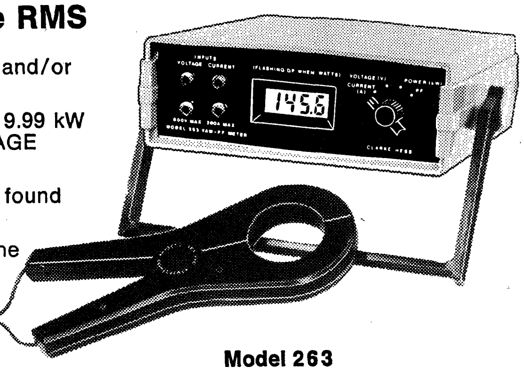
The Model 263 has FOUR autoranging POWER scales (199.9W, 1.999 kW, 19.99 kW and 120 kW), TWO auto-ranging CURRENT (19.99 and 199.9A), and VOLTAGE (199.9 and 600 V) scales.

The Model 263 handles HIGH CREST FACTOR waveshapes such as those found in capacitive input filters or SCR circuits.

The instrument may be operated either via a line cord (90 V-250 V) or from the VOLTAGE input leads (90 V-500 V). In either case, operation is possible from 50 Hz-400 Hz. (NO BATTERIES.)

The Model 263 is supplied complete with a clamp-on current transformer, voltage leads and a heavy duty carrying case.

Price: $895.00



Model 263

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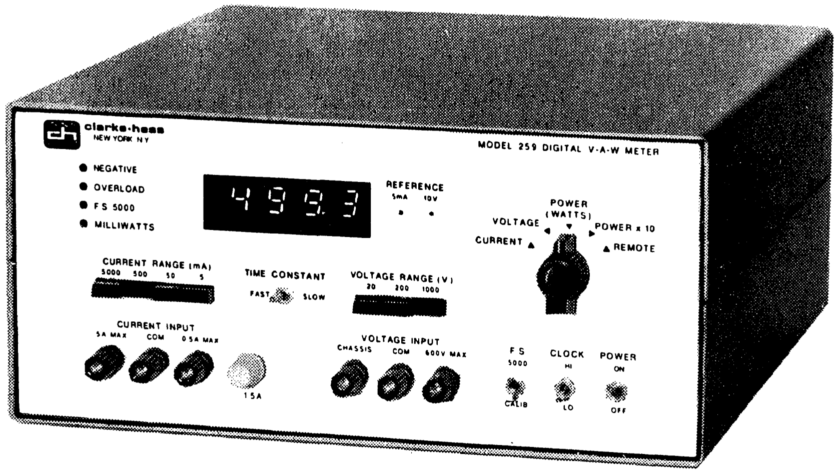
17 WEST 17th STREET, N.Y., N.Y. 10011 • (212) 255-2940

DIGITAL V-A-W METER

MODEL 259

IEEE-488



HIGH ACCURACY
TRUE RMS/BROADBAND

The Model 259 digital V-A-W meter provides true RMS measurements of VOLTAGE, CURRENT, and POWER. The measurements are independent of the waveshape and of the power factor from DC up to a frequency of 50 kilohertz. DC and AC accuracy for VOLTAGE, CURRENT, and POWER (any power factor) have the same low error of ±0.15% of Input ±0.1% of Full Scale from DC to 30 kHz. Very low DC turn over error coupled with the equal DC and AC accuracy allows easy DC calibration and AC/DC transfer measurements.

WIDE MEASUREMENT RANGE AMPLE RESOLUTION

The Model 259 provides FOUR CURRENT ranges and THREE VOLTAGE ranges. There are TWELVE POWER ranges and TWELVE more POWER x 10 ranges. Currents from 250μA to 7A, voltages from 1V to 600V and powers from 2μW to 4.2kW may all be measured directly. With external transformers, shunts, and dividers the limits may be extended up to 500A, 20 kW, and 5MW. A 5000 FULL SCALE switch allows 0.02% resolution of any Full Scale Reading.

HIGH CREST FACTOR

The Model 259 can deal with pulse or distorted inputs having crest factors (the ratio of the peak to the Full Scale RMS value) of FOUR or more (typically SIX) on all ranges, except the 1000V range which is limited to peak voltages of 900V.

LOW CIRCUIT LOADING HIGH COMMON MODE REJECTION

The constant voltage input impedance of 1MΩ and the low impedances (20Ω, 2Ω, 0.3Ω, and 30mΩ) of the current shunts cause negligible circuit interference or measurement errors.

From DC to 400 Hz the Model 259 may be operated with its common terminals up to 800V peak (600V RMS) above the chassis ground potential.

POSSIBLE MEASUREMENT USES

The Model 259 allows the high accuracy measurement of both conventional and highly distorted waveshapes. The fact of its equal accuracies of AC and DC allows AC/DC transfer measurements not usually associated with this type of instrument. The high resolutions and the ability to deal with very low power factor situations allows loss measurements in materials, components and systems of all types. Some typical uses are in connection with TRANSFORMER LOSSES, FLUORESCENT LAMP BALLASTS, R-C FILTER RECTIFIER CIRCUITS, SCR CIRCUITS, MERCURY-ARC LAMP CIRCUITS, SERVO SYSTEMS, MOTOR TESTING, ULTRASONICS, VARISTOR (MOV) TESTING, AUTOMATIC TEST EQUIPMENT, SODIUM LAMP BALLASTS, FERRITE CORE LOSSES, and ELECTRIC AUTOMOBILE EFFICIENCY MEASUREMENTS.

ISOLATED OUTPUTS AND REMOTE PROGRAMMING

Easily installed options exist to provide an isolated BCD digital output, and isolated ANALOG voltage proportional to the DISPLAY reading, or an isolated pulse output proportional to ENERGY.

An optically isolated REMOTE control option allows the selection of all FUNCTIONS and RANGES.

IEEE BUS and/or COMPUTER CONTROL

A Model 259 that has been equipped with isolated BCD and REMOTE options may be connected via a BCD control board or a parallel (32 line) board to almost any computer that has these facilities. An isolated IEEE-488 bus interface is available as an option.

EASY TO CALIBRATE AND MAINTAIN

The Model 259 is an all solid state instrument which provides a 10V and a 5mA precision DC reference which can be used for self calibration. All integrated circuits are in high quality sockets to allow straightforward component replacement.

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MINIGLOSSARIES
FORMULAS • CHARTS
PRODUCT SELECTION GUIDES
FORMS
CODES

TECHNICAL INFORMATION

WHERE TO FIND THEM IN THE 85/86 EDITION OF EEM

Abbreviations/Acronyms	**A**•1166, **B**•1012, **C**•1028, **D**•1016
ASCII Code	**D**•1087
Batteries, Product Selection Guide	**D**•1413
Batteries & Fuel Cells, Characteristics	**D**•1430
Cabinets, Enclosures, Racks, & Chassis, Product Selection Guide	**C**•1003
Capacitors, Basic Formulas	**A**•1093
Capacitors, Miniglossary	**A**•1066
Capacitors, Product Selection Guide	**A**•1003
Circuit Boards (Printed) Product Selection Guide	**C**•1099
Coils, Chokes, Inductors, Product Selection Guide	**A**•1205
Conductors, Maximum Current Capacity of Copper & Aluminum	**C**•1863
Connectors, Miniglossary	**C**•1129
Connectors, Terminals, & Sockets, Product Selection Guide	**C**•1105
Crystals, Oscillators, Crystal & Piezoelectric Filters, Product Selection Guide	**A**•1309
Delay Lines, Product Selection Guide	**A**•1459
Discrete Semiconductors, Product Selection Guide	**A**•2067
Displays, Readouts, Lamps, & Lights, Product Selection Guide	**B**•1015
EBCDIC Code	**D**•1092
Encapsulation, Miniglossary	**C**•1086
Fans, Blowers, Cooling Equipment, & Heat Exchangers, Product Selection Guide	**C**•1623
Filters, Product Selection Guide	**A**•1583
Instruments, Graphic Recording Product Selection Guide	**D**•1401
Instruments, Panel Meters, Product Selection Guide	**D**•1329
Instruments, Test & Measuring Product Selection Guide	**D**•1175
Interconnection Systems, Product Selection Guide	**C**•1699
Keyboards & Keypads, Product Selection Guide	**B**•1705
Logofinder & Trademark Directories	**B**•901
Microwave Components, Product Selection Guide	**A**•1701
Military Qualified Products Lists	**B**•1003
Motors, Drives, & Rotating Components, Product Selection Guide	**B**•1129
Opto Semiconductors, Miniglossary	**B**•1214
Oscilloscopes, Product Selection Guide	**D**•1385
Panel Hardware, Product Selection Guide	**C**•1589
Potentiometers, Trimmers, Controls, & Rheostats, Product Selection Guide	**A**•1991
Power Supplies, Miniglossary	**D**•1462
Power Supplies, AC, Product Selection Guide	**D**•1877
Power Supplies, DC, Product Selection Guide	**D**•1447
Protective Components (Fuses, Circuit Breakers, etc.), Product Selection Guide	**B**•1225
Relay Contact Forms	**B**•1317
Relays, Electromechanical, Miniglossary	**B**•1308
Relays, Product Selection Guide	**B**•1261
Resistor Color Codes	**A**•1828
Resistors, Product Selection Guide	**A**•1785
Servo Components, Miniglossary	**D**•1985
Solenoids, Product Selection Guide	**B**•1463
Switches, Product Selection Guide	**B**•1477
Thermal Components, Product Selection Guide	**B**•1741
Thermal Conductivity of Dielectrics at Room Temperature	**B**•1744
Thyristors/High Power Diodes, Miniglossary	**A**•2076
Transducers & Encoders, Product Selection Guide	**B**•1777
Transformers, Product Selection Guide	**A**•2099
Wire & Cable, Product Selection Guide	**C**•1743
Wire Gauges—Diameter, Area, Copper Weight	**C**•1844

Measure-Up

Model 83500
Expediter Digital
Wattmeter

Model 81000A
Directional
Wattmeter

Model 7510
Digital Frequency
Counter and
Wattmeter

Model 85A
Termination
Wattmeter

with Coaxial Dynamics.

Radio frequency power measurement and computation — wherever you need them — with rugged, cost-efficient instrumentation.

In-line or with accessory cables up to 200 feet away, Coaxial Dynamics' new **Model 81000A** is versatile and durable; and auxiliary DC input option is available as Model 81001A. A full line of Coaxial elements are available for use with these and other similarly functioning instruments.

Model 83500 provides fast tuning and accuracy. With both digital and analog operation and large display, the 83500 provides programmable forward and reflected power readings, VSWR and return loss measurements plus a host of other functions. Its digital feature makes it user friendly and allows for future computer interface.

For precise digital frequency measurements, forward and reflected power readings both from a single instrument, use our **Model 7510** X-AMINER.

Our **Model 85A** provides four power ranges with just the flip of a switch. This easily readable temperature compensated dry wattmeter functions in any physical orientation.

In addition to the above, Coaxial Dynamics manufactures directional wattmeters for use in higher power transmission line systems, such as, 1-5/8″ and 3-1/8″ sizes.

Coaxial's proven capabilities to custom design couplers and filters that are rugged, reliable, lightweight and compact, meet the requirements of government and military programs and are available for your specific needs.

A variety of dry dummy loads are available, having power ratings from 5 watts through 200 watts plus. These loads provide low VSWR over RF frequency ranges extending as high as 4000 MHz. Coaxial serves the electronics market with the newest RF technology.

For specifications or information on these instruments or Coaxials' full line, please call or write the factory for the name of your local distributor or representative.

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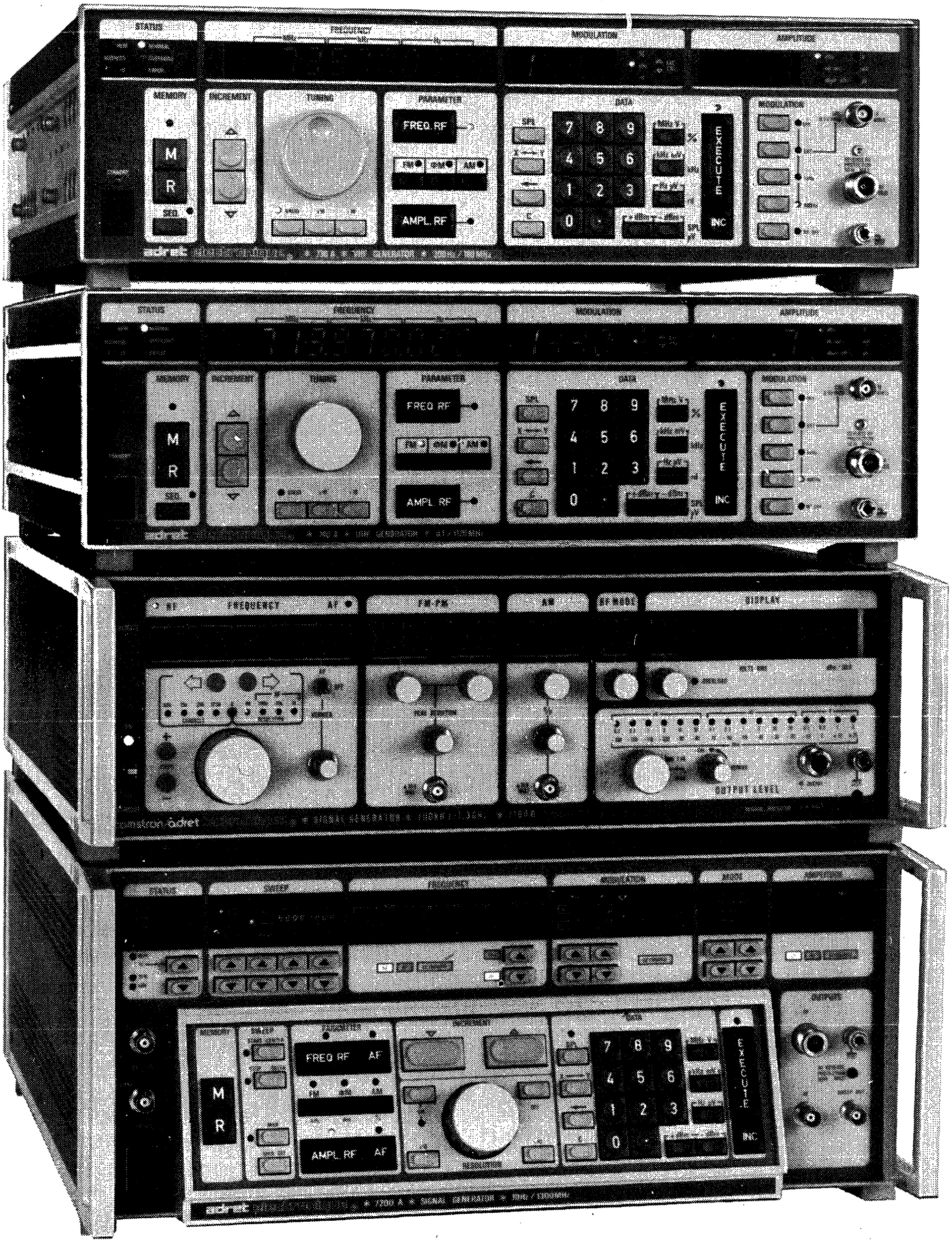
STATUS
FREQUENCY
MODULATION
AMPLITUDE
MEMORY
INCREMENT
TUNING
PARAMETER
DATA
FREQ RF
AMPL RF
EXECUTE
INC
M
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Model 730A:
300 Hz to 180 MHz;
1Hz Resolution;
AM, FM, and
phase modulation;
FM stereo capability;
IEEE-488 programming;
— under $7,000.

Model 740A:
0.1 to 1120 MHz;
AM, FM, phase
and pulse modulation;
IEEE-488 programming;
— under $10,000.

Model 7100:
0.1 to 1300 MHz;
phase noise: — 136 dBc
@6.5 kHz offset;
+20 dBm output level;
AM, FM, phase
and pulse modulation:
IEEE-488 programming;
— under $15,000.

Model 7200:
0.1 to 1300 MHz;
phase noise: — 136 dBc
@6.5 kHz offset;
keyboard and spinwheel entry;
full sweep of all parameters;
memory for 40 configurations;
best level accuracy available;
IEEE-488 programming;
— under $20,000.

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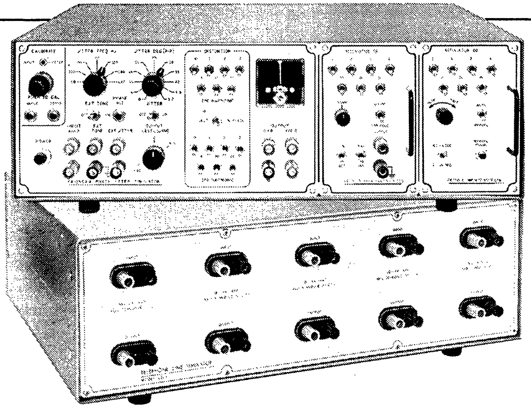
TELEPHONE/MODEM TEST EQUIPMENT



TELEPHONE CHANNEL PHASE JITTER SIMULATOR

- Phase Jitter
- Phase Hits
- Harmonic Distortion
- Impulse Hits
- Broad Band Noise
- Attenuation Characteristic
- Envelope Delay Characteristic
- Frequency Translation

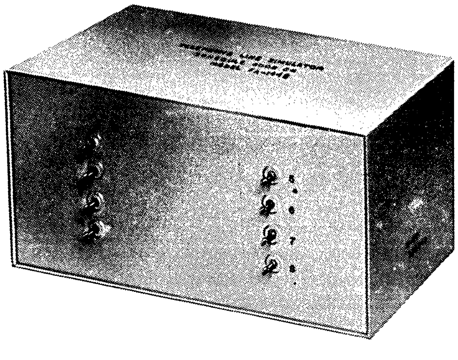
TELEPHONE CO. SPECIFICATIONS

Models	FA-1445	FA-1446	FA-1447	FA-1448	FA-1984	FA-3508
Bell Schedule	3002	C1	C2	C4	Average Long Haul	Worst Case Long Haul
INSERTION LOSS	16 ± 1db @ 1000 Hz	16 ± 1db @ 1000 Hz	16 ± 1db @ 1000 Hz	16 ± 1db @ 1000 Hz	10 ± 1db @ 1000 Hz	10 ± 1db @ 1000 Hz
ATTENUATION **CHARACTERISTIC (Ref. 1000 Hz)** VARIATION IN dB	300 to 3000 Hz −3 to +12db 500 to 2500 Hz −2 to +8dB	300 to 2700 Hz −2 to +6db 1000 to 2400 Hz −1 to +3dB 2700 to 3000 Hz +3 to 12dB	300 to 3000 Hz −2 to +6db 500 to 2800 Hz −1 to +3dB	300 to 3200 Hz −2 to +6db 500 to 3000 Hz −2 to +3dB	300 Hz: +4dB 600 Hz: +1.2dB 2300 Hz: +1.7dB 2750 Hz: +4.7dB	300 Hz: +6.1dB 600 Hz: +2.0dB 2300 Hz: +3.1dB 2750 Hz: +7.0dB
ENVELOPE DELAY **DISTORTION** (max.)	800 to 2600 Hz 1750 µsec.	1000 to 2400 Hz 1000 µsec.	1000 to 2600 Hz 500 µsec.	1000 to 2600 Hz 300 µsec.	600 Hz: 1335 µsec.	600 Hz: 1927 µsec.
		800 to 2600 Hz 1750 µsec.	600 to 2600 Hz 1500 µsec.	800 to 2800 Hz 500 µsec.	1000 Hz: 335 µsec.	1000 Hz: 544 µsec.
			500 to 2800 Hz 3000 µsec.	600 to 3000 Hz 1500 µsec.	2450 Hz: 442 µsec.	2450 Hz: 672 µsec.
				500 to 3000 Hz 3000 µsec.	2850 Hz: 1166 µsec.	2850 Hz: 1739 µsec.

Out-of-band Characteristics

Above Band: 80dB/octave roll-off to 50dB holding to 10kHz
Below Band: 24dB/octave roll-off to 150Hz holding to DC
Delay: 3000 µ sec. minimum at band edges
All Models: Selectable 135 ohm, 600 ohm, balanced input and output, transformer-coupled

Individual Unit Simulator



Our line of proven simulators continue to be available individually. These in fact are the units incorporated in the cased unit above. Any combination of 4 or 5 simulator models are currently available packaged in rack mount or carrying case assembly.

Special orders requiring more than 5 will be quoted separately.

comstron corporation

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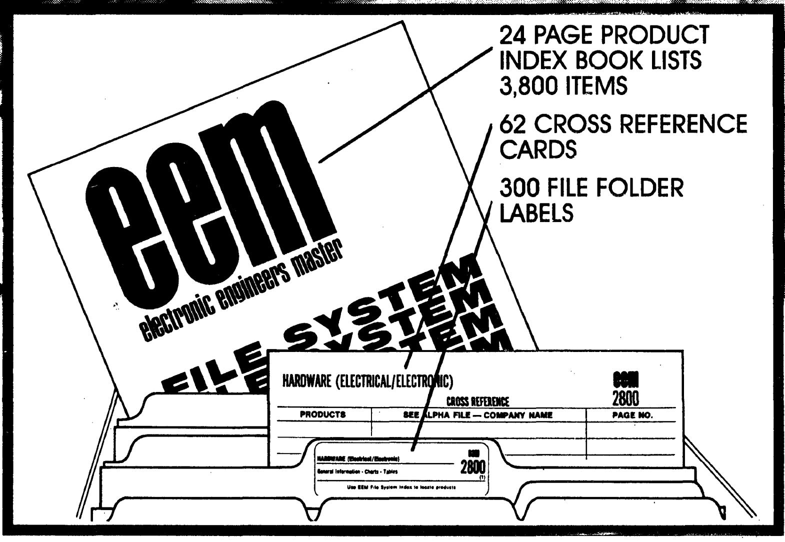
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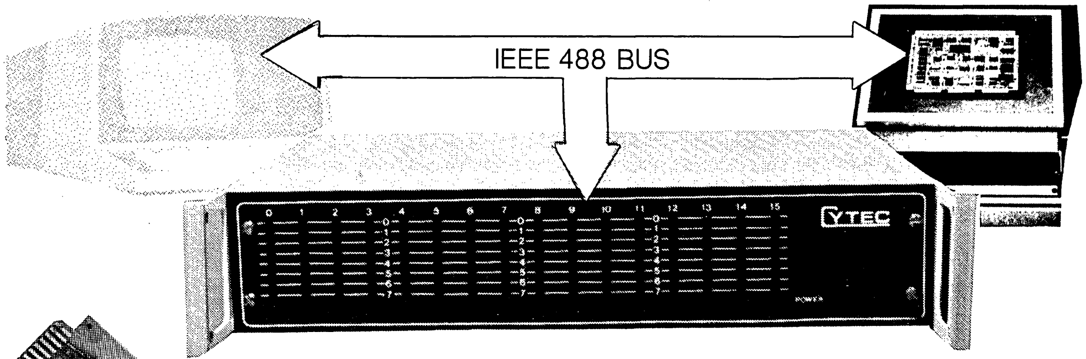
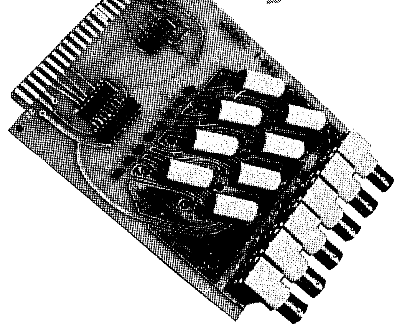
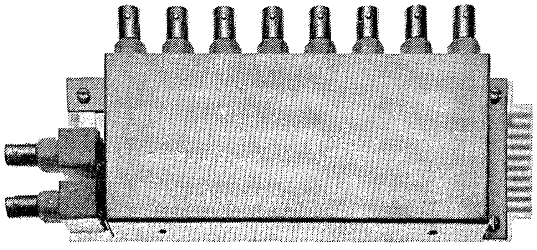
SWITCHING SYSTEMS
for
AUTOMATIC TEST, INSTRUMENTATION, COMMUNICATIONS AND CONTROLS





MX/16 SWITCH MODULE



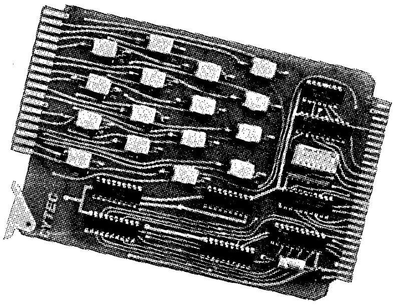
CX8 COAXIAL SWITCH MODULE

COMPUTER PROGRAMMABLE SWITCHING SYSTEMS WITH MODULAR ASSEMBLY OF SWITCHING MODULES AND CONTROL MODULES INTO PREWIRED MAINFRAMES WITH FRONT PANEL LED DISPLAY.

FEATURES

- UNLIMITED MODULAR EXPANSION CAPABILITY.
- FRONT PANEL DISPLAY OF SELECTED SWITCH.
- COAXIAL SWITCHING FROM DC TO 100 MHz.
- STATUS FEEDBACK OF SELECTED SWITCH.
- SINGLE OR MULTIPLE POLE SWITCHING.
- LOW LEVEL TO HIGH POWER SWITCHING.
- OPTIONAL FRONT PANEL CONTROL.
- 16 BIT PARALLEL CONTROLS.
- IEEE 488 BUS CONTROLS.
- RS232 SERIAL CONTROLS.

STD BUS SWITCH MODULES



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PHASE ANGLE CALIBRATION STANDARDS and PHASE ANGLE GENERATORS

PHASE ANGLE STANDARD
DEAK
technology
inc.

the PACS-50K SERIES

PACS-50K/AZI

PHASE ANGLE

Range: ± (0.000° to 999.999°)
Resolution: .001° over frequency range of 2Hz to 50KHz
Accuracy: (with 0.000° offset)

Amplitude Ratio (R*)	Voltage VRMS	Accuracy (degrees)		
		2Hz-1KHz	1KHz-5KHz	5KHz-50KHz
R = 1	0.1 to 5.0 5.0 to 100	±.005 ±.006	±.01 ±.01	±.05 ±.05
R >	0.1 to 5.0 5.0 to 100.0	±(.005+.001R) ±(.006+.001R)	±(.009+.001R) ±(.01+.001R)	±(.05+.002R) ±(.05+.002R)

*R = ratio of the larger amplitude voltage to the lesser amplitude voltage

Output Frequency: **Range:** 2Hz to 50KHz
Resolution: ± 1 Hz from 2Hz to 50KHz
Accuracy: ± 10 ppm
Output Amplitude: **Range:** 100mv rms to 100.00Vrms
Resolution: 2mv rms increments up to 10Vrms
40mv rms Increments up to 100Vrms
Accuracy: ± 0.005Vrms for voltages <= 1Vrms
± 0.5% of reading for voltages > 1Vrms
Total Harmonic Distortion: <.02% from 2Hz to 500Hz; <.05% from 500Hz to 5KHz
Noise: <.15% from 5KHz to 50KHz
<.01% from DC to 100KHz;<.05% from 100KHz to 10MHz
Output current capability: 2ma Minimum
Output Impedance: 2 ohms

DEAK technology inc.

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PHASE ANGLE CALIBRATION

PACS-50K/PGI

PHASE ANGLE

Range: ± (0.000° to 999.999°)
Resolution: .001° over frequency range of 2Hz to 50KHz
Accuracy: (with 0.000° offset)

Amplitude Ratio (R*)	Voltage VRMS	Accuracy (degrees)		
		2Hz-1KHz	1KHz-5KHz	5KHz-50KHz
R = 1	0.1 to 5.0	±.100	±.200	±.300
	5.0 to 100	±.150	±.200	±.300
R >	0.1 to 5.0	±(.100+.050R)	±(.200+.050R)	±(.300+.050R)
	5.0 to 100.0	±(.150+.050R)	±(.200+.050R)	±(.300+.050R)

*R = ratio of the larger amplitude voltage to the lesser amplitude voltage

Output Frequency: **Range:** 2Hz to 50KHz
Resolution: ± 1 Hz from 2Hz to 50KHz
Accuracy: ± 0.1% of reading + 1Hz
Output Amplitude: **Range:** 100mv rms to 100.00Vrms
Resolution: 2mv rms increments up to 10Vrms
40mv rms Increments up to 100Vrms
Accuracy: ± 0.005 Vrms for voltages <= 1Vrms
± 0.5% of reading for voltages > 1Vrms
Total Harmonic Distortion: <.02% from 2Hz to 500Hz; <.05% from 500Hz to 5KHz
<.15% from 5KHz to 50KHz
Noise: <.01% from DC to 100KHz; <.05% from 100KHz to 10MHz
Output current capability: 2ma Minimum
Output Impedance: 2 ohms

THE PACS-50K SERIES.

The PACS-50K series at last brings Phase Angle Calibration into the realms of Automatic Test Equipment. Via the IEEE-488 Interface they are capable of being completely controlled by computer. All functions and parameters can easily be programmed and all results and error messages can be received.

There are several versions of the Instruments, the top of the line being the PACS-50K/AZI Phase Standard. This has the built in self calibration feature "Auto-Zero" accessible via a key on the front panel. This is a digital circuit that checks the output waveforms at various points, determines if there is any inherent inaccuracy, and compensates accordingly. This gives the Phase Standard its remarkable accuracy.

The instruments have been designed for ease of use and require minimum maintenance and calibration.

DEAK technology inc.

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DIGITAL PHASE METERS

Deak Technology has developed a line of digital phase meters. These are based on the technology of the PACS-50K to give high accuracy with low maintenance. Labelled as the DPM-1, DPM-10 and the DPM-100 they have respective accuracies of 0.1 degrees, 0.01 degrees, and 0.001 degrees. Available only as rack mountable units using 2 standard rack mount units of a standard 19 inch rack. An IEEE-488 interface is offered as an option on all units.

The DPM-1 is a low cost item giving Automatic Test availability at an economical price.

The DPM-10 is a similar instrument, but offers 10 times the accuracy.

The DPM-100 is an entirely new concept in Phase Angle measurement as it is microprocessor based, with an accuracy of±0.001 degrees and resolution of±0.001 degrees. These instruments will be available in the Autumn of 1985.

The Deak Technology series of digital phase meters incorporates unique circuitry design that circumvents classical phase meter problems of crossover distortion and/or broadband noise appearing on the input signals.

Another advantage is their sensitivity in responding to very small phase angles. This feature is highlighted in the model DPM-100.

The accuracy vs. frequency response remains intrinsic throughout its entire frequency range.

Model DPM-1

Accuracy: ± 0.1 degrees
Resolution: ± 0.1 degrees
Frequency Range: 10 Hz to 1 MHz
Input voltage range: 0.01–120 Vrms
Display range: ±360 degrees
Input waveforms: Sine, Square, Triangle
IEEE-488 Interface available

Model DPM-10

Accuracy: ± 0.01 degrees
Resolution: ± 0.1 degrees
Frequency Range: 10 Hz to 1 MHz
Input voltage range: 0.01–120 Vrms
Display range: ±360 degrees
Input waveforms: Sine, Square, Triangle
IEEE-488 Interface available

Model DPM-100 Microprocessor based.

Accuracy: ± 0.001 degrees
Resolution: ± 0.001 degrees
Frequency Range: 10 Hz to 1 MHz
Input voltage range: 0.01–120 Vrms
Display range: ±360 degrees
Input waveforms: Sine, Square, Triangle
IEEE-488 Interface available

Dimensions (all models)

Width	Standard 19" rack
Height	3.5" (two rack units)
Depth	16"
Display	0.5" L.E.D.
Input Impedance	1 Megaohm

DEAK technology inc.

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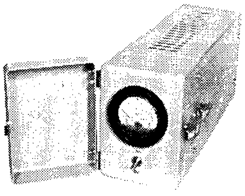
Electro IMPULSE, INC.

PRODUCTS FOR BROADCAST COMMUNICATIONS

DUMMY LOADS • POWER METERS • ATTENUATORS • BALUNS • CALORIMETERS

PM SERIES

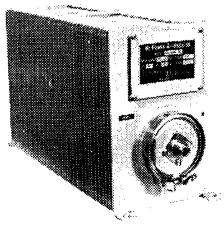
POWER METERS



- 1.5 — 150 Watts
- Termination-Type
- AC Calibration

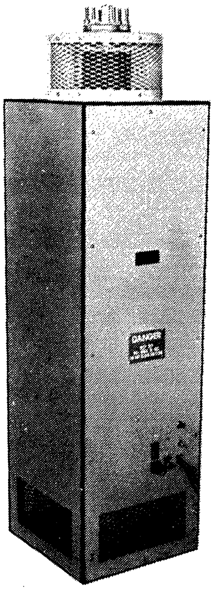
AX SERIES

ATTENUATORS



DC — 500 MHz
100-10,000 Watts
Many Standard Values

DPTC-FM SERIES

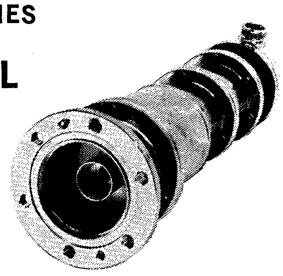


FM DRY FORCED AIR COOLED LOADS

10,000-75,000 Watts
VSWR 1.15:1

CLW SERIES

COAXIAL WATER LOADS

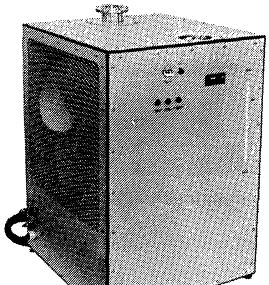


5000-80,000 Watts
Field Replaceable Resistor

CPTC SERIES

SELF-COOLED LOAD PACKAGE

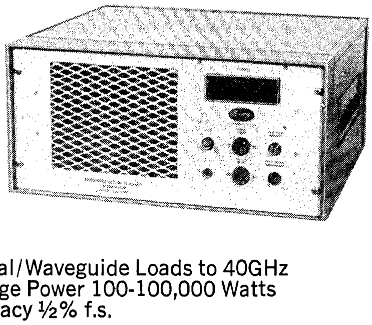
VSWR: 1.05:1
For FM/TV



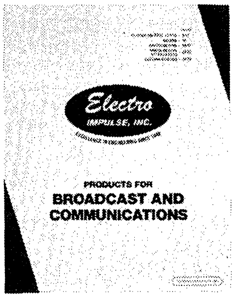
Up to 75,000 Watts
DC — GHz

RF POWER CALORIMETERS

ADR-1000
WITH DIGITAL
READOUT



- Coaxial/Waveguide Loads to 40GHz
- Average Power 100-100,000 Watts
- Accuracy ½% f.s.



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PRODUCTS FOR BROADCAST AND COMMUNICATIONS

NEW GENERAL CATALOG

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SEE OUR OTHER PRODUCTS ON PAGE C•1637

enclosures · capacitors · circuit boards · coils, chokes, inductors · connectors, electronic · sockets/terminals · crystals · oscillators · crystal filters delay lines · panel hardware · displays · lamps/lights · cooling equipment · filters · generators · multimeters · panel meters · oscilloscopes · graphic recorde[illegible]nnections · microwave components [illegible] motors/drives · batteries · power supplies, [illegible] power supplies, ac · [illegible] · relays · solenoids · resistors · potentiometers/trimmers controls/rheostats · [illegible] semiconductors · switches · keyboards/keypads · transducers/encoders · transformers · wire & cable · enclosures capacitors · circuit boards · coils, chokes, inductors · connectors, electronic · sockets/terminals

EEM PRODUCT SELECTION GUIDES

Use the EEM Product Selection Guides. There are 34 Guides in this edition of EEM. See page 2 (A•2, B•2, C•2, D•2) of each volume to locate the Product Selection Guides that pertain to your needs.

ELECTRONIC
DEVELOPMENT
CORPORATION

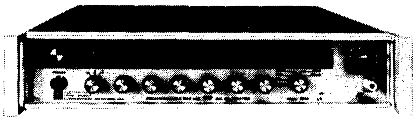
Digitally Programmable Standards AC and DC Voltage and Current

NOTICE: All instruments are traceable to the U.S. Bureau of Standards. Certification is supplied with all applicable instruments at time of delivery.
Line (mains) Power: 117 Vac and 230 Vac; from 50 Hz to 400 Hz.
All instruments are available under G.S.A. CONTRACT to authorized organizations. (Request Bulletin 4).

D.C. VOLTAGE & CURRENT STANDARD — MODEL 520 A (See Page A-3)

PROGRAMMABLE IEEE-488 GP-IB

- IEEE-488 interface is included. No extra charge.
- Floating output. Optically isolated from the logic.
- True bipolar, balanced zero.
- "Crowbar" zero reference.
- 100 Volts COMPLIANCE in the current mode.
- ±1000V range is optional.
- Complete output terminal sets on both front and rear panels. No extra charge.
- Bench or rack mountable. No extra charge.
- Weight 14 lbs., 6.35 kg.



D.C. VOLTAGE MODE					D.C. CURRENT MODE	
Model 520 A	**100 mV range**	**10 V range**	**100 V range**	**1000V range OPTION RA-5**	**10 mA range**	**100 mA range**
Output, d.c.	±100.0000 mV	±10.000 00 V	±100.000 0 V	±1000.000 V	±10.000 00 mA	±100.000 0 mA
Resolution (1 ppm)	±0.1μV	±10μV	±1μV	±1 mV	±10 nA	±100 nA
Accuracy	±0.002%	±0.002%	±0.002%	±0.002%	±0.005%	±0.005%
Accuracies stated are of setting plus range residual, "worst case" method, valid for 12 months.						
Noise	±0.0005% of range +2μV in a band pass of 0.1 Hz to 100 kHz.					
Compliance	emf into 400Ω	100 mA	100 mA	1 mA	100 V	100 V
Price	$2650 Complete			$575	$2650 Complete	

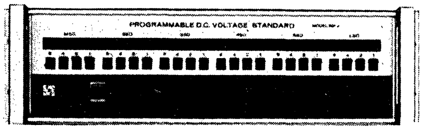
DIGITALLY PROGRAMMABLE D.C. STANDARDS, MODEL 501 J (See Page A-7)

"Building Block" Concept: Purchase only what you need.
Switching and setting time: 50μS
Program Formats: BCD or BINARY; **Entry:** Serial or Parallel or IEEE 488 (GP/IB).
Certification: NBS traceability.

	MAIN FRAME Model (501 J)	**100 mV RANGE Option: D**	**AC & DC CURRENT PCS-2**
See Page	**A-7**	**A-9**	**B-2**
Output d.c.	10.0000Vdc	100.000mVdc	1Ma, 10mA, 100mA, 1A, 10A ac/dc
Resolution	100μV (10 ppm)	1μV (10 ppm)	10nA, 100nA, 1mA, 10mA, 100mA
w/opt. B	10μV (1 ppm)	0.1μV (1 ppm)	1nA, 10nA, 100nA, 1mA, 10mA
Accuracy	±0.002%	±0.002%	DC: ±0.01%; AC: ±0.05%
Noise	0.0005%	0.0005%	0.15% to 0.00375%
Compliance	50mA	in to 400Ωload	1.5V-5Vdc
Prices	$1995	$240	$2395

ACCESSORIES (May be field installed)

MR-1	Memory register or buffer storage
AK-1	Negative programming logic.
AM-1	Front panel display and control (for BCD).
AM-2	Front panel display and control (for BINARY).
IS-40	Opto-Isolation.
KT-488	IEEE 488 interface (Kit)

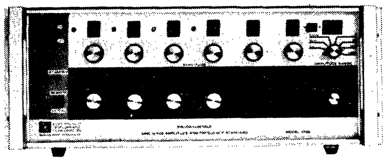


PROGRAMMABLE AC CALIBRATOR, MODEL 4500 (See Page A-14)

Completely Solid State. 60 Second warm up. Light Weight — 20 lbs. (9.1 kg)

Programming Format: BCD; **Entry:** Parallel or Serial or IEEE-488. GP/IB

5 Output Ranges	1mV to 111 Vac	**Resolution**	1 ppm
Accuracy (Amplitude)	0.04%	**Distortion**	0.1%
4 Frequency Ranges	10 Hz to 111 kHz	**Resolution**	100 ppm
Accuracy (Frequency)	0.001%	**AC Current**	See Model PCS-2 (Page B-2)
Price	$5775		



SEE FOLLOWING PAGES

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ELECTRONIC
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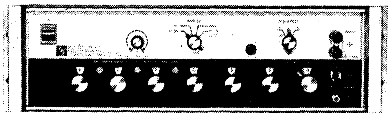
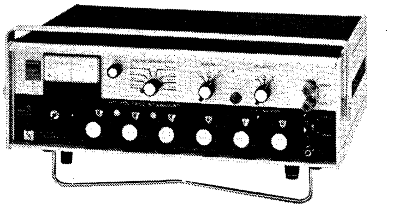
Manually Operated AC & DC Voltage and Current Standards, Sources, References, Calibrators.

NOTICE: All instruments are traceable to the U.S. Bureau of Standards. Certification is supplied with all applicable instruments at time of delivery.
Line (mains) Power: 117 Vac and 230 Vac; from 50 Hz to 400 Hz.
All instruments are available under G.S.A. CONTRACT to authorized organizations. (Request Bulletin 4).


1030 A


MV 116 J
with option G-1

DC VOLTAGE STANDARDS

Applications for Production Line QC, Field Service Calibration Laboratories. Ideal as a Reference/Source/Supply for design and development labs. Simulator for thermocouples and transducers.

MODELS	**E 100E**	**MV 106/J**	**MV 116/J**	**330J**	**1030A**
See Page	**C-2**	**C-5**	**C-5**	**D-2**	**D-3**
DC Volts (ranges)	± 11V ±100mV	± 11V ±100mV ± 10mv	± 11V ± 1V ±100mV	±311V ± 31V ± 3V ±300mV	±1111V ± 111V ± 11V ± 100mV
Resolution (1 ppm)	100μV 1μV	10μV 100nV 10nV	10μV 1μV 100nV	100μV 10μV 1μV 0.1μV	100μV 10μV 1μV 0.1μV
I out	75mA	50mA	50mA	100mA	50mA
Accuracy	±0.005% of setting	±0.002% of setting	±0.002% of setting	±0.002% of setting	±0.003% of setting
Price	$995	$1595	$1595	$2095	$2450

DIFFERENTIAL VOLTMETER (ΔVM) Option G-1 (See Page H-2) — Price $395
with RECORDER OUTPUT Option G-2 (See Page H-2) — Price $495

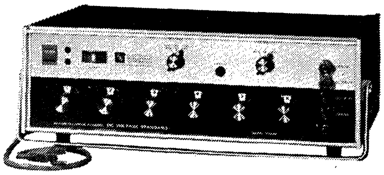
Available in Models MV 106, MV 116 and 1030. For potentiometric and differential measurements from 0.5μV to 1000 Vdc. Factory installed. **Accuracies:** from ±0.005% to ±0.002%.

BATTERY/EXTERNAL POWERED DC VOLTAGE STANDARD/SOURCE — MODEL MV 216 A

Internal, re-chargeable battery operation and 117 Vac, 12 Vdc and 24 Vdc external power. Absolute isolation from line. **(See Page C-3)**
High voltage accuracy and stability. Compliance current. Very low source impedance.

Ranges (dc)	±10V	±1V	±100mV
Resolution (1 ppm)	10μV	1μV	100NV
I out	10mA		
Accuracy	±0.003% of setting		

Z_{out}	0.01Ω	0.001Ω	20Ω
Power	Internal re-chargeable Batteries also 117 Vac, 12V and 24 Vdc		
Price	$1975		



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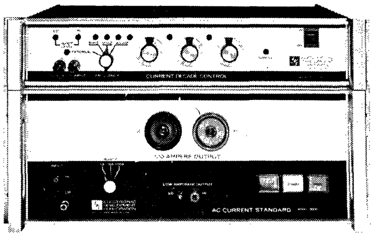
100 AMP AC CURRENT CALIBRATOR MODEL 3210

This is a calibrator for meters, shunts, coils and transducers when used in this stand-alone configuration. **(See Page E-6)**

Ranges (ac) 100A, 10A, 1A
Compliance 0.1V, 2.0V, 20V
Accuracy ± (0.05% of setting + 0.02% of range)
Price (3210A=$2595+CDC−32=$945) CDC 32/10=$3540

Stand-alone Configuration



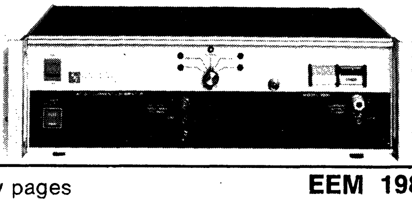
(For watt-hour meter configuration, see WMC-32)

---

10 AMP AC & DC CURRENT CALIBRATOR (Source), MODEL 3200B (See Page E-4)

This auxiliary instrument operates from the output of a stable, accurate AC or DC Voltage Calibrator, such as: EDC Model MV 116 J (for d.c.), and EDC Model 4600 or Model CDC-32 (for a.c.).

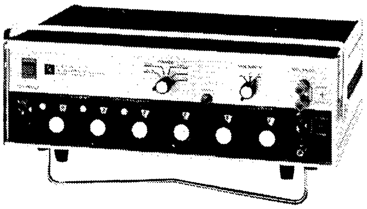
Ranges (ac & dc)	10A, 1A, 100mA, 10mA, and 1mA
Accuracy: (dc)	±(0.01% of setting+0.01% of range+10μA)
(ac)	±(0.05% of setting+0.001% of range+20μA)
Voltage Compliance	1.5V (min) to 5V (max)
Price	$1750



DC CURRENT AND VOLTAGE STANDARD — MODEL CR 103 J (See Page E-2)

Short-circuit and open-circuit protected. 30 second warm-up. Automatic zero.

	Current Mode	**Voltage Mode**
DC Ranges	±110mA ± 11mA	±11V ±1V ±110mV
Resolution (1 ppm)	100nA 10nA	10μV 1μV 0.1μV
Compliance	100V	50mA
Accuracy	±0.005% of setting	±0.003% of setting
Price	$1995	

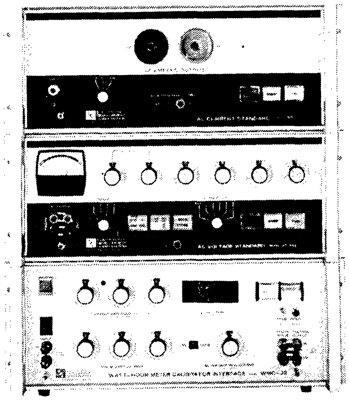


AC WATT-HOUR METER CALIBRATION SYSTEM (See Page E-6)

System WMC-32/10 and WMC-32/00

This is a completely flexible system comprised of three independently useable instruments:

Model 4600	AC Voltages up to 1000 Vac
Model WMC-32	Interface, Power-factor (Phase angle control), and time measurements.
Model 3210	100 Ampere a.c. Calibrator
Price	System WMC-32/10 $11,495
	— or —
Model 3200	10 Ampere a.c. and d.c. Calibrator
Total System Accuracy	0.1%
Frequency	50 Hz to 400 Hz.
Price	System WMC-32/00 $10,500



Model 3210
AC Current

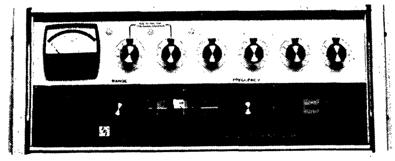
Model 4600
AC Voltage

Model WMC-32 Interface
Power Factor, Time

AC VOLTAGE STANDARD — MODEL 4600 (See Page F-2)

Completely solid state. Highly stable. 60 second warm-up. Low output impedance.

Vac rms Ranges	1000V, 100V, 10V, 1V, 100mV
Accuracy	±0.05%
Burden	50 VA (2A max.)
Frequency Range	50 Hz to 5 kHz



Model 4600

5 internal frequencies 50 Hz, 60 Hz, 400 Hz, 1 kHz plus optional frequency and unlimited number of frequencies attained by use of external oscillator via front panel terminals.

Distortion	0.5%
Weight	48 lbs.
Price	$5450

Auxiliary Instruments: **Model PAS-300** Phase Shifter
Model WMC-32 Watt Hour Meter Calibrator

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COMMONLY USED ELECTRICAL/ELECTRONIC ABBREVIATIONS AND ACRONYMS

A
AC alternating current
A/D analog to digital
ADC analog to digital converter
ADP automatic data processing
AF audio frequency
AFC automatic frequency control
ALGOL algorithmic language
AM amplitude modulation
AND a logical operator
AQL acceptable quality level
ASCII American national standard code for information interchange
AWG American wire gauge

B
BALUN balanced to unbalanced
BASIC beginners' all-purpose symbolic instruction
BCD binary-coded decimal
BNC baby "N" connector
BUS basic utility system

C
CAD computer aided design
CAM computer aided manufacture
CATV cable television or community antenna television
CERMET ceramic metal element
Comm. communications
CMOS complementary metal-oxide semiconductor
CPS characters per second
CPU central processing unit

D
D/A digital to analog
DAC digital to analog converter
DC direct current
DIAC bidirectional trigger diode
DIL dual in-line
DIN Deutsche Industrie Normenausschuss
DIP dual in-line package
DPM digital panel meter
DTL diode transistor logic

E
EDP electronic data processing
EBCDIC extended binary coded decimal interchange code
EEPROM electrically erasable PROM
EMC electromagnetic compatibility
EMI electromagnetic interference
EMP electromagnetic pulse
EPROM electrically programmable ROM
ESR equivalent series resistance

F
FEP fluorinated ethylene propylene Copolymar, 200° Teflon
FET field-effect transistor
FM frequency modulation
FORTRAN formula translator

G
GaAsFET gallium arsenide field effect transistor
GPIB general purpose interface bus

H
HF high frequency (3 to 30 MHz)
HIPOT test, measurement and diagnostic equipment
HLL high level language
HV high voltage
Hz Hertz

I
IC integrated circuit
IDC insulation displacement contact
IF intermediate frequency
IO input/output (devices)
IR insulation resistance (or) infrared

J
JFET junction field effect transistor
JMOS junction metal oxide semiconductor

K
kHz kilohertz (10^3 hertz)
KSR keyboard send receive

L
LC inductance capacitance
LCD liquid crystal display
LED light-emitting diode
LF low frequency (30 to 300 kHz)
LIF low insertion force
LNA low noise amplifier
LNB low noise band
LSI large scale integration
LVDT linear velocity displacement transformer

M
MASER microwave amplification by stimulated emission of radiation
MATV master antenna television
μF microforad
MHz megahertz
MIPS million instructions per second
MIB microcomputer interface board
MOS metal oxide semiconductor
MOSFET metal oxide semiconductor field effect transistor
MOSIGT metal-oxide semiconductor insulated-gate transistor
MOV metal oxide varistor
MPU microprocessor unit
MSI medium scale integration

N
NBS National Bureau of Standards
NEMP nuclear electromagnetic pulse
NIM nuclear instrumentation module
NOR not OR
NTC negative temperature coefficient

O
OCR optical character reader
OEM original equipment manufacturer
OR a logical operator

P
PC printed circuit
PCB printed circuit board
pF picofarad
PGA pin grid array
PIN positive-intrinsic-negative (transistor)
PLA programmable logic array
PLL phased lock loop
PPI plan position indicator
PROM programmable read only memory
PTC positive temperature coefficient
PUT programmable unijunction transistor

Q
QAM quadrature amplitude modulation
Q (meter) quality-factor meter

R
RAM random access memory
RC resistance-capacitance
RFI radio frequency interference
RMS root mean square
ROM read only memory
RF radio frequency
RFC radio-frequency choke
RFI radio-frequency interference
RTD resistance-temperature detector
RTL resistor transistor logic
RTV room temperature vulcanizing
RW read/write

S
SAS silicon asymmetrical switch
SBC single board (micro) computer
SBS silicon bilateral switch
SCR silicon-controlled rectifier
SCS silicon controlled switch
SDA source & detector assemblies
SIDAC bidirectional voltage-triggered switch
SIP single in-line package
SSI small scale integration
SSR solid state relay
STL Schottky transistor logic
SUS silicon unilateral switch

T
TC temperature coefficient
TCXO temperature compensated crystal oscillator
TFE tetrafluoride ethylene propylene Copolymer, 250° Teflon
TRIAC bidirectional AC switch
TTL transistor-transistor logic
TTY teletypewriter

U
UHF ultra high frequency (300 MHz to 3 GHz)
UJT silicon unijunction transistor
UL Underwriters Laboratory
UPS uninterruptible power supply

V
VAC volts (of) alternating current
VAR volt-ampere reactive
VCR video cassette recorder
VDC volts (of) direct current
VHF very high frequency
VHSIC very high speed integrated circuit
VLF very low frequency (3 to 30 kHz)
VLSI very large scale integration
VME virtual machine environment
VRM voice recognition module
VTVM vacuum tube volt meter
VU volume unit
VSWR voltage standing wave ratio

W
WPS word processing software

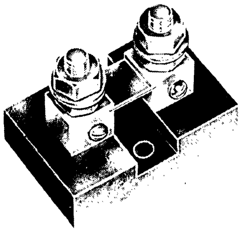
Y
YIG yttrium iron garnet

Z
ZIF zero insertion force

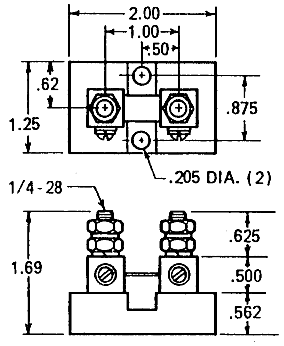
SERIES MV- LIGHTWEIGHT SHUNTS • MVA, MVB & MVC*

TYPE | **PART NUMBER** | **DIMENSIONS**

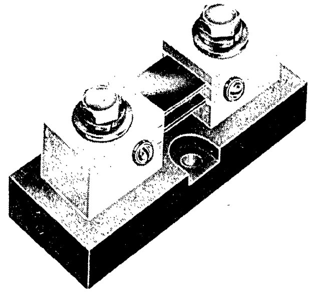
MVA



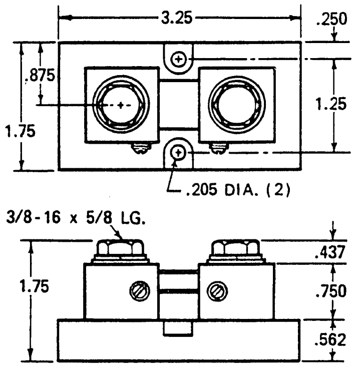
EPC NO.	AMPS	TYPE	MS PART NO.
MVA-		MSA-	MS-
5-50	5	-	-
10-50	10	100	91586-8
15-50	15	150	91586-9
20-50	20	200	91586-10
30-50	30	300	91586-1
50-50	50	500	91586-2
75-50	75	750	91586-3
80-50	80	800	91586-4
85-50	85	850	91586-5
100-50	100	101	91586-6
150-50	150	151	91586-7


2.00
1.00
.50
.62
1.25
.875
.205 DIA. (2)
1/4-28
1.69
.625
.500
.562

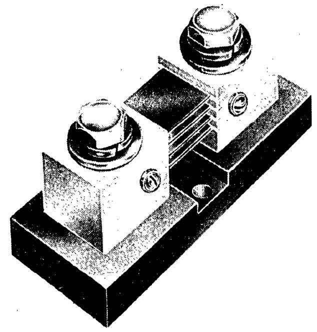
MVB



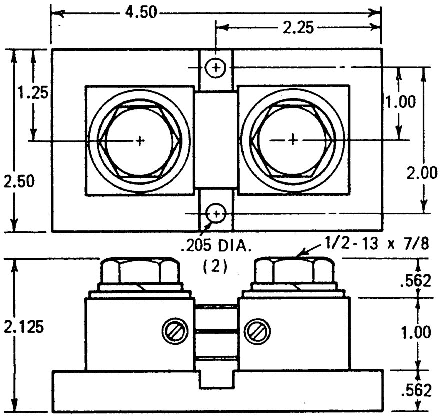
EPC NO.	AMPS	TYPE	MS PART NO.
MVB-		MSB-	MS-
170-50	170	171	91587-1
200-50	200	201	91587-2
250-50	250	251	91587-3
300-50	300	301	91587-4
400-50	400	401	91587-5
450-50	450	451	91587-6
500-50	500	501	91587-7
600-50	600	601	91587-8


3.25
.250
.875
1.75
1.25
.205 DIA. (2)
3/8-16 x 5/8 LG.
1.75
.437
.750
.562

MVC



EPC NO.	AMPS	TYPE	MS PART NO.
MVC-		MSC-	MS-
800-50	800	801	91588-1
1000-50	1000	102	91588-2
1200-50	1200	122	91588-3


4.50
2.25
1.25
1.00
2.50
2.00
.205 DIA.
(2)
1/2-13 x 7/8
2.125
.562
1.00
.562

* 50mV shown. (100mV available in this configuration for commercial applications)

Dimensions in inches. Tolerances: ±.015 for hole dia's. Others ±.030 unless otherwise noted.
NOTE: Specifications subject to change without prior notice.

OTHER TYPES AVAILABLE
Consult our engineering department for your particular requirements.
Quotations furnished promptly.

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CORPORATION

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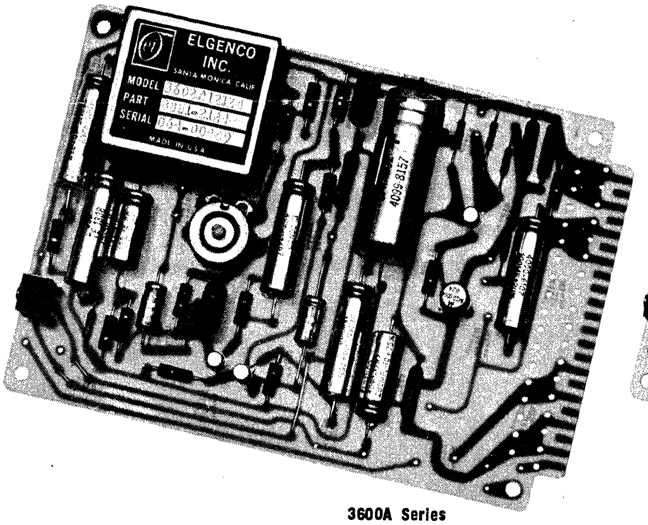
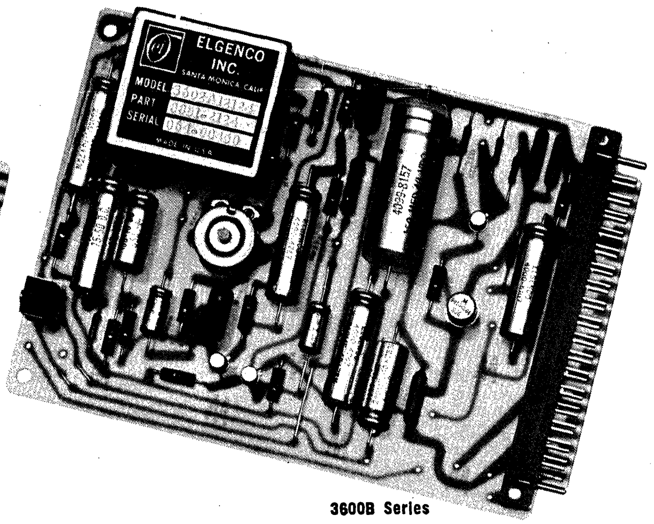
11 WEST SANDFORD BOULEVARD • MOUNT VERNON, NEW YORK 10550 • Telephone: (914) 664-2333

ELGENCO INCORPORATED
statistical instruments for industry
DEPT. EM • HURRICANE, UTAH 84737 • (801) 635-4954

SERIES 3600 FIXED RANGE • NOISE GENERATOR CARDS



3600A Series



3600B Series

SPECIFICATIONS

FREQUENCY RANGE: The frequency band may be any combination of the listed low and high frequencies.

Lower Frequency: 10, 20, 50, or 200 Hz, 5 kHz.

Upper Frequency: 20, 50, 100, 200, or 500 kHz; 1, 2, 3, or 5 mHz.

SPECTRAL UNIFORMITY: Spectral uniformities are available as:

Upper Frequency	Spectral Uniformity
20 kHz to 500 kHz	±0.5, ±1.0, ±2.0 or ±3.0db
1 mHz to 3 mHz	±1.0, ±2.0, or ±3.0db
5 mHz	±2.0 or ±3.0db

As a rule of thumb, the roll off above the specified upper frequency gives a 3db point about twice the specified upper frequency. Roll off above 3db point approaches 12db per octave.

OUTPUT IMPEDANCE:

20 kHz to 500 kHz units	600 ohms
1 to 5 mHz units	200 ohms

POWER REQUIREMENTS:

	3600A Series or 3600B Series	Low Current Option 3600A or 3600B	3600C Series
Power supply voltage required	−30 VDC ±1%	−30 VDC ±1%	−24 VDC ±1%
Approximate current..	50 ma	30 ma	37 ma
Open ckt. output level	0 to 3.0 VRMS	0 to 1.5 VRMS	0 to 2.2 VRMS

Note: The 3600B series units are the same as the 3600A series except the 3600B series have a test point and Elco 00-7023-035-000-001 connector mounted on the PCB.

The 3600A and 3600C units mate with a Cinch 250-22-30-170, Elco 00-6007-022-940-022 connector or equivalent.

SPECIFICATIONS COMMON TO ALL UNITS:

Specifications are for 25°C unless specified otherwise.

Amplitude Probability Distribution: Gaussian.

Peak to RMS Capability: Minimum dynamic ranges 3.5 to 1 at specified maximum level. Increases with lower output levels.

Maximum Load: 900 ohms minus output impedance.

Operating Temperature Range: 0 to 50°C.

Size: 4½ x 6½ x ⅞ inches.

Weight: 7 oz.

PRICING: (See price list on facing page)

Base Price: 3600A, 3600C and 3600A or C with reduced current option (specify on order).

Base price plus $60.00: 3600B or 3600B with reduced current option (specify on order).

OPTIONS:

Other than specified frequency; add $30.00 each per frequency per board.

Steel shield plate, ¼-inch off conductor side of PCB; add $20.00 each.

Other than specified output impedance, add $20.00 each.

To operate on other power supply voltages, voltage difference must be 30-volts for 3600A or 3600B and 24-volts for 3600C. Specify on order; "Decoupled option for operation on __________ power supply," and add to price as:

Quantity Per Order	Add Each	Quantity Per Order	Add Each
1	$25.00	25-49	$8.00
2	20.00	50-99	6.00
3	18.00	100-249	5.00
4	15.00	250-499	4.50
5-9	12.00	500 up	4.00

DISCOUNT: Quantity discounts apply as:

Quantity	Discount	Quantity	Discount
1-4	List	20-49	13%
5-9	5%	50-99	17%
10-19	10%	100	20%

MODEL 3609A POWER SUPPLY CARD

Size: 4½″ x 6½″ x 2¹⁄₁₆″.

Input: 115/230 volts ± 10/20 volts, 50 to 1000 Hz.

Supplies power for up to 2 noise generator cards or up to 4 noise generator cards with reduced current option. Price: **$261.00**

MATING CONNECTOR: Mating Elco Connector; Elgenco, Inc. part numbers 7521-1122, for 3600A, 3600C and 3609A is available at **$24.12** each.

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SERIES 1600 • ENCAPSULATED NOISE SOURCE MODULES • 10Hz TO 5MHz

ELGENCO
INC.
SANTA MONICA CALIF.
MODEL
PART
SERIAL
MADE IN U.S.A.

SPECIFICATIONS IN RECOMMENDED CIRCUIT:

The 1600 series provide a low level wide band output. A portion of this wide band is specified to a certain flatness; uniformity. The 3 or 5 millivolt output is for the whole band extending to 5 mHz. Specifications are for 25°C unless specified otherwise.

SPECTRAL DENSITY UNIFORMITY: Available with uniformity to ±½db, ±1db, ±2db, or ±3db and many frequency ranges within 10 Hz to 5 mHz. See price list for complete list of standards.

SPECTRAL DENSITY: Approximately 2 $\mu v/\sqrt{\ }$ Hz .

RMS OUTPUT LEVEL: 1602A series 3 mv; 1603A, 1606A, and 1607A series 5 mv.

OUTPUT IMPEDANCE: Approx 20 ohms.

AMPLITUDE PROBABILITY DISTRIBUTION: Gaussian.

OPERATING TEMPERATURE RANGE: 0 to 50°C.

POWER REQUIREMENTS: −30 volts dc ±1% at approximately 3.5 ma. **Note:** external passive components are required to properly install unit.

MOUNTING: .032″ Printed Circuit Leads.

Size: 11/16″ H x 1 51/64″ W x 1 37/64″ D.

WEIGHT: Approx 1.5 oz.

SERIES 3600/1600 PRICES

Frequency Band	Flatness	SERIES 3600 CARDS		SERIES 1600 MODULES		Frequency Band	Flatness	SERIES 3600 CARDS		SERIES 1600 MODULES	
		Model No.	Price	Model No.	Price			Model No.	Price	Model No.	Price
200 Hz to 20 kHz	±½db	3606A-52224	$654.00	1606A-52224	$585.00	200 Hz to 500 kHz	±1db	3603A-12255	$594.00	1603A-12255	$525.00
50 Hz to 20 kHz	±½db	-55124	$664.00	-55124	$595.00	50 Hz to 500 kHz	±1db	-15155	$604.00	-15155	$535.00
20 Hz to 20 kHz	±½db	-52124	$694.00	-52124	$625.00	20 Hz to 500 kHz	±1db	-12155	$634.00	-12155	$565.00
10 Hz to 20 kHz	±½db	-51124	$744.00	-51124	$675.00	10 Hz to 500 kHz	±1db	-11155	$684.00	-11155	$615.00
200 Hz to 50 kHz	±½db	3606A-52254	$674.00	1606A-52254	$605.00	200 Hz to 50 kHz	±2db	3602A-22254	$519.00	1602A-22254	$450.00
50 Hz to 50 kHz	±½db	55154	$684.00	-55154	$615.00	50 Hz to 50 kHz	±2db	-25154	$529.00	-25154	$460.00
20 Hz to 50 kHz	±½db	-52154	$714.00	-52154	$645.00	20 Hz to 50 kHz	±2db	-22154	$559.00	-22154	$490.00
10 Hz to 50 kHz	±½db	-51154	$764.00	-51154	$695.00	10 Hz to 50 kHz	±2db	-21154	$609.00	-21154	$540.00
200 Hz to 100 kHz	±½db	3606A-52215	$694.00	1606A-52215	$625.00	200 Hz to 100 kHz	±2db	3602A-22215	$529.00	1602A-22215	$460.00
50 Hz to 100 kHz	±½db	-55115	$704.00	-55115	$635.00	50 Hz to 100 kHz	±2db	-25115	$539.00	-25115	$470.00
20 Hz to 100 kHz	±½db	-52115	$734.00	-52115	$665.00	20 Hz to 100 kHz	±2db	-22115	$569.00	-22115	$500.00
10 Hz to 100 kHz	±½db	-51115	$784.00	-51115	$715.00	10 Hz to 100 kHz	±2db	-21115	$619.00	21115	$550.00
200 Hz to 200 kHz	±½db	3606A-52225	$709.00	1606A-52225	$640.00	200 Hz to 200 kHz	±2db	3602A-22225	$544.00	1602A-22225	$475.00
50 Hz to 200 kHz	±½db	-55125	$719.00	-55125	$650.00	50 Hz to 200 kHz	±2db	-25125	$554.00	-25125	$485.00
20 Hz to 200 kHz	±½db	-52125	$749.00	-52125	$680.00	20 Hz to 200 kHz	±2db	-22125	$584.00	-22125	$515.00
10 Hz to 200 kHz	±½db	-51125	$799.00	-51125	$730.00	10 Hz to 200 kHz	±2db	-21125	$634.00	-21125	$565.00
200 Hz to 500 kHz	±½db	3606A-52255	$729.00	1606A-52255	$660.00	200 Hz to 500 kHz	±2db	3602A-22255	$559.00	1602A-22255	$490.00
50 Hz to 500 kHz	±½db	-55155	$739.00	-55155	$670.00	50 Hz to 500 kHz	±2db	-25155	$569.00	-25155	$500.00
20 Hz to 500 kHz	±½db	-52155	$769.00	-52155	$700.00	20 Hz to 500 kHz	±2db	-22155	$599.00	-22155	$530.00
10 Hz to 500 kHz	±½db	-51155	$819.00	-51155	$750.00	10 Hz to 500 kHz	±2db	-21155	$649.00	-21155	$580.00
200 Hz to 20 kHz	±1db	3602A-12224	$529.00	1602A-12224	$460.00	200 Hz to 500 kHz	±3db	3602A-32255	$519.00	1602A-32255	$450.00
50 Hz to 20 kHz	±1db	-15124	$539.00	-15124	$470.00	50 Hz to 500 kHz	±3db	-35155	$529.00	-35155	$460.00
20 Hz to 20 kHz	±1db	-12124	$569.00	-12124	$500.00	20 Hz to 500 kHz	±3db	-32155	$559.00	-32155	$490.00
10 Hz to 20 kHz	±1db	-11124	$619.00	-11124	$550.00	10 Hz to 500 kHz	±3db	-31155	$609.00	-31155	$540.00
200 Hz to 50 kHz	±1db	3602A-12254	$549.00	1602A-12254	$480.00	5 kHz to 1 mHz	±1db	3607A-15316	$740.00	1607A-15316	$661.00
50 Hz to 50 kHz	±1db	-15154	$559.00	-15154	$490.00	5 kHz to 2 mHz	±1db	-15326	$840.00	-15326	$761.00
20 Hz to 50 kHz	±1db	-12154	$589.00	-12154	$520.00	5 kHz to 3 mHz	±1db	-15336	$950.00	-15336	$871.00
10 Hz to 50 kHz	±1db	-11154	$639.00	-11154	$570.00						
200 Hz to 100 kHz	±1db	3603A-12215	$569.00	1603A-12215	$500.00	5 kHz to 1 mHz	±2db	3607A-25316	$640.00	1607A-25316	$561.00
50 Hz to 100 kHz	±1db	-15115	$579.00	-15115	$510.00	5 kHz to 2 mHz	±2db	-25326	$715.00	-25326	$636.00
20 Hz to 100 kHz	±1db	-12115	$609.00	-12115	$540.00	5 kHz to 3 mHz	±2db	-25336	$805.00	-25336	$726.00
10 Hz to 100 kHz	±1db	-11115	$659.00	-11115	$590.00	5 kHz to 5 mHz	±2db	-25356	$965.00	-25356	$886.00
200 Hz to 200 kHz	±1db	3603A-12225	$574.00	1603A-12225	$505.00	5 kHz to 1 mHz	±3db	3607A-35316	$560.00	1607A-35316	$481.00
50 Hz to 200 kHz	±1db	-15125	$584.00	-15125	$515.00	5 kHz to 2 mHz	±3db	-35326	$630.00	-35326	$551.00
20 Hz to 200 kHz	±1db	-12125	$614.00	-12125	$545.00	5 kHz to 3 mHz	±3db	-35336	$700.00	-35336	$621.00
10 Hz to 200 kHz	±1db	-11125	$664.00	-11125	$595.00	5 kHz to 5 mHz	±3db	-35356	$855.00	-35356	$766.00

NOTE: A SERIES TO OPERATE ON −30VDC
C SERIES TO OPERATE ON −24VDC, PRICE SAME AS (A) SERIES
TO EXTEND 3607A LOW FREQUENCY ADD AS FOLLOWS:

200 Hz add $30.00	20 Hz add $ 70.00
50 Hz add $40.00	10 Hz add $120.00

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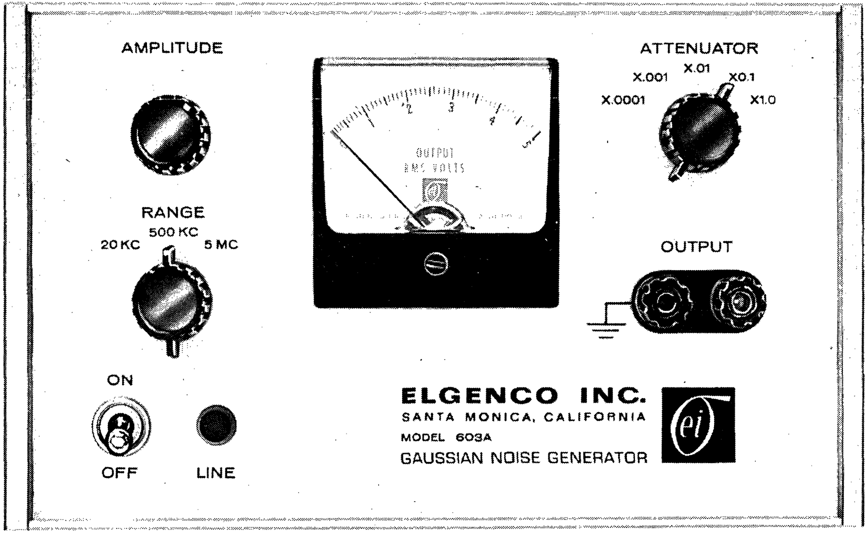
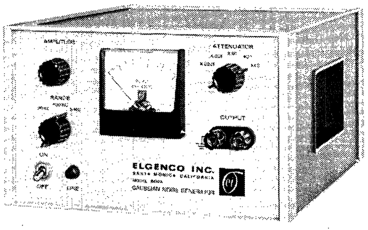
MODELS 602A-200/602A-1390/603A • ALL SOLID STATE NOISE GENERATORS 5 Hz TO 5 MHz





SPECIFICATIONS:

These specs are unique to the Series 602A-200, 602A-1390, 603A introduced on this page.

FREQUENCY RANGES: 5 Hz to 20 kHz, 5 Hz to 500 kHz, 5 Hz to 5 mHz.

AMPLITUDE PROBABILITY DISTRIBUTION: Gaussian.

OUTPUT SPECTRUM:

Accuracy	602A-1390	602A-200	603A
20 Hz to 20 kHz	±1 db	±1 db	—
20 Hz to 500 kHz	±3 db	±2.5 db	—
500 kHz to 5 mHz	±8 db	±5 db	—
10 Hz to 500 kHz	—	—	±1 db
500 kHz to 5 mHz	—	—	±3 db

RMS OUTPUT LEVEL: (Minimum value of maximum open circuit output).

	602A-1390	602A-200	603A
20 kHz range	3 volts	3 volts	3 volts
500 kHz range	2 volts	2.5 volts	3 volts
5 mHz range	1 volt	2.0 volts	3 volts

OUTPUT IMPEDANCE:

	602A-1390	602A-200	603A
	900 ohms ±10%	200 ohms ±10%	200 ohms ±10%

MAXIMUM LOAD: (on direct output)

	602A-1390	602A-200	603A
	no limit	700 ohms	700 ohms

OUTPUT STEP ATTENUATOR: Five positions: X1.0, X0.1, X.01, X.001, and X.0001; calibrated to work into open circuit. Accuracy:

	602A-1390	602A-200	603A
to 100 kHz	±3%	±3%	—
to 500 kHz	—	—	±3%
to 5 mHz	±10%	±10%	±5%
Output Impedance	200 ohms	200 ohms	200 ohms
	—	±1%	±1%

SPECTRAL DENSITY: Approximate spectral density (mv √ Hz) for 1 volt RMS output.

	602A-1390	602A-200	603A
20 kHz band	5.0	5.0	5.0
500 kHz band	1.2	1.2	1.2
5 mHz band	0.6	0.4	0.4

PRICE

	602A-1390	602A-200	603A
	$1,845.00	$2,075.00	$2,450.00

SPECIFICATIONS • ALSO COMMON TO SERIES 624A

These specs are common to the Series 602A-200, 602A-1390, 603A introduced on this page and the Series 624A on facing page. Specifications are for 25°C unless specified otherwise.

DYNAMIC RANGE: 3.5 to 1 peak to RMS at 3 volts RMS open circuit; 5 to 1 at 2.1 volts RMS. Dynamic range is inversly proportional to output level as set by front panel amplitude control.

OUTPUT METER: Rectifier type meter circuit reads proportional to average value, calibrated to read RMS value of Gaussian Noise; 0-5 volts RMS scale.

OPERATING TEMPERATURE RANGE: 0 to 50°C.

POWER SUPPLY: Built-in highly regulated dc supply.

POWER REQUIREMENTS: 115/230 volts ±10/20 volts, 50 to 1,000 Hertz ac; approximately 5 watts. A rechargeable battery option is available. Battery is recharged by operating unit on ac line.

DIMENSIONS: 5¼″ high x 8⅝″ wide x 11″ deep.

RACK MOUNT: A rack mounting adapter kit is available for rack mounting two units side by side. Also available is a rack mounting adapter kit for rack mounting one unit. One or two units use 5¼″ x 19″ of rack panel space with adapter kit. Full rack width cabinet option for one unit is available. Size of unit with this option is 5¼″ high x 17″ wide x 11″ deep and comes with rack mounting hardware.

SHIPPING WEIGHT: Approximately 12 lbs.

OPTIONS AVAILABLE: Full rack width cabinet with mounting hardware option; rechargeable battery option; BNC output terminal on rear panel option.

ACCESSORIES AVAILABLE: Dual adapter kit and rack mounting hardware; single unit adapter kit with rack mounting hardware and front and rear dummy panels; rechargeable battery adapter kit.

OPTIONS & ACCESSORIES FOR MODELS 602A/603A/610A & SERIES 624A

Adapter kit, single unit rack mounting (mounts one unit in rack, includes blank panel to make dual unit) Part No. 8804-0002	$306.00
Adapter kit, dual unit and rack mounting hardware (mounts two units side by side) Part No. 8804-0001	$71.00
Full rack width cabinet and rack mounting hardware option	add $265.00
Pink filters, Part No. 8890-0015	$265.00
Rechargeable battery option	add $695.00
Rechargeable battery kit	$720.00

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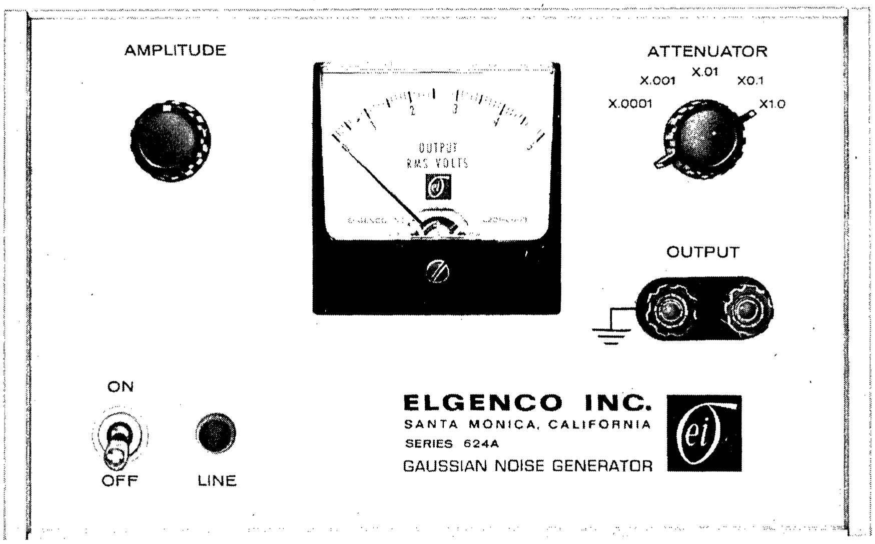
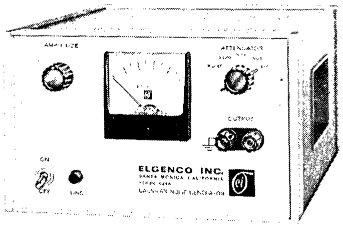
SERIES 624A FIXED RANGE • ALL SOLID STATE NOISE GENERATORS





SPECIFICATIONS • ALSO SEE FACING PAGE

FREQUENCY RANGES: See price list for a partial list of frequency ranges available.

RMS OUTPUT LEVEL: (Minimum value of maximum open circuit output) 3 volts.

OUTPUT IMPEDANCE: 200 ohms ±10%.

MAXIMUM LOAD: (on direct output) 700 ohms.

OUTPUT STEP ATTENUATOR: Five positions: X1.0, X0.1, X.01, X.001, and X.0001; calibrated to work into open circuit.

Accuracy: ±3%
Output Impedance: 200 ohms

SPECTRAL DENSITY: Approximate spectral density ($\text{mv}\sqrt{\text{Hz}}$) for 1 volt RMS output.

Accuracy	mv	Accuracy	mv
20 kHz band	5.0	200 kHz band	1.6
50 kHz band	3.1	500 kHz band	1.0
100 kHz band	2.2		

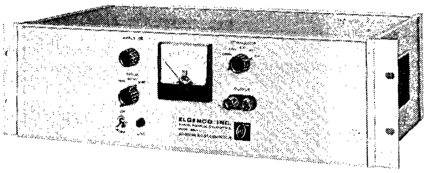
AMPLITUDE PROBABILITY DISTRIBUTION: Gaussian.

SPECIFICATIONS FOR SERIES 624A

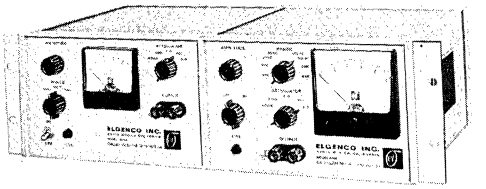
±1 db 200 Hz to 20 kHz	624A-12224	$1765.00
±1 db 50 Hz to 20 kHz	-15124	$1775.00
±1 db 20 Hz to 20 kHz	-12124	$1805.00
±1 db 10 Hz to 20 kHz	-11124	$1855.00
±1 db 200 Hz to 50 kHz	624A-12254	$1785.00
±1 db 50 Hz to 50 kHz	-15154	$1795.00
±1 db 20 Hz to 50 kHz	-12154	$1825.00
±1 db 10 Hz to 50 kHz	-11154	$1875.00
±1 db 200 Hz to 100 kHz	624A-12215	$1805.00
±1 db 50 Hz to 100 kHz	-15115	$1815.00
±1 db 20 Hz to 100 kHz	-12115	$1845.00
±1 db 10 Hz to 100 kHz	-11115	$1895.00
±1 db 200 Hz to 200 kHz	624A-12225	$1855.00
±1 db 50 Hz to 200 kHz	-15125	$1865.00
±1 db 20 Hz to 200 kHz	-12125	$1895.00
±1 db 10 Hz to 200 kHz	-11125	$1945.00

SPECIFICATIONS FOR SERIES 624A (Cont'd)

±1 db 200 Hz to 500 kHz	624A-12255	$1905.00
±1 db 50 Hz to 500 kHz	-15155	$1915.00
±1 db 20 Hz to 500 kHz	-12155	$1945.00
±1 db 10 Hz to 500 kHz	-11155	$1995.00
±2 db 200 Hz to 50 kHz	624A-22254	$1765.00
±2 db 50 Hz to 50 kHz	-25154	$1775.00
±2 db 20 Hz to 50 kHz	-22154	$1805.00
±2 db 10 Hz to 50 kHz	-21154	$1855.00
±2 db 200 Hz to 100 kHz	624A-22215	$1775.00
±2 db 50 Hz to 100 kHz	-25115	$1785.00
±2 db 20 Hz to 100 kHz	-22115	$1815.00
±2 db 10 Hz to 100 kHz	-21115	$1865.00
±2 db 200 Hz to 200 kHz	624A-22225	$1790.00
±2 db 50 Hz to 200 kHz	-25125	$1800.00
±2 db 20 Hz to 200 kHz	-22125	$1830.00
±2 db 10 Hz to 200 kHz	-21125	$1880.00
±2 db 200 Hz to 500 kHz	624A-22255	$1805.00
±2 db 50 Hz to 500 kHz	-25155	$1815.00
±2 db 20 Hz to 500 kHz	-22155	$1845.00
±2 db 10 Hz to 500 kHz	-21155	$1895.00
±3 db 200 Hz to 500 kHz	624A-32255	$1765.00
±3 db 50 Hz to 500 kHz	-35155	$1775.00
±3 db 20 Hz to 500 kHz	-32155	$1805.00
±3 db 10 Hz to 500 kHz	-31155	$1855.00
±½ db 200 Hz to 20 kHz	624A-52224	$1940.00
±½ db 50 Hz to 20 kHz	-55124	$1950.00
±½ db 20 Hz to 20 kHz	-52124	$1980.00
±½ db 10 Hz to 20 kHz	-51124	$2030.00
±½ db 200 Hz to 50 kHz	624A-52254	$1960.00
±½ db 50 Hz to 50 kHz	-55154	$1970.00
±½ db 20 Hz to 50 kHz	-52154	$2000.00
±½ db 10 Hz to 50 kHz	-51154	$2050.00
±½ db 200 Hz to 100 kHz	624A-52215	$1980.00
±½ db 50 Hz to 100 kHz	-55115	$1990.00
±½ db 20 Hz to 100 kHz	-52115	$2020.00
±½ db 10 Hz to 100 kHz	-51115	$2070.00
±½ db 200 Hz to 200 kHz	624A-52225	$2030.00
±½ db 50 Hz to 200 kHz	-55125	$2040.00
±½ db 20 Hz to 200 kHz	-52125	$2070.00
±½ db 10 Hz to 200 kHz	-51125	$2120.00
±½ db 200 Hz to 500 kHz	624A-52255	$2050.00
±½ db 50 Hz to 500 kHz	-55155	$2060.00
±½ db 20 Hz to 500 kHz	-52155	$2090.00
±½ db 10 Hz to 500 kHz	-51155	$2140.00



Model 602A with full rack width mounting option



Models 602A and **610A** combined by dual unit adapter kit.

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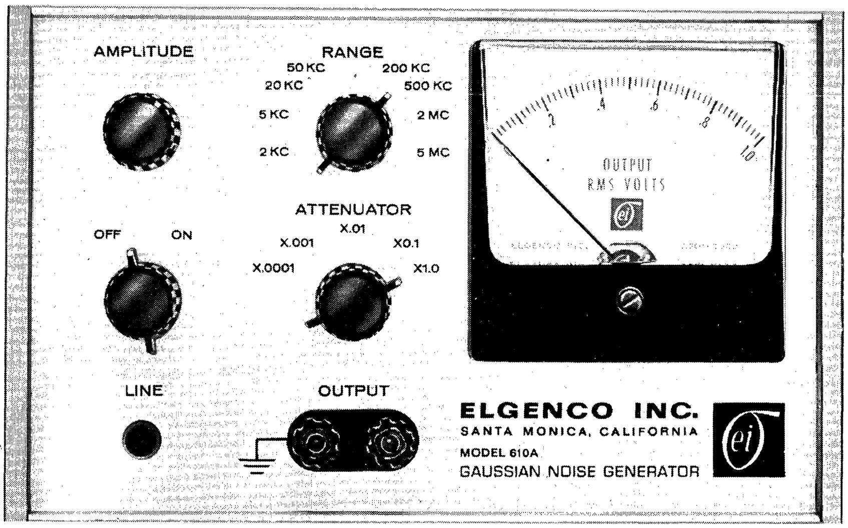
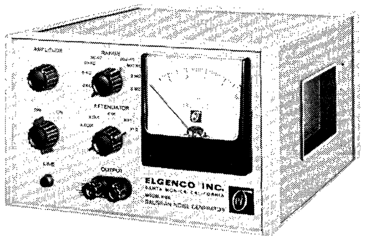
MODEL 610A • ALL SOLID STATE NOISE GENERATOR • 5Hz TO 5MHz





SPECIFICATIONS

Specifications are for 25°C unless specified otherwise.

FREQUENCY RANGES: Eight ranges selectably by front panel switch; 5 Hz to 2 kHz, 5 Hz to 5 kHz, 5 Hz to 20 kHz, 5 Hz to 50 kHz, 5 Hz to 200 kHz, 5 Hz to 500 kHz, 5 Hz to 2 mHz, and 5 Hz to 5 mHz.

OUTPUT SPECTRUM: Uniform to ±0.5 db from 10 Hz to 500 kHz and ±2.0 db from 500 kHz to 5 mHz.

OUTPUT LEVEL: 0 to 1 volt RMS, adjustable by front panel amplitude control. A dynamic range of 5 to 1 peak to RMS value is provided.

OUTPUT STEP ATTENUATOR: Five positions; X1.0, X0.1, X.01, X.001, X.0001. Accuracy ±0.1 db to 500 kHz; ±0.25 db to 5 mHz.

SPECTRAL DENSITY: Approximate spectral density for 1 volt RMS output.

Band	volts/√ Hz	Band	volts/√ Hz
2 kHz	1.75×10^{-2}	200 kHz	1.75×10^{-3}
5 kHz	1.1×10^{-2}	500 kHz	1.1×10^{-3}
20 kHz	5.5×10^{-3}	2 mHz	5.5×10^{-4}
50 kHz	3.5×10^{-3}	5 mHz	$.3 \times 10^{-4}$

AMPLITUDE PROBABILITY DISTRIBUTION: Symmetrical Gaussian Distribution all ranges.

OUTPUT METER: Meter reads 0 to 1 volt RMS. Accuracy ±2% of full scale to 2 mHz; ±5% to 5 mHz.

MAXIMUM LOAD: 500 ohms on direct output.

OUTPUT IMPEDANCE: Approximately 50 ohms direct output. Step attenuated output 50 ohms ±1%.

OPERATING TEMPERATURE RANGE: 0 to 50°C

POWER SUPPLY: Built-in highly regulated dc supply.

POWER REQUIREMENTS: 115/230 volts ±10/20 volts, 50 to 1,000 Hertz ac; approximately 7 watts. A rechargeable power option is available. Battery is recharged by operating unit on ac line.

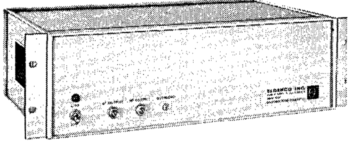
DIMENSIONS: 5¼″ high x 8⅝″ wide x 11″ deep.

RACK MOUNT: A rack mounting adapter kit is available for rack mounting two units side by side. Also available is a rack mounting adapter kit for rack mounting one unit. One or two units use 5¼″ x 19″ of rack panel space with adapter kit. Full rack width cabinet option for one unit is available. Size of unit with this option is 5¼″ high x 17″ wide x 11″ deep and comes with rack mounting hardware.

SHIPPING WEIGHT: Approximately 14 lbs.

PRICE: $4960.00

MODELS 632A/631A • ALL SOLID STATE NOISE GENERATOR



Model 632A Dual Output DC to 400 Hz and 5 Hz to 40 kHz **$9,795.00**

LOW FREQUENCY OUTPUT

AMPLITUDE PROBABILITY DISTRIBUTION: Gaussian ±1.0%.
OUTPUT SPECTRUM: Uniform ±0.1 db from DC to 350 Hz.

MAXIMUM OUTPUT: 1.0 volts rms. A dynamic range of 5 to 1 peak to rms value is provided.

MAXIMUM SPECTRAL DENSITY: Approx. 1.5×10^{-3} volts²/Hz.

OUTPUT MEAN: Less than 5 mv.

OUTPUT IMPEDANCE: Approximately 1,000 ohms.

HIGH FREQUENCY OUTPUT

AMPLITUDE PROBABILITY DISTRIBUTION: Gaussian ±2%.

OUTPUT SPECTRUM: Uniform ±0.5 db from 10 to 35,000 Hz.

MAXIMUM OUTPUT: 1.0 volts rms. A dynamic range of 5 to 1 peak to rms values is provided.

MAXIMUM SPECTRAL DENSITY: Approx. 2×10^{-5} volts²/Hz.

OUTPUT MEAN: Less than 1 mv.

OUTPUT IMPEDANCE: Approximately 100 ohms.

NOISE REGULATOR: rms output level continuously stabilized against a reference voltage.

OVERLOAD INDICATOR: Panel overload indicator lights when input noise level to regulator is out of regulation range.

POWER: 115/230 volts ±10/20 volts, 50 to 1,000 Hertz ac.

DIMENSIONS: 5¼″ high x 17″ wide x 11″ deep. 19″ wide with rack mounting flanges mounted (supplied).

Model 631A 5 Hz to 40 kHz **$6,320.00**

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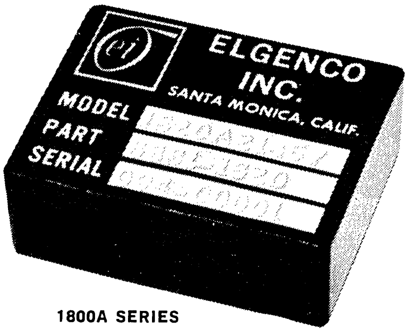
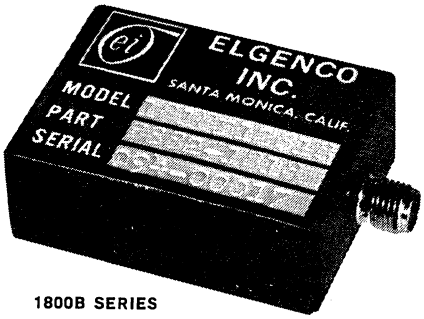
SERIES 1800 • NOISE SOURCE MODULES • 10KHz TO 100MHz



1800A SERIES



1800B SERIES

SPECIFICATIONS

The 1800 Series provides a low level wide band output. A portion of this band is specified to a certain flatness; uniformity. The approximate 6 mv open circuit output is for the whole band. The 1800B Series modules are the same as the 1800A series except the output is via a SMA connector. Specifications are for 25°C unless specified otherwise.

SPECTRAL DENSITY UNIFORMITY: Available with uniformity of ±0.5 db, ±1 db, ±2 db, ±3 db and ±4 db for many frequency ranges between lower frequencies of 10 kHz and 2 mHz and upper frequencies of 20 mHz, 30 mHz, 45 mHz, 50 mHz, 70 mHz, 80 mHz and 100 mHz.

SPECTRAL DENSITY: Approximately 0.3 μV per root Hz into 50 ohms.

RMS OUTPUT LEVEL: Approximately 3 mv rms into 50 ohms; 6 mv rms open circuit.

OUTPUT IMPEDANCE: Approximately 50 ohms.

AMPLITUDE PROBABILITY DISTRIBUTION: Gaussian.

OPERATING TEMPERATURE RANGE: 0 to 50°C.

POWER REQUIREMENTS: Model 1815, −15 VDC; Model 1818, −18 VDC; Model 1820, −20 VDC; Model 1822, −22 VDC; Model 1824, −24 VDC (well regulated power is required); current approximately 25 ma. Note: No external components are needed to properly install unit.

MOUNTING: .032″ printed circuit leads.

SIZE: 1.60 x 1.30 x 0.65 inches.

WEIGHT: Approximately 1 oz.

PRICING:
Base Price: 1818A.
Base Price plus $80.00: 1818B.
Base Price plus $20.00: 1815A, 1820A, 1822A and 1824A.
Base Price plus $100.00: 1815B, 1820B, 1822B and 1824B.

SERIES 1800 PRICES

Model No.	Frequency Band	Price
1818A-31427	10 kHz to 20 mHz, ±3 db	$ 589.00
-21427	10 kHz to 20 mHz, ±2 db	$ 609.00
-11427	10 kHz to 20 mHz, ±1 db	$ 729.00
-51427	10 kHz to 20 mHz, ±0.5 db	$ 819.00
1818A-31437	10 kHz to 30 mHz, ±3 db	$ 599.00
-21437	10 kHz to 30 mHz, ±2 db	$ 629.00
-11437	10 kHz to 30 mHz, ±1 db	$ 749.00
-51437	10 kHz to 30 mHz, ±0.5 db	$ 869.00
1818A-31447	10 kHz to 45 mHz, ±3 db	$ 629.00
-21447	10 kHz to 45 mHz, ±2 db	$ 679.00
-11447	10 kHz to 45 mHz, ±1 db	$ 869.00
-51447	10 kHz to 45 mHz, ±0.5 db	$1019.00
1818A-31457	10 kHz to 50 mHz, ±3 db	$ 679.00
-21457	10 kHz to 50 mHz, ±2 db	$ 759.00
-11457	10 kHz to 50 mHz, ±1 db	$ 919.00
-51457	10 kHz to 50 mHz, ±0.5 db	$1139.00
1818A-41477	10 kHz to 70 mHz, ±4 db	$ 679.00
-31477	10 kHz to 70 mHz, ±3 db	$ 699.00
-21477	10 kHz to 70 mHz, ±2 db	$ 789.00
-11477	10 kHz to 70 mHz, ±1 db	$ 979.00
1818A-41487	10 kHz to 80 mHz, ±4 db	$ 699.00
-31487	10 kHz to 80 mHz, ±3 db	$ 719.00
-21487	10 kHz to 80 mHz, ±2 db	$ 819.00
-11487	10 kHz to 80 mHz, ±1 db	$1029.00
1818A-41418	10 kHz to 100 mHz, ±4 db	$ 819.00
-31418	10 kHz to 100 mHz, ±3 db	$ 909.00
-21418	10 kHz to 100 mHz, ±2 db	$1089.00
-11418	10 kHz to 100 mHz, ±1 db*	$1459.00

Note: 1815 Series not available in 80 mHz and 100 mHz units.

Model No.	Frequency Band	Price
1818A-32627	2 mHz to 20 mHz, ±3 db	$ 469.00
-22627	2 mHz to 20 mHz, ±2 db	$ 489.00
-12627	2 mHz to 20 mHz, ±1 db	$ 609.00
-52627	2 mHz to 20 mHz, ±0.5 db	$ 699.00
1818A-32637	2 mHz to 30 mHz, ±3 db	$ 479.00
-22637	2 mHz to 30 mHz, ±2 db	$ 509.00
-12637	2 mHz to 30 mHz, ±1 db	$ 629.00
-52637	2 mHz to 30 mHz, ±0.5 db	$ 749.00
1818A-32647	2 mHz to 45 mHz, ±3 db	$ 509.00
-22647	2 mHz to 45 mHz, ±2 db	$ 559.00
-12647	2 mHz to 45 mHz, ±1 db	$ 749.00
-52647	2 mHz to 45 mHz, ±0.5 db	$ 899.00
1818A-32657	2 mHz to 50 mHz, ±3 db	$ 559.00
-22657	2 mHz to 50 mHz, ±2 db	$ 639.00
-12657	2 mHz to 50 mHz, ±1 db	$ 799.00
-52657	2 mHz to 50 mHz, ±0.5 db	$1019.00
1818A-42677	2 mHz to 70 mHz, ±4 db	$ 559.00
-32677	2 mHz to 70 mHz, ±3 db	$ 579.00
-22677	2 mHz to 70 mHz, ±2 db	$ 669.00
-12677	2 mHz to 70 mHz, ±1 db	$ 859.00
1818A-42687	2 mHz to 80 mHz, ±4 db	$ 579.00
-32687	2 mHz to 80 mHz, ±3 db	$ 599.00
-22687	2 mHz to 80 mHz, ±2 db	$ 699.00
-12687	2 mHz to 80 mHz, ±1 db	$ 909.00
1818A-42618	2 mHz to 100 mHz, ±4 db	$ 699.00
-32618	2 mHz to 100 mHz, ±3 db	$ 789.00
-22618	2 mHz to 100 mHz, ±2 db	$ 969.00
-12618	2 mHz to 100 mHz, ±1 db*	$1339.00

*Available 1800B Series only.

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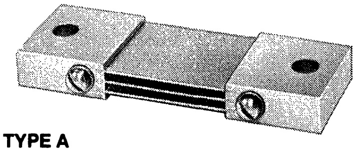
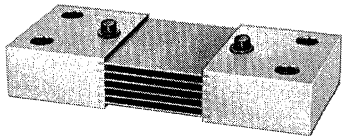
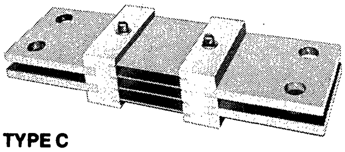


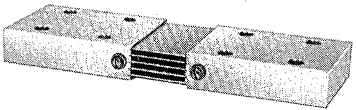
TYPE A
50 MV 15 through 600 amperes
100 MV 50 through 600 amperes



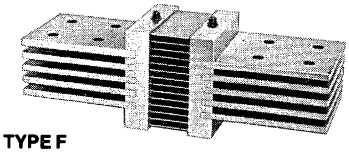
TYPE B
50 MV 300 through 1200 amperes
100 MV 300 through 1200 amperes



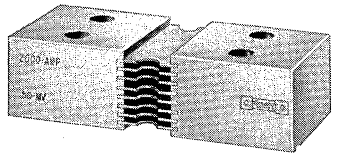
TYPE C
50 MV 1000 through 2000 amperes
100 MV 1000 through 2000 amperes



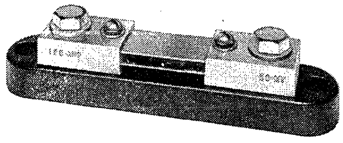
TYPE E
50 MV 1500 through 2000 amperes
100 MV 1500 through 2000 amperes



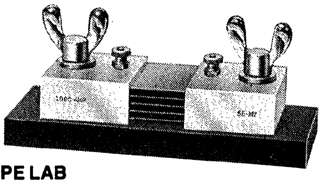
TYPE F
50 MV 2500 through 30000 amperes
100 MV 2500 through 10000 amperes



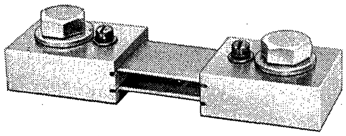
TYPE FL
50 MV 1000 through 3000 amperes



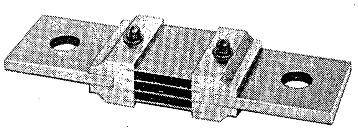
TYPE HA
50 MV 1 through 500 amperes
100 MV 1 through 500 amperes



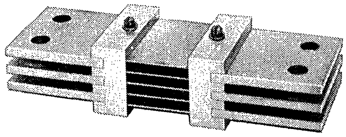
TYPE LAB
50 MV 15 through 1000 amperes
100 MV 15 through 1000 amperes



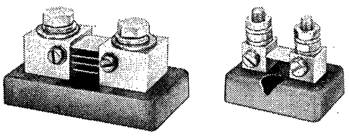
TYPE TRW-50
50 MV 100 through 600 amperes



TYPE W
50 MV 300 through 1000 amperes
100 MV 120 through 500 amperes



TYPE WT
50 MV 1000 through 10000 amperes
100 MV 600 through 6000 amperes



LIGHTWEIGHT
50 MV 5 through 1200 amperes

All types are also available in 25 MV • Accuracy is ¼%

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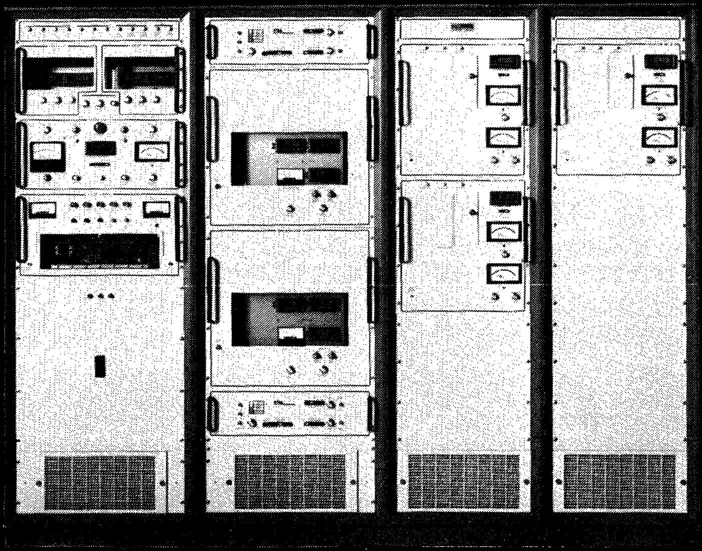
TECHNICAL INFORMATION

WHERE TO FIND THEM IN THE 85/86 EDITION OF EEM

Abbreviations/Acronyms	**A**•1166, **B**•1012, **C**•1028, **D**•1016
ASCII Code	**D**•1087
Batteries, Product Selection Guide	**D**•1413
Batteries & Fuel Cells, Characteristics	**D**•1430
Cabinets, Enclosures, Racks, & Chassis, Product Selection Guide	**C**•1003
Capacitors, Basic Formulas	**A**•1093
Capacitors, Miniglossary	**A**•1066
Capacitors, Product Selection Guide	**A**•1003
Circuit Boards (Printed) Product Selection Guide	**C**•1099
Coils, Chokes, Inductors, Product Selection Guide	**A**•1205
Conductors, Maximum Current Capacity of Copper & Aluminum	**C**•1863
Connectors, Miniglossary	**C**•1129
Connectors, Terminals, & Sockets, Product Selection Guide	**C**•1105
Crystals, Oscillators, Crystal & Piezoelectric Filters, Product Selection Gude	**A**•1309
Delay Lines, Product Selection Guide	**A**•1459
Discrete Semiconductors, Product Selection Guide	**A**•2067
Displays, Readouts, Lamps, & Lights, Product Selection Guide	**B**•1015
EBCDIC Code	**D**•1092
Encapsulation, Miniglossary	**C**•1086
Fans, Blowers, Cooling Equipment, & Heat Exchangers, Product Selection Guide	**C**•1623
Filters, Product Selection Guide	**A**•1583
Instruments, Graphic Recording Product Selection Guide	**D**•1401
Instruments, Panel Meters, Product Selection Guide	**D**•1329
Instruments, Test & Measuring Product Selection Guide	**D**•1175
Interconnection Systems, Product Selection Guide	**C**•1699
Keyboards & Keypads, Product Selection Guide	**B**•1705
Logofinder & Trademark Directories	**B**•901
Microwave Components, Product Selection Guide	**A**•1701
Military Qualified Products Lists	**B**•1003
Motors, Drives, & Rotating Components, Product Selection Guide	**B**•1129
Opto Semiconductors, Miniglossary	**B**•1214
Oscilloscopes, Product Selection Guide	**D**•1385
Panel Hardware, Product Selection Guide	**C**•1589
Potentiometers, Trimmers, Controls, & Rheostats, Product Selection Guide	**A**•1991
Power Supplies, Miniglossary	**D**•1462
Power Supplies, AC, Product Selection Guide	**D**•1877
Power Supplies, DC, Product Selection Guide	**D**•1447
Protective Components (Fuses, Circuit Breakers, etc.), Product Selection Guide	**B**•1225
Relay Contact Forms	**B**•1317
Relays, Electromechanical, Miniglossary	**B**•1308
Relays, Product Selection Guide	**B**•1261
Resistor Color Codes	**A**•1828
Resistors, Product Selection Guide	**A**•1785
Servo Components, Miniglossary	**D**•1985
Solenoids, Product Selection Guide	**B**•1463
Switches, Product Selection Guide	**B**•1477
Thermal Components, Product Selection Guide	**B**•1741
Thermal Conductivity of Dielectrics at Room Temperature	**B**•1744
Thyristors/High Power Diodes, Miniglossary	**A**•2076
Transducers & Encoders, Product Selection Guide	**B**•1777
Transformers, Product Selection Guide	**A**•2099
Wire & Cable, Product Selection Guide	**C**•1743
Wire Gauges—Diameter, Area, Copper Weight	**C**•1844

WHEN YOU DEPEND ON REGULATED HV POWER DEPEND ON ETM!

WHY?



ETM Electromatic designs and manufactures high performance power supplies, transmitters and test equipment for the microwave tube applications industry. Our products are used by nearly every major tube manufacturer in the United States.

For our customers, a purchase of an ETM power supply, amplifier or transmitter is an investment in the continuity and integrity of their programs.

Reliability

Why is reliability important to you? Consider your return on investment. There are 8,760 hours in a year. Many ETM customers have logged over 8,000 production hours a year on ETM equipment.

That's why we can say that we achieve the highest Mean Time Between Failure in the industry.

Increase reliability and you increase return on your investment.

Proven technology

When you buy an ETM power supply or transmitter, you don't pay for the development of reliability or performance. The R&D is paid for. The field testing has been done. The superior technical refinements of ETM products are an established fact.

You get the benefit of years of experience, packaged into modular units which are engineered for high performance and which can be easily integrated into a custom system.

This will save you money and get your system on line sooner, with no penalty in performance or reliability.

Production and test capability

From precision machining to painting and silk screening, from CAD printed circuit board design to fabrication to state of the art performance measurements, we get the job done.

ETM is the leading manufacturer of precision regulated high voltage equipment in the industry.

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Our business philosophy is based on building high reliability products and supporting them after the sale. Our customers have discovered that this emphasis pays off. If you need the services of a technician or an engineer, we are usually available to you on the same day locally and within 48 hours nationally.

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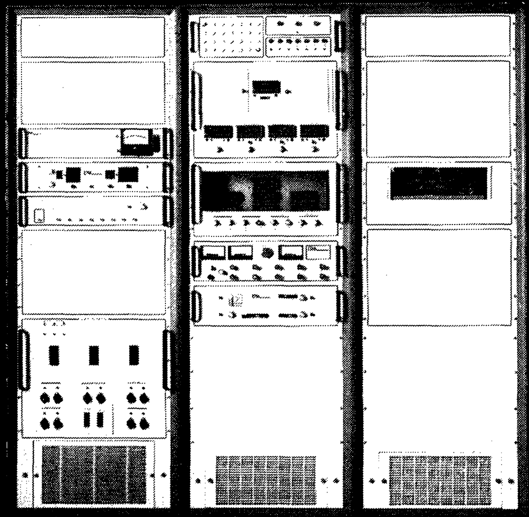
WHEN YOU NEED REGULATED HV POWER YOU NEED ETM!

WHY?



The ETM HV Power Supplies

REGULATED HIGH VOLTAGE

Output Power:
- CUSTOM UNITS
  5kW—500kW
- STANDARD UNITS
  10kV—100kV
  500mA—5A

Regulation:
+/− 2 volts

Ripple:
2 volts peak-to-peak

COLLECTOR DEPRESSORS:

Dissapation:
To 100kW typical

Regulation:
+/− 0.1% typical

Ripple:
+/− 0.1% peak-to-peak

HEATER SUPPLIES:

Output: 10—20 Volts
AC or DC
5 Amps typical

Regulation: +/−2 %

Ripple: 100mV peak-to-peak

ETM Grid Modulators

ETM Grid Modulators are versatile and designed for pulsing grids of Traveling Wave Tubes. They operate under CW, Pulse, and Pulse Burst modes. Available in Rack Mount and Stand Alone designs, may be automated with ETM'S IEEE-488 computer interface.

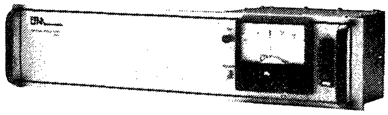
ANODE MODULATORS and other Modulator designs available.

Pulse Swing: 2000 volts
Rise & Fall Time: 200 nsec with 100 picofarad load
Pulse Width: 1 usec to CW
Repetition Rate: 10Hz—100 kHz

The ETM Model CPI Computer Interface

The ETM Model CPI-488 Series Computer Interface Systems allow a customer computer to evaluate voltage and current parameters, and to control the operation of ETM power supplies.

The CPI-488 systems are compatible with a sub-set of the IEEE-488 I/O bus.



Ion Pump Power Supplies

The ETM Model IPPS is designed to provide the voltage for an ion pump, used for degassing microwave tubes and other vacuum systems and products.

The design uniquely reduces the chances of serious operator injury.

Both Bench Type and Rack-Mount versions are available.

Metering: High Limit Trip Set, Continuously Adjustable. Analog, push-button control of customer specified ranges. SPDT switch contacts available.

Voltage: Up to 5kV, 3.5kV typical. Shall sustain 1500 volts while supplying 1 mA of current.

Current: Up to 2.0 milliamperes at any output voltage.

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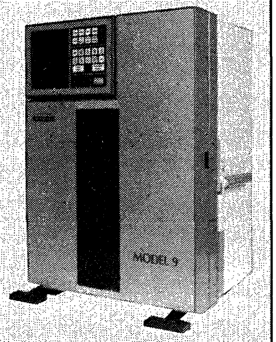
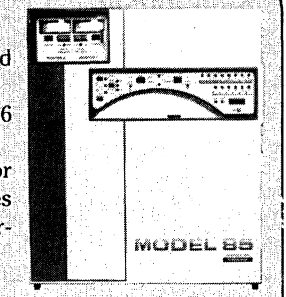
MODEL 9

- 14, 28, 32 or 42 channel capacity
- Useable reel sizes 10½, 14 or 15 inch
- Tape speed range 120 to 15/16 ips
- All program controls via touch membrane on the face of a 7" CRT
- Fast self test for Direct, FM and HDR



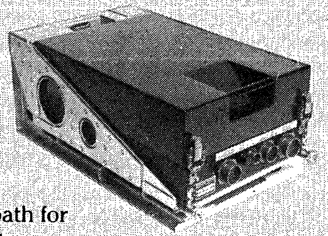
MODEL 85

- Up to 28 channel capacity
- Useable reel sizes 10½ and 14 inch
- Tape speed range 120 to 15/16 ips
- Operates from 26 VDC, 117 or 234 VAC plug-in power modules
- 3000 hours/3 year head warranty
- Universal µP stitcher.
- B.I.T.E.



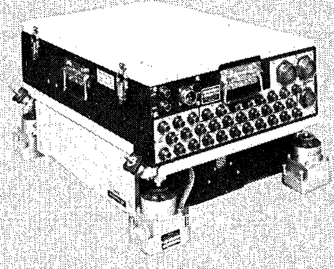
MODEL 12

- 7, 14 or 28 channel capacity
- Useable reel size of 10-½ inch
- Tape Speed Range 120 to 15/16 ips
- Raised zero loop tape path for maximum vibration resistance
- Operates from 18 to 30 VDC



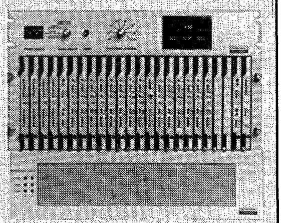
MODEL 15

- 7, 14, 28 or 32 channel capacity
- Useable reel sizes 10-½, 14 and 15 inch
- Tape speed range 120 to 15/16 ips
- Standard tape width ½ or 1 inch
- Built-in autotest and calibration



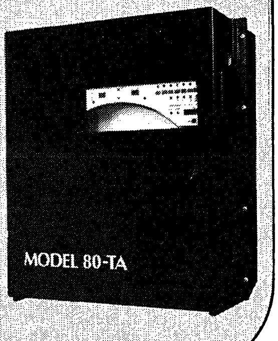
"EDCS"

- Total system capability, incorporating deskew and spectral correction allows wrap around to any quality instrumentation data recorder without the need for special signal electronics.
- Data bandwidth to 3.6 MB/S per track at 120 ips.
- 24 bit parity outperforms shorter parities.
- Built in error monitor.
- Error rate performance in 10^{10} or better.



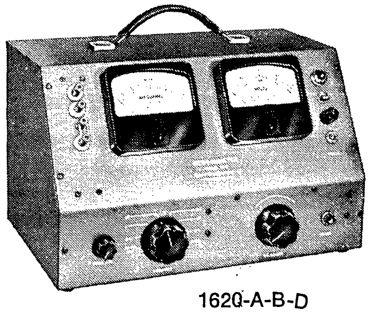
MODEL 80-TA

- Tempest qualified
- 7, 14, or 28 channel capacity
- Useable reel sizes 10-¼ and 14 inch
- Tape speed range 120 to 15/16 ips
- Two channel reproduce monitor
- Programmable stitcher mode of operation, standard
- B.I.T.E.

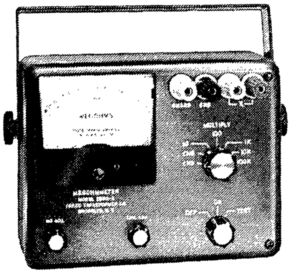


FAIRCHILD WESTON SYSTEMS INC. FAIRCHILD WESTON Schlumberger
DATA SYSTEMS DIVISION
P.O. Box 3041, Sarasota, Florida 33578
(813) 371-0811 • Telex 052-890 • TWX 810-864-0406

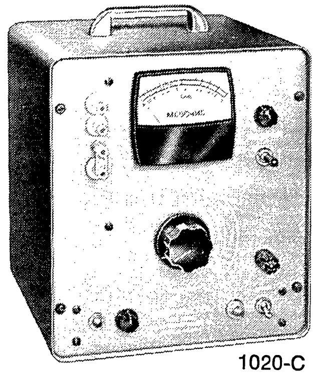
FREED TRANSFORMER CO., INC.



1620-A-B-D



2030-A-B-C-D



1020-C

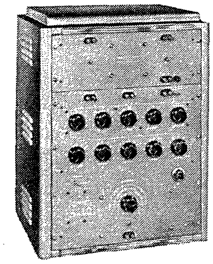
MEGOHMMETERS

Freed can supply a complete range of insulation resistance measuring equipment with fixed and variable d.c. test voltages from 5 to 2500 volts. Insulation and leakage measurements can be made on transformers, motors, cables, electronic assemblies and components, dielectric materials, electrical applicances and tools, capacitors and resistors.

Type	Resistance Range	Test Voltage	Accuracy	Power Requirements	Size and Weight
1620-A	0.01 to 4,000,000 megohms 0.1 to 200,000 megohms @ 50 volts 1 to 2,000,000 megohms @ 500 volts	Variable 5-100 volts d.c. 100-1000 volts d.c.	±5% at full scale	105-125 volts 50-60 cycles	15″ x 9″ x 7½″ 24 lbs. *
1620-B	1 to 2,000,000 megohms 10 to 2,000,000 megohms @ 2500 volts	Variable 250-2500 volts d.c.	±5% at full scale	105-125 volts 50-60 cycles	15″ x 9″ x 7½″ 24 lbs. *
1620-D	0.01 to 40,000,000 megohms 0.1 to 2,000,000 megohms @ 50 volts 1 to 20,000,000 megohms @ 500 volts	Variable 5-100 volts d.c. 100-1000 volts d.c.	±5% at full scale except highest range ±10%	105-125 volts 50-60 cycles	15″ x 9″ x 7½″ 25 lbs. *
1020-C	0.1 to 2,000,000 megohms 0.1 to 200,000 megohms @ 50 or 100 volts d.c. 1 to 2,000,000 megohms @ 500 volts d.c.	Fixed 50, 100, 500 volts Regulated	±3% all ranges except highest range ±5%	105-125 volts 50-60 cycles	9½″ x 10½″ x 8″ 18 lbs. *
2030-A	10 to 2,000,000 megohms	Fixed 500 volts d.c.	±5% full scale	battery operated transistor supply	6″ x 8″ x 4″ 8 lbs.
2030-B	1 to 20,000,000 megohms	Fixed 500 volts d.c.	±5% full scale	battery operated transistor supply	6″ x 8″ x 4″ 8 lbs.
2030-C	1 to 2,000,000 megohms	Fixed 50 volts d.c.	±5% full scale	battery operated transistor supply	6″ x 8′ x 4″ 8 lbs.
2030-D	1 to 2,000,000 megohms	Fixed 100 volts d.c.	±5% full scale	battery operated transistor supply	6″ x 8″ x 4″ 8 lbs.

INCREMENTAL INDUCTANCE BRIDGES

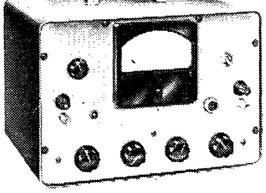
Direct in-line readings of inductance and conductance of iron core component at audio frequencies with or without super-imposed direct current. The bridge uses the Owens circuit with provisions for measuring the series or parallel inductance and conductance of the unknown inductor; five precision resistance and capacitance decades are provided to indicate these values. "Q" or storage factor can be measured as the product of the inductive reactance and the conductance.



Type	Inductance Range	Conductance Range	Frequency Range	D.C. Current	Accuracy	Dimensions and Weight
1115	111.1 h to 100 μh 5 decades 0.11 h to 0.1 μh 2 decades	0.15 μmho—1000 mho "Q" = 600 max @ 100 cycles	20 cycles to 10 KC	up to 15 amperes	±1% to 5 KC ±3% to 10 KC	21¾″ x 28″ x 15¼″ 80 lbs.
1185	111.1 h to 100 μh 5 decades 0.11 h to 0.1 μh 2 decades	0.15 μmho—1000 mho "Q" = 600 max @ 100 cycles	20 cycles to 10 KC	up to 30 amperes	±1% to 5 KC ±3% to 10 KC	21¾″ x 33¼″ x 15¼″ 100 lbs.

NULL DETECTOR

Sensitive null detector for bridge measurements, with self contained selective filters to limit the amplifier characteristics at various bridge measuring frequencies.



1140-B

Type	Sensitivity	Frequency Range	Filter	Power Requirements	Dimensions and Weight
1140-B	10μ volts @ 1 KC for 15% meter deflection filter in	20 to 20,000 cycles	Fixed 60, 400, 1000 cycles Adjustable ±5% of center Other frequencies available	105-125 volts 50-60 cycles	Cabinet 12″ x 8½″ x 10″—18 lbs. Rack—19″ x 6″ x 10″

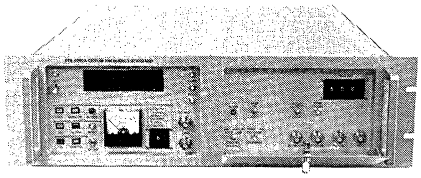
Prices quoted are subject to change without notice

FREED TRANSFORMER COMPANY. INC. 1795 WEIRFIELD ST., RIDGEWOOD, N.Y. 11385

FTS • FREQENCY AND TIME SYSTEMS, INC.

a DATUM company

CESIUM BEAM STANDARDS FOR FREQUENCY AND TIME



FTS Cesium Standards are recognized for providing the ultimate in accuracy, stability, and signal purity for atomic time and frequency standards.

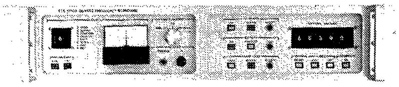
MODELS

FTS 4050A Primary Standard
FTS 4150 Militarized Primary Standard
FTS 5000 Modular Standard
FTS 4100 Militarized FTS 5000

FLEXIBILITY

- Multiple rf output signals
- Multiple pulse output signals
- Time-of-day display
- Internal battery/charger
- Multiple power inputs
- Fast warm-up
- Acceleration compensation
- 0 to 50°C or −28°C to +65°C
- Cesium beam tube retrofit kit for the HP5061A Cesium Standard
- Special options upon request

QUARTZ STANDARDS FOR FREQUENCY AND TIME



FTS Quartz Standards provide excellent value and high performance (aging to parts in 10^{11} per day) using quartz crystal resonator technology.

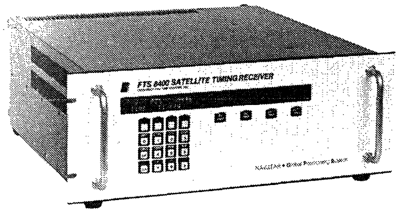
MODELS

FTS 1050A Quartz Standard
FTS 1050A/015 Disciplined Standard
FTS 9500 Militarized Quartz Standard

FLEXIBILITY

- Multiple rf output signals
- Multiple pulse and time code output signals
- Time-of-day display
- Internal battery/charger
- Multiple power inputs
- Extended temperature range
- Frequency/phase lock with memory
- Special options upon request

SATELLITE RECEIVERS FOR FREQUENCY AND TIME


FTS 8400 SATELLITE TIMING RECEIVER
NAVSTAR • Global Positioning System

FTS Satellite Receivers provide world-wide acquisition of time (UTC) to ±100 ns and frequency monitoring to parts in 10^{12}.

MODELS

FTS T-200 Transit Receiver
FTS 8200 Militarized Transit Receiver
FTS 8400 NAVSTAR (GPS) Receiver

FLEXIBILITY

- Time pulse and time code outputs
- Time-of-day display
- Position determination
- RS232C and IEEE-488 interface
- Special options upon request

FTS also offers a full line of OSCILLATORS:

- Clock oscillators
- TCXO
- OCXO
- VCXO
- High performance OCXO
- Mil specs
- Special options

FILTERS:

- Bandpass
- Notch
- Lowpass
- Highpass

SEE OUR ADD IN SECTION 2300.

Frequency and Time Systems, Inc. produces a complete line of state-of-the-art time and frequency standards. Included are primary cesium beam standards, quartz crystal oscillators, satellite timing receivers and integrated systems for the commercial as well as the military/aerospace markets.

Over a decade of design and production experience provides the basis for the company's present position of technological leadership. FTS offers a unique engineering and production facility. The modern, FTS-owned plant houses the very best in scientific and engineering capability, production control, quality assurance, restricted access production and custom service.

Specializing in satisfaction of individual customer requirements, FTS tailors its expertise in technology and production to meet exacting, customer defined specifications.

The company's products are in use today as: master frequency and time references for secure, high data rate telecommunications systems, satellite ground terminals, remote stations, metrology, laboratory research, offshore positioning, and shipboard timing systems.

Militarized applications find FTS products employed in airborne, land-mobile, and space programs for navigation and communication.

Frequency and Time Systems, Inc. offers a total spectrum of commercial, military, and aerospace products — resulting from a total commitment as time and frequency specialists.

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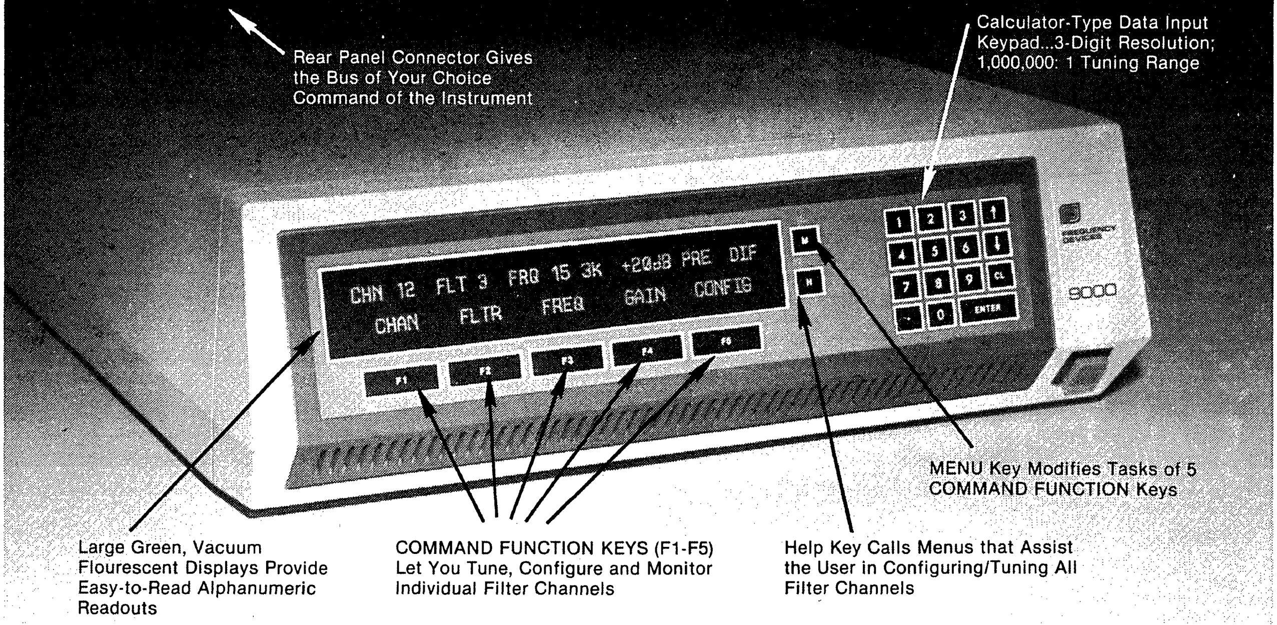
Telephone (617) 927-8220 / Telex 94-0518 FTS BVLY

KEYPAD- AND BUS- PROGRAMMABLE 16-CHANNEL FILTER

TUNABLE OVER A 1,000,000:1 FREQUENCY RANGE WITH 3-DIGIT RESOLUTION


Rear Panel Connector Gives the Bus of Your Choice Command of the Instrument
Calculator-Type Data Input Keypad...3-Digit Resolution; 1,000,000: 1 Tuning Range
CHN 12 FLT 3 FRQ 15 3K +20dB PRE DIF
CHAN FLTR FREQ GAIN CONFIG
F1
F2
F3
F4
F5
9000
ENTER
MENU Key Modifies Tasks of 5 COMMAND FUNCTION Keys
Large Green, Vacuum Flourescent Displays Provide Easy-to-Read Alphanumeric Readouts
COMMAND FUNCTION KEYS (F1-F5) Let You Tune, Configure and Monitor Individual Filter Channels
Help Key Calls Menus that Assist the User in Configuring/Tuning All Filter Channels

Makes complex filtering tasks easier

COMMAND and HELP menus in firmware make it easy for you to configure/tune any or all of up to 16 filter channels. You can mix and match **9000 Series** card-mounted lowpass, highpass and bandpass filters that span 0.1Hz to 100kHz and fit any card cage slot within the instrument.

Configure by Keypad or the bus of your choice

The choice is yours: the front-panel keypad or the rear-panel connector over the bus you specify: **HPIB..IEEE-488..Centronics Parallel..RS-232..RS-499.** Internal non-volatile memory stores up to 8 user-definable configurations independently for any of one through 16 channels.

A full spectrum of analog performance

Responses: Include Butterworth, Bessel, and near ideal Elliptic characteristics, with up to 8 poles and 6 zeros per filter. Special needs? No problem.

Configurations: Each channel is logic-or keypad-configurable with single-ended or differential inputs; programmable pre-and post-filter amplification, plus filter bypass...and much, much more.

ALL THIS, PLUS...THE RELIABILITY OF SOLID STATE SWITCHING

Connect a **9000 Series** instrument to your digitally controlled system to perform "intelligent" multichannel filtering with ease. Call us today and get the best of the analog and digital worlds.

FREQUENCY DEVICES™

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(617) 374-0761 TWX 710-347-0314

INSTRUMENTATION FROM GENERAL MICROWAVE

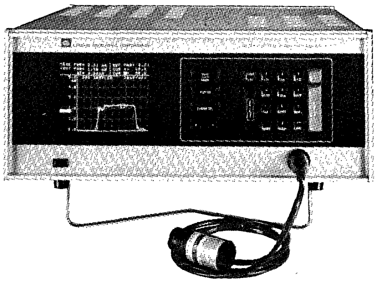
Average Power Meter 0.01-40 GHz

14.22 dBm
GENERAL MICROWAVE
MODEL 475 POWER METER

Model 475: Digital Readout
- Direct reading from: − 39.99 to + 35.0 dBm in one range
- Accuracy as high as 0.05 dB
- Resolution: 0.01 dB
- Noise and Drift: less than 0.01 W p-p
- Automatic zero set
- Built-in self calibrator

Model 476: Analog Readout
- 30 nanowatts to 3 W power range
- ± 1% of full scale accuracy
- less than 1.5% noise and drift on lowest range
- Automatic zero set
- Built-in self calibrator

Automatic Peak Power Meter 0.75* - 26GHz Model 478A



The new General Microwave microprocessor based Automatic Peak Power Meter characterizes pulses down to 15 Nanoseconds or less. With the GMC unit, the pulse to be measured is digitized and presented on the built in CRT Monitor on a calibrated graph in either dB or linear power units. The peak power is always displayed as well as any instantaneous power point that the operator selects by sliding a cursor on the graph. Any time parameter of the pulse such as rise time or pulse width is read out automatically by setting a set of cursors to any points on the pulse. Operation on the IEEE-488 standard bus is a standard feature of the instrument.

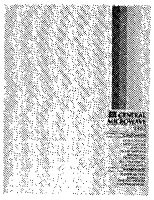
* Optionally to 5 MHz

Radiation Hazard Meter -RAHAM™

General Microwave RAHAM Hazard Meters detect and measure potentially hazardous electromagnetic energy radiating or leaking from rf and microwave sources, e.g. microwave ovens, medical equipment, radar installations, microwave heaters and dryers, mobile communication systems, electronic warfare systems.

Model	Polarization	Frequency Range, GHz
1	Bi-directional	0.3-18
2	Bi-directional	0.01-3
3	Isotropic	0.3-18
12	Bi-directional	0.01-18
4A	Isotropic, (High Stability)	200-kHz-26GHz

For complete information call or write.



GENERAL MICROWAVE

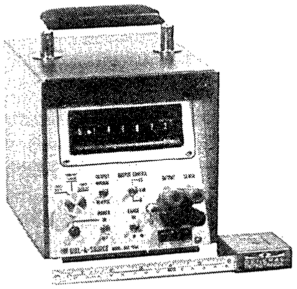
155 Marine Street, Farmingdale, L.I., New York 11735, Tel: 516-694-3600

Portable Standards

GENERAL RESISTANCE

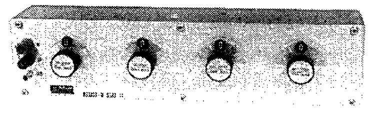
A PRIME TECHNOLOGY COMPANY

Dial-a-Source E/I Series

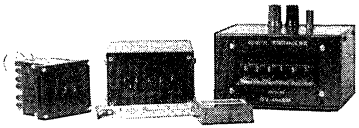


- For use in lab, plant or on-site.
- Programmable versions available.
- Battery operation available.
- Accuracies to ±15 ppm.
- "Zero" output Z.
- Outputs to ±100V.
- Resolution to 0.1μV.
- Simulates transducers and transmitters, 4-20 and 10-50mA loops.
- Checks and calibrates instruments and systems.
- Evaluates A/D and D/A converters.

Resistance Decade Boxes



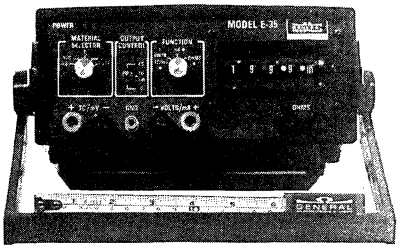
Resist-O-Stat Series



Dial-an-OHM Series

- Resistance values to 111.111 Meg.
- Resolution to 0.01 Ohms.
- Accuracies from ±1.0% to ±0.01%.
- 3, 4, 5, 6 and 7 decade models.
- OEM, test console, lab/bench configurations.

"Instant Lab" Battery-operated E/I/R Source



The portable "single box" that provides:

- Voltage: 10μV to 20V
- Current: 10μA to 200mA
- Resistance: 0.1Ω to 2111.0Ω
- T/C simulation
- RTD simulation

. . . **all accurate to ±0.1%**

The World's most Complete Line of RTD Simulators

RTD-100 Series
- The "industry standard".
- Overall accuracy ±0.01%.
- Resolution 0.001Ω.

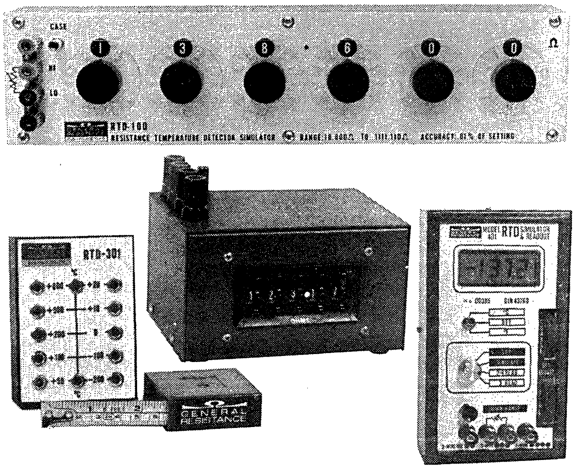
RTD-500/1000 Series
- The finest instrument available.
- Overall accuracy ±0.005%.
- Resolution ±0.01Ω.

RTD-200 Series
- Quality performance at modest price.
- Overall accuracy ±0.02%.
- Resolution 0.01Ω.

RTD-300 Series
- Shirt-pocket-portable.
- High accuracy, low price.
- Infinite number of temperatures available.

For simulation and measurement with 100Ω Platinum or 10Ω Copper RTD sensors:

RTD-400 Series
- Auto-ranging and polarity.
- 1mA test current.
- Battery operated (9V).



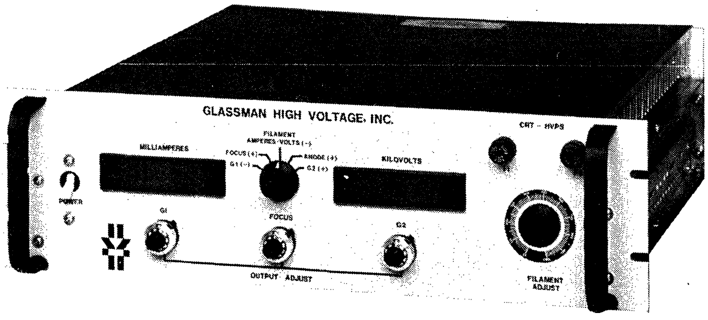
Other instrumentation for off-the-shelf delivery:

- Wheatstone Bridges • Strain-Gage Simulators • Thermocouple Simulators.

GENERAL RESISTANCE, INC.
P. O. Box 185, North Branford, Connecticut 06471
TWX 710-452-3092

CALL **203 481-5721**

A power supply package created specifically for CRT production testing and research.



THE CRT-HVPS

- Eliminates need to interface and debug five separate power supplies
- Less costly than purchasing separate units
- Takes up less bench or rack space
- Single source vendor responsibility

CRT-HVPS power supply system provides output voltages for G1, G2, Focus and Filament in one chassis.

To complete the package, simply add the Glassman anode power supply with the voltage of your choice.

FEATURES

- Modular construction—complete package provides 5 independent, individually adjustable outputs.
- Equipped with 4½ digit digital panelmeters switch selectable to read any of the outputs. Accuracy 1% full scale.
- Voltage-current regulation with automatic crossover.
- As in all Glassman High Voltage power supplies stored energy is low, on the order of 1 joule, for maximum equipment-personnel safety.
- Excellent transient response. Recovery time from a 50% load transient is less than 5 milliseconds.
- Low ripple 0.1% at rated output.

SPECIFICATIONS

Input: 105-125Vrms; 50-60Hz, single phase. Approximately 5 amperes at rated output.

Output: Anode: Select any Glassman Series LG or WH High Voltage Power Supply.
Focus: 0 to 10KV, at 1mA
G1 0 to −200V, at 1mA
G2: 0 to 2KV, at 1mA/1 watt max.
Filament: 0 to —10V, at 1A, unregulated

Continuous, stable adjustability from 0 to rated voltage and current. Separate 10-turn front-panel voltage controls for Focus, G1, and G2 with resolution and readability better than 500PPM. Linear to 1%. Control dials can be locked. Filament voltage has single-turn control.

Voltage Regulation: Load, better than ±0.01% for full load variation; line, better than ±0.01% over specified input range.*

Ripple: 0.1% for rated voltage at full load.

Stability: 0.01% per hour after ½ hour warm-up. 0.05% for 8 hours.*

Temperature Coefficient: 0.01%/°C.*

Ambient Temperature: −20°C to +60°C, operating; −40°C to +80°C, storage.

Protection: Automatic current regulation protects power supply against all overload conditions, including short circuits and inter-electrode arcing.

* For voltage range from 25% to 100% of rated output.

FRONT PANEL ELEMENTS

AC Power: Circuit breaker, pilot lamp.

Output Digital Milliammeter: 4½-digit, LED, 1% accuracy.

Output Digital Kilovoltmeter: 4½-digit, LED, 1% accuracy.

Output Metering Selection Switch: 5-position (G1, FOCUS, FILAMENT, ANODE, G2).

Voltage Controls: 10-turn with locking Vernier readout: one each, for G1, FOCUS, and G2. Single-turn for FILAMENT ADJUST. Anode supply has full set of independent controls.

Fuses: Filament supply protected by appropriate fusing.

REAR PANEL ELEMENTS

Line Cord: 6-foot, with standard 3-pin grounded plug.

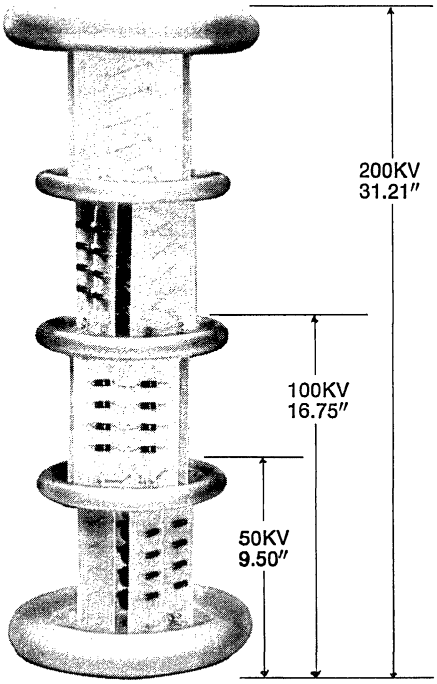
Outputs: Two BNC terminals, two Alden polyethylene terminals, and a 4-position terminal block (for interface with Anode power supply).

GLASSMAN HIGH VOLTAGE INC.

Route #22 (East), Salem Park, P.O. Box 551, Whitehouse Station, NJ 08889 • (201) 534-9007 • TWX 710-480-2839

SERIES RD HIGH VOLTAGE PROBE

For Measurement of
DC OUTPUT VOLTAGE
AC RIPPLE COMPONENT
of
HIGH VOLTAGE DC POWER SUPPLIES TO 200 KVDC!



FEATURES

- Three models, rated at 50, 100, and 200 KVDC max.
- Measurements accurate to ±0.25% of full scale
- Guarded and equipotentially shielded for minimum leakage
- Temperature coefficient: less than 100 ppm/degree C
- Voltage coefficient: less than 1 ppm/volt

SPECIFICATIONS

Accuracy: Internal calibrator sets divider accuracy to ±0.25%.

Temp coefficient: Resistor TC ≤ 100 ppm per degree C.

Voltage coefficient: Resistor divider ratio VC ≤ 1 ppm per volt.

Readout ratio: 10,000 to 1; readout error is less than 0.1% provided that input impedance at monitor voltmeter is > 1000 megohms.

(RD 200A SHOWN)

MODELS

Models	Maximum Voltage	Input Resistance	DC Blocking Capacitor
RD 50A	50 KV	1000 Megohm	.004 μF
RD 100A	100 KV	2000 Megohm	.002 μF
RD 200A	200 KV	4000 Megohm	.001 μF

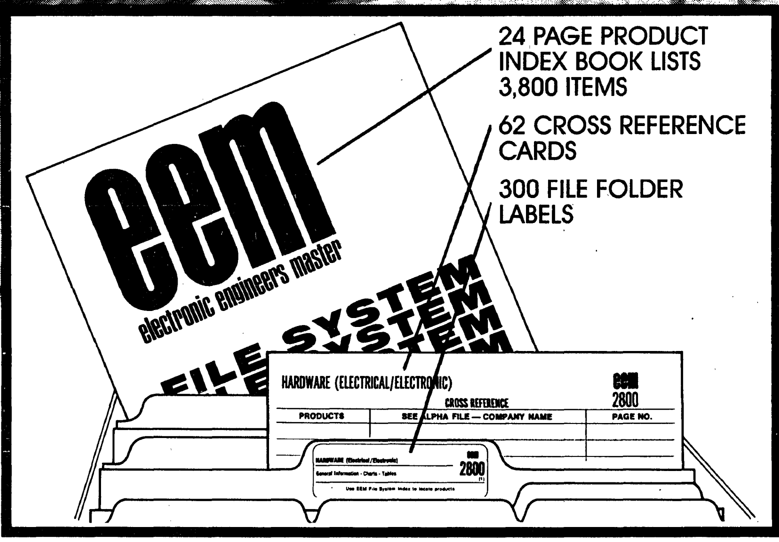
DIELECTRIC TESTERS (DC HIPOT TESTERS)

Glassman manufactures a wide range of High Voltage DC Power supplies. Applications include Non-Destructive testing of leakage currents, dielectric strength, etc. in transformers, motors, capacitors, transmission cable etc.

See our complete line of power supplies in EEM Section 4000 pages **D**•1648-**D**•1651.

GLASSMAN HIGH VOLTAGE INC.

Route #22 (East), Salem Park, P.O. Box 551, Whitehouse Station, NJ 08889 • (201) 534-9007 • TWX 710-480-2839


eem
electronic engineers master
FILE SYSTEM
HARDWARE (ELECTRICAL/ELECTRONIC)
CROSS REFERENCE
2800
PRODUCTS
SEE ALPHA FILE — COMPANY NAME
PAGE NO.

24 PAGE PRODUCT INDEX BOOK LISTS 3,800 ITEMS

62 CROSS REFERENCE CARDS

300 FILE FOLDER LABELS

ALL NEW with this edition of EEM

GET ORGANIZED!

Are your catalog files organized? Can you find any given catalog in a matter of seconds? If your answer is "Yes," you probably already have the EEM File System. But, if you said "No," you really ought to look into this simple system. It will save hours of time and tons of aggravation.

The EEM File System was invented over twenty-five years ago to help people who specify, buy, or work with electronic products and equipment. It is upgraded on a constant basis to reflect the current state of the art. It's easy to use and easy to customize to your particular needs.

You say you want to file catalogs by type of product? That's easy to do with The System. But, what are you going to do when there are multiple products in one catalog? Take Mallory for example. There are all kinds of products in the Mallory Short Form Catalog. With the EEM File System all you do is file the catalog under "M" for Mallory and refer to it on all of the cross reference cards that apply.

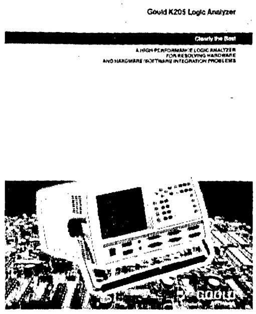
There are thousands of EEM File Systems in everyday use in engineering and procurement offices all over the world. Shouldn't you be using this proven system?

The EEM File System is shipped in one neat package. The package contains everything you need to set up your very own filing system. Best of all, it's easy to get and very affordable. Send a check or money order for $25.00 and EEM will pay the postage and sales tax. If you must use a purchase order, please add $5.00 for postage and handling. An invoice will accompany your System.

Don't waste any more time. Get organized now!

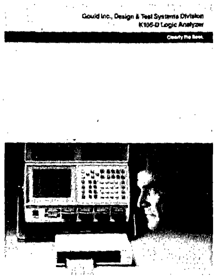
EEM FILE SYSTEM,
645 stewart ave., garden city, ny 11530

HIGH PERFORMANCE LOGIC ANALYZER


Gould K205 Logic Analyzer
Clearly the Best
A HIGH PERFORMANCE LOGIC ANALYZER FOR RESOLVING HARDWARE AND HARDWARE/SOFTWARE INTEGRATION PROBLEMS
GOULD

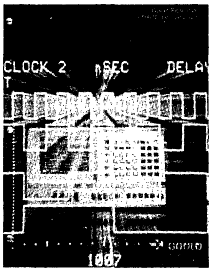
The Gould K205 high performance logic analyzer is designed for ease of use by the occasional user or the seasoned logic analyzer specialist. Its advanced data analysis capabilities make it well suited as an excellent tool for hardware design, hardware/software integration, manufacturing testing, and remote digital diagnosis. It features 10nsec resolution on all 48 channels, and captures 5nsec wide glitches at 100MHz. An AUTO SAVE feature captures data, compares it and saves it automatically.

MICROPROCESSOR HARDWARE-SOFTWARE LOGIC ANALYZER


Gould Inc., Design & Test Systems Division K105-D Logic Analyzer
Clearly the Best.

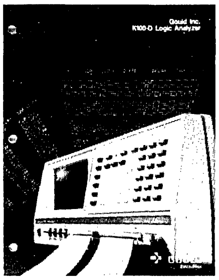
The Gould K105-D Logic Analyzer gives just the right combination of flexibility and user friendliness. It automatically recognizes the options installed, performs self-testing and identifies the configuration, in addition to the active and inactive inputs available. User friendliness includes the ease of entering set-up parameters, the color-coded keyboard, human engineered displays and menu driven screens for scrolling the available choices within a field. The K105-D answers questions about operating instructions for selected parameters or data displays. Or a complete user's guide can be commanded from the instrument.

COMPUTER MAINFRAME LOGIC ANALYZER



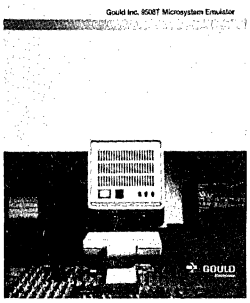
The Model K500-D Logic Analyzer from Gould is a technological breakthrough that greatly aids the design and development of high speed digital circuitry. It clocks at 500MHz permitting timing measurements on up to 8 digital signals, with a 2ns resolution. An internal 4-bit ADC makes it possible for analog recordings to be made at a 500MHz sample rate. A 2000 word memory makes precise timing measurements over a long period of time. Instrument control is simplified as a result of the microprocessor linked front keyboard, and status display.

100MHz HARDWARE LOGIC ANALYZER



The Model K100-D Logic Analyzer is designed to improve the efficiency of analysis for practically any digital circuitry. High performance recording, sophisticated triggering parameters, and comprehensive display analysis make the K100-D a very versatile analysis system. Instrument control is via direct keyboard entry or programmable GPIB interface. Complex timing and state analysis can be easily performed with standard high performance and specialized probe accessories. Active hybrid probe circuitry ensures 5ns glitch capture, and as many as 16 channels of signal information can be recorded simultaneously into the 1024 word memory.

HIGH-QUALITY, IN-CIRCUIT EMULATOR



The Gould 9508T microsystem emulator offers full hardware/software support throughout the entire development cycle. It provides complete control and visibility of the system under development. This cost-effective instrument is fully transparent and nearly functionally identical to the microprocessor. The emulator features programmable baud rates of 110 to 19.2K baud. You can load in Intel, Motorola, Tektronix or Gould binary formats. And you have a choice of three protocols: DTR/DSR, Xon/Xoff and Enq/Ack. The 9508T supports more than 28 eight-bit microprocessors and microcomputers.

LOGIC ANALYZER ACCESSORIES

LOGIC ANALYZER ACCESSORIES
Clearly the Best
GOULD Electronics

A logic analyzer application guide from Gould contains a broad line of accessories for the Models K105, K205, K100, and K500 logic analyzers. Sections in the catalog are grouped for microprocessor analysis packages, interface accessories, storage subsystem options, remote communication options, probes, cables, clips and more. A full description accompanies the categories with product photographs, screen display, general specifications and ordering information. An easy-to-use index cross-references the analyzers with their applications and the appropriate accessory.

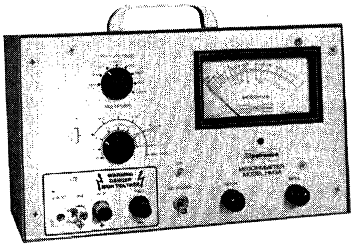
GOULD
Electronics

Gould Inc., Design & Test Systems Division
4650 Old Ironsides Drive, Santa Clara, CA 95054-1805
Telephone: (408) 988-6800 TWX: 910-338-0509
California: (800) 662-9231 National: (800) 538-9320

Hipotronics

H.V. MEGOHMMETERS

Model HV5



Model HM3A

Complete range H.V. Megohmmeters for testing insulation resistance on all electrical equipment. HIPOTRONICS, INC. offers two lines of Megohmmeters, the H.V. Series for Industrial Use and the H.M. Series for Precision Scientific Measurement.

Both units operate on a 115 Volt, 60 Hz input, (220 available). Units are lightweight, well packaged and provide portability in addition to accuracy. No tedious hand cranking required.

Megohmmeters are loaded with features which make them the most functional instruments available in industry today.

HV Series Heavy Duty Industrial Megohmmeters.

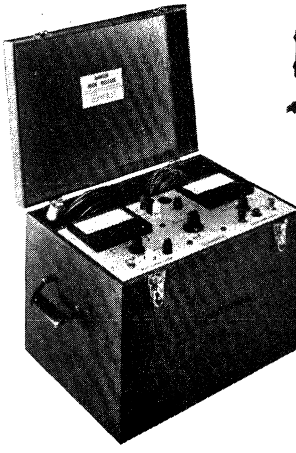
Model No.	Output Voltage	Megohm Range	Range Switch
HV2.5	0- 2,500	.1 to 50,000	X .01, .1, 1, 10
HV5	0- 5,000	.1 to 100,000	X .1, 1, 10, 100
HV10	0-10,000	.1 to 200,000	X .1, 1, 10, 100
HV15	0-15,000	.1 to 300,000	X .1, 1, 10, 100

HM Series Precision Measuring Scientific Megohmmeters.

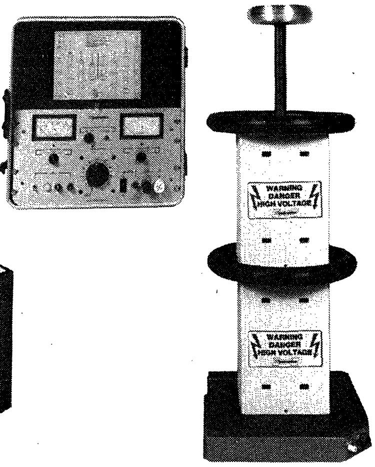
Model No.	Output Voltage	Megohm Range	Megohm Ranges
HM3A	50	0.1 to 1,000,000	6
	100	0.2 to 2,000,000	6
	500	1 to 10,000,000	6
	1000	2 to 20,000,000	6
HM6B	50	0.1 to 1,000,000	6
	250	0.5 to 5,000,000	6

For more information request **BROCHURE HP7101.**

PORTABLE HIGH VOLTAGE DC HIPOTS



Model 860 PL



Model 8120 PL-2

Both the control unit and the HV section are contained within fully-instrumented case. The safe, hermetically-sealed, oil filled HV section is mounted below the control panel. Cables are stored behind the control panel.

Input	115V, 60 Hz or 220V, 50/60 Hz, 3 amp	
Output	Model 880 PL	0-80 kV
	Model 860 PL	0-60 kV
	Model 815 PL	0-15 kV
	Model 8120-5 PL	0-120 KV
	Model 8170-5 PL	0-170 kV

For more information request **BROCHURE HP7103.**

8175 PL Series — Gas Insulated Modular Unit

The high voltage circuitry in this unit is a cascade system, overcoming disadvantages of conventional voltage-multiplier circuits. Each high voltage multiplier is a complete voltage doubler with its own transformer, rectifiers, capacitors, series resistors, meter multiplier, and an insulated tertiary to feed the next stage. The conservatively designed transformers can be overloaded repeatedly. Anticorona toroids are provided as needed.

8060 PL Series — Air Insulated DC Insulation Tester

The cascade circuitry (patent #3,643,105) of the 8060 PL series eliminates the major disadvantages of the widely used Cockroft Walton multiplier circuit: there is no decrease in power capability as more HV sections are added. Each HV module is a complete voltage doubler with its own epoxy-encapsulated transformer; each transformer has a tertiary winding to feed the succeeding stage. The standard controller has a continuous rating of 1 KW, which can be raised to 2 KW during cable charging.

Input	115V, 50/60 Hz or 220V, 50/60 Hz 3 KW at full load, 5 KW intermittent operation	
Output	Model 8175 PL-1	0-175 kV @ 17.0 mA
	Model 8175 PL-2	0-350 kV @ 8.5 mA
	Model 8175 PL-3	0-525 kV @ 5.7 mA
	Model 8175 PL-4	0-700 kV @ 4.3 mA
	Model 8175 PL-5	0-875 kV @ 3.4 mA
	Model 8175 PL-6	0-1050 kV @ 3.0 mA

Input	115V, 60 Hz or 220V, 50/60 Hz 1. KVA full load		
Output	Model No.	Number of 60 KV Modules	Output
	8060 PL	1	0-60 kV @ 16.0 mA 0-50 kV @ 20.0 mA
	8120 PL	2	0-120 kV @ 8.0 mA 0-100 kV @ 10.0 mA
	8180 PL	3	0-180 kV @ 5.5 mA 0-150 kV @ 7.5 mA
	8240 PL	4	0-240 kV @ 4.1 mA 0-200 kV @ 5.0 mA
	8300 PL	5	0-300 kV @ 3.3 mA 0-250 kV @ 4.0 mA

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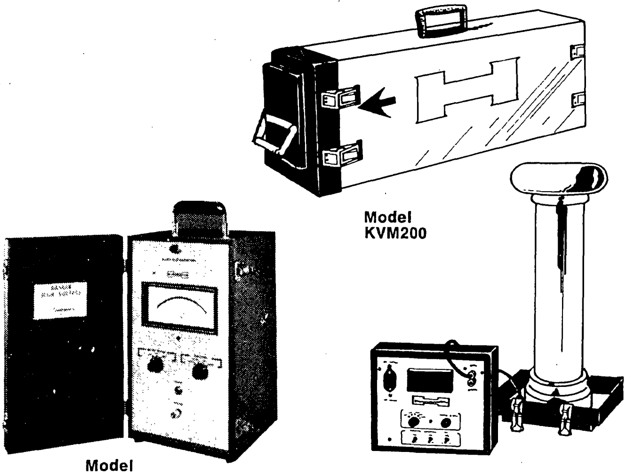
Hipotronics

KILOVOLTMETERS



Model KVM200

Model KV100A

KV Series — AC/DC Kilovoltmeter

Two Piece Laboratory Instruments with Analog Meter and Separate Divider for AC and DC Testing, packaged in one oil-filled phenolic cylinder.

Model No.	KV25A	KV100A	KV200A
Meter	0-5/10/25	0-20/50/100	0-40/100/200
Volts KV	5/10/25	20/50/100	40/100/200

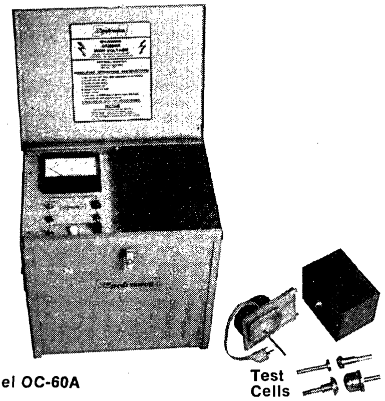
KVM Series — Digital Kilovolt Meter System

A precise battery operated unit with self-contained readout device, charger and a true passive high voltage divider. Entire unit is packaged in a single durable carrying case.

Model No.	KVM200	KVM100	KVM20
High Range Low Range	0-199.9 kV 0-19.99 kV	0-100 kV 0-10.0 kV	0-19.99 kV 0-1.999 kV
Voltage Rating	200 kVac (285 kVp) 200 kVdc	100 kVac (142 kVp) 100 kVdc	20 kVac (285 kVp) 20 kVdc
Ratio	2000:1*	1000:1*	200:1*

* (With Load Impedance of One Megohm and <500 pF.)

For more information request **BROCHURE HP7104.**



Model OC-60A

Test Cells

LIQUID DIELECTRIC TESTER

OC Series — Oil Testers

Designed to test breakdown Voltages of Insulating Oil to ASTM Specifications. Provided with extended voltage ranges to accommodate dielectrics currently being used in Transformers, Bushings, Capacitors, etc. Features Input Line Regulation ±10%.

OC Series

Input	115V, 50/60 Hz, 2 Amps, Single Phase (220V also available)	
Output	Model OC-60A	0-60 kV rms @ 2 KVA
	Model OC-90A	0-90 kV rms @ 2 KVA
	Model OC-51M*	0-50 kV rms @ 2 KVA

*Manual Rate of Rise Adjustment.

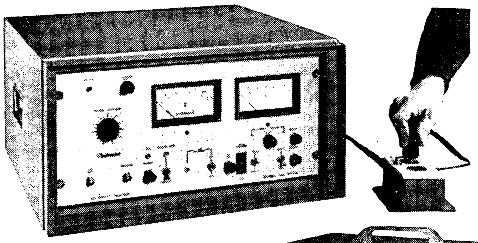
TC Series — ASTM Test Cells

Test Cell Model	TC/DE	TC/VDE	TC/CE90*
Specification tested to	D-877	D-1816	D-877 D-1816

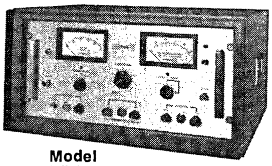
*Includes Oil Circulator VDE

For more information request **BROCHURE HP7106.**

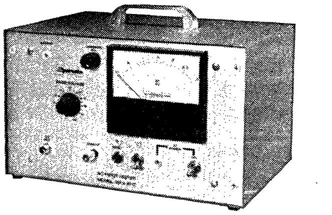
AC/DC HIPOT (INSULATION) TESTERS (completely automatic units available)



Model TT-3



Model HD115



Model HA3-AT

Non-Destructive Units for measurements of Leakage Current, Resistance, Dielectric Strength and Corona Discharge. Applications include hipot testing transformers, motors, cables, insulation material, electrical appliances, electronic assemblies, capacitors, etc.

300 Series — A Units — Two Megohm Range
B Units — Four Megohm Range

Model No.	H301A	H301B	H303A	H303B	H306A	H306B
Output AC	1.0 kV	1.0 kV	2.5 kV	2.5 kV	5.0 kV	5.0 kV
Output DC	1.5 kV	1.5 kV	3.0 kV	3.0 kV	6.0 kV	6.0 kV

100 Series — Voltage & Current Readout

Model No.	HD103	HD106	HD115	HD125	HD140
Output AC	2.5 kV	5.0 kV	12.0 kV	10.0 kV	15.0 kV
Output DC	3.0 kV	6.0 kV	15.0 kV	25.0 kV	40.0 kV

A-B Series — Simple Low Cost AC or DC Models

		AC			DC	
Model No.	HDA3	HDA5	HDA10	HDB4	HDB6	HDB12
Output	3 kV AC	5 kV AC	10 kV AC	4 kV DC	6 kV DC	12 kV DC

A-T Series — Electrical Appliance Testing to UL Standards

Model No.	A1-AT-C	HA3-AT, HA3-AT-C, HA3-AT-CT	HA5-AT	HDB4-AT
Output	1200 VAC	0-3000 VAC	0-5000 VAC	0-4000 VDC

TT-3 Model — Tool & Appliance Tester

Designed for unskilled or semi skilled personnel on a go/no-go basis in testing of electrical tools and appliances. Unit performs three major functions:

1. Test for Wire Continuity
2. AC Hipot Testing
3. Run Test Sample at 115V/220V — 3 Amps

For more information request **BROCHURE HP7107**

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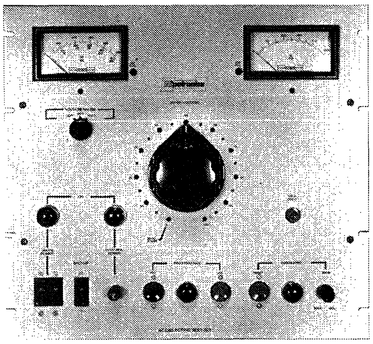
Hipotronics

AC Dielectric Test Set (controls)



HIGH VOLTAGE DIELECTRIC INSULATION TEST EQUIPMENT

AC dielectric test sets.
Standard Models with output ranges from 0.5 to 500 KVA for testing to UL, CSA, MIL, ASTM, AEIC, ICEA and other international specifications:

NOTE:
Hipotronics Series Resonant Test Sets are available for Capacitive Loads above 500 KVA (Brochure HP 7109).

No. of Models	Power Rating (KVA)*	AC Volt Range (KV)
8	0.5	1-30
8	1	1-30
9	2	1-50
11	5	1-100
13	10	1-150
15	20	1-200
16	40	1-300
17	60	1-350
20	100	1-400
21	150	1-500
22	200	1-600
23	250	1-750
23	300	1-750
23	400	1-750
23	500	1-750

* Higher KVA Ratings Available

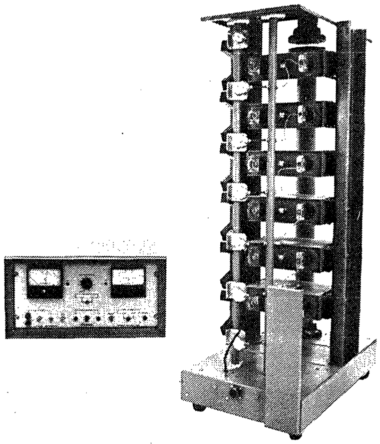
For more information request
BROCHURE HP7108

IMPULSE GENERATORS

Impulse Systems simulate Lightning or Transient Voltage Phenomena associated with power Distribution.

Standard Systems available in 100 kV and 200 kV stages and can be purchased and designed to be expandable to cover future Test Requirements.

Hipotronics Impulse Systems Provide flexibility. Generators are expandable in terms of energy and voltage to cover future test requirements. Due to the modular design and highly efficient Marx circuit each generator may be used for a variety of test applications including high current or high voltage requirements. Stage capacitors on 200 kV per stage units are manufactured in insulating cases which provides minimum inductance.



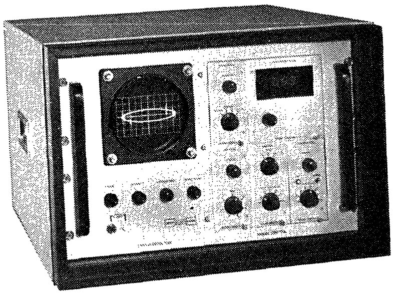
Impulse Generator System — IG 300-1.125

Generators can be built for both Indoor Operation or Outdoor/Indoor Operation.

Accessories Include:
Oscilloscope with camera, Peak Reading Voltmeter, Voltage Dividers, Phase Firing Controls, Electric Chop Gaps, Air Lift Pads, Automatic Polarity Reversal and Auxiliary Wave-Shaping Resistors.

For more information request
BROCHURE HP7201

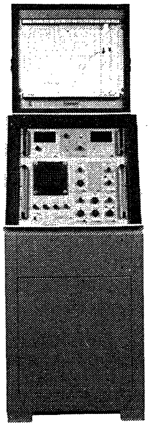
CORONA DETECTORS



Model CDO-77A:
System includes Horizontal Amplifier, Vertical Amplifier, Pre-Amp Amplifier and Calibrator, and Discharge Meter.

For more information request
BROCHURE HP7110

Modular Corona Detection System designed to user's specifications. Components for basic systems include: Calibrators, Horizontal Controls, Vertical Controls, Pre-Amp Controls, Accessory Racks, Fully Independent Power Supplies, KV Meters, Discharge Meters, X-Y Plotter and Electronic Window. System never becomes obsolete. As new technology becomes available we'll incorporate it into new modules, so you buy another module and not a complete new system.



Model CDO-77A3:
Similar to CDO-77A unit, the CDO-77A3 includes X-Y Plottor, KV Meter, Discharge Meter and Electronic Window Circuit.

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EEM PRODUCT SELECTION GUIDES

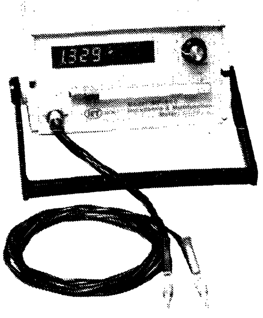
Use the EEM Product Selection Guides. There are 34 Guides in this edition of EEM. See page 2 (A•2, B•2, C•2, D•2) of each volume to locate the Product Selection Guides that pertain to your needs.

IET LABS, INC.

DEPT. EM, 534 MAIN STREET, WESTBURY, NY 11590, (516) 334-5959

MODEL IMF-600 DIGITAL IMPEDANCE AND MULTIFUNCTION METER

COMBINES MOST OF THE COMMONLY NEEDED LABORATORY MEASUREMENTS



- VOLTAGE (DC OR RMS) • CURRENT (DC OR RMS) • RESISTANCE • CAPACITANCE • INDUCTANCE • CONDUCTANCE • DISSIPATION FOR CAPACITORS • 1/Q FOR INDUCTORS • FREQUENCY & EVENT COUNTER

AUTOMATIC MEASUREMENT
Measurement for all functions is provided automatically in a 3½ digit display. At 4 measurements per second — no balancing or manual operations are required.

HIGH ACCURACY
The basic impedance accuracy is 0.25%; for multimeter functions, basic accuracy is 0.1%.

DISSIPATION FOR CAPACITORS & 1/Q FOR INDUCTORS
Capacitors and inductors are easy to classify in two dimensions. Dissipation is important in selection of low loss capacitors, especially for low power and critical designs.

WIDE RANGE
The full spectrum capability covers virtually all likely applications.

BATTERY OPERATION
The internal rechargeable battery option allows field operation away from the bench. A built in battery voltage monitor prevents erroneous measurements.

CRYSTAL CONTROLLED PERFORMANCE
1 kHz test frequency insures wide temperature range accuracy. (10 kHz optional).

PROTECTED CIRCUITRY
The IMF-600 will handle charged capacitors and active powered circuits on all functions.

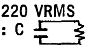
ANALOG & DIGITAL OUTPUTS
Analog and optional digital outputs may be used to interface to comparator or other devices.

4-TERMINAL SHIELDED KELVIN TEST TERMINALS
Insures precision measurements even for very low impedances like contact or wire resistance, as well as high impedances.

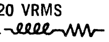
COMPANION COMPARATOR UNIT
The Model LC-603 Digital Limits Comparator can test or select any component or function within upper and lower limits, and may be cascaded for D or (1/Q) sequential checking. The combination becomes an economical GO/NO GO test or selection system.

SPECIFICATIONS

CAPACITANCE (C)

Number of ranges: 7
Full scale ranges: 200.0 pF to 200.0 μF; up to 20,000 μF may be measured using the inductance function
Accuracy: ±(0.25% +1 LSD + 1% of G reading in absolute digit counts on same range)
Bias: Up to 100 VDC may be applied in series with unknown impedance
Test voltage: 1.4 VRMS on Ranges 1-6; 0.14 VRMS on Range 7
Input protection: 220 VRMS
Impedance model: C  G

INDUCTANCE (L)

Number of ranges: 7
Full scale ranges: 200.0 μH to 200.0 H
Accuracy: ±(0.25% +1 LSD + 1% of R reading in absolute digit counts on same range)
Test current: 110 mA on Range 1; 11 mA on Ranges 2-3; 1.1 mA on Range 4; 110 μA on Range 5; 11 μA on Range 6; 1.1 μA on Range 7
Input protection: 220 VRMS
Impedance model: L R

RESISTANCE (R)

Type of measurement: 1 kHz AC resistance
Number of ranges: 7
Full scale ranges: 2.000Ω to 2000 kΩ; up to 1000 MΩ may be measured using the conductance function
Accuracy: ±(0.25% +1 LSD +1% of L reading in absolute digit counts on same range)
Test current: Same as inductance
Input protection: 220 VRMS
Impedance model: See INDUCTANCE

CONDUCTANCE (G)

Type of measurement: 1 kHz AC conductance
Number of ranges: 7
Full scale ranges: 2.000 μS to 2000 mS (S = 1/Ω)
Accuracy: ±(0.25% +1 LSD +1% of C reading in absolute digit counts on the same range)
Test voltage: Same as capacitance
Input protection: 220 VRMS
Impedance model: See CAPACITANCE

DISSIPATION (D OR 1/Q)

Type of measurement: $D = G/2\pi fC$ (see impedance model); $D = 1/Q = R/2\pi fL$ (see impedance model)
Full scale range: 2.000; higher values may be computed from readings
Accuracy: ±(1% + 2 LSD) for C or L > 500 counts; 1% + 4 LSD for C or L 200-500 counts

DC VOLTAGE (V DC)

Number of ranges: 5
Full scale ranges: 200.0 mV to 1000 V
Accuracy: ±(0.1% +1 LSD)
Input impedance: 10 MΩ
Maximum input: 1000 V peak; common mode voltage (low terminal to ground): 500 V peak

DC CURRENT (I DC)

Number of ranges: 5
Full scale ranges: 200.0 μA to 2000 mA
Accuracy: ±(0.2% + 1 LSD)
Burden voltage: 0.3V maximum on Ranges 1-5; 1.4V maximum on Range 5
Maximum input: 2A fuse and diode network protected

TRUE RMS VOLTAGE (V TRMS), AC COUPLED

Number of ranges: 5
Full scale ranges: 2.000 mV to 750V
Accuracy: ±(% of reading + number of least significant digits)

FREQ	50-100 Hz	100-500 Hz	500 Hz-1 kHz	1-10 kHz	10-20 kHz
200.0mV	0.5%+2	0.5%+2	0.5%+2	0.5%+2	1%+2
2.000V	1%+2	0.5%+2	0.5%+2	0.5%+2	1%+2
20.00V	1%+2	0.5%+2	0.5%+2	1%+2	1%+2
200.0V	1%+2	1%+2	2%+2	not specified	
750V	1%+2	2%+2	not specified		

Input impedance: 10 MΩ
Maximum input: Same as DC VOLTAGE

TRUE RMS CURRENT (I TRMS), AC COUPLED

Number of ranges: 5
Full scale ranges: 200.0 μA to 2000 mA
Accuracy: ±(% of reading + number of least significant digits)

FREQ	50-100 Hz	100-500 Hz	500 Hz-1 kHz	1-10 kHz	10-20 kHz
200.0μA	0.5%+2	0.5%+2	0.5%+2	1%+2	2%+2
2.000mA	0.5%+2	0.5%+2	0.5%+2	1%+2	2%+2
20.00mA	1%+2	1%+2	1%+2	2%+2	2%+2
200.0mA	1%+2	1%+2	1%+2	2%+2	2%+2
2000 mA	2%+2	2%+2	2%+2	3%+2	3%+2

Burden voltage: Same as DC CURRENT
Maximum input: Same as DC CURRENT

FREQUENCY (F)-MODEL IMF-600F

Display: Overrange will be indicated when the frequency option is not present.
Number of ranges: 6
Range: 100.0 Hz to 15.00 MHz; 30.0 Hz to 17.00 MHz typical
Resolution: 3½ digits, may be extended to one additional least significant digit by downranging. This does not apply to Range 1 (200.0 Hz)
Gate time: 10 seconds for 200.0 Hz range; 1 second for 2.000 kHz range; 0.1 second for 20.00 kHz range; 10 ms for 200.0 kHz range; 1 ms for 2.000 MHz range; 0.1 ms for 20.00 MHz range
Sampling period: 20 seconds for 200.0 Hz range; 2 seconds for 2.000 kHz range; 0.25 seconds for all other ranges
Impedance: > 1 Megohm, diode protected.
Coupling: AC
Sine wave sensitivity: 3 VRMS at 30 Hz; 1 VRMS at 100 Hz; 0.3 VRMS for 1 KHz-15 MHz
Maximum input: 100V peak 30 Hz-1 kHz; 75V peak 1 kHz-10 MHz; 50V peak to 10 MHz-15 MHz
Time base: 1 MHz crystal oscillator

EVENT COUNTER (FEC)-MODEL IMF-600FEC

Event count displayed: 1 to 100.0 x 10^6 events
Coupling: AC or DC (for low frequency inputs)

TEST CONDITIONS

Performance specifications apply
1) after correction for test lead zero readiing 2) after 10 minute warmup 3) between 15-35°C

GENERAL SPECIFICATIONS

Test frequency: 1 kHz for impedance functions
Reading rate: 4 measurements per second
Display: 3½ digit 0.5″ (1.2 cm) LED, with corresponding annunciator showing units; all decimal points on indicate overrange or illegal condition
Analog outputs: L, R, C, or G scaled at 0.1V/1000 counts; output impedance: 900 ohms
Digital output: BCD parallel output representing 3½ digit reading for any quantity
Test terminals: 4-terminal shielded Kelvin test leads, 50 inches (127 cm) long
Operating controls: Push button ON-OFF and function select switches; rotary range select switch
Power requirements: 105-125V or 210-250V; 50-60 Hz; 5W
Battery operation (optional): NiCd rechargeable batteries; up to 8 hours operation; low battery warning indicator and automatic shutoff
Dimensions: 8.5″W x 9.25″D x 4.44″H (22 cm x 24 cm x 12 cm)
Weight: 6 lbs. (2.7 kg) nominal

ORDERING INFORMATION:

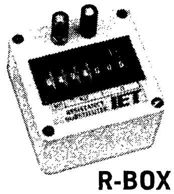
Model IMF-600 Impedance & Multifunction Meter	$989
—F Option (Frequency Measurement)	199
—FEC Option (Frequency Measurement & Event Counter)	279
—DO Option (Digital Output)	169
—HSC Option (High Sensitivity 20.00 pF)	89
—HSL Option (High Sensitivity 20.00 μH)	89
—B Option (Rechargeable Battery Pack)	399
Model LC-603 Single Channel Digital Limits Comparator	429
(Requires DO option. May be cascaded)	
—10 kHz Option	Consult IET

IET DESIGNS & MANUFACTURES TO MIL-SPEC & COMMERCIAL CUSTOM REQUIREMENTS

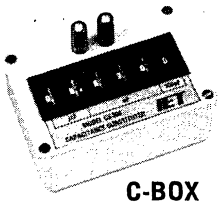
IET LABS, INC.

DEPT. EM, 534 MAIN STREET, WESTBURY, NY 11590, (516) 334-5959

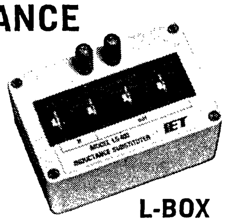
DIGITAL DECADE SUBSTITUTERS FOR: RESISTANCE • CAPACITANCE • INDUCTANCE



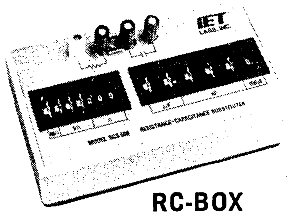
R-BOX
RS Series
Digital Resistance Substituter
.01Ω to
999.9999999 MΩ



C-BOX
CS Series
Digital Capacitance Substituter
1 pF to
99.999999 μF



L-BOX
LS Series
Digital Inductance Substituter
10 μH to
99.99999 H



RC-BOX
RCS Series
Digital Resistance Capacitance Substituter

- **DIRECT READING — NO FUMBLING WITH MULTIPLE SLIDE OR ROTARY SWITCHES**
- **WIDE RANGE**
- **ACCURATE**
- **COMPACT, CONVENIENT, AND RUGGED**
- **STANDARD AND CUSTOM MODELS**
- **ERROR PROOF**
- **COLOR CODED**
- **OPTIONS:**
  - Shielded case with grounding post
  - Panel mounting
  - Low residual impedance switch
  - Protection fuse
  - Programmable

STANDARD MODELS — SPECIFICATIONS

MODEL	RS-200	RS-201	RS-200W	RS-201W	CS-300	CS-301	RCS-500	RCS-502	LS-400	LS-400A
TYPE OF SUBSTITUTER	Resistance	Precision Resistance	Wide Range Resistance	Wide Range Precision Resistance	Capacitance	Precision Capacitance	Resistance-Capacitance	Precision Resistance-Capacitance	Wide Range Inductance	Inductance
ACCURACY	1%	0.1%	1%	0.1%	4%	1%	Combines the RS-200 and CS-300	Combines the RS-201 and CS-301	1.5% max, 1% typical	
DECADES	7		9		6				4	3
RANGE	1-9,999,999Ω		0.1-99,999,999.9Ω		100 pF — 99.9999 μF				1 mH-9.999 H	1 mH-999 mH
TYPE OF COMPONENTS	Metal Film Resistors (0.1-0.9Ω Wirewound Resistors)				100-900 pF: Mica .001-.009 μF: Polystyrene .01-0.9 μF: Polycarbonate 1-9 μF: Polyester 10-90 μF: Polarized Tantalum				Toroidal Inductors	
RATING	0.5 watt**				100 volts (20V 10-100 μF)				See table below	
RESIDUAL* IMPEDANCE	0.3Ω (.04Ω/decade)*, typ		0.4Ω (.04Ω/decade)*, typ		30 pF (5 pF/decade)*, typ				0.2Ω (.04Ω/decade)*, typ	
PHYSICAL	3.2x3.1x2.2 in, 6.5 oz (8.1x7.9x5.6 cm, 184 g)		4.7x3.1x2.2 in, 8.3 oz (12x7.9x5.6 cm, 235 g)		4.7x3.1x2.2 in, 8.3 oz (12x7.9x5.6 cm, 235 g)		7.4x4.3x2.4 in, 14 oz (18.8x11x6 cm, 410 g)		4.7x3.1x2.2 in, 8 oz (12x7.9x5.6 cm, 230 g)	
PRICE	$119.00	$239.00	$199.00	$419.00	$129.00	$259.00	$239.00	$479.00	$479.00	$359.00

* Residual switch impedance may vary up to 8% with setting.

Residual impedance is reduced to .04Ω or 5 pF for lowest decade with LR Option. This makes for more effective usage of low impedances. Lowest decade is isolated from the others with a switch when desired.

Residual impedance is reduced for all settings with programmable versions.

** Higher power resistance substituters (1 watt or higher) available. Consult IET.

ADDITIONAL INFORMATION FOR INDUCTANCE SUBSTITUTERS

INDUCTANCE	FREQUENCY RANGE	MAX. Q	RATING
0.1-0.9 mH	300 Hz-2 MHz	100 at 800 kHz	700 mA
1-9 mH	300 Hz-1 MHz	80 at 40 kHz	500 mA
10-90 mH	300 Hz-800 kHz	80 at 40 kHz	300 mA
0.1-0.9 H	300 Hz-200 kHz	40 at 20 kHz	100 mA
1-9 H	200 Hz-20 kHz	30 at 8 kHz	20 mA
10-90 H	200 Hz-6 kHz	60 at 2 kHz	4 mA

CUSTOM MODELS

IET can supply your choice of substituter in any number of decades with or without case in various tolerances. Generate a part number to meet your requirements from the table below. Consult IET for price.

RS — F — 4 — 0.1 — WC — __ (0.1-999.9Ω, 1%, Resistance Substituter in a case)

TYPE OF SUBSTITUTER
RS Resistance
CS Capacitance
LS Inductance

TOLERANCE
X .01%
A .05%
B 0.1%
C 0.5%
F 1%
G 2%
H 4%

NO. OF DECADES
1 to 10

IMPEDANCE PER STEP FOR LOWEST DECADE
.01Ω to 100 MΩ
1 pF to 10 μF
10 μH to 10H

PACKAGING
WC Packaged in a standard case with binding posts
PM Supplied without case for panel mounting or other use

RATING
Nil Standard rating
Other Specify

OPTIONS

LR Option: Residual Impedance is reduced to .04Ω or 5 pF on lowest decade .... Add $49.00
SC Option: Shielded case with grounding terminal .... Add 43.00
FP Option: Unit supplied with series 2A fuse for added protection ...... Add 19.00 (User may substitute other fuses; residual impedance will increase by .06Ω for 2A fuse)
PM Option: Unit supplied without case for panel mounting .... Subtract $ 5.00
LP Option: Unit supplied with low profile binding posts .... Add 4.00
Model CC-25 Lead Clip: Plugs into dual binding posts for convenient lead connections .... Add 8.00
Programmable Option: .... See next page

IET CAN SUPPLY THE ENCLOSURES IN WHICH ITS SUBSTITUTERS ARE PACKAGED

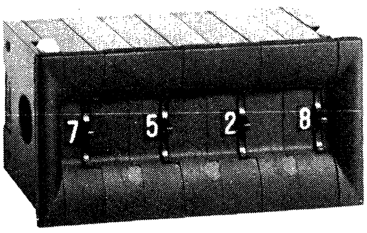
IET DESIGNS & MANUFACTURES TO MIL-SPEC & COMMERCIAL CUSTOM REQUIREMENTS

IET LABS, INC.

DEPT. EM, 534 MAIN STREET, WESTBURY, NY 11590, (516) 334-5959

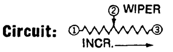
DP-500 SERIES DIGITAL POTENTIOMETER

PRECISION DIGITAL REPLACEMENT FOR ORDINARY POTENTIOMETERS



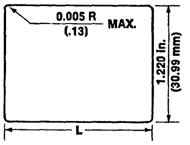
- UPDATE INSTRUMENTS WITH DIGIPOT FOR TRULY DIGITAL CONTROL
- ELIMINATES THE NEED FOR DIALS & MULTITURN POTENTIOMETERS
- PRECISE REPEATABILITY OF SETTING
- TRUE POTENTIOMETER CIRCUIT
- UNLIMITED CHOICE OF RESISTANCE VALUES
- IN-LINE DIGITAL READOUT
- CONVENIENT (SNAP IN) PANEL MOUNTING WITH BEZEL
- 1, 2, 3, 4, 5, AND 6 DECADE UNITS ARE AVAILABLE
- SUITABLE FOR USE IN VOLTAGE AND CURRENT DIVIDERS

GENERAL SPECIFICATIONS

Equivalent Circuit: 

Tolerance: 0.05%, 0.01%, or 1%; other tolerances available on request.
Total Resistance: 1Ω to 50 MΩ as in table below; other resistances available on request.
Number of Decades: 1, 2, 3, 4, 5, or 6.
Minimum Potentiometer Resistance: 0.04Ω/decade.
Power Across Input Terminals: 2 watts/decade min.; others available on request.
Temperature Coefficient: 50 ppm/°C; others available on request.
Operating Temperature: −25°C to +90°C:

PANEL CUT DIMENSIONS



(FOR PANEL MOUNTING)

STD. PANEL THICKNESS
0.125 ±0.010 in.
(3.17 ±0.254 mm)

No. of Decades	L (±0.002 in., ±0.051 mm)
1	.649 in. (16.48 mm)
2	1.283 in. (32.59 mm)
3	1.917 in. (48.69 mm)
4	2.551 in. (64.80 mm)
5	3.185 in. (80.90 mm)
6	3.800 in. (96.50 mm)

SPACE REQUIRED BEHIND PANEL: 2 in. (51 mm)

ORDERING INFORMATION:

IET can supply any resistance value in a number of tolerances and decades. A part number is determined as follows:

DP500 — B — 50k — 5 — PM

TOLERANCE

A	0.05%
B	0.1%
F	1%
Other on request	

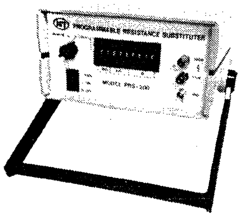
PACKAGING

PM	Supplied without case for panel mounting or other use.
WC	Packaged in a plastic case with binding posts. Size: 3.2 x 3.1 x 2.2 in. (81 x 79 x 56 mm) or 4.7 x 3.1 x 2.2 in. (120 x 79 x 56 mm)

Total Resistance (ohms)	No. of Decades 1	2	3	4	5	6
1, 2, 5	•					
10, 20, 50	•	•				
100, 200, 500	•	•	•			
1k, 2k, 5k	•	•	•	•		
10k, 20k, 50k	•	•	•	•	•	
100k, 200k, 500k	•	•	•	•	•	•
1M, 2M, 5M	•	•	•	•	•	•
10M, 20M, 50M	•	•	•	•	•	•
Other resistance values available on request.						

Decimal points available on request.

PROGRAMMABLE DECADE SUBSTITUTERS FOR: RESISTANCE • CAPACITANCE • INDUCTANCE



- HIGH RESOLUTION — UP TO 10 DECADES
- VIRTUALLY CONSTANT "ZERO" RESIDUAL IMPEDANCE
- MANUAL THUMBWHEEL OPERATION OR PROGRAMMABLE DIGITAL INPUT — PARALLEL BCD OR IEEE-488
- MERCURY WETTED RELAYS FOR LOW STABLE AND REPEATABLE "ZERO" RESIDUAL IMPEDANCE
- PROGRAMMABLE "OPEN CIRCUIT" AND "SHORT CIRCUIT" STATES

STANDARD MODELS — SPECIFICATIONS

MODEL	PRS-200	PRS-201	PRS-200W	PRS-201W	PCS-300	PCS-301	PLS-400	PLS-400A
TYPE OF SUBSTITUTER	Resistance	Precision Resistance	Wide Range Resistance	Wide Range Precision Resistance	Capacitance	Precision Capacitance	Wide Range Inductance	Inductance
ACCURACY	1%	0.1%	1%	0.1%	4%	1%	1.5% max, 1% typical	
DECADES	7		9		6		4	3
RANGE	1-9,999,999Ω		0.1-99,999,999.9Ω		100 pF — 99.9999 μF		1 mH-9.999 H	1 mH-999 mH
TYPE OF COMPONENTS	Metal Film Resistors (0.1-0.9Ω Wirewound Resistors)				100-900 pF: Mica .001-.009 μF: Polystyrene .01-0.9 μF: Polycarbonate 1-9 μF: Polyester 10-90 μF: Polarized Tantalum		Toroidal Inductors	
RATING*	0.5 watt*				100 volts (20V 10-100 μF)		See previous page	
RESIDUAL IMPEDANCE	600 mΩ typical, constant				30 pF typical, constant		200 mΩ typical, constant	

* Higher Rating available. Consult IET.

GENERAL SPECIFICATIONS

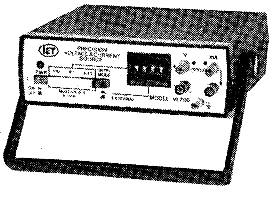
Switching Speed: Less than 4 ms

Digital Input: BCD Parallel TTL, positive true; IEEE-488 optional.

CUSTOM MODELS

IET can supply your choice of substituters in any number of decades with or without case in various tolerances and ratings. See Manual Substituter data sheet for range of choices (previous page).

MODEL VI-700 PRECISION MANUAL OR PROGRAMMABLE VOLTAGE AND CURRENT SOURCE



- VOLTAGE OUTPUT RANGE OF 100 μV to 20V
- CURRENT OUTPUT RANGE OF 0.1 μA to 20 mA
- 3½ DIGIT RESOLUTION
- HIGH ACCURACY AND LOW NOISE
- MANUAL THUMBWHEEL OPERATION OR PROGRAMMABLE DIGITAL INPUT — PARALLEL BCD OR IEEE-488 INTERFACE
- BATTERY OPERATION OPTIONAL
- SUITABLE FOR CALIBRATION — TESTING OF A/D-D/A CONVERTERS — GAIN & LINEARITY EVALUATION — WAVEFORM SYNTHESIS WITH DIGITAL INPUT

SPECIFICATIONS

VOLTAGE OUTPUT RANGES:	200 mV, 2V, 20V
VOLTAGE RESOLUTION:	100 uV, 1 mV, 10 mV
CURRENT OUTPUT RANGES:	200 μA, 2 mA, 20 mA
CURRENT RESOLUTION:	0.1 μA, 1 μA, 10 μA
MAX. OUTPUT CURRENT:	50 mA
ACCURACY:	0.0075% ±0.75 LSD (LSD is least significant digit; @ 25°C, nominal line voltage, no load after warm up)
NOISE AND RIPPLE:	50 μV peak (exclusive of random transients)
OUTPUT IMPEDANCE:	5 mΩ typical, 40 mΩ for 20V range
POWER REQUIREMENTS:	105-125V or 210-250V; 50-60 Hz; 5W
BATTERY OPERATION (Optional):	NiCd rechargeable batteries; up to 10 hours operation; low battery warning indicator and automatic shutoff
DIMENSIONS:	8.5" x 2.8"H x 9.0"D (7.1 x 12.6 x 22.9 cm)
WEIGHT:	5 lbs.

ORDERING INFORMATION:

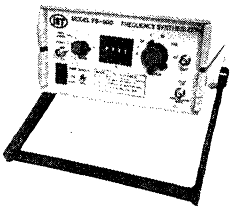
Model VI-700 Precision Voltage and Current Source	$445.00
—B Option (Rechargeable Battery Operation)	195.00
—BCD Option (Parallel BCD Remote Programming)	$ 95.00
—IEEE Option (IEEE-488 Remote Programming)	295.00

IET DESIGNS & MANUFACTURES TO MIL-SPEC & COMMERCIAL CUSTOM REQUIREMENTS

IET LABS, INC.

DEPT. EM, 534 MAIN STREET, WESTBURY, NY 11590, (516) 334-5959

MODEL FS-900 MANUAL OR PROGRAMMABLE FREQUENCY SYNTHESIZER



- WIDE RANGE .01 Hz-20 MHz
- HIGH ACCURACY AND STABILITY
- TRUE SQUARE WAVE 50% DUTY CYCLE OUTPUT
- USEABLE IN DIVIDER MODE AS HIGH STABILITY FREQUENCY DIVIDER OF INTERNAL TIME BASE OR USER'S TIME BASE
- PLL TECHNIQUE BASED ON STABLE 10 MHz CLOCK
- 4 DIGIT RESOLUTION
- MANUAL THUMBWHEEL OPERATION OR PROGRAMMABLE DIGITAL INPUT-PARALLEL BCD OR IEEE-488

SPECIFICATIONS

1. SYNTHESIZER MODE

Frequency output range: .01 Hz to 10 MHz (up to 20 MHz with non-square wave)
RANGES: 0.1 Hz, 1 Hz, 10 Hz, 100 Hz, and 10 kHz multiplied by a 1 to 9999 thumbwheel setting
Output waveform: TTL level, 50% duty cycle square wave
Rise time: 5 ns max.
Output current: Source: 15 mA, Sink: 24 mA
Time base: 10 MHz ±0.5 ppm, 20°-40°C
Waveform phase noise: Min. .01%: Typ: .05%; Max: 0.3%; defined as (period to period edge jitter/period) x 100

2. INTERNAL TIME BASE FREQUENCY DIVIDER MODE

Output frequency: 10 MHz/Front panel setting; setting range 1 to 10^9

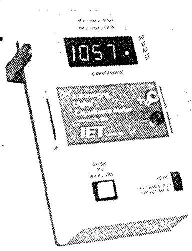
3. USER TIME BASE FREQUENCY DIVIDER MODE

Output frequency: Time base frequency/Front panel setting; setting range 1 to 10^9

ORDERING INFORMATION:

Model FS-900 Frequency Synthesizer	$895.00
—BCD Option (Parallel BCD Remote Programming)	95.00
—IEEE Option (IEEE 488 Remote Programming)	295.00

MODEL CM-500 PROFESSIONAL QUALITY AUTORANGING DIGITAL CAPACITANCE METER



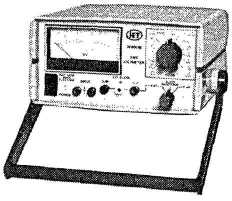
- AUTORANGING MISTAKE PROOF CAPACITANCE MEASUREMENT
- HIGH ACCURACY
- WIDE MEASUREMENT RANGE
- EASY TO READ
- CUTS TIME AND COSTS
- TROUBLE-FREE POWER SUPPLY
- CONVENIENT PORTABLE PACKAGING
- DIGITAL OUTPUT
- COMPANION COMPARATOR

Range:	9 ranges for measuring from 1 pF to 200,000 μF. The full scale value is automatically selected from one of the following to give maximum resolution: 2000 pF, 20.00 nF, 200.0 nF, 2.000 μF, 20.00 μF, 200.0 μF, 2000 μF, 20.00 mF, 200.0 mF.
Accuracy:	2000 pF to 20.00 μF scales: 0.1% ±1 LSD; 200.0 μF to 2000 μF scales: 0.8% ±1 LSD; 20.00 mF to 200.0 mF scales: 1.0% ±1 LSD; Temperature Range: 10°C to 40°C.
Reading Rate:	2000 pF to 200.0 μF scales: 0.25 sec./2000 μF to 20.00 mF scales: 0.8 sec./200.0 mF scale; 6.4 sec.
Test Parameters:	Determination of the time constant of the unknown capacitor and a known resistor. The maximum voltage is less than 3.2 volts.
Power Supply:	Battery Operation: 5 standard D cells. AC Adapter: IET Labs AC Adapter Model CM5001 (110 volts) or Model CM5002 (220 volts) may be used with or without the batteries in place.
Digital Output:	The range, the BCD capacitance value, the overrange signal, the sampling strobe signal, the power supply, and the system ground are available through a 26 pin header connector.
Input Protection:	The capacitance test terminals are shorted as long as the Measure Button is not depressed. During this time a charged capacitor will be automatically discharged. No fuse is required.
Physical:	Dimensions: 7.4″L x 4.33″W x 2.36″H. Weight: 31 oz. (batteries included). Test Terminals: Connector Strips, Component Clip, and Banana Plug-Alligator Clip Test Leads. Display: 0.5″ high, 3½ digit LED display with 4 LED scale indicators.

ORDERING INFORMATION:

Model CM-500 Autoranging Digital Capacitance Meter	$299.00
Model CC-25 Component Clip	8.00
Model TL-26 Alligator Clip Test Leads	5.00
Model CM-5001 100 Volt AC Adapter	15.00
Model CM-5002 220 Volt AC Adapter	$ 25.00
Model CLC-502 Capacitance Limits Comparator	429.00
Model CB-27 Connector Cable (for CM-500 BCD output)	16.00

MODEL MV-800 HIGH SENSITIVITY ANALOG RMS VOLTMETER



- TRUE RMS READING
- HIGH ACCURACY
- WIDE BANDWIDTH

- READS FROM −105 TO +53 dBm (30 μV-300V)
- SWITCHABLE AUDIO FILTER
- ACCEPTS VARIETY OF PLUG-IN FILTERS
- SEPARATE AC AND DC OUTPUTS
- RECHARGEABLE BATTERY OPERATION
- COMPACT, RUGGED CONSTRUCTION

ORDERING INFORMATION:

Model MV-800 Analog RMS Voltmeter	$625.00
Model A-810 Insulated Banana Plugs to Alligator Clips Coaxial Cable Test Leads	29.00
Model A-820 220 Volt Adapter	39.00
Model F-801 Hum Filter Module (Bandpass 800 Hz to 3 MHz)	76.00
Model F-802 "A" Weighted Noise Filter	99.00
Model F-803 Low Pass Filter (100 kHz cutoff)	76.00
Model F-804 Empty Filter Module Used to House Custom Filter	24.00

Consult factory for prices and availability of custom filter modules.

RMS Voltmeter Ranges:	30 μV, 100 μV, 300 μV, 1 mV, 3 mV, 10 mV, 30 mV, 100 mV, 300 mV, 1V, 3V, 10V, 30V, 100V, 300V; full scale; linear scales.					
dB Ranges:	−90 dB to +50 dB in 10 dB steps. 0 dB relative to 1 mW into 600Ω; log scale.					
Meter:	3.7 inches taut band, ruggedized.					
Scale Length:	3.2 inches mirrored, 2 color.					
Frequency Range:	5 Hz to 2 MHz.					
Accuracy and Frequency Response:	**dB Range**	**±3% Full Scale**	**±3 dB**	**dB Range**	**±3% Full Scale**	**±3 dB**
	−90	10-100 kHz	5-200 kHz	−10	10-200 kHz	5-1.7 MHz
	−80	10-100 kHz	5-600 kHz	0	10-900 kHz	5-2 MHz
	−70	10-100 kHz	5-800 kHz	+10	10-400 kHz	5-1 MHz
	−60	10-100 kHz	5-1 MHz	+20	10-4 kHz	5-2 MHz
	−50	10-600 kHz	5-1.5 MHz	+30	10-3 kHz	5-2 MHz
	−40	10-300 kHz	5-2.2 MHz	+40	10-500 Hz	5-2 MHz
	−30	10-800 kHz	5-1.7 MHz	+50	10-300 Hz	5-2 MHz
	−20	10-1.1 MHz	5-1.9 MHz			
	Above accuracy is over a temperature range of 18°-28°C, and a crest factor of 1-2; error increases by 1% at cost factor of 6.					
Filter Switch:	1. Flat: Flat response; no filter. 2. Audio: Provides a bandpass of 20 Hz and 20 kHz. Down 3 dB at 20 Hz and 20 kHz. Filter slope is 6 dB per octave; (see curve). 3. Ext.: Accesses an external plug-in filter per customer's requirements. (See listing of stock filter modules available).					
Input Impedance:	9 MΩ on all ranges.					
Maximum Continuous Input:	630V (AC peak + DC).					
Response Time:	Less than 3 seconds, worst case.					
Outputs:	1. Analog preamplifier output is provided on rear panel. 2. DC output is provided on rear panel; 0-1V DC proportional to meter deflection.					
Connectors:	Banana jacks (for maximum safety with a battery operated instrument).					
Power Supply:	Internal rechargeable batteries operate the unit for more than 20 hours continuously. Charger/adapter may be used to operate the unit while recharging.					
Size:	8.5 in. wide x 4.4 in. high x 9.2 in. deep (216 mm x 110 mm x 235 mm).					
Weight:	6 lbs. (2.7 kg).					
Accessories Supplied:	110 Volt AC Charger/Adapter, and Instruction Manual. Unit comes with carrying handle which serves as a tilt stand.					

All products are warranted for one year. Specifications and prices subject to change without notice.

IET DESIGNS & MANUFACTURES TO MIL-SPEC & COMMERCIAL CUSTOM REQUIREMENTS

im

The Instrument Mart

295 Community Drive, Great Neck, New York 11021

FLUKE

Digital Multimeters, Frequency Counters, Digital Thermometers

BK PRECISION DYNASCAN CORPORATION

Digital Multimeters, Oscilloscopes, Power Supplies, Function Generators, Video and Audio Test equipment, DMM's, **Authorized Factory Service**

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COMMITTED TO EXCELLENCE

Video Test Equipment Including NTSC and PAL Vector scopes, Waveform Monitors, Picture Monitors, Sync Generators

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Oscilloscopes, Video Test Equipment, **Authorized Factory Service**

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IWATSU

Oscilloscopes, scope calibrators, logic analyzers

GRALEX

Digital Panel Meters

Panasonic

Audio Test Equipment, Logic Analyzers, High Frequency & Storage Oscilloscopes

Polaroid

Cameras for Oscilloscopes and CRT Terminals

VIZ

Power Supplies, DMM's VOM's, AC Line Transformers, Frequency Counters

LEADER Instruments Corp.

Oscilloscopes, Video Test Equipment, Frequency Counters, Function Generators, Transistor Checkers, Audio Instrumentation, Oscilloscope Probes, LCR Bridges, Signal Generators, Frequency Synthesizers, Microwave Sweepers, DMM's, VOM's

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Hi-Reliability Laboratory Power Supplies

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VOM's, DMM's, Strip Chart Recorders, Analog & Digital Panel Meters, Insulation Testers, Function Generators

HAMEG

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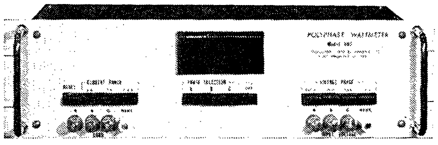
Powertron PRECISION AC POWER

POLYPHASE WATTMETER MODEL 600

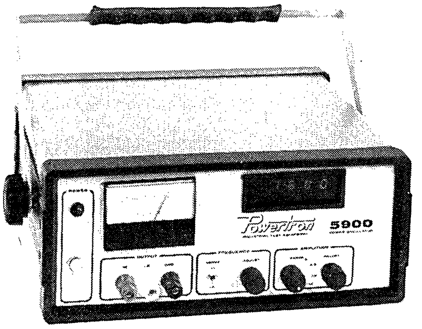
FEATURES

- 1ϕ, 2ϕ, and 3 power measurements
- DIRECT DIGITAL READOUT
- HIGH SENSITIVITY — NEGLIGIBLE INSTRUMENT LOSS
- WIDE FREQUENCY RANGE
- AUTOMATIC OVERLOAD PROTECTION
- ANALOG output — BCD output (optional)



The Model 600 is A TRUE THREE — WATTMETER instrument capable of measuring 3 independent loads simultaneously. As such, its operation is not limited to balanced 3ϕ loads, and may be used readily with wye or delta type loads. Front panel switches select the appropriate load or loads to be measured. Applications include laboratory and production testing of synchros, servo motors, 3ϕ motors, and other 1ϕ, 2ϕ, and 3ϕ devices.

MODEL 5900



The Model 5900 is a high power general purpose audio generator.

The circuit consists of a low distortion oscillator, a driver amplifier, and a bipolar class AB1 power amplifier with an output transformer.

The output transformer has three taps to allow utilization of the full power over a wide range of voltages.

A frequency counter and output voltmeter are built in.

Electronic overload protection is provided that limits the power into a short circuit to a safe value.

SPECIFICATIONS

Output: Low Range .... 0 to 8.5 V @ 8.2 A
Middle range .... 0 to 38 V @ 1.8 A
High range .... 0 to 130 V @ .53 A

Power: Max. .... 70 VA
Continuous .... 50 VA

Frequency: Low range .... 45 to 2 KHz
High range .... 2 K to 19.99 KHz
Also available with fixed frequency output.

Distortion .... 0.3% typ.

Power requirements .... 120 V 50 to 400 Hz

Dimensions (inches) .... 12¼ x 5¼ x 12½

Weight .... 23 lbs.

INDUSTRIAL TEST EQUIPMENT CO., INC.
21 Yennicock Avenue, Port Washington, NY 11050 • (516) 883-1700

Information Transfer Industrial, Inc.

"The Switching Company"

MATCHMAKER

A microprocessor-based system that locates, identifies, displays and records a complete list of wiring errors in backplanes, printed circuit boards, wire harnesses, cables, switch and relay assemblies.

Benefit by Owning an ITI MATCHMAKER

LOW INITIAL COSTS — Three models and four basic sizes to chose from. Buy only what you need now. Expand with simple plug-in modules.

CUT TEST COSTS — Perform high-speed testing of thousands of wiring paths in only seconds. Locate shorts, opens and miswires without the expense of hand buzzing. Generate printed data identifying fault and location.

EASY SETUP — MatchMaker runs a self-diagnostic to give the user assurance that it is ready to run reliable tests. Attach a good sample to the MatchMaker and it programs itself. Test programs are stored on disks for permanent use. MatchMaker can store more than one program on a single disk.

EASY OPERATION — Just call up the data file required and start the test. No special skills required. Edit and change programs by simply following the menu displayed on the CRT. User translator converts test points to user's identification; i.e., connector and pin number . . . etc.

OPTIONAL CONVENIENCES — A thermal printer provides hard copy identifying fault and location. A second disk drive frees the first disk from formatting requirements and provides a means for copying existing programs.

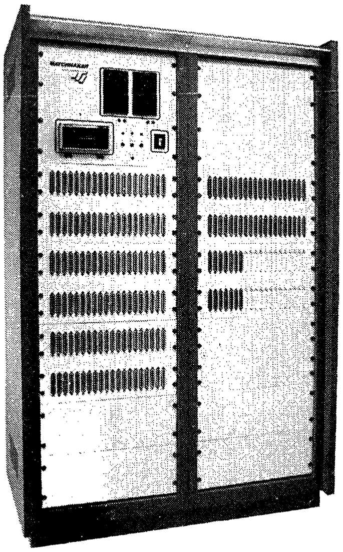
Pre-completion Screening for Cost Savings

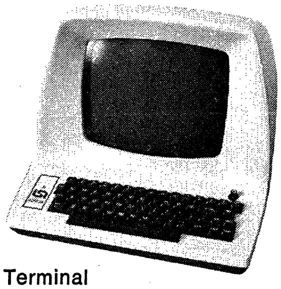
BACKPLANES — Correct backplane mistakes before they get into final assemblies. The MatchMaker will find and identify errors that can be repaired inexpensively by production people before they reach check-out.

SUB-ASSEMBLIES — The MatchMaker will prescreen all types of wire or printed sub-assemblies. Testing and repairs are less expensive when performed at this phase of the production cycle.

BARE PRINTED CIRCUIT BOARDS — Before components are inserted into a printed circuit card, be sure that card is free of defects. The MatchMaker checks the board for shorts or opens.

PRINTED CIRCUIT BOARDS WITH COMPONENTS — Sixty percent (60%) of printed circuit board failures are caused by process faults. Among those faults are poor solder flow and solder bridges. The MatchMaker tests loaded PCB's and locates those faults in seconds at the production level. This frees up your functional tester to do the job it was intended to do.


MATCHMAKER 16K
(Equipped with 8700 points)


CRT Terminal

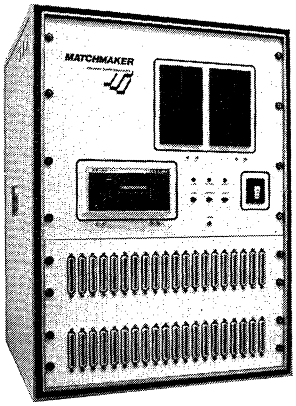
Three Models Available

Each of the four expandable sizes is available in three models:

1) Model M-550: For wires and bare PCB's only. The fastest MatchMaker in the series (9 volt test) is designed to locate, identify and report all shorts, opens and miswires in cables, harnesses, backplanes, and bare PCB's.

2) Model M-560: Does all that Model M-550 does plus having advantage of speed compensation for capacitive components and up to eight threshold levels of resistance measurements. At 9 volts, it tests cables, harnesses, backplanes and PCB's containing passive components while compensating for R.C. networks as well as for testing resistive networks and terminating resistors.

3) Model M-570: A low-voltage test system combining the advantages of the M-560 with 250 mV measurements. The lower voltage makes it suitable for testing PCB's populated with active components for shorts, opens and faulty resistive networks and terminators without damaging IC's.



MATCHMAKER 2K
(Equipped with 2000 points)

Expandable Systems

ITI makes the right system for your requirement. You purchase only what you need now. Select from a family of instruments to meet your ultimate size requirement. Then, implement it only for today's needs. Expand it as required with simple plug-in modules. The four systems which are all expandable in 100-point increments are:

2K	Minimum 100 test points. Maximum 2000 test points.
4K	Minimum 100 test points. Maximum 4000 test points.
8K	Minimum 100 test points. Maximum 8000 test points.
16K	Minimum 100 test points. Maximum 16,000 test points.

Standard Configuration

- Wired for Maximum Size
- Powered for Maximum Expansion
- Software Provided for Maximum Size
- CRT Terminal
- Flexible Disk for Permanent Storage
- Complete Diagnostics on Disk
- Self-Contained Operating Software
- Self-Learning Capability
- Multiprogramming Capability
- Interface for Other Peripherals

Information Transfer Industrial, Inc.
"The Switching Company"
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Information Transfer Industrial, Inc.

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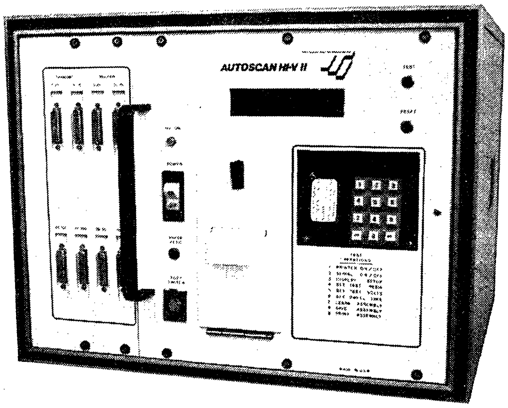


AUTOSCAN HI-V II

A smart, simple, low cost Hi-Pot cable tester that reports opens, shorts and miswires.

LOW COST — Two models to choose from.

CUT TEST COSTS — Perform high speed testing of wiring paths in only seconds. Locates shorts, opens and miswires without the expense of hand buzzing. Generate printed data identifying fault and location.

EASY SETUP — Attach a good assembly to the AutoScan Hi-V II and it programs itself. Store AutoScan HI-V II test programs in a memory module for permanent use. Store more than one test program in the memory module.

EASY OPERATION — Call up the data file required from the memory module and start the test. Change test parameters at any time by following the menu on the front panel.

Features

- Learns known good assembly
- Store up to six different assemblies, along with their individually set test parameters, on one memory module
- Selectable Hi-Pot Voltage
- Selectable Hi-Pot Dwell Time
- Selectable Continuity Resistance Threshold
- Selectable insulation breakdown threshold
- 20 character display

AUTOTRAK II

A fast, simple, low-cost way to test backplanes, wiring harnesses, cable assemblies, switch and relay assemblies and bare PC boards.

LOW INITIAL COST — Designed for the user with 2000 points or less to test. Start with as few points as needed and expand in 50-point increments with plug-in switch cards.

CONTINUED COST SAVINGS — Special algorithm allows AutoTrak II to test thousands of points in seconds. Multi-tests can be combined in one file for testing switch and relay paths without reloading test programs.

SIMPLE SETUP — Attach a known good sample to the AutoTrak II; it's as simple as that. The AutoTrak II writes its own program at the push of a button. Want a permanent copy of the program? Push another button and the program is stored on a tape cassette for future use.

SIMPLE OPERATION — Press another button and the test begins. Want to make a change? Don't call a Computer Programmer. Just press another button and enter the change. Operation of the AutoTrak II is that simple.

Standard Configurations

AutoTrak II wire for 1000 points

Expander wired for 1000 points

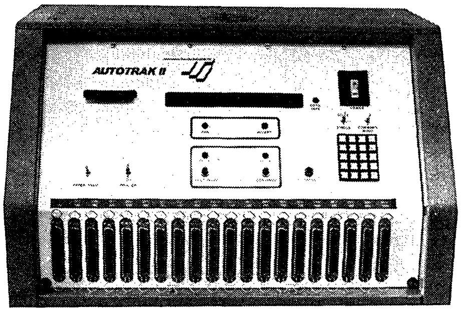
Powered for maximum expansion

Software provided for maximum expansion

Test Probe

Operation and Maintenance Manual

OPTIONAL CONVENIENCES — A thermal printer provides hard copy identifying fault and location. A new low-cost tape cassette machine is available for recording and reloading programs to and from the AutoTrak II. An optional foot switch makes "hand-free" operation possible.



Features

- 500 Points per Second Test Time
- Expandable to 2,000 Points
- Self Programmed Storage with optional tape cassette machine
- Simplified Program Edit Capability
- Self Diagnosis

Information Transfer Industrial, Inc.
"The Switching Company"
P.O. Box 357 • Holcomb, NY 14469 • (716) 657-7074

MINIGLOSSARIES
FORMULAS • CHARTS
PRODUCT SELECTION GUIDES
FORMS
CODES
TECHNICAL INFORMATION

WHERE TO FIND THEM IN THE 85/86 EDITION OF EEM

Abbreviations/Acronyms .... **A**•1166, **B**•1012, **C**•1028, **D**•1016
ASCII Code .... **D**•1087
Batteries, Product Selection Guide .... **D**•1413
Batteries & Fuel Cells, Characteristics .... **D**•1430
Cabinets, Enclosures, Racks, & Chassis, Product Selection Guide .... **C**•1003
Capacitors, Basic Formulas .... **A**•1093
Capacitors, Miniglossary .... **A**•1066
Capacitors, Product Selection Guide .... **A**•1003
Circuit Boards (Printed) Product Selection Guide .... **C**•1099
Coils, Chokes, Inductors, Product Selection Guide .... **A**•1205
Conductors, Maximum Current Capacity of Copper & Aluminum .... **C**•1863
Connectors, Miniglossary .... **C**•1129
Connectors, Terminals, & Sockets, Product Selection Guide .... **C**•1105
Crystals, Oscillators, Crystal & Piezoelectric Filters, Product Selection Gude .... **A**•1309
Delay Lines, Product Selection Guide .... **A**•1459
Discrete Semiconductors, Product Selection Guide .... **A**•2067
Displays, Readouts, Lamps, & Lights, Product Selection Guide .... **B**•1015
EBCDIC Code .... **D**•1092
Encapsulation, Miniglossary .... **C**•1086
Fans, Blowers, Cooling Equipment, & Heat Exchangers, Product Selection Guide .. **C**•1623
Filters, Product Selection Guide .... **A**•1583
Instruments, Graphic Recording Product Selection Guide .... **D**•1401
Instruments, Panel Meters, Product Selection Guide .... **D**•1329
Instruments, Test & Measuring Product Selection Guide .... **D**•1175
Interconnection Systems, Product Selection Guide .... **C**•1699
Keyboards & Keypads, Product Selection Guide .... **B**•1705
Logofinder & Trademark Directories .... **B**•901
Microwave Components, Product Selection Guide .... **A**•1701
Military Qualified Products Lists .... **B**•1003
Motors, Drives, & Rotating Components, Product Selection Guide .... **B**•1129
Opto Semiconductors, Miniglossary .... **B**•1214
Oscilloscopes, Product Selection Guide .... **D**•1385
Panel Hardware, Product Selection Guide .... **C**•1589
Potentiometers, Trimmers, Controls, & Rheostats, Product Selection Guide .... **A**•1991
Power Supplies, Miniglossary .... **D**•1462
Power Supplies, AC, Product Selection Guide .... **D**•1877
Power Supplies, DC, Product Selection Guide .... **D**•1447
Protective Components (Fuses, Circuit Breakers, etc.), Product Selection Guide .... **B**•1225
Relay Contact Forms .... **B**•1317
Relays, Electromechanical, Miniglossary .... **B**•1308
Relays, Product Selection Guide .... **B**•1261
Resistor Color Codes .... **A**•1828
Resistors, Product Selection Guide .... **A**•1785
Servo Components, Miniglossary .... **D**•1985
Solenoids, Product Selection Guide .... **B**•1463
Switches, Product Selection Guide .... **B**•1477
Thermal Components, Product Selection Guide .... **B**•1741
Thermal Conductivity of Dielectrics at Room Temperature .... **B**•1744
Thyristors/High Power Diodes, Miniglossary .... **A**•2076
Transducers & Encoders, Product Selection Guide .... **B**•1777
Transformers, Product Selection Guide .... **A**•2099
Wire & Cable, Product Selection Guide .... **C**•1743
Wire Gauges—Diameter, Area, Copper Weight .... **C**•1844

HV Test and Measurement Equipment

Jennings high voltage instruments allow direct measurement of the most important voltage parameters that apply to all AC wave-forms, whether sinusoidal, pulse, repetitive transient or combination signals. The instruments are small and highly portable and operate from line voltages. The instruments have proven to be very versatile in the number of applications including production processing for continuous monitoring of voltage withstand; used in laboratories for verification of design features; and troubleshooting for on-site installations.

Comprehensive data sheets on individual instruments are available upon request. In addition, demonstrations can be arranged in your plant.

Solid State AC Voltmeter Model J-1005

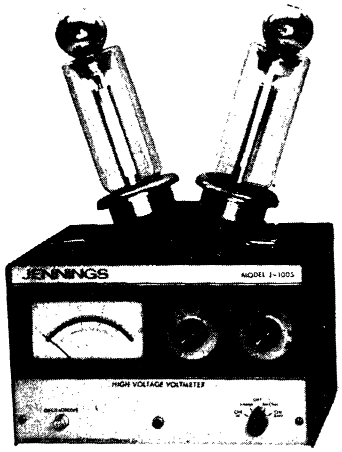
A compact, portable instrument for the accurate, direct reading of very high voltages at rf, audio and power frequencies...determination of the amplitude of pulses with oscilloscope connections for viewing wave shapes...removable high voltage input circuit for remote panel mounting of the meter...internal battery and ac line operation.

Portable AC High Voltage Tester Model JHP-70A

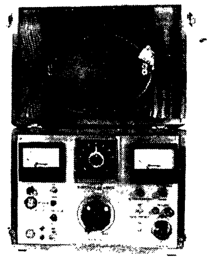
The smallest and lightest instrument available at its power level the JHP-70A will generate and measure 70,000 volts peak for on-site testing of high voltage components such as capacitors, switches, transformers, bushings, vacuum tubes, etc.

High Voltage AC Divider Model 13200

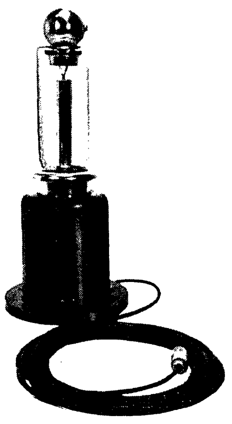
These dividers can be used with an oscilloscope to measure and observe voltages up to 50 kv at frequencies up to 20 MHz. Their low circuit loading design and shielding construction make them particularly suitable for rf measurement applications including tank circuit and transmission line voltages, pulse parameters, modulation voltages, and transient wave characteristics.



MODEL J-1005



MODEL JHP-70A



MODEL 13200

SOLID STATE AC VOLTMETER

Model Number	J-1005
Voltage Ranges	Peak Kilovolts (single-ended) 0-2.5, 0-5, 0-10, 0-25, 0-50 Peak Kilovolts (double-ended) 0-2.5, 0-5, 0-10, 0-25, 0-50, 0-100
Frequency Response	Flat from 10 Hz to 20 MHz at full rated voltage
Accuracy	3% of full scale on all voltage ranges
Oscilloscope Connection	600 to 1 division ratio (approx.)
Meter Calibration	The meter is calibrated in peak kilovolts with linear voltage scales of 0-2.5, 0-5, 0-10, 0-25, 0-50
Input Impedance	Greater than 2×10^{12} ohms and approx. 4 pf single-ended to ground, 2 pf double-ended
Power Supply	117/230 volts ± 10%, 50/60 Hz, 5 watts, or rechargeable battery
Dimensions	Height, 16"; width, 10¾"; depth, 8"
Net Weight	12 pounds (approx.)

PORTABLE AC
HIGH VOLTAGE TESTER

Model Number	JHP-70A
Maximum Output Voltage	70 kV Peak
Maximum Continuous Current	21 mA RMS
Short Circuit Current (Est.)	100 mA RMS
Power Requirements	105-125 Volts RMS*
Frequency	50-60 Hz
Current	15 Amps
Surge Current	10 Amps
Weight:	
Control Cabinet	28 lbs.
Transformer	43 lbs.

*NOTE: 230 volt version available upon special request.

HIGH VOLTAGE AC DIVIDER

Model Number	13200
Voltage	50 kV peak
Current	12.5 amperes RMS
Input Impedance	Above 10^{12} ohms, 4 pfd.
High Frequency Response	Flat to 20 MHz at 50 kV peak; maximum frequency 50 MHz at 20 kV peak
Division Ratio	As requested, 325:1, 1000:1 or 2000:1
Low Frequency Response when operated into shunt resistance of:	
1 megohm	1000 Hz
10 megohms	100 Hz
Weight	2 lbs. 4 oz.

JENNINGS

970 McLaughlin Avenue • Department EM • San Jose, CA 95122 • (408) 292-4025

JRL JULIE RESEARCH LABORATORIES INCORPORATED LOCOST 106

• LEASING A LOCOST SAVES THE AVERAGE CALIBRATION LAB A MIN. OF $4000/MONTH.

FEATURES

- High-reliability multi-station capability without limitations of central-processor time sharing.
- Requires zero software design by the user.
- Multi-function/Multi-instrument/Multi-parameter automation of short run test routines.
- Completely modular, endlessly field-expandable and totally non-dedicated.
- Based on NBS-traceable, state-of-the-art, ratiometric measurement technology.
- Dated, unconditionally guaranteed fully functional turnkey on-site performance . . . on-line, in your facility, from 84-114 days ARO.
- Provides economical solutions to all requirements from 2½-digit production ATE to 7½-digit standards-laboratory automation.

APPLICATIONS

- Completely automated production batch-testing of electrical and electronic components at accuracy levels from ±1% to ±0.00001%.
- Versatile short-run multi-point/multi-parameter testing of active and passive networks, circuits, subsystems, and systems.
- Automatically programmed data-logging of physical parameters into electrical qualities.
- Comprehensive life-test measurement and categorization of components, circuits and equipment by quality.
- Automated stimulus/response testing of circuit modules, subsystems and complete equipment.

SUPPORT COMPONENTS

- Master Program Cassettes.
- Disc memories for mass program storage.
- Fundamental standards of EMF, resistance, ratio and AC/DC transfer.
- Data-link Modems.
- Programmable Resistance (Standard Model PRS-106).
- Power amplifiers providing up to 1200 V and 200 W AC output.
- Programmable resistive dividers providing up to 1 million precise ratios.
- Graphic Displays.
- Computer-compatible D/A & A/D converters.
- Function, Signal, Pulse, Word and Sweep Generators.

System can include pulse/function generators, frequency synthesizers, distortion analyzers, vector voltmeters, phasemeters. Peripherals available for complete oscilloscope testing.

DESCRIPTION

From the leading manufacturer of precision standards and measuring instrumentation, Julie Research, a new computer controlled test system is available at a low cost to fit into the budgets of even small calibration and testing laboratories.

LOCOST* features a combination of computer, data terminal, high speed thermal printer, programming cassette memory and a programming calculator which can be operated by lab technicians with little or no computer and programming experience. It uses BASIC language, has an alphanumeric keyboard and an interactive 32-character display, as well as a built-in 15Kbyte main-line memory. Cassette memory is 32,000 words. Capability of the calculator is equivalent to a 10K or 12K minicomputer. A unique, labor saving feature of LOCOST* is its unique programmed software which makes it possible to generate, store, and carry-out test programs for new instruments efficiently. Simple questions concerning the specifications of the instrument under test are asked by the calculator and the operator answers these questions by typing specifications such as full-scale accuracy, etc. When completed, these specifications are then stored on cassette memory for future reference and use by the system's preprogrammed meter test routine. Programming costs are 80 to 90% lower than for conventional computer controlled systems.

A complete array of programmable DC and AC test instrumentation is available to satisfy even the most demanding testing and calibration applications. LOCOST* is a highly flexible user oriented system and is expandable in both hardware and software. Extended range instruments for both stimulus and measurement may be integrated into these systems at the time of purchase or at a later date as new requirements arise. Typical systems that are available include:

POPULAR LOCOST 106 MODELS

LOCOST 106 MINI (ON SITE) SYSTEM ......

Gives the user all the capabilities necessary for full-range precision measurement and limited range precision DC stimulus: calibrates and prints out complete data for potentiometers, decade boxes, meter functions, dividers, bridges, dc power supplies, DC voltage and current calibrators, standard cells, standard resistors, meter shunts, load cells, strain gauges, temperature, resistors, networks, and others. Does double duty as an automated on-site test system. (1)

LOCOST 106 DC/LF SYSTEM ....

Adds full-range precision AC and DC stimulus to the MINI system: in addition to the capabilities listed above gives full range precision calibration of all meters (AC and DC, digital and panel), volt boxes, high current shunts, AC voltage and current calibrators, etc. (2)

LOCOST 106 OSCILLOSCOPE/PLUG-IN SYSTEM ....

A complete stand alone automated system to provide fully automated calibration of oscilloscopes and plug-ins. (2)

LOCOST 106 STANDARD SYSTEM ....

Combines the LOCOST 106 DC/LF AND OSCILLOSCOPE/PLUG-IN systems in a single system. (3)

LOCOST 106/2 DUAL STATION UNIVERSAL SYSTEM ....

A complete two station automated system, as in the STANDARD system, with the addition of a second, fully independent work station and added capability for calibration of pulse and function generators, oscillators and counters. (4)

(1) This system produces savings of over $20,000/yr in a plant with $75,000 total present Standard/Calibration/Repair payroll
(2) This system produces savings of $30,000 to $55,000/yr in a plant with $150,000 to $250,000 total present S/C/R payroll
(3) This system produces savings of $55,000/yr (one shift) to $110,000/yr (two shift) in a plant with $150,000 to $300,000 total present S/C/R payroll
(4) This system produces $120,000/yr savings (one shift) in a plant with $400,000 total present S/C/R payroll

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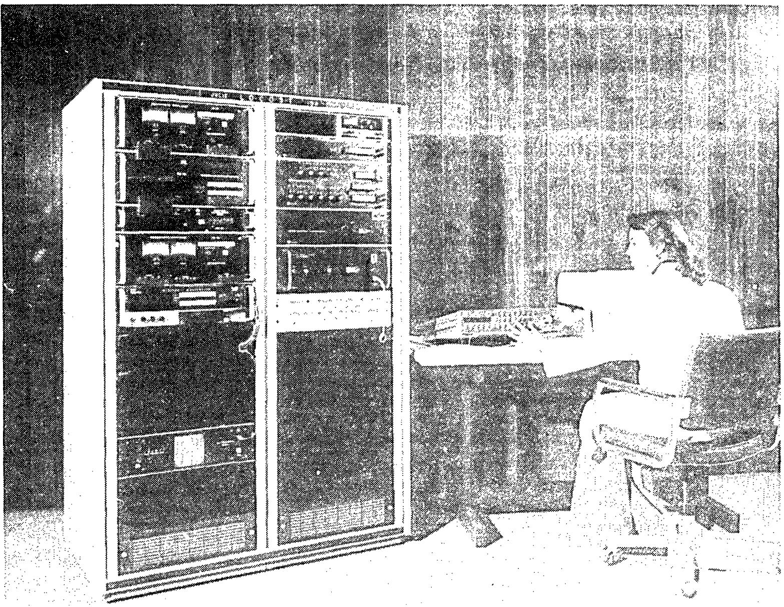
JRL JULIE RESEARCH LABORATORIES INCORPORATED

AUTOMATED TEST EQUIPMENT

FOR $60 YOU CAN TURN CALIBRATION PROBLEMS INTO PROFITS AT JULIE HIGH SPEED CALIBRATION CENTERS

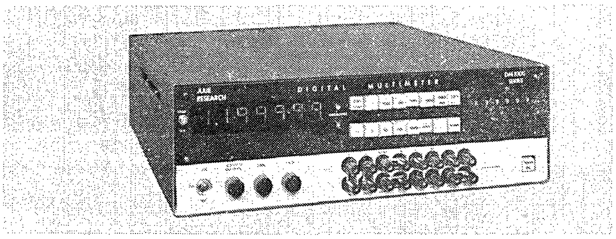


Why buy, rent, or invest in expensive hardware and software when $60 will allow you to time-share a state-of-the-art LOCOST computerized calibration system — including all of the high performance hardware and software you need for full-quality, fully documented and fully traceable calibrations. A single $60 time-shared hour on LOCOST is enough to finish four calibration jobs, (or three with calibration adjustments) — all of the highest quality, with complete computerized printout of all test variable data and repair diagnostics — easily worth $250 or more by present-day standards.

At our centers, the LOCOST system is there to serve you whenever you want it, and for as much work (or as little) as you really need.

Call us for more information about high-speed time-share calibration at the new LOCOST centers. If you should want to set up your own center, we also have data on leasing or franchising LOCOST systems.

PROGRAMMABLE AC/DC MULTIMETERS AND PRODUCTION CALIBRATORS DM-1000 SERIES DIGITAL MULTIMETERS TO 1 PPM ACCURACY/RESOLUTION/ STABILITY



JULIE RESEARCH, for 15 years the pioneer in the manufacture of Precision Standards, now leads the way in providing Multimodel automatic precision calibrators. The new approach to production measurements with three sigma certainty reduces test equipment costs and testing time. The DM-1000 Multimeter doubles as a Ratiometer and Voltage Source in addition to measuring Voltage, Resistance and Current to 1 ppm. Just a few of this amazing instrument's uses are:

- **CALIBRATING DVM's AND DMM's** — 2½ digits to 5½ digits, with full confidence.
- **CALIBRATING A/D AND D/A CONVERTERS** — 8-bit to 20-bit binary resolution.
- **CALIBRATING ANALOG TRANSDUCERS** — to unprecedented orders of precision.
- **MEASURING ZENER DIODES AND STANDARD CELLS** — 1% to 0.0001%, automatically.
- **MEASURING RESISTORS AND NETWORKS** — both absolute resistance and ratios.
- **CALIBRATING POTENTIOMETERS AND ATTENUATORS** — both linear and nonlinear.
- **MEASURING POWER-SUPPLY CHARACTERISTICS** — absolute output, regulation, tracking, stability.
- **CALIBRATING AC SIGNALS AND GAINS** — over 30 Hz-5 kHz, with excellent linearity.
- **STANDARDIZING CURRENT SOURCES** — over wide ranges, to unprecedented accuracy.
- **MONITORING PROCESS VARIABLES** — electrical parameters, temperature, strain, pressure, etc.

These new calibrators are the ultimate in accurate DC measurements, offering numerous benefits which yield the most reliable and flexible operation ever. Some of the more obvious benefits are low parts count for reliability, ease of programmable application for quality measurements with isolated data output with BCD input, and output options.

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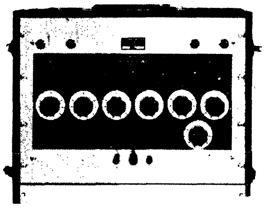
JRL JULIE RESEARCH LABORATORIES INCORPORATED PRECISION MEASURING & REFERENCE EQUIPMENT

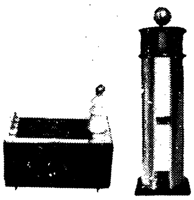
VOLTAGE DIVIDERS



Model	Accu. (ppm)	Lin. Resol. (ppm)	Stability (ppm/ yr.)	Resistance (Kohms)	Max. Volts	Mode of Operation
VDR-106/7H	1 (5 yr.)	1	1	100	700	Manual
VDR-106/7	1 (5 yr.)	.1	.2	100	300	Manual
VDR-307	1 (5 yr.)	.1	1	100	700	Manual
VDR-307J	1	.1	1	100/110/120	700	Manual
*RVD-106	1	1	.5	100	200	Prog./Manual
*RVD-126	1	1	.5	100/110/120	200	Prog./Manual

* All RVD Programmable Dividers are standard with BCD input/output.

HIGH VOLTAGE DIVIDERS/VOLT BOXES

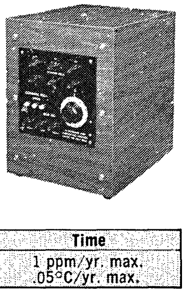


The Julie High Voltage Dividers and Volt Boxes on the table below are used to "drop" high voltages to a level that traditional precision potentiometers and high impedance electronic voltmeters can safely measure (such as the Julie models PVP-1000S and PVP-1000C).

Model	No.	Input Ranges Lowest	Input Ranges Highest	Input Imped.	Output Taps	Acc. (%)	1 Year Stab. (%)
DV-1500	11	1 v	1500 v	1 Kohm/v	1/1.5 v	.001	.001
DV-1000	7	1 v	1000 v	1 Kohm/v	1/1.5 v	.001	.001
DV-1000B	7	1 v	1000 v	1 Kohm/v	1 v	.001	.001
HV-100/w	1	100 Kv	100 Kv	1 Kohm/v	1 v	.05	.005
HV-100	1	100 Kv	100 Kv	4 Kohm/v	1 v	.05	.1
KV-50/.01	1	50 Kv	50 Kv	1 Kohm/v	1/10 v	.01	.0015
KV-25/.01	1	25 Kv	25 Kv	1 Kohm/v	1/10 v	.01	.0015
KV-10/.01	1	10 Kv	10 Kv	1 Kohm/v	1/10 v	.01	.0015
KV-10R	1	10 Kv	10 Kv	1 Kohm/v	1/10 v	.01	.0015
KV-VB/10	1	10 Kv	10 Kv	2 Kohm/v	10 v	.05	.005

VOLTAGE REFERENCES

SATURATED STANDARD CELL OVENS

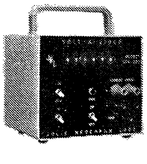


The best voltage reference possible must meet two basic critical requirements —

1. Time performance; the three saturated cells used must have minimum output voltage change with time.
2. The enclosure must maintain its nominal temperature with time.

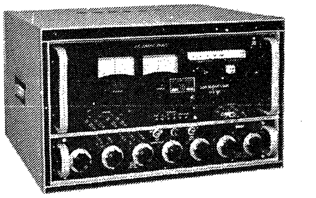
Stability Specs		Temperature	Time
SCO-106	cells	.64 ppm/.01°C	1 ppm/yr. max.
	oven	.01°C/day max.	.05°C/yr. max.

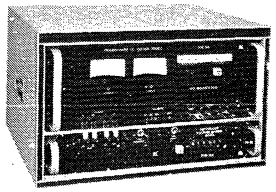
DIALABLE PRECISION DCV SOURCES



The GTX-300 Series is a high quality, compact, portable voltage source. Output settings on this 1 ppm resolution instrument range from 1 microvolt to 10 volts DC and can be made simply by dialing the desired value. Accuracies of from 0.001% to 0.005% can be ordered. Loads requiring up to 25 mA can be tolerated without accuracy deterioration. An output stability of ±3 ppm/24 hours is standard on all units.

DC VOLTAGE AND CURRENT SOURCES, MANUAL AND PROGRAMMABLE





Model	Outputs
*AVS-106	0 to ±12, 120, 1200V, 6 digits
DVS-106	0 to ±12, 120, 1200V at 35 ma, 7 digits
DVS-106D	0 to ±12, 120, 1200V at 35 ma, 6 digits
*ACS-106	0 to ±1.2, 12, 120 ma; 1.2, 12 Amps
DCS-105	0 to ±1.2, 12, 120 ma; 1.2, 12 Amps
DCS-106	0 to ±1.2, 12, 120 ma; 1.2, 120 Amps
*ACV-106	0 to ±1.2, 12 ma; 0-12V, 120 Volts

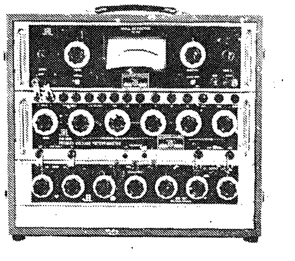
Accuracy	Stability	Linearity
To 2 ppm	To 5 ppm/30 days	To 1 ppm

* Compliance Programmable

POTENTIOMETERS

Through the use of POTENTIOMETER Plug-ins, the Multivider system is made into various precision voltage measuring systems. (Systems listed in the table below include null detector and voltage divider.)

Range Volts	PVP-1000S Accuracy (w/self cal.)
1000	8 ppm +1 ppm f.s.
300	8 ppm +1 ppm f.s.
100	8 ppm +1 ppm f.s.
30	8 ppm +1 ppm f.s.
12	—
10	5 ppm +1 ppm f.s.
3	5 ppm +1 ppm f.s.
1.2	—
1.1	+1 μv (cell compar.)
1.0	2 ppm +1 ppm f.s.
.12	—
.012	—
.0012	—

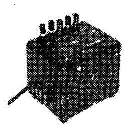


PVP-1000C Potentiometer/Voltbox Plug-in with ranges to 1000 volts and with accuracy as shown below for PVP-1000S:
PVP-1001J Universal Potentiometer Plug-in is used.

SOLID STATE REFERENCES — ZENERS

Line Regulation: 1 ppm for 10% line change for all models.
Output: +1.018, +1.0 and −5.0 volts all models except ZVR-500 Series.
Room Temp. Efficiency: 0.3 ppm/°C (20°C to 30°C) for ZVR-106 Series and 0.2 ppm/°C (20°C to 30°C) for ZVR-500 Series.

Model	MM	Size
ZVR-106B	152.4 x 152.4 x 101.6	6″ x 6″ x 4″
ZVR-106MV (10v, 1v, .1v, .01v)	152.4 x 152.4 x 101.6	6″ x 6″ x 4″
ZVR-506 (6.3v)	21.3 x 21.3 x 19.1	.84″ x .84″ x .75″
ZVR-512 (12.6v)	21.3 x 21.3 x 19.1	—
ZVR-518 (18.9v)	21.3 x 21.3 x 19.1	—
ZTS-106	1.000, 1.018 + Delta; + Delta VDC 0 to 1000 μV (Delta); ±2 ppm Accur.; 1 μV Resol.; ±3 ppm/Mo. Stable	



AC-DC THERMAL VOLTAGE TRANSFER STANDARDS

TNB-102 Series

This set of two Thermoelement Modules (2.5 ma and 5 ma) and six Resistor Modules provide highest available transfer accuracy from 0.5 v to 1000 v up to 50 kHz.

Model TNB-102 Series Coaxial AC/DC Transfer Standards

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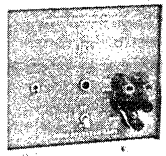
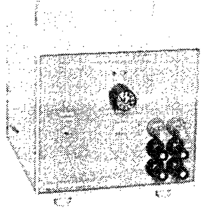
BUFFER AMPLIFIERS



BA106

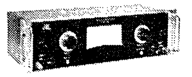


BA107, BA108

Line Operated High Performance Floating Amplifier

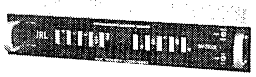
Specification	BA106	BA107	BA108
Gain	1.0 ±1.5 PPM 10.0 ±1 PPM	100 ±1 PPM	1000 ±1 PPM
Max. Output	±12 Volts	±12 Volts	±12 Volts

NULL DETECTORS



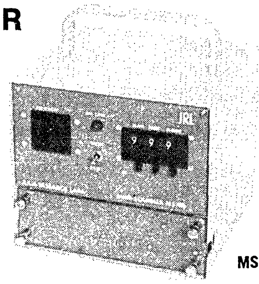
Model	Ranges	Sensitivity	Dimensions
ND-106	(9) 3 μv to 30 mv	.1 μv	19 x 5¼ x 8

AUTOMATIC RANDOM ACCESS SCANNER



Features: Random bussing capabilities, will not degrade 1 ppm measurements, up to 10 individually Addressable Decades, 2-Pole 100-Position and most combinations in-between. Programmable, sequential, or manual modes. Thermal EMF of 0.2 μV max. Please call us for custom applications.

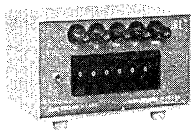
MINI SCANNER



MS-106

(1) Only .1 to .2 μV thermals, (can be used in 1 PPM accuracy systems)
(2) Manual and complete on line (computer) capabilities
(3) 10 test positions plus 2 mutually exclusive dual form A closures
(4) Random or sequential access
(5) Manually settable or programmable lower limit and manually settable upper limit in the sequential mode
(6) I/O, standard positive BCD code, TTL levels
(7) Illuminated test position display
(8) Automatic stop and hold position or repeat previous scan pattern capabilities.

MINIDIVIDER

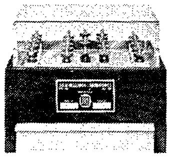


MVD306

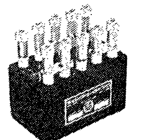
6 Reading Switches — Ratios from .000001 to .999999 — Over Range Switch to 1:100000 Ratio

Enclosure	3½" x 4" x 6"
MVD306	2.5 PPM Accuracy
MVD306	5 PPM Accuracy
MVD306	10 PPM Accuracy

RESISTANCE REFERENCES



DMR

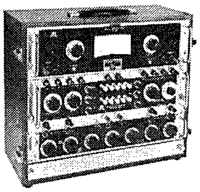


MRS-106

PRO-106

Model	Absolute Resistance Values	Accuracy (ppm)	Room Temp. Eff. (ppm/°C)	Approximate Size (inches)
PRO-106	10 ohms to 1 Meg.	8	.1(0-28°C)	10 x 14 x 15
PRO-106L	.001 ohms to 10 ohms	50-100	.1(0-28°C)	10 x 14 x 15
MRS-106	100 ohms to 1 Meg.	15	2.5/°C	4 x 2 x 4
MRS-105	.1 ohms to 100 ohms	30-100	2.5/°C	4 x 2 x 4
DMR Series	10 ohms to 1 Meg.	15	2.5/°C	5 x 4 x 3
BMR Series	29,996,131,071 ohms	15-50	5/°C	5 x 4 x 3
BDR Series	100,000 ohms Max.	15	5/°C	5 x 4 x 3

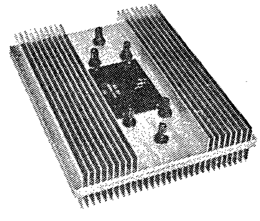
PRECISION RESISTANCE MEASURING SYSTEMS



PRB-205C PLUG IN	
0-1000Ω	±1 ppm Setting ±1 ppm f.s.
0-10K	±1 ppm Setting ±1 ppm f.s.
0-100K	±1 ppm Setting ±1 ppm f.s.
0-1 Meg.	±2 ppm Setting ±1 ppm f.s.
0-10 Meg.	±3 ppm Setting ±1 ppm f.s.

PRB205L & PRB205H available extending resistance range from .01 ohms to 100 K Meg.

CURRENT SHUNTS

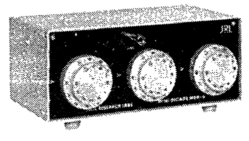


High quality shunts are high quality 4-terminal resistors especially designed to operate at relatively higher current levels without suffering appreciable resistance change. Most high ranges (50 A for example) are the finned heat-sink type. Most lower ranges are available in single and multiple-range (oil-filled) units. Accuracies up to .0025% are available although .05% or .01% are most typical. Yearly stabilities of .01% are typical and temperature coefficients are 5 ppm/°C or better. Ask for a data sheet.

MINI DECADE BOX

New DR100 Series Available:

Ranges: 1 Kohm to 11 MGohm; same high performance as our MDR116



Max. Res.	1,111,110Ω
Ohms Per Step	1Ω
Decade Ranges	6
Enclosure	3½" x 4" x 9" Metal Case

PRIMARY RESISTANCE AND RATIO STANDARDS

NB SERIES

These ultra-stable oil-immersed resistors, provide absolute accuracy and stability heretofore unattainable in conventional precision components
(See JRL Bulletins B-5 and B-6)

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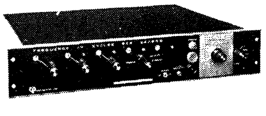
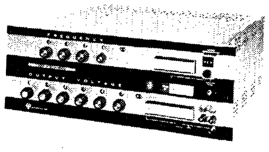
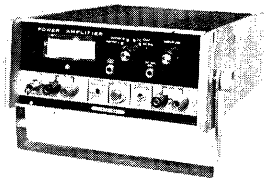
JRL JULIE RESEARCH LABORATORIES INCORPORATED

OPTIMATION Division







PRECISION OSCILLATORS						
Model	**Frequency Range**	**Frequency Accuracy**	**Output Voltage**	**Output Current**	**Frequency Response**	**Features**
RCD-10	.1 Hz-100 kHz	1%	0-5		±.5%	General Purpose Oscillator
RCD-902	10 Hz-1 MHz	1.0%	0-5			Wide Band
RCD-904	10 Hz-1 MHz	0.1%	0-11.11 absolute	100 MA	±.05%	Remote Sensing

POWER OSCILLATORS				
Model	**Power VA**	**Frequency Range**	**Voltage***	**Features**
AC-50	50	0.1 Hz to 100 kHz	15	Precision High Power

* Options are available to extend V+1 ranges of all power oscillators and amplifiers.

PRECISION POLYPHASE OSCILLATORS/POWER OSCILLATORS								
Model	**Phases Power/ϕ**	**Output V/ϕ**	**1/ϕ**	**Regulation**	**Frequency Range**	**Amplitude Stability**	**Distortion**	**Features**
AC-153	2/3 45	150	2a	adj. to Zero	10 Hz to 10 kHz	100 ppm	.05%	Switchable 2 or 3ϕ
RCD-11	2/3	5			.01 Hz to 10 kHz	100 ppm	.02%	General Purpose Oscillator

PRECISION POLYPHASE OSCILLATORS/POWER OSCILLATORS

- High Power — to 50 VA per phase
- Low Distortion — to less than 0.02%
- Fixed or Variable Stable Frequency
- Adjustable Load Regulation
- Perfectly Suited for Gyro Testing

POWER OSCILLATORS

- Accurate Digital Frequency Selection
- Stable Amplitude — less than 0.01% variation
- Stable Frequency — 10 ppm available
- Low Distortion — less than 0.05%
- Wide Frequency Range — up to 110 kHz
- Absolute Stability Regardless of Load
- Up to 50 VA Output

POWER AMPLIFIERS

- Low Distortion — under 0.05%
- Stable Voltage Gain — to 1 ppm
- Wide Frequency Ranges — DC to 2 Mhz
- Adjustable Output Impedance
- Absolute Stability Regardless of Load
- Voltage or Current Regulation

PRECISION SOURCES

- Stable Amplitude — less than 20 ppm variation
- Low Distortion — under 0.05%
- High Power Output — up to 200 VA
- Stable Frequency — less than 0.01% variation
- Wide Frequency Range — to 100 kHz at 1000 V
- Constant Voltage/Current—to 1500 V: to 40 Amps

PRECISION OSCILLATORS

- Absolute Amplitude Accuracy — ±0.05%
- Amplitude Stability — ±0.01% month
- Output — from 11 Volts to 100 Milliamperes
- Remote Sensing Available
- Quadrature Phase Accuracy — 0.05°
- Frequency Range — 10 Hz to 1 MHz
- Frequency Accuracy — to 0.1%

ABSOLUTE CALIBRATORS FOR:

Ammeters - Voltmeters - Wattmeters - Phasemeters - Digital Multimeters

- Programmable Models
- Highest Accuracy Available
- 10 Hz to 1 MHz
- Compact and Lightweight
- Complete Systems Available

ABSOLUTE CALIBRATORS					
		Accuracy			
Model	**Output Range**	**DC**	**AC***	**Frequency Range**	**Features**
AC125/PA225	10 NV to 1211.11V		0.02%	10 Hz to 1.1 MHz	Fixed Amplitude Quadrature Output
AC129/PA225	10 NV to 1211.11V		0.02%	10 Hz to 1.1 MHz	Fully Programmable
AC160	0-600V		0.05%	25 Hz to 10 kHz	Calibrates Volt, Amp and Watt Meters — Variable Phase
 CS112	0-10 Amps 1 μa to 2.2 Amp	 .005%	0.05% 0.02%	 10 Hz to 100 kHz	Absolute Power Factor Bi-polar DC
CS129	1 μa to 2 Amp		0.02%	10 Hz to 100 kHz	Programmable
QCS110	1 μa to 1.1 Amp		0.02%	10 Hz to 100 kHz	Phase Calibrated From 0-360° ±0.05°
PA270	1 Amp to 110 Amp		0.02%	10 Hz to 100 kHz	High Current—Self Calibrating
RCD709	0 to 5V RMS			10 Hz to 100 kHz	Absolute Phase Standard ±.05°

* Typical Midband

PRECISION SOURCES							
Model	**Voltage**	**Current**	**Resolution**	**Frequency Range**	**Distortion**	**Stability**	**Features**
AC50CAL	500V	10A	10 ppm	10 Hz to 100 kHz	<.05%	±20 ppm	High Performance at Low Cost
AC104	1500V	20A	10 ppm	10 Hz to 100 kHz	<.05%	±20 ppm	Full Power Output From 45 Hz to 100 kHz

POWER AMPS							
				Band Width			
Model	**Power (VA)**	**Voltage**	**Current**	**Full Power**	**Extended**	**Distortion**	**Features**
PA25	25	150		DC - 1 MHz	DC - 2 MHz	<.02%	Sine/Pulse—1500V μS
PA50	50	15		DC - 20 kHz	DC - 100 kHz	<.05%	Wide band
PA50T	45	150		45 Hz - 20 kHz	10 Hz - 100 kHz	<.05%	Voltage Regulated
PA50T/10A	45		10 Amps	45 Hz - 2 kHz	10 Hz - 100 kHz	<.05%	Current Regulated
PA50T/500	45	500	10 Amps	55 Hz - 10 kHz	10 Hz - 100 kHz	<.05%	High Voltage
PA250AC	250	150	10 Amps	25 Hz - 20 kHz	15 Hz - 40 kHz	<.05%	Adjust. Output Imped.
PA250H	250	300	5 Amps	45 Hz - 60 kHz	20 Hz - 100 kHz	<.05%	Absolute Load Stability

OPTIMATION

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KOEP PRECISION STANDARDS INC

KPS

NEW-TECH STANDARDS
FOR REAL-WORLD USE

- ✱ 0.2PPM DRIVEN VOLTAGE DIVIDER SYSTEM
- ✱ 1PPM/YEAR MULTIPLE-CELL DIODE-CELL BANKS
- ✱ VOLTAGE REFERENCE MODULES & DIODES
- ✱ WHITE NOISE GENERATORS

KPS DRIVEN VOLTAGE DIVIDERS

- * PROVIDES 1 MV TO 1000 V WITHIN 1PPM PLUS EXT. REF. STD.
- * INTERCOMPARES 10V, 6.35V, & 1V STANDARDS WITHIN 0.2PPM
- * SELF-CALIBRATES VERIFIABLE DC VOLTAGE RATIO AUTOMATICALLY
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SRL SOLID STATE STANDARDS

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- * **TCM** 2PPM/YR VOLTAGE REFERENCE MODULES FOR OEM USE
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- * **CERTACELL®** LINE POWERED 10PPM/YR VOLTAGE STANDARD
- * **CERTAVOLT®** MINIPACKAGE 10PPM/YR DCV MODULE FOR PCB'S

SRL WHITE NOISE GENERATORS

- * DIODES, 10HZ TO 300 MHZ, ECONOMICAL WHITE NOISE GENERATOR
- * MODULES, 10HZ TO 30MHZ AT UP TO 2 VOLTS
- * CUSTOMIZED TO YOUR APPLICATION-----GIVE US A CALL

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Dept. EM, Avon Industrial Park
Avon, Massachusetts 02322
(617) 580-1660
TWX 710-345-0831

Function & Sweep Generators

	Frequency Range	Model	Output Waveforms ∿	⊓	△	⇔	⎍	↑	Maximum Output	Output Impedance (Ohms)	Auxiliary Outputs	DC Offset	Ext. V.C.	Additional Features	Rack Mounting Kit—$50	Base Price
	.2Hz-3MHz	**1000A**	•	•	•				20V p-p	50	TTL	—	1500:1	1500:1 Tuning	RK-39	$ 395
	.2Hz-3MHz	**1200A**	•	•	•				20V p-p	50	TTL, ⟋	±10V	1500:1	Linear Sweep	RK-39	$ 550
	.2Hz-3MHz	1400	•	•	•		•		20V p-p	50	TTL, ⟋, CV	±10V	1500:1	Lin Swp. Trig. Gate. Burst	RK-314	$ 850
	.2Hz-3MHz	1600	•	•	•		•		20V p-p	50	TTL, ⟋, CV, MKR, PEN LIFT	±10V	1500:1	Lin Log Swp. Pause-Mkr. Trig. Gate. Burst	RK-314	$ 950
	.003Hz-30MHz	2000	•	•	•		•	•	30V p-p	50	TTL, CV	±15V	1000:1	dB Attenuator Symmetry Control	RK-58	$1095
	.003Hz-30MHz	2200	•	•	•		•	•	30V p-p	50	TTL⟋, ⟋CV, MKR, PEN LIFT	±15V	1000:1	Lin Log Swp. Pause-Mkr. Trig. Gate. Burst	RK-519	$1550
	.003Hz-30MHz	2400	•	•	•		•	•	30V p-p	50	20V ∿ ⊓ △	±15V	1000:1	AM, FM, φ Lock, Swp. Trig. Gate	RK-519	$1650
	.002Hz-3MHz	5100B	•	•	•	•	•	•	20V p-p	50	5 V ⊓	± 5V	1000:1	Symmetry Control Output Protection	RK-58	$1050
	.002Hz-3MHz	5200A	•	•	•	•	•		20V p-p	50	⊓ ⟋	± 5V	1000:1	Lin Swp. Trig. Gate. Burst Output Protection	RK-58	$1350
	.002Hz-3MHz	5300A	•	•	•	•	•		20V p-p	50	⊓ ⟋ ⟋ ∿	± 5V	1000:1	Lin Log Swp. Trig. Gate. Burst. Output Protection	RK-58	$1400
	.002Hz-5MHz	5400B	•	•	•	•	•	•	30V p-p	50	5 V ⊓	±10V	1000:1	Symmetry Control Output Protection	RK-58	$1150
	.002Hz-2MHz	5600	•	•	•				15V p-p	50/600 Bal	1V ∿ ⊓ △	± 5V	—	* Battery Operated	N A	$ 750
	002Hz-2MHz	5700	•	•	•				15V p-p	50/600 Bal	1V ⊓	± 5V	—	1000:1 Tuning	N A	$ 700
	.0001Hz-5MHz	5500AR	•	•	•		•	•	30V p-p	50	5V ⊓	±7.5V	1000:1	Programmable	N/A	$2500
IEEE-488	.0001Hz-5MHz	5900	•	•	•		•	•	30V p-p	50	TTL ⊓	±15V	200:1	GPIB, Autoprogrammer	RK-519	$3000
IEEE-488	.0001Hz-5MHz	5910	All Features of 5900 Plus Arbitrary Waveforms						Data Point Grid Ampl: 4000 X Time: 1024	Data Point Timing 200ns to 10,000 Sec		Data Point Slew Rate 20V/μSec		Features: Load Arbitrary Via IEEE Bus, Front Panel, or Auto-Programmer		$3500

WAVEGUARD™ (output protection): Standard on Models 1000A, 1200A, 5100B, 5200A, 5300A and 5400B. All other generator models, specify option 001: $45.00. ($90; Models 5500AR, 5900 and 5910) * Battery Kit, Model 5600, Part No. BK-560; $150.

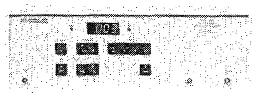
RC Oscillators

	Frequency Range	Model	Freq. Acc. %	Freq. Tuning	Output Each Phase Power (mw)	Output Each Phase Impedance (Ohms)	Quad. Output	Output Waveforms	Freq. Resp (dB)	Dist. %	Rack Mounting Kit—$50	Base Price
	001Hz-100kHz	4024A	0 5	Decade	125	200/600	Yes	∿ ⊓ ⎍	0.01	0.01	See Note*	$2250
	001Hz-100kHz	4025A*	0 1	Decade	125	200/600	Yes	∿ ⊓. ⎍	0.01	0.01	See Note*	$2650
	01Hz-1MHz	4100A*	0 5	P. Button	500	50		∿ ⊓	0.05	0.02	See Note*	$1300**
	1Hz-100kHz	4000A	0 5	Decade	125	200/600	Yes	∿	0.01	0.01	See Note*	$1700
	1Hz-100kHz	4001A	0 1	Decade	125	200/600	Yes	∿	0.01	0.01	See Note*	$2150
	10Hz-10MHz	4200A	2.0	Dial	500	50		∿ ∿	0.025	0.1	RK-58	$ 895**
	10Hz-10MHz	4300A	2.0	Dial	500	50		∿ ⊓ ∿	0.025	0.1	RK-58	$ 950**
	1Hz-110kHz	4400A	1.0	Decade	5/20	50/600	Yes	∿ ∿ ⊓	0 05	.001	RK-39	$ 750
	1Hz-110kHz	4500	10.0	Dial	5/20	50/600	Yes	∿ ⊓	0 05	0.001	RK-39	$ 750
	.1Hz-100kHz	4030R	0.5	Decade	125	200/600	Yes	∿ ⊓ ⎍	±0.01	0.01	N/A	$2900
	.1Hz-100kHz	4031R	0.1	Program	125	200/600	Yes	∿ ⊓ ⎍	0.01	0.01	N/A	$3200
	1Hz-1MHz	4141R	0.1	Program	500	50		∿ ⊓	0.05	0.02	N/A	$2500
IEEE-488	1Hz-1MHz	4180	0.1	Program	500	50		∿ ⊓	0.05	0.02	RK-519	$3200*

* Rack Model (19″ Panel) add $50. Add Suffix 'R' to Model No. **WAVEGUARD™, option 001: $45.

Automatic Distortion Analyzers

IEEE-488



Model 6880

Frequency Range	Model	Input Sensitivity VRMS	Display	Distortion Range %	Voltmeter Range VRMS	Internal Osc.	Additional Features	Rack Mounting Kit—$50	Base Price
1Hz-110kHz	6800	1-130	3 Digit	.000-12.0	0.1-130	1kHz 5V RMS	Distortion Output Analog Output	RK-319	$1650*
10Hz-110kHz	6801	0.1-13	3 Digit	.000-12.0	.01-13	1kHz 5V RMS	Distortion Output Analog Output	RK-319	$1650*
10Hz-110kHz	6880	0.1-130	3 Digit	.000-50.0	.01-130	1kHz 5V RMS	Freq. Counter GPIB Prog	RK-519	$3500**
5Hz-1MHz	6900	0.1-130	3 Digit	.000-19.9	.01-130	1kHz 5V RMS	Complete Auto-Ranging	RK-319	$2100‡

* Models 6800, 6801: Option 001; BCD output: $225. Option 002, %/dB Readout: $200. Option 003,30kHz, 80kHz LP Filters: $200.
** Model 6880: Option-001, 1Hz-110kHz: $250. ‡ Option 001, BCD Output: $225.

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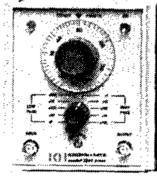
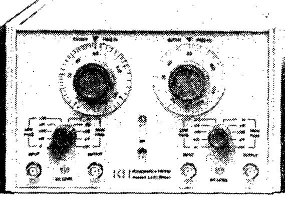
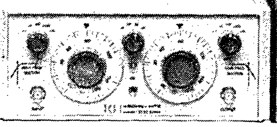
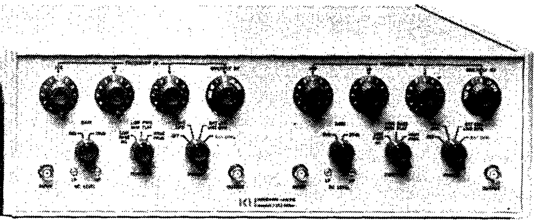
Tunable Active Filters


Model 3200


Model 3202

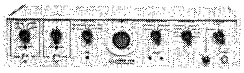

Model 3550


Model 3342

Frequency Range	Filter Model	BAND PASS	BAND REJECT	HIGH PASS	LOW PASS	Freq. Acc. %	Attenuation Slope dB/Octave	Hum and Noise (RMS)	Max. Atten-uation (dB)	Output Volt/Amps (RMS)	3dB Points	Battery Kits No./Price	Rack Mounting Kit—$50	Base Price
.001Hz-99.9kHz	3320			X	X	2	24	500uV	80	5v/50ma	DC-1MHz	BK332/$100	RK-58	$1175
.001Hz-99.9kHz	3322	X	X	X	X	2	24/48	500uV	80	5v/50ma	DC-1MHz	BK334/$200	RK-519	$2250
.001Hz-99.9kHz	3340			X	X	2	48	500uV	80	5v/50ma	DC-1MHz	BK332/$100	RK-58	$1600
.001Hz-99.9kHz	3342	X	X	X	X	2	48/96	500uV	80	5v/50ma	DC-1MHz	BK334/$200	RK-519	$3100
.01Hz-99.9kHz	3321			X	X	2	24	500uV	80	5v/50ma	DC-1MHz	BK332/$100	RK-58	$1100
.01Hz-99.9kHz	3323	X	X	X	X	2	24/48	500uV	80	5v/50ma	DC-1MHz	BK334/$200	RK-519	$2100
.01Hz-99.9kHz	3341			X	X	2	48	500uV	80	5v/50ma	DC-1MHz	BK332/$100	RK-58	$1395
.01Hz-99.9kHz	3343	X	X	X	X	2	48/96	500uV	80	5v/50ma	DC-1MHz	BK334/$200	RK-519	$2650
.02Hz-20kHz	3750	X	X	X	X	5	6,12,18,24	500uV	80	10v/2ma	DC-1MHz	BK375/$220	RK-519	$1450
.2Hz-20kHz	3700	X				5	24	200uV	80	5v/1ma	N/A	BK370/$110	RK-38	$ 995
2Hz-200kHz	3550	X	X	X	X	5	24	200uV	60	5v/10ma	.2Hz-3MHz	N/A	RK-38	$ 995
10Hz-1MHz	3100A	X				5	24	100uV	80	3v/10ma	N/A	N/A	RK-314	$ 950
10Hz-3MHz	3103A	X				5	24	100uV	80	3v/10ma	N/A	N/A	RK-314	$1050
10Hz-3MHz	3103A-4	X				5	18	100uV	80	3v/10ma	N/A	N/A	RK-314	$1050
20Hz-200kHz	3500	X				10	24	200uV	60	5v/3.5ma	N/A	N/A	RK-38	$ 895
20Hz-2MHz	3200			X	X	5	24	100uV	80	3v/10ma	DC-10MHz	N/A	See Note	$ 800
20Hz-2MHz	3202	X	X	X	X	5	24/48	100uV	80	3v/10ma	DC-10MHz	N/A	See Note*	$1450

* Rack Model (19″ Panel) add $50. Add Suffix 'R' to Model No.

Narrow Band Tracking Filter

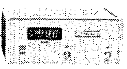

Model 3800

Frequency Range	Model	Bandwidths	Peak Output Volts/mA	Max. Atten-uation	Output* Noise (r.t.i.)	Tuning Modes	Rack Mfg. Kit—$50	Base Price
1Hz-100kHz	3800	001Hz,.01Hz,.1Hz,1Hz,10Hz,100Hz,1kHz,EXT	10V/5mA	40dB	100μV	REF,REF TRAK DIAL,SIG TRAK	RK-319	$2200

* Referred to input

Digital Phasemeters

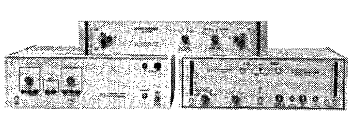
Model 6500


Model 6200A

Model	Phase Accuracy	Frequency Range	Resolu-tion	Input Waveforms	Input Voltage Range	Display Range	Rack Mounting Kit—$50	Base Price*
6500	.05°	3Hz-5MHz	.01°	∿ ⊓ ∿ ⎍	.01V-120V RMS	0° to 360°	RK-319	$2700
6400	0.1°	3Hz-5MHz	0.1°	∿ ⊓ ∿ ⎍	.01V-120V RMS	0° to 360°	RK-319	$2100
6200A	0.5°	10Hz-1MHz	0.1°	∿ ⊓	0.1V-120V RMS	−180° to +180°	RK-38	$ 895

* Optional 001, BCD Output: $225.

Wideband Amplifiers


Model 7500 Model MT-56R Model DCA-10

Frequency Range	Model	Output Power (watts)	Dist. %	Freq. Resp. dB	Input Volts (RMS)	Max. Voltage Gain	Matched Load (Ohms)	Max. Output Volts (RMS)	Max. Output Current	Rack Mfg. Kit—$50	Base Price
DC-1MHz	DCA-10	10	0.1	+1.0	10	10	600-1000	105	130ma	See Note*	$1795
DC-1MHz	7500	75	0.1	+0.1	1.25	100	200	125	625ma	RK519	$1995
30Hz-1MHz	MT-56R	75	—	—	125	—	2-1000	100	6.5A	N/A	$ 550

* Rack Model (19″ Panel) add $50. Add Suffix 'R' to Model No.

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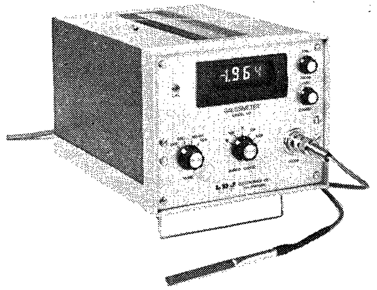

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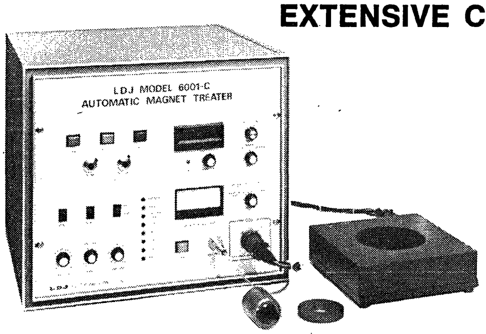

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The wide line of Magnetic Instrumentation, Inc. Gaussmeters shares the following features:

- Magnetic field measurements from 1 Gauss to 100,000 Gauss.
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- Simple setup and operation with front panel controls.
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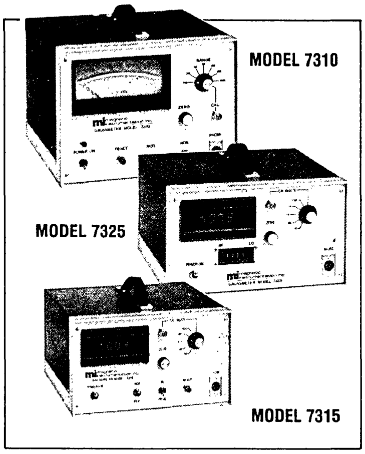

MODEL 7310

MODEL 7325

MODEL 7315

MAGNETIZERS

The Magnetic Instrumentation Capacitive Discharge type Magnetizer line features the following:

- High speed production operation.
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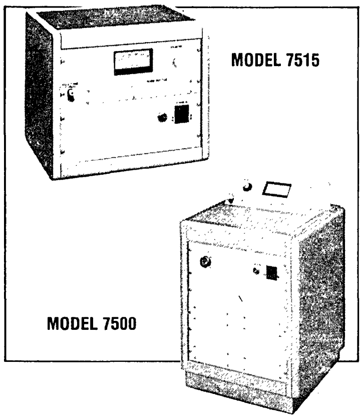

MODEL 7515

MODEL 7500

INTEGRATING FLUXMETERS

Fluxmeters by Magnetic Instrumentation, Inc. provide:

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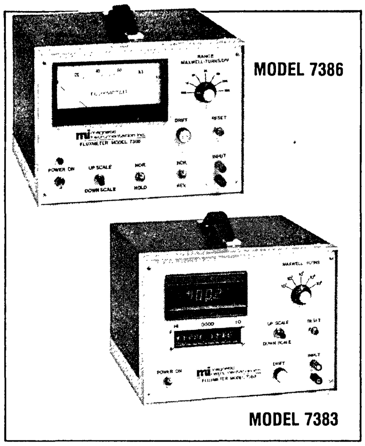

MODEL 7386

MODEL 7383

MAGLAB

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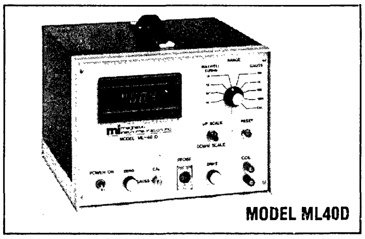

MODEL ML40D

MAGNECHARGERS™

The 8000 Series Magnechargers are half cycle type magnetizers designed for use in high volume production situations.

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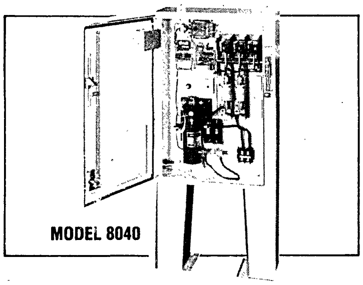

MODEL 8040

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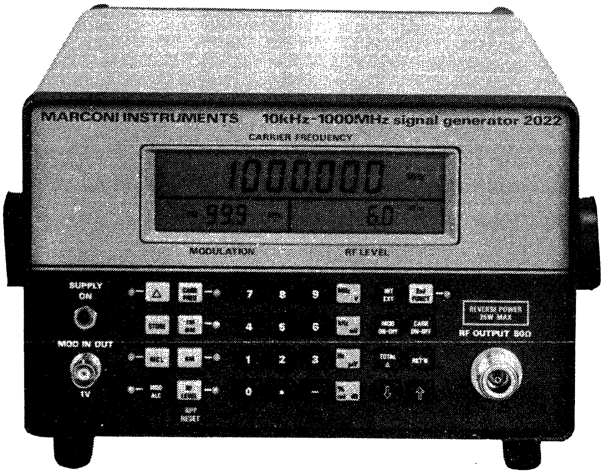
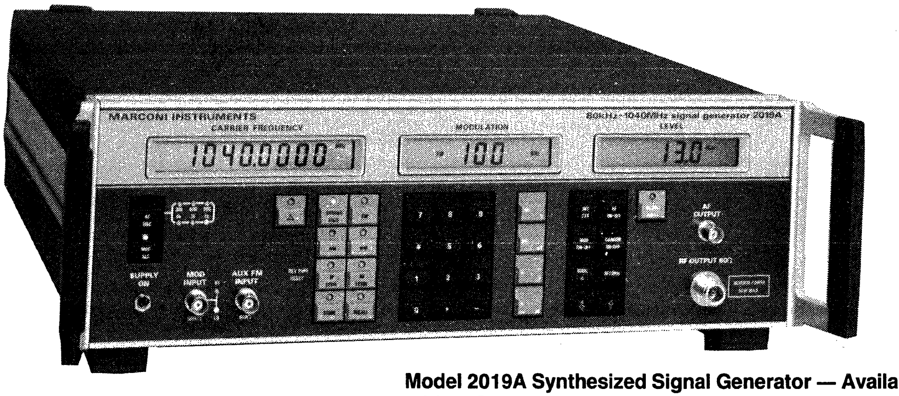


Model 2022 10kHz to 1000 MHz AM/FM/ϕM Signal Generator

SIGNAL GENERATORS

FM/AM SIGNAL GENERATOR Model 2017	10kHz to 1024MHz GPIB	Spurious free, low noise, cavity-tuned signal generator with keyboard/GPIB entry of all functions. Typical SSB noise −144 dBc/Hz, 20kHz from carrier. Output level to +19dBm, with ±1dB level accuracy down to 1μV, and integral reverse power protection. Facilities include slow analog sweep, FM/AM/Pulse, internal modulation oscillator, and GPIB counter function.
FM/AM SIGNAL GENERATOR Model 2018A Model 2019A ***NEW***	80kHz to 520MHz 80kHz to 1040MHz GPIB	Synthesized generators with very low close-in phase noise. Microprocessor control provides simple and rapid operation by direct keyboard of GPIB entry of all functions. Includes comprehensive frequency and amplitude modulation, ± 1dB level accuracy down to 1μV and integral reverse power protection. Calibration and fault finding performed from keyboard or GPIB to dramatically cut downtime. New A version includes phase modulation, memory improvements, and faster switching speed.
FM/AM/ϕM SIGNAL GENERATOR Model 2022 ***NEW***	10kHz to 1GHz GPIB	Compact, lightweight, synthesized generator offering FM, AM and ϕM. Microprocessor control provides simple rapid operation from keyboard or GPIB. Comprehensive memory stores 100 settings. Price includes integral high stability oven-controlled crystal oscillator, reverse power protection and numerous second functions to add flexibility and powerful fault diagnosis.

NEW
2018A
2019A
priced from
$5400



Model 2019A Synthesized Signal Generator — Available on GSA
with 4 Special Purpose Variants

SPECIAL PURPOSE VARIANTS

EXPANDED FM BANDWIDTH Option −01	80kHz to 1040MHz GPIB	The FM bandwidth is extended down to 1Hz to improve ability to handle digital signaling information on pagers and transceivers. Stereo separation is also improved to better than 56dB at 10MHz in this version.
AVIONICS Option −02	1.5MHz to 1040MHz	Variant designed to handle VOR/ILS signals used in aircraft navigation and landing equipment. Difference in depth of modulation better than 0.045% for ILS tones.
10kHz CARRIER FREQUENCY Option −04	10kHz to 1040MHz GPIB	This generator has extended carrier frequency to cover VLF communication bands between 10kHz and 80kHz used in maritime applications.
PULSE MODULATION Option −08	80kHz to 1040MHz	A pulse modulation facility allows testing of radar R.F. and I.F. stages. Rise and fall time less than 100ns, with on/off ratio better than 65dB at 70MHz.

marconi instruments

Partial Listing Only- Call Marconi for complete catalog of products.

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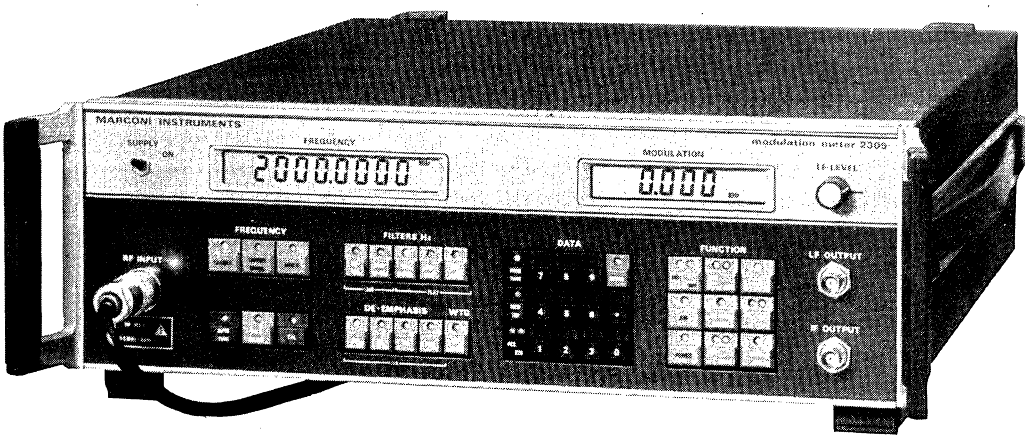
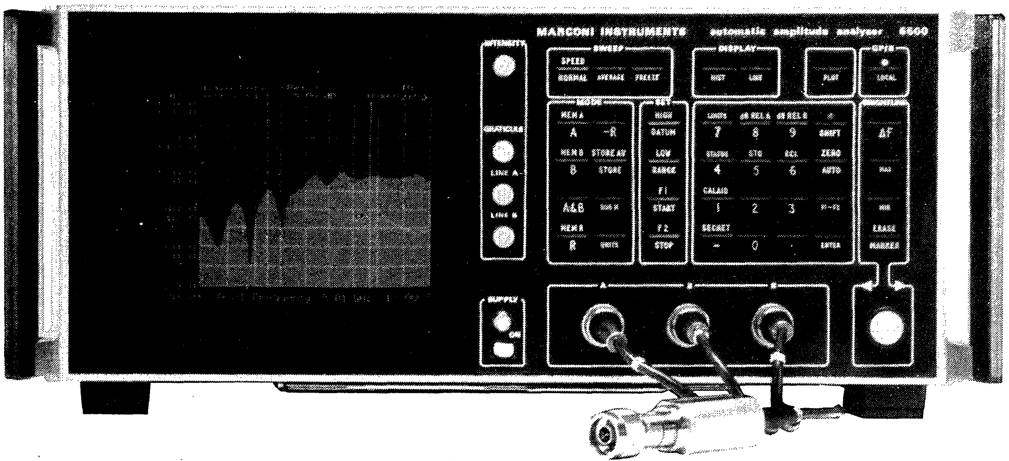

MARCONI INSTRUMENTS
modulation meter 2305
FREQUENCY
2000.0000
MODULATION
0.000
FILTERS Hz
DATA
FUNCTION
DE-EMPHASIS
RF INPUT
LF OUTPUT
IF OUTPUT

Now priced at $6500

Model 2305 2GHz Modulation Meter – Available on GSA

MODULATION METERS

AM/FM MODULATION METER Model 2305 (6625-01-154-4844)	500kHz to 2GHz GPIB	Measures FM to 500kHz, AM to 99%, ϕM to 500 radians with modulating frequencies up to 300kHz. Selectable automatic or manual tuning including display of carrier or modulation frequency. Choice of band limiting filters to optimize measurement of residual noise, S/N ratio, and frequency response. Design includes non-volatile memory and full GPIB programming facilities. Optional direct measurement of distortion and power.
AM/FM MODULATION METER Model 2304 (6625-01-033-5835)	25MHz to 1000MHz	Completely automatic tuning and level setting. Measures FM on ranges 1.5kHz to 150kHz, AM 30% and 100% for modulating frequency 50Hz to 9kHz. Accuracy 3%. Optional internal rechargeable battery.


MARCONI INSTRUMENTS automatic amplitude analyzer 6500
SWEEP
DISPLAY
GPIB
INTENSITY
GRATICULE
SUPPLY

Now with enhanced software $5795 plus sensors

Model 6500 Automatic Amplitude Analyzer. - available on GSA

MICROWAVE PRODUCTS

AUTOMATIC AMPLITUDE ANALYZER Model 6500 ***NEW***	10MHz to 126GHz GPIB	Provides versatile and accurate scalar measurements with on screen graphics. Includes direct display of transmission loss/gain, return loss, VSWR and absolute power. Dynamic range of at least 66dB, 71dB with noise reduction. Designed to be used with any sweeper. All functions keyboard/GPIB controlled with comprehensive memory system.
AM/FM SIGNAL SOURCE Model 6158A	8GHz to 12.4GHz GPIB	A tuneable X-Band solid state oscillator using a GaAs FET as the active element with a YIG resonator. Output has — 40dB harmonics and — 60dBc spurious for accurate use with 6500 Scalar Analyzer.
MICROWAVE COUNTER Model 2440 ***NEW***		Compact three channel automatic frequency counter with 0.1 Hz resolution to 20 GHz. Microprocessor control provides simple operation and flexibility from keyboard or GPIB. Acquisition time is typically 200 ms for fast response even in presence of high AM or FM, and levels up to + 27 dBm.

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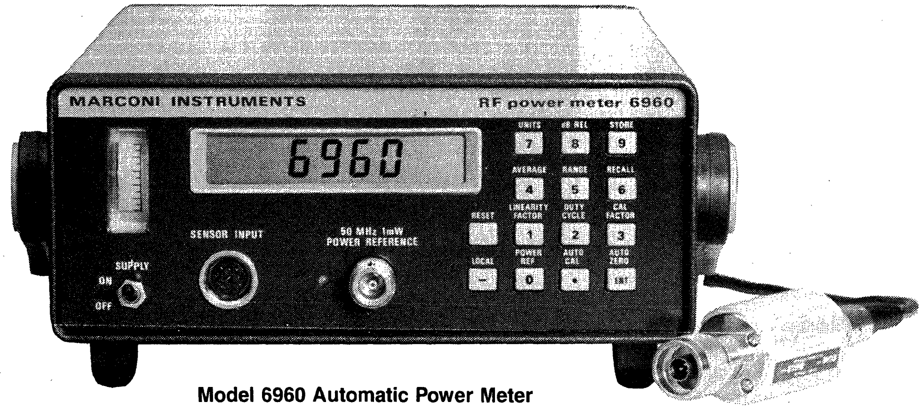
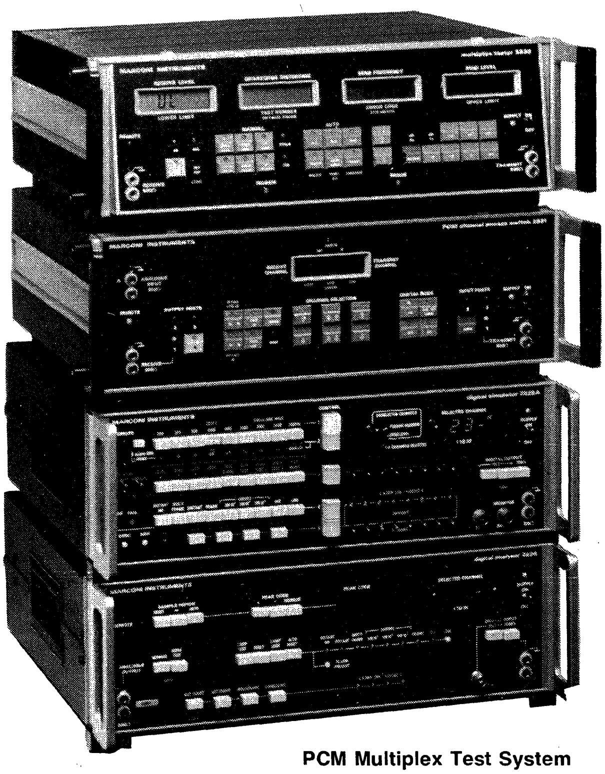
Now $2395
plus choice
of sensors



Model 6960 Automatic Power Meter
Available on GSA

POWER METERS

AUTOMATIC RF POWER METER Model 6960 ***NEW***	10MHz to 20GHz GPIB	Microprocessor controlled, fast response Power Meter with auto-range, auto-calibration, and auto-zero facilities. Under GPIB control, measurements can be made in less than 25ms. Includes non-volatile memory, self-test capability, and corrections for duty cycle and power meter nonlinearity. Choice of sensors to meet desired sensitivity and frequency range.
PORTABLE RF POWER METER Model 6950 ***NEW***	10MHz to 20GHz	Lightweight analog power meter designed for applications where portability is essential. Indications in dB and mW with meter accuracy of ±2%. Response time continuously adjustable from 50ms to 15s. This fast response time makes the unit ideal for power meter leveling applications using the recorder output. An optional rechargeable battery pack can be fitted internally. Sensors available to meet desired sensitivity and frequency range.
AF POWER METER Model 893B	20Hz to 35kHz	Covers power range from 300μW to 10W full scale. Impedance 2.5Ω to 20kΩ in 48 steps. Balanced or unbalanced input, calibrated in volts and dBm. Version available with SINAD filter.



PCM Multiplex Test System

OTHER MARCONI PRODUCTS INCLUDE:

WHITE NOISE TEST SETS

Noise Loading Test Sets Models 2090B and 2090C are designed to meet both manual and automatic requirements of testing FDM multichannel systems. Units meet latest CCIR and CCITT accuracy requirements (399-3 & 482-1). Both units are suitable for use with either A or B series filters. Model 2090C is programmable via GPIB with suitable interface.

SPECTRUM ANALYZERS

Choice of Spectrum Analyzers Systems 2370, 2371 and 2373 covering 30Hz to 1.25GHz. All feature narrow dispersion of 20Hz per division, resolution 0.1dB, filter bandwidth from 5Hz to 50kHz, frequency measurement to counter accuracy and built-in tracking generator for network analysis.

BROADCAST TEST SYSTEMS

Systems to analyze and display all essential television transmission parameters associated with the vertical interval test signal and timing of horizontal and vertical blanking intervals. Audio test system automatically performs 17 parameter measurements on mono and stereo sound broadcast systems in seconds.

PCM & DIGITAL TEST SETS

Instruments to measure and analyze performance parameters of digital communications links and their associated channel banks.

EDDYSTONE RECEIVERS

Communications receivers covering 10kHz through 1GHz, suitable for primary or back-up receiver requirements.

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M D F PRODUCTS INC.

WHITE NOISE Generator

DIODES AND MODULES: 1 Hz TO 50 GHz

PLEASE NOTE - most of our customers do not purchase our standard units, as they require different parameters. Therefore, do not hesitate to submit your particular requirements.

SPECIAL NOTICE - we have LOWERED PRICES on over 50 Standard units and 37 "Specials". AND, we have ADDED 14 Standard diodes and 7 Standard modules to our line, BUT they are not listed below. Therefore, request our COMPLETE Catalog and Price List 5041.

MDF NOISE DIODES

DO-7 GLASS PACKAGE

- Flatness over Frequency Range: ±2db
- Operating Temperature Range: −55°C to +125°C

MDF PART NO.	FREQUENCY RANGE	MINIMUM RMS NOISE OUTPUT		OPERATING CURRENT -ma		TEST LOAD
		$\mu v/\sqrt{Hz}$	µv / B.W.	RANGE	TYPICAL	OHMS
Vz= 8.2v ± 20% - other zener voltages are available						
MDF402	10Hz - 20KHz	.8	113	.020 - .060	.045	600
MDF501	10Hz - 100KHz	.8	252	.020 - .060	.045	600
MDF505	10Hz - 500KHz	.8	565	.020 - .060	.045	600
MDF601	10Hz - 1MHz	.05	50	0.5 - 2.0	1.5	50
MDF603	20Hz - 3MHz	.05	86	0.5 - 2.0	1.5	50
MDF701	20Hz - 10MHz	.05	158	0.5 - 2.0	1.5	50
MDF703	20Hz - 30MHz	.05	273	0.5 - 2.0	1.5	50
MDF801	20Hz - 100MHz	.05	500	0.5 - 2.0	1.5	50
MDF803	1KHz - 300MHz	.03	520	1 - 10	1.5	50
MDF805	1KHz - 500MHz	.03	671	1 - 10	1.5	50
MDF901	30MHz - 1250MHz	.02	632	1 - 10	1.5	50
Vz= 14v ± 20% - other zener voltages are available						
MDF402H	10Hz - 20KHz	7.0	989	.020 - .060	.035	10K
MDF501H	10Hz - 100KHz	7.0	2213	.020 - .060	.035	10K
MDF505H	10Hz - 500KHz	7.0	4949	.020 - .060	.035	10K
MDF601H	10Hz - 1MHz	7.0	7000	.020 - .060	.035	10K

MDF NOISE MODULES

- Flatness over Frequency Range: ± 2db.
- Operating Temperature Range: −35°C to + 85°C.

MDF △ PART NO. * ↓ ↓	Frequency Range	△Available Minimum RMS Noise Output Levels per B.W.	Test Load Resistance	*Available Supply Voltage	Maximum Supply Current	Available Module Packages
		MV	OHMS	+Vdc	MA	
☐ MDF 402- ☐	10Hz - 20KHz	5,10,20,50,100,1000	50Ω To 600Ω available - please specify	12 to 50	10 ma max. for low output units - 150 ma max. for higher output units ↓	L W H 2.5 1.25 .75 4.0 2.0 1.0 5.0 2.75 1.5 2.5 2.0 .75 ↓
☐ MDF 501- ☐	10Hz - 100KHz	5,10,20,50,100,1000		12 to 50		
☐ MDF 505- ☐	10Hz - 500KHz	5,10,20,50,100,1000		12 to 50		
☐ MDF 601- ☐	10Hz - 1MHz	5,10,20,50,100,1000		12 to 50		
☐ MDF 603- ☐	10Hz - 3MHz	5,10,20,50,100,1000		12 to 50		
☐ MDF 701- ☐	10Hz - 10MHz	5,10,20,50,100,1000		12 to 50		
☐ MDF 703- ☐	10Hz - 30MHz	5,10,20,50,100,1000		12 to 50		
☐ MDF 801- ☐	20Hz - 100MHz	5,10,20,50,100,1000		12 to 50		

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HIGHLY SENSITIVE
DC AC RF
TEST EQUIPMENT

MILLIVAC INSTRUMENTS

QUALITY, PRECISION
AND PERFORMANCE AT
COMPETITIVE PRICES

DC MILLIVOLTMETERS

- 100µV full scale to 1000V full scale
- Digital or analog readout
- Portable or panel mount
- Ease of calibration
- Compact, lightweight
- Left or center zero analog
- High input impedance

AC MILLIVOLTMETERS

- 10Hz to 2MHz
- 1mV full scale to 300V full scale
- True RMS indication
- Ease of calibration
- Digital or analog readout
- Portable or panel mount
- Compact, lightweight

RF MILLIVOLTMETERS

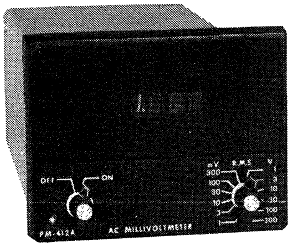
- 10KHz to 1.5GHz
- 1mV full scale to 300V full scale
- True linear response
- True RMS indication
- Programmable
- Digital or analog readout
- Line or battery power
- Portable, panel or rackmount
- Replaceable probe cartridge

MULTIMETERS

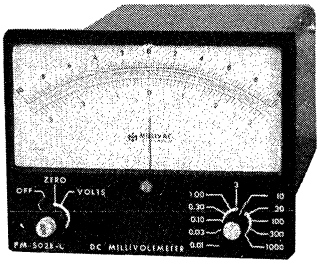
- 10µVDC full scale to 1000VDC full scale
- 10pA full scale to 1000mA full scale
- 3mVAC,RF full scale to 300VAC, RF full scale
- .1 Ohm to 5000 Meg Ohm range
- Individual calibration controls
- Line or battery power
- Portable or rackmount
- Left or center zero analog
- High input impedance
- DC recorder output

AC AMPLIFIERS

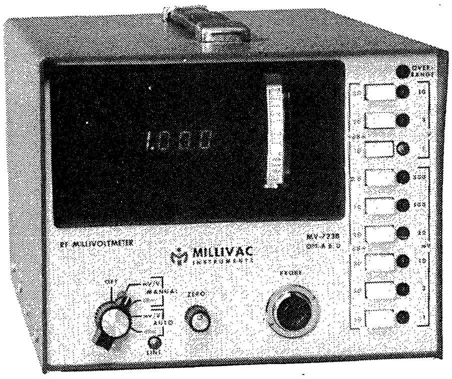
- Ultra low noise
- Variable gain, adjustable from 10dB to 60dB
- Variable bandpass limits from 5Hz to to 500KHz
- Selectable 10K ohm or 10Meg ohm input impedances
- Portable or rackmount
- Battery operated
- Rechargeable Ni-Cad batteries
- BNC input and output connectors
- Detachable input dividers



Model PM-412A
AC Millivoltmeter
1mV to 300V
full scale

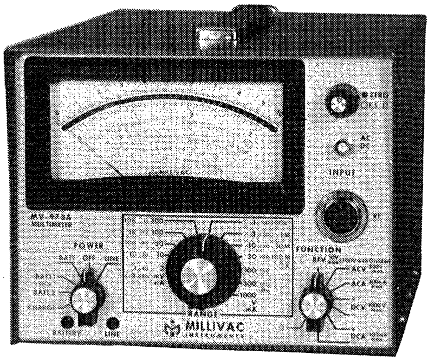


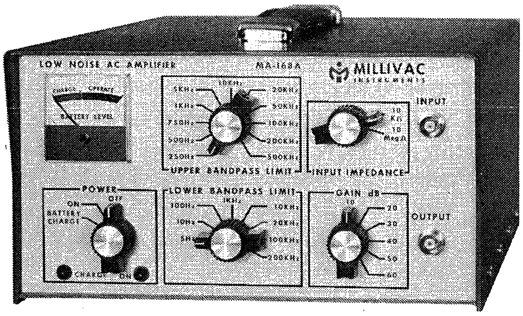
Model PM-502B-C
DC Millivoltmeter
10mV to 1000V
full scale



Model MV-723B
RF Millivoltmeter
with options:
autoranging,
BCD output
and dBm
readout
1mV to 10V
full scale

NEW
Model MV-973A
Multifunction Multimeter
DCV, DCA, ACV,
ACA, RFV and
Ohms
Battery or line
operated





NEW
Model MA-168A
Ultra Low Noise
AC Amplifier

The illustrations and highlights shown here are only representative of our complete line. Many additional models, options and accessories are available. Information and detailed specifications are available upon request.

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INSTRUMENTS, INC.

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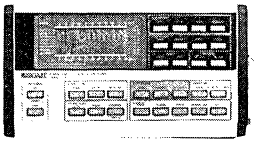
PROFESSIONAL ELECTRONIC INSTRUMENTS

MODELS 1310/1320



1310/ $1995.
1320/ $2495.

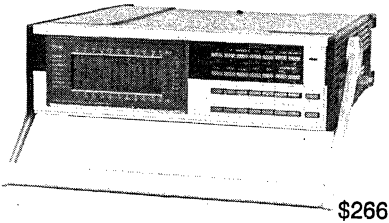
FEATURES

- Logic timing analyzer, state analyzer, and signature verifier analyzer.
- Ultra compact (B5 size) and light weight for convenient field service.
- Built-in memory back up batteries.
- High contrast liquid crystal dot matrix display.
- Trigger position, trigger pass count & trigger delay function.
- Single, repeat, & compare acquisition mode.
- X4 magnification, window display histogram display.
- Self-check & automatic power-off function.
- Data display, compare & search.
- Three power sources 1420

SPECIFICATIONS

Data Input Channel	16 Ch.
Input R/C	1MΩ ±5%/10 pF.
Logic Swing	Min. 500 mV p-p.
Max. Input Voltage	±30V
Glitch Pulse	Min. 15 ns
Threshold Level	TTL + 1.4V ±0.25V, VAR −2.2 ~ +7.5V.
Sampling: Internal Clock	100 ns ~ 200 ms, 1, 2, 5 Step (Model 1310); 50 ns ~ 200 ms, 1, 2, 5 Step (Model 1320, 1420).
External Clock	min. 100 ns (Model 1310); Min. 50 ns (Model 1320, 1420).
Min. Clock Pulse Width	20 ns (Hi or Low).
Data Set Up Time	25 ns.
Data Memory: Acquisition Memory	256 bit/ 1 ch x 16 ch.
Reference Memory	256 bit/1 ch x 16 ch.
Trigger Source	Internal, External, Glitch.
Trigger Position	Post-Word 12, Center-Word 127, Pre-Word 243.
Trigger Delay Setting	0 ~ 3800 Variable
Data Trigger Setting:	1, 0, x (Don't Care)
Glitch Trigger	16 Ch (Latch Mode)
Trigger Pass Count	0 ~ 15 Selectable.
Cyclic Trigger Mode	Single Mode, Repeat Mode, ACQ = REF Mode, ACQ = REF Mode.
Clock Qualifier	Input by Probe Q. Specify either "0", "1", "X" (Don't Care).
Trigger Qualifier	Input by Probe T. Specify either "0", "1", "X" (Don't Care).
Timing Display: Number of Display Channel	8 Ch/16 Ch (0 ~ 7 Ch, 8 ~F Ch).
Number of Timing Display	80 Bits (x1), 20 Bits (x4).
Magnification	Enlarged by 4 Times
Sub. Display	Blinking Cursor and Trigger Point Marker.
State Display: Display Code	Hexadecimal, Octal, Binary or ASCII
Data Table Size	4 Words.
Function	Search, Compare, Exchange, Save.
Window Display	Window Location, Trigger Position, Clock Number between Data Cursor and Trigger Point.

MODEL 1420



$2660.

SIGNATURE VERIFIER

Data Input R/C	1MΩ ± 5%/10 pF.
Logic Swing	Min. 500mV p-p, Max. −15V ~ +17.5V.
Max. Input Voltage	±30V.
Data Set-Up Time	20 ns.
Data Holding Time	0 ns.
Clock Input: Min. Clock Period	50 ns (20 MHz).
Min. Pulse Width	15 ns (High and Low).
Start/Stop Input: Min. Gate Length	1 Clock/ Cycle.
Max. Gate Interval Time	Unlimited.
Display Format	4-Character Signature.
Characters	0, 1, 2, 3, 4, 5, 6, 7, 8, 9, A, B, C, D, E, F.
Acquisition Mode	Single, Repeat, ACQ = REF, ACQ = REF.
Reference Data Memory	64 Words.
Acquisition Data	1 Word.
Pre-Acquisition Data:	1 Word
Function	Search, Compare, Exchange, Save.

BATTERY BACK-UP FUNCTION

Logic Analyzer	1 Reference Data, 1 Acquisition Data, and 2 Set-Up Parameters.
Signature Analyzer	64 Words Reference Data, 1 Acquisition Data, 1 Pre-Acquisition Data, and 1 Set-Up Parameter.
Memory Holding Time	Approx. 1 Year.

EXT. MODE

Expand & Remote	Optional

DISPLAY

Display	LCD 32 x 84 Dot, Dot Matrix.
LCD View Angle	Back-and-Fourth — ±10 to ±45 Degrees, Lateral Adjustment — ±30 Degrees.
LCD Contrast Control	x 10 (Adjustable).

POWER SUPPLY, ETC.

Model 1420	90 ~ 130V AC or 180 ~ 260V AC, 50 or 60 Hz, 3W Max. or Ni-Cad Battery.
Model 1310, 1320	AA Size Battery x 4 or AC, 2W Max.
Low-Battery Indication:	Low-Battery mark is lit when the Battery Voltage drops below Operating Voltage.
Automatic Power OFF	Approx. 5 minutes since last operation was made.
Operational Temperature	0 to 50°C, <80% RH.
Storage Temperature	−20 to 60°C, <70% RH.

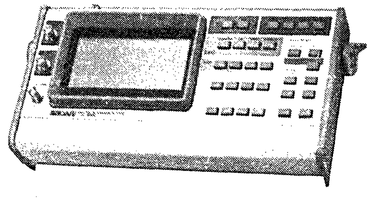
DIMENSIONS AND WEIGHT

Model 1310, 1320	253 (W) x 140 (D) x 38 (H) mm, Approx. 1 Kg.
Model 1420	241 (W) x 195 (D) x 70 (H) mm, Approx. 2.7 Kg.

ACCESSORIES

Instruction Manual	1
AA Size Battery	4 (Model 1310, 1320).
Logic Probe Unit	1
Carry Case	1 (Model 1310, 1320).
Power Source Cord	1 (Model 1420).
0.5A Fuse	2 (Model 1420).
AC Adapter	(Model 1310, 1320/Optional)

MODEL 1020



$2830.

FEATURES

- 20 MHz dual trace digital storage dot matrix LCD.
- Small size and light weight fits in attache case.
- Runs on 4 "D" size batteries for over 2.5 hours.
- Large LDC screen gives sharp, no bloom or blur image.
- Ideal for field service, telecommunications, computer, medical service etc.

SPECIFICATIONS

Sample Rate	1 MHz (CH A, CH B)
Display	128 x 256 Dot Matrix LCD
Vertical Bandwidth	20 MHz sequential sampling 100 kHz real time sampling
Cursor Function for P-P-Voltage and Delta Time	

Y AXIS OPERATION

Operating Mode	CH B, Dual, Add, (CH B Invert)
Frequency Characteristics	DC: 20 MHz (−3dB) AC: 10 Hz to 20 MHz (−3dB)
Deflection Factor	1-2-5 step 12 range 5mV/div
Resolution	8 bit
Input Coupling	AC-Gnd-DC
Input Impedance	1 M Ohm/20pF
Max Input Voltage	250 V (DC, AC, Peak)
Magnifier	x 2

X AXIS OPERATION

Time Base	1-2-5 step 18 range from 10 µs/Div to 5s/Div
Magnifier	x 10

TRIGGERING

Sweep Modes	Normal, Auto, Single roll
Trigger Source:	CH A, CH B, Ext.
Trigger Coupling	AC, HF-Rej, LF Rej, DC
Slope	Positive, Negative with variable control
Sensitivity	More than 0.5V/Div Internal More than 100mV Peak to Peak

MEMORY

Memory Size	8 bit by 2 K word
Memory Selector	Pre Trigger: 0-2048 word Post Trigger: 0-2048 word
Power Supply	D size battery x 4 (DC 6V) for AC adaptor
Battery Life:	2.5 hours
Power Consumption	6 W
Size	310 (W) x 160 (H) x 68 (D) mm 12¼" x 6¼" x 2⅝"
Weight	3 kg (6⅔ lbs.)

WARRANTY: One Year Parts and Labor
ALL PRICES SHOWN SUBJECT TO CHANGE WITHOUT NOTICE. PRICES SHOWN ARE FOR QUANTITIES OF 1 TO 3 PIECES OF A TYPE, DISCOUNTS AVAILABLE FOR HIGHER QUANTITIES.

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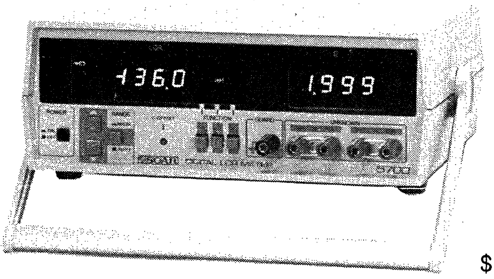
PROFESSIONAL ELECTRONIC INSTRUMENTS

AUTOMATIC DIGITAL LCR METER

MODEL 5700



$1399.00

FEATURES

- For contact resistance measurements on switches and relays, internal resistance measurments of batteries and junction capacitance in semiconductors, in addition to a wide variety of other component measurements.
- The use of auto-ranging and the automatic measurment mode automatically selects the optimum range to use in measuring an unknown component value.
- LCR Values are indicated on a 3.5-digit display and for L or C values, the dissipation factor D is also indicated simultaneously on a separate 3.5-digit display.
- A DC voltage output which is proportional to the measured value has been provided and is a convenient feature for use in driving such devices as analog recorders and comparators.

SPECIFICATIONS

Measured Items .... C (Capacitance) and (Dissipation factor) L (Inductance) and D (Dissipation factor) R (Resistance)
Display. .3-5-digit LED (maximum reading 1999)
Measurement Circuit Modes .. Parallel equivalent circuit (PARA) and series equivalent circuit (SER), automatically selected
Measurement Terminals: .... 5-Terminal configuration including voltage, current and guard terminals
Range Switching: ..... Automatic and manual
Measurement Frequency .... 1 kHz ±5&
External Bias .... 0 ~ 50 VDC
Bias may be applied at binding posts on the panel when making capacitance measurements
Analog Output ... 1.999V/1999 count (Internal resistance: 1 kΩ) LCR and D outputs (available at a BNC connectors on the rear panel)
Measurement Time ...... 1s or less until the measured value stabilizes
Sampling Time .... Approx 10 times/1s
Autoranging Time .... 100 x n (ms) (where n is the no. of ranges through which the auto-ranging circuit must step)
Operation Temperature ...... 0 ~ 40°C, 85% RH or less
Storage Temperature .... −20 ~ +70°C
Power Requirements ... 100 ~ 120 VAC/200 ~ 240 VAC ±10%, 48 ~ 66 Hz, 10 VA max
Size .... Approx. 260(W) x 95(H) x 249(D) mm
Weight .... Approx 2.3 kg

C-D Measurement (23°C ±5°C)

Accuracies are expressed as ± (percent reading + counts)

Measurement range	C	199.9 pF	1.999 nF	19.99 nF	199.9 nF	1.999 μF	19.99 μF	1999 μF	1999 μF
	D	0.001 ~ 1.999							
Measurement signal level		1V		100 mV		150 μA	1.5 mA	15 mA	15 mA
Measurement circuit mode		Parallel equivalent circuit				Series equivalent circuit			
Accuracy	C	0.3 + 2 counts + 0.2 pF				0.5 + 2 counts			1% + 2 counts
	D	0.5% + (2 + 1000/CX) counts				1% + (5 + CX/500) counts			

L-D Measurement (23°C ±5°C)

Measurement range	L	199.9 μH	1.999 mH	19.99 mH	199.9 mH	1.999H	19.99H	199.9H
	D		0.001 ~ 1.999					
Measurement signal level		100 mA	10 mA	1 mA	100 μA	10 μA		1 μA
Measurement circuit mode		Series equivalent circuit						
Accuracy	L	0.5% + 2 counts + 0.2 μH						1% + 2 counts
	D	1% + (3 + 200/LX) counts						

R Measurements (23°C +5°C)

Measurement range	1.999Ω	19.99Ω	199.9Ω	1.999 kΩ	19.99 kΩ	199.9 kΩ	1999 kΩ
Measurement signal level	100 mA	10 mA	1 mA	100 μA	10 μA		1 μA
Measurement circuit mode	Series equivalent circuit						
Accuracy	0.3% + 2 counts + 2 mΩ						

WARRANTY: One Year Parts and Labor
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SOAR corporation

NORTH AMERICAN SOAR CORPORATION

1126 CORNELL AVENUE / CHERRY HILL, NEW JERSEY 08002 / PHONE: 609-488-1060
PROFESSIONAL ELECTRONIC INSTRUMENTS

OPTICAL POWER MULTIMETERS

MODEL 1800 Series

Model 1800 (850nm)
Model 1801 (850nm with light source)
Model 1810 (1300nm)
Model 1811 (1300nm with light source)

OUTPUT
INPUT
- 20.0 dBm
OFFSET
SOAR 1801
OPTICAL POWER METER

1800/ $490.00.
1801/ $550.00.
1810/ $890.00.
1811/$1699.00.

FEATURES

- Designed for use in measuring optical power from fiber optics cables used for communications and in measuring optical attenuation and includes a DMM (digital multimeter) functions as well in a single compact case.
- Measure fiber optic power in watts and dBm for quick accurate gain or loss indication, plus zero reference and offset functions.
- Model 1801 and 1811 have optical power output functions.
- Uses two sensors to cover the wide wavelength range of 480nm to 1800nm using the wavelength sensitivity response chart.
- Designed for simple operation and easy sensor replacement. Several sensors are available to suit the measured wavelength, enabling direct reading of measured values. Also, by changing the measurement-end adaptor, matching is possible to a variety of connector types, enabling measurements not only of fused silica fibers but on plastic fibers as well.
- The DMM section provides six measurement functions as well as a temperature measurment function, making the instrument a versatile tool.

SPECIFICATIONS

Measurment Functions
Optical Section .. Absolute value measurement (W, dBm), Relative value measurement (dB, REF)
DMM Section .... DC Voltage, AC Voltage, DC Current, AC Current, Resistance, Continuity Check, Temperature
Sampling .... 2 times/s

Display
Type .. 3½ digit LCD (maximum display 1999)
Polarity .... Automatic (−) for negative values only
Overflow Display .. OL indicator (for the resistance mode only, the most significant digit is displayed as "1")
Operating Temperature ... 0 ~40°C (80% RH or less, non condensing)
Power Supply .. Four AA type batteries or AC adaptor (option), four Ni-Cad batteries usable as well
Power Consumption .. Approx. 36 mW (LED off)
Battery Life .... LED off — Approx. 120 hr
LED on — Appprox. 10 hr
After full Ni-Cad battery charge with LED off — Approx. 70 hr
Battery Low Alarm .. When the battery voltage drops below the minimum operating voltage, the BT mark appears in the display
Outer Dimensions .... 90(W) x 165(H) x 40(D)
Weight ..... Approx. 450g (including batteries)

Accessories

0.85 μm sensor	1 (1800, 1801)
1.3μ m sensor	1 (1810, 1811)
FC-type Connector Adaptor	1 (1800, 1810)
FC-type Connector Adaptor	2 (1801, 1811)
Wavelength sensitivity response chart (typical value)	1
AA Type Batteries	4
Ni-Cad Batteries (option)	4
Hard Carrying Case	1
Test Probe	1 (set)
Spare Fuse	1
Instruction Manual	1

OPTICAL METER

SENSOR SECTION

Model / Item	Short wavelength sensor (1800-08)	Longe wavelength sensor (1800-13)
Light-receiving element	Silicon photodiode	Germanium photodiode
Light-receiving window	4.6 mm x 3.9 mm	2 mmϕ
Wavelength range	0.48 μm ~ 1.05 μm	1.0 μm ~ 1.8 μm
Measurement range	−60 dBm ~ +3 dBm	− 50 dBm ~ +3 dBm

MAIN UNIT

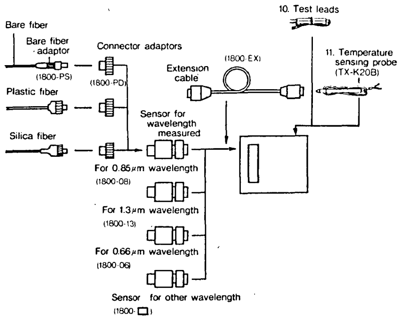
Model / Item	1800	1801	1810	1811
Measurement accuracy	±5% (at the calibrated waveform for each sensor −20 dBm, after adjusting offset)			
Resolution	0.1 dB or 1/2000 of display range			
Emitted wavelength		0.85 μm band		1.3 μm band
Output power		−25 dBm or greater		−30 dBm or greater

MULTIMETER SECTION (23°C ±5°C)

Function	Range	Accuracy (TYP)	Resolution
DCV	200 mV ~ 500V/5 range	1*	0.1 mV ~ 1V
ACV	200 mV ~ 500V/4 range	±1% ±5 dgt	1 mV ~ 1V
DCA	200 mA/1 range	±1% ±1 dgt	100 μA
ACA	200 mA/1 range	±1.5% ±5 dgt	100 μA
Resistance	200Ω ~ 20 MΩ/6 range	2*	0.1Ω ~ 10 kΩ
	200Ω/1 range	Approx. 50Ω or less for beeper	0.1Ω
°C	−20 ~ 700°C	±2% ±2°C	1°C

* 1. ±0.35% ±2 dgt (200 mV), ±0.5% ±1 dgt (2000 mV ~ 500V)
* 2. ±0.7% ±3 dgt (200Ω), ±0.7% ±1 dgt (2000Ω ~ 200 kΩ), ±1% ±2 dgt (2000 kΩ), ±2% ±2 dgt (20 MΩ)

CONFIGURATION



OPTIONS

No.	Product	Model	Description
1	Sensor	1800-08	0.85 μm wavelength −60 ~ +3 dBm
2	Sensor	1800-13	1.3 μm wavelength −50 ~ +3 dBm
3	Sensor	1800-06	0.66 μm wavelength −60 ~ +3 dBm
4	Sensor	1800-□	User-specified wavelength (3 month delivery)
5	Sensor extension cable	1800-EX	Cable length: 1m
6	Connector adaptor	1800-FC	For FC type silica fiber connector
7	Connector adaptor	1800-D	For D type silica fiber connector
8	Connector adaptor	1800-OF	For OF-2 type silica fiber connector
9	Connector adaptor	1800-SM	For SMA (mil) type silica fiber connector
10	Connector adaptor	1800-PD	For 905D type plastic fiber connector
11	Connector adaptor	1800-PB	For MBO type plastic fiber connector
12	Bare fiber adaptor	1800-PS	For plastic fibers
13	Temperature sensing probe	TX-K20B	K(CA) Thermocouple sensor −20°C ~ 300*C surface measurement
14	Ac adaptor	MQ-51	DC6V, 100 mA

* 0.85 μm = 850 nm, 1.33 μm = 1330 nm, 0.66 μm = 660 nm

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SOAR corporation

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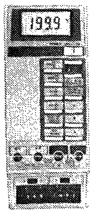
PROFESSIONAL ELECTRONIC INSTRUMENTS

3½ DIGIT MULTIMETER WITH COMPARATOR

MODEL 3025



$179.

FEATURES

- The use of SOAR CORP. custom-designed 80-pin LSI chip allows a low overall parts count that assures long-term stability and accuracy.
- The 3025 contains a built-in comparator circuit (High-Low Limit Set) that operates on all functions and is ideal for production line testing or incoming parts QC.
- Tactile switching for full auto or manual range (except current).
- Overload protection is built-in on all functions and ranges, surge protection up to 6000V.
- A fast response continuity check feature with "No Look" audible beeper sound is included.
- The LCD readout includes annunciators for function, unit, polarity, decimal, low battery and continuity plus auto polarity.
- Housed in a fully RFI/EMI shielded ABS plastic case with tilt stand for rugged everyday use. Safety designed probes, battery, fuse and spare fuse are included.

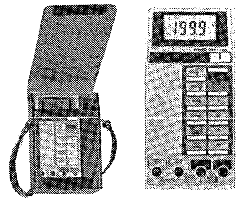
SPECIFICATIONS
FOR MODELS 3025, 3030, 3050, 5025, 5030

Display ... 3½ digit LCD, max. reading 1999. Annunciators include mV, V, µA, mA, A, Ω, kΩ, MΩ, .))) (buzzer), B (low battery), AC, "−" (minus sign) and + (diode check)
Switching ..... 6 touch-button function and 6 touch-button range tactile switch
Operation ...... Manual or automatic (except current)
Polarity ... Automatic, "+" inferred, "−" in display window
Operating Temperature ... 0°C to 40°C at 80% RH or less
Storage Temperature . −20°C to 60°C at 70% RH or less
Calibration ... Accuracy guaranteed for 1 year
Measurement Rate ..... 4 measurements per second nominal
Battery Type & Life .. 2 "AA" size 1.5V, >600 hours continuous with alkaline batteries, >400 hours typical with zinc carbon
Probes .... One red, one black, safety type
Fuse .... GMA type, 250V, 0.3A
Overrange Indication ...... Leading digit "1" displayed

MODELS 3030, 3050
Size ..... 6¼" x 3" x 1⅜" 160(H) x 76(W) x 35(D) mm
Weight ...... 8 oz. (225 grams) less batteries
Optional Accessory ..... Model CC-531 Deluxe Carrying Case is constructed of ⅛" simulated leather, saddle-stitched with velcro close cover and separate probe compartment

3½ DIGIT LCD AUTO/ MANUAL RANGE DMM

MODEL 3030/MODEL 3050



3030/ $139.
3050/ $115.

FEATURES

- The use of SOAR CORP. custom-designed 80-pin LSI chip allows a low overall parts count that assures long-term stability and accuracy.
- The 3030 and 3050 contain a diode check function.
- Touch switch selection for full auto-ranging or manual range (except current).
- Overload protection is built-in on all functions and ranges, surge protection up to 6000V.
- A fast response continuity check feature with "No Look" audible beeper sound is included.
- The LCD readout includes annunciators for function, unit, polarity, decimal, low battery, continuity and diode check.
- Housed in a fully RFI/EMI shielded ABS plastic case with tilt stand for rugged everyday use. Safety designed probes, battery, fuse and spare fuse are included.

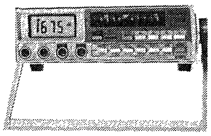
MODEL 3025
Size ..... 7⅜" x 3" x 1⅜" 188(H) x 76(W) x 35(D) mm
Weight ..... 11 oz. (310 grams) less batteries

MODELS 5025, 5030
Battery Type & Life ... 4 "C" size 1.5V, >300 hours continuous use with alkaline batteries, >200 hours typical with zinc carbon
AC Operation ...... Optional AC adaptor Model MQ-62
Probes .... One red, one black, safety type
Fuse .... 3 AG type, 250V, 0.2A
Overrange Indication .... Leading digit "1" displayed
Size ... 2¼" x 7¼" x 7⅛" 57(H) x 186(W) x 180(D) mm
Weight : 1 lb., 14 oz. (845 grams) less batteries

NOTE: Models 3030 and 3050 are identical in size, shape and layout. All range, accuracy etc. data listed in the bottom page 7 right column are for Models 3025, 3030, 3050, 5025, 5030.

3½ DIGIT LCD AUTO/ MANUAL BENCH DMM

MODEL 5025



$249.

FEATURES

- Uses SOAR custom 80-pin LSI chip for low parts count assuring long-term stability and accuracy.
- The 5025 contains a high-low limit set comparator circuit for all functions, ideal for production line or QC, etc. Has pass-fail beeper and LED indicators. Two 3½ digit thumbwheel switches with "+" "−" for high-low setting.
- Model 5025 has 8 channels of parallel BCD data out at the TTL level via rear panel connector giving all pertinent front panel readings and settings (10-pin connector supplied).
- Positive action tactile switching, full manual or auto-ranging (except current), built-in overload protection with surge up to 6000V, continuity beeper, LCD with annunciators, rugged ABS plastic case with U-bracket handle/tilt stand, supplied with safety probes, batteries and spare fuse. MQ-62 AC adaptor optional.

Range	Resolution	3050 Accuracy	All Other	Input Impedance	Overload Protection
DC Volts					
200mV	0.1mV	±0.5% reading ±2 digit	±0.25% reading ±2 digit	1000MΩ	DC/AC 1100 800 Vrms
2000mV	1mV	±0.5% ±1 digit	±0.25% ±1 digit	11MΩ	
20V	10mV			10MΩ	
200V	100mV				
1000V	1V				
AC Volts					
2000mV	1mV	±0.75% ±5 digit 40Hz~ 500Hz	±0.5% ±5 digit 40Hz~ 500Hz	11MΩ	DC/AC 1100 800 Vrms
20V	10mV			10MΩ	
200V	100mV				
750V	1V				
Ohms					
200Ω	0.1Ω	±0.5% ±3 digit	±0.25% ±3 digit	Test current 0.7mA	250V (0.2A Fuse)
2000Ω	1Ω	±0.5% ±1 digit	±0.25% ±1 digit	0.1mA	
20kΩ	10Ω			30µA	
200kΩ	100Ω			4µA	
2000kΩ	1kΩ	±1.0% ±2 digit	±1.0% ±2 digit	0.4µA	
20MΩ	10kΩ	±2.0% ±2 digit	±20% ±2 digit	0.04µA	
DC Amps					
200µA	0.1µA	±0.75% ±1 digit	±0.75% ±1 digit	Max. voltage drop Less Than 0.25V	250V (0.2A Fuse)
2000µA	1µA				
20mA	10µA				
200mA	100µA	±1.0% ±1 digit		Less Than 0.7V	
10A	10mA		±1.0% ±1 digit	Less Than 0.25V	—
AC Amps					
200µA	0.1µA	±1.0% ±5 digit 40Hz~ 500Hz	±1.0% ±5 digit 40Hz~ 500Hz	Max. voltage drop Less Than 0.25V	250V (0.2A Fuse)
2000µA	1µA				
20mA	10µA				
200mA	100µA	±1.2% ±5 digit 40Hz~ 500Hz	±1.2% ±5 digit 40Hz~ 500Hz	Less Than 0.7V	
10A	10mA			Less Than 0.25V	—
***Diode Test**					
0~ 1000mV	1mV	±5% ±1 digit	±5% ±1 digit	Test current 0.6mA	Open voltage 1.5V
Continuity Check					
All Ω	Buzzer	20Ω ±10Ω	20Ω ±10Ω	Test current 0.7mA	Open voltage 1.5V

* No diode test on Model 3025

WARRANTY: One Year Parts and Labor
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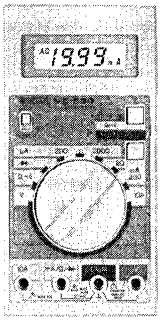
3½ DIGIT MULTIMETER WITH AUTO/MANUAL RANGE

MODEL ME-530



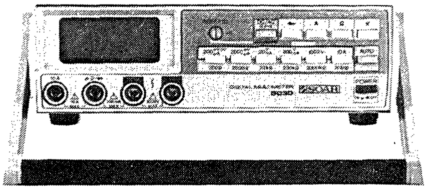
$69.

FEATURES

- Uses SOAR CORP. custom high density LSI chip to achieve low parts count for long term stability and accuracy.
- Auto- or manual-range for AC/DC volts and resistance.
- AC/DC current measurements from 0.1 μA to 10A on 5 ranges
- All AC/DC volts and resistance ranges are the same as ME-540 but DCV accuracy is ≤±0.5%.
- Has diode test and built-in continuity beeper.
- Comes complete with test leads, batteries, fuse and spare fuse.
- Overload protection is built-in on all functions and ranges. Surge protection up to 6000V.

3½ DIGIT LCD AUTO/ MANUAL BENCH DMM

MODEL 5030



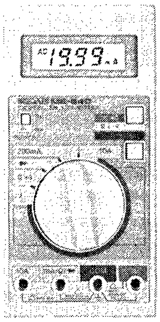
$179.

FEATURES

SOAR CORP. Model 5030 contains all the operating specifications/features and is housed in the same case as the Model 5025, but does not have the High/Low Limit Set Comparator Circuit and BCD output. The 5030 is ideal for bench or field service use. The use of tactile switches permits positive function/range selection without the pressure associated with spring loaded pushbuttons. Supplied with safety test leads, batteries and spare fuse. AC adaptor MQ-62 available separately.

7 FUNCTION AUTO/ MANUAL RANGE DMM

MODEL ME-540



$59.

FEATURES

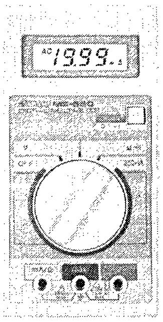
- Uses SOAR CORP. 80 pin LSI for low parts count that assures long term stability and accuracy, runs for over 500 hours on 2 "A" batteries.
- Manual or Auto-ranging for AC/ DC volts and ohms.
- Has diode test, continuity beeper and 10 Ampere AC/DC range, 1000 MΩ input resistance on 200 mV DC range, standard 10 MΩ all other.
- Auto polarity and decimal, large distinct numeral readout also has annunciators plus low battery indicator.
- Rugged ABS plastic case, LCD protective lens, RFI/EMI shielding, full overload protection for all functions, can withstand up to 6000V surge.
- Comes complete with two 1.5V "AA" batteries, test leads and spare fuse.

SPECIFICATIONS

DC Volts .... Resolution 0.1 mV to 1000V on 5 ranges accuracy <±0.7% reading ±1 digit
AC Volts ..... Resolution 1.0 mV to 750V on 4 ranges accuracy <±1% reading ±5 digits 40 Hz to 500 Hz
DC Current ... Resolution 100 μA to 10A on 2 ranges; accuracy <±1.2% reading ±1 digit; Max V drop <0.7V
AC Current ... Resolution 100 μA to 10A on 2 ranges; accuracy <±1.5% reading ±1 digit; Max V drop <0.7V
Resistance ... Resolution 0.1Ω to 20 MΩ on 6 ranges; accuracy <±0.8% reading (2000 kΩ <±1%, 20 MΩ <±2%); Max test current 0.7 mA diminishing to 0.04 μA
Diode Test .... Range 0 to 1000 mV, accuracy ±5% reading ±1 digit, Test current~0.6 mA, open voltage 1.5V
Continuity Test .. Range 200Ω, resolution 0.1Ω, buzzer goes on if circuit is less than 20Ω ±10Ω; Test current <0.7 mA, Open Voltage~1.5V
Size .. 6¼" x 3⅛" x 1⅛" (160 mm x 80 mm x 30 mm) HWD
Weight .... ½ lb. (~225g.)

6 FUNCTION AUTO RANGE DMM

MODEL ME-550



$49.

FEATURES

- Uses SOAR CORP. 80 pin LSI for low parts count that assures long term stability and accuracy, runs for over 500 hours on 2 "AA" batteries.
- Full auto-ranging for easy quick readings.
- Has continuity beeper, 1000 MΩ input resistance on 200 mV DC range for virtually no circuit loading of low output devices, standard 10 MΩ all other ranges.
- Auto polarity and decimal with full function annunciators plus low battery indicator.
- Rugged ABS plastic case, LCD protective lens, RFI/EMI shielding, full overload protection for all functions, can withstand up to 6000V surge.
- Comes complete with two 1.5V "AA" batteries, test leads and spare fuse.

SPECIFICATIONS

DC Volts ... Resolution 0.1 mV to 1000V on 5 auto ranges; accuracy <±0.8% reading ±1 digit
AC Volts ... Resolution 1 mV to 750V on 4 auto ranges; accuracy <±1.2% reading ±5 digits; 40 Hz to 500 Hz
DC Current ... Resolution 100 μA to 200 mA on 1 range; accuracy <±1.2% reading ±1 digit; Max V drop <0.7V
AC Current ... Resolution 100 μA to 200 mA on 1 range; accuracy <±1.5% reading ±1 digit; Max V drop <0.7V
Resistance ..... Resolution 0.1 to 20 MΩ on 6 auto ranges; accuracy <±0.8% reading ±1 digit (2000 kΩ <±1.0 reading 20 MΩ <±2% reading + 2 digits); Test current 0.7 mA diminishing to 0.04 μA
Continuity Test .. Range 200Ω, resolution 0.1Ω, buzzer goes on if circuit is less than 20Ω ±10Ω; Test current <0.7 mA, Open Voltage~1.5V
Size .. 6¼" x 3⅛" x 1⅛" (160 mm x 80 mm x 30 mm) HWD
Weight .... <½ lb. (<225g.)

WARRANTY: One Year Parts and Labor

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SOAR corporation

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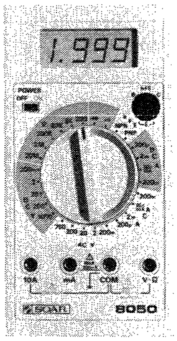
SUPER PERFORMANCE DMM

MODEL 8050



$76.50

FEATURES

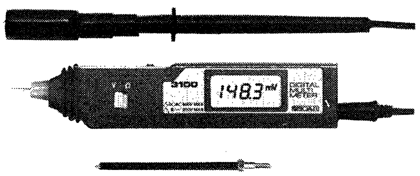
- 30 ranges, 8 functions, full overload protection.
- 10 Amperes AC and DC ranges.
- Super fast continuity beeper (<0.4 sec. response).
- Diode test plus transistor hFE.
- Large bold ½" LCD readout with low battery indicator.
- Complete with test leads, battery and spare fuse.
- Optional carrying case CC531, $9.90; transistor test extension leads UP-11, $4.50.

SPECIFICATIONS

DC Volts ...... Measure 0.1 mV to 1000V on 5 ranges; 1 yr. accuracy ±0.5%~0.8%, Input Res. 10 MΩ; Overload 1000 VDC or AC Peak all ranges
AC Volts ...... Measure 0.1 mV to 750V on 5 ranges 1 yr. accuracy ±1% Input Imp. 10 MΩ; Freq. response 45 to 500 Hz; Overload 750 Vrms/DC
DC Current ...... Measure 0.1 µA to 10A on 5 ranges; 1 yr. accuracy ±1%; Overload 0.5A/250V fast fuse; Max. burden 250 mV (700 mV on 10A)
AC Current ...... Measure 0.1 µA to 10A on 5 ranges; 1 yr. accuracy ±1.2%; Overload 0.5A/250V fast fuse; Max. burden 250 mV (700 mV on 10A)
Resistance ..... Measure 0.1Ω to 20 MΩ on 6 ranges; 1 yr. accuracy ±1% (±2% on 20 MΩ); Overload 250 VDC or AC rms
Diode Check ... Range 0~1.5V @ 1 mA typ. open ckt. V 2.8 typ.; Overload 250 VDC or AC rms
Transistor Check .. hFE (NPN or PNP) 0~1000; Vce = 2.8V
Continuity Check ... Buzzer, R = <20Ω ±10Ω
Power .... 9V Battery, life >200 hr.
Size/Weight .... 6¼" x 3⅓" x 1"; ½ Lb.

PEN TYPE DIGITAL MULTIMETER

MODEL 3100



$55.

FEATURES

- Uses SOAR CORP. Custom 80 pin LSI chip for expanded range capability, low parts count for long term stability and accuracy.
- Small size, one hand operation, rugged ABS plastic case with RFL/EMI shielding.
- Measure DCV from 0.1 mV through 500V, ACV 1 mV through 500V and resistance from 0.1 Ohm through 20M Ohms.
- Has Continuity check with buzzer, and data hold switch.
- LCD 3½ digit display with annunciators, auto polarity and auto decimal.
- Comes complete with batteries, two interchangeable probe tips ground lead, alligator clip and carrying case.

SPECIFICATIONS

Display ...... LCD 3½ digits reading of 1999 Display annunciators
Range .... Auto ranging
Polarity ... Automatic no indication for positive polarity, minus (−) sign for negative polarity
Over range indication . MBS 1 or −1 indication
Data hold ..... Data hold in all ranges by the hold switch ON
Low battery indication ... "B" mark is displayed when the battery voltage drops below operating voltage
Sampling .... 2 times/sec.
Operational temperature ... 0~40°C 80% RH MAX. (20 MΩ range: 70% RH)
Storage temperature ..... −20°C~60°C 70% RH MAX.
Power Supply .... SR44 (1.55V) x 2
Power Consumption .... 5.5 mW
Battery Life .... ~250 Hours
Size: ... ~6" x ¾" x 1¼" LWH (Less Probe Tips) [150 mm x 19.5 mm x 30 mm]
Probe Tips ½" and 2" (12 mm and 50 mm)

DMM ACCESSORIES

UP-11 Transistor Test Leads for 8050 ... $4.50
UP-12 IC (Mini-Hook) Test Leads Slip on Over Regular Test Lead Points ... $4.15
UP-13 Universal Test Lead Kit has Banana Plugs, Test Points, Spade Lugs, Shielded Clips, 52" Leads .. $7.50
TLD-1 Deluxe Leads, Two Banana Plugs to Shielded Alligator Clips on 30" Two Conductor Single Cable $6.00
MQ-62 AC Adaptor $12.00

WARRANTY: One Year Parts and Labor

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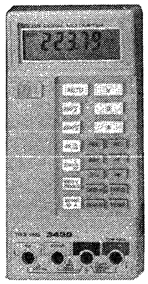
4½ DIGIT PORTABLE DMM

MODEL 3430 - PROFESSIONAL SERIES



$349.

FEATURES

- SOAR CORP. Custom LSI Chip with 25,000 count for extended range accuracy basic DCV ±0.04%
- 13 Functions including dBm, Freq., Temp., Relative V_2 −V, Data and Peak Hold.
- True RMS, input resistance on 250 mV range 1000 MΩ, standard 10 MΩ all other.
- Full overload protection on all ranges except 10 Amperes.
- Auto or Manual range with full annunciators in LCD readout.
- Comes complete with safety test leads, 9V battery, fuse and spare, tilt stand, with optional AC Operation.

SPECIFICATIONS

DC Volts ... Resolution 10 µV to 1000V on 5 ranges, accuracy ±0.04
AC Volts ... Resolution 10 µV to 1000V on 5 ranges accuracy ±0.3~0.5~0.75%, Freq. 20 Hz~30 kHz.
DC Current ... Resolution 10 µA to 10 Amperes on 2 ranges accuracy ±0.25% & ±1%
AC Current ... Resolution 10 µA to 10 Amperes on 2 ranges, accuracy ±0.5% & ±2%. Freq. 20 Hz~10 kHz crest factor 3
Resistance ... Resolution 0.01Ω to 25 MΩ on 6 ranges, accuracy ±0.06% to 0.75% on 25 MΩ range
Frequency ... Resolution 0.001 Hz to 100 kHz on 4 auto ranges with 5 attenuator From 1:1 to 1:100000, AC coupled
ACV dBm . Auto ranging, 600Ω (1 mW>0 dBm) 0.775V = 0 dBm constant
Continuity Test ... Buzzer sounds, if resistance in test circuit is 20Ω ±10Ω
Diode Test ... Range 0~2499 mV, Test Current ~1 mA, open ckt.V~5V
Peak Hold ... For AC/DC Volts and current Min. Pulse Duration 5 msec. sensitivity same as range
Temperature ..... −50°C~1250°C (−58°F ~2282°F) Reads °C or °F K type sensor
Relative Test .... Touch Rel. Button and store input as zero. Ref displayed value is meas. value minus Ref Value
Data Hold ..... For AC/DC Volts and Current, Resistance, Temp. Diode, Ref.
3½ Digit Selectable .... When "ON" least significant digit is blanked
Size & Weight ... 177 mm x 40 mm x 90 mm (~7" x 1½" x 3½") 380g. (13.5 oz.)

MODEL 3450 is the same as the Model 3430 but less Peak Hold, Temperature and AC V/A is average sensing. Price .. $299.

SOAR corporation

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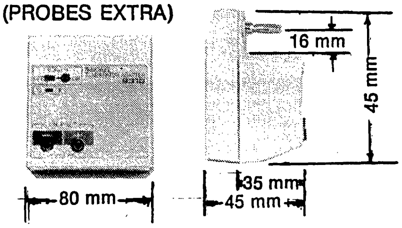
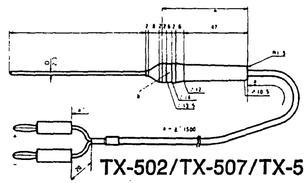
DMM TEMPERATURE ADAPTER

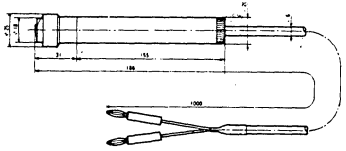
MODEL 9310

(PROBES EXTRA)



$75.


TX-502/TX-507/TX-512


TX-506

FEATURES

Model 9310 Temperature Adaptor can be used with DMM's having a DC 200 mV range, 10 MΩ input resistance and standard ¾″ spaced banana plug inputs (see note below). The output can be switch set to indicate either °C or °F. The 9310 was designed to work with most K type (CA) bi-metal sensors, such as our TX-502, TX-507 and TX-506 available separately (see below).

NOTE: Where direct physical matching of the 9310 to the DMM inputs isn't possible, banana plug/jack leads can be used.

SPECIFICATIONS
(+23°C ±5°C)

Range	−50°C∼+700°C ±(1% rdg. +2°C); Resolution 1°C or −58°F∼+1292°F ±(1% rdg. +4°F) Resolution 1°F
Output Voltage	On °C Setting: −5.0 mV∼70.0 mV (Display reading −50∼+700) On °F Setting: −5.8 mV∼129.2 mV (Display reading −58∼1292)
Temperature Coefficient	±(0.05% of rdg. +0.2°C)
Low Battery Indication	Power "ON" LED flashes
Battery (supplied)	One 9V transistor type
Weight (less battery)	250 grams (∼½ lb.) less battery
Accuracy of Probes	−50°C∼200°C, ±1°C to 400°C, ±2°C to 700°C ±.75 rdg.
TX-502	−50°C∼200°C
TX-507	−50°C∼700°C
Cable Length TX-502 and TX-507	125 cm (∼5 ft.)

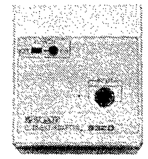
Bi-Metal Probes Class .75 CA Type K

TX-506	−50°C∼600°C - For Surface Measurements
Cable Length	125 cm (∼5 ft.)

Sensor same as TX-502/507

DMM AC/DC HI-CURRENT ADAPTOR

MODEL 9320



$60.

FEATURES

The 9320 was designed by SOAR to be used with the 9321 AC/DC clamp probe described below. It can be used with all DMM's having a DC 200 mV range, 10 MΩ input resistance and standard ¾″ spaced banana plug inputs. The physical dimensions are the same as Model 9310. Model 9320 provides the capability to measure high AC/DC current allowing technicians to extend the use of their DMM to measure motor, automobile, truck, boat, aircraft, appliance and other high current drain devices.

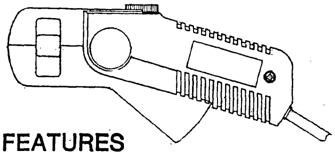
SPECIFICATIONS
(+23°C ±5°C)

Range	DC - 0∼200A, AC - 0∼150A ±(0.5% rdg. +0.2% FS) accuracy for 9320 only*
Resolution	1 ampere AC/DC
AC Frequency Response	50 to 100 Hz
Output Voltage	DC - 0∼20.0 mV (display reading 0∼200) AC - 0∼15.0 mV (display reading 0∼150)
Low Battery Indication	Power "ON" LED flashes
Battery (supplied)	One 9V transistor type
Weight (less battery)	∼130 grams (∼⅓ lb.) less battery

*Accuracy 9320 and 9321:
DC - 0∼200A ±(3% rdg. +2 dgt.)
AC - 0∼50A ±(2% rdg. +2 dgt.)

AC/DC CLAMP PROBE

MODEL 9321



$29.

FEATURES

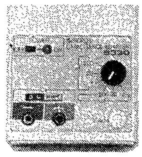
The 9321 was designed by SOAR to be used with the 9320. It uses a standard clamp around for all current measurements. Uses Hall effect sensor.

SPECIFICATIONS

Range	DC - 0∼200A ±(3% rdg. +2 dgt.) with zero adjust AC - 0∼150A ±(2% rdg. +2 dgt.) with zero adjust
Cable Length	∼1.5 meter (5¾ ft.)
I.D. Jaw Size	10 mm x 12 mm (2/5″ x 1/2″) Can fit cable up to 8 mm diameter
Weight	220 grams (∼½ lb.)

DMM CAPACITANCE ADAPTER

MODEL 9330



$55.

FEATURES

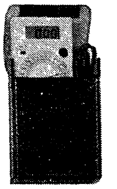
The 9330 was designed by SOAR to be used with DMM's having a DC 200 mV range; 10 MΩ input resistance and standard ¾″ spaced banana plug inputs. The physical dimensions are the same as Model 9310. Ideal for measuring capacitance in cable, switches, components as well as capacitors.

SPECIFICATIONS
(+23°C ±5°C)

Range	2 nF, Accuracy ±(0.8% rdg. +0.4% FS); 20 nF, 200 nF, 2 μF, Accuracy ±(0.8% rdg. + 0.2% FS); 20 μF, 200 μF, Accuracy ±(1.0% rdg. +0.2% FS); Resolution - one picofarad
Output Voltage	0∼199.9 mV (Display 0∼1999)
Test Method	Same as DMM dual slopo integrating
Low Battery Indication	Power "ON" LED flashes
Battery (supplied)	One 9V transistor type
Weight	200 grams (<½ lb.) less battery

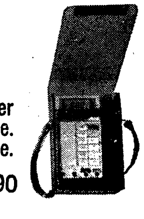
CARRYING CASES

Fits 8050, All ME-500 Series, 3030, 3050



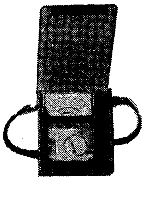
CC-531 with belt loop and Velcro close lid.

$9.90



CC-02 with shoulder strap Velcro close. Can use DMM in case.

$9.90



Fits SX-200 and SX-220

CC-200 with shoulder strap, Velcro close. Can use VOM in case.

$8.75

WARRANTY: One Year Parts and Labor

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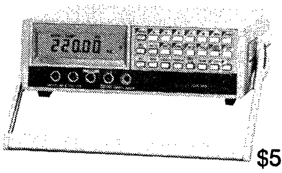
MODEL 5430



$599.00

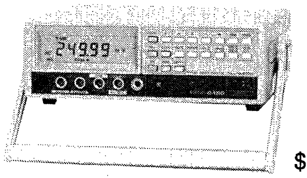
FEATURES

- 17 function, 46 ranges, microprocessor controlled using SOAR CORP. custom VLSI chip set with 25,000 count.
- Dual input frequency counter to 10 MHz and period.
- dBM, data hold, peak hold, temperature °C or °F with "K" Type thermocouple probe (optional).
- Comparator circuit for setting high/low limit with rear panel output.
- Front panel "key" lock, double fused, comes complete with voltage and freq. probes.
- Accuracy guaranteed 1 year, full annunciators in LCD.

SPECIFICATIONS

DCV	10 μV to 1000V on 5 Ranges (Manual/Auto) ±0.04%.
ACV	10 μV to 1000V TRMS on 5 Ranges (Manual/Auto) ±0.5%, ≥80 kHz.
DC Current	10 nA to 10A on 6 Ranges. ±0.2% (±1%, 10A)
AC Current	10 nA to 10A TRMS on 6 Ranges, ≥5 kHz, ±0.75%.
ACV and A Crest Factor	3
Resistance	0.01Ω to 25mΩ on 6 Ranges (Manual/Auto) ±0.06%.
Frequency	CH "A" 10 Hz to 100 kHz on 4 Auto Ranges, Resolution 0.001 Hz or 1 Hz ±0.02%, Period 99.999 ms to 9.000 μs on 4 Auto Ranges, Resolution Ins, ±0.02%, Attenuator 1:1, 1:10, 1:100, 1:1000, 1:10,000 (Manual Set) CH "B" 10 kHz to 10 MHz, Resolution 0.01 kHz, 0.1 kHz, ±0.02%.
Temperature	−50°C ~ 1200°C (−58°F ~ 2192°F) "K" Type Thermocouple. Switch Select °C/°F, ±0.5%, °C or °F. Resolution 1°C or °F.
ACV dBm	−50 dBm to 59.72 dBm (20 Hz ~ 100 kHz), Auto Range 0 dB = 0.7746V RMS, (600Ω, 1 mW).
Comparator Test Modes	DCV, ACV, DCA, ACA, Ω, "Lo", "Go", "Hi" LCD Indication, accurate to the L.S. Digit.
Data Hold Modes	DCV, ACV, DCA, ACA, Ω, Temp., Diode, Rel., can be set with Optional Data Hold Probe.
Peak Hold Modes	DCV, ACV, DCA, ACA, Temp. Acquisition Time DC V/A ≥5 ms, AC V/A ≥250 ms.
Relative Test	Input at Time Applied is Stored as "0" Reference.
Continuity Check	If Resistance ~ 20Ω or less Buzzer Sounds.
Diode Test	Range 0 ~ 2499.9 mV, Accuracy ±0.1%.
Max. Reading	LCD 4½ Digit 24999, Frequency 99999.
Power	100 ~ 240V, 50/60 Hz.
Size and Weight	3½" x 9⅝" x 9⅜" (88mm x 245mm x 240mm) 4 lbs., (1.8 kg).

MODEL 5450



$499.00

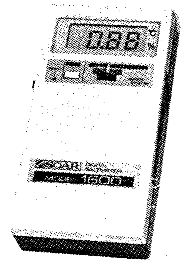
FEATURES

- Uses SOAR CORP. custom VLSI chip set for long term stability and accuracy.
- 13 functions, 33 ranges provides for most tests needed by the professional technician.
- The LCD readout has full annunciators that indicate both function and numeric value.
- In addition to AC/DC voltage, current, and resistance functions, the 5450 has diode test, continuity check, frequency, period, ACV dBm, relative test, data hold, with most functions manual or auto range selectable.
- Comes complete with probes, spare fuses. The accuracy is guaranteed for 1 year.

SPECIFICATIONS

DCV	10 μV to 1000V on 5 Ranges (Manual/Auto) ±0.7%.
ACV	10 μV to 750V TRMS on 5 Ranges (Manual/Auto) ±0.5%, ≥50 kHz.
DCA	10 μA to 10A on 2 Ranges, ±0.25%, ±1% on 10A.
ACA	10 μA to 10A TRMS on 2 Ranges, ±0.75%, ±2% on 10A, ≥5 kHz.
ACV or A Crest Factor	3
Resistance	0.01Ω to 25MΩ on 6 Ranges, (Manual/Auto) ±0.6%.
Frequency	10 Hz to 100 kHz on 4 Auto Ranges, Resolution 0.001 Hz to 1 Hz ±0.02%.
Period	99.999 ms to 9.000 μs on 4 Auto Ranges, Resolution to Ins, ±0.02%.
Input Attenuator	1:1, 1:10, 1:100, 1:1000, 1:10,000.
ACV dBm	−50 dBm to 59.7 dBm (20 Hz ~ 50 kHz), 0 dB = 0.7746 Vrms.
Data Hold Modes	DCV, ACV, DCA, ACA, Rel., Ω, Diode, dBm.
Relative Test	Input at time applied is stored as "0" Reference.
Diode Test	Range 0 ~ 2499.9 mV, Accuracy ±0.1%.
Continuity Check	If Resistance is ~ 20Ω or less, Buzzer Sounds.
Power	100 ~ 240V, 50/60 Hz.
Size & Weight	3½" x 9⅝" x 9⅜" (88mm x 245mm x 240mm) 4 lbs. (1.8 kg.).

MODEL 1600



$510.00

FEATURES

- The Model 1600 uses a 4-electrode technique in combination with microprocessor control and thermistor temperature compensation to measure salt content. It features a compact design and high accuracy.
- A simple probe may be inserted into either solids or liquids to quickly measure the salt concentration.
- Usable also as a thermometer.
- Easy-to-read digital display (3-digit LCD).

APPLICATION EXAMPLES

Use as a Quality Control Instrument in Food Processing such as salted or smoked fish, ham, sausage or seasoned meats, soups and sauces. Use as a Health Monitoring Instrument in Measuring Salt Intake.

SPECIFICATIONS

Salt Content Measurement Range	Model 1600: 0.1 ~15.9%. Model 1610: 0.01 ~ 1.50% (express as weight in salt water).
Measurement Accuracy	±5 Digits.
Measurement Principle	AC Bridge detects the conductivity difference between four electrodes.
Measured Materials	Liquids, Solids (soft solids).
Temperature Compensation	0 ~ +70°C.
Temperature Measurement Range	−30 ~ +120°C
Measurement Accuracy	±1°C (over the range 0 ~ +100°C).
Measurement Element	Thermistor.
Measured Material	Liquids, Solids (soft solids).
Measurement Modes	Salt Content/ Temperature.
Power Supply	9V Battery Type 6F22.
Continuous Operation Time	Approx. 20 Hrs.
Dimensions	Main Unit: 95 (W) x 146 (H) x 35 (D) mm; Probe: 151 x 6.15 Dia. (mm).
Weight	Main Unit: Approx. 220 g; Probe: Approx. 50 g.
Other Functions	Display Hold/ Battery Low Display.
Accessories: Sensor Probe	1
Battery	1
Instruction Manual	1

SALT CONTENT MEASUREMENT

The value indicated is the amount of salt by weight in salt water. Essentially, this is the weight of salt (in grams) in a saline solution weighing 100 g. For solids, this serves as an index of salt concentration.

WARRANTY: One Year Parts and Labor
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DIGITAL LEVEL METER AND INCLINOMETER

MODEL 1700

DIGITAL LEVELMETER 1700
SOAR
ON/OFF
HOLD

$99.

FEATURES
- Data hold function for measured data.
- 2 LCD digital readouts, one on top, one on the side for easy viewing.
- Automatic power off function.
- Buzzer alarm function for 0° (Level) indication.
- 500 ~ 800 hours operation.
- Slope direction mark and slope display (Height/1m)

SPECIFICATIONS

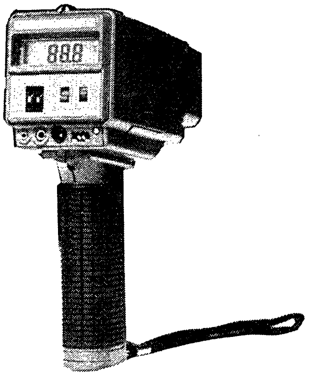
Display	3.5 Digit LCD with Annunciators (Two).
Range	Angle: 0° ~ ±120° Height/1 meter: 000 ~ 1.732 meter.
Accuracy	1.0°
Measuring Method	Encoder and Micro Computer.
Sampling	2 Times/Sec.
Operational Temperature	0°C ~ 40°C (80% RH Max.)
Storage Temperature	−20°C ~ 60°C (70% RH Max.)
Power Supply	Batteries 2 "AA" Size.
Power Consumption	2 mW (Typ.)
Size and Weight	6″ (W) x 4″ (H) x 1¼″ (D) Approx. 1 Lb.

Model 1710

Precision Digital Level with Accuracy to 0.01° is same style as Model 1700. Price .. $465.

INFRARED THERMOMETER

TX-700 L
TX-700 S



$1225.

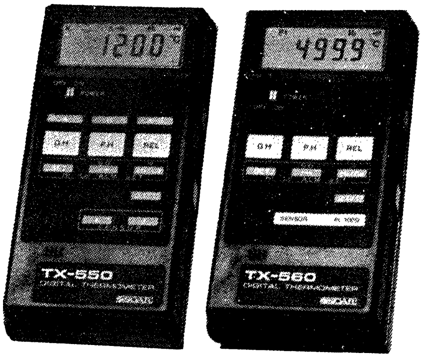
FEATURES
- Measure temperature without making contact.
- Extremely fast readings of 1 second or less.
- Has analog signal output for chart recorder.
- Has alarm signal (high or low beeper) set and output.
- Automatic data hold when trigger is released.
- Comes complete with batteries, and deluxe carrying case.

SPECIFICATIONS

Readout	3½ digit LCD with annunciators
Range	Low −50°C to 199.9°C, Resolution 0.1°C High −50°C to 500°C, Resolution 1°C
Accuracy	±½% reading plus 1 digit
Response Time	1 second
Spot Angle	700L = 1° 700S = 4 mm ϕ.
Sensor	Thermopile
Emissivity Range	0.20 ~1.00
Analog Output	1mV/°C
Alarm Mode	High; beeper sounds if temp. is above setting Low; beeper sounds if temp. is below setting
Alarm Output	30V, 100 mA
Power	4 "AA" batteries or external 4~8V DC
Battery Life	50 Hours
Size	5.7″ L (145mm) x 2.5″ W (64mm) x 7.7″ H (196mm)
Weight	~3 Lbs. (1300q.)

DIGITAL THERMOMETER

MODEL TX-550/560



$299. $335.

FEATURES
- Dual input, wide temperature range, "J" or "K" type sensors (5X-550) "PT" type sensor for Model TX-560.
- Handheld, battery operation allows for all on site measurements.
- Has a built-in comparator circuit for "go, no go" testing.
- Comes complete with one temperature probe, alarm output connector, deluxe carrying case, batteries.

SPECIFICATIONS

Display	3.5 Digit LCD with Annunciators.
Input	A and B (Two Separate Inputs).
Range	TX-550: −200°C ~ +1200°C (K Type Sensor) [−417°F ~ 2100°F]; −200°C ~ +1000°C (J Type Sensor) [−417°F ~ 1740°F]; TX-560: −200°C ~ +500°C (PT Type Sensor) [−417°F ~ 845°F]
Resolution	TX-550: 0.1°C/ −99.9°C ~ +299.9°C [0.1°F from −122.2°F to ~ +482.2°F] 1°C/ < −99.9°C/ > +299.9°C [1° from −417°F to 122.2°F and +482.2°F to ~ 2100°F (K Type) or 1740°F (J Type) TX-560: 1°C/ −200°C ~ +500°C [1°F from −417°F ~ +845°F].
Power Supply	Battery (006px1) 9.V
Battery Life	50 Hours (TX-550), 40 Hours (TX-560).
Operational Temperature	0°C ~ +40°C.
Storage Temperature	−20°C ~ +60°C.
Size and Weight	76 (W) x 159 (H) x 34 (D) mm, Approx. 260 g (3″ x 6¼″ x 1⅜″; ~ 0.6 Lb.).

SPECIAL FUNCTIONS

Data Hold
Peak Hold
Relative Test
Comparator Test
°C or °F Resolution Selectable
A Minus B' Display

WARRANTY: One Year Parts and Labor
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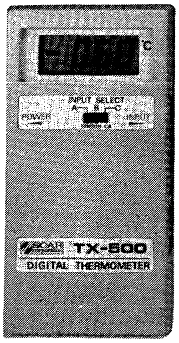
3½ DIGIT LCD TEMPERATURE METER

MODEL TX-500

(includes TX-502)



$169.

FEATURES

- Three separate inputs for selective temp. monitoring.
- 3½ Digit LCD reads directly in °C.
- Portable, thin design with rugged ABS plastic case makes this unit easy to use and transport conveniently.
- Comes complete with TX-502 (−50°C to 200°C) Bi-Metal Probe. Class .75 accuracy ±3°C (Typ. ±1°C) CA (K Type), and battery.
- TX-506 Surface Measurement Probe −50°C to 600°C available separately.

SPECIFICATIONS

Meter Range .... −50°C~+1200°C (−58°F~2200°F)
Input Z .... 100 kΩ
Sampling Rate .... 0.4 sec

UNIT OPERATING TEMPERATURE	READING ACCURACY −50°C to 0°C	0°C to 700°C (1200°C)*
23°C ±5°C	±2%	±(0.5% rdg. +1°C)
0°C to 18°C 28°C to 40°C	±3%	±(0.5% rdg. +2°C)

Battery Life .... >150 hours typical
Display .... 3½ Digit LCD, Resolution 1°C
Oper./Stor. Temp. ... 0°C to 40°C/−20°C to +60°C
Power .... One 9V transistor type battery
Size/Weight .... 5¾″ x 3″ x ⅞″, ~1 Lb.
TX-507 Access Probe ... Thermocouple sensor type CA, −50° to 700°C, Class .75 accuracy 0°C to 400°C ±3°C, to 700°C ±0.75%.

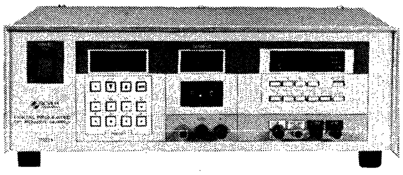
* with special thermocouple sensor probe

"K" TYPE THERMOCOUPLE PROBES

TX-502 .... −50°C ~200°C $ 35.
TX-507 .... −50°C ~ 700°C $ 45.
TX-506 .... −50°C ~ 600°C $ 75.
TX-512 .... −50°C ~ 1200°C $110.

16 STATION MEMORY DC POWER SUPPLIES

MODEL 7103



$1135.

FEATURES

- SOAR CORP. exclusive constant voltage/constant current design assures stable output plus load protection.
- Pre-set up to 16 different voltage settings for instant pushbutton recall with remote sensing.
- Large bright ¾″ LED's simultaneously monitor both voltage and current.
- Rear panel connector allows remote switching of all 16 preselected voltage settings. Output switching time to full on between station settings is 100 msec.
- Ideal for laboratory, production line or the design engineer's bench.
- Full 5-function, 26 range auto- and manual-ranging DMM for circuit investigation.

SPECIFICATIONS

(POWER SUPPLY)

Voltage Readout .... 3 digit LED
Voltage Setting Resolution .... 100 mV
Current Readout .... 2 digit LED
Current Setting Resolution .... 100 mA
V and A Readout Accuracy .... ±1 digit
Voltage Selection ... Two micro-touch switches for up/down
Current Selection ..... Two 0 to 9 thumbwheel switches
Output Selection ..... 8 touch-button switches
Output Switching Time ... From 0 to "full on", 100 msec
Warm-up Time ...... Unit is fully-stable in 30 minutes

All models can run either Series or Parallel operation.

Decimal point blinks when constant current is stabilizing.

Output .... CV/V, 0 to 36V; CC/A 0 to 3A
Line Reg. . 5mV, 5mA; Ripple 1mV, 1mA (p-p)
Load Reg. .... CV ±0.04%; CC ±0.5%
Temp. Coeff. .... ±40PPM/°C Typical

DMM SECTION

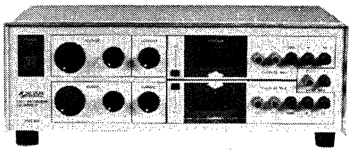
DCV .... 0.1mV to 1000V ±0.5%
ACV .... 1mV to 750V, 40 to 500 Hz
Resistance .... 0.1Ω to 20MΩ
DCA .... 0.1μA to 3A
ACA .... 0.1μA to 3A
Continuity Beeper
Size/Weight ... 5″ x 15⅜″ x 14″, ~30 Lbs.

DMM

Number of Digits .... 3½ LED
Operational Mode .... Auto or manual
Annunciators .... LED Indicator
Function/Range Selector ...... Tactile Switch

DUAL AND TRIPLE OUTPUT DC POWER SUPPLIES

MODELS 7200, 7201, 7202, 7203



7200/$699. 7202/$665.
7201/$620. 7203/$665.

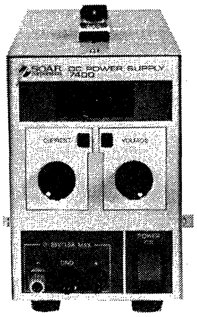
FEATURES

- Three dual output and one triple output DC voltage sources, ideal for working with today's advanced microprocessor circuits.
- SOAR designed circuit assures stable outputs even under wide line and/or load fluctuations.
- Large bright LED readout-to-monitors voltage and current simultaneously.
- Constant voltage/constant current design for load protection, unit fuse protected.
- Remote sensing terminals are provided to maintain regulation at the load.

7200 — Output 1 to 6V @ 0 to 5A and 10 to 15V @ 0 to 10A
7201 — Output Dual 0 to 25V @ 0 to 3A
7202 — Output Dual 0 to 20V @ 0 to 2A Plus Fixed 5V @ 3A
7203 — Output Dual 0 to 36V @ 0 to 3A
Size and Weight — All 5″ x 15⅜″ x 14″; 30 lbs.

SINGLE OUTPUT DC POWER SUPPLIES

MODELS 7400, 7401, 7402, 7403



7400/ $249.
7401/ $275.
7402/ $275.
7403/ $339.

FEATURES

- Rugged full-steel case, with compact size ideal for bench use.
- Digital readout of voltage or current for precise setting or monitoring.
- Uses temperature compensated tuner diode for reference voltage.
- Constant voltage/constant current design for maximum load protection, short circuit at output will cause voltage to drop to zero.
- Extremely stable design assures excellent line/load regulation with minimum noise.

7400 — Output 0 to 25V @ 0 to 1.5A
7401 — Output 0 to 25V @ 0 to 3A
7402 — Output 0 to 36V @ 0 to 2A
7403 — Output 0 to 36V @ 0 to 3A

Voltage resoution 0.1V
Current resolution 0.01A
Size and Weight — 6¼″ x 4⅜″ x 13⅛″; 13 lbs.

WARRANTY: One Year Parts and Labor
ALL PRICES SHOWN SUBJECT TO CHANGE WITHOUT NOTICE. PRICES SHOWN ARE FOR QUANTITIES OF 1 TO 3 PIECES OF A TYPE, DISCOUNTS AVAILABLE FOR HIGHER QUANTITIES.
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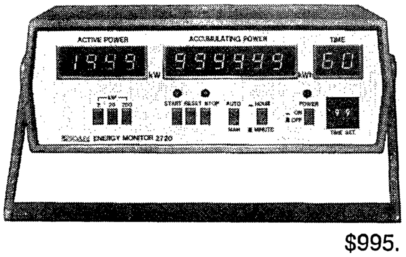
NORTH AMERICAN SOAR CORPORATION

1126 CORNELL AVENUE / CHERRY HILL, NEW JERSEY 08002 / PHONE: 609-488-1060
PROFESSIONAL ELECTRONIC INSTRUMENTS

kW/kWh ENERGY MONITOR

MODEL 2720



$995.

FEATURES

- Measure effective power to 200 kW, accumulated power to 10,000 kWh.
- Can be used with single or three phase systems, and measure unbalanced and distorted wave forms.
- Small and light weight, easy to transport.
- Built-in small load self compensation circuit.
- Auto/Manual time setting from 1 minute to 99 hours.
- Equipped with recorder output terminals.
- Comes complete with two clamp-on current probes and one 3-conductor voltage cable assembly, 3 spare fuses and carry case for accessories.

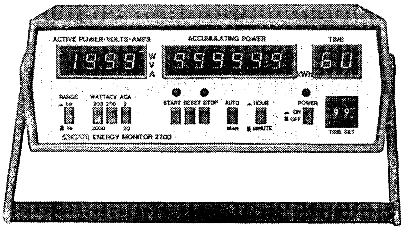
SPECIFICATIONS

LOAD

Voltage	80 to 600 Vrms Max.
Current	0 to 500 Arms per CT
Frequency	50 Hz to 400 Hz
Power (Max)	200 kW
kW Unit	2 range 20 kW/200 kW
Resolution	0.01 kW/0.1 kW
Accuracy	±0.5% of rdg. ±5 dgt (cosϕ = 1) ±1% of rdg. ±8 dgt (cosϕ = 0.5)
kWh	999.999 kWh (minute or hour) 20 kW range 9999.99 kWh (minute or hour) 200 kW range
Accuracy	±0.5% of rdg. (cosϕ = 1) ±1% of rdg. (cosϕ = 0.5)
Timer Set	Auto or manual 0 to 99 minutes or hours. Accuracy - ±1 sec.
Operating Temp.	0° to 40°C (32°F to 104°F) 80% RH
Storage Temp.	−20°C~60°C (−4°F to 140°F) 90% RH
Digital Display	Power readout (kW) 3½ digit LED, 1999 Max.; Accumulated (kWh) 6 digit LED, 9999.99 Max.; Elapsed Time (minutes/hours) 2 digit LED 99 Max.
Overage Indicator	"Power" (kW) blanking of all digits except the leading "1"; "Accumulated" (kWh) overload lamp goes "on"
Size	4⅓" x 12" x 10¼" (HWD) (110 x 305 x 260 mm)
Weight	8¾ Lbs. (4 kg.)

APPLIANCE ENERGY MONITOR

MODEL 2700



$840.

FEATURES

- Auto-zero function.
- True RMS voltage/current readout.
- Low cost.
- Setting "Time" (Max. 99 hours).
- With output terminal for Recorder (MR-200) and printer (2762).
- Ideal for measuring appliance power usage.
- Simple to use, 3 conductor female plug input for fast appliance operating parameter monitoring.

SPECIFICATIONS

Single Phase Active Power, AC Volts, AC Current

Power	200W/2000W
Voltage	200V
Current	2A/20A
Display	1999 LED (Overload indication "1" in display)
Voltage Scope	85~120V/120V/220V/240V ±10%
Max. Voltage	120V rms/120V/220V/240V ±10%
Current Scope	200W - 0~2.4A 2000W - 0~20A. Continuous Use Rating Current 15A rms
Frequency	50 Hz or 60 Hz
Output Voltage (Rear)	1V at full scale of display
Accuracy	(23°C ±5°C)
Power	±(0.7% of rdg. +5 dgt.) Cos ϕ = 1 ±(1% of rdg. +5 dgt.) Cos ϕ = 0.5
Voltage	±(0.5% of rdg. +3 dgt.)
Current	±(0.5% of rdg. +5 dgt.)
Output Voltage	±(1% of rdg. +0.5% of F.S.) Cos ϕ = 0.5~1

Single Phase Power Accumulation

Minutes	Max. Accumulated 99.9999 kWh
Hours	Max Accumulated 999.999 kWh
Display	LED 6 digits (Over range lamp)

General

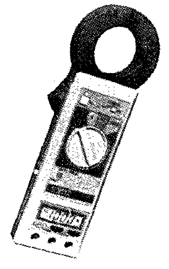
Power Source	AC 85~120V/220V (50 or 60 Hz)
Dimension	4⅛" (H) x 11" (W) x 9¾" (D) (105 x 280 x 250 mm)
Weight	Approx. 3 kgs., 6⅔ lbs.

Pen Recorders for use with Models 2720, 2700.

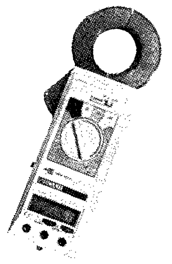
MR-200	$699.

DIGITAL CLAMP TESTER

MODELS 2200, 2210 2220
MODEL 2300 IS
TRUE RMS V/A



Models 2210/2220 & 2230



Model 2200

2200/	$85.
2210/	$110.
2220/	$135.
2230/	$199.

FEATURES

- Large 3½ digit LCD readout easy to read, with annunciators.
- Autoranging on all functions eliminates the need to change ranges.
- Continuity buzzer.
- Electronic data hold switch freezes readings (all models).
- Peak detector for measuring current and voltage surges (2220, 2230).
- Temperature range...Models 2210, 2220 and 2230 uses optional K type temp. probes listed below.
- Tough ABS plastic housing.
- Comes complete with carrying case, batteries, and voltage/ohms safety test leads.

SPECIFICATIONS

Display	3.5 digit LCD, max. reading 1999, with annunciators
Range Switching	Auto-ranging
Overrange Indication	Most significant digit "1"
AC Amps	200/1000A ±(1.2% ±2 dgt) Resolution 0.1A
AC Volts	200/1000V ±(1.0% ±3 dgt) Resolution 0.1V
Ohms	200/2000Ω ±(0.7% ±3 dgt) Resolution 0.1Ω
Temp.	−50~700°C ±(3.0% ±3 dgt) Resolution 1°C (2210, 2220)
Continuity Check	20Ω ±10Ω or less (200Ω range)
Peak Hold	±1.5% (2220)
Battery	UM-3 (1.5V) x (2200, 2210) S-006P (9V) x 1 (2220, 2230)
Jaw Size	3½" O.D., 2" I.D.
Size & Weight	3½" W x 10¼" H x 1⅓" D; ~¾ Lbs.

- Optional Accessories, Temp. Probe

TX-502 (−50~+200°C, Free Air type) $35.
TX-506 (−50~+600°C, Surface type) $75.
TX-506L (−50~+600°C, Surface "L" type) $139.00.
TX-507 (−50~+700°C, Free Air type) $45.
TX-512 (−50~+1200°C, Free Air type) $110.00.

WARRANTY: One Year Parts and Labor

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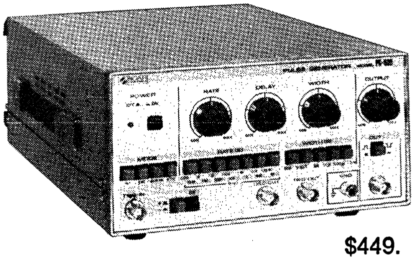
10 MHz PULSE GENERATOR

MODEL PG-905



$449.

FEATURES

- Generates high quality general purpose pulse signals for many applications such as logic and digital circuits, analog circuits as well as some mechanical devices.
- The wide pulse repetition rate range is continuously variable from 1 Hz to 10 MHz. Very fast rise and fall time pulses are obtained through a current mirror circuit.
- Can be used as a crystal controlled oscillator for seven calibrated frequencies from 10 Hz to 10 MHz... with its built-in crystal oscillator circuit and external input mode the input signal can be inverted.
- Delay time can be continuously varied from 0 to 2 μsec. Can be used with no delay oscilloscope to display full wave-forms.

SPECIFICATIONS

Crystal Mode	Rep. output 10, 100, 1k, 10k, 100k, 1M, 10M (Hz)
Int. Mode Rep. Rate	1 Hz to 10 MHz in 7 ranges + vernier
Ext. Mode Trigger Input	10 Hz to 10 MHz, +1V to −1V p-p Sine or Sq.
Output	Crystal controlled with better than 10^{-5} stability at 10 Hz, 100 Hz, 1k, 10k, 100k, 1M, 10M (Hz)
Manual Control	Single Pulse Output
Delay	0 to 2 μs variable
Pulse Width	50 ns to 5 ms in 5 ranges + vernier
Pulse Output	5V to 0.5V into 50Ω load, 10V to 1V open circuit
Rise and Fall	~10 ns
Trigger Output	5V/20 ns/Zo = 50Ω
Oscillator Output	5V/Zo = 50Ω
Oper. Temp.	40° to 105°F.
Power	18 VA; 120V/240V ±10% 50/60 Hz switchable
Size/Weight	4⅓″ x 8⅔″ x 11⅞″, ~10 Lbs.

AC CURRENT/LEAKAGE CLAMP-AROUND TESTERS

MODELS CLM-40DX, CLM-40SD

CLM-40DX/$299.
CLM-40SD/$189.

FEATURES

- Read AC current/leakage from 1 mA (DX); 40 mA (SD).
- No need to interrupt (break) AC line(s) to make leakage or regular AC current measurements.
- Also measure AC volts, ohms and temperature.
- Comes complete with voltage/resistance probes, spare fuse, battery and carrying case.
- High accuracy reading with "Hold Reading" Switch.
- Has Recorder Output and is uninfluenced by close external magnetic fields.

SPECIFICATIONS

CLM-40DX

AC Current	1 mA to 100 mA, 300 mA, 1, 30, 300A; 50/60 Hz
AC Voltage	0-500V; 50/60 Hz
Resistance	0-50 kΩ (2 kΩ center)
Temperature	0 to 200°C (32° to 392°F)

CLM-40SD

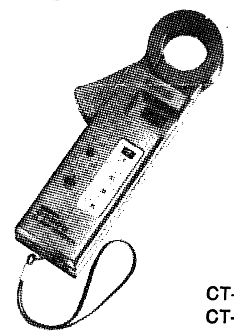
AC Current	40 mA to 1, 3, 10, 30, 100A; 50/60 Hz
AC Voltage	0-500V, 50/60 Hz
Resistance	0-1 kΩ (20Ω center)

CLM-40DX/CLM-40SD

Accuracy	Both units all functions/ranges ±3% F.S.
Volt. Withstand	2000V AC both units
Clamp Jaw Size	1½″ I.D. (both units)
Size/Weight	(both units) 8″ x 2″ x 1½″, 1 Lb.

CLAMP-AROUND MULTI-FUNCTION AC CURRENT TESTERS

MODELS CT-300, CT-600, CT-1200



CT-300/$69.
CT-600/$74.
CT-1200/$99.
TEMP PROBE TP-150/$19.50.

FEATURES

- No need to interrupt (break) AC line to make measurements.
- Rugged Taut Band meter movement, color coded for fast sure readings.
- Comes complete with voltage/resistance probes, battery, spare fuse and carrying case.
- All units have wrist straps, and meter "Hold Reading" switches.
- Rotary scales permit large uncluttered separate range/function displays.
- Readings are uninfluenced by external magnetic fields.
- All models are provided with a temperature range function to facilitate optional thermistor temperature probe.

SPECIFICATIONS

MODEL CT-300

AC Current	0 to 6, 15, 60, 150, 300A; 50/60 Hz
AC Voltage	0 to 150, 300, 600V; 50/60 Hz
Resistance	0 to 2.5 kΩ (25Ω center)
Temperature	−30°C to ~+150°C (−22°F ~+302°F)
Size/Weight	9½″ x 2½″ x 1½″, 1 Lb.

MODEL CT-600

AC Current	0 to 6, 15, 60, 150, 600A

MODEL CT-1200

AC Current	0 to 60, 150, 300, 600, 1200A

CT-300/CT-600

Clamp Jaw Size	2¼″ O.D., 1½″ I.D.

CT-1200

Clamp Jaw Size	3¼″ O.D., 2⅛″ I.D.

WARRANTY: One Year Parts and Labor
ALL PRICES SHOWN SUBJECT TO CHANGE WITHOUT NOTICE. PRICES SHOWN ARE FOR QUANTITIES OF 1 TO 3 PIECES OF A TYPE. DISCOUNTS AVAILABLE FOR HIGHER QUANTITIES.
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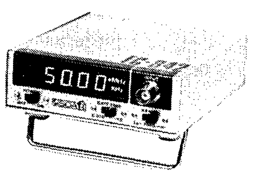
PROFESSIONAL ELECTRONIC INSTRUMENTS

50 MHz MINI-FREQ. COUNTER
MODEL FC-842

NEW!



FEATURES

- Wide frequency ranges of 5 Hz through 50 MHz.
- 4 digits red LED (Max 9999) enables easy and accurate readout.
- Battery or AC operation.
- When the range switch is in the "Hi" position you will read the first 4 digits of input, when in the "Lo" position you will read the last 4 digits. Example: If signal input is 95 + MHz, reading is 9501 (Hi), 7010 (Lo).

SPECIFICATIONS

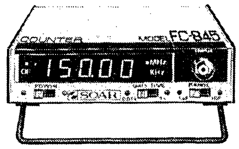
Measurement Range .... 5 Hz ~ 1 MHz (Lo-Freq Range); 10 kHz ~ 50 MHz (Hi-Freq. Range).
Display .... 4 Digits, 7-Segment Red LED.

GATE, TIME RESOLUTION (COMMAND TO BOTH)

Range	Unit Sign	Gate Time	Resolution
Lo-Freq	kHz	1s	0.001 kHz (1 Hz)
		0.01s	0.1 kHz (100 Hz)
Hi-Freq	MHz	1s	0.0001 MHz (100 Hz)
		0.01s	0.01 MHz (10 kHz)

Input Sensitivity .... Lo-Freq Range: 5 Hz ~ 10 Hz — 100m Vrms, 10 Hz ~ 1 MHz — 50m Vrms; Hi-Freq Range: 10 kHz ~ 10 MHz — 50m Vrms, 10 MHz ~ 50 MHz — 100m Vrms.
Input Impedance .... Approx. 1MΩ//20 pF.
Crystal Frequency .... 3.2768 MHz.
Accuracy .... ±50 ppm, ±1 Count.
Operational Temperature .... 0°C ~ 40°C.
Storage Temperature .... −20°C ~ 70°C.
Battery .... AA size (1.5V) x 6.
Power Consumption .... Approx. 100 mA.
Coupling .... AC Coupling.
Size .... 1¼″ x 4″ x 4½″.
Weight .... Approx. 1 lb.

160 MHz MINI FREQ COUNTER
MODEL FC-845



FEATURES

- Wide frequency range of 5 Hz through 160 MHz.
- Readout — 4½ digits LED plus Overgate, MHz-kHz and low battery indicators.
- Small size, battery, AC operation for portable, bench or built-in application.
- When the range switch is in the "Hi" position you will read the first 4½ digits of input, when in the "Lo" position you will read the last 4 digits. Example: If signal input is 155+ MHz, reading is 15542 (Hi), 3010 (Lo).

SPECIFICATIONS

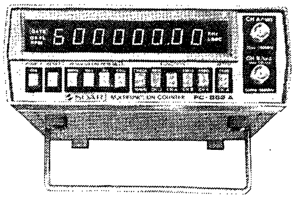
Measurement Range .... 5 Hz ~ 2 MHz (Lo-Freq Range), 1 MHz ~ 160 MHz (Hi-Freq Range).
Display ...... 4.5 Digits, 7-Segment Red LED.

GATE, TIME RESOLUTION (COMMAND TO BOTH)

Range	Unit Sign	Gate Time	Resolution
Lo-Freq	kHz	1s	0.001 kHz (1 Hz)
		0.01s	0.1 kHz (100 Hz)
Hi-Freq	MHz	1s	0.0001 MHz (100 Hz)
		0.01s	0.01 MHz (10 kHz)

Input Sensitivity ...... Lo-Freq Range: 5 Hz ~ 10 Hz, 1 MHz ~ 2 MHz — 50m Vrms, 10 Hz ~ 1 MHz — 35m Vrms; Hi-Freq Range: 1 MHz ~ 2 MHz, 120 MHz ~ 160 MHz 50m Vrms, 2 MHz ~ 120 MHz — 30m Vrms.
Input Impedance .... Lo-Freq Range: Approx. 150kΩ//35 pF; Hi-Freq Range: Approx. 2.5kΩ//15 pF.
Crystal Frequency .... 3.2768 MHz.
Accuracy .... ±50 ppm ±1 Count.
Operational Temperature .... 0°C ~ 40°C.
Storage Temperature .... −20°C ~ 70°C.
Battery .... AA size (1.5V x 6.
Power Consumption .... Lo-Freq Range: Approx. 80 mA; Hi-Freq Range: Approx. 140 mA.
Coupling .... AC Coupling.
Size .... 1¼″ x 4″ x 4¼″.
Weight .... Approx. 1 Lb.

550 MHz 150 MHz MULTI-FUNCTION COUNTER
MODELS FC-882A, FC-881A, FC-864A



FC-882A/$699.
FC-881A/$545.
FC-864A/$440.

Multi-Function Counters provide Frequency, Period and RPM measurements. Not shown but identical in appearance and size **MODEL FC-864A 8 DIGIT** and **MODEL FC-881A 8 DIGIT** to 150 MHz and same specs as **MODEL FC-882A.**

FEATURES

- Fast selection of all functions with push-button ease.
- All units are designed in a compact and rugged all steel case that provides RFI shielding for readings that are unaffected by stray signals.
- Model FC-882A and FC-881A are supplied with a TCXO for enhanced accuracy, test cable and spare fuse.

SPECIFICATIONS

Range .... FC-882A, 10 Hz to 100 MHz, CHB, 50 MHz to 550 MHz; FC-881A and FC-864A, 10 Hz to 150 MHz
Resolution .... 0.1 Hz, 1Hz, 10Hz, 100Hz
Gate Time .... 10s, 1s, 0.1s, 0.01s; FC-882A, CH"B", 6s, 0.6s, 0.06s
Period .... Range 100 ms to 1 μs
Resolution .... 0.1 μs, 10 ns, 1 ns, 0.1 ns
Multiply .... x 10^0, x 10^1, x 10^2, x 10^3
Accuracy .... ±1 count ± Time Base ±Trig. Error
RPM ...... 10^4 Pulse/s, Gate 6s, 0.6s, 0.06s
Accuracy .... ±1 Count
Input Sensitivity . 10 to 100 Hz, and 100 MHz to 150 MHz, 35 mV; 100 Hz to 100 MHz, 20 mV; FC-882A CH"B", 15 mV, CH"C" 5 to 20 Vp-p
CH"A" Attenuator .... 20 dB
Overload Protection .... <1 kHz, 250 Vrms to 100 kHz, 20 Vrms to 150 MHz, 5 Vrms; CH"B" 5 Vrms; CH "C" 20 Vrms
Time Base .... 10 MHz, 0 to 40°C ±5 x 10^{-7}
Ageing .... FC-864A, 3 x 10^{-6}/Year; FC-881A, FC-882A, 1 x 10^{-6}/Year
Output Level, TTL; Input Level 2.5 Vp-p to 10 Vp-p; Input Z ~600Ω
Power .... 115V or 220V, 50/60 Hz
Size/Weight .... 2½″ x 7″ x 7⅞″, 2⅔ Lbs.

WARRANTY: One Year Parts and Labor
ALL PRICES SHOWN SUBJECT TO CHANGE WITHOUT NOTICE. PRICES SHOWN ARE FOR QUANTITIES OF 1 TO 3 PIECES OF A TYPE, DISCOUNTS AVAILABLE FOR HIGHER QUANTITIES.
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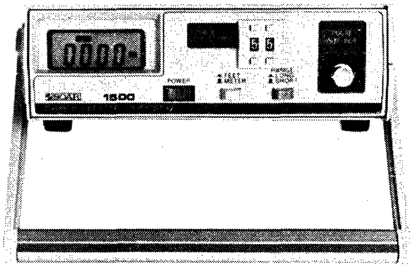
PROFESSIONAL ELECTRONIC INSTRUMENTS

CABLE LENGTH CHECKER

MODEL 1500



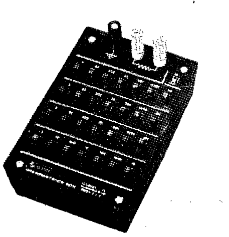
$499.

FEATURES

- Measures co-axial cable and twisted pairs length and indicates termination as either a short or open on 4 digit LCD readout with annunciators.
- Can measure coax cable and twisted pairs either strung out or on the reel, from 10 feet up to 6500 foot runs.
- Small size, battery portable, supplied with 6 Ni-Cad batteries and recharger, cigarette lighter adaptor plus short hook-up cable BNC to two alligator clips.

SPECIFICATIONS

Measuring Method	Pulse reflection technique
Cable Type	All type metallic co-axial cable and twisted pairs
Meter Display	Feet or meter, open or short, 4 digit LCD
Range	Short 3~200 Meter (10 to 650 ft) Long 200~2000 Meter (650 to 6500 ft)
Accuracy	±1% of full scale reading
Resolution	1 foot or 1 meter
Cable Dielectric Constant, set by digital switches	0.1~.99 ($\frac{1}{\sqrt{\text{Dielectric}}}$)
Dynamic Range	26 dB
Cable Connector	BNC front panel
Operating Temp.	0°C~45°C & <85% RH
Storage Temp.	−20°C~+60°C <70% RH
Power Consumption	~330 mA
Size	2¼″ x 7¼″ x 7⅞″ HWD
Weight	3 Lbs. (with batteries)



$49.00.

RD-111 RESISTOR SUBSTITUTION BOX

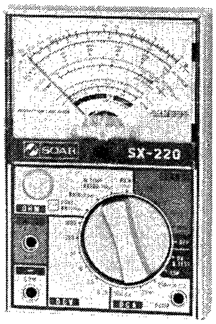
1 ohm to 11 Meg Ohms in 1 Ohm steps.

Accuracy	±1%
Power	1 Watt, 28 Slide Switches, Three 5 Way binding posts
Size	4″ x 6″ x 2″

SUPER PERFORMANCE VOM

MODEL SX-220

(20 kΩ/VDC)



$29.95

FEATURES

- Continuity buzzer for easy "No-Look" circuit or cable check.
- 10 Ampere DC current range, also capacitance & battery check.
- Inside mechanism is fully guarded by shock-resistant ABS plastic housing, which guarantees long lasting trouble free operation.
- High quality core-magnet type meter movement is used as the indicator so that the instrument can be free from the influence of outside magnetic fields.
- The SX-220 is specially designed with no metallic part on the front surface of the housing.
- With TP-150 Thermometer Probe optionally obtained, temperature measurement is possible on a doubly graduated scale showing both Celsius and Fahrenheit.

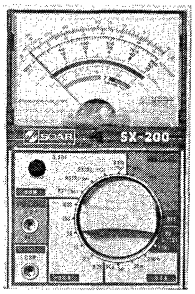
SPECIFICATIONS

MEASURING RANGE

DC Voltage (DCV)	0.25, 2.5, 10, 50, 250, 1000(V)
AC Voltage (ACV)	10, 50, 250, 1000(V)
DC Current (DCA)	50µ, 5m, 25m, 250m, 10(A)
Resistance (OHM)	Rx1, 10, 100, 1k
Load Current (LI)	75m (Rx1), 7.5m (Rx10), 750µ (Rx100), 75µ (Rx1k) (A)
Decibel (dB)	−20~+62 (dBm)
Battery Test	1.5V & 9V
Capacitance (C)	200P~0.25µ (F) at 50 Hz
Temperature (TEMP)	−20~+200 degrees C. 0~400 degrees F.
Sensitivity	20 kΩ/VDC, 8 kΩ/VAC
Accuracy	DCV ±3% FS, ACV ±4% FS, DCA ±3% FS, ohm/dB ±3%/±4% of arc
Continuity Test (CONT)	By buzzer sound at Rx1 range (Buzzer will sound less than 20 ohms)
Power	One penlite (AA) cell, 1.5V DC included
Extra Circuitry	Meter protection and Fuse
Dimensions/Weight	90(W) x 135(H) x 30 (D) mm, 210 grams
Accessories Included	2 test leads & 0.5A fuse
Optional Accessory	Model TP-150 Temp Probe $19.50

7 FUNCTION 20 kΩ/V VOM

MODEL SX-200



$28.

FEATURES

- 7 functions including L.I. Range; and Battery Check for 1.5 and 9V types.
- Has Fuse & Diode Protection plus Mirrored Scale.
- Comes complete with Probes and Battery.

SPECIFICATIONS

DCV	0.25, 2.5, 10, 50, 250, 1000V (20 kΩ/V)
ACV	10, 50, 250, 1000V (8 kΩ/V)
DC mA	50 µA, 5, 25, 250 mA
Resistance	Rx1, 10, 100, 1k (20Ω center)
LI	75 mA (Rx1), 7.5 mA (Rx10), 750 µA (Rx100) 75 µA (Rx1k)
dB	+20~+58 dB
Size	3½″ x 5⅛″ x 5⅛″ (90 x 135 x 35 mm)
Weight	~½ Lb. (250 g.)

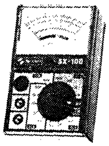
POCKET SIZE VOMs

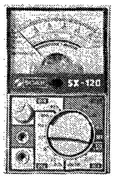
MODEL SX-100

2 kΩ/V

MODEL SX-120

20 kΩ/V





SX-100/$18.75
SX-120/$25.00

Both units are fuse protected and have mirrored scales, also 1.5V battery check function.

SPECIFICATIONS

DCV	0.25, 2.5, 10, 50, 250, 1000 (SX-120, 20 kΩ/V; SX-100, 2 kΩV & no 0.25V
ACV	10, 50, 250, 1000 (SX-120, 8 kΩ/V; SX-100, 2 kΩ/V)
DC mA	SX-120, 50 µA, 5, 250 mA; SX-100, 500 µA, 5, 250 mA
Resistance	Rx1k (Center 20Ω) [SX-100 Center 5Ω]
dB	−20~+22 dB both units
Size	2½″ x 4″ x 1⅛″ (66 x 100 x 31 mm) both units
Weight	⅓ Lb. (150 g.) both units

WARRANTY: One Year Parts and Labor

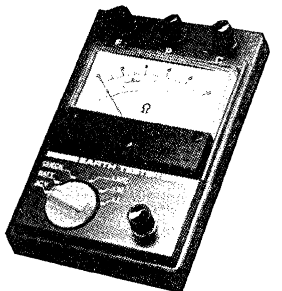
ALL PRICES SHOWN SUBJECT TO CHANGE WITHOUT NOTICE. PRICES SHOWN ARE FOR QUANTITIES OF 1 TO 3 PIECES OF A TYPE, DISCOUNTS AVAILABLE FOR HIGHER QUANTITIES.

SEE OUR PAGES IN SECTION 2975

SOAR corporation

NORTH AMERICAN SOAR CORPORATION
1126 CORNELL AVENUE / CHERRY HILL, NEW JERSEY 08002 / PHONE: 609-488-1060
PROFESSIONAL ELECTRONIC INSTRUMENTS

EARTH TESTER
MODEL 2350



$339.

FEATURES

- Quick and direct measurement of earth resistance.
- Uses a transistor type constant-current inverter for accuracy.
- Rugged taut band meter movement.
- Meets JIS standards.
- Easy push-to-read operation.

SPECIFICATIONS

Rating operation, allowance error, characteristics, and strength.

Measuring Range .... Earth Resistance: 0 to 10/100/1000Ω (3 range changeover); Earth potential: 0 to 30 Volts (AC).

Scale . Earth Resistance: Uniform Scale (Black); Earth Potential: Uniform Scale (Red); Check "Mark" for Batteries: 8 (Black); Check "Mark" for Earthing Condition of Auxiliary Rod: ICI (Red).

Accuracy .... (23°C ±3°C).

Earth Resistance .... 0 to 10Ω: 0.4Ω (±4% of 10Ω); 0 to 100Ω: 0.4Ω (±4% of 100Ω); 0 to 1000Ω: 40Ω (±4% of 1000Ω)

Earth Potential .... 0 to 10V: ±0.6V, 10 (Excl. 10V) to 30V: ±1.2V.

* Note: The earth resistance of each of the auxiliary electrode rods —500Ω ±5%.

Effect of Battery Voltage .... Within above-mentioned accuracy on the Battery Validity range.

Effect of Inclination ... The difference between the indicated value at horizontal position and that at 30°C inclined position is within ±5% of the full scale value.

Effect of Temperature .. The difference between the indicated value at 20°C and that at temperature changed by ±20°C is within ±5% of the full scale value.

Effect of Earth Potential .... The difference between the indicated values with and without the equivalent earth potential of sine waves (50/60 Hz) added is as follows: Equivalent earth potential 5V: ±5% of the full scale value; Equivalent earth potential 10V: ±15% of the full scale value.

Insulation Resistance ... 5MΩ at least between the measuring terminals (E, P, C) and outer casing at DC 500V.

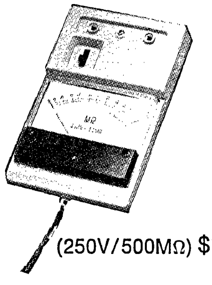
Power Source .... UM-3 ("R6" type or "AA" size) x 8 pcs.

Battery Life .... (Continuous number of operations). Approx. 1200 operations. (at 23°C).

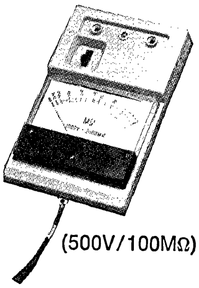
Dimensions ... 180 (L) x 117 (W) x 98 (H) mm.

Weight .... Approx. 820g (incl. batteries).

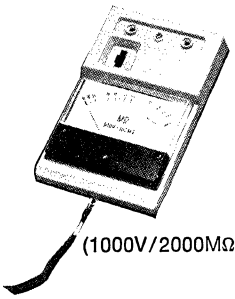
INSULATION RESISTANCE TESTERS
MODELS 2300/2310/2320



(250V/500MΩ) $134.



(500V/100MΩ) $134.



(1000V/2000MΩ) $175.

FEATURES

- Low battery check is built-in.
- Using a transistorized DC-DC converter for accurate measurement.
- Rugged taut-band meter movement.
- Easy push-to-read operation.
- Compact, lightweight and high-impact housing.
- Meets JIS standards.
- Ideal for insulation tests on electrical installations, machines, computers, transformers, etc.

SPECIFICATIONS

Rating

Model No.	Rated Voltage/ Rated Resistance	Effective Measuring Range	Central Scale
2300	250V/50MΩ	0.05～50MΩ	1MΩ
2310	500V/100MΩ	0.1～100MΩ	2MΩ
2320	1000V/2000MΩ	2～2000MΩ	50MΩ

Tolerance

Indicate Temp.	Effective Measuring Range	0 Point	∞ Point
20°C to under 30°C	±10%	1% of the full scale length	1% of the full scale length
0°C to under 20°C 30°C to under 50°C	±20%	2% of the full scale length	2% of the full scale length

Characteristics

Standard Temperature .... 20°C.

Standard Humidity .... 65% R.H.

Damping ...... Less than 3 seconds when the central scale mark is indicated.

Measuring Terminal Voltage ... Less than 10% of the rated voltage at the ∞ point. More than 90% of the rated voltage at the central scale mark.

Effect of Inclination .... Pointer variation at the ∞ point is less than 2% of the full scale length at an inclination of 30°.

Effect of Moisture .... Satisfies rated tolerances at 90% R.H.

Effect of External Magnetic Field .... Less than 3% error at the central mark when exposed to 400A/m.

Insulation Resistance ...... DC 500V, 50MΩ at least between electric circuit and outer casing metal.

Withstand Voltage ..... AC 2000V for 1 minute between electric circuit and outer casing metal.

Dimensions ... 169 (L) x 108 (W) x 35 (H) mm (6⅓" x 4¼" x 1⅓").

Weight .... About 490g (with 6 batteries) ~ 1.1 Lb.

Power .... UM-3 ("R6" type or "AA" size) x 6 pcs.

ACCESSORIES

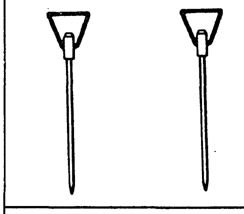
Probe-Attached Red Lead Wire (About 1.5m) .... 1 pc.

Clip-Attched Black Lead Wire (About 1.5m) .... 1 pc.

Soft Case .... 1 pc.

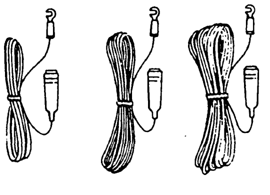
ACCESSORIES

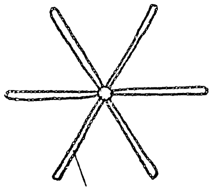
- Two auxiliary electrode rods



- Carrying case
- Carrying bag

- Three lead wires (Red: 20m Black: 10m White: 5m)





Auxiliary electrode chain (BN-031)

- Auxiliary electrode chain (BN-031)

WARRANTY: One Year Parts and Labor
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SEE OUR PAGES IN SECTION 2975

COMMONLY USED ELECTRICAL/ELECTRONIC ABBREVIATIONS AND ACRONYMS

A
AC alternating current
A/D analog to digital
ADC analog to digital converter
ADP automatic data processing
AF audio frequency
AFC automatic frequency control
ALGOL algorithmic language
AM amplitude modulation
AND a logical operator
AQL acceptable quality level
ASCII American national standard code for information interchange
AWG American wire gauge

B
BALUN balanced to unbalanced
BASIC beginners' all-purpose symbolic instruction
BCD binary-coded decimal
BNC baby "N" connector
BUS basic utility system

C
CAD computer aided design
CAM computer aided manufacture
CATV cable television or community antenna television
CERMET ceramic metal element
Comm. communications
CMOS complementary metal-oxide semiconductor
CPS characters per second
CPU central processing unit

D
D/A digital to analog
DAC digital to analog converter
DC direct current
DIAC bidirectional trigger diode
DIL dual in-line
DIN Deutsche Industrie Normenausschuss
DIP dual in-line package
DPM digital panel meter
DTL diode transistor logic

E
EDP electronic data processing
EBCDIC extended binary coded decimal interchange code
EEPROM electrically erasable PROM
EMC electromagnetic compatibility
EMI electromagnetic interference
EMP electromagnetic pulse
EPROM electrically programmable ROM
ESR equivalent series resistance

F
FEP fluorinated ethylene propylene Copolymar, 200° Teflon
FET field-effect transistor
FM frequency modulation
FORTRAN formula translator

G
GaAsFET gallium arsenide field effect transistor
GPIB general purpose interface bus

H
HF high frequency (3 to 30 MHz)
HIPOT test, measurement and diagnostic equipment
HLL high level language
HV high voltage
Hz Hertz

I
IC integrated circuit
IDC insulation displacement contact
IF intermediate frequency
IO input/output (devices)
IR insulation resistance (or) infrared

J
JFET junction field effect transistor
JMOS junction metal oxide semiconductor

K
kHz kilohertz (10^3 hertz)
KSR keyboard send receive

L
LC inductance capacitance
LCD liquid crystal display
LED light-emitting diode
LF low frequency (30 to 300 kHz)
LIF low insertion force
LNA low noise amplifier
LNB low noise band
LSI large scale integration
LVDT linear velocity displacement transformer

M
MASER microwave amplification by stimulated emission of radiation
MATV master antenna television
μF microforad
MHz megahertz
MIPS million instructions per second
MIB microcomputer interface board
MOS metal oxide semiconductor
MOSFET metal oxide semiconductor field effect transistor
MOSIGT metal-oxide semiconductor insulated-gate transistor
MOV metal oxide varistor
MPU microprocessor unit
MSI medium scale integration

N
NBS National Bureau of Standards
NEMP nuclear electromagnetic pulse
NIM nuclear instrumentation module
NOR not OR
NTC negative temperature coefficient

O
OCR optical character reader
OEM original equipment manufacturer
OR a logical operator

P
PC printed circuit
PCB printed circuit board
pF picofarad
PGA pin grid array
PIN positive-intrinsic-negative (transistor)
PLA programmable logic array
PLL phased lock loop
PPI plan position indicator
PROM programmable read only memory
PTC positive temperature coefficient
PUT programmable unijunction transistor

Q
QAM quadrature amplitude modulation
Q (meter) quality-factor meter

R
RAM random access memory
RC resistance-capacitance
RFI radio frequency interference
RMS root mean square
ROM read only memory
RF radio frequency
RFC radio-frequency choke
RFI radio-frequency interference
RTD resistance-temperature detector
RTL resistor transistor logic
RTV room temperature vulcanizing
RW read/write

S
SAS silicon asymmetrical switch
SBC single board (micro) computer
SBS silicon bilateral switch
SCR silicon-controlled rectifier
SCS silicon controlled switch
SDA source & detector assemblies
SIDAC bidirectional voltage-triggered switch
SIP single in-line package
SSI small scale integration
SSR solid state relay
STL Schottky transistor logic
SUS silicon unilateral switch

T
TC temperature coefficient
TCXO temperature compensated crystal oscillator
TFE tetrafluoride ethylene propylene Copolymer, 250° Teflon
TRIAC bidirectional AC switch
TTL transistor-transistor logic
TTY teletypewriter

U
UHF ultra high frequency (300 MHz to 3 GHz)
UJT silicon unijunction transistor
UL Underwriters Laboratory
UPS uninterruptible power supply

V
VAC volts (of) alternating current
VAR volt-ampere reactive
VCR video cassette recorder
VDC volts (of) direct current
VHF very high frequency
VHSIC very high speed integrated circuit
VLF very low frequency (3 to 30 kHz)
VLSI very large scale integration
VME virtual machine environment
VRM voice recognition module
VTVM vacuum tube volt meter
VU volume unit
VSWR voltage standing wave ratio

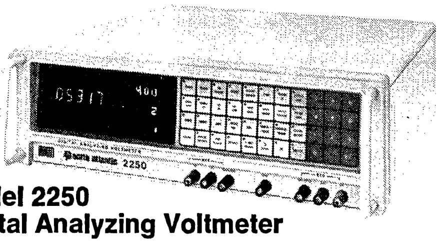
W
WPS word processing software

Y
YIG yttrium iron garnet

Z
ZIF zero insertion force

Synchro/Resolver Instrumentation

AC Analyzer and Phase Angle Voltmeters



Model 2250
Digital Analyzing Voltmeter

The Model 2250 features signal analysis capabilities never previously offered in an AC Analyzer. Using Fast Fourier Transform Techniques while operating over its 10 Hz to 100 KHz range, the Model 2250 is 68000 microprocessor-based instrument which provides the traditional measurements of Total, Fundamental, In Phase, Quadrature, and Phase Angle. Waveform analysis capabilities also include THD, individual harmonic, and ratio measurement. Autoranging, a zero center scale null meter, front panel keypad, and IEEE-488 GPIB are standard. The front panel annunciators indicate when an overload condition exists, the data displayed is modified by one or more Offset functions, and when the input signal is outside the bandwidth of a manually selected frequency. Typical phase accuracy is 0.05°. Voltage accuracy typically is 0.05% of reading +0.05% F.S. The Model 2250's multiple features make this instrument the ideal AC Analyzer for laboratory, test, and repair facilities.

Model 225, 225/Ratiometer
Digital Phase Angle Voltmeter

The Model 225 has up to 4 user selectable frequencies (within the range of 30 Hz to 54 KHz). In addition to Phase Angle the 225 measures Total, Fundamental, In Phase and Quadrature voltages. A 4½ digit display and null meter, signal autoranging and fully isolated signal and reference inputs are standard. Optional IEEE-STD-488 and ratio capability increases versatility for bench and ATE applications. Typical phase accuracy is 0.25°. Typical voltage accuracy is 0.05% RD 0.05% F.S.

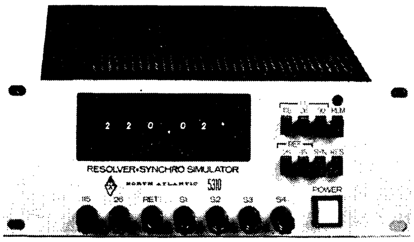
Model 321
Wideband Phase Angle Voltmeter

The Model 321 Features broadband phase sensitive operation at any frequency between 10 Hz and 100 KHz. Odd and even harmonic rejection exceeds 40 dB and phase accuracy is typically 0.5°. The 321's versatility and accuracy make it ideally suited for calibration, test or repair applications.

Model 213C Phase Angle Voltmeters

Successor to the famous VM-202, provides phase-sensitive measurement at a single pre-specified frequency from 30 Hz to 10kHz with ±5% frequency bandwidth (without adjustment). Full scale measurement from 300uV to 300V. The Model 213C has signal and reference isolation.

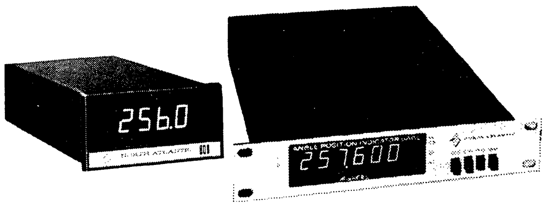
Programmable Resolver/Synchro Simulators



Model 5310
Programmable Resolver/Synchro Simulator

The Model 5310 can be used as a bench-top Resolver/Synchro Simulator or as a completely programmable device for ATE systems. The unit features isolated inputs and outputs and is protected against accidental short circuits and overloads on the output and overvoltage and transients on the power line input. Standard features include full remote programmability for line-to-line level, reference levels, synchro or resolver mode and output angle. Remote control is parallel BCD or binary bussable tri-state: IEEE-488-1978 GPIB is available. The 5310 also has full front-panel controls for manual operation. Featuring 18 bit resolution, 3.0VA output and 36 arc second accuracy, the 5310 is ideally suited for many commercial and military applications.

Angle Position Indicators



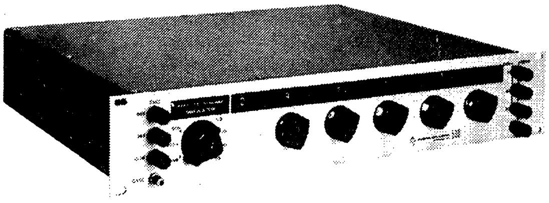
Series 800, 801, 8300, 8800
Angle Position Indicators

All North Atlantic industries' Angle Positions Indicators offer a combination of LSI - enhanced reliability, low cost and features never before available. The 800 Synchro Panel Meter features 0.1° resolution, small size, type II tracking and full pin programming at a very low price. Many options, including user settable variable scale, are available. The model 801 is physically identical to the 800 but offers an additional decade of resolution and an accuracy to 0.03°. Other features include rear switch programmable synchro/resolver and line-to-line selection, and tri-state BCD outputs.

The 8300 offers 0.01° resolution and accuracy to 0.03°. Through the use of direct hard-wire programming in the mating rear connector, mode and line-to-line are selected (resolver or synchro 11.8V, 26V or 90V) for each of the two front panel pushbuttons. The reference can vary between 47 and 440 Hz.

The 8800 achieves state-of-the-art performance with full type II tracking and auto phase correction. Featuring 0.001° resolution and 0.004° accuracy the 8800 accepts any standard line-to-line level without preselecting or pre-programming the input signal. The 8810 bench top or ATE version is available with the 488-IB (IEEE-STD-488).

Resolver Synchro Standards Simulators & Bridges



Models 530, 530/20, 532
Resolver Synchro Simulators

These simulators provide the ideal outputs for driving resolvers and synchros at 11.8, 26, 90 and 115V line-to-line voltages. The reference frequency can be 50 Hz to 11 kHz depending on model.

Accuracies of up to 2 arc seconds are available. Standard resolutions are .0001°, 001°. and 5°. The 530 and 530/20 are 19" rack mountable; the 532 is a thumbwheel settable DPM style unit.

Models 540/10, 540/20
Resolver Synchro Bridge

These bridges permit direct measurement of resolver and synchro transmitters. They feature a constant null gradient output voltage, isolated input and output, and input impedance over 500K. The Model 540/10 features 2 arc second accuracy over the band of 400 Hz to 800 Hz. Standard resolution is .001°. All units are 19" rack mountable.

north atlantic
Instrument Div.

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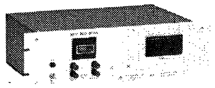
(516) 582-6500
(800) 645-5292
TWX 510-227-9660
Cable: NO ATLANTIC

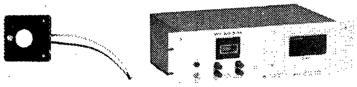
OSI AC WATT-HOUR METER WH30 SERIES

SINGLE PHASE 50/60 Hz MODELS



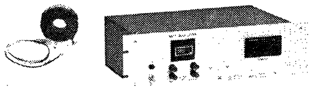
WITH INTERNAL SENSOR

MODEL NUMBER WH30-	VOLTAGE RANGE	CURRENT RANGE	METER FULL SCALE WATTS	W-H PER COUNT	CURRENT SENSOR*
1	0 to 150	0 to 5	600	0.1	Internal
2	0 to 300	0 to 5	1.2K	1	Internal
3	0 to 600	0 to 5	2.5K	1	Internal
10	0 to 150	0 to 10	1.2K	1	Internal
11	0 to 300	0 to 10	2.5K	1	Internal
12	0 to 600	0 to 10	5K	1	Internal
19	0 to 150	0 to 15	2K	1	Internal
20	0 to 300	0 to 15	4K	1	Internal
21	0 to 600	0 to 15	8K	1	Internal
28	0 to 150	0 to 50	6K	1	Internal
29	0 to 300	0 to 50	12K	1	Internal
30	0 to 600	0 to 50	25K	10	Internal
49	0 to 150	0 to 50	6K	1	Internal
50	0 to 300	0 to 50	12K	1	Internal
51	0 to 600	0 to 50	25K	10	Internal



SUPPLIED WITH CURRENT TRANSDUCERS

31	0 to 150	0 to 100	12K	10	C
32	0 to 300	0 to 100	25K	10	C
33	0 to 600	0 to 100	50K	10	C
34	0 to 150	0 to 200	25K	10	D
35	0 to 300	0 to 200	50K	10	D
36	0 to 600	0 to 200	100K	10	D
37	0 to 150	0 to 400	50K	10	D
38	0 to 300	0 to 400	100K	10	D
39	0 to 600	0 to 400	200K	100	D
40	0 to 150	0 to 600	80K	10	E
41	0 to 300	0 to 600	150K	100	E
42	0 to 600	0 to 600	300K	100	E
43	0 to 150	0 to 1K	120K	100	E
44	0 to 300	0 to 1K	250K	100	E
45	0 to 600	0 to 1K	500K	100	E
46	0 to 150	0 to 2K	250K	100	E
47	0 to 300	0 to 2K	500K	100	E
48	0 to 600	0 to 2K	1M	100	E



SUPPLIED WITH CURRENT TRANSFORMERS

58	0 to 150	0 to 100	12K	1	W
59	0 to 300	0 to 100	25K	10	W
60	0 to 600	0 to 100	50K	10	W
67	0 to 150	0 to 200	25K	10	W
68	0 to 300	0 to 200	50K	10	W
69	0 to 600	0 to 200	100K	10	W
76	0 to 150	0 to 400	50K	10	X
77	0 to 300	0 to 400	100K	10	X
78	0 to 600	0 to 400	200K	100	X
85	0 to 150	0 to 600	80K	10	X
86	0 to 300	0 to 600	150K	100	X
87	0 to 600	0 ot 600	300K	100	X
94	0 to 150	0 to 1K	120K	100	Y
95	0 to 300	0 to 1K	250K	100	Y
96	0 to 600	0 to 1K	500K	100	Y

* 100 Amperes and above, 3 External Sensors are supplied

FEATURES:

- Accurate measurement of watt-hours consumed by equipment
- Accurate for any conditions of phase, voltage unbalance, current unbalance and power factor
- Output is proportional to true power delivered to the load
- Meters using internal sensors or sensors C, D, or E provide excellent current transient response for measuring SCR control, chopped waveforms, or application where harmonics are present
- Highly-accurate, without worrying about the inaccuracies of current transformers and potential transformers
- Current sensors are included and calibrated with the watt-hour meter (where required)
- For interface with recorders, data loggers, computer or other instrumentation
- Wide Frequency Range: 48 to 70 Hz

SPECIFICATIONS:

INPUT:

Voltage: See Tables

Current: See Tables

Frequency Range: 48 to 70 Hz

Power Factor Range: Unity to Lead or Lag 0

Response (Transient — 90%):
  <100 microseconds with models using internal and sensors C, D and E
  1 millisecond with models using current sensors W, X and Y

Burden:
  Voltage: 1.25 VA
  Current: 1.25 VA

Current Overload (Continuous):
  2 X Rating: 1 Ampere thru 15 Ampere and Current Transformer Models
  50 X Rating: Current Transducer Models C, D and E
  10 Seconds: 6 X Rating

Dielectric Test (Input/Output/Case): 1500 VAC

Specifications continued on next page

OHIO SEMITRONICS, INC. 1205 CHESAPEAKE AVENUE, COLUMBUS, OHIO 43212-2287
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SPECIFICATIONS (cont.):

OUTPUT:

Wattmeter: 3½ digit DPM

Watt-Hour Counter: 6 digit with pushbutton reset (LCD) with battery back up

Analog Output:
10 VDC represents full scale watts
Analog W-H output available as option

Response: 250 milliseconds

Pulse Output: 4 Volt peak for external counter

Temperature Effect:
±0.5% FS +15°C to +35°C
±1.0% FS −10°C to +60°C

ACCURACY:

±0.5% FS power

GENERAL:

Instrument Size: 19″ x 5¼″ x 11″ W x H x D except Models WH3-52, thru 57, these are 19″ x 10½″ x 11″ W x H x D

Instrument Power:
115 VAC ±15% 50/60 Hertz
230 VAC 50 Hertz available

OPTIONS:

No load offset control

Split core on transducer models

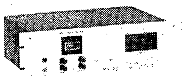
Analog meter, BCD output, analog W-H output

6 digit electromechanical counter

FOR DIMENSIONS REQUEST CATALOG #983

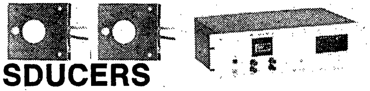
3 PHASE 3 WIRE 50/60 Hz MODELS

WITH INTERNAL SENSOR



MODEL NUMBER WH30-	VOLTAGE RANGE	CURRENT RANGE	METER FULL SCALE WATTS	W-H PER COUNT	CURRENT SENSOR*
4†	0 to 150	0 to 5	1.2K	1	Internal
5	0 to 300	0 to 5	2.5K	1	Internal
6	0 to 600	0 to 5	5K	1	Internal
13†	0 to 150	0 to 10	2.5K	1	Internal
14	0 to 300	0 to 10	5K	1	Internal
15	0 to 600	0 to 10	10K	1	Internal
22†	0 to 150	0 to 15	4K	1	Internal
23	0 to 300	0 to 15	8K	1	Internal
24	0 to 600	0 to 15	15K	10	Internal
52†	0 to 150	0 to 50	12K	1	Internal
53	0 to 300	0 to 50	25K	10	Internal
54	0 to 600	0 to 50	50K	10	Internal

SUPPLIED WITH CURRENT TRANSDUCERS



31-2†	0 to 150	0 to 100	20K	10	C
32-2	0 to 300	0 to 100	40K	10	C
33-2	0 to 600	0 to 100	80K	10	C

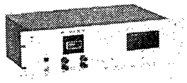
SUPPLIED WITH CURRENT TRANSFORMERS

61†	0 to 150	0 to 100	25K	10	W
62	0 to 300	0 to 100	50K	10	W
63	0 to 600	0 to 100	100K	10	W
70†	0 to 150	0 to 200	50K	10	W
71	0 to 300	0 to 200	100K	10	W
72	0 to 600	0 to 200	200K	100	W
79†	0 to 150	0 to 400	100K	10	X
80	0 to 300	0 to 400	200K	100	X
81	0 to 600	0 to 400	400K	100	X
88†	0 to 150	0 to 600	150K	100	X
89	0 to 300	0 to 600	300K	100	X
90	0 to 600	0 to 600	600K	100	X
97†	0 to 150	0 to 1K	250K	100	Y
98	0 to 300	0 to 1K	500K	100	Y
99	0 to 600	0 to 1K	1M	100	Y

* 100 Amperes and above, 2 External Sensors are supplied.
† May be used in 120V, 1ϕ, 3 Wire Edison Systems.

3 PHASE 4 WIRE 50/60 Hz MODELS

WITH INTERNAL SENSOR



MODEL NUMBER WH30-	VOLTAGE RANGE	CURRENT RANGE	METER FULL SCALE WATTS	W-H PER COUNT	CURRENT SENSOR
7	0 to 150	0 to 5	2K	1	Internal
8	0 to 300	0 to 5	4K	1	Internal
9	0 to 600	0 to 5	8K	1	Internal
16	0 to 150	0 to 10	4K	1	Internal
17	0 to 300	0 to 10	8K	1	Internal
18	0 to 600	0 to 10	15K	10	Internal
25	0 to 150	0 to 15	6K	1	Internal
26	0 to 300	0 to 15	12K	1	Internal
27	0 to 600	0 to 15	25K	10	Internal
55	0 to 150	0 to 50	20K	10	Internal
56	0 to 300	0 to 50	40K	10	Internal
57	0 to 600	0 to 50	80K	10	Internal

‡ 100 Amperes and above, 3 External Sensors are supplied.

SUPPLIED WITH CURRENT TRANSFORMERS

MODEL NUMBER WH30-	VOLTAGE RANGE	CURRENT RANGE	METER FULL SCALE WATTS	W-H PER COUNT	CURRENT SENSOR‡
64	0 to 150	0 to 100	40K	10	W
65	0 to 300	0 to 100	80K	10	W
66	0 to 600	0 to 100	150K	100	W
73	0 to 150	0 to 200	80K	10	W
74	0 to 300	0 to 200	150K	100	W
75	0 to 600	0 to 200	300K	100	W
82	0 to 150	0 to 400	150K	100	X
83	0 to 300	0 to 400	300K	100	X
84	0 to 600	0 to 400	600K	100	X
91	0 to 150	0 to 600	250K	100	X
92	0 to 300	0 to 600	500K	100	X
93	0 to 600	0 to 600	1M	100	X
100	0 to 150	0 to 1K	360K	100	Y
101	0 to 300	0 to 1K	800K	100	Y
102	0 to 600	0 to 1K	1.5M	1000	Y

OHIO SEMITRONICS, INC.

1205 CHESAPEAKE AVENUE, COLUMBUS, OHIO 43212-2287
PHONE (614) 486-9561 • TWX 810-482-1630

DC TO 100 Hz WATT-HOUR METER WH70 SERIES

MEASURES AND DISPLAYS WATTS AND WATT-HOURS

FEATURES:

- Accurate measurement of watt-hours consumed by equipment
- Highly-accurate, without worrying about the inaccuracies of shunts
- Current transducers are included and are calibrated with the watt-hour meter (where required)
- For interface with recorders, data loggers, computer of other instrumentation
- Wide frequency range, ideal for variable frequency applications
- Responds accurately to AC or DC components
- Suited for complex wave shapes
- 3 phase models available on request

SPECIFICATIONS:

INPUT:

Voltage: See Tables
Current: See Tables
Frequency Range: DC to 100 Hz
Power Factor Range: Unity to lead or lag 0
Response (Transient — 90%): <50 microseconds
Burden:
  Voltage: >1 megohm
  Current: 0.25 VA 5 thru 15 Amp
    0 VA 50 thru 2000 Amp
Current Overload (continuous):
  2 X Rating: 1 Ampere thru 15 Ampere
  50 X Rating: Current Transducer Models C, D and E
  10 Seconds: 6 X Rating
Dielectric Test (Input/Output/Case): 1500 VAC
Surge: Withstands IEEE SWC Test

OUTPUT:

Wattmeter: 3½ digit DPM
Watt-Hour Counter: 6 digit with pushbutton reset (LCD) with battery back up
Analog Output: 10 VDC represents full scale watts
  Analog W-H output available as option
Response: 250 milliseconds
Pulse Output: 4 volt peak for external counter
Temperature Effect:
  ±0.5% FS +15°C to +35°C
  ±1.0% FS −10°C to +60°C

ACCURACY:

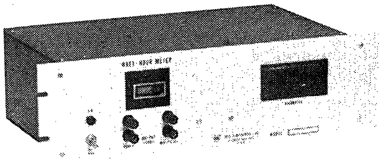
Watt-Hour Counter: ±0.5% FS
Analog Wattmeter: ±1.5% FS
Electrical Outputs: ±0.5% FS

GENERAL:

Instrument Size: 19″ x 5¼″ x 11″ W x H x D
Instrument Power:
  115 VAC ±15% 50/60 Hertz
  230 VAC 50 Hertz available

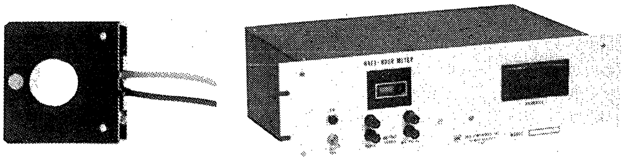
OPTIONS:

No load offset control
Split core on transducer models
Analog meter, BCD output, analog W-H output



STANDARD DC MODELS

MODEL NUMBER WH70-	VOLTAGE RANGE	CURRENT RANGE	METER FULL SCALE WATTS	W-H PER COUNT	CURRENT SENSOR*
1	0 to 150	0 to 5	600	0.1	Internal
2	0 to 300	0 to 5	1.2K	1	Internal
3	0 to 600	0 to 5	2.5K	1	Internal
10	0 to 150	0 to 10	1.2K	1	Internal
11	0 to 300	0 to 10	2.5K	1	Internal
12	0 to 600	0 to 10	5.0K	1	Internal
19	0 to 150	0 to 15	2.0K	1	Internal
20	0 to 300	0 to 15	4K	1	Internal
21	0 to 600	0 to 15	8K	1	Internal
28	0 to 150	0 to 50	6K	1	Internal
29	0 to 300	0 to 50	12K	1	Internal
30	0 to 600	0 to 50	25K	10	Internal



SUPPLIED WITH CURRENT SENSOR

31	0 to 150	0 to 100	12K	1	C
32	0 to 300	0 to 100	25K	10	C
33	0 to 600	0 to 100	50K	10	C
34	0 to 150	0 to 200	25K	10	D
35	0 to 300	0 to 200	50K	10	D
36	0 to 600	0 to 200	100K	10	D
37	0 to 150	0 to 400	50K	10	D
38	0 to 300	0 to 400	100K	10	D
39	0 to 600	0 to 400	200K	100	D
40	0 to 150	0 to 600	80K	10	E
41	0 to 300	0 to 600	150K	100	E
42	0 to 600	0 to 600	300K	100	E
43	0 to 150	0 to 1K	120K	100	E
44	0 to 300	0 to 1K	250K	100	E
45	0 to 600	0 ot 1K	500K	100	E
46	0 to 150	0 to 2K	250K	100	E
47	0 to 300	0 to 2K	500K	100	E
48	0 to 600	0 to 2K	1M	100	E

* 100 Amperes and above, 1 External Transducer is supplied.

FOR DIMENSIONS REQUEST CATALOG #980

OHIO SEMITRONICS, INC.

1205 CHESAPEAKE AVENUE, COLUMBUS, OHIO 43212-2287
PHONE (614) 486-9561 • TWX 810-482-1630

OSI DC AMPERE-HOUR METER AH70 SERIES

MEASURES AND DISPLAYS AMPERES AND AMPERE-HOURS

FEATURES:

- Accurate measurement and display of DC ampere-hours consumed by equipment
- Highly-accurate, without worrying about the inaccuracies of shunts
- Current transducers are included and are calibrated with the ampere meter (where required)
- For interface with recorders, data loggers, computer of other instrumentation

SPECIFICATIONS:

INPUT:

Overload (continuous):
2 X Rating (5-50 Ampere)
50 X Rating (100A-10KA)

DC Insertion Loss:
<0.01V X I (5-50 Amp)
Zero (100A-10 KA)

Isolation:
1.5 KV (5-50 Amperes)
5 KV (100A-10 KA)

Response: (Transient) 50 microsecond

Dielectric Test: Withstands IEEE SWC Test

OUTPUT:

Ampere Hour Counter: 6 digit pushbutton reset, LCD with battery backup

Ammeter: 3½ digit DPM

Electrical Output:
10 VDC FS for Current
4V Pulse (Amp-hour)

Response Time: 250 milliseconds

Accuracy and Linearity:
±0.5% FS (5A-2 KA)
±1.0% FS (5 KA-10 KA)

Meter: 1.5% FS

Electrical Output:
±0.5% FS (5A-2 KA)
±1.0% FS (5 KA-10 KA)

Zero Drift (max.)
±0.1% FS of rated Ampere hour per hour

Temperature Effect (0 to 40°C): ±0.1% FS ±1% of reading

Instrument Case Size: 19″ x 5¼″ x 11″ W x H x D

External Transducer: See Table

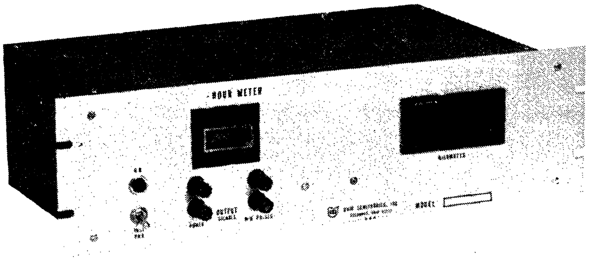
GENERAL:

Instrument Size: 19″ x 5¼″ x 11″ W x H x D

Instrument Power:
115 VAC ±15% 50/60 Herzt
230 VAC 50 Hertz available

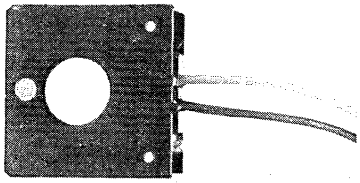
OPTIONS:

No load offset control
Split core on transducer models
Analog meter, BCD output, analog A-H output



STANDARD DC MODELS

MODEL NUMBER AH70-	INPUT CURRENT RANGE	METER FULL SCALE CURRENT	A-H PER COUNT	CURRENT SENSOR*
5	0 to 5	5	.001	Internal
10	0 to 10	10	.001	Internal
25	0 to 25	25	.01	Internal
50	0 to 50	50	.01	Internal



SUPPLIED WITH CURRENT SENSOR

100	0 to 100	100	.01	C
200	0 to 200	200	.1	D
400	0 to 400	400	.1	D
600	0 to 600	600	.1	E
1K	0 to 1K	1K	.1	E
2K	0 to 2K	2K	1	E
5K	0 to 5K	5K	1	G
10K	0 to 10K	10K	1	H

* 100 Amperes and above, 1 External Transducer is supplied.

NOTE: Models listed above are unipolar. For bipolar units add a BP after the model number.

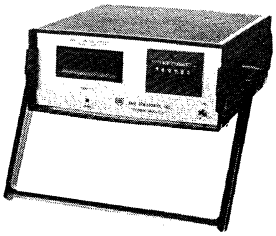
FOR DIMENSIONS REQUEST CATALOG #983

OHIO SEMITRONICS, INC. 1205 CHESAPEAKE AVENUE, COLUMBUS, OHIO 43212-2287
PHONE (614) 486-9561 • TWX 810-482-1630

ENERGY MONITORING INSTRUMENTS EM SERIES

FEATURES:

- Portable
- Easy to use, convenient way to measure electrical power
- 0.5% accuracy
- Digital display
- Totalizes electrical energy EM-5
- Single phase AC
- Isolated 0 to 10 VDC analog output EM-2 and EM-5



EM-5 WATT-HOUR METER

FEATURES:

- Acts as an in-line extension cord
- Totalizes electrical energy
- Measures electrical power

Input Voltage Range: 83 to 135 VAC
Input Current Range: 0 to 10 amperes AC
Frequency Range: 50 to 70 Hertz
Power Factor Range: Unity to Lead, Lag 0
Overload Current:
  15 amperes continuous
  50 amperes 5 seconds per hour
Input Response: <1 millisecond
Display:
  Meter: 3½ digit 0 to 1500 watts
  Counter: 6 digit, 1 watt-hour per count (pushbutton reset)

Output:
  Analog Signal: 0 to 10 VDC represents 1200 watts
  Response: 250 milliseconds
  Load on Output: >2K ohms
Accuracy: Includes set-point, linearity, and power factor error
  Watts: ±0.5% FS (1200 watts)
  Watt-Hours: ±0.5%
Temperature Effect: 0 to 40°C, ±1% of reading, ±0.1% FS
Instrument Power: 115 VAC, ±10%, 60 Hertz, 5 watts
Case Size: 10″ W x 4″ H x 9″ D overall

EM-3 AC MULTIPURPOSE METER

FEATURES:

- Acts as an in-line extension cord
- Measures current, voltage, and power
- Binding posts are provided for
- Connection of an external AC electrical power source

Input Voltage Range: 0 to 150 VAC
Input Current Range: 0 to 10 amperes AC
Burden (at maximum rated input):
  Voltage: 1.25 VA
  Current: 1.25 VA
Frequency Range: 50 to 70 Hertz
Power Factor Range: Unity to Lead, Lag 0
Overload Current:
  15 amperes continuous
  50 amperes 5 seconds per hour
Input Response: <1 millisecond

Display:
  Meter: 3½ digit
  Current: 0 to 10.0 amperes AC
  Voltage: 0 to 150.0 volts AC
  Watts: 0 to 1500 watts
Accuracy: Includes set-point, linearity, and power factor error
  Current: ±0.5%
  Voltage: ±0.5%
  Watts: ±0.5%
Temperature Effect: 0 to 40°C, ±1% of reading, ±0.1% FS
Instrument Power: 115 VAC, ±10%, 60 Hertz, 5 watts

EM-2 AC WATTMETER

FEATURES:

- Measures electrical power
- Voltage range switch
- 120V or 220V range
- Load easily connected

Input Voltage Range: 0 to 150 VAC or 300 VAC
Input Current Range: 0 to 10 amperes AC
Burden (at maximum rated input):
  Voltage: 1.25 VA
  Current: 1.25 VA
Frequency Range: 50 to 70 Hertz
Power Factor Range: Unity to Lead, Lag 0
Overload Current:
  15 amperes continuous
  50 amperes 5 seconds per hour
Input Response: <1 millisecond
Display:
  Meter: 3½ digit, 0 to 1500 watts at 120 volts, 0 to 1999 watts at 240 volts

Output:
  Analog Signal: 0 to 10 VDC represents 1000 watts or 2000 watts
  Response: 250 milliseconds
  Load on Output: >2K ohms
Accuracy: Includes set-point, linearity, and power factor error
  Watts: ±0.5% FS (1200 watts on 120 volt range and 2000 watts on 300 volt range)
Temperature Effect: 0 to 40°C, ±1% of reading, ±0.1% FS
Instrument Power: 115 VAC, ±10%, 60 Hertz, 5 watts

OHIO SEMITRONICS, INC.

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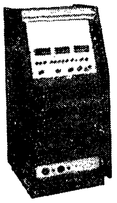
OSI POWER TEST PANELS

MODEL PTP-990 POWER TEST PANEL

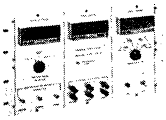


FEATURES AND APPLICATIONS:

- Commercial appliance testing
- Core loss testing
- Motor testing
- Large electrical machinery testing

The PTP-990 contains all necessary voltage, current, and power transducers, contactors, and circuit breakers. The operator selects the required service, voltage, and current range, connects the equipment to be tested to the PTP-990, and pushes the test button. The PTP-990 displays current, voltage, and power on digital panel meters. BCD outputs may be provided for a data collection system or microprocessor interface. This power test panel represents the capabilities of OSI to manufacture test equipment to meet customer needs.

MODULAR TEST PANEL



FEATURES AND APPLICATIONS

- Appliance testing
- Process monitoring
- Transient power determination
- Prototype characterization
- Production and quality testing
- Motor efficiencies
- Assembly line power consumption
- Sub station monitoring

OSI manufactures a complete line of Modular Power Test Panels, including volt, ampere, watt, and watt-hour modules. The flexibility of modular construction allows future expansion of a basic test panel.

Modules are available for 1 phase or poly phase power measurements. Voltage modules are available for 120, 240, and 480 volts, DC to 400 Hz. Current modules are available from 1 Amp through 2000 Amps.

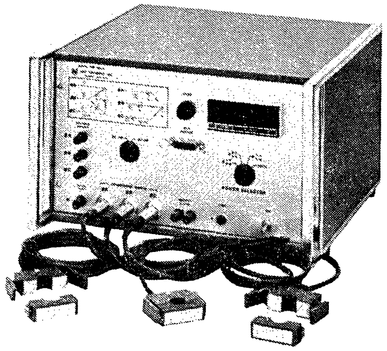
Each module has a 0 to 10 volt DC analog signal output. This isolated output provides a signal suitable for recording or display purposes.

Split core (clamp-on) transducers are available on 100 Ampere and higher current levels so that the modular test panel may be installed in the system without disconnecting the current leads.

These test panels are designed to meet Federal Regulations requiring manufacturer's to rate electrical power and energy consumption of their products. A detailed brochure provides information helpful in the selection of optimum units for particular testing or monitoring needs.

OSI DIGITAL WATT-METER WM SERIES

MODEL WM-365A DC TO 5 KHz RESPONSE



FEATURES AND APPLICATIONS:

- Traction motor monitoring
- Drive motor monitoring
- Power converters
- Variable frequency motor drives
- Power systems with DC components
- Power systems with nonsymmetrical wave shapes
- Power system protection
- Power data for computer input

SPECIFICATIONS:

Input Voltage Range	0 to 500 Volts DC or RMS line-to-line or line-to-neutral.
Input Current Range	0 to 100 Amperes DC or RMS per line through transducer.
Frequency Range	DC to 400 Hertz.
Full Scale Power	150.0 Kilowatts for 3 phase. 50.0 Kilowatts per phase or in single phase.
Meter Indication	3½ digit display with 0.1 Kilowatt resolution.
Electrical Output	0 to 5 Volts DC for 0 to 150 KW in total power arrangement. 0 to 5 Volts DC for 0 to 50 KW in single phase arrangement.
BCD Output	A BCD coded output is available on the front panel.
Electrical Isolation	1000 Volts DC or RMS between any line and output terminals.
Accuracy	±1 per cent of full scale in temperature range of 15 to 35°C and with power factor of .5 lead to .5 lag.
Case Size	17 x 10 x 14 inches.
Power Requirements For Electronics	120 Volt 60 Hertz

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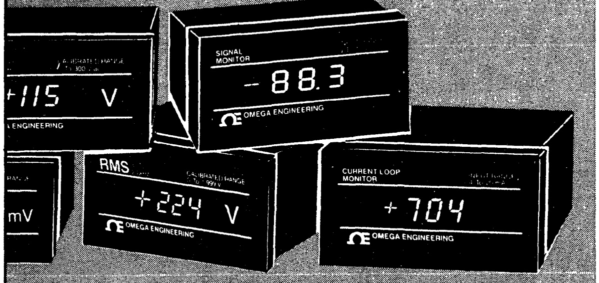
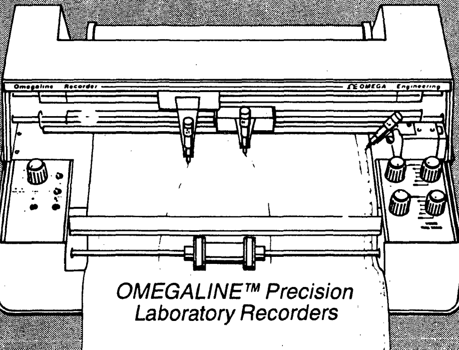
TEST AND MEASUREMENT INSTRUMENTATION

For Temperature, Pressure, Strain and Flow


+115 V
SIGNAL MONITOR
-88.3
OMEGA ENGINEERING
mV
RMS
+224 V
OMEGA ENGINEERING
CURRENT LOOP MONITOR
+704
OMEGA ENGINEERING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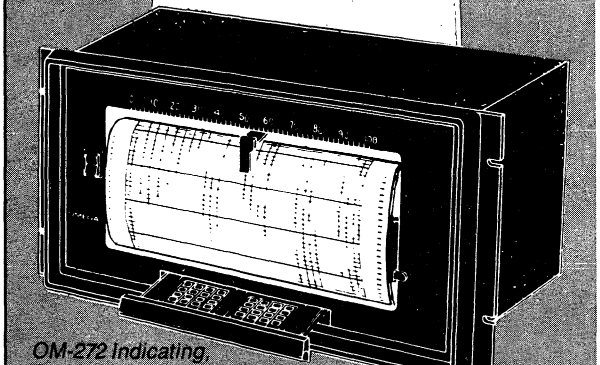

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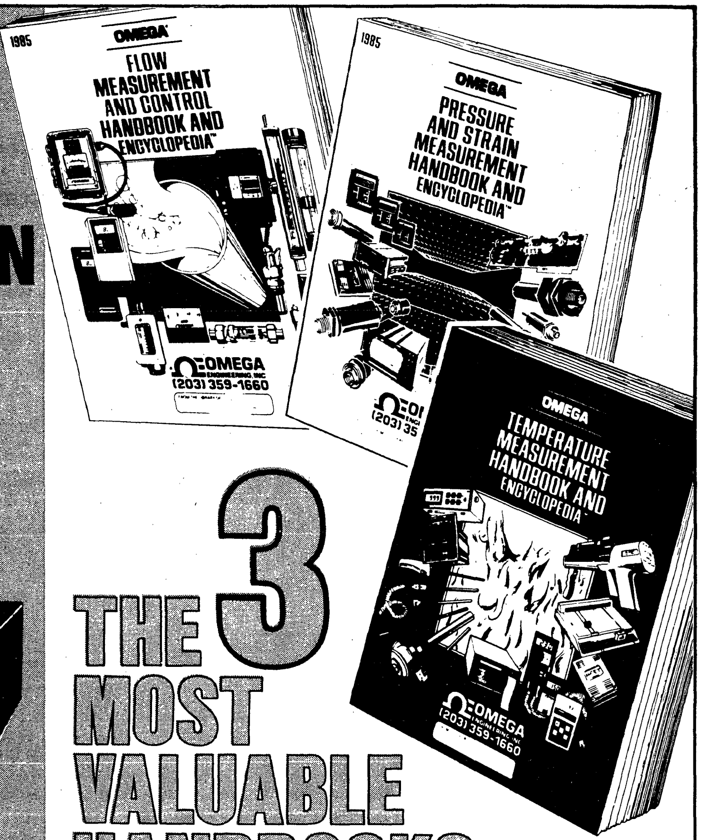
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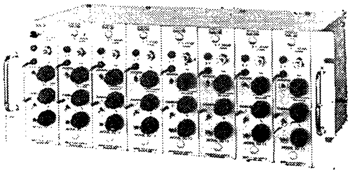
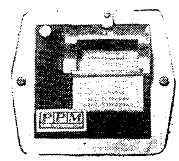


PPM, INC.

4521 EMERY INDUSTRIAL PKWY.
Cleveland, Ohio 44128 ● (216)292-6006



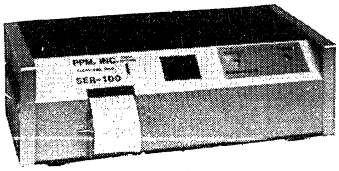
SIGNAL CONDITIONERS

PPM SIGNAL CONDITIONERS PROVIDE ULTRA-STABLE EXCITATION, BRIDGE BALANCE, AND MONITORING CIRCUITS FOR USE WITH STRAIN-GAGE AND RTD TRANSDUCERS.

MODEL SG-11 (ILLUSTRATED ABOVE, EIGHT UNITS IN ENCLOSURE) HAS AN INDIVIDUAL POWER SUPPLY PER CHANNEL FOR MAXIMUM ISOLATION (APPROACHING BATTERY OPERATION). THOUSANDS OF SG-11 UNITS ARE IN OPERATION AT N.A.S.A. AND INDUSTRIAL LABORATORIES THROUGHOUT THE WORLD.

MODEL SG-16 (NOT ILLUSTRATED) PROVIDES LOWEST-COST QUANTITY SIGNAL CONDITIONING. A 20-CHANNEL SYSTEM WITH COMMON POWER SUPPLY IS AVAILABLE AT $100/CHANNEL WITHOUT AMPLIFIERS. AMPLIFIER OPTIONS RANGE FROM $15/CHANNEL FOR 10 MA GALVO DRIVERS TO $150/ CHANNEL FOR LOW-DRIFT DIFFERENTIAL AMPLIFIERS.

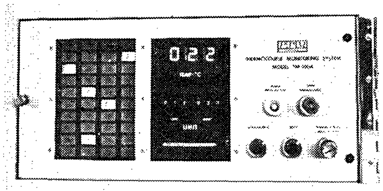
MODEL SG-11 PLUG-IN UNIT:	$249.50
MODEL SG-11-R (SOLDER-TERMINALS) ENCLOSURE:	199.00
MODEL SG-11-RC (MS-CONNECTORS) ENCLOSURE:	595.00



SEQUENTIAL EVENT RECORDERS

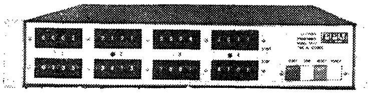
THE MODEL SER-100 SERIES OF SEQUENTIAL EVENTS RECORDERS PROVIDE A PRINTED RECORD OF THE TIME AND SEQUENCE OF INDEPENDENT ON/OFF EVENTS OCCURRING AT A NUMBER OF POINTS. THE SER-100 MAY BE SET TO RECORD EITHER THE TURN-ON TIME OR THE TURN-OFF TIME, OR BOTH, ALONG WITH THE POINT IDENTIFICATION.

MODEL SER-100 WITH 16 INPUTS:	$3,500.00
EACH ADDITIONAL 16 INPUTS:	300.00



THERMOCOUPLE MONITOR

THE MODEL TM-100A SCANS UP TO 100 THERMOCOUPLES, DISPLAYING TEMPERATURE DIGITALLY. A HIGH-LOW LIMIT CIRCUIT COMPARES THE TEMPERATURE WITH PRESET THUMBWHEEL SWITCH SETTINGS; A LAMP MATRIX DISPLAYS ALL OUT-OF-LIMIT CHANNELS. INTERFACES PROVIDE FOR PRINTOUT OR COMPUTER ENTRY OF DATA.



DIGITAL TIMERS-PROGRAMMERS

THE EP- SERIES OF DIGITAL ELECTRONIC PROGRAMMERS PROVIDE RELAY OR SOLID-STATE SWITCH OPERATION AT DIGITALLY-PRESET START AND STOP TIMES. EACH CHANNEL OPERATES INDEPENDENTLY. UNITS ARE AVAILABLE FROM 1 TO 1000 CHANNELS, WITH TIMING FROM MICROSECONDS TO HOURS.

FOR PRICING, CONSULT FACTORY OR SALES REP.

THERMAL PRINTERS

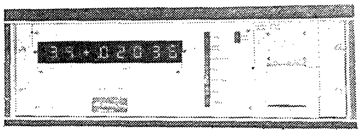
THE TP-100 SERIES IS A LINE OF SILENT ALPHA-NUMERIC THERMAL PRINTERS. QUIET, RELIABLE OPERATION, LONG LIFE, AND MODERATE COST RESULT FROM THE USE OF A SIMPLE MECHANISM WHOSE ONLY FUNCTION IS TO ADVANCE PAPER. EASE OF LOADING AND LOW MAINTENANCE MAKE THESE UNITS IDEAL FOR MEDICAL USE.

STANDARD MODELS ARE 12 (TP-112), 20 (TP-120), AND 40 (TP-140) COLUMNS. AVAILABLE TO OEM'S ARE 80 OR 120 COLUMN UNITS, AS WELL AS GRAPHIC STRIP-CHART RECORDERS WITH RESOLUTION TO 200 DOTS/INCH.

MODEL TP-112 (ILLUSTRATED) FITS INTO A PANEL CUT-OUT 3 INCHES HIGH BY 3.5 INCHES WIDE. IT INCLUDES DRIVE ELECTRONICS AND REQUIRES 8-BIT PARALLEL INPUT DATA. RS-232 OPTION IS AVAILABLE.

MODEL TP-112 (AS SHOWN):	$595.00
MODEL TP-112 WITH CABINET & POWER SUPPLY:	895.00

SUBSTANTIAL DISCOUNTS ON VOLUME OEM ORDERS.

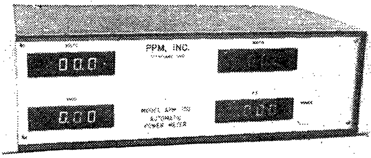


DATA LOGGERS

THE MODEL DL-3 IS A COMPLETE DATA ACQUISITION SYSTEM IN A COMPACT, PORTABLE PACKAGE. IT SCANS UP TO 256 INPUTS, DIGITIZES THEM, AND PRINTS OUT THE VALUES BY MEANS OF A BUILT-IN THERMAL PRINTER.

OPTIONS INCLUDE: FLOATING DECIMAL POINT, INTERNAL CALENDAR-CLOCK, STRAIN-GAGE OR THERMOCOUPLE CONDITIONING, COMPUTER INTERFACE, LIMIT COMPARATOR, AND ENGINEERING UNITS CONVERSION.

MODEL DL-3 WITH 16 CHANNELS:	$2,500.00
MODEL DL-3 WITH 256 CHANNELS:	5,000.00



AUTOMATIC POWER METER

THE MODEL APM-100 AUTOMATIC POWER METER DISPLAYS "TRUE RMS" VOLTS, AMPERES, KW, AND POWER FACTOR SIMULTANEOUSLY ON FOUR 3.5 DIGIT DISPLAYS. FULL-SCALE RANGES ARE: 1000 OR 199.9 VOLTS, 19.99 AMPERES, 19.99 OR 1.999 KW, AND 1.000 POWER FACTOR. RANGE-CHANGING IS AUTOMATIC. ACCURACY IS ± 0.3% OF FULL-SCALE FROM DC TO 1000 HZ.

THE MODEL APM-10 PROVIDES THE SAME READINGS AS ABOVE ON A SINGLE READOUT UNIT WITH MANUAL SWITCHING. ACCURACY IS ± 0.5% OF FULL-SCALE.

MODEL APM-100 (ILLUSTRATED):	$2,500.00
MODEL APM-10 (NOT ILLUSTRATED):	1,000.00

PROM PROGRAMMERS

PPM OFFERS A LINE OF PROM PROGRAMMERS TO PROGRAM EPROMS, BI-POLAR PROMS, AND PLA'S. THESE PROGRAMMERS ARE LOW-COST DEDICATED UNITS, EACH HANDLING A FAMILY OF SIMILAR DEVICES. OUR SPECIALTY IS OEM VOLUME CUSTOM REQUIREMENTS, BUT SINGLE UNITS ARE AVAILABLE.

MODEL EPROM 2700 (PROGRAMS 2716 SERIES): $1,000.00

PTS
FREQUENCY SYNTHESIZERS

HIGH-PERFORMANCE DIRECT SYNTHESIZERS

Accurate, stable, quiet frequencies on command, fast. For NMR, imaging, SATCOM, surveillance, ATE. Sources adapting to your needs with options. High demonstrated reliability. Thousands in use.

PTS 040

Range: 0.1-40MHz
Resolution: 0.1Hz-100KHz (opt.)
Switching: 5-20 s
Output: +3 to +13dBm: 50 ohm
Spurious Outputs: −75dB

Phase Noise: −75dBc, (0-15KHz)
Freq. St'd: Oven, TCXO, Ext.
Interface: BCD par. or GPIB
Size: 19"W, 5¼"H, 18"D

Other Options:
Progr. Attenuator, 0-90dB
(or 0-99dB with GPIB)
nx10MHz output 20-140MHz
or any 10MHz multiple
from 20-140MHz.

PTS 160

Range: 0.1-160MHz
Resolution: 0.1Hz-100KHz (opt.)
Switching: 5-20μs
Output: +3 to +13dBm: 50 ohm
Spurious Outputs: −75dB

Phase Noise: −70dBc, (0-15KHz)
Freq. St'd: Oven, TCXO, Ext.
Interface: BCD par. or GPIB
Size: 19"W, 5¼"H, 18"D

Other Options:
Progr. Attenuator, 0-90dB
(or 0-99dB with GPIB)
nx10MHz output 20-140MHz
or any 10MHz multiple
from 20-140MHz.

PTS 250

Range: 1-250MHz
Resolution: 0.1Hz-100KHz (opt.)
Switching: 5-20μs
Output: +3 to +13dBm: 50 ohm
Spurious Outputs: −70dB

Phase Noise: −70dBc, (0-15KHz)
Freq. St'd: Oven, TCXO, Ext.
Interface: BCD par. or GPIB
Size: 19"W, 5¼"H, 18"D

Other Options:
Progr. Attenuator, 0-90dB
(or 0-99dB with GPIB)
nx10MHz output 20-140MHz
or any 10MHz multiple
from 20-140MHz.

PTS 500

Range: 1-500MHz
Resolution: 0.2Hz-100KHz (opt.)
Switching: 5-20μs
Output: +3 to +13dBm: 50 ohm
Spurious Outputs: −70dB

Phase Noise: −63dBc, (0-15KHz)
Freq. St'd: Oven, TCXO, Ext.
Interface: BCD par. or GPIB
Size: 19"W, 5¼"H, 18"D

Other Options:
nx10MHz output, 20-140MHz,
or any 10MHz multiple
from 20-140MHz.

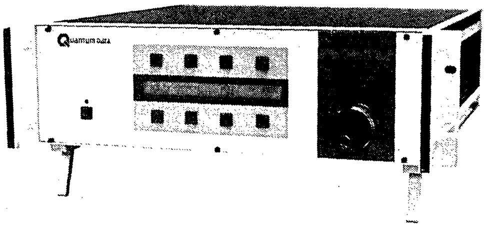
PTS 500
LOCAL
REMOTE
FREQUENCY CONTROL
LEVEL
OUTPUT
ON
PTS 250

***NEW:* Choice of table-look-up resolution with steady-phase switching.**

PROGRAMMED TEST SOURCES, INC.
Beaver Brook Rd. Littleton. MA 01460 617-486-3008

APO-61

QUANTUM DATA
455 E. KEHOE, CAROL STREAM, IL 60188 • (312) 668-3301 • TELEX 206725



NEW!

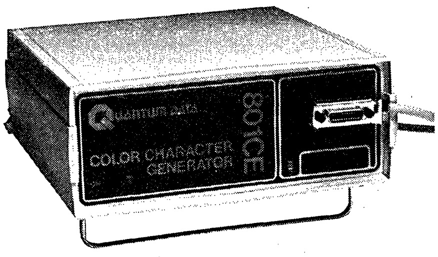
COLOR GRAPHIC GENERATOR

THE OPIX IMAGER

The OPIX IMAGER is the world's most powerful video signal generator. It is designed for people working at the leading edge of video technology, who need an extremely flexible signal source for evaluating ultra-high resolution raster-scanned products and signal formats.

FEATURES

- Full color graphics with 8M bit color/image map
- 1.6-200 MHz variable pixel rate
- Set the horizontal, vertical and video timing to meet your needs
- Build your own images from standard image primitives
- Images self scale to fit the display area you set
- You can use text and graphics in the same image
- Production mode allows single button operation
- Non-volatile image storage via CMOS & EPROM
- Floppy and hard disk image storage
- Easy interface to your personal computer for additional image designs
- RS-232 and IEEE-488 interfaces
- Expert system user interface
- Selection of 256 colors from over 16 million



COLOR SYSTEMS GENERATOR

MODEL 801CE

Now you can program the variable video information you need with a personal computer. The Model 801CE connects directly to IBM or Apple computers with plug-in IEEE-488 cards. You can use the PC's disk storage to store and recall thousands of custom signal formats. It makes changes easily and quickly without the programming of EPROM's.

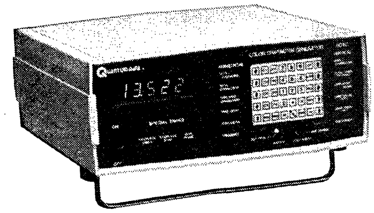
APPLICATIONS

- Computer controlled testing of O.E.M. CRT displays
- Automatic alignment of CRT displays
- Mass storage and distribution of test signal formats (in the lab and on the production floor)
- Remotely control custom designed signal buffers and control panels (using the Interflex Bus™)

FEATURES

(In addition to those provided by the Model 801C)

- A computer interface to the world standard IEEE-488 General Purpose Interface Bus (GPIB) instead of the 801C's front keypad
- A computer interface to Quantum Data's Interflex Bus™. Allows the direct attachment of custom-designed devices at very low cost
- Easy-to-use commands that allow you to program your own custom patterns
- Thirty-four (34) additional color patterns



COLOR CHARACTER GENERATOR

MODEL 801C

The Quantum Model 801C is a programmable RGB video test generator for use in development and manufacture of color monitors and terminals. The unit can be programmed to duplicate the video signals of a given CRT terminal or specific video application. Formats for many CRT applications may be stored in the Model 801C's EPROM, making it an excellent production test generator for companies who manufacture color display monitors for use in terminals. The Model 801C has all the features of the Model 801A plus color capabilities with sixteen selectable color patterns. These patterns allow testing for purity, convergence, gun tracking, geometry, bandwidth, focus, and brightness. Video amplifier characteristics may be accurately determined as color is switched on a dot basis.

FEATURES

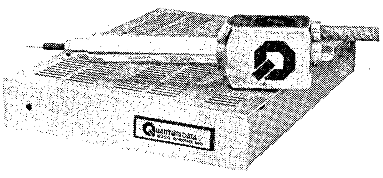
- Sixteen selectable color patterns
- Programmable dot clock range of 1.024-32.768 MHz color, 1.024-65.520 MHz monochrome
- Internal frequency synthesizer for variable dot clocks with crystal accuracy
- Auto-sequencing-color-pattern changes character and background colors to assure equal phosphor usage for life test applications
- Five selectable monochrome patterns (including crosshatch)
- Lockout switch inhibits unauthorized format tampering
- 64 character library or make your own characters
- Up to 256 characters/row by 128 character row/frame (including blanking)
- Custom characters programmable from the keypad
- Interlace and non-interlace modes
- Negative video capability
- Non-volatile CMOS memory stores and recalls four color or monochrome formats
- EPROM storage of up to 141 user formats
- Both video and sync timing are entirely programmed by the user
- Automatic frequency calculation from entered parameters
- Coded error messages to help identify invalid formats
- Resident performance check formats

APPLICATIONS

- Production testing of CRT displays
- Aids in testing of newly designed CRT displays
- Incoming inspection of OEM CRT displays

COMPUTERIZED ADJUSTMENT TOOL

CAT 2000



The CAT 2000 will improve your adjustment speed, consistency and precision, resulting in lower production costs.

The CAT 2000 allows you to adjust pots, coils and trimmers under direct computer control through the IEEE-488 GPIB and has accuracy greater than .03 degrees.

APPLICATIONS

- Automating operator based electronic adjustments
- Perfect tool for addition to adjustment robotics systems
- Verification of trimmer range
- Automatic calibration or adjustment

FEATURES

- A very simple program instruction set
- Programmable torque of 0-15 ounce inches
- Velocities up to 5 revolutions per second under program control
- Rack mountable

BENEFITS

- Saves time by adjusting multi-turn controls stop to stop in just seconds
- Consistently accurate due to computer control
- Payback is usually within 6 months
- Precision unmatched by manual methods of the past
- Eliminates operator error.
- Reduced operator fatigue
- Increased product quality
- Drastically reduces finished product reject rate by having accurate adjustment

MINIGLOSSARIES
FORMULAS • CHARTS
PRODUCT SELECTION GUIDES
FORMS
CODES

TECHNICAL INFORMATION

WHERE TO FIND THEM IN THE 85/86 EDITION OF EEM

Abbreviations/Acronyms .... **A**•1166, **B**•1012, **C**•1028, **D**•1016
ASCII Code .... **D**•1087
Batteries, Product Selection Guide .... **D**•1413
Batteries & Fuel Cells, Characteristics .... **D**•1430
Cabinets, Enclosures, Racks, & Chassis, Product Selection Guide .... **C**•1003
Capacitors, Basic Formulas .... **A**•1093
Capacitors, Miniglossary .... **A**•1066
Capacitors, Product Selection Guide .... **A**•1003
Circuit Boards (Printed) Product Selection Guide .... **C**•1099
Coils, Chokes, Inductors, Product Selection Guide .... **A**•1205
Conductors, Maximum Current Capacity of Copper & Aluminum .... **C**•1863
Connectors, Miniglossary .... **C**•1129
Connectors, Terminals, & Sockets, Product Selection Guide .... **C**•1105
Crystals, Oscillators, Crystal & Piezoelectric Filters, Product Selection Gude .... **A**•1309
Delay Lines, Product Selection Guide .... **A**•1459
Discrete Semiconductors, Product Selection Guide .... **A**•2067
Displays, Readouts, Lamps, & Lights, Product Selection Guide .... **B**•1015
EBCDIC Code .... **D**•1092
Encapsulation, Miniglossary .... **C**•1086
Fans, Blowers, Cooling Equipment, & Heat Exchangers, Product Selection Guide .. **C**•1623
Filters, Product Selection Guide .... **A**•1583
Instruments, Graphic Recording Product Selection Guide .... **D**•1401
Instruments, Panel Meters, Product Selection Guide .... **D**•1329
Instruments, Test & Measuring Product Selection Guide .... **D**•1175
Interconnection Systems, Product Selection Guide .... **C**•1699
Keyboards & Keypads, Product Selection Guide .... **B**•1705
Logofinder & Trademark Directories .... **B**•901
Microwave Components, Product Selection Guide .... **A**•1701
Military Qualified Products Lists .... **B**•1003
Motors, Drives, & Rotating Components, Product Selection Guide .... **B**•1129
Opto Semiconductors, Miniglossary .... **B**•1214
Oscilloscopes, Product Selection Guide .... **D**•1385
Panel Hardware, Product Selection Guide .... **C**•1589
Potentiometers, Trimmers, Controls, & Rheostats, Product Selection Guide .... **A**•1991
Power Supplies, Miniglossary .... **D**•1462
Power Supplies, AC, Product Selection Guide .... **D**•1877
Power Supplies, DC, Product Selection Guide .... **D**•1447
Protective Components (Fuses, Circuit Breakers, etc.), Product Selection Guide .... **B**•1225
Relay Contact Forms .... **B**•1317
Relays, Electromechanical, Miniglossary .... **B**•1308
Relays, Product Selection Guide .... **B**•1261
Resistor Color Codes .... **A**•1828
Resistors, Product Selection Guide .... **A**•1785
Servo Components, Miniglossary .... **D**•1985
Solenoids, Product Selection Guide .... **B**•1463
Switches, Product Selection Guide .... **B**•1477
Thermal Components, Product Selection Guide .... **B**•1741
Thermal Conductivity of Dielectrics at Room Temperature .... **B**•1744
Thyristors/High Power Diodes, Miniglossary .... **A**•2076
Transducers & Encoders, Product Selection Guide .... **B**•1777
Transformers, Product Selection Guide .... **A**•2099
Wire & Cable, Product Selection Guide .... **C**•1743
Wire Gauges—Diameter, Area, Copper Weight .... **C**•1844

RE • INSTRUMENTS

Electronics for Test and Communication

Signal Generation

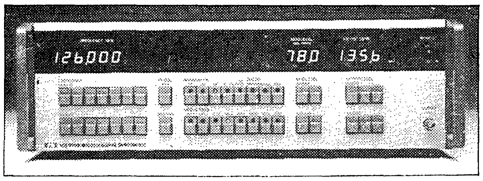
RE107 Synthesized Signal Generator
RE502 Programmable AM Stereo/FM Stereo Generator
RE503 Programmable AM Stereo/FM Stereo Generator

These instruments are capable of producing an AM stereo signal of the Motorola or Magnavox configurations, as well as the conventional AM/FM stereo signals. The RE107 is a fully programmable RF signal generator covering the frequency range of 100 kHz to 130 MHz. The RE502/503 provide programmable FM stereo generation and modulation sources for use with the RE signal generators. A variety of interfaces are available including IEEE/IEC, BCD, and a setup storing memory option.

RE104 Synthesized Signal Generator
RE501 Programmable Stereo Generator

Providing the same interface options as the RE107, RE502 and 503, the RE104 and RE501 units are ideal for production line applications. The RE501 produces the AM/FM stereo signals while the RE104 unit produces an RF signal in the frequency range of 150 kHz to 30 MHz, and 86 MHz to 130 MHz.

RE108 Synthesized Signal Generator



This latest edition to the RE group of programmable RF generators provides a low phase noise AM or FM signal in the frequency range of 100 kHz to 130 MHz. Available interface options make this instrument ideal for production line testing.

RE101 Signal Generator
SMG40 Stereo Generator

These compact instruments are designed exclusively for bench top testing of high quality receivers. The RE101 has a frequency range of 150 kHz to 30 MHz, and 87 MHz to 130 MHz. The output is continuously variable with a range of 140 dB up to 1.0V rms RF output level. Sweep capabilities are built in for alignment applications. Signal purity achieved is <.05% THD for FM and >.3% THD for AM. Stereo signals maintain a channel separation in excess of 60 dB.

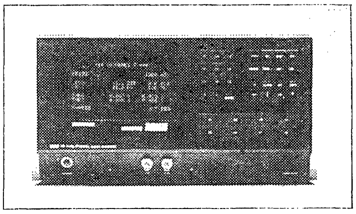
RE504 Programmable TV Stereo Generator
SMG44 TV Stereo Generator

Both the RE504 and the SMG44 generate a BTSC TV stereo baseband signal. Stereo separation is better than 60dB, and distortion is less than 0.02%. The pilot is phase locked to the horizontal scanning frequency component of a composite video input signal. The SMG44 is designed for bench top laboratory use, while the RE504 is programmable via IEEE, BCD, or RE memory interfaces.

RE INSTRUMENTS CORPORATION
31029 Center Ridge Road, Westlake, Ohio 44145
Telephone (216) 871-7617 Telefax (216) 871-4303

Audio Test Systems

RE201 Dual Channel Audio Analyzer



The RE201 makes measurements in the 20 Hz to 25 kHz bandwidth by use of FFT analysis and real-time measurements. It is capable of measuring:

THD to less than 0.01%, and 0.001% on single harmonics
TIM
IM (SMPTE)
DFIM (CCIF)
Frequency (with resolution down to 4 Hz retaining 80 dB isolation)
Phase
Separation/Crosstalk
RMS (Selective Peak)
DC
Wow and Flutter

This multi-processor unit is designed for maximum flexibility with a menu selectable operating system controlled from the front panel keyboard and displayed on the 9″ CRT.

Component Testing

CLT1
Component Linearity Test Equipment

This instrument is intended for reliability tests on passive electronic components. It gives information of the same nature as obtained by the widely accepted current noise test on resistors. The measurement method gives early detection of minute flaws that indicate the presence of design or manufacturing weaknesses which will later lead to failures. The CLT1 has a wide impedance range (1 ohm to 100 mohm), is insensitive to external fields, and isolates the 3rd harmonic to 150 dB below the fundamental. It is suited for automatic 100% "go/no go" testing and rated at 10 components/second, making it ideal for component development, or production/acceptance testing.

IM6 Megohmmeter

The IM6 is a logarithmically scaled device capable of measuring 1 to 100 Mohm or 1 pA to 1 mA in one range. Measurement voltages from 1 to 999 volts in one volt increments are selectable.

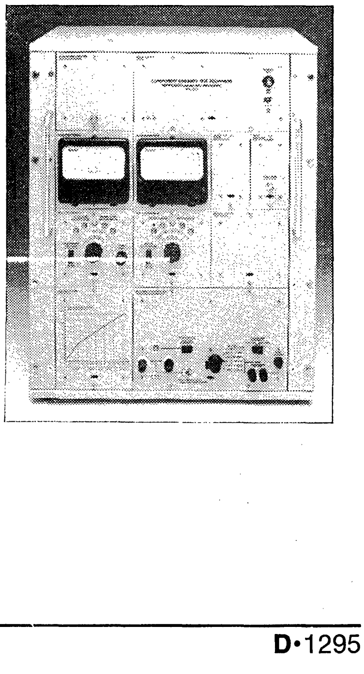
The audio source option digitally generates user programmable waveforms including the complex distortion waveforms and multi-tone signals containing up to 8 single tones. The RE201 is one of the most extensively EMI shielded instruments in the industry. It is fully programmable through the IEEE 488 bus and produces a hard copy of the CRT display through the RS 232 bus.

RE256 Dual Channel Audio Analyzer

The RE256 Dual Channel Audio Analyzer performs the same full complement of audio measurements as the RE201 with the exception of DC and Phase. The RE256 meets demanding production needs by providing RMS voltage measurements in 8 msec, and programmable digital filters for limited bandwidth measurements. Communication is achieved via an IEEE 488 bus and a seaparate controller. Results can be displayed on the RE902 CRT; which is provided with the RE256.

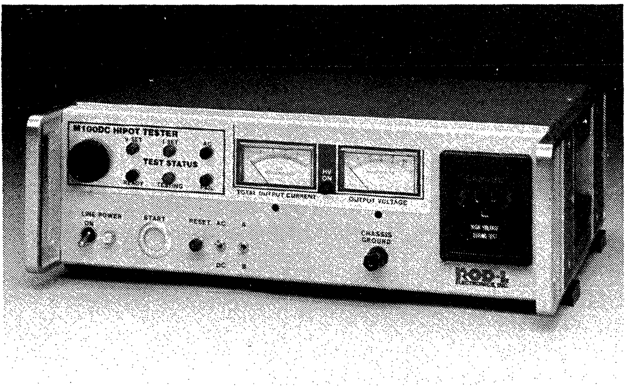
RE Automated Systems

The RE ATE approach utilizes our newest instruments for RF and stereo generation as well as audio analysis. No software background is necessary for programming because menu driven system editors adjust the system set-ups. RE automated systems provide flexible measurement capability, CRT prompted operator commands, and application software to meet present and future testing needs.



ROD-L ELECTRONICS, INC.

M100DC HIPOT TESTER



SPECIFICATIONS

Input: 115/230 VAC, 50-60 Hz
Output: Zero to 5.5 kV @ 5 mA (Adj.)
Voltage Rate of Rise: 50 V/sec. — 5000 V/sec. (Adj.)
Test Time: 1-90 seconds (Adj.)
ARC Detection Sensitivity: 10 micro secs.
Shutdown: Within 2 milliseconds
Dimensions: 16¾″ x 5¼″ x 13¼″ (43 x 13 x 34 cm)
Weight: 24 lbs. (11 Kg) net

FEATURES

Ammeter: Reads total output current.

The new M100DC Hipot Tester is completely automatic and safe to use. It enables quality assurance and production test personnel to fully comply with worldwide testing standards such as: UL, BSI, VDE, IEC and others.

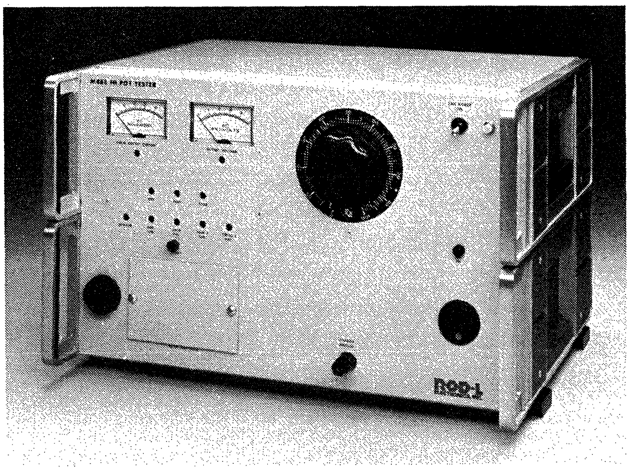
The M100DC performs both high voltage leakage tests and the usual hipot tests. As a special feature, the M100DC performs a one Ampere, AC ground continuity test before and during the hipot test. This continuous test ensures an established ground path between the M100DC and the device under test.

An unusual feature of this precision instrument is its ability to completely shut down the applied high voltage in two milliseconds and at the same time totally discharge the device under test. This action occurs at the conclusion of each test (pass or fail) and ensures a non-destructive test. The output is always clamped to ground until the test is initiated to make certain there are no floating voltages present between tests.

The M100DC includes all of the standard ROD-L solid-state, voltage-control circuitry for precise testing. Voltage regulation is within 1% at full rated load. The circuitry includes a unique auto-calibration mode which enables the desired test voltage and the current trip point to be adjusted. This eliminates the requirement for external meters or loads. Both the voltage rate of rise and the test time are adjustable at the rear panel while the front panel "A/B" switch selects the desired combination of rate of rise and test time in each position.

The M100DC is equipped with standard ROD-L front panel indicators including: Ready, Testing, V-Set, I-Set, High Voltage "ON", "FAIL" warning light, Audible alarm, Ammeter and Voltmeter, Power switch, A/B set-up switch, Rest pushbutton switch, AC/DC mode selector switch, Chassis ground binding post and a "Test Start" switch. The maximum output rating is 5.5 kVDC at 5 milliamperes. The voltage rate of rise is adjustable from 50 V/sec. to 5000 V/sec. and a test time lasting from 1 to 90 seconds may be selected. Many options are also available.

MODEL M488 BUS-COMPATIBLE HIPOT TEST SYSTEM



SPECIFICATIONS

Input Power: 115/230 VAC, 50-60 Hz, 300 watts, maximum, 30 watts typical
Test Voltage: User specified — up to 5000 VAC
Output Current: 50 milliamperes, maximum
Voltage Rate of Rise: Three preset rates — each can range from 1 to 30 seconds
Test Interval: 1 to 90 seconds (bus programmable)
ARC Detection Sensitivity: 10 micro secs.
Shutdown: Within 2 milliseconds after any test — pass or fail — without voltage-transient generation
Dimensions: ½″ x 11″ x 16¾″ (34 cm x 26 cm x 43 cm)
Weight: 45 lbs. (20.5 Kg)
Color: Mint-gray/olive-gray

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ROD-L ELECTRONICS, INC.

FEATURES

Performs A-C insulation breakdown and ground continuity tests

Applies a test potential up to 5000 VAC and up to 50 milliamperes

M488 Bus-compatible — enables remote programming of test time, voltage rate of rise, current trip points — plus data logging during each test

Complies with UL, VDE, CSA, BSI and IEC Standards

The M488 Hipot Test System is a self-contained, rugged instrument that can be operated either manually, or via a 488-bus interface. The bus feature is particularly valuable in fast, efficient testing of electronic and electrical products — hipot testing of power supplies and components such as transformers, line filters and cables.

Bus Programming — Data Logging

The test cycle is fully automatic. The M488 will raise the applied voltage at a predetermined rate of rise, up to the desired test voltage level, and then maintain it for the test time desired. Output voltage, rate of rise, test time and current trip point are bus controlled. Via the bus, the computer can also interrogate the M488 to learn what failure occurred, such as arc or ground continuity. It can also request the magnitudes of the total (complex) current and the resistive (real) current. In addition, a status update of current test parameters can be transmitted.

Continuous Ground Continuity Monitoring

A unique feature of the M488 is its ability to test and continuously monitor ground continuity for the duration of each hipot test. This ensures that an inadvertent shock does not occur to the operator and that the equipment undergoing test is not damaged.

For safety, a second security "CHASSIS GROUND" must be connected to a secure, low-resistance point on the unit under test. The security "CHASSIS GROUND" of the unit under test is monitored and tested electronically while the high voltage is applied. If the ground fails during the test, the M488 automatically activates failure operation, i.e., high voltage is shut down and there is a visual and audible alarm.

Low-Voltage, Dead-Short Test

Ensures that the device does not have a dead-short from the energized circuit to ground. The test load must be at least 1000 ohms. If not, a failure indication is generated.

Superior Safety Features

Designed with operator safety as the primary design rule, the new Hipot Test System incorporates traditional, ROD-L safety features. Electronic shutdown occurs within 2 milliseconds if either dielectric breakdown, over current, or a ground continuity fault occurs. To prevent turn-on surges, high-voltage application is governed by an electronically-controlled rate-of-rise circuit and zero-crossing turn on. A visual indicator warns the operator whenever voltage is present at the test socket. Other indicators, both visual and audible, denote ground continuity loop failure, arc detection and excessive current (both real and total).

Programming Details

Bus Address: Select address from 0 to 30

Test Parameter Configuration: Hipot test parameters — voltage, test time, voltage rate of rise, current trip points — are sent to the M488 before a test can begin. Each number is passed with a semi-colon between it and the next number to delimit the respective parameter fields.

End-of-Line Delimiters: The M488 will support all reasonable combinations of line delimiters — e.g., CR, LF, or EOI (End-or-Identify)

Starting a Test: Send "G" or "GET"

To Request An Update Message: Send "?" at the desired sample point. Set M488 to *TALKER* to receive data. During the test, the Update Message includes the voltage and current as well as the status of the test, and seconds remaining in the test

To Halt or Reset the M488: Send "DCL" (device clear) at any time. This will always asynchronously reset the M488

Test Time-Out: The M488 will either send a "SRQ" (service request) at the end of the test, or it will simply time-out and wait for the final update request from the controller, or DCL

ROD-L ELECTRONICS, INC.

M100/M500 HIPOT/DIELECTRIC WITHSTAND TESTERS

M100BVS5 HIPOT TESTER
TEST STATUS
TOTAL OUTPUT CURRENT
OUTPUT VOLTAGE
LINE POWER ON
START
RESET
PUSH FOR REAL I ÷10
CHASSIS GROUND
ROD-L

The M100 and M500 Series of ROD-L hipot/dielectric withstand testers are similar in standard features. Both series are made to the highest quality/safety standard. Both series are available in adjustable voltage models.

All models can be specified with or without the adjustable "Real Current Trip Point" feature on the rear panel. "Total Current Trip Point" (Adjustable) is standard on all models in both series. The adjustable voltage models feature rugged varible transformers with precision adjustment features for easy resetting to preselected ranges.

A full range of options is available with all models and in both series as shown in the table.

ROD-L can provide custom designed testers to fit virtually any hipot or similar testing situation. Call the factory in Menlo Park or contact your nearest ROD-L technical representative as listed in EEM's "Yellow Pages."

SPECIFICATIONS

Input: 115/230 VAC, 50/60 Hz: 500 watt maximum
Output: Voltage 0-5000 VAC (user specified)
Voltage Rate of Rise: 50 V/sec. to 5000 V/sec.
Test Time: Adjustable from 1 second to 90 secs.
Arc Detection Sensitivity: 10 micro secs.

CONTROLS/INDICATORS

Voltmeter: Accurate to ±3% F.S.
Ammeter: Total Current accurate to ±3%
Safety Ground: Reject level .5 ohm or .1 ohm (user specified)
Dimensions: 16¾″ x 5¼″ x 13¼″ (43 x 13 x 34 cm) rack mountable
Weight: 30-35 lbs. (13.6 - 15.9 Kg)

FEATURES

- Front panel receptacle, rated to withstand 8000V, for direct plug-in of device under test or for plug-in of test fixture.
- Security chassis receptacle for ground continuity tests. Test performed for duration of Hipot Test at 1 Amp at 1 Volt; .1 ohm or .5 ohm resistance (user specified).
- Analog current and voltage output meters for easy reading.
- Electronically controlled voltage rate-of-rise to ensure gradual, smooth and consistent rise time (eliminates harmful voltage spikes).
- Electronically controlled voltage shutdown. Fast shutdown (2 ms) prevents harm to operator and protects the device under test.
- Electronic, adjustable timing circuit to provide accurate, reliable test time.
- Completely solid state for reliability.
- Rack mountable.
- Audible and visual indication of breakdown and continuity failure.
- Recessed START button to prevent accidental testing.
- Compliance to all U.L., C.S.A., B.S.I., V.D.E., I.E.C., and F.C.C., etc. test requirements.
- Rate of rise and test time select switch allow easy test parameter changes.
- Over current failure potentiometers allow continuous trip point selection of any current level up to full scale output (real current failure potentiometer available on BV model only).
- Variac allows continuous output voltage selection from zero to full scale.
- Real/Resistive monitoring circuitry.

M100AVS5 AND M100BVS5 SERIES

Maximum Output Voltage	Maximum Current Limit			
	10 mA	25 mA	40 mA	50 mA
1500 VAC	●	●	●	●
2800 VAC	●	●	●	
5000 VAC	●	●		

M500AVS5 AND M500BVS5 SERIES

Maximum Output Voltage	Maximum Current Limit		
	100 mA	200 mA	350 mA
1500 VAC	●	●	●
2800 VAC	●	●	
5000 VAC	●		

OPTIONS

Suffix	Description
01	Remote Control — uses TTL control signals
02	Front Panel test time adjustment
03	Front Panel rise time adjustment
05	Hands-Off
06	Rear Panel lockout cover
08	5 Position switch selected failure point
10	Audible Test tone
14	Special pin configuration in rear panel H.V. connector
15	Rack mount kit
16	Divide by 10 current trip
18	Ohms sense
21	Undercurrent
22	Front Panel voltage adjust
23	Digital Panel Meters

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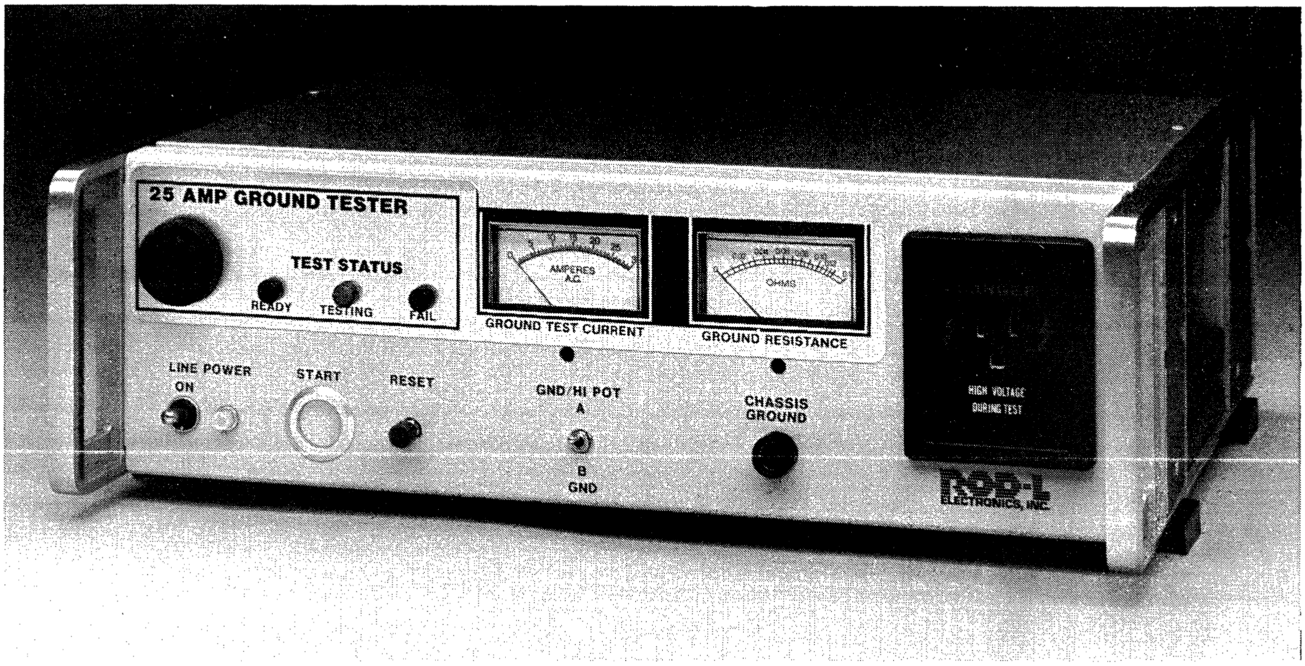
ROD-L ELECTRONICS, INC.

25 AMP GROUND CONTINUITY TESTER


25 AMP GROUND TESTER
TEST STATUS
READY
TESTING
FAIL
AMPERES A.C.
OHMS
GROUND TEST CURRENT
GROUND RESISTANCE
LINE POWER ON
START
RESET
GND/HI POT
A
B
GND
CHASSIS GROUND
HIGH VOLTAGE DURING TEST
ROD-L ELECTRONICS, INC.

ROD-L Ground Continuity Testers are manufactured to the most rigorous quality standards to ensure maximum accuracy for testing and the greatest degree of safety for the operators. The standard ground continuity tester shown here is equipped for 2.5 Volts output and 25 Amps (40 Amps maximum available). This equipment is rack mountable and may be interconnected with other ROD-L test equipment for a complete testing system.

An efficient combination consists of the 25 Amp Ground Tester in combination with any ROD-L hipot tester. The ground tester features a hipot interface as standard equipment. Remote controls may be specified as an option. This tester is essential equipment for testing your products in compliance with European safety standards such as B.S.I. (United Kingdom) and V.D.E. (Germany). Also available are 10 and 30 Amp testers for the UK BABT and CSA requirements.

SPECIFICATIONS

Input: 115/230 VAC, 50-60 Hz

Output: 2.5 Volts (fixed), 25 Amps (40 Amps max available)

Voltage Risetime: Instant ON at zero crossing

Test Time: 5 - 7 seconds recommended, internally controlled

CONTROLS

Ammeter: Indicates actual ground current 0-30 Amps. Accurate to ±5% F.S.

Ohm Meter: 0-0.15 ohms. Accurate to ±5% F.S.

Dimensions: 16¾″ x 5¼″ x 13¼″ (43 x 13 x 34 cm). Rack mountable.

Weight: 20 - 23 lbs. (9.1 to 10.4 Kg)

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ROD-L ELECTRONICS, INC.

MODEL M600CST POWER-SUPPLY CORD AND CORD SET TEST SYSTEM

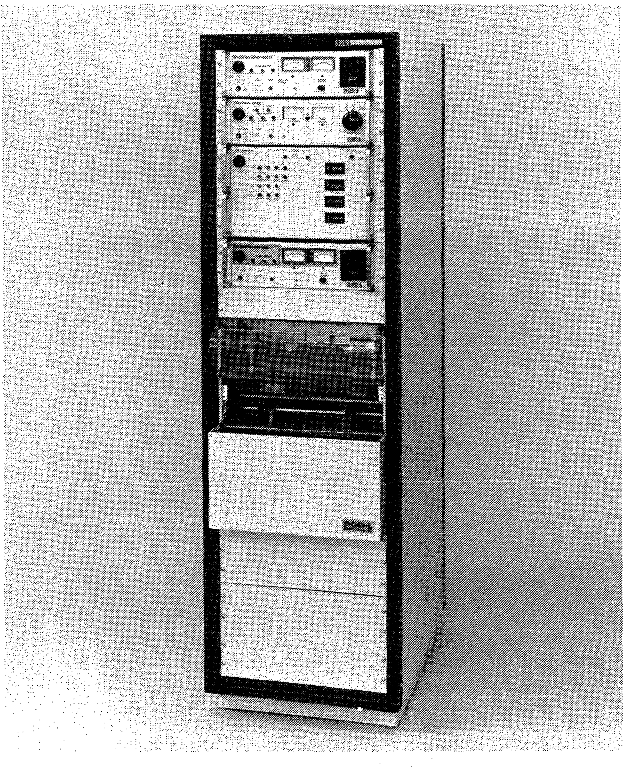
FEATURES:

- Performs the following tests:
    - Hipot
    - Skin
    - Continuity (Short, Open Circuit) — 10 or 25 Amp
    - Polarity
    - Insulation Resistance
- Two Test Heads available to test and load/unload four cord sets
- All Test Combinations are programmable
- Totally Modular
- Fast, Safe Accurate
- Tests in compliance with UL, CSA, VDE, BSI and IEC

PRODUCTION/QUALITY ASSURANCE TESTING

The M600CST tests cord sets and power-supply cords in compliance with the latest UL, CSA, VDE, BSI, and IEC standards.

Each test result is monitored. Counters record total test cycles performed and quantity of cords which failed each type of test. LED's provide visual status of actual test cycle progress. Visual and audible alarms indicate failures.



Acceptable Cords are automatically marked good. The male end of defective cords are automatically cut-off, ensuring that they are not mistaken as good when removed from tester.

When two TEST HEADS are used with the electronics modules, an operator can maximize throughput by loading/unloading two cords in one TEST HEAD while two cords are under test in the second TEST HEAD.

SPECIFICATONS

GENERAL SYSTEM

Input: 115 or 230 VAC ±10%, 60 Hz or 50 Hz
Overall Dimensions: 21" x 72" x 24" (53 cm x 183 cm x 61 cm)
Overall Weight: 400 lbs. (185 Kg) Net: 455 lbs. 210 Kg) Shipping
Total System Cycle Time: 16 seconds per cord (exclusive of insulation resistance test)

HIPOT/SKIN TEST MODULE

Output Voltage: Up to 2800 VAC, user selectable — standard.
Output Current: Total/complex — 10 mA: F.S., resistive/real — 1.0 mA, F.S. — standard
Voltage Ramp Rate: 50 V/sec to 5000 V/sec. User selectable.
Test Time: 1 to 90 seconds. User selectable.
Shutdown: 2 milliseconds after fail, 40 milliseconds after pass.

POLARITY/CONTINUITY/LOAD MODULE

Output: Up to 25 Amperes (30 Amps, F.S. ±5%) at 2.5 Volts. (10 Amp available)
AC Resistance: 0 to 0.15 Ohm, accurate to ±5% F.S. (0-1.0 Ohm available)
Voltage Ramp Rate: Instant rise at first sinusoidal zero crossing.
Test Time: 1 to 90 seconds (5 to 7 sec — standard factory setting)

INSULATION RESISTANCE MODULE

Output Voltage: Up to 500 VDC, user selectable.
DC Resistance: Up to 4000 megohms
Voltage Ramp Rate: 5 V/sec. to 500 V/sec. User selectable
Test Time: 1 to 90 seconds. User selectable.
Shutdown: 2 milliseconds after any failure.

TEST HEAD MODULE

Capacity: Two cords per set-up standard. Two HEADS may be installed to test 4 cords allowing two cords to be loaded/unloaded while 2 cords are under test.
Cord Marker: Automatic branding for acceptable cords. Automatic guillotine for defective cords.
Receptacle Types: Accepts all international plug configurations.

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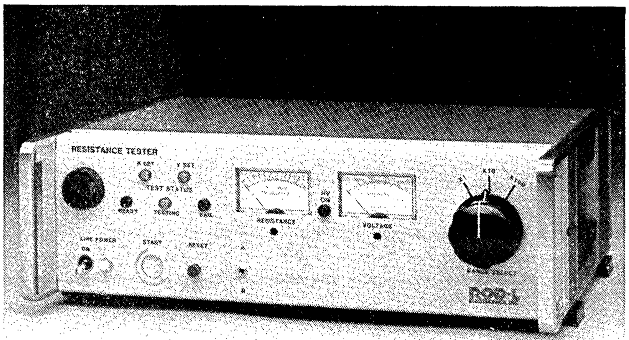
ROD-L
ELECTRONICS, INC.

MODEL M300RT INSULATION RESISTANCE TEST INSTRUMENT



FEATURES:

- Performs DC insulation resistance test — detects up to 4000 megohms with voltage range up to 500 VDC
- ARC detection circuit
- Fast HV shutdown and complete discharge within 2 milliseconds
- Tests in compliance with UL, VDE, IEC and MIL STD 202 test standards

PRODUCTON/QUALITY ASSURANCE TESTING

The M300RT test cycle is fully automatic. The voltage ramp, test time, test voltage and insulation resistance trip levels are easily preset by rear panel potentiometers. Different ramp/test time combinations are selectable by a front-panel switch.

All control circuitry is solid state and enables the M300RT to shutdown the high voltage and to discharge the device under test in 2 milliseconds. The HV generation and control system is solid state for reliability.

The M300RT is a DC Insulation Resistance Test Instrument which enables easy and safe testing on production line, receiving inspection, or lab environments. The M300RT tests in full compliance with UL, VDE, IEC and MIL STD 202 test standards.

SUPERIOR SAFETY FEATURES

Electronic shutdown occurs within 2 milliseconds if either insulation breakdown or low insulation resistance occurs. To prevent turn-on-surges, high-voltage application is governed by an electronically controlled rise time circuit. A visual indicator warns the operator whenever voltage is applied to device under test. Other indicators, both visual and audible, denote insulation breakdown and low insulation resistance.

SPECIFICATIONS

Insulation Resistance Detection: Up to 4000 megohms

Output Test Voltage: User adjusted up to 500 VDC

Volage Ramp: User adjustable from 5 V/sec. to 500 V/sec.

Test Cycle: 1 second to 180 seconds, adjustable

Shutdown: 2 milliseconds after any test — pass or fail

Power Requirements: 115/230 VAC, 44-66 Hz, 300 watts maximum

Dimensions: 16¾″ x 5¼″ x 13¼ (43 cm x 13 cm x 34 cm)

Weight: 24 lbs. (11 Kg) Net
Color: Mint grey/Olive Grey

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WHEN YOU NEED METERS & TEST EQUIPMENT

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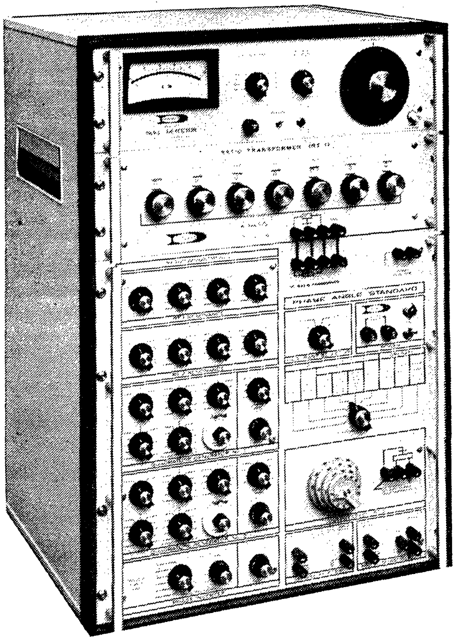
(301) 621-5077 in Wash DC Area
(804) 627-4388 in Norfolk, VA
(804) 649-1159 in Richmond, VA

DYTRONICS

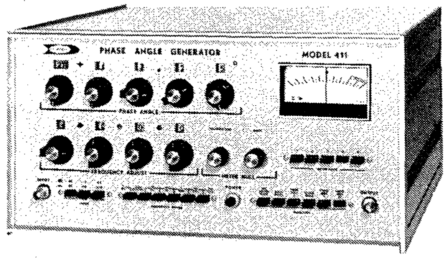


The first authentic Primary Phase Angle Standard for industry

MODEL 311/RT-1/717S PRIMARY PHASE ANGLE STANDARD

- 0.015° Accuracy
- Self-Calibrating
- Maximum 125 Volt Output
- Shift or Measure Phase Angle
- Frequency Range 30Hz to 10,000Hz
- 12 Microdegrees Resolution

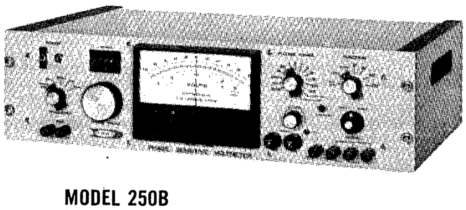
Ryan International Corp. offers an array of instrumentation for the measurement and generation of phase angle. This successful and advanced measurement technique pioneered by Ryan International Corp. is recognized as the finest throughout the world. See our catalog for complete information or contact Ryan International Corp., 4800 Evanswood Drive, Columbus, Ohio 43229, Telephone (614) 885-3303.



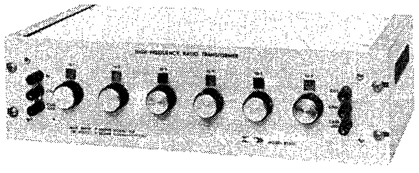
MODEL 411
PHASE SHIFTER/GENERATOR

Model Number	Frequency Range	Accuracy	Measure Phase?	Shift Phase?	0° to 360° Coverage without Ambiguity?
311/Rt-1/717S	30 Hz-10 kHz	±0.015°	Yes	Yes	Yes
312	4 kHz-500 kHz	±0.02°	Yes	Yes	Yes
402	400 Hz	±0.01°	No	Yes	No
411	1 Hz-100 kHz	±0.1°	No	Yes	Yes
412	.01 Hz-1 kHz	±0.1°	No	Yes	Yes

SEE OUR CATALOG FOR A COMPLETE LIST OF MODELS AND SPECIFICATIONS.



MODEL 250B
PHASE SENSITIVE VOLTMETER

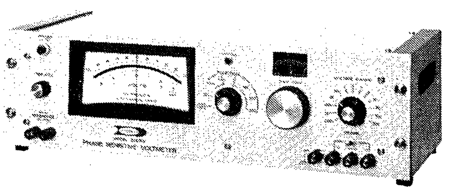


MODEL RT-501
HIGH FREQUENCY
RATIO TRANSFORMER

MODEL RT-501	Operation up to 500 kHz.	±0.0005% Accuracy at 5 kHz; ±0.09 Accuracy at 500 kHz.	Less than 1 ohm Output Impedance.	1 ppm Resolution

Model Number	Frequency Range	Accuracy	Internal Filters	Outputs	0° to 360° Coverage without Ambiguity?
244/RS	400 Hz	±1.0°	Yes	DC	Yes
250B	4 Frequency	±1.0°	Yes	DC	Yes

SEE OUR CATALOG FOR A COMPLETE LIST OF MODELS AND SPECIFICATIONS



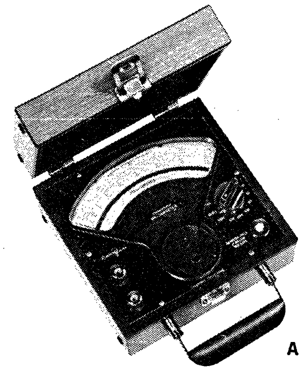
MODEL 244/RS
PHASE SENSITIVE VOLTMETER

RYAN INTERNATIONAL CORPORATION
4800 EVANSWOOD DRIVE, COLUMBUS, OHIO 43229
Telephone (614) 885-3303

Sensitive Research*

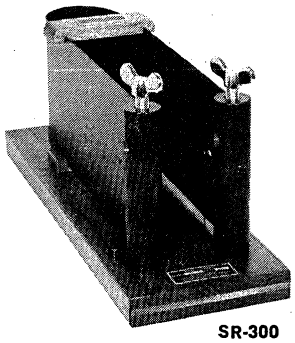
** A TRADEMARK OF EIS*

THERMOCOUPLE METERS AC-DC WATTMETERS



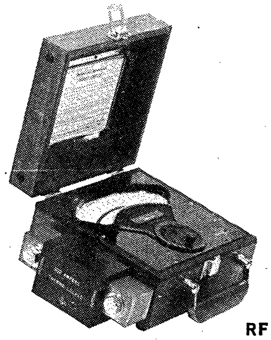
A

Thermocouple instruments offer the user significant advantages in frequency response and sensitivity over other AC types with true rms response. They can be used on DC and AC from 7 cps to 20 Mc/s, and in instances where UHF thermal converters are employed, this frequency range can be extended to over 100 Mc/s. **Sensitive Research** thermoelements have excellent AC/DC transfer characteristics (low reversal). Thermocouple instruments can be calibrated directly on DC and only their AC/DC difference, or frequency influence, has to be checked by AC transfer methods. A thermocouple field replacement feature (TRF) is supplied in the Models A and AU. Automatic or manual "Push to Read" overload protection is available. Automatic temperature compensation from 20° to 30° C is standard (except University Model).



SR-300

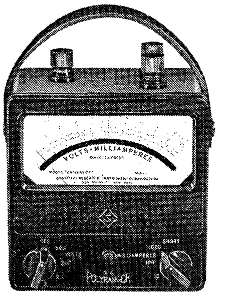
Standard Current Shunts



RF

Audio Frequency Volt and Milliammeters

Model A series consists of AC/DC multirange milliammeters and single or multirange voltmeters. Accuracy is ±0.5% fs (±0.75% for instruments with fs ranges of 3 ma or less or a sensitivity of 500 ohms/v). Multirange combinations are offered from 1 ma to 1.5 amps; 0.2 v to 1.5 kv. Frequency range is 7 cps to 7 Kc/s on voltage and 7 cps to 15 Kc/s on current. Sensitivity is 100, 200 or 500 ohms/v. 6.3" scale length. (Single range milliammeters have a frequency response up to 1 Mc/s and are listed under Model RF.) Model AU is identical to the Model A, except frequency range is extended to 35 Kc/s on voltage and 20 Kc/s on current.



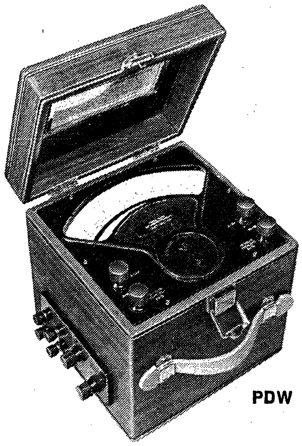
University

Radio Frequency Volt, Amp and Milliammeters

Model RF series consists of AC/DC single range and multirange instruments for use up to 20 Mc/s. Model RF multirange voltmeters utilize special switching to increase frequency range considerably beyond normal limits of other instruments containing this operational feature. Frequency influence is negligible over the first 20% of their frequency span. Accuracy is ±0.5% fs + (±0.5% max. frequency influence) on multirange units from 1 v (5 Mc/s) to 300 v (150 Kc/s). Instruments with a single range of 1 v or 3 v have a ±0.5% frequency response to 10 Mc/s. RF ammeters and milliammeters are available with accuracies of ±1% fs from 1 ma to 100 amps. 6.3" scale length.

Compact Thermocouple Instruments

University Model comprises a series of ±0.75% accurate, low cost, small sized milliammeters and voltmeters for AC/DC measurements up to 7.5 Kc/s (single range milliammeters up to 500 Kc/s). Multirange instruments are switch controlled. Up to 7 fs ranges available from 2 ma to 1 amp or 200 mv to 300 v (100 or 500 ohms/v). 4" scale length. University Model is comparable in general construction quality to Model A, but has certain limitations in range, frequency response, resolution and the accessory features it can contain (temperature compensation, TRF, etc.), because of relatively small size.



PDW

Polyphase Wattmeters

Model PDW is a multirange 2 element AC/DC electrodynamometer wattmeter for the measurement of single and 3 phase power down to 50% PF and up to 800 cps. Can be used in 3 phase 3 wire circuits, single phase 3 wire circuits and 3 phase 4 wire circuits. Indicates 3 phase power for any combination of balanced or unbalanced loads. Accuracy ±0.5% fs. 6.3" scale length. Model PDLW is a ±0.75% accurate wattmeter for use down to 20% PF and up to 500 cps. 5.2" scale length. Compensating inductor available for third leg of 3 phase circuits to balance load imposed by wattmeter insertion.

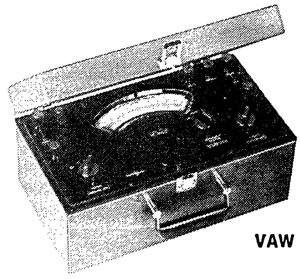
ELECTRICAL INSTRUMENT SERVICE, INC.

25 DOCK STREET, MT. VERNON, N.Y. 10550 914-699-9717

AC-DC WATTMETERS
GENERAL PURPOSE INSTRUMENTS

Sensitive Research*

* A TRADEMARK OF EIS



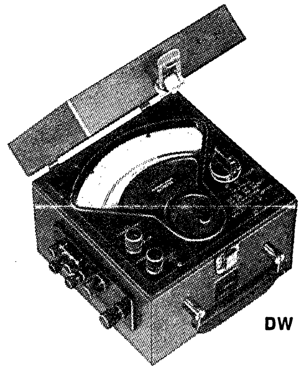
VAW

Volt-Amp-Wattmeter

Model VAW, volt-amp-wattmeters, are transformer-coupled electrodynamometers that make 50 to 125 cps or 50 to 800 cps tare-free compensated measurements of AC power down to 50% PF in 12 ranges from 12.5 w to 5 kw fs. Has potential drop ranges of 25/50/100/200/500 v fs; current ranges of 0.5/15/10 amps fs (12.5/25 w and 25/50 v included in 50 to 125 cps model only). Accuracy on current and voltage ranges ±0.5% fs; on watts ±0.75% fs. Switch controlled ranges. Measures all circuit parameters without necessity of changing external connections. Special 10 ma range for current measurements only. 5.2″ scale length. Self-contained in portable case.

Single Phase Wattmeters

Model DW is a ±0.25% accurate single phase AC/DC electrodynamometer wattmeter for use down to 50% PF and frequencies of 25 to 800 cps (2500 cps on special order). Overall accuracy, ruggedness and stability make it ideally suited for use as either a calibration standard or general purpose testing instrument. 6.3″ scale length. Y Boxes available for measurements of balanced 3 phase power. Model DLW is a single phase ±0.5% accurate wattmeter for use down to 20% PF and up to 500 cps. University Model, having accuracies of ±0.5% fs down to 50% PF and ±0.75% down to 20% PF, is a compact version of the Models DW and DLW. Has the advantage of being more economically priced than these instruments while covering essentially the same wide measuring range. Molded bakelite case. 4″ scale length.



DW

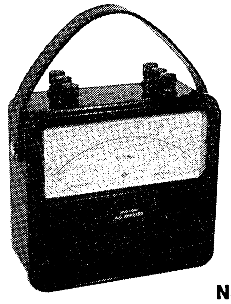
Differential Instruments

Model SD measures the difference between two DC currents or voltages. Inputs are isolated. Accuracy is ±0.5% fs for most ranges between 2 μa and 500 ma. Normally furnished zero center. Uniqueness is ability to withstand sustained overloads of 1000% which results in a 10X increase in comparison accuracy and scale resolution. 5.2″ scale length. Model JD is a differential galvanometer with a 3.25″ scale length that permits higher sensitivity. Suitable for horizontal bench mounting. Model JDJW-4 is an edgewise panel instrument with a 4″ scale length.

DC Reference Standards

Model C is a rugged ±0.25% fs accurate permanent magnet moving coil electrical indicating instrument. Moving element features an exceptionally high torque to weight ratio. 6.3″ scale length. Up to 9 self contained ranges available in switch controlled multirange combs. from 50 μv and 50 mv DC fs. Millivoltmeter available calibrated for use with external heavy current shunts. Sensitivities to 20,000 ohms/v. Design emphasis is on stability and sturdiness for long term accuracy and reliability.

Model S is a deluxe high sensitivity ±0.5% fs accurate instrument of the same superb quality and physical dimensions as the Model C. Up to 9 switch controlled ranges in various combs. available from 1.5 μa to 1 mv fs. Sensitivities to 500,000 ohms/v (1,000,000 ohms/v when zero center). Constant resistance multirange microammeters available for special applications. Low range millivoltmeters are particularly suited for use with thermal converters for ultra high frequency AC measurements. Model HS is an ultra high sensitivity multirange millivoltmeter designed mainly for use in corrosion and electrolysis measurements. Model J is a ±0.5% accurate instrument made primarily to use as a bench mounted, pointer type, high sensitivity galvanometer.



NSI

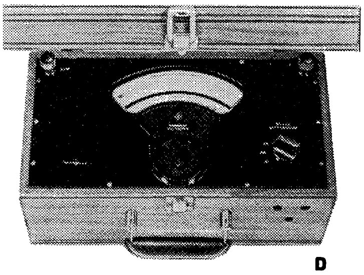
Model N is a low cost permanent magnet moving coil instrument with many features of higher priced indicators. Accuracy is ±0.5% or ±0.25% fs as required. Housed in a rugged plastic case for field use. Up to 5 switch controlled ranges available from 50 μa and 50 μv (up to 50 amps self contained). Sensitivities to 5000 ohms/v. 6.1″ scale length.

University Model is a low cost, compact, ±0.5% accurate version of the Model S, having slightly less sensitivity and resolution. Up to 5 switch controlled, self contained ranges from 2 μa and 2 mv fs. Sensitivities to 5000 ohms/v. 4″ scale length. Model UTS is a portable DC test set with 4 University Model indicating instruments to measure from 50 μa to 60 amps and 20 mv to 1200 v. Contains a Wheatstone Bridge, a decade resistance box and all necessary switching and facilities to make potentiometer voltmeter, zero resistance, DC power and high resistance voltmeter measurements.

AC and AC/DC Reference Standards

Model D is a rugged AC/DC ±0.25% fs accurate dynamometer electrical indicating instrument. 6.3″ scale length. Up to 4 self contained ranges available in switch controlled multirange combs. from 1.5 to 1000 v and 5 ma to 20 amps. Frequency response DC, 25 to 2500 cps.

Model MI is a rugged ±0.5% fs accurate moving iron electrical indicating instrument. Up to 3 self contained ranges available from 10 ma to 20 amps and 7.5 to 750 v. Frequency response 25 to 500 cps. 6.3″ scale length. Special transformer coupled voltmeter has 8 switch controlled ranges from 3 to 750 v fs. Model NSI is a low cost ±0.5% fs accurate version of the Model MI. Housed in a molded plastic field case. 6″ scale length. University Model is a compact low cost ±0.5% fs accurate version of the Model D. Up to 4 ranges available from 10 ma to 1 amps and 30 to 750 v. Frequency response DC, 25 to 125 cps (500 cps on special order). 4″ scale length.



D

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Sensitive Research*

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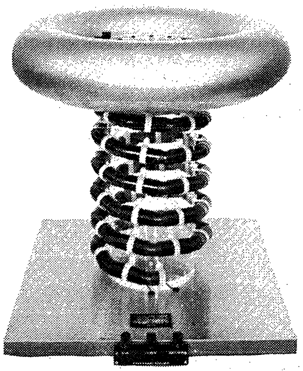
HIGH VOLTAGE MEASUREMENT



PARK

High Voltage Divider

Model PARK Voltage Divider is constructed to a design by J. H. Park. (Ref: "Journal of Research" of National Bureau of Standards, Engineering and Instrumentation Vol. 66C, No. 1, Jan.—Mar., 1962. Reprints available upon request.) It is similar to the NBS standard employed in their calibration of high voltage instruments. Each 100 kv divider consists of 100 individually shielded one-megohm resistors, matched to each other to achieve an approximate temperature coefficient of less than 1 ppm/°C, and connected in series to form a vertical helix between a ground plate and a high voltage electrode. Uniquely shielded, testing indicates that corona, heating and leakage errors are less than 10 ppm at less than 10 ppm at 50 kv and 50 ppm at 100 kv.

The divider's special "hat" is designed to give uniform gradients from the high voltage electrode to ground and allows stacking of additional 100 kv units for higher voltage measurements. Each unit is only 22¼″ high! DC Ratio Accuracy: ±.05%, 100 kv to 1 v; ±.5%, 100 kv to 1 kv. AC Ratio Accuracy: ±.5%, 50 kv (max.) to 500 v. (60 cps only). Recommended readout instrument at 1 v output tap is a precision DC potentiometer, at 1 kv tap (.5 kv on AC) recommended instrument is a ±.5% accurate electrostatic voltmeter (**Sensitive Research** Model ESD described below).

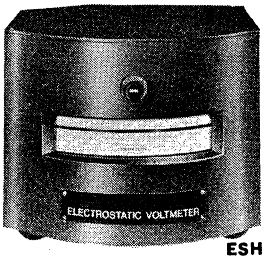
DCHI

Special High Voltage Dividers

Based on experience with the many Park Dividers already manufactured and their proved reliability, special designs have been constructed and proposed. These special dividers are essentially the same as the Park except for such criteria as sensitivity and size. Designs up to 600 KV DC at ±1% accuracy have been constructed and successfully used by our customers. Dividers for use up to 1,000,000 volts are under consideration. Although most designs considered so far have been for single ranges, there is no particular objection to building a divider with several ranges. Present certification by NBS is limited to 100 KV but higher ranges can be calibrated by "bootstrapping" methods.

DC Kilovoltmeter (multirange)

Model DCHI is a multirange permanent magnet moving coil, DC kilovoltmeter. Available at 50,000 ohms/v, ±1% fs accuracy, ranges of 1.5/3/7.5/15 kv or 3/7.5/15/30 kv, and at 75,000 ohms/v, ±.5% fs accuracy, ranges of 2/5/10/20 kv. The indicator is a University Model ±.5% accurate microammeter with a 4″ scale length. It is self-contained in a moulded bakelite case and internally bracketed to the instrument panel. Size: 13¾″ x 7½″ x 8″ h.



ESH

Electrostatic Voltmeter (high voltage)

Model ESH AC/DC electrostatic voltmeter is available as a single range instrument up to 100 kv fs (140 kv DC only), or with as many as 4 switch-controlled ranges from 5 to 50 kv fs. DC input resistances to 5 x 10^{15} ohms. Capacitance varies from approx. 30 mmfd on 5 kv range to 10 mmfd on 50-100 kv ranges. Reads true RMS. Accuracy is ±1% fs (±.5% up to 30 kv on special order). 6″ scale length. Transit lock and brackets for panel mounting available. Maximum frequency usage is expressed as follows: $f = 2\ fCE$, where f = max. allowable operating frequency, C = capacitance of instrument in farads, E = voltage in volts.

ESD

Electrostatic Voltmeter (portable)

Model ESD portable AC/DC electrostatic voltmeter is available as a single or multirange instrument to measure from 120 to 6 kv fs. Insulation resistance is 1 x 10^{15} ohms. Capacitance varies from approx. 225 mmfd for a 120 v range to 20 mmfd for a 6 kv range. Multirange instruments are designed for AC/DC measurements on first range, AC only on higher ranges. ±.5% to 1% fs accuracy (±1.5% for ranges of 150 v and less). 5.2″ scale length. Size: 7¾″ x 7½″ x $6\frac{1}{16}$″. Available as edgewise panel instrument with the same performance characteristics except insulation resistance approx. 1 x 10^{13} ohms.

Electrostatic Voltmeter (small portable)

University Model is a smaller, more economical version of the portable Model ESD. Single and multirange instruments available from 300 v to 5 kv fs. ±1% fs accuracy. 4″ scale length. Moulded bakelite case. Size 5¼″ x 5″ x 4⅜″.

ELECTRICAL INSTRUMENT SERVICE, INC.

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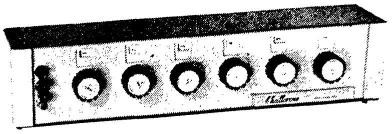
PRECISION INSTRUMENTS

PRECISION RESISTANCE DECADES

SERIES 6800



SPECIFICATIONS

DC Accuracy at Terminals

±.02% 10 ohms and above

±.003 ohms below 10Ω

Zero Resistance

2 milliohms ±2 milliohms per decade (approximate). Each instrument is supplied with exact reading.

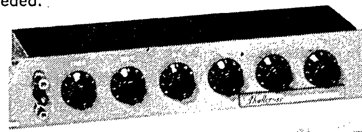
Wattage Rating per Step

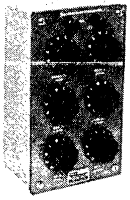
½ watt above 1 ohm, ¼ watt for .1 ohm steps, .16 watt for .01 ohm steps.

Maximum Voltage

1500 volts DC where individual resistor ratings are not exceeded.

SERIES 800





SPECIFICATIONS

Resistor DC Accuracy

±.05% 10 ohms and above
±1% .1 ohm to 10 ohms
±5% .01 ohm to .1 ohm

Stability per Year

±.01% when operated within rated wattages over 10°C-40°C range.

Temperature Coefficient

Less than ±20 PPM 20°C-30°C.

Maximum Wattage

½ watt per resistor.

Maximum Voltage

2000 volts DC if wattage rating for resistors is not exceeded.

6800 SERIES BENCH AND RACK MOUNTED DECADE MODELS

Bench Model No.	Rack Model No.	No. Dials	Resistance Step Increments (Ohms)	Total Resistance (Ohms)	Bench Size (Inches)
6840	6840 RM	4	.01	111.1	17⅓ x 5 x 5
6841	6841 RM	4	.1	1,111	17⅓ x 5 x 5
6842	6842 RM	4	1	11,111	17⅓ x 5 x 5
6843	6843 RM	4	10	111,110	17⅓ x 5 x 5
6844	6844 RM	4	100	111,000	17⅓ x 5 x 5
6845	6845 RM	4	1,000	110,000	17⅓ x 5 x 5
6850	6850 RM	5	.01	1,111.1	19½ x 5 x 5
6851	6851 RM	5	.1	11,111	19½ x 5 x 5
6852	6852 RM	5	1	111,110	19½ x 5 x 5
6853	6853 RM	5	10	111,100	19½ x 5 x 5
6854	6854 RM	5	100	111,000	19½ x 5 x 5
6860	6860 RM	6	.01	11,111.1	19½ x 5 x 5
6861	6861 RM	6	.1	111,111	19½ x 5 x 5
6862	6862 RM	6	1	111,110	19½ x 5 x 5
6863	6863 RM	6	10	111,100	19½ x 5 x 5

800 SERIES BENCH AND RACK MOUNTED MODELS

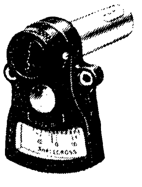
Bench Model No.	Rack Model No.	No. Dials	Resistance Step Increments (Ohms)	Total Resistance (Ohms)	Bench Size (Inches)
817-A	817 ARM	4	.01	111.1	9⅝ x 7¼ x 5¼
819	819 RM	4	.1	1,111	9⅝ x 7¼ x 5¼
825	825 RM	4	1	11,110	9⅝ x 7¼ x 5¼
826	826 RM	4	10	111,100	9⅝ x 7¼ x 5¼
827	827 RM	4	100	1,111,000	9⅝ x 7¼ x 5¼
828	828 RM	4	1,000	11,110,000	9⅝ x 7¼ x 5¼
817-B	817 BRM	5	.01	1,111.1	10⅞ x 6¼ x 5¼
8285	8285 RM	5	.1	11,111	10⅞ x 6¼ x 5¼
829	829 RM	5	1	111,110	10⅞ x 6¼ x 5¼
830	830 RM	5	10	1,111,100	10⅞ x 6¼ x 5¼
831	831 RM	5	100	11,111,000	10⅞ x 6¼ x 5¼
817-C	817 CRM	6	.01	11,111.1	10⅞ x 6¼ x 5¼
8315	8315 RM	6	.1	111,111	10⅞ x 6¼ x 5¼
832	832 RM	6	1	1,111,110	10⅞ x 6¼ x 5¼
833	833 RM	6	10	11,111,100	10⅞ x 6¼ x 5¼

6800 AND 400 SERIES UNMOUNTED DECADES — SPECS EQUAL TO 800 AND 6800 SERIES

Dials	Ohm Steps	Total (Ohms) Resistance	Weight (Lbs.)	Model No.	Dimensions (Inches)	Model No.	Dimensions (Inches)
1	.01	.1	½	6800	2⅞ x 3	435	3 x 3
1	.1	1	½	6801	2⅞ x 3	436	3 x 3
1	1	10	½	6802	2⅞ x 3	437	3 x 3
1	10	100	½	6803	2⅞ x 3	438	3 x 3
1	100	1,000	½	6804	2⅞ x 3	439	3 x 3
1	1,000	10,000	½	6805	2⅞ x 3	440	3 x 3
1	10,000	100,000	½	6806	2⅞ x 3	441	3 x 3
1	100,000	1,000,000	½	6807	2⅞ x 3	442	3 x 3
1	1,000,000	10,000,000	½	6808	2⅞ x 3		

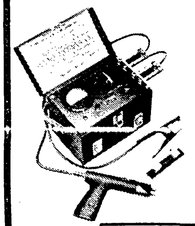
VALUE IN RESISTANCE MEASUREMENT

GALVANOMETER SYSTEMS WITH INTERNAL MAGNET CONSTRUCTION



Part No.	Sensitivity/ Div. in Microamps	Period Seconds	Coil Resistance	External Critical Damping Resistance
1961-A	1.0	3	250	950
1961-B	0.5	3	1000	2400
1961-C	2.0	3	50	125
1961-D	4.0	3	20	50
1966-B	0.25	4	1000	2000
1966-C	1.0	4	50	100
1964-D	1.5	4	30	40

670 SERIES LOW RESISTANCE TEST SETS

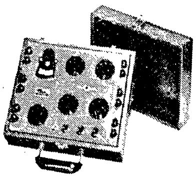


Six portable test sets offering the facility and operating speeds necessary for efficient production line testing of low resistances. Applications include the testing of welding bond resistances, welding cable resistances, switch contact resistances, etc. Six different measurement ranges (see chart below) with accuracies of ±5% of full scale values are available. A pistol grip probe and fixed clamp are standard accessories to facilitate production line tests.

657B pistol grip probe
676 fixed clamp
271 test standard 0.0025 ohm ±2%

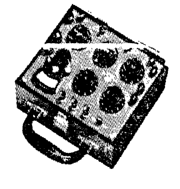
Shallcross Type	No. of Ranges	Ranges in Ohms — Reading From 0 to Full Scale Value Indicated
670-A	6	0.001 0.005 0.01 0.05 0.10 0.50
673-D	5	0.005 0.01 0.50 1.0 5.0

638-R KELVIN WHEATSTONE BRIDGE



A portable Kelvin Wheatstone Bridge offering exceptional versatility and practicality. Wide measurement range is afforded by integrated Kelvin (.001 ohm to 10 ohms) and Wheatstone (1 ohm to 11 megohms) circuits. Internal galvanometer and compartment for 3 (1.5 volt) flashlight batteries supply portable operation in 0.1 ohm to 50,000 ohm range. Binding posts to connect external galvanometer (.005MA/MM sensitivity) and power supply (1 to 45 volts) supplied for higher resistance measurements. Limits of error are ±.75% (Kelvin circuit) and ±.2% (Wheatstone circuit). Rheostat arm is brought out to two binding posts to provide resistance decade operation (11,110 ohms on 1 ohm step increments) with ±.1% accuracy above 10 ohms and ±.25% for 1 ohm steps. Separate current and potential terminals are available for low resistance measurements.

6100 WHEATSTONE-FAULT LOCATION BRIDGE



All purpose portable instrument for laboratory and field resistance measurements. Fault location capabilities of wires and cables performed with, Murray, Varley, Hilborn and Fisher loop tests. DC resistance from 1 ohm to 1.011 megohms with ±2% limit of error. Built-in galvanometer and compartment for 3 (1.5 volt) flashlight batteries permit portable measurements to 50,000 ohms — binding posts to connect external galvanometer and power supply available for testing of higher resistances. Rheostat arm of bridge connects to two binding posts for decade resistance operation. Available housed in weatherproof metal case and removable lid or with wooden case and removable lid.

SHALLTRONIX CORPORATION

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UL Listed

WORLD FAMOUS 260® Series 7 VOM

Priced from $119

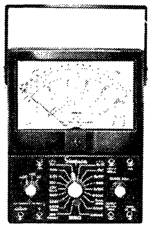
- Over 3,000,000 sold!
- 29 most popular ranges
- Buit-in dB ranges
- Overload-protected meter

UL Listed

260-6XL

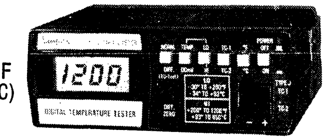
Priced from $139

- Extra ranges
- Low power ohms
- Drop resistant construction
- 33 AC/DC volts, DC current and ohms ranges



NEW Model 383 Digital Temperature Tester

$195



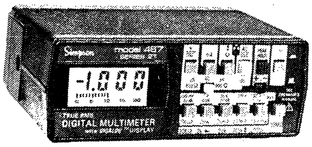
- Dual inputs, 2 ranges
- −30°F to +1200°F (−34°C to +650°C)
- Different mode
- DC millivolt range
- Recorder output

NEW Model IR-10 Non-Contact Temperature Adapter

$395

- Converts any DMM or VOM to "near instant" non-contact temperature tester
- Ranges: 0 to +600°F or −18 to +316°C
- Output: 1 mV per degree F or C

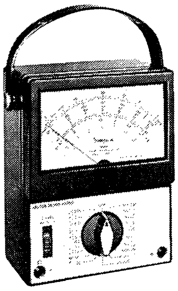
NEW Telephone Industry Test Sets



New Model 467-2T Telephone Communications DMM

$350

- Direct-reading dB ranges with user selectable 600Ω and 900Ω references
- Built-in 1004 Hz tone signal
- True RMS responding and 100 kHz frequency response
- 0.1% DC V accuracy
- Diode test, differential peak hold and pulse detection functions



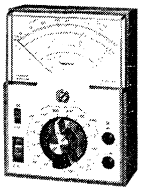
Model 14510 VOM

$155.70

- 20,000 ohms-per-volt DC sensitivity
- 20 "telephone" ranges cover DC/AC volts, DC current resistance
- Full size UL Recognized test leads

Model 16979 Telephone Handi-VOM

$123.40



- Pocket sized, fits in tool case
- 20 "telephone" ranges cover DC/AC volts, DC current and resistance
- Full-size UL Recognized test leads

Model 8455 Line Loop Tester

- Checks line shorts, opens and multiple ringers
- Measures DC volts and ohms
- Reverse switch for line checks

$110

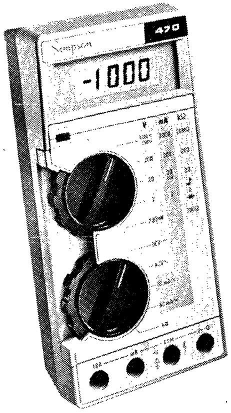
NEW HE-Series AC/DC Amp-Clamp Testers

Priced from

$590

- True RMS and averaging models
- AC plus DC! Up to 1000 Hz
- Up to 1000 A! 1% accuracy!
- Up to .01 A resolution
- Surge and hold functions

Simpson Hand-Held DMMs



3½-Digit 470® DMM

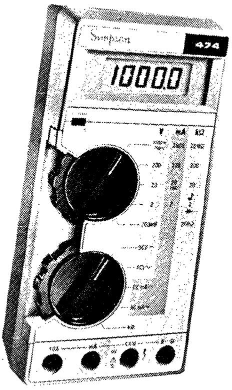
$139

- 25 AC/DC volts/current and ohms ranges
- 0.15% DC V accuracy
- 10 amp current range
- Continuity indicator
- Double fusing system
- 6 kV transient protection

4½ Digit 474™ DMM

$219

- 25 AC/DC volts/current and ohms ranges
- 0.03% basic DC accuracy
- Continuity indicator
- Diode test function
- Double fusing system
- 6 kV transient protection



ALL SIMPSON TEST INSTRUMENTS ARE AVAILABLE FROM LEADING ELECTRONICS/ELECTRICAL DISTRIBUTORS WORLDWIDE. ALSO SEE OUR PANEL METER LISTING IN SECTION 2950

Simpson®
INSTRUMENTS THAT STAY ACCURATE

SIMPSON ELECTRIC COMPANY
A Katy Industries, Inc. Subsidiary
853 Dundee Avenue, Elgin, Illinois 60120-3090
(312) 697-2260 • Telex 72-2416 • Cable SIMELCO
IN CANADA: Bach-Simpson Ltd., London, Ontario
IN ENGLAND: Bach-Simpson (U.K.) Ltd., Wadebridge, Cornwall

Write for Free Catalog

Automatic Test Equipment

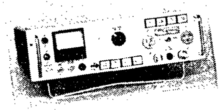
WRITE FOR DETAILS ON THE EQUIPMENT SHOWN. THESE THESE ARE FULLY ENGINEERED, PROVEN, STANDARD DESIGNS AVAILABLE ON A REASONABLE DELIVERY SCHEDULE . . . LET US QUOTE ON YOUR REQUIREMENTS.

SLAUGHTER COMPANY

P.O. BOX 1805 ARDMORE, OKLAHOMA 73402
TELEPHONE (405) 223-4773

Combination Dielectric Tester with continuity test for

ground lead
line shorts
line opens
breakdowns

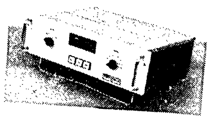


SERIES 116

SERIES 116 BREAKDOWN TEST CIRCUITRY COMBINED WITH GROUND LEAD CONTINUITY TEST SECTION . . . AUTOMATICALLY PERFORMS GROUND LEAD AND DIELECTRIC TESTS IN SEQUENCE. IDEAL FINAL TEST STATION FOR SIMPLE APPLIANCES.

High Speed Circuit Tester

... for accuracy and integrity



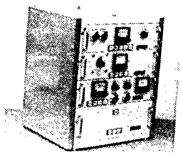
SERIES 703

3000 Tests per Minute

SELF PROGRAMMING FOR TESTING UP TO 500 POINTS . . . MICRO PROCESSOR CONTROLLED . . . GO/NO-GO OPERATION DIGITAL READOUT OF FAULT AND LOCATION.

Automatic Coil & Winding Test Station

micro-processor controlled . . . coils
. . . armatures
. . . stators
. . . fields



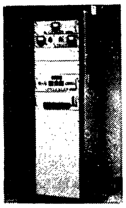
SERIES 720

Test Rates to 1000 Parts per Hour

READY-TO-GO PACKAGE HANDLES 90% OF COIL WINDING TEST APPLICATIONS . . . QUICK CHANGE TEST FIXTURES . . . FULLY AUTOMATIC GO/NO-GO CYCLE.

Automatic Cable & Harness Tester

. . . for continuity . . . breakdowns
. . . megohms



SERIES 707

Expandable to 500 Points

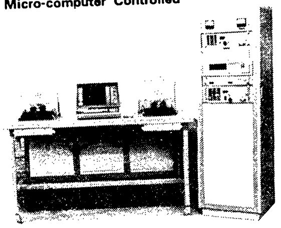
Micro-Processor Controlled

SELF PROGRAMMING WITH MAGNETIC TAPE CASSETTE STORAGE AND RECOVERY OF PROGRAMS . . . MODULAR CONSTRUCTION . . . TESTING RATES TO 3000 CIRCUITS PER MINUTE . . . GO/NO-GO OPERATION . . . DIGITAL READOUT.

Automatic Test System GPIB Configuration

SERIES 727

Micro-computer Controlled



MOST SOPHISTICATED AVAILABLE . . STANDARD GPIB BUS . . FULLY PROGRAMMABLE COMPONENT TEST PANELS AND OTHER SYSTEM ELEMENTS . . . TURN KEY (INCLUDING SOFT WARE) OR COMPONENT ELEMENT FORM . . .

Insulation Testers

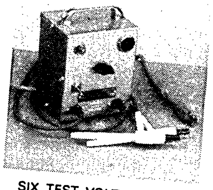
WRITE FOR DATA SHEETS ON THE INSTRUMENTS SHOWN . . . ALL ARE STANDARD PRODUCTION MODELS, AVAILABLE FOR IMMEDIATE DELIVERY FROM STOCK . . LET US QUOTE ON YOUR REQUIREMENTS FOR MODIFIED UNITS OR SPECIAL TEST EQUIPMENT.

SLAUGHTER COMPANY

P.O. BOX 1805 ARDMORE, OKLAHOMA 73402
TELEPHONE (405) 223-4773

High-voltage Insulation Tester with buzzer signal on breakdowns

. . . grounds
. . . . shorts



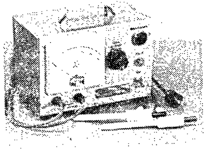
MODEL 101

Watch what you are doing . . . not the tester

SIX TEST VOLTAGES . . . 500 TO 2500 V.A.C. PRICED SO YOU CAN AFFORD TO SPOT A FEW ALONG YOUR ASSEMBLY LINES.

Adjustable High-voltage Tester with buzzer signal on breakdowns

. . . grounds
. . . . shorts



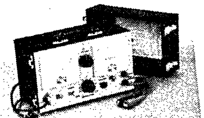
MODEL 106

Voltmeter shows actual Test Voltage

CONTINUOUSLY VARIABLE TEST VOLTAGE RATINGS TO 10,000 VOLTS AC & DC . . . RECOMMENDED FOR BREAKDOWN TESTING AT FINAL ASSEMBLY AND INSPECTION

High-voltage Leakage Tester checks insulation for . . . leakage

. . . grounds
. . . . . arcing



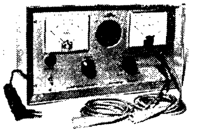
MODEL 122

16 lb. Portable for lab and field work

VARIABLE VOLTAGE RATINGS TO 2.5 KV AC & DC. DUAL RANGE LEAKAGE METER 0/100/1000 μa . . . CAPACITY COMPENSATION . . . MEASURES INSULATION RESISTANCE, CAPACITY, POWER FACTOR.

High-voltage Leakage Tester

audibly signals excess leakage
. . . grounds
. . . . . arcing



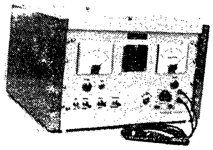
MODEL 103

Measures Leakage . . . not capacity current

TEST VOLTAGE CONTINUOUSLY VARIABLE ADJUSTABLE LEAKAGE LIMIT . . . CAPACITY COMPENSATION ON AC TESTS . . . RATINGS TO 10,000 VOLTS AC & DC . . . LIMITED ENERGY . . . NON-DESTRUCTIVE . . . FOR LAB AND PRODUCTION LINE SERVICE.

Automatic H-V Insulation Tester for precision checking . . . breakdowns

. . . leakage
. . . grounds



MODEL 103-MP

Automatic Test Cycle

FULLY AUTOMATIC TEST CYCLE . . . CONTROLLED RATE-OF-RISE . . . ADJUSTABLE TEST VOLTAGE, DWELL TIME, & LEAKAGE LIMIT . . . CAPACITY COMPENSATION ON AC TEST . . . FOR PRECISION TEST OF CRITICAL PARTS & ASSEMBLIES . . .

POWER
CHARGE
BATTERY
LOW
RESET
tecron
TEF
tecron®
TEF SYSTEM 10
AUDIO SPECTRUM ANALYZER/COMPUTER

TEF® SYSTEM 10

Specifications

Input

Gain range: 0 to 66 dB in 6 dB steps
Maximum input voltage: 7.0 volts peak
AC/DC coupling: switch selectable
Bandwidth: DC to greater than 100KHz
  AC 1.6 Hz to greater than 100KHz
Integration: Single or double beginning at 4 Hz
Impedance: DC, 1000 megohm; AC, 1 megohm
Connectors (software selectable):
  XLR Balanced (5 pin) w/guard & phantom supply
  BNC Noninverting
  BNC Inverting
  BNC Monitor Output (buffered)
    Max. output voltage 7.0 volts peak
    Max. output current 15 mA peak
    Output impedance 600 ohm

IF

Gain range: 0 to 45 dB in 3 dB steps
Bandwidth: Gaussian filter approx. 0.116Hz to 20,000Hz
  Brick-wall cutoff filter: 2Hz to 25,000 Hz
Dual IF strip filtering:
  Analytic signal (both real and imaginary parts)
  Synchronously sampled
  12 bit A to D converters

Data Storage

On disk in real and imaginary (16 bit words)
780K of file space on 1 Mbyte 5¼" mini-floppy disk
Dual disk optional
Stored data may be displayed in other formats and printed at later date

Sweep Rate

293 Hz/sec to 75,143 Hz/sec
Adjustable start and stop frequencies
TDS response measurable at DC using quadrature
Sweeps through 0Hz

Time offset

0 to 240 sec in 1 microsec steps

FFT

1024 samples 400 lines displayed
Window function is software selectable
Hamming, Hanning, and Flat (rectangular) included, other windows optional
Execution time approx. .6 sec using LSI floating-point/math processor

ETC

Bandwidth automatically coordinated with the selected sweep

TDS

Bandwidth selectable: 0.116 Hz to 20 KHz

Oscillator outputs

Phase coherent digitally synthesized oscillators
Analysis frequency range:
-31,620Hz to 31,620Hz
Source impedance: 600 ohms
Test oscillator voltage:
.01 to 2.55 vrms open circuit
(15 mA peak maximum current)
Analysis Oscillator voltage: 2.56 vrms open circuit quadrature outputs

Automatic documentation

Setup information saved on disk for all measurements made. Previous setups may be quickly loaded from disk.
Operator free-form remarks saved with setup data.

On-line operator's manual

User alterable disk files explaining operation associated with every menu.

RPN calculator program, built-in

Display:

7" flat-face green raster scan w/rear panel video out (75 ohms)
  Range: 72 dB in 3,6 or 12 dB per division
  Screen: 8 divisions on screen
  Dynamic range: 70 dB or better
  Cursor: Follows actual data

Reference, constants and display units

Velocity and units (reference to seconds)
Transducer coefficient and units (reference to volts)
0 dB reference in user units
(All may be changed to suit the user)

Power input

AC voltage: 100, 110, 120, 200, 220, 240
  (2A. maximum at 120 volts AC)
DC voltage: 10 to 15 volts (10A. maximum)
  Protected against load dump transients
Internal batteries for 15 min. of operation

Printer output:

Epson MX-80, MX-100 or FX80
Contact TECRON for other printer software drivers.

Standard Equipment

TEF® System 10 with:
One 5" disk drive
One Input Module
Two RS-232 ports
One RS-170 video port
TEF Operator's Manual
CP/M Manual
One CP/M Distribution Disk
One TEF Distribution Disk
One TEF Working Disk

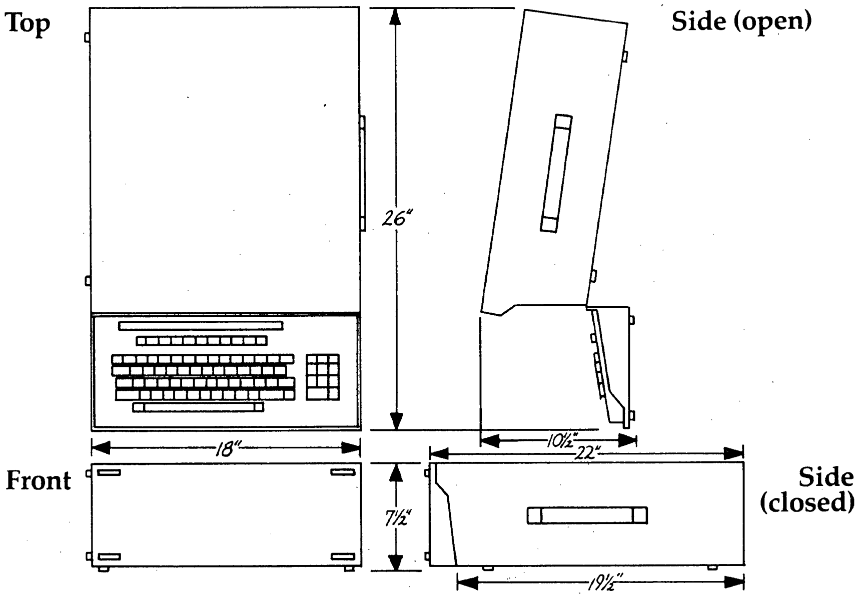
Optional Equipment

Dual Disk Drive
One Windows Disk,
  providing over 100 different windows (HAMMING is standard for TEF) for FFT data processing.
IEEE 488 (GPIB or HPIB)
Parallel Port
8" Disk Drive Port
Input Module B
TEF Computer Programming Manual
Contact TECRON for information on currently available software options.

Bibliography

TECRON has compiled an extensive bibliography on TDS and ETC measurements. A free copy will be sent on request.

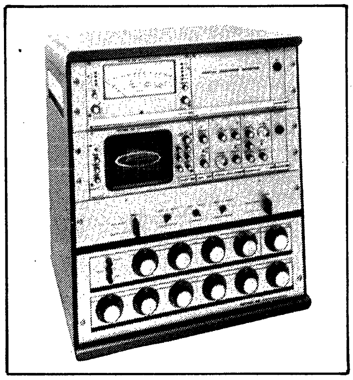
Dimension Drawings



TETTEX INSTRUMENTS INC

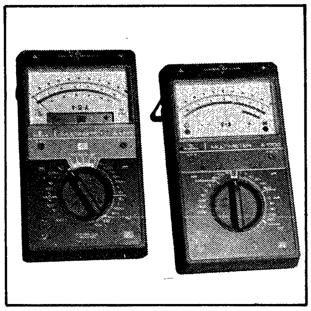
PRECISION INSTRUMENTS

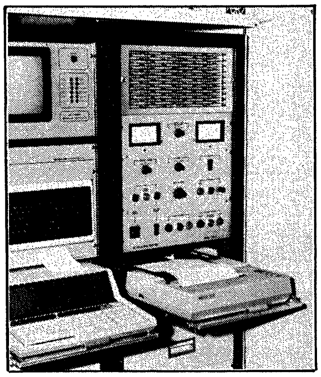
Established in 1945, TETTEX INSTRUMENTS is an independent company, specializing in design and manufacturing of instruments for electrical measurements. Strongly committed to produce high quality instruments for Research, Development, Quality Control and Maintenance, we have achieved worldwide recognition as a leading company in the field of electrical measurement technology. Continuous growth has led to a staff of approximately 100 employees producing over 200 different instruments ranging from small handheld units to completely automated measuring systems including processors, software and power supplies.



RESISTANCE MEASUREMENTS AND STANDARDS — We offer a wide range of medium and high accuracy Kelvin and Wheatstone bridges for Lab and Shop applications, complemented by digital Milli and Micro Ohmmeters for efficient quality control measurements. **Resistance, capacitance, inductances** and **dissipation factor standards** besides **decades** and **current transformers** are also available for calibration purposes. For high precision Laboratory applications, Bridges and Potentiometers offer 2ppM accuracy.

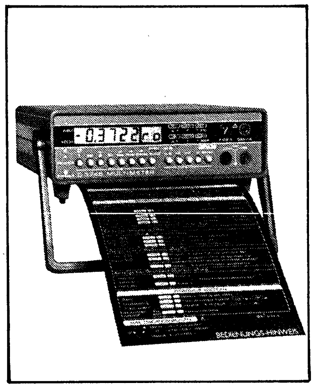
DISSIPATION FACTOR (Tan δ, Power Factor) and PARTIAL DISCHARGE Bridges for AC measurements on solid insulation materials, Oils, Wires, Cables, Capacitors, Transformers, etc. according to **IEEE, ANSI, AEIC, ASTM** specifications. We presently offer 12 different models from the small portable field unit to fully automatic systems including micro-processor controlled power supplies. An extensive line of accessories will support most applications. The modular Partial Discharge measuring systems feature straight and bridge detectors, wide and narrow-band amplifier characteristics, scope analog and digital displays.

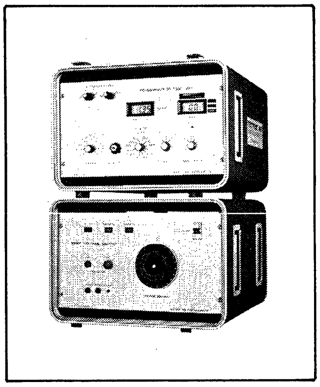




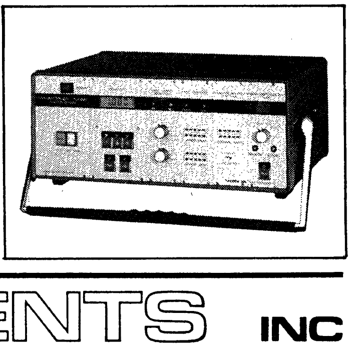
INSULATION RESISTANCE and DIELECTRIC measurement at DC voltages are performed by the analog and digital Insulation Testers. Various models hand cranked, battery or line powered cover the range from 100V to 5000V; two **megohmmeters** are featuring interfaces for processor control. The new handheld battery model measures 20MΩ at 500V. We manufacture guarded **test cells** for liquid and solid insulation materials with heaters for temperatures up to 300°C.

CURRENT and POTENTIAL TRANSFORMER TEST Systems — These modular systems consist of a fully automatic test set with digital display, zero-flux compensated standard current transformers up to 10kA; Potential transformers up to 800kV; Burdens according to **ANSI** and **VDE** standards and power suppy units. Completely automated systems for assembly line testing or for 400 Hz applications are also available. The capacitive electronic voltage divider enables potential transformer tests in the field.





POWER TRANSFORMERS — For all sizes **TETTEX** supplies measuring instruments and systems for **turns ratio, winding resistance, cooling curve, current, voltage, impedance loss** and **efficiency** measurements. We specialize in accurate and efficient measurements on transformers. Similar test systems are available for **motor** and **generator** testing. All instruments are modular and might either be used individually to upgrade existing installations or in a complex processor controlled system.



For other related measuring applications, we offer handheld, benchtop and system DVM's, Multimeters, Analog precision instruments, high voltage probes and current transformers, single and polyphase wattmeters, etc. We build to customer specifications, including processor controlled systems with software.

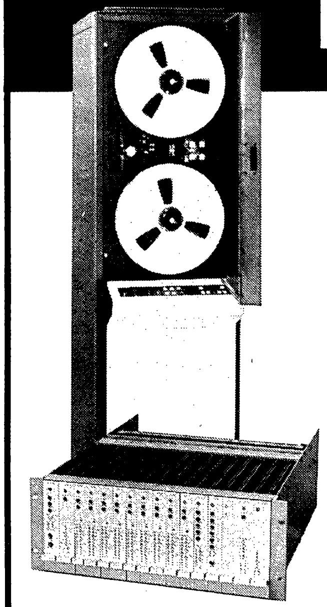
ASK FOR OUR EXTENSIVE CATALOG.

TETTEX INSTRUMENTS INC

P.O. BOX 281, 1055 WEST GERMANTOWN PIKE, FAIRVIEW VILLAGE, PA 19409 U.S.A., TEL. (215) 539-6050, TELEX 753899TETTEX

THORN EMI

Instrumentation Recorders



SE9000 16 inch Laboratory Recorders

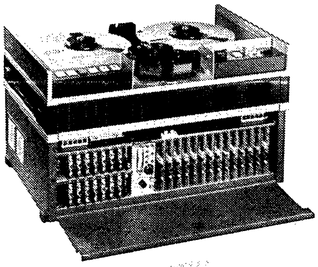
Full 42 track record/reproduce in single 6 foot rack. 7, 14, 28, 32, and 42 track, field convertible. 9 electronically switchable speeds, 15/16 -240 ips. IRIG Intermediate and Wideband; 4 MHz direct, 1 MHz FM, 40 kbpi HDDR; modular for any mix. Built-in calibrator for performance verification. Built-in tape cleaner. Optional IEEE-488 interface.

New SE9000HD High Density Digital Recording Systems

Packing density over 40 kbpi using standard headstacks and tape. Auto-ranging bit synchronization, microprocessor selection of tape speed for optimum packing density. Fully bi-directional operation, including error correction. Serial/parallel conversion, or individual synchronous or asynchronous parallel inputs. Rates to 150 Mbps.

New SE9500 Formatter

Provides HDDR capability to any 2 MHz wideband IRIG Recorder. Data transfer rates to 144 Mbps. Switchable track fan out—2 to 32 tracks—to 4.5 Mbps per track. Works with new generation double density and microgap recorders. Auto-ranging bit synchronization, built-in error detection and correction. Serial, parallel, or word serial modes.

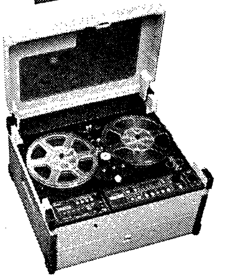


SE7000A, C, and D Field Portable Recorders

IRIG Intermediate and Wideband Group 1 recorders. 7 to 42 tracks. FM, direct, and HDDR in any mix, plus voice log. ½ and 1 inch tape, field convertible. 15/16 to 120 ips, tachometer or tape controlled. Built-in calibrator. Hand held or rack mounted remote controls. Optional 20-39 Vdc power, and IEEE-488 interface.

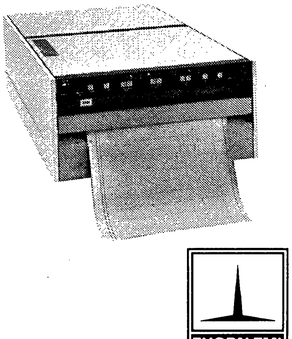
SE7000M Wideband

IRIG Wideband capabilities in the SE7000 chassis. 2MHz direct, 500 kHz FM, 30 kbpi HDDR. 7 or 14 track. Built-in calibrator. Optional 20-39 Vdc power, and IEEE-488 interface.



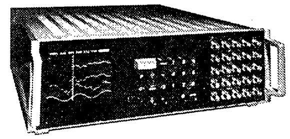
Lightweight SE3000 Series

offers heavyweight features. ¼ inch or ½ inch tape, field convertible. 4, 8, or 14 modular channels in any mix of FM, direct, or HDDR. Buy and carry only the channels you need. 8 speeds, 15/32 to 60 ips. Record up to 34 hours continuously. Built-in calibrator. Operates on 11-30 Vdc or 100-250 Vac (48-420 Hz). Optional IEEE-488 interface.



SE6300 Direct Writing UV Oscillographic Recorder

Up to 24 channels with either 8″ or 12″wide paper. Frequency response to 8500 Hz. Chart speeds from 0.02 ips to 200 ips.



SE2550 Transient Recorder

4 or 8 channels with up to 32k memory per channel. Microprocessor controlled. 1MHz sampling rate with 10 bit resolution.

THORN EMI Technology Inc.

8601 Dunwoody Place, Atlanta, GA 30338 Tel: (404) 587-0017
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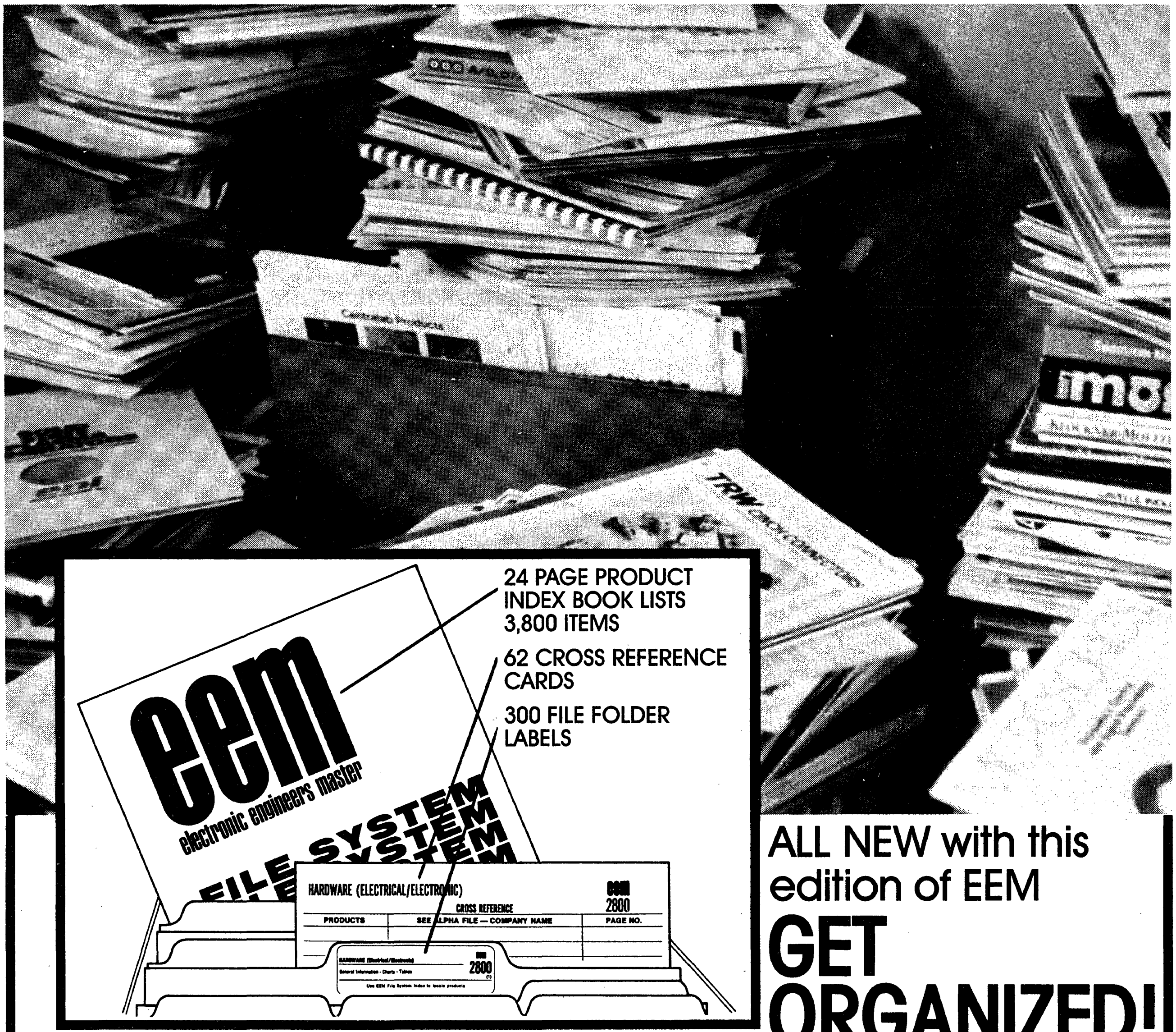
THORN EMI Datatech Ltd.
Spur Road, Feltham, Middlesex
TW14 OTD, England
Telephone: 01-890-1477 Telex: 23995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FILE SYSTEM
HARDWARE (ELECTRICAL/ELECTRONIC)
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SEE ALPHA FILE — COMPANY NAME
PAGE NO.
TRW

ALL NEW with this edition of EEM

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Are your catalog files organized? Can you find any given catalog in a matter of seconds? If your answer is "Yes," you probably already have the EEM File System. But, if you said "No," you really ought to look into this simple system. It will save hours of time and tons of aggravation.

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There are thousands of EEM File Systems in everyday use in engineering and procurement offices all over the world. Shouldn't you be using this proven system?

The EEM File System is shipped in one neat package. The package contains everything you need to set up your very own filing system. Best of all, it's easy to get and very affordable. Send a check or money order for $25.00 and EEM will pay the postage and sales tax. If you must use a purchase order, please add $5.00 for postage and handling. An invoice will accompany your System.

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TOROTRON CORP DEPT. EM, 519 SOUTH FIFTH AVE., MOUNT VERNON, NY 10550, (914) 664-2050

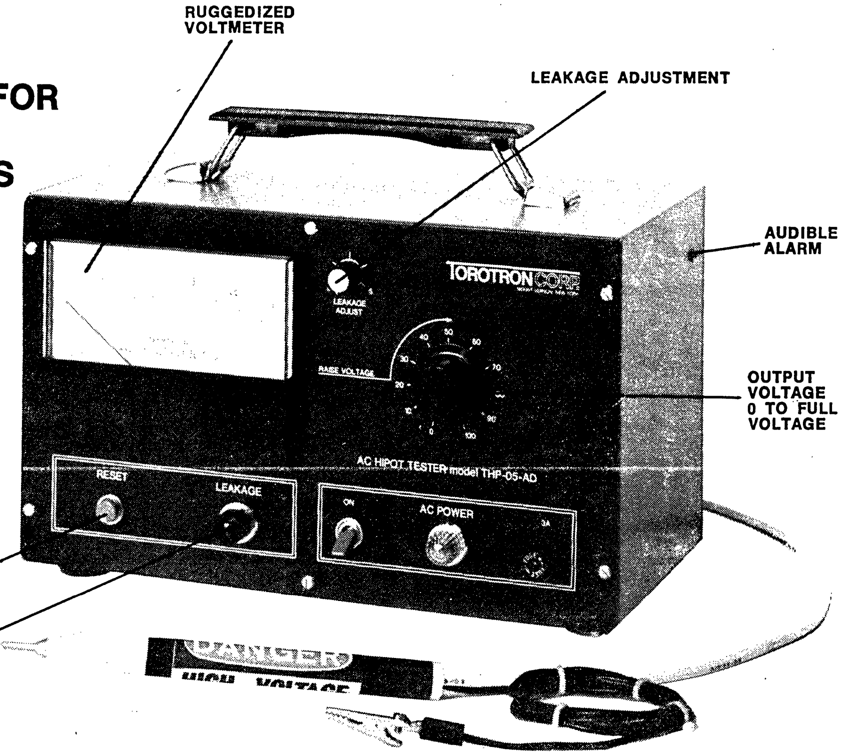
AC & DC Hipot Insulation Testers

Application: • Production testing for insulation resistance. Dielectric withstand, etc. • Motors • High Voltage Capacitor • Wire & Cable • Dielectric Materials • Transformers & Coils • Bushing & Insulators • High Voltage Rectifiers • **UL Listed Electrical Hi Pot Tests.**

THP-AD Hipot Series

AC & DC DIELECTRIC WITHSTANDING TESTER FOR MAKING U.L. LISTED ELECTRICAL HIPOT TESTS

Model THP-05-AD High Quality, Low Cost, AC & DC High Voltage Insulation Tester. Makes fast, accurate dielectric withstanding tests of Appliances, Motors, Coils, Transformers, Electronic Components, Insulation Materials, etc.


RUGGEDIZED VOLTMETER
LEAKAGE ADJUSTMENT
AUDIBLE ALARM
OUTPUT VOLTAGE 0 TO FULL VOLTAGE
RESET BUTTON
VISUAL FAILURE INDICATOR
TOROTRON CORP
LEAKAGE ADJUST
RAISE VOLTAGE
AC HIPOT TESTER model THP-05-AD
RESET
LEAKAGE
ON
AC POWER
3A
DANGER HIGH VOLTAGE

FEATURES:

- **High Voltage Output Control**
  Continuously variable from zero to full voltage.
- **Solid State Visual and Audible Alarm**
  Adjustable from 500 μA to 5 mA breakdown current.
- **Latching Relay**
  Shuts off power when breakdown current exceeds preset limit: keeps audible alarm on until defective part is removed and tester reset.
- **Voltage Monitoring**
  Actual output voltage monitored by rugged, 4½", mirror scale taut band kilovoltmeter.
- **Shielded Output Cable**
  Shielded cable with attached high voltage probe; separate ground lead.
- **Polarity**
  DC models: Probe output voltage negative with respect to ground.

SPECIFICATIONS:

Input	115 Vac, 60 Hz, 3A Max., 120W at full load
Size and Weight	7"H x 12"W x 6"D. Approx. 18 lb
Meter	Accuracy ±2% of full scale
Output Voltage	0 to full voltage, see table
Short Circuit Current	Transformer output capability 18 mA at full voltage

AC SERIES

Model	Output Voltage	Price 1 to 5
THP-03-AD	0-3 KVAC	$375.00
THP-05-AD	0-5 KVAC	$400.00
THP-10-AD	0-10 KVAC	$820.00

DC SERIES

Model	Output Voltage	Price 1 to 5
THP-03D-AD	0-3 KVDC	$375.00
THP-04D-AD	0-4 KVDC	$400.00
THP-07D-AD	0-7 KVDC	$680.00
THP-12D-AD	0-12 KVDC	$820.00

Note: Discount 5% 6 to 10. For larger quantities request quote.

ALSO AVAILABLE FROM TOROTRON: A Complete Line of Custom High Voltage Power Supplies, Regulated or Unregulated. CONTACT FACTORY DIRECT FOR INFORMATION. Specifications and price subject to change without notice.

Transistor Devices Inc.
274 S. SALEM ST., RANDOLPH, NJ 07869 TELEPHONE: (201) 361-6622

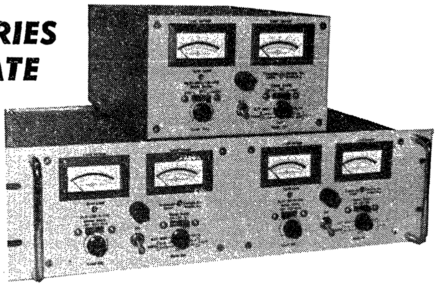
DYNALOAD POWER SUPPLY TEST EQUIPMENT

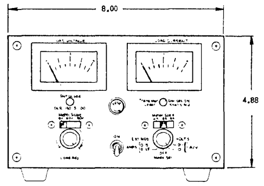
WHY THE DYNALOAD? Transistor Devices, Inc., has been a leader in the custom designed power supply field for over 20 years. We have developed over 3000 different power supplies and continue to produce many of them all the time. Testing these supplies would involve a multiplicity of power resistors and clip leads, resulting in a very long changeover time from one model to another, were it not for the Dynaload series of dynamic load test equipment. We developed the Dynaload series and used them successfully in our test department, improving on them and adding new features as we needed them. The models we are now able to offer represent over 10 years of experience in solving problems with the Dynaload.

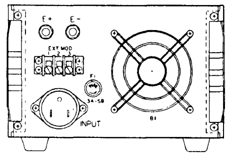
WHAT IS A DYNALOAD? The Dynaload is a solid state electrical load, designed for both special and production test of power supplies, servo systems, DC generators, and similar power equipment. The mode selector switch permits the instantaneous choice of constant resistance, constant current, or constant voltage load characteristics over a wide dynamic range. Provision is also made for external programming for automatic test equipment or for simulating special time-varying loads such as circuit breakers or digital printers.

We couldn't buy one this good, but you can!!

DLR SERIES STEADY STATE ELECTRICAL LOADS



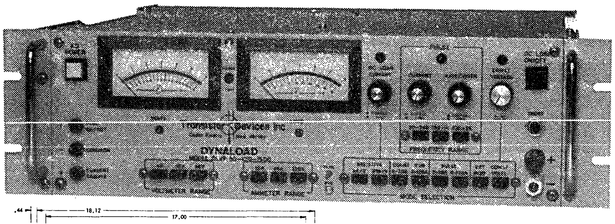


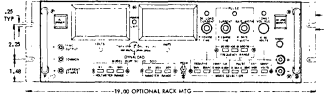


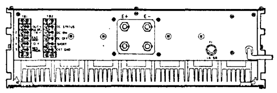
SPECIFICATIONS

MODEL	DLR 50-15-150A	DLR 130-5-100A	DLR 400-1.5-100
Operating Voltage	3-50V	5-130V	30-400V
Load Current	0-15A	0-5A	0-1.5A
Maximum Power	150W	100W	100W
Voltmeter Ranges	0-6V 0-18V 0-60V	0-18V 0-60V 0-180V	0-60V 0-180V 0-600V
Ammeter Ranges	0-1.8A 0-6A 0-18A	0-.6A 0-1.8A 0-6A	0-.18A 0-.6A 0-1.8A
Resistance Ranges	0-.5A/V 0-3A/V	0-.1A/V 0-1A/V	0-.003A/V 0-.01A/V
Constant Current Ranges	0-3A 0-15A	0-1.5A 0-5A	0-.3A 0-1.5A
Program Input	All models 0-6V @ 1mA		
Program Linearity	All models less than ±1% from 10% full load		
Response Time	All models less than 50 μsec		
Constant Voltage	0-50V	0-130V	0-400V
Meter Accuracy	All models less than ±3%		
Overvoltage	60V max	150V max	500V max
Current Limit	20A max	7A max	2A max
Power Limit	200W max	150W max	150W max

DLVP SERIES – PROGRAMMABLE VARIABLE PULSE-WIDTH DYNALOADS



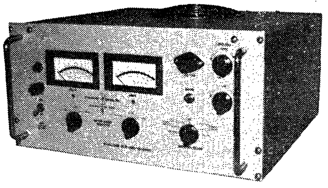


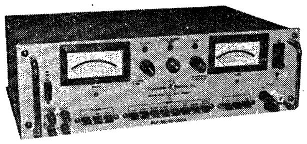


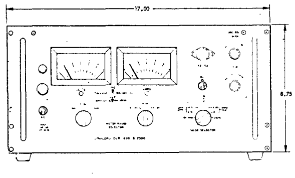
SPECIFICATIONS

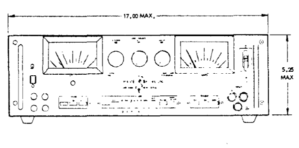
MODEL	DLVP-50-120-1500	DLVP 130-110-1000
Operating Voltage	3-50V	5-130V
Load Current	0-120A	0-110A
Maximum Power	1500W	1000W
Voltmeter Ranges	0-6V 0-18V 0-60V	0-18V 0-60V 0-180V
Ammeter Ranges	0-12A 0-36A 0-120A	0-12A 0-36A 0-120A
Resistance Ranges	0-5A/V 0-30A/V	02A/V 0-20 A/V
Constant Ranges	0-30A 0-120A	0-30A 0-110A
Program Input	0-10V @ 1mA	0-10V @ 1mA
Program Linearity	Less than ±1%	Less than ±1%
Pulse Width	10-100% duty cycle	10-100% duty cycle
Response Time	Less than 50 μsec 0-120A	Less than 50 μsec 0-110A
Constant Voltage	3-50V	5-130V
Meter Accuracy	Less than 3%	Less than 3%
Overvoltage	60V max	145V max
Overcurrent	130A max	125A max

DLP and DLR 400-15-2500 STEADY-STATE ELECTRICAL LOADS









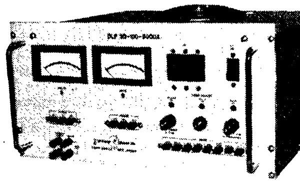
SPECIFICATIONS

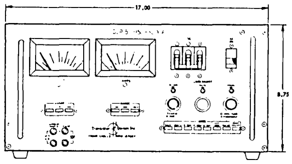
MODEL	DLR 400-15-2500	DLP 50-60-1000A
Operating Voltage	30-400V	3-50V
Load Current	0-15A	0-60A
Maximum Power	2500W	1000W
Voltmeter Ranges	0-60V 0-180V 0-600V	0-6V 0-18V 0-60V
Ammeter Ranges	0-1.8A 0-6A 0-18A	0-6A 0-18A 0-60A
Resistance Ranges	0-.03A/V 0-.1A/V	1A/V 10A/V
Constant Current Ranges	0-3A 0-15A	0-10A 0-60A
Program Input	All models 0-6V @ 1mA	
Program Linearity	All models less than ±1% from 10% to full load	
Response Time	All models less than 50 μsec	
Meter Accuracy	All models less than ±3%	
Constant Voltage	0-400V	0-50V
Overvoltage	500V max	60V max
Current Limit	20A max	68A max
Power Limit	3000W max	1200W max

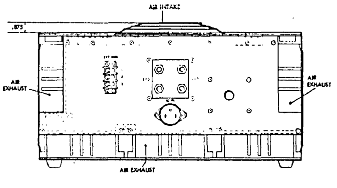
Transistor Devices Inc.

274 S. SALEM ST., RANDOLPH, NJ 07869 TELEPHONE: (201) 361-6622

DLP HIGH POWER SERIES PULSE AND STEADY STATE ELECTRICAL LOADS



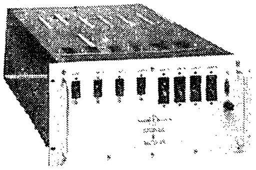


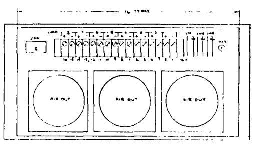


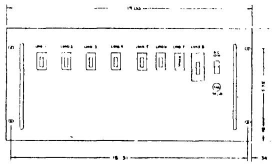
SPECIFICATIONS

MODEL	DLP 50-150-3000A	DLP 130-50-2500A
Operating Voltage	3-50V	5-130V
Load Current	0-150A	0-50A
Maximum Power	3000W	2500W
Voltmeter Ranges	0-6V 0-18V 0-60V	0-18V 0-60V 0-180V
Ammeter Ranges	0-18A 0-60A 0-180A	0-6A 0-18A 0-60A
Resistance Ranges	5A/V 30A/V	1A/V 10A/V
Constant Ranges	0-30A 0-150A	0-10A 0-50A
Pulse Load Range	0-150A peak	0-50A peak
Program Input	All models 0-6V @ 1mA	
Program Linearity	All models less than ±1% from 10% full load	
Frequency Adjust	All models 500-5K Hz	
Pulse Width	All models 50% Duty Cycle	
Response Time	All models less than 50 μsec	
Meter Accuracy	All models less than ±3%	
Constant Voltage	0-50V	0-130V
Overvoltage	60V max	150V max
Current Limit	180A max	60A max
Power Limit	3400W max	3000W max

CUSTOM PROGRAMMABLE LOADS





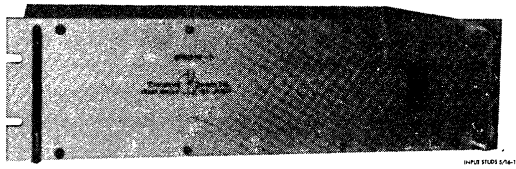


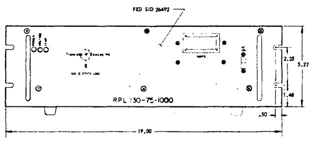
SPECIFICATIONS 8 MODULES MAX

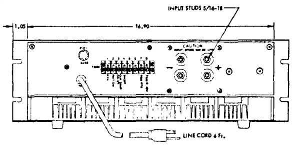
MODEL	MODULE "A"	MODULE "B"	MODULE "C"	MODULE "D"
Operating Voltage	3-50V	3-50V	7-130V	10-250V
Load Current	0-15A	0-30A	0-15A	0-5A
Maximum Power	150W	500W	750W	750W
Program Input	0-10 @ 1 mA			
Program Ranges	0-15A	0-30A	0-15A	0-5A
Program Linearity	1%	1%	1%	1%
Load Regulation	.5%	.5%	.5%	.5%
Overvoltage	60V max	60V max	150V max	300V max
Current Limit	20A max	40A max	20A max	7A max
Power Limit	200W max	700W max	1000W max	1000A max

Optional modules are available. Please consult factory for further information.

RPL 130-75-1000 — REMOTELY PROGRAMMABLE, DYNALOAD FOR AUTOMATIC TESTING



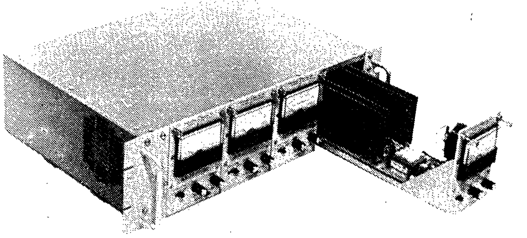




SPECIFICATIONS

MODEL	RPL 130-75-1000
Operating Voltage	2-130V
Load Current	0-75A
Maximum Power	1000W
Program Input	0-10V @ 1mA
Program Linearity	Less than 1%
Load Regulation	Less than 1%
Response Time	Less than 50 μsec
Overvoltage	150V max
Overcurrent	85A max
Overpower	1200W max
Remote Turn On	Negative TTL signal 3mA max
Remote Short Circuit	Negative TTL signal 3mA max
Current Sample Output	1mv/A
Fault Alarms	Individual LED indicators for: Overvoltage condition Current/power limit condition Overtemperature condition

DLM MODULAR RACK MOUNTED MODULAR LOADS



MODULES INSTALL IN STD. 5¼" X 19" EIA RACK 12½" DEEP

SPECIFICATIONS

MODEL	DLM 50-20-100	DLM 130-5-100
Input Voltage	115 or 230V	115 or 230V
Operating Voltage	3-50V	4-130V
Load current	0-20A	0-5A
Maximum Power	100W	100W
Ammeter Ranges	0-5A/0-20A	0-2A/0-5A
Meter Accuracy	<3%	<3%
Constant Current	0-20A	0-5A
Constant Resistance	0-4 A/V	0-.25 A/V
Program Input	0-6VDC @ 1ma	0-6VDC @ 1ma
Program Linearity	Less than ±1% from 10% to full load	
Response Time	Less than 50us	
Program Coefficient	3.33 A/V	.83 A/V
Current Sample Output	20 mV/A	20 mV/A
Current Limit	24A Max	7A Max
Power Limit	140W Max	140W Max
	Full Rack Wt. 20 Lbs.	

MODEL 310 V-O-M TYPE 5

1. Drop-resistant, hand-size V-O-M with high-impact thermoplastic case.

2. 20,000 Ohms per Volt DC and 5,000 Ohms per volt AC; diode overload protection with fused Rx1 Ohms range.

3. Single enclosed range switch; direct reading AC Amp range to facilitate clamp-on AC Ammeter usage.

RANGES

DC Volts: 0-3-12-60-300-1200 (20,000 Ohms per Volt).

AC Volts: 0-3-12-60-300-1200 (5,000 Ohms per Volt).

Ohms: 0-20k-200k-2MΩ-20MΩ (200 Ohm center scale on low range).

DC Microamperes: 0-600 at 250 mV.

DC Milliamperes: 0-6-60 at approx. 250 mV; 0-600 at approx. 330 mV.

Accuracy: ±3% DC; ±4% AC; (full scale).

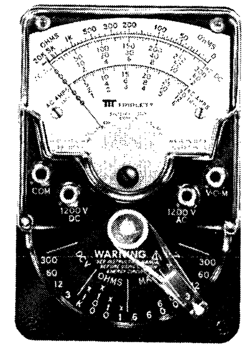
Scale Length: 2⅛".

Meter: Self-shielded; diode overload protected, fused Rx1 ohms range; spring backed jewels.

Case: Molded, black, high impact thermoplastic with slide latch cover for access to batteries and fuse, 2¾"w x 1⁵⁄₁₆"d x 4¼"h.

Batteries: NEDA 15V 220 (1), 1½V 910F (1): Complete with 42" leads, screw-on insulated alligator clips, batteries and instruction manual. Shpg. Wt. 2 lbs.

Model 310
Cat. No. 3018 .... **$58.00**



ACCESSORIES FOR 310's

Model 10 Clamp-on AC Ammeter—For 310, 310-FET & 310T. Ranges. 0-6-12-30-60-120-300.
Cat. No. 60-211 .... **$34.70**

Model 101 Line Separator—Divides two conductor cords direct or increases Model 10 sensitivity 10x and 20x.
Cat. No. 60-218 .... **$13.70**

Model 311 Lead—42" long lead to separate Model 10 from 310 unit for easy reading in awkward spots.
Cat. No. 79-416 .... **$7.50**

Model 369 Carrying Case—For Model 310's.
Cat. No. 10-1258 ...... **$8.50**

Model 79-153 Replacement Lead—For Model 310 series.
Cat. No. 79-153 .... **$6.80**

MODEL 310-C V-O-M TYPE 5

1. Drop-resistant, hand-size V-O-M with high-impact thermoplastic case.

2. 20,000 Ohms per volt DC and 15,000 Ohms per volt AC; diode overload protection with fused Rx1 Ohms range.

3. Single, enclosed range switch minimizes error; DC polarity-reversing switch.

RANGES

DC Volts: 0-3-12-60-300-600 (20,000 Ohms per Volt).

AC Volts: 0-3-12-60-300-600 (15,000 Ohms per Volt).

Ohms: 0-20k-200k-2MΩ-20MΩ (200 Ohm center scale on low range).

DC Microamperes: 0-600 at 250 mV.

DC Milliamperes: 0-6-60 at approx. 250 mV; 0-600 at approx. 330 mV.

Accuracy: ±3% DC; ±4% AC; (full scale).

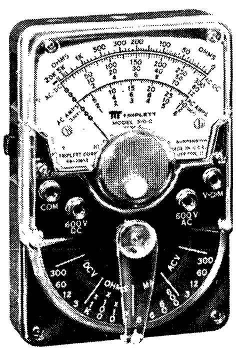
Scale Length: 2⅛".

Meter: Self-shielded; diode overload protected suspension movement; fused Rx1 ohms range; DC polarity-reversing switch; single, enclosed range switch.

Case: Molded black, 2¾"w x 1⁵⁄₁₆"d x 4¼"h.

Batteries: NEDA 15V 220 (1), 1½V 910F (1).
Complete with 42" leads, screw-on insulated alligator clips, batteries and instruction manual. Shpg. Wt. 2 lbs.

Model 310-C
Cat. No. 3022 .... **$97.00**



ACCESSORIES FOR 310-C

Model 10-C Clamp-on AC Ammeter—For 310-C. Ranges, 0-6-12-30-60-120-300.
Cat. No. 60-335 .... **$34.70**

Model 101 Line Separator—Divides two conductor cords direct or increases Model 10-C sensitivity 10x and 20x.
Cat. No. 60-218 .... **$13.70**

Model 311 Lead—42" long lead to separate Model 10-C from 310-C unit for easy reading in awkward spots.
Cat. No. 79-416 .... **$7.50**

Model 369 Carrying Case—For Model 310's.
Cat. No. 10-1258 ...... **$8.50**

Model 79-153 Replacement Lead—For Model 310 series.
Cat. No. 79-153 .... **$6.80**

MODEL 60 V-O-M TYPE 2

1. X'TRA Rugged—Will withstand an accidental drop up to a five foot height.

2. Overload protected—All ranges protected by by diode and unusual three fuse arrangement, including ⅛ amp, 1 amp and 2 amp/1000V fuses.

3. Safety Designed For You—Designed to most rigid safety standards; completely insulated unit including newly designed safety leads.

RANGES

DC Volts: 0-0.3-1-3-10-30-100-300--1000 (Approx. 20,000 Ohms per Volt).

AC Volts: 0-3-10-30-100-300 (Approx. 5,000 Ohms per Volt).

Ohms: 0-1k-10k-100k-1MΩ-10MΩ (12 Ohms center scale on low range).

DC Microamperes: 0-100 at approx. 320 mV.

DC Milliamperes: 0-10-100-1000 at approx. 320 mV.

Decibels: −20 to +52 ("0" db at 1mW on 600 Ohm line).

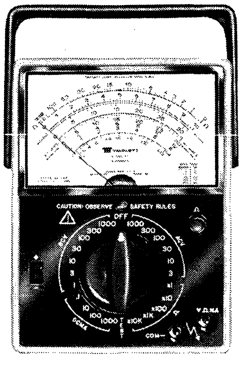
Accuracy: ±2% DC; ±3% AC; (full scale).

Scale Length: 4½".

X'TRA Rugged: Will withstand an accidental drop up to a five foot height with deviation from stated accuracy not exceeding ±4%.

Overload Protected: All ranges protected by diodes and unusual three fuse arrangement, including ⅛ amp and 2 amp/1000V fuses.

Safety Designed to most rigid safety standards to prevent explosive arcs in high energy circuits, up to the 2 amp/1000V (20kW) fuse capacity.



Meter: Diode overload protected ruggedized suspension meter movement module, all range polarity reversing switch.

Confidence Test: Reassurance check of instrument meter.

Case: Molded, orange, high impact thermoplastic;easy external access sealed battery and fuse compartment; handle holds tester at 30° angle; 5¼"w x 7¼"h x 3¼"d.

Batteries: NEDA 9V 1604 (1), 1½V 13F (1).
Complete with 48" safety test leads, screw-on insulated alligator clips, batteries, spare ⅛A and 1A fuses and instruction manual. Shpg. Wt. 4 lbs.

Model 60
Cat. No. 3145 .... **$147.00**

MODEL 60-NA V-O-M TYPE 2

1. X'TRA Rugged—50 ranges with mirror scale and ±1½% DC accuracy—will withstand an accidental drop up to a five foot height.

2. Overload Protected—All ranges protected by diode and unusual three fuse arrangement, including ⅛ amp, 1 amp and 2 amp/1000V fuses.

3. Safety Designed For You—Designed to most rigid safety standards; completely insulated unit including newly designed safety leads.

RANGES:

DC Volts: 0-0.3-1-3-10-30-100-300-1000 (10,000 Ohms/Volt). 0-0.15-0.5-1.5-5-15-50-150-500 (20,000 Ohms/Volt).

AC Volts: 0-3-30-100-300-1000 (Approx. 10,000 Ohms/Volt).

Ohms: 0-1k-10k-100k-1MΩ-10MΩ 100MΩ (6 Ohm center scale).

DC Microamperes: 0-50-100-500.

DC Milliamperes: 0-1-5-10-50-100-500-1000.

Decibels: −26 to +52 ("0" dbm at 1mW on 600 Ohm line).

Output Volts (AC): 0-3-30-100-300 (5,000 Ohms/Volt).
0-1.5-15-50-150 (10,000 Ohms/Volt).

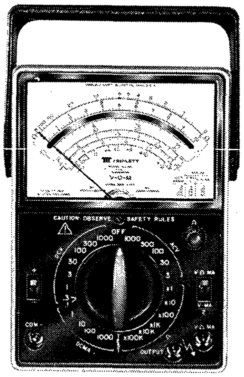
Accuracy: ±1½% DC; ±3% AC; (full scale).

Frequency Compensated.

Scale Length: 4½".

X'TRA Rugged. See Model 60.

Overload Protected. See Model 60.



Safety Designed. See Model 60.

Meter: Diode overload protected ruggedized suspension meter movement, ½% resistors.

Confidence Test: See Model 60.

Case: Molded, gray, high impact thermoplastic; external access sealed battery and fuse compartment; handle holds tester at 30° angle; 5¼"w x 7½"h x 3¼"d.

Batteries: NEDA 30V 210 (1), 1½V 13F (1).
Complete with 48" safety test leads, screw-on insulated alligator clips, batteries, spare ⅛A and 1A fuses and instruction manual. Shpg. Wt. 4 lbs.

Model 60-NA
Cat. No. 3151........ **$199.00**

TRIPLETT

TRIPLETT®
A Penril COMPANY
BLUFFTON, OHIO 45817
TEL. (419) 358-5015 TWX 810-490-2400

THE MARK OF QUALITY
OVER 75 YEARS

MODEL 310-FET—TYPE 2

1. Hand-size FET V-O-M with 10 megohm DC input resistance and diode overload-protected suspension movement.

2. Low voltage range of 300 mV DC; X1 megohm range

3. Single range switch; DC polarity-reversing switch.

RANGES

DC Volts: 0-0.3-1.2-6-30-120-600. Input resistance 10 megohms.

AC Volts: 0-3-12-60-300-600 (5,000 Ohms per Volt).

Ohms: 0-5k-500k-50MΩ-5,000MΩ (50 Ohm center scale on low range).

DC Milliamperes: 0-0.12-1.2 at 300 mV.

Accuracy: ±3% DC; ±4% AC; (full scale).

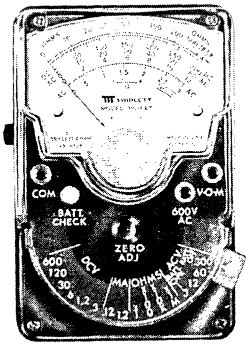
Scale Length: 2⅛".

Meter: Self-shielded, diode overload protected suspension movement; DC polarity-reversing switch.

Case: Molded, black, 2¾"w x 1$^{5}/_{16}$"d x 4¼"h.

Batteries: NEDA 7V 1501M (1), 1½V 910A (1).
Complete with 42" leads, screw-on insulated alligator clips, batteries and instruction manual. Shpg. Wt. 2 lbs.

Model 310-FET
Cat. No. 3027 .... **$133.00**



ACCESSORIES FOR 310's

Model 10 Clamp-on AC Ammeter—For 310, 310-FET & 310-T. Ranges, 0-6-12-30-60-120-300.
Cat. No. 60-211 .... **$34.70**

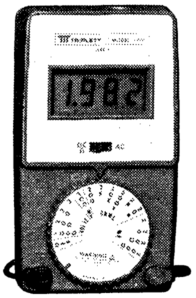
Model 101 Line Separator—Divides two conductor cords direct or increases Model 10 sensitivity 10x and 20x.
Cat. No. 60-218 .... **$13.70**

Model 311 Lead—42" long lead to separate Model 10 from 310 unit for easy reading in awkward spots.
Cat. No. 79-416 .... **$7.50**

Model 369 Carrying Case—For Model 310's.
Cat. No. 10-1258 ...... **$8.50**

Model 79-153 Replacement Lead—For Model 310 series.
Cat. No. 79-153 .... **$6.80**

MODEL 3400 DMM TYPE 2



1. HAND-SIZE, 3½ Digit, single range switch—6 function, 24 ranges with Hi and Low Power Ohms. Auto-Zero and Auto-polarity

2. OVERLOAD PROTECTION—Protected up to 1000 volts with special 2A/600V fuse arrangement; no nuisance fuse blows in volt and ohm ranges.

3. BATTERY LIFE—500 hour typical with 9V battery display has low battery indication with 8 hours battery life remaining.

RANGES

DC Volts: 0-0.2, ±0.15% Rdg. ±1 digit. 0-2-20-200, ±0.2% Rdg. ±1 digit. 0-1000, ±0.5% Rdg. ±1 digit. Input impedance all ranges: 10 Meg. Full scale step response: 1 sec. max.

AC Volts: 0-0.2-2-20-200, ±0.6% Rdg. ±2 digits. 0-1000, ±1.0% Rdg. ±2 digits. Input impedance all ranges: 10 Meg. Full scale step response: 5 sec. max.

Low Power Ohms: 0-200-20k-2M ±0.3% Rdg. ±1 digit. Max. open circuit voltage 3V. Full scale step response: 2 sec. max.

Hi Power Ohms: 0-2k-200k, 0.3% Rdg. ±1 digit. 0-20M, ±1.0% Rdg. ±1 digit. Max. open circuit voltage 3V. Full scale step response: 2 sec. except 20M range, 8 sec. max.

DC Milliamperes: 0-2-20-200, ±1.0% Rdg. ±1 digit. 0-2000, ±1.5% Rdg. ±1 digit. Voltage drop across input, 200mV. Full scale step response: 1 sec. max.

AC Milliamperes: 0-2-20-200, ±1.5% Rdg. ±2 digits. 0-2000, ±2.0% Rdg. ±2 digits. Voltage drop across input, 200mV RMS. Full scale step response: 5 sec. max.

CONSTRUCTION

Display: 0.5", 3½ digit LCD.

Overrange Indication:

AC Frequency Response: 50Hz to 400Hz, all ranges.

Battery: NEDA 9V 1604A (1).

Low Battery Indication:

Fuse: 2 Amp/600 Volt.

Case: Molded, fiesta tan high impact thermoplastic with non-slip "finger tread" surface finish.

Dimensions: Approx. 3"w x 5⅜"h x 1½"d.

Weight: Approx. 10 oz.

Model 3400, complete with one year warranty, 36" test leads, screw-on insulated alligator clips. Wire tilt stand, 9V battery and instruction manual.
Cat. No. 3400 ...... **$130.00**

MODEL 64 VOLT-OHMMETER

1. X'TRA Rugged/Overload Protected (all ranges)/Safety Designed solid state Volt-Ohmmeter.

2. Low-Power Ohms—LPΩ™ —6 ranges with 90mV power source for in-circuit measurements plus junction test circuit.

3. Exclusive Triplett Micro Power—TMP™ —permits continuous operation with carbon battery life in excess of a year.

RANGES

DC Volts: 0-0.3-1-3-10-30-100-300-1000. Input res. 11.12 MΩ.

AC Volts: 0-0.3-1-3-10-30-100-300-1000. Input imp. 10 MΩ. Frequency range 20Hz to 20kHz, except 300 and 1000V.

Ohms-Low Power: 0-1k-10k-100k-1MΩ-10MΩ-100MΩ. (Max. voltage 90mV, max. power 0.8mW, 10 Ohm center scale).

Ohms-Conventional: 1000MΩ. (Max. voltage 0.9V, max. power 0.08μW, 10M Ohm center scale).

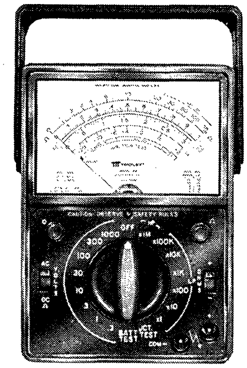
Junction Test: Checks diodes and transistor junctions (silicon-germanium-open or shorted); forward and reverse conduction. (Max. V. 0.9V, max. power 0.8mW).

Decibels: −30dB to +32dB.

Accuracy: ±3% F.S., all ranges.

Scale Length: 4½".

X'TRA Rugged: Will withstand an accidental drop up to a five foot height with deviation from stated accuracy not exceeding ±4%.



Overload Protected: All ranges protected by diodes and unusual two fuse arrangement, including 1 amp and 2 amp/1000V fuses.

Safety Designed to most rigid safety standards to prevent explosive arcs in high energy circuits, up to the 2 amp/1000V (20kW) fuse capacity.

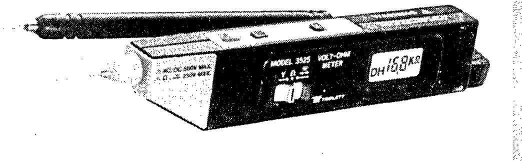
Meter: Diode overload protected suspension movement module.

Case: Molded, green, high impact thermoplastic; external access sealed battery and fuse compartment; 5¼"w x 7½"h x 3¼"d.

Batteries: NEDA 9V 1604 (2), 1½V 13F (1).
Complete with 48" safety test leads, screw-on insulated alligator clips, batteries, spare 1A fuse and instruction manual. Shpg. Wt. 4 lbs.

Model 64
Cat. No. 3152 .... **$202.00**

MODEL 3525 DIGI-PROBE™



EASY TO USE
Fully automatic range selection for volts and ohm functions; readout is in hand with option of Data Hold switch. Just "touch & test."
EASY TO CARRY
Comes complete with shirt pocket carrying case.
EASY CONTINUITY CHECKING
Fast audible continuity tone.
EASY DIODE CHECKING
Both checks and classifies germanium and silicon diodes.
OVERLOAD PROTECTION
Internal overload protection to 750 VAC/DC in voltage ranges and 250 VAC/DC in ohms and continuity ranges.

RANGES

DC Volts—Range selection fully automatic. 0-2V, 20V, 200V, ±0.75% Rdg. +2 digits. 0-500V. ±1.0% Rdg. +2 digits. Input impedance: Greater than 10 Meg all ranges. Full scale step response: 4 sec. maximum.

AC Volts—Range selection fully automatic. 0-2V, 20V, 200V, 500V, ±1.25% Rdg. +4 digits.
Input Impedance: Greater than 10 Meg all ranges.
Full scale step response: 5 sec. maximum.

Ohms—Range selection fully automatic. 0-2k, 20k, 200k, ±0.75% Rdg.+3 digits. 0-2,000k, ±1.25% Rdg. +3 digits. Will read to 2,999k ohms in overrange. Maximum open circuit voltage: less than 0.45V.
Full scale step response: 5 sec. maximum.

Audible Continuity/Diode Check—Threshold level: audible tone with resistance of approximately 4000 ohms or less. Indication: 4kHz tone and ⌒ on LCD. Response time: less than 1 msec. Maximum open circuit voltage: 1.5V.

CONSTRUCTION

Display: 5mm, 3½ digit LCD.

Overrange Indication:

Overload Protection: up to 750 VDC, 530 V RMS or 750 VAC Peak and 250 V AC/DC on ohms for 1 minute.

Continuity-Audible Tone: Activated with resistance levels of 1.5k to 15k Ω, typically 4k Ω, a 4kHz tone will be heard, the tone response is less than 1 msec.

AC Frequency Response: 40Hz to 500Hz all ranges.

Battery: Two 1½V Button Type—NEDA 1107 SO silver oxide, 1166A alkaline.

Battery Life: 100 hours typical silver oxide, 70 hours alkaline.

Low Battery Indication:

Data Hold: When DH button depressed, will hold all readings except continuity, "DH" shows on display.

Case: Molded black high impact thermoplastic with textured surface finish.

Dimensions: Approx. 6⅜" long x 1⅛" wide x ¾" deep (162mm x 28mm x 20mm.)

Weight: 2½ oz. (0.07 kg).

Complete with one year warranty, 2-1½ V batteries, attached 28" test lead, instruction manual and carrying case.

Model 3525
Cat. No. 3525 .... **$65.00**

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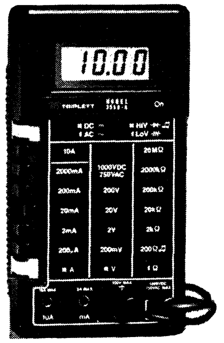
MODEL 3550-A



1. Handheld—6 functions, 34 ranges with 200μa AC and DC, Hi-Lo Ohms/Diode check on all ranges.
2. Overload Protected—All ranges protected with special 2 A/600V fuse arrangement. No nuisance fuse outages on volt and ohm ranges.
3. Audible continuity; safety designed input jacks and test leads; tilt stand for bench use; easy access to battery and fuse compartment; 2000 hr. battery life; and 10A range.

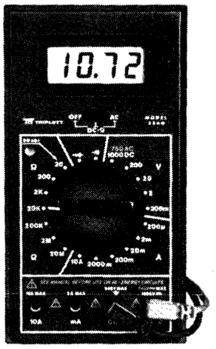
RANGES

DC Volts: 0-0.2-2-20-200-1000. ±0.25% of Rdg. + 1 digit.
Input Impedance all ranges: 10 Meg.
Full scale step response: 1 sec. max.
AC Volts: 0-0.2-2-20-200. ±0.5% of Rdg. + 5 digits. 0-750. ±1.0% of Rdg. + 5 digits.
Frequency response at specified accuracy: 45Hz to 400Hz. 200mV to 20V; 45Hz to 120Hz. 200V to 750V.
Input impedance all ranges: 10 Meg shunted <100pF all ranges.
Full scale step response: 3 sec. max.
Low Power Ohms: 0-200. ±0.5% of Rdg. +4 digits: 0-2k-20k-200k. ±0.3% of Rdg. +1 digit: 0-2000k. ±0.75% of Rdg. +1 digit: 0-20M. ±1.5% of Rdg. +1 digit.
Max. open circuit voltage. 400mV.
Full scale step response: 3 sec. to rated accuracy except 20M range 8 sec.
Hi Power Ohms Diode Check: 0-200. ±0.5% of Rdg. +4 digits: 0-2k-20k-200k. ±0.3% of Rdg. +1 digit: 0-2000k. ±0.75% of Rdg. +1 digit: 0-20M. ±1.5% of Rdg. +1 digit.
Audible continuity tone: (at ♫ position) activated on 200Ω range.
Maximum open circuit voltage. 3V.
Full scale step response: 3 sec. max. except 20M range. 8 sec.
DC Current: 0-0.2-2-20mA: ±0.5% of Rdg. +1 digit: 0-200 mA. ±0.75% of Rdg. +1 digit: 0-2000mA. ±1.5% of Rdg. +1 digit: 0-10A. ±2.0% of Rdg. +5 digits.
Full scale step response: 1 sec. max.
AC Current: 0-0.2-20-200mA. ±0.75% of Rdg. +5 digits; 0-2000mA. ±1.5% of Rdg. +5 digits; 0-10A. ±3% of Rdg. +5 digits.
Frequency response at specified accuracy: 45 to 60Hz.
Full scale step response: 3 sec. max.

CONSTRUCTION

Display: 0.5". 3½ digit LCD.
Overrange Indication:
Battery: NEDA 9V. 1604A (1).
Low Battery Indication:
Fuse: 2 Amp/600 volt.
Case: Molded black high impact thermoplastic with textured surface finish.
Dimensions: Approx. 3½"W x 6¾"L x 1⅝"D (87mmW x 170mmL x 42mmD).
Weight: Approx. 10 oz. (283g).
Complete with one year warranty. 42" test leads. 9V battery and instruction manual.
Model 3550-A
Cat. No. 3551 .... **$85.00**

MODEL 3560



1. A low resistance range to read from 0 to 20 ohms with a zero adjust to zero out lead resistance.
2. A 7 function, 20 range DMM with 2A at 250V fuse protection on the current ranges (except 10A) and 2000 hrs. battery life typical.
3. Both a continuity test and a diode test on a single easy to operate, easy to understand rotary switch.

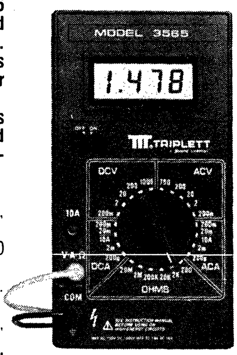
RANGES

DC VOLTS: 0-0.2-2-20-200-1000, ±0.25% + 1. Input impedance: 10 Meg ohms all ranges. Response time: 1 second max. Over voltage protection: 1000VDC or peak AC.
AC VOLTS: 0-0.2-2-20-200, ±0.5% +5 and 0-750, ±1% + 5. Frequency ranges at specified accuracy: 0-200mV to 20V, 45Hz-400Hz; 200V to 750V, 45Hz-120Hz. Input Impedance: 10 Meg ohms shunted 100pF all ranges. Response time: 3 seconds max.
RESISTANCE: 20 ohms, ±3% + 5; 200 ohms, ±.5% +4; 2K-20K-200K ohms, ±.3% + 1; 2000K ohms, ±.75% + 1 and; 20 Megohms, ±1.5% + 1. Response time: 3 seconds max. except 20 Meg ohms, 8 seconds.
DC CURRENT: 0-.2mA, 2mA, and 20mA, ±0.5% + 1; 0-200mA, ±.75% + 1; 0-2000mA, ±1.5% + 1 and; 10A, ±2% + 5. Response time: 1 second max.
AC CURRENT: 0-.2mA, 2mA, 20mA, and 200mA, ±.75% + 5; 2000mA, ±1.5% + 5 and; 10A, ±3% + 5. Response time: 3 sec. max.
Frequency: 45 to 60Hz.
CONTINUITY TEST: Resistance range for "On Condition": 0 to 100 ohms. Response time: Less than 100m Sec.
DIODE TEST: Open circuit voltage: 2.8V max. Test current: <.2Ma.

CONSTRUCTION

Display: 3½ digit LCD 0.5".
Overrange Indication:
Audible Continuity Tone: Activated when the circuit under test has less than approximately 100Ω resistance.
Power: 9V alkaline or carbon-zinc battery (NEDA 1604).
Battery Life: 2000 hours with alkaline battery.
Battery Indicator:
Size: 6.7" long 3.4" wide 1.65" deep (170 mm x 87 mm x 42 mm).
Weight: 12.5 oz.
Fuse: 2A at 250V Bussman #GMA2.
Model 3560
Cat. No. 3562 .... **$79.50**

MODEL 3565



1. Hand-held—5 functions, 26 ranges with 200μA and 10A AC and DC ranges. Includes carrying case.
2. Overload Protection—all ranges with no nuisance fuse outages for volts and ohms.
3. Single range switch provides operational ease. Safety designed test leads and easy external battery/fuse access.

RANGES

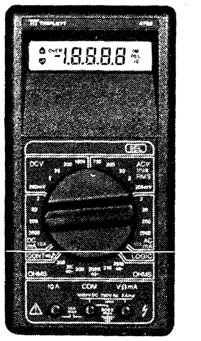
DC Volts: 0-0.2, 2, 20, 200, 1000, ±0.8% Rdg. + 1 digit.
Input Impedance all ranges: 10 Meg.
Full scale step response: 1 sec. max.
AC Volts: 0-0.2, 2, 20, 200, 750, ±1.2% Rdg. + 3 digits.
Frequency response at specified accuracy: 40Hz to 120Hz.
Input impedance all ranges: 10 Meg.
Full scale step response: 3 sec. max.
Ohms: 0-200-2K-20K-200K-2000K, ±1% Rdg. +2 digits. 0-20M, ±1.8% Rdg. + 2 digits.
Maximum open circuit voltage: Approx. 2.8V. max.
Full scale step response: 2 sec. except 20M range 8 sec.
DC Current: 0-0.2-2-20-200mA, ±1% Rdg. + 2 digits. 0-10A, ±2% of Rdg. + 2 digits.
Burden Voltage: 200mV except 10A < 200mV.
Full scale step response: 1 sec. max.
AC Current: 0-0.2-2-20-200mA, ±1.5% Rdg. + 3 digits. 0-10A, ±2.5% Rdg. + 3 digits.

Burden Voltage: 200mV except 10A <200mV.
Frequency response at specified accuracy: 40Hz to 120Hz.
Full scale step response: 3 sec. max.

CONSTRUCTION

Display: 0.5", 3½ digit LCD.
Overrange Indication:
Operating Temperature: 0° to 50° C with < 80% RH.
Battery: NEDA 9V, 1604, 500 hours typical.
Low Battery Indication:
Fuse: 0.5A/250V.
Test Leads: Safety type black and red, 36" long.
Case: Molded, black, high impact thermoplastic with textured surface finish.
Dimensions: Approx. 3$\frac{7}{16}$"W x 6½" Lx1$\frac{3}{16}$"D (86mm W x 162mm L x 31mm D).
Weight: 8½ oz. (245g.).
Complete with one year warranty, 36" test leads, 9V battery, instruction manual and carrying case.
Model 3565
Cat. 3565 .... **$65.00**

MODEL 4700



1. 4½ digit DMM with microcomputer control.
2. True RMS, dB Relative, & Logic capabilities.
3. Easy to operate 28 position rotary switch.

RANGES

DC VOLTAGE Ranges: 200mV, 2V, 20V, 200V, 1000V; ±0.04% +2.
Resolution: 10μV on 200mV range.
Input Impedance: 10 M ohms in parallel with < 100 pF.
AC VOLTAGE Ranges: 200mV, 2V, 20V, 200V, 750V.
Conversion Type: True RMS, ac coupled.
Accuracy: 5% to 100% of range.
200mV, 2V, 20V, 200V: 40Hz— 10KHz 0.5% + 10; 10KHz-20KHz 1.0% + 20.
750V: 40Hz—500Hz 0.5% + 15; 500Hz-1KHz 1.0% + 15
Input Impedance: 10Meg ohm in parallel with < 100 pF.
Response Time: 3 sec. max.
DC CURRENT Ranges: 2mA, 20mA, 200mA, 10A.
Accuracy: 2mA, 20mA, & 200mA ranges: 0.5%+2; 2000mA, 1.0%+2; 10A, 1.5%+2.
Response Time: 1 sec. max.
AC CURRENT Ranges: 2mA, 20mA, 200mA, 2000mA, 10A.
Conversion Type: True RMS, ac coupled.
Accuracy: 5% to 100% of range.
2mA, 20mA, 200mA 40Hz—10KHz 1% + 10.
2000mA 40Hz—1KHz 1.0% + 10.
10A 40Hz—1KHz 1.5% + 10.
Response Time: 3 sec. max.
RESISTANCE Ranges: 200 ohm, 2K ohm, 20K ohm, 200K ohm, 2M ohm, 20M ohm.
Accuracy: 200 ohm through 2 meg ohm; ± .25% + 2. 20 Meg ohm; ±0.5% + 2.
Open Circuit Voltage: 8 volts.
Response Time: 2 sec. max.
dB MODE: Conversion Display reading = 20 log .7746, that is, 0dB equals 1mV into 600Ω.
Accuracy: 5% of scale to full scale.

Range	**dBm**
200mV	−98 to −11.76
2V	−78 to 8.24
20V	−58 to 28.24
200V	−38 to 48.24
750V	−28 to 60.28

CONTINUITY Threshold: < 200 ohm nominally.
LOGIC PROBE Threshold: 1.75V nominally.
Minimum Pulse Width Detectable: 60 μSec without tone mode; 95 μSec with tone mode.
Indication: V in > threshold display HI; V in < threshold display LO.
RELATIVE MODE: AC or DC voltage, AC or DC current and resistance.
HIGH and LOW POWER OHMS: (Low) 200, 20K, 2Meg; (HIGH) 2K, 200K, 20Meg.

CONSTRUCTION

Battery: NEDA 1.5V, 15A (4 ea.), 100 hrs. batt. life typical.
Size: 3⅞"W x 7¼"L x 2"D (96.88mmW x 181.25mmL x 50mmD).
Weight: 19.5 oz. Approx. (546g.).
Complete with one year warranty, 42" test leads, four "AA" batteries and instruction manual.
Model 4700
Cat. No. 4700 .... **$330.00**

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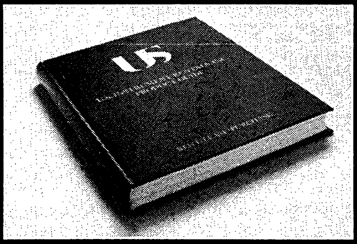

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Components: Crystal Detectors and Thermal Converters, Directional Couplers and Power Splitters, Filters, Fixed Attenuators, Modulators, Terminations, Variable Attenuators, Waveguide Attenuators.

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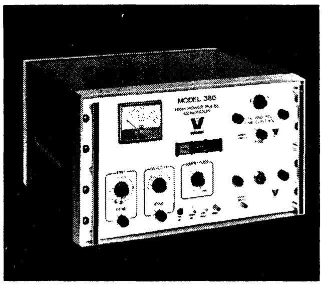
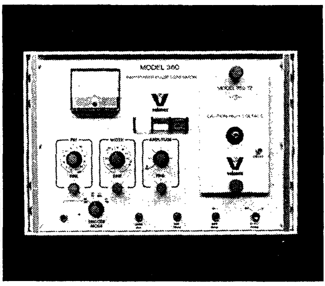
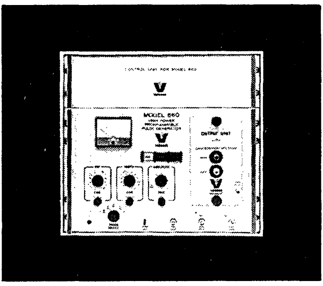
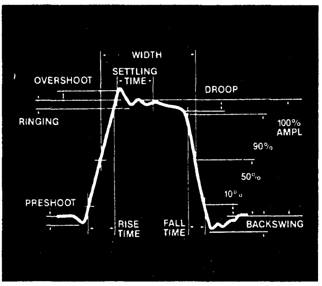
The Model 660 features programmable pulse width, PRF and amplitude through BCD inputs or IEEE interface bus. Inputs are TTL compatible and separate grounding is provided, allowing interconnection to a computer system or an external programming source.









Product Specifications	**Low Cost**	**High-Power**	**Well-Regulated High-Power**	**Ultra Fast**	**ATE/ Programmable**
Characteristics/Model	**345**	**350**	**360**	**380**	**660**
VOLTAGE PEAK Max.					
Direct Out	⩾1kV	⩾2.1kV	⩾2.5kV	500V	⩾2.5kV
With Standard Plug-In	11.4kV	24kV	30kV	1kV	30kV
CURRENT PEAK Max.					
Direct Out	⩾5.0A	⩾10.5A	⩾12.5A	⩾10.0A	⩾12.5A
With Standard Plug-In	290A	600A	750A	100A	750A
POWER OUTPUT					
Peak One-Shot	6kW	26kW	31kW	5kW	31kW
Full Duty Factor	5kW	22kW	31kW	5kW	31kW
Average	50W	220W	460W	50W	460W
DUTY FACTOR					
Full Output Power	1.0%	1.0%	1.5%	1.0%	1.5%
Reduced Output Power	10%	10% (Option E)	1.5%	1.0%	1.5%
PULSE WIDTH					
Internal Minimum	80ns	100ns	50ns	15ns	50ns
Internal Maximum	10ms	300μs	3ms	25μs	1ms
PULSE REPETITION					
Internal Minimum	One-Shot & 1pps	One-Shot & 3pps	One-Shot & 1pps	One-Shot & 3pps	One-Shot & 1pps
Internal Maximum	100kpps	100kpps	300kpps	400kpps	300kpps
External	0 to 100kpps	0 to 100kpps	0 to 300kpps	0 to 400kpps	0 to 300kpps
TRANSITION TIME					
Rise	35ns	30ns	20ns	7ns	20ns
Fall	35ns	50ns	30ns	7ns	30ns
DROOP					
Maximum	0.004%/μs	0.04%/μs	0.003%/μs	0.1%/μs	0.009%/μs
PHYSICAL					
Width	19¾″ (50.17 cm)	19¾″ (50.17 cm)	19¾″ (50.17 cm)	19¾″ (50.17 cm)	19¾″ (50.17 cm)
Depth	18″ (50.17 cm)	18″ (45.72 cm)	21½″ (54.61 cm)	18″ (45.72 cm)	21½″ (54.61 cm)
Height	11″ (27.9 cm)	13″ (33.02 cm)	13″ (33.02 cm)	11″ (27.9 cm)	18″ (45.72 cm)
Weight	65 lbs (29.6 kg)	120 lbs (54.43 kg)	140 lbs (63.50 kg)	120 lbs (54.43 kg)	161 lbs (75.30 kg)

VELONEX

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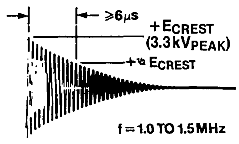
■HIGH-POWER PULSE GENERATORS ■SURGE TRANSIENT GENERATORS ■VOLTAGE SPIKE GENERATORS
■NOISE GENERATORS ■COMMERCIAL AND RUGGEDIZED DIGITAL PANEL METERS
■PROCESS CONTROL METERS ■EVENT COUNTERS

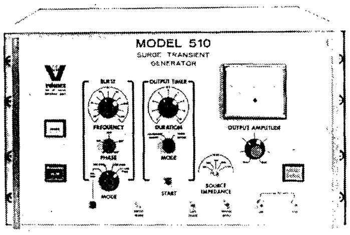
SURGE GENERATORS

Velonex leads the industry in the manufacture of precision Surge, Pulse, and Spike simulating equipment. All of our Surge Transient Generators feature solid-state design, eliminating jitter and erratic performance and the relative short life associated with generators using magnetic relay switches. Each instrument is fully shielded, and comes with built-in safety features, as well as an easy-to-use surge selector switch. All controls are conveniently located on the front panel. Available options make special applications routine.



≥6μs
+ECREST
(3.3kVPEAK)
+½ ECREST
f = 1.0 TO 1.5 MHz

Damped Oscillatory
$E_O = 1.5$ to 3.3 kV
$f = 1.25$ MHz nominal
$t_R = <100$ ns
Envelope decay to 50% of crest value is 6μs, minimum open-circuit

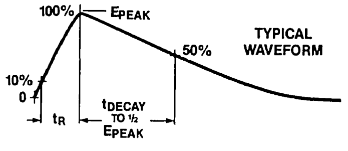


MODEL 510
SURGE TRANSIENT GENERATOR
BURST
OUTPUT TIMER
FREQUENCY
DURATION
OUTPUT AMPLITUDE
PHASE
MODE
START
SOURCE IMPEDANCE

MODELS 510 AND 515

- Produces the Surge Withstand Capability wave shape for testing systems, equipment, and components.
- Provides bursts of damped sine waves into an open-circuit (2.5 kV on the Model 510 and 3.3 kV on the Model 515).
- Manual trigger, internal variable burst rate (up to 120 bursts per second) and synchronized to 1× and 2× line frequency operation.
- Two high-voltage indicator lights are incorporated into the Models 510 and 515.
- Isolation Networks V-2269 and V-2538 are used with these instruments.
- Physical: 19¾″ wide × 18″ deep × 11¼″ high; Weight: 70 lbs.

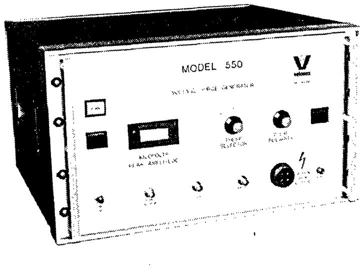
The Models 510 and 515 meet part or all of the following specifications: ANSI/IEEE 37.90a-1978 (formerly IEEE 472-1974), CIGRE 36-05, IEC TC-41, EDF HN 54 530, ENEL LV 1504, SEN 361 503-1.



100%
EPEAK
TYPICAL WAVEFORM
50%
10%
0
tR
tDECAY TO ½ EPEAK

Output Voltage Open-Circuit Peak Voltage	Rise Time to Peak Voltage
800V	<10μs
1500V	<10μs
2500V	<2μs

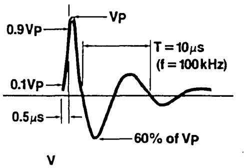
Short-Circuit Peak Amperes	Time Decay to 1/2 of Peak Voltage
>200A	>560μs
>200A	>160μs
>1000A	>10μs



MODEL 550

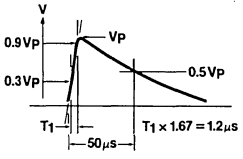
- Produces voltage and current waveforms for metallic and longitudinal testing.
- Provides 3 well-defined selectable waveforms at 800V, 1500V, and 2500V.
- Manual and external trigger capability.
- Digital Panel Meter indicates the output peak voltage.
- Physical: 19¾″ wide × 18″ deep × 11¼″ high; Weight: 60 lbs.

The Model 550 meets the following specifications: FCC 19528 Part 68.



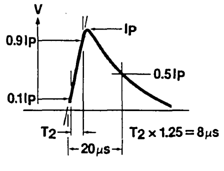
VP
0.9VP
T = 10μs
(f = 100kHz)
0.1VP
0.5μs
60% of VP

Oscillatory
E_O (OC) = 6kVP
$f = 100$ kHz
$t_R = 0.5\mu s$
I_O (SC) = 500 A (std)
I_O (SC) = 200 A/500 A (option C)



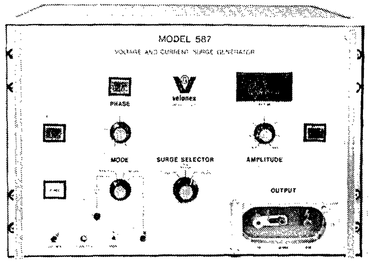
V
0.9VP
VP
0.5VP
0.3VP
T1
T1 × 1.67 = 1.2μs
50μs

Exponential
$E_O = 6$ kVP
1.2/50μs
Open-Circuit (OC)



V
IP
0.9IP
0.5IP
0.1IP
T2
T2 × 1.25 = 8μs
20μs

Exponential
$E_O = >3$ kAP
8/20μs
Short-Circuit (SC)



MODEL 587
VOLTAGE AND CURRENT SURGE GENERATOR
PHASE
velonex
MODE
SURGE SELECTOR
AMPLITUDE
OUTPUT

MODEL 587

- Provides the testing requirement of surge voltages in low AC power circuits for systems, equipment, and components.
- Produces one oscillatory and two exponential waveforms (one open-circuit and one short-circuit).
- Dual Continuous Waveform feature.
- Physical: 19¾″ wide × 22½″ deep × 13″ high; Weight: 100 lbs.

The Model 587 meets all or part of the requirements for the following specifications: ANSI/IEEE C62.41-1980 (formerly IEEE STD 587-1980), IEC 664, CIGRE 36-05, IEC 521, EDF HN 54-530, ENEL LV 1504, SEN 361 503-1, SEV 1055-1978, UL 943, UL 217/UL 268, VDE 0565, VDE 0845, MIL-STD-1399.

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lights • cooling equipment • filters • generators •
multimeters • panel meters • oscilloscopes • gra
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components [illegible]tors/
drives • ba[illegible]
supplies, ac [illegible] • relays •
solenoids • resistors • potentiometers/trimmers
controls/rhe[illegible]tors •
switches • [illegible] transducers/en
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tors • connectors, electronic • sockets/terminals

EEM PRODUCT SELECTION GUIDES

Use the EEM Product Selection Guides. There are 34 Guides in this edition of EEM. See page 2 (A•2, B•2, C•2, D•2) of each volume to locate the Product Selection Guides that pertain to your needs.

Viking Labs/Honeywell

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PRODUCT RELIABILITY/ ENVIRONMENTAL TESTING

VIBRATION TESTING

- HIGH CAPACITY VIBRATION TABLE has dynamic pitch moment capacity in excess of 3.5 million inch pounds, a cross axis (yaw) in excess of 900 thousand inch pounds and a roll capacity of more than 1.2 million inch pounds
- UNHOTLZ-DICKIE T-1000 produces up to 17,500 force pounds (1.0 d.a.) sinusoidal transient function, spectrum analysis and combined sine/random vibration
- ALL-AMERICAN VIBRATION FATIGUE TESTER accommodates a 25 pound load from 2Hz to 60 Hz
- LAB SHAKERS capable of 500 pound load from 2Hz to 100 Hz
- Four electro-dynamic shakers to 6,000 force pounds

SHOCK AND ACCELERATION TESTING

- Six impact shock machines with capabilities ranging from a 450 pound load to 150g up to a three pound load to 5000 g.
- UNHOLTZ-DICKIE T-1000 used to provide synthesized (pyrotechnic) test spectra
- "SLING" SHOCK SYSTEM develops velocity changes of up to 125 feet per second (30,000g.)
- Two GENISCO CENTRIFUGES: one with a 46" radius, capable of 150 pounds up to 75g; and one with a 24" radius, capable of 120g's up to 25 pounds

CLIMATIC TESTING

- 750 cubic foot WALK-IN TEMPERATURE—HUMIDITY CHAMBER with temperature range of -100°F to 350°F and a humidity range of 20% RH to 95% RH as limited by a 40% minimum dewpoint and a maximum dry bulb temperature of 160°F
- 23 environmental test chambers:
  - 16 completely programmable for temperature and humidity (moisture resistance) testing - 20% RH to 99% RH over a 40°F to 200°F temperature range (five of these chambers have the capacity of attaining -100°F)
  - Seven high/low temperature chambers
- Two AGREE systems for combined vibration and temperature
- Five 85/85 chambers
- Two Salt Spray systems
- Two altitude chambers, -100°F to 300°F, sea level to 100,000 feet altitude
- Two thermal vacuum chambers, -250°F to 300°F, and pressure 1 x 10^{-7} Torr (mm.Hg)

TEST DATA

- All test data and reports prepared in accordance with MIL-STD-831
- Documentation ranges from simple data sheet to more complex procedures and reports

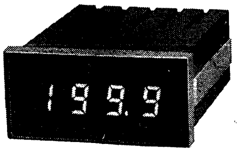
DATA TECH DPMs.

FOR THOSE WHO DEMAND THE BEST.

THEY FIT SMALL SPACES...

DT-23A SUB-MINIATURE

Ideal for limited space applications. This tiny (24H x 48W x 72D mm) meter has a 3½ digit, LED display and is available in 4 dc input voltage ranges.



DT-51 LOW PROFILE

Less than 1 inch deep, this 3½ digit, LED meter fits where standard depth meters won't. Unbuffered multiplex BCD output, 4 dc input voltage ranges.

REPLACE COMPETITOR'S METERS...

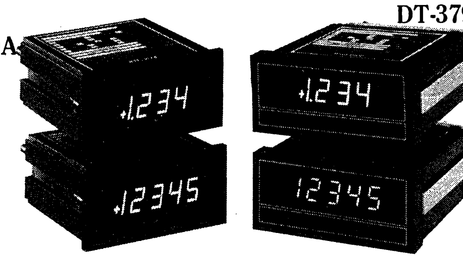
DT-379A/W are 3½ digit, dc voltage or dc current meters with single-ended or true differential inputs, LED display. Parallel BCD, offset & span optional.

DT-379A is a substitute for Analogic Model 2570. DT-379W replaces Weston Models 1230, 2432, 2460.

DT-479A/W measure dc voltage or dc current. Features include true differential input, extremely low tempco, 4½ digit LED. Optional 3-state parallel BCD.

DT-479A replaces Analogic Model 2574. DT-479W replaces Weston Models 1234, 2470.

DT-379A DT-379W

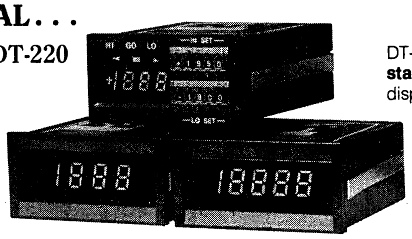


DT-479A DT-479W

ARE ENCASED IN METAL...

DT-220 is a 3-state, 3½ digit, comparator indicator with relays and multiplex BCD output. **Metal case standard.** Measures dc voltage or dc current. LED display. 4-20mA or 1-5V inputs optional.

DT-220



DT-29 DT-35

DT-29 features fast read rate up to 20/sec. **Metal case standard**, dc voltage or dc current, 3½ digit LED display, can display external BCD inputs.

DT-35 is a dc voltage, 4½ digit, LED meter with **metal case** and BCD output standard. Differential inputs for 200mV and 2V ranges.

HAVE FLUORESCENT AND GAS DISCHARGE DISPLAYS...

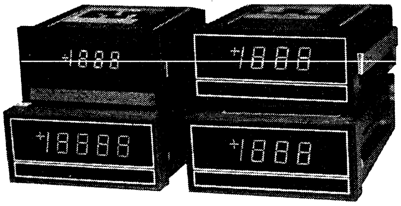
A 3½ digit, fluorescent display makes DT-41 ideal for low light environments. Inputs dc voltage or dc current, BCD parallel, 10μVdc resolution available.

4½ digit model DT-4412 has a gas discharge display, parallel BCD output, dc voltage or dc current measurement. Fast readings of up to 15/sec.

A powerful 3½ digit, dc voltage meter with gas discharge display. DT-3312 has an externally adjustable read rate to 30/sec, and BCD parallel.

Model 4312 is a 3½ digit meter with a gas discharge display. Measures dc voltage or dc current, 5-15 readings/sec, 1000Vdc range available.

DT-41 DT-3312

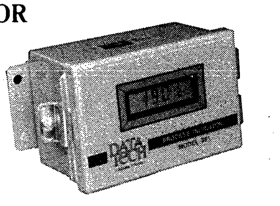


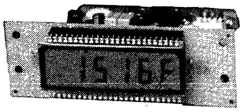
DT-4412 DT-4312

AND HAVE SPECIAL APPLICATIONS...

DT-381 PROCESS MONITOR

A 3½ digit, LCD meter that is powered from a current transmitter loop. 4-20mA or 10-50mA, 4 decimal points, and least significant digit are all DIP switch selectable. JIC/NEMA case or uncased for special mounting.





DT-384 DIP-SWITCH SELECTABLE RANGE

Caseless, LCD meter with on-board DIP switch for selection of decimal points, one to three ranges, and 2½, 3½, or 4½ digits of data. Power 5-20Vdc isolated.

BUT MOST OF ALL—THEY PERFORM!

DATA TECH
MEASUREMENT AND CONTROL PRODUCTS
A PENRIL COMPANY

Other DATA TECH DPM capabilities include true or average rms, temperature, custom DPMs, and many more. Ask for our free full-line catalog today.

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DIGITAL PANEL METERS

Manufacturer	EEM Page No.	Model/Series	Number of Digits (Number of Counts)						Function							Type of Display	Power Requirements		
			3 (999)	3½ (1999)	3¾ (3999-5999)	4 (9999)	4½ (19999)	4¾ (39999-59999)	General Purpose	Temperature	Pressure	Weight	RPM	Process Control	Other		AC Line	+5 VDC	BCD Output
Bowmar/ALI	D•1331- D•1333															LED	●	●	●
Data Tech	D•1335	DT18, 19, 21		●					●						●	LED	●	●	●
	D•1336	DT26, 29, 30		●					●						●	FL/LED	●		●
	D•1337	DT41, 51, 73		●					●						●	FL/LED	●	●	●
	D•1338	DT31, 34, 35				●	●		●						●	LED	●		●
	D•1339	DT44, 4412				●	●		●						●	FL/GP/LED	●	●	●
	D•1340	DT110, 210		●					●						●	LED	●		●
	D•1341	381, 384		●			●		●					●	●	LCD		●	
Datel	D•1346	DM		●			●		●							LCD/LED	●	●	●
DCI Inc.	D•1347	All		●	●	●	●	●	●	●	●	●	●	●	●	LED			●
Digitec	D•1348	2770/80A		●			●			●				●	●				●
Dixson Instrs.	D•1349	051/101				●			●	●				●		LED		●	
Electro Industries	D•1350	FF/FVA/FVD		●					●						●	LED	●		
	D•1350	PF		●					●						●	LED	●		
	D•1351	VA		●					●						●	LED	●		●
	D•1351	LF				●			●						●	LED	●		●
	D•1351	LM	●						●						●	LED	●		●
Gralex	D•1354	40/41,30,32/33		●			●		●							LED		●	
	D•1355	35, 36-4, 38-2		●					●				●			LED/GP	●	●	●
	D•1356	37/DLM/PVI			●				●				●			GP	●		●
Lincoln Instrs.	D•1361	All		●			●	●	●						●	LED	●	●	●
Modutec	D•1362 D•1362	D BL		● ●					● ●	●						LCD/LED LCD	●	● ●	
NES, Inc.	D•1365- D•1368	Slimline	●	●	●	●	●	●	●	●	●	●	●	●	●	LCD/LED	●	●	●
Newport	D•1370 D•1371	All		●	●		●	●	●	●	●	●	●	●	●	LEC/LED/GP	●	●	●
North Atlantic	D•1373	800/801			●	Opt.									●	LED			●
Omega Engrg.	D•1374	199	●											●					
Simpson	D•1377	2865		●			●		●							LED	●	●	
	D•1377	2842					●		●							LED	●	●	
	D•1377	2850							●							LED/GP	●	●	●
Texmate	D•1378	PM-35		●					●							LCD/LED		●	Opt.
	D•1378	PM-45					●		●							LCD/LED		●	●
	D•1378	ID		●					●							LED	●		
	D•1378	SM		●			●		●							LCD/LED		●	
	D•1378	CM-35		●										●		LCD			
	D•1379	TM		●						●						LCD/LED			
	D•1379	PC					●								●	LCD/LED			
	D•1379	RD					●									LED/LCD			
	D•1379	RP		●			●									LED	●		Opt.
Velonex	D•1383	31	●						●							LED	Opt.	●	●
	D•1383	36/37		●					●							LCD/LED	Opt.	●	●
	D•1383	41				●			●							LED	Opt.	●	●
	D•1383	46					●		●							LED	Opt.	●	●
	D•1383	32	●						●							LED	Opt.	●	●
	D•1383	141/142				●									●	LED		●	

FL = Fluorescent GP = Gas Plasma LCD = Liquid Crystal Display LED = Light Emitting Diode

For manufacturers' sales offices, see yellow pages

ANALOG PANEL METERS

			Type			Size (Inches)												
Manufacturer	EEM Page No.	Model/Series	Moving Coil	Moving Iron	Taut Band	1½ & Under	2	2½	3	3½	4	4½	5	Over 5	Edgewise	Illuminated	Custom	Bargraph
Bowmar/ALI	D•1331- D•1333														●	●	●	●
Dixson Instrs.	D•1349	051/101	●	●							●		●		●	●	●	●
Emico	D•1352	60			●			●		●		●					●	
	D•1352	50		●				●									●	
	D•1352	44		●					●						●			
	D•1352	13/13F		●											●		●	
	D•1352	B02/12		●		●									●			
	D•1352	58		●				●										
	D•1353	25	●		●			●										
	D•1353	250	●		●			●										
International Instruments	D•1357	All	●		●	●	●	●	●	●					●	●	●	●
JBT Instruments	D•1358	All	●	●	●		●	●	●	●	●					●	●	
Jewell	D•1359	All	●	●	●	●	●	●	●	●	●	●	●		●	●	●	
Modutec	D•1363	S		●	●	●		●		●		●		●		●	●	
	D•1363	W & WM		●	●			●		●		●				●	●	
	D•1363	PB		●	●	●		●		●							●	
	D•1362	FBG																●
	D•1363	DN	●				●		●	●				●				
	D•1363	M	●			●	●	●		●					●		●	
Omega Engrg.	D•1374	All								●		●		●				
Shogyo	D•1376	All				●	●	●	●		●							
Simpson	0•1377	All	●	●	●	●		●		●		●		●	●			
Texmate	D•1378	AM														●		●
	D•1381	G/GLB	●	●	●	●		●		●		●		●	●	●	●	
	D•1381	M/R	●	●	●	●		●		●		●		●				
	D•1381	Phenolic	●	●	●			●		●		●		●				

For manufacturers' sales offices, see yellow pages

See the Difference... Bowmar Bargraphs

General Specifications

Product Series and Descriptions

APM100 Series: 100 segments, 3" LED display
APM200 Series: 100 segments, 3" LED display, Militarized

APM500 Series: 50 segments, 5" LED display, front or rear mount
APM600 Series: 50 segments, 5" LED display, rear mount
APM700 Series: 50 segments, 5" LED display, rear mount, without scale or bezel
APM800 Series: 100 segments, 10" LED display, rear mount
CPM500 Series: 50 segments, LED, 250° arc, 4" circular display

Electrical

Input Signal Ranges:

30 Standard; Including:	Special Ranges Available:
0-10 V DC	DC volts: 50 MV to 100 V
4-20 mA DC	DC amps: 100 mA to 10 A
0-10 V AC	AC volts: 50 MV to 250 V RMS
7 bit binary	AC amps: 1 mA to 5 A RMS
−40 to +3 VU	

Accuracy: Linearity: ±0.5% of full scale (0° to +50°C)
Gain Temp.: Coefficient: ±0.015%/°C maximum
Zero Temp.: Coefficient: ±0.01%/°C maximum
Response Time: 2.5 MS full scale
Power Supply Sensitivity: ±0.1%/volt maximum
Input Bias Current: 100 NA typical
Common Mode: Rejection: 60 dB typical. (Standard: −0.4 to 2.8 V CMV. For 4-20 mA input: −4.0 to 42.4 V CMV)
Input Impedance: 100 K ohms for most models, 50 millivolt shunt for most ammeters
Power Requirements: +5 ±.25 V DC (most models) 380 mA typical

Environmental

Operating Temperature: 0 to 50°C
Storage Temperature: −62 to 71°C
Shock: to 8½ G's
Humidity: to 95% noncondensing
Approximate Weight: 6-12 ounces
Calibration: Fully factory calibrated. May be field calibrated approximately ±20% FS at zero and full scale.

Options

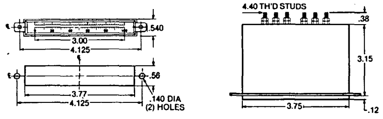
- Differential input
- High impedance to 10 meg for VV001 only, other models consult factory
- Auto polarity (negative input displays underrange indicator and bargraph)
- Single set point (nonvisible) [for visible set points see model X41]
- Dual set point (nonvisible) [for visible set points see model X42]
- Increased damping to 1 sec (not available for ranges less than 100 MV)
- Special input signal ranges (see price list for standard input signal range listings)
- Custom and semi-custom scales
- Hold function
- BCD output
- Green or yellow display
- 3 or 4 digit display on CPM models
- NEMA 4 mountings for APM600 and CPM models

Scales

Standard Scales:

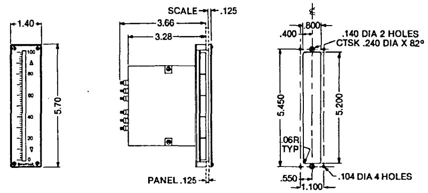
	Part Number		
Scale	**Vertical**	**Horizontal**	**Circular**
0-100	S3	S1	S3
0-50	S8	S11	S8
0-10	S12	S13	S12
−100 to 0 to +100	S4	S2	S4
−50 to 0 to +50	S113	S112	S113
−10 to 0 to +10	S136	S137	S136
Division Markings Only	S242	S10	S242
Blank Scale	S Blank	S Blank	S Blank

Typical dimensions of a few selected models. Please see installation sheets for visual set point, center zero, and digital input meters.



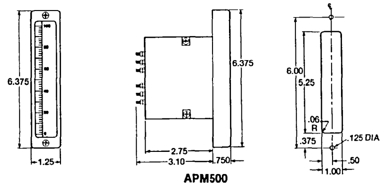
4.40 TH'D STUDS
.540
3.00
4.125
.56
3.77
4.125
.140 DIA (2) HOLES
.38
3.15
3.75
.12

APM100



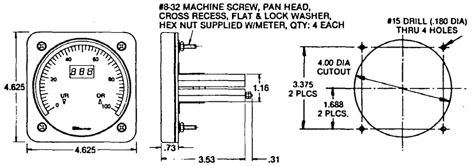
SCALE
.125
3.66
3.28
1.40
5.70
PANEL .125
.400
.800
.140 DIA 2 HOLES CTSK .240 DIA X 82°
5.450
5.200
.06R TYP
.550
1.100
.104 DIA 4 HOLES

APM600



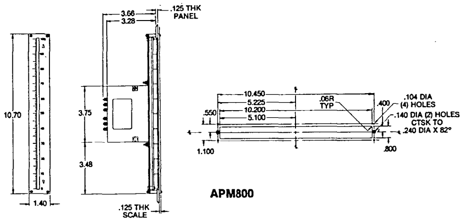
6.375
1.25
6.375
2.75
3.10
.750
6.00
5.25
.06 R
.375
.125 DIA
.50
1.00

APM500



#8-32 MACHINE SCREW, PAN HEAD, CROSS RECESS, FLAT & LOCK WASHER, HEX NUT SUPPLIED W/METER, QTY: 4 EACH
#15 DRILL (.180 DIA) THRU 4 HOLES
4.625
4.625
1.16
.73
3.53
.31
4.00 DIA CUTOUT
3.375 2 PLCS
1.688 2 PLCS.

CPM500



3.66
3.28
.125 THK PANEL
10.70
3.75
3.48
1.40
.125 THK SCALE
10.450
5.225
10.200
5.100
.06R TYP
.550
1.100
.400
.104 DIA (4) HOLES
.140 DIA (2) HOLES CTSK TO .240 DIA X 82°
.800

APM800

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Call Bowmar today for complete information on all Bowmar Bargraph Meters.

See the Difference... Bowmar Bargraphs

One look says it all...Visibility, Versatility and Performance from Bowmar—the name synonymous with electronic bargraphs. Only Bowmar gives you a choice: combining versatile analog displays and digital electronics to define a new standard of visibility, accuracy and reliability. Bowmar manufactures a complete line of bargraphs in a variety of shapes and sizes to meet your specific application.

Compare Bowmar bargraphs with any analog meter pointer or digital display. Call Bowmar to put the advantages of Bowmar bargraphs to work in your system...

Visibility **—** Seeing is believing. At a single glance, you see absolute positioning of a variable, its value relative to its total range, and its trend. Closely spaced display elements appear as a brilliant continuous bar for viewing at great distances.

Digital Accuracy **—** Bowmar bargraphs are a generation ahead in display technology. Large Scale digital IC's convert the input signal with accuracy to 1/2 of 1% and drive each element of the display. An optional digital display—available on some models—provides accuracy to 1/10 of 1% for the most demanding applications.

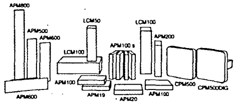
Reliability **—** Bowmar bargraph meters are built to withstand the challenge of time. No needles to stick, no bearings, no fragile mechanisms—completely solid state means no moving parts. Bowmar meters are virtually immune to vibration and shock, and have an outstanding performance record in *OEM, Control, Military* and *Industrial* applications.

Versatility **—** Whatever your needs, Bowmar has the meter for your application. Select analog electrical signals, AC, DC, or transducer signals, or digital input for computer compatibility. Add center zero, horizontal, vertical, round scales, set points and other numerous options. Standard and compact bargraph sizes allow easy retrofitting into existing panels to gain the advantage of precise, reliable displays.

Operation **—** Simply connect the power and signal leads. External jumpers allow dimming and selection of full bar or single point display.

Uses **—** Process monitoring and control, OEM and manufacturing plants, medical instrumentation, electronic test equipment and scientific apparatus are all common uses. Bowmar bargraph meters can be used to measure voltage, current, power, frequency, RPM, tank level, pressure, depth, volume, temperature, flow rate, position, altitude, range, compass direction, percent of composition of gases, graphic profiles, etc. Specify Bowmar bargraphs for harsh environments where meters are exposed to shock, vibration, or dust. Bowmar bargraphs shine with visibility and performance incumbent from total elimination of moving parts.

See the difference...for yourself with Bowmar's extraordinary electronic bargraph meters. Call Bowmar today and arrange a demonstration. **800-343-5202 (toll free).**



APM800
APM500
APM600
LCM50
LCM100
APM200
APM100 II
LCM100
APM100
APM19
APM20
APM100
CPM500
CPM500DIG

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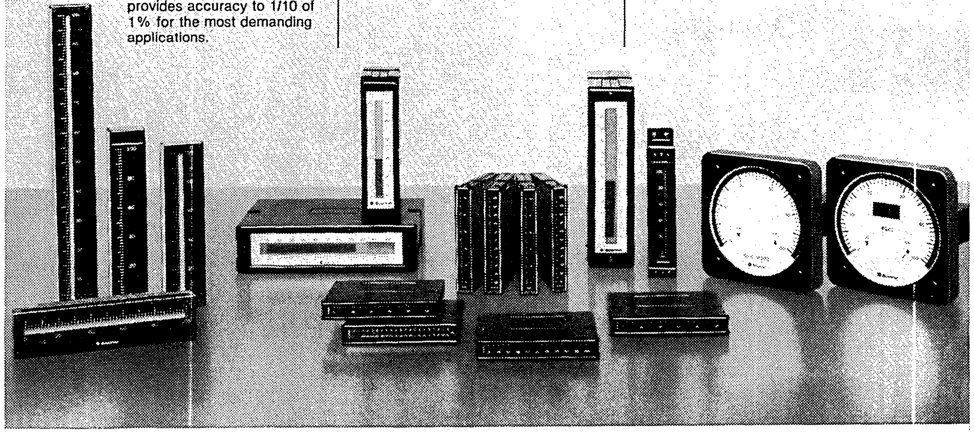
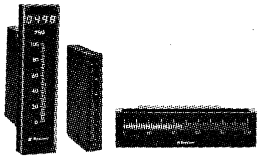


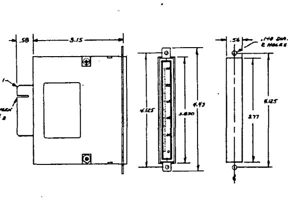
For manufacturers' sales offices, see yellow pages



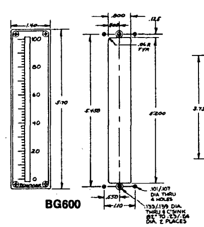
BG Bargraph Series

Analog/Digital Solid State Bargraph Meters

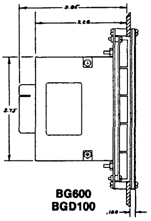
	BG100	BG600	BGD100
DESCRIPTION	3" display, 100 LED element bargraph	5" display, 50 LED element bargraph	5" display, 100 LED element bargraph with 4 digits
SIGNAL RANGES	Standard: 0-1 VDC; 0-5 VDC; 0-10 VDC; 4-20mA Custom: 50 MV to 100 VDC; 10μA to 10A DC	Standard: 0-1 VDC; 0-5 VDC; 0-10 VDC; 4-20mA Custom: 50 MV to 100 VDC; 10μA to 10A DC	Standard: 0-1 VDC; 0-5 VDC; 0-10 VDC; 4-20mA Custom: 50 MV to 100 VDC; 10μA to 10A DC
Absolute Maximum	250% overrange 150% reverse polarity	250% overrange 150% reverse polarity	250% overrange 150% reverse polarity
LINEARITY	± 1.0%	± 1.0%	± 1.0%
Gains Temp. Coefficient	± .15%/°C maximum	± .15%/°C maximum	± .15%/°C maximum
Zero Temp. Coefficient	± .01%/°C maximum	± .01%/°C maximum	± .01%/°C maximum
Resolution	1%	2%	0.1%
INPUT IMPEDANCE	100K ohms or greater for voltmeters, 100 millivolt shunt for current meters	100K ohms or greater for voltmeters, 100 millivolt shunt for current meters	100K ohms or greater for voltmeters, 100 millivolt shunt for current meters
METER RESPONSE TIME (zero to full scale)	2.5 milliseconds	2.5 milliseconds	2.5 milliseconds
POWER SUPPLY Voltage	5.0 VDC ± .25 V + 6 VDC absolute maximum	5.0 VDC ± .25 V + 6 VDC absolute maximum	5.0 VDC ± .25 V + 6 VDC absolute maximum
Typical current	50mA point 380mA full bargraph	50mA point 380mA full bargraph	60mA point 450mA full bargraph and digits
REAR CONNECTOR	Card Edge (Phoenix #MKDSF 3/3-5.08 or Cinch #251-10-30-160; no connector supplied)	Card Edge (Phoenix #MKDSF 3/3-5.08 or Cinch #251-10-30-160; no connector supplied)	Card Edge (Phoenix #MKDSF 3/3-5.08 or Cinch #251-10-30-160; no connector supplied)



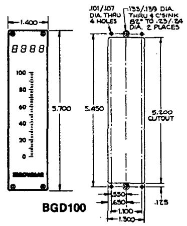
BG33 and BG100


1.40
100
80
60
40
20
0
.800
.125
.101/.107 DIA THRU 4 HOLES
.133/.139 DIA. THRU & C'SINK 82° TO .23/.24 DIA. 2 PLACES
.630
1.10

BG600



BG600
BGD100


1.400
8888
.101/.107 DIA. THRU 4 HOLES
.133/.139 DIA. THRU & C'SINK 82° TO .23/.24 DIA. 2 PLACES
5.700
5.450
5.200 CUTOUT
.550
.650
1.100
1.300
.125

BGD100

Specifications

Operating Temperature: 0° to 50°C; 32° to 120°F
Storage Temperature: − 62° to 71°C; − 74° to 159°F
Shock: to 8½ G's
Humidity: to 95%
Approx. Weight: 6-10 oz.
Calibration: Fully factory calibrated on shipment. May be field calibrated at zero and full scale.
Overrange: Indicator
Underrange: Indicator
Common Mode: Rejection: 60 dB typical. (Standard: − 0.4 to 2.8 volts CMV. For 4-20mA input: − 4.0 to 42.4 volts CMV.)
Companion Products: Please see price list and other product brochures for complete availability of 3", 5", 10", and 4½" round, horizontal, vertical and circular meters.

Options

- Differential input
- Auto polarity (negative signal displays underrange indicator and bargraph) [not available on model BG33]
- Single set point (nonvisible) [for visible set point see APM series]
- Dual set points (nonvisible) [for visible set points see APM series]
- Increased damping to 1 sec (not available for ranges less than 100 MV)
- Special input signal ranges
- Custom and semi-custom scales
- Hold function
- BCD output
- Green or yellow display
- Drip proof mounting bezel (for BG600 and BGD100)
- Bezel for BG100
- Dimming
- Full bar or single point display selection

Scales

Standard

0 to 100
0 to 10
0 to 50
− 100 to 0 to + 100
− 10 to 0 to + 10
Blank
Division Markings Only

Special

Special scales are available to meet your needs. Please consult factory.

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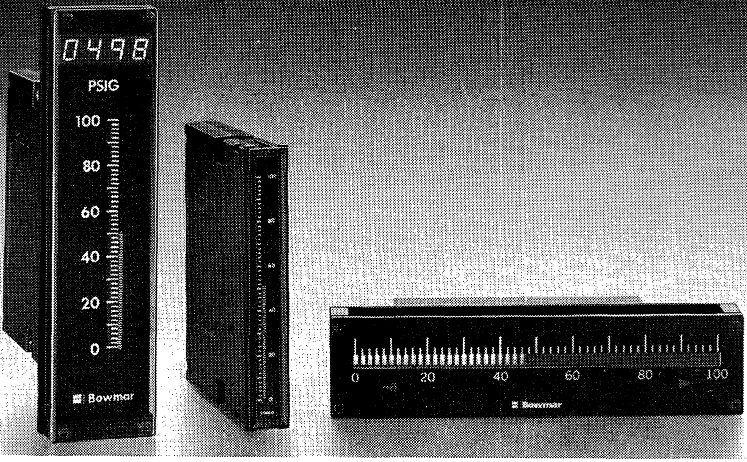
Bowmar

BG Bargraph Series
Analog/Digital
Solid State
Bargraph Meters



General Description

BG Series — The Bowmar BG Series represents the finest value in bargraph meters. Bowmar has combined analog bargraph displays and digital electronics for accuracy and visibility not available with digital or electromechanical meters. Technical breakthroughs now allow significant cost reductions with the BG Series design.

Visibility — Seeing is believing. At a single glance, you see the absolute position of a variable, its value relative to its total range, and its trend. Closely spaced display elements appear as a brilliant continuous bar for viewing at great distances. On digital models, the large sized digits offer excellent visibility in combination with the analog bargraph.

Digital Accuracy — Bowmar bargraphs are a generation ahead in display technology. Large scale digital IC's convert the input signal and drive each element of the display. An optional digital display—available on the BGD meters—provides accuracy to 1/10 of 1% for the most demanding applications.

Reliability — Bowmar BG Series meters are built to withstand the challenge of time. No needles to stick, no bearings, no fragile mechanisms—completely solid state means no moving parts. Bowmar Bargraph meters are virtually immune to vibration and shock. They have an outstanding performance record in OEM, Control, Military and Industrial applications.

Affordable — The BG Series meters are far and away the most affordable bargraphs available. The advanced concepts and custom integrated circuits have afforded a real price breakthrough while maintaining the quality standards that put Bowmar at the top in bargraphs.

Versatility — Whatever your needs, Bowmar has the meter in its line for you. Choose from the BG Series; the APM Series of 3", 5" and 10" displays; the CPM Series of switchboard meters or the LCM Series of liquid crystal bargraphs. Standard and compact physical sizes allow easy retrofitting into existing panels. A choice of options allows custom tailoring to your applications to gain the advantage of precise, reliable bargraph displays.

Operation — Simply connect the power and signal leads. Connections for external pots and alarm signals are provided for optional set point and hold functions.

Uses — Process monitoring and control, OEM and manufacturing plants, medical instrumentation, electronic test equipment and scientific apparatus are all common uses. The BG Series meters can be used to measure voltage or current. In conjunction with appropriate transducers; power, frequency, RPM, tank level, pressure, depth, volume, temperature, flow rate, position, altitude, range, compass direction, percent of composition of gases, graphic profiles, and much more can be measured.

Applications

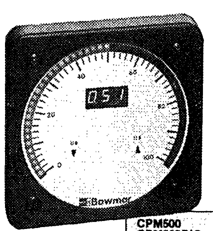
Enhanced Operator Interface — In human factors engineering, BG Series meters are people friendly. Compared to digital panel meters, bargraphs give superior visibility and immediate recognition of process variables.

Increased Accuracy — Where increased accuracy and record keeping are required, the digital option provides a degree of accuracy and precision not available in electromechanical meters. The BGD meter with digital readout is particularly valuable where process values are logged.

Harsh Environments — Environments where meters are exposed to shock, vibration or dust are well suited for the BG Series. This would include shipboard applications as well as industrial plants, ore processing, power and chemical facilities.

These applications gain from the high reliability incumbent by total elimination of moving parts.

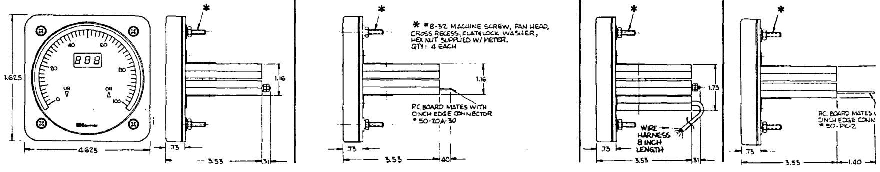
See the difference for yourself with Bowmar's extraordinary electronic bargraph meters. Call Bowmar today and arrange a demonstration. **800-343-5202 (toll free).**



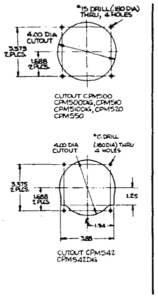
CPM500 Series

Analog/Digital Solid State Circular Switchboard Meters

	CPM500 CPM500DIG	CPM510 CPM510DIG	CPM520	CPM542 CPM542DIG	CPM550
DESCRIPTION	DC input, circular bargraph (DIG = 3 digit display)	Digital input, circular bargraph (DIG = 3 digit display)	AC input, circular bargraph	DC input, circular bargraph with set points (DIG = 3 digit display)	DC input, circular bargraph center zero meter
SIGNAL RANGES	50 MV to 100 VDC 10uA to 10A DC	7 bit binary parallel TTL or CMOS offset binary	500 MV to 250 VAC 1mA to 5A AC 40Hz to 1000Hz ± 1%	50 MV to 100 VDC 10uA to 10A DC	50 MV to 100 VDC
Absolute Maximum	250% overrange 150% reverse polarity	250% overrange 150% reverse polarity	250% overrange 150% reverse polarity	250% overrange 150% reverse polarity	250% overrange 150% reverse polarity
LINEARITY	±0.5%	±0.5%	±0.7%	±0.5%	±1%
Gains Temp. Coefficient	±.015%/°C maximum	±.015%/°C maximum	±.015%/°C maximum	±.015%/°C maximum	±.015%/°C maximum
Zero Temp. Coefficient	±.01%/°C maximum	±.01%/°C maximum	±.01%/°C maximum	±.01%/°C maximum	±.01%/°C maximum
INPUT IMPEDANCE	100K ohms or greater for voltmeters, 50 millivolt shunt for current meters except 100 millivolt shunt for 10 amp meters	100K ohms to ground	100K ohms or greater for voltmeters, 100 millivolt shunt for current meters	100K ohms or greater for voltmeters, 50 millivolt shunt for current meters except 100 millivolt shunt for 10 amp meters	100K ohms or greater for voltmeters, 50 millivolt shunt for current meters except 100 millivolt shunt for 10 amp meters
METER RESPONSE TIME (zero to full scale)	2.5 milliseconds	2.5 milliseconds	300 milliseconds	2.5 milliseconds	2.5 milliseconds
POWER SUPPLY Voltage	5.0 VDC ±.25 V +6 VDC absolute maximum	5.0 VDC ±.25 V 6 VDC absolute maximum +15 VDC supply 3mA	5.0 VDC ±.25 V +6 VDC absolute maximum	5.0 VDC ±.25V +6 VDC absolute maximum	5.0 VDC ±.25V +6 VDC absolute maximum
Typical Current	50mA point 380mA full bargraph	50mA point 380mA full bargraph	50mA point 380mA full bargraph	40mA point 190mA full bargraph	40mA single point 380mA full bargraph
REAR CONNECTOR	Threaded 4-40 studs with nuts	Cinch 50-20A-30 PC connector supplied with meter	Cinch 50-20A-30 PC connector supplied with meter	Threaded 4-40 studs with nuts	Cinch 50-12A-20 PC connector supply with meter



*8-32 MACHINE SCREW, PAN HEAD, CROSS RECESS, FLAT & LOCK WASHER, HEX NUT SUPPLIED W/ METER. QTY: 4 EACH
P.C. BOARD MATES WITH CINCH EDGE CONNECTOR #50-20A-30
WIRE HARNESS 8 INCH LENGTH
P.C. BOARD MATES WITH CINCH EDGE CONN. #50-PK-2
1.625
4.625
.73
3.53
.31
.40
1.40
1.16
1.73



Specifications

Operating Temperature: 0° to 50°C; 32° to 120°F
Storage Temperature: −62° to 71°C; −74° to 159°F
Shock: to 8½ G's
Humidity: to 95%
Approx. Weight: 18 oz.
Calibration: Fully factory calibrated on shipment. May be field calibrated at zero and full scale.
Accuracy: ±.5%, ±.1% with 3 or 4 digit display
Overrange: Indicator arrow
Underrange: Indicator arrow
Bargraph LED Segments: 51

Scales

Standard		*Special*
	0 to 100	A large variety of special scales are available. Please consult factory for your individual needs.
	0 to 10	
	0 to 50	
−100 to	0 to +100	
−50 to	0 to +50	
−10 to	0 to +10	
Blank		
Division Markings Only		

Options

- Differential input
- High impedance to 10 meg for VV001 only, other models consult factory
- Auto polarity (negative signal displays underrange indicator and bargraph)
- Single set point (nonvisible)
- Dual set point (nonvisible) [for visible set points see models 542 or 542DIG]
- Increased damping to 1 sec (not available for ranges less than 100 MV)
- Special input signal ranges (see price list for standard range listings)
- Custom and semi-custom scales
- Hold function
- BCD output
- Green or yellow display
- 4 digit display (please consult factory)
- Drip proof mounting

Bowmar manufactures a complete line of vertical and horizontal bargraph displays in 3", 5" and 10" configurations. Please see price list and other product brochures for complete availability.

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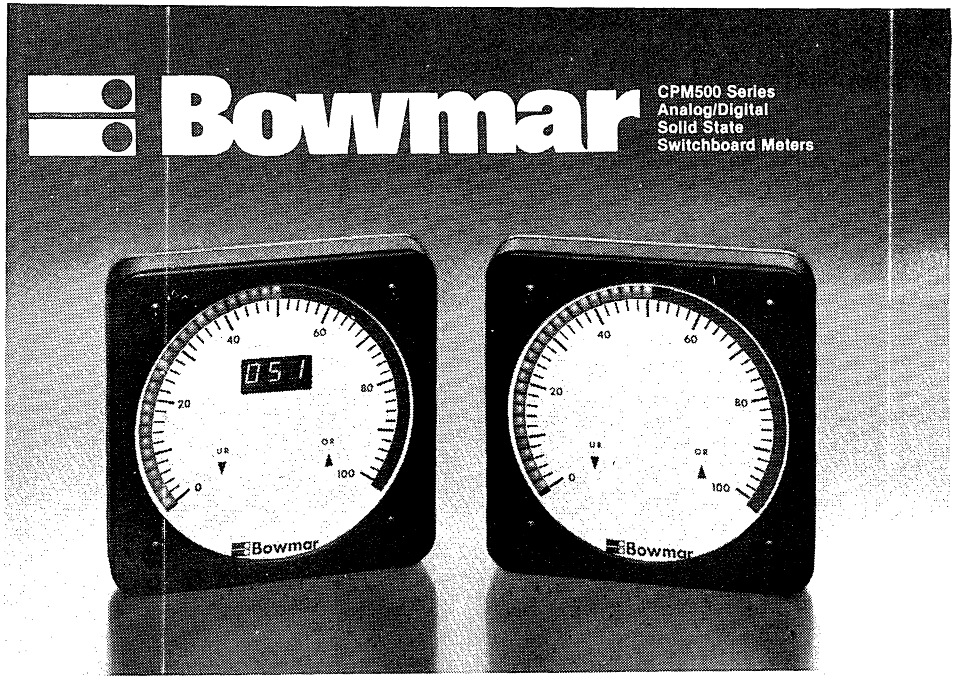

Bowmar

CPM500 Series
Analog/Digital
Solid State
Switchboard Meters

General Description

***CPM500** — The most advanced concept in switchboard meters.* Bowmar has combined analog display and digital electronics for accuracy and visibility not available with digital or electro-mechanical meters.

Accurate — Large scale integrated circuits display the input signal on the circular bargraph with accuracy to 1/2 of 1%. Optional 3 or 4 digit displays provide accuracy to 1/10 of 1%.

Visible — At a single glance from distances of 25 feet in light and darkness, the absolute position of a variable, its value relative to its total range, and its trend are immediately visible. Extreme brightness is achieved with current controlled LED drive. Bowmar's intensity matching gives uniform color and visibility to each element. On close inspection, the 51 bargraph segments combine with the digital readouts to give unsurpassed visibility and precision.

Reliable — Completely solid state means no moving parts. No pointers that stick, no bearings, and no fragile mechanisms. Bowmar switchboard meters are virtually immune to vibration and shock.

Versatile — The CPM500 Series accepts most analog or digital electrical inputs; AC, DC, transducer outputs or computer generated signals. Center zero, special scales, green and yellow displays and set points are available. The CPM500's standard switchboard size allows easy retrofitting into existing panels.

Affordable — The CPM500 Series means better visibility, more accuracy and reliability. Its extremely fast response time makes it an unbeatable value.

Operation — Simply connect power and signal leads. External jumpers allow dimming and selection of full bar or single point display.

On set point models, individually illuminated LED's show set point values on the analog scale. Alarm output transistors will sink a 5 volt 50 milliampere load through an open collector transistor. A wire harness is provided for external pots and alarm signals.

Uses — Process monitoring and control, OEM and manufacturing plants, medical instrumentation, electronic test equipment and scientific apparatus are all common uses. CPM500 Series meters can be used to measure voltage, current, power, frequency, RPM, tank level, pressure, depth, volume, temperature, flow rate, position, altitude, range, compass direction, percent of composition of gases, graphic profile, etc.

Applications

Switchboard Panels — The CPM500 Series meter is designed for dynamic measurement of electrical signals. Its size and input ranges allow direct form-fit-and-function replacement of existing switchboard meters.

Enhanced Operator Interface — In human factors engineering, CPM500 Series meters give superior visibility and immediate recognition of process variables.

Increased Accuracy — Where increased accuracy and record keeping are required, the digital option provides a degree of accuracy and precision not available in electro-mechanical meters. The CPM500 Series meters with digital readout are particularly valuable where process values are logged.

Harsh Environments — Environments where meters are exposed to shock, vibration or dust are well suited for the CPM500 Series. This would include shipboard applications as well as industrial plants; ore processing, power and chemical facilities.
These applications gain from the high reliability incumbent by total elimination of moving parts.

DPM Selection Chart

+ = Yes − = No O = Option

Function and Measured Variable	No. Digits	Parallel BCD Output	Fast Conversion	True Differential	LED					Fluorescent	Gas Discharge	LCD
					DIN Plastic		Plastic		DIN Metal		Plastic	DIN Plastic, JIC/NEMA, or Uncased
					24x48mm (0.94″x 1.89″)	48x96mm (1.89″x 3.78″)	47x103mm (1.85″x 4.05″)	50.3x85.7mm (1.98″x3.375″)	48x96mm (1.89″x3.78″)		47x103mm (1.85″x 4.05″)	
DC POWER SUPPLY												
Indicator DC Voltage	3½	−	−	−	DT-23A							
	3½	+ Multiplex	−	−		DT-51						
Indicator DC Voltage/ Current	3½	+	−	−		DT-21						
	3½	−	−	+				DT-73				
	3½	O	−	+		DT-379A						
	3½	−	−	+								DIN Plastic Case DT-380A No Case DT-384
	4½	O	−	+		DT-479A						
DC Process Monitor	3½	−	−	−								JIC/NEMA Case DT-381 No Case DT-381NM
AC POWER SUPPLY												
Indicator DC Voltage Current	3½	−	−	−		DT-18						
	3½	−	−	+				DT-73				
	3½	+	−	−		DT-19						
	3½	+	+	−					DT-29			
	3½	O	−	+		DT-379A	DT-379W					
	3½	+	O	−							DT-3312	
	3½	+	O	−							DT-4312	
	3½	−	−	+								DIN Case DT-380A
	3½	−	−	−						DT-40		
	3½	+	−	−						DT-41		
	4½	+	O	−							DT-4412	
	4½	O	−	+		DT-479A	DT-479W					
Indicator DC Voltage Only	4½	−	−	+					DT-34			
	4½	+	−	+					DT-35			
	4½	−	−	−						DT-44		
Indicator DC Process Monitor	3½	O	−	−		379A						
	3½	+	+	−					DT-30			
	4½	O	−	−					DT-31			
	3½	O	−	+			DT-379W					
Indicator AC Voltage/ Current	4	−	−		Ave. RMS	DT-36						
	3½	+	+		True RMS	DT-26						
Indicator Comparator DC Voltage Current	3½	−	−	−				One Limit	DT-110			
	3½	−	−	−				Two Limits	DT-210			
	3½	+ Multiplex	+	−				Two Limits	DT-220			
	4	+ Multiplex Opt.	+	−				Two Limits	DT-230			

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3½ Digit Panel Meters

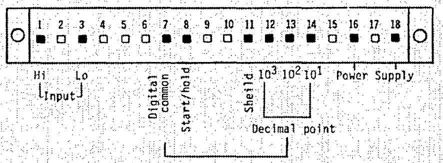
DT-18

NO FRILL, HIGH QUALITY, AC-POWERED INDICATOR IN DIN CASE

Features:

- DC Voltage or DC Current Measurement
- DIN Case and Panel Cutout
- 0.56″ (14.2mm) Display
- AC Power
- Mating Connector (Optional)
- Nomenclature on Lens (Optional)

Connecting Diagram:


1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18
Hi
Lo
Input
Digital common
Start/hold
Sheild
10^3 10^2 10^1
Decimal point
Power Supply

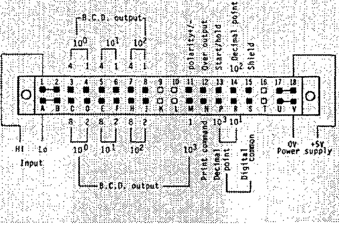
DT-21

OUR POPULAR DC POWERED INDICATOR WITH PARALLEL BCD OUTPUT

Features:

- DC Voltage or DC Current Measurement
- Isolated Parallel BCD Output
- DIN Case and Panel Cutout
- 0.56″ (14.2mm) LED Display
- DC Power
- Mating Connector (Optional)
- Nomenclature on Lens (Optional)

Connecting Diagram:


B.C.D. output
10^0 10^1 10^2
4 1 4 1 4 1
polarity+/-
Over output
Start/hold
Decimal point 10^2
Shield
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18
A B C D E F H J K L M N P R S T U V
8 2 8 2 8 2
1
10^3 10^1
Hi
Lo
Input
10^0 10^1 10^2
10^3
B.C.D. output
Print command
Decimal point
Digital common
0V
+5V
Power supply

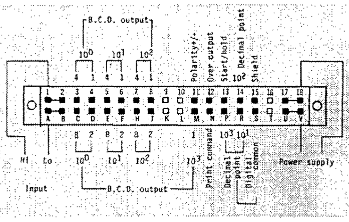
DT-19

OUR BASIC AC POWERED INDICATOR WITH PARALLEL BCD OUTPUT

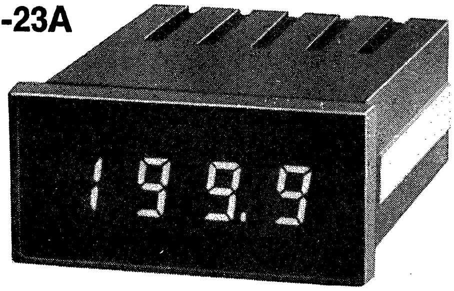
Features:

- DC Voltage or DC Current Measurement
- Isolated Parallel BCD Output
- DIN Case and Panel Cutout
- 0.56″ (14.2mm) LED Display
- AC Power
- Mating Connector (Optional)
- Nomenclature on Lens (Optional)

Connecting Diagram:


B.C.D. output
10^0 10^1 10^2
4 1 4 1 4 1
Polarity+/-
Over output
Start/hold
Decimal point 10^2
Shield
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18
A B C D E F H J K L M N P R S T U V
8 2 8 2 8 2
1
10^3 10^1
Hi
Lo
10^0 10^1 10^2
10^3
Input
B.C.D. output
Print command
Decimal point
Digital common
Power supply

DT-23A



ACTUAL SIZE

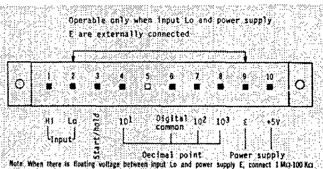
OUR SMALLEST: A SUBMINIATURE 3½ DIGIT INDICATOR

A favorite with OEMs when space is at a premium

Features:

- DC Voltage Measurement
- Dimensions: 0.94 x 1.89 x 2.83 Inches (24 x 48 x 72mm)
- DIN Case and Panel Cutout
- 0.33″ (8.3mm) LED Display
- DC Power
- Mating Connector (Optional)
- Nomenclature on Lens (Optional)

Connecting Diagram:


Operable only when input Lo and power supply E are externally connected
1 2 3 4 5 6 7 8 9 10
Hi
Lo
Input
Start/hold
10^1
Digital common
10^2
10^3
E
+5V
Decimal point
Power supply

Note: When there is floating voltage between input Lo and power supply E, connect 1 MΩ-100 KΩ resistance between Lo and E terminal.

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3½ Digit Panel Meters

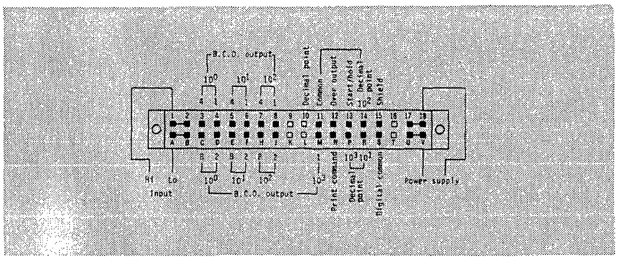
DT-26

TRUE RMS AC MEASUREMENT WITH BCD OUTPUT

Features:

- True RMS AC Voltage or AC Current Measurement
- Isolated Parallel BCD Output
- DIN Case and Panel Cutout
- 0.56″ (14.2mm) LED Display
- AC Power
- Mating Connector (Optional)
- Nomenclature on Lens (Optional)

Connecting Diagram:


B.C.D. output
10⁰
10¹
10²
Decimal point
Common
Over output
Start/hold
Decimal point 10²
Shield
Hi
Lo
Input
10⁰
10¹
10²
10³
B.C.D. output
Print command
10³ 10¹
Decimal point
Digital common
Power supply

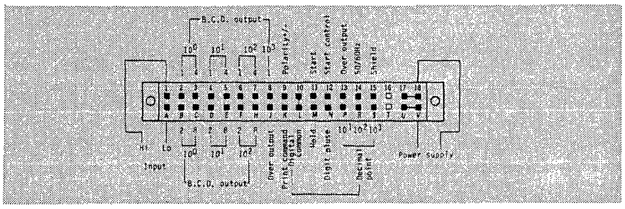
DT-29

FAST CONVERSION RATE WITH BCD OUTPUT IN A METAL CASE

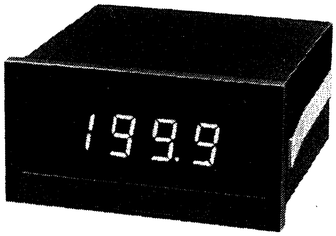
Features:

- Metal Case Standard
- DC Voltage or DC Current Measurement
- Can Display External BCD Signals
- Conversion Rate — 15 Readings/Sec (60 Hz)
  20 Readings/Sec Ext. Start
- DIN Case and Panel Cutout
- 0.56″ (14.2mm) LED Display • AC Power
- Optional: Mating Connector/Nomenclature on Lens

Connecting Diagram:


B.C.D. output
10⁰
10¹
10²
10³
Polarity+/-
Start
Start control
Over output
50/60Hz
Shield
Hi
Lo
Input
10⁰
10¹
10²
B.C.D. output
Over output
Print command
Digital common
Hold
Digit pluse
10¹ 10² 10³
Decimal point
Power supply

DT-30

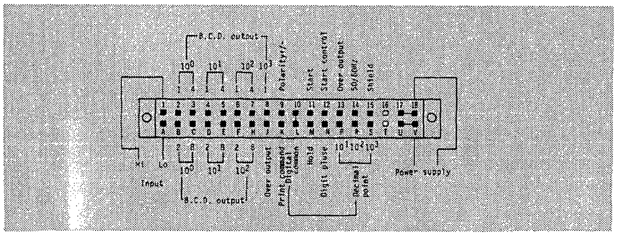


A PROCESS MONITOR WITH FAST READ RATE, BCD OUTPUT, AND METAL CASE

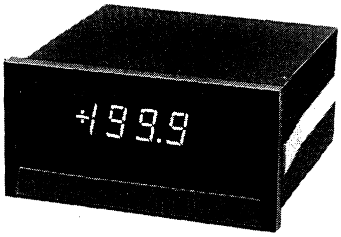
Features:

- Metal Case Standard
- DC Voltage or DC Current Measurement
- Can Display External BCD Signals
- Fast Read Rate — 15 Readings/Sec (60 Hz)
  20 Readings/Sec Ext. Start
- Isolated Parallel 3-State BCD Output
- DIN Case and Panel Cutout
- 0.56″ (14.2mm) LED Display • AC Power
- Optional: Mating Connector/Nomenclature on Lens

Connecting Diagram:


B.C.D. output
10⁰
10¹
10²
10³
Polarity+/-
Start
Start control
Over output
50/60Hz
Shield
Hi
Lo
Input
10⁰
10¹
10²
B.C.D. output
Over output
Print command
Digital common
Hold
Digit pluse
10¹ 10² 10³
Decimal point
Power supply

DT-40

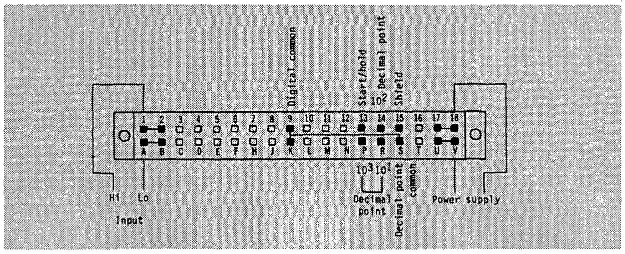


A RUGGED METAL CASED INDICATOR WITH HIGH INTENSITY FLUORESCENT DISPLAY

Features:

- Metal Case Standard
- DC Voltage or DC Current Measurement
- 10 μV Resolution for Model DT-40-10
- DIN Case and Panel Cutout
- 0.43″ (10.9mm) Fluorescent Display
- AC Power
- Mating Connector (Optional)
- Nomenclature on Lens (Optional)

Connecting Diagram:


Digital common
Start/hold
10² Decimal point
Shield
Hi
Lo
Input
10³ 10¹
Decimal point
Decimal point common
Power supply

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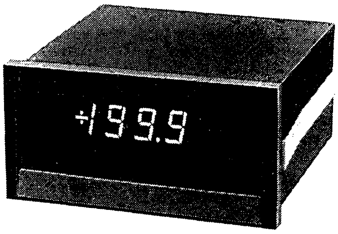
3½ Digit Panel Meters

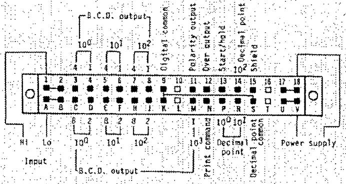
DT-41



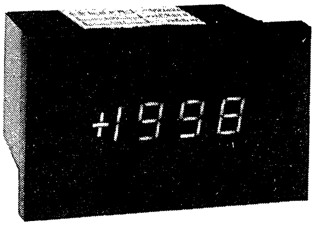
FOR LOW LIGHT, NOISY ENVIRONMENTS: BRIGHT FLUORESCENT DISPLAY, METAL CASE AND BCD OUTPUT

Features:
- Metal Case Standard
- DC Voltage or DC Current Measurement
- 10 μV Resolution for Model DT-41-10
- Isolated Parallel BCD Output
- DIN Case and Panel Mount
- 0.43″ (10.9mm) Fluorescent Display • AC Power
- Mating Connector (Optional)
- Nomenclature on Lens (Optional)

Connecting Diagram:


B.C.D. output
10^0
10^1
10^2
4 1 4 1 4 1
Digital common
Polarity output
Over output
Start/hold
10^2 Decimal point
Shield
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18
A B C D E F H J K L M N P R S T U V
8 2 8 2 8 2
Hi
Lo
Input
10^0
10^1
10^2
1
10^3
B.C.D. output
Print command
10^0 10^1
Decimal point
Decimal point common
Power supply

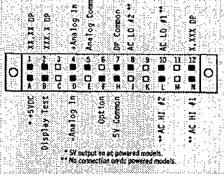
DT-73



A LOW COST INSTRUMENT WITH TRUE DIFFERENTIAL INPUT

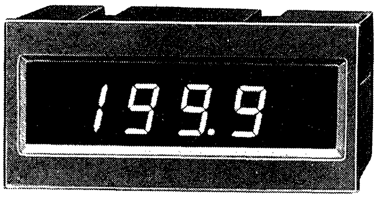
Features:
- DC Voltage or DC Current Measurement
- True Differential Input
- 0.43″ (10.9mm) LED Display
- AC or DC Power
- Mating Connector (Optional)
- Nomenclature on Lens (Optional)

Connecting Diagram:


XX.XX DP
XXX.X DP
+Analog In
Analog Commo
DP Common
AC LO #2 **
AC LO #1 **
X.XXX DP
1 2 3 4 5 6 7 8 9 10 11 12
A B C D E F H J K L M N
* +5VDC
Display Test
-Analog In
Option
5V Common
** AC HI #2
** AC HI #1

* 5V output on ac powered models.
** No connection on dc powered models.

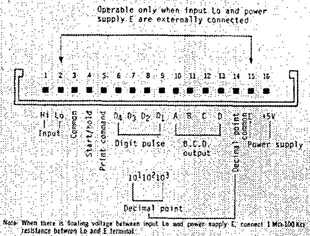
DT-51



WHEN STANDARD DEPTH CASE WON'T DO — OUR LESS THAN 1″ DEEP MODEL 51 SQUEEZES IN

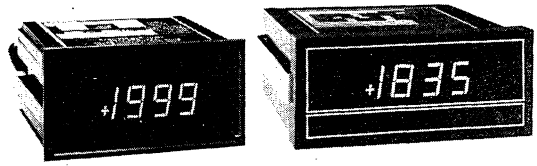
Features:
- DC Voltage Measurement
- Unbuffered Multiplex BCD Output
- DIN Case and Panel Cutout
- 0.56″ (14.2mm) LED Display
- 5 Vdc Power
- Mating Connector Furnished
- Nomenclature on Lens (Optional)

Connecting Diagram:


Operable only when input Lo and power supply E are externally connected
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Hi Lo
Input
Common
Start/hold
Print command
D_4 D_3 D_2 D_1
Digit pulse
A B C D
B.C.D. output
Decimal point common
E +5V
Power supply
10^1 10^2 10^3
Decimal point

Note: When there is floating voltage between input Lo and power supply E, connect 1 MΩ-100 KΩ resistance between Lo and E terminal.

DT-379A/W



A METER SERIES WITH MANY CAPABILITIES, ALSO SUBSTITUTES FOR ANALOGIC AND WESTON METERS

Features:
- DC Voltage or DC Current Measurement
- Single-Ended or True Differential Inputs
- DIN Case and Panel Cutout (379A)
- 0.56″ (14.2mm) LED Display • AC or DC Power

Options:
- Offset/Scaling Circuitry
- Buffered Isolated or Non-Isolated Parallel BCD
- 3 or 4 Wire Ratio
- Gold Fingers on 379A
- Mating Connector
- Nomenclature on Lens

Model DT-379A is a substitute for Analogic Model 2570
Model DT-379W is a substitute for Weston Models 1230, 2432, and 2460

Connecting Diagrams:
See page 19

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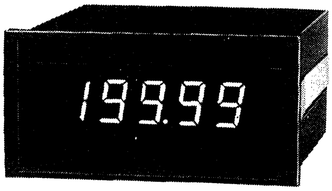
4-4½ Digit Panel Meters

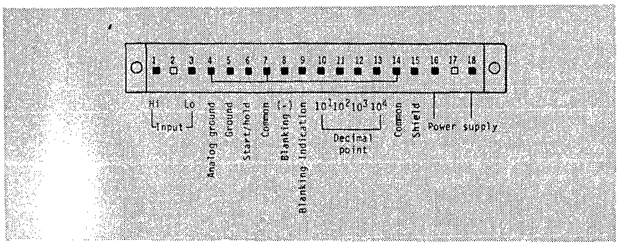
DT-31



A METAL CASED PROCESS MONITOR

Features:
- Metal Case Standard
- DC Voltage or DC Current Measurement
- Isolated, Parallel, 3-State BCD Output (Optional)
- DIN Case and Panel Cutout
- 0.56″ (14.2mm) LED Display
- AC Power
- Mating Connector (Optional)
- Nomenclature on Lens (Optional)

Connecting Diagram:

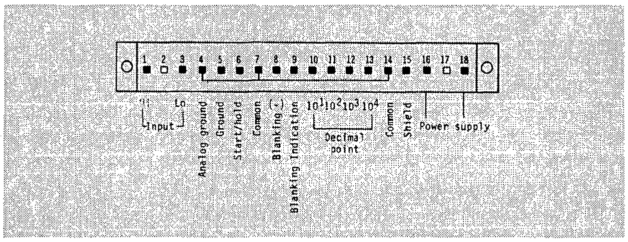

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18
Hi
Lo
Input
Analog ground
Ground
Start/hold
Common
Blanking (-)
Blanking Indication
10¹ 10² 10³ 10⁴
Decimal point
Common
Shield
Power supply

DT-34

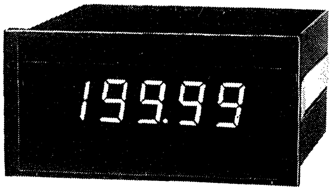
A LOW PRICED 4½ DIGIT INDICATOR IN A RUGGED METAL CASE

Features:
- Metal Case Standard
- DC Voltage Measurement
- Offset/Scaling Circuitry
- Differential Input for 200 mV & 2V Ranges
- DIN Case and Panel Cutout
- 0.56″ (14.2mm) LED Display
- AC Power
- Mating Connector/Nomenclature on Lens (Optional)

Connecting Diagram:


1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18
Hi
Lo
Input
Analog ground
Ground
Start/hold
Common
Blanking (-)
Blanking Indication
10¹ 10² 10³ 10⁴
Decimal point
Common
Shield
Power supply

DT-35

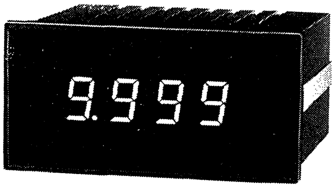


A HIGH QUALITY INSTRUMENT WITH METAL CASE AND BCD OUTPUT

Features:
- Metal Case Standard
- DC Voltage Measurement
- Offset/Scaling Circuitry
- Differential Input for 200 mV and 2V Ranges
- Isolated Parallel, 3-State, BCD Output
- DIN Case and Panel Cutout
- 0.56″ (14.2mm) LED Display
- AC Power
- Mating Connector (Optional)
- Nomenclature on Lens (Optional)

Connecting Diagram:
See Page 19

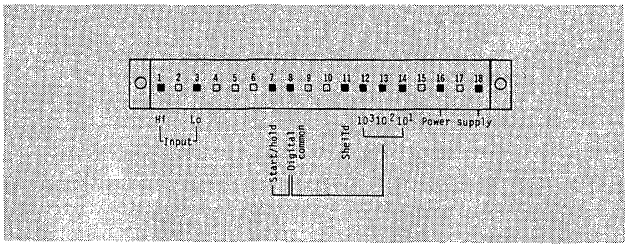
DT-36



A 4 DIGIT, AVERAGE RMS AC INDICATOR

Features:
- Average RMS AC Voltage or AC Current Measurement
- AC Line Monitor and Low Ranges
- 4 Digit 0.56″ (14.2mm) LED Display
- DIN Case and Panel Cutout
- AC Power
- Mating Connector (Optional)
- Nomenclature on Lens (Optional)

Connecting Diagram:


1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18
Hi
Lo
Input
Start/hold
Digital common
Sheild
10³ 10² 10¹
Power supply

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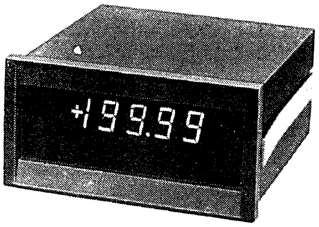
4-4½ Digit Panel Meters

DT-44

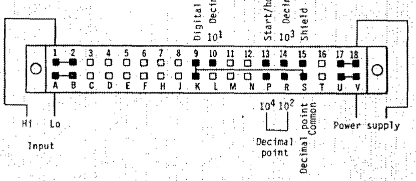


A RUGGED, METAL CASED INDICATOR WITH HIGH INTENSITY FLUORESCENT DISPLAY

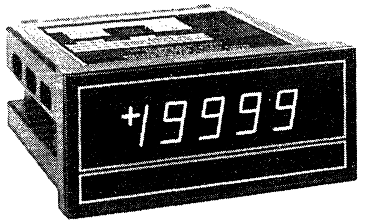
Features:

- Metal Case Standard
- DC Voltage or DC Current Measurement
- DIN Case and Panel Cutout
- 0.43″ (10.9mm) Fluorescent Display
- AC Power
- Mating Connector (Optional)
- Nomenclature on Lens (Optional)

Connecting Diagram:


Digital common
Decimal point
10^1
Start/hold
Decimal point
10^3
Shield
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18
A B C D E F H J K L M N P R S T U V
10^4 10^2
Decimal point
Decimal point Common
Hi
Lo
Input
Power supply

DT-4412

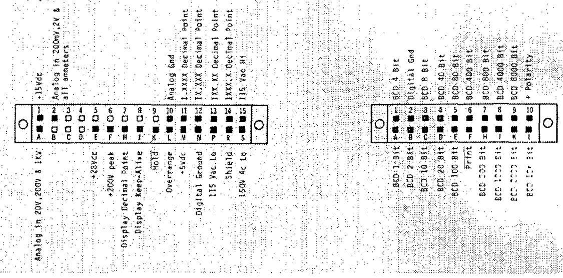


EXCEPTIONAL STABILITY, TOP OF THE LINE GAS DISCHARGE METER

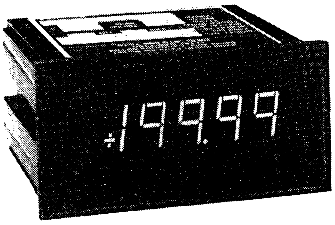
Features:

- DC Voltage or DC Current Measurement
- Optional Fast Read Rate — Up to 15 Readings/Sec
- Parallel BCD Output
- 1000V Range Available
- 2 μA Current Range Resolves 100 pA
- 0.55″ (13.98mm)
- Gas Discharge Display • AC Power
- Mating Connector (Optional)
- Nomenclature on Lens (Optional)

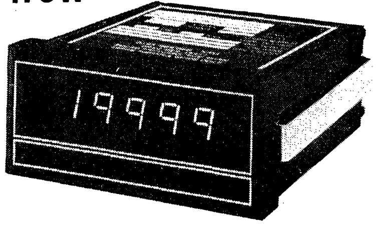
Connecting Diagram:


Upper
+15Vdc
Analog in 200mV,2V & all ammeters
Analog Gnd
1.XXXX Decimal Point
1X.XXX Decimal Point
1XX.XX Decimal Point
1XXX.X Decimal Point
115 Vac Hi
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
A B C D E F H J K L M N P R S
Analog in 20V,200V & 1KV
+28Vdc
+200V peak
Display Decimal Point
Display Keep-Alive
Hold
Overrange
+5Vdc
Digital Ground
115 Vac Lo
Shield
150V Ac Lo
Lower
BCD 4 Bit
Digital Gnd
BCD 8 Bit
BCD 40 Bit
BCD 80 Bit
BCD 400 Bit
BCD 800 Bit
BCD 4000 Bit
BCD 8000 Bit
+ Polarity
1 2 3 4 5 6 7 8 9 10
A B C D E F H J K L
BCD 1 Bit
BCD 2 Bit
BCD 10 Bit
BCD 20 Bit
BCD 100 Bit
Print

DT-479A



DT-479W



THESE POWERFUL 4½ DIGIT METERS ARE ALSO REPLACEMENTS FOR ANALOGIC AND WESTON METERS

Features:

- DC Voltage or DC Current Measurement
- True Differential Input
- Extremely Low Temperature Coefficient: ±.0015 of Reading
- 0.56″ (14.2mm) LED Display

Options:

- Parallel BCD Latched, Buffered, or Isolated 3-State BCD
- 3 or 4 Wire Ratio
- Mating Connector
- Nomenclature on Lens

Connecting Diagram:
See Page 19

Model DT-479A is a subsititute for Analogic Model 2574

Features:

- DIN Case and Panel Cutout
- AC or DC Power

Special Options

- Count By Two

Model 479W is a substitute for Weston Models 1234, 2470

Features:

- NEMA Case and Panel Cutout
- AC Power Only

DATA TECH 3110 W. Segerstrom Ave., Santa Ana, CA 92704 • 714/546-7160 • TWX: 910-595-1570

Digital Indicator Comparators

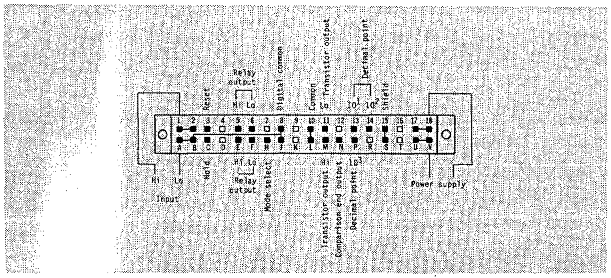
DT-110

HI
LO
SET
+1.999

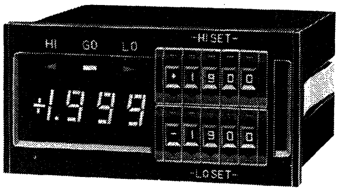
OUR COMPACT, 2-STATE, DIGITAL SET-POINT COMPARATOR INDICATOR

Features:
- 3½ Digit • Metal Case Standard
- DC Voltage or DC Current Measurement
- Single Limit • Relay Contact Output
- Open Collector Isolated Output
- Hi-Lo Indicators • End Comparison Output
- Pen Activated Digital Set-Point Switch
- DIN Case and Panel Cutout
- 0.39″ (10mm) LED Display
- AC Power • Mating Connector (Optional)

Connecting Diagram:


Reset
Relay output
Hi Lo
Digital common
Common
Lo
Transistor output
10^1 10^2
Decimal point
Shield
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18
A B C D E F H J K L M N P R S T U V
Hi Lo
Input
Hold
Hi Lo
Relay output
Mode select
Hi
Transistor output
Comparison end output
10^3
Decimal point
Power supply

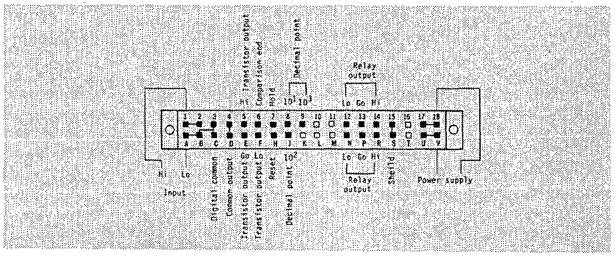
DT-210


HI GO LO
HI SET
+1.999
LO SET

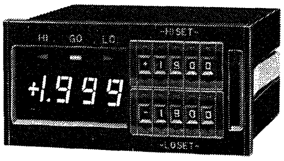
A 3-STATE DIGITAL COMPARATOR INDICATOR IN A 48 x 96mm (LESS THAN 2″ x 4″) DIN METAL CASE

Features:
- 3½ Digit • Metal Case Standard
- DC Voltage or DC Current Measurement
- Dual Limit • Relay Contact Output
- Open Collector Isolated Output
- Hi-Go-Lo Indicators • End Comparison Output
- Pen Activated Digital Set-Point Switch
- DIN Case and Panel Cutout
- 0.39″ (10mm) LED Display
- AC Power • Mating Connector (Optional)

Connecting Diagram:


Hi
Transistor output
Comparison end
Hold
10^1 10^3
Decimal point
Relay output
Lo Go Hi
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18
A B C D E F H J K L M N P R S T U V
Hi Lo
Input
Digital common
Common output
Go Lo
Transistor output
Transistor output
Reset
10^2
Decimal point
Lo Go Hi
Relay output
Shield
Power supply

DT-220

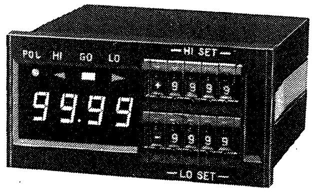

HI GO LO
HI SET
+1.999
LO SET

A 3-STATE DIGITAL COMPARATOR INDICATOR WITH MULTIPLEX BCD OUTPUT AND METAL CASE

Features:
- 3½ Digit • Metal Case Standard
- DC Voltage or DC Current Measurement
- Dual Limit • 4-20 mA, 1-5V Input (Optional)
- Relay Contact Output
- Open Collector Isolated Output
- Hi-Go-Lo Indicators • End Comparison Output
- BCD Multiplex Output
- Pen Activated Set-Point Switch
- DIN Case and Panel Cutout
- 0.39″ (10mm) LED Display
- AC Power • Mating Connector (Optional)

Connecting Diagram:
See page 19

DT-230


POL HI GO LO
HI SET
9999
LO SET

A RUGGED 4 DIGIT DIGITAL COMPARATOR INDICATOR

Features:
- Metal Case Standard • Hi-Go-Lo Indicators
- DC Voltage or DC Current Measurement
- 4-20 mA, 1-5V Input (Optional)
- Dual Limit • Relay Contact Output
- Open Collector Isolated Output
- End Comparison Output
- **BCD Parallel Output (Optional)**
- Pen Activated Set-Point Switch
- DIN Case and Panel Cutout
- 0.39″ (10mm) LED Display
- AC Power • Mating Connector (Optional)

Connecting Diagram:

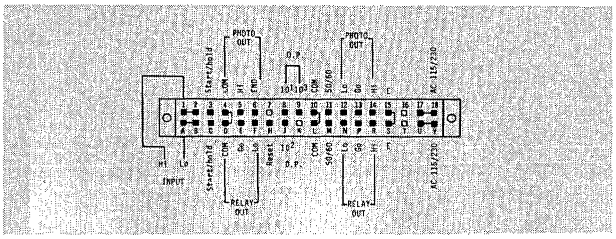


PHOTO OUT
Start/hold
COM
Hi
END
D.P.
10^1 10^3
COM
50/60
PHOTO OUT
Lo
Go
Hi
AC 115/230
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18
A B C D E F H J K L M N P R S T U V
Hi Lo
INPUT
Start/hold
COM
Go
Lo
Reset
10^2
D.P.
COM
50/60
Lo
Go
Hi
AC 115/230
RELAY OUT
RELAY OUT

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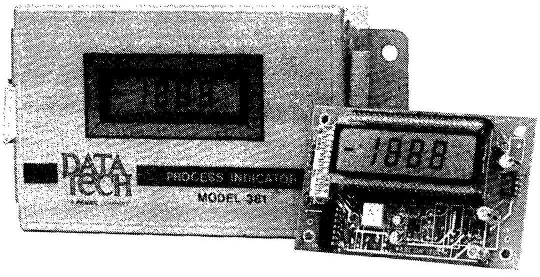
Model 381 Two Wire Process Monitor

Features:

- 4-20 mA or 10-50 mA Switch Selectable Input
- Switch Selectable Decimal Points
- Available in JIC/NEMA Enclosure or Uncased
- Programmable Readout of LSD
- Requires no External Power
- 0.5″ (12.7mm) LCD Display
- 100% Offset Scaling

The Model 381 is a two-wire process meter that displays the normalized value from a process transmitter loop.

The full scale display is 1999X, with the least significant digit DIP switch selectable as a constant zero, C, F, or Blank. Four decimal points are also DIP switch selected.



LAST DIGIT IN "BLANKED" MODE

The power to operate the instrument is derived from the current loop and may be DIP switch selected for either 4-20 mA or 10-50 mA. The maximum voltage drop across the meter at 20 mA is 2.3V and 2.4V at 50 mA.

Model 381HC uses a JIC/NEMA dust and oil resistant steel case which provides excellent protection from hostile environments. Model 381NM, the caseless version, provides a cost efficient approach for the user who wishes to mount the meter inside his own enclosure.

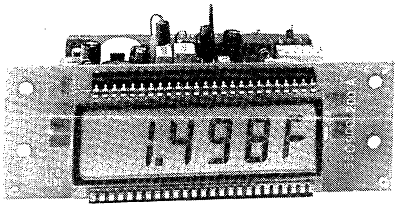
Model 384 Selectable Range LCD Panel Meter

Features:

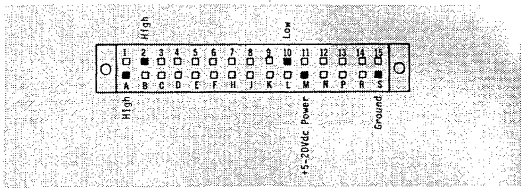
- DC Voltage or Current
- Range Selectable by DIP Switch
- DIP Switch Programmable Least Significant Digit and Decimal
- Isolated DC Operation
- Differential Input
- Caseless Packaging for Special Mounting
- 0.5″ (12.7mm) LCD Display
- Mating Connector (Optional)

DATA TECH's Model DT-384 is a 3½ digit, LCD instrument of unique design. An on-board DIP switch allows the user to select one of three ranges and to read out 2½ or 3½ digits of data. Another DIP switch permits the user to select a dummy zero for a 4½ digit display, or to program an F, C, or blank for display. Even the decimal points are programmable by DIP switch.

Other user-oriented features include: overrange blanking of all digits except the MSD, sign, and decimal point; (−) sign polarity indicator; 0.5″ (12.7mm) display, and caseless packaging for tight space requirements.



Connecting Diagram:



Model 386A Thermocouple Amplifier/Linearizer

Features:

- 9V Battery Operation
- Choice of °C or °F Ranges
- Output 1 mV/Degree
- Choice of J, K, T, Type Thermocouple Input
- Standard Banana Plug Output
- Standard SMP TC Female Connector Input

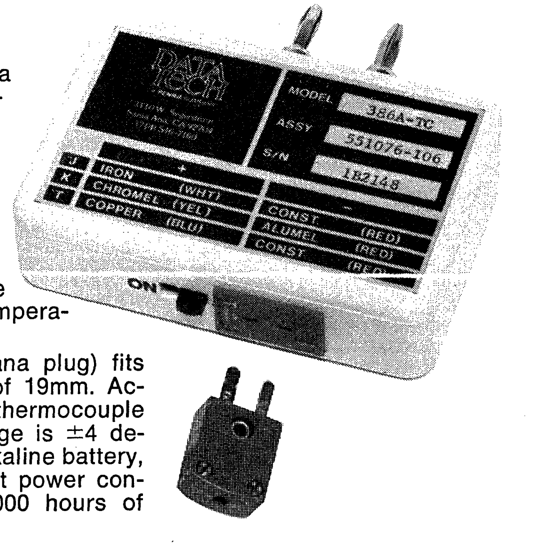
Battery Life:

Load Resistance	Life
10 MΩ	1000 hrs
1000 KΩ	800 hrs
10 KΩ	200 hrs

DATA TECH Model 386A is a multipurpose thermocouple amplifier and linearizer capable of providing a highly accurate 1 mV per °C or °F output for the popular J, K, and T thermocouples.

Model DT-386A can turn any multimeter or strip chart recorder into an accurate, wide range, and highly versatile temperature measuring instrument.

The output connector (banana plug) fits standard multimeter spacing of 19mm. Accuracy over the entire useful thermocouple temperature measurement range is ±4 degrees. Requiring just one 9V alkaline battery, the Model 386A uses the latest power consumption devices to yield 1000 hours of operating life.



3½ Digit Panel Meters X = STANDARD 0 = OPTIONAL

Model	Range	Input Imped.	Input Frequency Range	Accuracy	Max. Input	Read Rate	BCD Parallel	Mtplx BCD	Hold	Blank	Off-set/ Scale	NMR	CMRR	Power	Display	Weight	Dimensions (H x W x D)
DT-18-11	±199.9 mV	100 MΩ	DC	±0.1% rdg ±1 digit	±100 V	Approx. 2.5/sec	—	—	X	—	—	40 dB	100 dB @ 50/60 Hz	115/230 Vac ±10%, 50/ 60 Hz, 4 VA	LED 0.56 in (14.2mm)	12.50 oz (350 g)	1.89 x 3.78 x 4.05 in (48 x 96 x 103mm)
-12	±1.999 V	100 MΩ			±100 V		—	—	X	—	—						
-13	±19.99 V	1 MΩ			±250 V		—	—	X	—	—						
-14	±199.9 V	10 MΩ			±500 V		—	—	X	—	—						
-21	±199.9 μA	1 kΩ		±0.2% rdg ±1 digit	± 10 mA		—	—	X	—	—						
-22	±1.999 mA	100 Ω			± 50 mA		—	—	X	—	—						
-23	±19.99 mA	10 Ω			±150 mA		—	—	X	—	—						
-24	±199.9 mA	1 Ω		±0.3% rdg ±1 digit	±500 mA		—	—	X	—	—						
-25	±1.999 A	0.1 Ω			± 3 A		—	—	X	—	—						
DT-19-11	±199.9 mV	100 MΩ	DC	±0.1% rdg ±1 digit	±100 V	Approx. 2.5/sec	X	—	X	—	—	40 dB	100 dB @ 50/60 Hz	115/230 Vac ±10%, 50/ 60 Hz, 5 VA	LED 0.56 in (14.2mm)	12.50 oz (350 g)	1.89 x 3.78 x 4.05 in (48 x 96 x 103mm)
-12	±1.999 V	100 MΩ			±100 V		X	—	X	—	—						
-13	±19.99 V	1 MΩ			±250 V		X	—	X	—	—						
-14	±199.9 V	10 MΩ			±500 V		X	—	X	—	—						
-21	±199.9 μA	1 kΩ		±0.2% rdg ±1 digit	± 10 mA		X	—	X	—	—						
-22	±1.999 mA	100 Ω			± 50 mA		X	—	X	—	—						
-23	±19.99 mA	10 Ω			±150 mA		X	—	X	—	—						
-24	±199.9 mA	1 Ω			±500 mA		X	—	X	—	—						
-25	±1.999 A	0.1 Ω		±0.3% rdg ±1 digit	± 3 A		X	—	X	—	—						
DT-21-11	±199.9 mV	100 MΩ	DC	±0.1% rdg ±1 digit	±100 V	Approx. 2.5/sec	X	—	X	—	—	40 dB	100 dB @ 50/60 Hz	5 Vdc ±5%, 300 mA	LED 0.56 in (14.2mm)	7.14 oz (200 g)	1.89 x 3.78 x 4.05 in (48 x 96 x 103mm)
-12	±1.999 V	100 MΩ			±100 V		X	—	X	—	—						
-13	±19.99 V	1 MΩ			±250 V		X	—	X	—	—						
-14	±199.9 V	10 MΩ			±500 V		X	—	X	—	—						
-21	±199.9 μA	1 kΩ		±0.2% rdg ±1 digit	± 10 mA		X	—	X	—	—						
-22	±1.999 mA	100 Ω			± 50 mA		X	—	X	—	—						
-23	±19.99 mA	10 Ω			±150 mA		X	—	X	—	—						
-24	±199.9 mA	1 Ω			±500 mA		X	—	X	—	—						
-25	±1.999 A	0.1 Ω		±0.3% rdg ±1 digit	± 3 A		X	—	X	—	—						
DT-23A-11	±199.9 mV	100 MΩ	DC	±0.15% rdg ±1 digit	10 V	Approx. 2.5/sec	—	—	X	—	—	40 dB	100 dB @ 50/60 Hz	5 Vdc $^{+40\%}_{-20\%}$, 60 mA	LED 0.33 in (8.3mm)	1.78 oz (50 g)	0.98 x 1.89 x 2.83 in (24 x 48 x 72mm)
-12	±1.999 V	100 MΩ			100 V		—	—	X	—	—						
-13	±19.99 V	10 MΩ			250 V		—	—	X	—	—						
-14	±199.9 V	10 MΩ			500 V		—	—	X	—	—						
DT-26-11	199.9 mV	10 MΩ	40 Hz-10 kHz	±0.3% rdg ±0.1% F.S.	10 Vac	Approx. 2.5/sec	X	—	X	—	—	Crest factor 4:1	—	115/230 Vac ±10%, 50/ 60 Hz, 4 VA	LED 0.56 in (14.2mm)	12.50 oz (350 g)	1.89 x 3.78 x 4.05 in (48 x 96 x 103mm)
-12	1.999 V	10 MΩ	40 Hz-10 kHz		100 Vac		X	—	X	—	—		—				
-13	19.99 V	10 MΩ	40 Hz- 4 kHz		300 Vac		X	—	X	—	—		—				
-14	199.9 V	10 MΩ	40 Hz- 1 kHz		700 Vac		X	—	X	—	—		—				
-15	600 V	10 MΩ	40 Hz- 1 kHz	±0.5% rdg ±2 digit	700 Vac		X	—	X	—	—		—				
-21	199.9 μA	1 kΩ	40 Hz-1 kHz	±0.5% rdg ±0.1% F.S.	10 mAac		X	—	X	—	—		—				
-22	1.999 mA	100 Ω			50 mAac		X	—	X	—	—		—				
-23	19.99 mA	10 Ω			150 mAac		X	—	X	—	—		—				
-24	199.9 mA	1 Ω			500 mAac		X	—	X	—	—		—				
-25	1.999 A	0.1 Ω		±0.8% rdg ±0.1% F.S.	3 Aac		X	—	X	—	—		—				
DT-29-11	±199.9 mV	100 MΩ	DC	±0.1% rdg ±1 digit	±100 V	Approx. 12.5/sec @ 50 Hz 15/sec @ 60 Hz	X	—	X	—	—	40 dB	100 dB @ 50/60 Hz	115/230 Vac ±10%, 50/ 60 Hz	LED 0.56 in (14.2mm)	17.86 oz (500 g)	1.89 x 3.78 x 4.41 in (48 x 96 x 112mm)
-12	±1.999 V	100 MΩ			±100 V		X	—	X	—	—						
-13	±19.99 V	1 MΩ			±250 V		X	—	X	—	—						
-14	±199.9 V	10 MΩ			±500 V		X	—	X	—	—						
-21	±199.9 μA	1 kΩ		±0.2% rdg ±1 digit	± 10 mA		X	—	X	—	—						
-22	±1.999 mA	100 Ω			± 50 mA		X	—	X	—	—						
-23	±19.99 mA	10 Ω			±150 mA		X	—	X	—	—						
-24	±199.9 mA	1 Ω			±500 mA		X	—	X	—	—						
-25	±1.999 A	0.1 Ω		±0.3% rdg ±1 digit	± 3 A		X	—	X	—	—						

Operating temperature of all meters: 0-50°C. Accuracy stated 73.4° ±9°F (23° ±5°C).

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For manufacturers' sales offices, see yellow pages

3½ Digit Panel Meters X = STANDARD 0 = OPTIONAL

Model	Range	Input Imped.	Input Frequency Range	Accuracy	Max. Input	Read Rate	BCD Parallel	Mtplx BCD	Hold	Blank	Offset/Scale	NMR	CMRR	Power	Display	Weight	Dimensions (H x W x D)
DT-30-V	1-5 V	100 MΩ	DC	±0.1% rdg ±1 digit	±100 V	Approx. 12.5/sec @ 50 Hz 15/sec @ 60 Hz	X	—	X	—	X	40 dB	100 dB @ 50/60 Hz	115/230 Vac ±10%, 50/60 Hz, 4 VA	LED 0.56 in (14.2mm)	17.86 oz (500 g)	1.89 x 3.78 x 4.41 in (48 x 96 x 112mm)
-11	0-±199.9 mV	100 MΩ			±100 V		X	—	X	—	—						
-12	0-±1.999 V	100 MΩ			±100 V		X	—	X	—	—						
-A	4-20 mA	12.4 Ω		±0.2% rdg ±1 digit	±140 mA		X	—	X	—	X						
-24	0-±199.9 mA	1 Ω			±500 mA		X	—	X	—	—						
-25	0-±1.999 A	0.1 Ω		±0.3% rdg ±1 digit	± 3 A		X	—	X	—	—						
DT-40-10	±19.99 mV	100 MΩ	DC	±0.1% rdg ±1 digit	± 70 V	Approx. 2.5/sec	—	—	X	—	—	40 dB	100 dB @ 50/60 Hz	115/230 Vac ±10%, 50/60 Hz, 4 VA	Fluorescent 0.43 in (11mm)	16.8 oz (470.4 g)	1.89 x 3.78 x 4.41 in (48 x 96 x 112mm)
-11	±199.9 mV	100 MΩ			± 70 V		—	—	X	—	—						
-12	±1.999 V	100 MΩ			±100 V		—	—	X	—	—						
-13	±19.99 V	1 MΩ			±250 V		—	—	X	—	—						
-14	±199.9 V	10 MΩ			±500 V		—	—	X	—	—						
-21	±199.9 μA	1 kΩ		±0.2% rdg ±1 digit	± 10 mA		—	—	X	—	—						
-22	±1.999 mA	100 Ω			± 50 mA		—	—	X	—	—						
-23	±19.99 mA	10 Ω			±150 mA		—	—	X	—	—						
-24	±199.9 mA	1 Ω		±0.3% rdg ±1 digit	±500 mA		—	—	X	—	—						
-25	±1.999 A	0.1 Ω			± 3 A		—	—	X	—	—						
DT-41-10	±19.99 mV	100 MΩ	DC	±0.1% rdg ±1 digit	± 70 V	Approx. 2.5/sec	X	—	X	—	—	40 dB	100 dB @ 50/60 Hz	115/230 Vac ±10%, 50/60 Hz, 4 VA	Fluorescent 0.43 in (11mm)	17.86 oz (500 g)	1.89 x 3.78 x 4.41 in (48 x 96 x 112mm)
-11	±199.9 mV	100 MΩ			± 70 V		X	—	X	—	—						
-12	±1.999 V	100 MΩ			±100 V		X	—	X	—	—						
-13	±19.99 V	1 MΩ			±250 V		X	—	X	—	—						
-14	±199.9 V	10 MΩ			±500 V		X	—	X	—	—						
-21	±199.9 μA	1 kΩ		±0.2% rdg ±1 digit	± 10 mA		X	—	X	—	—						
-22	±1.999 mA	100 Ω			± 50 mA		X	—	X	—	—						
-23	±19.99 mA	10 Ω			±150 mA		X	—	X	—	—						
-24	±199.9 mA	1 Ω			±500 mA		X	—	X	—	—						
-25	±1.999 A	0.1 Ω		±0.3% rdg ±1 digit	± 3 A		X	—	X	—	—						
DT-51-11	±199.9 mV	100 MΩ	DC	±0.15% rdg ±1 digit	± 10 V	Approx. 2.5/sec	—	X	X	—	—	40 dB	100 dB @ 50/60 Hz	5 Vdc ±10%, 0.4 W	LED 0.56 in (14.2mm)	1.97 oz (55 g)	1.89 x 3.78 x 0.98 in (48 x 96 x 25mm)
-12	±1.999 V	100 MΩ			±100 V		—	X	X	—	—						
-13	±19.99 V	10 MΩ			±250 V		—	X	X	—	—						
-14	±199.9 V	10 MΩ			±500 V		—	X	X	—	—						
DT-73-100	±199.9 mV	1000 MΩ	DC	±0.05% rdg +1 digit	50 Vpk	Approx. 2.5/sec	—	—	—	—	—	45 dB @ 60 Hz 40 dB @ @ 50 Hz	80 dB @ 50/60 Hz	5 Vdc ±10%, 225 mA	LED 0.43 in (11mm)	8 oz (ac) (225 g) 5 oz (dc) (140 g)	2.09 x 3.49 x 3.07 in (5.03 x 85.7 x 77.9mm)
-101	±1.999 V	10 MΩ			400 Vpk		—	—	—	—	—						
-102	±19.99 V	10 MΩ			400 Vpk		—	—	—	—	—						
-103	±199.9 V	10 MΩ			400 Vpk		—	—	—	—	—						
-110	±199.9 mV	1000 MΩ			50 Vpk		—	—	—	—	—			110/220 Vac ±20%, 50-400 Hz, 1 VA			
-111	±1.999 V	10 MΩ			400 Vpk		—	—	—	—	—						
-112	±19.99 V	10 MΩ			400 Vpk		—	—	—	—	—						
-113	±199.9 V	10 MΩ			400 Vpk		—	—	—	—	—						
DT-379A-C	±199.9 mV	1000 MΩ	DC	±0.05% rdg +1 digit	±300 Vdc	Approx. 2.5/sec	0	—	X	X	0	40 dB @ @ 50 Hz	80 dB @ 50/60 Hz	110/220 Vac ±20%, 47-440 Hz, 2W or 5 Vdc ±5%, 250 mA isolated & non-isolated (optional)	LED 0.56 in (14.2mm)	11 oz (308 g)	1.89 x 3.78 x 4.02 in (48 x 96 x 102mm)
-0	±1.999 V	1000 MΩ			±300 Vdc		0	—	X	X	0						
-D	±19.99 V	10 MΩ			±500 Vdc		0	—	X	X	0						
-E	±199.9 V	10 MΩ			±500 Vdc		0	—	X	X	0						
DT-379W-C	±199.9 mV	1000 MΩ	DC	±0.05% rdg +1 digit	±300 Vdc	Approx. 2.5/sec	0	—	X	X	0	40 dB @ @ 50 Hz	80 dB @ 50/60 Hz	110/220 Vac ±20%, 2W	LED 0.56 in (14.2mm)	11 oz (308 g)	1.85 x 4.05 x 4.84 in (47 x 103 x 123mm)
-0	±1.999 V	1000 MΩ			±300 Vdc		0	—	X	X	0						
-D	±19.99 V	10 MΩ			±500 Vdc		0	—	X	X	0						
-E	±199.9 V	10 MΩ			±500 Vdc		0	—	X	X	0						
DT-380A-0	±199.9 mV	1000 MΩ	DC	±0.05% rdg +1 digit	±300 Vdc	Approx. 2.5/sec	—	—	—	—	0	40 dB @ @ 50 Hz	80 dB @ 50/60 Hz	110/220 Vac ±20%, 75W or ±5 Vdc, 10 mA isolated or non-isolated (optional)	LCD 0.50 in (12.7mm)	11 oz (308 g)	1.89 x 3.78 x 4.02 in (48 x 96 x 102mm)
-1	±1.999 V	1000 MΩ			±300 Vdc		—	—	—	—	0						
-2	±19.99 V	10 MΩ			±500 Vdc		—	—	—	—	0						
-3	±199.9 V	10 MΩ			±500 Vdc		—	—	—	—	0						

Operating temperature of all meters: 0-50°C. Accuracy stated 73.4° ±9°F (23° ±5°C).

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For manufacturers' sales offices, see yellow pages

3½ Digit Panel Meters **X = STANDARD 0 = OPTIONAL**

Model	Range	Input Imped.	Input Frequency Range	Accuracy	Max. Input	Read Rate	BCD Parallel	Mtplx BCD	Hold	Blank	Offset/ Scale	NMR	CMRR	Power	Display	Weight	Dimensions (H x W x D)
DT-3312-01	±199.9 mV	1000 MΩ	DC	±0.1% rdg +1 digit	200 V peak to peak	Approx. 3 to 30/sec	X	—	X	X	—	18 dB @ 60 Hz	80 dB @ 60 Hz	115 Vac ±10%, 50/60 Hz, 2.5W	Planar gas discharge 0.55 in (13.98mm)	11 oz (308 g)	1.85 x 4.05 x 4.84 in (47 x 103 x 123mm)
-02	±1.999 V	1000 MΩ					X	—	X	X	—						
-11	±19.99 V	10 MΩ					X	—	X	X	—						
-12	±199.9 V	10 MΩ					X	—	X	X	—						
-03	±199.9 mV	1000 MΩ					X	—	X	X	—			100 Vac ±10%, 50/60 Hz, 2.5W			
-04	±1.999 V	1000 MΩ					X	—	X	X	—						
-13	±19.99 V	10 MΩ					X	—	X	X	—						
-14	±199.9 V	10 MΩ					X	—	X	X	—						
-05	±199.9 mV	1000 MΩ					X	—	X	X	—			230 Vac ±10%, 50/60 Hz, 2.5W			
-06	±1.999 V	1000 MΩ					X	—	X	X	—						
-07	±19.99 V	10 MΩ					X	—	X	X	—						
-08	±199.9 V	10 MΩ					X	—	X	X	—						
DT-4312-01	±199.9 mV	1000 MΩ	DC	±0.1% rdg + 3 digits	250 Vpk	0.1 to 15/sec 5/sec Standard	X	—	X	—	—	20 dB @ 60 Hz	100 dB dc to 100 kHz	115 Vac ±10%, 50/60 Hz, 5W	Planar gas discharge 0.43 in (11mm)	17 oz (476 g)	1.84 x 4.05 x 4.82 in (45.7 x 102.9 x 121.6mm)
-02	±1.999 V	1000 MΩ			250 Vpk		X	—	X	—	—						
-03	±19.99 V	10 MΩ			1000 Vpk		X	—	X	—	—						
-04	±199.9 V	10 MΩ			1000 Vpk		X	—	X	—	—						
-05	±1000 V	10 MΩ			1000 Vpk		X	—	X	—	—						
-06	±1.999 μA	100 kΩ		±0.1% rdg +5 digits	Burden 200 mV		X	—	X	—	—						
-07	±19.99 μA	10 kΩ					X	—	X	—	—						
-08	±199.9 μA	1 kΩ					X	—	X	—	—						
-09	±1.999 mA	100 Ω					X	—	X	—	—						
-10	±19.99 mA	10 Ω					X	—	X	—	—						
-11	±199.9 mA	1 Ω					X	—	X	—	—						

Operating temperature of all meters: 0-50°C. Accuracy stated 73.4° ±9°F (23° ±5°C).

4-4½ Digit Panel Meters **X = STANDARD 0 = OPTIONAL**

DT-31-V	1-5 Vdc	1 MΩ	DC	±0.005% rdg ±5 digits	±100 V	Approx. 2.5/sec	—	—	X	X	X	50 dB @ 50/60 Hz	100 dB @ 50/60 Hz	115/230 Vac ±10%, 50/60 Hz, 2.5 VA	LED 0.56 in (14.2mm)	15.7 oz (440 g)	1.89 x 3.78 x 5.12 in (48 x 96 x 103mm)
-A	4-20 mA	12.4 Ω		±0.1% rdg ±5 digits	±140 mA		—	—	X	X	X						
DT-34-11	±199.99 mV	100 MΩ	DC	±0.03% rdg ±1 digit	± 70 V	Approx. 2.5/sec	—	—	X	X	X	50 dB @ 50/60 Hz	100 dB @ 50/60 Hz	115/230 Vac ±10%, 50/60 Hz, 2.5 VA	LED 0.56 in (14.2mm)	15.7 oz (440 g)	1.89 x 3.78 x 5.12 in (48 x 96 x 103mm)
-12	±1.9999 V	100 MΩ			±100 V		—	—	X	X	X						
-13	±19.999 V	1 MΩ			±250 V		—	—	X	X	X						
-14	±199.99 V	1 MΩ			±500 V		—	—	X	X	X						
DT-35-11	±199.99 mV	100 MΩ	DC	±0.03% rdg ±1 digit	± 70 V	Approx. 2.5/sec	X	—	X	X	—	50 dB @ 50/60 Hz	100 dB @ 50/60 Hz	115/230 Vac ±10%, 50/60 Hz, 2.5 VA	LED 0.56 in (14.2mm)	17.1 oz (480 g)	1.89 x 3.78 x 5.12 in (48 x 96 x 103mm)
-12	±1.9999 V	100 MΩ			±100 V		X	—	X	X	—						
-13	±19.999 V	1 MΩ			±250 V		X	—	X	X	—						
-14	±199.99 V	1 MΩ			±500 V		X	—	X	X	—						
DT-36-11	99.99 mV	10 MΩ	30 Hz-10 kHz	±0.2% rdg ±10 digits	10 V	Response 1/sec full scale	—	—	X	—	—	—	—	115/230 Vac ±10%, 50/60 Hz, 2 VA	LED 0.56 in (14.2mm)	10.71 oz (300 g)	1.89 x 3.78 x 4.05 in (48 x 96 x 103mm)
-12	999.9 mV	10 MΩ	30 Hz-11 kHz		100 V		—	—	X	—	—	—	—				
-13	9.999 V	10 MΩ	30 Hz- 4 kHz		300 V		—	—	X	—	—	—	—				
-14	99.99 V	10 MΩ	30 Hz- 1 kHz		700 V		—	—	X	—	—	—	—				
-15	700.0 V	10 MΩ	30 Hz- 1 kHz		700 V		—	—	X	—	—	—	—				
-21	99.99 μA	1 kΩ	30 Hz-1 kHz	±0.5% rdg ±10 digits	10 mA		—	—	X	—	—	—	—				
-22	999.9 μA	100 Ω			50 mA		—	—	X	—	—	—	—				
-23	9.999 mA	10 Ω			150 mA		—	—	X	—	—	—	—				
-24	99.99 mA	1 Ω			500 mA		—	—	X	—	—	—	—				
-25	999.9 mA	0.1 Ω		±0.7% rdg ±10 digits	3 A		—	—	X	—	—	—	—				
DT-44-11	±199.99 mV	100 MΩ	DC	±0.03% rdg ±1 digit	± 70 V	Approx. 2.5/sec	—	—	X	—	—	40 dB @ 50/60 Hz	100 dB @ 50/60 Hz	115/230 Vac ±10%, 50/60 Hz, 3 VA	Fluorescent 0.43 in (11mm)	16.8 oz (470 g)	1.89 x 3.78 x 4.41 in (48 x 96 x 112mm)
-12	±1.9999 V	100 MΩ			±100 V		—	—	X	—	—						
-13	±19.999 V	1 MΩ			±250 V		—	—	X	—	—						
-14	±199.99 V	1 MΩ			±500 V		—	—	X	—	—						

Operating temperature of all meters: 0-50°C. Accuracy stated 73.4° ±9°F (23° ±5°C).

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4-4½ Digit Panel Meters X = STANDARD 0 = OPTIONAL

Model	Range	Input Imped.	Input Frequency Range	Accuracy	Max. Input	Read Rate	BCD Parallel	Mtplx BCD	Hold	Blank	Offset/ Scale	NMR	CMRR	Power	Display	Weight	Dimensions (H x W x D)
DT-479A-F	±199.99 mV	1000 MΩ	DC	±0.005% rdg +1 digit	±160 Vdc	Approx. 2.5/sec	0	—	X	X	0	70 dB @ 50 Hz	160 dB dc to 60 Hz	115/230 Vac ±20%, 50/ 400 Hz, 3 W +5 Vdc ±5%, 450 mA isolated or non-isolated	LED 0.56 in (14.2mm)	11 oz (308 g)	1.89 x 3.78 x 4.01 in (48 x 96 x 102mm)
-0	±1.9999 V	1000 MΩ			±160 Vdc		0	—	X	X	0						
-J	±19.999 V	10 MΩ			±500 Vdc		0	—	X	X	0						
-K	±199.99 V	10 MΩ			±500 Vdc		0	—	X	X	0						
DT-479W-F	±199.99 mV	1000 MΩ	DC	±0.005% rdg ±2 digits	±160 Vdc	Approx. 2.5/sec	0	—	X	X	0	70 dB @ 50 Hz	160 dB @ 50 Hz	115/230 Vac ±20%, 50/ 400 Hz, 3 W	LED 0.56 in (14.2mm)	11 oz (308 g)	1.85 x 4.05 x 4.84 in (47 x 103 x 123mm)
-H	±1.9999 V	1000 MΩ			±160 Vdc		0	—	X	X	0						
-J	±19.999 V	1 MΩ			±500 Vdc		0	—	X	X	0						
-K	±199.99 V	10 MΩ			±500 Vdc		0	—	X	X	0						
DT-4412-01	±199.99 mV	1000 MΩ	DC	±0.01% rdg +2 digits	250 Vpk	5/sec Standard 0.1 to 15/sec optional	X	—	X	—	—	34 dB @ 60 Hz	100 dB dc to 100 kHz	115/230 Vac ±10%, 50/ 60 Hz, 8W	Planar gas discharge 0.43 in (11mm)	19 oz (532 g)	1.84 x 4.05 x 4.82 in (45.7 x 102.9 x 121.6mm)
-02	±1.9999 V	1000 MΩ			250 Vpk		X	—	X	—	—						
-03	±19.999 V	10 MΩ		±0.02% rdg +2 digits	1000 Vpk		X	—	X	—	—						
-04	±199.99 V	10 MΩ			1000 Vpk		X	—	X	—	—						
-05	± 1000 V	10 MΩ			1000 Vpk		X	—	X	—	—						
-06	±1.9999 μA	100 kΩ		±0.03% rdg +2 digits	Burden 200 mV		X	—	X	—	—						
-07	±19.999 μA	10 kΩ					X	—	X	—	—						
-08	±199.99 μA	1 kΩ					X	—	X	—	—						
-09	±1.9999 mA	100 Ω					X	—	X	—	—						
-10	±19.999 mA	10 Ω					X	—	X	—	—						
-11	±199.99 mA	1 Ω					X	—	X	—	—						

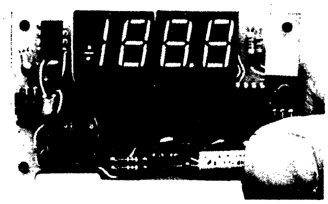
Operating temperature of all meters: 0-50°C. Accuracy stated 73.4° ±9°F (23° ±5°C).

Digital Indicator Comparators X = STANDARD 0 = OPTIONAL

DT-110-11	±199.9 mV	100 MΩ	DC	±0.15% rdg ±1 digit	± 70 V	Approx. 2.5/sec	—	—	X	—	0	40 dB @ 50/60 Hz	100 dB @ 50/60 Hz	115/230 Vac ±10%, 50/ 60 Hz, 3 VA	LED 0.39 in (10mm)	17.86 oz (500 g)	1.89 x 3.78 x 4.41 in (48 x 96 x 112mm)
-12	±1.999 V	100 MΩ			± 70 V		—	—	X	—	0						
-13	±19.99 V	10 MΩ			±250 V		—	—	X	—	0						
-14	±199.9 V	10 MΩ			±500 V		—	—	X	—	0						
-21	±199.9 μA	1 kΩ			± 10 mA		—	—	X	—	0						
-22	±1.999 mA	100 Ω		±0.3% rdg ±1 digit	± 50 mA		—	—	X	—	0						
-23	±19.99 mA	10 Ω			±150 mA		—	—	X	—	0						
-24	±199.9 mA	1 Ω			±500 mA		—	—	X	—	0						
-25	±1.999 A	0.1 Ω		±0.5% rdg ±1 digit	± 3 A		—	—	X	—	0						
DT-210-11	±199.9 mV	100 MΩ	DC	±0.15% rdg ±1 digit	± 70 V	Approx. 2.5/sec	—	—	X	—	0	40 dB @ 50/60 Hz	100 dB @ 50/60 Hz	115/230 Vac ±10%, 50/ 60 Hz, 3.5 VA	LED 0.39 in (10mm)	17.86 oz (500 g)	1.89 x 3.78 x 5.12 in (48 x 96 x 130mm)
-12	±1.999 V	100 MΩ			± 70 V		—	—	X	—	0						
-13	±19.99 V	10 MΩ			±250 V		—	—	X	—	0						
-14	±199.9 V	10 MΩ			±500 V		—	—	X	—	0						
-21	±199.9 μV	1 kΩ		±0.3% rdg ±1 digit	± 10 mA		—	—	X	—	0						
-22	±1.999 mA	100 Ω			± 50 mA		—	—	X	—	0						
-23	±19.99 mA	10 Ω			±150 mA		—	—	X	—	0						
-24	±199.9 mA	1 Ω			±500 mA		—	—	X	—	0						
-25	±1.999 A	0.1 Ω		±0.5% rdg ±1 digit	± 3 A		—	—	X	—	0						
DT-220-11	±199.9 mV	100 MΩ	DC	±0.15% rdg ±1 digit	± 70 V	12.5/sec @ 50 Hz 15/sec @ 60 Hz	—	X	X	—	0	40 dB @ 50/60 Hz	100 dB @ 50/60 Hz	115/230 Vac ±10%, 50/ 60 Hz, 3.5 VA	LED 0.39 in (10mm)	17.86 oz (500 g)	1.89 x 3.78 x 5.71 in (48 x 96 x 145mm)
-12	±1.999 V	100 MΩ			± 70 V		—	X	X	—	0						
-13	±19.99 V	10 MΩ			±250 V		—	X	X	—	0						
-14	±199.9 V	10 MΩ			±500 V		—	X	X	—	0						
-21	±199.9 μA	1 kΩ		±0.3% rdg ±1 digit	± 10 mA		—	X	X	—	0						
-22	±1.999 mA	100 Ω			± 50 mA		—	X	X	—	0						
-23	±19.99 mA	10 Ω			±150 mA		—	X	X	—	0						
-24	±199.9 mA	1 Ω			±500 mA		—	X	X	—	0						
-25	±1.999 A	0.1 Ω		±0.5% rdg ±1 digit	± 3 A		—	X	X	—	0						

Operating temperature of all meters: 0-50°C. Accuracy stated 73.4° ±9°F (23° ±5°C).

MINIATURE DIGITAL INSTRUMENTS



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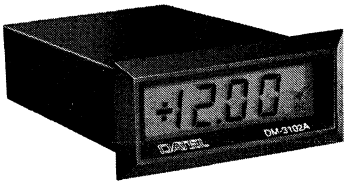

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Input Ranges:
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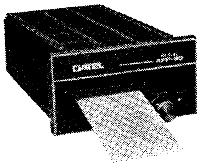
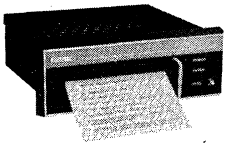


20-column alphanumeric
APP-20 Series



48-column alphanumeric
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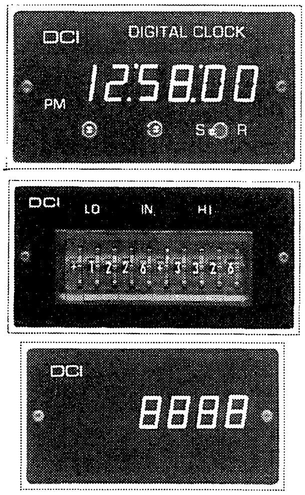
Digital Panel Counters, Timers, Tachometers, Voltmeters, Controllers, Strain Gage Indicators for Systems or Stand-Alone Use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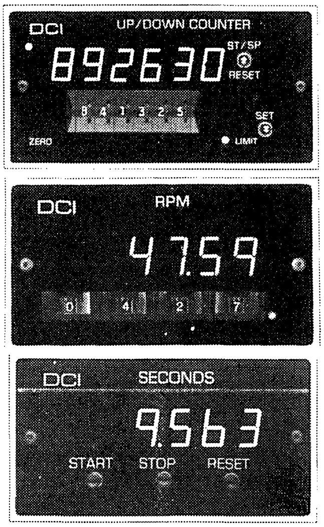
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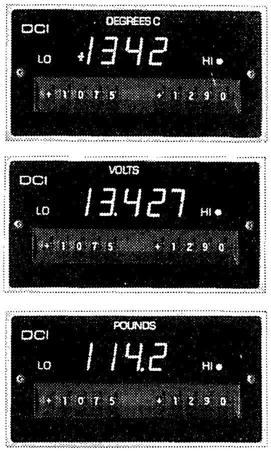
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High/Low Setpoint Controller monitors and controls process variables such as Temperature, DC Voltage, AC Voltage, 4-20 ma. current loop, strain gages and many others.

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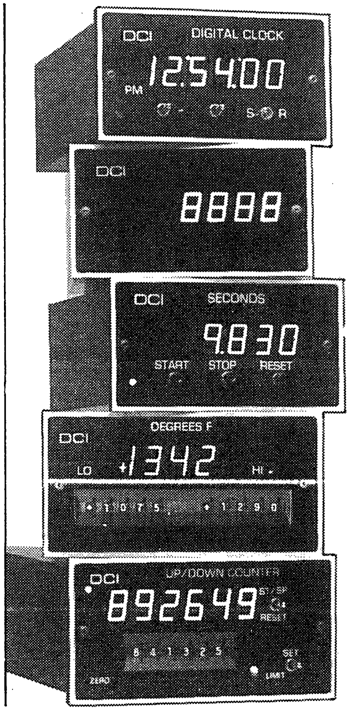
- RS232 Outputs
- RS422 Outputs

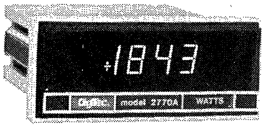

DCI
DIGITAL CLOCK
PM
12:54:00
DCI
8888
DCI
SECONDS
9.830
START
STOP
RESET
DCI
DEGREES F
LO
-1342
HI
DCI
UP/DOWN COUNTER
892649
ZERO
LIMIT

DCI has a whole stack of reliable solutions for your measurement/control problems, all with BCD or serial outputs, aluminum cases, .56" high-efficiency LED Displays and Remote-Control inputs. For more information or applications assistance call BIll Cook at (913) 782-5672 or write 14812 W. 117th St., Olathe, Kansas 66062

DCI incorporated

14812 W. 117TH ST., OLATHE, KANSAS 66062 • (913) 782-5672

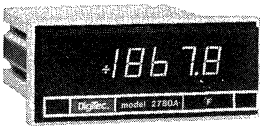
Digitec Digital Panel Instruments



3½ and 4½ digit DPMs

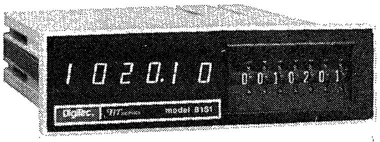
Measure any parameter with reliable, high-accuracy Digitec panel instrumentation. Designed and built for demanding industrial applications, these panel-mount instruments offer performance, adaptability, and a full range of options to simplify system standardization.

Series 2770A and 2780A Panel Instrumentation – Bulletin 0801
- ■ High-accuracy 3½ and 4½ digit models.
- ■ Panel meters: AC and DC current and voltage, true rms, strain gage/load cell.
- ■ Process monitors: accept any process transmitter/transducer input.
- ■ Panel thermometers: TC, RTD and thermistor inputs.
- ■ Optional BCD outputs.
- ■ Every unit burned in for assured reliability.



Thermometers

Counter/Timers – Bulletins 2414 and 2415
- ■ Fast computed display of low input rates – down to one pulse in 1000 sec.
- ■ Uni- and bidirectional counting, timing, totalizing, and control.
- ■ Factored counting and timing.



Counters/Timers

Digitec Instruments

Digitec
5810 thermometer °C
+ 18.8.8
FUNCTION

Model 5810 Portable Thermometer

- ■ Portable thermometers – Bulletin **3200.**
- ■ Calibrators – Bulletin **4031.**
- ■ Analog multiplexers.
- ■ Comparators.

Digitec Corporation, 918 Woodley Road, P.O. Box 458,
Dayton, Ohio 45401, Tel. (513) 254-6251. Telex (310) 687-4219.

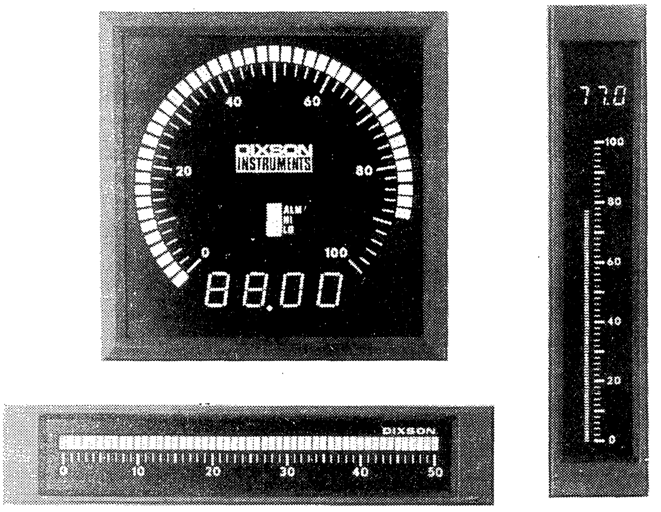
DigiTec®

DIXSON INSTRUMENTS
DIVISION OF DIXSON, INCORPORATED

BARGRAPH
METER/CONTROLLERS

FEATURES:

- STATE OF THE ART TECHNOLOGY
- MICROPROCESSOR BASED
- ANALOG/DIGITAL DISPLAY
- ILLUMINATED SCALE
- INSENSITIVE TO VIBRATION/SHOCK
- RAPID RESPONSE
- THREE SETPOINTS
- EXTERNAL SET POINT OUTPUTS
- +5 VDC OPERATION
- MILITARIZED MODELS
- AUDIO VU/PPM MODELS
- ECONOMY MODELS
- LCD MODELS
- CUSTOM SCALEPLATES/LOGOS



40
60
20
80
0
100
DIXSON INSTRUMENTS
88.00
770
100
80
60
40
20
0
DIXSON
0
10
20
30
40
50

GENERAL DESCRIPTION

Meter/Controllers are solid state instruments that can be used in unlimited measuring and controlling applications. They combine the instant trend recognition of an analog meter with the precision of a 2 1/2, 3 or 4 digit LED display. The Model 101 provides a 1.0% resolution. In addition, these instruments may be used as HI-LO Controllers or Annunciators in process or other control applications.

The analog scale, set point annunciators and digital display are red LED's. In addition to displaying readings, the LO, HI and ALARM set points may be utilized to activate external devices. Flashing segments indicate under/over range conditions.

The analog display is available in the bar mode with center or end scale zero. The Model 051 and W51 are divided into 51 segments. The 101 has a 4" scale with 101 segments.

Sensitivity ranges include both AC and DC currents and voltages for virtually any application as follows:

DC Volts: 50mv to 250V
DC Current: 50ua to 5A
AC Volts: 250mv to 250V
AC Current: 1ma to 5A

Optional set point controls are normally supplied internally to prevent tampering. They may also be front panel mounted for easy accessibility. The HI set point must always be higher than LO, but the ALARM may be set anywhere. The internal microprocessor provides a "failsafe" condition by always reading the initial settings at startup.

Dixson Bargraph Meter/Controllers are supplied in handsome black NORYL or ABS complying with UL94V-O or -1. The P/C board protrudes at the back for easy engagement with an edge connector or terminal block.

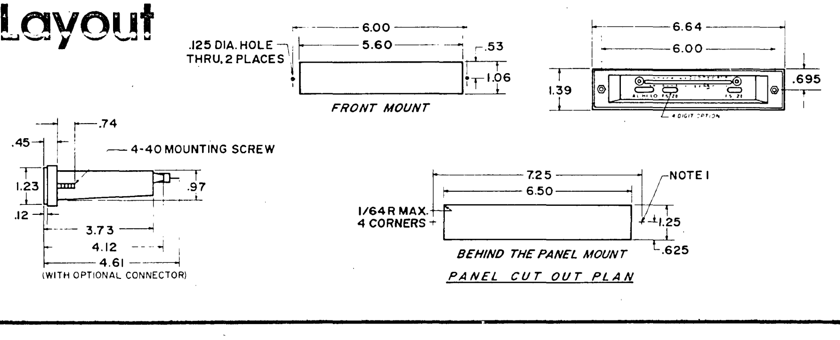
Operating temperature range is from 0° to 60° C. Current drain: Model 101 260ma; Model 051 and W51 670ma.

Options for the bargraph include: set points, center zero, 2 1/2, 3 or 4 digit readout, differential input model, recorder drive analog output, suppressed scales, custom algorithms and scales, digital interface model.

Accessories include: Edge connector, terminal block interface, power supply. Unit pricing ranges from $150.00 to $400.00 with options. For complete details call for a FREE catalog and/or color brochure.

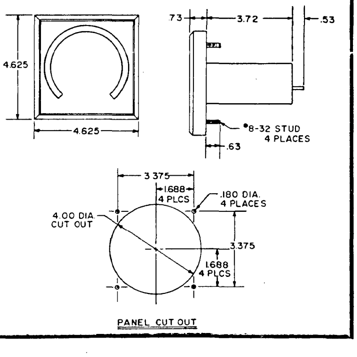
Mechanical Layout

MODELS DBGE051, DBGE101



6.00
5.60
.125 DIA. HOLE THRU, 2 PLACES
.53
1.06
FRONT MOUNT
6.64
6.00
1.39
.695
4 DIGIT OPTION
.74
.45
4-40 MOUNTING SCREW
1.23
.97
.12
3.73
4.12
4.61
(WITH OPTIONAL CONNECTOR)
7.25
6.50
NOTE 1
1/64 R MAX. 4 CORNERS
1.25
.625
BEHIND THE PANEL MOUNT
PANEL CUT OUT PLAN

MODEL DBGEW51

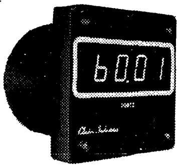


.73
3.72
.53
4.625
4.625
8-32 STUD 4 PLACES
.63
3.375
1.688 4 PLCS
.180 DIA. 4 PLACES
4.00 DIA CUT OUT
3.375
1.688 4 PLCS
PANEL CUT OUT

P.O. Box 1449 Grand Junction, CO 81502•(303)242-8863 EXT 223/TWX 910-929-9661

Electro Industries

SOLID STATE DIGITAL SWITCH BOARD INSTRUMENTS



SPECIFICATIONS COMMON TO ALL MODELS

ACCURACY

DC VOLTS / DC AMPS .05% of the reading ± 1 digit

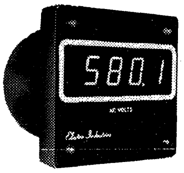
AC VOLTS / AC AMPS .35% of the reading ± 1 digit

POWER REQUIREMENT

115 ± 15% 6va 47 - 44 Hz
230v ± 15% 6va 47 - 440 Hz (Suffix A)

DIGITAL DISPLAY

High intensity ,8" L.E.D.



FREQUENCY

MODEL #	FREQUENCY RANGE	FREQUENCY ACCURACY
FF 60	5,00 - 99.99 Hz	± 1 Digit over operating temperature range
FF 400	50.0 - 999.9 Hz.	**SAMPLE RATE**
FF 1000	5 - 9999 Hz.	1 second

NEW!

AC VOLTS

MODEL #	F.S. RANGE	INPUT
FVA10	9.999 VAC	Direct
FVA100	99.99 VAC	Direct
FVA600	600.00 VAC	Direct
FVA120*	* *	PT (120V) Secondary)

*To be use with 120 V seconadry PT
**Indicate primary voltage when ordering

AC AMPS

MODEL #	F.S. RANGE	INPUT
FAA10	9.999 A	Direct
FAA20	25.00 A	Direct
FAA5*	* *	CT (5 Amp secondary)

*To be used with 5 Amp CT.
**Indicate primary current on CT when ordering

DC VOLTS

MODEL #	F.S. RANGE	INPUT
FVD 10	9.999 VDC	Direct
FVD 100	99.99 VDC	Direct
FVD 6000	600.0 VDC	Direct

DC AMPS

MODEL #	F.S. RANGE	INPUT
FAD10	9.999 A	Direct
FAD20	25.00	Direct
FAD100*	* *	Shunt

*To be used with a 100mV Shunt
**Indicate rate of Shunt when ordering

TRANSDUCER READOUT

MODEL #	F.S. RANGE	INPUT RANGE
FT 1	* *	0 - 1 MA
FT 5	* *	0 - 5 MA
FT 16	* *	0 - 16 MA
FT 20	* *	4 - 20 MA

**Indicate F.S. Reading including ubits when ordering. Specify type of engineering unit.

OPTIONS

1. True RMS reading (for AC models) add Suffix RMS.
2. 220v Power Input add Suffix A.

SOLID STATE DIGITAL KILOWATT/KILOWATT HOUR & POWER FACTOR MONITORS

19.99
KW-KWH MONITOR
KW
KWH
Electro Industries

A highly accurate multi-range instrument which measures true Kilowatt and Kilowatt Hour.

Range is selected by choosing proper CT and changing dip switches located behind front panel.

MODELS

K Watt Only	K Watt & K Watt Hour
W 101 . . . . .single phase	WH101 . . . .single phase
W 201 . . . . .3 phase delta	WH 201 . . . .3 phase delta
W 301 . . . . .3 phase Y	WH 301 . . . .3 phase Y

METER RANGES

Full Scale Reading	Current Input		Voltage Range
1.999 KW	15 amps direct		0-300 VAC max.
19.99 KW	100/5ct,50/5ct, 25/5ct	5A	0-600 VAC max
199.9 KW	1,000/5ct, 500/5ct, 250/5ct		(use suffix G)
1999 KW	10,000/5ct, 5,000/5ct, 2,500/5ct		

-.973
POWER FACTOR
Electro Industries

A truly power factor monitor, using digital techniques to calculate the Vectorial Ratio between Watts and Vars.

MODELS

PF 100 Single phase 1 element
PF 200 Three phase delta 2 element
PF 250 Three phase * 2½ element *
PF 300 Three phase * 3 element **

* ½ element will assume a uniform voltage
** PF300 has a larger case

METER RANGE

Voltage	Current
0 to 300 VAC max.	5A
Suffix G 0-600V	15A

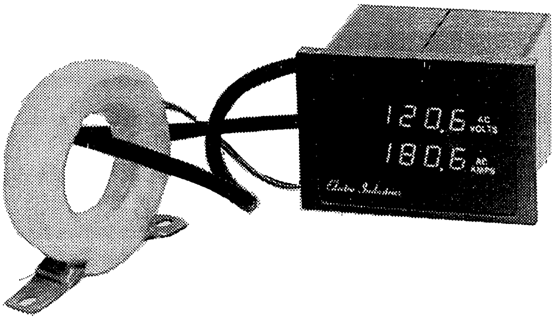
Options

A. Power input 220 ± 20% (suffix A);
B. B.C.D. output (suffix N)

ELECTRO INDUSTRIES / PANEL METER DIVISION/ Dept. EM, 1800 Shames Drive/Westbury, NY 11590/(516) 334-0870

Electro Industries

SOLID-STATE DIGITAL VOLTS AMPERES MONITOR



This solid state digital AC/Volts/Amp Monitor takes the place of two conventional meters plus providing an unambiguous bright LED readout and saving panel space. BCD output is optional.

SPECIFICATIONS COMMON TO ALL MODELS

VOLTAGE RANGE

F.S. Reading	Resolution
199.9V	.1V
600V (Suffix G)	1V

ACCURACY
AC volt .35% of the reading ± 1 digit
AC Amps .5% of the reading ± 1 digit
DC volt .25% of the reading ± 1 digit
DC Amps .35% of the reading ± 1 digit

FREQUENCY RANGE
47-440Hz

POWER REQUIREMENTS
115v. ± 15% 5VA max.
Suffix A 230v. ± 15% 5VA max.

SIZE
4.75" W x 3.25" H x 3.50" L
Panel cut out required
4.125" x 3.125"

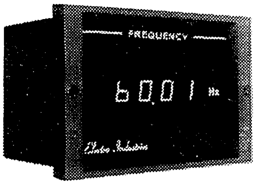
DIGITAL DISPLAYS
L.E.D. .43" high

MODELS		CURRENT	
AC	DC	F.S. reading	Resolution
VA 20	VA 20DC	1.999 (direct)	.001A
VA 200	VA 200DC	19.99 (direct)	.01A
VA 2000*	VA 2000DC**	199.9 or 1999	.1A or 1A

*Use with 200/5 ct for 199.9 amps
Use with 2000/5 ct for 1999 amps

**Use with 200 amps/100 Mv shunt for 199.9 amps
Use with 2000 amps/100 Mv shunt for 1999 amps

SOLID-STATE DIGITAL FREQUENCY MONITOR

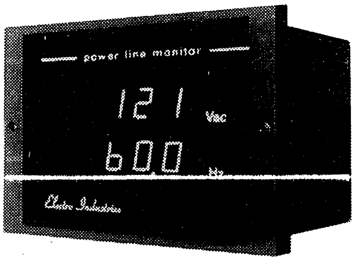


Designed to satisfy the requirements of high resolution at low frequency and fast updating. The fast up-date feature is achieved thru the use of phase locked loop techniques. The Oscillator is crystal controlled, and free of calibration requirements. BCD output is optional.

SPECIFICATIONS COMMON TO ALL UNITS
INPUT VOLTAGE RANGE: 2-300V
FREQUENCY ACCURACY: ±1 Digit over operating temperature range
SAMPLE RATE: 1 second
DIGITAL DISPLAY: LED — .43" high
SIZE: 4.75" W x 3.25" H x 3.50" L
OPTIONS: BCD output Option N

MODELS	FREQUENCY RANGE	FREQUENCY RESOLUTION
LF 60	5.00 - 99.99 Hz.	.01 Hz.
LF 400	50.0 - 999.9 Hz.	.1 Hz.
LF 60-8	5.00 - 999.9 Hz.	.01 & .1 Hz. (Auto Range)
LF 1000	5 - 9999 Hz.	1. Hz.

SOLID-STATE DIGITAL POWER LINE MONITOR



This unique device combines the display of both AC Volts and Frequency on a bright 3 digit LED display with a resolution of up to 1 volt and 0.1 Hz. Designed for panel mounting, this instrument offers reliable and stable operation. BCD output is optional.

SPECIFICATIONS COMMON TO ALL UNITS

OPERATING RANGE:
Voltage: 85-145V
Suffix A - 170-270V
(When power input is parallel with the measurement input)
Measurement input is 0-300V
(When applying a fixed power input voltage)

VOLTAGE ACCURACY:
Voltage — ±.5% f.s. ±1 Digit

SAMPLE RATE:
Voltage — 30m sec. - 600m sec.

DIGITAL DISPLAYS:
LED — .43" high

SIZE: 4.75" W x 3.25" H x 3.50" L
Panel cut out required
4.125" x 3.125"

OPTIONS: Opto Isolator Multiplexed BCD output Option N. 600 VAC range for volts display Option G.

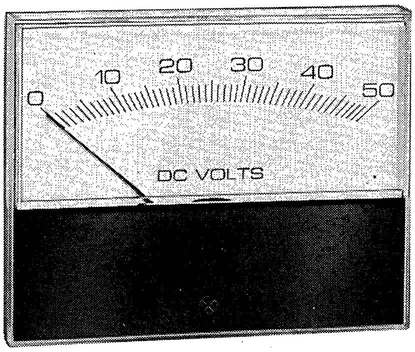
MODELS	FREQUENCY RANGE	FREQUENCY ACCURACY		SAMPLE RATE FREQUENCY
LM 150	———	———		———
LM 160	42 - 99 Hz.	±1 Hz.		1 sec.
LM-1400	42 - 999 Hz.	±.1 Hz.	Crystal Controlled	1 sec.
LM 1600	42.0 - 99.9 Hz.	±.1 Hz.		10 sec.
LM 1600-10	42.0 - 99.9 Hz.	±.1 Hz.		1 sec.
LM 1600-18	42.0 - 999 Hz.	±.1 Hz. ±1 Hz. (Auto Range)		1 sec.

ELECTRO INDUSTRIES/PANEL METER DIVISION/ Dept. EM, 1800 Shames Drive/Westbury, NY 11590/(516) 334-0870

EMICO
ELECTRICAL/ELECTRONIC INSTRUMENTS

A complete line of AC and DC analog meters and indicators. Shown here are just a few of the more popular EMICO products currently available for OEM applications.

TAUT BAND METERS



for Front Panel Mounting

Series 60

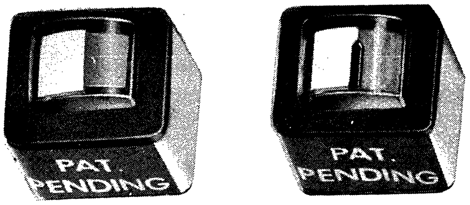
Three sizes to choose from: 2½", 3½", and 4½". These meters are handsome in design and lend a distinctive look to any control panel.

This model 64 series comes in all commonly used ranges: expanded scale, elapsed time, UV, and frequency (reed and electronic).

- ±2% FS accuracy in DC, 3% in AC
- ±1½% tracking, DC, ±2% AC
- Response time, 1.5 sec. maximum except 0-50 uA and below where response time is 3.0 sec. maximum
- ±1.5% FS
- Repeatability ±1.5% FS
- Self shielded
- Scale arc 100°

INDICATORS

Micro-Miniature Current Indicators



Measuring only ½" square, these rugged, dependable indicators (Model 802) are extra low in cost. Extremely popular to:

- Monitor on-off conditions
- Indicate battery-charge conditions
- Indicate circuit-operating conditions

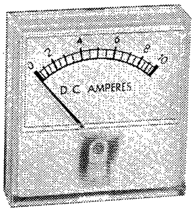
Less than 2 milliwatts required to move flag or pointer. Overload capacity is 15 times current rating without burn-out or calibration shift. All models are packaged in a high-impact, clear plastic case and are available either with wire leads or plug-in jacks for ease of installation.

Edge-Reading Current Indicator

Model 12 is ideal as "go — no go" check on condition or to check circuit balance. Available in virtually any range up to a sweep of 100 milliamperes DC.

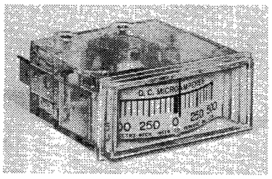
ANALOG METERS

Square-Shaped Panel Meters



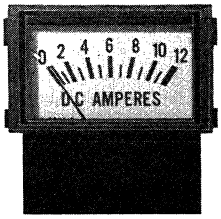
Featuring the unique EMICO High-Tork movement, these versatile plastic bezel meters are available as AC or DC ammeters, voltmeters, and milliammeters in choice of three sizes. They can be supplied 2.3125" square (Model 42), 2.3690" square (Model 50 series), and 2.8125" square (Model 44). Additional sizes available in models with a metal bezel. All AC meters have 5% accuracy; DC meters available with 3% or 5% accuracy. Regardless of the type or size of the bezel, any model can be mounted into a 2-1/16" diameter panel hole.

Edge-Reading Panel Meters



These space and cost saving meters, supplied with choice of flat-across front (Model 13-F) or curved-front (Model 13), are available as AC or DC ammeters, voltmeters, and milliammeters. They measure 1-13/16" x 3/4" and have clear molded plastic cases for easy illumination. Either 3% or 5% accuracy depending upon range. Standard quick disconnect-type terminal fits ¼" x .032" connector...screw-type also available. Can be supplied with zero-left, zero-center, or zero-right. Vertical or horizontal installation.

AMMETER Model 58



Compact size, 2.16 x 1.30; dependable and low in price; clean, modern design.
• Fast installation, snaps into panels .02 to .09 • Range 0 to 200 amperes • Conventional terminals in lower ranges • Above 30A. the terminals are replaced by a formed metal guide through which a charger lead is passed. A simple solution of hooking up heavy duty leads. Exceptionally low in price.

How to Order The more information you supply the better we can serve you. Information should include:
• Model number • Ammeter, Milliameter or Voltmeter • Range • AC or DC • Accuracy • Zero-left, center or right • Custom dial info • Use of meter • Quantity • Delivery date(s)
For more information contact your nearest Emico representative or call factory direct.

THORN EMI

EMICO INCORPORATED
A Member of the THORN EMI Group

123 North Main Street, P.O. Box 368, Dublin, PA 18917 • Phone 215-249-9330 • TWX 510-665-9583

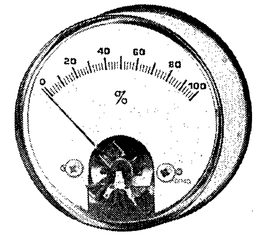
EMICO
ELECTRICAL INDICATORS AND GAUGES

Shown here are only a few of our line of instruments currently available to the automotive and heavy equipment OEM markets.

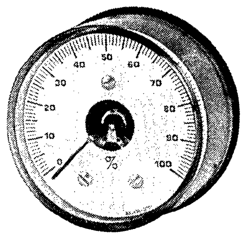
Industrial Process Meters...provide accurate readouts of flow meters and other industrial process instruments. Featuring polycarbonate covers and back, taut band/moving-coil movements, and banana plugs for easy installation.

Series 25

Size: 2.5" dia. at front; 2.75" dia. at flange; 1.45" deep
Scale: 90° arc, linear, length 2.0"



- Rugged taut band suspension
- 2% full scale accuracy
- Watertight, shock/vibration resistant



Series 250

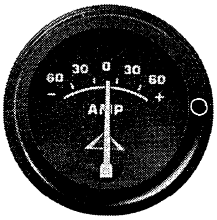
Size: 2.5" dia. at front; 2.75" dia. at flange; 1.8" deep
Scale: 250° arc. linear, length 4.7"

Accuracy: ± 2% of full scale
Inductance: -1.0 mH
Resistance: 5 ohms ± 20%
Temp. Coefficient: App. -.02%/°C

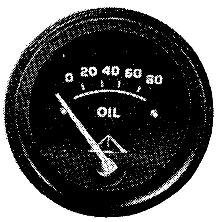
Accuracy: ± 2% of full scale
Inductance: App. 0.95 mH
Resistance: 8.2 ohms ± 20%
Temp. Coefficient: App. -.02%/°C

Heavy Duty Electrical Gauges

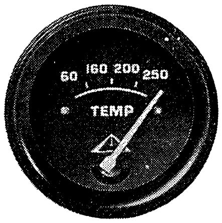
Unaffected by vibration, harsh weather or tough abuse, these rugged 2" gauges are ideal on construction equipment, electric generators, and all types of vehicles. All gauges have internal lighting, glass lenses, easy to read dials; zinc-plated case, chrome or black anodized aluminum bezels. Pointer spans 90° on the dial.



Ammeter
Ranges: 60-0-60 — 30-0-30
15-0-15



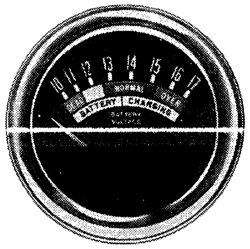
Oil Pressure Gauge
Range: 0-80 lbs.



Temperature Gauge
Range: 60° - 250°

VOLTMETER

Designed for multi-purpose use, this voltmeter indicates voltage of battery at idle and under varying conditions. A red pointer indicates 10 to 17 volts on a clearly marked multi-color scale.



For 12-volt systems

THORN EMI

EMICO INCORPORATED
A Member of the THORN EMI Group

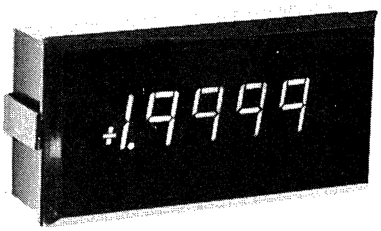
123 North Main Street, P.O. Box 368, Dublin, PA 18917 • Phone 215-249-9330 • TWX 510-665-9583

GRALEX DIGITAL PANEL METERS

THE STAR PERFORMERS

From Coast to Coast Gralex has the DPM's you want, in stock, for quick delivery. And we can custom scale every meter to meet your specific application. Gralex state-of-the-art meters from 0.05%, 3½ digit, high-quality instrument grade, 3¾ digit units, AC line power meters, ¾″ deep units, true RMS meters, LED or gas planar.

MODELS 40/41



- ACCURACY ±0.05% OF READING ±1 COUNT
- LINEARITY ±0.025% OF READING ±0.5 COUNT
- ¾″ DEEP
- LOW INPUT CURRENT (10 pA TYPICAL)
- SINGLE ENDED OR LIMITED DIFFERENTIAL OPERATION
- INPUT VOLTAGE RANGE ±1.9999 Vdc
- 5 V ±0.25 V POWER SUPPLY
- 2 W TYPICAL WITH DISPLAY
- 0.06 W TYPICAL WITH DISPLAY BLANKED
- RATIO MEASUREMENT CAPABILITY
- DISPLAY HOLD CAPABILITY
- AUTOMATIC ZERO
- AUTOMATIC POLARITY INDICATION

DESCRIPTION

The Models 40 and 41, 4½-digit DPMs are identical except the Model 41 does not include the plastic housing. Both units are designed for low-cost, low-power, full-feature digital panel meter applications. Operating from a 5 Vdc supply voltage with only 1 W power consumption, both models are ideal for instrument applications. Operation of the blanking pin further reduces the power to under 60 mW while the display is blanked and allows the units to be used in battery operated equipment.

All electronics are contained on a single pc board, using only four IC dice and a few other components plus the LED display.

Unlike many low-cost DPMs that reduce performance to achieve low price, the Models 40 and 41 meet or exceed the specifications of high priced and larger instruments. Both models offer as standard features: dual polarity input, full 1999 counts, rejection of common and normal mode signals, true automatic zero, polarity indication, user external decimal point selection, 1000 MΩ input impedance, and ratiometric operation.

The display is a high-brightness, multiplexed, 0.5″ high LED display.

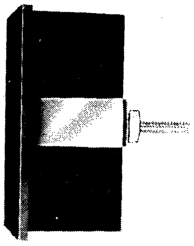
MODEL 30

- ACCURACY ±0.05% OF READING ±1 COUNT
- LINEARITY ±0.025% OF READING ±0.5 COUNT
- ¾″ DEEP
- LOW INPUT CURRENT (10 pA TYPICAL)
- SINGLE ENDED OR LIMITED DIFFERENTIAL OPERATION
- INPUT VOLTAGE RANGE ±1.999 Vdc
- 5 V ±0.25 V POWER SUPPLY
- 1 W TYPICAL WITH DISPLAY
- 0.06 W TYPICAL WITH DISPLAY BLANKED
- RATIO MEASUREMENT CAPABILITY
- DISPLAY HOLD CAPABILITY
- AUTOMATIC ZERO
- AUTOMATIC POLARITY INDICATION

SPECIFICATIONS

Configuration: Limited Differential or Single Ended input operations.
Ratiometric Operation: Uses external reference voltage or comparison voltage as inputs.
Common Mode Voltage: 0.4 V with 133 Ω maximum between ANALOG GROUND input and DIGITAL GROUND.
Common Mode Rejection: ≥50 dB at 50 or 60 Hz (With 250 Ω source imbalance).
Normal Mode Rejection: ≥45 dB @ 50 or 60 Hz.
Linearity: ±0.025% of reading ±0.5 count.
Accuracy: ±0.05% of reading ±1 count.
Temperature Coefficient: 0.01% of reading/°C.
Settling Time: 800 ms to 0.1% error from a (+) or (−) full scale step input.
Automatic Zero: No zero control required.
Display: 7-segment planar solid state (LED): 0.5″ (1.27 cm) high numerals.
Polarity Indication: Negative sign only.
Overrange Indication: 1 or −1 is indicated when count exceeds ±1999. All other digits are blanked.
External Hold: Last conversion is held and displayed.
Decimal Point: 3-position externally user-selectable. (Figures 1 and 2)
Temperature Range:
Operating — 0°C to +55°C.
Non-operating — −40°C to +75°C.
Relative Humidity: 0 to 85% (non-condensing).
Power: Display Operating — 1 W (typ.).
Display Blanked — 0.06 W (typ) with display blanked.
Power Supply Voltage: +5 Vdc ±0.25 V at 0.2 A typical.
Conversion Time: 400 ms/full scale reading.
Conversion Rate: 2.5 readings/sec (factory set).

MODELS 32/33



- ACCURACY ±0.1% OF READING ±2 COUNTS
- LINEARITY ±0.05% OF READING ±1 COUNT
- ¾″ DEEP
- LOW INPUT CURRENT (10 pA TYPICAL)
- SINGLE ENDED OR LIMITED DIFFERENTIAL OPERATION
- INPUT VOLTAGE RANGE ±199.9 MILLIVOLTS
- 5 V ±0.25 V POWER SUPPLY
- 1 W TYPICAL WITH DISPLAY
- 0.06 W TYPICAL WITH DISPLAY BLANKED
- RATIO MEASUREMENT CAPABILITY
- DISPLAY HOLD CAPABILITY
- AUTOMATIC ZERO
- AUTOMATIC POLARITY INDICATION

SPECIFICATIONS

Configuration: Limited Differential or Single Ended input operations.
Ratiometric Operation: Uses external reference voltage or comparison voltage as inputs.
Common Mode Voltage: 0.4 V with 133 Ω maximum between ANALOG GROUND input and DIGITAL GROUND.
Common Mode Rejection: ≥50 dB at 50 or 60 Hz (With 250 Ω source imbalance).
Normal Mode Rejection: ≥45 dB @ 50 or 60 Hz.
Linearity: ±0.05% of reading ±1 count.
Accuracy: ±0.1% of reading ±2 counts.
Temperature Coefficient: 0.01% of reading/°C.
Settling Time: 800 ms to 0.1% error from a (+) or (−) full scale step input.
Automatic Zero: No zero control required.
Display: 7-segment planar solid state (LED): 0.5″ (1.27 cm) high numerals.
Polarity Indication: Negative sign only.
Overrange Indication: 1 or −1 is indicated when count exceeds ±1999. All other digits are blanked.
External Hold: Last conversion is held and displayed.
Decimal Point: 3-position externally user-selectable. (Figures 1 and 2)
Temperature Range:
Operating — 0°C to +55°C.
Non-operating — −40°C to +75°C.
Relative Humidity: 0 to 85% (non-condensing).
Power: Display Operating — 1 W (typ.).
Display Blanked — 0.06 W (typ) with display blanked.
Power Supply Voltage: +5 Vdc ±0.25 V at 0.2 A typical.
Conversion Time: 400 ms/full scale reading.
Conversion Rate: 2.5 readings/sec (factory set).

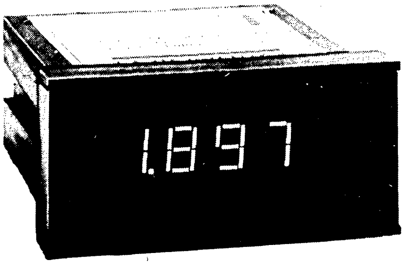
GRALEX INDUSTRIES INC
295 Community Drive, Great Neck, NY 11021 **516/487-7289 • 800/645-6535** OUTSIDE NY

GRALEX DIGITAL PANEL METERS

THE STAR PERFORMERS DIGITAL METERS FOR:

VOLTS DC / VOLTS AC / VOLTS RMS / MICROVOLTS / CURRENT LOOPS / RATE / FREQUENCY / RPM / TIME / RATIO / INTEGRATION /, AMPERE-HOUR / COUNTING / CALIBRATORS

MODEL 35

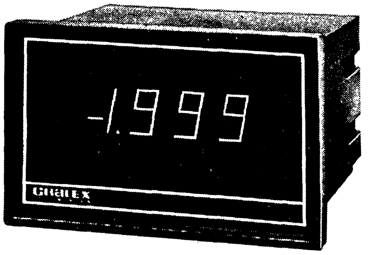


- ACCURACY ±0.05% OF READING ±1 COUNT
- LINEARITY ±0.025% OF READING ±0.5 COUNT
- LOW INPUT CURRENT (20 pA TYPICAL)
- SINGLE ENDED OR LIMITED DIFFERENTIAL OPERATION
- INPUT VOLTAGE RANGE ±1.999 Vdc
- 2 W TYPICAL WITH DISPLAY
- 0.2 W TYPICAL WITH DISPLAY BLANKED
- RATIO MEASUREMENT CAPABILITY
- DISPLAY HOLD CAPABILITY
- AUTOMATIC ZERO
- AUTOMATIC POLARITY INDICATION
- POWER REQUIRED 100, 115, 200, 230 Vac or 5 VDC or 7-15 Vdc

SPECIFICATIONS

Configuration: Limited Differential or Single Ended input operations.
Ratiometric Operation: Uses external reference voltage or comparison voltage as inputs.
Common Mode Voltage: 0.4 V with 133 Ω maximum between ANALOG GROUND and DIGITAL GROUND.
Common Mode Rejection: ≥50 dB at 50 or 60 Hz (with 250 Ω source imbalance).
Normal Mode Rejection: ≥45 dB @ 50 or 60 Hz.
Linearity: ±0.025% of reading ±0.5 count.
Accuracy: ±0.05% of reading ±1 count.
Temperature Coefficient: 0.01% of reading/°C.
Settling Time: 800 ms to ±2 counts from a (+) or (−) full scale step input.
Automatic Zero: No zero control required.
Display: 7-segment planar solid state (LED): 0.5″ (1.27 cm) high numerals.
Polarity Indication: Negative sign only.
Overrange Indication: 1 or −1 is indicated when count exceeds ±1999. All other digits are blanked.
External Hold: Last conversion is held and displayed.
Decimal Point: 3-position externally user-selectable. (Figures 2 and 3).
Temperature Range:
  Operating — 0°C to +55°C.
  Non-operating — −40°C to +75°C.
Relative Humidity: 0 to 85% (non-condensing).
Power:
  Display Operating — 2 W (typ.)
  Display Blanked — 0.2 W (typ.) with display blanked.
Power Supply Voltage: 5 Vdc, 7-15 Vdc, 100 Vac, 115 Vac, 200 Vac, 230 Vac typical.
Conversion Time: 400 ms/full scale reading.
Conversion Time: 2.5 reading/sec (factory set).
Mating Connector: Gralex 6G1280-5.

MODEL 36-4



FLOATING DIFFERENTIAL INPUT

- TRUE INSTRUMENT TYPE
- 1000 MEGOHMS INPUT IMPEDANCE
- 160 pA MAX. BIAS CURRENT
- AUTOPOLARITY
- AUTOZERO

PRECISION INTEGRATING A/D CIRCUIT
DTL/TTL OUTPUTS AND CONTROL INPUTS

- BCD DATA OUTPUTS STANDARD
- PROGRAMMABLE DECIMAL POINTS
- ADJUSTABLE CONVERSION RATE
- HOLD/READ & EXT. TRIGGER CAPABILITY

COMPACT DESIGN

- ONLY 2.0″ H x 3.5″ W x 2.82″ D.

SPECIFICATIONS

Full Scale Ranges: ±199.9 mV, differential; ±19.99 V, single ended.
Maximum Allowable:
  Input Voltage — 100 V.
  Impedance — 1000 Megohms, (1 Megohm for 19.99 V).
  Bias Current — 160 pA max.
  Common Mode Voltage — ±2.0 Vdc (signal input to analog gnd).
  Common Mode Rejection — >70 dB, 50 to 60 Hz.
  Normal Mode Rejection — >30 dB at 60 Hz
Accuracy: ±0.05″ rdg ±1 digit.
Stability: 80 ppm/°C rdg, typ.
Zero Drift: Auto zero (1 μV/°C)
Conversion Rate: 3 per second (internal control); 0 to 16 per second, ext. trigger.
Type: Seven segment gas discharge, 0.55 in.
Overrange Indication: 3 LSD's blank.
Decimal Points: Programmable.
Polarity: Automatic + and − indication.
Data Format: 8421 BCD, parallel, latched.
Fanout: 1 std TTL load.
Polarity: Logical 1 — positive input.
Overrange: Logical 1 = overload.
Data Ready: Logical 0 = data ready.
Hold: Ground or logical 0 freezes data.
External Trigger: Logical 0 pulse initiates update of last conversion data (1.5 μsec min, 2 msec max.)
Power: 100, 115, 220 or 237 V ±10% 50-440 Hz at 3.5 watts nom.
Operating Temperature: 0°C to +60°C.
Storage Temperature: −25°C to +70°C.
Relative Humidity: To 95%, non-condensing
Weight: 12 oz. (approx.)
Connectors Required: 6 G 1280-5 (2 req'd).

MODEL 38-2

- 3½ DIGITS
- BIPOLAR OPERATION
- 0.05% ACCURACY
- 0.6 INCH (15 mm) BRIGHT LED DISPLAY
- AUTOZERO
- LOW (160 pA) INPUT BIAS CURRENT
- HOLD CONTROL

SPECIFICATIONS

Full Scale Ranges: ±199.9 mV, differential, impedance 1000 megohms; ±1.999 V, differential, impedance 1000 megohms; ±19.99 V, single ended, impedance 1 megohm.
Maximum Allowable: ±100 V.
Bias Current: 160 pA max.
Common Mode Voltage: ±2.0 Vdc (sgl. input to analog gnd.)
Common Mode Rejection: >70 dB(dc to 60 Hz).
Normal Mode Rejection: >30 dB at 60 Hz.
Accuracy: ±0.05% rdg ±1 digit.
Stability: ±80 ppm rdg/°C max.
Zero Drift: Auto zero (1 μV/°C).
Conversion Rate: 3 per second.
Settling Time: 1 sec. max. for full scale step change.
Type: High intensity LED, 0.6 in.
Overrange Indication: 3 LSD's blank.
Decimal Points: Programmable.
Polarity: Automatic — indication.
Data Format: 8421 BCD, parallel, latched
Fanout: 1 std TTL load.
Polarity: Logical 1 = positive input.
Overrange: Logical 1 = overload
Data Ready: Logical 1 = converter busy.
Hold: Grounding inhibits update.
Power: 100, 117, 220 or 237 V ±10% 50 to 440 Hz at 3 watts max.
Operating Temperature: 0°C to +60°C.
Storage Temperature: −25°C to +70°C.
Relative Humidity: To 95%, non-condensing.
Weight: Approximately 12 oz.
Connector Required: Gralex P/N 6G 1280-5.

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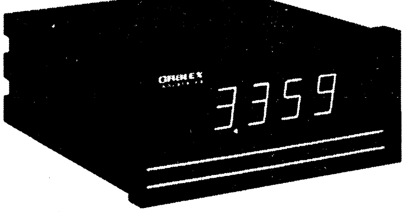
MODEL 37

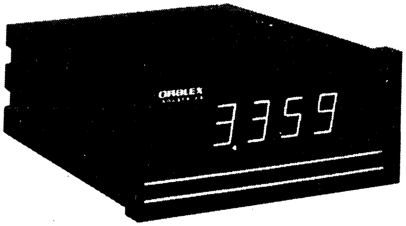


- 3¾ DIGIT DESIGN
- SCALEABLE (DISPLAY TEMP, ANGLES, ETC.)
- QUALITY, STATE-OF-THE-ART DESIGN
- CUSTOMS AVAILABLE
- ACCURACY OF ±0.1% READING
- AUTO POLARITY
- BCD OUTPUT OPTION
- RUGGED ABS CASE
- EASY INSTALLATION (ONE OPENING, ONE CONNECTOR)
- DISPLAY HOLD AND BLANKING
- THREE AUXILIARY REGULATED POWER SUPPLY OUTPUTS
- WORLDWIDE-UNIVERSAL AC POWERED 100 V, 117 V, 220 V, 237 V IN ONE UNIT.

SPECIFICATIONS

Full Scale Range: ±399.9 mV, ±3.999 V, ±39.99 V.
Maximum Allowable Input Voltage: ±50 V (±150 for 39.99 V).
Impedance: >100 megohms (except 39.99 V: >1 megohm).
Common Mode Voltage: ±300 Vdc (600 ac, P-P).
Common Mode Rejection: >100 dB up to 60 Hz.
Normal Mode Rejection: >24 dB (60 Hz).
Bias Current: 5 nA nominal (10 nA max.).
Accuracy: ±0.1% reading ±1 count.
Temp. Coefficient: 80 PPM rdg/°C max.
Zero Drift: 25 PPM fsr/°C max. ±5 μV/°C; 13 PPM fsr/°C max. ±5 μV/°C.
Settling Time: 1 second max. for step change of 2000 counts; 4 seconds max. for 4000 counts.
Conversion Rate: Approximately 6 per second.
Display Type: 7-segment planar gas discharge, .55 in.
Overload Indication: Dashes.
Dec. Point Program: X.XXX; XX.XX; XXX.X
Polarity Indicator: Minus (−) illuminates for negative inputs
AC Input Voltage: 100, 117, 220 or 237 Vac ±10%, 50 to 400 Hz.
Power Consumption: Less than 4 watts.
Auxiliary Regulated Supplies: +12 V @ 2 mA max., −12 V @ 2 mA max., +4.5 V @ 10 mA max.
Operating Temperature: 0°C to +60°C.
Storage Temperature: −25°C to 75°C.
Relative Humidity: To 95%, non-condensing.
Weight: 12 oz.
Mating Connector Required: Gralex P/N 6G 1280-5 (BCD option also requires P/N 6G 1280-3).

MODEL 37-DLM



DESCRIPTION

The Gralex Model 37DLM is a panel mounted meter designed to accurately measure AC line voltage. State of the art construction, including LSI circuits, and seven segment planar gas discharge displays ensure long trouble-free operation. A true RMS option (06) makes the 37DLM, a complete measuring system.

There are seven ranges to choose from, 0-1.999 or 0-3.999 volts with resolution of 1.0 mvolts to 0-600 volts* with resolution of 1 volt. All models are equipped with an internal universal power transformer that permits operation from most standard worldwide AC power lines with selection made at the input connector.

Standard units provide a basic accuracy of ±0.5% of reading ±1 digit when measuring sine wave voltages in the frequency range of 45 to 2000 Hz, and ±1% of reading ±1 digit at frequencies up to 20 kHz. Accuracy will be degraded where wave forms are distorted or contain harmonics. For such conditions, an optional version employing a true RMS measurement technique can be supplied. The true RMS version retains the accuracy of the basic model in the presence of distortion, harmonics or other complex wave forms.

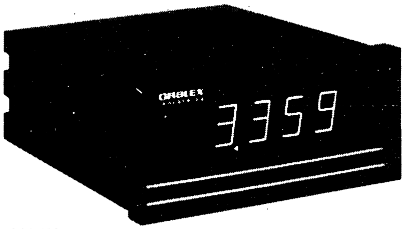
Packaged in a compact hight impact molded plastic case, the Model 37DLM conforms to the proposed NEMA standard for digital panel meters. Requiring only about seven square inches of panel area, the unit is easy to install and mounting hardware is included.

* The upper limit of 600 volts is determined solely by voltage ratings of commercial grade input connectors. Connectors tested to MIL-C-21097 will permit voltage measurement to 800 volts.

SPECIFICATIONS

Input Ranges: 0-1.999 V, 0-3.999 V; 0-19.99 V, 0-39.99 V; 0-199.9 V, 0-3999.9 V; 0-600 V.
Maximum Allowable Input: 600 V.
Input Impedance: >100K ohms.
Accuracy: ±0.5% rdg ±1 digit, 45-2 kHz** ±1.0% rdg ±1 digit, 2K-20 kHz.
Temperature Coefficient
of offset — ±0.003% f.s./°C.
of scale — ±0.01% f.s./°C.
Settling Time: 1.5 sec max. for 199.9 & 600 V models, 4 sec. max. for 399.9 V model.
Conversion Rate: Approximately 6 readings/sec.
Display: Seven segment planar gas discharge, .55 inch high.
Power: 100, 117, 220 or 237 Vac ±10%, 50-440 Hz.
Operating Temperature: 0°C to +60°C.
Storage Temperature: −25°C to +75°C.
Relative Humidity: To 95% non-condensing.
Weight: Approx. 12 oz.
Connectors required: Gralex P/N 6G 1280-3 and 6G 1280-5.

MODEL 37-PVI



DIGITAL PANEL METER SCALEABLE TRANSDUCER READOUT

- CUSTOM SCALED FOR ANY TRANSDUCER
- LOW COST
- READS TO 3999
- IDEAL FOR INDUSTRIAL CONTROLS

SPECIFICATIONS

CONSULT FACTORY FOR COMPLETE SPECIFICATIONS.

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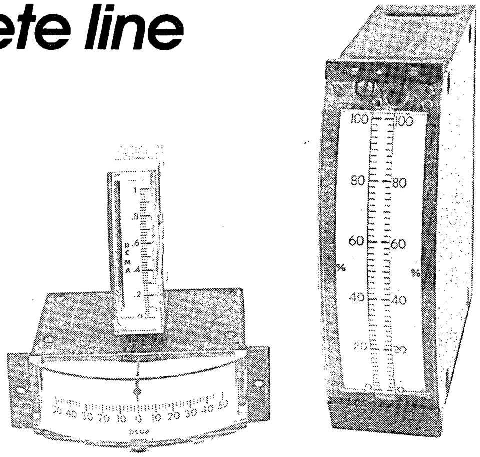
Panel Meters for OEM and Industry

INTERNATIONAL INSTRUMENTS

A PRIME TECHNOLOGY COMPANY

The World's most complete line of edgewise units



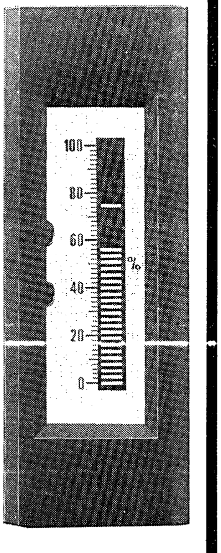
- ☐ Single and Dual.
- ☐ Switchboard-Class Units.
- ☐ Ruggedized Mil. Spec. Units.
- ☐ Alarm/Control Instruments:
  - □ Pyrometer/Controllers
  - □ Electronic Control Meters
- ☐ Custom Meters and Movements

International Instruments offers the industry's most comprehensive line of edgewise meters, alarm/control products and solid-state instruments to make it easy for you to select the precise range, physical package, performance characteristics and data presentation style best suited to your application.

The standard range of edgewise meters provides ±2% F.S. DC and ±3% F.S. AC accuracy as well as maximum information display in minimum panel space. Internal shielding allows mounting on magnetic or non-magnetic panels. Options available include internal illumination, VU and dB range, and other modifications for specific applications.

New solid-state bargraphs are super-readable.

Brighter, bolder VFD indicators/controllers. At less cost then LEDs or neon tubes.



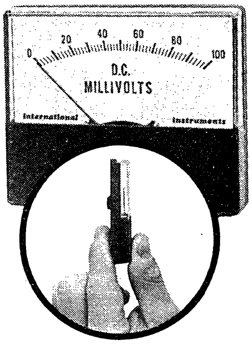
VERIGRAPH™ indicators/controllers are designed for easy replacement of your present 3½-inch edgewise units. Either vertical or horizontal format. A variety of 6-inch models will soon be available.

Super-bright vacuum fluorescent display (VFD) comes in a range of colors — blue-green, blue, green, yellow. High definition 2-inch bargraph is made up of 51 extra-wide segments (100 for 6-inch model).

Verigraph controllers cost 40% less than many comparable d'Arsonval units. They provide two alarm setpoints and a 1 amp relay output. Setpoints flash on alarm condition. Entire bargraph flashes on over/under range.

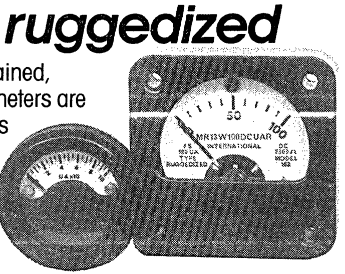
Unit is microprocessor-controlled, provides ±2% FS accuracy and meets ANSI C39.1 shock and vibration requirements. It requires 5 Vdc at 200 mA and uses either an edgecard-connector or barrier-terminal. Operating temperature is 0°C to 50°C.

Flat-Pak™ meters save space, money



Low-cost Flat-Pak meters are designed to mount on front of panel. Extra-slim shape — which eliminates the barrel and saves space behind the panel — is made possible by high-density samarium/cobalt magnets and an all-new miniature cantilever-coil taut-band movement. Available in 1.5" to 3.5" models with high-impact acrylic case, snap-together construction and snap-in scale replacement. Accuracy ±2%, linearity 1.5%.

Miniature ruggedized



These rugged, self-contained, individually-calibrated meters are specified where extremes of shock, vibration and dust prevail. Excellent for geophysical and electronic prospecting equipment, vehicular communications gear and other demanding applications. D'Arsonval movements with spring-backed bearings. Accuracy ±3% F.S. dc, ±5% F.S. ac. Unusually long scales for meter size.

INTERNATIONAL INSTRUMENTS
Division of General Resistance, Inc.,
P. O. Box 185, North Branford, Connecticut 06471

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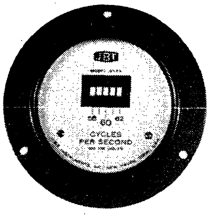
J-B-T INSTRUMENTS

45 Years of Manufacturing Excellence

J-B-T INSTRUMENTS

VIBRATING REED FREQUENCY METERS

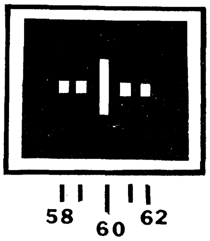


31-FX

Operate on AC or interrupted DC to provide direct reading of frequency by viewing reed. Exceptional long-life and stability is assured by patented simple rugged construction. Standard meters are shown in table. Other styles and closer accuracies are available.

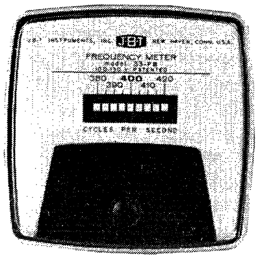
Model	Range Hz	Reeds	Hz/ Reed	Standard V.	Ω/V	Power Watts	Accuracy ±%**	Size (In.)	Style
30-FX	48-52*	10	1	100-130	140	0.9	0.3	3½	Round Molded Case
31-FX	58-62†	5	1	100-130	120	1.0	0.3	3½	Round Molded Case
31-FX-7	57-63†	7	1	100-130	140	0.9	0.3	3½	Round Molded Case
33-FX	380-420	9	5	100-130	130	0.7	0.3	3½	Round Molded Case
34-FX	56-64†	9	1	100-130	140	0.9	0.3	3½	Round Molded Case
34-FX-Z	58-62†	9	0.5	100-130	140	0.9	0.2	3½	Round Molded Case
36-FX-21-115	380-420	21	2	100-130	130	0.7	0.3	3½	Round Molded Case
31-FHXX	58-62†	5	1	100-130	120	1.0	0.3	3½	Round Metal Case (Sealed)
31-FHXX-7	57-63†	7	1	100-130	140	0.9	0.3	3½	Round Metal Case (Sealed)
33-FHXX	380-420	9	5	100-130	130	0.7	0.3	3½	Round Metal Case (Sealed)
34-FHXX	56-64†	9	1	100-130	140	0.9	0.3	3½	Round Metal Case (Sealed)
36-FHXX-21-115	380-420	21	2	100-130	130	0.7	0.3	3½	Round Metal Case (Sealed)
23-FHXX	380-420	5	10	100-130	125	0.55	0.3	2½	Round Metal Case (Sealed)
15-FHAC	60 & 400	2	—	8-10	270	0.04	0.5	1½	Round Metal Case (Sealed)
15-FH-400	380-420	5	10	100-130	115	1.25	0.3	1½	Round Metal Case (Sealed)

* Also 58-62 † Also available in 50 Hz range ** At reference temperature of 77°F. Change is only .0075% per degree negative.



TYPICAL RESPONSE PATTERN

NEW 34-FXP Portable Frequency Tester — To check generator loads, speeds, or performance; to verify unknown frequency at campsites; to simplify maintenance work, this 9-reed 56-64 Hz instrument is housed in a sturdy molded case 5½″ x 5½″ x 5¼″ wide. Comes complete with prods and grounded plug-in cord.



33-FB

ELAPSED TIME METERS (NON-RESETTABLE)

Used to record operating time of AC equipment synchronously by 1/10th hour steps up to 9,999.9 or 99,999.9 hours.

31-EGW-5: Supplied in a jewel-like case 3½″ wide and 3″ high. Reading to 9,999.9 hours for 110-125 VAC, 60 Hz.

31-EGW: Same as 31-EGW-5 except reading to 99,999.9 hours. 110-125 VAC, 60 Hz.

Both models available with half-bezel adapters 3.83″ wide x 2.27″ high as 13A-239 (metal) or 13A-234 (molded plastic).

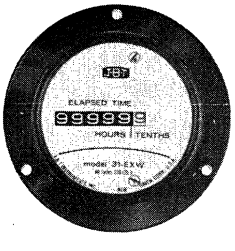
31-EXW-5: 3½″ round style shown to left. Meter reads to 9,999.9 hours and automatically resets to zero. Tenths are red on white with units white on black. Meets MIL-M-6B. 110-125 VAC, 60 Hz.

31-EX: Similar to 31-EXW-5 but with smaller numbers; same 3½″ round case. Reads to 9,999.9 hours. 110-125 VAC, 60 Hz.

31-EX-200: Same as 31-EX except for 200-240 VAC, 60 Hz.

31-EXW: Versatile elapsed time meter in 3½″ round case reading to 99,999.9 hours with large numerals same size as 31-EXW-5 and interchangeable with all FX type frequency meters. 110-125 VAC, 60 Hz.

31-ES: Same readout as 31-EX except housed in 3″ black square molded case. Reads to 9,999.9 hours. 110-125 VAC, 60 Hz.



31-EXW

TEMPERATURE TESTERS & ACCESSORIES

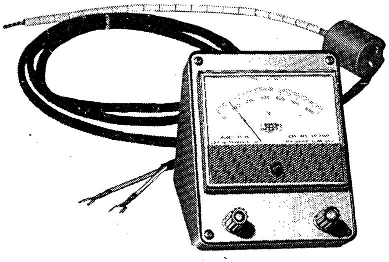
J-B-T supplies several widely-used temperature measuring instruments and testers with a complete line of accessories for each.

23-JP-1: Portable indicating pyrometer in black vinyl carrying case. Reads from zero to 650°F on 2.48″ scale in 10°F increments and readable to 3°F. Automatic ambient temperature correction for accurate reading. Supplied with attached SA-199 thermocouple, clip and convection shield with 5½ foot long cord.

32-JP-7P: An extremely versatile and easy to read pyrometer in a handsome black vinyl carrying case. Reads 0-650°F on a large 4″ scale. Is supplied with the SA-199P plug-in thermocouple, clip and convection shield with a 5½ foot long cord. Widely used for checking appliances and electronic equipment. Also available with scale reading 0-1200°F.

32-JG: Laboratory pyrometers in three ranges, 0-650, 0-1200 or 0-2000°F with large easy to read dial, thermocouple, lead and connector block. Normally supplied in sloping front stand.

Write for catalog of temperature measuring accessories.



32-JG-650

CALL OR WRITE FOR GENERAL CATALOG 180

J-B-T INSTRUMENTS, INC., BOX 1818, NEW HAVEN, CONNECTICUT 06508
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COMMONLY USED ELECTRICAL/ELECTRONIC ABBREVIATIONS AND ACRONYMS

A
AC alternating current
A/D analog to digital
ADC analog to digital converter
ADP automatic data processing
AF audio frequency
AFC automatic frequency control
ALGOL algorithmic language
AM amplitude modulation
AND a logical operator
AQL acceptable quality level
ASCII American national standard code for information interchange
AWG American wire gauge

B
BALUN balanced to unbalanced
BASIC beginners' all-purpose symbolic instruction
BCD binary-coded decimal
BNC baby "N" connector
BUS basic utility system

C
CAD computer aided design
CAM computer aided manufacture
CATV cable television or community antenna television
CERMET ceramic metal element
Comm. communications
CMOS complementary metal-oxide semiconductor
CPS characters per second
CPU central processing unit

D
D/A digital to analog
DAC digital to analog converter
DC direct current
DIAC bidirectional trigger diode
DIL dual in-line
DIN Deutsche Industrie Normenausschuss
DIP dual in-line package
DPM digital panel meter
DTL diode transistor logic

E
EDP electronic data processing
EBCDIC extended binary coded decimal interchange code
EEPROM electrically erasable PROM
EMC electromagnetic compatibility
EMI electromagnetic interference
EMP electromagnetic pulse
EPROM electrically programmable ROM
ESR equivalent series resistance

F
FEP fluorinated ethylene propylene Copolymar, 200° Teflon
FET field-effect transistor
FM frequency modulation
FORTRAN formula translator

G
GaAsFET gallium arsenide field effect transistor
GPIB general purpose interface bus

H
HF high frequency (3 to 30 MHz)
HIPOT test, measurement and diagnostic equipment
HLL high level language
HV high voltage
Hz Hertz

I
IC integrated circuit
IDC insulation displacement contact
IF intermediate frequency
IO input/output (devices)
IR insulation resistance (or) infrared

J
JFET junction field effect transistor
JMOS junction metal oxide semiconductor

K
kHz kilohertz (10^3 hertz)
KSR keyboard send receive

L
LC inductance capacitance
LCD liquid crystal display
LED light-emitting diode
LF low frequency (30 to 300 kHz)
LIF low insertion force
LNA low noise amplifier
LNB low noise band
LSI large scale integration
LVDT linear velocity displacement transformer

M
MASER microwave amplification by stimulated emission of radiation
MATV master antenna television
μF microforad
MHz megahertz
MIPS million instructions per second
MIB microcomputer interface board
MOS metal oxide semiconductor
MOSFET metal oxide semiconductor field effect transistor
MOSIGT metal-oxide semiconductor insulated-gate transistor
MOV metal oxide varistor
MPU microprocessor unit
MSI medium scale integration

N
NBS National Bureau of Standards
NEMP nuclear electromagnetic pulse
NIM nuclear instrumentation module
NOR not OR
NTC negative temperature coefficient

O
OCR optical character reader
OEM original equipment manufacturer
OR a logical operator

P
PC printed circuit
PCB printed circuit board
pF picofarad
PGA pin grid array
PIN positive-intrinsic-negative (transistor)
PLA programmable logic array
PLL phased lock loop
PPI plan position indicator
PROM programmable read only memory
PTC positive temperature coefficient
PUT programmable unijunction transistor

Q
QAM quadrature amplitude modulation
Q (meter) quality-factor meter

R
RAM random access memory
RC resistance-capacitance
RFI radio frequency interference
RMS root mean square
ROM read only memory
RF radio frequency
RFC radio-frequency choke
RFI radio-frequency interference
RTD resistance-temperature detector
RTL resistor transistor logic
RTV room temperature vulcanizing
RW read/write

S
SAS silicon asymmetrical switch
SBC single board (micro) computer
SBS silicon bilateral switch
SCR silicon-controlled rectifier
SCS silicon controlled switch
SDA source & detector assemblies
SIDAC bidirectional voltage-triggered switch
SIP single in-line package
SSI small scale integration
SSR solid state relay
STL Schottky transistor logic
SUS silicon unilateral switch

T
TC temperature coefficient
TCXO temperature compensated crystal oscillator
TFE tetrafluoride ethylene propylene Copolymer, 250° Teflon
TRIAC bidirectional AC switch
TTL transistor-transistor logic
TTY teletypewriter

U
UHF ultra high frequency (300 MHz to 3 GHz)
UJT silicon unijunction transistor
UL Underwriters Laboratory
UPS uninterruptible power supply

V
VAC volts (of) alternating current
VAR volt-ampere reactive
VCR video cassette recorder
VDC volts (of) direct current
VHF very high frequency
VHSIC very high speed integrated circuit
VLF very low frequency (3 to 30 kHz)
VLSI very large scale integration
VME virtual machine environment
VRM voice recognition module
VTVM vacuum tube volt meter
VU volume unit
VSWR voltage standing wave ratio

W
WPS word processing software

Y
YIG yttrium iron garnet

Z
ZIF zero insertion force

LINCOLN INSTRUMENTS, INC.

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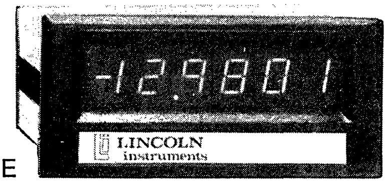
DIGITAL PANEL METER

5½ DIGIT
NOVA
MODEL



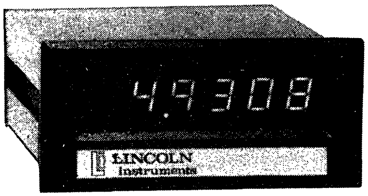
ULTRA HIGH-PERFORMANCE

±130000 COUNT RESOLUTION

- monolithic analog-to-digital converter
- high-efficiency 0.56" red LEDs
- exceptional terminal linearity and accuracy stability
- standard NEMA case size
- ideal for use in high precision pressure and temperature indicators, test equipment & electronic scales
- rugged, anodized aluminum case

DIGITAL PANEL METER

4¾ DIGIT
ALTAIR
MODEL



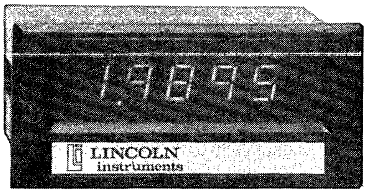
ULTRA HIGH-PERFORMANCE

±49999 COUNT RESOLUTION

- ±49,999 count resolution
- monolithic analog-to-digital converter
- rugged, anodized aluminum case
- standard NEMA case size
- high-efficiency 0.56" red LEDs
- low component count, high reliability

DIGITAL PANEL METER

4½ DIGIT
STARTRAC
MODEL



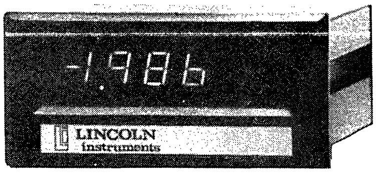
ULTRA HIGH-PERFORMANCE

±19999 COUNT RESOLUTION

- monolithic analog-to-digital converter
- high-efficiency 0.56" red LEDs
- minimum component count ≃60 parts
- standard case size
- pin-for-pin interchangeable with Weston 2470 Data Tech 4412
- rugged, anodized aluminum case

DIGITAL PANEL METER

3½ DIGIT
ASTRA
MODEL



ULTRA HIGH-PERFORMANCE

±1999 COUNT RESOLUTION

- monolithic analog-to-digital converter
- rugged, anodized aluminum case
- standard case size
- minimum component count ≃60 parts
- high-efficiency 0.56" red LEDs

ORDERING INFORMATION

NOVA—A—1 0—0

5½ digit model

Range
A=±1.30000v (RIN=1000MΩ)
B=±3.25000v (RIN=1000MΩ)
C=±6.50000v (RIN=1000MΩ)
D=±13.0000v (RIN=1MΩ)
E=±130.000v (RIN=1MΩ)
F=130.000 μa (RSH=10KΩ)
G=1.30000 ma (RSH=1KΩ)
H=13.0000 ma (RSH=100Ω)
J=130.000 ma (RSH=10Ω)

Input power option
-1=115 vac ±10% 50-60 hz
-2=220 vac ±10% 50-60 hz

Extra option
-0=none

Buffered, latched, parallel BCD output option
-0=without BCD option
-1=with BCD option

ALTAIR—A—1 0—1

4¾ digit model

Range
A=±499.99 mv (RIN=1000MΩ)
B=±4.9999v (RIN=1000MΩ)
C=±49.999v (RIN=1MΩ)
D=±499.99v (RIN=10MΩ)
E=49.999 μa
F=499.99 μa
G=4.9999 ma
H=49.999 ma
J=499.99 ma

Input power option
-1=115 vac ±10% 50-60 hz
-2=220 vac ±10% 50-60 hz

Option
-0=none

Buffered, latched, parallel BCD output option
-0=without BCD option
-1=with BCD option

STARTRAC—A—1 2—0

4½ digit model

Range
A=±199.99 mv (RIN=1000MΩ)
B=±1.9999v (RIN=1000MΩ)
C=±19.999v (RIN=1MΩ)
D=±199.99v (RIN=1MΩ)
E=19.999 μa (RSH=50KΩ)
F=199.99 μa (RSH=5KΩ)
G=1.9999 ma (RSH=500Ω)
H=19.999 ma (RSH=50Ω)
J=199.99 ma (RSH=5Ω)

Input power option
-1=115 vac ±10% 50-60 hz
-2=220 vac ±10% 50-60 hz
-3=±15 to ±18 vdc at 25 ma and +5 ±0.25 vdc at 200 ma

Interchangeability option
-0=none
-1=Weston model 2470
-2=Data Tech model 4412

Buffered, latched, parallel BCD output option
-0=without BCD option
-1=with BCD option

ASTRA—A—1 0—0

3½ digit model

Range
A=±199.9 mv (RIN=1000MΩ)
B=±1.999v (RIN=1000MΩ)
C=±19.99v (RIN=1MΩ)
D=±199.9v (RIN=1MΩ)
E=19.99 μa (RSH=10KΩ)
F=199.9 μa (RSH=1KΩ)
G=1.999 ma (RSH=100Ω)
H=19.99 ma (RSH=10Ω)
J=199.9 ma (RSH=1Ω)

Input power option
-1=115 vac ±10% 50-60 hz
-2=220 vac ±10% 50-60 hz
-3=±15 to ±18 vdc at 25 ma and +5 ±0.25 vdc at 200 ma

Extra option
-0=none

Buffered, latched, parallel BCD output option
-0=without BCD option
-1=with BCD option

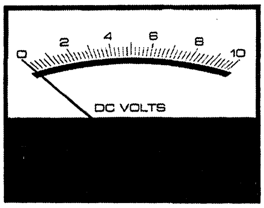
MODUTEC Analog Panel Meters

2% D'Arsonval & Iron-Vane Meters taut-band & pivot jewel suspension

Meet or Exceed ANSI Spec C39.1 (1981)

S SERIES - Surface Mount - 1½", 2½", 3½", 4½", 5½", 8"

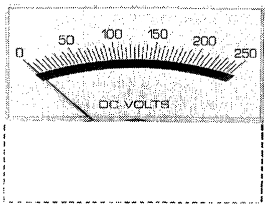
Industry Standard for Performance and Good Looks



DC:	AC:
Microammeters	**Milliammeters**
logarithmic	**Ammeters**
suppressed zero	**Voltmeters**
Milliammeters	**Frequency meters**
suppressed zero	**Elapsed time meters**
Ammeters	**VU meters**
Millivoltmeters	------------------
Voltmeters	**Null meters**
VU-type meters	**Pyrometers**

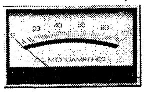
Meters of similar appearance are available with translucent dials and backs for rear illumination, integral light boxes, in ruggedized, MIL-spec versions, and with UL recognition.

W SERIES-Windo-Mount- 1½", 2½", 3½", 4½", 5½", 8"

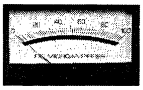


This original Modutec design provides a true flush mount without sinking the dial deep into the panel. W Series meters come in the same ranges and types as the S Series, at left, and are also available with UL recognition.

BEZEL MOUNT METERS—1½", 2½", 3½", 4½", 5½"



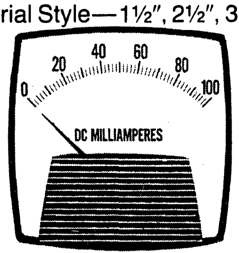
Metallized inline bezel



Solid black bezel

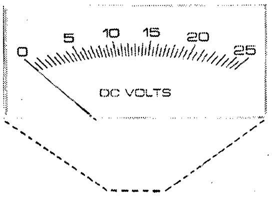
The attractive Bezel Mount option is available with S Series meters, and all other series with the S configuration, including the SWM Series described below.

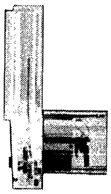
PB SERIES—Surface Mount Industrial Style—1½", 2½", 3½"



These meters have the bold-look styling preferred by many for industrial applications. They have the same sizes and ranges as the S Series above (VU ranges not available).

WM SERIES-Windo-Mount - 1½", 2½", 3½", 4½"





These sophisticated "World Meters" use less behind-panel space than any meters of equivalent size, yet are accurate and rugged. Wide selection of ranges and types.

- Exceptionally small barrels are fully insulated.
- Translucent backs & dials for shadow-free backlighting.
- Quick-connect terminals on case or barrel.
- Designed to facilitate PC board attachment.

SWM SERIES "SPACE SAVERS" —2½", 3½", 4½"

Surface Mount & Windo-Mount

These meters have cases and covers similar to the S and W Series described above, but incorporate the small barrels of the World Meters at left, producing a very useful, very compact meter.

- Threaded stud or quick-connect terminals optional.
- Surface mount type offer mounting studs in 2 standard European and 2 standard USA configurations.
- Available for shadow-free backlighting.

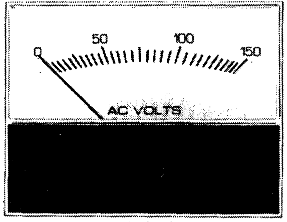
5% METERS — Moving Magnet Type

Handsome, rugged, dependable meters at low cost for applications where 2% precision is not required. Surface or flush mount without modification.

DC **(zero left or zero center):**
Microamp, milliamp, and ammeters
Millivolt and voltmeters
VU-type meters
AC: Milliamp and ammeters
Voltmeters
VU-type meters

Rectangular Meters

MAS Series—1½", 2½", 3½"

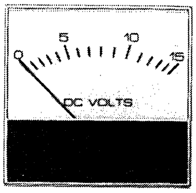


Handsomely styled, these meters have operating zero adjusters and scales printed on translucent backs, permitting glare-free backlighting.

Typical prices (500 units)
1½" DC voltmeter—$5.85
2½" DC voltmeter—$6.75
3½" DC voltmeter—$7.05

Square Meters

OMS (1½"), MSQ (2½")



Traditional shape, these meters have operating zero adjusters and scales printed on translucent backs, permitting back-lighting.

Typical prices (500 units)
1½" DC voltmeter—$5.40
2½" DC voltmeter—$6.50

Edgewise Meters

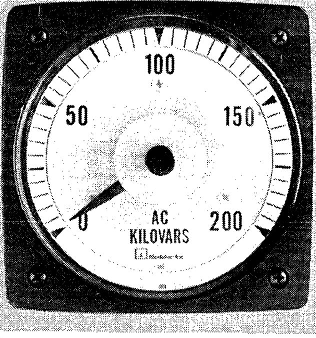
MD(1¼"), ME(2"), MF(2½")

DC AMPERES
0 2 4 6 8 10

Space saving meters that lie flat on the panel. Glare-free backlighting available as a low-cost option. Quick-mounting hardware supplied.

Typical prices (500 units)
1¼" DC voltmeter—$4.85
2" DC voltmeter—$5.10
2½" DC voltmeter—$6.40

SWITCHBOARD METERS



4SB Series—4½" square

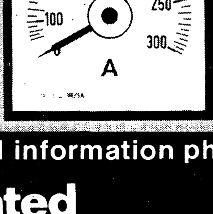
- **1% moving-coil and iron-vane types.**
- **Meet requirements of ANSI Spec C39.1**
- **Steel cases—integral transducers.**

Available in the following ranges

DC Microammeters	**AC Voltmeters**
DC Milliammeters	**AC Varmeters**
DC Ammeters	**AC Wattmeters**
DC Voltmeters	**AC P.F. Meters**
AC Ammeters	**Frequency Meters**
	Synchroscopes

DN Series—DIN Type Cases

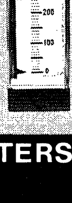
- **48mm, 72mm, 96mm, 144mm.**
- **1½% moving-coil and iron-vane types.**
- **Meet IEC standards.**



Available in the following types:
DC Microammeters
DC Milliammeters
DC Ammeters
DC Voltmeters
AC Ammeters
AC Voltmeters
AC Varmeters
AC Wattmeters
AC P.F. Meters
Frequency Meters
Synchroscopes

SBE Series Edge Reading

Size (nominal): 1¾" × 6½". Meet requirements of ANSI Spec C39.1 for edge-reading meters.



Available in the following types:
DC Microammeters
DC Milliammeters
DC Ammeters
DC Voltmeters
AC Ammeters
AC Voltmeters
AC Varmeters
AC Wattmeters
AC P.F. Meters
Frequency Meters
Synchroscopes

For full information phone 1-800-METERS-1

THORN EMI

Modutec Incorporated

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MODUTEC Digital Meters & Bargraphs

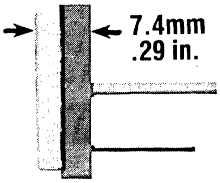
BL SERIES—BIG LITTLE™ DPMs

BIG in looks, performance, versatility, reliability— **LITTLE** in size & cost

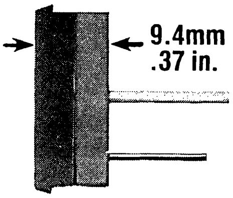
- **Choice of mounting styles**
- **Three power options**
- **Big ½″-high digits**

Size: .95″ × 2.36″ 24 × 60mm

Accuracy: ±(0.1% ±1 count)
Resolution: 1 part in 2000
Display: LCD, 3½ digits 12.7mm high
Polarity: Automatic (–) displayed
Decimal point: External selection
Analog inputs: ±200mV or ±2V
Input resistance: 1000MΩ
Input protection: 250VDC or 150V rms continuous; 300V intermittent
Operating range: 0°C to +50°C
Range tempco: 100ppm/°C
Power options:
9V batt @100µA (with LOBAT)
±5VDC ±5% @ 100µA
+5VDC ±5% @ 750µA



Series BL100
Surface or Windo



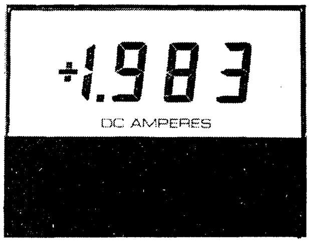
Series BL130
Bezel Mount

MODELS and DESCRIPTION

Model	Connection Arr.
Surface or Windo Mount	
BL100	13-pins for wire-wrap, solder, or fit standard female connector
Windo-mount	
BL101	7-position terminal block
BL102	7 solder pads
Bezel Mount	
BL130	13 pins (see BL100, above)
BL131	7-position terminal block
BL132	7 solder pads
Drop-in replacement for other flat DPMs	
BL176	Solder pads

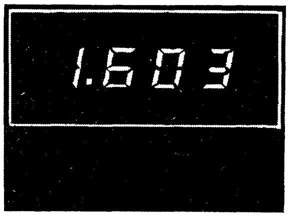
D SERIES—LCD READOUT—2½″, 3½″, 4½″

Surface, Windo, and Bezel Mount



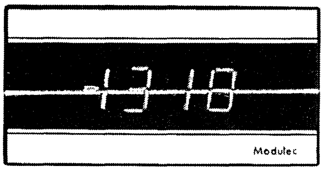
- **Interchangeable with Modutec S and W Series analog meters.**
- **Five power options—very low dissipation.**
- **Standard AC & DC ranges, plus Pyrometers & Loop Receivers**
- **Auto polarity and decimal.**

DH SERIES—3″ Surface/Windo Mount LED display

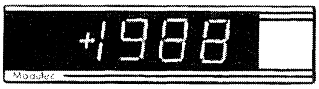


- **Bright display 11mm high.**
- **Flat back saves space.**
- **Auto polarity indication.**
- **External decimal selection.**

DM SERIES—DIN CASE, LED readout AC and DC ranges



2DM Series—48 × 96mm size



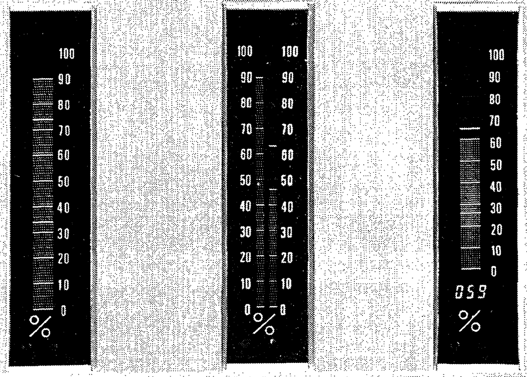
1DM Series—24 × 96mm size

- **Case configuration has worldwide acceptance.**
- **Highly visible red LED display.**
- **Quick-connect terminals.**
- **Automatic polarity indication.**

FBG SERIES BARGRAPHS

The BEST and the BRIGHTEST

- **100-segment high accuracy analog display plus digital display in some models.**
- **Front-adjustable set points switch 10W/50V (250mA max).**
- **Wide selection DC and AC inputs.**
- **Operate on 110VAC line—no power supply needed.**
- **Horizontal and vertical scales available.**



Single Channel Models
10—plain display
11—display with 2 set points
12—plain display zero center
13—display with zero center, 2 set points

Dual Channel Models
20—plain display
21—display with 1 set point on each channel
22—display with 2 set points on right channel

Single Channel Models with Digital Readout
30—plain display plus digital readout
31—display with 2 set points plus digital display

For full information phone 1-800-METERS-1

THORN EMI

Modutec Incorporated

A THORN EMI company
18 Marshall St., P.O. Box 778, Norwalk, CT 06856 ■ (203) 853-3636 ■ TWX 710-468-2039

im

The Instrument Mart

295 Community Drive, Great Neck, New York 11021

FLUKE

Digital Multimeters, Frequency Counters, Digital Thermometers

B+K PRECISION DYNASCAN CORPORATION

Digital Multimeters, Oscilloscopes, Power Supplies, Function Generators, Video and Audio Test equipment, DMM's, **Authorized Factory Service**

Tektronix®

COMMITTED TO EXCELLENCE

Video Test Equipment Including NTSC and PAL Vector scopes, Waveform Monitors, Picture Monitors, Sync Generators

HITACHI

Oscilloscopes, Video Test Equipment, **Authorized Factory Service**

DATA PRECISION

Digital Multimeters, DC Voltage Standards, Digital Capacitance Meters

ASSOCIATED RESEARCH, INC.

Hypots, Megohmmeters, Cable & Fault Locaters, Oil Testers, Vibrograms

PHILIPS

Oscilloscopes, Frequency Counters, Pulse Generators, Video Test Equipment

KEITHLEY

Digital Multimeters, Digital Thermometers

IWATSU

Oscilloscopes, scope calibrators, logic analyzers

GRALEX

Digital Panel Meters

Panasonic

Audio Test Equipment, Logic Analyzers, High Frequency & Storage Oscilloscopes

Polaroid

Cameras for Oscilloscopes and CRT Terminals

VIZ

Power Supplies, DMM's VOM's, AC Line Transformers, Frequency Counters

LEADER Instruments Corp.

Oscilloscopes, Video Test Equipment, Frequency Counters, Function Generators, Transistor Checkers, Audio Instrumentation, Oscilloscope Probes, LCR Bridges, Signal Generators, Frequency Synthesizers, Microwave Sweepers, DMM's, VOM's

BECKMAN

Digital Multimeters, **Authorized Factory Service**

POWER DESIGNS

Hi-Reliability Laboratory Power Supplies

Simpson

INSTRUMENTS THAT STAY ACCURATE

VOM's, DMM's, Strip Chart Recorders, Analog & Digital Panel Meters, Insulation Testers, Function Generators

HAMEG

Oscilloscopes

EVEREADY®

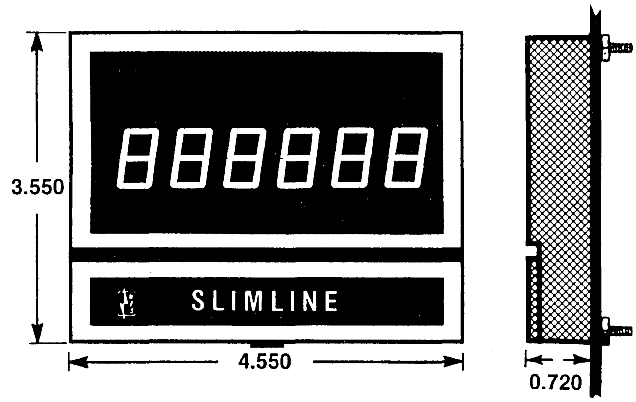
Batteries, Carbon Zinc, Alkaline, NiCad

(516) 487-7430 outside N.Y. (800) 645-6535

The Professional Test Equipment Source

SLIMLINE® METERS

MORE THAN A METER

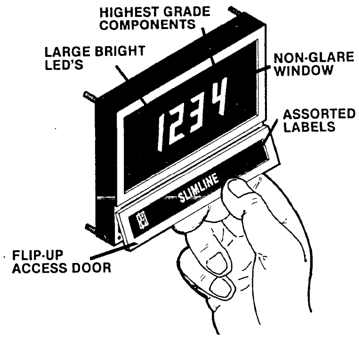


888888
SLIMLINE
3.550
4.550
0.720

FEATURES

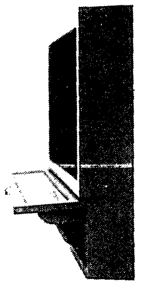
- **Best quality available**
- **Display only, parallel BCD, tri-state BCD, open collector and serial ASCII data outputs**
- **Large, bright LED display**
- **All meters in same Slimline case**
- **Front surface panel mounting**
- **Easy wiring and installation**
- **Flip-up door for easy access to controls**
- **Socketed parts for ease of maintenance**
- **Rugged industrial design; 3-year warranty**

The modular Slimline System is flexible enough and affordable enough to keep you one step ahead of the competition. And it is only available from NES.

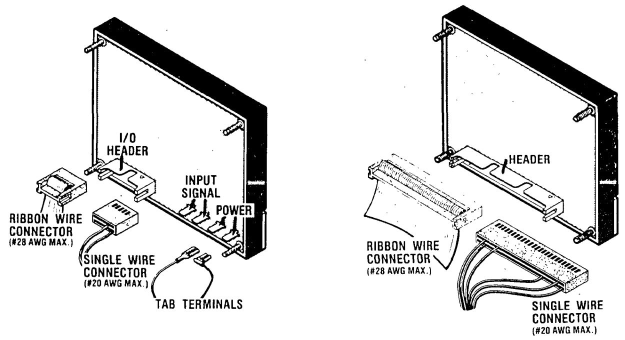


HIGHEST GRADE COMPONENTS
LARGE BRIGHT LED'S
NON-GLARE WINDOW
ASSORTED LABELS
FLIP-UP ACCESS DOOR
1234
SLIMLINE

Wired via tab terminals or connectors (10 or 50 pin)



Controls under flip-up door



I/O HEADER
INPUT SIGNAL
POWER
RIBBON WIRE CONNECTOR (#28 AWG MAX.)
SINGLE WIRE CONNECTOR (#20 AWG MAX.)
TAB TERMINALS
HEADER
RIBBON WIRE CONNECTOR (#28 AWG MAX.)
SINGLE WIRE CONNECTOR (#20 AWG MAX.)

Rear view showing 10 and 50 pin connectors

SLIMLINE QUALITY

Slimlines are the highest quality digital panel meters you can buy. From the conservative and flexible design approach to the best in components, no detail is overlooked. That is why Slimlines were chosen for the Space Shuttle, Air Force One, nuclear power installations and in virtually all industries. All Slimlines have a 3-year warranty.

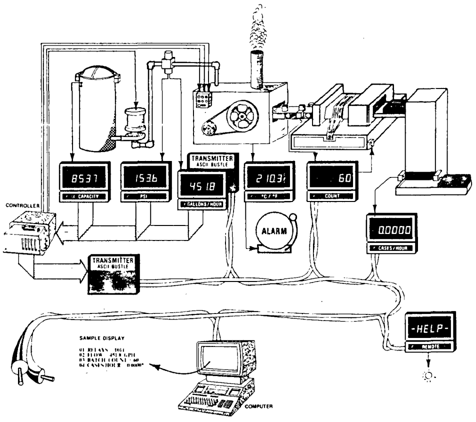
SLIMLINE VERSATILITY

Field scaleable means an uncomplicated way for you to change ranges, switch select your type of input, or adjust the noise/response filtering, all from under the flip-up door. Future expandability is assured. Slimlines offer fast and easy ways to change an individual meter or the whole system.

SLIMLINE VARIETY

NES digital panel meters can measure and display functions ranging from analog process or electrical signals to production rate or temperature. We offer meters with setpoints, BCD outputs and serial ASCII for control and communications. Slimlines can fulfill your requirements!

FROM SIMPLE METERING TO DATA ACQUISITION & TELEMETRY



8537
CAPACITY
1536
PSI
TRANSMITTER ASCII BUSTLE
45 18
GALLONS/HOUR
2 103
°C/°F
60
COUNT
CONTROLLER
ALARM
00000
CASES/HOUR
TRANSMITTER ASCII BUSTLE
SAMPLE DISPLAY
-HELP-
COMPUTER

FEATURES

- **Fully compatible with most computers & programmable controllers**
- **Can transmit full 128 character ASCII set**
- **Up to 100 individually addressable meters on the same 2-wire data line**
- **Remote analog, digital and serial ASCII readouts**

Slimlines are ideal data gathering peripherals for computers and programmable controllers. They are available with serial ASCII outputs or a variety of BCD and open collector formats. Up to 100 individually addressable units can be connected on the same two-wire serial ASCII data line.

ASCII transmitter Bustles® convert parallel BCD (from programmable controllers or other Slimlines) to serial ASCII. Receiver Bustles® accept ASCII from any source and convert it to parallel BCD. Altogether, Slimline modules offer the most cost-effective means of gathering data in a system specially suited to your needs.

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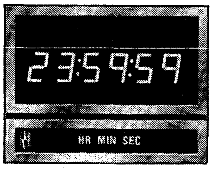
SLIMLINE® METERS

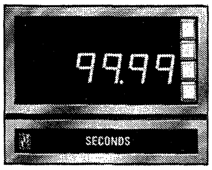
MORE THAN A METER



CLOCKS & CALENDARS

Give accurate day and time-of-day for control panels, clock systems, programmable controllers, computers, etc. Can be expanded into battery back-up, master-slave and variable time zone clock systems. Units with readout only, BCD or ASCII output.

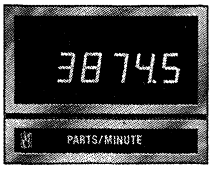
• 12 or 24 hour and hr/min or hr/min/sec format • 10, 50, 60 Hz or .005% crystal time base • Remote control capability standard • Day-of-year or automatic month/day • Automatic leap year • Hidden setting controls under flip-up door • Price: Clocks $152 - $295; Calendars $255 - $270.



TIMERS & INVERVAL METERS

Manually or automatically time events. Control events after a countdown, count-up or at regularly recurring intervals. Use Interval Meters to measure on-time, off-time, time between pulses or pulse duration. Have BCD, serial ASCII, or switch outputs.

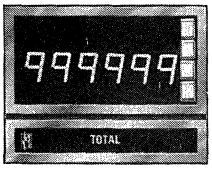
• 3, 4, 5 or 6 digit models • All display formats: decimal to hr/min/sec • Resolution to μS available • 50, 60 Hz or .005% crystal time base available • 0.2 - 80 VDC, 120, 240 VAC or switch input • Manual or remote control standard. • Models with internal digital preset limit • Price: $185 - $295.



RATEMETERS

Field scaleable to measure machine rate directly in any desired unit. For example, one pulse per bottle can be read out in six packs/minute, cases/hour, etc. Accepts pulse inputs from most transducers. Powerful μP-based circuitry allows flexibility.

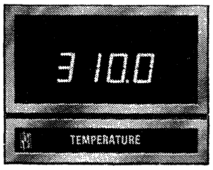
• 4, 4½ or 6 digit models • Pulses can go as low as 1 pulse per hour • 0.2 - 80 VDC switch input standard • Variable switch selected noise filtering • Easy switch programmable scaling • High accuracy crystal time base • Remote control capability • Price: $295 - $425.



COUNTERS & TOTALIZERS

Units are available to: (1) count up, (2) count up and down, (3) count up or down to or from a preset limit, and (4) to divide the count by any 4-digit switch-selected number. Also Perma-stor® Memory (stores counts with no power needed).

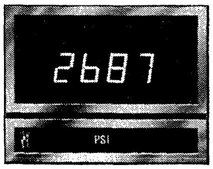
• 2, 3, 4, 5 or 6 digit models • 0.2 - 80 VDC, switch input standard • Easy, direct connection to rotary encoders • Manual or remote control • Variable switch-selected noise filtering • Rotary switches on preset limits and divide by "N" • Setting controls under flip-up door • Price: $160 - $418.



THERMOMETERS

Thermocouple types J, K, T, R, S, E to cover from −328° to 3,092°F (−200° to 1,700°C). Platinum 100Ω RTD from −58° to 1,112°F (−50° to 600°C). Thermistor from +32.0° to 212.0°F (0.0° to 100.0°C). All units are high accuracy and industrial designed.

• Dual range models to display °C or °F • 0.1° resolution available • Long lead length compensation circuitry • Cold-junction compensation for thermocouple units • Ideal junction sensing • High accuracy continuous linearization over entire range • Price: $230 - $427.



PROCESS METERS

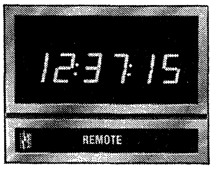
These meters take most standard DC process signals such as 4-20 mA, 0.5 V, 10-100Ω, etc. and display them in virtually any desired engineering units, i.e., a 4-20 mA loop can be read in PSI, gal/min, °F, %, etc. Models with setpoint outputs for control.

• DC voltage, current or resistance inputs • Wide range span & zero • Multi-turn coarse & fine pots on span & zero • Variable noise filter • Model changing resistor terminal mounted • Dual range models to display full scale or percent • Digital setpoints under flip-up door • Price: $208-$288.

TACHOMETERS

Scaleable to monitor RPM from a wide range of gears and inputs signals. Units can accept external time base signals to permit ratio measurements. Also can be set up to indicate scaled interval times. μP-based units do not require 60-tooth gears.

• 4, 4½ or 6 digit models • 0.2 - 80 VDC, switch input standard • Pulses can go as low as 1 pulse per hour • Remote control capability • Easy switch programmable field scaling • Optional ASCII outputs • High accuracy crystal time base • Setting controls under flip-up door • Price: $295-$425.



REMOTE DISPLAYS

Provide a large, bright readout from parallel BCD, octal or hexadecimal data. Optional latches for use with programmable controllers, computers, etc. Also, units available to accept serial ASCII input, and have ASCII output command switches.

• 3, 4, 5, 6 digit models • LCD units available • Selectable decimal point • Non-glare display window • Switches under flip-up door • Normal or inverted strobe capability • Parallel, strobe, RS232, RS422, 20/60 mA loop modes • Inputs from 5 - 48 VDC • Price: $154 - $214

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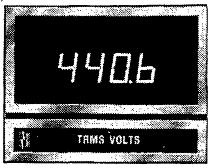
SLIMLINE® METERS

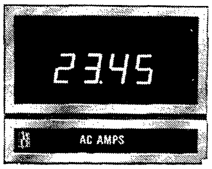
MORE THAN A METER



VOLTMETERS

Measure AC, DC or TRMS volts from microvolts to kilovolts. Setpoint and ASCII output models available. Scaleable units allow easy special field calibration to most any input. TRMS units are switch-selectable to permit reading the DC component.

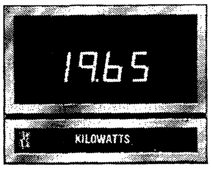
• Bi-polar, auto polarity operation and display •Auto zero and high stability circuitry • Decimal point selection • Switch selectable variable response time and noise filtering • High common mode rejection • High input impedance, no circuit loading • Digital preset limit • Price: $184 - $279.



AMMETERS

AC, DC, or TRMS current measurement from microamps to kiloamps. TRMS have switch selection to allow reading the DC component. 5 A scaleable units allow fast and easy custom field scaling. Dual set point units allow system control.

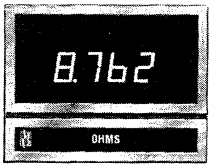
• Auto zero and high stability circuitry • Switch-selectable variable response time & noise filtering • Bi-polar, auto polarity operation and display • Low input impedance, minimum circuit loading • High common mode rejection • Digital preset limit • Price: $213 - $305.



WATTMETERS

Read true alternating current (AC) watts directly. Unit automatically compensates for any power factor so it can be used with capacitive or inductive loads (leading or lagging current). Models available from microwatts to megawatts.

• Separate voltage and current inputs • High impedance circuitry on voltage input • Auto zero & high stability circuitry • Low input impedance on current input • Full differential on AC voltages • Optimized for 60 Hz operation • High common mode rejection • Price: $429.



OHMMETERS

Measure resistance from 1.999 ohms to 300.0 kΩ. Scaleable models have wide range span and zero adjust for easy field scaling, e.g. testing of weld joints in percent rather than resistance. Also with outputs of setpoints, BCD, ASCII, etc.

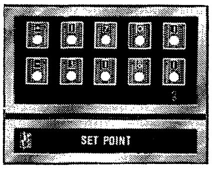
• Model changing resistors screw terminal mounted • 2-wire or 4-wire hook-up • Automatic or adjustable lead length compensation • Scaleable field set-up controls under flip-up access door • Internal high stability current source • Price: $223 - $305.

60.000
HERTZ

FREQUENCY METERS

Measures from DC to 100 kHz by gated counter or calculation mode techniques. Selectable input averaging. Set point models as well as ASCII output models. Can be easily scaled to monitor frequency, ratio, deviation, percentage or period.

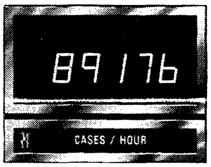
• 4 or 6 digit models • Switch-select input frequency roll-off • High noise rejection circuitry • Digital preset scaling • Fast updating with high resolution & high stability • Digitally scaled time bases • Easy controls under flip-up door • High accuracy crystal time base • Price: $295 - $425



COMPARATORS & PRELOADERS

Comparators take standard BCD input data and compare it against built-in switches, less than, equal to and greater than outputs with both polarities. Preloaders output tri-state parallel BCD to allow bussing many units to one input.

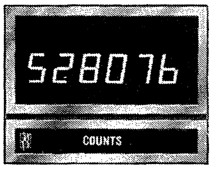
• Single or dual limit models • Removable knobs - manual for screwdriver setting • Polarity switches on all models • Voltage and ground outputs permit stacking • Red & green front panel LED's • Manual or remote activation • Have bus connected data lines • Price: $142 - $304.



METERS WITH SETPOINTS

Most any parameter (volts, amps, watts, temperature, counts, etc.) can be displayed and have dual setpoint outputs. These meters also have wide range capability. Input circuitry immune to electrical noise. Built with the very best quality parts.

• 2 to 6 digit models available • μprocessor-based • Full instrumentation input • RS232, RS422, 20/60 mA outputs available • Parallel or strobe BCD outputs available • Scale factor .000000001 to 59999 • 110-9600 baud • High electrical noise immunity circuitry • Price: $235 - $425.



MINI-PERIPHERAL METERS (Setpoints available)

NES has a full line of meters to interface easily to your programmable controller, computer, processor, terminal, etc. Various controls, setpoints, parameters, as well as the outputs are all ASCII (RS232, RS422, 20/60 mA loop) compatible.

• Microprocessor-based circuitry • Baud rates from 110-9600 • Easily field programmable • Field selected message and input formatted • High electrical noise immunity • Output (display) or input (measure) units available • Price:$240-$435

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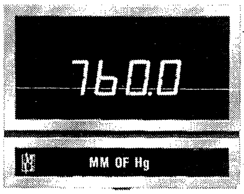
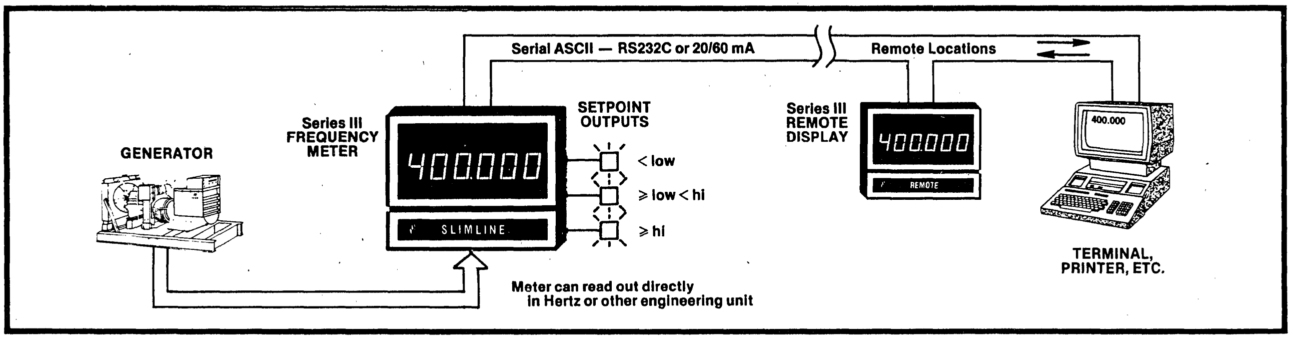
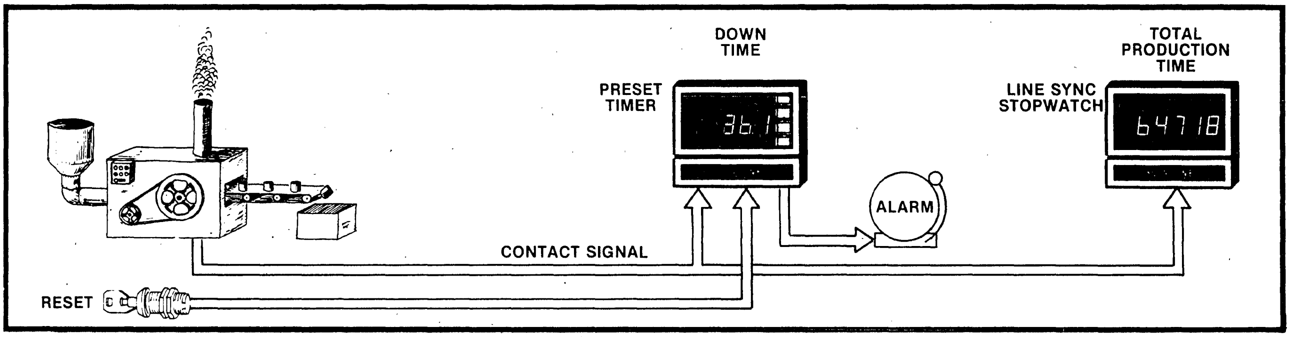
SLIMLINE® METERS

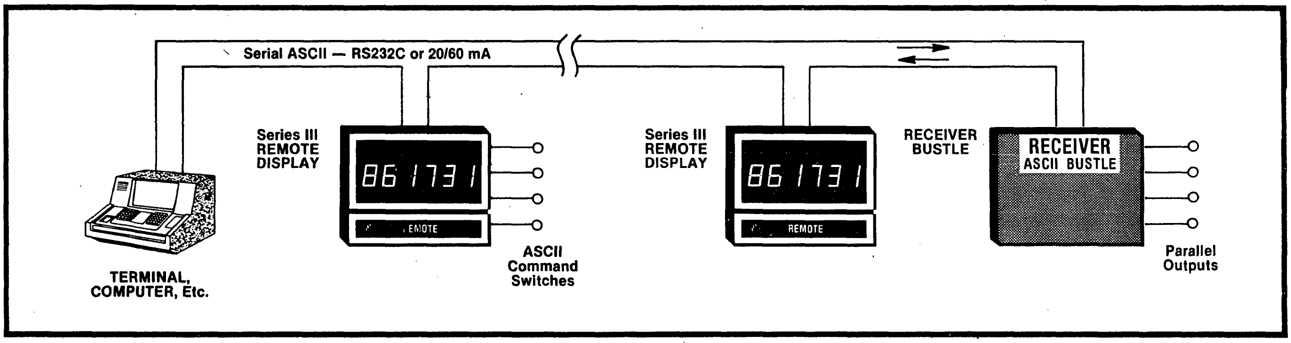
MORE THAN A METER

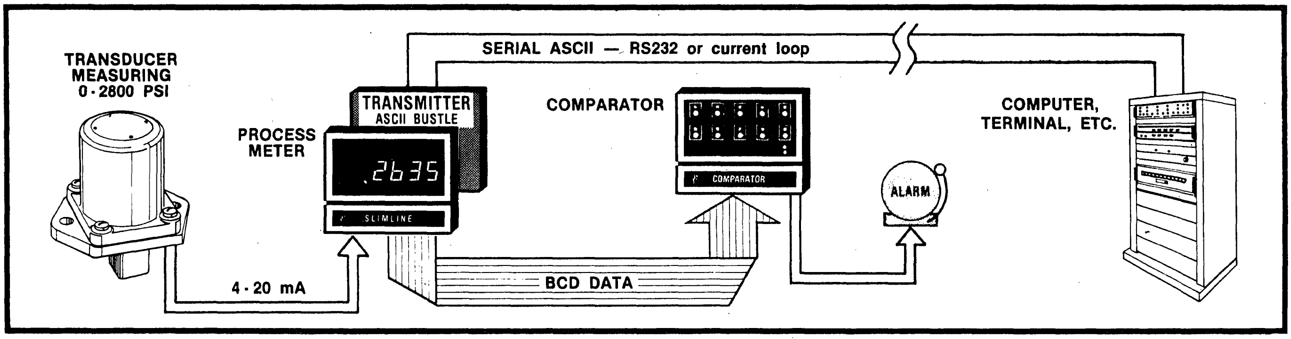

760.0
MM OF Hg

If you did not see the model you need, please ask. Our standard meters can usually be adapted to the most unusual applications. Also NES has one of the most aggressive new product development programs in the industry, so even if we do not have it today, we probably will have it tomorrow.


Serial ASCII — RS232C or 20/60 mA
Remote Locations
GENERATOR
Series III FREQUENCY METER
400000
SLIMLINE
SETPOINT OUTPUTS
< low
≥ low < hi
≥ hi
Series III REMOTE DISPLAY
400000
REMOTE
400.000
TERMINAL, PRINTER, ETC.
Meter can read out directly in Hertz or other engineering unit


DOWN TIME
PRESET TIMER
36.1
TOTAL PRODUCTION TIME
LINE SYNC STOPWATCH
64718
ALARM
CONTACT SIGNAL
RESET


Serial ASCII — RS232C or 20/60 mA
Series III REMOTE DISPLAY
861731
REMOTE
ASCII Command Switches
Series III REMOTE DISPLAY
861731
REMOTE
RECEIVER BUSTLE
RECEIVER
ASCII BUSTLE
Parallel Outputs
TERMINAL, COMPUTER, Etc.


TRANSDUCER MEASURING 0-2800 PSI
SERIAL ASCII — RS232 or current loop
TRANSMITTER
ASCII BUSTLE
PROCESS METER
2635
SLIMLINE
COMPARATOR
COMPARATOR
ALARM
COMPUTER, TERMINAL, ETC.
4-20 mA
BCD DATA

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TECHNICAL INFORMATION

WHERE TO FIND THEM IN THE 85/86 EDITION OF EEM

Abbreviations/Acronyms .... **A**•1166, **B**•1012, **C**•1028, **D**•1016
ASCII Code .... **D**•1087
Batteries, Product Selection Guide .... **D**•1413
Batteries & Fuel Cells, Characteristics .... **D**•1430
Cabinets, Enclosures, Racks, & Chassis, Product Selection Guide .... **C**•1003
Capacitors, Basic Formulas .... **A**•1093
Capacitors, Miniglossary .... **A**•1066
Capacitors, Product Selection Guide .... **A**•1003
Circuit Boards (Printed) Product Selection Guide .... **C**•1099
Coils, Chokes, Inductors, Product Selection Guide .... **A**•1205
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Instruments, Panel Meters, Product Selection Guide .... **D**•1329
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Relay Contact Forms .... **B**•1317
Relays, Electromechanical, Miniglossary .... **B**•1308
Relays, Product Selection Guide .... **B**•1261
Resistor Color Codes .... **A**•1828
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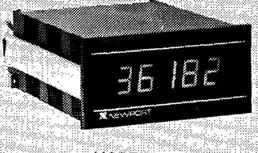
YOUR RELIABLE SOURCE FOR PANEL INSTRUMENTATION

MULTIPURPOSE DIGITAL PANEL METERS



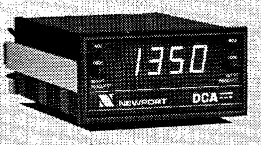
MODEL 2004

Newport is your source for the most complete line of digital panel meters. Specialized models are available for a wide range of input signals. Input power can be 24 Vac, 120 Vac, 240 Vac, 5 Vdc, or 9-32 Vdc (isolated). Some models can take power directly off a 4-20 mA current loop (see Process Transmitter and Indicator Section).

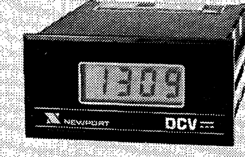
Three types of displays are offered: LED, PGD (gas discharge), and LCD. Most units are designed for panel mounting in a standard 1/8 DIN cutout (92 x 45 mm). Some offer an optional case for mounting in a NEMA cutout (99.7 x 42.7 mm). Most models offer BCD as a standard feature or as an option to interface to printers, comparators, and other instruments.

			Signal					Case				Display			Power			Digital output	
Model	Display range (counts)	Readings per sec	DC	AC avg	AC rms	Process	Strain gauge	DIN size	NEMA size	Metal	Splash-proof lens	LED	LCD	PGD	120/240 Vac	5 Vdc	9-32 Vdc	BCD, non-isolated	BCD, isolated
QUANTA	± 1999	2.5	•	•	•	•	•	1/8			•	•	•		•	•	•		•
200A/S	± 1999	4-60	•							•				•	•			•	
201P	± 1999	2.5	•			•		1/8			•	•	•		•		•		
203A	± 1999	4	•	•	•			1/8	•		•	•			•	•	•	•	•
215	± 1999	2.5	•					1/16								•			
258	± 1999	.5-30	•					1/8			•			•	•			•	•
204B	± 3999	3.6	•	•	•	•	•	1/8	•		•	•			•	•	•	•	•
400A/S	± 3999	4-60	•							•				•	•			•	
204B, ER1	± 4999	3.5	•	•	•	•	•	1/8	•		•	•			•	•	•	•	•
400A/S, ER	± 4999	4-60	•							•				•	•			•	
204B, ER2	± 5999	3.4	•	•	•	•	•	1/8	•		•	•			•	•	•	•	•
2000B/S	±19999	4-30	•							•				•	•			•	
2003B	±19999	4.3	•	•	•		•	1/8	•		•	•			•	•	•	•	•
2520	±19999	2.5	•				•	1/16				•				•		•	
2000A/S	±39999	.5-20	•							•				•	•				•
2004	±39999	3.3	•	•	•	•	•	1/8	•		•	•			•	•	•	•	•
8203	±39999	4-30	•							•				•	•			•	
2004, ER1	±49999	3.2	•			•	•	1/8	•		•	•			•	•	•	•	•
2004, ER2	±59999	3.1	•			•	•	1/8	•		•	•			•	•	•	•	•
2004, ER3	±69999	3.0	•			•	•	1/8	•		•	•			•	•	•	•	•

QUANTA MODULAR METER/ CONTROLLERS



QUANTA LED



QUANTA LCD

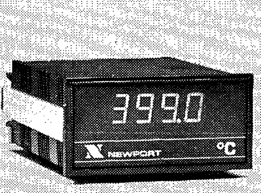
The QUANTA series is a new achievement in modular 3 1/2-digit (± 1999 count) panel instruments. A universal, compact 1/8 DIN case houses a motherboard and up to three plug-in boards to provide an unmatched choice of signal conditioner inputs, analog outputs, and control outputs. Standard features of all QUANTA configurations include a screw terminal barrier strip for signal and power inputs and a 1 mV per count analog output to drive a chart recorder. The table serves as a configuration guide. Fully configured, scaled, and calibrated units are available from Newport's worldwide network of QUANTA distributors.

Model	Modules
Motherboards (with case & display)	
Q20xxx	LED, 120 Vac (50/60 Hz)
Q21xxx	LCD, 120 Vac (50/60 Hz)
Q22xxx	LED, 240 Vac (50/60 Hz)
Q23xxx	LCD, 240 Vac (50/60 Hz)
Q24xxx	LED, isolated 9-32 Vdc
Q25xxx	LCD, isolated 9-32 Vdc
Q26xxx	LED, 5 Vdc
Q27xxx	LCD, 5 Vdc
Q28xxx	LED, 24 Vac (50/60 Hz)
Q29xxx	LCD, 24 Vac (50/60 Hz)
Analog output boards (optional, maximum one)	
Q2x0xx	None (1 mV/count is standard)
Q2x1xx	0-5 Vdc
Q2x2xx	0-10 Vdc
Q2x3xx	0-1 mA (internally driven)
Q2x4xx	4-20 mA (internally driven)
Q2x5xx	4-20 mA (externally driven)
Control output boards (optional, maximum one)	
Q2xx0x	None
Q2xx1x	Dual-setpoint, dual 10 A relay
Q2xx2x	4-20 mA proportional
Q2xx3x	4-20 mA proportional plus time proportional 2 A relay
Q2xx4x	Parallel BCD, buffered, isolated
Signal conditioner input boards (one required, maximum one)	
Q2xxxA	DC voltage
Q2xxxB	DC current
Q2xxxC	AC AVG voltage
Q2xxxD	AC AVG current
Q2xxxF	AC RMS voltage
Q2xxxG	AC RMS current
Q2xxxH	Frequency/rate
Q2xxxJ	Type J thermocouple
Q2xxxK	Type K thermocouple
Q2xxxT	Type T thermocouple
Q2xxxN	3-wire ratio potentiometer
Q2xxxO	2- or 4-wire resistance
Q2xxxP	Process (span & zero adjust)
Q2xxxM	RTD, 1 degree resolution
Q2xxxR	RTD, .1 degree resolution
Q2xxxS	Strain gauge
Q2xxxZ	Prototype/kluge board

TEMPERATURE METERS

Newport offers a comprehensive line of DPMs for temperature measurement with direct thermocouple or 100-Ohm platinum RTD input. All models provide cold junction compensation, linearization, and scaling as needed to display degrees C or F. Input power can be 120/240 Vac, 5 Vdc, or isolated 9-32 Vdc. A plastic case for panel mounting in a 1/8 DIN cutout (92 x 45 mm) is standard. A bench-style case is optional.

QUANTA and Model 267B use signal conditioning boards for different inputs. Model 269 is a microcomputer based instrument which allows different thermocouple types to be selected by plug-in jumpers. Fully configured units of all series are available from Newport or its worldwide network of distributors.



MODEL 269

		Thermocouple type								RTD resolution			Display		Digital output		
Model	Range (counts)	J	K	T	E	R	S	B	W	1.0°	0.1°	0.01°	LED	LCD	BCD non-isolated	BCD isolated	Serial ASCII
QUANTA	−1999 to +1999	•	•	•						•	•		•	•		•	
267B	−2000 to +7800	•	•	•	•	•	•	•	•	•	•	•	•		•	•	
268	−1999 to +1999	•	•	•	•	•				•	•	•	•		•	•	
269	−1999 to +7999	•	•	•	•	•	•						•				•

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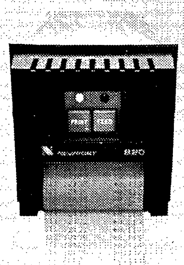
PANEL-MOUNT COMPACT PRINTERS


MODEL 820A

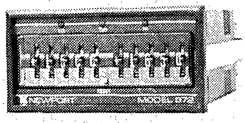
Newport's printers are compact, microcomputer controlled units for panel mounting in a standard 1/4 DIN cutout (92 x 92 mm). All models can print 20 columns at up to 1.5 lines per second on internally-stored thermal paper.

Model 820A features a built-in time-of-day clock and can turn any DPM or other instrument with BCD output into a datalogger by printing days, hours, minutes, readings, and engineering units. The addition of a Model 320 BCD bus controller allows one Model 820A printer to record data from up to 15 instruments.

Model	Interface	Special Features
820A	BCD, character serial BCD, character parallel	Time-of-day clock, .6 sec to 2 hr intervals
821	RS-232C or TTL serial ASCII 20 mA serial ASCII Centronics parallel ASCII	5 x 9 dot matrix, 102 alphanumeric characters
822	IEEE-488, listener	5 x 9 dot matrix, 102 alphanumeric characters
320	BCD bus controller	Connects up to 15 DPM's with BCD output to Model 820A printer

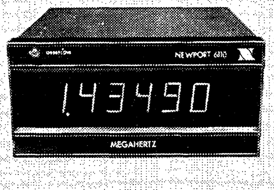
DIGITAL COMPARATOR/ CONTROLLERS

Newport's comparator/controllers accept BCD output from a DPM or other instrument and compare it to one (Model 871) or two (Model 872) thumbwheel-programmable setpoints to open or close 5A Form-C relays. They are designed for panel mounting in a 1/8 DIN cutout (92 x 45 mm). Model 872 can control one channel with hysteresis, one channel with two switching points for three-zone control, or two independent channels.


MODEL 872

Model	Relays	Control Function
871	1	HI-LO (1 channel)
872	1 2 2	HI-LO w/ hysteresis (1 channel) HI-GO-LO (1 channel) HI-LO and HI-LO (2 channels)

TACHOMETER/COUNTER/TIMERS AND CLOCK


MODEL 6110

Models 6110 and 6130A can be used as tachometer, event counter, or time interval counter over a wide dynamic range. Model 6110 features a gas discharge display and a metal case. Model 6130A is an LED unit in a plastic case for panel mounting in a 1/8 DIN cutout (92 x 45 mm). Model 6720 is a 12- or 24-hour panel mountable clock with remote stopwatch capability. All units provide BCD output.

Model	Maximum counts	Frequency range	Frequency gate period	Stopwatch resolution
6110	999,999	DC to 1 MHz	10 ms to 6 sec	1 μs to 10 sec/count
6130A	99,999	DC to 10 MHz	100 ms to 10 sec	1 μs to 10 sec/count
6720	99:23:59	50/60 Hz line or internal crystal		0.1 sec

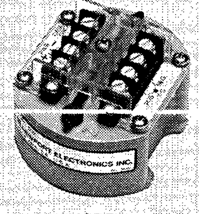
5-DIGIT REMOTE DISPLAYS

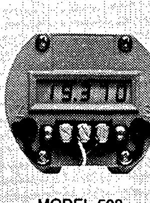
These units accept BCD output from a DPM or other instrument to provide a remote .56" LED display. The appearance is that of a 1/8 DIN DPM (Model 6152) or 1/16 DIN DPM (Model 6153).

MODEL 6153

Model	Power	Panel Cutout
6152	120/240 Vac or 5 Vdc	92 x 45 mm
6153	5 Vdc	92 x 22.5 mm

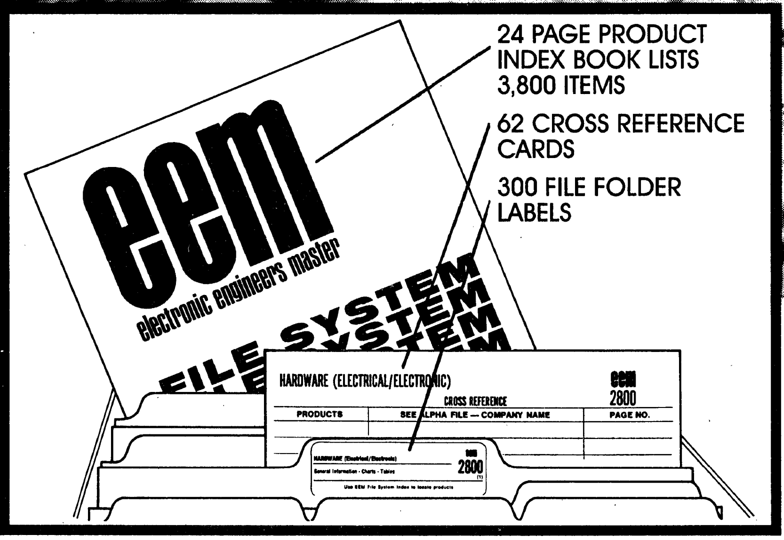
PROCESS TRANSMITTER AND INDICATORS


MODEL 502


MODEL 508

Model 502 is a 4-20 mA two-wire thermocouple transmitter with outstanding industrial specs: waterproof housing, −40 to 85°C operating temperature, 500 Vrms input-to-output isolation, 120 Vac differential input and output protection, and 9 to 45 Vdc supply compliance. Model 508 is a current loop indicator, which derives its power directly from the current loop with a 2.5 Vdc voltage drop. Its 5-digit LCD readout can be programmed to show engineering units. It features the industrial specs of Model 502. Model 558 is an unsealed version of Model 508 for panel mounting in a 1/8 DIN cutout (92 x 45 mm). A splashproof lens is optional.

Model	Operating temperature	Input	Output	Programmable scaling	Case
502	−40 to 85°C	J, K, E, T thermocouples	4-20 mA	Zero Suppression to 800°C Span ranges from 50°C	63.5 mm H x 51.8 mm D Hockey puck
508	−40 to 85°C	4-20 mA, or 10-50 mA	±1999 display	±full scale zero 10% to 100% span	63.5 mm H x 51.8 mm D Hockey puck
558	0 to 60°C	4-20 mA, or 10-50 mA	±1999 display	±full scale zero 10% to 100% span	1/8 DIN, 84 mm D plastic case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Synchro Panel Meters

North Atlantic's broad experience in advanced synchro/resolver instrumentation has resulted in the development of the Model 800 and Model 801 Synchro Panel Meters.

Designed for portable, system or test set applications, North Atlantic's Synchro Panel Meters can operate directly off the stator and rotor input signals, requiring no separate power. A broad frequency range of 47-1200Hz and programming for all standard synchros and resolvers results in maximum versatility for the user.

The 800 and 801 Synchro Panel Meters use a Type II tracking servo loop which results in no tracking lag error up to the maximum tracking rate. The bright and very large .56″ L.E.D. display allows readability even under the most difficult conditions. In addition, a tri-state parallel B.C.D. output is available at the rear panel connector for remote use. To permit data transfer to a computer or other digital device without having to freeze the converter, a data valid signal is available at the rear connector.

Both Synchro Panel Meters have a ±2° offset adjustment on the back panel to allow for final system zeroing without the sometimes difficult task of physically "tweaking in" a remote synchro.

A prime consideration in the circuit design of the Synchro Panel Meters was reliability and maintainability. No sealed modules are used; all components are accessible and test points are provided for signal tracing.

Model 800

- Resolution 0.1°
- Accuracy ±0.1° +1 LSB
- Range 0.0°-359.9° std.;
  ±179.9° optional
- Variable scaling 0000-9999 optional

Model 801

- Resolution 0.01°
- Accuracy ±0.05° std.;
  ±0.03° optional
- Range 0.00°-359.59°
- Degrees/Minutes Display optional

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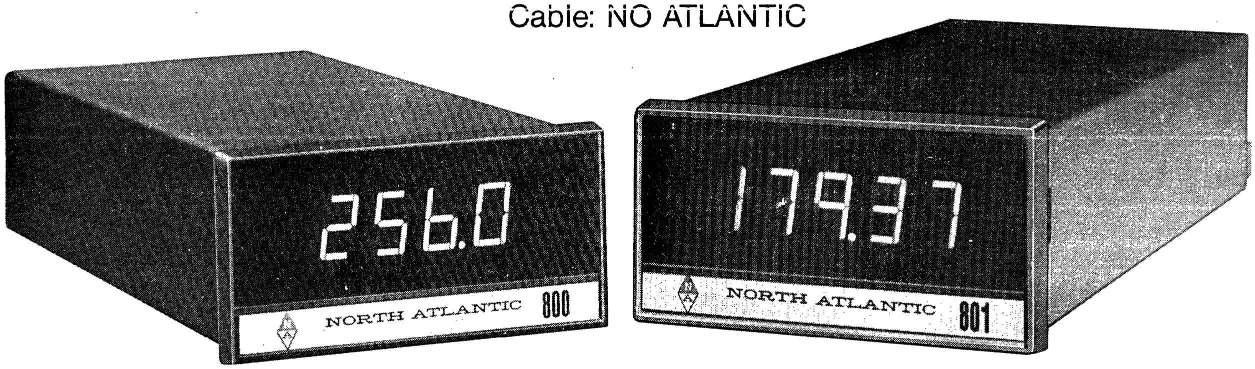
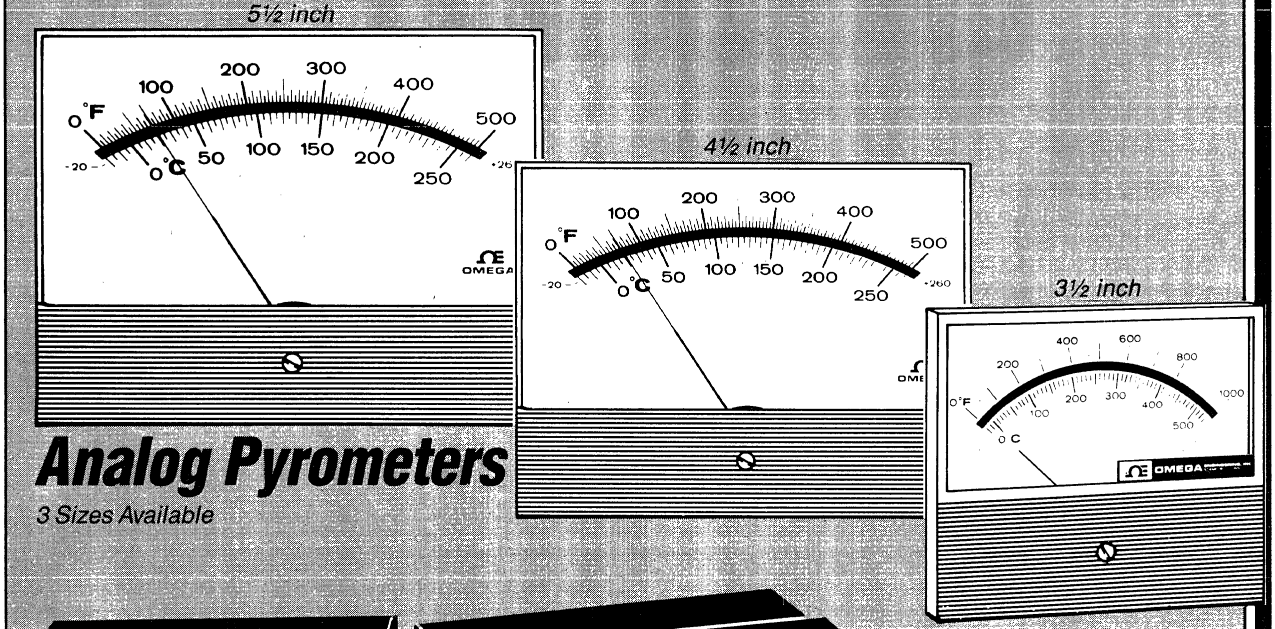


PANEL METERS ANALOG AND DIGITAL

For Temperature, Pressure, Strain and Flow


5½ inch
4½ inch
3½ inch
0°F 100 200 300 400 500
0°C 50 100 150 200 250
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Analog Pyrometers

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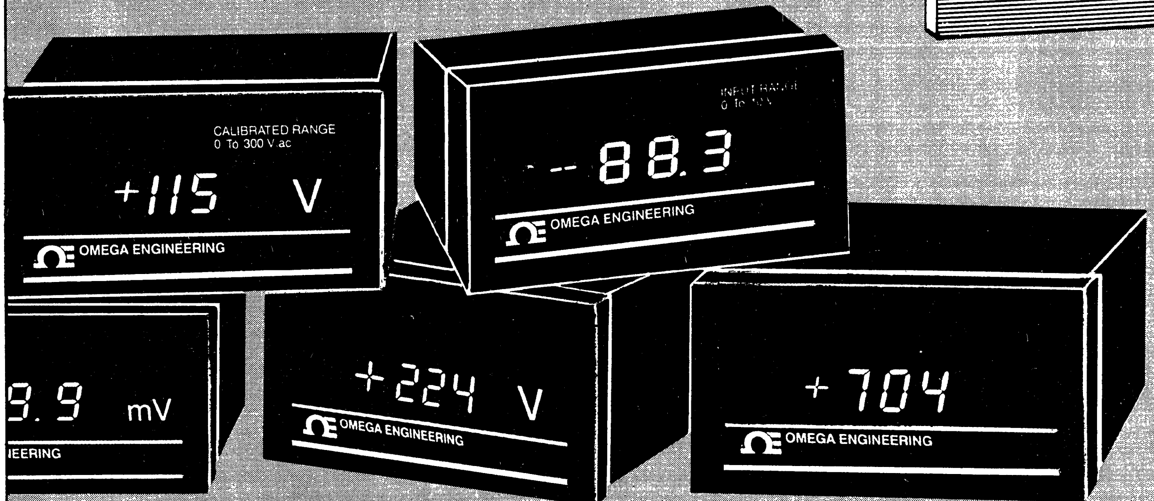
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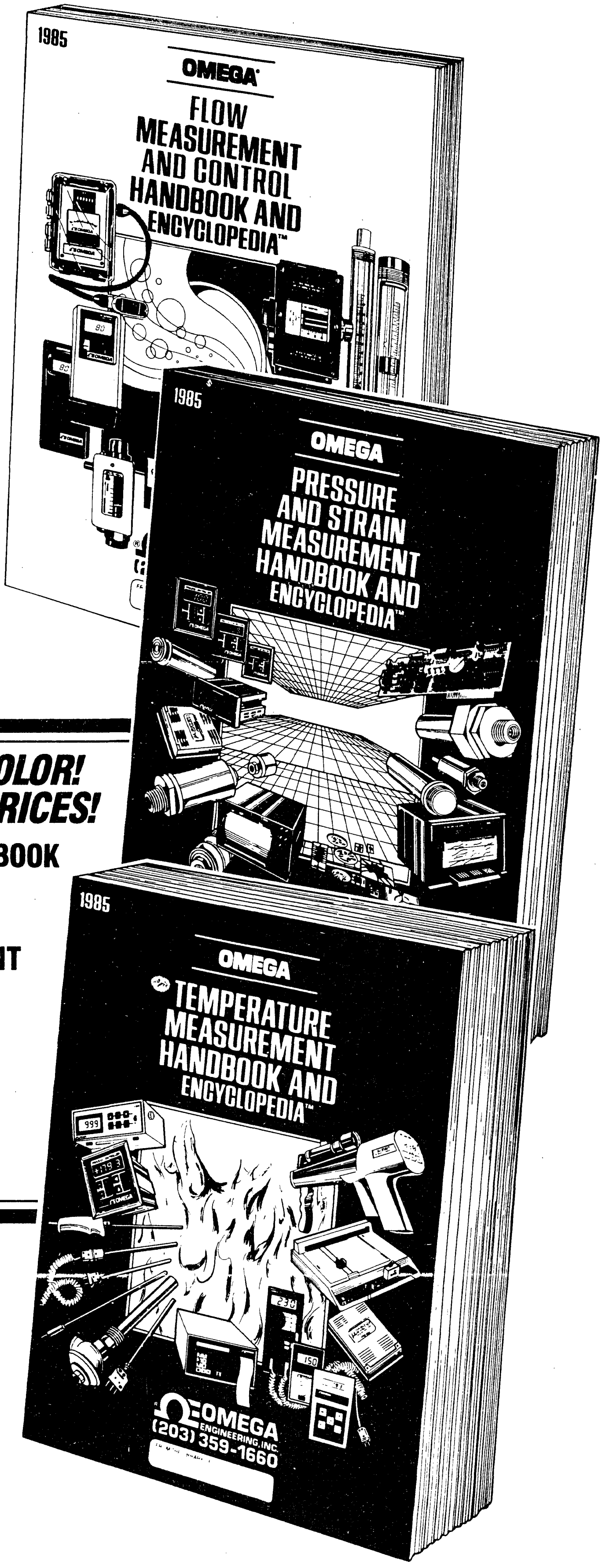

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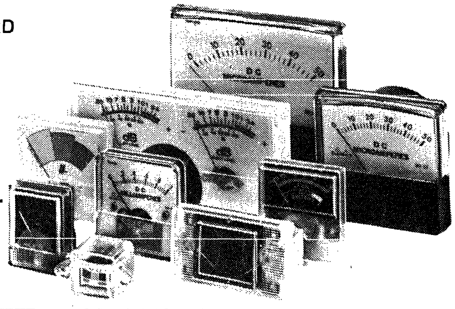


METERS

ELECTRICAL INDICATING METERS

MODEL	RANGE	RESISTANCE
SR40	0-100VA, 150VA, 200VA, 250VA, 300-400VA, 500VA	1800Ω, 1700Ω, 1500Ω, 1200Ω, 800Ω, 500Ω
SR44	0-100VA, 150VA, 200VA, 250VA, 300-400VA, 500VA	1800Ω, 1700Ω, 1500Ω, 1200Ω, 800Ω, 500Ω
SR70	0-300VA -400VA, 500VA	800Ω, 500Ω
SR72	0-300VA -400VA, 500VA	800Ω, 500Ω
SR74	0-300VA -400VA, 500VA	800Ω, 500Ω
SR76	0-250VA, 500VA	1200Ω, 500Ω
SY06	0-100VA, 150VA, 200VA, 250VA, 300-400VA, 500VA	1800Ω, 1700Ω, 1500Ω, 1200Ω, 800Ω, 500Ω
SY08	0-100VA, 150VA, 200VA, 250VA, 300-400VA, 500VA	1800Ω, 1700Ω, 1500Ω, 1200Ω, 800Ω, 500Ω

All models listed below have the following range: 0-100VA, 150VA, 200VA, 250VA, 300-400VA, 500VA. Resistance: 1800Ω, 1700Ω, 1200Ω, 800Ω, 500Ω.

SY10
SY12
SY14
SY16
SS50
SK06
SP06
SP08
SF24
SQ02
SQ04
S24
S24R
S26
S36
SR30
SR32
SR34
SR36
S90
S92
S96
SQ12
SQ14
SQ60
SS10
SS12
SS14
SS14L
SS18
SS24
SS28
SS30
SS32
SS40
SS42
SS46
SS20
SS22
SS26
SS60
SS66
SS84
SS86
SS88
SS92
SS94
SS96
SS98
SS100
SS102
SW06
SW16
SW26
SW38
SW30
SW36

SCALE/WINDOW DIMENSIONS

MODEL	L	W	D	MODEL	L	W	D	MODEL	L	W	D
SR40	12.8	18.0	4.6	S36	18.0	34.2	3.0	SS46	25.0	44.0	1.0
SR44	12.6	17.8	4.2	SR30	15.0	35.0	7.0	SS20	25.0	44.0	5.5
SR70	11.4	17.1	5.0	SR32	15.0	35.0	10.0	SS22	25.0	44.0	3.0
SR72	11.5	17.0	5.0	SR34	15.0	35.0	8.0	SS26	28.0	50.0	4.0
SR74	11.5	17.2	5.0	SR36	15.0	35.0	10.0	SS60	24.0	42.6	3.0
SR76	12.8	20.8	4.0	S90	20.6	45.0	7.0	SS66	24.0	42.4	4.5
SY06	8.2	23.2	2.0	S92	20.6	45.0	7.0	SS84	18.0	48.0	1.2
SY08	7.9	23.7	3.0	S96	19.0	45.8	3.2	SS86	18.0	48.0	2.0
SY10	8.0	23.0	1.2	SQ12	30 Dia.		3.8	SS88	19.0	44.0	5.5
SY12	9.5	23.0	2.5	SQ14	36 Dia.		4.6	SS92	35.0	59.8	5.0
SY14	7.8	23.5	3.0	SQ60	40 Dia.		5.3	SS94	35.0	59.8	1.5
SY16	16.0	52.0	1.2	SS10	18.5	36.3	3.0	SS96	18.0	48.0	1.7
SS50	9.5	23.7	3.0	SS12	21.0	36.0	8.0	SS98	46.0	60.0	5.0
SK06	16.9	34.3	2.8	SS14	21.5	36.5	5.0	SS100	39.2	64.2	3.0
SP06	15.0	35.0	4.0	SS14L	21.5	36.5	5.0	SS102	32.0	76.2	—
SP08	15.0	33.0	3.0	SS18	21.5	36.5	5.0	SW06	23.0	28.0	3.0
SF24	18.9	35.2	2.5	SS24	30.0	50.0	4.0	SW16	16.0	52-52	1.2
SQ02	25 Dia.		2.3	SS28	28.0	50.0	4.0	SW26	29.0	93.8	1.8
SQ04	24.0	21.0	2.3	SS30	30.0	36.4	3.0	SW38	32.0	112.0	3.0
S24	31.0	14.0	2.0	SS32	31.0	62.0	1.2	SW30	36.0	45.0	16.2, 16.3, 17.3
S24R	13.7	34.9	6.8	SS40	30.4	35.5	3.0				
S26	15.0	30.0	7.5	SS42	14.0	34.0	3.5	SW36	30.5	100.0	2.5

PANEL METERS

DIMENSIONS

	L(mm)	W(mm)	D(mm)	MOUNTING CENTERS L(mm)	MOUNTING CENTERS W(mm)
SS76	44	44	32	32	32
SS90	51	51	32	38	38
SS104	60	60	34	48	48
SL104	61	70	36	48	48
SS130	80	80	36	64	64
SU76	45	50	34	32	32
SU90	52	58	43	38	38
SU104	60	65	37	48	48
SU104E	66	80	37	48	64
SU130	82	100	37	64	80
SU130E	100	120	39	80	100

These items represent a small portion of the full production line. Consult Shogyo for full line catalog.

RANGE AVAILABLE FROM STOCK

FUNCTION	RANGE	INTERNAL RESIST-ANCE*	SCALE DIVISION SS-76	SS-90	SS-104	SL-104	SS-130	SU-76	SU-90	SU-104	SU-104E	SU-130	SU-130E
DC Microammeter	0-50uA DC	3500Ω	25	25	50	50	50	25	25	50	50	50	50
	0-100uA DC	3500Ω	25	25	50	50	50	25	25	50	50	50	50
	0-200uA DC	1450Ω	20	20	40	40	40	20	20	40	40	40	40
	0-500uA DC	430Ω	25	25	50	50	50	50	50	50	50	50	50
DC Galvanometer	25-0-25uA DC	3500Ω	25	25	50	50	50	25	25	50	50	50	50
	50-0-50uA DC	3500Ω	25	25	50	50	50	25	25	50	50	50	50
	100-0-100uA DC	1450Ω	20	20	40	40	40	20	20	40	40	40	40
	250-0-250uA DC	430Ω	25	25	50	50	50	25	25	50	50	50	50
DC Milliammeter	0-1mA DC	200Ω	25	25	50	50	50	25	25	50	50	50	50
	0-3mA DC	65Ω	30	30	30	30	30	30	30	30	30	30	30
	0-5mA DC	8Ω	25	25	50	50	50	25	25	50	50	50	50
	0-10mA DC	3Ω	25	25	50	50	50	25	25	50	50	50	50
	0-20mA DC	2Ω	20	20	40	40	40	20	20	40	40	40	40
	0-50mA DC	1.5Ω	25	25	50	50	50	25	25	50	50	50	50
	0-100mA DC	0.8Ω	25	25	50	50	50	25	25	50	50	50	50
	0-200mA DC	0.4Ω	20	20	40	40	40	20	20	40	40	40	40
	0-500mA DC	0.2Ω	25	25	50	50	50	25	25	50	50	50	50
DC Ammeter	0-1A DC	0.1Ω	25	25	50	50	50	25	25	50	50	50	50
	0-3A DC	0.03Ω	30	30	30	30	30	30	30	30	30	30	30
	0-5A DC	0.02Ω	25	25	50	50	50	25	25	50	50	50	50
	0-10A DC	0.01Ω	25	25	50	50	50	25	25	50	50	50	50
DC Voltmeter	0-3V DC	1000Ω/V	30	30	30	30	30	30	30	30	30	30	30
	0-5V DC	1000Ω/V	25	25	50	50	50	25	25	50	50	50	50
	0-10V DC	1000Ω/V	25	25	50	50	50	25	25	50	50	50	50
	0-15V DC	1000Ω/V	25	25	50	50	50	25	25	50	50	50	50
	0-30V DC	1000Ω/V	30	30	30	30	30	30	30	30	30	30	30
	0-50V DC	1000Ω/V	25	25	50	50	50	25	25	50	50	50	50
	0-100V DC	1000Ω/V	25	25	50	50	50	25	25	50	50	50	50
	0-150V DC	1000Ω/V	30	30	30	30	30	30	30	30	30	30	30
	0-300V DC	1000Ω/V	30	30	30	30	30	30	30	30	30	30	30
AC Voltmeter†	0-10V AC	1000Ω/V	25	25	50	50	50	25	25	50	50	50	50
	0-15V AC	1000Ω/V	30	30	30	30	30	30	30	30	30	30	30
	0-30V AC	1000Ω/V	30	30	30	30	30	30	30	30	30	30	30
	0-50V AC	1000Ω/V	25	25	50	50	50	25	25	50	50	50	50
	0-100V AC	1000Ω/V	25	25	50	50	50	25	25	50	50	50	50
	0-150V AC	1000Ω/V	30	30	30	30	30	30	30	30	30	30	30
S-meter	0-1mA DC		Special S-meter scale F. S.= 1mA DC										
VU-meter†	1.228V AC(OVU)		Special VU-meter scale, OVU (1000 Hz) = 1.228V AC										

* Resistance tolerance: ±10% † Rectifier type

SEE OUR OTHER CATALOG PAGES IN EEM SECTIONS 1300/2100/2450/4750/5600/6000

Simpson® PANEL METERS

If It's a Meter — Stock or Special — Analog, Digital or ANA LED . . . Simpson Makes It!

ANALOG PANEL METERS

Industry's Widest Source!

Century Series: Modern styling in 1½″, 2½″, 3″ and 4½″ sizes.

Wide-Vue®: In 1½″, 2½″, 3½″, 4½″ and 8″ sizes.

Edgewise Series: Save panel space. In barrel or stackable styles with vertical or horizontal scales. Also: **Bold-Vue, Designer, UL Recognized round and rectangular, metal cased, MIL meters, Meter Relays and Controllers.**

All have Simpson self-shielded meter movement — calibration not affected by stray magnetic fields or magnetic mounting.

All available in the industry's widest selection of stock ranges plus specials.

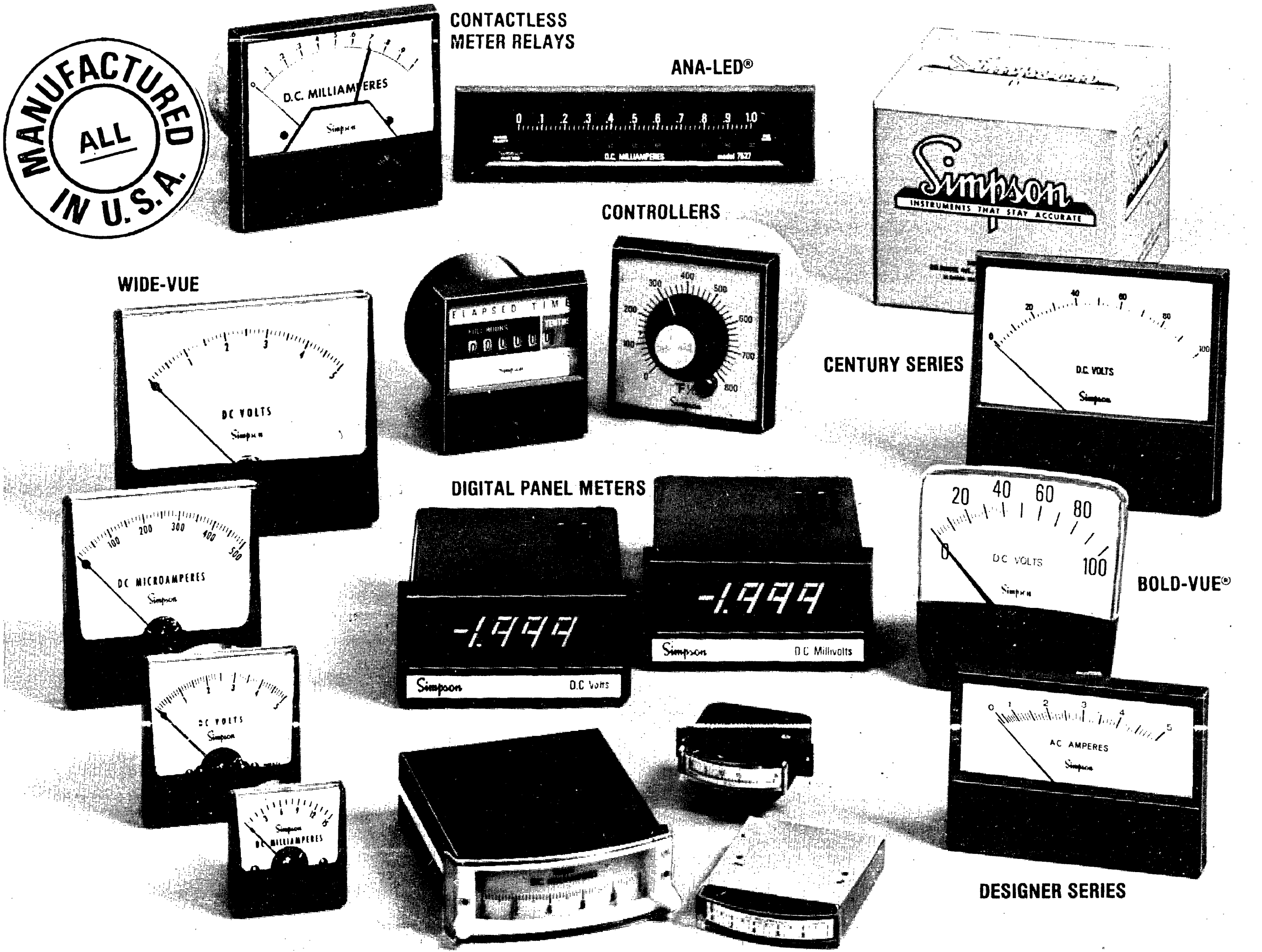
ALL SIMPSON PANEL METERS ARE AVAILABLE FROM LOCAL AUTHORIZED SIMPSON DISTRIBUTORS AND MODIFICATION CENTERS. For O.E.M. quantities, contact factory.

DIGITAL PANEL METERS

Reliable 3½ and 4½ digit instruments with LSI circuitry. 3½ digit accuracy is 0.1% of reading. 4½ digit accuracy is 0.02% of reading. All fit standard 1.682″ x 3.622″ cutouts. Adapters available for other cutout sizes. 120 or 5V DC power standard, 240V AC optional. With input/output connector, mounting hardware, manual. **Low Cost Series 2865 DMM** with 0.43″ LED readout 9 stock DC ranges plus specials. **Deluxe Series 2850** with 0.43″ LED or 0.55″ planar gas discharge display. 9 Stock DC ranges plus specials. **4½ Digit Series 2842** with 0.56″ LED readout. 8 stock ranges plus specials.

ANA LED METERS AND CONTROLLERS

Bar graph meter has instantaneous response with no overshoot. Easy to read 5″ linear LED scale. Analog output for up to 50 controller modules. ±2% FS accuracy. Wide choice of stock ranges plus specials.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DC MICROAMPERES
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D C Millivolts
AC AMPERES
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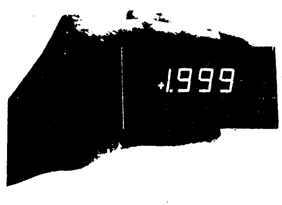
WRITE FOR FREE PANEL METER CATALOG

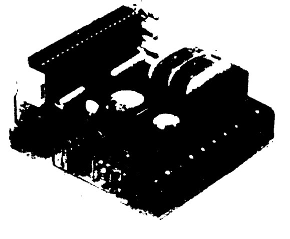
TEXMATE INC

Texmate employs no sales representatives or salesmen, so none will call on you. Instead we offer factory direct contact, quality products, fast delivery and lower prices.

INDUSTRIAL METERS

ID-35 $59 $50 (100's)



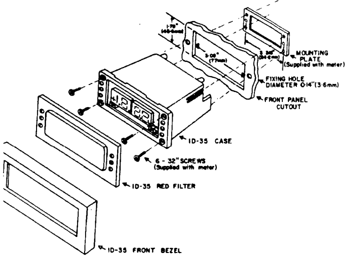


3½ digit LED meter. 0.56" high LED's. 117V/230V AC line operated. Ruggedized DPM with dust and water proof industrial case with screw terminals. Fine and coarse adjustments through header selectable ranges of 2V, 20V, & 200V. Infinitely scalable with bipolar inputs with easy scaling for 4-20mA or 1-5VDC signals with the offset option. 1 megohm input impedance, hold reading, display test, display blank, auto zero, programmable decimals, automatic polarity. TC 50ppm typical.

ID-35 WITH PREAMPLIFIER $69 $54 (100's)

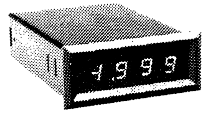
Low level preamplifier option available for ID-35 with DIP switch programmable full scale ranges of 200mV, 100mV, 50mV and 20mV.

ID CASE DIMENSIONS


1.75"
3.03" (77mm)
MOUNTING PLATE (Supplied with meter)
FIXING HOLE DIAMETER 0.14"(3.6mm)
FRONT PANEL CUTOUT
ID-35 CASE
6 - 32" SCREWS (Supplied with meter)
ID-35 RED FILTER
ID-35 FRONT BEZEL

SCREW TERMINAL METERS FOR LOW PROFILE CASES

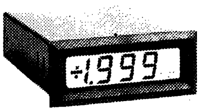
SM-35 $49 $37 (100's)



New, multi-purpose, 3½ digit, LED meter. 0.56" high LED's. 5VDC powered, 170mA maximum. Fine and coarse adjustments through header selectable ranges of 2V, 200V and 200V. Infinitely scalable with single ended input with easy scaling for 6-20mA or 1-5V signals with the offset option. 1 megohm input impedance, hold reading and display test functions. Auto zero, automatic polarity, programmable decimal points. No DC/DC convertor to radiate EMI. TC 50ppm typical. No soldering is required for this meter which, as a standard feature, is supplied with a new screw terminal input clip.

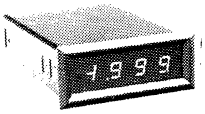
SCREW TERMINAL METERS

SM-35X $59 $50 (100's)



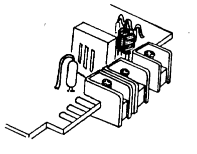
New, multi-purpose, 3½ digit LCD meter. 0.68" high display. 5VDC powered, 17mA maximum. Fine and coarse adjustments through header selectable ranges of 2V, 20V and 200V. Infinitely scalable with single ended input with easy scaling for 6-20mA or 1-5V signals with the offset option. 1 megohm input impedance, hold reading and display test function. Dummy, non-functional, trailing zero. Auto zero, automatic polarity, programmable decimal points. No DC/DC convertor to radiate EMI. TC 50ppm typical. No soldering is required for this meter which, as a standard feature, is supplied with a new screw terminal input clip.

SM-45 $69 $54 (100's)



New, multi-purpose, 4½ digit LED meter. 0.4" high LED's. 5VDC powered, 250mA maximum. Fine and coarse adjustments through header selectable ranges of 2V, 20V and 200V. Infinitely scalable with single ended input, with easy scaling for 6-20mA or 1-5V with the offset option. 1 megohm input impedance, hold reading, display test and display functions. Auto zero, automatic polarity, programmable decimal points. No DC/DC convertor to radiate EMI. TC 50ppm typical. No soldering is required for this meter which, as a standard feature, is supplied with a new screw terminal input clip.

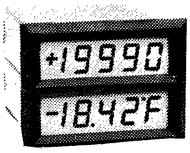
OPTIONAL SCREW TERMINAL OR EDGE CONNECTOR



2-WIRE PROCESS DPM's

POWERED DIRECTLY FROM THE SIGNAL CURRENT LOOP

CM-35XT $75 $64 (100's)



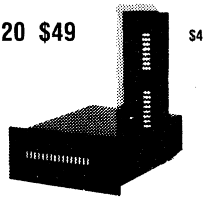
Powered by 4 to 20mA signal loop power • No external power source required • Translates 4 to 20mA input into 0 to 1999 digital display • May be user scaled to any required engineering unit • Programmable extra digit for use as trailing "0" or as °C or °F descriptor • 48" LCD display • Bipolar • 50 PPM TC • Programmable decimals • Safe for hazardous areas • Available in stackable cases as shown

CM-35XHC $79 $67 (100's)

Identical features to the CM-35X but configured for operation from 10 to 50mA signal loop current

ANALOG METERS

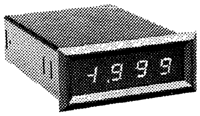
AM-20 $49 $41 (100's)



Rugged Versatile Solid State Analog DPM • Accuracy ±2% of Full Scale • 10 Meg Ω Input Impedance • User Programmable for Bargraph Display • Moving Dot Display • Moving Proportional Brightness 3 to 4 Dot (slinky) Display • 0-4V FS to 0-1200V FS Input • 4/20mA Input • Offset Capability • Bipolar Center Zero Null Meter • Unipolar Center Zero with expanding Bar or intersecting Bars • Selectable LED Scale Points • Flashing Overrange • Overrange Alarm Output • 5V DC Pwr Bar Mode • 4V to 24V DC Pwr Dot Mode

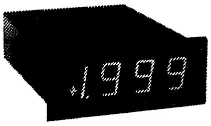
DIGITAL PANEL METERS

PM-35U $39 $29 (100's)



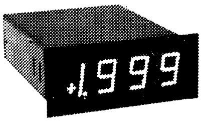
Lowest prices quality 3½ digit DPM available • Bright .3" LEDS • Differential Inputs • Bipolar • Auto Zero • Ratiometric • OHMs/Amps • Programmable Decimals • 200mV 2V 20V 200V 1200V rgs • Edge connector or direct solder tab connections • TC 100 ppm typ. 200 max. • 4V DC Pwr

PM-35A $49 $37 (100's)



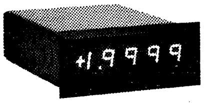
Popular, general purpose 3½ digit instrument. More than 50,000 units have been installed throughout the world in thousands of different applications, attesting to the meter's reliability • Differential Inputs • Programmable Current & Ohmmeter Capability • Ratiometric • 200mV 2V 20V 200V 1200V inputs • Scaling in Engineering Units with Offsets • Lamp Test • Low TC 50 ppm Typ. • Auto Zero • Bipolar • Programmable Decimals • 5V DC Pwr

PM-35AR $74 $63 (100's)



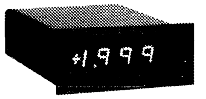
World's Smallest Size Lowest Priced Autoranging DPM. Has all the features of the PM-35A except Ratiometric ohms measurement • Autoranges between 200mV-2V, 2V-20V, 20V-200V, 200V-1200V • 1000 meg Ω input impedance on 200mV-2V range, 10 meg Ω on others • Auto Switching Decimals • Programmable to Display Engineering Units • 5V DC Pwr

PM-45 $79 $67 (100's)



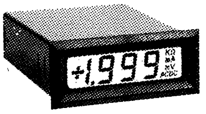
Popular economical 4½ Digit DPM • Single ended Input • MUX BCD Available • Sample & Hold • Leading Zero Blanking • 0.015% Rdg Accuracy • .0001 volt resolution • Ratiometric • Bright .3" LEDs • 5V DC Pwr

PM-3.5 $59 $50 (100's)



Very fast update rate available • 3½ digit • Single ended Input • MUX BCD Available • Sample & Hold • Leading Zero Blanking • Bright .3" LEDs • 5V DC Pwr

PM-35XAC $69 $54 (100's)

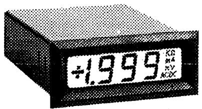


The World's smallest 115/230V AC Line Operated DPM, Fully Isolated with internal transformer.
PM-35XAC has all the features of the PM-35X but with AC pwr • can also operate from DC Voltages of 9V DC to 50V DC.

ENERGY MISER LOW POWER DIGITAL PANEL METERS

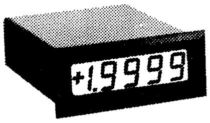
Incorporating TEXMATE's propriety Hi-Rel Hi-Contrast 0.48" LCD Displays

PM-35X $65 $52 (100's)



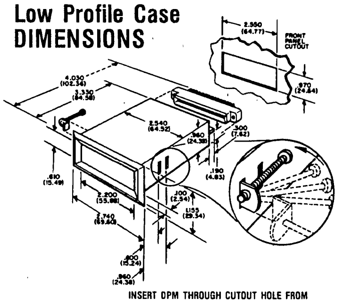
Versatile 3½ digit low pwr LCD meter • Wide operating voltage range capability 3.5V to 50VDC @ 4/15mA • Differential inputs • Programmable current & Ohmmeter capability • Ratiometric • 200mV 2V 20V 200V 1200V inputs • Scaling in Engineering units with offset • Lamp test • Auto zero • Bipolar • Programmable decimals • 8 selectable Function Descriptors

PM-45X $150 $129 (100's)



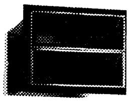
Smallest 4½ digit .48" LCD DPM available • Super stable temperature compensated reference • (0.01% Rdg + 1 Digit) accuracy • True differential & single ended inputs • 100KHz quartz crystal controlled clock for 120dB 50/60Hz NMR • 80dB CMR • 200mV to 1200VFS • 4/20mA • Ohms • Current • Ratiometric • Programmable decimals • Scaling in engineering units with offset capability • Overrange/underrange output • Busy Output • Clock output • Run/Hold • MUX BCD output • Ultra low power requirements 3~5mA at +4.5V to +5.5VDC (25mW)

Low Profile Case DIMENSIONS

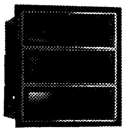


INSERT DPM THROUGH CUTOUT HOLE FROM FRONT OF PANEL. ATTACH MOUNTING BRACKETS AND SCREWS AS SHOWN, USING SECOND SLOT WHEN PANEL THICKNESS IS GREATER THAN ¼ INCH. TIGHTEN SCREWS AGAINST REAR OF PANEL.

Texmate's Popular Low Profile 1" x 2½" DPM Cases For Twin Mounting or multiple arrays order your DPMs in cases to suit your panel layout.



End Mount Case
Two End Mount Cases enable simple Twin mounting in a single cutout.



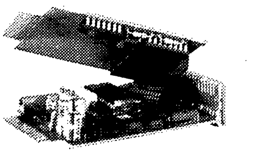
Center Mount Case
Any number of center mount cases may be fitted between two end mount cases for multiple mounting arrays.

Full Bezel Case
has complimentary styling to multiple mounting cases.

Slim Line Case
Standard Texmate case with attractive matte finish. (Shipped with all orders unless otherwise specified.)

Ask about our new ruggedized, dust and waterproof Industrial Panel Meter line. For complete data sheets and application notes on these and other Texmate measurement and control products, call (619) 481-7177.

PM-45XBCD $180 $153 (100's)



The worlds smallest 4½ Digit DPM with a buffered Tri-State parallel BCD output is created by adding an internally mounted PCB to the standard PM-45X. Data outputs include polarity • overrange and underrange • Data Ready • Controls include Run/Hold • Clear and Output Select • Interconnection is by a standard 26 pin PCB to ribbon cable connector

PM-45XU $97 $87 (100's)

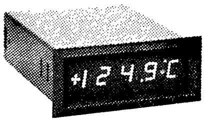
Low cost utility version of the PM-45X. Has all the same low power features of the PM-45X except uses a standard TC reference and has derated specifications • Accuracy (0.015% Rdg +2 Digits)

PM-45XUBCD $127 $108 (100's)

All the same features as the PM-45XU but with an internally mounted buffered Tri-state parallel BCD output

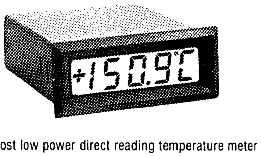
TEMPERATURE METERS

TM-150/150F $55 $47 (100's)
TM-150R/150RF $59 $50 (100's)



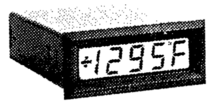
Low cost direct reading temperature meters 0.3″LED • 5V DC pwr • TM-150 and TM-150F are configured for voltage and current sensing and are factory prescaled to display °C and °F with popular IC transducers such as NSC LM 135, LM 235, LM 335 or Analog Devices AD590 sensors • TM-150R and TM-150RF are configured for resistance sensing with a precision 1μA to 10mA current source and are factory prescaled to display °C and °F with platinum 100 ohm RTD sensors • Two programmable decimal positions • Auto polarity

TM-150X $75 $64 (100's)
TM-150XR $79 $67 (100's)
TM-150XAC $79 $67 (100's)
TM-150XACR $83 $71 (100's)



Low cost low power direct reading temperature meter • High contrast .48″ LCD display • Operates with most popular RTD and voltage or current output transducers/probes • The TM-150X 5VDC Pwr and TM-150XAC 115VAC Pwr are configured for voltage and current sensing and are factory prescaled to display °C with NSC LM135, LM235, LM335 or Analog Devices AD590 sensors • The TM-150XR 5VDC Pwr and TM-150XACR 115VAC Pwr are configured for resistance sensing with a precision 1μA to 10mA current source and are factory prescaled to display °C with Platinum 100 ohm RTD sensors • Programmable °C and °F descriptors and two programmable decimal positions • Measurements from −185° to +600°C & Accuracies to 0.1°C are possible depending on sensor/probe selected • Auto polarity

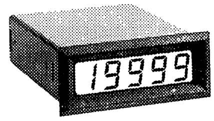
TM-150XF $75 $64 (100's)
TM-150XRF $79 $67 (100's)
TM-150XACF $79 $67 (100's)
TM-150XACRF $83 $71 (100's)



Identical features to the TM-150X, TM-150XR, TM-150XAC & TM-150XACR but factory prescaled to display °F • Any of the TM-150 Series may be user modified and calibrated to display either °C or °F, or user modified to enable switch selection of °C or °F display

EVENT COUNTERS

PC-45X $59 $50 (100's)

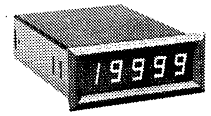


A versatile event counter/totalizer featuring 19999 counts with overrange indication, or 9999 counts with cascade output • contact closure, AC or logic signal inputs • High contrast 48″ LCD • 4∼6VDC Power with outputs for user supplied Ni-Cad battery backup • Capable of Signal Powered Operation • Internal Debouncing Circuit • Controls include count reset, count inhibit and display hold • 4 user programmable decimal points • Overload indication

PC-45XAC $65 $52 (100's)

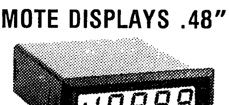
All the same features as the PC-45X but designed to be operated from 110VAC or 220VAC mains power • The Internally mounted transformer provides a 1.8mA output to trickle charge a user supplied 7.2V standard Ni-Cad back-up battery. (Eveready CH 22 or eqv.)

PC-45 $49 $37 (100's)



A versatile event counter/totalizer featuring 19999 counts with overrange indication, or 9999 counts with cascade output • contact closure, AC or logic signal inputs • High brightness .4″ LED display • +5VDC powered • outputs for user supplied Ni-Cad battery backup • Internal debouncing circuit • controls include count reset, count inhibit and display hold • 4 user programmable decimal points • overload indication

REMOTE DISPLAYS .48″ LCD



RD-45XMUX4 $49 $42 (100's)

Accepts standard 4-wire BCD Data inputs with 2μ second minimum spacing between Digit scan/digit drive outputs • Positive or negative logic • Polarity sign and 5 selectable decimal positions • Overrange indication • 26 pin Ribbon cable/Edge connector input • +3V to +6V operation at 2∼3mA

RD-45XMUX4I $49 $42 (100's)

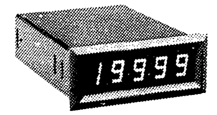
All the same features as the RD-45MUX4 but designed to operate with Intersil A/D converters where the Digit scan outputs overlap and a STROBE signal identifies the data for each Digit

RD-45XMUX7 $54 $46 (100's)

Accepts multiplexed 7 segment inputs • Common Anode or Common Cathode • Negative or Positive Logic • Requires 2μs minimum spacing between Digit scan/Digit Drive outputs • Polarity sign • Overrange indication • 5 decimals • +3V to +5V DC operation at 2∼3 mA

REMOTE DISPLAYS .4″ LED

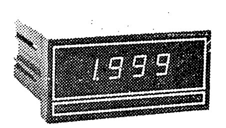
RD-45MUX4 $40 $34 (100's)
RD-45MUX4I $40 $34 (100's)
RD-45MUX7 $45 $39 (100's)



The RD-45MUX4, RD-45MUX4I and RD-45MUX7 have corresponding features to the RD-45XMUX4, RD-45XMUX4I and RD-45XMUX7 but feature high brightness .4″ LED displays instead of LCD • 26 Pin Ribbon cable/Edge connector input • Low Ripple +4V to +4.4V DC Pwr at 200mA typ.

AC POWERED DPM'S

RP-35U $49 $42 (100's)



World's lowest priced 115/230VAC line operated DPM • 3½ Digits • .56″ Standard Red LEDs • True Differential Inputs • 200mV to 1200V FS • Ratiometric • Ohms • Current • Bipolar • Auto Zero • Programmable Decimals • TC 100ppm typ.

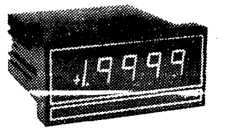
RP-35A $59 $50 (100's)

Extremely versatile full feature 3½ digit 115/230VAC line operated DPM • Differential Inputs • Customer Programmable Current and Ohmmeter Capability • Ratiometric • 4/20mA • Scaling in Engineering Units with Offset • DC Outputs Available • Display Test • Low TC 60 ppm Typ. • Auto Zero • Bipolar • Programmable Decimals

RP-35AR $85 $73 (100's)

World's lowest cost autoranging AC PWR DPM • Has all the features of the RP-35A except Ratiometric ohms measurement • Auto Ranges between any two Ranges from 200mV-2V to 200V-1200V • Auto Switching Selectable Decimals

RP-3500D2 $97 $87 (100's)
RP-4500D2 $125 $108 (100's)

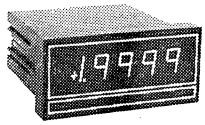


RP-3500D 3½ digit and RP-4500D 4½ digit are top of the line 115/230VAC Pwr instrumentation DPMs • High normal mode noise rejection at 50/60 Hz of 120dB with internal 200K Hz quartz clock • Scaling in engineering units with offset • 4/20mA • Ratiometric • Ideal for load cell measurements • 20Ω to 20MΩ ohmmeter capability • 10 microvolt resolution on RP-4500D

RP-3500DBCD $127 $108 (100's)
RP-4500DBCD $160 $137 (100's)

All the same features as RP-3500D and RP-4500D but with buffered Tri-state parallel BCD output. **Note:** Parallel BCD output board is also available for field retrofit of previously purchased RP-3500D/4500D meters

RP-3500 $79 $67 (100's)
RP-4500 $95 $81 (100's)



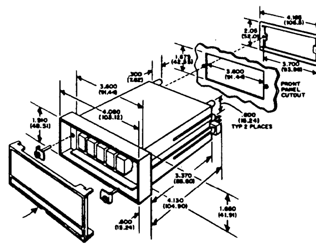
RP-3500 3½ digit and RP-4500 4½ digit are low cost 115/230VAC line operated DPMs • Single-ended inputs • MUX BCD • Remote control sample/hold feature • Display blanking • Leading zero blanking • Autorange outputs • Display test • Autozero • Bipolar • Flashing overload • 2V FS to 1200V

RP-3500BCD $109 $93 (100's)
RP-4500BCD $130 $111 (100's)

All the same features as RP-3500 and RP-4500 but with buffered Tri-state parallel BCD output. **Note:** Parallel BCD output board is also available for field retrofit of previously purchased RP-3500/4500 meters

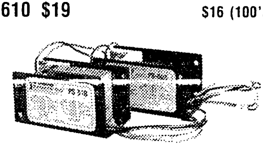
THE REPLACER (RP-) SERIES OF AC POWERED DPM's UTILIZE A CASE DESIGNED TO FIT MOST OTHER DPM MANUFACTURERS CUT-OUTS INCLUDING DIN/NEMA STANDARDS.

RP- CASE DIMENSIONS



REGULATED POWER SUPPLIES LOW COST +5VDC OUTPUT

PS-505 $17 $14 (100's)
PS-610 $19 $16 (100's)



The PS-505 with a 500mA output and the PS-510 with a 1 Amp lamp output are general purpose low ripple regulated power supplies suited for +5VDC powered DPM's • Both units provide user selectability for 110VAC or 220VAC operation

TEXMATE INC

348 SOUTH CEDROS AVENUE, P.O. BOX 2000
SOLANA BEACH, CA 92075 TWX-910-322-1738

AUSTRALIA: SYDNEY (02) 797-9222; MELBOURNE (03) 329-8873 • **CANADA:** TORONTO (416) 661-3193; MONTREAL (514) 337-0425; EDMONTON (403) 432-7746; OTTAWA (613) 238-7077 • **FRANCE:** PARIS (1) 575-53-53 • **GERMANY:** QUICKBORN 041 06/612-1; HANOVER 05 11/88 6086; DUSSELDORF 02 11/66 61 45; DARMSTADD 0 61 51/2 64 46; STUTTGART 07 11/73 63 57; MUNICH 089-47 3023 • **INDIA:** BANGALORE (812) 58227 • **NEW ZEALAND:** AUCKLAND 546-745/543-214 • **SPAIN:** BARCELONA (93) 692-35-19 • **SWEDEN:** STOCKHOLM 08-710 06 20 • **TAIWAN:** TAIPEI 592-3509/591-9651 • **UNITED KINGDOM:** WALSALL (0922) 640003

Telephone (619) 481-7177

TRIPLETT

PANEL

Custom tooled . . . custom specifications or standard off-the-shelf . . . Triplett can supply your panel instruments or requirements.

Even though Triplett offers a wide selection of different styles, sizes and types of standard panel instruments, a large proportion of our customers require custom designed instruments. Many have a specific requirement for custom packaging to enhance the appearance or function of their product.

Triplett's versatile GL-GL/B Series provides a flexibility that may enable you to save considerable tooling expense by utilizing a standard back with a custom designed front panel. This flexibility can save you up to 50% on tooling costs.

If your requirements do not demand special packaging, but do demand custom instrument movements, Triplett engineering can also design to your accuracy, tracking, resistance or damping requirements.

Panel Instrument parameters and standard case styles are shown below to assist you in determining your instrument requirements.

METER SPECIFICATIONS

Instruments can be DC or AC, Taut-Band (Suspension) or Pivot and Jewel and designed to your accuracy, tracking, resistance, sensitivity or damping requirements. They can be zero left or right, up-scale zero, zero center (null meter) or with a suppressed zero.

DC Instruments are the d'Arsonval type with linear scales, extra light moving coil, rugged construction, Bar-Ring Magnet and one piece diecast frames.

AC Instruments are either the moving iron vane type with viscous damping and light moving parts or the rectifier type.

Coil Support System—Both the taut band and pivot and jewel systems are available. All pivot and jewel movements have selected spring back jewel bearings with highly polished and specially treated pivots.

Resistance—Instruments can normally be designed to meet your internal resistance requirements. For best results, current instruments should be low resistance and voltmeters should be high resistance.

Accuracy—Instruments can be designed to within ½% (standard ±2%) with mirror scales and knife-edge pointers.

RANGES

DC Ammeters—From 5μA to 50A with internal construction and up to 5,000A using an external shunt.

DC Voltmeters—from 5mV to 1000V with internal construction and up to 5,000V using an external multiplier box.

AC (Iron Vane Type) Ammeters—from 5mA to 50A with internal construction and up to 1,000A using external current transformer.

AC (Iron Vane Type) Voltmeters—from 1.5V to 600V with internal construction and up to 1,000V using external multiplier box.

AC (Rectifier Type) Ammeters—from 0.5mA to 10mA.

AC (Rectifier Type) Voltmeters—from 1V to 1000V with internal construction and up to 5,000V using external multiplier box.

RF Thermocouple Ammeters—from 2mA to 10A.

Watt Meters, VU Meters, db Meters (power level indicators) and Pyrometers are also available in many sizes and styles.

SCALES

Dials can be custom designed to conform with the overall appearance of the end product. Company logos, different ink colors and custom dials reading in such units as pH, roentgens, mm, Hg, rpm, %, heartrate and inches can be designed.

Pointers are also available in many styles.

Mirror Scales can be added for greater reading accuracy.

Divisions—For standard ranges, each division is in multiples or decimal multiples of 1, 2 or 5 of the units measured, determined by size, readability accuracy, etc.

If the standard case designs do not fulfill your design requirements contact the factory for custom machining or molding.

INFORMATION FOR ORDERING

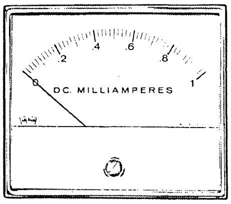
What custom panel instrument specifications do you need to make your product more reliable, more accurate, more rugged and—in the long run—less expensive? For quick, dependable delivery of small quantities of Triplett's "designed-for-you" panel instruments, contact your Triplett Sales/Service/Modification Center. For prototypes or production quantities, contact your Triplett representative. He'll put you in touch with our Instrument Designers/Engineers who'll help you analyze the problem and suggest the optimum cost/result solution.

INSTRUMENTS

TEL: (419) 358-5015 TWX 810-490-2400
TRIPLETT CORPORATION, BLUFFTON, OHIO 45817

STANDARD CASE STYLES

G SERIES: Models 120-G, 220-G, 320-G, 420-G, 520-G.

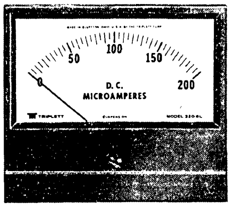


Sizes available: 1½"; 2½", 3½", 4½", 5½".

Case and Composition: Thermoplastic front and back, four stud mounting.

Options Available: Half-Bezel for behind panel mounting, illumination kit, and shallow barrel.

GL SERIES: Models 220-GL, 320-GL, 420-GL, 520-GL, 820-GL.

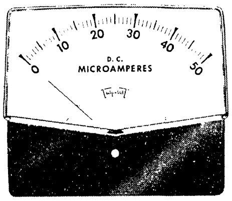


Sizes available: 2½", 3½", 4½", 5½", 8".

Case and composition: Glass window, flat black thermosetting plastic case, two stud mounting except 820-GL and 220-GL with four stud mounting, contains contoured base with sealed meter movement permitting utilization of lower part of front for mounting controls, switches, etc.

Options available: Three and four stud mounting for 320-GL, four stud mounting for 420-GL 520-GL.

M SERIES: Model 820-M.

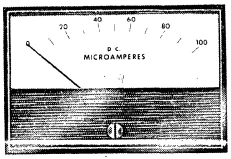


Sizes available: 8½".

Case and Composition: Thermoplastic front and back.

Options available: A thermosetting plastic accessory case 3¾" d (with handle) is available allowing instrument to be utilized in special test equipment requirements. Contact factory for additional data.

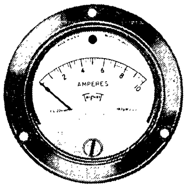
R SERIES: Models 320-R, 420-R.



Sizes available: 3½", 4½".

Case and composition: Thermoplastic front and thermosetting plastic back with flat scale arc.

RUGGEDIZED SERIES: Models 127-HR, 221-HR, 321-HR.

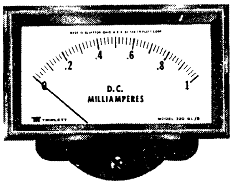


Models 221-HR and 321-HR meet MIL-M-10304-D.

Sizes available: 1½", 2½", 3½".

Case and composition: Thermoplastic front and steel back.

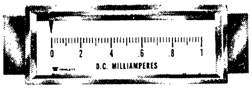
GL/B SERIES: Models 320-GL/B, 420-GL/B, 520-GL/B.



Sizes available: 3½", 4½", 5½".

Case and composition: Glass window, flat black thermosetting plastic case, integral bezel provides behind the panel mounting, minimum panel space requirement permits fuller utilization of panel area.

EDGEWISE SERIES: Models .5-E, 120, 220-E, 320-E, 320-EG, 420-E.



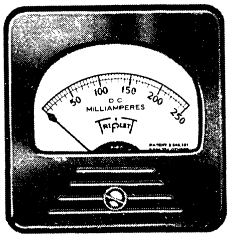
Sizes available: ½", 1½", 2½", 3½", 4½".

Case and composition: .5-E thermoplastic front, steel back; all others thermoplastic front (320-EG sealed glass window), thermo-setting plastic back. 320-EG constructed to withstand rough environmental and high vibration industrial applications.*

Options available: Bezels available for 320-E, 420-E. Models 320-E, 320-EG and 420-E can be mounted from front or rear of panel. Also available for vertical mounting.

*Includes steel mounting brackets.

PHENOLIC SERIES:

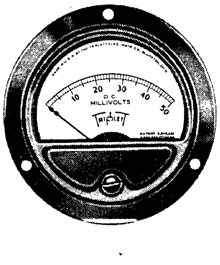


Models: 227-T, 327-T.

Sizes available: 2½", 3½".

Case and composition: Glass window, thermosetting plastic case, four stud mounting.

Options available: Illumination available for certain models—contact factory.

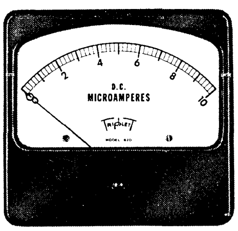


Models: 221-T, 321-T.

Sizes available: 2½", 3½".

Case and composition: Glass window, thermosetting plastic case, three stud mounting.

Options available: Illumination available for certain models—contact factory.



Models: 420, 626, 726.

Sizes available: 4½", 6½", 7½".

Case and composition: Glass window, thermosetting plastic case, four stud mounting.

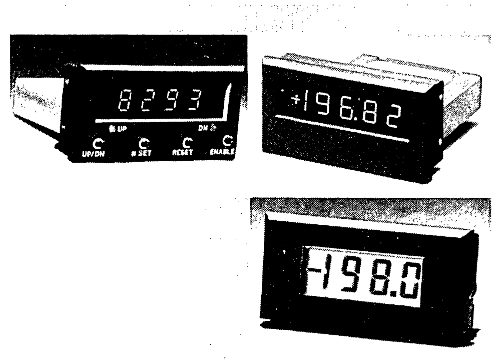
Options available: Illumination available for certain models—contact factory.

enclosures · capacitors · circuit boards · coils,
chokes, inductors · connectors, electronic · sockets/
terminals · crystals · oscillators · crystal filters
delay lines · panel hardware · displays · lamps/
lights · cooling equipment · filters · generators ·
multimeters · panel meters · oscilloscopes · gra

EEM PRODUCT SELECTION GUIDES

Use the EEM Product Selection Guides. There are 34 Guides in this edition of EEM. See page 2 (A•2, B•2, C•2, D•2) of each volume to locate the Product Selection Guides that pertain to your needs.

coders · transformers · wire & cable · enclosures
capacitors · circuit boards · coils, chokes, induc
tors · connectors, electronic · sockets/terminals



IMPAC™ Digital Panel Meters

IMPAC Digital Panel Meters are one of the small wonders of the world for applications requiring high reliability, low power consumption and sharp, readable displays. Accurate measurement capabilities are designed into IMPAC Meters, including dual-slope conversion circuitry, high quality components, and 100% burn-in and testing on all models. IMPAC features auto-zero reset, display test, display blanking and moveable decimal point. BCD inputs, sign and overrange outputs are standard.

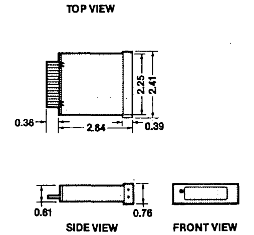
Ruggedized meters are encapsulated to protect against moisture and corrosive fumes and other harsh environments such as vibration, shock and acceleration.

LED DIGITAL PANEL METERS						**LCD DIGITAL PANEL METERS**	
Commercial Model	**31ZD**	**36ZD**	**41ZD**	**46ZD**	**32ZD**		
Ruggedized Model	**V-2901Z**	**V-2902Z**	**V-2903Z**	**V-2904Z**	**V-2864Z**		
Display	0.3 in.	0.3 in.	0.3 in.	0.3 in.	0.3 in.		
Commercial Model	**31ZB**	**36ZB**	**41ZB**	**46ZB**	**32ZB**	**37J**	**37K**
Ruggedized Model	**V-2362Z**	**V-2363Z**	**V-2364Z**	**V-2365Z**	**V-2667Z**		
Display	0.33 in.	0.33 in.	0.33 in.	0.33 in.	0.33 in.	0.5 in.	0.5 in.
Digits	3	31/2	4	41/2	3	31/2	31/2
Input Ranges -1 -2 -3 -4	 ±99.9mV ±999mV ±9.99V ±99.9V	 ±199.9mV ±1.999V ±19.99V ±199.9V	 ±99.99mV ±999.9mV ±9.999V ±99.99V	 ±199.99mV ±1.9999mV ±19.999V ±199.99V	**Display (000-999)** +1 to +5mA +4 to +20mA +10 to +50mA +1 to +5V	**Display (000-999)** ±199.99mV ±1.999V ±19.99V ±199.9V	**Display (000-999)** ±199.99mV ±1.999V ±19.99V ±199.9V
Accuracy[1]	+0.1% RDG+ +0.1% FS	+0.1% RDG+ +0.05% FS	+0.05% RDG+ +0.02% FS	+0.05% RDG+ +0.01% FS	+0.01% RDG+ +0.01% FS	±0.05% RDG+ +0.05% FS	±0.05% RDG+ +0.05% FS
Sample Rate[3]	2.5/s	2.5/s	2.5/s	2.5/s	2.5/s	2.5/s	2.5/s
Conversion Time[3]	400ms	400ms	400ms	400ms	400ms	400ms	400ms
Response Time	400ms	400ms	400ms	400ms	400ms	400ms without filter, 2sec with filter	
Input Impedance[4] -1 -2 -3 -4	 >1000MΩ >1000MΩ >1MΩ >1MΩ	 >1000MΩ >1000MΩ >1MΩ >1MΩ	 >1000MΩ >1000MΩ >1MΩ >1MΩ	 >1000MΩ >1000MΩ >1MΩ >1MΩ	 30Ω 7.5Ω 3Ω >300kΩ	 >1000MΩ >1000MΩ >10MΩ >9MΩ	 >1000MΩ >1000MΩ >10MΩ >9MΩ
Common-Mode Noise Rejection	Typical 86dB from DC to 400Hz, 1kΩ imbalance				N/A	Typical 80dB from DC to 400Hz, 1kΩ imbalance	
Normal Mode Rejection	>40dB at 50, 60 and 400Hz					>50dB at 50, 60 and 400Hz (w/filter)[6]	
Temperature Range	Operating: 0°C to +50°C; Storage: −20°C to +85°C (Commercial) Operating: −10°C to +70°C; Storage: −40°C to +85°C (Ruggedized)					Operating: 0°C to +50°C; Storage: −20°C to +65°C	
Temperature Coefficient	0.01%/°C, from 0°C to +50°C (Commercial) 0.01%/°C from +10°C to +40°C (Ruggedized)				0.03%/°C from 0°C to +50°C (Com.) 0.03%/°C from −10°C to +70°C (Rug.)	0.01%/°C from 0°C to +50°C	
Voltage	+4.8 to +6.0 V_{DC} (+7.0 V_{DC} maximum without damage)					+7 to +12 V_{DC} (+13.0 V_{DC} max. w/o damage)	+4.8 to +6.0 V_{DC} (+13.0 V_{DC} max. w/o damage)[5]
Current (Typical)	75mA	80mA	90mA	95mA	80mA	7mA	2.5mA

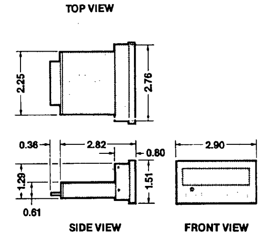
LED EVENT COUNTERS		
Series	**141B**	**142B**
Display	4-Digit LED display; counts between 0000 and 9999. Display digit of 0.33 inches.	
Input	One-shot to 2MHz. Input count voltage threshold approximately +2V (5V max). Resist: 75kΩ.	
Operating Mode(s)	Counts up from 0000 to 9999, then rolls over to 0000. The 142B also counts down from any preset number.	
Input Signal Interface	a) Reset to zero. b) Leading-zero blanking, blank normal.[7] c) Display hold.[7] d) Decimal point location. e) Carry pulse indicator when count passes zero. f) Leading-zero blanking, entire display blanking, or normal.[7]	a) Carry pulse indicates when count passes zero. b) Reset to zero. (TTL levels). c) Reset to preentered value. *d) Leading-zero blanking, entire display blanking, or normal.[7] *e) Display hold.[7] f) Decimal point location.
Temperature Range	Operating: 0°C to +50°C; Storage: −20°C to +85°C	
Voltage	From +4.5V up to +5.5 V_{DC} (+6 V_{DC} maximum without causing damage)	
Current at 5 V_{DC} Typical	400 μA_{DC} (all digits off) 180 mA_{DC} (all segments lit)	20 mA_{DC} (all digits off) 200 mA_{DC} (all segments lit)

Note 1. RDG = Reading, FS = Full-Scale
Note 2. Underrange is optional (Option N) on 31Z and 41Z models.
Note 3. Other rates or times available on special order.
Note 4. Refers to DC signal input.
Note 5. Battery return must be ungrounded; multiple DPMs should not use common battery.
Note 6. Internal input filter is selectable at the rear connector.
Note 7. The counter will continue to count normally when these controls are actuated.

D Series

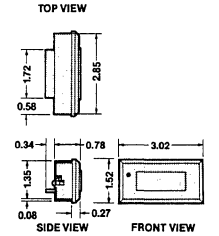


B Series

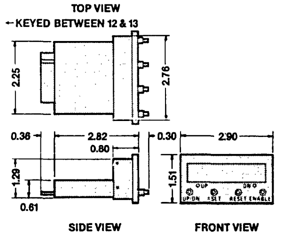


Weight: DPM <3.5oz.; Mounting Clamp <1.0oz.

LCD



Counters



Weight: <2.0oz.

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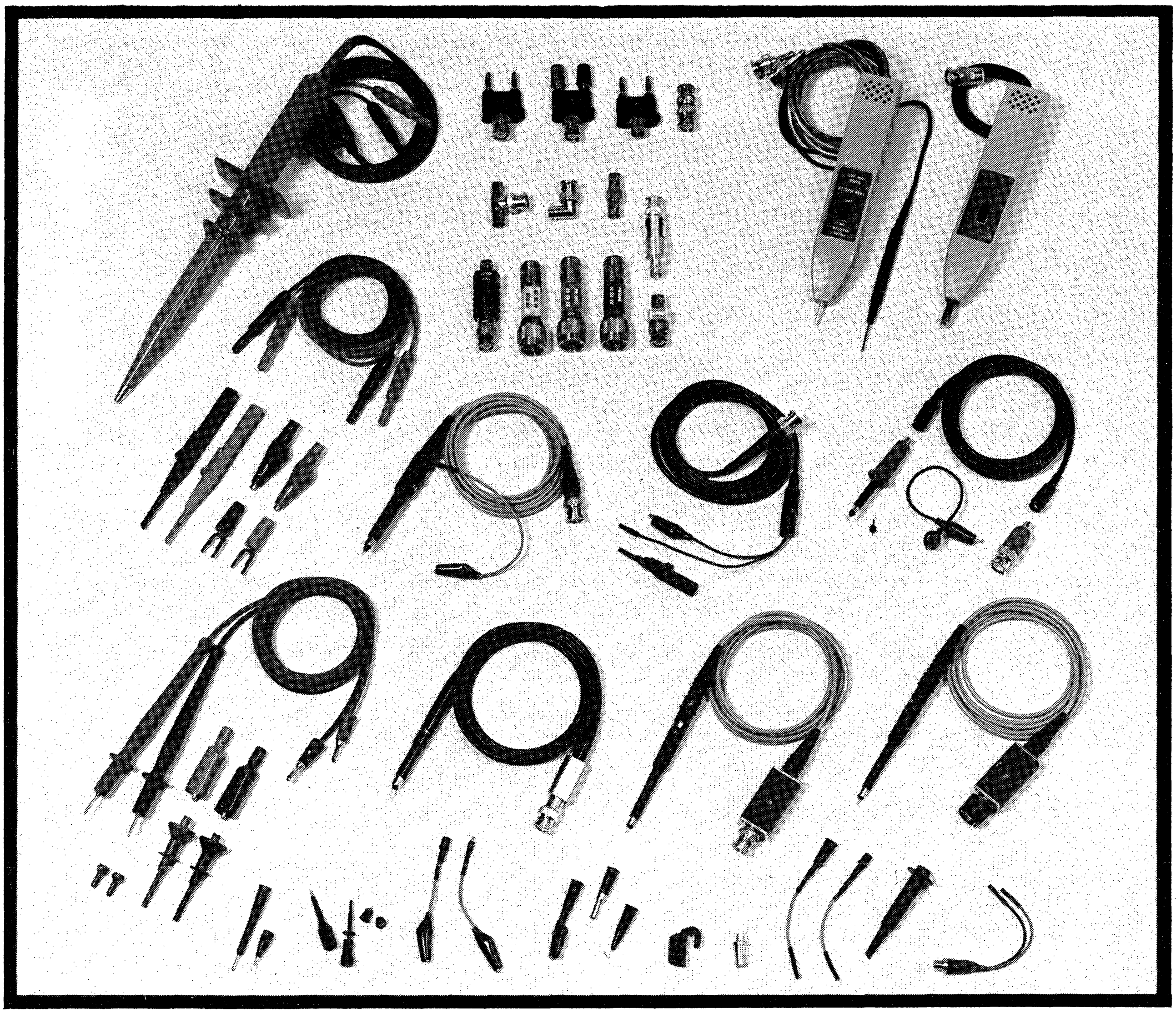

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OSCILLOSCOPES

Manufacturer	EEM Page No.	Model/ Series	Band-width (MHz)	Rise-time (ns)	Vertical Sensitivity (mV/div)	Sweep Rate (μS/div)	No. of Traces	No. of Chan-nels	Lab	Field	De-layed Sweep	Auto.	Trigger Exter-nal	Z-Axis Input	X-Y Display Mode	Stor-age	IEEE 488 Interface
B & K Precision	B•1387	1590A	100	3.5	1	2 ns	8	4	●		●	●	●	●	●		
	B•1388	1580	100	3.5	1	2 ns	2	2	●		●	●	●	●	●		
	B•1387	1570A	80	5	1	5 ns	4	4	●		●	●	●	●	●		
	B•1388	1560	60	5.8	1	5 ns	3	3	●		●	●	●	●	●		
	B•1388	1540	40	8.8	1	10 ns	2	2	●		●	●	●	●	●		
	B•1386	1535	35		2	20		2				●					
	B•1386	1479B	30		5	40 ns		2									
	B•1386	1522	20		1	20 ns		2				●					
	B•1386	1477	15		10	0.1		2									
	B•1386	1420	15		10	100 ns		2									
	B•1386	1476A	10		1	50 ns		2				●					
	B•1386	1466A	10		1	50 ns		1									
	B•1386	1405	5		10	Recurrent		1									
Iwatsu Instruments	B•1392	SS-5321	250	1.4	5	1 ns	3	3	●	●	●	●	●		●		
	B•1390	SS-5711	100	3.5	5	20 ns	8	4	●	●	●	●	●	●	●		
	B•1398	SS-5712	200		1	10 ns		4	●	●	●	●	●				
	B•1391	TS-8123	100		1				●		●			●	●	A+D	GPIB
	B•1390	SS-5710	60	5.8	5	50	8	4	●	●	●	●	●	●	●		
	B•1392	SS-3510	50		10	0.1	2	2	●	●		●	●	●	●		
	B•1392	SS-5705	40		5	0.1	6	3	●	●		●	●	●	●		
	B•1392	SS-5706	30		5	0.1	3	3	●	●		●	●	●	●		
	B•1392	SS-5702	20		5	0.1	2	2	●	●		●	●		●		
	B•1391	SS-5802	10	35	5	0.5	3		●	●	●	●	●	●	●	Digital	GPIB
Kikusui International	B•1393	6100	100	3.5			5	5	●	●		●			●		
	B•1393	5100	100				8	3		●	●	●					
	B•1393	5060	60	5.8			2	2	●	●		●	●				
	B•1393	5040/41	40	8.8					●	●	Opt.	●					
	B•1393	5020	20	17.5				2	●		Opt.	●				●	
	B•1393	DSS 6520	20	17.5			4	2	●		Opt.	●	●			●	
North American Soar	B•1394	MS-6110	100	3.5	5	0.5	4	4	●		●	●	●	●	●		
	B•1394	MS-6050	50	7	5	0.2	2	2	●	●	●	●	●	●	●		
	B•1395	MS-6050D	50	7	5	0.2	2	2	●	●		●	Delay	●	●		
	B•1394	MS-6035	35	10	5	0.1	2	2	●		●	●	●	●	●		
	B•1395	MS-6022/3	20	17.5	5	0.2	2	2	●			●	●	●	●		
	B•1396	MS-3015	15	24	2	0.5	2	2	●	●		●	●		●		
	B•1396	MS-3020	15	24	5	0.5	3	3	●			●	●		●	●	
Sencore	B•1399	SC61	60					2	●			●	●		●		

B+K PRECISION DYNASCAN CORPORATION / OSCILLOSCOPES

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Model No.	Bandwidth (MHz)	Deflection Factor/ Division	No. of Channels	Accelerating Potential	Sweep Rate Max.	Delayed Sweep/Dual Time Base	Delay Line	V-Mode Alternate Trigger	Video Sync
1596	150	1 mV/div to 100 MHz	4	20 kV	2 ns/div	YES	YES	YES	YES
1590A	100	1 mV/div to 100 MHz	4	20 kV	2 ns/div	YES	YES	YES	YES
1570A	80	1 mV/div to 80 MHz	4	12 kV	5 ns/div	YES	YES	YES	YES
1560	60	1 mV/div to 20 MHz 5 mV/div to 60 MHz	3	16 kV	5 ns/div	YES	YES	YES	YES
1540	40	1 mV/div to 15 MHz 5 mV/div to 40 MHz	2	12 kV	10 ns/div	YES	YES	YES	YES
1479B	30	5 mV/div to 30 MHz	2	6 kV	40 ns/div	NO	YES	NO	YES
1522	20	1 mV/div to 10 MHz 2 mV/div to 20 MHz	2	6 kV	20 ns/div	NO	NO	YES	YES
1477	15	10 mV/div to 15 MHz	2	2 kV	0.1 μs	NO	NO	NO	YES
1420	15	10 mV/div to 15 MHz	2	1.0 kV	100 ns/div	NO	NO	NO	YES
1476A	10	1 mV/div to 7 MHz 2 mV/div to 10 MHz	2	2 kV	50 ns/div	NO	NO	YES	YES
1466A	10	1 mV/div to 7 MHz 2 mV/div to 10 MHz	1	2 kV	50 ns/div	NO	NO	NO	YES
1405	5	10 mV/div to 5 MHz	1	1.3 kV	Recurrent	NO	NO	NO	NO

See your local B&K-PRECISION distributor for complete specifications or write for a catalog.

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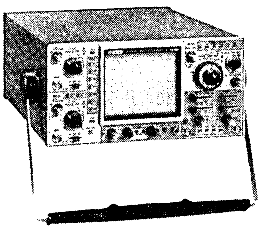
NEW 150 MHz QUAD-INPUT DUAL INDEPENDENT TIME BASE SCOPE



Model 1596 / $2095

FEATURES

• 1 mV sensitivity • 500 µV/div cascade sensitivity to 70 MHz • 23 calibrated sweeps • Rectangular CRT with internal graticule and scale illumination • 20 kV accelerating voltage • V mode — displays four signals unrelated in frequency • Alternate timebase operation • Signal delay line • 20 MHz bandwidth limiter • Lighted pushbutton function switching • Voltage and current probe calibrators • Video sync separators Channel 1 output.

SPECIFICATIONS

VERTICAL AMPLIFIERS (CH 1 and CH 2)
Deflection Factor: 1 mV/div to 5 V/div with vernier adjustment. LED UNCAL reminder.
Cascade: (CH 1 and CH 2): 500 µV/div.
Accuracy: ±2% (+10° to +35°C).
Response: (X1 or X5 vertical gain)
DC: DC to 150 MHz (−3 dB), 7 Hz to 70 MHz (cascaded).
AC: 5 Hz to 150 MHz (−3 dB), 7 Hz to 70 MHz (cascaded)
Rise Time: 2.3 ns.
Bandwidth Limiting. Approx. 20 MHz by bandwidth limit switch.
Input Impedance: 1 MΩ ±1%/22 pF.
CH 2 Polarity: Normal or inverted.
Max. Input Voltage: 1 MΩ Mode: 400 V (DC + AC peak) or 800 VAC p-p. 50Ω Mode: 5 V rms or DC.
(CH 3 and CH 4)
Deflection Factor: 1:1 — 0.1 V/div ±2%, 10:1 — 1 V/div ±2%.
Response: DC to 150 MHz (−3 dB).
Rise Time: 3.5 ns or less. Input Impedance: 1Ω ±1%/22 pF. Input Coupling: DC only.
Max. Input Displayed: 1:1 DC Component — ±0.5 V. AC Component — 1 V p-p. 10:1 DC Component — ±5 V. AC Component — ±10 V p-p.
Max Input Voltage: 400 V (DC + AC peak)
(CH 1 thru CH 4)
Operating Modes: CH 1 — CH 1, single trace. CH 2 — CH 2, single trace. DUAL — CH 1 and CH 2, dual trace. ADD — algebraic sum of CH 1 + CH 2, single trace (CH 1 — CH 2 with CH 2 inverted). QUAD — CH 1 thru CH 4, four trace.
Chop Frequency: Approx. 250 kHz, adjustable.

SWEEP SYSTEM
Modes: A — A sweep. ALT — A sweep (intensified for duration of B sweep) and B sweep alternating. A-INT-B — Duration of B sweep is displayed as an intensified portion of the A sweep. B DLY'D — Delayed B sweep. DUAL — Dual Sweep, A and B sweeps independent. X-Y — X-Y display mode.
A Sweep: 20 ns/div to 0.5 s/div in 1-2-5 seq., 23 steps. Vernier control. LED UNCAL reminder.
B Sweep: 20 ns/div to 50 ms/div in 1-2-5 sequence, 20 steps.
Accuracy: ±2% (+10° to +35°C).
Sweep Magnification: X10 ±5% (+10° to +35°C).
Linearity: ±3%; 10X, ±5%.
Holdoff: Contin. adjust. for A sweep (NORM to >5 times normal.)
Delay Time: 0.2 to 10 times A SWEEP TIME/DIV setting, continuously adjustable.

TRIGGERING
A TRIGGER: Modes: AUTO (free run), NORM. SINGLE/RESET. FIX.
Source: V. MODE, CH 1, CH 2, (EXT) CH 3, EXT) CH 3 1/10, line trigger.
Coupling: AC — 20 Hz to 150 MHz. LF Rej — 30 kHz to 150 MHz. HF Rej — 20 Hz to 30 kHz. DC — DC to 150 MHz. VIDEO — Trigger signal is routed through sync separator.
Level: ±90°; selects triggering at any point on the pos. and neg. slope of waveform. Slope: Can trigger on the pos. or neg. going slope on the trigger waveform. LED Indicator: Sweep A TRIG'D.
B TRIGGER: Modes: Starts after delay. Triggerable after delay.
Source: CH 1, CH 2, (EXT) CH 4, (EXT) CH 4 1/10.
Coupling: AC — 20 Hz to 150 MHz. LF Rej — 30 kHz to 150 MHz. HF Rej — 20 Hz to 30 MHz. DC — DC to 150 MHz.
Level: ±90°; selects triggering at any point on the pos. and neg. slope of waveform.
Slope: Can trigger on the pos. or neg. going slope on the trigger waveform.
LED Indicator: Sweep B TRIG'D.
Trigger Sensitivity (A and B):

COUPLING	BANDWIDTH	INT	EXT
DC	DC—20 MHz	0.5 div	50 mV
	DC—50 MHz	1.0 div	100 mv
	DC—150 MHz	2.0 div	280 mV
AC	Same as DC exc. lower limit is 20 Hz		
HF Rej	Same as AC exc. atten. above 30 kHz		
LF Rej	Same as AC exc. atten. below 30 kHz.		
VIDEO	FRAME	0.5 div	50 mV
	LINE	0.5 div	50 mV
AUTO	Same as AC exc. lower limit is 30 Hz		
FIX	40 Hz-20 MHz	1.5 div	150 mV
	40 Hz-150 MHz	3.0 div	420 mV

HORIZONTAL AMPLIFIER
(Input through Channel 2 input)
Freq. Response: DC: DC to 5 MHz (−3 dB). AC: 5 Hz to 5 MHz (−3 dB).
X-Y Operation: CH 2 becomes X axis, CH 1 is Y axis. X-Y Phase Difference: 3° or less at 100 kHz.

Z-AXIS INPUT
(Intensity Modulation)
Input Signal: TTL level, intensity increasing with more positive levels. Usable Freq. Range: DC to 10 MHz. Input Impedance: Approx. 10 kΩ. Max. Input Voltage: 50 V (DC + AC peak)

CRT
Type: Rectangular with internal graticule. Accelerating Voltage: 20 kV. Display Area: 8 x 10 division (1 div = 1 cm).

OTHER SPECIFICATIONS
Calibration Output: Positive Square Wave: 1 kHz ±3%.
Voltage: 1.0 V p-p ±1% (+10° to +35°C). 1.0 V p-p ±2% (0° to +50°C).
Current: 10 mA p-p ±2% (+10° to +35°C). 10 mA p-p ±4% (0° to +50°C).
Gate Outputs: Pos. gate (pulse) output.
Environment: Operating: +10° to +35°C, 85% max. rel. humidity for full specs. 0° to +50°C, 90% max. rel. humidity, full operating range. Altitude: Up to 5000 m (16,000 ft.).
Trace Rotation: Electrical, ext. adj.
Beam Finder: Pushbutton shrinks and intensifies display.
Power: 90-264 VAC, 45 ~ 400 Hz, approx. 60W.
Dimension (H x W x D): 13.8 x 28.4 x 40 cm (5¼ x 11¼ x 15¾") Weight: 7.4 kg (16¼ lbs.)

ACCESSORIES SUPPLIED
Two 10:1 Probes, Spare Fuses, Instruction Manual, Schematic Diagram and Parts List.

OPTIONAL ACCESSORIES
Demodulator Probe — PR-32, Deluxe 10:1/direct Probe—PR-37, 10:1/direct Probe — PR-40, Front Panel Cover — LC-100, Probe Pouch — LC-150.

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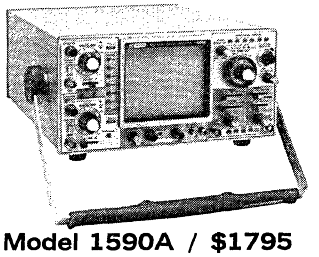
100 MHz QUAD-INPUT DUAL INDEPENDENT TIME BASE SCOPE



Model 1590A / $1795

FEATURES

• 1 mV sensitivity to full bandwidth • 500 µV/div cascade sensitivity to 70 MHz • 23 calibrated sweeps • Rectangular CRT with internal graticule and scale illumination • 20 kV accelerating voltage • V mode — displays four signals unrelated in frequency • Alternate timebase operation • Signal delay line • 20 MHz bandwidth limiter • Lighted pushbutton function switching • Voltage and current probe calibrators • Video sync separators • CH 1 output.

SPECIFICATIONS

VERTICAL AMPLIFIERS (CH 1 and CH 2)
Deflection Factor: 1 mV/div to 5 V/div with vernier adjustment. LED UNCAL reminder.
Cascade: (CH 1 and CH 2): 500 µV/div.
Accuracy: ±2% (+10° to +35°C).
Response: (X1 or X5 vertical gain)
DC: DC to 100 MHz (−3 dB), DC to 120 MHz (−6 dB), DC to 70 MHz (cascaded).
AC: 5 Hz to 100 MHz (−3 dB), 5 Hz to 120 MHz (−6 dB), 7 Hz to 70 MHz (cascaded).
Rise Time: 3.5 ns or less.
Bandwidth Limiting. Approx. 20 MHz by bandwidth limit switch.
Input Impedance: 1 MΩ ±1%/22 pF.
CH 2 Polarity: Normal or inverted.
Max. Input Voltage: 1 MΩ Mode: 250 V (DC + AC peak) or 500 VAC p-p. 50Ω Mode: 5 V rms or DC.
(CH 3 and CH 4)
Deflection Factor: 1:1 — 0.1 V/div ±2%, 10:1 — 1 V/div ±2%.
Response: DC to 100 MHz (−3 dB), DC to 120 MHz (−6 dB).
Rise Time: 3.5 ns or less. Input Imepdance: 1 Megohm ±1%/22 pF. Input Coupling: DC only.
Max. Input Displayed: 1:1 DC Component — ±0.5 V. AC Component — 1 V p-p. 10:1 DC Component — ±5 V. AC Component — ±10 V p-p.
Max Input Voltage: 50 V (DC + AC peak)
(CH 1 thru CH 4)
Operating Modes: Same as 1596 above.
Chop Frequency: Approx. 250 kHz, switchable.

SWEEP SYSTEM Same as 1596 above.

TRIGGERING
A TRIGGER: Modes: AUTO (free run), NORM, SINGLE/RESET, FIX.
Source: V. MODE, CH 1, CH 2, (EXT) CH 3, EXT) CH 3 1/10, line trigger.
Coupling: AC — 20 Hz to 100 MHz. LF Rej — 30 kHz to 100 MHz. HF Rej — 20 Hz to 30 kHz. DC — DC to 100 MHz. VIDEO — Trigger signal is routed through sync separator.
Level: ±90°; selects triggering at any point on the pos. and neg. slope of waveform. Slope: Can trigger on the pos. or neg. going slope on the trigger waveform. LED Indicator: Sweep A TRIG'D.
B TRIGGER: Modes: Starts after delay. Triggerable after delay.
Source: CH 1, CH 2, (EXT) CH 4, (EXT) CH 4 1/10.
Coupling: AC — 20 Hz to 100 MHz. LF Rej — 30 kHz to 100 MHz. HF Rej — 20 Hz to 30 MHz. DC — DC to 100 MHz.
Level: ±90°; selects triggering at any point on the pos. and neg. slope of waveform.
Slope: Can trigger on the pos. or neg. going slope on the trigger waveform.
LED Indicator: Sweep B TRIG'D.
Trigger Sensitivity (A and B):

COUPLING	BANDWIDTH	INT	EXT
DC	DC—20 MHz	0.5 div	50 mV
	DC—50 MHz	1.0 div	100 mV
	DC—100 MHz	1.5 div	150 mV
AC	Same as DC exc. lower limit is 20 Hz		
HF Rej	Same as AC exc. atten. above 30 kHz		
LF Rej	Same as AC exc. atten. below 30 kHz.		
VIDEO	FRAME	0.5 div	50 mV
	LINE	0.5 div	50 mV
AUTO	Same as AC exc. lower limit is 30 Hz		
FIX	40 Hz-20 MHz	1.0 div	100 mV
	40 Hz-80 MHz	1.5 div	150 mV

HORIZONTAL AMPLIFIER
(Input through Channel 2 input)
Frequency Response: DC: DC to 5 MHz (−3 dB). DC to 6 MHz (−6 dB). AC: 5 Hz to 5 MHz (−3 dB). 5 Hz to 6 MHz (−6 dB).
X-Y Operation: CH 2 becomes X axis, CH 1 is Y axis. X-Y Phase Difference: 3° or less at 100 kHz.
Z-AXIS INPUT Same as 1596 abuve.
CRT Same as 1596 above.

OTHER SPECIFICATIONS
Calibration Output: Positive Square Wave: 1 kHz ±3%.
Voltage: 0.3 V p-p ±1% (+10° to +35°C). 0.3 V p-p ±2% (0° to +50°C).
Current: 10 mA p-p ±2% (+10° to +35°C). 10 mA p-p ±4% (0° to +50°C).
Gate Outputs: Pos. gate (pulse) output.
Environment: Same as 1596 above.
Trace Rotation: Electrical, externally adj.
Beam Finder: Pushbutton shrinks and intensifies display.
Power: 90-132 VAC; 180-264 VAC 50/60 Hz, approx. 56 W.
Dimension (H x W x D): 13.8 x 28.4 x 40 cm (5¼ x 11¼ x 15¾") Weight: 7.4 kg (16¼ lbs.)

ACCESSORIES SUPPLIED
Two 10:1 Probes, Spare Fuses, Instruction Manual, Schematic Diagram and Parts List.

OPTIONAL ACCESSORIES
Demodulator Probe — PR-32, Deluxe 10:1/direct Probe—PR-37, 10:1/direct Probe — PR-40, Front Panel Cover — LC-100, Probe Pouch — LC-150.

B+K PRECISION DYNASCAN CORPORATION / OSCILLOSCOPES

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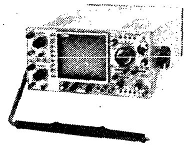
80 MHz, QUAD-INPUT DUAL TIME BASE SCOPE



Model 1570A / $1395

FEATURES

• Channel 1 output • 1 mV/div sensitivity to full bandwidth • 500 μV/div cascade sensivity to 40 MHz • 22 calibrated sweeps • Rectangular CRT with internal graticule and scale illumination • 12 kV accelerating voltage • V mode—displays four signals unrelated in frequency • Alternate timebase operation • Signal delay line • 20 MHz bandwidth limiter • Lighted pushbutton function switching • Video sync separators.

SPECIFICATIONS

VERTICAL AMPLIFIERS (CH 1 and CH 2)

Deflection Factor: 1 mV/div to 5 V/div with vernier adjustment.

Cascade: CH 1 to CH 2): 500 μV/div.

Accuracy: ±2% (+10° to +35°C).

Response: (X1 or X5 vertical gain) DC: DC to 80 MHz (−3 dB). DC to 40 MHz (cascaded). AC: 5 Hz to 80 MHz (−3 dB). 7 Hz to 40 MHz (cascaded).

Rise Time: 5 ns or less.

Bandwidth Limiting: Approx. 20 MHz by bandwidth limit switch.

Input Impedance: 1 Megohm ±1%/22 pF.

CH 2 Polarity: Normal to inverted.

Max. Input Voltage: 250 V (DC + AC peak) or 500 VAC p-p.

(CH 3 and CH 4)

Deflection Factor: 0.1 V/div ±2%.

Response: DC to 80 MHz (−3 dB).

Rise Time: 5 ns or less. Input Impedance: 1 Megohm ±1%/22 pF. Input Coupling: DC only.

Max. Input Displayed. DC Component — ±0.5 V. AC Component — 1 V p-p.

Max. Input Voltage: 50 V (DC + AC peak).

(CH 1 thru CH 4)

Operating Modes: Same as 1596.

Chop Frequency: Approx. 250 kHz.

SWEEP SYSTEM

Modes: A — A sweep. ALT — A sweep (intensified for duration of B sweep) and B sweep alternating. A-INT-B — Duration of B sweep is displayed as an intensified portion of the A sweep. B DLY'D — Delayed B sweep. X-Y — X-Y display mode.

A Sweep: 50 ns/div to 0.5 s/div in 1-2-5 seq., 22 steps. Vernier control.

B Sweep: 50 ns/div to 50 ms/div in 1-2-5 seq., 19 steps.

Accuracy: ±2% (+10° to +35°C).

Sweep Magnification: 10X, ±5% (+10° to +35°C).

Linearity: ±3%; 10X, ±5%.

Holdoff: Continu. adj. for A sweep (NORM to > 5 times normal).

Delay Time: 0.2 to 10 times A SWEEP TIME/DIV setting, contin. adj.

TRIGGERING

A TRIGGER: Modes: AUTO (free run), NORM, SINGLE, RESET.

Source: V. MODE, CH 1, CH 2, (EXT) CH 3, Line Trigger.

Coupling: AC — 20 Hz to 80 MHz. LF Rej — 30 kHz to 80 MHz. HF Rej — 20 Hz to 30 MHz. DC — DC to 80 MHz. VIDEO — Trigger signal is routed through sync separator.

Level: Same as 1596.

B TRIGGER: Modes: Starts after delay. Triggerable after delay.

Source: CH 1, CH 2, (EXT) CH 4.

Coupling: AC only — 20 Hz to 80 MHz.

Level: +90°; selects triggering at any point on the pos. and neg. slope of the waveform.

Slope: Can trigger on the pos. or neg. going slope on the trigger waveform.

LED Indicator: Sweep B TRIG'D.

Trigger Sensitivity (A and B):

COUPLING	BANDWIDTH	INT	EXT
DC:	DC—20 MHz	0.5 div.	50 mV
	DC—80 MHz	1.5 div.	150 mV
AC:	Same as DC exc. lower limit is 30kHz.		
HFrej:	Same as AC exc. atten. above 30kHz.		
LFrej:	Same as AC exc. atten. below 20Hz.		
VIDEO:	FRAME	0.5 div.	50 mV
	LINE	0.5 div.	50 mV
AUTO:	Same as AC exc. lower limit is 30Hz.		

HORIZONTAL AMPLIFIER (Input through channel 2 input)

Frequency Response: DC: DC to 5 MHz (−3 dB). DC to 6 MHz (−6 dB). AC: 5 Hz to 5 MHz (−3 dB). 5 Hz to 6 MHz (−6 dB).

X-Y Operation: CH 2 becomes X axis, CH 1 is Y axis. X-Y Phase Difference: 3° or less at 100 kHz.

Z-AXIS INPUT: (Intensity Modulation) Same as 1596.

CRT

Type: Rectangular with internal graticule. Accelerating Voltage: 12 kV. Display Area: 8 x 10 division (1 div = 1 cm).

OTHER SPECIFICATIONS

Calibration Output: Positive Square Wave: 1 kHz ±3%.

Voltage: 0.3 V p-p ±1% (+10° to +35°C). 0.3 V p-p ±2% (0° to +50°C).

Environment: Operating: +10° to +30°C, 85% max. relative humidity for full specifications. 0° to +50°C, 90% max. rel. humidity, full operating range. Altitude: Operating: up to 5000 meters (16,000 ft).

Trace Rotation: Electrical, externally adjustable.

Power: 90-132 VAC; 180-264 VAC 50/60 Hz, approx. 56 W.

Dimensions (H x W x D): 13.8 x 28.4 x 40 cm (5¼ x 11¼ x 15¾").

Weight: 7.4 kg (16¼ lbs.)

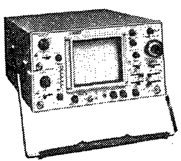
ACCESSORIES SUPPLIED

Two 10:1 Probes, spare fuses, instruction manual, schematic diagram and parts list.

OPTIONAL ACCESSORIES

Demodulator Probe — PR-32, Deluxe 10:1/direct Probe — PR-37, 10:1/direct Probe — PR-40, Front Panel Cover — LC-100, Probe Pouch — LC-150.

60 MHz TRIPLE TRACE SCOPE



Model 1560 / $1150

FEATURES

• 1 mV/div sensitivity • 22 calibrated sweeps • Signal delay line • Rectangular CRT with internal graticule and scale illumination • Video sync separators • X-Y operation • Z axis input • 16 kV accelerating voltage • X10 sweep magnification • Delayed sweep/dual time base • Single sweep • Auto focus • V mode — displays two signals unrelated in frequency • Sum and difference capability • Channel 1 output • Includes probes.

SPECIFICATIONS

VERTICAL AMPLIFIERS (CH 1 and CH 2)

Deflection Factor: 1 mV/div to 5 V/div, ±3% in 12 step, 1-2-5 seq. with Vernier.

Response: (−3 dB) 1 mV/div., 2 mV/div. DC: DC to 20 MHz. AC: 5 Hz to 20 MHz, 5 mV/div. to 5 V/div. DC: DC to 60 MHz. AC: 5 Hz to 60 MHz.

Rise Time: 5.8 ns or less (60 MHz).

Input Impedance: 1 MΩ ±2%/27 pF.

Max Input Voltage: 500 V p-p or 250 V (DC + AC peak).

CH 3

Deflection Factor: 0.1 V/div and 1 V/div ±3%.

Response: DC: DC to 60 MHz, −3 dB. AC: 5 Hz to 60 MHz, −3 dB.

Rise Time: 5.8 ns or less.

Input Impedance: 1 MΩ ±2%/27 pF.

Max Input Voltage: 50 V (DC + AC peak).

Operating Modes: CH 1 — Single Trace. CH 2 — Single Trace. ADD — CH 1 + CH 2 Single Trace. Dual — CH 1 and CH 2, dual trace. TRIPLE — CH 1, CH 2, CH 3, triple trace. ALT — Dual or triple trace, alternating sweep. CHOP — Dual or triple trace, chopped sweep.

Signal Delay Time: Approx. 20 ns on the CRT screen.

SWEEP SYSTEM

Mode: NORM, AUTO, FIX, SINGLE.

Sweep Time: A — 0.05 μs/div to 0.5 s/div, ±3% in 22 ranges, in 1-2-5 seq. with Vernier. B — 0.05 μs/div to 50 ms/div in 19 ranges, in 1-2-5 seq.

Sweep Magnification: X10 ±5%. Extends max sweep rate to 5 ns/div.

Linearity: ±3%.

Holdoff: Cont. var. (NORM to >10X).

Delay Time: Cont. adj. 500 ns to 0.5 s). 0.2 to 10 times the A sweep setting.

TRIGGERING

Source: V MODE, CH1, CH2, CH 3/ EXT. LINE.

Coupling: AC, HF rej, DC, VIDEO Frame, VIDEO Line.

Automatic: Sweep without an input.

Normal: No sweep without an adequate trigger signal.

Fix: Trigger threshold autom. set at center of trigger signal.

Single: Single sweep operation.

Slope: Can trigger on pos. or neg. going slope on the trigger waveform.

Video Sync: Vert. and horiz. sync sep.

Sensitivity: DC — DC-60 MHz, 1 div. int. or 0.1 V p-p ext. AC — 20 Hz — 60 MHz, 1 div. int. or 0.1 V p-p ext. AC HF rej — Incr. min. level below 20 Hz and above 30 kHz. VIDEO — FRAME or LINE: 1 div. int. or 0.1 V p-p-ext. AUTO — 30 Hz — 60 MHz: 1 div. int. or 0.1 V p-p ext. FIX — 40 Hz — 60 MHz: 1 div. int. or 0.1 V p-p ext.

EXTERNAL TRIGGER INPUT

Max Input Voltage: 50 V (DC + AC peak).

Input Impedance: 1 MΩ ±2%/28 pF.

HORIZONTAL AMPLIFIER (Input thru CH 2, X10 MAG not included)

Response: DC: DC to 2 MHz, −3 dB. AC: 5 Hz to 2 MHz, −3 dB.

X-Y Operation: Mode selectable with HORIZ DISPLAY switch. CH 1 = Y axis, CH 2 = X axis. X-Y Phase Difference: 3° or less at 100 kHz.

Z-AXIS INPUT (Intensity Modulation)

Sensitivity: TTL Compatible. Frequency Range: DC to 5 MHz. Input Impedance: Approx. 10 kΩ. Max Input Voltage: 50 V (DC + AC peak).

GATE OUTPUT

Output Voltage: TTL Compatible; Approx. 220Ω.

SWEEP OUTPUT

Output Voltage: 1 V p-p/Approx. 1 kΩ.

CRT

Type: Rectangular, with internal graticule. Acceleration Voltage: 16 kV. Display Area: 8 x 10 div. (1 div. = 1 cm).

OTHER SPECIFICATIONS

Probe Adjust Voltage: 0.5 V, ±6%, sq. wave, approx. 1 kHz. Trace Rotation: Electrical, adjust. Environmental: 0°C to +50°C, 90% max. RH — full operation. Power: 100/120/220/240 V AC ±10%, 50/60 Hz, approx. 65 W. Dim.: (W x H x D): 304 x 160 x 401 mm (11.97 x 6.3 x 15.8"). 346 x 173 x 461 mm (13.6 x 6.8 x 18.1"). Weight: 24.2 lbs. (11 kg).

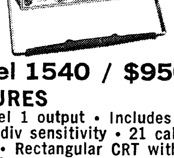
ACCESSORIES SUPPLIED

Two 10:1 Probes, spare fuses, instruction manual; schematic diagram.

OPTIONAL ACCESSORIES

Probe Pouch — LC-150, Demodulator Probe — PR-32, 10:1 Probe — PR-45, 10:1/Direct Probe — PR-40, Deluxe 10:1/Direct Probe — PR-37.

40 MHz DUAL TRACE SCOPE



Model 1540 / $950.00

FEATURES

• Channel 1 output • Includes probes • 1 mV/div sensitivity • 21 calibrated sweeps • Rectangular CRT with internal graticule and scale illumination • Video sync separators • Signal delay line • 12 kV accelerating voltage • X-Y operation • Z axis input • X10 sweep magnification • Delayed sweep/dual time base • Single sweep • Auto focus • V mode — displays two signals unrelated in frequency • Sum and difference capability.

SPECIFICATIONS

VERTICAL AMPLIFIERS (CH 1 and CH 2)

Deflection Factor: 1 mV/div. to 5 V/div., ±3% in 12 steps, 1-2-5 seq. with Vernier. Response: (−3 dB) 5 mV/div. to 5 V/div., DC: DC to 40 MHz. AC: 5 Hz to 40 MHz. 1 mV/div., 2 mV/div., DC: DC to 15 MHz. AC: 5 Hz to 15 MHz.

Rise Time: 8.8 ns or less (40 MHz).

Input Impedance: 1 MΩ ±2%, approx. 20 pF.

Max Input Voltage: 500 V p-p or 250 V (DC + AC peak).

Operating Modes: Same as 1560 except dual-trace only.

Signal Delay Time: Approx. 20 ns on the CRT screen.

SWEEP SYSTEM

Mode: NORM, AUTO, FIX, SINGLE.

Sweep Time: A 0.1 μs/div. to 0.5 s/div., ±3% in 21 ranges, in 1-2-5 seq. with Vernier. B — 0.1 μs/div. to 50 ms/div., in 18 ranges.

Sweep Magnification: X10, ±5%. Extends max. sweep rate to 10 ns/div.

Linearity: ±3%.

Holdoff: Cont. var. (NORM to >10X).

Delay Time: Cont. adjustable (500 ns to 0.5 s), 0.2 to 10 times the A sweep.

TRIGGERING

Source: V MODE — Trigger sel. by vertical MODE switch. CH 1, CH 2, EXT, LINE.

Coupling: AC, HF rej: DC, VIDEO Frame, VIDEO Line.

Automatic: Sweep without an input.

Normal: No sweep without adequate trigger signal.

Fix: Trigger threshold autom. set.

Single: Single sweep operation.

Slope: Can trigger on the pos. or neg. going slope on the trigger waveform.

Video Sync: Vertical and horizontal sync separators.

Sensitivity: DC — DC-40 MHz, 1 div. All other specs same as 1560 except 40 MHz max.

EXTERNAL TRIGGER INPUT

Max. Input: 50 V (DC + AC peak).

Input Impedance: 1 MΩ, approx. 27 pF.

HORIZONTAL AMPLIFIER (Input thru CH 2, X10 MAG not included)

Freq. Resp.: DC — to 2 MHz, −3 dB. AC — 5 Hz to 2 MHz, −3 dB.

X-Y Operation: Same as 1560.

Z-AXIS INPUT (Intensity Modulation)

Sensitivity TTL Compatible. Freq. Range: DC to 3.5 MHz. Input Impedance: Approx. 10 kΩ. Max Input Voltage: 50 V (DC + AC peak).

GATE OUTPUT

Output Voltage: TTL Compatible/ Approx. 220Ω.

SWEEP OUTPUT

Output Voltage: 1 V p-p./Approx. 1 kΩ.

CRT

Type: Rect., with internal graticule. Acceleration Voltage: 12 kV. Display Area: 8 x 10 div. (1 div. = 1 cm).

OTHER SPECIFICATIONS

Same as Model 1560.

ACCESSORIES SUPPLIED

Two 10:1/Direct probes, spare fuses, manual, schematic; diagram.

OPTIONAL ACCESSORIES

Probe Pouch — LC-150, Demodulator Probe — PR-32, 10:1 Probe — PR-45, 10:1/Direct Probe — PR-40, Deluxe 10:1/Direct Probe — PR-37.

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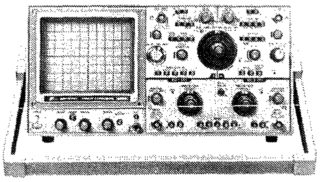
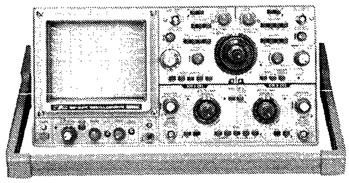


60 MHz
4 Channel

SPECIFICATIONS

CRT Display and Accelerating Voltage	6-inch rectangular 8x10 div (1 div = 10mm) parallax-free internal scale 15kV approx.
Vertical Deflection System Deflection Factor Frequency Response	5mV/div – 10V/div, ±2% 1mV/div – 2mV/div, ±4% 1mV/div – 25V/div variable DC – 60MHz, – 3dB (x1GAIN) DC – 20MHz, – 3dB (x5GAIN)
Triggering Source Coupling	A. INT (CH1, CH2, NORM), EXTERNAL B. INT (CH1, CH2), EXTERNAL A. DC, AC, LF REJ, HF REJ, TV-V, TV-H, FIX B. DC, AC, HF REJ, TV-H
Horizontal Deflection Sweep Mode Sweep Rate Magnification	A. AUTO, NORM SINGLE B. RUNS AFTER DELAY, TRIG'D DELAY A. 50ns/div – 0.5s/div, ±3% 50ns/div – 1.25/div variable B. 50ns/div – 50ms/div, ±3% 10 Times
XY Operation Deflection Factor Freq. Response Input RC XY Phase Diff.	Same as CH1 DC – 2MHz, – 3dB 1MOhm +2%/32pf ±2pf 3° max to 50 kHz
Weight	8kgs (17.7 lbs.)
Dimensions	$12\frac{5}{8}$"W x $6\frac{3}{8}$"H x $15\frac{3}{4}$"L

SS-5711

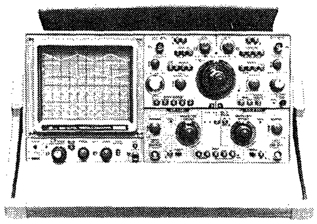


100 MHz
4 Channel

SPECIFICATIONS

CRT Display and Accelerating Voltage	6-inch rectangular 8x10 div (1 div = 10mm) parallax-free internal scale 20kV approx.
Vertical Deflection System Deflection Factor Frequency Response	5mV/div – 5V/div, ±2% 1mV/div, 2mV/div, ±4% 1mV/div – 12.5V variable DC–100MHz, – 3dB (x1GAIN) DC–50MHz, – 3dB (x5GAIN)
Triggering Source Coupling	A. INT (CH1, CH2, NORM), EXTERNAL B. INT (CH1, CH2), EXTERNAL A. DC, AC, LF REJ, HF REJ, TV-V, TV-H, FIX B. DC, AC, LF REJ, HF REJ, FIX, TV-H
Horizontal Deflection Sweep Mode Sweep Rate Magnification	A. AUTO, NORM, SINGLE B. RUNS AFTER DELAY, TRIG'D DELAY A. 20ns/div – 0.5s/div, ±2% 20ns/div – 1.25/div variable B. 20ns/div – 50ms/div, ±2% 10 Times
XY Operation Deflection Factor Freq. Response Input RC XY Phase Diff	Same as CH1 DC – 2MHz, – 3dB 1MOhm ±1.5%/25pF ±2pF 3° max. to 100 kHz
Weight	9.5kgs (21 lbs.)
Dimensions	$12\frac{5}{8}$"W x $6\frac{5}{16}$"H x $15\frac{3}{4}$"L

SS-5712

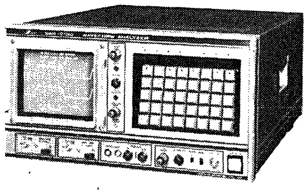


200 MHz
4 Channel

SPECIFICATIONS

CRT Display and Accelerating Voltage	6-inch rectangular 8x10 div (1 div = 10mm) parallax-free internal graticule 20kV approx.
Vertical Deflection System Modes Deflection Factor Freq. Response Input Coupling Max. Input Voltage	CH1, CH2, ALT, CHOP, ADD, QUAD (CH1, CH2) 1mV/div to 5V/div ±3% (CH3, CH4) 0.1V/div, 0.5V/div ±4% DC – 200MHz, – 3dB (CH1, CH2) AC, GND, DC (CH3, CH4) AC, DC Direct: 250V (DC + AC peak) With probe: 600V (DC + AC peak)
Triggering A Source B Source A Coupling B Coupling	CH1, CH2, CH3 (EXT), LINE, NORM, COMB CH1, Ch2, CH4 AC, DC, HF, REJ, LF REJ, FIX, TV-H, TV-V AC, DC, HF REJ, FIX, TV-H
Horizontal Deflection A Sweep Sweep Modes Sweep Rates B Sweep Delay System Sweep Rate Magnification	AUTO, NORM, SINGLE 10ns/div to 0.5s/div, ±2% Runs after delay, triggered delay 10ns/div to 50ms/div, ±2% x10
Weight	11.5kgs (25.4 lbs.)
Dimensions	$12\frac{5}{8}$"W x $6\frac{3}{8}$"H x $15\frac{3}{4}$"L

SAS-8130



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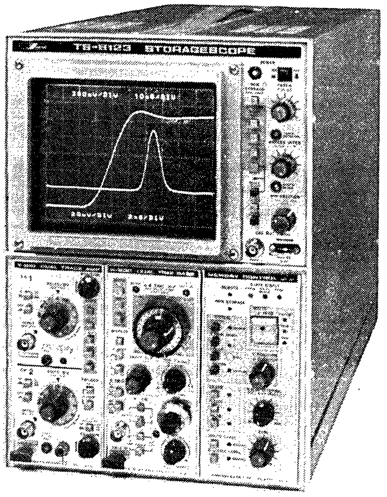


IWATSU offers the 100 MHz oscilloscope with a super-high writing speed of 2500 divisions per microsecond (1 div = 12 mm).

In addition, a digitizing speed of 1000 div / µs, which is equivalent to the conversion speed of a 40-ps (25-GHz) clock can be obtained when waveforms are converted from analog to digital format after analog storage.

Converted digital data are sent via the standard GP-IB interface, to a computer for digital signal processing.

The TS-8123 uses a large, 7-inch cathode ray tube (CRT) developed by IWATSU, which displays bright, sharp traces and further broadens the scope of measurements.

TS-8123

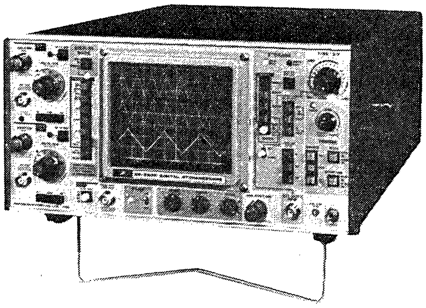
SUPER-HIGH-SPEED STORAGESCOPE

FEATURES

- 2500 div/µs super-high writing speed
- Stored waveforms can be digitized
  1) Ultra high speed: equivalent to 25 GHz clock
  2) 8-bit (1/256 resolution is independent of input frequency even with 100 MHz signals)
  3) Easy operation by simply pressing the Write & Read switch
- Stored waveform can be monitored on an external monitor screen and recorded on a VTR or printed. A composite video signal output is provided
- Measuring conditions can be displayed. Pressing the Scale Factor switch displays the measuring conditions
- Waveform comparison is possible. The stored waveform can be digitized and compared with another digitized or real-time waveform

SPECIFICATIONS

CRT	7-inch rectangular Display Area: 8 x 10 div (1 div = 12mm), parallax-free internal graticule. Accelerating Voltage: 20 KV approx.
Analog Storage	Fastest Writing Speed: 2,500 div/µS. Readout Time: 30 seconds or more
Digital Storage	Fastest Writing Speed: 1,000 div/µS. Resolution: Y-axis: 8 bits; X-axis: 512 words. Amount of Storage: A-B (up to 2 data items)
Z-Axis Input	0.5 Vp-p for noticeable intensity modulation
Signal Delay	Delay line provided
Sweep Magnification	x 10
Calibrator	Output Waveform: Square wave, 1 KHz ±1% Output Voltage: 60mV, 0.6V, ±1% Output Current: 10 mA ±1%
Signal Outputs	Gate Out: A gate and B gate, 1V approx. Sawtooth Out: A only, 250 mV/div. Video Out: Composite video signal D/A Out: D/A conversion signal of digitized waveform X-axis: 5V, Y-axis: 4V, Z-axis: 5V
Power Supply	100/117/217/234 VAC, 50/60 Hz, 160W (approx.)
Weight	23 Kg (51 lbs.) approx. including the plug-in units
Dimensions	8¾" W x 12⅜" H x 20½" L (approx.)



The SS-5802 is a unique measuring instrument combining the functions performed conventionally by two separate instruments; a transient recorder and an oscilloscope. It digitizes analog input signals and stores and displays them; it also works as a 3-trace oscilloscope with a bandwidth of 10 MHz.

Real-time and stored waveforms can be displayed simultaneously for comparison. Another powerful feature is the provision of a GP-IB interface which allows connection of a controller so that operations can be coordinated with customer's program flow. The SS-5802 can also be used to monitor the progress of low-speed writing (WATCH mode).

SS-5802

DIGITAL STORAGESCOPE

FEATURES

- Built-in GP-IB (General-Purpose Interface Bus) interface
- High-brightness CRT
- 3-channel 10 MHz oscilloscope function
- 8-bit x 2048 word/channel, 1 µs/word digital storage
- Both real-time and digital storage waveforms can be displayed on the CRT simultaneously
- WATCH mode allows monitoring of on-going low-speed input signals at low writing speed clock rate
- PEN recorder output

SPECIFICATIONS

CRT	6-inch rectangular, 8 x 10 div (1 div = 10mm), parallax-free internal graticule, 10 kV accelerating voltage
Vertical Deflection System	
Display Modes	CH1, CH2, ALT, CHOP, ADD, X-Y, TRI
Deflection Factor	5 mV/div ~ 10 V/div ±3%, 1 mV/div, 2 mV/div ±5% (at x 5 GAIN), 1 mV/div ~ 25V/div (continuously variable), 0.1 V/div (CH3)
Frequency Response	DC ~ 10 MHz, -3 dB
Rise Time	35 ns
Input Coupling	AC, GND, DC
Input RC	1MΩ ±2%, 34 pF ±2 pF
Max Input Voltage	250 V (DC + AC peak)
Triggering	
Sources	CH1, CH2, CH3
Coupling	AC, DC, HF REJ
Sensitivity	0.5 div
Horizontal Deflection System	
Sweep Modes	AUTO, NORM
Sweep Rate	0.5 µs/div ~ 0.2 s/div ±4%, 0.5 µs/div ~ 0.5 s/div (continuously variable)
Fastest Sweep Rate	50 ns/div
Sweep Magnification	x 10
A/D Converter	1 µs/word, 8 bit (0.4%) at full scale
Memory Length	8 bit x 2048 word (at CH1 and CH2) 8 bit x 4096 word (at CH1)
Writing Modes	SINGLE, REPEAT, WATCH, PEN
Delay Range	0 div, 2.5 div, 7.5 div
Analog Outputs	X Out, Y Out
X-Y Operation	CH1-X, CH2-Y
Z-Axis Input	3 Vp-p, DC ~ 1 MHz
Calibrator	1kHz square wave, 0.3 V output
Power Supply	100/117/217/234 V AC, 50 ~ 400 Hz, 74 W, (approx.)
Weight	11 kg (24.3 lbs) approx.
Dimensions	12⅝" W x 6⅜" H x 18⅝" L approx.

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IWATSU INSTRUMENTS INC.

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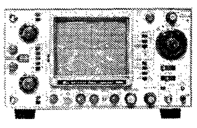
SS-5705/SS-5706
PORTABLE OSCILLOSCOPES



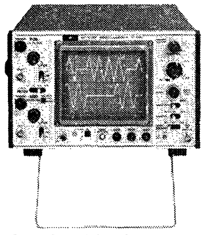
FEATURES

- SS-5705: DC-40MHz/SS-5706: DC-30MHz
  3-Input, 6-trace (05) /3-trace (06)
  12KV accelerating voltage
- Versatile trigger capability with TV-SYNC
- Jitter-free circuitry and variable Hold-off
- High accuracy for V and H (±2%)
- Accurate calibrator (Amplitude ±1% and Frequency ±1%)

SPECIFICATIONS

CRT	6-inch rectangular
Display area	8 X 10 div (1div=10mm), parallax-free internal graticule
Accelerating voltage	12KV approx.
Vertical deflection System	
Modes	CH1, CH2, ADD, DUAL, TRI
Deflection factor	5mV/div to 10v/div, ±2%
X 5 MAG	CH1 and CH2 (SS-5705), CH1 only (SS-5706)
Frequency response	DC-40MHz, -3dB (SS-5705), DC-30MHz (SS-5706)
Max. input voltage	400V (DC+AC peak)
CH3	0.1V/div, ±3%, AC and DC coupling
Triggering	
Source	CH1, CH2, CH3, (EXT), LINE
Coupling	AC, DC, HF REJ, TV-SYNC, FIX (SS-5705 only)
Horizontal Deflection System	
Sweep mode	A, A INTEN, ALT (SS-5705 only), B, X-Y
Sweep rate	0.1uS/div to 0.5S/div, ±2% (A sweep) 0.1uS/div to 50mS/div, ±3% (B sweep)
Magnification	X 5
Z-axis input	3Vp-p, DC-3MHz (SS-5705), 5Vp-p, DC-1MHz (SS-5706)
Calibrator	1KHz, ±1% and 0.3V, ±1%
Weight	7.2kg (15.9lbs) approx.
Dimensions	11.1" (W) × 6" (H) × 15.9" (L)

SS-5702 20 MHZ
OSCILLOSCOPE



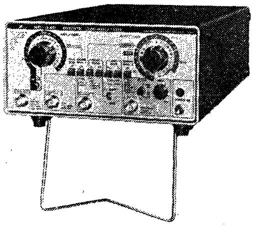
FEATURES

- Compact and lightweight; low power consumption
- 6-inch rectangular parallax-free CRT with internal graticule
- 1 mV/div ~ 10 V/div deflection factor
  0.1 µs/div ~ 0.2 s/div sweep rate
- Variable sweep length and 2-channel X-Y operation facilities
- TV-V trigger mode

SPECIFICATIONS

CRT	6-inch rectangular
Display area	8 X 10 div (1div=10mm), parallax-free internal graticule
Accelerating voltage	2KV approx.
Vertical Deflection System	
Modes	CH1, CH2, DUAL, ADD
Deflection Factor	5mV/div ~ 10v/div, ±4%
Frequency Response	DC ~ 20 MHz, −3dB
Input Coupling	AC, GND, DC
Max. Input Voltage	250 V (DC + AC peak)
Polarity Inversion	CH2 only
Triggering	
Sources	INT (CH1, CH2), EXT
Coupling	AC (INT), DC (EXT), TV-V
Sensitivity	INT: 0.5 div, EXT: 0.5V
Horizontal Deflection System	
Sweep Modes	AUTO, NORM
Sweep Rate	0.5 µs/div ~ 0.2, s/div ±4%
Sweep Magnification	×5
X-Y Operation	X. MODE (CH1, CH2, EXT) V. MODE (CH1, CH2, DUAL, ADD)
Ext. Intensity Modulation	3 Vp-p, DC ~ 1 MHz
Calibrator	1KHz square wave, 0.3 Vp-p ±3%
Weight	6.5kg (14.4 lbs) approx.
Dimensions	10" X 63/8" X 16" approx.

SC-340
SCOPE CALIBRATOR



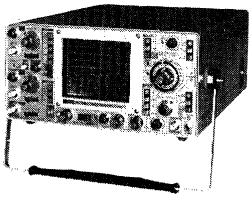
FEATURES

- Calibration and adjustments of oscilloscopes are possible: Vertical gain and phase (1 kHz⊓⊔, 100 V max. out), Sweep rate (10 ns/div, 20 ns/div, 0.1 ms/div ~ 2 s/div),
  Square wave response,
  Rise time (output with 300 ps rise time),
  Triggering confirmation
- Can be used as a general purpose signal generator
- Easy operation

SPECIFICATIONS

Voltage Calibrator	
Output	Square wave, 0.12 mV ~ 100 V ±0.5%
Rise Time	5 µs or less
Flatness	±0.5% or less
Impedance	50 Ω (at 0.2V or less)
Time Calibrator	
Normal	Differentiating wave, 0.1 Vp-p or more (into 50Ω), 0.1 µs ~ 2s ±0.05%
Fast	Sine wave (10 ns), square wave (20 ns) 0.2 Vp-p or more (50 Ω termination), 10 ns or 20 ns ±0.05%
Sine Wave Generator	Sine wave, 1 kHz ±20%, 50/60 Hz line frequency
Waveform Calibrator	
Output	Square wave from 0.5 Hz ~ 1 MHz, 1.3 V max. or more
Rise Time	5 ns or less
High Speed Rise Calibrator	
Output	Waveform of tunnel diode, 0.1 V or more (into 50 Ω)
Repetition	10 kHz ~ 200 kHz
Rise Time	300 ps or less
Weight	3.5 kg (7.8 lbs) approx.
Dimensions	83/8" x 4" x 137/8" approx.

SS-5321 250 MHZ
PORTABLE OSCILLOSCOPE



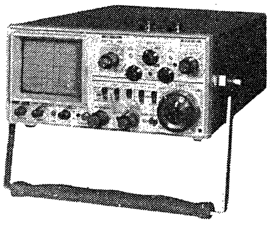
FEATURES

- Three input channels, triple-trace display
- Large 6-inch (8 x 10 cm) quadrupole-lens dome-mesh CRT with auto-focus circuit
- Fastest sweep rate of 1 ns/div plus Alternate Sweep mode
- Enhance facility
- Variable trigger holdoff time
- Four trigger select modes; CH1, CH2, CH3 and NORM

SPECIFICATIONS

CRT	6-inch rectangular
Display area	8 X 10 div (1div=10mm), parallax-free internal graticule
Accelerating voltage	20 kV approx.
Vertical Deflection System	
Modes	CH1, CH2, ALT, CHOP, ADD, TRIPLE
Deflection factor	5mV/div ~ 5V/div, ±2%
Frequency Response	DC ~ 250 MHz, -3dB
Rise Time	1.4 ns approx.
Input RC	1 MΩ±2%, 16 pF ±2 pF
Max. Input Voltage	500 V (DC + AC peak)
Triggering	
Sources	Internal, External (CH3), Line
Coupling	AC, HF REJ, DC
Sensitivity	INT: 0.3 div max. EXT (CH3): 0.2 div
Horizontal Deflection System	
Display Modes	A, A INTEN, ALT, B (DLY'D)
Sweep Rates	A: 10 ns/div ~ 0.5 s/div, ±2% B: 10 ns/div ~ 50 ms/div, ±2%
Delay Time Jitter	1/20,000 max.
Sweep Magnification	x 10
X-Y Operation	CH1-X, CH2-Y
Weight	11 kg (24.3 lbs) approx.
Dimensions	121/4" x 6" x 153/4" approx.

SS-3510 50 MHZ
MINI OSCILLOSCOPE



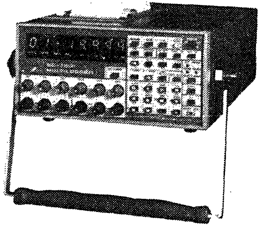
FEATURES

- Bright, sharp display with 3.5-inch rectangular internal-graticule CRT and high 12 kV accelerating voltage
- Compact but powerful, versatile and reliable; comparable to much larger oscilloscope
- Switching regulator used in power supply circuit
- Full range of optional accessories including DC-AC inverter for use with battery

SPECIFICATIONS

CRT	3.5-inch rectangular
Display area	8 X 10 div (1div=6.35 mm), parallax-free internal graticule
Accelerating voltage	12 kV approx.
Vertical Deflection System	
Modes	CH1, CH2, ALT, CHOP, ADD, X-Y
Deflection Factor	10 mV/div ~ 5 v/div, ±3%, 2 mV/div, 5 mV/div (x 5 GAIN)
Frequency Response	DC ~ 50 MHz, -3 dB
Input RC	1 MΩ±3%, 36 pF ±2 pF
Max. Input Voltage	250 V (DC + AC peak)
Triggering	
Sources	Internal (CH1, CH2), External (EXT)
Coupling	AC, LF REJ, HF REJ (TV-V), DC (EXT only)
Sensitivity	INT: 0.5 div
Horizontal Deflection System	
Display Modes	A, A INT BY B, B
Sweep Rates	A: 0.1 µs/div ~ 0.2 s/div, B: 0.1 µs/div ~ 0.5 ms/div
Sweep Magnification	x 10
X-Y Operation	CH1-Y, CH2-X
Z-Axis Input	5 Vp-p, DC ~ 1 MHz
Calibrator	1 KHz square wave, 0.6 V output
Weight	4 kg (8.8 lbs) approx.
Dimensions	81/4" x 4" x 117/8" approx.

SC-7501
MULTILOGGER



FEATURES

- 12 channels (Optionally 30 channels)
- Independent measuring condition for each channel
- Powerful data processing and limit detection
- Self-contained thermal printer
- GPIB interface, Battery operation and D/A output (Option)
- Easy to use keyboard input and battery backed up set conditions

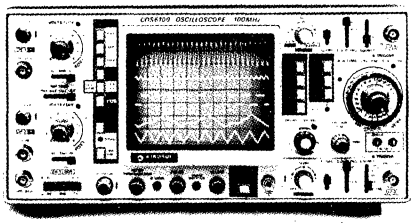
SPECIFICATIONS

DC Voltage Measurement	CH1 to CH12
Measuring range	20mV, 200mV, 2V, 20V, 200V, 270V
Resolution	1uV max.
AC Voltage Measurement	CH1 to CH6
Measuring range	200mV, 2V, 20V, 200V, 270V
Frequency	45Hz to 100KHz
Resolution	10uV max.
Resistance Measurement	CH1 to CH6
Measuring range	20Ω, 200Ω, 2KΩ, 20KΩ, 200KΩ, 2MΩ, 20MΩ
Resolution	1mΩ MAX
Temperature Measurement	CH7 to CH12
Thermocouple type	R, K (CA), T (CC), J(IC), E(CRC)
Measuring range	-200°C to +1600°C
Internal Clock	Counts up to 23H59M59S
Data Processing	Xσ, dB, △%, ·, ÷, △
Printer	Thermal type, 0.5s/line printing speed
Display	19999 (A/D converter full scale), 99999 (processor full scale)
A/D Converter	Dual slope integration
Limit Detection	High and Low limit is available
Weight	5.5kg (12.2lbs)
Dimensions	8.3" (W) X 3.9" (H) X 13.8" (L)

430 COMMERCE BLVD., CARLSTADT, NJ 07072/Phone: (201) 935-5220

KIK Scopes

MODEL #6100A, #6150

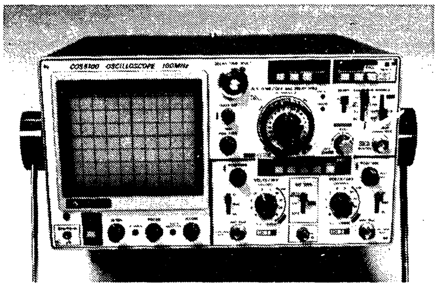


150 & 100 MHZ, 5 channel oscilloscope designed for laboratory and field service applications (19 lbs.) Key features include: ALTERNATE-TIME BASE, AUTOMATIC TRIGGERING with LEVEL LOCK™, AUTOMATIC FOCUS CONTROL, ALTERNATE TRIGGER, TV SYNC, VERTICAL SIGNAL AND SWEEP GATE OUT.

THREE YEAR WARRANTY STANDARD IF REGISTERED WITH FACTORY.

#6100A $1,950.00*
#6150 $2,295.00*

MODEL #5100

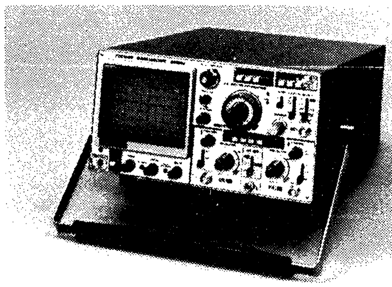


100 MHz, 3 channel scope. For field service. Displays eight traces. All channel in any combination. Features alternate time base, automatic triggering with Level Lock™, patented Auto Focus, TV sync and HF trigger modes, CH. 1 vertical, sweep + gate outputs.

THREE YEAR WARRANTY STANDARD IF REGISTERED WITH FACTORY.

#5100 $1,495.00*

MODEL #5060A, 5042



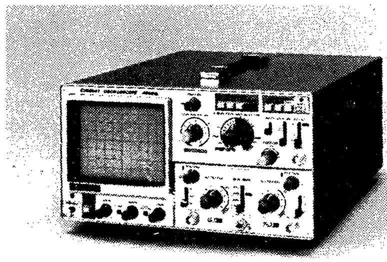
15.4 lbs. 60 MHZ, field service instrument offering TRIGGER VIEW, ALTERNATE TIME BASE, AUTOMATIC TRIGGERING with LEVEL LOCK™, AUTOMATIC FOCUS, ALTERNATE TRIGGER, TV SYNC, TWO VERTICAL CHANNELS, ADD MODE, CH 2 INVERT.

Model COS 5042 is identical in operation with a 40 HMZ bandwidth.

THREE YEAR WARRANTY STANDARD IF REGISTERED WITH FACTORY.

#5060A $1,150.00*
#5042 $895.00*

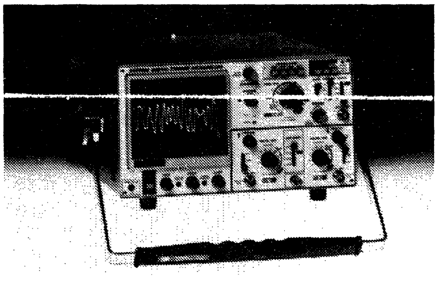
MODEL #5040, #5041



These 40 MHZ scopes offer a choice of delayed sweep or single time base operation in a lightweight field service or production instrument. Key features are: AUTOMATIC TRIGGERING with LEVEL LOCK™, AUTOMATIC FOCUS, TV SYNC, DUAL CHANNEL

#5040 $695.00*
#5041 $795.00*

MODEL #DSS 5020



New 20 MHz dual channel digital storage scope features storage up to 400 KHz in the sine interpolation mode, a fast 1.5 usec rise time in the pulse interpolation mode, "add" mode and off line signal storage capability. The significant feature, however, is the ease of operation. The function selection controls are *identical* to those on an analog scope. The additional function controls are push button selectors for interpolation mode and the push button controls for store, erase and memory. Additional features: variable trigger hold off, AUTO ERASE, TV SYNC, HF Reject and AUTO TRIGGERING.

#DSS5020 $1,495.00*

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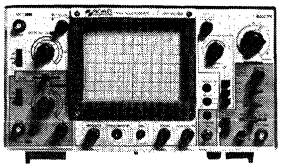
50 MHz DUAL TRACE
MODEL MS-6050
WITH SIGNAL AND TRIGGER DELAY



$950.

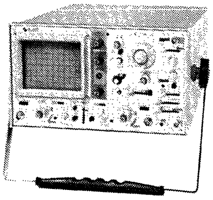
FEATURES

- 6″ metal backed mesh CRT with 15 kV PDA
- 50 MHz dual trace with both sig. and var. trig. delay
- 1 mV/Div sensitivity thru 10 MHz, 5 mV/Div thru 50 MHz
- 70 MHz~−6 dB, triggerable~80 MHz
- Has TV sync, X-Y or X-Y-Z and single sweep
- Comes with two hook-on probes and spare fuses

SPECIFICATIONS

CRT ..... 6″ Flat-Face Metal-Back PDA (15 kV drive) Internal Grat.
Vertical .... Operating Modes: CH1, CH2, dual, add, chop (200 kHz) CH2, invert
Freq. & Deflect ..... DC or AC 10 Hz to 50 MHz (−3 dB) (to 70 MHz−6 dB) 5 mV to 5V/Div on 12 ranges; 1 mV to 1V/Div (5x gain) DC thru 10 MHz
Rise Time ... <7 ns (<35 ns with 5x); Overshoot <3%; Input Z, 1 MΩ/20 pF ±3 pF
Delay Line ...... 120 ns (Effective delay 50 ns in display)
Max. Input V ... 600V p-p or 300V (DC + AC p-p); Channel Sep. >70 dB @ 1 kHz
Horizontal Sweep Mode .. Normal, Auto, Single, Delay
Time Base ...... 0.2 µs to 0.5s/Div, 20 ranges with x5 Mag, Linearity <3%
Delay Trig. .... Intend Switch for Setting Delay time, Delay Switch Starts Sweep at Delay Time Selected, Delay time 100 ms to 1 µs in 5 steps + fine.
Trigger Modes ... Int. CH1, CH2, Line, Ext. Plus TV-V/H, HF-REJ; Auto Free Run + (−) Slope, X-Y or X-Y-Z
Sensitivity .... Int <0.3 Div DC~10 MHz, <0.2V p-p DC~50 MHz <1.5 Div with 5x gain. (Triggerable~80 MHz) Ext. <50 mV p-p DC~10 MHz <0.2V p-p DC~50 MHz
Other ... Single Sweep of Trigger Signal can be displayed
Int. Mode .... TTL Level (3V p-p) DC~1 MHz, Max. 50V
Power .... 120 or 240 ±10% 50/60 Hz Switch Select.
Size/Weight ... 6⅜″ x 11½″ x 16¾″ (HWD), 21¼ Lbs.
Supplied with two hook-on probes, spare fuse, 3 cond. AC cord.

100 MHz QUAD TRACE OSCILLOSCOPE
MODEL MS-6110



$1695.

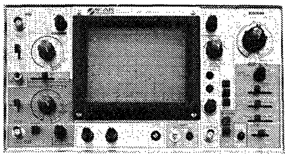
FEATURES

- 6″ CRT, 20 kV acceleration, P-31 Phosphor Quad Trace or Two Channel plus 2 Trigger View, with Verticle Delay Line, Beam Finder.
- High sensitivity 500 µV/Div (5 MHz) and accuracy ±2% for voltage and time axis.
- Alternate Trigger, TV sync Separator, 20 MHz Bandwidth Limiter, Variable Hold-Off.
- Supplied with two 10:1 probes, spare fuse, dust cover and screw driver.

SPECIFICATIONS

Bandwidth/Rise Time . DC or 10 Hz to 100 MHz, Rise Time ≤3.5 ns, (70 ns at 10 x mag)
Deflection . 5 mV to 5V/Div in 10 steps (1-2-5) Plus uncal variable between steps. x 10 mag extends min deflection to 0.5 mV/Div. Accuracy ±2% max input 250V (DC + peak AC) or 500 Vp-p AC
Display Modes .... CH 1, CH 2, (CH 2 Invert) Alternate, Chop (250 kHz rate) Add
Input Z .. 1 M ohm ±2% parallel with 30 pF Simultaneously display CH 1, CH 2 and external Trig. signal (deflect factor 200 mV/Div)
Horizontal Deflection . Time Base A: 20 ns to 0.5s/Div in 23 steps (1-2-5) plus variable uncal. Time Base B: 20 ns to 50 ms/Div in 20 steps (1-2-5) 10 x mag extends sweep to 2 ns/Div. Accuracy ±2% or less
Horizontal Display Modes . A only, A intensify, Alternate, B Delayed. Calibrated sweep delay from 0.5 and 10 x time Base A setting. Delay jitter better than 1:20,000
"A" Trigger Modes .... Auto, Normal, Single, TV-V, TV-H, Source Internal (CH 1, 2) Line, Ext: 10; Slope + or −. Sensitivity DC to 10 MHz Internal 0.3 Div., External 50 mV, 10 to 100 MHz. 1.5 Div., 150 mV; Coupling DC or 30 Hz to full bandwidth, HF and LF Rej.; Input Z and max voltage same as vert.
"B" Trigger Modes .. Auto, Normal, (CH 1, 2) External; Slope + or −; Coupling AC only 30 Hz to full bandwidth; X-Y operation. Accuracy Y: ±2%, X: ±4% BW DC to ≥2 MHz. Phase error ≤3°
Calibrator . 0.5V ±1%, 1 kHz ±5% sq. wave
Power .... 120/240V 50 Hz to 400 Hz ≤60W
Size/Weight . 12¼″ x 7⅞″ x 16¼″, 20.5 Lbs.
MTBF .... 20,000 hours nominal

35 MHz DUAL TRACE
MODEL MS-6035



$799.

FEATURES

The MS-6035 is of advanced design using a high brightness rectangular 6″ short neck PDA Tube with internal graticle and Trace rotator. Included are all the features most wanted by professional engineers and techs. Alternate trigger capability, trigger hold-off, delayed trigger, single sweep and variable hold-off for accurate pulse train display (Min. to Max.: 10 times). Built-in HF & LF Filters, TV (Video) sync separator, X-Y Operation plus Z axis input are standard. Two 10:1 hook-on probes, spare fuse supplied.

SPECIFICATIONS

VERTICAL

Freq. & Deflect. .. CH1 & CH2, DC or 10 Hz to 35 MHz (−3 dB) 5 mV to 10V/Div, 11 steps, 1 mV-2V/Div to 5 MHz with x5 mag.
Operating Modes ... CH1, CH2, Dual, Add, CH2 invert
Rise Time ... <10 ns; input R/C, 1 MΩ 20 pF
Max. Input ... 600V p-p or 300V p-p (DC + AC peak)
Channel Isolation .... >60 dB at 1 kHz, overshoot <3%

HORIZONTAL

Sweep Mode ... Auto., Trig., Single and Delay Sweep
Time Base ... 0.1 µs - 0.5s/Div, 21 ranges plus x5 mag.
Delayed Sweep ... delay time 100 ms −1 µs in 5 steps plus fine, delay jitter <1/5000

TRIGGERING

Sensitivity .. Int. 0.3 div/DC −5 MHz, 1.0 div/DC −35 MHz, 1.5 div/DC −5 MHz (x5); Ext: 50 mV p-p DC −5 MHz 0.2V p-p DC −35 MHz
Source ... Int. (CH1, CH2, ALT) Line. Ext. 1/10 Ext. +TV (Line, Frame)
Coupling .... DC, AC 20 Hz −35 MHz; HF
X-Y Oper. .... CH1 is X axis, CH2 is Y Axis, Horiz, Freq. DC-2 MHz
Intens. Mod. ... TTL (3V p-p) Positive Brighter DC −1 MHz, Max. input Z axis 50V
Calibration ... 0.5V p-p ±5%, 1 kHz sq. wave
Power . 100, 120, 220, 240V, 50/60 Hz, ~34W
Size/Weight ... 6⅜″ x 11½″ x 13¾″ (HWD), 17¾ Lbs.

WARRANTY: One Year Parts and Labor
ALL PRICES SHOWN SUBJECT TO CHANGE WITHOUT NOTICE. PRICES SHOWN ARE FOR QUANTITIES OF 1 TO 3 PIECES OF A TYPE, DISCOUNTS AVAILABLE FOR HIGHER QUANTITIES.
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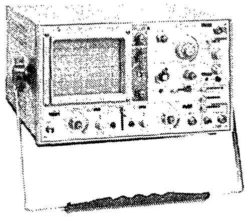
PROFESSIONAL ELECTRONIC INSTRUMENTS

60 MHz DUAL TRACE

MODEL MS-6060



$1299.

FEATURES

- Large 6″ CRT with internal graticle 10 kV acceleration, P31 phosphor.
- Delayed sweep with up to 1000 times magnification.
- Variable hold-off, with trigger view, Z axis input, X-Y operation.

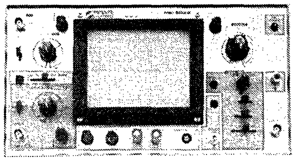
SPECIFICATIONS

Vert. Deflection	DC or 10 Hz to $>$60 MHz (−3 dB).
Rise Time	5.8 ns or less.
Sensitivity	5 mV to 5V/Div. in 10 Steps, 1, 2, 5, sequence. Calibrated with variable Un-Cal. X5 Mag. extends Sens. to 1 mV/Div. Accuracy: ±3% (10-35°C) ±5% (0-50°C).
Display Modes	CH1, CH2 (Normal or Invert.) Alternate, Chopped (250 kHz) Added and Difference.
Input Impedance	1M Ohm ±1.5%// ~ 30 pF
Max. Input Voltage	250V (DC & Peak AC) or 500 Vp-p AC at $\leq$1 kHz.
CH1 Output	DC to $\geq$20 MHz ~ 25 mV into 50Ω. Output Z ~ 50Ω.
Horizontal Deflection (Time Base A)	50 ns to 0.5s/Div. in 22 calibrated steps, 1, 2, 5 sequence plus cont. Un-Cal. X10 mag. extends sweep speed to 5 ns/Div.
(Time Base B)	50 ns to 50 ms/Div in cal. steps, 1, 2, 5, sequence, X10 mag. extends sweep speed to 5 ns/Div.
Horiz. Display Modes	A only, A intensified, B delayed.
Sweep Delay	Cont. cal. control between 0.5 and 10X Time Base A setting, Jitter $>$1:20,000.
Trigger Modes	Auto, Normal, Single, TV-V, TV-H with Trigger Hold-Off Adj. Control.
Trigger Source	Internal (CH1, CH2) Line, External, A Slope ±.
Trigger Sensitivity	Internal 0.5 Div. (DC to 10 MHz), 1.5 Div. to 50 MHz, 2 Div. to 60 MHz. Ext. 150 mV (DC to 10 MHz) 500 mV, 600 mV.
Trigger Coupling	AC: 30 Hz to Full. Bandwidth, HF Rej.; 30 Hz to 4 kHz, HF Rej.: 4 kHz to 60 MHz, DC ≈ 0 to Full BW.
External Trig. Input Z	1M Ohm ±20%// 30 pF.
Max. Input V	250V (DC + Peak AC), 500V p-p AC at $\leq$1 kHz.
B Trig. Modes and Source	Auto, Norm. (Internal, External) Slope ± or − Coupling AC only: 30 Hz to Full BW.
X-Y Operation	CH1 Horz., CH2 Vert., BW DC to $\geq$500 kHz.
Calibrator	0.5V ±1%, 1 kHz ± 5% Square Wave.
Power	100V, 20V, 220V, 240V ±10% 50/60 Hz, ±5% 400 Hz.
Size & Weight	12¼″ x 7″ x 16⅛″; 20.5 lbs.

20 MHz DUAL TRACE OSCILLOSCOPE

MODEL MS-6022

(WITH BUILT-IN COMPONENT TESTER)



$599.

FEATURES

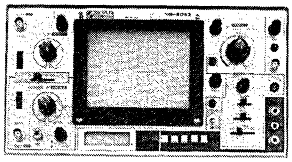
- Model MS-6022 has a special built-in circuit that allows testing single or multiple components in or out of circuit. This quick tracer technique displays unique component signature patterns on the scope CRT screen that indicates the components relative condition. Ideal for trouble-shooting in cold (no power) circuits.
- Large flat-face 6″ CRT with internal graticule, front panel trace rotator, 2 kV acceleration.
- CH2 invert, X-Y operation, Z axis intensity modulation, TV-V, H (Video) sync separator.
- Fully shielded switching regulator power supply for accuracy, high frequency filter in the trigger circuit.
- Smooth rolloff exceeding 20 MHz, triggers beyond 30 MHz.
- Comes complete with two 10:1 hook-on probes and spare fuses.

SPECIFICATIONS

Vertical Frequency & Deflection	AC 10 Hz/DC to 20 MHz, 5 mV to 20V/div on 12 ranges. 1-2-5 step (−3 dB) [~28 MHz −6 dB]
Risetime	$\leq$17.5 nsec.
Overshoot	$<$3%
Modes	CH1, CH2, DUAL, ADD, X-Y
Input Impedance	1 MΩ/20 pF ±3 pF
Max. Input	600V p-p or 300 VDC + peak AC
Chop Frequency	200 kHz
Channel Separation	$>$60 dB at 1 kHz
Time Base	Auto or triggered, in Auto Mode Trace is on without input signal.
Sweep Time	0.2 μsec to 0.5 sec/div on 20 ranges in 1-2-5 step, x5 Mag.
Linearity	$<$3%
Triggering	Sensitivity Int. 1 div or more, Ext. 1V p-p or more, Source, Int., CH2, Line, Ext. Pos/Neg, pull for Auto range 20 Hz to $>$20 MHz; Sync AC, HF Rej, TV
Calibration	0.5V p-p ±5%, 1 kHz square wave
Power	120V/240V ±10%, 50/60 Hz
Size/Weight	6¼″ x 11½″ x 14″, 17 Lbs.

20 MHz DUAL TRACE with DMM

MODEL MS-6023



$699.

Model MS-6023 contains all the same oscilloscope specifications, features and size as the MS-6022 but includes a 3½ digit Multimeter. It is two instruments in one as they can operate independently or simultaneously in the same circuit. DMM has 3½ digit LCD readout and allows measuring AC/DC Volts from 1 mV thru 1000 Volts, AC/DC current from 1 μA thru 1 Amp. Resistance from 1Ω to 20 MΩ. Full overload protection all functions and ranges. Basic DCV accuracy ±0.5% ±2 digit.

NOTE:

All SOAR oscilloscopes are furnished with an instruction manual that contains a full schematic diagram, parts layout, parts list by generic part numbers and description, plus maintenance and calibration data.

WARRANTY: One Year Parts and Labor

ALL PRICES SHOWN SUBJECT TO CHANGE WITHOUT NOTICE. PRICES SHOWN ARE FOR QUANTITIES OF 1 TO 3 PIECES OF A TYPE, DISCOUNTS AVAILABLE FOR HIGHER QUANTITIES.

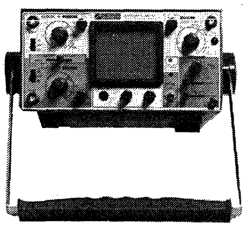
SEE OUR PAGES IN SECTION 2900

NORTH AMERICAN SOAR CORPORATION

SOAR corporation
1126 CORNELL AVENUE / CHERRY HILL, NEW JERSEY 08002 / PHONE: 609-488-1060
PROFESSIONAL ELECTRONIC INSTRUMENTS

15 MHz DUAL TRACE PORTABLE

MODEL MS-3015



$699.

FEATURES

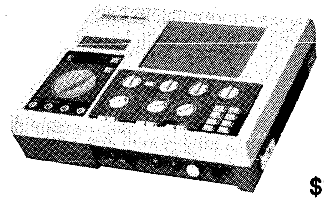
- 15 MHz dual trace with 2 mV/Div sensitivity
- Complete with built-in rechargeable battery, runs on external DC 11V to 30V (car or boat) AC 120/240 48-440 Hz
- Rect. 3½″ CRT with int. graticle and ext. trace rotate
- Full vert. input and trigger mode selection plus CH2 invert, X-Y, add, sub, auto-free run
- Comes with two 10:1 hook-on probes and spare fuse.

SPECIFICATIONS

Vert. Deflect. ... 2 mV-10V/Div, 12 ranges in 1-2-5 step + fine
Bandwidth . DC or AC 10 Hz to 15 MHz (−3 dB)
Risetime .... 24 nsec overshoot $<3\%$
Input Z .... 1 MΩ shunted by 20 pF $\pm$3 pF
Modes ... CH1, CH2, dual, add and chop (100 kHz Rate)
Channel Sep. ... 60 dB at 1 kHz; CH2 can be inverted
Time Base ... Auto. and trig.—in auto mode, sweep obtained without input signal
Sweep Time ..... 0.5 μsec to 0.5 sec/Div, 19 ranges in 1-2-5 step + fine and x5 mag.
Horiz. Deflect. .... DC to 1 MHz, input Z 1 MΩ shunted by 20 pF $\pm$3 pF
Max. Input .. 600V p-p or 300V (DC + AC p-p)
X-Y Operation ..... Selected by Sweep Time/Div Switch CH1:Y, CH2:X axis
Trig. Sens. ... INT: 1 Div or more, EXT: 1V p-p
Source .... INT, CH1, CH2 or EXT
Slope ... Pos. and Neg. continuously variable, pull for Auto-Free Run
Range .... 20 Hz to 15 MHz
TV Sync .... TV-H (Line) TV-V (Frame) sync auto select by Sweep Time. Div switch TV-V: 0.5 sec/Div to 0.1 msec/Div TV-H 50 μsec/Div to 0.5 μsec/Div
Calib. V ..... 0.5V p-p $\pm$5%, 1 kHz Sq. Wave
Power .. AC: 90-130V or 180-260V, 48-440 Hz DC: 11-30V, 7.2 VA Battery: Ni-Cad battery plus recharger built-in
Size/Weight ... 4⅜″ x 8¾″ x 11¾″, 12¼ Lb.
CC3015 carrying case $65.00

DUAL TRACE LCD DIGITAL STORAGE OSCILLOSCOPE

MODEL 1000



$1599.

FEATURES

- Small size and light weight, can fit in your briefcase.
- Using 128 x 160 dot matrix liquid crystal display with variable contrast control for a no bloom or blurr image and 6 hours battery operation.
- $\pm$3 dB or less for DC $\sim$ 200 kHz.
- Ideal for field service, design engineering plant maintenance.
- Also has 7 function 27 range auto (V&Ω) or manual ranging DMM built-in.
- Comes complete with two 10:1 oscilloscope probes, two DMM probes, two "AA" batteries, rechargeable Ni-Cad battery pack and an AC adaptor, and deluxe carrying case.

SPECIFICATIONS

Sample Rate .... 3.2 MHz.
Display .... 128 x 160 Dot Matrix Liquid Crystal Display, effective area 76.74 x 95.94mm, Dot Size 0.55mm x 0.55mm (Y axis) 64 dots x 2 channels, (X axis) 160 dots.
Display Control .... Contrast Regulator, White-Black Reverse Indication Switch, DOT/BAR Switch.
Display Shift .... Pre-Trigger: −25, −50, −75, −100%; Post-Trigger: +25, +50, +75, +100%
Memory Backup Function ..... Ni-Cad Battery.
Waveform Alarm .... Display Reverse at about 20 display waves or more.
Power Supply .... Ni-Cad (1.8 Ah x 6) Battery or AC Adaptor.
Power Consumption ...... DC 7.2V, 0.3A Max. (Approx. 6 hours battery life).

Y-AXIS OPERATION

Operating Mode .... Dual Trace (CHA and CHB chopped).
Scale .... 4 Div/Channel.
Sensitivity ...... 9 ranges from 10 mV/Div to 5V/Div (1, 2, 5 Steps), full span 40 mV to 20V.
Frequency Characteristic ...... $\pm$3 dB or less for DC to 200 kHz.
Input Circuit .. DC Coupling, AC Coupling, GND.
Input Impedance .... 1MΩ//30 pF.
Crosstalk .... −40 dB or less (for input of 1 kHz) between CHA and CHB.
Maximum Input Voltage .... 220V (Peak Value) for both CHA and CHB.
Direct Digital Signal Input Measurement ... "H" 8 Dot Indication for Input 4.5 to 5V, and "L" 1 Dot Indication for 0 to 1V. Maximum Sampling Frequency 1.6 MHz/Dot, Input Impedance 1MΩ.

X-AXIS OPERATION

Scale .... 10 Div.
Sweep Mode .. Normal, Auto (free run), Single.
Time Base ...... 20 ranges from 5 μs/Div to 5s/Div, Fast: 5 μs/Div $\sim$ 5 ms/Div 1, 2, 5, (10 steps). Slow: 5 ms/Div $\sim$5s/Div 1, 2, 5, (10 steps).

TRIGGERING

Trigger Source .... Internal and External.
Coupling Systems .... DC and AC (only DC Coupling for External Trigger).
Input Impedance .... 1MΩ//30 pF (External Trigger).
Trigger Sensitivity .... 0.5V/Div (Internal Trigger), 50 mV/Div (External Trigger).

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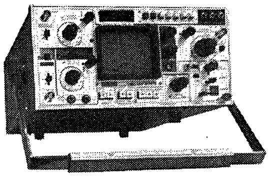
15 MHz TRIPLE TRACE DIGITAL STORAGE OSCILLOSCOPE

MODEL MS-3020



$1995.

FEATURES

- Complete test system in one case — includes DMM with separate inputs, component test for resistors, caps, diodes, etc. in or out of circuit.
- Scope has trigger delay and single sweep with storage signal output X-Y + sync via rear BNC's.
- Small size shipped with two 10:1/1:1 scope probes, two DMM probes, spare fuse.

SPECIFICATIONS

Modes .... CH1, CH2, Dual, Add, Triple
Sensitivity ... 5 mV to 20V/Div in 1-2-5 seq. 12 ranges for CH1, CH2; CH3 is 0.5V & 10V/Div in 2 steps no fine.
Bandwidth ..... DC or 10 Hz AC to $\geq$15 MHz Rise Time $<$24 nsec. overshoot $<3\%$ CH3 $<10\%$.
Polarity Invert .... CH2 only, CH3 by slope
Chop Freq. .... 200 kHz.
Ch. Separation ... $>$60 dB at 1 kHz, Max input 600V p-p.
Horizontal Modes . Auto, Norm, Delayed, Single
Sweep Time ..... 0.5 μsec to 0.5 sec/Div, 19 ranges, 1-2-5 seq. accuracy $\pm$3%, 5X Mag., Lin $<3\%$.
Delay Time ... 100 msec to 1 μsec in 5 steps, Jitter 1:5k
Trigger Source ... Int. CH2, Ext 1/1, Ext 1/20 Sensitivity $>$1 Div (20 Hz to 15 MHz), Ext 1V p-p Ext 1:20 (20V p-p or more), X-Y operation DC to 1 MHz (−3 dB)
Digital Storage ... Memory 1024 words, speed 0.1 msec to 0.5 sec/Div in 12 ranges (1 μs to 5 ms/word)
AD Converter ... Resolution 8 Bits (256), speed 1 μsec max, scale over Y Axis 8 Bit (256), Bandwidth DC or 10 Hz AC to 200 kHz.
Sweep Mode .. Auto, Triggered, Delayed, Single
DMM Section ... AC/DC Volts, 1 mV to 1000V; AC/DC A, 1 μA to 1A; Ω, 1Ω to 20 MΩ.
Size & Weight ... 10″ W x 5⅛″ H x 12¼″ D, $\sim$13⅓ Lbs.
Power ... 100/120/220/240V 50/60 Hz, 19w

WARRANTY: One Year Parts and Labor

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SEE OUR PAGES IN SECTION 2900

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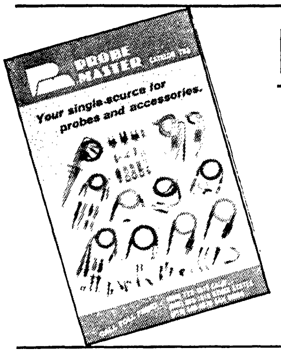

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NEW! MINIATURE SCOPE PROBE

FROM $30 TO $60

The Probe Master 2900 series oscilloscope probes combine the characteristics of high performance, and fast rise time pulse response, with a **slender design** to meet the needs of today's micro electronics.

The **miniature tip** is ideal for accessing high density boards and hard to reach test points. By locating the high and low frequency compensation circuits in the BNC end of the cable, the design of the probe has become light weight and slender for easy handling.

Other features of the 2900 series probes include a replaceable probe tip, replaceable ground lead and a Readout Actuator option (RA).

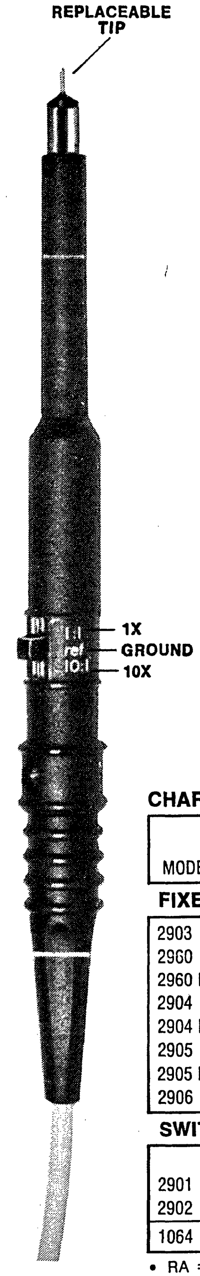
The Readout Actuator option (permanently attached) is available on the 10x fixed attenuation probes only. This option provides the necessary resistor circuit to change the range factor on the model 465, 475, 485 and 7000 series Tektronix scopes.

GROUP A STANDARD ACCESSORIES
(included with each probe)

PM1065	Sprung Hook A	$4.30
PM1070	Trimmer Tool B	$ .70
PM1069	BNC Adapter C	$2.50
PM1068	Tip Insulator D	$ .60
PM1067	IC Tip Cover E	$ .60
PM1066	Spare Probe Tip F	$1.60
PM1008	Ground Lead 6″ G	$2.00
PM1002	Storage Pounch (NOT SHOWN)	$ .70

GROUP B ENGINEER ACCESSORY KIT (OPTIONAL)
(add $12.00 for this group) PM1064

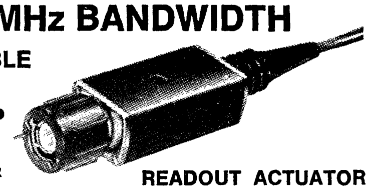
PM1073	Alligator Tip	$3.00
PM1071	Wire Wrap Adapter, Tip	$3.50
PM1072	Wire Wrap Adapter, Gnd.	$3.00
PM1052	Micro Sprung Hook	$2.50
PM1009	Ground Lead 12″	$2.00



ACTUAL SIZE

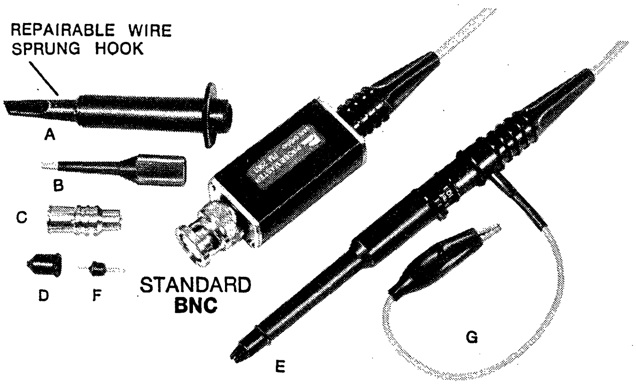
2900 SERIES HIGH PERFORMANCE 60 MHz to 250 MHz BANDWIDTH

- **RUGGED • RELIABLE**
- **REASONABLE**
- **REPLACEMENT TIP & GROUND LEAD**
- **ADJUSTABLE LF & HF RESPONSE**
- **ACCEPTS MOST TEK & HP ACCESSORIES**
- **COMPENSATION FOR MOST SCOPES**



READOUT ACTUATOR (RA) OPTION
SWITCHES READOUT ON TEKTRONIX 465, 475, 485 & 7000 SERIES SCOPES (FOR 10X PROBES ONLY)

STANDARD ACCESSORIES



CHARACTERISTICS

MODEL	ATTENUATION	CABLE TERMINATION	BAND WIDTH (MHz)	RISE TIME (NS)	LOADING CAP. (PF)	LOADING *RES. (M-OHM)	DC MAX.	PRICE
FIXED ATTENUATION								
2903	1X	STD	25	11	40	1	600V	$25.00
2960	10X	STD	60	5.8	16	10	500V	$30.00
2960 RA	10X	RA	60	5.8	16	10	500V	$40.00
2904	10X	STD	100	3.5	17	10	600V	$35.00
2904 RA	10X	RA	100	3.5	17	10	600V	$45.00
2905	10X	STD	250	1.5	17	10	600V	$45.00
2905 RA	10X	RA	250	1.5	17	10	600V	$55.00
2906	100X	STD	70	5.0	6	100	1.2KV	$55.00
SWITCHED								
			10X/1X	10X/1X	10X/1X	10X/1X		
2901	10X, 1X, GND	STD	100/5	3.5/70	17/100	10/1	600V	$39.00
2902	10X, 1X, GND	STD	250/5	1.5/70	17/100	10/1	600V	$49.00
1064	Engineers Accessory Kit							$12.00

- RA = Readout Actuator, STD = Standard BNC • Cable length 5½ ft.
- On switched probes, probe tip is grounded thru a 9 Meg OHM resistor, when switch is in the GND position • 10X compensation range, 15 to 50 PF

* With 1 Meg OHM Scopes

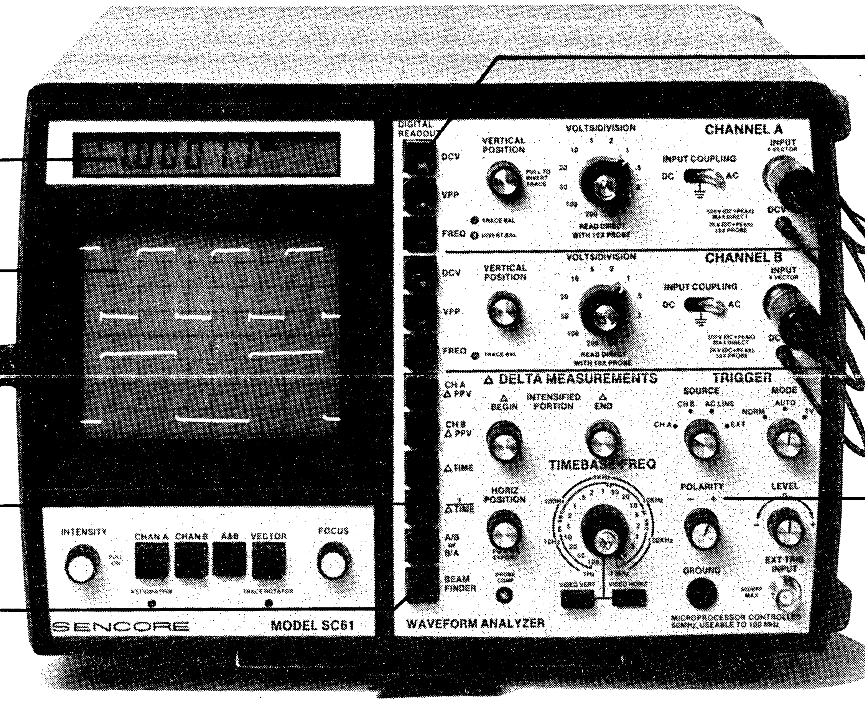
MINIGLOSSARIES
FORMULAS • CHARTS
PRODUCT SELECTION GUIDES
FORMS
CODES
TECHNICAL INFORMATION

WHERE TO FIND THEM IN THE 85/86 EDITION OF EEM

Abbreviations/Acronyms	**A**•1166, **B**•1012, **C**•1028, **D**•1016
ASCII Code	**D**•1087
Batteries, Product Selection Guide	**D**•1413
Batteries & Fuel Cells, Characteristics	**D**•1430
Cabinets, Enclosures, Racks, & Chassis, Product Selection Guide	**C**•1003
Capacitors, Basic Formulas	**A**•1093
Capacitors, Miniglossary	**A**•1066
Capacitors, Product Selection Guide	**A**•1003
Circuit Boards (Printed) Product Selection Guide	**C**•1099
Coils, Chokes, Inductors, Product Selection Guide	**A**•1205
Conductors, Maximum Current Capacity of Copper & Aluminum	**C**•1863
Connectors, Miniglossary	**C**•1129
Connectors, Terminals, & Sockets, Product Selection Guide	**C**•1105
Crystals, Oscillators, Crystal & Piezoelectric Filters, Product Selection Gude	**A**•1309
Delay Lines, Product Selection Guide	**A**•1459
Discrete Semiconductors, Product Selection Guide	**A**•2067
Displays, Readouts, Lamps, & Lights, Product Selection Guide	**B**•1015
EBCDIC Code	**D**•1092
Encapsulation, Miniglossary	**C**•1086
Fans, Blowers, Cooling Equipment, & Heat Exchangers, Product Selection Guide	**C**•1623
Filters, Product Selection Guide	**A**•1583
Instruments, Graphic Recording Product Selection Guide	**D**•1401
Instruments, Panel Meters, Product Selection Guide	**D**•1329
Instruments, Test & Measuring Product Selection Guide	**D**•1175
Interconnection Systems, Product Selection Guide	**C**•1699
Keyboards & Keypads, Product Selection Guide	**B**•1705
Logofinder & Trademark Directories	**B**•901
Microwave Components, Product Selection Guide	**A**•1701
Military Qualified Products Lists	**B**•1003
Motors, Drives, & Rotating Components, Product Selection Guide	**B**•1129
Opto Semiconductors, Miniglossary	**B**•1214
Oscilloscopes, Product Selection Guide	**D**•1385
Panel Hardware, Product Selection Guide	**C**•1589
Potentiometers, Trimmers, Controls, & Rheostats, Product Selection Guide	**A**•1991
Power Supplies, Miniglossary	**D**•1462
Power Supplies, AC, Product Selection Guide	**D**•1877
Power Supplies, DC, Product Selection Guide	**D**•1447
Protective Components (Fuses, Circuit Breakers, etc.), Product Selection Guide	**B**•1225
Relay Contact Forms	**B**•1317
Relays, Electromechanical, Miniglossary	**B**•1308
Relays, Product Selection Guide	**B**•1261
Resistor Color Codes	**A**•1828
Resistors, Product Selection Guide	**A**•1785
Servo Components, Miniglossary	**D**•1985
Solenoids, Product Selection Guide	**B**•1463
Switches, Product Selection Guide	**B**•1477
Thermal Components, Product Selection Guide	**B**•1741
Thermal Conductivity of Dielectrics at Room Temperature	**B**•1744
Thyristors/High Power Diodes, Miniglossary	**A**•2076
Transducers & Encoders, Product Selection Guide	**B**•1777
Transformers, Product Selection Guide	**A**•2099
Wire & Cable, Product Selection Guide	**C**•1743
Wire Gauges—Diameter, Area, Copper Weight	**C**•1844

SENCORE MODEL SC61 **60 MHz WAVEFORM ANALYZER**

Double Your Troubleshooting and Testing Productivity . . . Or Your Money Back!



Six-digit readout: Automatically tracks every CRT test. We call it digital autotracking. It's patent pending.

Bright 60 MHz dual-trace: 60 MHz CRT (3 dB); usable to 100 MHz (12 dB)

Delta PPV, Time, Freq: Measure any part of a waveform for PPV, time or frequency using Delta measurements. Just dial in waveform section you want to measure and push.

Simplify Freq ratio tests: Automatically compare input/output ratio of multiply/divide stages from 1:1 to 1:999,999 with the push of a button.

Autotracking DCV, PPV, Freq: Measure DCV to .5%; PPV to 2%; freq. to .001%. Just push a button for either Channel A or B.

One probe input: One probe input per channel for all measurements - digital and scope - with 5 mV to 2000 V measuring range. (2 lo-cap probes provided.)

Super sync: ECL provides rock-solid sync trigger circuits with only 4 controls; includes TV sync separators for video work.

$2995

U.S. Patent Pending

The first scope with push button digital readout. If you use general purpose oscilloscopes for troubleshooting or testing, we can double your present productivity with the SC61 Waveform Analyzer, the first scope with push button digital readout.

It's ten times faster — ten times more accurate. The SC61 is the first and only instrument to integrate the speed and accuracy of a digital readout with the viewing capability of a high performance 60 MHz scope. Connect only one probe and you can view any waveform to 60 MHz. Then, just push a button to read DCV, PPV, frequency and time.

There are no graticules to count or calculations to make so every measurement is 10 to 100 times faster than before.

The digital readout is 10 to 10,000 times more accurate than conventional scopes as well, for measurements you can trust in today's high precision circuits.

Plus having everything you want to know about a test point, at the push of a button, eliminates guesswork and backtracking.

A special Delta function even lets you intensify any part of a waveform and digitally measure the PPV, time or frequency for just that waveform section.

And it's neat. No more tangled leads, piles of probes or dangling cords. The SC61 is an entire test station in one unit.

Double your productivity. When we say the SC61 will double your productivity, we're being conservative. We've seen cases of three, four, even ten time increases in productivity with this first-of-its-kind, automated oscilloscope. Every situation is different, however, so try the SC61 and judge for yourself. Here's our offer.

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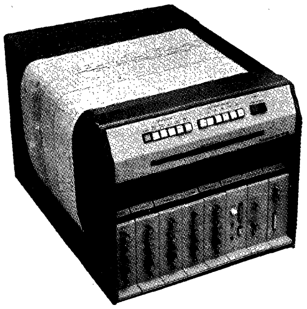
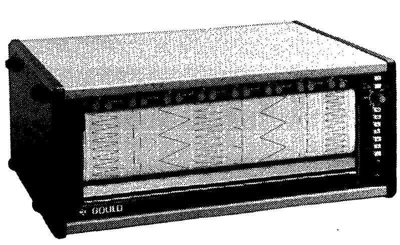
Gould offers a complete line of instruments and systems for test and measurement applications that require the highest precision, sensitivity and accuracy.

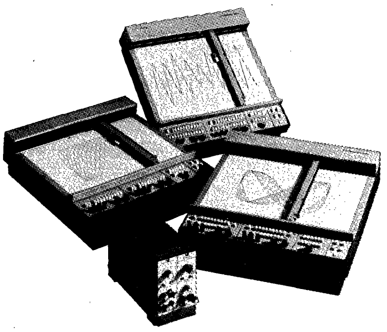
The product line includes computer-based data acquisition systems, high speed waveform recorders, and general purpose oscillographs with plug-in amplifiers. In addition, Gould also offers a complete line of X-Y recorders, digital plotters, electrostatic recorders and tape recorders.



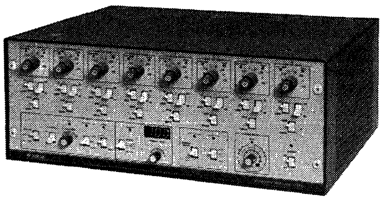
Gould ES 1000B. Electrostatic analog recorder automatically makes preprogrammed chart notations. To 16 channels, 40 μs transient response.



Gould's 8000S Series thermal chart recorders offer low weight and good performance in a portable system. Compatible with Gould's broad line of signal conditioners.



Gould X-Y recorders. Fast, sensitive response for comparing two analog variables. Digital plotters for computer-generated graphics.



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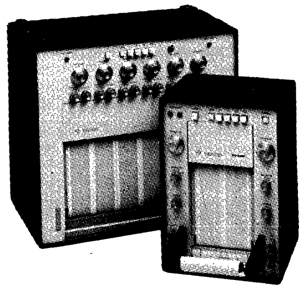
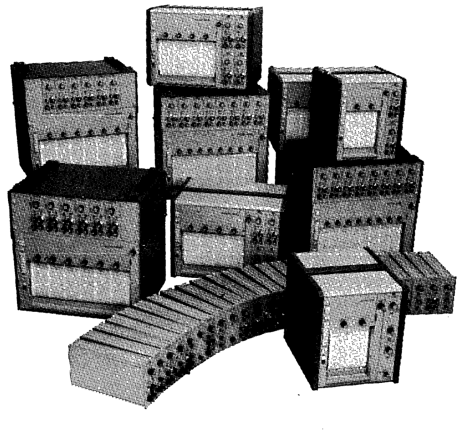


Accuracy, dependability and economy are made portable in Gould's 220 two-channel and 260 six-channel recorders.



The Gould 2000S direct-writing recorders are a truly superior line of measurement instruments, with frequency response to 160 Hz and 99.65% linearity. 40, 50 and 100 mm channels. Thermal or pressurized fluid. Full line of more than 30 signal conditioners for maximum measurement flexibility. Chart edge annotation and stack to stack charts are available in some versions.

With service locations throughout the world, Gould provides you with a level of service that matches the high quality and precision of your Gould instrument.

For more information on products and service, contact Gould Inc., Recording Systems Division, 3631 Perkins Avenue, Cleveland, Ohio. In the U.S. and Canada, **call toll-free 800-447-4700, operator 100.**

GOULD
Electronics

eem selection guide

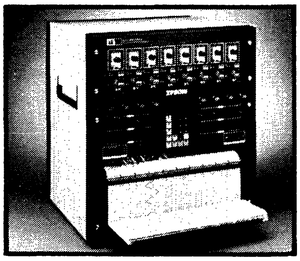
graphic recorders-3000

GRAPHIC RECORDERS

Manufacturer	EEM Page No.	No. of Channels	Oscillographic	Strip Chart	X-Y Plotter	Event Multi-event	Computer Data	Transient	Thermal	Other Types
Astro-Med	**D**•1402	1-8		●		●		●	●	Battery operated field recorder; Digital recorder
Chessell Corp.	**D**•1403	1-6		●		●	●	●		
Gould	**D**•1404	1-16	●	●	●	●	●	●	●	Magnetic Tape
Linseis, Inc.	**D**•1405	1-12		●	●	●	●		●	Linear Array Penless
Omega Engineering	**D**•1407	Ask Mfr.		●			●		●	Laboratory Recorders
Thorn EMI Technology	**D**•1313	1-24	●							

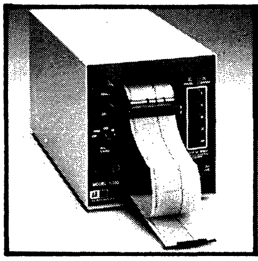
There's an Astro-Med recorder for every medical, scientific and industrial application.

WORLD-CLASS 8-CHANNEL RECORDER



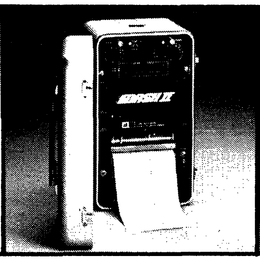
The ZF-8000, offered with 8 or 6 channels, features a full range of computer interfaces. Point writing, Z-fold charts, and more than 743 precise speeds. Prints date, time and chart speed. Plug-in signal conditioners. Ideal for aerospace, medical, scientific and industrial uses.

1-CHANNEL PHYSIOLOGICAL/LAB RECORDER



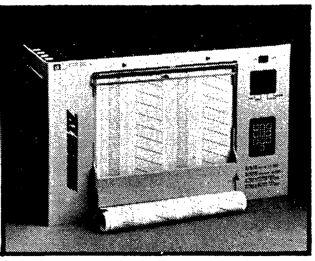
The Z-1000 1-channel physiological/lab recorder. Superb point writing. Battery/AC power with more than 40 chart speeds. Convenient Z-fold chart presentation. Use it for a wide variety of physiological recording applications.

WORLD'S ONLY TRUE FIELD RECORDER



The Dash II 2-channel field recorder. Reliable under the most brutal conditions. Battery/line power. Supplied complete with compact, sturdy carrying case. Acknowledged by industry as the standard for field testing.

THE INTELLIGENT 4-CHANNEL RECORDER

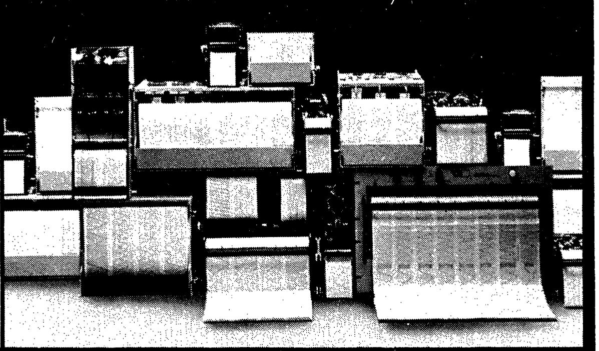


The versatile Dash IV 4-channel recorder. Small and lightweight, but packed with advanced technology. Automatic date, time, and chart speed printing. More than 40 microprocessor-controlled chart speeds. Plug it in and put it to work anywhere.

All Astro-Med recorders feature position feedback galvanometers with more than 99% accuracy, DC to 125 Hz response, and reliable low-cost thermal writing. All Astro-Med recorders are produced at our plant in West Warwick, R.I., U.S.A.

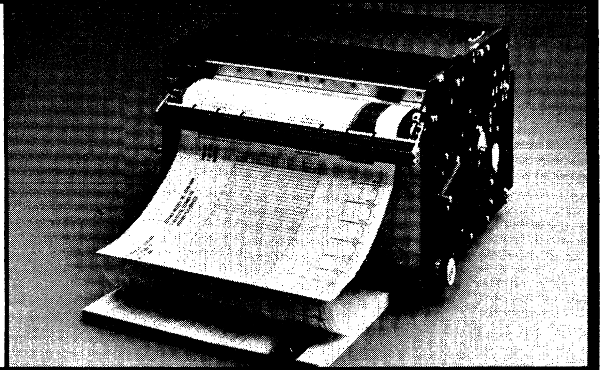
OEM recorders

Astro-Med is the world leader in the design, manufacturer and sales of OEM graphic recorders. We have a model to meet your every need: 1 through 8 channels. Configurations to meet all requirements. A wide range of electronically-selected chart speeds; fast snap-in or cartridge chart loading. Knife edge or point writing. Roll type or Z-fold chart handling. Thermal printers and event markers are standard options.



Astro-Graph™ OEM digital recorder

The Astro-Graph—the world's first high speed, high resolution direct writing digital recorder that produces waveforms, line printing and graphics in a single instrument with no moving parts. Under control of the operator, copyrighted softwear permits these three data formats to be recorded separately, or in any combination or sequence. An obvious low-cost replacement for electrostatic recorders and photographic oscillographs.



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Astro-Med Industrial Park, West Warwick, Rhode Island 02893
Telephone (401) 828-4000 Telex No. 710-382-6409
Phone toll free (800) 343-4039

THE *Super* SERVO RECORDERS

Engineering Excellence— continuous-trace recording in compact, modular construction . . . many field-retrofittable options.

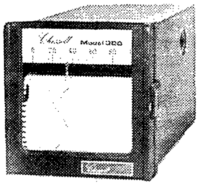
Custom Design— unique recorders for special applications . . . oil drilling, energy management, traffic census, and many more.

Flexibility—built to the user's specifications . . . over 4,000 dedicated input conditioning modules available.

Reliability— over 100,000 product installations world-wide . . . Chessell's reputation of excellence is second to none.

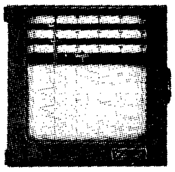
4 in. INDUSTRIAL RECORDERS

MODEL 300 – single channel, single speed, with choice of 3 writing systems: capillary pen, disposable cartridge or electric writing . . . roll or Z-fold charts . . . choice of chart speed . . . linearized plug-in signal conditioners for mA, A, mV, V, T/C's, RTD's, etc. . . . Panel cutout: 5½" square. Power req: 115/230V, 50 or 60 Hz, 8VA.



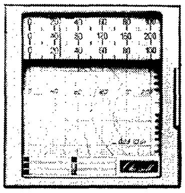
Model 300 Single Pen

MODEL 301 – similar to Model 300 but available with up to 3 over-lapping pens, also more versatile & expandable. Additional channels or options easily added by the user. Typical options: chart annotation (time, date, chart speed and range), alarms, event marker, 10-speed chart drive.



Model 301
with 1, 2 or 3 Pens

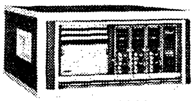
MODEL 306 – six channel, six color multipoint recorder with alphanumeric printing of scale data, chart speed, day number and time. Accepts up to three independent, linearized signal conditioners assignable to any channel. Records on standard linear chart. Continuous analog printing of alarm set points. Communications module provides RS422 or RS232e interface.



Model 306
Multipoint Recorder

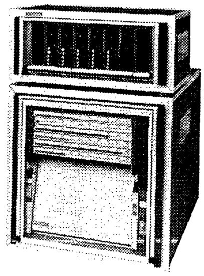
LABORATORY RECORDERS

100mm Precision Recorders . . . better than 0.01% resolution



Model 3003
with 100 mm chart,
1 to 3 pens

MODEL 3003 – a unique "zoom" facility expands and normalizes any signal to provide a frame-filled calibrated presentation . . . lets the signal fill the chart, giving a 10 meter effective chart width in a 100 mm (4 in.) recorder with 1, 2 or 3 channels. (Each channel requires a plug-in signal conditioning module.)



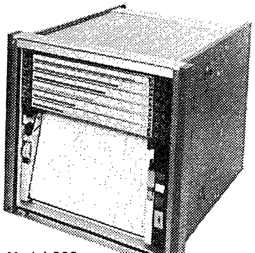
Model 3026
with 250 mm chart,
1 to 6 pens

Special ultra-high resolution recording systems, and multi-channel signal conditioners can be assembled to meet critical requirements.

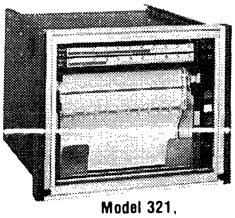
250mm Precision Recorder . . . better than 0.005% resolution

MODEL 3026 – the same signal conditioning modules used in the Model 3003 are also used in this 250mm (10 in.) recorder – available with up to 6 overlapping traces.
Signal Conditioning: same as Model 3003.
Writing System: capillary ink or disposable cartridge.
Chart: Ruled width, 250mm. Choice of roll or Z-fold format (interchangeable cassettes). Extra-long roll-feed cassette, available with one or two channel versions only, gives large, 250 x 250mm viewing area.
Chart speed: 10-speed electronic drive, from 60 cm/min to 10 cm/hr (other drives available).
Typical Options: (refer to the Model 320 in the adjacent column.)

10 in. INDUSTRIAL RECORDERS



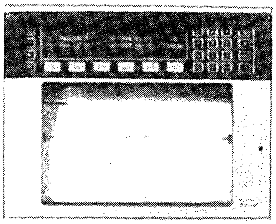
Model 320,
1 to 6 Pens



Model 321,
1 or 2 Pens

MODEL 320 – multi-channel unit with up to 6 overlapping traces . . . color-coordinated moving ribbon indicators give high readability . . . swing-out chassis gives instant access to plug-in modules, pen servos, chart drive, test & calibration sockets.
Input Modules: each channel requires a dedicated single range unit or multi-range module.
Writing System: capillary ink or disposable cartridge.
Charts: roll or Z-fold.
Chart Drive: 10-speed, high or low ranges.
Panel Cutout: approx. 14½"W x 15"H.
Typical Options: alarms, event markers, retransmission signal, remote control.

MODEL 321 – similar to the Model 320 in low profile case (cut out) 14½"W x 12"H) and accepts either one or two pens. (Specifications same as for Model 320).



Model 4001
6-30 point recorder/logger

MODEL 4001 – Microprocessor based multi-point recorder scans and prints up to 30 channels per second. Its multiple microprocessor-based input modules eliminates the need for multiplexing relays, providing fast scan times and field-configurable, linearized TC, RTI, mA dc, and mVdc signals.
Unique digital display. The large fluorescent display can present four channels at a time – values in engineering units, time and date, alarm indication, and priority alarm mode – as well as other messages.

- 10"-wide (250 mm), self-threading chart cassette with high-speed forward and reverse drive.
- Six-color, high-definition printing.
- Disposable, long-life ribbon ink cartridge.
- Printing formats include trend and tabular.
- RS232C serial communications port.
- 250Vac channel-to-channel and channel-to-ground isolation and fault protection.
- Simple pull-out mechanism for easy maintenance.
- Designed to meet UL, CSA, and VDE standards.

Chessell

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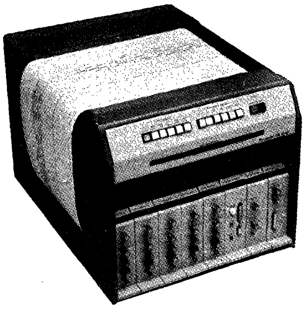
Gould... Innovation and Quality in Instrumentation.

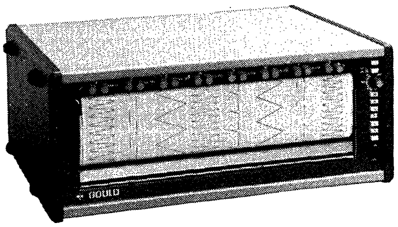
The Complete Line of Recording Systems.

Gould offers a complete line of instruments and systems for test and measurement applications that require the highest precision, sensitivity and accuracy.

The product line includes computer-based data acquisition systems, high speed waveform recorders, and general purpose oscillographs with plug-in amplifiers. In addition, Gould also offers a complete line of X-Y recorders, digital plotters, electrostatic recorders and tape recorders.



Gould ES 1000B. Electrostatic analog recorder automatically makes preprogrammed chart notations. To 16 channels, 40 μs transient response.



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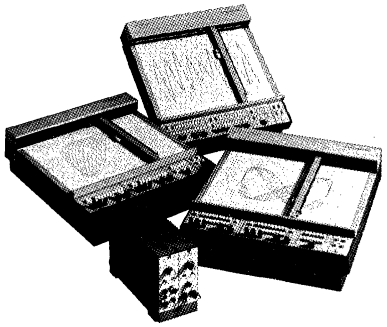

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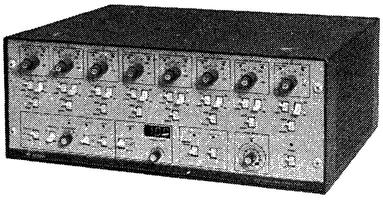

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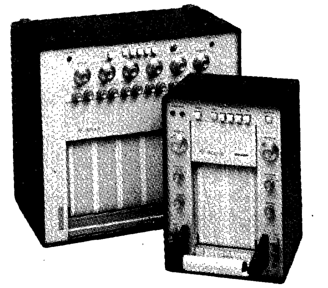

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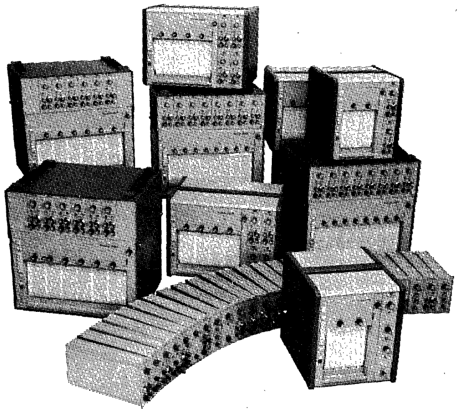

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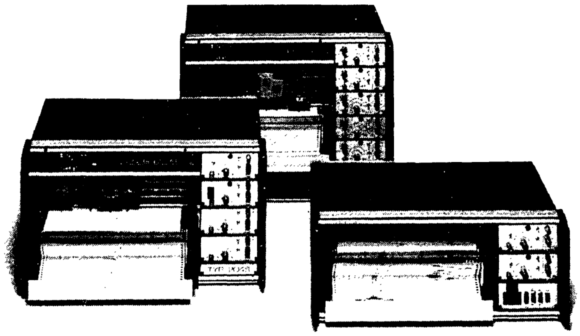
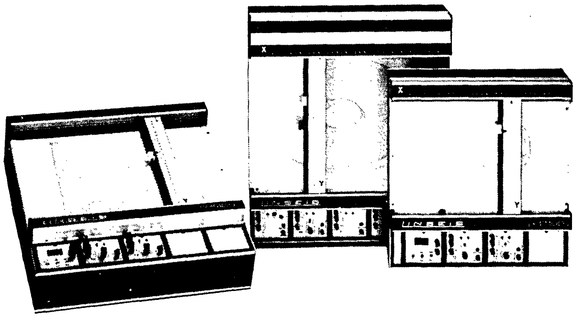
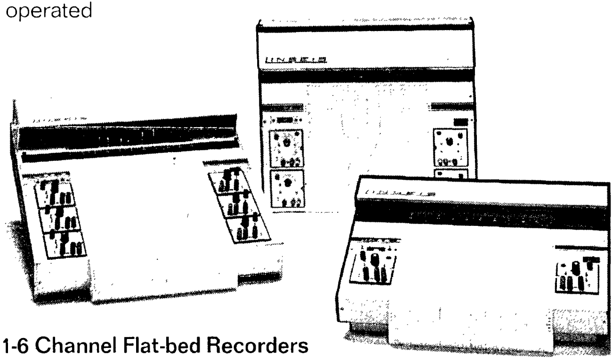
The Recorder Company Presents:



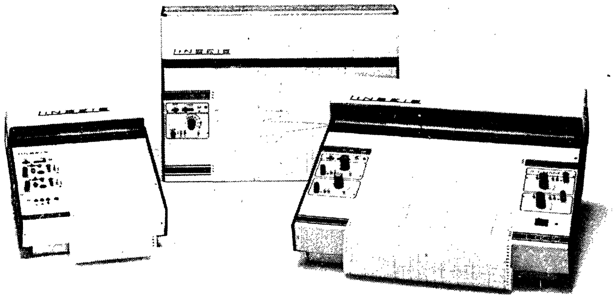
L2005 1-6 Channel Rackmountable Recorders
Microprocessor-controlled data synchronization of the time delay between channels available, 42 different input modules, RS-232/IEEE 488 Interface optional. Linearized recording for 9 different thermocouples.
L7005 standard model, 250 and 120 mm, AC and battery-operated



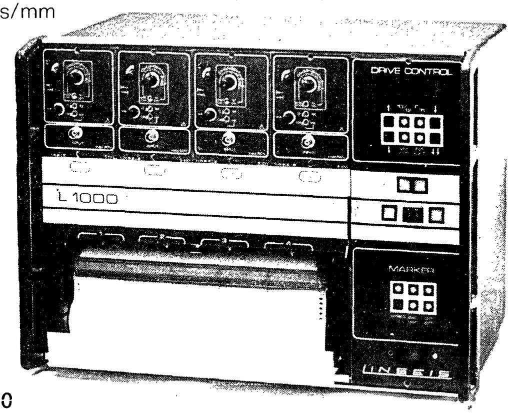
XY Recorders
Two sizes 8½ x 11" and 11 x 17", XY and XYY models, optional paper take-up mechanism for continuous paper feed. LY/PL for XY and plotting operation on A3 models



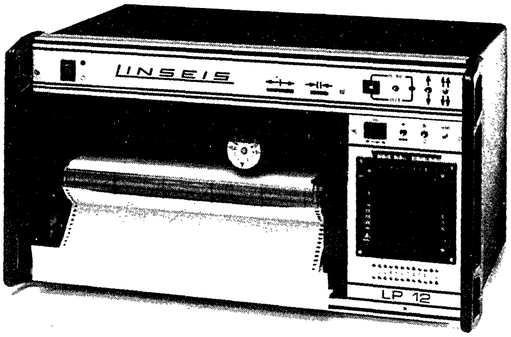
1-6 Channel Flat-bed Recorders
Retrofittable due to modular construction, input modules for voltage, current, resistance, and temperature measurements. Linearized thermocouples. Optional inputs, chart drive with 48 steps/mm



Compact Flat-bed Recorders
Our economical recorder line, 120, 200 or 250 mm chart widths, voltage and temperature inputs. Optional chart drive with 48 steps/mm. Digital flat-bed recorder for analog recording and digital outputs (V24/RS232 interface)



L1000
1-6 channel fast response recorder,
DC-100 Hz,
µP-logic enabling frequency and speed dependent stylus heating 50 cm/s fast response



12 Channel Multiplexing Point-printing Recorder
12 independently programmable input channels, voltage, current, and temperature measurements (linearized).
Each channel can record either mV/V/mA or temperature signals.

Other LINSEIS products:
Data Acquisition System L8500
Data Loggers L8000
Penless Recorders LRS4

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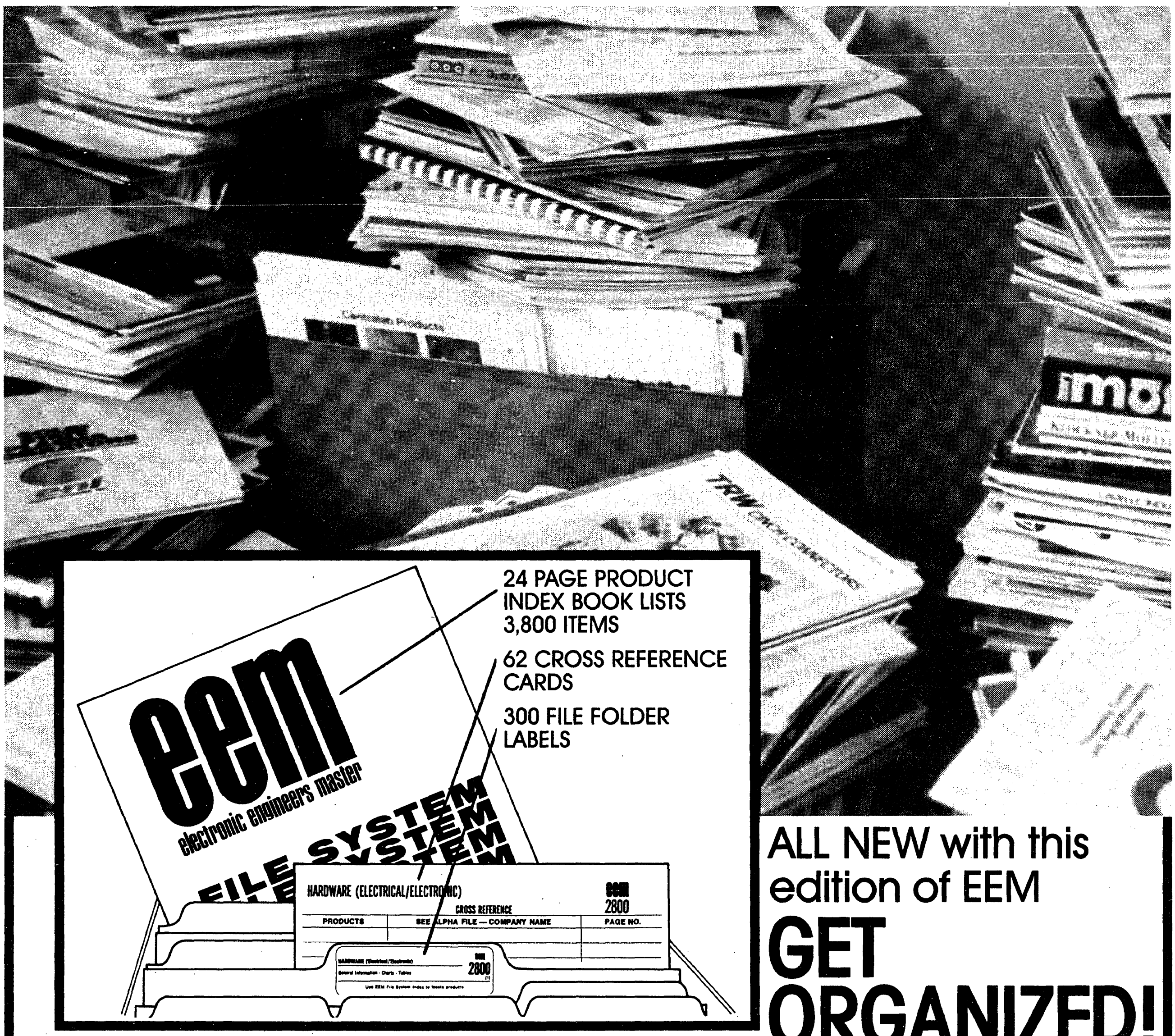
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The EEM File System is shipped in one neat package. The package contains everything you need to set up your very own filing system. Best of all, it's easy to get and very affordable. Send a check or money order for $25.00 and EEM will pay the postage and sales tax. If you must use a purchase order, please add $5.00 for postage and handling. An invoice will accompany your System.

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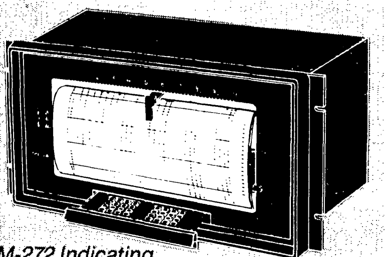
RECORDING INSTRUMENTS

For Temperature, Flow Pressure and Strain



OM-272 Indicating, Programmable Data Logger

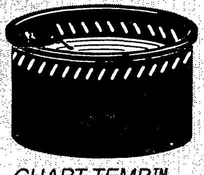
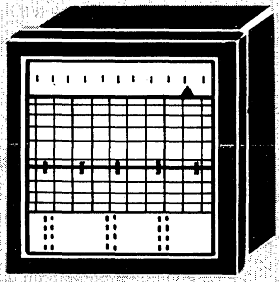
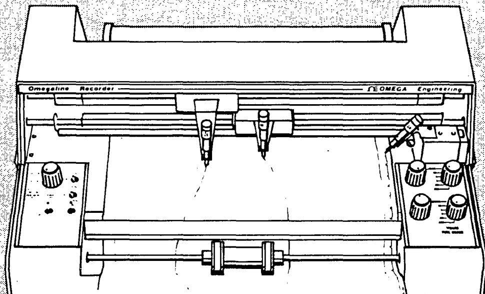


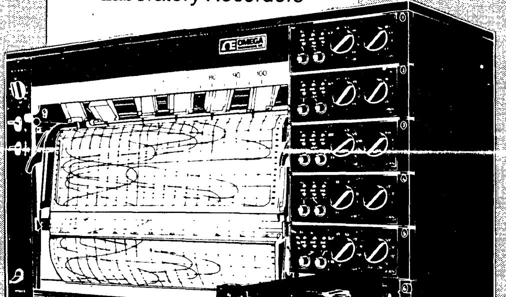
CHART TEMP™ Self Contained Multi-Day Recorder



180A Series Precision Temperature Process Recorders


Omegaline Recorder
OMEGA Engineering

OMEGALINE™ Precision Laboratory Recorders



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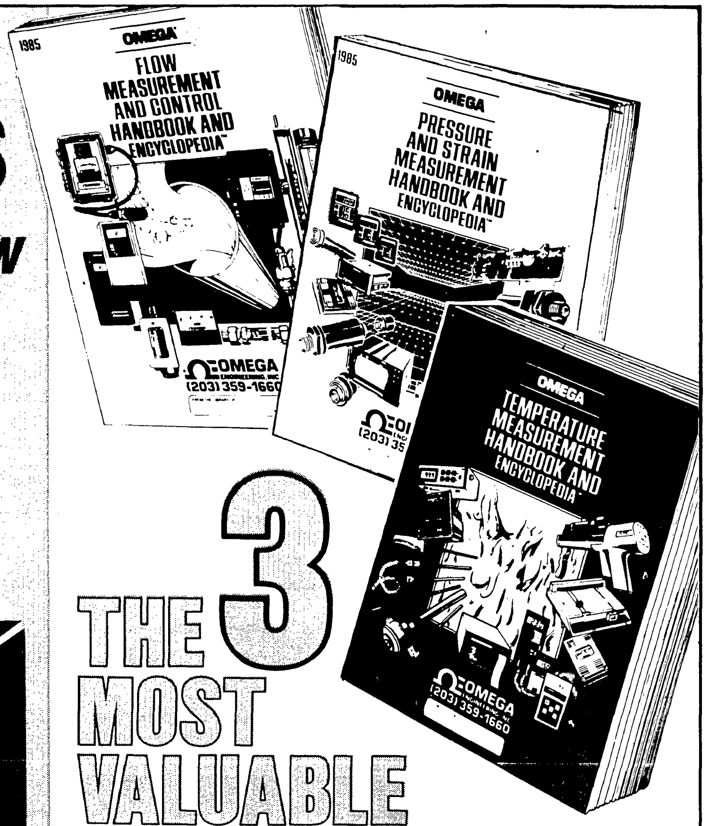
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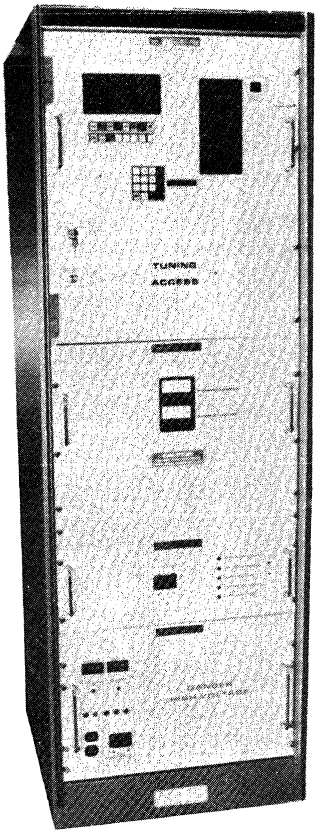
M-C-L INC
LA GRANGE ILL

MICROWAVE SYSTEMS

COMMUNICATION AMPLIFIERS

- C Band 5.9-6.4 GHz
- K Band 14-14.5 GHz



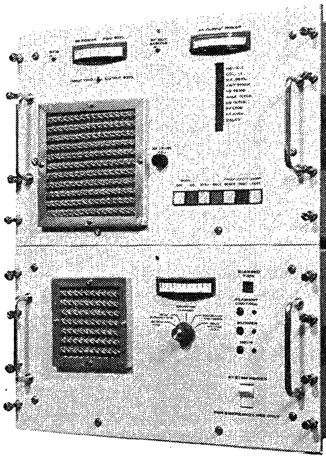
"COMPUTER COMPATIBLE" KLYSTRON AMPLIFIER SERIES 10000

Producing Klystron and TWT amplifiers for commercial satellite earth stations, MCL's engineers have provided solutions to most communication systems' problems. For many years, our engineers have been known as some of the finest microwave problem solvers in the industry.

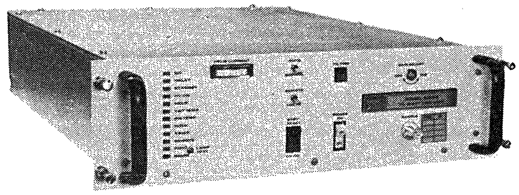
Two excellent solutions incorporated into our equipment are: CMOS logic-controlled fault isolation circuitry which shuts down all high-voltage functions within 8 ms should key components fail, and our unique arc detector with photo-diode sensing coupled with a PIN-diode switch which removes RF drive.

Other features include forward/backward fiberoptic inputs which survey the entire waveguide including the Klystron window, plug-in PC boards, color-coded LED status indicators displayed on panel fronts to make trouble-shooting easier and quicker, and regulated beam power supply.

With C-Band units having from 75 W to 3,350 W outputs and system gains up to 85 dB; and 6 Ku-Band frequency models with from 50 W to 2,000 W and up to 75 dB system gain, MCL's HPA series amplifiers provide the best answer for your communications systems.



TWT AMPLIFIER 200-700 WATTS



TWTA 75-125 WATTS

INSTRUMENTATION KLYSTRON CW AMPLIFIER SYSTEMS

An exclusive MCL achievement in design and development of self-contained, rack-mounted Klystron cavity amplifier-power supply systems that eliminates clutter and contributes to work area efficiency.

Suggested applications include biological research, factory test-source. This series includes many individual systems, each embodying highly desirable features such as high power capability, broad frequency range. (Any of these systems can be custom modified.) Each system is engineered conservatively and quality built, affording users maximum reliability and economy.

- Rack-mounted; completely self-contained; front panel serviceable
- 1700 to 18,000 MHz coverage
- Individual front panel accessible tuning dials and dial vs frequency calibration charts (where applicable).
- Front panel metering of beam voltage and current, body current, filament voltage and current, forward and reflected power of input and output circuits.
- Elapsed time indicator.
- Fault and Control Panel — indicates equipment's operational status and fault status.

—MCL/INC DESIGNERS AND MANUFACTURERS OF RF COMPONENTS AND SYSTEMS
TEN NORTH BEACH LA GRANGE ILLINOIS 60525 312-354-4350 TWX 910-683-1899

MCL INC LA GRANGE ILL

MICROWAVE AMPLIFIERS AND GENERATORS

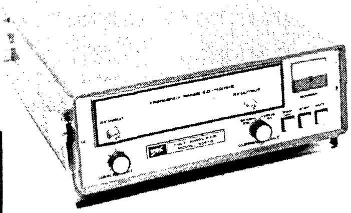
TWT AMPLIFIERS

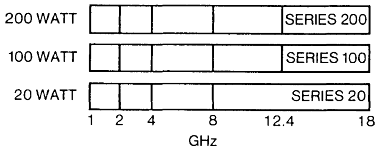
Three models cover your power requirements: 20, 100 and 200 watts. All provide stable microwave power to meet testing, measurement, and calibration requirements.

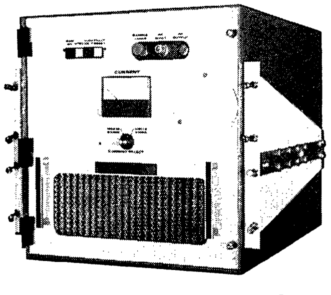
Modular construction and plug-in boards accommodate a wide variety of standard and special traveling wave tubes.

Solid state components and protective circuitry. Beam and helix current metering. Options include VSWR protection and power monitoring.

20 WATT SERIES







100/200 WATT SERIES

65 & 100 WATT SIGNAL GENERATORS

10 to 2500 MHz with six plug-in heads. Highest stability and reliability for laboratory calibration, testing and measurement.

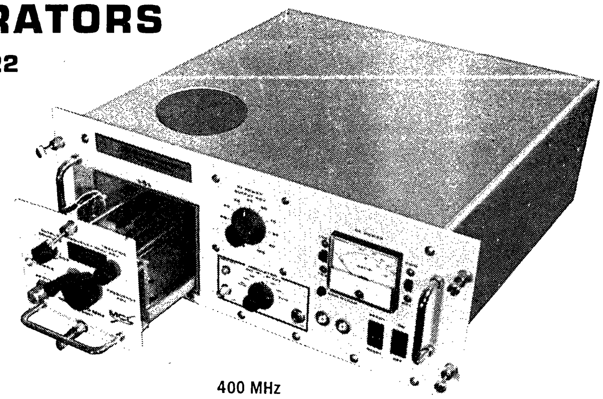
Frequency Stability: ±0.003%/10 minutes.

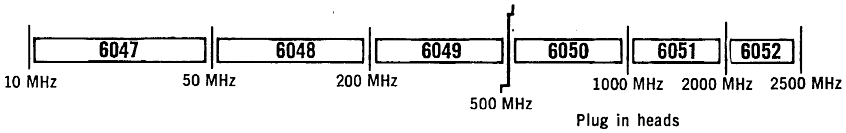
Power Stability: ±0.2db/hour.

Internal 1 KHz modulation, and external pulse and AM modulation. Single control tuning to 2% of actual frequency. Front panel power indication.

All solid state components (except osc. tube), regulated power supplies, and conservative design provide laboratory quality in a compact unit.

MODEL 15122/15222 SIGNAL GENERATOR

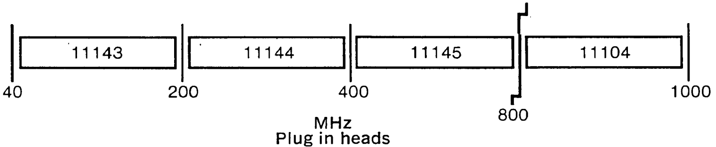




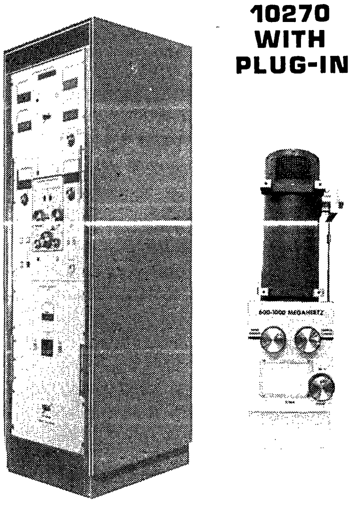
1000 WATT RF CW POWER AMPLIFIER

- Front Panel Dial Tuning of Each RF Cavity.
- Front Panel Dial Vs. Frequency Calibration Charts on Each Cavity.
- Front Panel Metering of Plate, Screen, Grid and Filament Circuits and Forward and Reflected Power of Input and Output Circuits.
- Elapsed Time Indicator.
- Minimum 13 dB Gain.

Model 10270 is the ultimate in RF power amplifier design . . . affording maximum utility in commercial, military and similar installations where space must be budgeted. Its modular cavity bandchange feature provides users with a high degree of flexibility, high power efficiency and extreme economy in one quality constructed package.



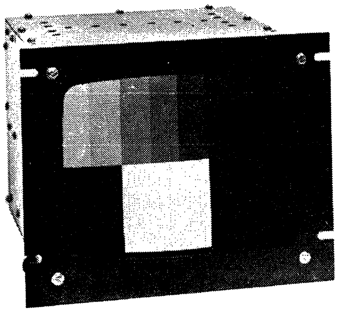
10270 WITH PLUG-IN



—MCL/INC DESIGNERS AND MANUFACTURERS OF RF COMPONENTS AND SYSTEMS
TEN NORTH BEACH LA GRANGE ILLINOIS 60525 312-354-4350 TWX 910-683-1899

INFODEX INCORPORATED
395 WEST MAIN STREET, WATERBURY, CT 06702 • (203) 757-9291

RUGGEDIZED, 9 INCH MIL SPEC CRT MONITORS



Optional front panels can be supplied to your specification, as shown. Conductive faceplates provide EMI/RFI shielding in both open frame and fully enclosed models.

Infodex 9 inch raster scan CRT display modules are high resolution television monitors. They accept composite video inputs, and lock to inputs with either 50 Hz or 60 Hz field refresh rate, interlaced or noninterlaced, without adjustment.

*** ALSO ASK ABOUT INFODEX'S NEW LINE OF MIL SPEC ELECTROLUMINESCENT FLAT PANEL DISPLAYS**

All units are supplied to military specifications, and workmanship meets MIL STD 454. All units conform to applicable EIA and ARINC standards, and are designed to comply with UL requirements.

Infodex displays are very compact, one piece units designed for installation directly behind control panels. Their modular design permits rapid, easy fault isolation and fast replacement of functional modules in the field. High voltage components are sealed and encapsulated to permit safe, reliable operation under extremes of altitude, humidity, and condensation.

The CRT is permanently mounted in a resilient support that permits the tube to withstand extremes of shock and vibration. The deflection yoke is secured to the CRT funnel by tension bands to minimize shear stress under transverse shock conditions.

All models have conductive, antireflection coated, bonded faceplates that provide EMI shielding, minimize glare and reflections from external light sources, and protect the user from implosion of the CRT. Special combinations of different phosphors and optical filters can be supplied to provide high contrast displays under high ambient light conditions.

SPECIFICATIONS — 9 inch CRT Displays

Screen: 9 inch (diagonal)

Faceplate: Bonded, antireflection coated, spherical faceplate provides EMI/RFI shield, contrast enhancement, and implosion protection.

Input Signal: Composite video, 0.5V to 2V peak to peak (nominal 140 IRE units), terminated in 75 ohms. Polarity: black negative, sync negative.

Resolution: Not less than 800 TV lines at center screen, and not less than 650 TV lines over entire raster area. Measured at 50 foot lamberts peak luminance (technique similar to RS375A).

Response: Video frequency response 10 MHz typical.

Horizontal Frequency: 15,750 Hz nominal (adj ±500 Hz). ±300 Hz capture and lock range. Retrace time 10 μsec max.

Vertical Frequency: 48 to 62 Hz capture and lock range, interlaced or noninterlaced. Operation conforms to RS170 (525 line, interlaced) and CCIR (630 line, interlaced). Retrace time 1000 μsec max.

Raster Size: Total active area 14 x 18 cm (5.5″ x 7.1″) nominal. Internal adjustment approximately ±5%.

Size Stability: Size change less than ±1% for change of 0 to 70% APL at rated luminance. Less than ±1% for ±10% supply voltage change.

Geometric Distortion and Linearity: No picture element shall be displaced from its true position by more than 2.8 mm.

Peak Luminance: 50 foot lamberts minimum. Less than 10% change when APL is changed from 20% to full white field.

Contrast (with filter faceplate): At least 4:1 contrast ratio between white and black areas with 500 foot candle illumination incident at 45°. Special phosphors, optical filters, and A/R coatings can be supplied for specific applications.

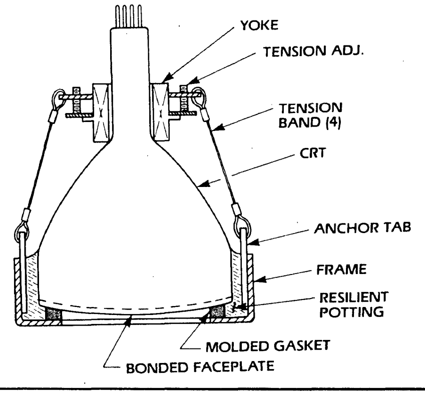
Service Conditions: Operating −40° to 55°C, to 10,000 feet. Storage −40° to 85°C, to 40,000 feet. Humidity 0 to 100%, including condensation.

Power: 28 Vdc ±4V @ 2.2A, unregulated.

Interface Connector: 25 pin D subminiature plug carries video and power inputs, and remote fault sensing signal outputs. Mating connector user supplied (M24308/4-3).

MODEL	FRAME*	OPTICAL FILTER FACE-PLATE	PHOS-PHOR	
77M46A	Open	Yes	P43	For high ambient illumination conditions.
77M77A	Open	No	P4	For normal illumination conditions.
77M101A	Enclosed	Yes	P43	Fully enclosed, shielded version of 77M46.
77M112A	Open	No	P43	Green phosphor version of 77M77.
77M119A	Enclosed	No	P4	Fully enclosed version of 77M77.

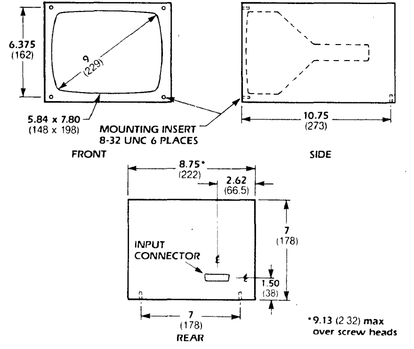
* Enclosed units have painted front panels and top covers.
Open units attach to user's panel by threaded inserts.



INFODEX CRT ASSEMBLY

CRT envelope is firmly supported, and yoke mounting minimizes shear stress on the CRT neck under transverse shock conditions. Special versions of this mounting have been tested to withstand repeated 100g shocks. The CRT is easily replaced in the field as a preassembled module, and the original yoke is easily transferred to the replacement CRT.

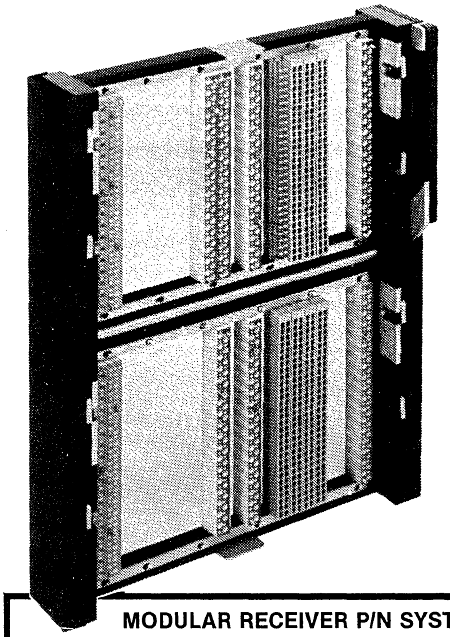
MOUNTING DIMENSIONS

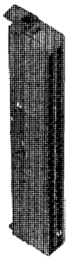


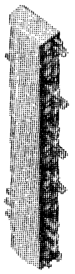
Infodex manufactures a broad range of OEM and MIL SPEC CRT display systems for military, industrial, computer graphics, and medical applications. These include both raster scan and vector writing models, with on/off beam control for graphics and alphanumerics, and continuous gray scale modulation for analog video.

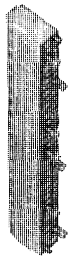
1958-1986 Our 28th Year
PLUGBOARD PROGRAMMING SYSTEMS

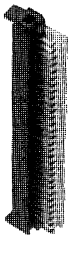
MAC PANEL

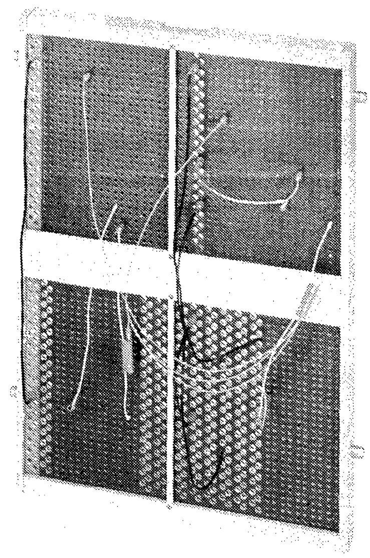












MODULAR RECEIVER P/N SYSTEM (MATE)

06 1 X YY Z WWWW

- 06 - DENOTES MATE SERIES
- 1 - DENOTES RECEIVER
- X - DENOTES NUMBER OF TIERS
  - 1-SINGLE
  - 2-DUAL
  - 3-TRIPLE
- YY - DENOTES NUMBER OF CHANNELS PER TIER (1 - 21)
- Z - DENOTES TYPE OF MECHANISM
  - 1-SINGLE ACTION (ALL TIERS)
  - 2-INDEPENDENT ACTION (DUAL TIER ONLY)
- WWWW - DENOTES SEQUENTIAL NUMBERS RESERVED FOR CUSTOMER SPECIAL REQUESTS (MOUNTING HOLES, ETC.)

PLUGBOARD P/N SYSTEM (MATE)

06 2 X YY Z WWWW

- 06 - DENOTES MATE SERIES
- 2 - DENOTES PLUGBOARD
- X - DENOTES NUMBER OF TIERS
  - 1-SINGLE
  - 2-DUAL
  - 3-TRIPLE
- YY - DENOTES NUMBER OF CHANNELS (1 - 21)
- Z - DENOTES TYPE OF PLUGBOARD
  - 1-NON-MODULAR FRAME W/FIXED BOARD
  - 2-MODULAR FRAME ONLY
  - 3-NON-MODULAR FRAME ONLY (NO BOARD)
- WWWW - DENOTES SEQUENTIAL NUMBERS RESERVED FOR CUSTOMER SPECIAL REQUESTS (MOUNTING HOLES, ETC.)

Versatility and dependability are the keys to **MAC PANEL COMPANY'S** 06 Series of Modular Patchboard Programming Systems. Designed to meet the rigid specifications of the United States Air Force MATE standard 2806768, this system allows the ATE engineer to customize his particular program requirements with stock components that assure the reliability of the current State-Of-The-Art in interface systems.

The system provides for digital and analog signals (5 AMPS), high power requirements (30 AMPS), and superior coaxial connections (50 OHM and 95 OHM Impedance) in one precision-engineered unit.

In addition to the modularity of the Receiver, this system allows for individual connectors in the Mating Plugboard so that any engineering change in the Receiver Pin-Mapping can be duplicated in the Plugboard without the necessity of expensive factory re-work.

To further enhance the versatility and capability of this system, **MAC PANEL** manufactures a large selection of Patchcords in a variety of configurations to provide the engineer with maximum versatility in his wiring requirements.

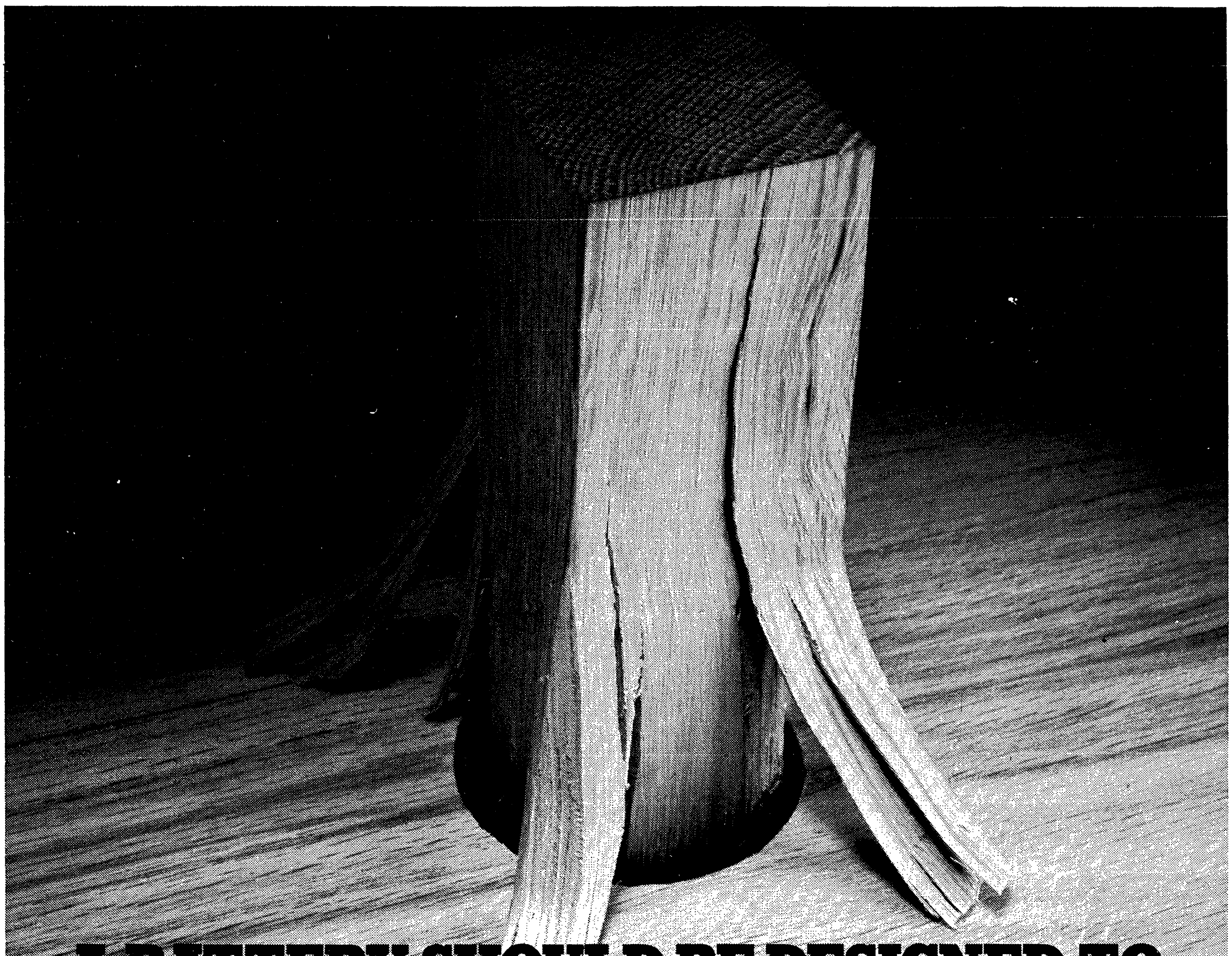
The Quality Assurance Department at **MAC PANEL COMPANY** complies with the requirements of Military Specifications. The combination of quality control, engineering, modern and exacting machining methods, and over 27 years of experience assures the engineer that **MAC PANEL** is providing the very best product available for the most important item in the WORLD . . . HIS PROJECT!!

IN-STOCK CONNECTORS & TOOLS
We maintain shelf stock on connectors, and crimping, insertion and extracting hand tools.

MATE'S AT MAC
ASK US ABOUT IT

OUR COMMERCIAL PATCHBOARD PROGRAMMING SYSTEMS CAN BE FOUND IN VOLUME C, SECTION 3200

MAC PANEL CO. • 216 Pine St., P. O. Box 5027 • High Point, NC 27262, U.S.A. • Phone: (919) 884-8111 TWX: 510-926-1542



A BATTERY SHOULD BE DESIGNED TO MATCH YOUR SPECIFICATIONS. NOT VICE VERSA.

Has this ever happened to you?

Your specs and their battery complement each other about as well as the proverbial square peg in a round hole.

And oddly enough, when that happens, you're the one that gets sent back to the drawing board. Not them.

After laboring months, or even years on specifications, you're forced to compromise for want of a power system.

Well, that won't happen if you bring your project to Saft first. We're a leading manufacturer of all types of high technology electro-chemical energy systems: Nicad®, Lithium, Gelyte, and Lead Acid just to name a few.

In fact, we're the ultimate power source. Unlike many of our competitors we give you choices. Not excuses, or whatever happens to be on the shelf.

Add to those choices our expertise and innovative design capabilities, and you'll discover we can solve many of your energy problems.

You'll find Saft batteries virtually everywhere: in computers, aviation, military, medical, home appliances, and even in aerospace.

Ours is the original equipment battery on the Boeing 757 and 767 jumbo jets, the most advanced aircraft in the sky today.

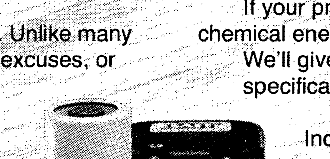
You'll find a Saft battery safeguarding the electronic memory in portable drug pumps, the latest medical breakthrough in the control of diabetes.

We're even considered a pioneer in rechargeable batteries used in video cassette recorders, stereos, photoflash equipment and mobile transceivers. Batteries that can be recharged up to 1,000 times.

If your project requires a high technology electrochemical energy system, talk to a specialist at Saft first.

We'll give you a battery that's custom fit to your specifications. Not ours.

For more information, contact SAFT America Inc., 711 Industrial Blvd., Valdosta, GA 31601 or call (912) 247-2331.



SAFT

MORE POWER TO YOU.

eem selection guide

batteries-3900

This Guide provides a quick reference to most of the battery systems used in electronic applications. It should be used as a starting point to select the style of battery needed. The next step is to turn to the manufacturers' data pages in EEM and then contact the manufacturer or the nearest sales office listed in the EEM Yellow Pages.

ZINC-CARBON (Leclanché)

The most common zinc-carbon batteries are shown below along with the type numbers of only one manufacturer. Most types are available from other suppliers: Avex (**D**•1416), Power Group (**D**•1428), Tauber (**D**•1439) and Varta (**D**•1442).

Max. Service Hrs.	@ mA	V Nom.	ANSI	NEDA	Eveready Page D•1440
650	0.1	1.5	WO	—	201
22	20.0	1.5	N	—	E340E
22	20.0	1.5	N	910F	904
*	20.0	1.5	AAA	24P	812
21	20.0	1.5	AAA	24F	912
*	25.0	1.5	AA	15P	815
54	20.0	1.5	AA	15C	HS15
54	20.0	1.5	AA	15F	915
72	20.0	1.5	AA	15	1015
*	25.0	1.5	AA	15D	1215
420	9.0	1.5	C	—	T35
2	325.0	1.5	C	14P	835
140	20.0	1.5	C	14C	HS35
140	20.0	1.5	C	14F	935
185	18.0	1.5	C	14	1035
97	37.5	1.5	C	14D	1235
1100	9.0	1.5	D	—	T50
*	150.0	1.5	D	13P	850
113	60.0	1.5	D	13C	HS50
360	20.0	1.5	D	13F	950
440	18.0	1.5	D	13	1050
16.3	375.0	1.5	D	13C	HS150
15.8	375.0	1.5	D	13C	1150
139	60.0	1.5	D	13D	1250
75	300.0	1.5	—	700	711
1200	40.0	1.5	—	4	742
32	1.14A	1.5	—	—	735
3000	20.0	1.5	6	905	HS6
37	20.0	3.0	—	704	750
87	20.0	4.5	—	—	703
225	20.0	4.5	—	—	781
90	120.0	4.5	—	903	714
550	20.0	4.5	—	3	736
17.5	60.0	6.0	—	2	724
40	187.0	6.0	—	908	509
47	187.0	6.0	—	917	510F
155	60.0	6.0	—	—	744
61	187.0	6.0	—	908D	1209
110	187.0	6.0	—	918	731
1200	40.0	6.0	—	902	706
2000	30.0	6.0	—	907	1461
270	20.0	7.5	—	9	717
29	937.0	7.5	—	903	715
2000	30.0	7.5	—	—	1562
40	12.0	9.0	—	1611	206
50	9.0	9.0	—	1604	216
41	12.0	9.0	—	1604D	1222
61	12.0	9.0	—	1600	226
90	12.0	9.0	—	1613	2709N
165	12.0	9.0	—	1602	246
138	20.0	9.0	—	1605	266
350	20.0	9.0	—	1603	276
185	25.0	9.0	—	1612	2356N
1200	40.0	9.0	—	—	716
59	12.0	12.0	—	1810	228
500	20.0	12.0	—	—	732
500	20.0	12.0	—	923	2780N
2300	20.0	12.0	—	922	1463
750	*	12.0	—	—	1862
112	1.0	15.0	—	220	504
74	2.0	15.0	—	208	411
60	5.0	15.0	—	224	417
112	1.0	22.5	—	221	505
74	2.0	22.5	—	215	412
60	5.0	22.5	—	225	420
85	18.0	22.5	—	—	763
70	2.0	30.0	—	210	413
155	1.0	45.0	—	710	415
370	1.0	45.0	—	—	460
630	1.0	45.0	—	—	455
138	20.0	45.0	—	202	482
125	40.0	45.0	—	207	484
49	8.4	63.0	—	211	477
57	3.4	67.5	—	217	416
60	5.0	67.5	—	203	457
150	5.0	67.5	—	200	467
111	27.0	69.0	—	914D	646
60	9.0	90.0	—	214	479
63	10.0	90.0	—	204	490
63	10.0	225	—	728	489
74	2.0	240	—	729	491
74	2.0	300	—	722	493
63	10.0	450	—	740	496

*** Special discharge conditions, see mfrs. data**

ALKALINE-MANGANESE

This is a listing of the most popular styles of alkaline-manganese (nonrechargeable) batteries with the type numbers from two manufacturers. Other suppliers include: Avex (**D**•1416), Power Group (**D**•1428) and Tauber (**D**•1439).

Max. Serv. Hrs.*	* @ mA	V. Nom.	Size	NEDA	Eveready Page D•1440	Varta Page D•1442
17	10	1.5	—	—	EPX825	7201
90	9	1.5	N	910A	E90	7245
150	10	1.5	½AA	—	E89	—
25	37.5	1.5	AAA	24A	E92	7239
107	20	1.5	AA	15A	E91	7244
160	37.5	1.5	C	14A	E93	7233
270	50	1.5	D	13A	E95	7232
270	50	1.5	D	13A	HS95	7232
17	10	3.0	—	—	EPX30	—
35	20	3.0	1	1308A	532	7253
7.5	18	4.5	—	—	538	—
35	20	4.5	1	1306A	523	7251
35	20	4.5	1	1307A	531	7252
31	2.5	6.0	—	—	537	7250
30.5	18	6.0	—	—	539	—
59	375	6.0	G	930A	520	—
33	18	9.0	—	1604A	522	—

MERCURY

Mercury batteries are supplied in two versions. Those with a 100% mercuric oxide depolarizer deliver a nominal voltage of 1.35. When manganese dioxide is added, the output increases to a nominal 1.4 volts. Two manufacturers' types are shown in the table. Other suppliers include: Avex (**D**•1416), Power Group (**D**•1428) and Tauber (**D**•1439).

mAh (Ah)	V. Nom.	Cells	NEDA No.	Eveready D•1441	Varta D•1442
16	1.35	1	—	E212E	*
50	1.35	1	1155M	E325	*
65	1.35	1	1157M	E388	*
80	1.35	1	1116M	E400N	*
95	1.35	1	1156M	E323	7086
120	1.35	1	1154M	E343	*
150	1.35	1	1153M	E354	*
220	1.35	1	1152M	E313	7081
250	1.35	1	1123M	E625N	7102
500	1.35	1	1105M	E640N	*
800	1.35	1	1117M	E401N	*
1000	1.35	1	1109M	E1N	*
2200	1.35	1	—	E3	*
2400	1.35	1	—	E502	*
3400	1.35	1	1112M	E4	*
3800	1.35	1	1113M	E12N	*
(14)	1.35	1	1115M	E42N	*
250	2.70	2	1201MP	EPX14	239
1000	2.70	2	1203M	E132N	*
1000	4.05	3	1314M	E133N	*
500	5.40	4	1410M	E164N	*
1000	5.40	4	1409M	E134N	*
1000	6.75	5	1505M	E135N	*
1000	8.10	6	—	E136N	*
45	1.40	1	—	E312	*
80	1.40	1	—	E400	*
85	1.40	1	—	E13	*
105	1.40	1	—	E575E	7109
160	1.40	1	—	E41	*
190	1.40	1	1127M	E675E	7101
215	1.40	1	1127MD	E675	*
350	1.40	1	1122M	E625	7102
350	1.40	1	1104M	E630	*
500	1.40	1	1105M	E640	*
800	1.40	1	1118M	E401	*
1000	1.40	1	1100M	E1	*
2400	1.40	1	—	E502E	*
2500	1.40	1	15M	E9	*
3800	1.40	1	1101M	E12	*
(14)	1.40	1	—	E42	*
350	2.80	2	—	E152	*
1000	2.80	2	1200M	E132	*
500	4.20	3	—	E163	*
1000	4.20	3	1306M	E133	*
2200	4.20	3	—	E233	*
110	5.60	4	1407MP	EPX23	434
500	5.60	4	—	EPX32	*
500	5.60	4	1404M	E164	*
1000	5.60	4	1408M	E134	*
180	7.00	5	1501M	E175	*
350	7.00	5	—	E115	*
500	7.00	5	1500M	E165	*
1000	7.00	5	—	E135	*
575	8.40	6	1604M	E146X	*
600	8.40	6	1611M	E126	*
1000	8.40	6	1615M	E136	*
215	9.80	7	1606M	E177	*
750	12.60	9	1810M	E289	*

*** Contact manufacturer for availability.**

SILVER OXIDE

Silver oxide cells exhibit similar performance to mercury cells, but at a higher (1.55) nominal voltage. In addition to the manufacturer shown, these batteries are available from: Avex (**D**•1416), Power Group (**D**•1428), Tauber (**D**•1439) and Varta (**D**•1442).

mAh	V.	NEDA No.	Eveready D•1441
35	1.5	1134SO	384
38	1.5	—	S312
38	1.5	1135SO	392
60	1.5	1136SO	309
75	1.5	—	S13
75	1.5	1137SO	393
100	1.5	1132SO	301
120	1.5	—	S41
120	1.5	1133SO	386
165	1.5	1130SO	303
190	1.5	1107SO	S76
190	1.5	1131SO	357
210	1.5	1140SO	355
190	6.0	1406SOP	544
*	1.5	1138SO	389
*	1.5	1139SO	344
*	1.5	1158SO	362
*	1.5	1159SO	390
*	1.5	1160SO	391
*	1.5	1161SO	394
*	1.5	1162SO	395
*	1.5	1163SO	396
*	1.5	1164SO	397
*	1.5	1165SO	399

*** Contact manufacturer for data.**

LITHIUM

Lithium batteries are available in many styles, in several chemical compositions and many configurations. A group of common types from three suppliers appears in the table. Other suppliers include: Avex (**D**•1416), Elpower (**D**•1420), Tauber (**D**•1439), Eveready (**D**•1441) and Varta (**D**•1442).

V. Nom.	mAh	Diam. mm	Height mm	Catalyst Research D•1417	Power Group D•1429	Panasonic D•1427
3.0	40	3.8	33.0	—	PCR333	—
3.0	20	4.2	26.0	—	BR425	—
3.0	40	4.2	35.9	—	BR435	—
3.0	30	7.9	7.2	—	PCR772	—
2.8	40	11.6	2.0	11620	—	—
3.0	160	11.6	10.8	—	PCR1/3N	—
3.0	1000	12.0	60.0	—	PCR2N	—
3.0	30	12.5	2.0	—	PCR1220	—
6.0	160	13.0	25.2	—	P2CR1/3N	—
3.0	50	16.0	2.0	—	PCR1620	—
3.0	750	16.8	22.5	—	BR1/2A	BR1/2A
3.0	1200	16.8	33.4	—	BR2/3A	BR2/3A
2.8	200	19.0	3.5	1935	—	—
3.0	50	20.0	1.6	—	BR2016	BR2016
3.0	90	20.0	2.5	—	BR2025	—
3.0	120	20.0	2.5	—	CR2025	—
3.0	100	20.0	2.5	—	PCR2025H	—
3.0	170	20.0	3.2	—	PCR2032	BR2032
3.0	130	20.0	3.2	—	PCR2032H	—
3.0	90	23.0	1.6	—	PCR2316	—
3.0	110	23.0	2.0	—	BR2320	BR2320
3.0	150	23.0	2.5	—	BR2325	BR2325
3.0	120	24.5	2.0	—	PCR2420	—
3.0	200	24.5	3.0	—	PCR2430	—
2.8	350	27.0	3.6	2736	—	—
2.8	700	34.0	4.0	3440	—	—

NICKEL-CADMIUM

Ni-cad batteries have become extremely popular and are available in a great many types and styles from many suppliers. Several are listed in the following tables along with representative batteries. Other suppliers include: Avex (**D**•1416), Tauber (**D**•1439) and Varta (**D**•1442).

1.2 Volt (Nominal) Cylindrical

Size	Eve-ready D•1441	Saft D•1432	Elpower D•1419	Pwr. Grp. D•1428	Panasonic D•1424	Power Sonic D•1431
½AAA	*	070SC	*	070SC	*	*
N	CF150	*	EPN150	PCF150	P15N	PS-N
⅓AA	*	110SC	*	100SC	P11AA	PS-1/3AA
⅓A	*	150SC	EPN180	150SC	*	*
½A	CF450	*	*	PCF450	*	*
AAA	*	180SC	EPN181	180SC	P18AAA	PS-AAA
½AA	*	250SC	*	250SCS	*	*
⅔AA	*	450SC	*	450SC	P25AA	PS-2/3AA
AA	CH15	500SC	EPN500	500SC	P50AA/FT	PS-AA
AA	CH500	VR0.5	EPN500F	PCH500	P50AA	*
A	*	600SC	*	600SC	*	*
½C	*	750SC	*	750SC	*	*
⅔C	*	*	EPN1000	900SC	P60SC	*
SC	CH1.2	1.2SC	EPN1200	1200SC	P120SC	PS-SC
C	CH35	2.0SC	EPN1800	1800SC	P180C	PS-C
½D	*	2.2SC	*	2000SC	*	PS-1/2D
⅔D	*	*	*	2500SC	*	*
D	CH4	4.0SC	EPN4000	4000SC	P400D	PS-D
F	*	7.0SC	*	7000SC	*	PS-F
M	*	*	*	10000SC	*	*

1.2 Volt (Nominal) Button Cells

Size D x L (mm)	Eveready D•1441	Saft D•1432	Power Group D•1428	Varta D•1442
7.5 x 5.0	*	*	10B	*
11.5 x 5.4	B20	20B	20B	20DK
15.4 x 6.0	B50	50B	60B	50DK
25.2 x 6.9	B150	150B	150B	150DK
25.2 x 7.4	*	*	180VBH	*
25.2 x 8.9	B225	225B	250B	225DK
25.2 x 9.1	BH225	225BH	250BH	*
25.2 x 14.5	*	*	400B	*
34.4 x 5.3	*	*	250VBH	*
34.4 x 10.0	BH500	500BH	500BH	500DK
50.8 x 8.4	*	*	1000VBH	*
50.8 x 15.0	*	*	2000VBH	*

Multicell Types

Descrip.	V. Nom.	Evr.	Saft	Pan.	Pwr. Grp.	Var.
9V	7.2	X	X	X	X	X
9V	8.4	X	X	X	X	X
Stacks						
2	2.4	X	X	X	X	X
3	3.6	X	X	X	X	X
4	4.8	X	X	X	X	X
5	6.0	X	X	X	X	X
6	7.2	X	X	X	X	X
7	8.4	X	X	X	X	X
8	9.6	X	X	X	X	X
9	10.8	X	X	X	X	X
10	12.0	X	X	X	X	X

X = Available.

LEAD ACID

Sealed lead acid batteries are widely used in UPS systems. A few of the available types are shown in the tables. Three manufacturers are listed. Other suppliers include: Avex (**D**•1416), Panasonic (**D**•1422), Power Group (**D**•1428), Power-Sonic (**D**•1431) and Tauber (**D**•1439).

6.0 Volt

Size (Nom.) L x W x H (mm)	Wt. (Kg)	20 hr. Ah	Elpower D•1418	Sonnen-schein D•1438	Yuasa D•1445
51 x 42 x 61	0.27	0.9	EP610-16	—	—
51 x 43 x 51	0.25	1.0	—	206/1.0	NP1-6
97 x 25 x 51	0.34	1.2	—	—	NP1.2-6
134 x 34 x 60	0.60	2.6	EP626-16	—	NP2.6-6
70 x 47 x 102	0.90	4.0	—	—	NP4-6
67 x 67 x 103	0.90	4.0	EP640-16	—	—
67 x 67 x 109	0.90	4.5	EP640-21	—	—
151 x 34 x 101	1.14	5.0	EP650-16	—	—
91 x 58 x 101	1.18	5.5	EP655-16	—	—
151 x 34 x 96	1.25	6.0	—	—	NP6-6
137 x 71 x 127	*	6.0	—	—	—
71 x 71 x 95	*	6.0	—	—	—
151 x 50 x 96	1.65	8.0	—	—	NP8-6
108 x 70 x 141	1.82	8.0	EP680-1	—	—
151 x 50 x 101	1.79	8.5	EP685-16	—	—
96 x 58 x 144	*	9.0	—	—	—
108 x 70 x 141	2.20	9.5	EP695-1	A206/9.5	—
151 x 50 x 96	2.20	10.0	—	—	NP10-6
108 x 70 x 141	2.50	12.0	EP6120-1	A206/12.0	—
213 x 70 x 140	3.67	16.0	EP6160-1	—	—
193 x 58 x 145	*	18.0	—	—	—
159 x 85 x 165	4.09	20.0	EP6200-24	—	—
175 x 96 x 145	*	27.0	—	—	—
159 x 85 x 165	4.86	30.0	EP6300-24	—	—
159 x 85 x 165	5.00	33.0	EP6330-24	—	—

12.0 Volt

97 x 48 x 51	0.59	1.2	—	—	NP1.2-12
178 x 34 x 59	0.90	1.9	—	—	NP1.9-12
134 x 67 x 60	1.10	2.6	—	—	NP2.6-12
134 x 34 x 125	1.32	2.6	EP1226-6	—	—
111 x 76 x 93	1.70	3.5	EP1235-23	—	—
134 x 67 x 103	1.77	4.0	EP1240-16	—	—
151 x 64 x 101	2.22	5.0	EP1250-16	—	—
151 x 65 x 96	2.40	6.0	—	—	NP6-12
141 x 71 x 98	*	6.0	—	—	—
149 x 86 x 163	*	6.0	—	—	—
213 x 70 x 140	3.72	8.0	EP1280-1	—	—
117 x 96 x 144	*	9.0	—	—	—
213 x 70 x 140	5.00	12.0	EP12120-1	A212/12.0	—
193 x 117 x 145	*	18.0	—	—	—
170 x 159 x 165	8.17	20.0	EP12200-4	A212/20.0	—
166 x 175 x 125	7.70	24.0	—	—	NP24-12
289 x 117 x 145	*	27.0	—	—	—
170 x 159 x 165	9.75	30.0	EP12300-24	—	—
159 x 172 x 173	10.0	33.0	EP12330-24	—	—
197 x 165 x 170	14.0	38.0	—	—	NP38-12

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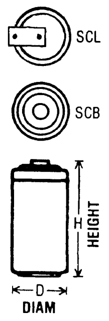

Coil Type	Name	Capacity (AH)	Weight (oz.)	Diameter (inches)	Height (inches)
100SCL	1/3AA	.100	.23	.562	.670
150SCL	1/3A	.150	.28	.615	.645
180RCL	AAA	.180	.32	.402	1.760
225SCL	1/3Af	.225	.38	.681	.716
226SCL	1/2AA	.225	.38	.562	1.102
450SCL	2/3Af	.450	.55	.681	1.138
500SCL	AA	.500	.70	.554	1.980
500SCB	AA	.500	.70	.554	1.967
600SCL	A	.600	.86	.615	1.960
750SCL	1/2C	.750	1.10	1.034	.965
800SCL	Af	.800	1.05	.681	1.978
1.0SCL	3/5C	1.0	1.40	1.038	1.190
1.2SCL	Cs	1.2	1.60	.903	1.696
2.0SCL	C	2.0	2.40	1.034	1.940
2.0SCB	C	2.0	2.40	1.034	1.969
2.2SCL	1/2D	2.2	2.80	1.299	1.488
4.0SCL	D	4.0	4.60	1.295	2.358
4.0SCB	D	4.0	4.60	1.295	2.406
7.0SCL	F	7.0	7.40	1.301	3.566

Dimensions are maximum. Cells have plastic insulation and lugs (L) or raised positive button (B). Contact factory on Kraft paper insulation, lugs, buttons or other options not shown above.

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Battery Types	Volts/Ampere-Hours	Battery Types	Volts/Ampere-Hours
PB1226	6/2.6	PB1290	12/9.0
PB626	12/2.6	PB6180	6/18.0
PB645L	6/4.5	PB12180	12/18.0
PB660L	6/6.0	PB6270	6/27.0
PB660	6/6.0	PB12270	12/27.0
PB1260	12/6.0	PB2300	2/30.0
PB690	6/9.0		

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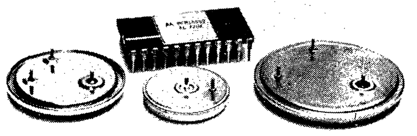

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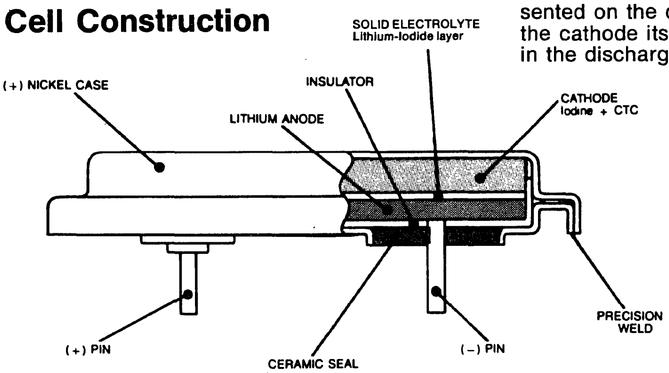
As current is drawn from the cell, lithium is oxidized and iodine reduced, forming additional lithium-iodide. This lithium-iodide, which serves as both electrolyte and separator, accumulates as the cell is discharged, increasing the internal resistance. The result is an initial linear decline in voltage, represented on the discharge curves. Later, when the CTC loses most of its iodine, the cathode itself begins to rise in resistance. This results in the "knee" seen in the discharge curves.

Cell Construction



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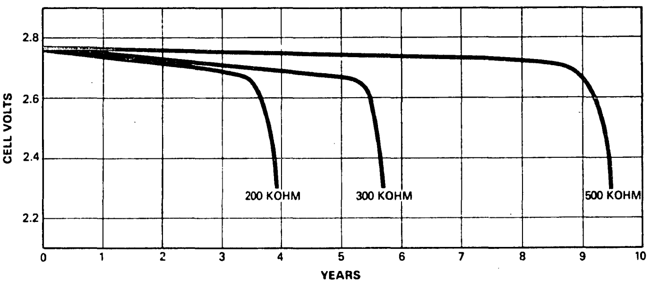
HERMETICALLY SEALED	Prevents battery leakage and improves battery life and reliability
BATTERY MOUNTING	Designed for standard circuit boards and wave soldering
TEMPERATURE RANGE	Will operate from −55°C to +125°C
OPERATING SAFETY	Completely safe under short circuit and voltage reversal conditions
HIGH ENERGY OUTPUT	Energy density is 0.6 watt-hr/cc and 0.12 watt-hr/gm

Battery Chart

Battery Model	Voltage	Capacity	Current Capability at 25°C	Physical Size		Weight
				Diameter	Height	
1935	2.8	200 mAhr	15 µamp	19mm	3.5mm	4.8gm
2736	2.8	350 mAhr	15 µamp	27mm	3.6mm	7.1gm
3440	2.8	700 mAhr	30 µamp	34mm	4.0mm	17.8gm

Performance Chart



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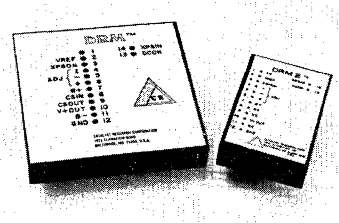

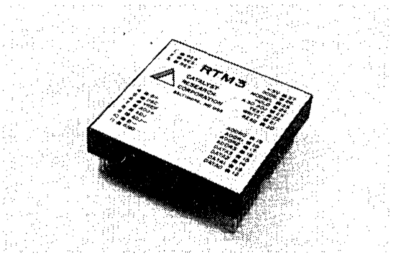

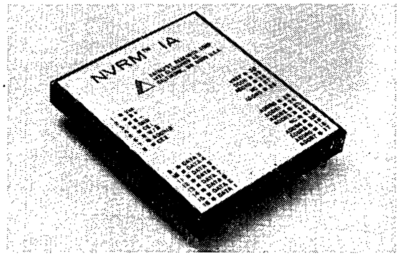

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Model Number	Nominal Voltage	Capacity @ 20 hr. (ampere-hours)	Current @ 20 hr. Rate (milli-amperes)	Weight		Dimensions						Height over Terminals	
				lb.	Kilo-grams	Length in.	mm	Width in.	mm	Height in.	mm	in.	mm
EP285-26	2V	8.5A.H.	425	1.3	.590	2.08	52.83	1.97	50.04	3.70	93.98	3.90	99.06
EP450-26	4V	5.0A.H.	250	1.7	.771	2.52	64.01	2.08	52.83	3.70	93.98	3.90	99.06
EP485-26	4V	8.5A.H.	425	2.6	1.18	4.02	102.11	1.97	50.04	3.70	93.98	3.90	99.06
EP610-26	6V	0.9A.H.	45	0.6	0.27	2.00	50.8	1.65	41.9	2.08	52.83	2.28	57.91
EP626-26 (-36)	6V	2.6A.H.	130	1.4	0.64	5.28	134.1	1.33	33.7	2.39	60.71	2.59	65.79
EP640-16	6V	4.0A.H.	200	2.0	0.90	2.63	66.8	2.63	66.8	3.78	96.01	4.01	101.85
EP640-21	6V	4.0A.H.	200	2.0	0.90	2.63	66.8	2.63	66.8	3.78	96.01	4.28	108.70
EP650-26 (-36)	6V	5.0A.H.	250	2.5	1.14	5.96	151.4	1.33	33.7	3.72	94.49	3.92	99.57
EP680-1 (-5)	6V	8.0A.H.	400	4.0	1.82	4.26	108.2	2.75	69.9	5.54	140.72	5.54	140.72
EP682-26	6V	8.0A.H.	400	3.4	1.55	3.86	98.0	2.21	56.13	4.65	118.11	4.65	118.11
EP685-26 (-36)	6V	8.5A.H.	425	3.9	1.79	5.96	151.4	1.97	50.0	3.72	94.49	3.92	99.57
EP695-1 (-5)	6V	9.5A.H.	475	4.9	2.20	4.26	108.2	2.75	69.9	5.54	140.72	5.54	140.72
EP6120-1 (-5)	6V	12.0A.H.	600	5.5	2.50	4.26	108.2	2.75	69.9	5.54	140.72	5.54	140.72
EP6160-1	6V	16.0A.H.	800	8.1	3.67	8.38	212.9	2.75	69.9	5.50	139.70	5.50	139.70
EP6200-34	6V	20.0A.H.	1000	9.0	4.09	6.25	158.8	3.35	85.1	6.50	165.10	6.70	170.18
EP6200-40	6V	20.0A.H.	1000	9.0	4.09	6.25	158.8	3.35	85.1	6.50	165.10	6.95	176.53
EP6300-34	6V	30.0A.H.	1500	10.7	4.86	6.25	158.8	3.35	85.1	6.50	165.10	6.70	170.18
EP6300-40	6V	30.0A.H.	1500	10.7	4.86	6.25	158.8	3.35	85.1	6.50	165.10	6.95	176.53
EP6330-34	6V	33.0A.H.	1650	11.0	5.0	6.25	158.8	3.35	85.1	6.50	165.10	6.70	170.18
EP6330-40	6V	33.0A.H.	1650	11.0	5.0	6.25	158.8	3.35	85.1	6.50	165.10	6.95	176.53
EP1212-26	12V	1.2A.H.	60	1.25	.57	3.83	97.28	1.86	47.24	2.00	50.80	2.20	55.88
EP1218-26 (-36)	12V	1.8A.H.	90	1.8	.82	7.02	178.31	1.33	33.78	2.38	60.45	2.58	65.53
EP1226-6	12V	2.6A.H.	130	2.9	1.32	5.28	134.1	1.33	33.8	4.93	125.22	4.93	125.22
EP1226-26	12V	2.6A.H.	130	2.9	1.32	5.28	134.1	2.52	57.1	2.36	59.94	2.56	65.02
EP1240-26	12V	4.0A.H.	200	3.9	1.77	5.12	134.1	2.63	66.8	3.78	96.01	4.05	102.87
EP1250-26	12V	5.0A.H.	250	4.9	2.22	5.96	151.4	2.52	64.0	3.72	94.49	3.92	99.57
EP1280-1	12V	8.0A.H.	400	8.2	3.72	8.38	212.9	2.75	69.9	5.50	139.70	5.50	139.70
EP1295-1	12V	9.5A.H.	475	10.0	4.55	8.38	212.9	2.75	69.9	5.50	139.70	5.50	139.70
EP12120-1	12V	12.0A.H.	600	11.0	5.0	8.38	212.9	2.75	69.9	5.50	139.70	5.50	139.70
EP12240-34	12V	24.0A.H.	1200	20.0	9.1	6.54	166.12	6.90	175.26	4.98	126.49	5.27	133.86
EP12240-40	12V	24.0A.H.	1200	20.0	9.1	6.54	166.12	6.90	175.26	4.98	126.49	5.51	139.95
EP12300-34	12V	30.0A.H.	1500	21.5	9.75	6.54	166.12	6.90	175.26	6.91	175.51	7.20	182.88
EP12300-40	12V	30.0A.H.	1500	21.5	9.75	6.54	166.12	6.90	175.26	6.91	175.51	7.34	186.44
EP12380-34	12V	38.0A.H.	1900	29.0	13.2	6.54	166.12	6.90	175.26	6.91	175.51	7.20	182.88
EP12380-40	12V	38.0A.H.	1900	29.0	13.2	6.54	166.12	6.90	175.26	6.91	175.51	7.34	186.44

Explanation of Terminal Types

-1 Solder-lug/quick disconnect tabs, terminals located on top of battery. Positive terminal (6.35 mm wide × 0.81 mm thick)(.250 in. wide × .032 in. thick). Negative terminal (4.75 mm wide × 0.51 mm thick)(.187 in. wide × .020 in. thick). Will accept Amp, Inc. Faston "250" and "187" series respectively or equals.

-5 Solder-lug/quick disconnect tabs, same dimensions as -1, terminals located on side of battery.

-6 18 gauge wire leads, red positive, black negative (101.6 mm)(4 in. long).

-16 Solder-lug/quick disconnect tabs (4.75 mm wide × 0.81 mm thick)(.187 in. wide × .032 in. thick). Tabs parallel with the width of the battery.

-21 Coil spring terminals for pressure type electrical connections: with circuit breaker.

*__-26__ Solder-lug/quick disconnect tabs (.187 wide × .032 thick). Tabs parallel with width of battery.

*__-34__ Solder-lug/quick disconnect tabs (6.35 mm wide × 0.81 mm thick)(.250 in. wide × .032 in. thick).

*__-36__ Solder-lug/quick disconnect tabs, same dimensions as a -26. Tabs parallel with the length of the battery.

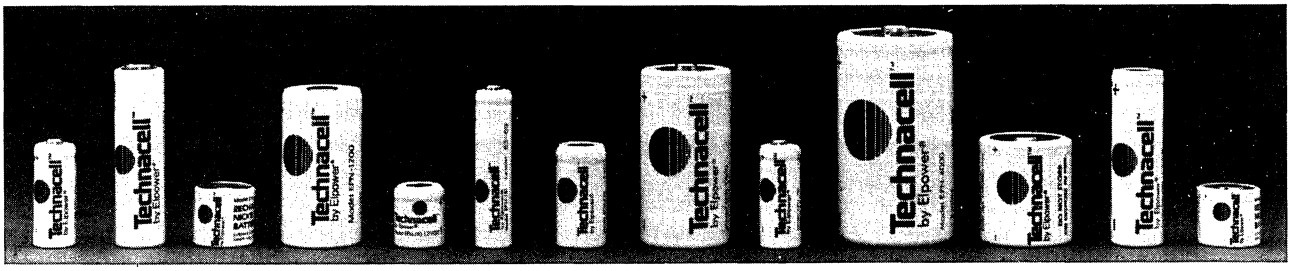
-40 Flat lead post drilled for a #10 screw and nut.

*Terminal imbedded in epoxy.

Operating Temperature Range:
Discharge: −40°C to 60°C (−40°F to 140°F)
Charge: −20°C to 50°C (−4°F to 122°F)
Capacity is rated at 20°C (68°F)

Depth of Discharge: Although battery design tolerates deep discharges, for maximum life a low voltage cut-off circuit is recommended for discharges below 1.66 volts per 2 volt cell.

Technacell Nickel Cadmium Batteries



The Technacell nickel-cadmium rechargeable batteries are rated at 1.2 volts and are available in single cell capacities from 110 mAH to 4000 mAH in industry standard sizes.

These cells are capable of more than 750 charge-discharge cycles. More than eight years of life can be expected when subjected to constant trickle charge at room temperature. High temperature models are also available for ambient temperatures ranging to 65°C.

Model Number	Type	Nominal Voltage	Capacity @ 5 Hour Rate, mAH	Normal Charge Rate		*Maximum Charge Rate		Dimensions				Weight	
								Height		Diameter			
				mA	Hours	mA	Hours	in.	mm.	in.	mm.	oz.	g.
EPN 150	N	1.2	150	15	15	38	6.0	1.139	28.9	.475	12.1	.40	11.3
EPN 181	AAA	1.2	180	18	15	45	6.0	1.750	44.6	.415	10.5	.35	10.0
** EPN 250	2/3AA	1.2	250	25	15	80	4.5	1.181	30.0	.570	14.5	.40	12.0
EPN 450	$2/3A_f$	1.2	450	45	15	150	4.5	1.116	28.4	.675	17.2	.71	20.1
EPN 500	AA	1.2	500	50	15	150	4.5	1.969	50.0	.553	14.1	.80	22.7
** EPN 500F	AA	1.2	500	50	15	150	4.5	1.880	47.8	.553	14.1	.80	22.7
EPN 1200	C_S	1.2	1,200	120	15	300	6.0	1.679	42.7	.900	22.9	1.9	53.9
EPN 1800	C	1.2	1,800	180	15	180	15.0	1.970	50.0	1.025	26.0	2.7	75.0
EPN 4000	D	1.2	4,000	400	15	400	15.0	2.350	59.7	1.310	33.3	5.4	153.0

Temp. ranges: For charge 0°C (32°F) to 45°C (113°F)
For discharge and storage: −20°C (−4°F) to 45°C (113°F)

HIGH TEMPERATURE MODELS

**EPN H 110	1/3AA	1.2	110	11	15	11	15	.670	17.0	.570	14.5	.25	7.0
**EPN H 500	AA	1.2	500	50	15	50	15	1.880	50.0	.553	14.1	.80	22.7
EPN H 1800	C	1.2	1,800	180	15	180	15	1.970	50.0	1.025	26.0	2.7	75.0
EPN H 4000	D	1.2	4,000	400	15	400	15	2.350	59.7	1.310	33.3	5.4	153.0

For charge: 0°C (32°F) to 65°C (149°F)
For discharge and storage: −20°C (−4°F) to 65°C (149°F)
*For rates higher than this, contact Elpower factory
All batteries supplied with standard button top unless otherwise noted
**Supplied with flat top only

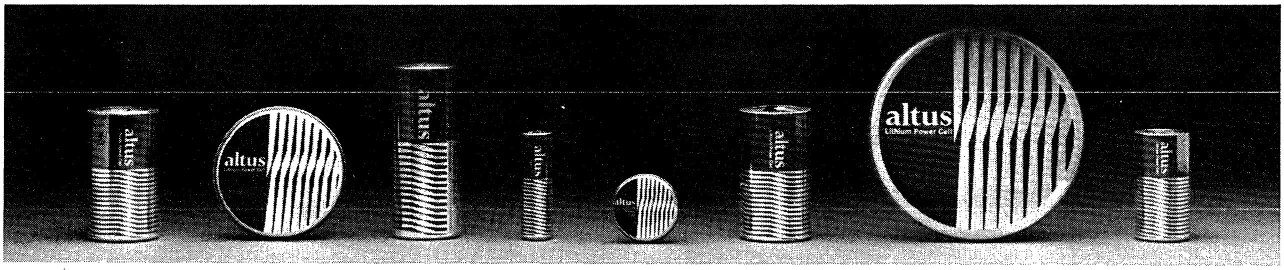
Battery Packs

The Technacell nickel-cadmium cells are available in a wide variety of custom pack configurations. Cells are welded together with nickel tabs to insure rugged, reliable performance. A wide variety of terminals, cases, and hardware are stocked for even the most unusual battery requirement.

ELPOWER CORPORATION

Subsidiary of Altus Corporation / 2117 South Anne St. / Santa Ana, CA 92704/ (714)540-6155/ Telex: 678354 ELPOWER SNA
Eldon Industries of Canada Inc. / 500 Esna Park Dr. / Markham, Ontario L3R 1H5/ (416)475-9407/ Telex: 06-966519

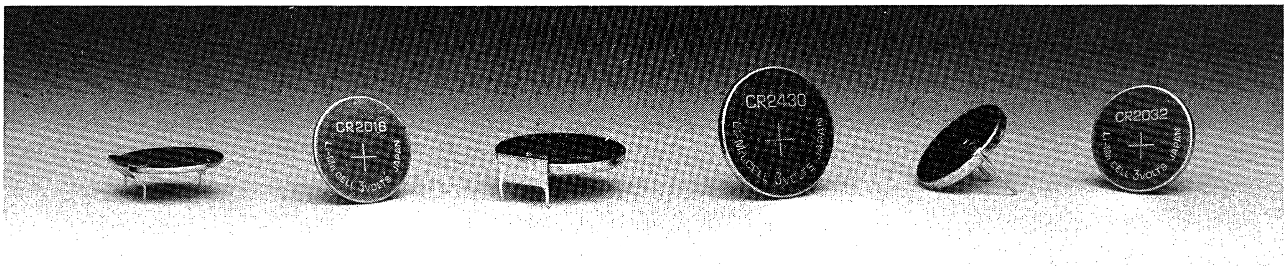
Lithium Thionyl Chloride Cells



High-energy-density lithium thionyl chloride cells enjoy a reputation for quality and safety unmatched by any other manufacturer. Lithium batteries have an open circuit voltage of 3.6 volts, 10+ year shelf life, and an operating temperature of −40 degrees C to 70 degrees C.

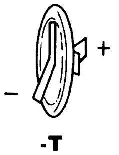
Model Number	Nominal Capacity	Approx. Weight (ounces)	Maximum Diameter (inches)	Maximum Height (inches)	Maximum Height Over Terminals (inches)
AL125	1.4 AH	0.67	1.27	0.41	0.41
AL250	5.5 AH	2.65	2.50	0.44	0.44
AL400	15.0 AH	8.29	4.02	0.48	0.48
AL½AA	0.8 AH	0.42	0.580	1.037	1.07
AL2AA	2.0 AH	0.74	.59	2.07	2.07
AL6-C	6.0 AH	1.98	1.04	2.09	2.09
AL14-D	14.0 AH	4.06	1.37	2.43	2.41
AL9V	1.8 AH	1.62	1.02 W.×1.90 H.		1.90

Lithium Manganese Dioxide Cells


CR2016
Li-MnO2 CELL 3VOLTS JAPAN
CR2430
Li-MnO2 CELL 3VOLTS JAPAN
CR2032
Li-MnO2 CELL 3VOLTS JAPAN

High-energy-density and long storage life characterize these cells. Ideal for memory protection. Each cell has a voltage of 3.0 volts and an operating temperature of −20 degrees C to 60 degrees C.

Model Number	Nominal Capacity	Approx. Weight (ounces)	Maximum Diameter (inches)	Maximum Height (inches)
CR2016	60 mAh	0.07	0.787	0.063
CR2032	170 mAh	0.11	0.787	0.126
CR2430	200 mAh	0.14	0.965	0.118



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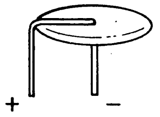

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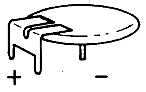

-F

Lithium cells (CR2016, CR2032, CR2430) are available with the terminations shown to the left. Please add suffix -T for solder tabs, -P for pins or -F for fixed tab, to part number when specifying.

Safety Note:
Lithium, an active component of these cells, will burn if exposed directly to water. Do not attempt to mutilate, incinerate, disassemble, attempt to charge, place batteries in water or heat above 100°C. Soldering directly to the cells will cause damage and possible release of hazardous materials.

ELPOWER CORPORATION

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Eldon Industries of Canada Inc. / 500 Esna Park Dr. / Markham, Ontario L3R 1H5/ (416)475-9407/ Telex: 06-966519

PRODUCT GUIDE

BATTERIES (rechargeable)

GLOBE—Sealed gel-cell (lead-acid) batteries and chargers
SAFT/AMERICA (formerly GOULD)—Nickel-cadmium (cells, packs, stacks and communication), lead-acid and non-rechargeable lithium types
POWER SONIC—Sealed lead-acid batteries and chargers

CAPACITORS

BISHOP—Metallized mylar, polycarbonate and polyester
ELECTROCUBE—Metallized mylar, polycarbonate, polystyrene, polypropylene and networks
ELPAC—Metallized mylar, polyester and foil, subminiature mylar and polycarbonate, polystyrene and foil

CONNECTORS

TEKA—Card-edge, PCB, Eurocard and burn-in connectors

HARDWARE

SAMTEC—Socket and terminal strips, sockets and adaptor plugs, cable and cable assemblies, custom assemblies, and lead sockets and terminals

HEAT SINKS

AHAM-TOR—(now IERC)
IERC—Dissipators, retainers for semiconductors, miniature tube shields

INDICATOR LIGHTS

INTER-MARKET—LED indicators

LEDs

INTER-MARKET—LED Lamps

RELAYS

AROMAT—Electromechanical relays and timers
DOUGLAS RANDALL—Reed, solid state, high voltage, low profile and DIP molded

RESISTORS

PYROFILM—Metal film, thick film to 1,000 meg, microwave, pill, termination, flange, DIP networks-MIL-R-83401

SHIELDING (MAGNETIC)

AD-VANCE—Fully annealed foil, .002-.010, fully annealed sheets, .014-.092; available with adhesive backing

SWITCHES

AROMAT—Snap-action switches
CHICAGO SWITCH—(now ITW SWITCHES)
INTER-MARKET—Thumbwheel
ITW SWITCHES—Rotary, slide, pushbutton, lighted pushbutton, snap-action, sealed, rocker and paddle switches
LAMB INDUSTRIES—Toggle, tiny toggle, DIP, mini DIP rotary, pushbutton, lighted pushbutton, slide and snap-action switches; illuminated and non-illuminated power rockers, keypads, AC power receptacles and power outlets
LICON—(now ITW SWITCHES)
RCL—(now ITW SWITCHES)
UID—(now ITW SWITCHES)

THERMISTORS

FENWAL—Disc, beads, glass probe, rods, washers and uni-curve

VALUE-ADDED SERVICES

MIL-COMM CUSTOM PAK—Send us your drawings and we will be happy to quote on as well as meet your design and construction specifications on SAFT/AMERICA nickel-cadmium batteries.

THE ENERGIZING DISTRIBUTOR!

MIL-COMM DISTRIBUTORS, INC.

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Member of NEDA

Panasonic® Industrial Company

RECHARGEABLE SEALED LEAD-ACID BATTERIES

The LCR Series is a sealed lead-acid rechargeable battery system. The lead-calcium rechargeable (LCR) battery, will stand up to tough operating conditions such as overcharge and deep discharge. In field service, troubles due to abnormal, improper operation or misuse are reduced to a minimum.

Suggested Applications

- Power sources for various portable equipment.
- Power sources for power failure back-up and/or emergency use.

Major Features

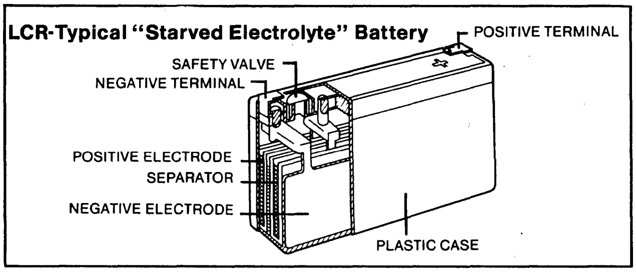
1. Exceptional deep discharge recovery.
2. Long service life; float or cyclic.
3. Gelled or starved electrolyte.
4. Maintenance-free operation.
5. Charge, discharge, or store in any position.
6. No corrosive gas generation.
7. Leakproof design.
8. No memory effect.
9. Approved as "dry cell" for airshipment by Department of Transportation and IATA.

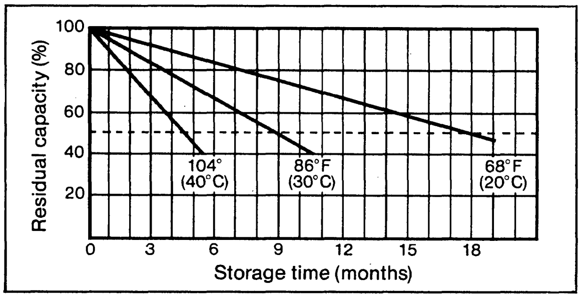
- **Temperature Range Summary**

Discharge: 5° ~ 122°F (-15° ~ 50°C)
Charge: 32° ~ 104°F (0° ~ 40°C)
Storage: 5° ~ 104°F (-15° ~ 40°C)

- **"Shelf Life"**

Self-discharge rate is very much dependent on the storage temperature as shown in the graph. Lower temperatures allow the battery to be stored for longer periods. (Each ten degree drop results in a halving of self-discharge rate and doubles storage time.)


LCR-Typical "Starved Electrolyte" Battery



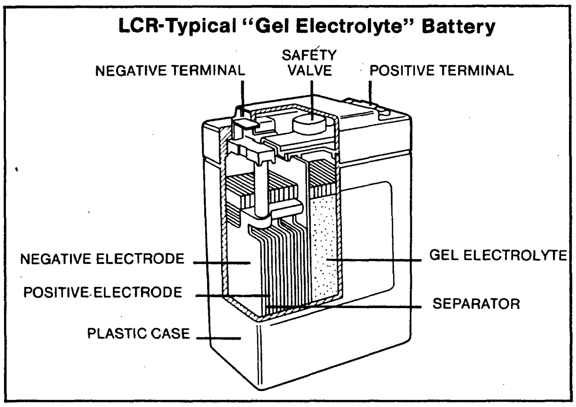
- **Cycle Life**

Cycle life is very much dependent on the depth of the discharge which the battery encounters during each cycle.

Discharge Depth	Resultant Cycle Life
100% discharge	200 ~ 250
60% discharge	600 ~ 700
30% discharge	1500 ~ 2000

- **Standby Life**

The expected float life at room temperature is estimated to be **more than 8 years** on the basis of accelerated tests.


LCR-Typical "Gel Electrolyte" Battery

- **Charging method and battery application**

	Cyclic operation	**Trickle operation**	**Float operation**
Constant Voltage (Note: all at 68°F, 20°C)	Regulation range of controlled voltage: 6 volt batteries: 7.3V to 7.5V 12 volt batteries: 14.6V to 15.0V Initial current: 0.4C or less	Regulation range of controlled voltage: 6 volt batteries: 6.8V to 6.9V 12 volt batteries: 13.6V to 13.8V Initial current: 0.4C or less	Regulation range of controlled voltage: 6 volt batteries: 6.8V to 6.9V 12 volt batteries: 13.6V to 13.8V Initial current: 0.4C or less

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Cypress, CA 90630
(714) 895-7315

Panasonic® Industrial Company

RECHARGEABLE SEALED LEAD-ACID BATTERIES

Model Number	Nominal Voltage (V)	Nominal Capacity		Dimension				Weight (Approx.) lbs. (g)	Standard Terminals or Connectors	Type
		10 hour rate (Ah)	20 hour rate (Ah)	Length inch (mm)	Width inch (mm)	Height inch (mm)	Total Height (including terminals) inch (mm)			
LCR-156P	6	1.5	1.6	2.60 (66)	1.30 (33)	3.35 (85)	3.35 (85)	0.84 (380)	FASTON Type 187	G
LCR-226P	6	2.2	2.4	2.60 (66)	1.30 (33)	4.11 (104.5)	4.11 (104.5)	1.15 (520)	"	G
LCR-306P	6	3.0	3.2	2.60 (66)	1.30 (33)	4.92 (125)	4.92 (125)	1.46 (660)	"	G
LCR-456P	6	4.5	4.8	3.70 (94)	1.30 (33)	4.92 (125)	4.92 (125)	2.03 (920)	"	G
LCR-606P	6	6.0	6.4	3.58 (91)	1.93 (49)	4.53 (115)	4.53 (115)	2.65 (1200)	FASTON Type 250	G
LCR-756P	6	7.5	8.0	4.53 (115)	1.93 (49)	4.53 (115)	4.53 (115)	3.31 (1500)	"	G
LCR-856P	6	8.5	9.2	4.53 (115)	1.93 (49)	4.53 (115)	4.53 (115)	3.53 (1600)	"	G
LCR-1512PF	12	1.5	1.6	2.60 (66)	2.64 (67)	3.35 (85)	3.35 (85)	1.68 (760)	FASTON Type 187	G
LCR-1512PS	12	1.5	1.6	5.24 (133)	1.34 (34)	3.39 (86)	3.39 (86)	1.70 (770)	"	G
LCR-2212PF	12	2.2	2.4	2.60 (66)	2.64 (67)	4.11 (104.5)	4.11 (104.5)	2.29 (1040)	"	G
LCR-2212PS	12	2.2	2.4	5.24 (133)	1.34 (34)	4.15 (105.5)	4.15 (105.5)	2.31 (1050)	"	G
LCR-3012PF	12	3.0	3.2	2.60 (66)	2.64 (67)	4.92 (125)	4.92 (125)	2.91 (1320)	"	G
LCR-3012PS	12	3.0	3.2	5.24 (133)	1.34 (34)	4.96 (126)	4.96 (126)	2.93 (1330)	"	G
LCR-4512PF	12	4.5	4.8	3.70 (94)	2.64 (67)	4.92 (125)	4.92 (125)	4.08 (1850)	"	G
LCR-4512PS	12	4.5	4.8	7.44 (189)	1.34 (34)	4.96 (126)	4.96 (126)	4.08 (1850)	"	G
LCR-6012PF	12	6.0	6.4	3.58 (91)	3.90 (99)	4.53 (115)	4.53 (115)	5.29 (2400)	FASTON Type 250	G
LCR-6012PS	12	6.0	6.4	7.20 (183)	1.97 (50)	4.57 (116)	4.57 (116)	5.29 (2400)	"	G
LCR-7512PF	12	7.5	8.0	4.53 (115)	3.90 (99)	4.53 (115)	4.53 (115)	6.61 (3000)	"	G
LCR-7512PS	12	7.5	8.0	9.09 (231)	1.97 (50)	4.57 (116)	4.57 (116)	6.61 (3000)	"	G
LCR-8512PF	12	8.5	9.2	4.53 (115)	3.90 (99)	4.53 (115)	4.53 (115)	7.05 (3200)	"	G
LCR-8512PS	12	8.5	9.2	9.09 (231)	1.97 (50)	4.57 (116)	4.57 (116)	7.05 (3200)	"	G
LCR-1812P	12	1.8	1.9	7.89 (200.5)	0.98 (24.8)	2.38 (60.5)	2.38 (60.5)	1.54 (700)	DC Plug	S
LCR-2012P	12	2.0	2.1	7.90 (200.7)	0.98 (24.8)	2.43 (61.8)	2.43 (61.8)	1.54 (700)	Pressure Contact	S
LCR-3012VBP	12	3.0	3.2	9.45 (240)	1.34 (34)	2.64 (67)	2.64 (67)	2.91 (1320)	DC Plug	G
LCR-6V1.2P	6	1.1	1.2	3.82 (97)	0.94 (24)	1.97 (50)	2.17 (56)	0.66 (300)	FASTON Type 187	S
LCR-6V3P	6	2.8	3.0	5.28 (134)	1.34 (34)	2.36 (60)	2.60 (66)	1.21 (550)	"	S
LCR-6V6.5P	6	6.0	6.5	5.95 (151)	1.36 (34.5)	3.70 (94)	3.94 (100)	2.65 (1200)	FASTON Type 187 or 250	S
LCR-6V8P	6	7.9	9.0	5.95 (151)	2.01 (51)	3.70 (94)	3.94 (100)	3.64 (1650)	"	S
LCR-6V10P	6	8.8	10.0	5.95 (151)	2.01 (51)	3.70 (94)	3.94 (100)	3.64 (1650)	"	S
LCR-12V1.9P	12	1.8	1.9	6.97 (177)	1.34 (34)	2.36 (60)	2.60 (66)	1.54 (700)	FASTON Type 187	S
LCR-12V3PF	12	2.8	3.0	5.84 (134)	2.72 (69)	2.36 (60)	2.60 (66)	2.43 (1100)	"	
LCR-12V6.5P	12	6.0	6.5	5.95 (151)	2.56 (65)	3.70 (94)	3.94 (100)	5.18 (2350)	FASTON Type 187 or 250	S
LCR-12V24P	12	22.0	24.0	6.89 (175)	6.50 (165)	4.92 (125)	4.92 (125)	19.2 (8.7kg)	M5 Bolt and Nut Type	S
LCR-12V40P	12	34.0	40.0	10.16 (258)	6.74 (171)	7.88 (200)	9.30 (236)	41.9 (19.0kg)	M6 Bolt and Nut Type	S
LCR-12V60P	12	50.0	60.0	11.97 (304)	6.74 (171)	7.88 (200)	9.30 (236)	52.9 (24.0kg)	"	S
LCR-12V80P	12	70.0	80.0	16.03 (407)	6.82 (173)	8.27 (210)	9.69 (246)	80.0 (36.0kg)	M8 Bolt and Nut Type	S
LCR-12V100P	12	86.0	100.0	19.77 (502)	7.09 (180)	8.27 (210)	10.04 (255)	100.0 (45.0kg)	"	S
LCR-12V120P	12	104.0	120.0	19.89 (505)	8.67 (220)	8.27 (210)	10.04 (255)	115.0 (52.0kg)	"	S
LCL-12V38P	12	34.0	38.0	7.76 (197)	6.50 (165)	6.89 (175)	6.89 (175)	31.3 (14.2kg)	M6 Bolt and Nut Type	S
LCL-12V65P	12	58.0	65.0	13.78 (350)	6.50 (165)	6.89 (175)	6.89 (175)	50.7 (23.0kg)	"	S

G: Gel Electrolyte

S: Starved Electrolyte

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RECHARGEABLE NICKEL CADMIUM BATTERIES

Applications

For Cyclic Use

- Consumer Applications
- Office Equipment
- Tools
- Instruments and Medical Equipment
- Photography
- Toys and Hobby

For Trickle or Float Charge Use

- Emergency Devices
- Memory Back up

General Characteristics

Panasonic offers a wide range of cells for varying applications and requirements:

- Standard
- Rapid Charge "R"
- High Temperature "H"
  Emergency Back Up
  Memory Back Up
- High Capacity "E"
- High Rate Discharge "P"

Discharge

The discharge characteristics of the Panasonic Ni-Cd cell are extremely flat when compared to those of dry cells.

Discharge voltage characteristics depend upon discharge current and temperature.

Life

The Panasonic Ni-Cd cell can be charged and discharged hundreds of times.

Under normal conditions, more than 500 cycles (charge/discharge) can be expected. The cell has reached its end of life when capacity falls below 80% of original rating.

Life is decreased by charge/discharge cycles beyond the specified temperature or current range or by extended storage under conditions which exceed specified temperature limits, or by cell reversal.

Effects of Temperature upon Performance

The standard Panasonic Ni-Cd cell has excellent discharge characteristics at normal temperatures. If the temperature during charge and discharge is high, capacity tends to decrease. When cells are trickle-charged at a high temperature, this tendency is accelerated. Therefore, it is recommended that special high temperature cells be used for applications in high temperature ambients.

Special Purpose Batteries

Rapid-Charge "R" type

The "R" type cell has a specially improved negative plate with increased gas absorption characteristics. It can be subjected to uncontrolled charging at the 1 C, rate and a Rapid charge in 1 to 1.5 hours is possible.

High-Temperature "H" type

By using a polypropylene separator, the "H" type cell can withstand a temperature of 65°C (149°F) during use. When charging is conducted at a low charging current of C/20 to C/30 in a high-temperature ambient, the "H" type cell has sharply improved capacity compared to a standard cell.

Panasonic "H" type cells for high-temperature use can be classified into two types according to application: the emergency back-up type and the memory back-up type.

(A) Emergency back-up ("H" type)
Emergency back-up normally uses DH, CH, SCH, or AAH, and a trickle or float charge of C/20 to C/30 is usually applied.

(B) Memory back-up ("H" type)
This application requires less capacity, and normally uses AAH, 1/3AAH. In addition to excellent high-temperature characteristics, the charge/discharge characteristics for small currents in the μA range are excellent.

High-Capacity "E" type

These extra capacity cells combine a high-capacity density positive plate with a high-capacity paste negative plate. These cells have 20 ~ 30% more capacity than equivalent standard cells.

High-Rate Discharge "P" type

Using plates with low internal resistance, edge-welded plates and terminals, the resulting cell has sharply reduced internal resistance and improved voltage characteristics during high rate discharge.

Charging Methods

Standard charge

Panasonic Ni-Cd cells are charged using constant current or semi-constant current chargers. The rate of charge is dependent on the size and type of cell. Standard cells, sub C and smaller, can be charged at rates from C/3 ~ C/4 to C/20.

Rapid-charge "R" type

The "R" type Panasonic Ni-Cd cell can be rapidly charged in 1 ~ 1.5 hours using recommended charging circuits and controls. The cell is normally charged at the 1C rate for 1 ~ 1.5 hours, at which time charging current is reduced to C/10 (or less) to complete the charge.

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RECHARGEABLE NICKEL CADMIUM BATTERIES

Temperature Conditions

Charge

Charging temperature ranges are:

- Standard charge: 0° ~ 45°C (32° ~ 113°F)
- C/3 quick charge: 10° ~ 45° (50° ~ 113°F)
- Trickle (float) charge: 0° ~ 65°C (32° ~ 149°F)
- "R" type Rapid charge (- ΔV method): 10° ~ 45°C (50° ~ 113°F)
- Temperature sensing system: 10° ~ 40°C (50° ~ 104°F)

Discharge

Discharge temperature ranges are -20° to +65°C (-4° to +140°F).

Storage

Panasonic cells can withstand very long storage time under typical conditions at a storage temperature range of -20° to +45°C (-4° ~ 113°F). If the cell must provide full capacity after storage, completely charge the cell before use. In addition, after prolonged storage, completely normal capacity can be returned within 1 ~ 3 charge/discharge cycles.

P.C. MOUNT (MEMORY) BATTERIES
"L" TYPE PACKS (STACKS)

Model (Former Model)	Terminals	Voltage (V)	Capacity (mAh)
P-01H-L2N2 (NR-⅓AAHL2-F1)	Tabs	2.4	110
P-01H-L2P2 (NR-⅓AAHL2-P1)	Pins	2.4	110
P-01H-L3N2 (NR-⅓AAHL3-F1)	Tabs	3.6	110
P-01H-L3P5 (NR-⅓AAHL3-P1)	Pins	3.6	110

P.C. MOUNT (MEMORY) BATTERIES
"F" TYPE (SIDE BY SIDE)

Model (Former Model)	Terminals	Voltage (V)	Capacity (mAh)
P-01H-F3P2 (NR-⅓AAHF3-P1)	Pins	3.6	110
P-01H-F3P9*	Pins	3.6	110

*Special Pin Location

STANDARD TYPE

Model	Former Model	Voltage (V)	Capacity (mAh)	Diameter (in.)	Height (in.)	Weight (oz.)	Internal Resistance mΩ
P-11AA	(NR-⅓AA)	1.2	110	0.55±0.02	0.65±0.02	0.24	60
P-15N	(NR-N)	1.2	150	0.45±0.02	1.16±0.02	0.29	40
P-18AAA	(NR-AAA)	1.2	180	0.39±0.02	1.74±0.02	0.35	30
P-25AA	(NR-⅔AA)	1.2	250	0.55±0.02	1.09±0.02	0.43	25
P-50AA/FT	(NR-AA)	1.2	500	0.55±0.02	1.88±0.02	0.78	18
P-50AA	(P-50AA)	1.2	500	0.55±0.02	1.95±0.02	0.78	18
P-60SC	(NR-⅔SC)	1.2	600	0.89±0.02	1.02±0.02	1.02	25
P-120SC	(NR-SC)	1.2	1200	0.89±0.02	1.67±0.02	1.8	13
P-180C	(NR-C)	1.2	1800	1.00±0.02	1.94±0.03	2.6	12
P-400D	(NR-D)	1.2	4000	1.27±0.03	2.36±0.04	4.7	8

HIGH CAPACITY TYPE (E)

Model	Former Model	Voltage (V)	Capacity (mAh)	Diameter (in.)	Height (in.)	Weight (oz.)	Internal Resistance mΩ
P-60AAE	(P-60AA)	1.2	600	0.55±0.02	1.88±0.02	0.78	18
P-150SCE	(P-150SC)	1.2	1500	0.89±0.02	1.67±0.02	1.8	13
P-220CE	(P-220C)	1.2	2200	1.00±0.02	1.94±0.03	2.65	12
P-440DE	(P-440D)	1.2	4400	1.27±0.03	2.36±0.04	4.9	8

HIGH RATE DISCHARGE TYPE (P)

Model	Former Model	Voltage (V)	Capacity (mAh)	Diameter (in.)	Height (in.)	Weight (oz.)	Internal Resistance mΩ
P-120SCP	—	1.2	1200	0.89±0.02	1.67±0.02	1.8	6

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RECHARGEABLE NICKEL CADMIUM BATTERIES
PRIMARY LITHIUM BATTERIES

RECHARGEABLE NICKEL CADMIUM BATTERIES
HIGH TEMPERATURE TYPE (H)

Model	Former Model	Voltage (V)	Capacity (mAh)	Diameter (in.)	Height (in.)	Weight (oz.)	Internal Resistance mΩ
P-11AAH	(NR-⅓AAH)	1.2	110	0.55±0.02	0.65±0.02	0.24	80
P-50AAH	(NR-AAH)	1.2	500	0.55±0.02	1.88±0.02	0.78	18
P-180CH	(NR-CH)	1.2	1800	1.00±0.02	1.94±0.03	2.65	12
P-400DH	(NR-DH)	1.2	4000	1.27±0.03	2.36±0.04	4.7	10

RAPID CHARGE TYPE (R)

Model	Former Model	Voltage (V)	Capacity (mAh)	Diameter (in.)	Height (in.)	Weight (oz.)	Internal Resistance mΩ
P-40AR	—	1.2	400	0.65±0.02	1.11±0.03	0.62	18
P-70AR	—	1.2	700	0.65±0.02	1.68±0.03	0.95	15
P-80AAR	—	1.2	800	0.55±0.02	2.54±0.02	1.0	15
P-120SCR	—	1.2	1200	0.89±0.02	1.67±0.02	1.8	13
P-180CR	—	1.2	1800	1.00±0.02	1.94±0.03	2.5	10

PRIMARY LITHIUM BATTERIES

Versatile, Long-Life Lithium Batteries

Since 1971, Panasonic has pioneered the development of Lithium Batteries as an extremely long life, leakproof, high-energy power source for a wide range of electronic applications.

From watches, cameras, radios and other consumer products to dependable computer memory back-up systems, Panasonic Lithiums have proven themselves as an ideal solution for today's most demanding electronic requirements.

Using a solid-state polycarbon monofluoride as the cathode, Panasonic Lithiums are **inherently** safe, remaining both chemically and thermally stable. Corrosive liquid or poisonous gas discharge is never a problem, even during long storage periods.

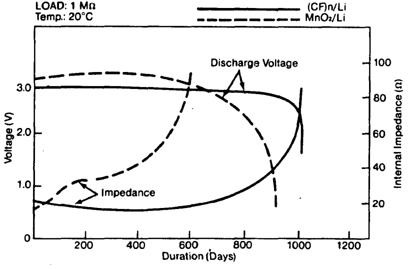
Features

- Inherently safer than MnO_2/Li systems
- High voltage (3V); high energy density
- Excellent storage properties
- Flat voltage characteristics
- Outstanding leak-resistant properties
- Minimum operating temperature -40°C
- 0.5% capacity deterioration per year
- Available in a wide choice of types; pin cell, coin cell and high capacity cylindrical cells

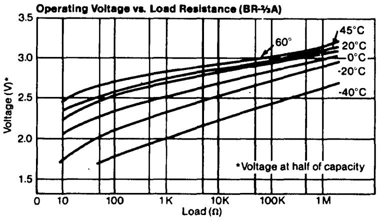
Recognized under the Component Program of Underwriters Laboratories, Inc. File #MH12210*

*with the exception of Type BR-C.

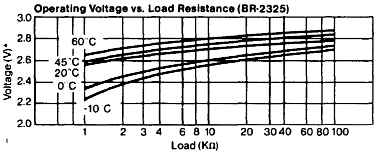
Comparison of (CF)n/Li and MnO_2/Li



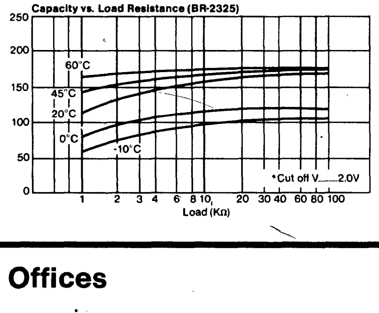
Operating Voltage vs. Load Resistance (BR-⅔A)



Operating Voltage vs. Load Resistance (BR-2325)



Capacity vs. Load Resistance (BR-2325)



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PRIMARY LITHIUM BATTERIES

Panasonic
LITHIUM
BATTERY
BR-C
3V

PC MOUNTABLE COIN TYPE (VERTICAL MOUNT)

Model	Former Model	Terminals	Voltage (V)	Capacity (mAh)
BR-2325-1VG	—	3 Pins	3	160
BR-2325-1VB	—	2 Pins	3	160
BR-1225-1VB	—	2 Pins	3	38
BR-2325-2VC	—	2 Pins	6	160

PC MOUNTABLE CYLINDRICAL TYPE

Model	Former Model	Terminals	Voltage (V)	Capacity (mAh)
BR-CT2P	(BR-C-F1)	Tabs	3	5000
BR-CP3P	(BR-C-P1)	2 Pins	3	5000
BR-⅔AT2P	(BR-⅔A-F1)	Tabs	3	1200
BR-⅔AP3P	(BR-⅔A-P1)	2 Pins	3	1200
BR-⅔AE2P	(BR23AE2P)	3 Pins	3	1200
BR-½AT2P	(BR-½A-F1)	Tabs	3	600
BR-½AP2P	(BR-½A-P1)	2 Pins	3	600
BR-½AE2P	—	3 Pins	3	600
BR-⅔AAT2P	(BR-⅔AA-F1)	Tabs	3	600
BR-⅔AAE2P	—	3 Pins	3	600

PC MOUNTABLE COIN TYPE (HORIZONTAL MOUNT)

Model	Former Model	Terminals	Voltage (V)	Capacity (mAh)
BR-2325-1HB	—	2 Pins	3	160
BR-2325-1HE	—	2 Pins	3	160
BR-2325-1HG	—	3 Pins	3	160
BR-2032-1HB	—	2 Pins	3	180
BR-1225-1HB	—	2 Pins	3	38
BR-2325-2HA	—	2 Pins	6	160
BR-1225-2HA	—	2 Pins	6	38
BR-2325-HC	—	2 Pins	3	320

CYLINDRICAL TYPE

Model	Former Model	Terminals	Voltage (V)	Capacity (mAh)	Diameter (mm)	Height (mm)	Weight (gms)
BR-C	—	Flat Contacts	3	5000	26.0	50.0	47.0
BR-⅔A	—	Flat Contacts	3	1200	17.0	33.5	13.5
BR-½A	—	Flat Contacts	3	600	17.0	23.0	9.5
BR-⅔AA	—	Flat Contacts	3	600	14.5	33.5	9.5

COIN TYPE

Model	Former Model	Terminals	Voltage (V)	Capacity (mAh)	Diameter (mm)	Height (mm)	Weight (gms)
BR-2032	—	Flat Contacts	3	180	20.0	3.2	3.0
BR-2325	—	Flat Contacts	3	160	23.0	2.5	3.1
BR-2320	—	Flat Contacts	3	110	23.0	2.0	2.5
BR-2020	—	Flat Contacts	3	85	20.0	2.0	1.8
BR-2016	—	Flat Contacts	3	75	20.0	1.6	1.5
BR-1616	—	Flat Contacts	3	45	16.0	1.6	1.0
BR-1225	—	Flat Contacts	3	38	12.5	2.5	0.9

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We have over 100,000 cell and battery sizes in stock

Nickel -- Cadmium

RECHARGEABLE

Sealed Cells and Batteries

CAPACITIES UP TO 2000 AMPERE HOURS ON REQUEST

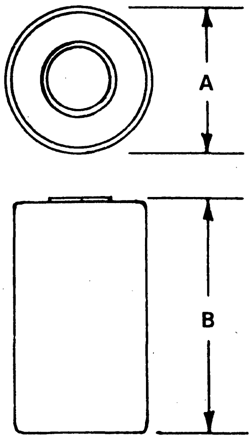

FIG. A

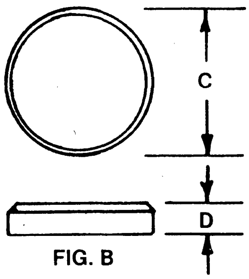

FIG. B

TYPICAL CYLINDRICAL CELLS (FIG. A) 1.2 VOLTS PER CELL

Type	Cell Size	Capacity mAH	Dimensions (in.) A	Dimensions (in.) B	Wt. (oz.)
070SC	1/2 AAA	75	0.375	0.805	0.14
80SC	1/3 A	70	0.497	0.593	0.2
100SCS	1/3 AA	100	0.571	0.669	0.28
110SC	1/3 AA	110	0.550	0.650	0.24
150SC	N	150	0.475	1.135	0.4
170SC	1/3 A	170	0.625	0.625	0.4
180SC	AAA	180	0.405	1.730	0.4
225SC	1/3 AF	225	0.675	0.646	0.4
270SCS	2/3 AA	270	0.560	1.168	0.5
450SC	2/3 AF	450	0.675	1.120	0.7
500SC	AA	500	0.554	1.920	1.0
600SCP	AA	600	0.554	1.920	1.0
600SC	A	600	0.625	1.920	1.0
600SCP	2/3 SC	700	0.906	1.044	1.0
700SC	AF	750	0.655	1.920	1.0
750SC	1/2 C	750	1.020	0.910	1.1
800SCS	AF	800	0.640	1.910	1.0
800SCP	5/4 AA	800	0.550	2.500	1.0
1000SC	3/5 C	1000	1.000	1.280	1.1
1200SC	SC	1200	0.875	1.600	1.5
1550SCP	SC	1550	0.875	1.600	1.5
1800SC	C	1800	1.000	1.840	2.5
2200SCP	C	2200	1.000	1.940	2.8
2000SC	1/2 D	2000	1.272	1.400	2.8
4000SC	D	4000	1.289	2.300	4.6
7000SC	F	7000	1.290	3.490	7.6
10,000SCS	M	10,000	1.683	4.218	12.5

TYPICAL BUTTON CELLS 1.2 VOLTS PER CELL

Type	Capacity mAH	Dimensions (in.) Diameter (C)	Dimensions (in.) Height (D)	Wt. (oz.)
10B	10	0.294	0.200	0.02
20B	20	0.449	0.201	0.04
60B	60	0.606	0.230	0.09
90DKO†	100	See Below		
170B	170	0.984	0.260	0.30
180VBH*	180	0.984	0.290	0.39
225BH	225	0.984	0.339	0.41
250B	250	0.984	0.328	0.44
400B	400	0.992	0.571	0.66
450B	450	1.689	0.299	1.10
600BH*	600	1.340	0.374	0.90
1000VBH*	1000	2.000	0.330	2.24

* H denotes high rate discharge capability.
† The 90DKO is an oval cell 1.01″ long x 0.555″ wide x 0.24″ thick with 100 mAH capacity. Wt. .17 oz.

ALSO MARKETS:

Emergency lighting units.
Flashlight and lantern rechargeable batteries.
Custom and prototype design battery packs built to your specifications.
Battery chargers for all types of batteries.
Batteries - NICKEL CADMIUM - SILVER CADMIUM - SILVER ZINC - MERCURY - SEALED LEAD-ACID - LITHIUM.

All cylindrical battery types feature a pressure safety device for security and reliability making them especially suited for cordless consumer and electronic products.

CUSTOM BATTERY PACKS

Cylindrical cells are incased in a rigid, high impact case. Case materials are highly dielectric to provide maximum cell insulation at minimum cost. The case is vented to each cell to provide cooling and long life. Packs are available to your specifications in any voltage.

FAST CHARGE CELLS

Special fast charge cells are available on special order either individually or in custom battery packs with thermistors for extra fast rechargeable capability.

Button cell batteries are constructed of sealed nickel cadmium button cells (see fig. B) to meet almost any application requirement. The compact size of button cells permits easy stacking to form multiple cell batteries of optimum power/volume ratio and space utilization. Completely sealed button cells are ideally suited for portable radios, flashlights, photoflash, alarms, and any low-drain, high capacity application.

Custom Nickel-Cadmium and Lithium Packs Available for Low Profile Printed Circuit Board Mounting

INVESTIGATE direct current emergency power sources available in any regulated voltage or current, featuring automatic SCR solid state switchover to a self-contained battery. We have the answer to reliable economical D.C. power with automatic emergency back-up.

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For Emergency order placement call 1-800-328-3773.

NEW PANASONIC BATTERY SOURCE

PANASONIC LITHIUM BATTERIES

Type	Model No.	Nominal Voltage (V)	Nominal Capacity (MAh)	Standard Drain (mA)	Maximum Drain (mA)	Dimensions (MAX) (inches) Height	Dimensions (MAX) (inches) Diameter	Average Weight (oz.)
Cylinder	BR-C	3	5,000	150	300	1.969	1.024	1.66
	BR2/3AA	3	600	2	40	1.300	.554	1.50
	BR-2/3A	3	1,200	35	150	1.319	0.669	0.48
	BR-1/2A	3	750	5	70	0.906	0.669	0.34
Coin	BR2325	3	160	0.2	5	0.098	0.906	0.11
	BR2320	3	110	0.2	5	0.079	0.906	0.09
	BR2020	3	85	0.2	.10	0.075	0.783	0.09
	BR2016	3	60	0.1	2	0.063	0.787	0.05
	BR1225	3	35	0.1	2	0.098	0.492	0.03
	CR2025	3	110	0.2	5	0.098	0.787	0.09
	CR2016	3	50	0.2	5	0.063	0.787	0.06
Pin	BR435	3	40	1	3	1.413	0.165	0.03
	BR425	3	20	0.5	1.5	1.020	0.165	0.02

High Carbon • Mono-Fluoride • Safe System

- Non-toxic
- Non-combustible
- Non-corrosive
- Non-gassy
- No pressure buildup
- Up to 10 year service life
- Internal resistance low & constant

(UL *recognized*)

NEW Soon to be available RECHARGEABLE Lithium Coin Type.

UNION CARBIDE "EVEREADY" LITHIUM BATTERIES

Type	Model No.	Nominal Voltage (V)	Nominal Capacity (MAh)	Standard Drain (mA)	Maximum Drain (mA)	Dimensions (MAX) (inches) Height	Dimensions (MAX) (inches) Diameter	Average Weight (oz.)
Buttons	801*	1.5	100			0.165	0.455	
	803*	1.5	160			0.220	0.455	
Coin	CR2032**	3	190			0.126	0.787	
Cylindrical	2L76**	3	160			0.425	0.456	
	L544**	6	160			0.990	0.505	
	L31***	3.6	1.0Ah			1.809	0.523	

*Lithium Iron
**Lithium/Manganese Dioxide
***Lithium/Thionyl Chloride

PANASONIC SEALED LEAD ACID BATTERIES

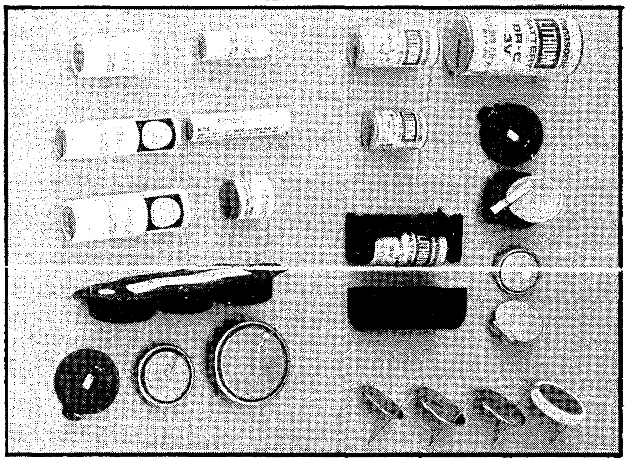
Model No.	Nominal Voltage (V)	Nominal Capacity (Ah)	Dimensions (MAX) (inches) Length	Dimensions (MAX) (inches) Width	Dimensions (MAX) (inches) Height	Average Wt. (lbs.)
LCR-156P*	6	1.5	2.60	1.30	3.35	0.84
LCR-226P*	6	2.2	2.60	1.30	4.11	1.15
LCR-306P*	6	3.0	2.60	1.30	4.92	1.46
LCR-456P*	6	4.5	3.70	1.30	4.92	2.03
LCR-606P*	6	6.0	3.58	1.93	4.53	2.65
LCR-756P*	6	7.5	4.53	1.93	4.53	3.31
LCR-856P*	6	8.5	4.53	1.93	4.53	3.53
LCR-1512PF*	12	1.5	2.60	2.64	3.35	1.68
LCR-1512PS*	12	1.5	5.24	1.34	3.39	1.70
LCR-2212PF*	12	2.2	2.60	2.64	4.11	2.29
LCR-2212PS*	12	2.2	5.24	1.34	4.15	2.31
LCR-3012PF*	12	3.0	2.60	2.64	4.92	2.91
LCR-3012PS*	12	3.0	5.24	1.34	4.96	2.93
LCR-4512PF*	12	4.5	3.70	2.64	4.92	4.08
LCR-4512PS*	12	4.5	7.44	1.34	4.96	4.08
LCR-6012PF*	12	6.0	3.58	3.90	4.53	5.29
LCR-6012PS*	12	6.0	7.20	1.97	4.57	5.29
LCR-7512PF*	12	7.5	4.53	3.90	4.53	6.61
LCR-7512PS*	12	7.5	9.09	1.97	4.57	6.61
LCR-8512PF*	12	8.5	4.53	3.90	4.53	7.05
LCR-8512PS*	12	8.5	9.09	1.97	4.57	7.05
LCR-1812P	12	1.8	7.89	0.98	2.38	1.54
LCR-2012P	12	2.0	7.90	0.98	2.43	1.54
LCR-3012VBP	12	3.0	9.45	1.34	2.64	2.91
LCR-6V1.2P*	6	1.1	3.82	0.94	1.97	0.66
LCR-6V3P*	6	2.8	5.28	1.34	2.36	1.21
LCR-6V6.5P*	6	6.0	5.95	1.36	3.70	2.65
LCR-6V8P*	6	7.9	5.95	2.01	3.70	3.64
LCR-6V10P*	6	8.8	5.95	2.01	3.70	3.64
LCR-12V1.9P*	12	1.8	6.97	1.34	2.36	1.54
LCR-12V3PF*	12	2.8	5.84	2.72	2.36	2.43
LCR-12V6.5P*	12	6.0	5.95	2.56	3.70	5.18
LCR-12V24P	12	22.0	6.89	6.50	4.92	19.2
LCR-12V40P	12	34.0	10.16	6.74	7.88	41.9
LCR-12V60P	12	50.0	11.97	6.74	7.88	52.9
LCR-12V80P	12	70.0	16.03	6.82	8.27	80.0
LCR-12V100P	12	86.0	19.77	7.09	8.27	100.0
LCR-12V120P	12	104.0	19.89	8.67	8.27	115.0
LCL-12V38P	12	34.0	7.76	6.50	6.89	31.3
LCL-12V65P	12	58.0	13.78	6.50	6.89	50.7

* = Fast on terminals

Batteries are available for video camera and other portable equipment including, but not limited to VHS, ENG and VTR.

Can be left in a discharged condition for months without damage

- No memory effect
- LCR design
- Available with snap on terminals
- New high rate discharge capability
- Longer service life under trickle charge conditions



PANASONIC, UNION CARBIDE (EVEREADY), BATTERIES AND OTHER BRANDS ARE AVAILABLE FOR PC BOARD MOUNTING

Shown are just a few of the infinite variety of pin and lug mounts we supply. We will weld 0.032″ diameter PC board, pins to batteries of any configuration or voltage, for all types of cells or battery packs. Double pin polarized models are available.
(Not shown in photo)

BATTERY HOLDERS AVAILABLE INCLUDING, BUT NOT LIMITED TO, SAMPLES SHOWN IN PHOTO.

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eem

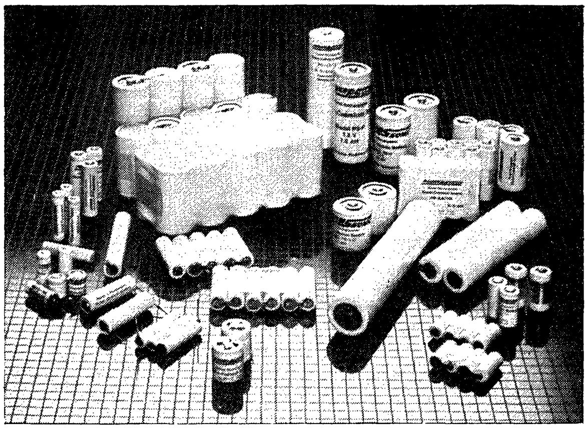
CHARACTERISTICS OF BATTERIES AND FUEL CELLS

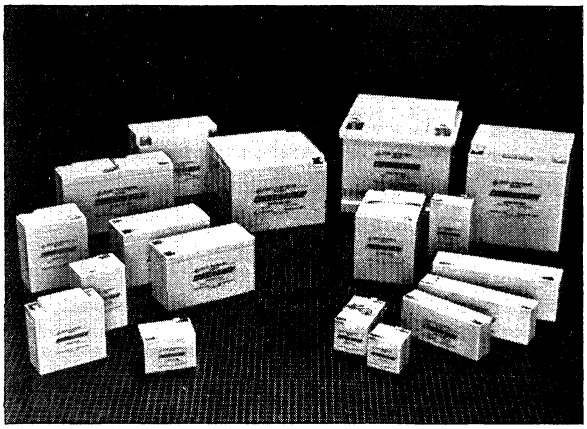
System	Anode	Cathode	Theoretical battery		Practical battery		
			Voltage, V	Capacity, Ah/kg	Typical voltage, V	Capacity[a]	
						Wh/kg	Wh/dm^3
Primary:							
Leclanche	Zn	MnO_2	1.6	230	1.2	65	175
Magnesium	Mg	MnO_2	2.0	270	1.5	100	195
Organic cathode	Mg	*m*-DNB	1.8	1,400	1.15	130	180
Alkaline MnO_2	Zn	MnO_2	1.5	230	1.15	65	200
Mercury	Zn	HgO	1.34	185	1.2	80	370
Mercad	Cd	HgO	0.9	165	0.85	45	175
Silver oxide	Zn	AgO	1.85	285	1.5	130	310
Zinc-air	Zn	Air (O_2)	1.6	815	1.1	200	190
Li-organic electrolyte	Li	[b]	2.1-5.4	130-660	1.8-3.2	250	400
Secondary:							
Lead-acid	Pb	PbO_2	2.1	55	2.0	37	70
Edison	Fe	Ni oxides	1.5	195	1.2	29	65
Nickel-cadmium	Cd	Ni oxides	1.35	165	1.2	33	60
Silver-zinc	Zn	AgO	1.85	285	1.5	100	170
Silver-cadmium	Cd	AgO	1.4	230	1.05	55	120
Zinc-nickel oxide	Zn	Ni oxides	1.75	185	1.6	55	110
Zinc-air[c]	Zn	Air (O_2)	1.6	815	1.1	150	155
Cadmium-air[c]	Cd	Air (O_2)	1.2	475	0.8	90	90
Zinc-O_2	Zn	O_2	1.6	610	1.1	130	120
H_2-O_2	H_2	O_2	1.23	3,000	0.8	45	65
Reserve:							
Cuprous chloride	Mg	CuCl	1.5	240	1.4	45	65[d]
Silver-chloride	Mg	AgCl	1.6	170	1.5	60	95[d]
Zinc-silver oxide	Zn	AgO	1.85	285	1.5	30	75[e]
Thermal	Ca	[b]	2.8	240	2.6	10	20[f]
Ammonia-activated	Mg	*m*-DNB	2.2	1,400	1.7	22	60[g]
High-	NA	S	2.1	685	1.8	200	[h]
temperature	Li	S	2.2	1,150	1.8	200	[i]
Solid electrolyte	Ag	Polyiodide	0.66	. . .	0.6	180	75[j]
Fuel cell:							
Hydrogen[c]	H_2	Air	1.23	26,000	0.7		[k]
Hydrazine[c]	N_2H_4	Air	1.5	2,100	0.7	800[b]	[l]
Methanol[c]	CH_2OH	Air	1.3	1,400	0.9	175[b]	185[m]

a Delivered capacity when discharged at normal temperatures (20°C) at normal discharge rates.
b Based on fuel consumption only.
c Weight of air not considered in computation of watt hours.
d Water-activated
e Automatically activated; high rate discharge; 2- to 10-min rate.
f Fused salt; heat-activated; high rate discharge; 2- to 10-min rate.
g Four-minute discharge rate.
h β-alumina electrolyte, 300°C operation.
i Fused salt; 350°C operation.
j Solid $RbAg_4I_5$ electrolyte.
k Several different cathode materials used.
l Fuel consumption is based on source of H_2.
m Based on methanol battery-fuel supply in situ.

RECHARGEABLE POWER SONIC BATTERIES

3106 SPRING ST., BOX 5242, REDWOOD CITY, CA 94063 TEL: (415) 364-5001





SEALED LEAD-ACID BATTERIES

Model	Nominal Voltage V	Nominal Capacity @ 20hr rate A.H.	Current @ 20hr rate mA	Length		Width		Height		Ht. Over Terminal		Weight	
				in.	mm.	in.	mm.	in.	mm.	in.	mm.	lbs.	kg.
PS-412	4	1.2	60	2.64	67	0.94	24	2.09	53	2.24	57	0.5	0.2
PS-426	4	2.6	130	3.54	90	1.34	34	2.36	60	2.52	64	1.0	0.5
PS-490	4	9.0	450	4.02	102	1.73	44	3.70	94	3.86	98	2.4	1.1
PS-610	6	1.0	50	2.00	51	1.65	42	2.00	51	2.20	56	0.6	0.3
PS-612	6	1.2	60	3.94	100	0.94	24	2.09	53	2.24	57	0.6	0.3
PS-618	6	1.8	90	2.95	75	2.00	51	2.09	53	2.28	58	0.9	0.4
PS-626	6	2.6	130	5.28	134	1.34	34	2.35	60	2.56	65	1.3	0.6
PS-640	6	4.0	200	2.76	70	1.89	48	4.02	102	4.02	102	1.8	0.8
PS-660	6	6.0	300	5.98	152	1.34	34	3.78	96	4.13	105	2.6	1.2
PS-665	6	6.5	325	3.86	98	2.20	56	4.05	103	4.05	103	3.0	1.4
PS-682	6	8.0	400	3.86	98	2.20	56	4.65	118	4.65	118	3.3	1.5
PS-685	6	8.5	425	5.95	151	1.97	50	3.78	96	4.05	103	3.7	1.7
PS-6100	6	10.0	500	5.95	151	2.00	51	3.70	94	3.86	98	4.6	2.1
PS-6200	6	20.0	1000	6.18	157	3.27	83	4.92	125	4.92	125	8.2	3.7
PS-826	8	2.6	130	7.00	178	1.34	34	2.36	60	2.52	64	1.9	0.9
PS-1212	12	1.2	60	3.94	100	1.65	42	2.09	53	2.20	56	1.3	0.6
PS-1219	12	1.9	95	7.01	178	1.34	34	2.36	60	2.56	65	1.9	0.9
PS-1226	12	2.6	130	7.68	195	1.85	47	2.76	70	2.95	75	2.9	1.3
PS-1245	12	5.0	250	5.96	152	2.56	65	3.78	96	3.89	99	5.1	2.3
PS-1265	12	6.5	325	5.95	151	2.56	65	3.70	94	3.86	98	5.7	2.6
PS-1282S	12	8.0	400	4.40	112	3.86	98	4.65	118	4.65	118	6.7	3.0
PS-12150	12	15.0	750	7.13	181	2.99	76	6.57	167	6.57	167	12.8	5.8
PS-12200	12	20.0	1000	6.89	175	6.54	166	4.92	125	4.92	125	17.6	8.0
PS-12240	12	24.0	1200	6.52	166	4.92	125	6.89	175	6.89	175	19.8	9.0
PS-12280	12	28.0	1400	7.75	197	5.19	132	6.12	155	7.31	186	21.0	9.5
PS-12400	12	40.0	2000	7.64	194	6.85	174	6.85	174	6.85	174	28.7	13.0

TOLERANCES: Length and Width: ±0.04 in. (1mm) – Height: ±0.08 in. (2mm)

SEALED NICKEL-CADMIUM BATTERIES

Model No.	Nominal Voltage (V)	Capacity 5 hr. rate (mAh)	Std. Charge		Quick Charge		Diameter (Max.)		Height (Max.)		Weight	
			(mA)	(hrs.)	(mA)	(hrs.)	inches	mm.	inches	mm.	oz.	g
PS-1/3AA	1.2	110	11	15	28	6	0.571	14.5	0.669	17.0	0.25	7
PS-N	1.2	150	15	15	38	6	0.473	12.0	1.142	29.0	0.30	9
PS-AAA	1.2	180	18	15	45	6	0.413	10.5	1.752	44.5	0.35	10
PS-2/3AA	1.2	250	25	15	75	4.5	0.571	14.5	1.181	30.0	0.42	12
PS-AA	1.2	500	50	15	150	4.5	0.571	14.5	1.988	50.5	0.74	22
PS-1/2SC	1.2	600	60	15	150	6	0.906	23.0	1.043	26.5	0.99	28
PS-SC	1.2	1200	120	15	300	6	0.906	23.0	1.693	43.0	1.69	48
PS-C	1.2	1800	180	15	–	–	1.024	26.0	1.969	50.0	2.65	75
PS-1/2D	1.2	2200	220	15	–	–	1.300	33.0	1.476	37.5	3.03	86
PS-D	1.2	4000	400	15	–	–	1.339	34.0	2.402	61.5	5.47	155
PS-F	1.2	7000	700	15	–	–	1.339	34.0	3.583	91.5	8.82	250

SAFT

SAFT AMERICA INC.
711 Industrial Blvd.
Valdosta, GA 31601
912/247-2331

NICAD® SEALED
RECHARGEABLE
NICKEL-CADMIUM
BATTERIES

GENERAL PARAMETERS

The unique features of the SAFT NICAD® system lend themselves to a wide range of product applications:

Portable Power for:
- Tools
- Instruments
- Medical Equipment
- Photography
- Portable Comm.
- Toys

Standby Power for
- Memory Preservation
- Emergency Lighting
- Logic Systems
- Alarms
- Controls
- Electronic Equipment

Sealed rechargeable SAFT NICAD brand nickel-cadmium cells and batteries offer distinct advantages not obtainable from primary or other secondary systems.

FEATURES

Long Life

Parameters of the application, such as charge rates, temperature, and discharge rates affect the total, standby or cycle, life of the NICAD cell. A life of 300 to 1000 cycles of discharge, or 5 or more years of standby power is common. Shallow discharges, lower operating temperatures, and a reduction of the overcharge, time and rates, will extend the life of NICAD cells.

Overcharge Capability

SAFT NICAD cells can be overcharged continuously at the recommended rates without loss of life or performance.

High-Rate Discharge Capability

SAFT NICAD cells are especially suited to continuous high-rate discharge or high current pulsing. This feature is due to the low internal resistance and flat discharge voltage of the NICAD cell.

High-Rate Charge Capability

SAFT cylindrical NICAD cells can be continuously charged, under most conditions, at rates up to and including 0.33C (4-hour recharge) without loss of performance. Higher charge rates (from 1 hour to 15 minutes) can be achieved with the use of temperature cutoff and voltage regulated charging methods.

Operate In Any Position

Due to their sealed construction, NICAD cells can be operated in any position, without damage to the cells or the equipment in which they are installed.

Operating Temperatures

SAFT NICAD cells are designed to operate over the following temperature ranges:

	Polytemp™	Button Cells	Standard Cells
Charge*	+15° C to +70° C	+10° C to +50° C	+ 5° C to +50° C
Discharge	-40° C to +70° C	-40° C to +50° C	-40° C to +50° C
Storage	-40° C to +70° C	-40° C to +50° C	-40° C to +50° C

*For charging at other than recommended continuous rates or at lower temperatures, contact factory.

Long Storage Life

SAFT NICAD cells can be stored indefinitely without significant irreversible degradation in their performance. After extended storage, a few charge/discharge cycles may be needed to restore full capacity.

Charge Retention

The charge retention shown is based on storage at 20° C. The self-discharge rate is a function of temperature and internal resistance. Storage at higher temperatures will reduce charge retention during storage. Cells should be charged prior to use to restore full capacity.

	Percent Charge Retained		
Cell Type	1 Month	3 Months	5 Months
Cylindrical	75%	50%	15%
Button	65%	40%	5%

Safety Vents

The safety vent on cylindrical cells may be of either hermetic or resealable design. Both are designed to release excess pressure as a safety measure to prevent cell rupture. Regardless of the vent employed, repeated venting of a cell will release gas and lower the electrolyte level in the cell causing it to dry out, degrade in performance, and ultimately fail to deliver power at a functional level. Whether hermetic or resealable, the vents prime purpose is to provide a pressure relief to prevent accidental cell rupture due to abuse or misuse.

Your SAFT representative should be contacted as to the correct vent for your application.

Internal Impedance and Resistance

The internal impedance as well as the internal resistance of a NICAD cell is low. As the cell discharges, impedance increases. The impedance increases approximately 20% for a semi-discharged cell, and approximately 50% for a discharged cell.

SAFT

SAFT AMERICA INC.
711 Industrial Blvd.
Valdosta, GA 31601
912/247-2331

NICAD® SEALED
RECHARGEABLE
NICKEL-CADMIUM
BATTERIES

NICAD® STANDARD CELLS

Standard cells, due to their wide operating temperature range (-40° C to +50° C) and excellent cycle life (300 to 1000 cycles) are ideal for a majority of applications. Standard cells are the most economical of the NICAD designs and with 34 models ranging in capacity from .070 Ah to 10.0 Ah, they are also the most versatile.

Cell Type		Max. Bare Cell Dim.				Capacity, Ah		Charge Rates @ 20° C				Bare		Int.	Vent
		Height		Diameter		Rated @ 20° C*		Continuous		Maximum		Cell Weight		Resist.	Type
Model	Size	In.	MM	In.	MM	1C	0.2C*	Amps	Hrs	Amps	Hrs	Oz	Grams	mΩ	H Hermetic R Resealable
.070SC	1/2AAA	0.825	20.96	0.380	9.65	0.060	0.070	0.007	16	0.023	4.0	0.14	4.0	220.0	H
.110SC	1/3AA	0.660	16.76	0.540	13.72	0.100	0.110	0.011	16	0.037	4.0	0.23	6.5	80.0	H
.150SC	1/3A	0.635	16.13	0.593	15.06	0.140	0.150	0.015	16	0.030	8.0	0.28	7.9	100.0	H
.180SC	AAA	1.750	44.45	0.380	9.65	0.160	0.180	0.018	16	0.036	8.0	0.32	9.0	120.0	H
.225SC	1/3A_f	0.665	16.89	0.652	16.56	0.200	0.225	0.023	16	0.045	8.0	0.38	10.8	30.0	H
.250SC	1/2AA	1.192	30.28	0.540	13.72	0.225	0.250	0.025	16	0.080	4.0	0.38	10.8	60.0	H
.450SC	2/3A_f	1.100	27.94	0.652	16.56	0.405	0.450	0.045	16	0.150	4.0	0.55	15.6	48.0	H
VR0.45	2/3A_f	1.106	28.09	0.671	17.04	0.405	0.450	0.045	16	0.180	3.5	0.74	21.0	24.0	R
.500SC	AA	1.967	49.96	0.540	13.72	0.450	0.500	0.050	16	0.165	4.0	0.70	19.9	28.0	H
VR0.5	AA	1.976	50.20	0.563	14.30	0.450	0.500	0.050	16	0.200	3.5	0.85	24.1	26.0	R
VR0.5	AAL	1.937	49.20	0.563	14.30	0.450	0.500	0.050	16	0.200	3.5	0.85	24.1	26.0	R
.600SC	A	1.920	48.77	0.593	15.06	0.530	0.600	0.060	16	0.120	8.0	0.86	24.0	26.0	H
.750SC	1/2C	0.925	23.50	1.012	25.70	0.660	0.750	0.075	16	0.150	8.0	1.10	31.0	23.0	H
.800SC	A_f	1.940	49.28	0.652	16.56	0.720	0.800	0.080	16	0.265	4.0	1.05	29.8	22.0	H
VR0.8	A_f	1.929	49.00	0.648	16.46	0.720	0.800	0.080	16	0.320	3.5	1.16	32.9	16.9	R
1.0SC	3/5C	1.150	29.21	1.012	25.70	0.880	1.000	0.100	16	0.200	8.0	1.40	39.7	20.0	H
1.2SC	C_S	1.652	41.96	0.876	22.25	1.060	1.200	0.120	16	0.240	8.0	1.60	45.4	15.0	H
1.2SC	C_SL	1.575	40.01	0.876	22.25	1.060	1.200	0.120	16	0.240	8.0	1.60	45.4	15.0	H
VR1.2	C_S	1.657	42.10	0.880	22.35	1.080	1.200	0.120	16	0.480	3.5	1.80	51.1	8.5	R
2.0SC	C	1.865	47.37	1.012	25.70	1.800	2.000	0.200	16	0.400	8.0	2.40	68.0	17.0	H
VR2	C	1.957	49.70	1.006	25.55	1.800	2.000	0.200	16	0.600	4.0	2.72	77.0	8.5	R
VR2	CL	1.878	47.70	1.006	25.55	1.800	2.000	0.200	16	0.600	4.0	2.72	77.0	8.5	R
2.2SC	1/2D	1.448	36.78	1.275	32.39	2.000	2.200	0.220	16	0.440	8.0	2.80	80.0	10.0	H
VR2.5	2/3D	1.713	43.51	1.281	32.54	2.300	2.500	0.250	16	0.500	8.0	3.70	105.0	6.0	R
4.0SC	D	2.318	58.88	1.275	32.39	3.500	4.000	0.400	16	0.800	8.0	4.60	130.0	9.0	H
VR4	D	2.382	60.50	1.281	32.55	3.500	4.000	0.400	16	0.800	8.0	5.31	150.0	5.0	R
VR4	DL	2.311	58.50	1.281	32.55	3.500	4.000	0.400	16	0.800	8.0	5.31	150.0	5.0	R
VRD	D	2.382	60.50	1.281	32.55	3.500	4.000	0.400	16	NA	NA	4.95	140.0	5.0	R
VRD	DL	2.303	58.50	1.281	32.55	3.500	4.000	0.400	16	NA	NA	4.95	140.0	5.0	R
7.0SC	F	3.508	89.10	1.275	32.39	6.300	7.000	0.700	16	1.400	8.0	7.40	210.0	7.0	H
VR7	F	3.594	91.30	1.281	32.55	6.300	7.000	0.700	16	1.400	8.0	8.46	240.0	4.4	R
VR7	FL	3.516	89.30	1.281	32.55	6.300	7.000	0.700	16	1.400	8.0	8.46	240.0	4.4	R
VRF	F	3.594	91.30	1.281	32.55	6.300	7.000	0.700	16	NA	NA	8.10	230.0	5.5	R
VR10	SF	3.512	89.20	1.628	41.35	9.000	10.000	1.000	16	NA	NA	14.10	400.0	3.3	R

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NICAD® SEALED
RECHARGEABLE
NICKEL-CADMIUM
BATTERIES

POLYTEMP™ BRAND HIGH TEMPERATURE CELLS

Polytemp's long life at high temperatures makes it an ideal backup power source for many applications including:

- Computers and computer peripherals
- Emergency lighting and alarms
- Telephone and telegraph equipment
- Stationary and portable electronic instruments
- Process control equipment

Polytemp performance is the result of a combination of electrode design innovations with a polypropylene separator material. Polypropylene is much more resistant to deterioration than the nylon separator used in standard designs.

The following table illustrates the relative effect of continuous overcharge at the 0.1C rate (where C = ampere-hour rated capacity of the cell), on capacity over time (or life). This difference in life increases substantially as the continuous cell temperature is increased above 25° C.

	Percent of 25° C Life	
Cell Temp, ° C	**Standard**	**Polytemp**
25	100	100
35	40	75
45	20	60
55	10	45
65	1	30

Cell Type		Max. Bare Cell Dim.				Capacity, Ah Rated @ 20° C*		Charge Rates @ 20° C				Bare Cell Weight		Int. Resist.	Vent Type
		Height		Diameter				Continuous		Maximum					
Model	Size	In.	MM	In.	MM	1C	0.2C*	Amps	Hrs	Amps	Hrs	Oz	Grams	mΩ	H = Hermetic R = Resealable
.070PT	1/2AAA	0.825	20.96	0.380	9.65	0.060	0.070	0.004	24+	0.007	16	0.14	4.0	220.0	H
.110PT	1/3AA	0.660	16.76	0.540	13.72	0.100	0.110	0.007	24+	0.011	16	0.23	6.6	80.0	H
.150PT	1/3A	0.635	16.13	0.593	15.06	0.135	0.150	0.010	24+	0.015	16	0.28	7.9	100.0	H
.180PT	AAA	1.750	44.45	0.380	9.65	0.160	0.180	0.012	24+	0.018	16	0.32	9.0	120.0	H
.250PT	1/2AA	1.192	30.28	0.540	13.72	0.225	0.250	0.017	24+	0.025	16	0.38	10.8	60.0	H
.450PT	$2/3A_f$	1.100	27.94	0.652	16.56	0.405	0.450	0.030	24+	0.045	16	0.55	15.6	48.0	H
.500PT	AA	1.967	49.96	0.540	13.72	0.450	0.500	0.033	24+	0.050	16	0.70	19.9	28.0	H
VT0.5	AA	1.976	50.20	0.563	14.30	0.450	0.500	0.036	24+	0.050	16	0.85	24.1	32.5	R
.600PT	A	1.920	48.77	0.593	15.06	0.540	0.600	0.040	24+	0.060	16	0.86	24.4	26.0	H
.750PT	1/2C	0.925	23.50	1.012	25.70	0.675	0.750	0.050	24+	0.075	16	1.10	31.2	23.0	H
.800PT	A_f	1.940	49.28	0.652	16.56	0.720	0.800	0.053	24+	0.080	16	1.05	29.8	22.0	H
1.0PT	3/5C	1.150	29.21	1.012	25.70	0.900	1.000	0.067	24+	0.100	16	1.40	39.7	20.0	H
1.2PT	C_S	1.652	41.96	0.876	22.25	1.080	1.200	0.080	24+	0.120	16	1.60	45.4	15.0	H
VT1.2	C_S	1.657	42.10	0.880	22.35	1.080	1.200	0.086	24+	0.120	16	1.80	51.1	12.1	R
2.0PT	C	1.865	47.37	1.012	25.70	1.600	1.800	0.120	24+	0.180	16	2.40	68.1	17.0	H
VT2	C	1.957	49.70	1.006	25.55	1.800	2.000	0.143	24+	0.200	16	2.70	77.0	11.2	R
2.2PT	1/2D	1.448	36.78	1.275	32.39	2.000	2.200	0.146	24+	0.220	16	2.80	79.5	10.0	H
4.0PT	D	2.318	58.88	1.275	32.39	3.500	4.000	0.267	24+	0.400	16	4.60	130.5	9.0	H+R
VT4	D	2.382	60.50	1.281	32.55	3.500	4.000	0.279	24+	0.400	16	5.30	150.4	7.0	R
VT4	DL	2.303	58.50	1.281	32.55	3.500	4.000	0.279	24+	0.400	16	5.30	150.4	7.0	R
7.0PT	F	3.508	89.10	1.275	32.39	6.300	7.000	0.467	24+	0.700	16	7.40	210.0	7.0	H
VT7	F	3.594	91.30	1.281	32.55	6.300	7.000	0.500	24+	0.700	16	8.50	241.0	5.5	R

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NICAD® SEALED
RECHARGEABLE
NICKEL-CADMIUM
BATTERIES

QUICK CHARGE CELLS

Quick charge cells are specifically designed for applications where a full charge must be accomplished in 3.5 to 4.0 hours. Quick charge cells do not require special charge controls and may be charged up to 72 hours at the maximum rates without significant loss of life.

Cell Type		Max. Bare Cell Dim.				Capacity, Ah Rated @ 20° C*		Charge Rates @ 20° C				Bare Cell Weight		Int. Resist.	Vent Type
		Height		Diameter				Continuous		Maximum					
Model	Size	In.	MM	In.	MM	1C	0.2C*	Amps	Hrs	Amps	Hrs	Oz	Grams	mΩ	H Hermetic R Resealable
.070SC	1/2AAA	0.825	20.96	0.380	9.65	0.060	0.070	0.007	16	0.023	4.0	0.14	4.0	220.0	H
.110SC	1/3AA	0.660	16.76	0.540	13.72	0.100	0.110	0.011	16	0.037	4.0	0.23	6.5	80.0	H
.250SC	1/2AA	1.192	30.28	0.540	13.72	0.225	0.250	0.025	16	0.080	4.0	0.38	10.8	60.0	H
.450SC	2/3A$_f$	1.100	27.94	0.652	16.56	0.405	0.450	0.045	16	0.150	4.0	0.55	15.6	48.0	H
VR0.45	2/3A$_f$	1.106	28.10	0.671	17.05	0.405	0.450	0.045	16	0.180	3.5	0.74	21.0	24.0	R
.500SC	AA	1.967	49.96	0.540	13.72	0.450	0.500	0.050	16	0.165	4.0	0.70	19.9	28.0	H
VR0.5	AA	1.976	50.20	0.563	14.30	0.450	0.500	0.050	16	0.200	3.5	0.85	24.1	26.0	R
VR0.5	AAL	1.937	49.20	0.563	14.30	0.450	0.500	0.050	16	0.200	3.5	0.85	24.1	26.0	R
800SC	A$_f$	1.940	49.28	0.652	16.56	0.720	0.800	0.080	16	0.265	4.0	1.05	29.8	22.0	H+R
VR0.8	A$_f$	1.929	49.00	0.648	16.46	0.720	0.800	0.080	16	0.320	3.5	1.16	32.9	16.9	R
VR1.2	C$_S$	1.657	42.10	0.880	22.35	1.080	1.200	0.120	16	0.480	3.5	1.80	51.1	8.5	R
VR2	C	1.957	49.70	1.006	25.55	1.800	2.000	0.200	16	0.600	4.0	2.72	77.0	8.5	R
VR2	CL	1.878	47.70	1.006	25.55	1.800	2.000	0.200	16	0.600	4.0	2.72	77.0	8.5	R

BUTTON CELLS

The SAFT VB type button cell is a sintered/sintered construction (ref. Figure 2). This construction facilitates discharge rates up to 10C, continuous charge rates of up to 0.05C, minimum cycle life of 300 (100% depth of discharge) cycles and continuous charge failure rates of less than 5 cells per 1000 cells after 5 years of continuous charge.

As a complement to the VB cell, SAFT offers a series of button cells of the same dimensions and capacities which are designed to withstand severe operating conditions. These VBE cells offer improved temperature and voltage performance coupled with higher reliability. (Contact your SAFT representative regarding VBE cells.)

Cell Type Model	Max. Bare Cell Dim.				Capacity, Ah Rated @ 20° C*		Charge Rates @ 20° C				Avg Bare Cell Weight		Int. Resist.
	Height		Diameter				Continuous		Maximum				
	In.	MM	In.	MM	C/1	C/5*	Amps	Hrs	Amps	Hrs	Oz	Grams	mΩ
VB4/VBE4	0.233	5.92	0.610	15.50	0.036	0.040	0.002	36+	0.004	14-16	0.12	3.5	293.0
VB10/VBE10	0.205	5.21	0.898	22.81	0.090	0.100	0.005	36+	0.010	14-16	0.25	7.0	63.0
VB22/VBE22	0.303	7.70	0.980	24.89	0.200	0.220	0.011	36+	0.022	14-16	0.42	12.0	36.0
VB30/VBE30	0.214	5.44	1.358	34.49	0.270	0.300	0.015	36+	0.030	14-16	0.63	18.0	28.0
VB60/VBE60	0.382	9.70	1.358	34.49	0.540	0.600	0.030	36+	0.060	14-16	1.09	31.0	23.0

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NICAD® SEALED RECHARGEABLE NICKEL-CADMIUM BATTERIES

FAST CHARGE CELLS

Fast charge NICAD® cells can be 100% charged in 1.0 to 1.5 hours. This can be accomplished without the need for complicated circuitry. A simple temperature cutoff circuit is all that is required. (Ref. Charging Parameters, page 4.)

Cell Type		Max. Bare Cell Dim.				Capacity, Ah Rated @ 20° C*		Charge Rates @ 20° C				Bare Cell Weight		Int. Resist.	Vent Type
		Height		Diameter				Continuous		Maximum					H = Hermetic R = Resealable
Model	Size	In.	MM	In.	MM	1C	0.2C*	Amps	Hrs	Amps	Hrs	Oz	Grams	mΩ	
VR0.45	2/3A_f	1.106	28.10	0.665	16.89	0.405	0.450	0.045	16	0.450	1 - 1.5	0.74	21.00	24.0	R
VR0.5	AA	1.976	50.20	0.563	14.30	0.450	0.500	0.050	16	0.500	1 - 1.5	0.85	24.10	26.0	R
VR0.5	AAL	1.937	49.20	0.563	14.30	0.450	0.500	0.050	16	0.500	1 - 1.5	0.85	24.10	26.0	R
VR0.8	A_f	1.929	49.00	0.648	16.46	6.720	0.800	0.080	16	0.800	1 - 1.5	1.16	32.90	16.9	R
VR1.2	C_S	1.657	42.10	0.880	22.35	1.080	1.200	0.200	16	1.200	1 - 1.5	1.80	51.08	8.5	R
VR2	C	1.957	49.70	1.006	25.55	1.800	2.000	0.200	16	2.000	1 - 1.5	2.72	77.00	8.5	R
VR2	CL	1.878	47.70	1.006	25.55	1.800	2.000	0.200	16	2.000	1 - 1.5	2.72	77.00	8.5	R
VR2.5	2/3D	1.713	43.51	1.281	32.55	2.250	2.500	0.250	16	2.500	1 - 1.5	3.70	105.00	6.0	R
VR4	D	2.382	60.50	1.281	32.55	3.600	4.000	0.400	16	4.000	1 - 1.5	5.31	150.00	5.0	R
VR4	DL	2.303	58.50	1.281	32.55	3.600	4.000	0.400	16	4.000	1 - 1.5	5.31	150.00	5.0	R
VR7	F	3.594	91.30	1.281	32.55	6.300	7.000	0.700	16	7.000	1 - 1.5	8.46	240.00	4.4	R
VR7	FL	3.516	89.30	1.281	32.55	6.300	7.000	0.730	16	7.000	1 - 1.5	8.46	240.00	4.4	R

SPECIAL LOW RESISTANCE CELLS

Low resistance cells are of a special design to provide excellent high-rate characteristics during both charge and discharge. These cells can be charged to 100% of capacity in as little as 15 minutes. They also exhibit excellent voltage retention during very high-rate discharging.

Cell Type		Max. Bare Cell Dim.				Capacity, Ah Rated @ 20° C*		Charge Rates @ 20° C				Bare Cell Weight		Int. Resist.	Vent Type
		Height		Diameter				Continuous		Maximum					H Hermetic R = Resealable
Model	Size	In.	MM	In.	MM	1C	0.2C*	Amps	Hrs	Amps	Min	Oz	Grams	mΩ	
VY1.15	C_S	1.657	42.10	0.880	22.35	1.040	1.150	1.000	1.5	4.000	15	1.80	51.00	7.0	R

With the largest sealed NICAD® cell line in the industry, you should be able to find a SAFT cell design to fit any application you may have. But if you can't, pick up the phone and call your nearest SAFT representative. We are constantly expanding and improving our product line to meet your needs for the future.

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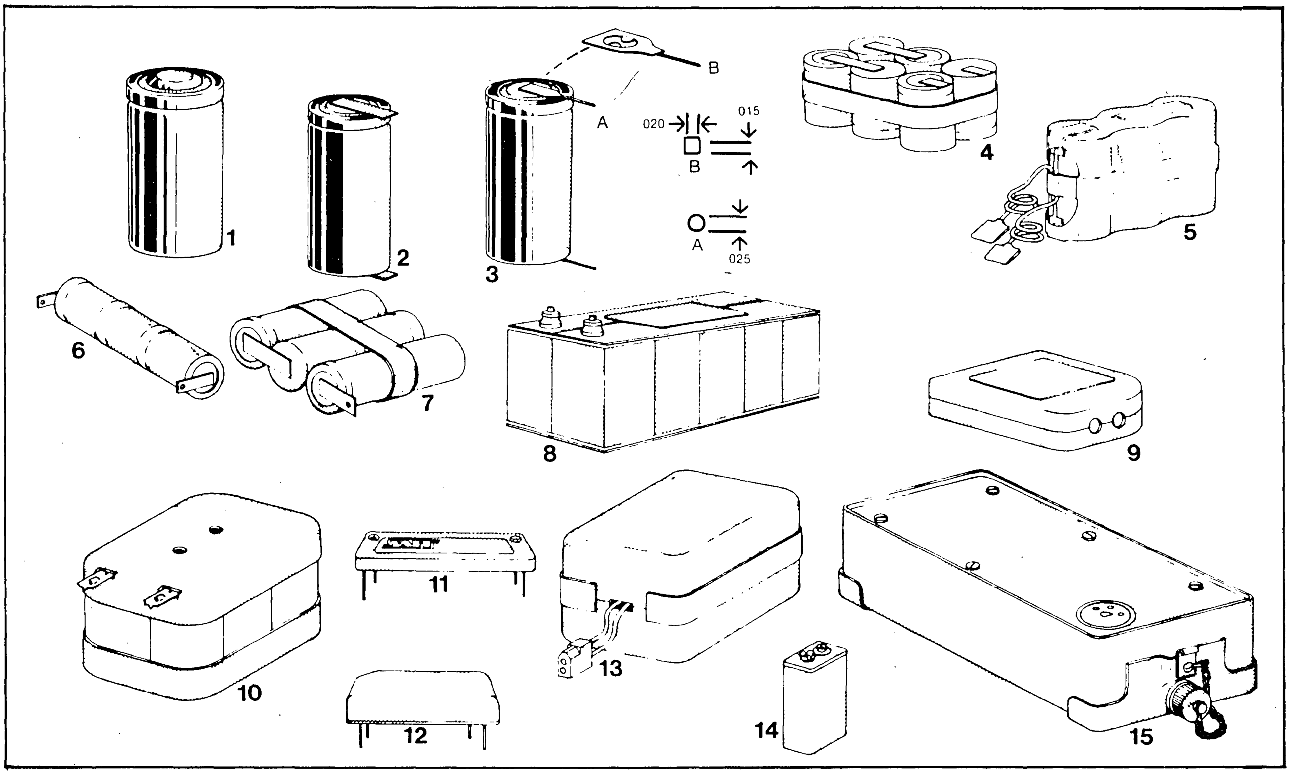
NICAD® SEALED, RECHARGEABLE NICKEL-CADMIUM BATTERIES

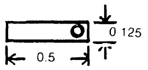
SAFT BATTERY ASSEMBLIES



1. Single cell button contact
2. Single cell standard lugs
3. Single cell P.C. mount lugs
    A. Circular
    B. Rectangular
4. Standard taped and lugged
5. Heat shrink overwrap
6. Cylindrical stack
7. Combination pack (4 and 6)
8. Modpack
9. Custom designed injection molded case
10. Redhead
11. Memoguard™
12. DataProtector™
13. Custom designed vacuum formed case
14. Consumer package transistor battery
15. Custom designed military spec. - PRC 77

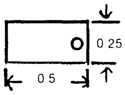
STANDARD LUGS

Style A



Cells using this style: 1/3AAA, 1/3AA, 1/3A, AAA, 1/3A_f, 1/2AA 2/3A_f, AA, A, A_f

Style B



Cells using this style: 1/2C, 3/5C, C_S, C, 1/2D, 2/3D, D, F, SF

STANDARD WIRE

18 AWG and 20 AWG, medium wall vinyl UL1007 90°C

Sonnenschein dryfit systems

Maintenance-free sealed lead-acid batteries with fixed electrolyte

All US stock ▪ Superb technical service

dryfit A200

Type code	Nominal voltage V	Nominal capacity 20 hr. rate Ah	Max. load approx. A
A 202/1.0 K	2	1.0	40
A 202/3.0 V	2	3.0	60
A 202/5.7 V	2	5.7	80
A 202/9.5 S	2	9.5	80
A 204/1.0 K	4	1.0	40
A 204/3.0 S	4	3.0	60
A 206/1.0 K	6	1.0	40
A 206/1.0 S	6	1.0	40
A 206/1.1 U	6	1.1	40
A 206/1.1 S	6	1.1	40
A 206/2.0 S	6	2.0	60
A 206/3.0 U	6	3.0	60
A 206/3.0 S	6	3.0	60
A 206/3.8 K	6	3.8	60
A 206/3.8 S	6	3.8	60
A 206/5.7 U	6	5.7	80
A 206/5.7 S	6	5.7	80
A 206/6.5 S	6	6.5	80
A 206/9.5 S	6	9.5	80
A 206/12.0 G	6	12.0	200
A 208/1.1 U	8	1.1	40
A 208/1.1 N	8	1.1	2
A 208/1.1 S	8	1.1	40
A 208/3.0 S	8	3.0	60
A 208/3.0 N	8	3.0	2
A 208/3.8 S	8	3.8	60
A 212/1.1 S	12	1.1	40
A 212/1.8 S	12	1.8	40
A 212/2.7 S	12	2.7	60
A 212/3.0 S	12	3.0	80
A 212/5.7 S	12	5.7	80
A 212/9.5 S	12	9.5	80
A 212/12.0 G	12	12.0	200
A 212/20.0 G	12	20.0	200
A 212/36.0 A	12	36.0	400
A 212/50.0 A	12	50.0	400
A 212/63.0 G	12	63.0	440
A 212/110.0 A	12	110.0	770

dryfit A300

Type code	Nominal voltage V	Nominal capacity 10 hr. rate Ah	Max. load approx. A
A 302/3.0 V	2	3.0	60
A 302/5.7 V	2	5.7	80
A 302/9.5 S	2	9.5	80
A 304/3.0 S	4	3.0	60
A 306/1.0 S	6	1.0	40
A 306/1.1 S	6	1.1	40
A 306/2.0 S	6	2.0	60
A 306/3.0 S	6	3.0	60
A 306/6.5 S	6	6.5	80
A 306/9.5 S	6	9.5	80
A 312/1.1 S	12	1.1	40
A 312/1.8 S	12	1.8	40
A 312/3.0 S	12	3.0	80
A 312/5.7 S	12	5.7	80
A 312/9.5 S	12	9.5	80

dryfit A600

Type code	Nominal voltage V	Nominal capacity 10 hr. rate Ah
4/180	2	180
5/225	2	225
6/270	2	270
5/315	2	315
6/380	2	380
7/440	2	440
6/540	2	540
8/720	2	720
10/900	2	900
12/1080	2	1080
12/1350	2	1350

NEW

dryfit A 400-1 longlife float

Type Code	Nominal Voltage V	Nominal Capacity 20 hr. rate Ah	Max. Load approx. A
12 V 4 Ah G	12	4,0	80
12 V 18 Ah G	12	18,0	200
12 V 52 Ah G	12	52,0	440
12 V 85 Ah A	12	85,0	770

dryfit Block

Type Code	Nominal Voltage V	Nominal Capacity 10 hr. rate AH
6 V 1 OGi 12,5	6	12,5
6 V 2 OGi 25	6	25
6 V 3 OGi 37,5	6	37,5
6 V 4 OGi 50	6	50
6 V 5 OGi 62,5	6	62,5
6 V 6 OGi 75	6	75
6 V 4 OGi 100	6	100
6 V 5 OGi 125	6	125
6 V 6 OGi 150	6	150
4 V 7 OGi 175	4	175
4 V 8 OGi 200	4	200

dryfit A200

The top performance of the dryfit range. Ideal for use on high-quality power supplies, in high-cycling operations involving total discharges and for float operations with periodic deep discharges.

- Maintenance-free
- Excellent float and cycle life

Applications

Alarm Systems
Buoy Lighting
Cable Television
Communication Equipment
Control Equipment
Computers
Electric Powered Wheelchairs
Electronic Cash Registers
Electronic Test Equipment
Emergency Power Supply System
Emergency Lighting Systems
Fire Alarm Systems
Geophysical Equipment
Marine Equipment
Medical Equipment
Office Machines
Portable Lighting, Video Lights
Power Tools
Radar Stations
Radio & TV Stations
Radio Relay Stations
Robotics
Safety Lighting Systems
Security Systems
Ships' Batteries
Solar-Powered Systems
Telecommunications Systems
UPS Systems
Vending Machines
Warning Systems

dryfit A300

The most economical battery type of the dryfit range for professional grade standby parallel operation.

- Maintenance-free
- Excellent float life

Applications

Alarm Systems
Cable Television
Communication Equipment
Control Equipment
Computers
Electronic Cash Registers
Electronic Test Equipment
Emergency Power Supply System
Emergency Lighting Systems
Fire Alarm Systems
Marine Equipment
Medical Equipment
Office Machines
Radar Stations
Radio & TV Stations
Radio Relay Stations
Safety Lighting Systems
Security Systems
Ships' Batteries
Telecommunications Systems
UPS Systems
Vending Machines
Warning Systems

dryfit A600

The stationary batteries for unattended industrial standby applications with a life expectancy far in excess of a decade.

- Maintenance-free
- Excellent float life up to 15 years

Applications

Alarm Systems
Buoy Lighting
Cable Television
Communication Equipment
Control Equipment
Computers
Emergency Power Supply System
Emergency Lighting Systems
Fire Alarm Systems
Marine Equipment
Medical Equipment
Office Machines
Radar Stations
Radio & TV Stations
Radio Relay Stations
Safety Lighting Systems
Security Systems
Ships' Batteries
Solar-Powered Systems
Telecommunications Systems
UPS Systems
Warning Systems

Sonnenschein

Sonnenschein Batteries Inc.
300 E. Johnson Ave., PO Box 339
Cheshire, CT 06410
Telephone: (203) 271-0091
Telex: 5101007052

THINKING BATTERIES? TALK TO TAUBER!

PACKAGED POWER . . .

We've built our reputation on quality products, professional workmanship and flexible design and production capabilities. We can fabricate to your specification or assist you in a custom design for your application. Assemblies are available in rechargeable or primary types such as Sealed Lead-Acid, Nickel Cadmium, Lithium, Alkaline and others. Applications range from on-board memory backup, medical instruments, communication and video, to portable tools, oceanographic equipment and computer UPS systems.

Call or write for our Facilities Brochure/Design Guide.

OR RIGHT OFF THE SHELF,

Primary Cells

- Alkaline
- Carbon Zinc
- Lithium
- Mercury
- Silver Oxide
- Zinc Chloride

Manufacturers

- Duracell
- Electrochem
- Eternacell
- Panasonic

Rechargeable

- Sealed Lead-Acid
  - Gelled or Starved Electrolyte
- Nickel Cadmium
  - Cylinderical or Button Cells
- Silver Zinc
  - Button Cells
- Lead Calcium
  - Maintenance-free Wet Cells

Manufacturers

- Gates
- Panasonic
- Yuasa
- Varta
- Medicharge
- Mule

Battery Chargers	**Manufacturers**
Constant Voltage Constant Current Cyclic and Float Duty	Ault Gates Xenotronix
Audio Transducers Buzzers	Star Micronics
Switching Power Supplies	Panasonic

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how to choose the right battery for the right job, at the right price

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GUARANTEED
Lantern Battery
9 VOLT GENERAL PURPOSE BATTERY

OUR "GOOD" BATTERY FOR OCCASIONAL GENERAL PURPOSE USE

- Our lowest price battery family
- Variety of shapes and sizes
- Provides from 1.5 Volts to 510 Volts
- Good shelf life
- Voltage drops gradually with use

APPLICATIONS

Low to moderate current in occasional use. Radios, flashlights, lanterns, small lighted toys and novelties, high voltage electronic photoflash, barricade flashers, lighting and alarm systems, electric fence controllers, laboratory instruments, telephone amplifiers, marine depth finders, smoke detectors (but only when recommended by manufacturer), pagers, electronic games, calculators, remote control transmitters.

SUPER HEAVY DUTY BATTERIES

EVEREADY
SUPER HEAVY DUTY
lantern battery

PREMIUM POWER AT POPULAR PRICES

- Variety of shapes and sizes
- Provides 1.5 Volts, 6 Volts, or 9 Volts
- Good shelf life
- "Better" voltage maintenance under load than General Purpose Batteries
- "Better" low temperature characteristics than General Purpose Batteries
- Excellent leakage resistance

APPLICATIONS

Moderate to heavy current or regular use. Flashlights, lanterns, fluorescent lanterns, Halogen lanterns, calculators, radios, portable tape recorders and players, motor driven devices, communication equipment, electronic games, remote control transmitters.

"ENERGIZER"® CYLINDRICAL ALKALINE

OUR "BEST," LONGEST LASTING ALL PURPOSE POWER SOURCE

- "Best" shelf life—outlasts General Purpose and Super Heavy Duty
- "Best" voltage maintenance under load
- "Best" low temperature characteristics
- Variety of shapes and sizes
- Provides 1.5 Volts, 3 Volts, 4.5 Volts, 6 Volts and 9 Volts

APPLICATIONS

Heavy current or continuous use. Electronic photoflash, movie cameras, still cameras and motor drives, motor toys, portable tape recorders and players, calculators, smoke detectors, shavers, television sets, portable communication systems, motor driven devices, medical instruments, signal lights, electronic games.

"Eveready," "Energizer," "Air Cell," are trademarks of

UNION CARBIDE CORPORATION

BATTERY PRODUCTS DIVISION

39 Old Ridgebury Road, Danbury, CT 06817-0001

Sales Offices: Norcross-GA, Itasca-IL, Middleburg Heights-OH, Dallas, Saddle Brook-NJ, San Francisco

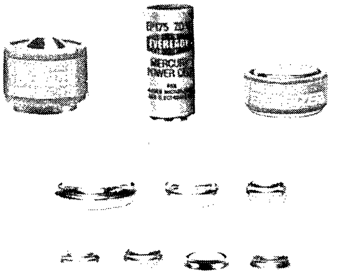
Union Carbide Corporation provides a consulting service of experienced battery engineers as an aid to manufacturers in need of special battery designs. For help with your specific battery problems, call (203) 794-7548 or write Battery Engineering Dept. No. 18 in Danbury (address shown on this page).

Recommend the right EVEREADY® battery for the right job

"EVEREADY"® BATTERY SYSTEMS AND THEIR PROMINENT FEATURES

. . . FROM THE MANUFACTURER OF THE MOST COMPLETE DRY BATTERY LINE IN THE WORLD

MINIATURE
(Silver Oxide, Mercuric Oxide, MnO_2)



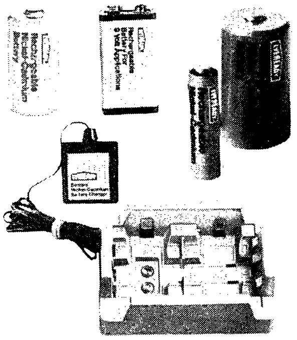
HIGH ENERGY DENSITY MINIATURE POWER SOURCE

- Variety of shapes and sizes
- Provides 1.35 Volts to 12.6 Volts
- Outstanding shelf life
- "Good" voltage maintenance under load
- "Good" low temperature characteristic
- Exceptional salting resistance

APPLICATIONS

Miniature battery powered electronic equipment. LCD, LED, or Analog electronic watches or clocks, hearing aids, calculators, cameras, electronic thermometers, miniature radios, medical instruments, wireless microphones, paging devices, test instruments, electronic games, musical greeting cards and novelty items.

NICKEL-CADMIUM RECHARGEABLE
(High Rate and Fast Charge Types)



RECHARGEABLE POWER SOURCE

- Variety of shapes and sizes
- Standard voltages 1.2 Volts to 7.2 Volts
- Custom batteries available
- Good high and low temperature performance
- High rate discharge
- Long cycle life
- Fast Charge types available
- Consumer cells and chargers available

APPLICATIONS

Rechargeable devices, standby power and replacement cells for high usage devices. Portable tools and appliances, electronic photoflash, calculators, tape recorders, and dictating equipment, toys, R/C models, standby power, alarm systems, professional communication recording equipment, personal pagers and cordless phones.

LITHIUM

LITHIUM 3.6V
L-1002
EVEREADY
Lithium
ENERGIZER

HIGH ENERGY DENSITY, LONG LIFE POWER SOURCE

- Miniature provides 1.5 Volts or 3 Volts
- Cylindrical provides 3 to 7.2 Volts
- Outstanding shelf life
- Exceptional salting resistance
- Good low and high temperature use and storage performance

MINIATURE BATTERY APPLICATIONS

Long life, low drain electronic equipment. Quartz watches, Analog or LCD watches, calculators, cameras, microprocessor memory back-up.

CYLINDRICAL BATTERY APPLICATIONS

Long life, moderate drain electronic equipment. Hearing aids, cameras, microprocessor memory back-up.

VARTA Batteries–High quality

Button batteries

Nickel Cadmium. Rechargeable.

The unique Nickel-Cadmium button battery. Varta Nickel Cadmium button batteries have advantages unique to their construction: for equivalent power they take less room, require a lower charging rate and hold their charge longer than conventional Nickel Cadmium batteries. Available in single cells and stack formats for instruments, portable tools, cameras, recorders, standby power, toys, alarm systems and other industrial electronic applications.

Also available: cylindrical Nickel Cadmium batteries of industrial quality which provide higher discharge rates, better temperature performance and better reliability under mechanical stress.

Silver Oxide. High capacity, constant voltage throughout service life, leakage resistant, long shelf life. Low and high drain cells for electric and electronic watches with analog, LED, LCD and backlit displays. Also suitable for cameras, calculators and other electronic circuits.

Mercury Oxide. Low and moderate drain cells for electric/electronic watches with analog displays, and hearing aid applications. Also suitable for cameras, calculators, microphones, and other miniature electronic devices.

Lithium. High energy density and extremely long shelf life, excellent voltage stability over wide temperature ranges. For use in various electronic applications.

Standard dry cells

Zinc Carbon. Standard long life batteries for general use. For occasional low current demands in flashlights, portable recorders, radios, toys and other common uses.

Zinc Chloride. High performance. For moderate to heavy current demands in flashlights, radios, recorders, toys, small motor applications, cameras and other uses requiring more voltage under load than Zinc Carbon batteries deliver.

Alkaline Manganese. Superior voltage under load, extra long shelf life. For continuous heavy current demands in portable recorders, movie cameras, signal lights, electronic games and motorized applications. Highest voltage under heavy loads.

Varta was established in 1887, and is world renowned for its research and development of stored energy sources. Varta manufactures batteries and battery products EXCLUSIVELY.

VARTA

VARTA Batteries

VARTA Batteries, Inc., 300 Executive Blvd., Elmsford, NY 10523 (914) 592-2500

From The Ocean Depths To Limitless Space

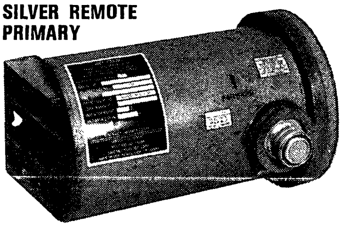
PACKAGED POWER BY **Yardney**

BATTERIES FROM THE LEADER IN HIGH-ENERGY DENSITY POWER SYSTEMS

For over thirty-five years Yardney has pioneered the development of primary, primary reserve and rechargeable high energy, lightweight batteries. Yardney batteries are essential components in aircraft, missiles, torpedoes, submersibles, communication equipment and many types of portable power supplies and instrumentation. Products include:

YARDNEY SILVERCEL*: Silver-Zinc Silvercels* provide the highest energy density available in a rechargeable battery. Both high and low rate discharge cells in capacities ranging from 100 mAH to 20,000 AH are available to match specific requirements. Applications include: portable industrial equipment, and sophisticated missile and deep submersible systems.

SILVER REMOTE PRIMARY

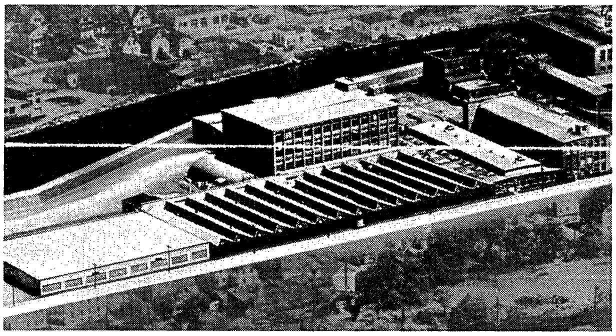


For applications requiring exceptionally high energy and/or power density, Silvercels are also produced as both primary and primary reserve batteries. These non-rechargeable battery systems can be manually or remotely activated and can be on-alert for many years.

* Registered Trademark

YARDNEY SILCAD*: Silver-Cadmium Silcad* cells combine the high energy capability of the positive silver electrode with the long-life negative cadmium electrode. With energy densities significantly higher than Nickel Cadmium and cycle life greater than Silver-Zinc, rechargeable Silcad* batteries are used in applications where both of these characteristics must be considered. In addition to portable power, Silcad* cells are used in missiles, space vehicles, and electronic devices where pure non-magnetic signatures are required.

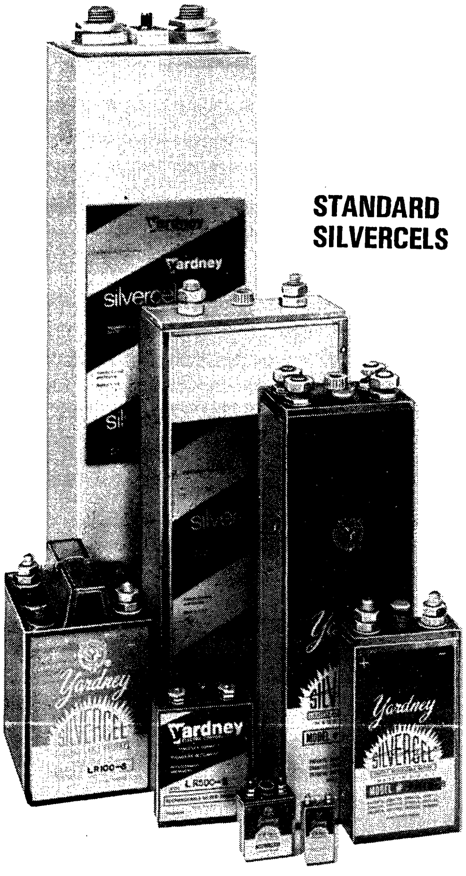
YARDNEY SILVER CHLORIDE-MAGNESIUM: Non-rechargeable high and low rate AgCl-Mg seawater batteries are unique in that they can be constructed in a pile bipolar or spiral-wound configuration. As a result, higher efficiency is achieved by eliminating the need for cell-to-cell connections. The utilization of seawater as the battery electrolyte eliminates the need to store a toxic liquid until the battery is activated. Major applications range from torpedo propulsion to buoy electronics.



YARDNEY BATTERY DIVISION

YARDNEY CORPORATION 82 Mechanic St. Pawcatuck, CT. 02891

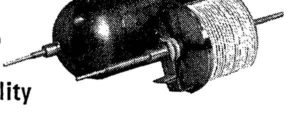
Write, phone or wire for additional information and engineering assistance.
(203) 599-1100/TWX NO. 710-470-0260/INTNL. TELEX NO. 6813114 YARDNY



STANDARD SILVERCELS

NICKEL HYDROGEN CELLS 30 AH, to 70 AH:

- Aerospace/Satellite Applications
- Geosynchronous Earth Orbit (GEO)
- Low Earth Orbit (LEO)
- Exceptionally High Cycle Life and Reliability



YARDNEY NICKEL ELECTRODE BATTERIES: Utilizing a proprietary electrochemical process, Yardney manufactures long-life Nickel-Hydrogen, Nickel-Cadmium and Nickel-Zinc batteries. Specialized cells and batteries incorporating these electrodes exhibit exceptionally high quality and reliability, far exceeding standard commercial cells and batteries.

YARDNEY CUSTOM BATTERY PACKS & SUPPORT EQUIPMENT: In addition to assembling battery packs utilizing our own high performance cells, Yardney also assembles other types of commercially available cells into custom battery packs. From a common battery in an uncommon package to an advanced sophisticated power supply, Yardney can provide complete battery systems meeting the most stringent environmental requirements. Battery charging, conditioning and monitoring systems are also available to support your maintenance needs.

YARDNEY RESOURCES: Located in Pawcatuck, Connecitcut, Yardney's resources include a dedicated and experienced engineering staff to assist in solving your battery application problems, a complete manufacturing facility with qualified personnel and a complete MIL-SPEC rated electronic, environmental and dynamic testing lab. Yardney's Quality Assurance Program, complying with MIL-Q-9858/A, fully meets the requirements of resident government/customer quality assurance representatives.

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EEM PRODUCT SELECTION GUIDES

Use the EEM Product Selection Guides. There are 34 Guides in this edition of EEM. See page 2 (A•2, B•2, C•2, D•2) of each volume to locate the Product Selection Guides that pertain to your needs.

coders · transformers · wire & cable · enclosures capacitors · circuit boards · coils, chokes, inductors · connectors, electronic · sockets/terminals

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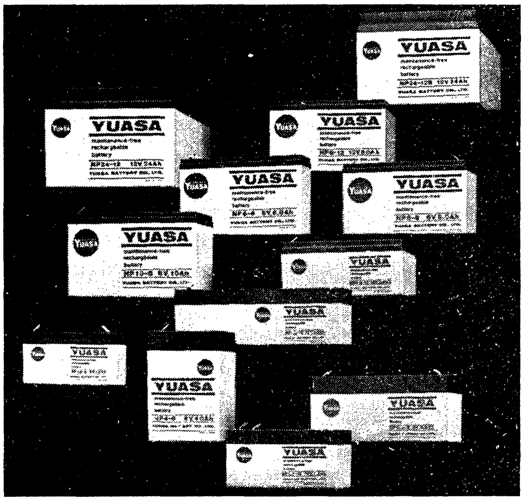
9728 Alburtis Ave., P.O. Box 3748
Santa Fe Springs, California 90670
Call (213) 949-4266 or (800) 423-4667
Telex 696272



YUASA MAINTENANCE-FREE SEALED LEAD ACID BATTERIES

FEATURES

- These compact and efficient power sources are especially designed for long life, rugged durability, and dependable service.
- Yuasa's unique suspended electrolyte and new venting systems give you the freedom to mount these batteries in any position without fear of leakage or loss of capacity.
- Unparalleled life expectancy in both float and cyclic applications.
- Available for immediate delivery from our warehouse.

COMMON SPECIFICATIONS

Operating temperature ranges

Charge: −20°C to 50°C (5°F to 122°F)

Discharge: −40°C to 50°C (−40°F to 122°F)

Storage: −40°C to 60°C (−40°F to 140°F)

Life expectancy

Standby use: 4 to 5 years

Cyclic use: 250 to 1200 cycles

Sealed construction

Can be operated, charged or stored in any position.

CHARGING METHODS

Constant Voltage Charging at 25°C

Standby use:

Maximum charging current .... 25% of rated capacity

Charging voltage** .... 2.25 to 2.30 volts per cell

Cyclic use:

Maximum charging current .... 25% of rated capacity

Charging voltage** .... 2.43 to 2.50 volts per cell

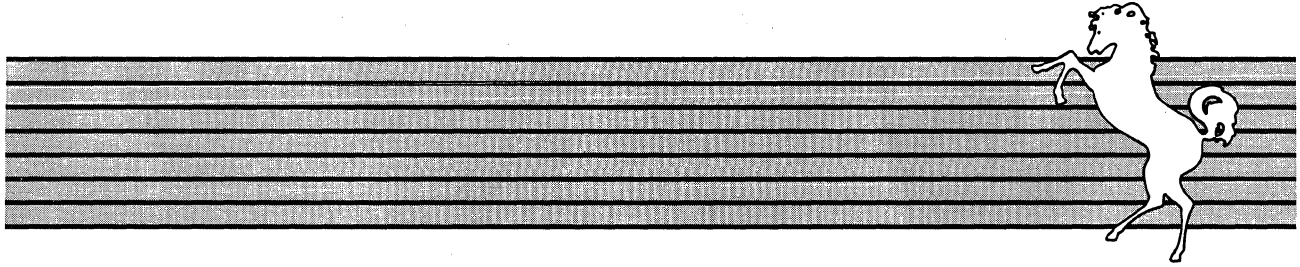
** When using a constant voltage, current limited charging system in the temperature range of 5° to 40°C (41° to 104°F), temperature compensation is not necessarily needed. Temperature compensation when required is -4mv/°C/cell.

MECHANICAL SPECIFICATIONS

	length		width		height		weight		
	mm	in.	mm	in.	mm	in.	kgs.	lbs.	terminals
NP1-6	51	(2.00)	42.5	(1.67)	51	(2.00)	10.25	(0.55)	faston tab .187
NP1.2-6	97	(3.82)	25	(.98)	50.5	(1.99)	0.34	(0.75)	faston tab .187
NP2.6-6	134	(5.27)	34	(1.33)	60	(2.36)	0.60	(1.32)	faston tab .187
NP4-6	70	(2.76)	47	(1.85)	102	(4.02)	0.90	(1.98)	faston tab .187
NP6-6	151	(5.95)	34	(1.33)	96	(3.78)	1.25	(2.75)	faston tab .187
NP8-6	151	(5.95)	50	(1.97)	96	(3.78)	1.65	(3.63)	faston tab .187
NP10-6	151	(5.95)	50	(1.97)	96	(3.78)	2.20	(4.85)	faston tab .187
NP1.2-12	97	(3.82)	48	(1.89)	50.5	(1.99)	0.59	(1.30)	faston tab .187
NP1.9-12	178	(7.01)	34	(1.33)	59	(2.36)	0.90	(1.98)	faston tab .187
NP2.6-12	134	(5.27)	67	(2.64)	60	(2.36)	1.10	(2.42)	faston tab .187
NP6-12	151	(5.95)	65	(2.56)	96	(3.78)	2.40	(5.28)	faston tab .187
NP24-12	166	(6.54)	175	(6.89)	125	(4.92)	7.70	(17.0)	faston tab .250 bolt terminal
NP38-12	197	(7.76)	165	(6.50)	170	(6.69)	14.00	(30.9)	bolt terminal

DISCHARGE RATES

6 VOLTS	20 hr.	10 hr.	5 hr.	3 hr.	1 hr.	12 VOLTS	20 hr.	10 hr.	5 hr.	3 hr.	1 hr.
NP1-6 6v1.0AH	0.05A	0.09A	0.17A	0.25A	0.60A	NP1.2-12 12v1.2AH	0.06A	0.11A	0.20A	0.30A	0.70A
NP1.2-6 6v1.2AH	0.06A	0.11A	0.20A	0.30A	0.70A	NP1.9-12 12v1.9AH	0.095A	0.18A	0.32A	0.50A	1.10A
NP2.6-6 6v2.6AH	0.13A	0.24A	0.44A	0.66A	1.60A	NP2.6-12 12v2.6AH	0.13A	0.24A	0.44A	0.66A	1.60A
NP4-6 6v4AH	0.20A	0.37A	0.68A	1.00A	2.40A	NP6-12 12v6AH	0.30A	0.56A	1.02A	1.50A	3.60A
NP6-6 6v6AH	0.30A	0.56A	1.02A	1.50A	3.60A	NP24-12 12v24AH	1.20A	2.23A	4.08A	6.85A	14.40A
NP8-6 6v8AH	0.40A	0.74A	1.36A	2.00A	4.80A	NP38-12 12v38AH	1.90A	3.50A	6.46A	9.50A	22.80A
NP10-6 6v10AH	0.50A	0.93A	1.70A	2.50A	6.00A						



From 1/2 to 1,500 watts, there's no power supply problem we can't solve.

PACKAGED POWER® The world has a new leader in power supplies!

Computer Products Inc. combines the resources of our Compower, Power Products, Stevens-Arnold and Power Products Ltd. (Ireland) Divisions.

Our new name stands for technological leadership. We can create and deliver virtually any type and size power supply you will **ever** need:

- AC/DC Linears, 1 W to 150 W
- AC/DC Switchers, 15 W to 2000 W
- AC/DC UPS Systems, 25 W to 500 W
- DC/DC Converters, 1/2 W to 800 W

All are backed by our no-hassle two-year warranty, which is seldom needed. Because the word **reliability** was invented just for us.

And we offer high-quality design and application assistance, prototype services and a host of other supports we call PACKAGED POWER.

Turn the page and you'll find our short-form catalog — complete specifications on the industry's widest selection of high-quality power supplies (see pages D•1551 through D•1585).

For more specifics, contact us for product literature and our free informative booklet, "How to Get the Best Value for Your Power Supply Dollar."

See Pages D•1551 through D•1585

COMPUTER PRODUCTS™
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World leader in power-supply technology. Custom, special, and standard units.

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Power Products Division • Stevens-Arnold Division • Compower Division • Power Products Ltd. (Ireland)

POWER SUPPLIES, DC

Manufacturer	Starting on EEM Page No.	Output						Dual	Three or More	Pro-grammable	DC-DC Converter	Linear	Switching	Open Frame	Encapsulated	Enclosed/ Modular	Lab or System
		Volts (V)			Current (A)												
		<28	28.01-1000	>1000	<1	1-1000	>1000										
Abbott Transistor	D•1449*	●	●		●	●		●	●	●	●	●	●	●	●	●	●
Acopian	D•1463*	●	●		●	●		●	●	●	●	●			●	●	●
Adtech Power	D•1499*	●	●		●	●			●				●	●			
Applied Power Conversion	D•1500*	●	●		●	●		●	●		●		●	●		●	
Arnold Magnetics	D•1496*	●	●	●	●	●		●	●		●		●		●	●	
Astec	D•1512	●	●		●	●					●			●		●	
Astron	D•1515	●				●						●				●	●
Astrosystems	D•1517*	●			●	●		●	●	●		●				●	●
Ault	D•1518	●	●		●	●		●				●	●			●	
B & K Precision	D•1521	●			●	●		●	●			●				●	●
Bertan Associates	D•1522*		●	●	●	●	●	●	●	●	●	●	●			●	●
Bikor Corp.	D•1536	●	●		●	●		●	●			●	●	●			
Boschert	D•1537	●	●		●	●		●	●		●		●	●		●	
Calex Manufacturing	D•1542	●	●		●	●		●	●		●	●	●		●		
California DC	D•1546	●			●	●		●	●				●	●			
Christie Electric	D•1547*	●	●		●	●	●					●					●
Computer Products	D•1551	●	●		●	●		●	●	●	●	●	●	●	●	●	
Condor, Inc.	D•1587	●			●	●		●	●			●	●	●			
Converter Concepts	D•1600	●	●		●	●		●	●		●		●	●		●	
CPS Div. Vector Gen.	D•1607*			●				●	●	●		●			●	●	●
Cord Electronics	D•1605	●			●	●		●	●				●	●			
Cost Effective Systems	D•1606	●	●										●				
Crestronics	D•1609		●	●		●				●	●					●	
D & B Power, Inc.	D•1610*	●			●	●						●				●	
Del Electronics	D•1614	●	●	●	●					●		●	●			●	●
Delta Electronic	D•1616	●			●	●							●	●		●	
Displex, Inc.	D•1619*	●	●		●	●					●		●	●		●	
DVE/Caltronic Co.	D•1613	●			●	●		●	●				●	●		●	
EG&G Almond Instrs.	D•1620*	●	●		●	●		●	●		●	●	●			●	
Electronic Measurements	D•1622	●	●		●	●	●	●	●	●		●				●	●
Elpac Power Sys.	D•1626	●	●		●	●		●	●		●	●	●	●		●	
EMCO High Voltage Co.	D•1632*	●	●	●	●	●	●	●		●	●	●	●		●	●	
Endicott Research	D•1633	●	●		●			●			●				●		
EPSCO, Inc.	D•1634	●	●		●	●		●				●				●	●
ERA Transpac	D•1635*	●	●		●	●		●	●				●	●			
ETM Electromatic	D•1638			●			●										●
EVI, Inc.	D•1639	●	●		●											●	●
Ferrotran Electronics	D•1640*	●	●	●	●	●		●				●				●	
Frederick Comps.	D•1643	●						●	●				●	●		●	
Gamma High Voltage	D•1644			●	●	●				●		●			●	●	●
GFC/Hammond	D•1647	●			●	●		●	●			●	●			●	
Glassman High Voltage	D•1648			●	●					●				●		●	●
Hewlett Packard	D•1653	●	●	●	●	●		●	●	●		●		●		●	●
Hipotronics	D•1658			●	●	●										●	●
Hitran	D•1660	●	●	●	●	●	●	●			●	●		●		●	●
Integrated Circuits	D•1661*	●			●	●		●			●	●	●		●	●	
Interelectronics	D•1667*	●	●	●							●	●			●	●	
Intl. High Voltage	D•1668			●	●							●				●	●
International Power	D•1670*	●	●		●	●		●	●					●		●	
Intronics	D•1676	●			●	●		●			●	●			●	●	
Jerome Industries	D•1678	●			●	●		●	●			●			●	●	
Kaiser Systems	D•1680			●	●			●	●			●	●			●	
KEC Electronics	D•1685	●			●	●		●	●				●	●		●	
Keltec Florida	D•1688*	●		●		●		●	●		●	●	●	●		●	

* Mil. Spec.

POWER SUPPLIES, DC (Con't.)

Manufacturer	Starting on EEM Page No.	Output						Dual	Three or More	Pro-gram-mable	DC-DC Con-verter	Linear	Switch-ing	Open Frame	Encap-sulated	En-closed/ Modular	Lab or System
		Volts (V)			Current (A)												
		<28	28.01-1000	>1000	<1	1-1000	>1000										
KEPCO, Inc.	D•1689	●	●	●	●	●		●	●	●	●	●	●	●		●	●
KGS Electronics	D•1715	●			●	●					●					●	
Kikusui Intl.	D•1652	●	●					●		●		●				●	●
Laser-Sonics	D•1719	●	●	●				●	●	●	●	●	●	●		●	
LZR Electronics	D•1716	●	●		●	●			●						●		
Microcomputer Power	D•1721	●	●		●	●		●	●				●	●			
Mid-Eastern Industries	D•1724*		●		●	●				●		●	●	●		●	●
Modular Devices	D•1727*	●	●						●		●		●	●			
Multi Products	D•1728	●			●	●		●	●			●				●	
Murata Erie	D•1729		●	●	●			●				●			●	●	
National Power Technlg.	D•1730	●				●		●	●				●	●			
NJE	D•1733	●	●			●		●	●			●	●	●		●	●
North Hills	D•1734	●	●	●	●	●		●		●		●				●	●
NWL Transformers	D•1735							●	●			●	●	●		●	
OPT Industries	D•1736*	●				●		●	●				●			●	
Oram Electronics	D•1740		●	●		●	●										●
Pan-Magnetics	D•1742	●	●		●	●		●	●			●	●	●	●	●	
Penn-Tron Corp.	D•1741				●							●				●	
Pico Electronics	D•1744	●	●		●			●			●		●			●	
Pioneer Magnetics	D•1752	●	●			●		●	●	●	●		●			●	
Power Designs	D•1755	●	●	●	●	●		●	●	●		●				●	●
Power General	D•1760	●			●	●		●	●		●		●	●	●	●	
Power-One	D•1768	●	●		●	●		●	●			●	●	●			
Power Pac Inc.	D•1774	●	●		●	●		●	●			●	●	●			
Power Systems	D•1780	●	●					●	●			●		●		●	●
Powertec	D•1782	●	●		●	●		●	●			●	●	●		●	
Power Ten	D•1779*	●	●														
Prime Power	D•1801	●	●		●	●		●	●				●	●		●	
Qualidyne Systems	D•1803*	●	●		●	●		●	●				●	●		●	
RIFA, Inc.	D•1810	●	●		●	●		●	●		●		●		●	●	
RO Associates	D•1812*	●	●		●	●		●	●		●		●	●		●	
RTE/Power/Mate	D•1816*	●			●	●			●			●	●	●	●		
S & H Industries	D•1829			●		●		●				●				●	
Secoinsa Digi-power	D•1830*	●	●		●	●		●	●			●	●	●		●	
Sierracin/Power Sys.	D•1834	●			●	●		●	●			●	●	●			
Sola	D•1838	●				●		●	●				●	●			
Spellman	D•1840			●	●	●				●						●	●
Standard Energy	D•1844			●	●	●		●	●	●	●	●	●		●	●	●
Summit Electronics	D•1846	●				●		●	●		●	●	●	●		●	
Taylor Electronics	D•1848	●	●			●		●	●			●				●	
TDK Corp.	D•1849	●						●	●		●	●			●	●	
Technipower	D•1850*	●	●					●	●		●	●	●	●	●		
Technology Dynamics	D•1851*	●	●		●	●		●	●		●		●	●		●	
TII Electronics	D•1852	●				●		●	●				●	●		●	
Todd Products	D•1854	●	●			●		●	●				●	●		●	
Toko America	D•1856	●	●		●	●		●	●		●		●	●		●	
Transformation Elctrns.	D•1857	●			●			●	●			●	●			●	
Universal Voltronics	D•1858			●								●				●	●
Varian Canada	D•1859*		●	●		●	●	●	●	●	●	●	●	●		●	●
Venus Scientific	D•1863			●	●			●	●		●					●	
Viz	D•1864	●	●		●	●		●	●							●	●
Voltex	D•1865	●	●	●								●	●	●		●	
Wilmore Electronics	D•1867	●	●	●	●	●					●	●	●	●	●	●	●
Xentek, Inc.	D•1870	●			●	●		●	●			●		●			
Xylog Corp.	D•1875	●				●			●				●	●			

* Mil. Spec.

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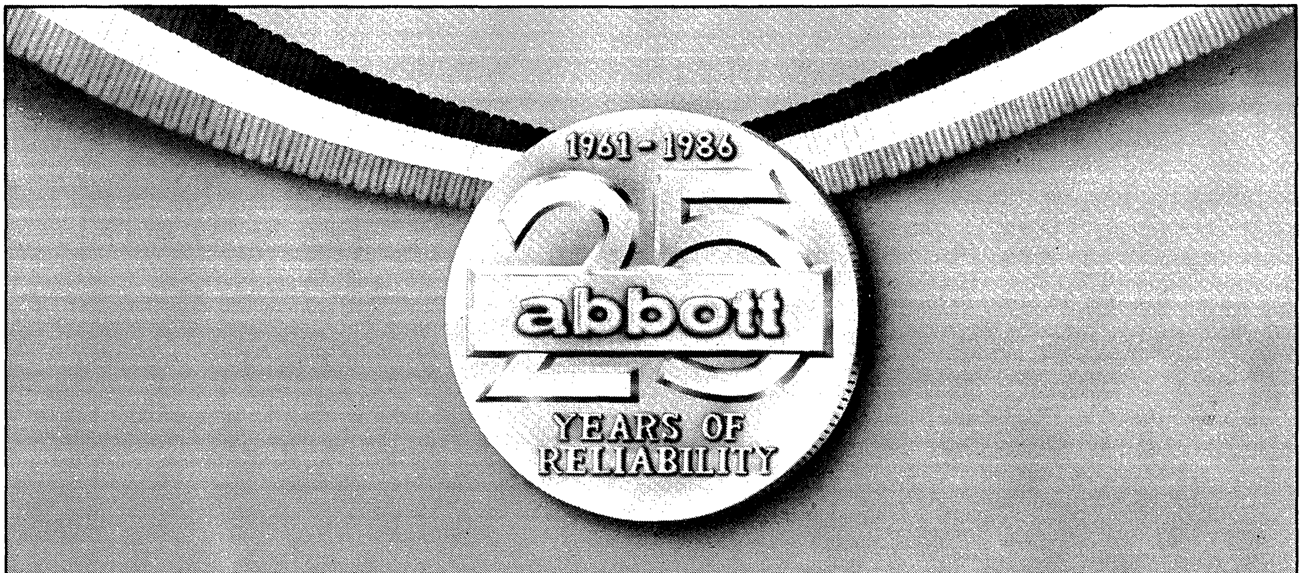
MILITARY - INDUSTRIAL

Power Supply Modules



When reliability is imperative.™

For Mil Spec and critical industrial applications where reliability is the prime consideration, Abbott Power Supplies have been the predominant choice for the past 25 years. This enduring acceptance has been earned through sound design, dependable components, meticulous workmanship, exhaustive quality control and proven performance in the field under severe operating conditions. Whatever your demanding requirements, you will find the correct Abbott Power Supply module in the next 12 pages.

686 models are listed on the next 12 pages

MILITARY POWER SUPPLIES

FUNCTION	DESCRIPTION	MODEL	PAGE
AC to DC			
60/400 Hz to 5-28 VDC	High density single/dual outputs	Model LV	D•1450
50-60 Hz to 5-28 VDC	High efficiency low EMI switcher	Model M	D•1451
400 Hz to 5-100 VDC	High performance single and dual outputs	Model W, WW	D•1453
400 Hz to 5-28 VDC	High density 3φ single/dual output	Model WL, WWL	D•1454
DC to DC			
20-32 VDC to 5-28 VDC	High efficiency switcher, single output	Model BA	D•1455
20-32 VDC to 5-50 VDC	High efficiency switcher single and dual outputs	Model BN, BBN	D•1456
20-32 VDC to 5-50 VDC	High performance single and dual outputs	Model C, CC	D•1457
24-30 VDC to 5-500 VDC	High reliability linear	Model B	D•1458
DC to AC			
22-32 VDC to 400-1600 Hz	Sine Wave Inverter	Model S	D•1459

INDUSTRIAL POWER SUPPLIES

FUNCTION	DESCRIPTION	MODEL	PAGE
AC to DC			
50-60 Hz to 5-30 VDC	Single and multiple output, high density switchers	Model ZB, ZBT, ZBQ	D•1460
50-440 Hz to 5-28 VDC	Open frame single and dual output	Model NL	D•1461
50-420 Hz to 5-30 VDC	High reliability linear single and dual outputs high temperature	Model RN, RRN	D•1461
DC to AC			
12-48 VDC to 50-440 Hz	High reliability inverters	Models KN, PN, LN, TN	D•1884
	In AC Power Supply Section Page		

Case Dimensions, Models W, WW, BN, BBN, C, CC, B and S — see page D•1459

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MILITARY POWER SUPPLIES

60/400 Hz to 5-28 VDC

MODEL LV

SPECIFICATIONS

INPUT VOLTAGE RANGE: 105 to 125 VRMS.

EFFICIENCY: Typical efficiency 35% for 5V, 65% for 28V.

LINE REGULATION: 0.05% (±1 VC for LLV model).

LOAD REGULATION: 0.10%.

PARD (NOISE & RIPPLE): 1 mVRMS, 5 mV ptp.

INPUT FREQUENCY RANGE: 55 to 65/380 to 420 Hz. Units may be operated down to 47 Hz with 20% derating.

OUTPUT ADJUSTMENT RANGE: ±5% of nominal at output terminals.

INSULATION VOLTAGE: 500 VDC input to case, input to output and output to case.

INSULATION RESISTANCE: 50 megohms minimum between input and output, input and case when measured at 50 VDC.

POLARITY: Inputs and outputs are isolated, either positive or negative output may be grounded.

TEMPERATURE RANGE: Operating: −20°C to +71°C, −40°C to +85°C optional (please consult your nearest Abbott Sales Office for details). Storage temperatures: −55°C to +85°C.

TEMPERATURE EFFECT COEFFICIENT: 0.01% per degree Celsius over entire range.

ENVIRONMENT: Hermetically sealed and encapsulated to meet MIL-STD-810C, including altitude (to 1.3 inches of Hg), acceleration, vibration, shock and temperature altitude cycling. Unit meets MIL-S-901 (5 ft. hammer drop). Copies of certified test reports are available upon request.

ADJUSTMENT RANGE: Unit is equipped with an internal potentiometer. An external adjustment potentiometer is available. Please consult your nearest Abbott Sales Office.

SHORT CIRCUIT PROTECTION: Each unit is completely protected against an overload or short circuit of any duration. The output voltage automatically restores to normal when the overload is removed.

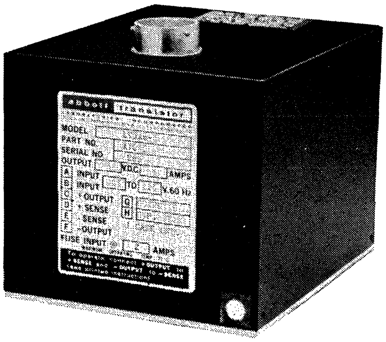
INPUT TRANSIENT PROTECTION: 143.8 VRMS, for 0.3 seconds.

REMOTE ERROR SENSING: Each unit contains a means by which the regulator circuit monitors the voltage directly at the load using extra "sensing" leads. The regulator circuit action compensates for a DC voltage drop up to 0.3 volts in the load leads.

LOAD TRANSIENT: Output voltage returns to regulation limit within 100 microseconds after 50% step change in load current.

ELECTROMAGNETIC INTERFERENCE: Meets MIL-STD-461A, methods CE01 and CE03 for conducted emissions.

RELIABILITY: The Mean Time Between Failure (MTBF) per MIL-HDBK-217D under operating conditions of +50°C baseplate temperature, maximum rated output power for LV5DE20-1 was calculated to be 69,987 hrs. for ground benign environment and 10,384 hrs, for naval sheltered environment. MTBF for LLV12DE0.5-1 was calculated to be 186,947 hrs. for a ground benign environment and 30,081 for naval sheltered environment. With Enhanced Reliability Option (ER) MTBF for LV5DE20-1 (ER) was calculated to be 236,033 hrs. for ground benign environment and 35,585 hrs. for naval sheltered environment. For LLV12DE0.5-1 (ER) MTBF was calculated to be 330,349 hrs. for ground benign environment and 50,682 hrs. for a naval sheltered environment.



FEATURES

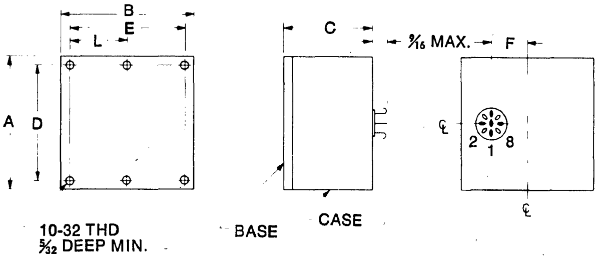
- Up to 65% efficiency
- Low Output Ripple, 5 mV peak-to-peak
- 0.1% Regulation
- High Density
- Single and Dual Outputs

SINGLE OUTPUT: LV SERIES

Output Voltage Range (VDC)	Output Current (Amps)	Size (see Dwg.)	Weight (Lbs.)	Model Number
4.75 to 5.25	2.4	9A	3.1	LV5DE2.4
	6.0	11C	5.8	LV5DE6
	10.0	12A	7.7	LV5DE10
	20.0	13B	10.9	LV5DE20
11.4 to 12.6	1.7	9A	3.1	LV12DE1.7
	4.0	11C	5.8	LV12DE4
	7.5	12A	7.7	LV12DE7.5
14.2 to 15.7	1.5	9A	3.1	LV15DE1.5
	3.0	11C	5.8	LV15DE3
14.5 to 15.5	4.0	12A	7.7	LV15DE4
22.8 to 25.2	0.9	9A	3.1	LV24DE0.9
	2.5	11C	5.8	LV24DE2.5
	3.9	12A	7.7	LV24DE3.9
	7.5	13B	10.9	LV24DE7.5
26.6 to 29.4	0.75	9A	3.1	LV28DE0.75
	2.0	11C	5.6	LV28DE2
	3.15	12A	7.5	LV28DE3.15
	7.5	13B	10.9	LV28DE7.5

DUAL OUTPUT: LLV SERIES

Output Voltage Range (VDC)	Output Current (Amps)	Size (see Dwg.)	Weight (Lbs)	Model Number
±11 to ±13	0.5	11N	3.6	LLV12DE0.5
	0.9	12K	4.8	LLV12DE0.9
	1.5	13D	6.6	LLV12DE1.5
±14 to ±16	0.5	11N	3.6	LLV15DE0.5
	0.9	12K	4.8	LLV15DE0.9
	1.5	13D	6.6	LLV15DE1.5



SIZE	A	B	C	D	E	F	L
9A	2.75	4.75	3.75	2.25	4.25	0.875	—
11C	4.25	5.25	4	3.75	4.75	1.875	2.375
12A	4.5	6	4	4	5.5	2.25	2.75
13B	5.5	6.5	5	5	6	2.188	3

SIZE	A	B	C	D	E	F	L
11N	3	6	3.375	2.5	5.5	2	—
12K	4	6.25	3.375	3.5	5.75	0.875	2.875
13D	5.5	6	3.375	5	5.5	1.25	2.5

OPTIONAL FEATURES

TTL: (L Option) Abbott provides an isolated pair of terminals used to turn-on and turn-off the regulator portion of the power supply. The unit remains in an idling state while the output is off. The power supply will turn-on with TTL logic "1", and turn-off with TTL logic "0". To specify this feature, please add an "L" to the character after the character "E" in the model number. (EXAMPLE: LV5DE6 to LV5DEL5)

SPECIAL CONNECTORS: A hermetically sealed military-type connector is available for the LV series (as shown in picture). Please consult your nearest Abbott Sales Office for details.

WIDER OPERATING TEMPERATURE RANGE: (T Option) −40°C to +85°C operating temperature range available. Please consult your nearest Abbott Sales Office for details.

OVER TEMPERATURE PROTECTION: (OT Option) Removes input power when conduction surfaces exceed safe limits. Please consult your nearest Abbott Sales Office for details.

OVERVOLTAGE PROTECTION: (-1 Option) An internal crowbar type OVP is available. Unit will crowbar output when output voltage exceeds adjustable set point. Unit input power must be recycled to restore unit. To specify this feature, please add a "-1" after the last number in the model number. (EXAMPLE: LV5DE6 to LV5DE6-1)

WIDER INPUT VOLTAGE RANGE: (H Option) Available at a voltage range 210 to 250 VAC. Please consult your nearest Abbott Sales Office for details.

ENHANCED RELIABILITY: (ER OPTION) This option provides increased reliability by using a higher level of military grade components. This feature allows the power supply to meet customer-specific requirements as to "Hi-Rel" components.

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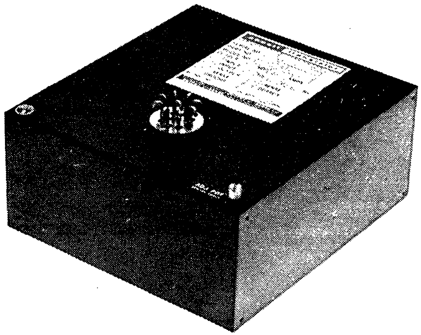
MILITARY POWER SUPPLIES

Switching Power Supplies

MODEL
M



103.5-126.5 VAC to 4.7-29.7 VDC 47 to 440 Hz. 1 Ø

- Tight line and load regulation.
- Wide temperature range.
- High reliability.
- Encapsulated and hermetically sealed. Meets MIL-STD-810C and MIL-S-901.
- Low EMI. Meets MIL-STD-461A, (Radiated C.E. and C.S. specs) with F option.
- High efficiency. 75% to 81% typical.
- Internal OVP available.
- Remote programming optional.
- TTL compatibility available.

SPECIFICATIONS

INPUT VOLTAGE: 103.5 to 126.5 Vac, (Vrms) single phase, 47 to 440 Hz. Wide input option is available.

INPUT TRANSIENT PROTECTION: Unit will withstand 143.8 Vac for 0.3 seconds in accordance with MIL-STD-1399.

INRUSH CURENT:

MAXIMUM:	(M-50)	16 times the peak input current at low line, full load output, and nominal output voltage, with source impedance of no less than 0.25 ohm.
	(M-100)	8 times the peak input current at low line, full load output, and nominal output voltage, with source impedance of no less than 0.25 ohm.
TYPICAL:	(M-50)	8 times the peak input current under the same conditions.
	(M-100)	4 times the peak input current under the same conditions.

EFFICIENCY: Minimum 65% @ FL, 25°C baseplate temperature and nominal output. Typical efficiency is 75-81% under same conditions.

LINE REGULATION: Within 0.2% or 25mV, whichever is greater for input change of 103.5 to 126.5 Vac, (Vrms) with load constant.

LOAD REGULATION: Within 0.2% or 25mV, whichever is greater for load change of NL to FL with line constant.

RIPPLE & NOISE: 30mVrms, 100mV, whichever is greater for load change of NL to FL with line constant.

LOAD TRANSIENT RECOVERY TIME: Output Voltage returns to regulation limits within 3 msec after a 50% change in load current. Maximum over/under shoot is less than 0.4 Vdc or 3% of the output voltage, whichever is greater.

BROWNOUT HOLDUP-TIME: 15 msec. minimum at low line and maximum output current, 30 msec. typical at nominal line and maximum output current.

OPERATING TEMPERATURE RANGE: 0°C to 71°C. Wider temperature range is available.

STORAGE TEMPERATURE: −55°C to +85°C.

TEMPERATURE COEFFICIENT: 0.03% per degree Celsius maximum.

ISOLATION: 500 Vdc input to output and input to case. 100 Vdc output to case.

INSULATION RESISTANCE: 50 megohms minimum between input and output, input to case, and output to case when measured at 50 Vdc (Input pins tied together, Output pins tied together).

POLARITY: Input and outputs are isolated, either positive or negative side may be grounded.

OUTPUT VOLTAGE ADJUSTMENT: Output continuously adjustable between the limits shown by means of an externally accessible adjustment potentiometer.

ADJUSTMENT RESOLUTION:	NOMINAL OUTPUT VOLTAGE	RESOLUTION
	5, 12, 15 Vdc units	35 milivolts
	24, 28 Vdc units	60 milivolts

REMOTE ERROR SENSING: Each unit contains a means by which the regulator circuit monitors the voltage directly at the load using extra "Sensing" leads. The resulting circuit action compensates for a dc voltage drop up to 0.3 volts in the load leads.

OUTPUT IMPEDANCE: dc to 1 KHz; .03 R_L^* or 0.5 ohm, whichever is greater. 1 KHz to 10 KHz: 0.5 R_L or 0.1 ohm, whichever is greater. 10 KHz to .100 KHz: 0.7 R_L to 0.3 ohm, whichever is greater. * Rate loaded.

SHORT CIRCUIT PROTECTION: Each unit is completely protected against a short circuit of any duration. Unit automatically recovers to normal when short circuit is removed.

ENVIRONMENT: Unit is hermetically sealed to meet MIL-STD-810C. Unit meets MIL-S-901 (5 foot hammer drop). Certified test reports are available.

EMI: Units meet MIL-STD-461A, CE01, CE03 with optional filter.

JUNCTION TEMPERATURE: Maximum Junction Temperature of the power transistors is 85°C. Complies with NAVMAT NOTE 3080.

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MILITARY POWER SUPPLIES

Switching Power Supplies

MODEL M

OPTIONAL FEATURES

TTL: (L Option) Abbott provides an isolated pair of terminals used to turn-on and turn-off the regulator portion of the power supply. The unit remains in an idling state while the output is off. The power supply will turn-on with TTL logic "I", and turn-off with TTL logic "0". To specify this feature, please add an "L" to the character preceding the first dash of the model number. EXAMPLE: M100DL-5A, M50DL-5A

OVER-VOLTAGE PROTECTION: (-1 Option) An internal non-crowbar type OVP is available. Power supply turns off when output voltage exceeds set point. Unit input power must be recycled to restore output. To specify this feature, please add a "-1" after the "A" in the model number. EXAMPLE: M100DT-5A-1, M50D-5A-1

WIDER OPERATING TEMPERATURE RANGE: (T Option) −20°C to +71°C peak to peak output ripple spec increases to 200mV. To specify this option, please add a "T" to the character preceding the dash of the model number. EXAMPLE: M100DT-5A, M50DT-5A

SPECIAL CONNECTORS: A hermetically sealed military-type connector is available for the M Series. Please consult your nearest Abbott Sales Office for details.

WIDER INPUT VOLTAGE RANGE: (H Option) The standard input voltage range of the "M" line is 103.5 to 126.5 Vac. For the wider input voltage range of 90-126.5 Vac; output current is derated by 20%. To specify this feature, please add an "H" to the character preceding the first dash in the model number. EXAMPLE: M100DH-5A, M50DH-5A

REMOTE PROGRAM OPTION: (R Option) Units can be modified so that their output voltage can be adjusted from a remote location. This is accomplished by adding an additional pin to the header on the unit. To specify this option, please add an "R" after the character preceding the first dash of the model number. EXAMPLE: M100DR-5A, M50DR-5A

EMI FILTER: (F option) An internal EMI filter is available to reduce conducted interference on the input leads. With these filters the model M's will comply with MIL-STD-461A notice 3, CE01 and CE03 on the input leads. The addition of this filter alters the isolation of the input to case to 200 Vdc. To specify this feature, please add an "F" after the "D" in the model number. EXAMPLE: M100DF-5A, M50DF-5A

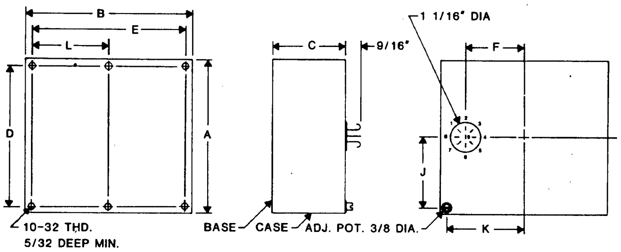
ENHANCED RELIABILITY: (ER Option) This option provides increased reliability by using higher levels of Mil. grade components. This feature allows the power supply to meet customer specific requirements as to "Hi Rel" components, environmental testing and extended Thermal Cycling. Please consult your nearest Abbott Sales Office for details.

SPECIAL ENCAPSULATION: (E Option) All of our hermetically sealed power modules are encapsulated to meet or exceed the shock, acceleration, and vibration requirements of MIL-STD-810C. Special encapsulation to enable these modules to withstand higher shock levels of 60g's, acceleration levels of 50g's, and vibration levels of 30g's, is available. To specify this feature, please add an "E" after the character preceding the first dash in the model number. EXAMPLE: M100DE-5A, M50DE-5A

TEN STANDARD MODELS

Output Voltage Range	Output Current (Amps)	Weight (Lbs.)	Model Number
4.7-5.3	10.0	4.0	M50D-5A
	20.0	5.0	M100D-5A
11.25-12.75	4.15	4.0	M50D-12A
	8.3	5.0	M100D-12A
14.1-15.9	3.35	4.0	M50D-15A
	6.7	5.0	M100D-15A
22.5-25.5	2.1	4.0	M50D-24A
	4.2	5.0	M100D-24A
26.3-29.7	1.8	4.0	M50D-28A
	3.6	5.0	M100D-28A

MECHANICAL DIMENSIONS



MODEL	A	B	C	D	E	F	J	K	L
M100	5¾	6¼	2¾	5.25	5.75	2 3/16	2⅝	2⅞	2.88
M50	3⅞	6¼	2¾	3.38	5.75	2 7/16	1 11/16	2⅞	—

TOLERANCES:	FRACTION — ±1/32, DECIMAL — ±.015
MATERIAL:	BASE — ALUMINUM 6061-T6, CASE-STEEL
FINISH:	BLACK FLAT LACQUER FED. STD. 595 COLOR 37038

PIN DESIGNATIONS:

1 AC INPUT
2 AC INPUT
3 −SENSE
4 −OUTPUT (DC)
5 −OUTPUT (DC)
6 +OUTPUT (DC)
7 +OUTPUT (DC)
8 +SENSE
9 CASE GROUND

RELIABILITY

RELIABILITY: MTBF for the Standard version calculated per MIL-HDBK-217D (50°C baseplate temperature, maximum operating input voltage, and maximum rated output power) is shown below.

Model Number	Baseline Temp.	Environment	MTBF
M50D-5A-1 (STD)	50°C	Ground Benign	100,659 hrs.
M50D-5A-1 (STD)	50°C	Naval Sheltered	16,819 hrs.
M100D-5A-1 (STD)	50°C	Ground Benign	71,126 hrs.
M100D-5A-1 (STD)	50°C	Naval Sheltered	11,214 hrs.

ENHANCED RELIABILITY: Abbott offers a higher MTBF unit, as shown below. (see optional features)

Model Number	Baseplate Temp.	Environment	MTBF
M50D-5A-1 (ER)	50°C	Ground Benign	187,251 hrs.
M50D-5A-1 (ER)	50°C	Naval Sheltered	29,261 hrs.
M100D-5A-1 (ER)	50°C	Ground Benign	119,095 hrs.
M100D-5A-1 (ER)	50°C	Naval Sheltered	18,350 hrs.

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abbott
MILITARY POWER SUPPLIES

400 Hz to 5-27 VDC

MODEL
W
and WW

SPECIFICATIONS

INPUT VOLTAGE RANGE: 105 to 125 VRMS

INPUT FREQUENCY RANGE: 380 to 420 Hertz, 1 phase

INPUT POWER: Per MIL-STD-704A for category B equipment

LINE REGULATION: 0.1% (0.2% for duals) or 10 mv (whichever is greater) for input change of 105 to 125 VRMS with load constant

LOAD REGULATION: 0.1% (0.2% for duals) or 20 mv (whichever is greater) for change from no load to full load with line constant

RIPPLE: 0.02% or 5 mv RMS (whichever is greater) 25 mv peak-to-peak maximum, each output, measured with scope having 25 MHz bandwidth

OUTPUT VOLTAGE ADJUSTMENT: Voltage is continuously adjustable between the limits shown in the table by means of an externally accessible screwdriver adjustment potentiometer

TRACKING ACCURACY: The negative output will track the positive output to within 1.0% or 100 mv (whichever is greater) for all rated conditions of input voltage, output current, operating temperature, and output voltage adjustment

ISOLATION VOLTAGE: 750 vdc input to output and input to case • 200 vdc output to case

INSULATION RESISTANCE: 50 megohms minimum between input and output, input and case, and output and case when measured at 50 vdc.

POLARITY: Inputs and outputs are isolated, either positive or negative side may be grounded

TEMPERATURE RANGE: Operating: −55°C to +100°C maximum at center of mounting base Storage: −65°C to +125°C

TEMPERATURE COEFFICIENT: 0.03% per degree Celsius maximum

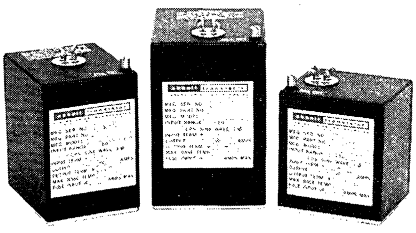
ENVIRONMENT: Encapsulated to meet the environmental requirements of MIL-STD-810C and MIL-E-5400P, Class 2, including: altitude (to a vacuum), vibration, shock, acceleration, sand, dust, humidity, salt spray, fungus, explosion, etc.

SHORT CIRCUIT PROTECTION: Each unit is completely protected against an overload or short circuit of any duration. The output automatically restores to normal when the overload is removed

INPUT TRANSIENT PROTECTION: MIL-STD-704A Figure 3, Limit 1 (180 VAC for 0.1 seconds)

LOAD TRANSIENT RECOVERY TIME: Output voltage returns to regulation limits within 100 microseconds (200 microseconds for duals) after 50% step change in load current

ELECTROMAGNETIC INTERFERENCE: Built to meet the requirements of MIL-STD-461 for generation of and susceptibility to radiated and conducted interference



High Performance

- Encapsulated and hermetically sealed to meet MIL-STD-810C and MIL-E-5400P, Class 2.
- Operating temperature range: −55°C to +100°C.
- Low Peak-to-Peak Ripple.
- Tight line and load regulation.
- High reliability. Up to 214,600 hrs. MTBF per MIL-HDBK-217C.
- Compact. Power density up to 2 watts per cu. in.
- Low EMI.

RELIABILITY: MTBF per MIL-HDBK-217C up to 214.600 Hrs.

OVER-VOLTAGE PROTECTION*: An internal, non-crowbar type OVP is available. Power supply turns off when output voltage exceeds set-point.

TTL*: Abbott provides an isolated pair of terminals used to turn-on and turn-off the regulator portion of the power supply. The unit remains in an idling state while the output is off.

* Inclusion of these optional features on these models will most likely require that the case size increases slightly. Please consult nearest Abbott sales office for further details.

Output Voltage Range	Output Curr. (Amps)	Size*	Wt. (Lbs.)	Model Number
4.5-5.5	2.5	2E	1.9	W5D2.5
	5.0	4D	2.7	W5D5.0
	10.0	10B	5.1	W5D10
	15.0	14C	8.9	W5D15
	20.0	14C	8.9	W5D20
5.5-6.5	2.5	2E	1.9	W6D2.5
	5.0	4D	2.7	W6D5.0
	10.0	10B	5.1	W6D10
	15.0	14C	8.9	W6D15
	20.0	14C	8.9	W6D20
6.5-7.5	2.5	2E	1.9	W7D2.5
	5.0	4D	2.7	W7D5.0
	10.0	10B	5.1	W7D10
	15.0	14C	8.9	W7D15
	20.0	14C	8.9	W7D20
7.5-8.5	2.5	2E	1.9	W8D2.5
	5.0	4D	2.7	W8D5.0
	10.0	10B	5.1	W8D10
	15.0	14C	8.9	W8D15
	20.0	14C	8.9	W8D20
8.5-9.5	2.5	2E	1.9	W9D2.5
	5.0	4D	2.7	W9D5.0
	10.0	10B	5.1	W9D10
	15.0	14C	8.9	W9D15
	20.0	14C	8.9	W9D20
9.5-10.5	2.5	2E	1.9	W10D2.5
	5.0	4D	2.7	W10D5.0
	10.0	10B	5.1	W10D10
	15.0	14C	8.9	W10D15
	20.0	14C	8.9	W10D20
10.5-11.5	2.5	2E	1.9	W11D2.5
	5.0	4D	2.7	W11D5.0
	10.0	10B	5.1	W11D10
	15.0	14C	8.9	W11D15
	20.0	14C	8.9	W11D20
11-13	2.5	2E	1.9	W12D2.5
	5.0	4D	2.7	W12D5.0
	10.0	10B	5.1	W12D10
	15.0	14C	8.9	W12D15
	20.0	14C	8.9	W12D20
13-15	1.2	2E	1.9	W14D1.2
	2.5	4D	2.7	W14D2.5
	5.0	10B	5.1	W14D5.0
	10.0	14C	8.9	W14D10
	15.0	14C	8.9	W14D15
14-16	1.2	2E	1.9	W15D1.2
	2.5	4D	2.7	W15D2.5
	5.0	10B	5.1	W15D5.0
	10.0	14C	8.9	W15D10
	15.0	14C	8.9	W15D15
15-17	1.2	2E	1.9	W16D1.2
	2.5	4D	2.7	W16D2.5
	5.0	10B	5.1	W16D5.0
	10.0	14C	8.9	W16D10
	15.0	14C	8.9	W16D15
17-19	1.2	2E	1.9	W18D1.2
	2.5	4D	2.7	W18D2.5
	5.0	10B	5.1	W18D5.0
	10.0	14C	8.9	W18D10
19-21	1.2	2E	1.9	W20D1.2
	2.5	4D	2.7	W20D2.5
	5.0	10B	5.1	W20D5.0
	10.0	14C	8.9	W20D10
21-23	1.2	2E	1.9	W22D1.2
	2.5	4D	2.7	W22D2.5
	5.0	10B	5.1	W22D5.0
	10.0	14C	8.9	W22D10
23-25	1.2	2E	1.9	W24D1.2
	2.5	4D	2.7	W24D2.5
	5.0	10B	5.1	W24D5.0
	10.0	14C	8.9	W24D10
25-27	1.2	2E	1.9	W26D1.2
	2.5	4D	2.7	W26D2.5
	5.0	10B	5.1	W26D5.0
	10.0	14C	8.9	W26D10
27-29	1.2	2E	1.9	W28D1.2
	2.5	4D	2.7	W28D2.5
	5.0	10B	5.1	W28D5.0
	10.0	14C	8.9	W28D10
DUAL OUTPUT				
±3.75- ±4.25	0.3	8B	1.9	WW4D0.3
	0.5	9C	2.2	WW4D0.5
	1.0	9C	2.2	WW4D1.0
	2.0	9D	3.1	WW4D2.0
	4.0	11D	5.5	WW4D4.0
±4.5- ±5.5	0.3	8B	1.9	WW5D0.3
	0.5	9C	2.2	WW5D0.5
	1.0	9C	2.2	WW5D1.0
	2.0	9D	3.1	WW5D2.0
	4.0	11D	5.5	WW5D4.0
±11- ±13	0.3	8B	1.9	WW12D0.3
	0.5	9C	2.2	WW12D0.5
	1.0	9C	2.2	WW12D1.0
	2.0	9D	3.1	WW12D2.0
	4.0	11D	5.5	WW12D4.0
±14- ±16	0.3	8B	1.9	WW15D0.3
	0.5	9C	2.2	WW15D0.5
	1.0	9C	2.2	WW15D1.0
	2.0	9D	3.1	WW15D2.0
	4.0	11D	5.5	WW15D4.0
±29- ±31	0.3	9C	2.2	WW30D0.3
	0.5	9C	2.2	WW30D0.5
	1.0	9D	3.1	WW30D1.0
	2.0	11D	5.5	WW30D2.0
	4.0	14C	8.0	WW30D4.0

Other standard Models with any output up to 100 vdc are available. For complete information, please consult our nearest office.
Other standard Models with any output between ±2.75 and ±31.0 vdc are available. For complete information, please consult our nearest office.

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* See page D•1459 for size charts.

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MILITARY POWER SUPPLIES

400 Hz to 5-28 VDC

MODEL WL AND WWL

SPECIFICATIONS

INPUT VOLTAGE RANGE: 105-125 VRMS 3ϕ delta.

INPUT FREQUENCY RANGE: 380-420 Hz.

INPUT TRANSIENT PROTECTION: 180 VRMS for 0.1 seconds per MIL-STD-704, Figure 3, Limit 1.

LINE REGULATION: 0.1% or 20 mV, whichever is greater.

ELECTROMAGNETIC INTERFERENCES: Meets MIL-STD-461A, methods CE and CS for conducted emissions.

TURN-ON/TURN-OFF OVERSHOOT: 0.2% or 20 mV, whichever is greater.

LOAD REGULATION: 0.1% or 20 mV, whichever is greater. For load change of no load to full load.

RIPPLE: 0.02% or 5 mVRMS (whichever is greater) 25 mV peak-to-peak.

TRACKING ACCURACY: (WWL models only) The negative output will track the positive output to within 100 mV for all rated conditions of input voltage, output current, operating temperature, and output voltage adjustment.

POLARITY: Outputs are isolated. Either positive or negative may be grounded.

SHORT CIRCUIT PROTECTION: Each unit is completely protected against an overload or short circuit of any duration. The output voltage automatically restores to normal when the overload is removed.

REMOTE ERROR SENSING: Each unit contains a means by which the regulator circuit monitors the voltage directly at the load using extra "sensing" leads. The regulator circuit action compensates for a DC voltage drop up to 0.5 volts in the load leads.

LOAD TRANSIENT RECOVERY TIME: Output voltage returns to regulation limit within 100 microseconds after 50% step change in load current for units outputting 10A or less.

ISOLATION VOLTAGE: 750 VDC between input and output, input and case, and 200 VDC between output and case.

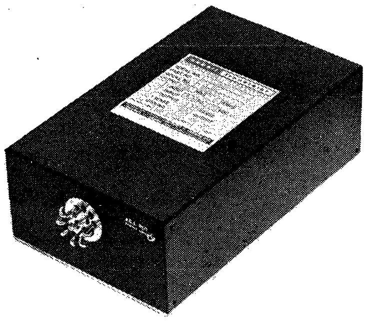
INSULATION RESISTANCE: 50 megohms minimum between input and output, input and case when measured at 50 VDC.

TEMPERATURE RANGE: −55°C to +80°C baseplate temperature. 80% rated power at −55°C to +100°C. Storage: −65°C to +125°C.

RELIABILITY: MTBF per MIL-HBK-217D under operating conditions of 50°C baseplate temperature, maximum rated output power for standard model was calculated to be 164,406 hrs. for ground benign environment and 25,633 hrs. for air inhabited transport. With Enhanced Reliability Option (ER) MTBF was calculated to be 883,580 hrs. for ground benign environment and 94,956 hrs. for air inhabited transport.

ENVIRONMENT: Hermetically sealed and encapsulated to meet MIL-STD-810C, including altitude (to 1.3 inches of Hg), acceleration, vibration, shock and temperature altitude cycling.

EFFICIENCY: Typical 55%.

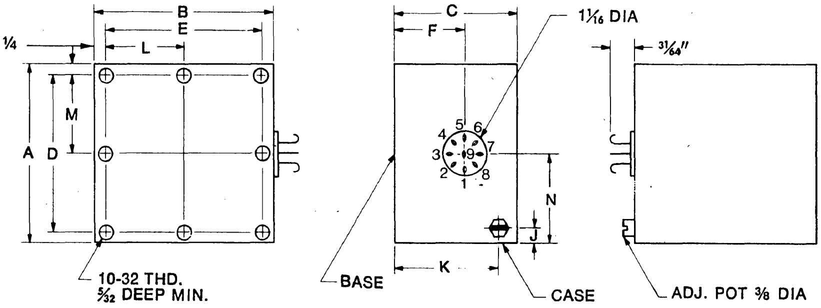


SINGLE OUTPUT: WL SERIES

Output Voltage Range (VDC)	Output Current (Amps)	Size (see Dwg.)	Model Number
4.8 to 5.8	20	12M	WL5.3D-20
5.8 to 6.8	20	12M	WL6.3D-20
11 to 13	10	11S	WL12D-10
11 to 13	20	12N	WL12D-20
14 to 16	12	12M	WL15D-12
23 to 25	7.5	12M	WL24D-7.5
23 to 25	15	12N	WL24D-15
27 to 29	10	12N	WL28D-10
27 to 29	15	12N	WL28D-15

DUAL OUTPUT: WWL SERIES

Output Voltage Range (VDC)	Output Current (Amps)	Size (see Dwg.)	Model Number
±11 to 13	2	10J	WWL12D-2
±14 to 16	2	10J	WWL15D-2



SIZE	A	B	C	D	E	F	J	K	L	M	N
11S	3¼	6	2½	2.75	5.50	1½	¼	2⅛	2.75	—	1⅜
12M	4½	7⅜	2½	4.00	6.88	1½	¼	2	3.44	—	2¼
12N	4¾	8¾	2¾	4.25	8.25	1½	¼	2¼	4.13	—	2⅜
10J	3	5¼	2½	2.50	4.75	1½	¼	2⅛	2.38	—	1½

TOLERANCE: Fractions = ±1⁄32, Decimals = .015, ±.050
MATERIAL: Base — Aluminum 6061-T6, Case — Steel

OPTIONS

OVERVOLTAGE PROTECTION: (−1 Option) An internal crowbar-type OVP is available. Unit will crowbar output when output voltage exceeds adjustable set point, to 10% or 2V above maximum rated output. To specify option, add "−1" to model number.

ENHANCED RELIABILITY: (ER Option) This option provides increased reliability by using a higher level of military grade components. This feature allows the power supply to meet customer specific requirements as to "Hi-Rel" components. Please consult your nearest Abbott Sales Office for details.

TTL: (L Option) Abbott provides an isolated pair of terminals used to turn-on and turn-off the regulator portion of the power supply. The unit remains in an idling state while the output is off. The power supply will turn-on with TTL logic "1" and turn-off with TTL logic "0". To specify this feature, please add an "L" to the character preceding the first dash of the model number.

3ϕ WYE: (−3 Option) This input voltage is also available as an option. To specify, add "−3" to the end of the model number.

PIN DESIGNATIONS:

	Single Output	Dual Output		Single Output	Dual Output		Single Output	Dual Output
1	AC Input	AC Input	4	+ Output	+ Output	7	− Sense	− Output
2	AC Input	AC Input	5	+ Sense	+ Sense	8	Case Gnd	− Sense
3	AC Input	AC Input	6	− Output	Com Output	9	Not Used	Case Gnd

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MILITARY POWER SUPPLIES

28 VDC to 5-28 VDC

MODEL BA

SPECIFICATIONS

INPUT VOLTAGE: 24-30 VDC (20-32 VDC with option)

EFFICIENCY: Typical efficiency 55-75% for 5V units, 65-85% for 12, 15, and 18V units.

IN RUSH CURRENT: Less than 8 times the peak input current at low line, full out load and nominal output voltage.

LINE REGULATION: 0.1% (or 20 mV whichever is greater)

LOAD REGULATION: 0.1% (or 20 mV whichever is greater).

PARD (NOISE & RIPPLE): 100 mV peak-to-peak, 20 mVRMS from +25°C to +100°C; 130 mV peak-to-peak, 40 mVRMS from −55°C to +25°C.

ADJUSTMENT RANGE: Output is continuously adjustable between the limits shown by means of externally accessible adjustment potentiometer.

RESOLUTION:	Nominal Output Voltage	Resolution
	5, 12, 15	35 mV
	24, 28	60 mV

INSULATION VOLTAGE: 100 VDC between input and output, and input and case; 50 VDC between output and case.

INSULATION RESISTANCE: 50 megohms between input and output, input and case when measured at 50 VDC.

POLARITY: Inputs and outputs are isolated, either positive or negative side may be grounded.

TEMPERATURE RANGE: Operating −55°C to +100°C baseplate temperature. Derated maximum output current linearly above +85°C baseplate temperature to 80% of full load rating at +100°C baseplate temperature. Storage: −65°C to +125°C.

TEMPERATURE EFFECT (COEFFICIENT): Less than 0.01% per degree Celsius.

ENVIRONMENT: Hermetically sealed and encapsulated to meet MIL-STD-810C, including altitude (to 1.3 inches of Hg), acceleration, vibration, shock and temperature altitude cycling.

SHORT CIRCUIT PROTECTION: Each unit is completely protected against a short circuit of any duration. Unit automatically recovers to normal when fault is removed.

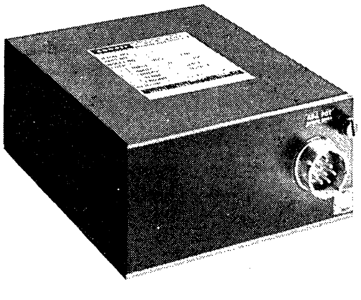
INPUT TRANSIENT PROTECTION: Unit will shut off at input voltage of 37V. Maximum voltage is 80V for one second.

REMOTE ERROR SENSING: Each unit contains a means by which the regulator circuit monitors the voltage directly at the load using extra "sensing leads." The resulting circuit action compensates for a DC voltage drop up to 0.3V in the load leads.

LOAD TRANSIENT RESPONSE: Output voltage returns to regulation limits within 2 milliseconds after 50% step change in load current. Maximum overshoot is less than 0.8V.

ELECTROMAGNETIC INTERFERENCE: Meets MIL-STD-461A, Methods CE01 and CE03 for conducting emissions (available with "F" option).

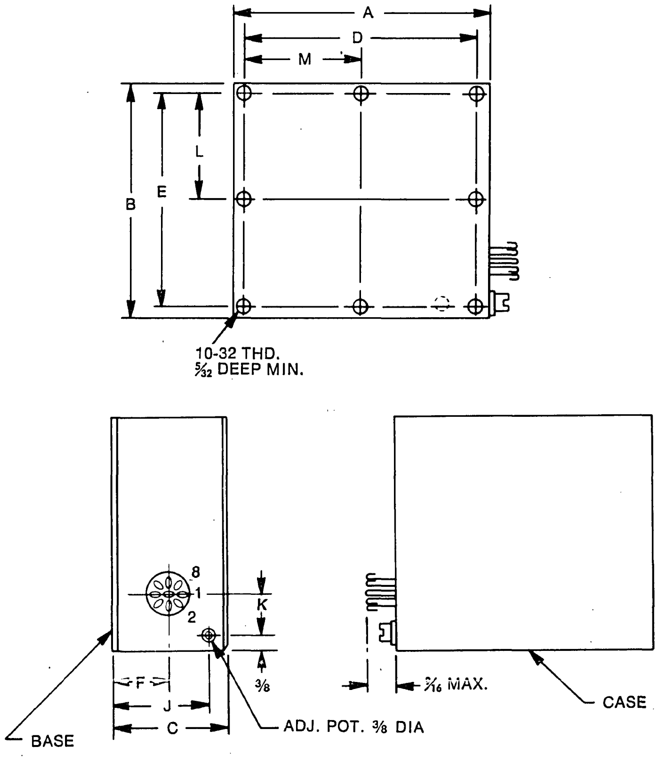
RELIABILITY: The Mean Time Between Failure (MTBF) per MIL-HDBK-217D under operating conditions of +50°C baseplate temperature, maximum rated output power for BA100D-5A-1 was calculated to be 139,899 hrs. for a ground benign environment and 16,866 hrs. for an air inhabited transport environment. With Enhanced Reliability Option (ER) MTBF was calculated to be 378,759 hrs. for ground benign environment and 51,131 hrs. for air inhabited transport environment.



FEATURES

- Up to 85% efficiency
- Meets MIL-STD-810C
- Wide DC input range available (20-32 VDC)
- Tight Regulation within 0.1%

Output Voltage Range (VDC)	Output Current (Amps)	Size (see Dwg.)	Weight (Lbs.)	Model Number
4.7 to 5.3	20.0	12F	4.7	BA100D-5A
11.25 to 12.75	8.33	12F	4.7	BA100D-12A
14.1 to 15.9	6.67	12F	4.7	BA100D-15A
22.5 to 25.5	4.17	12F	4.7	BA100D-24A
26.3 to 29.7	3.57	12F	4.7	BA100D-28A



A	B	C	D	E	F	J	K	L	M
5.875	5.5	2.625	5.37	5	1.375	2.125	1.37	2.5	2.68

OPTIONAL FEATURES

TTL: (L Option) Abbott provides an isolated pair of terminals used to turn-on and turn-off the regulator portion of the power supply. The unit remains in an idling state while the output is off. The power supply will turn-on with TTL logic "1", and turn-off with TTL logic "0". To specify this feature, please add an "L" to the character preceding the first dash of the model number. (EXAMPLE: BA100D-5A to BA100DL-5A)

SPECIAL CONNECTORS: A hermetically sealed military-type connector is available for the BA series (as shown in picture). Please consult your nearest Abbott Sales Office for details.

EMI FILTER: (F Option) An internal EMI filter is available to reduce conducted interference on the input leads. With these filters the Model BA will comply with MIL-STD-461A Notice 3, CE01 and CE03 on the input leads. To specify this feature, please add an "F" after "D" in the model number. (EXAMPLE: BA100D-5A to BA100DF-5A)

REMOTE PROGRAM OPTION: (R Option) Units can be modified so that their output voltage can be adjusted from a remote location. This is accomplished by adding an additional pin to the header on the unit. To specify this option, please add an "R" after this character "D" in the model number. (EXAMPLE: BA100D-5A to BA100DR-5A).

OVERVOLTAGE PROTECTION: (-1 Option) An internal non-crowbar type OVP, power supply turns off when output voltage exceeds set point (available as option by adding "-1" to model number)

WIDER INPUT VOLTAGE RANGE: (H Option) The standard model BA operates from an input voltage range of 24 to 30 VDC. The units can be modified to operate from 20 to 32 VDC. To have this feature included add an "H" after the "D" in the model number and specify the desired input voltage range in parentheses after the entire model number. (EXAMPLE: BA100D-5A to BA100DH-5A (20-26))

ENHANCED RELIABILITY: (ER Option) This option provides increased reliability by using higher levels of military grade components. This feature allows the power supply to meet customer specific requirements as to "Hi-Rel" components, environmental testing and extended Thermal Cycling. Please consult your nearest Abbott Sales Office for details.

SPECIAL ENCAPSULATION: (E Option) All of our hermetically sealed power modules are encapsulated to meet or exceed the shock, acceleration and vibration requirements of MIL-STD-810C. Special encapsulation to enable these modules to withstand higher shock levels of 60g's, acceleration levels of 50g's and vibration levels of 30g's is available. To specify this feature, please add an "E" after the character "D" in the model number. (EXAMPLE: BA100D-5A to BA100DE-5A)

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Eastern: 520 Main St., Ft. Lee, NJ 07024 (201) 461-4411. Telex: 13-5332 • Southwest: 710 Kindred Lane, Richardson, TX 75080 (214) 437-0697
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abbott
MILITARY POWER SUPPLIES

20-32 VDC to 5-50 VDC

MODEL
BN
and BBN

SPECIFICATIONS

INPUT VOLTAGE RANGE: 20 to 32 VDC

EFFICIENCY: Typical efficiency ranges from 50 to 70%.

INRUSH CURRENT: Less than 8 times normal steady-state full load input current

LINE REGULATION: Within 0.5% for input change of 20 to 32 VDC

LOAD REGULATION: Within 0.5%. For load change of no load to full load

PARD (RIPPLE & NOISE): 100 mv peak-to-peak, 25 mv rms from 25°C to +100°C: 130 mv peak-to-peak, 40 mv rms from −55°C to +25°C. Measured at power module terminals with measurement system noise bandwidth of 25 MHz

OUTPUT VOLTAGE ADJUSTMENT: Voltage is continuously adjustable between the limits shown by means of an externally accessible screwdriver adjustment potentiometer. Wider output ranges are available by restricting the input voltage range. Consult the factory for further information

ADJUSTMENT RESOLUTION:

Nominal Output Voltage	Resolution
5-10 VDC	37 mv
12-18 VDC	49 mv
24-31 VDC	75 mv

ISOLATION VOLTAGE: 100 VDC between input & output and input & case; 50 VDC between output & case

INSULATION RESISTANCE: 50 megohms minimum between input & output, input & case and output & case when measured at 50 VDC

POLARITY: Inputs and outputs are isolated; either positive or negative side may be grounded.

TEMPERATURE RANGE: Operating; −55°C to +100°C baseplate temperature. Derate maximum output current linearly above 85°C baseplate temperature to 80% of full load rating at 100°C baseplate temperature. Storage; −65°C to +125°C

TEMPERATURE EFFECT (COEFFICIENT): 0.03% per degree Celsius

ENVIRONMENT: Hermetically sealed and encapsulated to meet the environmental requirements to MIL-STD-810C and MIL-E-5400P, Class 2 including altitude (to a vacuum), vibration, shock, acceleration, sand, dust, humidity, salt spray, fungus, explosion, etc.

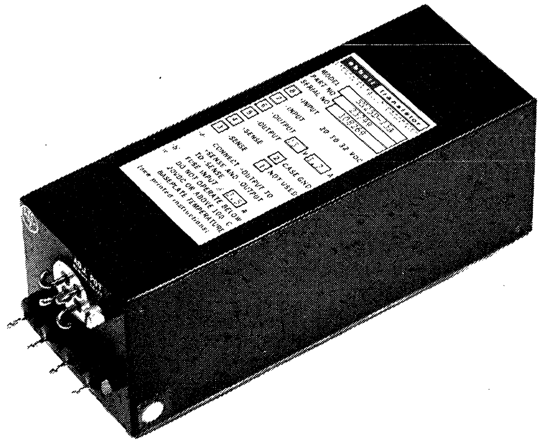
SHORT CIRCUIT PROTECTION: Each unit is completely protected against overloads (greater than 150% rated load) and short circuits of any duration. The output automatically restores to normal when the fault is removed

INPUT TRANSIENT PROTECTION: Each unit is completely protected against the transients of MIL-STD-704, Category B, (80 VDC for 0.1 sec) having rise times greater than 100 microseconds. Unit will turn off and resume operation when the input returns to normal

OVERVOLTAGE PROTECTION: Internal OVP is available as an optional feature and is indicated by adding "—1" to the model number (i.e.: BN25D-5A-1 indicates that OVP has been included.) The overvoltage threshold is factory set to approximately 2 V or 10% (whichever is greater) above the nominal output voltage. The OVP circuitry has a built-in delay of approximately 500 microseconds to minimize 'nuisance' tripping

REMOTE ERROR SENSING: Each unit contains a means by which the regulator circuit can monitor the voltage directly at the load by using extra "sense" leads. The resulting circuit action will compensate for a DC voltage drop of up to 0.3 volts in the load leads

LOAD TRANSIENT RESPONSE: Output voltage returns to regulation limits within 2 ms after a 50% step change in load current. Maximum overshoot is less than 0.8 V



High Efficiency

- Operating temperature range: −55°C to +100°C operation.
- Up to 70% efficiency.
- Small size.
- High reliability. MTBF: 112,000 hrs. per MIL-HDBK-217C.
- Short Circuit Protection.

TURN-ON/TURN-OFF OVERSHOOT: No overshoot during turn-on into loads greater than half load. For loads less than half load, turn-on overshoot is less than 0.8 V for 25 ms. No turn-off overshoot under any conditions

ELECTROMAGNETIC INTERFERENCE: Designed to meet the requirements of MIL-STD-461A for generation of conducted and radiated interference. Test report on a typical model is available.

RELIABILITY: MTBF per MIL-HDBK-217C up to 112,000 hrs.

SINGLE OUTPUT

Output Voltage Range	Output Current (Amps)	Size*	Weight (Lbs.)	Model Number
4.75-5.25	5.0	10E	1.8	BN25D-5A
	10.0	11J	2.9	BN50D-5A
5.7-6.3	4.17	10E	1.8	BN25D-6A
	8.33	11J	2.9	BN50D-6A
9.5-10.5	2.5	10E	1.8	BN25D-10A
	5.0	11J	2.9	BN50D-10A
11.4-12.6	2.08	10E	1.8	BN25D-12A
	4.17	11J	2.9	BN50D-12A
14.25-15.75	1.67	10E	1.8	BN25D-15A
	3.33	11J	2.9	BN50D-15A
17.1-18.9	1.39	10E	1.8	BN25D-18A
	2.78	11J	2.9	BN50D-18A
22.8-25.2	1.04	10E	1.8	BN25D-24A
	2.08	11J	2.9	BN50D-24A
26.6-29.4	0.89	10E	1.8	BN25D-28A
	1.79	11J	2.9	BN50D-28A
29.45-32.55	0.81	10E	1.8	BN25D-31A
	1.61	11J	2.9	BN50D-31A
45.6-50.4	0.52	10E	1.8	BN25D-48A
	1.04	11J	2.9	BN50D-48A

* See page D•1459 for size charts.

DUAL OUTPUT

±11.4 to ±12.6	1.04	10F	2.2	BBN25D-12A
	2.08	11J	2.9	BBN50D-12A
±14.25 to ±15.75	0.83	10F	2.2	BBN25D-15A
	1.67	11J	2.9	BBN50D-15A

Dual Output Units: 1) The output current listed is for each output.
2) The negative output is "semiregulated" and will meet regulation specifications only when operated into a balanced load from ½ load to full load.
3) The negative output will typically be within 4% of the positive output voltage for load imbalances up to 3:1 in magnitude, provided outputs have a minimum of 30% full load.

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abbott
MILITARY POWER SUPPLIES

28 VDC to 5-37 VDC

MODEL
C
and CC

SPECIFICATIONS

INPUT VOLTAGE RANGE: 24 to 30 VDC. Other input ranges available

LINE REGULATION: 0.1% (0.2% for duals) or 10 mv (whichever is greater) for input change of 24 to 30 VDC with load constant

LOAD REGULATION: 0.1% (0.2% for duals) or 20 mv (whichever is greater) for change from no load to full load with line constant

RIPPLE: 0.02% or 5 mv RMS (whichever is greater) 50 mv peak-to-peak maximum, each output, measured with scope having 25 MHz bandwidth

OUTPUT VOLTAGE ADJUSTMENT: Voltage is continuously adjustable between the limits shown in the table by means of an externally accessible screwdriver adjustment potentiometer

TRACKING ACCURACY: The negative output will track the positive output to within 1.0% or 100 mv (whichever is greater) for all rated conditions of input voltage, output current, operating temperature, and output voltage adjustment

ISOLATION VOLTAGE: 200 volts DC between input and output, input and case, and output and case

INSULATION RESISTANCE: 50 megohms minimum at 50 volts DC between input and output, input and case, and output and case

POLARITY: Inputs and outputs are isolated, either positive or negative side may be grounded.

TEMPERATURE RANGE: Operating: −55°C to +100°C maximum at center of mounting base
Storage: −65°C to +125°C

TEMPERATURE COEFFICIENT: 0.03% per degree Celsius maximum

ENVIRONMENT: Encapsulated to meet the environmental requirements of MIL-STD-810C and MIL-E-5400P, Class 2, including: altitude (to a vacuum), vibration, shock, acceleration, sand, dust, humidity, salt spray, fungus, explosion, etc.

SHORT CIRCUIT PROTECTION: Each unit is completely protected against an overload or short circuit of any duration. The output automatically restores to normal when the overload is removed

INPUT TRANSIENT PROTECTION: MIL-STD-704A, Fig. 9, Limt 1 (80 VDC for 0.1 sec.).

LOAD TRANSIENT RECOVERY TIME: Output voltage returns to regulation limits within 100 microseconds (200 microseconds for duals) after 50% step change in load current

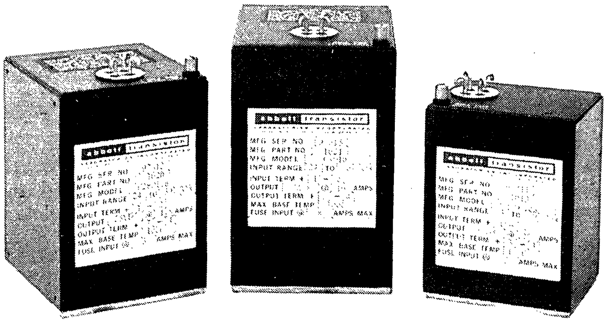
RELIABILITY: MTBF per MIL-HDBK-217C up to 277,200 hrs.

ELECTROMAGNETIC INTERFERENCE: Units meet EMI requirements of MIL-STD 461 conducted and radiated (F option).

OVER-VOLTAGE PROTECTION*: An internal, non-crowbar type OVP is available. Power supply turns off when output voltage exceeds set-point.

TTL*: Abbott provides an isolated pair of terminals used to turn-on and turn-off the regulator portion of the power supply. The unit remains in an idling state while the output is off.

* Inclusion of these optional features on these models will most likely require that the case size increases slightly. Please consult nearest Abbott sales office for further details.



High Performance

- Operating temperature range: −55°C to +100°C.
- Low Peak-to-Peak Ripple.
- Compact. Power density up to 2 watts per cu. in.
- High reliability. Up to 277,200 hrs. MTBF per MIL-HDBK-217C.
- Low EMI. To MIL-STD-461.
- Encapsulated and hermetically sealed to meet MIL-STD-810C and MIL-E-5400P, Class 2.
- 0.1% Line and Load regulation.
- TTL compatibility available.
- Internal OVP optional.

Output Voltage Range	Output Curr. (Amps)	Size†	Wt. (Lbs.)	Model Number
4.5-5.5	2.5	2D	1.2	C5D2.5
	5.0	6B	1.7	C5D5.0
	10.0	7A	2.6	C5D10
5.5-6.5	2.5	2D	1.2	C6D2.5
	5.0	6B	1.7	C6D5.0
	10.0	7A	2.6	C6D10
6.5-7.5	2.5	2D	1.2	C7D2.5
	5.0	6B	1.7	C7D5.0
	10.0	7A	2.6	C7D10
7.5-8.5	1.8	2D	1.2	C8D1.8
	3.5	6B	1.7	C8D3.5
	7.5	7A	2.6	C8D7.5
8.5-9.5	1.8	2D	1.2	C9D1.8
	3.5	6B	1.7	C9D3.5
	7.5	7A	2.6	C9D7.5
9.5-10.5	1.8	2D	1.2	C10D1.8
	3.5	6B	1.7	C10D3.5
	7.5	7A	2.6	C10D7.5
10.5-11.5	1.8	2D	1.2	C11D1.8
	3.5	6B	1.7	C11D3.5
	7.5	7A	2.6	C11D7.5
11-13	1.2	2D	1.2	C12D1.2
	2.5	6B	1.7	C12D2.5
	5.0	7A	2.6	C12D5.0
13-15	1.2	2D	1.2	C14D1.2
	2.5	6B	1.7	C14D2.5
	5.0	7A	2.6	C14D5.0
14-16	1.2	2D	1.2	C15D1.2
	2.5	6B	1.7	C15D2.5
	5.0	7A	2.6	C15D5.0
15-17	1.2	2D	1.2	C16D1.2
	2.5	6B	1.7	C16D2.5
	5.0	7A	2.6	C16D5.0

Output Voltage Range	Output Curr. (Amps)	Size†	Wt. (Lbs.)	Model Number
17-19	1.2	2D	1.2	C18D1.2
	2.5	6B	1.7	C18D2.5
	5.0	7A	2.6	C18D5.0
19-21	0.8	2D	1.2	C20D0.8
	1.8	6B	1.7	C20D1.8
	3.5	7A	2.6	C20D3.5
21-23	0.8	2D	1.2	C22D0.8
	1.8	6B	1.7	C22D1.8
	3.5	7A	2.6	C22D3.5
23-25	0.8	2D	1.2	C24D0.8
	1.8	6B	1.7	C24D1.8
	3.5	7A	2.6	C24D3.5
25-27	0.8	2D	1.2	C26D0.8
	1.8	6B	1.7	C26D1.8
	3.5	7A	2.6	C26D3.5
27-29	0.8	2D	1.2	C28D0.8
	1.8	6B	1.7	C28D1.8
	3.5	7A	2.6	C28D3.5
29-31	0.6	2D	1.2	C30D0.6
	1.2	6B	1.7	C30D1.2
	2.5	7A	2.6	C30D2.5
31-33	0.6	2D	1.2	C32D0.6
	1.2	6B	1.7	C32D1.2
	2.5	7A	2.6	C32D2.5
33-35	0.6	2D	1.2	C34D0.6
	1.2	6B	1.7	C34D1.2
	2.5	7A	2.6	C34D2.5
35-37	0.6	2D	1.2	C36D0.6
	1.2	6B	1.7	C36D1.2
	2.5	7A	2.6	C36D2.5

DUAL OUTPUT

Output Voltage Range	Output Curr. (Amps)	Size†	Wt. (Lbs.)	Model Number
±2.75- ±3.25	0.5	10C	2.3	CC3D0.5
	1.0	10C	2.3	CC3D1.0
	2.0	10D	2.5	CC3D2.0
	3.5	11E	3.9	CC3D3.5
±4.5- ±5.5	0.5	10C	2.3	CC5D0.5
	1.0	10C	2.3	CC5D1.0
	2.0	10D	2.5	CC5D2.0
	3.5	11E	3.9	CC5D3.5
±11- ±13	0.5	10C	2.3	CC12D0.5
	1.0	10C	2.3	CC12D1.0
	2.0	10D	2.5	CC12D2.0
	3.5	11E	3.9	CC12D3.5
±14- ±16	0.5	10C	2.3	CC15D0.5
	1.0	10C	2.3	CC15D1.0
	2.0	10D	2.5	CC15D2.0
	3.5	11E	3.9	CC15D3.5
±19- ±21	0.5	10C	2.3	CC20D0.5
	1.0	10D	2.5	CC20D1.0
	2.0	11E	3.9	CC20D2.0
	3.5	14D	7.9	CC20D3.5
±23- ±25	0.5	10C	2.3	CC24D0.5
	1.0	10D	2.5	CC24D1.0
	2.0	11E	3.9	CC24D2.0
	3.5	14D	7.9	CC24D3.5

* See page **D•1459** for size charts.

Other standard Models with any output up to 100 vdc are available. For complete information, please consult our nearest office.
Other standard Models with any output between ±2.75 and ±31.0 vdc are available. For complete information, please consult our nearest office.

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abbott
MILITARY POWER SUPPLIES

28 VDC to 500 VDC

MODEL
B

SPECIFICATIONS

Input Voltage Range
24 to 30 volts DC Other ranges available

Line Regulation
Within 0.4% for input 24 to 30 VDC

Combined Line and Load Regulation
Within 3.0% for input 24 to 30 VDC and from ½ load to full load on Model B's
Within 5.0% for input 24 to 30 VDC and from ½ load to full load on Model BL's

Ripple
0.5 RMS — Model B's
1.0% RMS — Model BL's

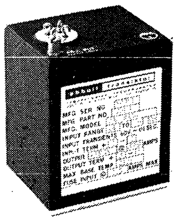
Voltage Adjustment Range
12% by screwdriver adjustment

Input Transient Protection
In accordance with MIL-STD-704A, Fig. 9, Limit 1, (80 VDC for 0.1 sec.)

Environment
+212°F max. at mounting base using adequate heat sink
−65°F min. at mounting surface
Altitude: To vacuum (true hermetic seal).
Vibration, shock, sand, dust, humidity, salt-spray, fungus, sunshine, rain, and explosion to MIL-STD-810C and MIL-E-5400P, Class 2

Output Voltage and Current
See specific models listed
(Outputs and inputs are isolated)

Reliability: MTBF per MIL-HDBK-217C up to 626,400 hrs.



High Reliability

- Operating temperature range −54°C to +100°C.
- Small size.
- High reliability. Up to 626,400 hrs. MTBF per MIL-HDBK-217C.
- Encapsulated and hermetically sealed. Meets MIL-STD-810C and MIL-E-5400P, Class 2.

Output Voltage Range	Output Current (Amps)	Size*	Wt. lbs.	Model Number
4.7-5.3	0.400	1B	0.5	BL02D-5A
	1.0	1A	0.9	BL05D-5A
	2.0	1	1.0	BL1D-5A
	4.0	2	1.1	BL2D-5A
	6.0	4	1.3	BL3D-5A
	10.0	6A	2.5	BL5D-5A
5.3-5.9	0.357	1B	0.5	BL02D-5.6A
	0.9	1A	0.9	BL05D-5.6A
	1.8	1	1.0	BL1D-5.6A
	3.6	2	1.1	BL2D-5.6A
	5.4	4	1.3	BL3D-5.6A
	8.91	6A	2.5	BL5D-5.6A
5.9-6.6	0.318	1B	0.5	BL02D-6.3A
	0.8	1A	0.9	BL05D-6.3A
	1.6	1	1.0	BL1D-6.3A
	3.2	2	1.1	BL2D-6.3A
	4.8	4	1.3	BL3D-6.3A
	7.92	6	1.9	BL5D-6.3A
6.6-7.4	0.286	1B	0.5	BL02D-7A
	0.7	1A	0.9	BL05D-7A
	1.4	1	1.0	BL1D-7A
	2.8	2	1.1	BL2D-7A
	4.2	4	1.3	BL3D-7A
	7.15	6	1.9	BL5D-7A
7.4-8.3	0.253	1B	0.5	BL02D-7.9A
	0.63	1A	0.9	B05D-7.9A
	1.26	1	1.0	BL1D-7.9A
	2.52	2	1.1	BL2D-7.9A
	3.78	4	1.3	BL3D-7.9A
	6.32	6	1.9	BL5D-7.9A
8.3-9.3	0.227	1B	0.5	BL02D-8.8A
	0.57	1A	0.9	B05D-8.8A
	1.14	1	1.0	BL1D-8.8A
	2.28	2	1.1	BL2D-8.8A
	3.42	4	1.3	BL3D-8.8A
	5.68	6	1.9	BL5D-8.8A
9.3-10.4	0.202	1B	0.5	B02D-9.9A
	0.50	1A	0.9	B05D-9.9A
	1.00	1	1.0	BL1D-9.9A
	2.00	2	1.1	BL2D-9.9A
	3.00	4	1.3	BL3D-9.9A
	5.05	6	1.9	BL5D-9.9A
	10.10	11	3.7	BL10D-9.9A
10.4-11.6	0.182	1B	0.5	B02D-11A
	0.45	1A	0.9	B05D-11A
	0.91	1	1.0	BL1D-11A
	1.82	2	1.1	BL2D-11A
	2.73	4	1.3	BL3D-11A
	4.55	6	1.9	BL5D-11A
	9.10	11	3.7	BL10D-11A
11.6-13.0	0.163	1B	0.5	B02D-12.3A
	0.40	1A	0.9	B05D-12.3A
	0.81	1	1.0	BL1D-12.3A
	1.62	2	1.1	BL2D-12.3A
	2.43	4	1.3	BL3D-12.3A
	4.06	6	1.9	BL5D-12.3A
	8.12	11	3.7	BL10D-12.3A
	13.83	14	10.3	BL17D-12.3A
13.0-14.8	0.145	1B	0.5	B02D-13.8A
	0.36	1A	0.9	B05D-13.8A
	0.72	1	1.0	BL1D-13.8A
	1.44	2	1.1	BL2D-13.8A
	2.15	4	1.3	BL3D-13.8A
	3.62	6	1.9	BL5D-13.8A
	7.24	11	3.7	BL10D-13.8A
	12.31	14	10.3	BL17D-13.8A
14.8-16.6	0.127	1B	0.5	B02D-15.7A
	0.32	1A	0.9	B05D-15.7A
	0.64	1	1.0	BL1D-15.7A
	1.28	2	1.1	BL2D-15.7A
	1.92	4	1.3	BL3D-15.7A
	3.18	6	1.9	BL5D-15.7A
	6.36	11	3.7	BL10D-15.7A
	10.81	14	10.3	BL17D-15.7A
16.6-18.6	0.114	1B	0.5	B02D-17.6A
	0.28	1A	0.9	B05D-17.6A
	0.57	1	1.0	BL1D-17.6A
	1.14	2	1.1	BL2D-17.6A
	1.71	4	1.3	BL3D-17.6A
	2.84	6	1.9	BL5D-17.6A
	5.68	11	3.7	BL10D-17.6A
	9.65	14	10.3	BL17D-17.6A
18.6-20.8	0.101	1B	0.5	B02D-19.7A
	0.255	1A	0.9	B05D-19.7A
	0.510	1	1.0	BL1D-19.7A
	1.02	2	1.1	BL2D-19.7A
	1.63	4	1.3	BL3D-19.7A
	2.54	6	1.9	BL5D-19.7A
	5.08	11	3.7	BL10D-19.7A
	8.62	14	10.3	BL17D-19.7A
20.8-23.3	0.091	1B	0.5	B02D-22A
	0.230	1A	0.9	B05D-22A
	0.460	1	1.0	BL1D-22A
	0.920	2	1.1	BL2D-22A
	1.38	4	1.3	BL3D-22A
	2.27	6	1.9	BL5D-22A
	4.54	11	3.7	BL10D-22A
	7.72	14	10.3	BL17D-22A
23.3-26.1	0.081	1B	0.5	B02D-24.7A
	0.205	1A	0.9	B05D-24.7A
	0.410	1	1.0	BL1D-24.7A
	0.820	2	1.1	BL2D-24.7A
	1.23	4	1.3	BL3D-24.7A
	2.02	6	1.9	BL5D-24.7A
	4.04	11	3.7	BL10D-24.7A
	6.88	14	10.3	BL17D-24.7A
26.1-29.2	0.073	1B	0.5	B02D-27.6A
	0.180	1A	0.9	B05D-27.6A
	0.360	1	1.0	BL1D-27.6A
	0.720	2	1.1	BL2D-27.6A
	1.08	4	1.3	BL3D-27.6A
	1.81	6	1.9	BL5D-27.6A
	3.62	11	3.7	BL10D-27.6A
	6.16	14	10.3	BL17D-27.6A
29.2-32.6	0.065	1B	0.5	B02D-31A
	0.160	1A	0.9	B05D-31A
	0.320	1	1.0	B1D-31A
	0.640	2	1.1	B2D-31A
	0.960	4	1.3	BL3D-31A
	1.61	6	1.9	BL5D-31A
	3.22	11	3.7	BL10D-31A
	5.48	14	10.3	BL17D-31A
32.6-36.5	0.058	1B	0.5	B02D-34.6A
	0.145	1A	0.9	B05D-34.6A
	0.290	1	1.0	B1D-34.6A
	0.580	2	1.1	B2D-34.6A
	0.870	4	1.3	BL3D-34.6A
	1.44	6	1.9	BL5D-34.6A
	2.88	11	3.7	BL10D-34.6A
	4.91	14	10.3	BL17D-34.6A
36.5-40.9	0.052	1B	0.5	B02D-38.7A
	0.130	1A	0.9	B05D-38.7A
	0.260	1	1.0	B1D-38.7A
	0.520	2	1.1	B2D-38.7A
	0.780	4	1.3	BL3D-38.7A
	1.29	6	1.9	BL5D-38.7A
	2.58	11	3.7	BL10D-38.7A
	4.39	14	10.3	BL17D-38.7A
40.9-45.8	0.046	1B	0.5	B02D-43.3A
	0.155	1A	0.9	B05D-43.3A
	0.230	1	1.0	B1D-43.3A
	0.460	2	1.1	B2D-43.3A
	0.690	4	1.3	BL3D-43.3A
	1.15	6	1.9	BL5D-43.3A
	2.30	11	3.7	BL10D-43.3A
	3.92	14	10.3	BL17D-43.3A
45.8-51.4	0.041	1B	0.5	B02D-48.6A
	0.103	1A	0.9	B05D-48.6A
	0.206	1	1.0	B1D-48.6A
	0.412	2	1.1	B2D-48.6A
	0.618	4	1.3	B3D-48.6A
	1.03	6	1.9	BL5D-48.6A
	2.06	11	3.7	BL10D-48.6A
	3.49	14	10.3	BL17D-48.6A
51.4-59.0	0.036	1B	0.5	B02D-55.2A
	0.091	1A	0.9	B05D-55.2A
	0.182	1	1.0	B1D-55.2A
	0.364	2	1.1	B2D-55.2A
	0.546	4	1.3	B3D-55.2A
	0.905	6	1.9	BL5D-55.2A
	1.81	11	3.7	BL10D-55.2A
	3.07	14	10.3	BL17D-55.2A
59.0-66.0	0.032	1B	0.5	B02D-63A
	0.080	1A	0.9	B05D-63A
	0.160	1	1.0	B1D-63A
	0.320	2	1.1	B2D-63A
	0.480	4	1.3	B3D-63A
	0.795	6	1.9	BL5D-63A
	1.59	11	3.7	BL10D-63A
	2.69	14	10.3	BL17D-63A
66.0-74.0	0.029	1B	0.5	B02D-70A
	0.071	1A	0.9	B05D-70A
	0.143	1	1.0	B1D-70A
	0.286	2	1.1	B2D-70A
	0.429	4	1.3	B3D-70A
	0.715	6	1.9	BL5D-70A
	1.43	11	3.7	BL10D-70A
	2.42	14	10.3	BL17D-70A
74.0-83.0	0.025	1B	0.5	B02D-79A
	0.063	1A	0.9	B05D-79A
	0.127	1	1.0	B1D-79A
	0.254	2	1.1	B2D-79A
	0.381	4	1.3	B3D-79A
	0.634	6	1.9	BL5D-79A
	1.27	11	3.7	BL10D-79A
	2.15	14	10.3	BL17D-79A
83.0-514	Other standard models are available with output voltages between 83.0 and 514 Vdc at output power ratings of 2, 5, 10, 20, 30, 50, 100 or 170 watts. For complete information, please consult one of the offices listed below.			

* See page D•1459 for size charts.

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Power Supply Div. Western Offices: 5200 W. Jefferson Blvd., Los Angeles, CA 90016 (213) 936-8185. Telex: 69-1398
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abbott
MILITARY POWER SUPPLIES

28 VDC to 25-122 VAC

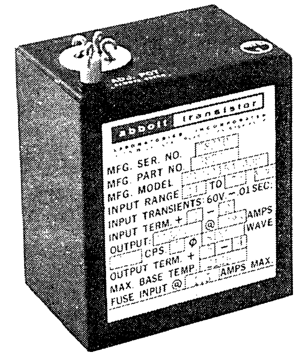
MODEL S

SPECIFICATIONS

Input Voltage Range: 24 to 30 volts DC. Other input ranges are available.
Load Regulation: ±1.0% from ½ to full load.
Frequency Stability: ±1.0%
Voltage Adjustment Range: 12% by screwdriver adjustment.
Reliability: Up to 340,600 Hrs. MTBF per MIL-HDBK-217C.
Input Transient Protection: In accordance with MIL-STD-704A, Limit 1, Fig. 9 (80 volts for 0.1 seconds).
Environment: +212°F max. at mtg. base using adequate heat sink. −65°F min. at mounting base. Encapsulated to meet the environmental requirements of MIL-STD 810C and MIL-E 5400P, Class 2, including: altitude (to a vacuum), vibration, shock, acceleration, sand, dust, humidity, saltspray, fungus, explosion, etc.

Input Voltage Range	Output Frequency (Hertz)	Output Voltage Range	Output Power (Volt-Amps)	Harmonic Distortion (%)	Size (See Below)	Weight (Lbs.)	Model Number
24-30	400	25.4-28.6	5	2.0	4	1.6	S05D-27A-400
			10	2.5	4C	1.7	S1D-27A-400
			20	2.5	4B	2.3	S2D-27A-400
			30	2.5	6A	2.4	S3D-27A-400
			60	3.0	12	4.8	S6D-27A-400
			120	4.0	14	9.1	S12D 27A-400
24-30	400	108-122	5	2.0	4	1.6	S05D-115A-400
			10	2.5	4C	1.7	S1D-115A-400
			20	2.5	4B	2.3	S2D-115A-400
			30	2.5	6A	2.4	S3D-115A-400
			60	3.0	12	4.8	S6D-115A-400
			120	4.0	14	9.1	S12D-115A-400
24-30	800	25.4-28.6	5	2.0	4	1.6	S05D-27A-800
			10	2.5	4C	1.7	S1D-27A-800
			20	2.5	4B	2.3	S2D-27A-800
			30	2.5	6A	2.4	S3D-27A-800
			60	3.0	12	4.8	S6D-27A-800
			120	4.0	14	9.1	S12D-27A-800
24-30	800	108-122	5	2.0	4	1.6	S05D-115A-800
			10	2.5	4C	1.7	S1D-115A-800
			20	2.5	4B	2.3	S2D-115A-800
			30	2.5	6A	2.4	S3D-115A-800
			60	3.0	12	4.8	S6D-115A-800
			120	4.0	14	9.1	S12D-115A-800

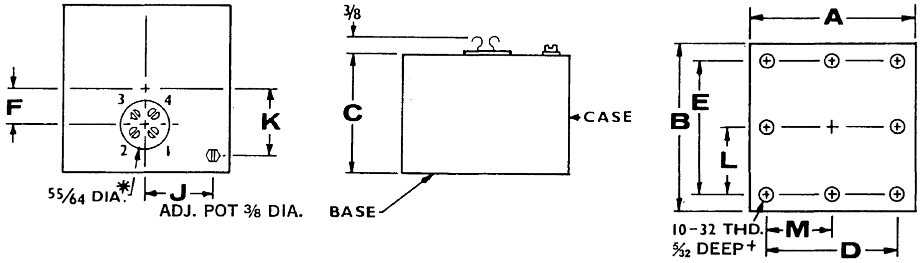
Output frequencies up to 1600 Hz are listed in our catalog as standard models. Contact our nearest office for your free copy.



Sine Wave — 1 Ø 400 to 1600 Hz

- Operating temperature range: −54°C to +100°C.
- High reliability. Up to 340,600 hrs. MTBF per MIL-HDBK-217C.
- Encapsulated and hermetically sealed per MIL-STD-810C and MIL-E-5400P.

CASE DIMENSIONS FOR ABBOTT MODELS W, WW, BN, BBN, C, CC, B AND S



* Models CC and WW use special 8 pin header.
Size of special headers is 1 1/16 dia. by 9/16 high.
† 6-32 Thd, 3/16 deep on case size 1B.
** **Model BN uses special terminals on A x C face.**

Size	A	B	C	D	E	F	J	K	L	M
1	1½	2¾	3	1.00	2.25	9/16	½	1⅛	—	—
1A	1½	2¾	2¾	1.00	2.25	9/16	½	1⅛	—	—
1B	1½	2	2	1.00	1.50	0	½	¾	—	—
2	1⅞	2¾	3¼	1.37	2.25	¾	11/16	1⅛	—	—
2C	2	2¾	2⅛	1.50	2.25	0	¾	1⅛	—	—
2D	2	3	3½	1.50	2.50	¾	¾	1¼	—	—
2E	2⅛	3¼	3¼	1.62	2.75	⅞	13/16	1⅜	—	—
3	2¾	2¾	3	2.25	2.25	¾	1⅛	1⅛	—	—
3A	2¾	2¾	2¾	2.25	2.25	¾	1⅛	1⅛	—	—
4	2¼	2¾	3¼	1.75	2.25	¾	⅞	1⅛	—	—
4B	2½	3	3¾	2.00	2.50	¾	1	1¼	—	—
4C	2¼	2¾	3½	1.75	2.25	¾	⅞	1⅛	—	—
4D	2½	3½	3½	2.00	3.00	0	1	1½	—	—
5	2¾	2¾	3¼	2.25	2.25	¾	1⅛	1⅛	—	—
6	2¾	3	3¼	2.25	2.50	¾	1⅛	1¼	—	—
6A	2¾	3	4	2.25	2.50	¾	1⅛	1¼	—	—
6B	2¾	3⅛	3⅝	2.25	2.62	¾	1⅛	15/16	—	—
7	2¾	2¾	4	2.25	2.25	¾	1⅛	1⅛	—	—
7A	2⅞	3⅜	4½	2.37	2.87	¾	1 3/16	1 7/16	—	—
8B	2⅝	3½	2⅞	2.12	3.00	¾	1 1/16	1½	—	—
9A	2¾	4¾	3¾	2.25	4.25	0	1⅛	2⅛	—	—
9B	2¾	4¾	3½	2.25	4.25	0	1⅛	2⅛	—	—
9C	2½	4⅜	3⅛	2.00	3.87	1	1	1 15/16	—	—
9D	2⅝	4¾	3⅝	2.12	4.25	1	1 1/16	2⅛	—	—
10A	3	5	4	2.50	4.50	0	1¼	2¼	—	—

Size	A	B	C	D	E	F	J	K	L	M
10B	2⅞	4¼	4⅜	2.37	3.75	1⅜	1 3/16	1⅞	—	—
10C	3⅜	3⅜	3¾	2.87	2.87	¾	1 7/16	1 7/16	—	—
10D	3½	3½	4	3.00	3.00	¾	1½	1½	—	—
10E	2⅜	6¼	2½	1.87	5.75	**	**	**	2.87	—
10F	2¾	6¼	2½	2.25	5.75	**	**	**	2.87	—
10G	3½	5½	2½	3.00	3.50	**	**	**	—	—
10H	4	5½	2⅝	3.50	3.50	**	**	**	—	—
11	3	5½	3¼	2.50	5.00	2⅛	1¼	2½	2.50	—
11C	4¼	5¼	4	3.75	4.75	0	1⅞	2⅜	2.37	—
11D	4	4⅞	3⅞	3.50	4.37	1⅜	1¾	2 3/16	—	—
11E	3¾	4½	4¼	3.25	4.00	¾	1⅝	2	—	—
11F	2¾	6¼	2¾	2.25	5.75	1	1⅛	2⅞	2.87	—
11J	3⅜	6¼	2½	2.87	5.75	**	**	**	2.87	—
11K	3⅝	8 13/16	2⅝	2.55	4.31	**	**	**	—	—
12	3	5½	4	2.50	5.00	2⅛	1¼	2½	2.50	—
12A	4½	6	4	4.00	5.50	0	2	2¾	2.75	—
12C	3⅞	6¼	2¾	3.37	5.75	1½	1 11/16	2⅞	2.87	—
12F	5½	5⅞	2⅝	5.00	5.37	**	**	**	2.68	2.50
12G	5⅛	8¾	2⅝	4.62	6.56	**	**	**	3.28	—
13A	5½	6½	4½	5.00	6.00	0	2½	3	3.00	2.50
14	6	6	4	5.50	5.50	2⅜	2¾	2¾	2.75	2.75
14C	5½	5½	3⅝	5.00	5.00	1⅞	2½	2½	2.50	2.50
14D	6	6¼	3⅞	5.50	5.75	1¼	2¾	2⅞	2.87	2.75
14E	5¾	6¼	2¾	5.25	5.75	1¼	2⅝	2⅞	2.87	2.62
16A	6¾	7½	4¼	6.25	7.00	2¾	3⅛	3½	3.50	3.12

DIMENSIONAL TOLERANCES: FRACTIONS ±1/32; DECIMALS .XX ±0.015.

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abbott
INDUSTRIAL POWER SUPPLIES

AC to DC Single & Multiple Output Switchers

MODELS
ZB
ZBT
ZBQ

SPECIFICATIONS

AC INPUT RANGE: 90 to 132 and 180 to 265 VRMS, 47 to 440 Hz, single phase. Dual input selectable.

EFFICIENCY: 75% typical on single output models, 65% typical on others.

LINE REGULATION: 0.12% for full input change on singles, 0.2% on multiples.

LOAD REGULATION: 0.2% for main outputs, 1% on other outputs.

RIPPLE: 50 mV typical on single output models (100 mV max) 200 mV max on other outputs.

STABILITY: Output voltages changes less than ±.05% for 24 hours following an initial warmup period.

TEMPERATURE RANGE: Operating: 0°C to +80°C 100% rated power at 75°C conduction cooling. Storage: −25°C to +85°C. Units may be operated with convection cooling, operating temperature: −20°C to +80°C at extra cost. Consult factory for cooling curves.

TEMPERATURE COEFFICIENT: 0.01% per degree centigrade typical, 0.03% per degree centigrade maximum.

OUTPUT VOLTAGE ADJUSTMENT: Voltages are continuously adjustable ±5% by means of an externally accessible screwdriver adjustment potentiometer.

ISOLATION VOLTAGE: 1000 VDC input to output and input to case, 500 VDC output to case. (2750 VDC optional at additional cost)

INSULATION RESISTANCE: 50 megohms minimum between input and output, input and case, and output and case when measured at 50 VDC.

LOAD TRANSIENT RESPONSE: On regulated outputs, recovery to within 1% of nominal within 0.5 msecs for 50% load change. On semi-regulated outputs, recovery occurs within 1.5 msecs.

LOAD TRANSIENT OVERSHOOT: Maximum voltage deviation: 5% from nominal voltage set point.

HOLD-UP TIME: 20 milliseconds minimum on single output units, 16 milliseconds on multiple output units.

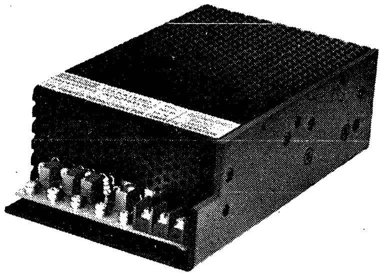
SHORT CIRCUIT PROTECTION: Each unit is completely protected against a short circuit of any duration. The output voltage automatically restores to normal when the short is removed.

OVER VOLTAGE PROTECTION: Standard. Non Crowbar OVP.

REMOTE ERROR SENSING: Each unit contains a means by which the regulator circuit monitors the voltage directly at the load using extra "sensing" leads. The resulting circuit action compensates for a DC voltage drop up to 0.3 volts in the load leads. Remote off-on available at no extra charge.

INPUT POWER PROTECTION: Internal fuse standard on single output units, external fuse recommended on multiple output units.

WEIGHT: 2 lbs., (0.9 Kgs.)



FEATURES

- High power density, up to 2 watts per cu. in.
- High reliability, MTBF of 135,540 hrs. per MIL-HDBK-217D.
- High efficiency. Up to 80%. 65% minimum.
- Dual input 90 to 132 and 180 to 265 VRMS standard.
- Conduction or convection cooled.
- 100% power at 80°C with conduction cooling.
- Meets FCC 20780 Class A for EMI emissions.
- UL Recognition applied for on selected models.
- Special models can meet MIL-STD 810C.
- 2-year warranty.

SINGLE OUTPUT — UNIT PRICE $220

Model Number	*Voltage	Maximum Load	
		Current	Power
Z5B20	5	20A	100W
Z6B18	6	18A	108W
Z10B12	10	12A	120W
Z12B10	12	10A	120W
Z15B8	15	8A	120W
Z18B7	18	6.7A	120W
Z20B6	20	6A	120W
Z22B6	22	5.5A	120W
Z24B5	24	5A	120W
Z28B4	28	4.3A	120W
Z30B4	30	4A	120W

* Voltage is continuously adjustable ±5% by means of an externally accessible screwdriver adjustment potentiometer.

TRIPLE OUTPUT — UNIT PRICE $250

Model Number	Output No. 1		Output No. 2		Output No. 3		Maximum Continuous Power
	Voltage*	Max. Cur.	Voltage*	Max. Cur.	Voltage*	Max. Cur.	
ZB95T5/12	5	13A	+12	1.0A	−12	1.0A	90W
ZB95T5/15	5	13A	+15	1.0A	−15	1.0A	95W
ZB90T5/12	5	11A	+12	1.3A	−12	1.3A	85W
ZB90T5/15	5	10A	+15	1.3A	−15	1.3A	90W

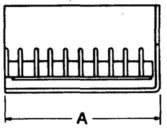
* All outputs are continuously adjustable ±5%. External adjustment accessible by a screwdriver to potentiometer.

QUAD OUTPUT — UNIT PRICE $280

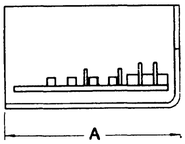
Model Number ZB100Q5/	Output No. 1		Output No. 2		Output No. 3		Output No. 4		Max. Cont. Power All Outputs
	Voltage*	Max. Cur.	Voltage*	Max. Cur.	Voltage*	Max. Cur.	Voltage*	Max. Cur.	
12/24	5	10A	+12	1.0A	−12	1.0A	24	2.0A	100W
15/24	5	10A	+15	1.0A	−15	1.0A	24	2.0A	100W
12/5	5	10A	+12	1.0A	−12	1.0A	−5	1.0A	79W
15/5	5	10A	+15	1.0A	−15	1.0A	−5	1.0A	85W
12/12	5	10A	+12	1.0A	−12	1.0A	12	2.0A	98W
15/12	5	10A	+15	1.0A	−15	1.0A	12	2.0A	100W

* All outputs are continuously adjustable ±5%. External adjustment accessible by a screwdriver to potentiometer.

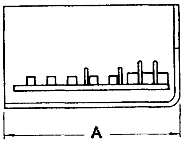
ZB

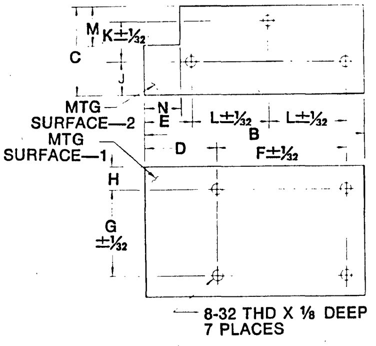


ZBT



ZBQ





A	B	C	D	E	F	G	H	J	K	L	M	N
4	6.75	2.25	1.875	1	4.125	2.5	.75	.875	.875	2.5	1	.75

Model ZB: Terminal functions left to right: 230 AC input, AC common, 115 AC input, ground, + out, + out, + sense, − out, − out, − sense.

Model ZBT: Output terminal functions right to left: +5V, 5V + sense, common return, 5V return sense, ± Output 2, ± Output 3. Input terminal functions right to left: 230 VAC, AC common, 115 VAC, chassis ground.

Model ZBQ: Output terminal functions right to left: + 5V, 5V + sense, common return, 5V return sense, ± Output 2, ± Output 4. Input terminal functions right to left: 230 VAC, AC common, 115 VAC, chassis ground.

Dimensional tolerances: ±0.0625 In. except as specified.

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Industrial Products Div. Western Offices: 8203 Vineland Ave., Sun Valley, CA 91352 (818) 504-0644. Telex: 75-2972.
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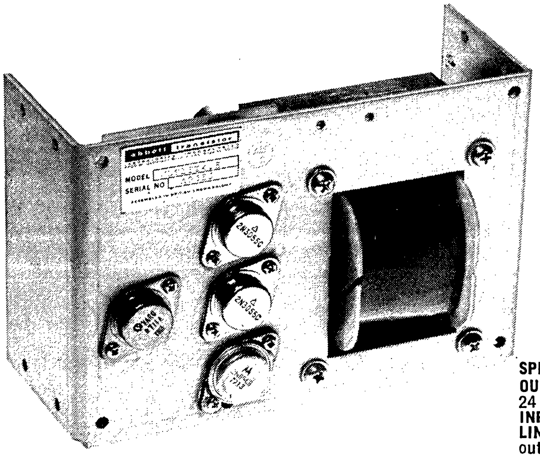
abbott
INDUSTRIAL POWER SUPPLIES

60 Hz to DC Power Modules

MODELS
NL,
RN



MODEL NL

SINGLE, DUAL AND TRIPLE OUTPUTS
5 to 28 VDC, ±12 and ±15 VDC

- Low cost.
- Operating temperature full current 0°C to +50°C, derated 40% at 71°C.
- 2 year warranty.
- Functionally similar to Lambda LO series.

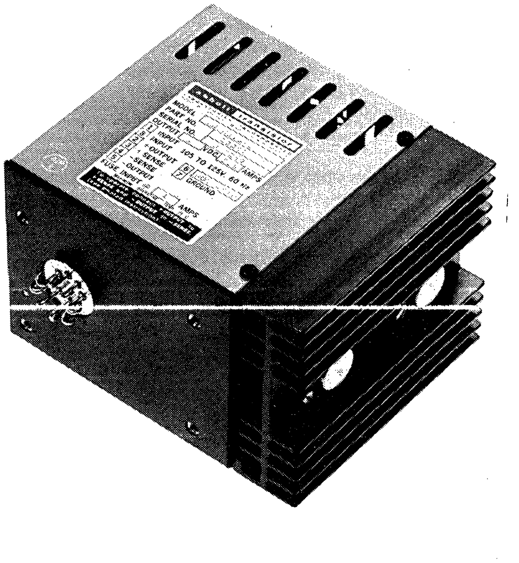
SPECIFICATIONS
OUTPUTS: Single output models: 5 through 28 VDC, 15 to 168 watts. Dual output models: ±12 and ±15, 24 to 80 watts. Triple output models 5, ±12 and 5, ±15, 22 watts to 105 watts
INPUT: 105-125, 210-250 VRMS, 47-440 Hz
LINE REGULATION: 0.02% for 10% input change single output, 0.1% for 10% input change multiple output
LOAD REGULATION: 0.1% for no load to full load change with line constant single output, 0.2% for no load to full load change with line constant multiple output
RIPPLE: 1.0 mv RMS maximum, 1.5 mv peak-to-peak typical. 5 mv peak-to-peak maximum
LOAD TRANSIENT RECOVERY TIME: 50 μSec typical after a 50% step change in load current
SHORT CIRCUIT PROTECTION: Each unit is completely protected against a short circuit of any duration. The output voltage automatically restores to normal in approximately 5 mSec after removal of the short
REVERSE VOLTAGE PROTECTION: Provided on output and on pass element
REMOTE ERROR SENSING: Each unit contains a means by which the regulator circuit monitors the voltage directly at the load using extra sensing leads. The resulting circuit action compensates for a DC voltage drop of up to 0.5 VDC in the load leads. Open sense lead protection is built in. Not included on units in case size "A".
STABILITY: Typically, ±0.05% for 24 hours after warm-up (single output), and ±0.3% for 24 hours after warm-up (dual and triple output).
TEMPERATURE: Operating: 0°C to +50°C, derated to 40% at +71°C. Storage: −40°C to +85°C
TEMPERATURE COEFFICIENT: ±0.04% per degree Celsius maximum, ±0.002% per degree Celsius typical
EFFICIENCY: Typically 45% to 60%
OVERVOLTAGE PROTECTION: Additional circuitry will reduce the output voltage to approximately 1 VDC within 25 μSec typ. If the output voltage rises to 10% or 2 VDC (whichever is greater) above nominal. Available as an optional feature by adding "-1" to the model number

For dimensions, see our catalog or call factory.

MODEL RN

HIGH QUALITY LINEAR POWER SUPPLY
SINGLE OUTPUT: 5 to 30 VDC, 1.5 to 150 WATTS
DUAL OUTPUT: ±12, ±15, 28 to 150 WATTS

- 5 year warranty.
- Full power at 71°C operating temperature.
- High reliability.
- Functionally similar to Lambda LXS series.



SPECIFICATIONS
OUTPUT: Single output models 5 through 30 VDC, 1.5 to 150 watts. Dual output models ±12, ±15, 28 to 150 watts
INPUT: 105-125, 210-250 VRMS 50-420 Hz
LINE REGULATION: 0.1% or 10 mv (whichever is greater) for input change of 105-125 VRMS
LOAD REGULATION: 0.1% or 10 mv (whichever is greater) for change from no load to full load
RIPPLE: 0.02% or 5 mv RMS (whichever is greater)
OUTPUT VOLTAGE ADJUSTMENT: Voltage is continuously adjustable between the limits shown in table by means of an externally accessible screwdriver adjustment potentiometer
ADJUSTMENT RESOLUTION: 30 mv max.
ISOLATION VOLTAGE: 300 VDC between output terminals and chassis ground
INSULATION RESISTANCE: 50 megohms between output terminals and chassis ground when measured at 50 VDC
POLARITY: Inputs and outputs are isolated; either positive or negative side may be grounded
TEMPERATURE: Operating: −4°F (−20°C) to +160°F (+71°C) without derating, forced air, or heat-sinking. Storage: −40°F (−40°C) to +185°F (+85°C)
TEMPERATURE COEFFICIENT: 0.03% per degree Celsius
ALTITUDE: 10,000 feet above sea level
LOAD TRANSIENT RECOVERY TIME: Output voltage typically returns to regulation limits within 75 microseconds after a 50% step change in load current
REMOTE ERROR SENSING: Each unit contains a means by which the regulator circuit monitors the voltage directly at the load using extra "sensing" leads. The resulting circuit action compensates for a DC voltage drop up to 0.5 volts in the load leads
TURN ON/TURN OFF OVERSHOOT: The output voltage overshoot during "turn on" or "turn off" typically will not exceed 0.1% of the output voltage, or 20 mv, (whichever is greater)
MOUNTING: Threaded inserts are provided for mounting of cases

For dimensions, see our catalog or call factory.

ABBOTT TRANSISTOR LABORATORIES, INC.
Industrial Products Div. Western Offices: 8203 Vineland Ave., Sun Valley, CA 91352 (818) 504-0644. Telex: 75-2972.
Eastern: 520 Main St., Fort Lee, NJ 07024 (201) 461-4411. Telex: 13-5332
Southwest: 710 Kindred Lane, Richardson, TX 75080 (214) 437-0697 • W. Canada: (604) 986-1286

eem

MINIGLOSSARY POWER SUPPLIES

Ambient reference: Refers to the temperature of the still air surrounding the power supply

Case reference: One of the specs that make up the nominal rating. The temperature of the case with the temperature of the surrounding still air at a stated temperature (usually 25°C).

Crowbar circuit: Protects the load. A protective circuit that applies a short circuit across the output immediately upon overload. (See overvoltage).

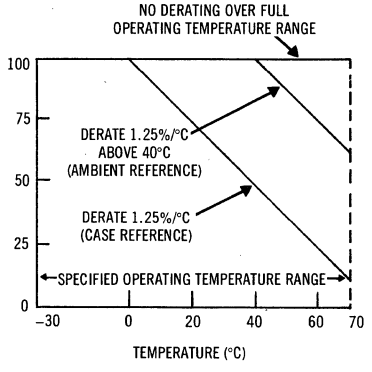


Fig. 1. Power output derating can be referred to ambient or case.

Derating: The degree output is reduced as temperature increases. Usually referenced to ambient case temperature and shown on a graph.

Efficiency: Ratio of the output power to the required input power. Usually expressed as a percentage given nominal environmental temperature.

EMI/RFI: Interference electronic circuitry caused by energy from electromechanical or radio frequency power supplies.

Foldback: Built-in protective circuits that automatically reduce the output voltage and/or current to very low levels in the event of an overload.

Holdover (Holdup): The interval that rated output will continue after input ceases. Usually milliseconds.

Input reflected current: The peak-to-peak alternating current generated by switching transients in DC/DC converters. Should not exceed 1%.

Inrush current limiting: Built-in circuits that monitor high currents through the rectifiers to the capacitors at turn ON. Circuit is usually inhibited as capacitors attain full charge.

Nominal rating: The spec value of the supply at stated conditions of input, output, and temperature.

Overshoot: A transient voltage change occurring during turn ON or OFF or during an abrupt load change.

Overvoltage (Overload) protection: Built-in circuits that protect the load or the supply by shutting it down or providing foldback.

Recovery: The time interval between the termination of an overload and restoration to normal operations.

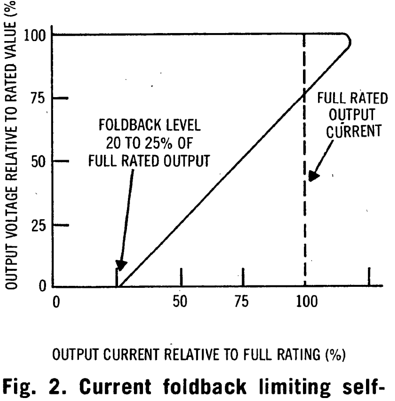


Fig. 2. Current foldback limiting self-resets with removal of fault.

Response: The time interval between a stated step change in input voltage or load current and return of output to normal operating conditions.

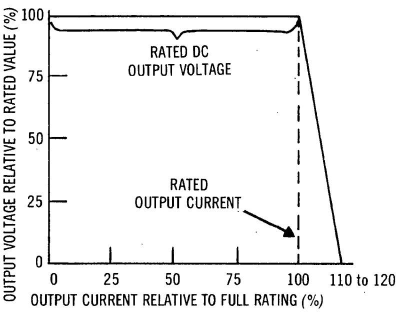


Fig. 3. Current limiting restrictions output current to a valve somewhat greater than full rated output; it resets when fault is removed.

Sensing: Regulation techniques that monitor output voltage and/or current. *Local sensing* refers to the output terminals. *Remote sensing* allows a feedback from the load circuit to the power supply.

Soft start: Allows the supply to start from zero current and/or voltage over a stated period of time during start up to prevent voltage overshoots and current imbalances.

Switchers: Power supplies using switching techniques to achieve high efficiency regulation. These techniques can have attendant EMI/RFI problems.

Tracking: The maintaining of fixed ratios between multiple outlets despite variations in line, load or temperature. Particularly important in supplies with symetrical (+)(−) outputs.

Transient protection: Circuitry designed to protect the supply from high amplitude line transients. Generally expressed in terms of peak voltage and maximum transient time duration.

POWER SUPPLIES SHIPPED IN 3 DAYS

Any time you order Acopian power modules selected from the thousands of models described on the following pages, shipment will be made within 3 days after your purchase order is received. To save more time, telephone your order. We'll ship within 3 days after you've put down the phone.

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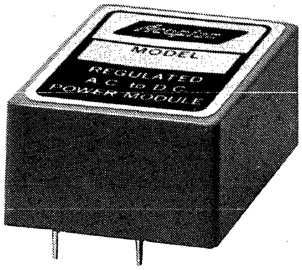
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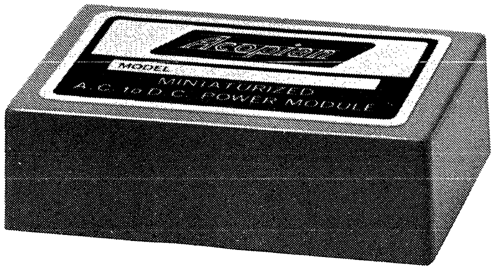
MODEL
REGULATED
A.C. to D.C.
POWER MODULE


Acopian
MODEL
MINIATURIZED
A.C. to D.C. POWER MODULE

MINIATURIZED REGULATED SINGLE OUTPUT

ALL MODELS U.L. RECOGNIZED

Conserve space with mini-modules as small as 2.3″ x 1.8″ x 1.0″. Models with outputs ranging from 1 to 75 volts, and from 30 ma to 2.5 amps are available. All feature excellent regulation and ripple parameters, and are short circuit protected.

Rugged encapsulated construction and generously derated components insure years of reliable operation. Mini-modules are also available with multiple outputs—see pages 4 and 5.

STANDARD FEATURES

- May be used in series
- No derating or heat sinking required
- Short circuit protected
- Small, lightweight

SPECIFICATIONS

Input Voltage: 105–125 VAC, 47 to 420 Hz, single phase.

Output Specifications: See table.

Output Voltage Trim Adjustment: Output is factory preset to ±2% (1 to 9 volt models) or ±1% (10 to 75 volt models) of nominal output voltage. Output may be trimmed to the nominal voltage rating with an external trim resistor.

Polarity: Output is floating. Either positive or negative terminal may be grounded.

Ambient Operating Temperature: −20 to +71°C. (Model 5E150, 0 to +71°C.) No derating required.

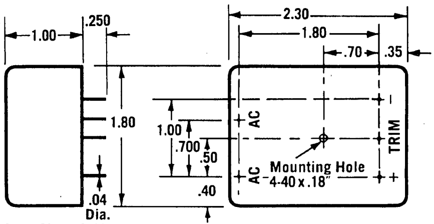
Storage Temperature: −55 to +85°C.

Temperature Coefficient: From 9 to 75 volts, approximate TC is .015%/°C; 1 to 8 volts, .03%/°C.

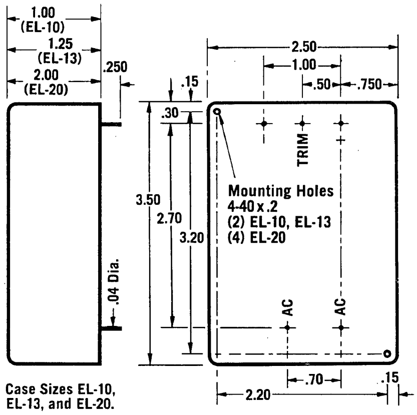
Impedance: 0.07 ohms at 1 kHz and 0.2 ohms at 10 kHz (approx.).

Weight: 7 oz. (Case size ES-10.)
1 lb. (Case size EL-10.)
1 lb. 3 oz. (Case size EL-13.)
2 lb. (Case size EL-20.)

Optional 230 Volt Input: All models can be alternately furnished for operation on an input of 210 to 250 VAC, 47-420 Hz. To order, add suffix "−230" to model number and $10.00 to price.


1.00
.250
1.80
.04 Dia.
2.30
1.80
.70
.35
1.00
.700
.50
.40
AC
AC
TRIM
Mounting Hole 4-40 x .18″
−
+

Case Size ES-10

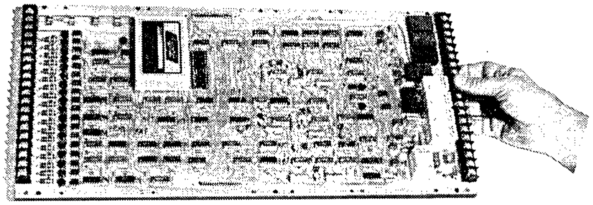

1.00 (EL-10)
1.25 (EL-13)
2.00 (EL-20)
.250
.15
.30
3.50
2.70
3.20
.04 Dia.
2.50
1.00
.50
.750
TRIM
Mounting Holes 4-40 x .2 (2) EL-10, EL-13 (4) EL-20
AC
AC
.70
.15
2.20

Case Sizes EL-10, EL-13, and EL-20.

High voltage displays such as NIXIE* indicators may be powered with the Model NX-25A or NX-50. With an input of 115 VAC 47-420 Hz, they provide nominal (unregulated) outputs of 185 VDC.

*Registered trademark of Burroughs Corp.

Placement of a mini-module on a printed circuit assembly eliminates the need for an outboard power supply, as well as all the associated wiring, connectors and hardware. Layout and construction are simplified, equipment size can be reduced, and system reliability is improved. The assembly shown is used in a control system manufactured by JB Systems Inc.



Output Voltage	Output Current Amps.	Regulation		Ripple mv RMS	Price	Model	Case Size
		Load ±%	Line ±%				
1	.250	.1	.05	0.5	$ 59	1E25	ES-10
1	.500	.2	.05	1	75	1E50A	EL-10
1.5	.250	.1	.05	0.5	59	1.5E25	ES-10
1.5	.500	.2	.05	1	75	1.5E50A	EL-10
1.5	1.0	.3	.05	1	98	1.5E100	EL-13
1.5	2.5	.3	.05	1	130	1.5E250	EL-20
2	.200	.1	.05	0.5	59	2E20	ES-10
2	.400	.2	.05	1	75	2E40A	EL-10
3	.250	.1	.05	0.5	59	3E25	ES-10
3	.500	.2	.05	1	75	3E50A	EL-10
3.6	.250	.05	.05	0.5	59	3.6E25	ES-10
3.6	.500	.1	.05	1	75	3.6E50A	EL-10
3.6	1.0	.3	.05	1	98	3.6E100	EL-13
3.6	2.5	.3	.05	1	130	3.6E250	EL-20
4	.200	.05	.05	0.5	59	4E20	ES-10
4	.400	.1	.05	1	75	4E40A	EL-10
5	.250	.05	.05	0.5	59	5E25	ES-10
5	.500	.1	.05	1	69	5E50A	EL-10
5	1.0	.2	.05	1	85	5E100	EL-13
5	1.5	.3	.1	1	98	5E150	EL-13
5	2.0	.15	.05	1	115	5E200	EL-20
5	2.5	.15	.05	1	130	5E250	EL-20
6	.200	.05	.05	0.5	59	6E20	ES-10
6	.400	.1	.05	1	75	6E40A	EL-10
6	.550	.2	.05	1	89	6E55	EL-10
6	1.0	.2	.05	1	105	6E100	EL-13
6	1.75	.15	.05	1	125	6E175	EL-20
7	.170	.05	.05	0.5	59	7E17	ES-10
7	.340	.1	.05	1	75	7E34A	EL-10
7	.450	.2	.05	1	89	7E45	EL-10
7	.900	.2	.05	1	105	7E90	EL-13
7	1.15	.15	.05	1	125	7E115	EL-20
8	.150	.05	.05	0.5	59	8E15	ES-10
8	.300	.1	.05	1	75	8E30A	EL-10
8	.700	.2	.05	1	105	8E70	EL-13
8	1.1	.15	.05	1	125	8E110	EL-20
9	.130	.05	.05	0.5	59	9E13	ES-10
9	.260	.1	.05	1	75	9E26A	EL-10
9	.450	.15	.05	1	89	9E45	EL-10
9	.850	.15	.05	1	105	9E85	EL-13
9	1.5	.15	.05	1	130	9E150	EL-20
10	.120	.02	.02	0.5	49	10E12	ES-10
10	.240	.05	.05	1	75	10E24A	EL-10
10	.400	.15	.05	1	89	10E40	EL-10
10	.750	.15	.05	1	105	10E75	EL-13
10	1.2	.1	.05	1	130	10E120	EL-20
11	.110	.02	.02	0.5	59	11E11	ES-10
11	.220	.05	.05	1	75	11E22A	EL-10
11	.350	.15	.05	1	89	11E35	EL-10
11	.600	.15	.05	1	105	11E60	EL-13
11	1.0	.1	.05	1	130	11E100	EL-20
12	.100	.02	.02	0.5	49	12E10	ES-10
12	.150	.05	.05	0.5	65	12E15	ES-10
12	.200	.05	.05	1	75	12E20A	EL-10
12	.400	.1	.05	1	89	12E40	EL-10
12	.700	.1	.05	1	110	12E70	EL-13
12	1.2	.15	.05	1	130	12E120	EL-20
13	.100	.02	.02	0.5	59	13E10	ES-10
13	.200	.05	.05	1	75	13E20A	EL-10
13	.350	.1	.05	1	89	13E35	EL-10
13	1.0	.1	.05	1	130	13E100	EL-20
14	.100	.02	.02	0.5	59	14E10	ES-10
14	.200	.05	.05	1	75	14E20A	EL-10
14	.300	.1	.05	1	89	14E30	EL-10
14	.500	.1	.05	1	105	14E50	EL-13
14	1.0	.1	.05	1	130	14E100	EL-20
15	.100	.02	.02	0.5	49	15E10	ES-10
15	.150	.05	.05	0.5	65	15E15	ES-10
15	.200	.05	.05	1	75	15E20A	EL-10
15	.400	.1	.05	1	89	15E40	EL-10
15	.600	.1	.05	1	105	15E60	EL-13
15	1.0	.1	.05	1	130	15E100	EL-20
16	.080	.02	.02	0.5	59	16E08	ES-10
16	.160	.05	.05	1	75	16E16A	EL-10
16	.350	.1	.05	1	95	16E35	EL-10
16	.500	.1	.05	1	110	16E50	EL-13
16	.900	.1	.05	1	130	16E90	EL-20
17	.070	.02	.02	0.5	59	17E07	ES-10
17	.140	.05	.05	1	75	17E14A	EL-10

Output Voltage	Output Current Amps.	Regulation		Ripple mv RMS	Price	Model	Case Size
		Load ±%	Line ±%				
17	.450	.1	.05	1	$110	17E45	EL-13
17	.750	.1	.05	1	130	17E75	EL-20
18	.060	.02	.02	0.5	49	18E06	ES-10
18	.120	.05	.05	1	75	18E12A	EL-10
18	.270	.1	.05	1	89	18E27	EL-10
18	.400	.1	.05	1	105	18E40	EL-13
18	.550	.1	.05	1	125	18E55	EL-20
19	.060	.02	.02	0.5	59	19E06	ES-10
19	.120	.05	.05	1	75	19E12A	EL-10
19	.250	.1	.05	1	89	19E25	EL-10
19	.400	.1	.05	1	105	19E40	EL-13
19	.700	.1	.05	1	130	19E70	EL-20
20	.060	.02	.02	0.5	59	20E06	ES-10
20	.120	.05	.05	1	75	20E12A	EL-10
20	.200	.1	.05	1	89	20E20	EL-10
20	.400	.1	.05	1	105	20E40	EL-13
20	.700	.1	.05	1	130	20E70	EL-20
21	.060	.02	.02	0.5	59	21E06	ES-10
21	.120	.05	.05	1	75	21E12A	EL-10
21	.175	.1	.05	1	89	21E18	EL-10
21	.375	.1	.05	1	105	21E38	EL-13
21	.600	.1	.05	1	125	21E60	EL-20
22	.050	.02	.02	0.5	59	22E05	ES-10
22	.100	.05	.05	1	75	22E10A	EL-10
22	.150	.1	.05	1	89	22E15	EL-10
22	.300	.1	.05	1	105	22E30	EL-13
22	.500	.1	.05	1	125	22E50	EL-20
23	.050	.02	.02	0.5	59	23E05	ES-10
23	.100	.05	.05	1	75	23E10A	EL-10
23	.200	.1	.05	1	89	23E20	EL-10
23	.300	.1	.05	1	105	23E30	EL-13
23	.600	.1	.05	1	130	23E60	EL-20
24	.050	.02	.02	0.5	49	24E05	ES-10
24	.100	.05	.05	1	75	24E10A	EL-10
24	.200	.1	.05	1	89	24E20	EL-10
24	.350	.1	.05	1	110	24E35	EL-13
24	.600	.1	.05	1	130	24E60	EL-20
25	.050	.02	.02	0.5	59	25E05	ES-10
25	.100	.05	.05	1	75	25E10A	EL-10
25	.190	.1	.05	1	89	25E19	EL-10
25	.325	.1	.05	1	110	25E33	EL-13
25	.550	.1	.05	1	130	25E55	EL-20
26	.040	.02	.02	0.5	59	26E04	ES-10
26	.080	.05	.05	1	75	26E08A	EL-10
26	.170	.1	.05	1	89	26E17	EL-10
26	.300	.1	.05	1	105	26E30	EL-13
26	.450	.1	.05	1	125	26E45	EL-20
27	.040	.02	.02	0.5	59	27E04	ES-10
27	.080	.05	.05	1	75	27E08A	EL-10
27	.160	.1	.05	1	89	27E16	EL-10
27	.300	.1	.05	1	105	27E30	EL-13
27	.500	.1	.05	1	130	27E50	EL-20
28	.040	.02	.02	0.5	49	28E04	ES-10
28	.080	.05	.05	1	75	28E08A	EL-10
28	.150	.1	.05	1	89	28E15	EL-10
28	.300	.1	.05	1	110	28E30	EL-13
28	.500	.1	.05	1	130	28E50	EL-20
30	.080	.02	.02	1	79	30E08A	EL-13
32	.070	.02	.02	1	79	32E07A	EL-13
34	.060	.02	.02	1	79	34E06A	EL-13
35	.050	.02	.02	1	79	35E05A	EL-13
36	.050	.02	.02	1	79	36E05A	EL-13
38	.040	.02	.02	1	79	38E04A	EL-13
40	.030	.02	.02	1	79	40E03A	EL-13
40	.060	.02	.02	1	98	40E06A	EL-13
42	.030	.02	.02	1	79	42E03A	EL-13
44	.030	.02	.02	1	79	44E03A	EL-13
45	.030	.02	.02	1	79	45E03A	EL-13
48	.030	.02	.02	1	79	48E03A	EL-13
48	.050	.02	.02	1	98	48E05A	EL-13
50	.030	.02	.02	1	79	50E03A	EL-13
50	.050	.02	.02	1	98	50E05A	EL-13
55	.040	.02	.02	1	98	55E04A	EL-13
60	.050	.02	.02	1	98	60E05A	EL-13
65	.050	.02	.02	1	98	65E05A	EL-13
70	.040	.02	.02	1	98	70E04A	EL-13
75	.030	.02	.02	1	98	75E03A	EL-13
185	.025	Unregulated		2V	49	NX-25A	EL-10
185	.050	Unregulated		3.5V	69	NX-50	EL-13

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3

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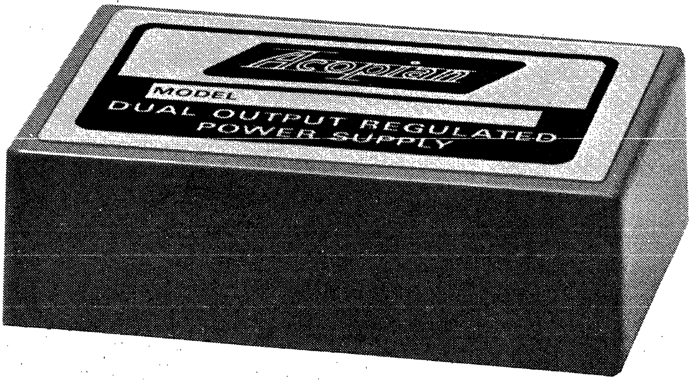
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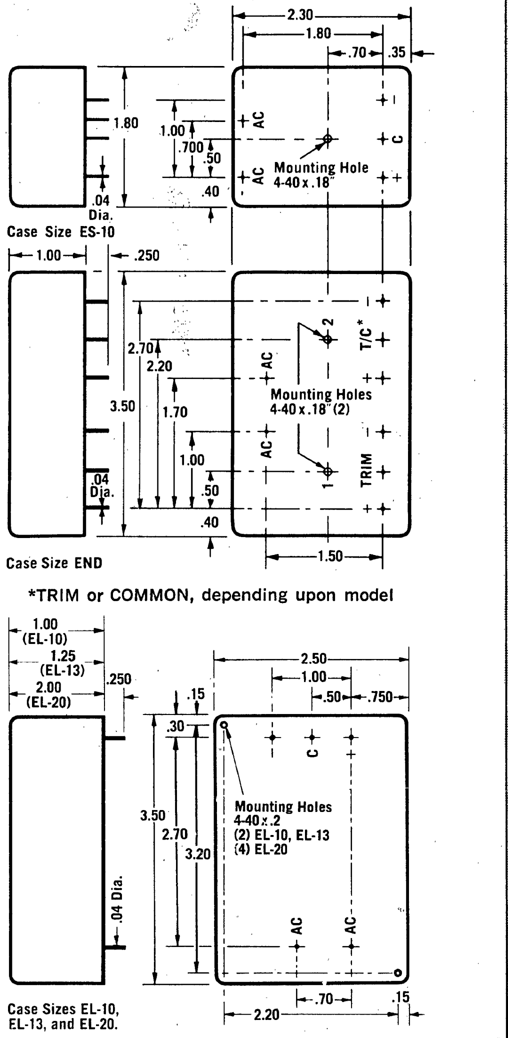
MODEL
DUAL OUTPUT REGULATED
POWER SUPPLY

MINIATURIZED REGULATED MULTIPLE OUTPUT

ALL MODELS U.L. RECOGNIZED

These dual and triple output mini-modules are compact and convenient sources of the voltages required to power operational amplifiers and related circuits. They may be mounted directly on printed circuit board assemblies, simplifying system layout and minimizing the connectors and wiring required.


2.30
1.80
.70
.35
1.80
1.00
.700
.50
.40
.04 Dia.
AC
AC
C
Mounting Hole 4-40 x .18"
Case Size ES-10
1.00
.250
2.70
2.20
3.50
1.70
1.00
.50
.40
.04 Dia.
AC
AC
2
1
T/C*
TRIM
Mounting Holes 4-40 x .18" (2)
1.50
Case Size END
1.00 (EL-10)
1.25 (EL-13)
2.00 (EL-20)
.250
.15
2.50
1.00
.50
.750
.30
3.50
2.70
3.20
.04 Dia.
C
Mounting Holes 4-40 x .2 (2) EL-10, EL-13 (4) EL-20
AC
AC
.70
.15
2.20
Case Sizes EL-10, EL-13, and EL-20.

*TRIM or COMMON, depending upon model

STANDARD FEATURES

- May be used in series
- No derating or heat sinking required
- Short circuit protected
- Compact, lightweight

SPECIFICATIONS

Input Voltage: 105–125 VAC, 47 to 420 Hz, single phase.

Output Specifications: See table.

Output Voltage Setting: Each output is factory preset to ±2% (1 to 9 volt outputs) or ±1% (10 to 28 volt outputs) of the nominal output voltage. Outputs of Case Size END modules, except those marked (*), may be trimmed to the nominal voltage rating with an external trim resistor.

Polarity: Single output sections may be used in either polarity. Dual output sections, marked (*), are provided with a plus/common/minus output connection configuration.

Ambient Operating Temperature: −20 to +71°C. No derating required.

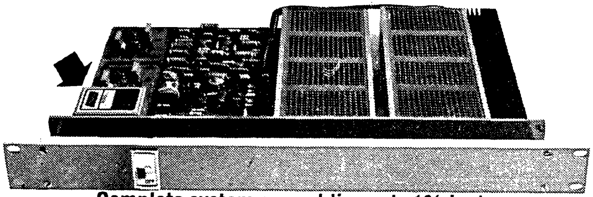
Storage Temperature: −55 to +85°C.

Temperature Coefficient: From 9 to 28 volts, approximate TC is .015%/°C; 1 to 8 volts, .03%/°C.

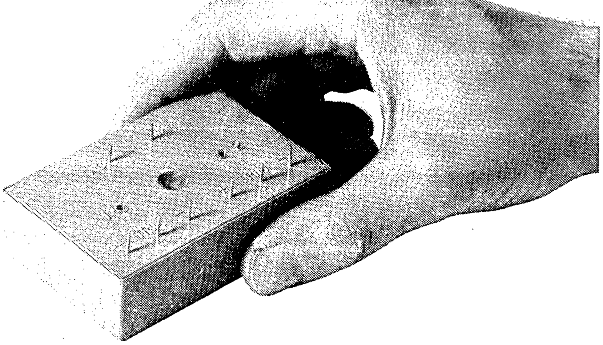
Impedance: 0.07 ohms at 1 kHz and 0.2 ohms at 10 kHz (approx.).

Weight: 7 oz. (Case size ES-10.)
13 oz. (Case size END.)
1 lb. (Case size EL-10.)
1 lb. 3 oz. (Case size EL-13.)
2 lb. (Case size EL-20.)

Optional 230 Volt Input: All models can be alternately furnished for operation on an input of 210 to 250 VAC, 47-420 Hz. To order, add suffix "−230" to model number and $10.00 to price.



Complete system assemblies only 1¾-inches high. Mini-modules permit exceptional flexibility in the design of rack-mounting assemblies built on standard 19-inch panels as small as 1¾-inches high.



Dual output modules have isolated outputs; triples provide two balanced and tracking voltages in a three-terminal configuration, plus an isolated third output for logic, control circuits, etc.

HOW TO ORDER:

Any two of the sections listed below, or two of the same section, can be combined into a multiple-output module. The complete model number is the combination of the two section numbers selected. Note that some sections provide two outputs; combination with a single output section results in a triple-output module.

Example: The combination of sections 6E20D and 15E10D is the Model 6E20D-15E10D. Always assign the lower voltage section first. For pricing purposes, add the costs of the sections selected. Example: The price of the Model 6E20D-15E10D is $52.00 plus $45.00, or $97.00 total.

Output Voltage	Output Current Amps.	Regulation		Ripple mv RMS	Price per Section	Section (See "How to order")	Case Size
		Load ±%	Line ±%				
1	.250	.1	.05	0.5	$52	1E25D	END
1.5	.250	.1	.05	0.5	52	1.5E25D	END
2	.200	.1	.05	0.5	52	2E20D	END
3	.250	.1	.05	0.5	52	3E25D	END
3.6	.250	.05	.05	0.5	52	3.6E25D	END
4	.200	.05	.05	0.5	52	4E20D	END
5	.250	.05	.05	0.5	52	5E25D	END
6	.200	.05	.05	0.5	52	6E20D	END
7	.170	.05	.05	0.5	52	7E17D	END
8	.150	.05	.05	0.5	52	8E15D	END
9	.130	.05	.05	0.5	45	9E13D	END
10	.120	.02	.02	0.5	45	10E12D	END
±12*	.050	.10	.05	1.0	52	D12E05	END
12	.100	.02	.02	0.5	45	12E10D	END
12	.150	.05	.05	0.5	55	12E15D	END
13	.100	.02	.02	0.5	45	13E10D	END

Output Voltage	Output Current Amps.	Regulation		Ripple mv RMS	Price per Section	Section (See "How to order")	Case Size
		Load ±%	Line ±%				
14	.100	.02	.02	0.5	$45	14E10D	END
±15*	.050	.10	.05	1.0	52	D15E05	END
15	.100	.02	.02	0.5	45	15E10D	END
15	.150	.05	.05	0.5	55	15E15D	END
16	.080	.02	.02	0.5	45	16E08D	END
17	.070	.02	.02	0.5	45	17E07D	END
18	.060	.02	.02	0.5	45	18E06D	END
20	.060	.02	.02	0.5	45	20E06D	END
21	.060	.02	.02	0.5	45	21E06D	END
22	.050	.02	.02	0.5	45	22E05D	END
23	.050	.02	.02	0.5	45	23E05D	END
24	.050	.02	.02	0.5	45	24E05D	END
25	.050	.02	.02	0.5	45	25E05D	END
26	.040	.02	.02	0.5	45	26E04D	END
27	.040	.02	.02	0.5	45	27E04D	END
28	.040	.02	.02	0.5	45	28E04D	END

*Dual output section. Combination with a single output section results in a triple output module.

DUAL OUTPUT SUPPLIES FOR OP AMPS

(These model numbers are complete as shown.)

Nominal Output Voltages	Current per Output Amps.	Regulation		Ripple mv RMS	Price	Model	Case Size
		Load ±%	Line ±%				
±12	.025	.1	.05	1	$ 49	D12-03	ES-10
±12	.050	.1	.05	1	59	D12-05	ES-10
±12	.100	.05	.05	1	69	D12-10A	EL-10
±12	.150	.05	.05	1	79	D12-15A	EL-10
±12	.200	.05	.05	1	89	D12-20	EL-10
±12	.300	.05	.05	1	105	D12-30	EL-13
±12	.350	.05	.05	1	115	D12-35	EL-13
±12	.500	.1	.05	1	135	D12-50	EL-20

Nominal Output Voltages	Current per Output Amps.	Regulation		Ripple mv RMS	Price	Model	Case Size
		Load ±%	Line ±%				
±15	.025	.1	.05	1	$ 49	D15-03	ES-10
±15	.050	.1	.05	1	59	D15-05	ES-10
±15	.100	.05	.05	1	69	D15-10A	EL-10
±15	.150	.05	.05	1	79	D15-15A	EL-10
±15	.200	.05	.05	1	89	D15-20	EL-10
±15	.300	.05	.05	1	105	D15-30	EL-13
±15	.350	.05	.05	1	115	D15-35	EL-13
±15	.500	.1	.05	1	135	D15-50	EL-20

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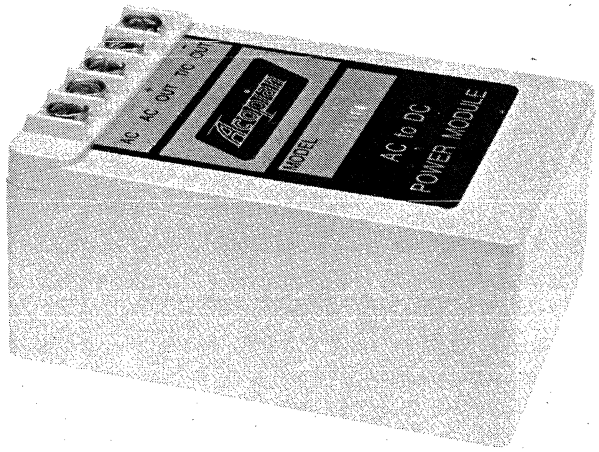
MINIATURIZED REGULATED
Terminal Strip Connections



ALL MODELS U.L. RECOGNIZED

Although small in size, these mini-modules offer high performance at modest prices. All models, with series regulated outputs ranging from 1 to 75 volts and as high as 2.5 amps, may be mounted in an area only 3.5″ x 2.5″. Dual output models are available with the ratings commonly required for driving op amps and other balanced loads. Terminal strip input/output connections eliminate all need for sockets or soldering. Short circuit protection, encapsulated construction, and conservative design assure long term reliability.

STANDARD FEATURES

- May be used in series
- No derating or heat sinking required
- Short circuit protected
- Small, lightweight

SPECIFICATIONS

Input Voltage: 105–125 VAC, 47 to 420 Hz, single phase.

Output Specifications: See tables.

Output Voltage Trim Adjustment: Outputs factory preset to ±2% (1 to 9 volt models) or ±1% (10 to 75 volt models) of nominal output voltage. Single output models may be trimmed to the nominal voltage rating with an external trim resistor.

Polarity: Either positive or negative terminal of a single output module may be grounded. Dual output modules have a positive/common/negative output terminal configuration.

Ambient Operating Temperature: −20 to +71°C. (Model 5EB150, 0 to +71°C.) No derating required.

Storage Temperature: −55 to +85°C.

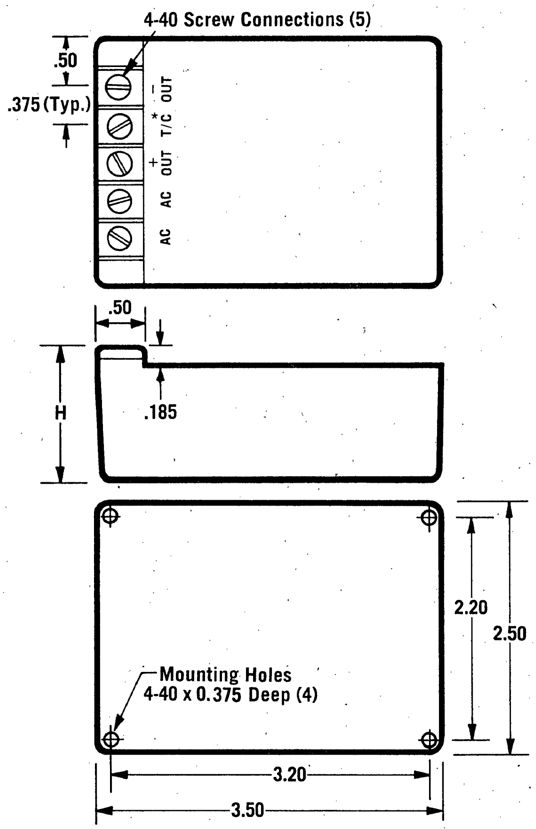
Temperature Coefficient: From 9 to 75 volts, approximate TC is .015%/°C; 1 to 8 volts, .03%/°C.

Impedance: 0.07 ohms at 1 kHz and 0.2 ohms at 10 kHz (approx.).

Optional 230 Volt Input: All models can be alternately furnished for operation on an input of 210 to 250 VAC, 47-420 Hz. To order, add suffix "–230" to model number and $10.00 to price.

High voltage displays such as NIXIE* indicators may be powered with the Model NX-25B or NX-50B. With an input of 115 VAC 47-420 Hz, they provide nominal (unregulated) outputs of 185 VDC.

*Registered trademark of Burroughs Corp.



*TRIM on single output modules; COMMON on duals

Case	H	Approx. Weight
EB-10	1.375	15oz
EB-13	1.625	1lb 5oz
EB-20	2.375	2lb 1oz

SINGLE OUTPUT MODELS

Output Voltage	Output Current Amps.	Regulation		Ripple mv RMS	Price	Model	Case Size
		Load ±%	Line ±%				
1	.500	.4	.05	1	$ 79	1EB50	EB-10
1.5	.500	.3	.05	1	79	1.5EB50	EB-10
1.5	1.0	.5	.05	1	105	1.5EB100	EB-13
1.5	2.5	.6	.05	1	140	1.5EB250	EB-20
2	.400	.25	.05	1	79	2EB40	EB-10
3	.500	.25	.05	1	79	3EB50	EB-10
3.6	.500	.15	.05	1	79	3.6EB50	EB-10
3.6	1.0	.4	.05	1	105	3.6EB100	EB-13
3.6	2.5	.4	.05	1	140	3.6EB250	EB-20
4	.400	.15	.05	1	79	4EB40	EB-10
5	.500	.15	.05	1	79	5EB50	EB-10
5	1.0	.25	.05	1	95	5EB100	EB-13
5	1.5	.35	.1	1	110	5EB150	EB-13
5	2.0	.25	.05	1	125	5EB200	EB-20
5	2.5	.25	.05	1	140	5EB250	EB-20
6	.400	.1	.05	1	79	6EB40	EB-10
6	.550	.25	.05	1	95	6EB55	EB-10
6	1.0	.25	.05	1	110	6EB100	EB-13
6	1.75	.2	.05	1	130	6EB175	EB-20
7	.340	.1	.05	1	79	7EB34	EB-10
7	.450	.2	.05	1	95	7EB45	EB-10
7	.900	.25	.05	1	110	7EB90	EB-13
7	1.15	.2	.05	1	130	7EB115	EB-20
8	.300	.1	.05	1	79	8EB30	EB-10
8	.700	.2	.05	1	110	8EB70	EB-13
8	1.1	.2	.05	1	130	8EB110	EB-20
9	.260	.1	.05	1	79	9EB26	EB-10
9	.450	.15	.05	1	95	9EB45	EB-10
9	.850	.2	.05	1	110	9EB85	EB-13
9	1.5	.2	.05	1	135	9EB150	EB-20
10	.240	.05	.05	1	79	10EB24	EB-10
10	.400	.15	.05	1	95	10EB40	EB-10
10	.750	.2	.05	1	110	10EB75	EB-13
10	1.2	.15	.05	1	135	10EB120	EB-20
11	.220	.05	.05	1	79	11EB22	EB-10
11	.350	.15	.05	1	95	11EB35	EB-10
11	.600	.15	.05	1	110	11EB60	EB-13
11	1.0	.15	.05	1	135	11EB100	EB-20
12	.200	.05	.05	1	79	12EB20	EB-10
12	.400	.1	.05	1	95	12EB40	EB-10
12	.700	.15	.05	1	115	12EB70	EB-13
12	1.2	.2	.05	1	135	12EB120	EB-20
13	.200	.05	.05	1	79	13EB20	EB-10
13	.350	.1	.05	1	95	13EB35	EB-10
13	.600	.1	.05	1	115	13EB60	EB-13
13	1.0	.15	.05	1	135	13EB100	EB-20
14	.200	.05	.05	1	79	14EB20	EB-10
14	.300	.1	.05	1	95	14EB30	EB-10
14	.500	.1	.05	1	110	14EB50	EB-13
14	1.0	.15	.05	1	135	14EB100	EB-20
15	.200	.05	.05	1	79	15EB20	EB-10
15	.400	.1	.05	1	95	15EB40	EB-10
15	.600	.1	.05	1	110	15EB60	EB-13
15	1.0	.15	.05	1	135	15EB100	EB-20
16	.160	.05	.05	1	79	16EB16	EB-10
16	.350	.1	.05	1	100	16EB35	EB-10
16	.500	.1	.05	1	115	16EB50	EB-13
16	.900	.15	.05	1	135	16EB90	EB-20
17	.140	.05	.05	1	79	17EB14	EB-10
17	.325	.1	.05	1	100	17EB33	EB-10
17	.450	.1	.05	1	115	17EB45	EB-13
17	.750	.15	.05	1	135	17EB75	EB-20
18	.120	.05	.05	1	79	18EB12	EB-10
18	.270	.1	.05	1	95	18EB27	EB-10

Output Voltage	Output Current Amps.	Regulation		Ripple mv RMS	Price	Model	Case Size
		Load ±%	Line ±%				
18	.400	.1	.05	1	$110	18EB40	EB-13
18	.550	.1	.05	1	130	18EB55	EB-20
19	.120	.05	.05	1	79	19EB12	EB-10
19	.250	.1	.05	1	95	19EB25	EB-10
19	.400	.1	.05	1	110	19EB40	EB-13
19	.700	.1	.05	1	135	19EB70	EB-20
20	.120	.05	.05	1	79	20EB12	EB-10
20	.200	.1	.05	1	95	20EB20	EB-10
20	.400	.1	.05	1	110	20EB40	EB-13
20	.700	.1	.05	1	135	20EB70	EB-20
21	.120	.05	.05	1	79	21EB12	EB-10
21	.175	.1	.05	1	95	21EB18	EB-10
21	.375	.1	.05	1	110	21EB38	EB-13
21	.600	.1	.05	1	130	21EB60	EB-20
22	.100	.05	.05	1	79	22EB10	EB-10
22	.150	.1	.05	1	95	22EB15	EB-10
22	.300	.1	.05	1	110	22EB30	EB-13
22	.500	.1	.05	1	130	22EB50	EB-20
23	.100	.05	.05	1	79	23EB10	EB-10
23	.200	.1	.05	1	95	23EB20	EB-10
23	.300	.1	.05	1	110	23EB30	EB-13
23	.600	.1	.05	1	135	23EB60	EB-20
24	.100	.05	.05	1	79	24EB10	EB-10
24	.200	.1	.05	1	95	24EB20	EB-10
24	.350	.1	.05	1	115	24EB35	EB-13
24	.600	.1	.05	1	135	24EB60	EB-20
25	.100	.05	.05	1	79	25EB10	EB-10
25	.190	.1	.05	1	95	25EB19	EB-10
25	.325	.1	.05	1	115	25EB33	EB-13
25	.550	.1	.05	1	135	25EB55	EB-20
26	.080	.05	.05	1	79	26EB08	EB-10
26	.170	.1	.05	1	95	26EB17	EB-10
26	.300	.1	.05	1	110	26EB30	EB-13
26	.450	.1	.05	1	130	26EB45	EB-20
27	.080	.05	.05	1	79	27EB08	EB-10
27	.160	.1	.05	1	95	27EB16	EB-10
27	.300	.1	.05	1	110	27EB30	EB-13
27	.500	.1	.05	1	135	27EB50	EB-20
28	.080	.05	.05	1	79	28EB08	EB-10
28	.150	.1	.05	1	95	28EB15	EB-10
28	.300	.1	.05	1	115	28EB30	EB-13
28	.500	.1	.05	1	135	28EB50	EB-20
30	.080	.02	.02	1	85	30EB08	EB-13
32	.070	.02	.02	1	85	32EB07	EB-13
34	.060	.02	.02	1	85	34EB06	EB-13
35	.050	.02	.02	1	85	35EB05	EB-13
36	.050	.02	.02	1	85	36EB05	EB-13
38	.040	.02	.02	1	85	38EB04	EB-13
40	.030	.02	.02	1	85	40EB03	EB-13
40	.060	.02	.02	1	105	40EB06	EB-13
42	.030	.02	.02	1	85	42EB03	EB-13
44	.030	.02	.02	1	85	44EB03	EB-13
45	.030	.02	.02	1	85	45EB03	EB-13
48	.030	.02	.02	1	85	48EB03	EB-13
48	.050	.02	.02	1	105	48EB05	EB-13
50	.030	.02	.02	1	85	50EB03	EB-13
50	.050	.02	.02	1	105	50EB05	EB-13
55	.040	.02	.02	1	105	55EB04	EB-13
60	.050	.02	.02	1	105	60EB05	EB-13
65	.050	.02	.02	1	105	65EB05	EB-13
70	.040	.02	.02	1	105	70EB04	EB-13
75	.030	.02	.02	1	105	75EB03	EB-13
185	.025	Unregulated		2V	55	NX-25B	EB-10
185	.050	Unregulated		3.5V	75	NX-50B	EB-13

DUAL OUTPUT MODELS

Output Voltage Voltages	Current per Output Amps.	Regulation		Ripple mv RMS	Price	Model	Case Size
		Load ±%	Line ±%				
±12	.100	.05	.05	1	$ 75	DB12-10	EB-10
±12	.150	.05	.05	1	85	DB12-15	EB-10
±12	.200	.05	.05	1	95	DB12-20	EB-10
±12	.300	.05	.05	1	115	DB12-30	EB-13
±12	.350	.05	.05	1	125	DB12-35	EB-13
±12	.500	.1	.05	1	145	DB12-50	EB-20

Output Voltage Voltages	Current per Output Amps.	Regulation		Ripple mv RMS	Price	Model	Case Size
		Load ±%	Line ±%				
±15	.100	.05	.05	1	$ 75	DB15-10	EB-10
±15	.150	.05	.05	1	85	DB15-15	EB-10
±15	.200	.05	.05	1	95	DB15-20	EB-10
±15	.300	.05	.05	1	115	DB15-30	EB-13
±15	.350	.05	.05	1	125	DB15-35	EB-13
±15	.500	.1	.05	1	145	DB15-50	EB-20

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7

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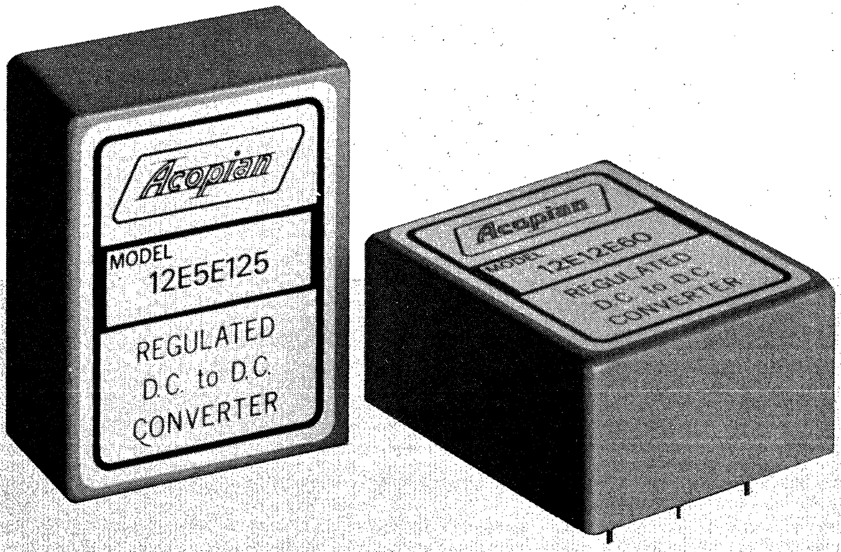
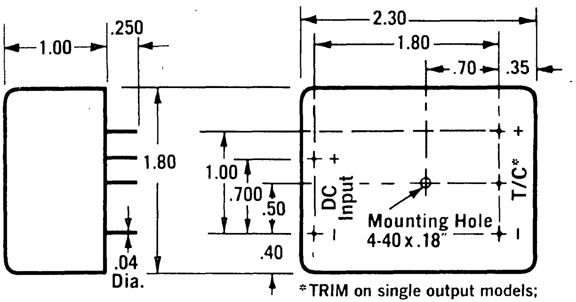
MINIATURIZED DC-DC CONVERTERS



These versatile DC/DC converters are ideally suited for powering a wide variety of analog and digital circuitry, such as op amps, logic and microprocessors. All have been designed to provide high performance and long-term reliability in combination with small size and high efficiency. They may be mounted directly on a printed circuit board for OEM applications, or installed in a socket for developmental and small quantity requirements.

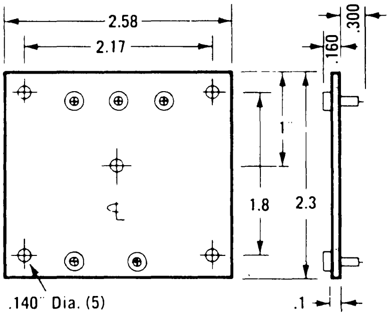
Efficiency is in the order of 65%, and is maintained down to low levels of output current. Provision for trimming the single output models permits setting the voltage to an accuracy of better than 1%, when required. Input reflected ripple is reduced to less than 1% by means of a standard built-in pi filter, and electrostatic shielding on all six sides minimizes radiated energy. High input/output isolation permits separation of the output from the dc input bus to minimize circuit interaction due to ground loops, and the use of inputs (and the outputs of single output models) in either polarity.

DIMENSIONS



Case Size ESC-10; Weight: 5 oz.

*TRIM on single output models; COMMON on duals.



MODEL ES-1 SOCKET

SPECIFICATIONS

Input Voltage: Nominal voltage ±10%

Input Reflected Ripple: 1% E_{in} (max.)

Output Regulation:
Line: ±.02%
Load: ±.05%

Output Ripple: 1 mv rms, 50 mv P-P (25 MHz BW)

Output Voltage Tolerance: Output(s) factory preset within ±1% of nominal. Single output models may be trimmed to the nominal rating with an external trim resistor.

Polarity: The output of single output models may be connected in either polarity. Dual output models have a positive/common/negative output terminal configuration.

Transient Response (NL-FL): 50 microseconds

Output Protection: Electronic current limiting with automatic recovery.

Input/Output Isolation:
Voltage: 500 Vdc
Resistance: 100 megohms
Capacitance: 100 pF

Switching Frequency: 20 kHz minimum

Temperature Coefficient: .02%/°C

Ambient Operating Temperature: −20 to +71°C

Storage Temperature: −40 to +85°C

Humidity: 20% to 80% R.H. (non-condensing)

Mounting: May be mounted on printed circuit board or in socket (Order Model ES-1. Price, $5.00)

SINGLE OUTPUT

Nominal Input Voltage	Output Voltage	Output Current Amps at 55°C	Output Current Amps at 71°C	%Efficiency at Nominal Input (typ.)	Price	Model
5	5	1.25	1.0	59	$98	5E5E125
5	12	600	.500	64	98	5E12E60
5	15	500	.400	65	98	5E15E50
12	5	1.25	1.0	60	98	12E5E125
12	12	600	500	67	98	12E12E60
12	15	500	.400	68	98	12E15E50
24	5	1.25	1.0	61	98	24E5E125
24	12	600	500	68	98	24E12E60
24	15	500	400	69	98	24E15E50
28	5	1.25	1.0	62	98	28E5E125
28	12	600	500	69	98	28E12E60
28	15	500	400	70	98	28E15E50

DUAL OUTPUT

Nominal Input Voltage	Output Voltage	Output Current Amps at 55°C	Output Current Amps at 71°C	%Efficiency at Nominal Input (typ.)	Price	Model
5	±12	300	250	62	$105	5E12D30
5	±15	250	250	63	105	5E15D25
12	±12	300	250	65	105	12E12D30
12	±15	250	250	66	105	12E15D25
24	±12	300	250	65	105	24E12D30
24	±15	250	250	66	105	24E15D25
28	±12	300	250	65	105	28E12D30
28	±15	250	250	66	105	28E15D25

ACOPIAN P.O. BOX 638, EASTON, PA 18044
TOLL FREE NO.: (800) 523-9478 • 3-DAY SHIPMENT GUARANTEED

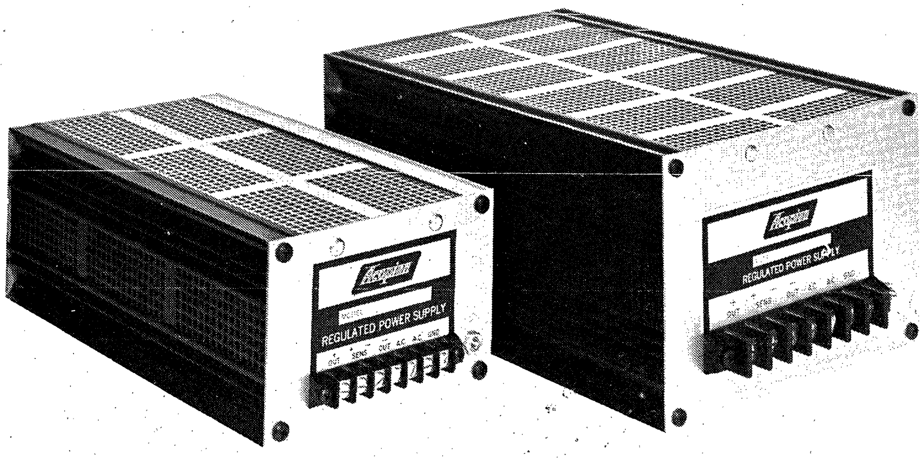
9

Acopian

SERIES A REGULATED PREMIUM PERFORMANCE

SERIES B REGULATED LOWEST COST

U.L. RECOGNIZED


Acopian
REGULATED POWER SUPPLY
OUT SENS OUT AC AC GND
Acopian
REGULATED POWER SUPPLY

A broad selection of power supplies offering unusually high performance—many models have regulation of ±0.005%. Electronic current limiting and provision for remote voltage sensing are standard features; overvoltage protection is available as a built-in option. Rugged extruded aluminum cases include threaded mounting holes on bottom, back, and side, permitting mounting in any position.

SERIES A PREMIUM PERFORMANCE POWER SUPPLIES

STANDARD FEATURES

- Provision for remote sensing and/or external output adjustment
- Short circuit proof with automatic recovery (electronic current limiting)
- Can be mounted on any of three surfaces (case sizes H8, H11 and H16, two surfaces)
- Convection cooled—no heat sinking or forced-air ventilation is necessary
- Silicon semiconductors
- Completely serviceable

SPECIFICATIONS

Input Voltage: 105–125 VAC, 50–400 Hz, single phase.

Output Specifications: See pages 10 and 11. Series A supplies have model numbers beginning with the letter A.

Remote Voltage Sensing: Provision for sensing the output voltage across the load, so that drops in the load line are compensated, is a standard feature.

Polarity: Output is floating; either positive or negative terminal may be grounded or floated up to 300 V above ground.

Ambient Operating Temperature: −20 to +71°C.

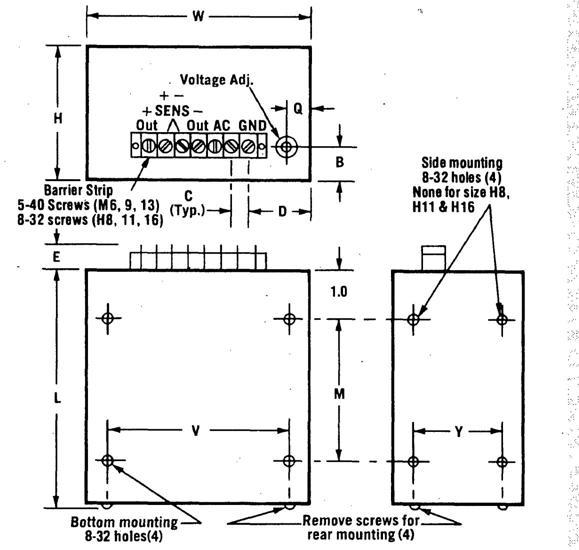
Storage Temperature: −55 to +85°C.

Response Time: Less than 20 microseconds.

OPTIONS

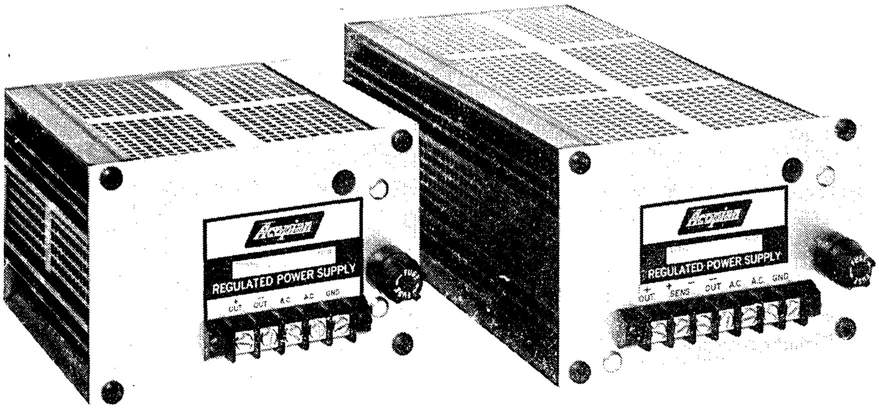
Overvoltage Protection: An internal preset overvoltage protector is available on all models with outputs of 3 to 70 volts. To order, add prefix "V" to the model number, and increase standard price as follows:

For all case sizes except H16:		
Nominal output voltages from 3 to 28 V.		$25.00
	30 to 70 V.	35.00
Case size H16 (all voltages)		75.00


W
H
Voltage Adj.
+ −
+SENS−
Out Out AC GND
Q
B
Barrier Strip
5-40 Screws (M6, 9, 13)
8-32 screws (H8, 11, 16)
C (Typ.)
D
Side mounting 8-32 holes (4) None for size H8, H11 & H16
E
1.0
L
M
V
Y
Bottom mounting 8-32 holes(4)
Remove screws for rear mounting (4)

Size	L	W	H	M	V	Y	E	Q	B	C	D	Approx. Weight
M6	6.59	5.12	3.44	4.0	4.5	3.0	.38	.5	.75	.375	1.44	4lb 4oz
M9	9.25	5.12	3.44	6.0	4.5	3.0	.38	.5	.75	.375	1.44	7lb 4oz
M13	13.25	5.12	3.44	10.0	4.5	3.0	.38	.5	.75	.375	1.44	11lb
H8	8.75	7.37	5.12	6.0	6.75	4.56	.75	1.12	1.25	.562	2.25	15lb 8oz
H11	11.25	7.37	5.12	8.0	6.75	4.56	.75	1.12	1.25	.562	2.25	18lb 4oz
H16	16.00	7.37	5.12	11.0	6.75	4.56	.75	1.12	1.25	.562	2.25	23lb

230 Volt Input: All models can be alternately furnished for operation on inputs of 210–250 VAC, 50–400 Hz. To order, add suffix "-230" to model number and $25.00 to price.


Acopian
REGULATED POWER SUPPLY
OUT OUT AC AC GND
Acopian
REGULATED POWER SUPPLY
+ SENS OUT AC AC GND

These low-cost supplies provide the same high reliability as the Series A, and without sacrificing the basic features necessary for most applications. Many models have regulation of ±0.1% or better. All components are generously derated to insure a long and trouble-free life. And they use the same rugged construction as the Series A line. Overvoltage protection and other options are available.

SERIES B LOW-COST POWER SUPPLIES

STANDARD FEATURES

- Delivers current surges without damage—built-in fuse protects supply against prolonged overloads and shorts
- May be mounted on any of three surfaces
- Convection cooled—no heat sinking or forced-air ventilation is necessary
- Silicon semiconductors
- Completely serviceable

SPECIFICATIONS

Input Voltage: 105–125 VAC, 50–400 Hz, single phase.

Output Specifications: See pages 10 and 11. Series B supplies have model numbers beginning with the letter B.

Remote Voltage Adjustment/Sensing: Available as an option. See below.

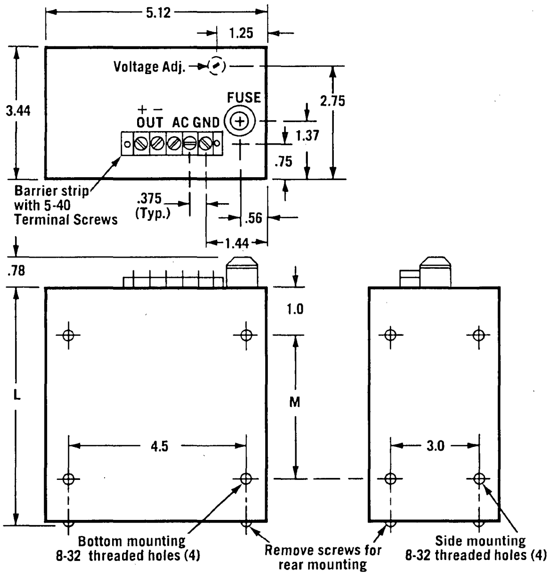
Polarity: Output is floating; either positive or negative terminal may be grounded or floated up to 300 V above ground.

Ambient Operating Temperature: 0 to +71°C.
Storage Temperature: −55 to +85°C.

OPTIONS

Overvoltage Protection: An internal preset overvoltage protector is available on all models with outputs of 3 to 70 volts. To order, add prefix "V" to the model number and add $25.00 to the standard price of models with output voltages of 3 to 28 V, $35.00 to the price of models with output voltages from 30 to 70 V.

Remote Voltage Sensing: Provision for sensing the output voltage across the load, so that drops in the load lines are compensated, is available on all models. (This option also permits the use of an externally located potentiometer to adjust output voltage.) To order, add prefix "R" to the model number. No increase in price.


5.12
1.25
Voltage Adj.
FUSE
+ −
OUT AC GND
3.44
2.75
1.37
.75
Barrier strip with 5-40 Terminal Screws
.375 (Typ.)
.56
1.44
.78
1.0
L
M
4.5
3.0
Bottom mounting 8-32 threaded holes (4)
Remove screws for rear mounting
Side mounting 8-32 threaded holes (4)

Size	L	M	Approx. Weight
G3	3.71	1.62	3 lb 2 oz
G5	5.09	3.00	4 lb 14 oz
G6	6.59	4.00	5 lb 8 oz
G9	9.25	6.00	7 lb 4 oz
G13	13.25	10.00	11 lb

230 Volt Input: All models can be alternately furnished for operation on inputs of 210–250 VAC, 50–400 Hz. To order, add suffix "-230" to model number and $25.00 to price.

Acopian

SERIES A
SERIES B

Nominal Output Voltage	Ad-just ±V.	Output Current Amps. at 40°C	55°C	71°C	Regulation Load ±%*	Line ±%*	Ripple mv RMS	Price	Model	Size
1.5	.5	6.0	4.3	3.5	.005	.005	.250	$195	A1.5MT600	M6
1.5	.5	9.0	7.2	5.5	.005	.005	.250	225	A1.5MT900	M9
1.5	.5	12.0	10.0	8.0	.005	.005	.250	250	A1.5MT1200	M13
1.5	.5	22.0	18.5	15.5	.005	.005	.250	340	A1.5H2200	H11
1.5	.5	32.0	27.0	22.5	.005	.005	.250	410	A1.5H3200	H16
3	.5	.250	.250	.250	.2	.1	1	75	B3G25	G3
3	.5	.500	.500	.500	.2	.1	1	95	B3G50	G3
3	.5	.750	.750	.750	.2	.1	1	100	B3G75	G3
3	.5	1.2	1.1	1.0	.2	.1	1	115	B3G120	G3
3	.5	2.1	2.1	2.0	.5	.1	1	135	B3G210	G5
3	.5	4.0	3.5	3.0	.5	.1	1.5	170	B3G400	G6
3	.5	6.0	4.3	3.5	.005	.005	.250	200	A3MT600	M6
3	.5	7.0	5.9	4.9	.5	.1	1.5	210	B3G700	G9
3	.5	9.0	7.2	5.5	.005	.005	.250	225	A3MT900	M9
3	.5	10.0	9.0	7.0	.5	.1	1.5	240	B3G1000	G13
3	.5	12.0	10.0	8.0	.005	.005	.250	250	A3MT1200	M13
3	.5	17.0	14.5	12.0	.005	.005	.250	300	A3H1700	H8
3	.5	20.0	16.5	13.5	.005	.005	.250	340	A3H2000	H11
3	.5	30.0	25.0	20.0	.005	.005	.250	410	A3H3000	H16
3.6	.5	.250	.250	.250	.2	.1	1	75	B3.6G25	G3
3.6	.5	.500	.500	.500	.2	.1	1	95	B3.6G50	G3
3.6	.5	.750	.750	.750	.2	.1	1	100	B3.6G75	G3
3.6	.5	1.2	1.1	1.0	.2	.1	1	115	B3.6G120	G3
3.6	.5	2.1	2.1	2.0	.5	.1	1	135	B3.6G210	G5
3.6	.5	4.0	3.5	3.0	.5	.1	1.5	170	B3.6G400	G6
3.6	.5	6.0	4.3	3.5	.005	.005	.250	200	A3.6MT600	M6
3.6	.5	7.0	5.9	4.9	.5	.1	1.5	210	B3.6G700	G9
3.6	.5	9.0	7.2	5.5	.005	.005	.250	225	A3.6MT900	M9
3.6	.5	12.0	10.0	8.0	.005	.005	.250	250	A3.6MT1200	M13
3.6	.5	17.0	14.5	12.0	.005	.005	.250	300	A3.6H1700	H8
3.6	.5	22.0	18.5	15.5	.005	.005	.250	340	A3.6H2200	H11
3.6	.5	32.0	27.0	22.5	.005	.005	.250	410	A3.6H3200	H16
5	.5	.250	.250	.250	.1	.1	1	75	B5G25	G3
5	.5	.500	.500	.500	.1	.1	1	95	B5G50	G3
5	.5	.750	.750	.750	.1	.1	1	100	B5G75	G3
5	.5	1.2	1.1	1.0	.1	.1	1	115	B5G120	G3
5	.5	1.7	1.5	1.3	.2	.1	1.5	120	B5G170	G3
5	.5	2.1	2.1	2.0	.2	.1	1.5	135	B5G210	G5
5	.5	4.0	3.5	3.0	.3	.1	1.5	160	B5G400	G6
5	.5	5.0	4.4	3.0	.4	.1	1.5	175	B5G500	G6
5	.5	5.1	3.6	2.6	.005	.005	.250	190	A5MT510	M6
5	.5	6.0	4.3	3.5	.005	.005	.250	200	A5MT600	M6
5	.5	8.0	7.0	5.0	.4	.1	1.5	205	B5G800	G9
5	.5	9.0	7.2	5.5	.005	.005	.250	225	A5MT900	M9
5	.5	10.0	9.0	7.0	.4	.1	1.5	230	B5G1000	G13
5	.5	12.0	10.0	8.0	.005	.005	.250	250	A5MT1200	M13
5	.5	17.0	14.5	12.0	.005	.005	.250	300	A5H1700	H8
5	.5	22.0	18.5	15.0	.005	.005	.250	340	A5H2200	H11
5	.5	32.0	27.0	22.0	.005	.005	.250	410	A5H3200	H16
6	1	.250	.250	.250	.1	.1	1	75	B6G25	G3
6	1	.500	.500	.500	.1	.1	1	95	B6G50	G3
6	1	.750	.750	.750	.1	.1	1	100	B6G75	G3
6	.5	1.2	1.1	1.0	.1	.1	1	115	B6G120	G3
6	.5	1.7	1.5	1.3	.2	.1	1.5	120	B6G170	G3
6	.5	3.2	3.1	3.0	.3	.1	1.5	155	B6G320	G6
6	.5	4.9	3.5	2.5	.005	.005	.250	175	A6MT490	M6
6	.5	5.5	4.5	3.5	.4	.1	1.5	180	B6G550	G6
6	.5	6.0	4.5	3.5	.005	.005	.250	200	A6MT600	M6
6	.5	8.5	7.5	5.2	.005	.005	.250	225	A6MT850	M9
6	.5	8.8	6.9	5.0	.4	.1	1.5	225	B6G880	G9
6	.5	10.0	8.0	7.0	.4	.1	1.5	230	B6G1000	G13
6	.5	11.0	9.3	7.5	.005	.005	.250	250	A6MT1100	M13
6	.5	16.0	13.6	11.2	.005	.005	.250	300	A6H1600	H8
6	.5	21.0	17.0	14.0	.005	.005	.250	340	A6H2100	H11
6	.5	28.0	23.0	19.0	.005	.005	.250	410	A6H2800	H16
7	1	.200	.200	.200	.05	.05	1	75	B7G20	G3
7	1	.500	.500	.500	.1	.05	1	95	B7G50	G3
7	1	.750	.750	.750	.1	.1	1	105	B7G75	G3
7	1	1.0	1.0	1.0	.1	.1	1	115	B7G100	G3
7	.5	2.0	2.0	2.0	.2	.1	1.5	145	B7G200	G5
7	.5	3.0	2.7	2.5	.3	.1	1.5	155	B7G300	G6
7	.5	5.0	4.0	3.0	.005	.005	.250	175	A7MT500	M6
7	.5	6.5	5.2	4.0	.4	.1	1.0	200	B7G650	G9
7	.5	8.0	6.5	5.0	.005	.005	.250	225	A7MT800	M9
7	.5	10.0	8.0	7.0	.4	.1	1.5	240	B7G1000	G13
7	.5	10.0	8.8	7.0	.005	.005	.250	250	A7MT1000	M13
8	1	.200	.200	.200	.05	.05	1	75	B8G20	G3
8	1	.500	.500	.500	.1	.05	1	95	B8G50	G3
8	1	.750	.750	.750	.1	.1	1	100	B8G75	G3
8	1	1.0	1.0	1.0	.1	.1	1	115	B8G100	G3
8	.5	2.0	2.0	2.0	.2	.1	1.5	145	B8G200	G5
8	.5	3.0	2.7	2.5	.2	.1	1.5	155	B8G300	G6
8	.5	5.0	4.0	3.5	.005	.005	.250	175	A8MT500	M6
8	.5	6.5	5.2	4.0	.3	.1	1.5	200	B8G650	G9
8	.5	8.0	6.5	5.0	.005	.005	.250	225	A8MT800	M9
8	.5	10.0	8.0	7.0	.4	.1	1.5	225	B8G1000	G13
8	.5	10.5	8.8	7.0	.005	.005	.250	250	A8MT1050	M13
8	.5	20.0	16.8	13.5	.005	.005	.250	340	A8H2000	H11
8	.5	28.0	23.0	19.0	.005	.005	.250	410	A8H2800	H16
9	1	.200	.200	.200	.05	.05	1	75	B9G20	G3
9	1	.500	.500	.500	.1	.05	1	95	B9G50	G3
9	1	.750	.750	.750	.1	.1	1	105	B9G75	G3
9	1	1.0	1.0	1.0	.1	.1	1	115	B9G100	G3
9	.5	2.0	2.0	2.0	.2	.1	1.5	145	B9G200	G5
9	.5	3.0	2.7	2.5	.2	.1	1.5	155	B9G300	G6
9	.5	6.5	5.2	4.0	.3	.1	1.5	195	B9G650	G9
9	.5	10.0	8.3	7.0	.4	.1	1.5	240	B9G1000	G13
9	.5	10.0	8.3	7.0	.005	.005	.250	250	A9MT1000	M13
10	1	.200	.200	.200	.05	.05	1	75	B10G20	G3
10	1	.500	.500	.500	.1	.05	1	95	B10G50	G3
10	1	.750	.750	.75	.1	.1	1	105	B10G75	G3
10	1	1.0	1.0	1.0	.1	.1	1	115	B10G100	G3
10	.5	2.0	2.0	2.0	.2	.1	1.5	$145	B10G200	G5
10	.5	3.0	2.7	2.5	.2	.1	1.5	155	B10G300	G6
10	.5	4.5	3.6	2.7	.005	.005	.250	175	A10MT450	M6
10	.5	6.0	5.0	4.0	.3	.1	1.5	205	B10G600	G9
10	.5	7.5	6.0	4.5	.005	.005	.250	225	A10MT750	M9
10	.5	10.0	8.3	7.0	.4	.1	1.5	225	B10G1000	G13
10	.5	10.0	8.3	7.0	.005	.005	.250	250	A10MT1000	M13
10	.5	14.0	11.9	9.8	.005	.005	.250	300	A10H1400	H8
10	.5	18.0	15.0	12.0	.005	.005	.250	340	A10H1800	H11
10	.5	25.0	20.0	16.5	.005	.005	.250	410	A10H2500	H16
12	1	.200	.200	.200	.05	.05	1	75	B12G20	G3
12	1	.500	.500	.500	.1	.05	1	95	B12G50	G3
12	1	.750	.750	.750	.1	.1	1	105	B12G75	G3
12	1	1.0	1.0	1.0	.1	.1	1	115	B12G100	G3
12	1	1.3	1.1	1.0	.1	.1	1	120	B12G130	G3
12	1	1.5	1.4	1.3	.1	.1	1.5	130	B12G150	G3
12	.5	2.0	1.7	1.5	.2	.1	1.5	135	B12G200	G5
12	.5	3.0	2.7	2.5	.2	.1	1.5	155	B12G300	G6
12	.5	3.8	3.3	2.6	.2	.1	1.5	160	B12G380	G6
12	.5	4.0	3.3	2.6	.005	.005	.250	175	A12MT400	M6
12	.5	6.5	5.3	4.0	.3	.1	1.5	205	B12G650	G9
12	.5	6.5	5.3	4.0	.005	.005	.250	225	A12MT650	M9
12	.5	9.0	7.5	6.0	.4	.1	1.5	240	B12G900	G13
12	.5	9.0	7.5	6.0	.005	.005	.250	250	A12MT900	M13
12	.5	13.0	11.0	9.1	.005	.005	.250	300	A12H1300	H8
12	.5	17.0	14.3	11.5	.005	.005	.250	340	A12H1700	H11
12	.5	21.0	17.5	14.5	.005	.005	.250	410	A12H2100	H16
13	1	.200	.200	.200	.05	.05	1	75	B13G20	G3
13	1	.500	.500	.500	.1	.05	1	95	B13G50	G3
13	1	.750	.750	.750	.1	.1	1	105	B13G75	G3
13	1	1.0	1.0	1.0	.1	.1	1	115	B13G100	G3
13	1	1.5	1.4	1.3	.1	.1	1.5	130	B13G150	G3
13	.5	2.0	2.0	2.0	.2	.1	1.5	145	B13G200	G5
13	.5	3.0	2.7	2.5	.2	.1	1.5	160	B13G300	G6
13	.5	3.5	3.0	2.5	.005	.005	.250	175	A13MT350	M6
13	.5	5.0	4.5	4.0	.2	.1	1.5	195	B13G500	G9
13	.5	8.0	7.5	7.0	.3	.1	1.5	230	B13G800	G13
13	.5	8.0	7.5	7.0	.005	.005	.250	250	A13MT800	M13
14	1	.200	.200	.200	.05	.05	1	75	B14G20	G3
14	1	.500	.500	.500	.1	.05	1	95	B14G50	G3
14	1	1.0	1.0	1.0	.1	.1	1	115	B14G100	G3
14	1	1.5	1.4	1.3	.1	.1	1.5	130	B14G150	G3
14	.5	2.0	2.0	2.0	.2	.1	1.5	145	B14G200	G5
14	.5	3.0	2.7	2.5	.2	.1	1.5	160	B14G300	G6
14	.5	3.0	2.7	2.5	.005	.005	.250	175	A14MT300	M6
14	.5	5.0	4.5	4.0	.2	.1	1.5	195	B14G500	G9
14	.5	7.0	6.5	6.0	.3	.1	1.5	230	B14G700	G13
14	.5	8.0	6.7	7.0	.005	.005	.250	250	A14MT800	M13
15	1	.200	.200	.200	.05	.05	1	75	B15G20	G3
15	1	.500	.500	.500	.1	.05	1	95	B15G50	G3
15	1	.750	.750	.750	.1	.1	1	105	B15G75	G3
15	1	1.0	1.0	1.0	.1	.1	1	115	B15G100	G3
15	1	1.3	1.1	1.0	.1	.1	1	120	B15G130	G3
15	1	1.5	1.4	1.3	.1	.1	1.5	130	B15G150	G3
15	.5	2.0	1.7	1.5	.1	.1	1.5	145	B15G200	G5
15	.5	3.0	2.8	2.5	.1	.1	1.5	160	B15G300	G6
15	.5	3.0	2.8	2.5	.005	.005	.250	175	A15MT300	M6
15	.5	4.2	3.8	3.0	.15	.1	1.5	195	B15G420	G9
15	.5	5.5	4.7	4.0	.005	.005	.250	225	A15MT550	M9
15	.5	6.0	5.0	4.0	.2	.1	1.5	225	B15G600	G9
15	.5	7.0	6.0	5.0	.2	.1	1.5	230	B15G700	G13
15	.5	8.0	6.5	5.5	.005	.005	.250	250	A15MT800	M13
15	.5	11.5	9.7	8.0	.005	.005	.250	300	A15H1150	H8
15	.5	15.0	12.8	10.5	.005	.005	.250	340	A15H1500	H11
15	.5	19.0	16.3	13.5	.005	.005	.250	410	A15H1900	H16
16	1	.200	.200	.200	.05	.05	1	75	B16G20	G3
16	1	.500	.500	.500	.1	.05	1	95	B16G50	G3
16	1	.750	.750	.750	.1	.1	1	105	B16G75	G3
16	.5	1.0	1.0	1.0	.1	.1	1	120	B16G100	G3
16	.5	3.0	2.5	2.0	.15	.1	1	175	B16G300	G9
16	.5	5.0	5.0	5.0	.2	.1	1.5	225	B16G500	G9
16	.5	6.5	5.0	5.5	.005	.005	.250	250	A16MT650	M13
18	1	.200	.200	.200	.05	.05	1	75	B18G20	G3
18	1	.500	.500	.500	.05	.05	1	95	B18G50	G3
18	1	.750	.750	.750	.1	.1	1	100	B18G75	G3
18	.5	1.1	1.1	1.0	.1	.1	1	115	B18G110	G5
18	.5	2.1	2.0	1.8	.1	.1	1	145	B18G210	G5
18	.5	2.1	2.1	2.0	.005	.005	.250	160	A18MT210	M6
18	.5	3.0	2.8	2.5	.15	.1	1	190	B18G300	G9
18	.5	4.5	4.0	3.5	.005	.005	.250	210	A18MT450	M9
18	.5	5.5	5.0	5.0	.2	.1	1.5	225	B18G550	G13
18	.5	6.5	6.0	5.5	.005	.005	.250	250	A18MT650	M13
18	.5	14.0	12.0	10.0	.005	.005	.250	340	A18H1400	H11
18	.5	18.0	15.5	13.0	.005	.005	.250	410	A18H1800	H16
20	1	.200	.200	.200	.05	.05	1	75	B20G20	G3
20	1	.500	.500	.500	.05	.05	1	95	B20G50	G3
20	1	.750	.750	.750	.1	.05	1	100	B20G75	G3
20	1	1.1	1.1	1.0	.1	.1	1	115	B20G110	G5
20	.5	1.7	1.7	1.5	.1	.1	1.5	130	B20G170	G5
20	.5	2.0	2.0	2.0	.005	.005	.250	160	A20MT200	M6
20	.5	2.7	2.0	1.2	.15	.1	1.5	190	B20G270	G6
20	.5	4.0	3.5	3.0	.005	.005	.250	210	A20MT400	M9
20	.5	5.0	5.0	5.0	.15	.1	1.5	225	B20G500	G13
20	.5	6.0	5.5	5.0	.005	.005	.250	250	A20MT600	M13
20	.5	9.5	8.0	6.6	.005	.005	.250	300	A20H950	H8
20	.5	13.0	11.3	9.5	.005	.005	.250	340	A20H1300	H11
20	.5	16.0	14.0	12.0	.005	.005	.250	410	A20H1600	H16
24	1	.200	.200	.200	.05	.05	1	75	B24G20	G3
24	1	.500	.500	.500	.05	.05	1	95	B24G50	G3
24	1	.750	.750	.750	.1	.05	1	100	B24G75	G3
24	1	1.1	1.1	1.0	.1	.1	1.5	120	B24G110	G5
24	.5	1.7	1.7	1.5	.1	.1	1.5	130	B24G170	G5

*or 2 mv, whichever is greater

Nominal Output Voltage	Adjust ±V.	Output Current Amps. at			Regulation		Ripple mv RMS	Price	Model	Size
		40°C	55°C	71°C	Load ±%*	Line ±%*				
24	.5	2.1	2.0	2.0	.1	.1	1.5	$145	B24G210	G5
24	.5	2.1	2.0	2.0	.005	.005	.250	160	A24MT210	M6
24	.5	3.5	3.0	2.5	.15	.1	1.5	200	B24G350	G9
24	.5	3.5	3.0	2.5	.005	.005	.250	220	A24MT350	M9
24	.5	5.0	5.0	5.0	.15	.1	1.5	230	B24G500	G13
24	.5	5.5	5.0	4.5	.005	.005	.250	250	A24MT550	M13
24	.5	8.5	7.2	5.9	.005	.005	.250	300	A24H850	H8
24	.5	12.0	10.5	9.0	.005	.005	.250	340	A24H1200	H11
24	.5	15.0	13.0	11.0	.005	.005	.250	410	A24H1500	H16
25	1	.200	.200	.200	.05	.05	1	80	B25G20	G3
25	1	.500	.500	.500	.05	.05	1	95	B25G50	G3
25	1	.750	.750	.750	.1	.05	1	100	B25G75	G3
25	1	1.2	1.1	1.0	.1	.1	1.5	120	B25G120	G5
25	.5	1.7	1.7	1.5	.1	.1	1.5	145	B25G170	G5
25	.5	2.1	2.1	2.0	.1	.1	1.5	155	B25G210	G5
25	.5	3.5	3.0	2.5	.15	.1	1.5	200	B25G350	G9
25	.5	5.0	5.0	5.0	.15	.1	1.5	230	B25G500	G13
28	1	.100	.100	.100	.05	.05	1	80	B28G10	G3
28	1	.200	.200	.200	.05	.05	1	85	B28G20	G3
28	1	.500	.500	.500	.05	.05	1	95	B28G50	G3
28	1	.800	.800	.800	.1	.05	1	120	B28G80	G5
28	1	1.1	1.1	1.0	.1	.05	1	135	B28G110	G5
28	.5	1.8	1.6	1.5	.1	.1	1.5	150	B28G180	G5
28	.5	2.1	2.1	2.0	.1	.1	1.5	155	B28G210	G5
28	.5	2.1	2.1	2.0	.005	.005	.250	170	A28MT210	M6
28	.5	3.0	2.7	2.5	.15	.1	1.5	180	B28G300	G9
28	.5	3.0	2.7	2.5	.005	.005	.250	200	A28MT300	M9
28	.5	5.0	5.0	5.0	.15	.1	1.5	230	B28G500	G13
28	.5	5.0	5.0	5.0	.005	.005	.250	250	A28MT500	M13
28	.5	8.0	6.8	5.6	.005	.005	.250	300	A28H800	H8
28	.5	11.0	9.5	8.0	.005	.005	.250	340	A28H1100	H11
28	.5	14.0	12.0	10.0	.005	.005	.250	410	A28H1400	H16
30	1	.100	.100	.100	.05	.05	1	80	B30GT10	G3
30	1	.200	.200	.200	.05	.05	1	85	B30GT20	G3
30	1	.500	.500	.500	.05	.05	1	95	B30GT50	G3
30	1	.750	.750	.700	.1	.05	1	120	B30GT75	G5
30	1	1.1	1.1	1.0	.1	.1	1	135	B30GT110	G5
30	.5	1.7	1.6	1.5	.1	.1	1.5	150	B30GT170	G5
30	.5	2.1	2.1	2.0	.1	.1	1.5	155	B30GT210	G5
30	.5	2.1	2.1	2.0	.005	.005	.250	175	A30MT210	M6
30	.5	3.0	2.7	2.5	.005	.005	.250	205	A30MT300	M9
30	.5	5.0	5.0	5.0	.15	.1	1.5	230	B30GT500	G13
30	.5	5.0	5.0	5.0	.005	.005	.250	250	A30MT500	M13
30	.5	7.5	6.3	5.2	.005	.005	.250	300	A30H750	H8
30	.5	10.0	9.0	8.0	.005	.005	.250	340	A30H1000	H11
30	.5	14.0	12.0	10.0	.005	.005	.250	410	A30H1400	H16
32	1	.100	.100	.100	.05	.05	1	80	B32GT10	G3
32	1	.300	.300	.300	.05	.05	1	95	B32GT30	G3
32	1	.500	.500	.500	.05	.05	1	100	B32GT50	G3
32	1	.600	.600	.600	.1	.05	1	120	B32GT60	G3
32	1	1.0	1.0	1.0	.1	.1	1	135	B32GT100	G5
32	1	1.5	1.5	1.5	.1	.1	1.5	155	B32GT150	G5
34	1	.200	.200	.200	.05	.05	1	85	B34GT20	G3
34	1	.800	.800	.800	.1	.1	1	130	B34GT80	G5
34	1	1.5	1.5	1.5	.1	.1	1.5	155	B34GT150	G5
35	1	.100	.100	.100	.05	.05	1	80	B35GT10	G3
35	1	.200	.200	.200	.05	.05	1	85	B35GT20	G3
35	1	.500	.500	.500	.05	.05	1	100	B35GT50	G3
35	1	.600	.600	.600	.1	.05	1	120	B35GT60	G3
35	1	.800	.800	.800	.1	.1	1.5	130	B35GT80	G5
36	1	.100	.100	.100	.05	.05	1	80	B36GT10	G3
36	1	.200	.200	.200	.05	.05	1	95	B36GT20	G3
36	1	.500	.500	.500	.05	.05	1	105	B36GT50	G3
36	1	.600	.600	.500	.1	.05	1	120	B36GT60	G5
36	1	.800	.750	.700	.1	.05	1	130	B36GT80	G5
36	.5	1.3	1.3	1.3	.1	.1	1.5	145	B36GT130	G6
36	.5	1.3	1.3	1.3	.005	.005	.250	160	A36MT130	M6
36	.5	2.3	2.0	1.8	.1	.1	1.5	200	B36GT230	G9
36	.5	2.3	2.0	1.8	.005	.005	.250	220	A36MT230	M9
36	.5	4.0	3.2	2.5	.005	.005	.250	260	A36MT400	M13
40	1	.100	.100	.100	.05	.05	1	80	B40GT10	G3
40	1	.200	.200	.200	.05	.05	1	95	B40GT20	G3
40	1	.300	.300	.300	.05	.05	1	105	B40GT30	G3
40	1	.400	.400	.400	.05	.05	1	115	B40GT40	G3
40	1	.500	.500	.500	.1	.05	1	125	B40GT50	G5
45	1	.100	.100	.100	.05	.05	1	80	B45GT10	G3
45	1	.200	.200	.200	.05	.05	1	95	B45GT20	G3
45	1	.300	.300	.300	.05	.05	1	105	B45GT30	G3
45	1	.400	.400	.400	.05	.05	1	125	B45GT40	G3
48	1	.100	.100	.100	.05	.05	1	85	B48GT10	G3
48	1	.200	.200	.200	.05	.05	1	100	B48GT20	G3
48	1	.300	.300	.300	.05	.05	1	120	B48GT30	G3
48	1	.400	.400	.400	.05	.05	1	130	B48GT40	G3
48	1	.600	.600	.600	.1	.1	1	150	B48GT60	G5
48	1	1.1	1.0	.600	.1	.1	1.5	170	B48GT110	G6
48	1	1.8	1.6	1.2	.1	.1	1.5	205	B48GT180	G9
48	1	1.8	1.6	1.2	.005	.005	.250	225	A48MT180	M9
48	.5	3.0	2.6	2.1	.005	.005	.250	260	A48MT300	M13
50	1	.100	.100	.100	.05	.05	1	80	B50GT10	G3
50	1	.200	.200	.200	.05	.05	1	95	B50GT20	G3
50	1	.300	.300	.300	.05	.05	1	120	B50GT30	G3
50	1	.400	.400	.400	.05	.05	1	130	B50GT40	G3
50	1	.500	.500	.500	.05	.05	1	160	B50GT50	G5
50	.5	2.7	2.3	1.8	.005	.005	.250	275	A50MT270	M13
55	1	.100	.100	.100	.05	.05	1	95	B55GT10	G3
55	1	.200	.200	.200	.05	.05	1	120	B55GT20	G3
55	1	.300	.300	.300	.05	.05	1	130	B55GT30	G3
55	1	.400	.400	.400	.05	.05	1	155	B55GT40	G5
55	1	.500	.500	.500	.05	.05	1	160	B55GT50	G5
60	1	.050	.050	.050	.05	.05	1	$ 95	B60GT05	G3
60	1	.100	.100	.100	.05	.05	1	105	B60GT10	G3
60	1	.200	.200	.200	.05	.05	1	120	B60GT20	G3
60	1	.300	.300	.300	.05	.05	1	155	B60GT30	G3
60	1	.400	.400	.400	.05	.05	1	160	B60GT40	G5
65	1	.050	.050	.050	.05	.05	1	95	B65GT05	G3
65	1	.100	.100	.100	.05	.05	1	105	B65GT10	G3
65	1	.300	.300	.300	.05	.05	1	155	B65GT30	G3
70	1	.050	.050	.050	.05	.05	1	95	B70GT05	G3
70	1	.100	.100	.100	.05	.05	1	105	B70GT10	G3
70	1	.200	.200	.200	.05	.05	1	120	B70GT20	G3
70	1	.300	.300	.300	.05	.05	1	155	B70GT30	G3
75	1	.050	.050	.050	.05	.05	1	105	B75GT05	G3
75	1	.100	.100	.100	.05	.05	1	120	B75GT10	G3
75	1	.200	.200	.200	.05	.05	1	155	B75GT20	G3
75	.5	2.0	1.8	1.5	.005	.005	.250	275	A75MT200	M13
80	1	.050	.050	.050	.05	.05	1	105	B80GT05	G3
80	1	.100	.100	.100	.05	.05	1	120	B80GT10	G3
80	1	.200	.200	.200	.05	.05	1	155	B80GT20	G3
85	1	.050	.050	.050	.05	.05	1	115	B85GT05	G3
85	1	.100	.100	.100	.05	.05	1	145	B85GT10	G3
85	1	.200	.200	.200	.05	.05	1	155	B85GT20	G3
90	1	.050	.050	.050	.05	.05	1	120	B90GT05	G3
90	1	.100	.100	.100	.05	.05	1	150	B90GT10	G3
90	1	.200	.200	.200	.05	.05	1	160	B90GT20	G3
90	1	1.5	1.3	1.0	.005	.005	.250	275	A90MT150	M13
95	1	.050	.050	.050	.05	.05	1	135	B95GT05	G3
95	1	.100	.100	.100	.05	.05	1	150	B95GT10	G3
95	1	.200	.200	.200	.05	.05	1	160	B95GT20	G3
100	1	.050	.050	.050	.05	.05	1	135	B100GT05	G3
100	1	.100	.100	.100	.05	.05	1	150	B100GT10	G3
100	1	.200	.200	.200	.05	.05	1	160	B100GT20	G3
100	1	.460	.460	.340	.1	.1	1.5	180	B100GT46	G6
100	1	.650	.650	.650	.1	.1	1.5	200	B100GT65	G9
100	1	1.3	1.2	1.0	.005	.005	.250	275	A100MT130	M13
110	1	.050	.050	.050	.05	.05	1	145	B110GT05	G3
110	1	.100	.100	.100	.05	.05	1	155	B110GT10	G3
110	1	.200	.200	.200	.05	.05	1	170	B110GT20	G3
120	1	.050	.050	.050	.05	.05	1	145	B120GT05	G3
120	1	.100	.100	.100	.05	.05	1	155	B120GT10	G3
120	1	.200	.200	.200	.05	.05	1	170	B120GT20	G3
120	1	.400	.400	.300	.1	.1	1.5	190	B120GT40	G6
120	1	.550	.550	.550	.1	.1	1.5	200	B120GT55	G9
120	1	1.2	1.1	1.0	.005	.005	.250	275	A120MT120	M13
125	1	.050	.050	.050	.05	.05	1	150	B125GT05	G3
125	1	.100	.100	.100	.05	.05	1	160	B125GT10	G3
125	1	.200	.200	.200	.05	.05	1	175	B125GT20	G3
130	1	.200	.200	.200	.05	.05	1	175	B130GT20	G3
135	1	.200	.200	.200	.05	.05	1	175	B135GT20	G3
140	1	.200	.200	.200	.05	.05	1	175	B140GT20	G3
150	1	.050	.050	.050	.05	.05	1	150	B150GT05	G3
150	1	.100	.100	.100	.05	.05	1	160	B150GT10	G3
150	1	.200	.200	.200	.05	.05	1	175	B150GT20	G3
150	1	.320	.320	.250	.1	.1	1.5	190	B150GT32	G6
150	1	.420	.420	.420	.1	.1	1.5	200	B150GT42	G9
150	1	1.0	.900	.800	.005	.005	.250	300	A150MT100	M13
200	1	.050	.050	.050	.5	.5	5	155	B200GT05	G3
200	1	.100	.100	.100	.5	.5	5	170	B200GT10	G3

*or 2 mv, whichever is greater

MODELS WITH WIDE ADJUSTMENT RANGES

Load Regulation: ±0.005%*

Line Regulation: ±0.005%*

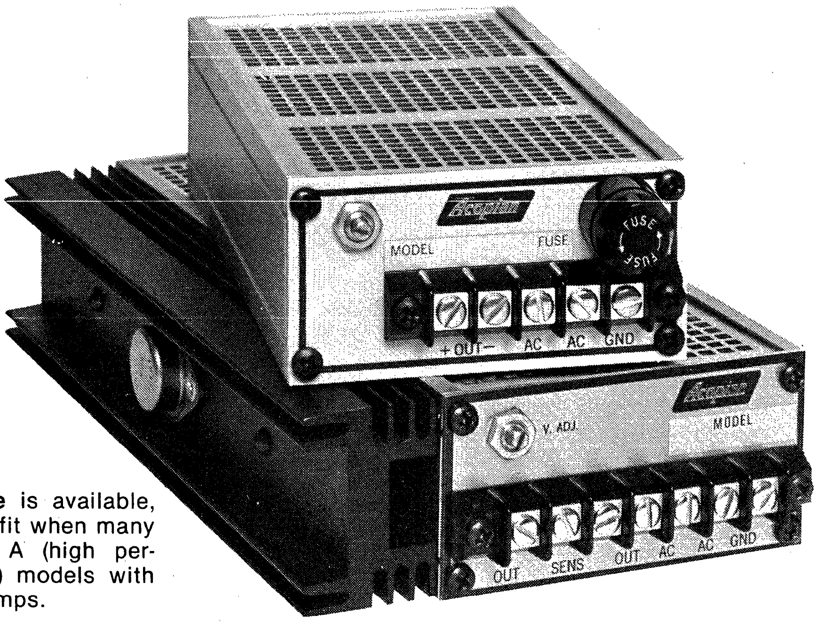
Ripple: 0.250 mv RMS

Other Specifications:
Same as Series A

Contact factory for information on other models with wide adjustment ranges.

Output Voltage Range	Output Current Amps. at 40°C	55°C	71°C	Price	Model	Size
0-6	1.2	1.2	1.2	$140	A06MT120	M6
0-6	2.0	2.0	2.0	160	A06MT200	M6
0-6	3.0	2.5	2.0	190	A06MT300	M6
0-6	5.0	4.0	3.0	215	A06MT500	M9
0-6	8.0	7.0	6.0	260	A06MT800	M13
0-6	12.0	10.0	7.0	355	A06HT1200	H11
0-6	16.0	13.0	10.0	420	A06HT1600	H16
0-15	1.0	1.0	1.0	140	A015MT100	M6
0-15	2.0	2.0	2.0	190	A015MT200	M6
0-15	2.5	2.0	1.5	215	A015MT250	M9
0-15	5.0	4.0	2.5	260	A015MT500	M13
0-15	8.0	6.0	4.0	355	A015HT800	H11
0-15	10.0	8.0	6.0	420	A015HT1000	H16
0-30	.500	.500	.500	160	A030MT50	M6
0-30	1.0	1.0	1.0	190	A030MT100	M6
0-30	1.6	1.4	1.2	215	A030MT160	M9
0-30	2.5	2.0	1.5	260	A030MT250	M13
0-30	4.0	3.0	2.0	355	A030HT400	H11
0-30	5.0	4.0	3.0	420	A030HT500	H16
0-50	.350	.340	.330	160	A050MT35	M6
0-50	.600	.500	.400	190	A050MT60	M6
0-50	.850	.750	.650	215	A050MT85	M9
0-100	.100	.090	.080	205	A0100MT10	M6
0-100	.250	.200	.150	230	A0100MT25	M6

Acopian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NARROW PROFILE REGULATED

ALL MODELS U.L. RECOGNIZED

Where only a narrow mounting space is available, Acopian narrow profile power supplies fit when many others cannot. Choose from Series A (high performance) and Series B (lower priced) models with output ratings up to 150 volts, up to 3.5 amps.

SPECIFICATIONS

Input Voltage: 105–125 VAC, 50–400 Hz, single phase.

Output Specifications: See table. Series A supplies have model numbers beginning with the letter A; Series B, with the letter B.

Remote Voltage Adjustment/Sensing: Standard in Series A, not available in Series B.

Polarity: Output is floating; either positive or negative terminal may be grounded or floated up to 300 V above ground.

Ambient Operating Temperature: Series A, −20 to +71°C; Series B, 0 to 71°C.

Storage Temperature: −55 to +85°C.

Short Circuit and Overload Protection: Series A, electronic current limiting with automatic recovery; Series B, fused—delivers current surges without damage.

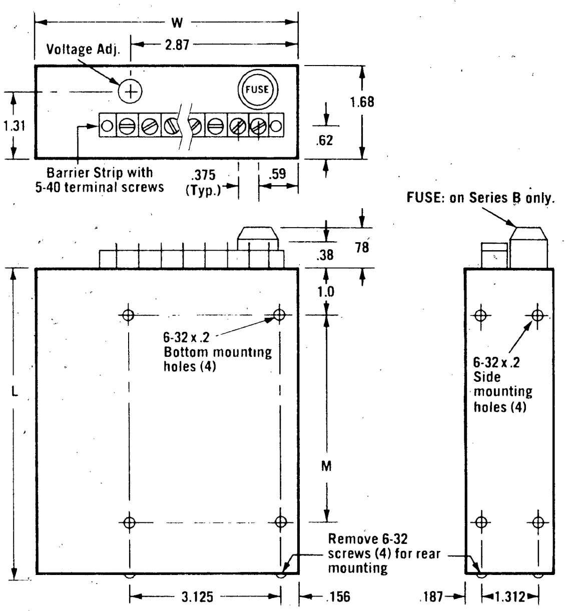
OPTIONS

Overvoltage Protection: An internal preset overvoltage protector is available on all models with outputs of 3 to 70 V. To order, add prefix "V" to the model number and add $25.00 to the standard price of models with output voltages of 3 to 28 V, $35.00 to the price of models with output voltages from 30 to 70 V.

230 Volt Input: All models can be alternately furnished for operation on inputs of 210–250 VAC, 50–400 Hz. To order, add suffix "-230" to model number and $25.00 to price.

MODELS WITH WIDE ADJUSTMENT RANGES

Output Voltage Range	Output Current (To +71°C)	Regulation Load ±%*	Regulation Line ±%*	Ripple mv RMS	Price	Model	Size
0-7	1.0	0.005	0.005	0.250	$130	A07NT100	N8
0-7	2.1	0.005	0.005	0.250	155	A07NT210	N8H
0-18	.400	0.005	0.005	0.250	120	A018NT40	N8
0-18	1.0	0.005	0.005	0.250	150	A018NT100	N8H
0-32	.250	0.005	0.005	0.250	120	A032NT25	N8
0-32	.600	0.005	0.005	0.250	165	A032NT60	N8H
0-60	.125	0.005	0.005	0.250	145	A060NT12	N8T
0-60	.250	0.005	0.005	0.250	165	A060NT25	N8H
0-150	.050	0.005	0.005	0.250	175	A0150NT05	N8T
0-150	.100	0.005	0.005	0.250	215	A0150NT10	N8H


W
Voltage Adj.
2.87
FUSE
1.68
1.31
.62
Barrier Strip with 5-40 terminal screws
.375 (Typ.)
.59
FUSE: on Series B only.
.38
.78
1.0
6-32 x .2 Bottom mounting holes (4)
6-32 x .2 Side mounting holes (4)
L
M
Remove 6-32 screws (4) for rear mounting
3.125
.156
.187
1.312

Size	L	W	M	Approx. Weight
F6	6.59	3.44	4.0	2lb 4oz
F6T	6.59	3.81	4.0	2lb 4oz
N8	8.47	3.44	5.0	3lb
F8T	8.47	3.81	5.0	3lb 2oz
N8T	8.47	3.81	5.0	3lb 2oz
N8H	8.47	4.68	5.0	3lb 14oz

ACOPIAN P.O. BOX 638, EASTON, PA 18044
TOLL FREE NO.: (800) 523-9478 • 3-DAY SHIPMENT GUARANTEED

Nominal Output Voltage	Adjust ±V.	Output Current Amps. at			Regulation		Ripple mv RMS	Price	Model	Size
		40°C	55°C	71°C	Load ±%*	Line ±%*				
1	.5	1.1	1.0	1.0	.005	.005	.250	$125	A1NT110	N8
1	.5	2.2	2.1	2.0	.005	.005	.250	150	A1NT220	N8T
1	.5	3.5	3.5	3.0	.005	.005	.250	180	A1NT350	N8H
1.5	.5	1.1	1.0	1.0	.005	.005	.250	125	A1.5NT110	N8
1.5	.5	2.2	2.1	2.0	.005	.005	.250	150	A1.5NT220	N8T
1.5	.5	3.5	3.5	3.0	.005	.005	.250	180	A1.5NT350	N8H
2	.5	1.1	1.0	1.0	.005	.005	.250	125	A2NT110	N8
2	.5	2.2	2.1	2.0	.005	.005	.250	150	A2NT220	N8T
2	.5	3.0	3.0	3.0	.005	.005	.250	180	A2NT300	N8H
3	.5	.500	.500	.500	.5	.05	1	100	B3N50	F6
3	.5	1.0	1.0	1.0	.5	.1	1	115	B3N100	F6
3	.5	1.1	1.0	1.0	.005	.005	.250	125	A3NT110	N8
3	.5	2.2	2.1	2.0	.005	.005	.250	150	A3NT220	N8T
3	.5	3.5	3.5	3.0	.005	.005	.250	180	A3NT350	N8H
3.6	.5	.500	.500	.500	.5	.05	1	100	B3.6N50	F6
3.6	.5	1.0	1.0	1.0	.5	.1	1	115	B3.6N100	F6
3.6	.5	1.1	1.0	1.0	.005	.005	.250	125	A3.6NT110	N8
3.6	.5	2.2	2.1	2.0	.005	.005	.250	150	A3.6NT220	N8T
3.6	.5	3.5	3.5	3.0	.005	.005	.250	180	A3.6NT350	N8H
5	.5	.500	.500	.500	.1	.1	1	100	B5N50	F6
5	.5	1.0	1.0	1.0	.1	.1	1	115	B5N100	F6
5	.5	1.1	1.0	1.0	.005	.005	.250	125	A5NT110	N8
5	.5	2.2	2.1	2.0	.005	.005	.250	150	A5NT220	N8T
5	.5	3.5	3.5	3.0	.005	.005	.250	180	A5NT350	N8H
6	1	.500	.500	.500	.1	.1	1	100	B6N50	F6
6	.5	1.0	1.0	1.0	.1	.1	1	115	B6N100	F6
6	.5	1.1	1.0	1.0	.005	.005	.250	125	A6NT110	N8
6	.5	2.2	2.1	2.0	.005	.005	.250	150	A6NT220	N8T
6	.5	3.0	3.0	3.0	.005	.005	.250	180	A6NT300	N8H
7	1	.500	.500	.500	.1	.1	1	100	B7N50	F6
7	1	1.0	1.0	1.0	.1	.1	1	115	B7N100	F6
7	.5	1.1	1.0	1.0	.005	.005	.250	130	A7NT110	N8
7	.5	2.0	2.0	2.0	.005	.005	.250	155	A7NT200	N8H
8	1	.500	.500	.500	.1	.1	1	100	B8N50	F6
8	1	1.0	1.0	1.0	.1	.1	1	115	B8N100	F6
8	.5	1.1	1.0	1.0	.005	.005	.250	130	A8NT110	N8
8	.5	2.0	2.0	2.0	.005	.005	.250	155	A8NT200	N8H
9	1	.500	.500	.500	.1	.1	1	105	B9N50	F6
9	1	1.0	1.0	1.0	.1	.1	1	120	B9N100	F6
9	.5	1.1	1.0	1.0	.005	.005	.250	135	A9NT110	N8
9	.5	2.0	2.0	2.0	.005	.005	.250	165	A9NT200	N8H
10	1	.500	.500	.500	.1	.1	1	105	B10N50	F6
10	1	1.0	1.0	1.0	.1	.1	1	120	B10N100	F6
10	.5	1.1	1.0	1.0	.005	.005	.250	135	A10NT110	N8
10	.5	2.0	2.0	2.0	.005	.005	.250	165	A10NT200	N8H
11	1	.500	.500	.500	.1	.1	1	105	B11N50	F6
11	1	1.0	1.0	.750	.1	.1	1	120	B11N100	F6
11	.5	1.1	1.0	1.0	.005	.005	.250	135	A11NT110	N8
11	.5	2.0	2.0	2.0	.005	.005	.250	165	A11NT200	N8H
12	1	.500	.500	.500	.1	.1	1	105	B12N50	F6
12	1	1.0	1.0	.750	.1	.1	1	120	B12N100	F6
12	.5	1.1	1.0	1.0	.005	.005	.250	135	A12NT110	N8
12	.5	2.0	2.0	2.0	.005	.005	.250	165	A12NT200	N8H
13	1	.500	.500	.500	.1	.1	1	105	B13N50	F6
13	1	1.0	1.0	.750	.1	.1	1	120	B13N100	F6
13	.5	1.1	1.0	1.0	.005	.005	.250	135	A13NT110	N8
13	.5	2.0	2.0	2.0	.005	.005	.250	165	A13NT200	N8H
14	1	.500	.500	.500	.1	.1	1	105	B14N50	F6
14	1	1.0	1.0	.750	.1	.1	1	120	B14N100	F6
14	.5	1.1	1.0	1.0	.005	.005	.250	135	A14NT110	N8
14	.5	2.0	2.0	2.0	.005	.005	.250	165	A14NT200	N8H
15	1	.500	.500	.500	.1	.1	1	105	B15N50	F6
15	1	1.0	1.0	.750	.1	.1	1	120	B15N100	F6
15	.5	1.1	1.0	1.0	.005	.005	.250	135	A15NT110	N8
15	.5	2.0	2.0	2.0	.005	.005	.250	165	A15NT200	N8H
16	1	.500	.500	.500	.1	.1	1	105	B16N50	F6
16	1	1.0	1.0	.750	.1	.1	1	120	B16N100	F6
16	.5	1.0	1.0	1.0	.005	.005	.250	140	A16NT100	N8
16	.5	1.75	1.75	1.75	.005	.005	.250	160	A16NT175	N8H
18	1	.500	.500	.500	.1	.1	1	105	B18N50	F6
18	1	.750	.750	.750	.1	.1	1	120	B18N75	F6
18	.5	1.0	1.0	1.0	.005	.005	.250	140	A18NT100	N8
18	.5	1.5	1.5	1.5	.005	.005	.250	160	A18NT150	N8H
20	1	.400	.400	.400	.05	.05	1	105	B20N40	F6
20	1	.750	.750	.750	.1	.1	1	120	B20N75	F6
20	.5	.900	.900	.900	.005	.005	.250	140	A20NT90	N8
20	.5	1.25	1.25	1.25	.005	.005	.250	160	A20NT125	N8H
24	1	.200	.200	.200	.05	.05	1	90	B24N20	F6
24	1	.400	.400	.400	.05	.05	1	105	B24N40	F6
24	1	.750	.750	.750	.1	.1	1	120	B24N75	F6
24	.5	.900	.800	.750	.005	.005	.250	140	A24NT90	N8
24	.5	1.0	1.0	1.0	.005	.005	.250	145	A24NT100	N8
24	.5	1.25	1.25	1.25	.005	.005	.250	160	A24NT125	N8H
25	1	.200	.200	.200	.05	.05	1	90	B25N20	F6
25	1	.400	.400	.400	.05	.05	1	105	B25N40	F6
25	1	.750	.750	.750	.1	.05	1	120	B25N75	F6
25	.5	.750	.750	.750	.005	.005	.250	140	A25NT75	N8
25	.5	1.25	1.25	1.25	.005	.005	.250	160	A25NT125	N8H
26	1	.200	.200	.200	.05	.05	1	90	B26N20	F6
26	1	.400	.400	.400	.05	.05	1	105	B26N40	F6
26	1	.750	.750	.750	.1	.05	1	120	B26N75	F6
26	.5	1.2	1.25	1.25	.005	.005	.250	160	A26NT125	N8H
28	1	.200	.200	.200	.05	.05	1	90	B28N20	F6
28	1	.400	.400	.400	.05	.05	1	105	B28N40	F6
28	1	.700	.700	.700	.1	.05	1	120	B28N70	F6
28	.5	.800	.800	.800	.005	.005	.250	140	A28NT80	N8T
28	.5	1.25	1.25	1.25	.005	.005	.250	160	A28NT125	N8H
30	1	.200	.200	.200	.05	.05	1	90	B30FT20	F6
30	1	.400	.400	.400	.05	.05	1	105	B30FT40	F6
30	1	.500	.500	.500	.05	.05	1	115	B30FT50	F6
30	.5	.750	.750	.750	.005	.005	.250	145	A30NT75	N8T
30	.5	1.1	1.1	1.1	.005	.005	.250	165	A30NT110	N8H
32	1	.100	.100	.100	.05	.05	1	90	B32FT10	F6
32	1	.200	.200	.200	.05	.05	1	105	B32FT20	F6
32	1	.400	.400	.400	.05	.05	1	120	B32FT40	F6
32	.5	.600	.600	.600	.005	.005	.250	140	A32NT60	N8
32	.5	1.1	1.1	1.1	.005	.005	.250	$165	A32NT110	N8H
34	1	.100	.100	.100	.05	.05	1	90	B34FT10	F6
34	1	.200	.200	.200	.05	.05	1	105	B34FT20	F6
34	1	.400	.400	.400	.05	.05	1	120	B34FT40	F6
34	.5	.600	.600	.600	.005	.005	.250	145	A34NT60	N8
34	.5	1.1	1.1	1.1	.005	.005	.250	165	A34NT110	N8H
35	1	.100	.100	.100	.05	.05	1	90	B35FT10	F6
35	1	.200	.200	.200	.05	.05	1	105	B35FT20	F6
35	1	.400	.400	.400	.05	.05	1	120	B35FT40	F6
35	.5	.600	.600	.600	.005	.005	.250	145	A35NT60	N8
35	.5	1.1	1.1	1.1	.005	.005	.250	165	A35NT110	N8H
36	1	.100	.100	.100	.05	.05	1	90	B36FT10	F6
36	1	.200	.200	.200	.05	.05	1	105	B36FT20	F6
36	1	.400	.400	.400	.05	.05	1	120	B36FT40	F6
36	.5	.600	.600	.600	.005	.005	.250	145	A36NT60	N8
36	.5	1.0	1.0	1.0	.005	.005	.250	165	A36NT100	N8H
38	1	.100	.100	.100	.05	.05	1	90	B38FT10	F6
38	1	.200	.200	.200	.05	.05	1	105	B38FT20	F6
40	1	.100	.100	.100	.05	.05	1	90	B40FT10	F6
40	1	.200	.200	.200	.05	.05	1	105	B40FT20	F6
40	1	.400	.400	.400	.05	.05	1	120	B40FT40	F6
40	.5	.600	.600	.600	.005	.005	.250	145	A40NT60	N8
40	.5	.750	.750	.750	.005	.005	.250	165	A40NT75	N8T
45	1	.100	.100	.100	.05	.05	1	95	B45FT10	F6
45	1	.200	.200	.200	.05	.05	1	110	B45FT20	F6
45	1	.400	.400	.400	.05	.05	1	130	B45FT40	F6
45	.5	.600	.600	.600	.005	.005	.250	165	A45NT60	N8T
48	1	.050	.050	.050	.05	.05	1	90	B48FT05	F6
48	1	.100	.100	.100	.05	.05	1	100	B48FT10	F6
48	1	.200	.200	.200	.05	.05	1	115	B48FT20	F6
48	1	.400	.400	.400	.05	.05	1	135	B48FT40	F6
48	.5	.500	.500	.500	.005	.005	.250	165	A48NT50	N8T
50	1	.050	.050	.050	.05	.05	1	90	B50FT05	F6T
50	1	.100	.050	.100	.05	.05	1	100	B50FT10	F6T
50	1	.200	.050	.200	.05	.05	1	115	B50FT20	F6T
50	1	.400	.400	.400	.05	.05	1	135	B50FT40	F6T
50	1	.450	.450	.450	.005	.005	.250	165	A50NT45	N8T
55	1	.050	.050	.050	.05	.05	1	95	B55FT05	F6T
55	1	.100	.100	.100	.05	.05	1	105	B55FT10	F6T
55	1	.200	.200	.200	.05	.05	1	120	B55FT20	F6T
55	1	.400	.400	.400	.005	.005	.250	165	A55NT40	N8T
60	1	.050	.050	.050	.05	.05	1	100	B60FT05	F6T
60	1	.100	.100	.100	.05	.05	1	110	B60FT10	F6T
60	1	.150	.150	.150	.05	.05	1	120	B60FT15	F6T
60	1	.300	.300	.300	.05	.05	1	140	B60FT30	F8T
60	1	.350	.350	.350	.005	.005	.250	165	A60NT35	N8T
65	1	.050	.050	.050	.05	.05	1	105	B65FT05	F6T
65	1	.100	.100	.100	.05	.05	1	120	B65FT10	F6T
65	1	.250	.250	.250	.05	.05	1	140	B65FT25	F8T
65	1	.270	.270	.270	.005	.005	.250	165	A65NT27	N8T
67	1	.050	.050	.050	.05	.05	1	110	B67FT05	F6T
67	1	.100	.100	.100	.05	.05	1	120	B67FT10	F6T
70	1	.050	.050	.050	.05	.05	1	110	B70FT05	F6T
70	1	.100	.100	.100	.05	.05	1	120	B70FT10	F6T
70	1	.200	.200	.200	.05	.05	1	135	B70FT20	F8T
70	1	.250	.250	.250	.005	.005	.250	165	A70NT25	N8T
75	1	.050	.050	.050	.05	.06	1	115	B75FT05	F6T
75	1	.100	.100	.100	.05	.05	1	125	B75FT10	F6T
75	1	.200	.200	.200	.05	.05	1	140	B75FT20	F8T
75	1	.250	.250	.250	.005	.005	.250	170	A75NT25	N8T
80	1	.050	.050	.050	.05	.05	1	120	B80FT05	F6T
80	1	.100	.100	.100	.05	.05	1	130	B80FT10	F6T
80	1	.200	.200	.200	.05	.05	1	145	B80FT20	F8T
80	1	.250	.250	.250	.005	.005	.250	175	A80NT25	N8T
85	1	.050	.050	.050	.05	.05	1	125	B85FT05	F6T
85	1	.100	.100	.100	.05	.05	1	135	B85FT10	F6T
85	1	.200	.200	.200	.05	.05	1	150	B85FT20	F8T
85	1	.250	.250	.250	.005	.005	.250	175	A85NT25	N8T
90	1	.050	.050	.050	.05	.05	1	130	B90FT05	F6T
90	1	.100	.100	.100	.05	.05	1	140	B90FT10	F6T
90	1	.200	.200	.200	.05	.05	1	155	B90FT20	F8T
90	1	.250	.250	.250	.005	.005	.250	180	A90NT25	N8T
95	1	.050	.050	.050	.05	.05	1	135	B95FT05	F6T
95	1	.100	.100	.100	.05	.05	1	145	B95FT10	F6T
95	1	.200	.200	.200	.05	.05	1	160	B95FT20	F8T
95	1	.200	.200	.200	.005	.005	.250	180	A95NT20	N8T
100	1	.020	.020	.020	.05	.05	1	120	B100FT02	F6T
100	1	.050	.050	.050	.05	.05	1	140	B100FT05	F6T
100	1	.100	.100	.100	.05	.05	1	150	B100FT10	F6T
100	1	.200	.200	.200	.05	.05	1	170	B100FT20	F8T
100	1	.200	.200	.200	.005	.005	.250	185	A100NT20	N8T
105	1	.050	.050	.050	.05	.05	1	140	B105FT05	F6T
105	1	.100	.100	.100	.05	.05	1	155	B105FT10	F6T
105	1	.200	.200	.200	.05	.05	1	170	B105FT20	F8T
105	1	.200	.200	.200	.005	.005	.250	185	A105NT20	N8T
110	1	.050	.050	.050	.05	.05	1	145	B110FT05	F6T
110	1	.100	.100	.100	.05	.05	1	160	B110FT10	F6T
110	1	.200	.200	.200	.05	.05	1	170	B110FT20	F8T
110	1	.200	.200	.200	.005	.005	.250	185	A110NT20	N8T
115	1	.050	.050	.050	.05	.05	1	145	B115FT05	F6T
115	1	.100	.100	.100	.05	.05	1	160	B115FT10	F6T
115	1	.200	.200	.200	.05	.05	1	170	B115FT20	F8T
115	1	.200	.200	.200	.005	.005	.250	185	A115NT20	N8T
120	1	.050	.050	.050	.05	.05	1	150	B120FT05	F6T
120	1	.200	.200	.200	.05	.05	1	175	B120FT20	F8T
120	1	.200	.200	.200	.005	.005	.250	190	A120NT20	N8T
125	1	.050	.050	.050	.05	.05	1	155	B125FT05	F6T
125	1	.200	.200	.200	.05	.05	1	175	B125FT20	F8T
125	1	.200	.200	.200	.005	.005	.250	190	A125NT20	N8T
130	1	.150	.150	.150	.05	.05	1	170	B130FT15	F8T
130	1	.170	.170	.170	.005	.005	.250	190	A130NT17	N8T
135	1	.150	.150	.150	.005	.005	.250	190	A135NT15	N8T
140	1	.130	.130	.130	.005	.005	.250	190	A140NT13	N8T
150	1	.100	.100	.100	.05	.05	1	170	B150FT10	F8T
150	1	.100	.100	.100	.005	.005	.250	190	A150NT10	N8T

*or 2 mv, whichever is greater

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15

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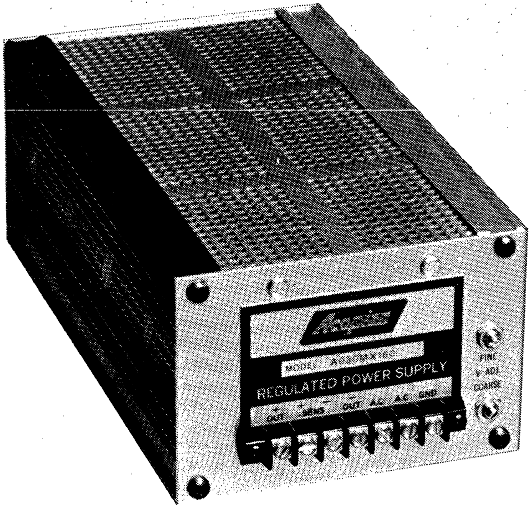

VOLTAGE PROGRAMMABLE

Adjustable Current Limiting

ALL MODELS U.L. RECOGNIZED

Power supplies with the broad adjustment capability required for analog instrumentation and circuitry, electronic system development; basic research, and similar applications.

For applications requiring a constant current or adjustable current limiting, a power supply with a true constant current characteristic, such as those with model numbers beginning with the letter P, should be used.

SPECIFICATIONS

Input Voltage: 105-125 VAC, 50-400 Hz, single phase.

Regulation, Ripple (constant voltage operation):
Line Regulation: ±0.005% or 2 mv, whichever is greater.
Load Regulation: ±0.005% or 2 mv, whichever is greater.
Ripple: 0.25 mv rms.

Regulation, Ripple (constant current operation):
Line Regulation: ±0.1%.
Load Regulation: ±0.2%.
Ripple: 0.1% rms.

Remote Voltage Sensing: Provision for sensing the output voltage across the load, to compensate voltage drops in output wiring, is a standard feature.

Remote Voltage Programming: The output voltage of all models may be controlled by means of external resistance connected in series with the −S lead.

Voltage Programming Coefficient: See table. Calibration tolerance, ±2%.

For applications where the capability for external adjustment of output voltage is necessary, but a guaranteed programming coefficient tolerance is not required, these power supplies may be ordered with the programming coefficient uncalibrated. To order, change the letter "X" in the model number to the letter "T", and subtract $15.00 from the standard price.

Current Limiting: Models with fixed current limiting have a foldback-type characteristic with automatic recovery. All others have current limiting with a constant-voltage/constant-current crossover characteristic.

Polarity: Output is floating; either positive or negative terminal may be grounded or floated up to 300 V above ground.

Ambient Operating Temperature Range: −20 to +71°C.
Storage Temperature Range: −55 to +85°C.

OPTIONS

Remote Current Limiting Adjustment: All models having numbers beginning with the letter P have a built in (front panel) current limit control. Provision for control of the current limit setting by adjustment of an external resistance is available as an option. To order, add the prefix letter "E" to the model number, and add $10.00 to the standard price.

The current limit setting is inversely related to resistance. Use a 200 ohm ½ W potentiometer.

Overvoltage Protection: An internally mounted overvoltage protection circuit, fixed set approximately 20% above the maximum output voltage rating of the supply, is available on all models with maximum outputs of 60 volts or less. To order, add prefix "V" to the model number, and increase standard price as follows:

For all case sizes except H16:	
0-6V through 0-18V models	$25.00
0-30V through 0-60V models	35.00
Case size H16 (all voltages)	75.00

230 Volt Input: All models can be alternately furnished for operation on inputs of 210-250 VAC, 50-400 Hz. To order, add suffix "-230" to model number and $25.00 to price.

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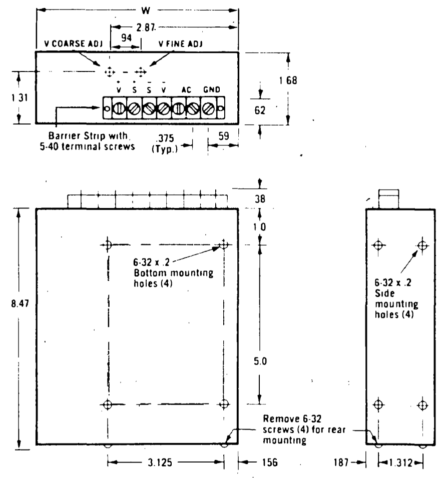
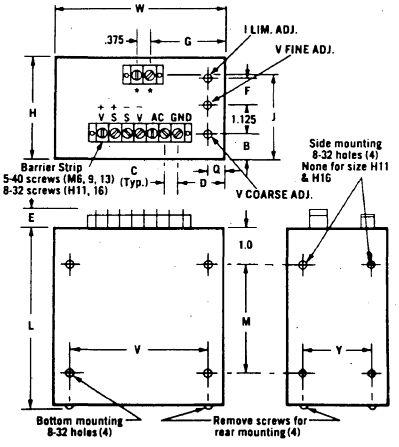
NARROW PROFILE MODELS FOR LIMITED SPACE APPLICATIONS—foldback current limiting


W
2.87
.94
V COARSE ADJ
V FINE ADJ
V S S V AC GND
1.31
1.68
.62
Barrier Strip with 5-40 terminal screws
.375 (Typ.)
.59
.38
1.0
6-32 x .2 Bottom mounting holes (4)
8.47
5.0
6-32 x .2 Side mounting holes (4)
Remove 6-32 screws (4) for rear mounting
3.125
.156
.187
1.312

Output Voltage Range	Output Current Amps. (To +71°C)	Voltage Prgmg. Coeff. (Ω/V)	Case Size	Model	Price
0-7	1.0	700	N8	A07NX100	$145
0-7	2.1	700	N8H	A07NX210	170
0-18	.400	270	N8	A018NX40	135
0-18	1.0	270	N8H	A018NX100	165
0-32	.250	150	N8	A032NX25	135
0-32	.600	150	N8H	A032NX60	180
0-60	.125	820	N8T	A060NX12	160
0-60	.250	820	N8H	A060NX25	180
0-150	.050	330	N8T	A0150NX05	190
0-150	.100	330	N8H	A0150NX10	230

Case Size	W	Approx. Weight
N8	3.44	3lb
N8T	3.81	3lb 2oz
N8H	4.68	3lb 14oz


W
.375
G
I LIM. ADJ.
V FINE ADJ.
* *
+ + − −
V S S V AC GND
H
F
1.125
J
B
Barrier Strip
5-40 screws (M6, 9, 13)
8-32 screws (H11, 16)
C (Typ.)
Q
D
V COARSE ADJ.
Side mounting 8-32 holes (4) None for size H11 & H16
E
1.0
M
L
V
Y
Bottom mounting 8-32 holes (4)
Remove screws for rear mounting (4)

*To external current limit control (optional)

Output Voltage Range	Output Current Amps. at 40°C	55°C	71°C	Voltage Prgmg. Coeff. (Ω/V)	Case Size	Voltage Programmable Fixed Current Limiting Model	Price	Voltage Programmable Adjustable Current Limiting Model	Price
0-6	1.2	1.2	1.2	820	M6	A06MX120	$155	P06MX120	$175
0-6	2.0	2.0	2.0	820	M6	A06MX200	175	P06MX200	195
0-6	3.0	2.5	2.0	820	M6	A06MX300	205	P06MX300	230
0-6	5.0	4.0	3.0	820	M9	A06MX500	230	P06MX500	255
0-6	8.0	7.0	6.0	820	M13	A06MX800	275	P06MX800	300
0-6	12.0	10.0	7.0	820	H11	A06HX1200	370	P06HX1200	395
0-6	16.0	13.0	10.0	820	H16	A06HX1600	435	P06HX1600	465
0-15	1.0	1.0	1.0	330	M6	A015MX100	155	P015MX100	175
0-15	2.0	1.6	1.2	330	M6	A015MX200	205	P015MX200	230
0-15	3.0	2.4	1.8	330	M9	A015MX300	230	P015MX300	255
0-15	5.0	4.0	2.5	330	M13	A015MX500	275	P015MX500	300
0-15	8.0	6.0	4.0	330	H11	A015HX800	370	P015HX800	395
0-15	10.0	8.0	6.0	330	H16	A015HX1000	435	P015HX1000	465
0-30	.50	.50	.50	160	M6	A030MX50	175	P030MX50	195
0-30	1.0	1.0	1.0	160	M6	A030MX100	205	P030MX100	230
0-30	1.6	1.4	1.2	160	M9	A030MX160	230	P030MX160	255
0-30	2.5	2.0	1.5	160	M13	A030MX250	275	P030MX250	300
0-30	4.0	3.0	2.0	160	H11	A030HX400	370	P030HX400	395
0-30	5.0	4.0	3.0	160	H16	A030HX500	435	P030HX500	465
0-50	.35	.34	.33	1000	M6	A050MX35	175	P050MX35	195
0-50	.60	.50	.40	1000	M6	A050MX60	205	P050MX60	230
0-50	.85	.75	.65	1000	M9	A050MX85	230	P050MX85	255
0-100	.10	.09	.08	500	M6	A0100MX10	220	P0100MX10	245
0-100	.25	.20	.15	500	M6	A0100MX25	245	P0100MX25	270

Case Size	L	W	H	M	V	Y	E	Q	B	C	D	F	G	J	Approx. Weight
M6	6.59	5.12	3.44	4.0	4.5	3.0	.38	.5	.75	.375	1.44	.75	2.37	3.09	4lb 4oz
M9	9.25	5.12	3.44	6.0	4.5	3.0	.38	.5	.75	.375	1.44	.75	2.37	3.09	7lb 4oz
M13	13.25	5.12	3.44	10.0	4.5	3.0	.38	.5	.75	.375	1.44	.75	2.37	3.09	11lb
H11	11.25	7.37	5.12	8.0	6.75	4.56	.75	1.12	1.25	.562	2.25	1.12	3.75	4.72	18lb 4oz
H16	16.00	7.37	5.12	11.0	6.75	4.56	.75	1.12	1.25	.562	2.25	1.12	3.75	4.72	23lb

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17

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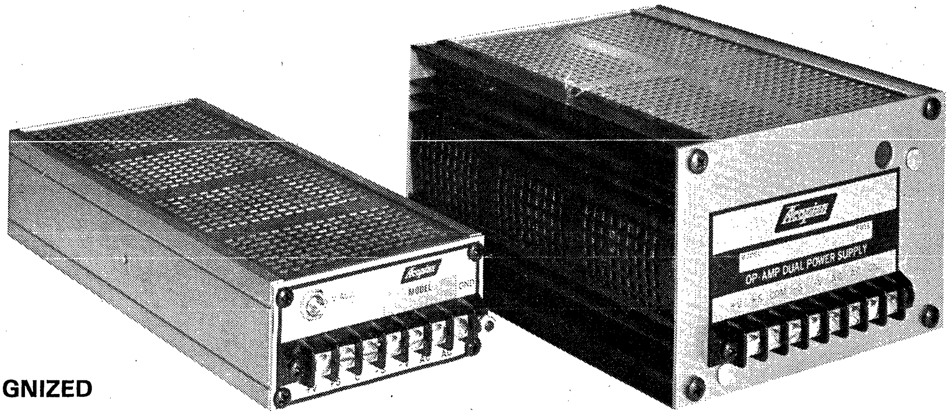
DUAL OUTPUT For Op Amps.



ALL MODELS U.L. RECOGNIZED

Series D dual output power supplies are a convenient source of the tracking voltages required for powering operational amplifiers and related circuits. Their positive/common/negative output terminal configuration minimizes system wiring. Provision for remote sensing permits compensation of load line effects. Although moderately priced, they are sturdily constructed and conservatively rated.

SPECIFICATIONS

Input Voltage: 105–125 VAC, 50–400 Hz, single phase.

Output Voltages: Tracking within 1%.
Output Currents:
Output Voltage Adjustment Ranges:
} See tables. Outputs are short circuit protected.

Load Regulation: ±0.1%.

Line Regulation: ±0.1%.

Ripple: 1.5 mv RMS.

Polarity: Positive output, common, and negative output.

Remote Voltage Sensing: Standard.

Ambient Operating Temperature: −10 to +71°C.

Storage Temperature: −55 to +85°C.

OPTIONS

Overvoltage Protection: A built-in preset overvoltage protection circuit is available on all models. If either output fails, both outputs are "crowbarred." To order, add prefix "V" to the model number, and increase standard price by $30.00.

230 Volt Input: All models can be alternately furnished for operation on inputs of 210–250 VAC, 50–400 Hz. To order, add suffix "-230" to model number and $25.00 to price.

***Connections:**
(Supplies for Op Amps)

+V	+S	COM	–S	–V	AC	AC	GND

Nominal Output Voltages	Adjust ±V.	Current/Output Amps. at 40°C	55°C	71°C	Price	Model	Size*
±5	.5	.750	.650	.550	$170	TD5-75	TG5
±5	.5	1.5	1.25	1.0	200	TD5-150	TG6
±5	.5	2.5	2.0	1.5	235	TD5-250	TG9
±12	1	1.0	.900	.800	170	TD12-100	TG5
±12	1	1.6	1.4	1.0	200	TD12-160	TG6
±12	1	2.5	2.0	1.5	235	TD12-250	TG9
±12	.5	4.5	3.7	3.0	290	TD12-450	TG13
±12	.5	8.5	7.0	5.5	375	TD12-850	TH11
±15	1	.400	.400	.400	125	TD15-40	TG5
±15	1	1.0	.900	.800	170	TD15-100	TG5
±15	1	1.6	1.4	1.0	200	TD15-160	TG6
±15	1	2.5	2.0	1.5	235	TD15-250	TG9
±15	.5	4.5	3.7	3.0	290	TD15-450	TG13
±15	.5	8.5	7.0	5.5	375	TD15-850	TH11

NARROW PROFILE MODELS — for limited space applications

Nominal Output Voltage	Adjust ±V.	Current/Output Amps. at 40°C	55°C	71°C	Price	Model	Size*
±12	1	.500	.500	.400	$140	FD12-50	TN6
±12	.5	1.0	.900	.800	185	LD12-100	TN8H
±15	1	.500	.500	.400	140	FD15-50	TN6
±15	.5	1.0	.900	.800	185	LD15-100	TN8H

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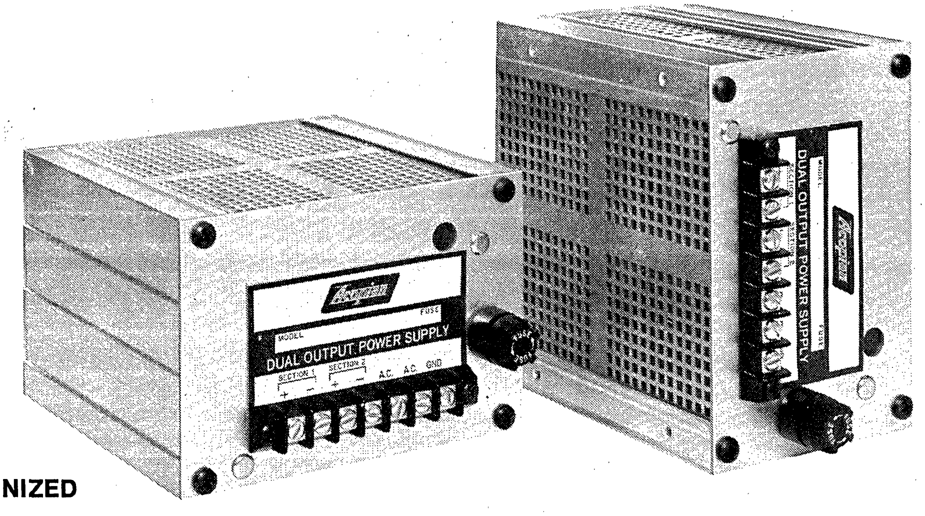
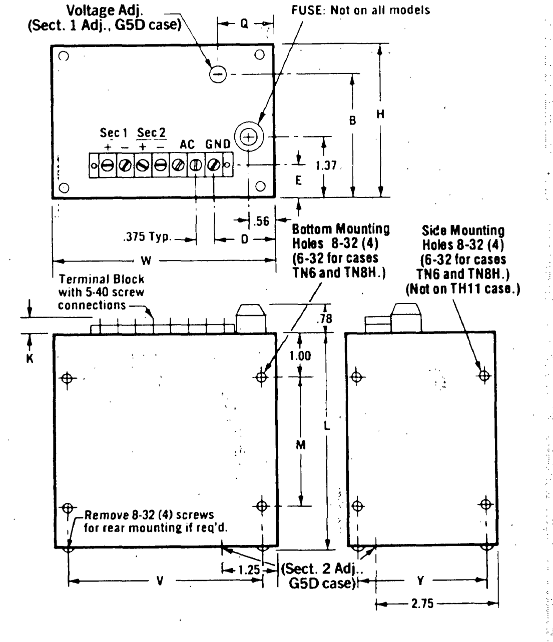

Acopian
MODEL
FUSE
DUAL OUTPUT POWER SUPPLY
SECTION 1
SECTION 2
+ − + −
AC AC GND

DUAL OUTPUT General Purpose

ALL MODELS U.L. RECOGNIZED

Acopian general purpose duals furnish two completely independent outputs, either identical or different, in less space and at less cost than two equivalent single output supplies. Thousands of output voltage/current rating combinations are available. Mounting and system wiring are simplified. Quality components, generously derated, insure long-term reliability.


Voltage Adj.
(Sect. 1 Adj., G5D case)
Q
FUSE: Not on all models
B
H
Sec 1 Sec 2
+ − + −
AC GND
1.37
E
.56
.375 Typ.
D
W
Bottom Mounting Holes 8-32 (4) (6-32 for cases TN6 and TN8H.)
Side Mounting Holes 8-32 (4) (6-32 for cases TN6 and TN8H.) (Not on TH11 case.)
Terminal Block with 5-40 screw connections
K
.78
1.00
L
M
Remove 8-32 (4) screws for rear mounting if req'd.
1.25
(Sect. 2 Adj., G5D case)
V
Y
2.75

Size	L	W	H	M	V	Y	E	Q	B	K	D	Approx. Weight
G5D	5.09	5.12	3.44	3.00	4.50	3.00	.75	1.25	2.73	.38	1.44	4 lb
TG5	5.09	5.12	3.44	3.00	4.50	3.00	.75	1.25	2.73	.38	1.44	3 lb 4 oz
TG6	6.59	5.12	3.44	4.00	4.50	3.00	.75	1.25	2.73	.38	1.44	4 lb 4 oz
TG9	9.25	5.12	3.44	6.00	4.50	3.00	.75	1.25	2.73	.38	1.44	6 lb 8 oz
TG13	13.25	5.12	3.44	10.00	4.50	3.00	.75	1.25	2.73	.38	1.44	12 lb
TH11	11.25	7.37	5.12	8.00	6.75	4.56	.75	2.73	4.36	.38	2.38	18 lb 4 oz
TN6	6.59	3.44	1.68	4.00	3.12	1.31	.62	2.87	1.31	.53	.59	2 lb 4 oz.
TN8H	8.47	4.68	1.68	5.00	3.12	1.31	.62	2.87	1.31	.53	.59	3 lb 14 oz

HOW TO ORDER: Select two sections from one of the three tables on pages 20 and 21. The complete model number is the combination of the two sections selected. Example: The combination of section 5GT20D and section 8GT50D is Model 5GT20D-8GT50D. Always assign the lower voltage section first. For pricing purposes, add the cost of the individual sections selected.

SPECIFICATIONS

Input Voltage: 105—125 VAC, 50—400 Hz, single phase.

Output Specifications: See pagès 20 and 21. No derating required through ambient temperature range of — 10 to + 71 °C.

Short Circuit Protection: Delivers current surges without damage—built-in fuse protects supply against prolonged overloads and shorts.

Polarity: Outputs are floating. Each output may be independently connected to provide any combination of positive and negative voltages. Outputs may be floated up to 300 V above ground.

Ambient Operating Temperature: — 10 to + 71 °C.

Storage Temperature: —55 to + 85 °C.

Dimensions and Weight: Case size G5D.

OPTIONS

Overvoltage Protection: Separate preset overvoltage protection circuit for each output. To order, add prefix "V" to model number. When both outputs are in the range of 3 to 28V, add $20.00 to the standard price. An additional $5.00/output charge applies for outputs from 30 to 70V. Not available for other voltages.

230 Volt Input: All models can be alternately furnished for operation on inputs of 210-250 VAC, 50-400 Hz. To order, add suffix "-230" to the model number and $25.00 to the standard price.

Acopian DUAL OUTPUT

(500 MA MAXIMUM)

Nominal Output Voltage	Adjust ±V.	Output Current Amps.	Regulation		Ripple mv RMS	Price per Section	Section (See "How to Order")
			Load ±%	Line ±%			
1.5	.5	.200	.4	.05	1	$60	1.5GT20D
1.5	.5	.400	.5	.1	1	65	1.5GT40D
2.5	.5	.200	.4	.05	1	60	2.5GT20D
2.5	.5	.400	.5	.1	1	65	2.5GT40D
3	.5	.200	.3	.05	1	60	3GT30D
3	.5	.400	.5	.1	1	65	3GT40D
3.6	.5	.200	.2	.05	1	60	3.6GT20D
3.6	.5	.400	.3	.1	1	65	3.6GT40D
5	.5	.200	.2	.05	1	60	5GT20D
5	.5	.500	.3	.05	1	65	5GT50D
6	1	.200	.05	.05	1	60	6GT20D
6	1	.500	.15	.05	1	65	6GT50D
7	1	.200	.05	.05	1	60	7GT20D
7	1	.500	.15	.05	1	65	7GT50D
8	1	.200	.05	.05	1	60	8GT20D
8	1	.500	.1	.05	1	65	8GT50D
9	1	.200	.05	.05	1	60	9GT20D
9	1	.500	.1	.05	1	65	9GT50D
10	1	.250	.05	.05	1	60	10GT25D
10	1	.500	.1	.05	1	65	10GT50D
11	1	.250	.05	.05	1	60	11GT25D
11	1	.500	.1	.05	1	65	11GT50D
12	1	.250	.05	.05	1	60	12GT25D
12	1	.500	.1	.05	1	65	12GT50D
13	1	.250	.05	.05	1	60	13GT25D
13	1	.500	.1	.05	1	65	13GT50D
15	1	.150	.05	.05	1	55	15GT15D
15	1	.250	.05	.05	1	60	15GT25D
15	1	.500	.1	.05	1	65	15GT50D
16	1	.250	.05	.05	1	60	16GT25D
16	1	.500	.1	.05	1	65	16GT50D
17	1	.250	.05	.05	1	60	17GT25D
17	1	.500	.1	.05	1	65	17GT50D
18	1	.250	.05	.05	1	60	18GT25D
18	1	.500	.1	.05	1	65	18GT50D
19	1	.250	.05	.05	1	60	19GT25D
19	1	.500	.1	.05	1	65	19GT50D
20	1	.250	.05	.05	1	60	20GT25D
20	1	.500	.1	.05	1	65	20GT50D
21	1	.250	.05	.05	1	60	21GT25D
21	1	.500	.1	.05	1	65	21GT50D
22	1	.250	.05	.05	1	60	22GT25D
22	1	.500	.1	.05	1	65	22GT50D
23	1	.250	.05	.05	1	60	23GT25D
23	1	.500	.1	.05	1	65	23GT50D
24	1	.250	.05	.05	1	60	24GT25D
24	1	.500	.05	.05	1	65	24GT50D
25	1	.250	.05	.05	1	60	25GT25D
25	1	.500	.05	.05	1	65	25GT50D
	1	.250	.05	.05	1	60	26GT25D
26	1	.400	.05	.05	1	65	26GT40D
28	1	.250	.05	.05	1	60	28GT25D
28	1	.400	.05	.05	1	65	28GT40D
30	1	.250	.05	.05	1	60	30GT25D
30	1	.400	.05	.05	1	65	30GT40D
31	1	.100	.05	.05	1	60	31GT10D
31	1	.300	.05	.05	1	65	31GT30D
32	1	.100	.05	.05	1	60	32GT10D
32	1	.300	.05	.05	1	65	32GT30D
33	1	.100	.05	.05	1	60	33GT10D
33	1	.300	.05	.05	1	65	33GT30D

Nominal Output Voltage	Adjust ±V.	Output Current Amps.	Regulation		Ripple mv RMS	Price per Section	Section (See "How to Order")
			Load ±%	Line ±%			
34	1	.100	.05	.05	1	$60	34GT10D
34	1	.300	.05	.05	1	65	34GT30D
35	1	.100	.05	.05	1	60	35GT10D
35	1	.200	.05	.05	1	65	35GT20D
36	1	.100	.05	.05	1	60	36GT10D
36	1	.200	.05	.05	1	65	36GT20D
38	1	.100	.05	.05	1	60	38GT10D
38	1	.200	.05	.05	1	65	38GT20D
40	1	.100	.05	.05	1	60	40GT10D
40	1	.200	.05	.05	1	65	40GT20D
42	1	.100	.05	.05	1	60	42GT10D
42	1	.200	.05	.05	1	65	42GT20D
44	1	.100	.05	.05	1	60	44GT10D
44	1	.200	.05	.05	1	65	44GT20D
45	1	.100	.05	.05	1	60	45GT10D
45	1	.200	.05	.05	1	65	45GT20D
46	1	.100	.05	.05	1	60	46GT10D
46	1	.200	.05	.05	1	65	46GT20D
48	1	.100	.05	.05	1	60	48GT10D
48	1	.200	.05	.05	1	65	48GT20D
50	1	.100	.05	.05	1	65	50GT10D
50	1	.200	.05	.05	1	70	50GT20D
52	1	.100	.05	.05	1	65	52GT10D
52	1	.200	.05	.05	1	70	52GT20D
54	1	.100	.05	.05	1	65	54GT10D
54	1	.200	.05	.05	1	70	54GT20D
55	1	.100	.05	.05	1	65	55GT10D
55	1	.200	.05	.05	1	70	55GT20D
56	1	.050	.05	.05	1	60	56GT05D
56	1	.100	.05	.05	1	65	56GT10D
58	1	.050	.05	.05	1	60	58GT05D
58	1	.100	.05	.05	1	65	58GT10D
60	1	.050	.05	.05	1	60	60GT05D
60	1	.100	.05	.05	1	65	60GT10D
62	1	.050	.05	.05	1	65	62GT05D
62	1	.100	.05	.05	1	70	62GT10D
64	1	.050	.05	.05	1	65	64GT05D
64	1	.100	.05	.05	1	70	64GT10D
65	1	.050	.05	.05	1	65	65GT05D
65	1	.100	.05	.05	1	70	65GT10D
67	1	.050	.05	.05	1	65	67GT05D
67	1	.100	.05	.05	1	70	67GT10D
68	1	.050	.05	.05	1	65	68GT05D
68	1	.100	.05	.05	1	70	68GT10D
69	1	.050	.05	.05	1	65	69GT05D
69	1	.100	.05	.05	1	70	69GT10D
70	1	.050	.05	.05	1	65	70GT05D
70	1	.100	.05	.05	1	70	70GT10D
75	1	.050	.05	.05	1	70	75GT05D
75	1	.100	.05	.05	1	75	75GT10D
76	1	.020	.05	.05	1	70	76GT02D
76	1	.050	.05	.05	1	75	76GT05D
80	1	.020	.05	.05	1	70	80GT02D
80	1	.050	.05	.05	1	75	80GT05D
85	1	.020	.05	.05	1	70	85GT02D
85	1	.050	.05	.05	1	75	85GT05D
90	1	.020	.05	.05	1	70	90GT02D
90	1	.050	.05	.05	1	75	90GT05D
95	1	.020	.05	.05	1	75	95GT02D
95	1	.050	.05	.05	1	80	95GT05D
100	1	.020	.05	.05	1	75	100GT02D
100	1	.050	.05	.05	1	80	100GT05D

ACOPIAN P.O. BOX 638, EASTON, PA 18044
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(2 AMP MAXIMUM)

Nominal Output Voltage	Adjust ±V.	Output Current Amps.	Regulation Load ±%	Regulation Line ±%	Ripple mv RMS	Price per Section	Section (See "How to Order")
1.5	.5	.200	.4	.05	1	$60	1.5GT20D
1.5	.5	.400	.5	.1	1	65	1.5GT40D
2.5	.5	.200	.4	.05	1	60	2.5GT20D
2.5	.5	.400	.5	.1	1	65	2.5GT40D
3	.5	.200	.3	.05	1	60	3GT20D
3	.5	.400	.5	.1	1	65	3GT40D
3	.5	.700	.5	.1	1	75	3GT70D
3	.5	1.0	.5	.1	1	85	3GT100D
3.6	.5	.200	.2	.05	1	60	3.6GT20D
3.6	.5	.400	.3	.1	1	65	3.6GT40D
3.6	.5	.700	.4	.1	1	75	3.6GT70D
3.6	.5	1.0	.5	.1	1	85	3.6GT100D
5	.5	.200	.2	.05	1	60	5GT20D
5	.5	.500	.3	.05	1	65	5GT50D
5	.5	.700	.4	.05	1	75	5GT70D
5	.5	1.0	.5	.05	1	85	5GT100D
5*	.25	2.0	.5	.05	1	95	5GT200D
6	1	.200	.05	.05	1	60	6GT20D
6	1	.500	.15	.05	1	65	6GT50D
6	.5	.700	.2	.05	1	75	6GT70D
6	.5	1.0	.3	.05	1	85	6GT100D
7	1	.200	.05	.05	1	60	7GT20D
7	1	.500	.15	.05	1	65	7GT50D
7	.5	.700	.2	.05	1	75	7GT70D
7	.5	1.0	.3	.05	1	85	7GT100D
8	1	.200	.05	.05	1	60	8GT20D
8	1	.500	.1	.05	1	65	8GT50D
8	.5	.700	.15	.05	1	75	8GT70D
8	.5	1.0	.2	.05	1	85	8GT100D
9	1	.200	.05	.05	1	60	9GT20D
9	1	.500	.1	.05	1	65	9GT50D
9	.5	.700	.15	.05	1	75	9GT70D
9	.5	1.0	.2	.05	1	85	9GT100D
10	1	.250	.05	.05	1	$60	10GT25D
10	1	.500	.1	.05	1	65	10GT50D
10	.5	.700	.15	.05	1	75	10GT70D
10	.5	1.0	.2	.05	1	85	10GT100D
12	1	.250	.05	.05	1	60	12GT25D
12	1	.500	.1	.05	1	65	12GT50D
12	.5	.700	.1	.05	1	75	12GT70D
12	.5	1.0	.1	.05	1	85	12GT100D
14	1	.250	.05	.05	1	60	14GT25D
14	1	.500	.1	.05	1	65	14GT50D
14	.5	.700	.1	.05	1	75	14GT70D
14	.5	1.0	.1	.05	1	85	14GT100D
15	1	.250	.05	.05	1	60	15GT25D
15	1	.500	.1	.05	1	65	15GT50D
15	.5	.700	.1	.05	1	75	15GT70D
15	.5	1.0	.1	.05	1	85	15GT100D
16	1	.250	.05	.05	1	60	16GT25D
16	1	.500	.1	.05	1	65	16GT50D
16	.5	.700	.1	.05	1	75	16GT70D
16	.5	1.0	.1	.05	1	85	16GT100D
18	1	.250	.05	.05	1	60	18GT25D
18	1	.500	.1	.05	1	65	18GT50D
18	.5	.700	.1	.05	1	75	18GT70D
18	.5	1.0	.1	.05	1	85	18GT100D
19	1	.250	.05	.05	1	60	19GT25D
19	1	.500	.1	.05	1	65	19GT50D
19	.5	.750	.1	.05	1	85	19GT75D
20	1	.250	.05	.05	1	60	20GT25D
20	1	.500	.1	.05	1	65	20GT50D
20	.5	.750	.1	.05	1	85	20GT75D

*Other section chosen may not have output current rating exceeding 500 ma.

(90 TO 150 VOLTS)

Nominal Output Voltage	Adjust ±V.	Output Current Amps.	Regulation Load ±%	Regulation Line ±%	Ripple mv RMS	Price per Section	Section (See "How to Order")
90	1	.050	.05	.05	1	$75	90GT05D
90	1	.100	.05	.05	1	85	90GT10D
95	1	.050	.05	.05	1	80	95GT05D
95	1	.100	.05	.05	1	85	95GT10D
100	1	.050	.05	.05	1	80	100GT05D
100	1	.100	.05	.05	1	85	100GT10D
105	1	.050	.05	.05	1	80	105GT05D
105	1	.100	.05	.05	1	85	105GT10D
110	1	.050	.05	.05	1	80	110GT05D
110	1	.100	.05	.05	1	85	110GT10D
115	1	.050	.05	.05	1	80	115GT05D
115	1	.100	.05	.05	1	85	115GT10D
120	1	.050	.05	.05	1	80	120GT05D
120	1	.100	.05	.05	1	$85	120GT10D
125	1	.050	.05	.05	1	80	125GT05D
125	1	.100	.05	.05	1	85	125GT10D
130	1	.050	.05	.05	1	85	130GT05D
130	1	.100	.05	.05	1	90	130GT10D
135	1	.050	.05	.05	1	85	135GT05D
135	1	.100	.05	.05	1	90	135GT10D
140	1	.050	.05	.05	1	85	140GT05D
140	1	.100	.05	.05	1	90	140GT10D
145	1	.050	.05	.05	1	85	145GT05D
145	1	.100	.05	.05	1	90	145GT10D
150	1	.050	.05	.05	1	85	150GT05D
150	1	.100	.05	.05	1	90	150GT10D

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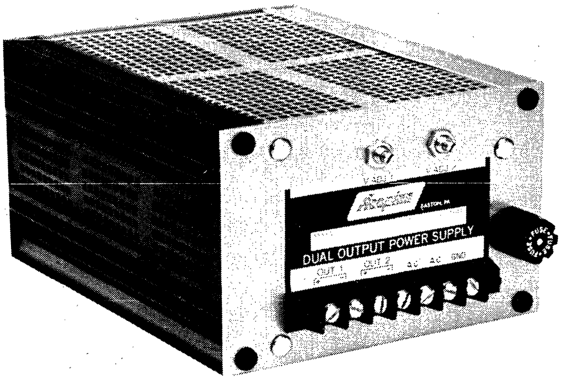
Acopian

DUAL OUTPUT

For Microprocessors

Isolated Outputs


V. ADJ
Acopian
EASTON, PA
DUAL OUTPUT POWER SUPPLY
OUT 1
OUT 2
AC
AC
GND
FUSE

Dual isolated output power supplies may be connected to provide any desired arrangement of positive and negative output voltages. Each voltage is independently adjustable. No derating is required up to +60°C. A separate overvoltage protector on each output is available as a built-in option.

SPECIFICATIONS

Input Voltage: 105-125 VAC, 50-400 Hz, single phase.

Output Specifications: No derating required through ambient temperature range.

Polarity: Outputs are floating. Each may be independently connected to provide any combination of positive and negative voltages. Outputs may be floated up to 300 V above ground.

Ambient Operating Temperature: −10 to +60°C.

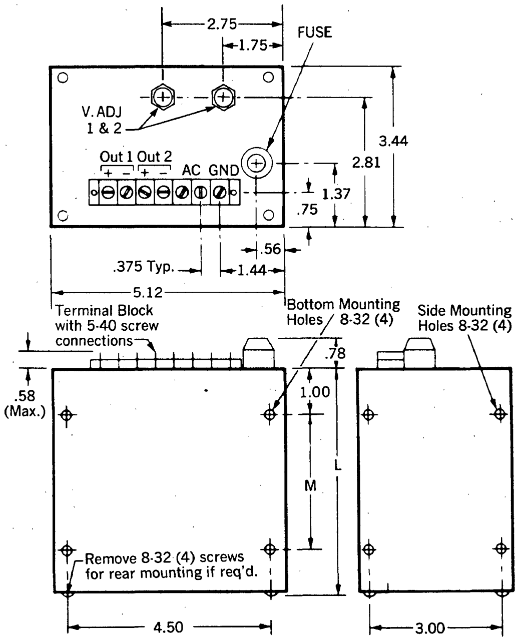
Storage Temperature: −55 to +85°C.

Nominal Output Voltage	Adjustment ± Volts	Output Current Amps.	Regulation		Ripple mv RMS	Price	Model	Size
			Load ±%	Line ±%				
5 9	.25 1	2.5 .400	.15 .15	.15 .15	1 1	$170	59D5A	DG5
5 9	.25 1	4.0 .700	.15 .15	.15 .15	1 1	190	59D6A	DG6
5 9	.25 1	7.0 1.4	.15 .15	.15 .15	1 1	230	59D9A	DG9
5 12	.25 1	2.0 .600	.15 .15	.15 .15	1 1	170	512D5A	DG5
5 12	.25 1	3.0 1.2	.15 .15	.15 .15	1 1	190	512D6A	DG6
5 12	.25 1	6.0 2.4	.15 .15	.15 .15	1 1	230	512D9A	DG9

OPTIONS

Overvoltage Protection: Two separate, preset overvoltage protection circuits, one for each output. To order, add prefix "V" to model number and add $20.00 to the standard price.

230 Volt Input: All models can be alternately furnished for operation on inputs of 210-250 VAC, 50-400 Hz. To order, add suffix "-230" to the model number and $25.00 to the standard price.


2.75
1.75
FUSE
V. ADJ 1 & 2
Out 1 Out 2
+ − + −
AC GND
3.44
2.81
1.37
.75
.56
.375 Typ.
1.44
5.12
Terminal Block with 5-40 screw connections
Bottom Mounting Holes 8-32 (4)
Side Mounting Holes 8-32 (4)
.78
.58 (Max.)
1.00
M
L
Remove 8-32 (4) screws for rear mounting if req'd.
4.50
3.00

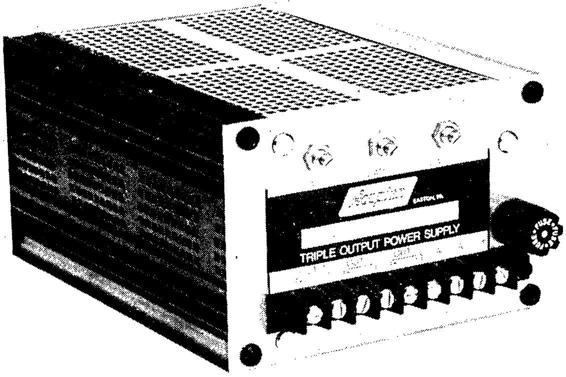
Size	L	M	Approx. Weight
DG5	5.09	3.00	4lb
DG6	6.59	4.00	4lb 4oz
DG9	9.25	6.00	6lb 8oz

Acopian

TRIPLE OUTPUT

For Microprocessors

Isolated Outputs


TRIPLE OUTPUT POWER SUPPLY
Acopian
EASTON, PA

Triple isolated output power supplies provide the features and characteristics of three supplies in one compact, easy-to-use package. They are available in the voltage combinations most frequently required for driving microprocessors and associated circuitry.

SPECIFICATIONS

Input Voltage: 105-125 VAC, 50-400 Hz, single phase.

Output Specifications: No derating required through ambient temperature range of −10 to +60°C.

Polarity: Outputs are floating. Each output may be independently connected to provide any combination of positive and negative voltages. Outputs may be floated up to 300 V above ground.

Ambient Operating Temperature: −10 to +60°C.

Storage Temperature: −55 to +85°C.

Nominal Output Voltage	Adjustment ± Volts	Output Current Amps.	Regulation Load ± %	Regulation Line ± %	Ripple mv RMS	Price	Model	Size
5 5 12	.25 .25 1	2.0 .500 .300	.15 .15 .15	.15 .15 .15	1 1 1	$180	5512T5A	GT5
5 5 12	.25 .25 1	3.0 1.0 .600	.15 .15 .15	.15 .15 .15	1 1 1	200	5512T6A	GT6
5 5 12	.25 .25 1	6.0 2.0 1.2	.15 .15 .15	.15 .15 .15	1 1 1	245	5512T9A	GT9
5 9 12	.25 1 1	2.0 .400 .300	.15 .15 .15	.15 .15 .15	1 1 1	180	5912T5A	GT5
5 9 12	.25 1 1	3.0 .700 .600	.15 .15 .15	.15 .15 .15	1 1 1	200	5912T6A	GT6
5 9 12	.25 1 1	6.0 1.4 1.2	.15 .15 .15	.15 .15 .15	1 1 1	245	5912T9A	GT9
5 12 12	.25 1 1	2.0 .300 .300	.15 .15 .15	.15 .15 .15	1 1 1	180	51212T5A	GT5
5 12 12	.25 1 1	3.0 .600 .600	.15 .15 .15	.15 .15 .15	1 1 1	200	51212T6A	GT6
5 12 12	.25 1 1	6.0 1.2 1.2	.15 .15 .15	.15 .15 .15	1 1 1	245	51212T9A	GT9
5 15 15	.25 1 1	2.0 .250 .250	.15 .15 .15	.15 .15 .15	1 1 1	180	51515T5A	GT5
5 15 15	.25 1 1	3.0 .500 .500	.15 .15 .15	.15 .15 .15	1 1 1	200	51515T6A	GT6
5 15 15	.25 1 1	6.0 1.0 1.0	.15 .15 .15	.15 .15 .15	1 1 1	245	51515T9A	GT9

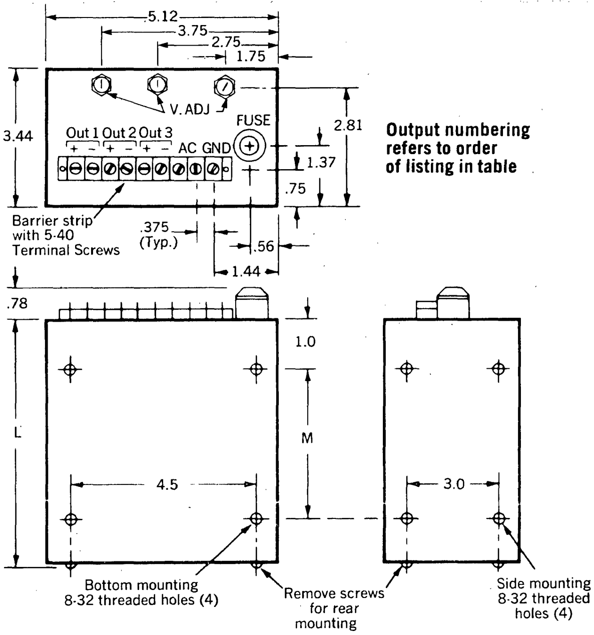
OPTIONS

Overvoltage Protection:

On Output 1 only: Add prefix "V" to model number and add $10.00 to the standard price.

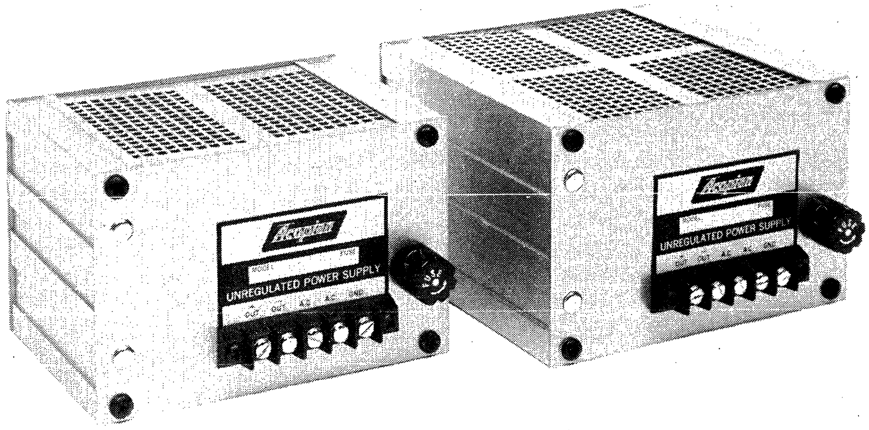
Separate overvoltage protection circuit on each output: Add prefix "3V" to model number and add $25.00 to the standard price.

230 Volt Input: All models can be alternately furnished for operation on inputs of 210-250 VAC, 50-400 Hz. To order, add suffix "-230" to the model number and $25.00 to the standard price.


5.12
3.75
2.75
1.75
3.44
V. ADJ
FUSE
Out 1 Out 2 Out 3
+ − + − + − AC GND
2.81
1.37
.75
Barrier strip with 5-40 Terminal Screws
.375 (Typ.)
.56
1.44
.78
1.0
L
M
4.5
3.0
Bottom mounting 8-32 threaded holes (4)
Remove screws for rear mounting
Side mounting 8-32 threaded holes (4)

Output numbering refers to order of listing in table

Size	L	M	Approx. Weight
GT5	5.09	3.00	4lb 14oz
GT6	6.59	4.00	5lb 8oz
GT9	9.25	6.00	7lb 4oz



SERIES U UNREGULATED

U.L. RECOGNIZED

Low-cost DC power suitable for driving loads such as lamps, relays, and small motors is provided by Series U unregulated power supplies. All components are generously derated, insuring a long and trouble-free life; built-in fusing prevents damage due to prolonged overloading or short circuits. Mechanically similar to the regulated supplies shown on pages 10 and 11, they are housed in extruded aluminum cases which can be mounted in any position.

STANDARD FEATURES

- Silicon rectifiers
- Capacitive filtering
- Fused input
- May be used in series or parallel
- No derating or heat sinking required
- Completely serviceable

SPECIFICATIONS

Input Voltage: 0–125 VAC, 50–400 Hz, single phase.

Output Voltage:
Output Current: } See table
Ripple:

Load Regulation: Nominal output voltage is based on 115 VAC input, with approximately 50% of rated output current being drawn.

Line Regulation: With fixed load, output voltage change is proportional to input voltage change.

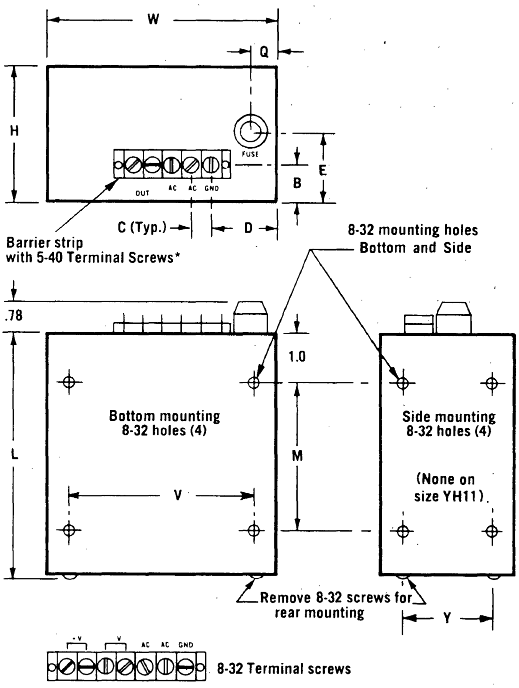
Output Voltage Adjustment: An adjustable autotransformer (not included) may be used to adjust output voltage by varying the AC input voltage to the supply.

Polarity: Output is floating; either positive or negative terminal may be grounded or floated up to 300 V above ground.

Ambient Operating Temperature: −10 to +65°C. No derating required.

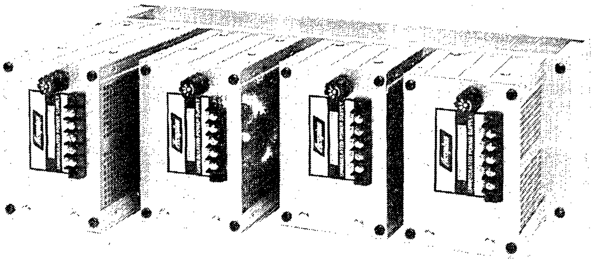
Storage Temperature: −55 to +85°C.

Optional 230 Volt Input
Provision for inputs of 0—250 VAC, 50—400 Hz, replacing the standard 0—125 VAC input voltage range, is available on all models except those having an output current rating of 20 ma. To order, add the suffix "-230" to the model number, and $25.00 to the standard price.

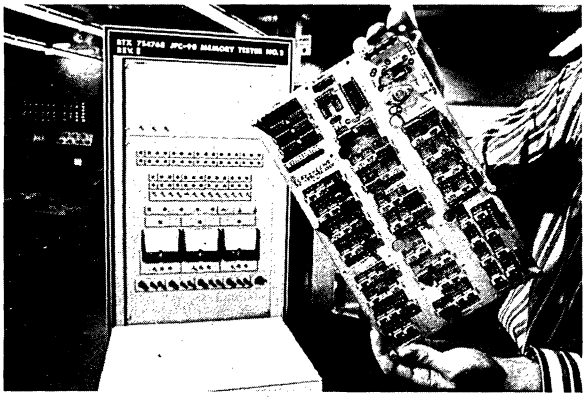

W
Q
H
FUSE
OUT
AC
AC
GND
E
B
C (Typ.)
D
Barrier strip with 5-40 Terminal Screws*
8-32 mounting holes Bottom and Side
.78
1.0
L
M
Bottom mounting 8-32 holes (4)
Side mounting 8-32 holes (4)
(None on size YH11).
V
Remove 8-32 screws for rear mounting
Y
+V
V
AC
AC
GND
8-32 Terminal screws

*for case size YH11

Size	L	W	H	M	V	Y	Q	E	B	D	C	Approx. Weight
Y3	3.71	5.12	3.44	1.62	4.5	3.0	.56	1.37	.75	1.44	.375	2 lb. 8 oz.
Y5	5.09	5.12	3.44	3.00	4.5	3.0	.56	1.37	.75	1.44	.375	4 lb. 8 oz.
Y6	6.59	5.12	3.44	4.00	4.5	3.0	.56	1.37	.75	1.44	.375	7 lb. 8 oz.
YH11	11.25	7.37	5.12	8.0	6.75	4.56	1.10	2.64	1.25	2.25	.562	18 to 23 lb.



The cross-sectional dimensions of Series U power supplies permit efficient rear mounting on either 3½" or 5¼" rack assemblies. Threaded holes on three surfaces permit mounting in any position.



Hamilton Standard uses Acopian power supplies in a memory tester which checks jet engine control. The equipment performs tests on the PROM (Programmable Read Only Memory) board which supplies information to the jet fuel control's processor.

Nominal Output Voltage	Output Amps.	Output Voltage N/L—F/L	Ripple Volts RMS	Price	Model	Size
4	.200	4.4 to 3.6	.2	$45	U4Y20	Y3
5	10.0	6.7 to 3.6	1.8	95	U5Y1000	Y6
	(@ 5.0)	(5.0)	(1.3)			
6	.800	6.6 to 5.4	.7	50	U6Y80	Y3
6	10.0	7.8 to 4.3	2.0	95	U6Y1000	Y6
	(@ 5.0)	(5.7)	(1.3)			
7	1.0	7.7 to 6.3	.8	50	U7Y100	Y3
8	.400	8.8 to 7.2	.4	45	U8Y40	Y3
9	1.0	9.9 to 8.1	.7	50	U9Y100	Y3
9	10.0	11.5 to 7.5	2.3	95	U9Y1000	Y6
	(@ 5.0)	(9.0)	(1.3)			
10	10.0	12.4 to 8.0	2.3	95	U10Y1000	Y6
	(@ 5.0)	(9.8)	(1.3)			
11	10.0	13.5 to 9.1	2.3	95	U11Y1000	Y6
	(@ 5.0)	(10.6)	(1.3)			
12	1.5	14.9 to 10.9	2.5	45	U12Y150	Y3
12	10.0	14.1 to 9.8	2.3	95	U12Y1000	Y6
	(@ 5.0)	(11.5)	(1.3)			
14	1.0	15.4 to 12.6	.7	50	U14Y100	Y3
14	10.0	16.4 to 12.1	2.3	95	U14Y1000	Y6
	(@ 5.0)	(14.0)	(1.3)			
15	10.0	17.2 to 12.8	2.3	95	U15Y1000	Y6
	(@ 5.0)	(14.5)	(1.3)			
16	1.0	17.6 to 14.4	.7	50	U16Y100	Y3
16	10.0	18.8 to 14.2	2.3	95	U16Y1000	Y6
	(@ 5.0)	(16.0)	(1.3)			
17	.250	18.7 to 15.3	.2	45	U17Y25	Y3
17	1.0	18.7 to 15.3	.7	50	U17Y100	Y3
18	1.0	19.8 to 16.2	.7	50	U18Y100	Y3
18	10.0	21.0 to 15.8	2.4	95	U18Y1000	Y6
	(@ 5.0)	(18.0)	(1.4)			
19	.600	20.9 to 17.1	.5	45	U19Y60	Y3
20	10.0	23.7 to 18.3	2.4	95	U20Y1000	Y6
	(@ 5.0)	(20.4)	(1.4)			
24	1.0	26.4 to 21.6	1.7	45	U24Y100	Y3
24	5.0	26.5 to 21.0	2.5	95	U24Y500	Y6
24	10.0	26.8 to 21.4	2.4	135	U24Y1000	Y6
24	17.0	26.4 to 21.6	1.5	180	U24Y1700	YH11
24	23.0	27.0 to 21.0	1.5	220	U24Y2300	YH11
25	5.0	28.1 to 22.3	2.5	95	U25Y500	Y6
27	5.0	30.0 to 24.0	2.6	95	U27Y500	Y6
28	1.0	30.8 to 25.2	1.7	45	U28Y100	Y3
28	5.0	31.2 to 24.8	2.6	95	U28Y500	Y6
28	8.0	30.2 to 25.0	2.4	135	U28Y800	Y6
28	15.0	30.8 to 25.2	1.5	180	U28Y1500	YH11
28	20.0	30.4 to 24.5	1.5	220	U28Y2000	YH11
30	1.0	33.0 to 27.0	1.6	55	U30Y100	Y5
30	2.0	33.0 to 27.0	1.5	75	U30Y200	Y5
30	5.0	33.0 to 26.5	2.6	95	U30Y500	Y6
32	.400	35.2 to 28.8	.6	45	U32Y40	Y3
32	5.0	35.5 to 28.0	3.3	95	U32Y500	Y6
35	1.0	38.5 to 34.5	1.6	55	U35Y100	Y5
35	2.0	38.5 to 31.5	1.5	75	U35Y200	Y5
35	5.0	38.0 to 30.0	3.3	95	U35Y500	Y6
37	.400	40.3 to 33.7	.6	45	U37Y40	Y3
37	5.0	40.5 to 32.2	3.3	95	U37Y500	Y6
38	5.0	43.0 to 34.0	3.3	95	U38Y500	Y6
40	1.0	44.0 to 36.0	1.6	55	U40Y100	Y5
40	2.0	44.0 to 36.0	1.5	75	U40Y200	Y5
40	5.0	45.0 to 37.0	3.3	95	U40Y500	Y6
41	.400	45.1 to 36.9	.6	45	U41Y40	Y3
42	5.0	48.0 to 36.0	6.5	95	U42Y500	Y6
44	.100	48.4 to 39.6	.7	50	U44Y10	Y3
44	2.0	48.4 to 39.6	1.5	85	U44Y200	Y5
45	1.0	49.5 to 40.5	1.6	60	U45Y100	Y5
45	5.0	51.0 to 38.5	6.5	95	U45Y500	Y6
48	.400	52.8 to 43.2	.6	55	U48Y40	Y3
50	1.0	55.0 to 45.0	1.6	65	U50Y100	Y5
52	.400	57.2 to 46.8	.6	55	U52Y40	Y3

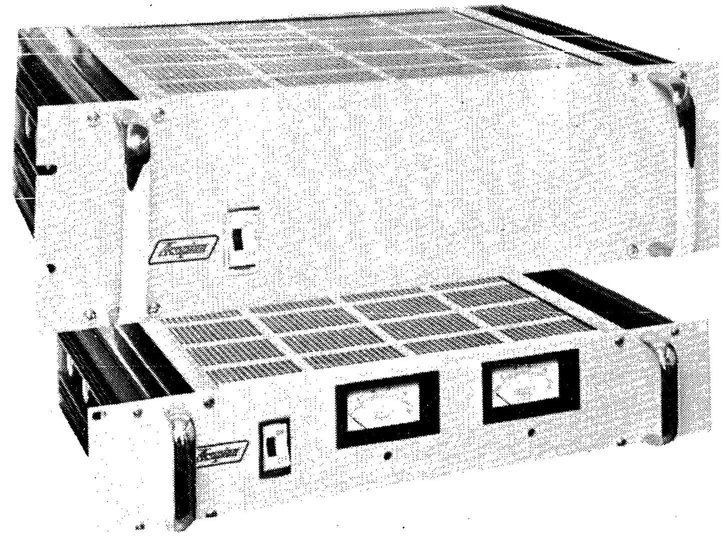
Nominal Output Voltage	Output Amps.	Output Voltage N/L—F/L	Ripple Volts RMS	Price	Model	Size
55	.250	60.5 to 49.5	.4	$55	U55Y25	Y3
55	1.0	59.4 to 48.4	2.8	70	U55Y100	Y5
56	.400	61.6 to 51.4	.6	65	U56Y40	Y3
60	1.0	65.3 to 53.0	2.8	75	U60Y100	Y5
62	.400	69.0 to 58.0	1.5	65	U62Y40	Y3
65	.250	71.5 to 58.5	.4	65	U65Y25	Y3
72	.250	79.2 to 64.8	.9	65	U72Y25	Y3
80	.150	88.0 to 72.0	.6	60	U80Y15	Y3
80	.300	88.0 to 72.0	1.0	70	U80Y30	Y3
85	.150	93.5 to 76.5	.6	65	U85Y15	Y3
90	.150	99.0 to 81.0	1.1	65	U90Y15	Y3
90	.400	99.0 to 81.0	2.2	75	U90Y40	Y3
95	.150	105 to 85	1.1	75	U95Y15	Y3
100	.200	110 to 93	1.0	80	U100Y20	Y3
110	.200	121 to 100	1.0	80	U110Y20	Y3
120	.200	132 to 110	1.0	80	U120Y20	Y3
130	.200	143 to 120	1.5	80	U130Y20	Y3
140	.200	154 to 126	1.7	80	U140Y20	Y3
150	.200	165 to 135	1.7	85	U150Y20	Y3
165	.200	176 to 144	1.7	85	U165Y20	Y3
170	.200	187 to 153	2.0	85	U170Y20	Y3
180	.200	190 to 162	2.0	85	U180Y20	Y3
200	.200	220 to 180	2.0	90	U200Y20	Y3
210	.100	231 to 189	2.0	75	U210Y10	Y3
215	.100	236 to 193	2.0	75	U215Y10	Y3
230	.100	252 to 207	3.0	75	U230Y10	Y3
250	.100	275 to 225	3.0	75	U250Y10	Y3
250	.200	275 to 225	5.0	90	U250Y20	Y5
275	.100	303 to 247	3.0	75	U275Y10	Y3
275	.200	303 to 247	3.6	90	U275Y20	Y5
300	.200	330 to 270	5.0	90	U300Y20	Y5
325	.200	360 to 295	6.0	90	U325Y20	Y5
340	.100	374 to 306	3.0	75	U340Y10	Y3
350	.200	385 to 330	6.0	95	U350Y20	Y5
360	.100	396 to 324	3.0	80	U360Y10	Y3
370	.100	407 to 333	3.0	80	U370Y10	Y3
375	.200	412 to 352	6.0	95	U375Y20	Y5
400	.200	440 to 360	6.0	95	U400Y20	Y5
420	.100	462 to 378	7.0	80	U420Y10	Y3
425	.200	467 to 383	9.1	100	U425Y20	Y5
450	.200	495 to 405	9.1	100	U450Y20	Y5
475	.020	523 to 426	3.1	65	U475Y02	Y3
475	.200	524 to 426	9.1	100	U475Y20	Y5
500	.200	550 to 450	9.1	100	U500Y20	Y5
525 †	.100	574 to 473	4.8	95	U525Y10	Y5
550 †	.100	605 to 495	4.8	95	U550Y10	Y5
575 †	.100	630 to 518	4.8	95	U575Y10	Y5
580 †	.020	638 to 522	3.1	70	U580Y02	Y3
600 †	.100	660 to 540	10.0	95	U600Y10	Y5
625 †	.100	680 to 565	10.0	95	U625Y10	Y5
650 †	.100	715 to 595	10.0	95	U650Y10	Y5
675 †	.100	732 to 608	10.0	95	U675Y10	Y5
700 †	.100	770 to 630	10.0	100	U700Y10	Y5
725 †	.100	790 to 665	10.0	100	U725Y10	Y5
750 †	.020	825 to 675	3.1	75	U750Y02	Y3
750 †	.100	838 to 710	13.0	100	U750Y10	Y5
800 †	.100	880 to 720	13.0	100	U800Y10	Y5
850 †	.100	935 to 765	13.0	100	U850Y10	Y5
900 †	.020	990 to 810	5.0	80	U900Y02	Y3
900 †	.100	990 to 810	13.0	105	U900Y10	Y5
950 †	.100	1045 to 855	13.0	105	U950Y10	Y5
1000 †	.100	1100 to 900	13.0	105	U1000Y10	Y5

†Not U.L. recognized when this catalog was published.

RACK MOUNTING GENERAL PURPOSE

Shipped in 9 Days

ALL MODELS U.L. RECOGNIZED



Acopian rack-mounting power supplies feature excellent regulation and ripple specifications in 92 models with outputs up to 60 volts and 60 amps. Metering and overvoltage protection are available as options. These power supplies are constructed in sturdy extruded aluminum assemblies designed expressly for mounting in standard 19″ wide RETMA cabinet racks. The front panels are finished in light gray enamel; sides are black; the remaining casework is finished in gold alodyne.

SPECIFICATIONS

Input Voltage: 105-125 VAC, 50-400 Hz, single phase.

Remote Voltage Sensing: Provision for sensing the output voltage across the load is a standard feature.

Output Voltage/Current:
Line Regulation:
Load Regulation:
Ripple:
Output Voltage Adjustment Range:
} See tables

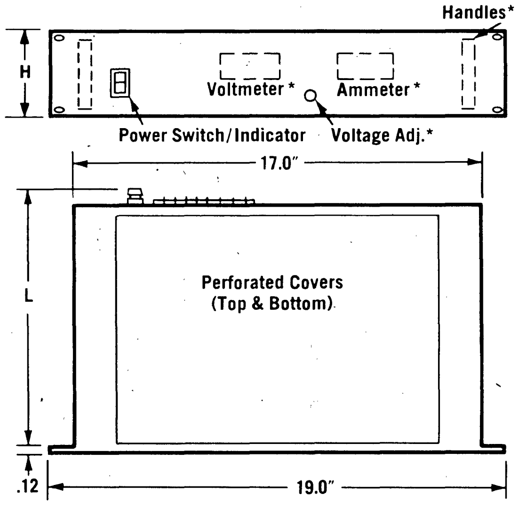
Polarity—Single Output Models: Output is floating; either positive or negative terminal may be grounded or floated up to 300V above ground.

Polarity—Dual Output Models: Positive output, common, negative output.

Storage Temperature: −55 to +85°C.

Ambient Operating Temperature—
Single Output Models: −20 to +55°C.
Dual Output Models: −10 to +55°C.

Short Circuit and Overload Protection: Electronic current limiting with automatic recovery.

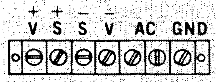


*Optional (Option positions shown are for single output models.)

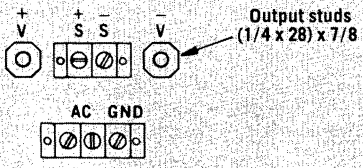
Size	H	L	Approx. Weight
3P11	3½	11.0	22 lb.
3P17	3½	17.0	38 lb.
5P12	5¼	12.0	28 lb.
5P17	5¼	17.0	53 lb.

CONNECTIONS: Single Output Models

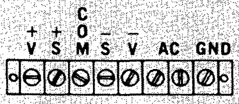
Case Sizes 3P11 and 5P12



Case Sizes 3P17 and 5P17



CONNECTIONS: Dual Output Models



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SINGLE OUTPUT

Nominal Output Voltage	Adjust Range ±V	Output Current Amps @ 40°C	Output Current Amps @ 55°C	Regulation Load* ±%	Regulation Line* ±%	Ripple mv RMS	Price	Model	Size
1.5	.5	20	20	.005	.005	.25	$420	1.5PT20	3P11
1.5	.5	32	27	.005	.005	.25	515	1.5PH32	5P12
1.5	.25	60	47	.05	.05	1	790	1.5PT60	5P17
3	.5	20	20	.005	.005	.25	420	3PT20	3P11
3	.5	30	25	.005	.005	.25	515	3PH30	5P12
3	.25	48	37	.05	.05	1	675	3PT48	3P17
3	.25	60	47	.05	.05	1	790	3PT60	5P17
3.6	.5	20	20	.005	.005	.25	420	3.6PT20	3P11
3.6	.5	32	27	.005	.005	.25	515	3.6PH32	5P12
3.6	.25	60	47	.05	.05	1	790	3.6PT60	5P17
4	.25	60	47	.05	.05	1	790	4PT60	5P17
5	.5	20	20	.005	.005	.25	420	5PT20	3P11
5	.5	32	27	.005	.005	.25	515	5PH32	5P12
5	.25	48	37	.05	.05	1	675	5PT48	3P17
5	.25	60	47	.05	.05	1	790	5PT60	5P17
6	.5	20	20	.005	.005	.25	420	6PT20	3P11
6	.5	28	23	.005	.005	.25	515	6PH28	5P12
6	.25	47	36	.05	.05	1	675	6PT47	3P17
6	.25	58	45	.05	.05	1	790	6PT58	5P17
7	.5	20	20	.005	.005	.25	420	7PT20	3P11
8	.5	20	20	.005	.005	.25	420	8PT20	3P11
8	.5	28	23	.005	.005	.25	515	8PH28	5P12
8	.5	44	34	.05	.05	1	675	8PT44	3P17
8	.25	54	42	.05	.05	1	790	8PT54	5P17
9	.5	20	20	.005	.005	.25	420	9PT20	3P11
9	.5	41	32	.05	.05	1	675	9PT41	3P17
9	.5	52	41	.05	.05	1	790	9PT52	5P17
10	.5	20	20	.005	.005	.25	420	10PT20	3P11
10	.5	25	20	.005	.005	.25	515	10PH25	5P12
10	.5	38	30	.05	.05	1	675	10PT38	3P17
10	.5	50	39	.05	.05	1	790	10PT50	5P17
12	.5	17	17	.005	.005	.25	420	12PT17	3P11
12	.5	22	22	.005	.005	.25	515	12PH22	5P12
12	.5	33	26	.05	.05	1	675	12PT33	3P17
12	.5	45	35	.05	.05	1	790	12PT45	5P17
13	.5	16	16	.005	.005	.25	420	13PT16	3P11
13	.5	43	34	.05	.05	1	790	13PT43	5P17
14	.5	12	12	.005	.005	.25	420	14PT12	3P11
15	.5	10	10	.005	.005	.25	420	15PT10	3P11
15	.5	19	16	.005	.005	.25	515	15PH19	5P12
15	.5	25	20	.05	.05	1	675	15PT25	3P17
15	.5	40	31	.05	.05	1	790	15PT40	5P17
16	.5	10	10	.005	.005	.25	420	16PT10	3P11
18	.5	10	10	.005	.005	.25	420	18PT10	3P11

Nominal Output Voltage	Adjust Range ±V	Output Current Amps @ 40°C	Output Current Amps @ 55°C	Regulation Load* ±%	Regulation Line* ±%	Ripple mv RMS	Price	Model	Size
18	.5	18	15	.005	.005	.25	$515	18PH18	5P12
18	.5	24	19	.05	.05	1	675	18PT24	3P17
18	.5	36	28	.05	.05	1	790	18PT36	5P17
20	.5	10	10	.005	.005	.25	420	20PT10	3P11
20	.5	16	14	.005	.005	.25	515	20PH16	5P12
20	.5	23	18	.05	.05	1	675	20PT23	3P17
20	.5	32	25	.05	.05	1	790	20PT32	5P17
22	.5	10	10	.005	.005	.25	420	22PT10	3P11
24	.5	10	10	.005	.005	.25	420	24PT10	3P11
24	.5	15	13	.005	.005	.25	515	24PH15	5P12
24	.5	20	16	.05	.05	1	675	24PT20	3P17
24	.5	30	23	.05	.05	1	790	24PT30	5P17
25	.5	10	10	.005	.005	.25	420	25PT10	3P11
26	.5	10	10	.005	.005	.25	420	26PT10	3P11
28	.5	10	10	.005	.005	.25	420	28PT10	3P11
28	.5	14	12	.005	.005	.25	515	28PH14	5P12
28	.5	19	15	.05	.05	1	675	28PT19	3P17
28	.5	28	22	.05	.05	1	790	28PT28	5P17
30	.5	10	10	.005	.005	.25	420	30PT10	3P11
30	.5	14	12	.005	.005	.25	515	30PH14	5P12
32	.5	5	5	.005	.005	.25	360	32PT5	3P11
32	.5	10	10	.005	.005	.25	450	32PT10	5P12
34	.5	5	5	.005	.005	.25	370	34PT5	3P11
34	.5	10	10	.005	.005	.25	460	34PT10	5P12
35	.5	5	5	.005	.005	.25	380	35PT5	3P11
35	.5	10	10	.005	.005	.25	470	35PT10	5P12
36	.5	5	5	.005	.005	.25	390	36PT5	3P11
36	.5	10	10	.005	.005	.25	480	36PT10	5P12
38	.5	5	5	.005	.005	.25	400	38PT5	3P11
38	.5	10	10	.005	.005	.25	490	38PT10	5P12
40	.5	5	5	.005	.005	.25	410	40PT5	3P11
40	.5	10	10	.005	.005	.25	500	40PT10	5P12
45	.5	5	5	.005	.005	.25	420	45PT5	3P11
45	.5	10	10	.005	.005	.25	525	45PT10	5P12
48	.5	5	5	.005	.005	.25	430	48PT5	3P11
48	.5	10	10	.005	.005	.25	540	48PT10	5P12
48	.5	15	12	.005	.005	.25	790	48PT15	5P17
50	.5	5	5	.005	.005	.25	440	50PT5	3P11
50	.5	10	10	.005	.005	.25	550	50PT10	5P12
55	.5	5	3.8	.005	.005	.25	450	55PT5	3P11
55	.5	8	6	.005	.005	.25	560	55PT8	5P12
60	.5	5	3.8	.005	.005	.25	460	60PT5	3P11
60	.5	8	6	.005	.005	.25	575	60PT8	5P12
60	.5	12	9	.005	.005	.25	790	60PT12	5P17

*or 2 mv, whichever is greater.

OPTIONS

Overvoltage Protection: An internal preset overvoltage protector is available on all models. To order, add prefix "V" to the model number, and increase standard price as follows:

For case size 3P11:
Nominal output voltages from 3 to 28 V. $25.00
30 to 70 V. 35.00
Case sizes 3P17, 5P12 & 5P17 (all voltages) 75.00

Front Panel Voltage Adjustment: Standard models have a voltage adjustment located at the rear. A voltage control mounted on the front panel is available as an option. To order, add suffix "P" to the model number and $10.00 to price.

Voltmeter: Add suffix "F" to model number and $30.00 to price.

Ammeter: Add suffix "A" to model number and $30.00 to price.

230 Volt Input: Add suffix "-230" to model number and $40.00 to price.

Handles: Add suffix "H" to model number and $20.00 to price.

EXAMPLE: The Model 5PT20 equipped with all options is designated as the Model V5PT20AFHP-230. (List suffix letters in alphabetical sequence.)

DUAL OUTPUT

Nominal Output Voltages	Adjust. Range ±V	Output Current Amps. 40°C	Output Current Amps. 55°C	Regulation Load ±%	Regulation Line ±%	Ripple mv RMS	Price	Model	Size
±12	.5	7	5.6	.1	.1	1.5	$490	PD12-700	3P11
±12	.5	9	7.2	.1	.1	1.5	575	PD12-900	5P12
±15	.5	7	5.6	.1	.1	1.5	490	PD15-700	3P11
±15	.5	9	7.2	.1	.1	1.5	575	PD15-900	5P12

OPTIONS

Voltmeters: One for each output. Add suffix "F" to model number and $60.00 to price. "A" and "F" options cannot be combined in one power supply.

Ammeters: One for each output. Add suffix "A" to model number and $60.00 to price. "A" and "F" options cannot be combined in one power supply.

Voltmeter and Ammeter: Each with switch for selecting output to be monitored. Add suffix "G" to model number and $100.00 to price.

Overvoltage Protection: An internally installed and preset overvoltage protector is available for all models. If either output fails, both outputs are "crowbarred." To order, add prefix "V" to the model number, and $30.00 to the price of models in case size 3P11; $50.00 to the price of models in case size 5P12.

Handles: Add suffix "H" to model number and $20.00 to price.

Front Panel Voltage Adjustment: Standard models have a voltage adjustment located at the rear. A voltage control mounted on the front panel is available as an option. To order, add suffix "P" to the model number and $10.00 to price.

230 Volt Input: Add suffix "-230" to model number and $40.00 to price.

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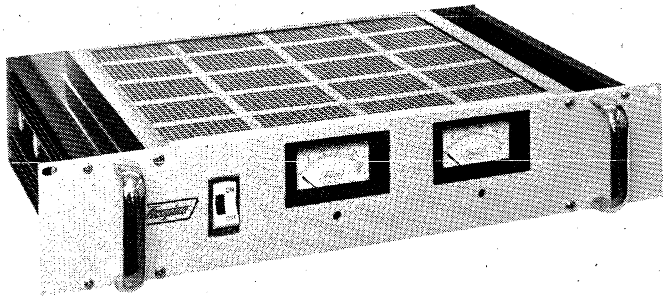


RACK MOUNTING PROGRAMMABLE

Shipped in 9 Days

ALL MODELS U.L. RECOGNIZED

Similar to the rack mounting power supplies listed on pages 26 and 27, but with broadened output voltage ranges. All models may be programmed through their voltage ranges by means of external resistance. Models with adjustable current limiting have a constant-voltage / constant-current crossover characteristic, and so may be used as constant current sources.

Output Voltage Range	Output Current Amps. at 40°C	55°C	71°C	Voltage Prgmg. Coeff. (Ω/V)	Size	Voltage Programmable Fixed Current Limiting Model	Price	Voltage Programmable Adjustable Current Limiting Model	Price
0-6	10.0	8.0	6.0	820	3P11	A06PX10	$450	P06PX10	$475
0-6	16.0	12.8	9.6	820	5P12	A06PX16	575	P06PX16	600
0-15	7.0	5.6	4.2	330	3P11	A015PX7	450	P015PX7	475
0-15	10.0	8.0	6.0	330	5P12	A015PX10	575	P015PX10	600
0-30	4.0	3.2	2.4	160	3P11	A030PX4	450	P030PX4	475
0-30	5.0	4.0	3.0	160	5P12	A030PX5	575	P030PX5	600
0-50	2.4	1.9	1.5	1000	3P11	A050PX2	450	P050PX2	475
0-50	3.0	2.4	1.8	1000	5P12	A050PX3	575	P050PX3	600

SPECIFICATIONS

Input Voltage: 105-125 VAC, 50-400 Hz, single phase.

Regulation, Ripple (constant voltage operation):
Line Regulation: ±0.005% or 2 mv, whichever is greater.
Load Regulation: ±0.005% or 2 mv, whichever is greater.
Ripple: 0.25 mv rms.

Regulation, Ripple (constant current operation):
Line Regulation: ±0.1% or 2 ma.
Load Regulation: ±0.2% or 5 ma.
Ripple: 0.1% rms.

Remote Voltage Sensing: Provision for sensing the output voltage across the load, to compensate voltage drops in output wiring, is a standard feature.

Remote Voltage Programming: The output voltage of all models may be controlled by means of external resistance connected in series with the −S lead.

Voltage Programming Coefficient: See table. Calibration tolerance, ±2%.

For applications where the capability for external adjustment of output voltage is necessary, but a guaranteed programming coefficient tolerance is not required, these power supplies may be ordered with the programming coefficient uncalibrated. To order, change the letter "X" in the model number to the letter "T", and subtract $15.00 from the standard price.

Current Limiting/Programming: Models with fixed current limiting have a foldback-type characteristic with automatic recovery. All others have current limiting with a constant-voltage/constant-current crossover characteristic.

Polarity: Output is floating; either positive or negative terminal may be grounded or floated up to 300 V above ground.

Controls: Coarse and fine voltage adjustments, and the current limit adjustment, are located at the rear of the assembly.

Ambient Operating Temperature Range: −20 to +71°C.

Storage Temperature Range: −55 to +85°C.

Input/Output Connections: Barrier strip terminals at the rear (#5 screws for case size 3P11, #8 screws for case size 5P12).

OPTIONS

Remote Current Limit Adjustment: All models having numbers beginning with the letter P have a built in current limit control. Provision for control of the current limit setting by adjustment of an external resistance is available as an option. To order, add the prefix letter "E" to the model number, and add $20.00 to the standard price.

The current limit setting is inversely related to resistance. Use a 200 ohm ½ W potentiometer.

Overvoltage Protection: An internally installed and preset overvoltage protector is available for all models. To order, add the prefix "V" to the model number and $25.00 to the price of models with output voltage ranges of 0-6 and 0-15V, add $35.00 to the price of other models.

Ammeter: Add suffix "A" to model number and $30.00 to price.

Voltmeter: Add suffix "F" to model number and $30.00 to price.

Handles: Add suffix "H" to model number and $20.00 to price.

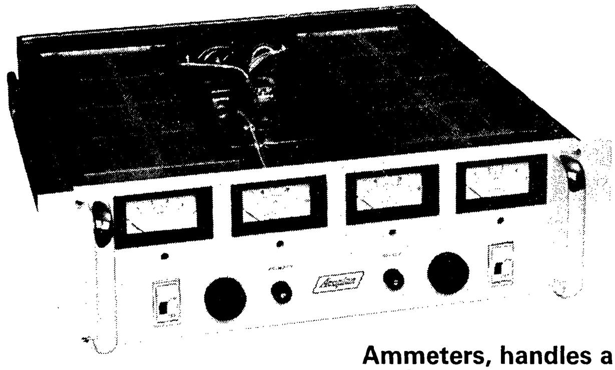
230 Volt Input: Add suffix "-230" to model number and $40.00 to price.

Front Panel Controls: For voltage controls (coarse and fine) mounted on the front panel, instead of the standard screwdriver-slot adjustments at the rear, add suffix "P" to the model number and $20.00 to price. For a current limit control mounted on the front panel, add suffix "Y" to the model number and $10.00 to price.

Acopian

REDUNDANT OUTPUT POWER SYSTEMS

Shipped in 9 Days



Ammeters, handles and audible alarms optional.

A redundant output power system, as its name implies, delivers output power without interruption as long as either power module of the redundant pair is functional. A "backup" supply continues to operate the system while a defective "primary" supply is removed and repaired or replaced.

FEATURES

- Specifically designed to safely permit the rapid replacement of a power supply while the system continues to furnish uninterrupted power to the load.
- Separate ac input power circuit for each power supply, permitting the use of two separate sources of input power.
- Overvoltage protection.
- Provision for control of external failure alarms or indicators (standard), or built-in audible alarms (optional).
- Foldback current limiting with automatic reset.
- Remote voltage sensing.

Redundant output power systems should be considered for any equipment where high reliability is paramount and an unexpected loss of power would cause disastrous results. Such applications include communications systems (both voice and data types); computer systems (volatile memory systems in particular); process controls; utility, transit and municipal systems; and security/safety alarm systems.

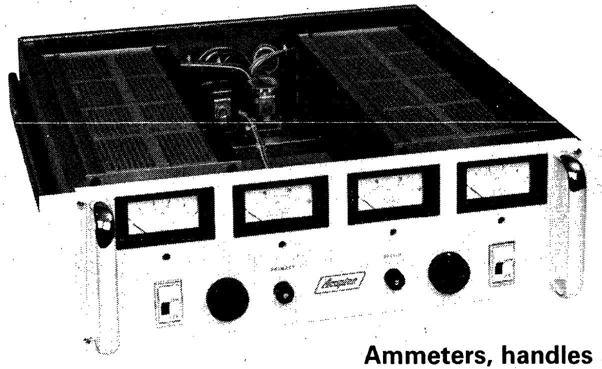
Each redundant output power system consists of two power supplies, interconnected so that the required output is delivered to the load even when one power supply has been removed. This is accomplished with a diode switching arrangement that senses an abnormal output, isolates it from the load being driven, and substitutes the output of the backup supply. There is no interruption of output power during the transition, or while a power supply is being removed or replaced.

The output voltage of the primary supply is set approximately 0.2V higher than that of the backup supply. Under this condition, the backup supply's diode is not forward biased; only the primary supply delivers current to the load. If the output voltage of the primary supply decreases by more than 0.2V, the situation is reversed and only the backup supply delivers load current.

Each power supply contains an overvoltage protection circuit, to assure that the output will not significantly exceed the nominal output voltage rating under any condition, including incorrect application and misadjustment. Each supply also has a voltage monitor circuit that operates a relay, the contacts of which are available to control external failure alarms or other circuitry. The contact wiring of the two relays is connected in cascade, to simulate a single set of Form C contacts which switches if the output voltage of either power supply decreases by approximately 2V from the nominal rating.

Acopian

REDUNDANT OUTPUT POWER SYSTEMS



Shipped in 9 Days

Ammeters, handles and audible alarms optional.

SPECIFICATIONS

Input Voltage: 105-125 Vac, 50-400 Hz, single phase. A separate set of ac input terminals is provided for each power supply, so that if two sources of ac input power are available, one may be used for each supply and so reduce the possibility of output dropout due to loss of input power.

Output Voltage:
Normal mode — Nominal voltage shown in table.
Backup mode — 0.2V less than nominal voltage shown in table.

Output Voltage Adjustment Range: ±0.5V minimum.

Output Regulation:
Line — ±0.05%.
Load — ±0.05%. (Dynamic regulation — does not include 0.2V shift which occurs during switch-over to lower-set backup supply.)

Output Ripple: 1 mv rms.

Load Protection: Foldback current limiting with automatic reset, and overvoltage protection.

Polarity: Output is floating; either positive or negative output terminal may be grounded or floated up to 300V above ground.

Voltage Monitor Circuits: One for each power supply. Relay contacts switch when output voltage decreases approximately 2V from the nominal rating, and may be used to control an external failure alarm.

Output Metering: Two voltmeters (standard). Ammeters available; see Options.

Ambient Operating Temperature Range: −20 to +71°C.

Storage Temperature Range: −55 to +85°C.

Assembly Size:

5R17	5¼″ x 19″ panel, 17″ deep. (53 lbs.)
5R18	5¼″ x 19″ panel, 17¾″ deep. (28 lbs.)
7R18	7″ x 19″ panel, 18½″ deep. (43 lbs.)
7R20	7″ x 19″ panel, 20½″ deep. (53 lbs.)

Assembly Finish: Front panel finished in light gray baked enamel. Remainder finished in gold alodyne.

OPTIONS

Add option suffixes in alphabetical order. Example: R5H16AH-230.

Ammeters: One for each output. Add suffix letter "A" to model number and $60.00 to system prices, $30.00 to unit prices of parallelable supplies.

Audible Alarms: Piercing whistle alerts personnel to a voltage lower than normal. Front panel mounted, one for each power supply. Systems and supplies with this option do not have provision for control of an external alarm. To order, add suffix "K" to model number and $50.00 to system prices, $25.00 to unit prices of parallelable supplies.

Handles: Add suffix "H" to model number and $20.00 to price.

Slides: For racks having rear mounting rails spaced 20″ to 22″ behind the front panel. Not available on parallelable supplies. To order, add suffix "S" to model number and $50.00 to price.

230 Volt Input: For operation on inputs of 210-250 Vac, 50-400 Hz. To order, add suffix "-230" to model number and $75.00 to system prices, $40.00 to unit prices of parallelable supplies.

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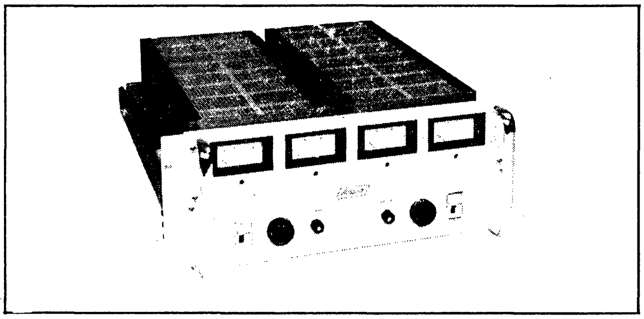
SYSTEM ASSEMBLIES

Consist of two modular power supplies in a rack-mounting assembly: Thumbscrew mounting, and insulated connectors in the wiring to each power supply, facilitate the rapid and safe installation or removal of a module from the system without the need for tools. All input/output/alarm-contact connections are by means of screw terminals at the rear of the assembly. The chassis slide and handle options are recommended for applications where it is desired to service the system without removing it from the rack.

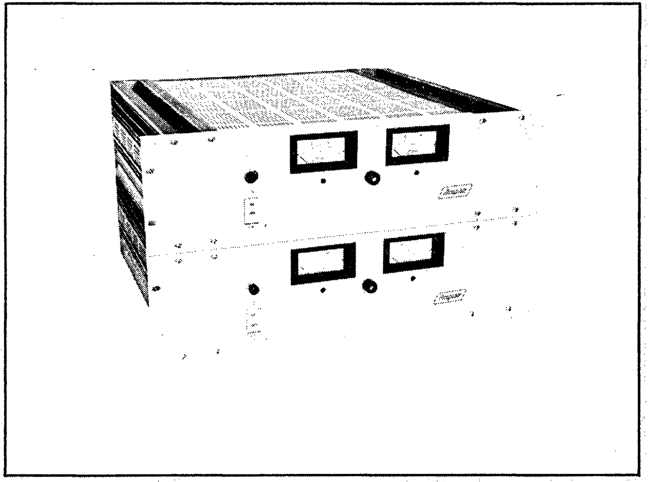


Nominal Output Voltage	Output Current Amps. at 40°C	55°C	71°C	Price	Model	Assembly Size	Approx. Weight (lbs.)
5	11.0	9.3	7.5	$1095	R5M13	5R18	28
5	21.0	17.0	14.0	1295	R5H11	7R18	43
5	28.0	23.0	19.0	1595	R5H16	7R20	53
12	8.0	7.5	7.0	1095	R12M13	5R18	28
12	16.0	13.8	11.2	1295	R12H11	7R18	43
12	20.0	17.0	14.2	1595	R12H16	7R20	53
15	6.5	6.0	5.5	1095	R15M13	5R18	28
15	14.7	12.5	10.3	1295	R15H11	7R18	43
15	18.7	16.0	13.3	1595	R15H16	7R20	53
24	5.0	5.0	5.0	1095	R24M13	5R18	28
24	11.7	10.2	8.7	1295	R24H11	7R18	43
24	14.7	12.7	10.7	1595	R24H16	7R20	53
28	5.0	5.0	5.0	1095	R28M13	5R18	28
28	10.5	9.2	8.0	1295	R28H11	7R18	43
28	14.0	12.0	10.0	1595	R28H16	7R20	53
48	3.0	3.0	3.0	1095	R48M13	5R18	28
48	6.0	5.0	4.0	1295	R48H11	7R18	43
48	8.5	7.2	5.5	1595	R48H16	7R20	53

PARALLELABLE "SEMISYSTEM" POWER SUPPLIES

Two units function as a redundant system.

For output currents greater than obtainable from modular power supplies, two of the rack mounting supplies listed below may be used with their output connections paralleled (through the user's rack wiring). Each supply contains a voltmeter, isolation diodes, a voltage monitor circuit providing contacts for control of an external alarm (or built-in audible alarm) and overvoltage protection circuit, so that two paralleled units are functionally equivalent to the system assemblies described above. All connections are by means of a Jones connector (mate provided), so that one supply may be quickly, easily and safely installed in or removed from the rack while another provides uninterrupted power to the load. For a redundant system, order two units.

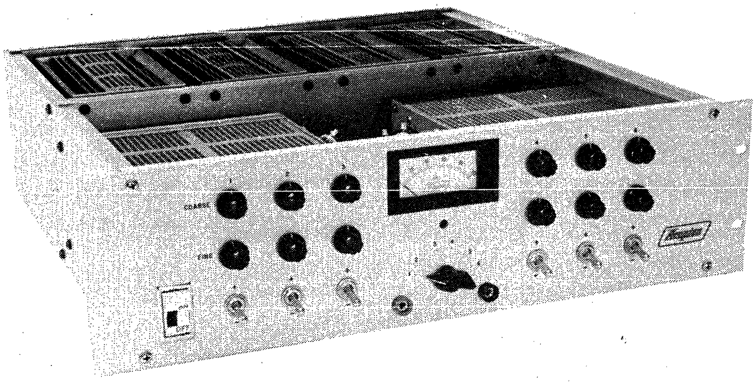


Nominal Output Voltage	Output Current Amps. at 40°C	55°C	Price	Model	Size	Approx. Weight (lbs.)
5	55	43	$1095	R5P17	5R17	53
12	41	32	1095	R12P17	5R17	53
15	37	29	1095	R15P17	5R17	53
24	28	22	1095	R24P17	5R17	53
28	27	21	1095	R28P17	5R17	53
48	15	12	1095	R48P17	5R17	53

Acopian

MULTIPLE-OUTPUT POWER SUPPLY SYSTEMS

Shipped in 9 Days



Now you can fill your requirements for completely wired multiple-output rack-mounting power supply systems, without any need to search through a catalog and prepare time-consuming mechanical layouts, item-by-item pricing and detailed purchase requisitions. Instead, simply call Acopian and specify the output voltages and currents that you require.

Each system is designed and constructed to provide an optimum mechanical and wiring configuration for the complement of power modules necessary to deliver the outputs specified. Acopian production expertise assures shipment of each system, completely wired and 100% tested, within 9 days after your order is received.

Ordering an Acopian power system is this easy: List the DC outputs that you require. (Or, select the power modules that you wish to be included.) Note the system features which you consider necessary. Then, call Acopian toll-free at (800) 523-9478 and ask for the POWER SYSTEM DEPARTMENT.

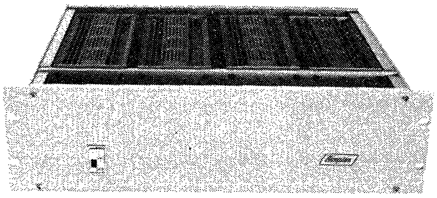
An Acopian Applications Engineer will answer—on the phone—any questions which you may have. A distinctive system model number will be assigned, and a firm price will be quoted. Your completely-wired power supply system will be shipped within 9 days.

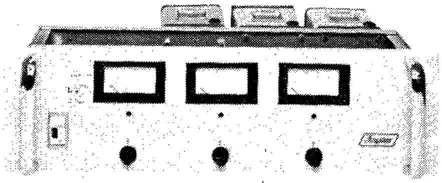
System Description

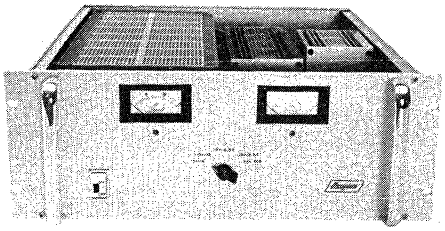
Any of the power modules listed in this catalog can be included in a power system. Commonly required features such as voltmeters, ammeters, front panel controls, handles, and chassis slides can also be provided. The rack assembly will be designed and wired in a manner optimum for the complement of modules and operating features to be included.

Each assembly is constructed from ⅛-inch thick aluminum extrusions. The front panel is finished in oven baked light gray enamel. The rear portion is finished in gold alodyne. Input and output connections are on a screw terminal strip at the rear.

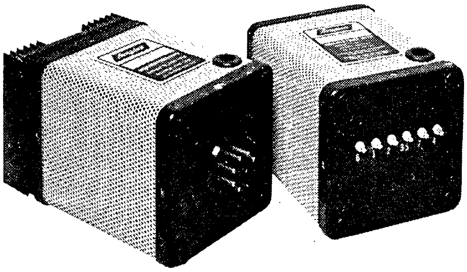
TYPICAL BUILT-TO-ORDER POWER SUPPLY SYSTEMS







SINGLE OUTPUT REGULATED PLUG-IN



An Acopian plug-in power module can be installed in a matter of seconds. Simply plug it into an octal socket. You don't even have to screw it down (although threaded holes are provided) unless it is to be mounted in other than a vertical position, or will be subjected to shock or vibration.

SPECIFICATIONS

Input Voltage: 105-125 VAC, 50-400 Hz, single phase.

Polarity: Output floating; either positive or negative terminal may be grounded or floated up to 300 V above ground.

Ambient operating temperature: −10 to +65°C. No derating required.

MIL Tested/Increased Temperature Range: Contact factory for specific information.

Storage Temperature: −55 to +85°C.

Installation: Plugs into standard octal socket. Mounting holes (6-32) provided at each corner for installation in any position.

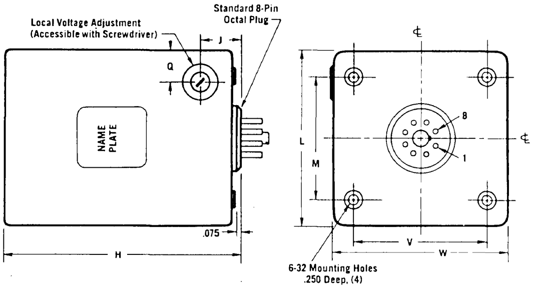
OPTIONS

Solder Terminals: All models can be furnished with solder terminals instead of the octal-type plug. To order, add suffix "L" to model number and $10.00 to price.

Remote Output Adjustment: All models have a local voltage adjustment. When provision for remote (external) adjustment is also desired, add prefix "E" to model number. No increase in price.

Remote Sensing: Provision for remote sensing of the output voltage to compensate for drops in the load lines can be furnished at an additional charge of $10.00 per unit. Add prefix "R" to model number when ordering. "R" power supplies have a local voltage adjustment and provision for remote (external) output adjustment.

230 Volt Input: All models can be alternately furnished for operation on inputs of 210 to 250 VAC, 50-400 Hz. Add suffix "–230" to model number and $25.00 to price.


Local Voltage Adjustment (Accessible with Screwdriver)
Standard 8-Pin Octal Plug
J
Q
NAME PLATE
.075
H
℄
8
1
L
M
V
W
6-32 Mounting Holes .250 Deep, (4)

Size	L	W	H	M	V	J	Q	Approx. Weight
AS	3.40	3.28	4.67	2.625	2.625	1.00	0.66	2lb 8oz
BS	3.40	3.28	5.25	2.625	2.625	1.00	0.66	2lb 14oz
TS	3.33	4.15	4.85	2.562	2.750	1.12	0.62	3lb 6oz
US	3.33	4.15	5.43	2.562	2.750	1.12	0.62	3lb 8oz
WS	3.40	5.02	5.43	2.562	3.562	1.12	0.62	4lb 14oz
HS	3.40	5.02	6.57	2.562	3.562	1.12	0.62	5lb

Standard models are available for any voltage from 1 to 200. For information on those not listed, contact factory.

Nominal Output Voltage	Adjustment ±Volts	Output Current Amps.	Regulation Load ±%	Regulation Line ±%	Ripple mv RMS	Price	Model	Size
5	1	.050	.5	.5	5	$ 60	5L05	AS
5	1	.100	.5	.5	5	65	5L10	AS
5	1	.200	.5	.5	5	75	5L20	AS
5	1	.200	.2	.05	1	80	5J20	AS
5	1	.400	.3	.05	1	95	5J40	AS
5	1	.750	.4	.05	1	110	5J75	AS
5	.5	1.0	.5	.05	1	125	5J100	AS
5	.5	1.5	.4	.05	1	140	5J150	US
5	.5	2.0	.5	.05	1	155	5J200	WS
5	.5	3.0	.5	.05	1	170	5J300	WS
5	.5	4.0	.5	.05	1	185	5J400	HS
5	.5	5.0	.7	.05	1	200	5J500	HS
12	1	.100	.5	.5	5	65	12L10	AS
12	1	.200	.5	.5	5	80	12L20	AS
12	1	.200	.05	.05	0.5	85	12J20	AS
12	1	.400	.5	.5	5	90	12L40	AS
12	1	.400	.1	.05	1	95	12J40	AS
12	1	.750	.15	.05	1	115	12J75	AS
12	1	1.0	.1	.05	1	130	12J100	AS
12	.5	2.0	.1	.05	1	175	12J200	WS
12	.5	3.0	.25	.05	1	200	12J300	HS
15	1	.100	.05	.05	0.5	70	15J10	AS
15	1	.200	.05	.05	0.5	85	15J20	AS
15	1	.400	.5	.5	5	90	15L40	AS
15	1	.400	.1	.05	1	95	15J40	AS
15	1	.750	.5	.5	5	110	15L75	AS
15	1	.750	.15	.05	1	115	15J75	AS
15	1	1.0	.15	.05	1	130	15J100	AS
15	1	1.5	.2	.05	1	150	15J150	US
15	.5	2.0	.1	.05	1	175	15J200	WS
15	.5	3.0	.25	.05	1	200	15J300	HS
24	1	.100	.05	.05	0.5	75	24J10	AS
24	1	.200	.5	.5	5	80	24L20	AS
24	1	.200	.05	.05	0.5	85	24J20	AS
24	1	.400	.5	.5	5	95	24L40	AS
24	1	.400	.05	.05	1	100	24J40	AS
24	1	.750	.5	.5	5	110	24L75	AS
24	1	.750	.1	.05	1	115	24J75	AS
24	1	1.0	.1	.05	1	130	24J100	US
24	1	1.5	.15	.05	1	150	24J150	WS
24	.5	2.0	.1	.05	1	175	24J200	WS
28	1	.100	.05	.05	0.5	80	28J10	AS
28	1	.200	.5	.5	5	85	28L20	AS
28	1	.200	.05	.05	0.5	90	28J20	AS
28	1	.400	.5	.5	5	100	28L40	AS
28	1	.400	.05	.05	1	105	28J40	AS
28	1	.750	.1	.05	1	120	28J75	TS
28	1	1.0	.1	.05	1	135	28J100	US
28	1	1.5	.15	.05	1	160	28J150	WS
28	.5	2.0	.1	.05	1	185	28J200	WS

ACOPIAN P.O. BOX 638, EASTON, PA 18044
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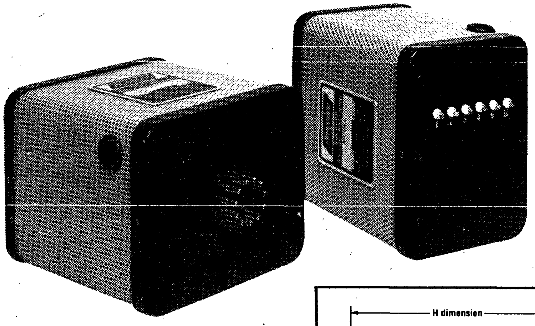
Acopian

DUAL OUTPUT REGULATED PLUG-IN



Space-saving Acopian duals combine two electrically independent DC outputs in a single case. Either identical or different outputs may be selected. And with a choice of more than 300 output ratings, over 10,000 combinations can be supplied . . . each with Acopian's usual 3-day shipment guarantee.

SPECIFICATIONS

Input Voltage: 105-125 VAC, 50-400 Hz, single phase.

Output Adjustment Range: ±1 volt.

Polarity: Outputs are floating. Each section may be independently connected to provide any combination of positive and negative outputs.

Short Circuit Protection: Delivers current surges without damage—to protect against prolonged overloads and shorts, use of an input fuse is recommended.

Ambient operating temperature: −10 to +65°C. No derating required.

MIL Tested/Increased Temperature Range: Contact factory for specific information.

Storage Temperature: −55 to +85°C.

HOW TO ORDER

Select the two sections desired. The complete model number is the combination of the two sections selected. Example: The combination of section 6J20D and section 12L40D is Model 6J20D-12L40D. Always assign the lower voltage section first. Where the indicated case sizes for the two sections differ, the larger case size applies.

For pricing purposes, add the cost of the individual sections selected.

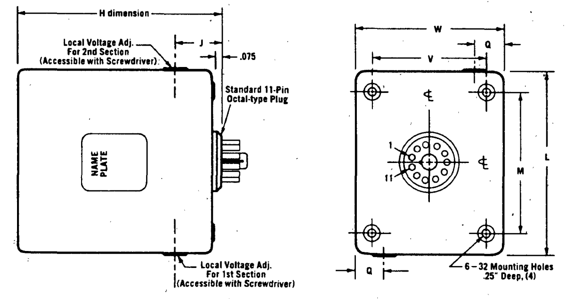
OPTIONS

Solder Terminals: All models can be furnished with solder terminals instead of the 11-pin plug. To order, add suffix "L" to model number and $10.00 to price.

Remote Output Adjustment: All models have local voltage adjustments. When provision for remote (external) adjustments is also desired, add prefix "E" to model number.

Remote Sensing: Provision for remote sensing of the output voltages, to compensate for drops in the load lines, can be furnished at an additional charge of $20.00 per unit. Add prefix "R" to model number when ordering.

230 Volt Input: All models can be alternately furnished for operation on inputs of 210 to 250 VAC, 50-400 Hz. Add suffix "–230" to model number and $25.00 to price.


H dimension
Local Voltage Adj. For 2nd Section (Accessible with Screwdriver)
J
.075
Standard 11-Pin Octal-type Plug
NAME PLATE
Local Voltage Adj. For 1st Section (Accessible with Screwdriver)
W
Q
V
1
11
℄
L
M
Q
6–32 Mounting Holes .25" Deep, (4)

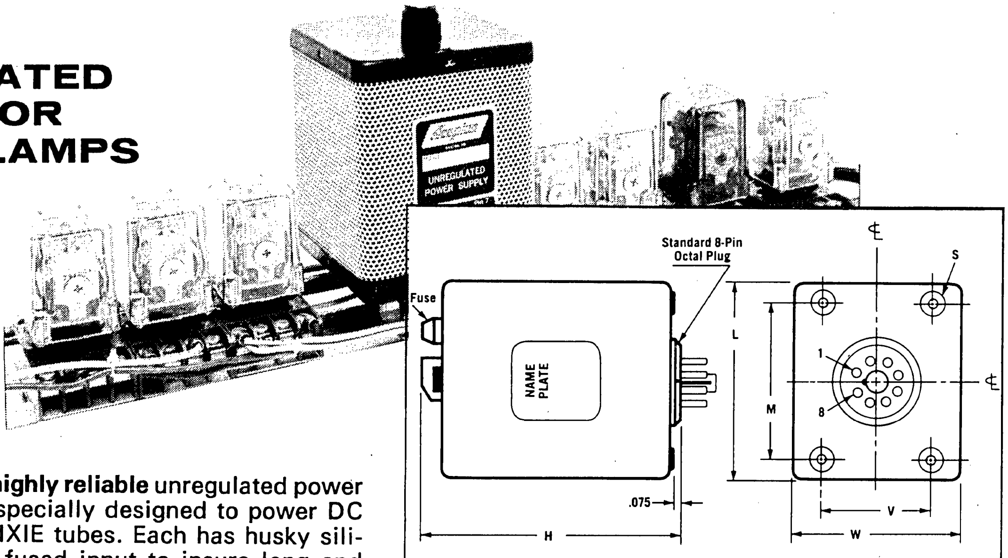
Size	L	W	H	M	V	J	Q	Approx. Weight
ADJ	3.28	3.40	4.60	2.625	2.625	1.0	.66	1lb 8oz
TDJ	4.15	3.33	4.85	2.750	2.562	1.12	.62	3lbs
UDJ	4.15	3.33	5.43	2.750	2.562	1.12	.62	3lbs
WDJ	5.02	3.40	5.43	3.562	2.562	1.12	.62	4lb 12oz

Standard models are available for any voltages from 1 to 150, and with current ratings to 1 amp. For information on those not listed, contact factory.

Nominal Output Voltage	Output Current Amps.	Regulation		Ripple mv RMS	Price per Section	Section (See "How to Order")	Size
		Load ±%	Line ±%				
5	.200	.2	.05	1	$64	5J20D	TDJ
5	.400	.3	.05	1	67	5J40D	TDJ
6	.100	.05	.05	1	60	6J10D	ADJ
6	.200	.5	.5	5	55	6L20D	TDJ
6	.200	.05	.05	1	64	6J20D	TDJ
6	.400	.5	.5	5	64	6L40D	TDJ
6	.400	.15	.05	1	67	6J40D	TDJ
10	.100	.05	.05	1	55	10J10D	ADJ
10	.200	.5	.5	5	55	10L20D	TDJ
10	.200	.05	.05	1	60	10J20D	TDJ
10	.400	.5	.5	5	64	10L40D	TDJ
10	.400	.1	.05	1	67	10J40D	TDJ
12	.100	.05	.05	1	55	12J10D	ADJ
12	.200	.5	.5	5	55	12L20D	TDJ
12	.200	.05	.05	1	60	12J20D	TDJ
12	.400	.5	.5	5	64	12L40D	TDJ
12	.400	.1	.05	1	67	12J40D	TDJ
15	.060	.02	.02	.25	44	15J06D	ADJ
15	.100	.05	.05	1	55	15J10D	ADJ
15	.200	.5	.5	5	55	15L20D	TDJ
15	.200	.05	.05	1	60	15J20D	TDJ
15	.400	.5	.5	5	64	15L40D	TDJ
15	.400	.1	.05	1	67	15J40D	TDJ
18	.100	.5	.5	5	55	18L10D	ADJ
18	.100	.05	.05	1	60	18J10D	ADJ
18	.200	.5	.5	5	60	18L20D	TDJ
18	.200	.05	.05	1	64	18J20D	TDJ
18	.400	.5	.5	5	64	18L40D	TDJ
18	.400	.1	.05	1	67	18J40D	TDJ
24	.100	.05	.05	1	60	24J10D	TDJ
24	.200	.5	.5	5	60	24L20D	TDJ
24	.200	.05	.05	1	64	24J20D	TDJ
24	.400	.5	.5	5	64	24L40D	TDJ
24	.400	.1	.05	1	67	24J40D	TDJ
28	.100	.05	.05	1	60	28J10D	TDJ
28	.200	.5	.5	5	60	28L20D	TDJ
28	.200	.05	.05	1	64	28J20D	TDJ
28	.400	.5	.5	5	64	28L40D	TDJ
28	.400	.05	.05	1	67	28J40D	TDJ
30	.100	.05	.05	1	60	30J10D	TDJ
30	.200	.5	.5	5	60	30L20D	TDJ
30	.200	.05	.05	1	64	30J20D	TDJ
30	.400	.5	.5	5	64	30L40D	TDJ
30	.400	.05	.05	1	67	30J40D	TDJ

ACOPIAN P.O. BOX 638, EASTON, PA 18044
TOLL FREE NO.: (800) 523·9478 • 3·DAY SHIPMENT GUARANTEED

UNREGULATED PLUG-IN FOR RELAYS, LAMPS AND NIXIE TUBES



Size	L	W	H	M	V	S	Approx. Weight
G	3.40	3.28	5.0	2.625	2.625	Four 6–32 x ¼″ deep mounting holes	2lb 8oz
K	4.15	3.33	5.2	2.750	2.562	Four 6–32 x ¼″ deep mounting holes	2lb 14oz
Q	4.15	3.33	7.0	2.750	2.562	Four 10–32 x ½″ long mounting studs	7lb

These low-cost, yet highly reliable unregulated power supplies have been specially designed to power DC relays, lamps and NIXIE tubes. Each has husky silicon rectifiers and a fused input to insure long and trouble-free operation. Installation consists of simply plugging the unit into a standard octal socket.

SPECIFICATIONS

Input Voltage: 0-125 VAC, 50-400 Hz, single phase.

Output Voltage:
Output Current: See table.
Ripple:

Load Regulation: Nominal voltage is based on 115 VAC input with approximately one-half load. At no load, the output voltage will increase by approximately 10%. At full load, the output voltage will be reduced by approximately 10%.

Line Regulation: Output voltage change due to input voltage change is directly proportional to the change in input.

Polarity: Output is floating; either positive or negative terminal may be grounded or floated up to 300 V above ground.

Ambient Operating Temperature: −10 to +65°C. No derating required.

Storage Temperature: −55 to 85°+.

Installation: Plugs into standard octal socket.

OPTIONS

Solder Terminals: All models can be furnished with solder terminals instead of the octal plug. To order, add suffix "L" to model number and add $10.00 to price. Example: Model 24U100 becomes 24U100L.

230 Volt Input: All models can be alternately furnished for operation on inputs of 210 to 250 VAC, 50-400 Hz. Add suffix "-230" to model number and $25.00 to price.

Nominal Output Voltage	Output Current Amps.	Ripple Volts RMS	Model	Price	Size
4	.200	.2	4U20	$45	G
6	.800	.7	6U80	50	G
7	1.0	.8	7U100	50	G
7	2.0	1.5	7U200	75	Q
8	.400	.4	8U40	45	G
9	.600	.6	9U60	45	G
9	1.0	.7	9U100	50	G
13	.600	.5	13U60	45	G
13	2.5	1.8	13U250	85	Q
14	1.0	.7	14U100	50	G
16	1.0	.7	16U100	50	G
18	1.0	.7	18U100	50	G
20	3.0	2.3	20U300	85	Q
22	.400	.7	22U40	50	G
24	.600	1.1	24U60	45	G
24	1.0	1.7	24U100	50	G
24	3.0	2.2	24U300	85	Q
28	1.0	1.7	28U100	50	G
28	3.0	2.7	28U300	85	Q
30	1.0	1.6	30U100	55	K
30	2.0	1.5	30U200	80	Q
32	.400	.6	32U40	45	G
35	1.0	1.6	35U100	55	K
35	2.0	1.5	35U200	80	Q
40	1.0	1.6	40U100	55	K
40	2.0	1.5	40U200	80	Q
45	1.0	1.6	45U100	65	K
48	.400	.6	48U40	55	G
56	.400	.6	56U40	65	G
62	.300	2.7	62U30	65	K
72	.250	.9	72U25	65	G
80	.150	.6	80U15	65	G
80	.300	1	80U30	75	K
100	.200	1	100U20	80	K
120	.200	1	120U20	80	K
140	.200	2	140U20	85	K
150	.200	2	150U20	85	K
160	.100	1.7	160U10	70	G
*180	.100	1.7	180U10	70	G
*200	.150	2	200U15	85	K
250	.100	3	250U10	80	K
340	.100	3	340U10	80	K
420	.100	6.7	420U10	80	K
475	.020	3.1	475U02	70	G
580	.020	3.1	580U02	75	G
750	.020	3.1	750U02	80	G
900	.020	5	900U02	85	G

*Suitable for supplying input voltages to NIXIE tubes. NIXIE is a registered trademark of Burroughs Corporation.

35

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COMMONLY USED ELECTRICAL/ELECTRONIC ABBREVIATIONS AND ACRONYMS

A

AC alternating current
A/D analog to digital
ADC analog to digital converter
ADP automatic data processing
AF audio frequency
AFC automatic frequency control
ALGOL algorithmic language
AM amplitude modulation
AND a logical operator
AQL acceptable quality level
ASCII American national standard code for information interchange
AWG American wire gauge

B

BALUN balanced to unbalanced
BASIC beginners' all-purpose symbolic instruction
BCD binary-coded decimal
BNC baby "N" connector
BUS basic utility system

C

CAD computer aided design
CAM computer aided manufacture
CATV cable television or community antenna television
CERMET ceramic metal element
Comm. communications
CMOS complementary metal-oxide semiconductor
CPS characters per second
CPU central processing unit

D

D/A digital to analog
DAC digital to analog converter
DC direct current
DIAC bidirectional trigger diode
DIL dual in-line
DIN Deutsche Industrie Normenausschuss
DIP dual in-line package
DPM digital panel meter
DTL diode transistor logic

E

EDP electronic data processing
EBCDIC extended binary coded decimal interchange code
EEPROM electrically erasable PROM
EMC electromagnetic compatibility
EMI electromagnetic interference
EMP electromagnetic pulse
EPROM electrically programmable ROM
ESR equivalent series resistance

F

FEP fluorinated ethylene propylene Copolymar, 200° Teflon
FET field-effect transistor
FM frequency modulation
FORTRAN formula translator

G

GaAsFET gallium arsenide field effect transistor
GPIB general purpose interface bus

H

HF high frequency (3 to 30 MHz)
HIPOT test, measurement and diagnostic equipment
HLL high level language
HV high voltage
Hz Hertz

I

IC integrated circuit
IDC insulation displacement contact
IF intermediate frequency
IO input/output (devices)
IR insulation resistance (or) infrared

J

JFET junction field effect transistor
JMOS junction metal oxide semiconductor

K

kHz kilohertz (10^3 hertz)
KSR keyboard send receive

L

LC inductance capacitance
LCD liquid crystal display
LED light-emitting diode
LF low frequency (30 to 300 kHz)
LIF low insertion force
LNA low noise amplifier
LNB low noise band
LSI large scale integration
LVDT linear velocity displacement transformer

M

MASER microwave amplification by stimulated emission of radiation
MATV master antenna television
µF microforad
MHz megahertz
MIPS million instructions per second
MIB microcomputer interface board
MOS metal oxide semiconductor
MOSFET metal oxide semiconductor field effect transistor
MOSIGT metal-oxide semiconductor insulated-gate transistor
MOV metal oxide varistor
MPU microprocessor unit
MSI medium scale integration

N

NBS National Bureau of Standards
NEMP nuclear electromagnetic pulse
NIM nuclear instrumentation module
NOR not OR
NTC negative temperature coefficient

O

OCR optical character reader
OEM original equipment manufacturer
OR a logical operator

P

PC printed circuit
PCB printed circuit board
pF picofarad
PGA pin grid array
PIN positive-intrinsic-negative (transistor)
PLA programmable logic array
PLL phased lock loop
PPI plan position indicator
PROM programmable read only memory
PTC positive temperature coefficient
PUT programmable unijunction transistor

Q

QAM quadrature amplitude modulation
Q (meter) quality-factor meter

R

RAM random access memory
RC resistance-capacitance
RFI radio frequency interference
RMS root mean square
ROM read only memory
RF radio frequency
RFC radio-frequency choke
RFI radio-frequency interference
RTD resistance-temperature detector
RTL resistor transistor logic
RTV room temperature vulcanizing
RW read/write

S

SAS silicon asymmetrical switch
SBC single board (micro) computer
SBS silicon bilateral switch
SCR silicon-controlled rectifier
SCS silicon controlled switch
SDA source & detector assemblies
SIDAC bidirectional voltage-triggered switch
SIP single in-line package
SSI small scale integration
SSR solid state relay
STL Schottky transistor logic
SUS silicon unilateral switch

T

TC temperature coefficient
TCXO temperature compensated crystal oscillator
TFE tetrafluoride ethylene propylene Copolymer, 250° Teflon
TRIAC bidirectional AC switch
TTL transistor-transistor logic
TTY teletypewriter

U

UHF ultra high frequency (300 MHz to 3 GHz)
UJT silicon unijunction transistor
UL Underwriters Laboratory
UPS uninterruptible power supply

V

VAC volts (of) alternating current
VAR volt-ampere reactive
VCR video cassette recorder
VDC volts (of) direct current
VHF very high frequency
VHSIC very high speed integrated circuit
VLF very low frequency (3 to 30 kHz)
VLSI very large scale integration
VME virtual machine environment
VRM voice recognition module
VTVM vacuum tube volt meter
VU volume unit
VSWR voltage standing wave ratio

W

WPS word processing software

Y

YIG yttrium iron garnet

Z

ZIF zero insertion force

ADTECH POWER

1400 SERIES

MOD-U-LAR Switching Power Supplies

Up to Five Outputs • Up to 500 Watts Continuous Power

FEATURES

- Selectable 90-130/180-260V AC input
- 47-63 Hz AC input
- Input surge protected
- Over voltage and short circuit protected
- Typical efficiency to 72%
- 0 to 50°C non-derated operation
- MBTF to 78,000 hours @ 25°C
- All outputs fully regulated
- Fully compliant with UL, CSA, VDE and FCC
- **6 basic chassis available**
- Over 300 output combinations
- Modules are field replaceable
- First article shipped 4 days ARO

3-POWER RANGES

- 150 watts 15 AMP main loop continuous
- 250 watts 35 AMP main loop continuous
- 500 watts 50 AMP main loop continuous

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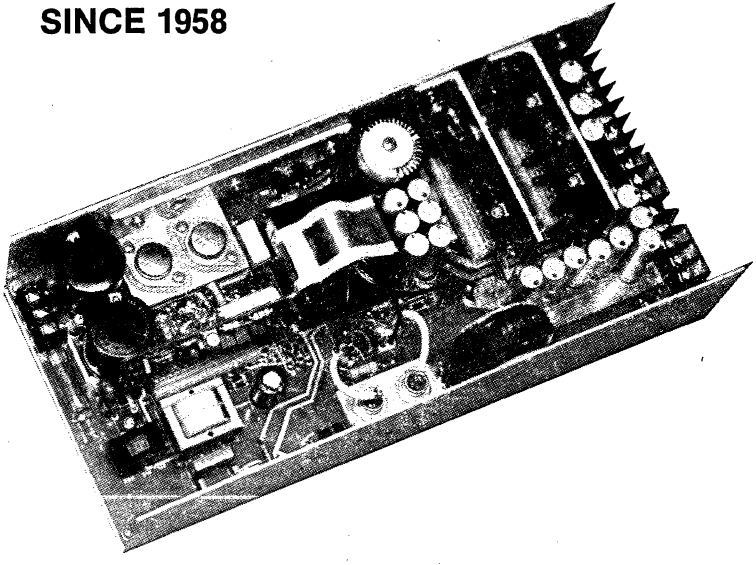


POWER PAC REGULATOR BOARD SPECIFICATIONS

Module	Output 1	Output 2	Regulation	Ripple
Reg **P**	6A	N/A	±1%/N/A	50 mV/N/A
Reg **O**	6A	1A	±1%/±2%	50 mV/50 mV
Reg **W**	10A	N/A	±1%/N/A	100 mV/N/A
Reg **E**	10A	1A	±1%/±2%	100 mV/50 mV
Reg **R**	6A	6A	±1%/±1%	50 mV/50 mV

Standard voltages available, either positive or negative (OK to mix)—5V, 12V, 15V, 24V, and 28V. Other voltage available. Consult factory.

MAIN LOOP SPECIFICATIONS

Hold up time	Nominal line, max load	25 ms minimum
Input surge current	Nominal line input, cold start, peak current	30A maximum
Line/Load regulation	Low line to high line, full load	0.2%
Current limit	Nominal line	125% rated
Ripple and noise (PARD)	Main loop	50 mV maximum

ADTECH POWER

ADTECH POWER INCORPORATED
1620 SOUTH SUNKIST STREET
ANAHEIM, CALIFORNIA 92806
TEL: 714/634-9211 • TELEX: 68-1498

ALSO FULL LINES OF:

- Military Quality Switchers Both AC-DC and DC-DC
- Linear Power Supplies
- AC Line Regulators
- Battery Backup
- Custom Designs

FULL LINE SWITCHING POWER SUPPLIES AND DC-DC CONVERTERS

30W-2000W COMMERCIAL • MILITARY • MILITARIZED

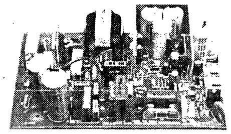
Off The Shelf Products. 10 Days Delivery

OFF-LINE SWITCHERS

30W-100W

Off-Line Switchers
Open Frame or Enclosed
One to Four Outputs

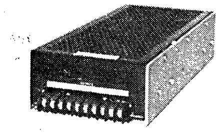
Models: **TDM-38, TDM-45**
TDI-149



100W-200W

Off-Line Switchers
Enclosed
One to Four Outputs

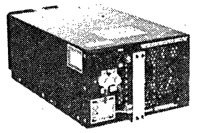
Model: **TDM-200**
High Output Pulse Capability
6.5″ x 13.5″ x 3.5″



500W-2000W

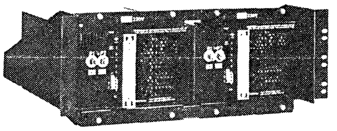
Off-Line Switchers
Enclosed
Single Phase 3 Phase Optional

Model: **TDS-XX-XXX** Single Output
Model: **TDM-** Multi Output
8″ x 5″ x 11″

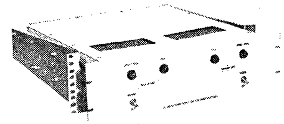


LINEAR & SWITCHING REDUNDANT POWER SUPPLIES

Dual System on Standard NEMA Rack Frame up to 1000 Watt. Up to 3 Output. Composed of TDM Units with "OR"ing Diodes. Each Unit can Supply Entire Load. Specifically designed for telecommunication applications.

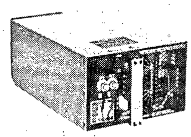


Dual Linear Module System on 19″ x 19″ x 5.25″ Rack STD Enclosure. Each Module 28V, 4A. Alarm Indicators & Relay Contacts. Contains "OR"ing diodes. Very low output noise.



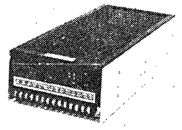
UNINTERRUPTABLE SWITCHING POWER SUPPLIES UNITS WITH BATTERY BACKUP — DC OUTPUTS

Newly Announced, Most Advanced Design TDS & TDM Off Line Switchers are Available with Battery Backup Feature. Dual Input of 115/230V & 24 VDC or 36 VDC Unit Provide Glitch Free Transfer. Up to 600W. Up to 3 Outputs. Eliminates the Need for UPS Inverters. Model: **TDS-UPS**

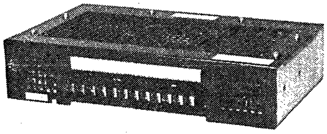


DC-DC CONVERTERS & SWITCHING REGULATORS

DC-DC Converter. Up to 5 Outputs, up to 200W. Available in Extended Military Temp Range. Inputs: 24, 36, 48 & 120 VDC. Outputs: 5V, ±12V & ±15V. Model: **TDC-200**



DC-DC with 24V, 36V, 48V or 120 VDC Inputs, up to 4 Outputs. Slim Line 5.5″ x 9.5″ x 2.2″. Up to 150 Watt. Standard Outputs: 5V, +12V, −12V & 24V. Powerful yet very compact unit. Model: **TDC-150**



Standard 30W & 50W Switching Regulator. 4″ x 5″ x 1.3″.
Input 10-32 VDC, Standard Outputs: 5V, 12V and 15V.

Models:		
	SR30P	30W
	SR50P	50W

APPLIED POWER CONVERSION
DIVISION OF TECHNOLOGY DYNAMICS, INC.

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DIV. OF **TECHNOLOGY DYNAMICS, INC.**
100 School Street, Bergenfield, New Jersey 07621 / (201) 664-7636

HIGH RELIABILITY STANDARD & CUSTOM POWER SYSTEMS

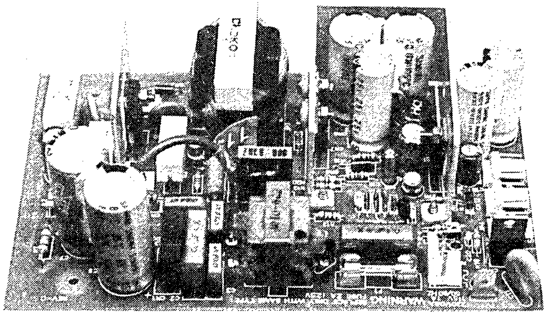
OFF LINE SWITCHERS

30-200W 115/230V INPUT

A full line of inexpensive high reliability OFF LINE Switchers is offered in the range of 38W to 200W. Most of these units are open frame, but an enclosure can be supplied optionally.

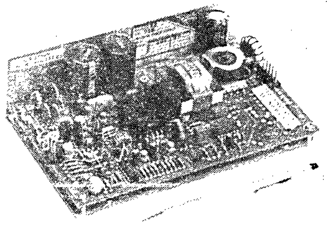
38W and 45W • Model: **TDM-38 and TDM-45**

Inexpensive yet highly reliable, this flyback design provides outputs of +5V, +12V and −12V. The unit is designed to meet the safety requirement of UL & VDE, and with enclosure it will meet FCC RFI radiation limits. Model TDM-38 is produced in our affiliate factory in the Far East. Production capacity is 5000 units per month. OEM quantity prices are $26 and $35 respectively.



90W, 4 Output Series **TDI-149**

Smaller than most competitive products, this powerful unit provides exceptionally wide ranges of applications in data processing equipment. Standard features include O.L. & O.V., soft start and shielded magnetic components. Standard outputs: +5V, ±12V or ±15V & 12V or 24V. Consult factory for exact Model Number.



7.5″ x 4.7″ x 2.125″

150W Multiple Output Switching • **TDI-170A and TDI-171A** Power Supply

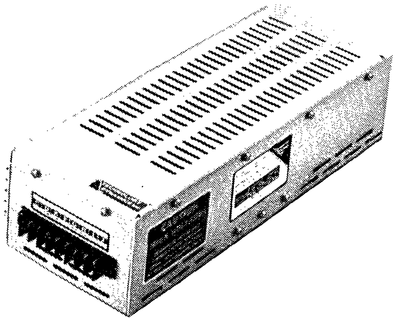
Input: 85-132 VAC 47-63 Hz

Outputs: TDI-170A	**TDI-171A**
+5V @ 10A	+5V @ 0.5A
+12V @ 4.0A	+15V @ 1.0A
−12V @ 1.5A	−15V @ 0.5A
−5V @ −4A	+24V @ 4.0A

- Operating temperature 0°C-70°C
- OV and OL protection
- Optional conformal coating
- Militarized for high reliability
- Other output voltages available
- High reliability militarized design for shipboard applications

Ripple and Noise: Within 1% peak to peak

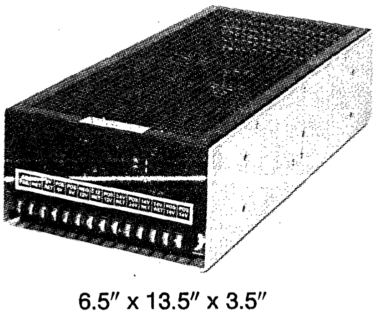
Dimensions: 13.5″ x 6.0″ x 3.5″



13.5″ x 6″ x 3.5″

200W Series **TDM-200**

This line contains several units with standard input voltage of 110230V. All units are designed to UL, CSA, FCC, and VDE requirements. Up to 5 outputs are available in each unit. These are +5V, ±12V, +24V, or +14V. The +14V is highly regulated and is intended for pulsing applications in thermal or dotmatrix applications. Up to 15A pulses can be taken from it. This relatively inexpensive unit comes in a size of 6.5″ x 13.5″ x 3.5″, and requires some forced air cooling.



6.5″ x 13.5″ x 3.5″

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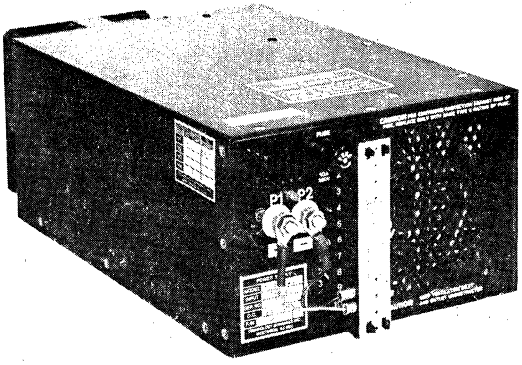
HIGH RELIABILITY STANDARD & CUSTOM POWER SYSTEMS

SWITCHING POWER SUPPLIES
500—2000 WATTS

DATA PROCESSING • COMMUNICATIONS • ROBOTICS & VEHICULAR
STANDARD OUTPUTS: 5V / 12V / 28V / 48V / 56V / 110V

Off The Shelf Products. 10 Days Delivery



TDS SERIES

8" x 5" x 11" (excluding fan)

FEATURES:

- Rugged Mechanical Design for High Shock & Vibration
- Size & Mounting are Compatible w/Industry Standard
- Soft Start, No Overshoots
- High Efficiency to 85%
- High Reliability in Accordance with Military Standards
- Self Contained DC or AC Fan
- 110/220V Operation
- Wide Range Units Available. (80-135 VAC)
- Overload, Overvoltage & Overtemperature Protection
- Modular Design
- RFI Filter for FCC Compliance
- Low Output Noise
- High Pulse Capability for RF & Microwave Applications
- May be Used to Replace 28V or 48V Batteries
- May be Used as Battery Charger

Single Output Units
Standard Model Numbers

	Model	Output Voltage	Max. Current
500W	TDS 5-10	5V	100A
	TDS 12-45	12V	45A
	TDS 28-18	28V	18A
	TDS 48-12	48V	12A
	TDS 110-4.5	110V	4.5A
1000W	TDS 5-200	5V	200A
	TDS 12-90	12V	90A
	TDS 28-36	28V	36A
	TDS 48-25	48V	25A
	TDS 110-10	110V	10A

	Model	Output Voltage	Max. Current
1500W	TDS 5-300	5V	300A
	TDS 15-100	15V	100A
	TDS 28-55	28V	55A
	TDS 48-31	48V	31A
	TDS 110-14	100V	14A
2000W	TDS 36-55	36V	55A
	TDS 48-42	48V	42A
	TDS 60-33	60V	33A
	TDS 110-18	110V	18A

FOR OTHER THAN STANDARD OUTPUTS CONSULT FACTORY.

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HIGH RELIABILITY STANDARD & CUSTOM POWER SYSTEMS

TDS: SINGLE OUTPUT AND TDM: MULTIPLE OUTPUT

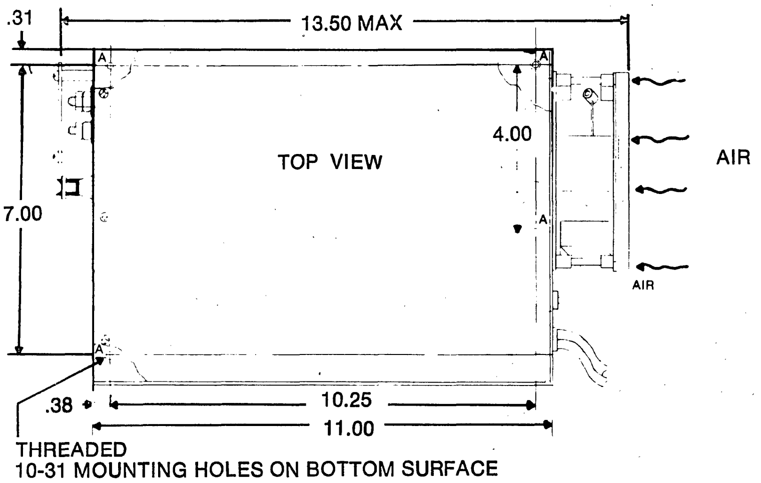
AVAILABLE OPTIONS

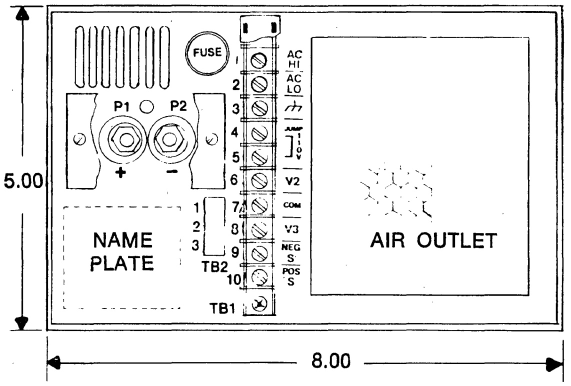
	INPUT	
3-PHASE SERIES	208 or 240V 3 or 4 Wire 47 to 400 Hz	All units in one to three outputs are available in Single or 3-Phase Input. For 3-Phase add 3-Phase Suffix to Model Number. Example: TDS-28-55-3Phase

	SECOND OUTPUT*			THIRD OUTPUT*		
	VOLT	Io	SUFFIX	VOLT	Io	SUFFIX
MULTIPLE OUTPUTS **TDM SERIES**	−5	5A	A1	+5	10A	B1
	−12	3A	A2	+12	10A	B2
	−15	3A	A3	+15	6A	B3
	−24	2A	A4	+24	4A	B4
	None	—	A0	None	—	None
	Example: TDM-12-45-A1 **For +12 @ 45A & −5V @ 5A**			**Example: TDM-28-18-A2-B2** **For 28V @ 18A,** **−12V @ 3A & +12V @ 10A**		

*** Second and Third Outputs are Regulated to ±2% and Overload Protected.**

Mechanical Outline TDS Series


.31
13.50 MAX
A
A
4.00
TOP VIEW
AIR
7.00
A
AIR
A
.38
10.25
11.00
THREADED
10-31 MOUNTING HOLES ON BOTTOM SURFACE


FUSE
P1
P2
+
−
5.00
NAME PLATE
TB2
TB1
1
2
3
4
5
6
7
8
9
10
AC HI
AC LO
V2
COM
V3
NEG S
POS S
AIR OUTLET
8.00

NOTES
For 110V input, short pin TB1-4 to TB1-5. Use 110V Fan.

For 220V input, remove short between TB1-4 and TB1-5. Use 220V Fan.

Unless notified all units are shipped with 110V connections and Fan.

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HIGH RELIABILITY STANDARD & CUSTOM POWER SYSTEMS

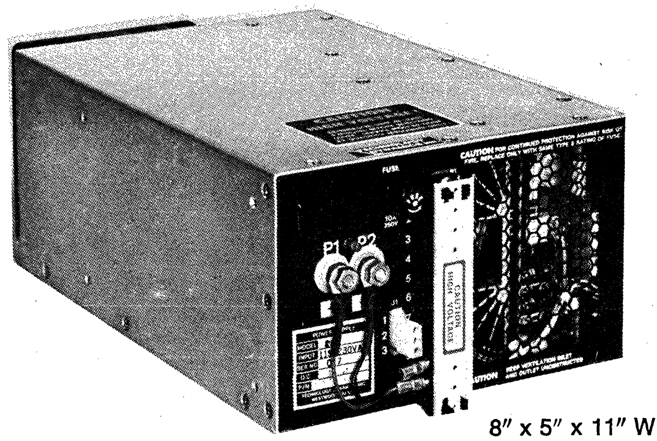
UNINTERRUPTABLE DC OUTPUT SWITCHING POWER SUPPLIES UP TO 600W WITH BATTERY BACKUP

(FOR LOW POWER UPS OPEN FRAME UNITS CONSULT FACTORY)

A unique design permits the TDS and TDM series to accept battery input voltage as well as AC 115/230V. Glitch free performance is accomplished by a DC-DC module which is internally mounted. When AC voltage drops, a sensing circuit activates this module and the outputs continue normal performance without interruption. Conversion is done at 80% efficiency, and the length of time the unit works on battery depends only on the battery capacity. Output power is limited to 600W with 24V battery.

While on AC input, the unit charges the battery and tests its charge condition. When AC drops, the unit delivery AC FAIL signal and performs automatic switchover to battery power.

MODELS
TDS-UPS
TDM-UPS



NEW
PRODUCT

8″ x 5″ x 11″ WITH DC FAN

For Mechanical Outline See TDS Series

	BATTERY VOLTAGE*	FEATURES
BATTERY BACKUP **UPS SERIES**	Recommended Battery Types: NiCad Gel-Cel Lead-Acid 24V Standard 36V Optional	All TDS & TDM units with total output up to 600W are available with Battery Backup option. Add Suffix "UPS" to model number. Units with or without Battery Backup are the same size. Units will charge battery and provide AC-Fail, Battery-Lo, & Battery-Charged monitoring signals. Transition to battery is automatic. Example: TDS-5-100-UPS Delivery 57, 100A and has Battery Backup feature.

*** Battery is Mounted Externally. Consult Factory for Size & Capacity.**
Also, for Units with Redundancy Features Consult Factory.

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HIGH RELIABILITY STANDARD & CUSTOM POWER SYSTEMS

REDUNDANT POWER SUPPLIES

INPUT 115/230V SINGLE PHASE

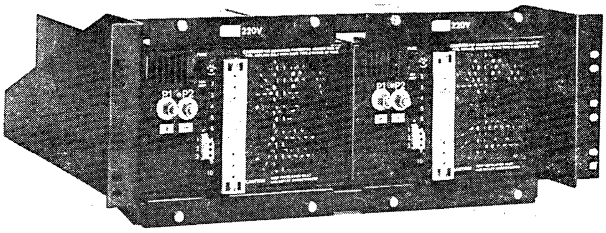
A diversified line of redundant power supply systems is offered for sensitive applications where system downtime due to power failure cannot be tolerated. In the redundant systems offered here each unit is capable of supplying the entire load, and should one unit fail, the other keeps the load energized at full performance. The individual units within the redundant power supply can be easily replaced when their sister unit continues to function.

Each unit in the pair is equipped with "OR"ing diodes so that no failure within one unit can drag with it the entire power system. Under normal operation the units share in the load, however equal current sharing is not guaranteed. Logic signals inform the host system which power supply failed when failure occurs.

Switching Up To 1000 Watt

This redundant unit contains 2 power supplies from the TDS (single output) or TDM (multiple output). The rack is standard 19″ width. Each unit is mounted in place using captive hardware. "OR"ing diodes are mounted internally. For catalog number choose the TDS or TDM model and add suffix R. Example: TDS-28-36R

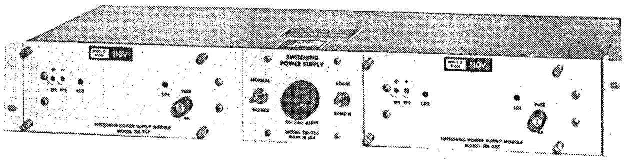
Note: Not all TDS or TDM units may be used.



19″ x 6.85″ x 17″
Consult Factory for Model No.

Switching 200 Watt

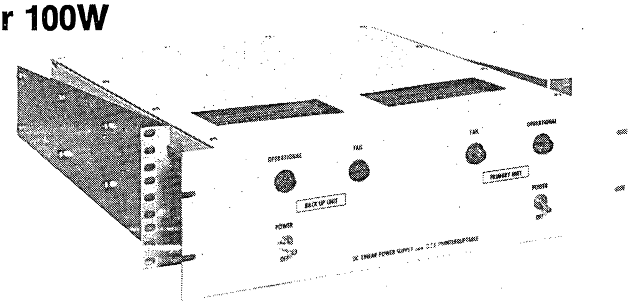
This slim line rack mount redundant power supply has 2 identical plug-in modules, each capable of 200W. ORing diodes are included. Standard outputs are 12V, 15V or 24V.



22.6″ x 8″ x 3.5″
Consult Factory for Model No.

Linear 100W

This unit contains 2 linear modules, each capable of 28V up to 5A. Other outputs are also possible. Front switches and indicators permit power on/off to each module, and fault identification. NEMA Rack Enclosure is equipped with slides as an extra option.



17″ x 17″ x 4.85″
Consult Factory for Model No.

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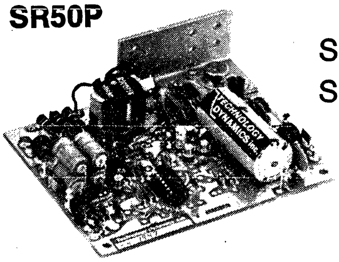
HIGH RELIABILITY STANDARD & CUSTOM POWER SYSTEMS

DC-DC CONVERTERS and SWITCHING REGULATORS

SR30P
SR50P



Single Output DC-DC Switching Regulators

Standard Features

- Overload Protection
- Overload Protection Protection
- Input RFI Filter
- High Efficiency — 70%
- High Reliability — 150,000Hr. MTBF
- Compact Size — 4″ x 5″ x 1.3″
- Build your own multiple output supply

SR30P-*	30 Watts	Input: +9 VDC to +30 VDC	Output: +5 VDC to +15 VDC
SR50P-*	50 Watts	Input: +9 VDC to +30 VDC	Output: +5 VDC to +15 VDC

* Please Consult Factory for Model Number

Input voltage must exceed output voltage by 3V min.

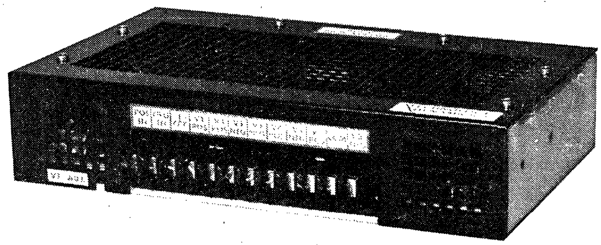
TDC-50 50W

DC-DC Converter
3 Outputs

This unit is designed in a form of a module which may be installed inside the user system. It measures 5″ x 5″ x 1.5″ and offers standard outputs. Output voltage of +5V, +6V, +8V, ±12V, ±15V, or ±24V are available. Traditionally, the main output is +5V at 5A, while the second and third outputs are ±12V, or ±15V at 1A each. These outputs can be regulated to ±5% or ±2%. All outputs are overload protected, and a summary fault signal can be (optionally) delivered. Input voltages are offered in 4 standard ranges: 9-15V, 20-32V, 41-54V, and 100-125V. Input to output isolation is 1000 VDC.

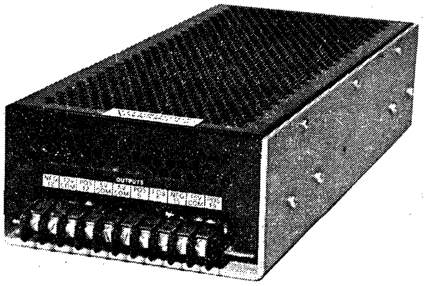
TDC-150 DC-DC Converter 150W

4 Outputs



This is a slim line and very compact line of DC-DC converters providing standard voltages of +5V, ±12V, or ±15V, and a fourth output of 12V or 24V, total output power is 150W. Standard inputs are 12V, 24V, 48V and 120 VDC. Extensive RFI filtering at the input, makes this series especially suitable to telecommunication applications where the ovallall noise requirements on the input side are very stringent. The unit measures 9.5″ x 5.5″ x 2.2″ and has mounting holes at the bottom as well as one of the sides.

TDC-200 DC-DC Converter 200W



This unit is designed to survive very adverse input voltage transients such that exist in electric utility control or monitoring apparatus. Standard outputs are +5V, ±12V, ±15V, or ±24V. Other voltages can also be considered. The unit measures 10.75″ x 5.5″ x 2.75″ and has a perforated cover. This unit is also offered in a −30 to +71°C operation range, and will withstand severe shock and vibration. The above units are available in DC inputs of +24V, +48V, or +120 VDC.

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HIGH RELIABILITY STANDARD & CUSTOM POWER SYSTEMS

CUSTOM DESIGNS: COMMERCIAL & MILITARY

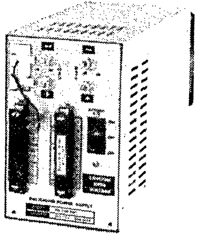
PROTOTYPES IN 10 WEEKS

Shown below are samples of our custom design capability. All standard units can be modified to suit unique customer requirements. New custom designs are accomplished at a record speed of 10 weeks. NRE charges are minimal, and for large quantity orders no NRE is charged. Call or send your specifications to get our quick and responsive quotation.

COMMERCIAL PRODUCTS

800W Single Output Uninterruptable Power Supply

TDI-184



Input: 115/230 VAC 50/60 Hz and +12 VDC battery

Output: 13.5 VDC @ 55A

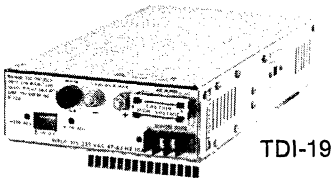
Regulation: ±1.0% line and load combined for a 20-100% load change

Features:
1) Battery charging circuit
2) Very low switching noise
3) OV and OL protection
4) Input RFI filter

Dimensions: 11.5″ x 8.0″ x 5.0″

Outputs Available: 24V, 48V, 56V

400W Slim Line Multiple Output



TDI-194

Input: 115/230 VAC 50/60 Hz

Output: +5 VDC @ 65A
±15 VDC @ 1.5A

Line Regulation: ±0.5%

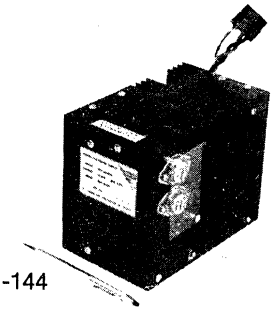
Load Regulation:
±1.0% for 10-100% load change

Features:
1) Designed to meet U.L. 544
2) Overvoltage protection
3) Overload protection
4) Remote sensing of +5V output
5) Input RFI filter

Dimensions: 13.5″ x 6.75″ x 3.0″

Other output voltages may be provided upon request.

300W High Power Converters and Battery Chargers



TDI-144

Input: 105-160 VDC (or 55-80 VDC) (AC input option available)

Output: 15 VDC @ 20A

Line Regulation: ±1% max.

Load Regulation: ±1% from 15%-full load

Ripple and Noise: Less than 1% pp

Dimensions: 4$\frac{13}{16}$″ x 5¼″ x 6$\frac{9}{16}$″

Note: Other output voltages available upon request.

Military to Mil-E-5400
(AIRBORN)

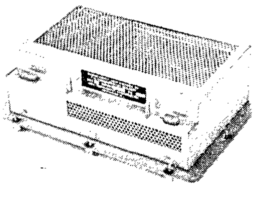
150W Full Mil, Multiple Output

Input: 108-118 VAC 50-425 Hz

Outputs: +15 VDC @ 6.0A ±2%
−15 VDC @ 1.7A ±2%
±10 VDC @ 0.2A ±5%
+24 VDC @ 1.1A ±3%
−5.3 VDC @ 0.15A ±5%
+5.3 VDC @ 2.2A ±5%

Dimensions: 12.15″ x 7.875″ x 3.38″ Wt.: 8.6 lbs.

Built in accordance with Mil-E-5400



TDI-183

150W Full-Mil DC/DC Converter

Input: 28 VDC nominal per Mil-Std-704C

Outputs: +5 VDC @ 14A
−5 VDC % 0.75A
±12 VDC @ 1.5A

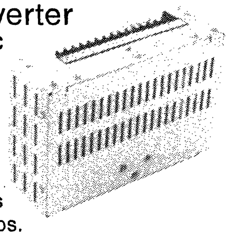
Line Regulation: ±0.5%, all outputs

Load Regulation:
±1.0% for +5V, ±5.0% all others

Ripple and Noise: 100 mVpp, all outputs

Dimensions: 3.0″ x 6.0″ x 8.75″. Wt.: 4 lbs.

Built in accordance with Mil-E-5400



TDI-189

Militarized Units

800W Multiple Output, Enclosed
(AIRBORN)

TDI-211

Input: 104-132 VAC 47-440 Hz

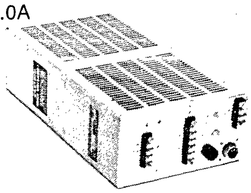
Outputs: +5 VDC @ 140A/±15 VDC @ 4.0A

Regulation: ±1% line and load combined

Ripple and Noise: ±1% peak-to-peak

Features:
- Militarized for high reliability
- Remote sensing of 5V output
- O.V. protection on all outputs
- Overload protection on all outputs

Dimensions: 14″ x 7.5″ x 4.0″



800W Multiple Output, Open-Frame
(SHIPBOARD)

Input: 704-132 VAC 47-440 Hz

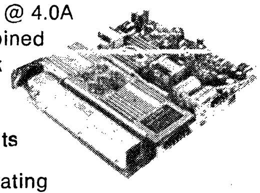
Outputs: +5 VDC @ 140A/±15 VDC @ 4.0A

Regulation: ±1% line and load combined

Ripple and Noise: ±1% peak to peak

Dimensions: 15.0″ x 13.5″ x 2.0″

Features:
1) OV and OL protection on all outputs
2) Remote sensing of 5V output
3) Militarized for high reliability-operating temp to 70°C with no derating



TDI-210

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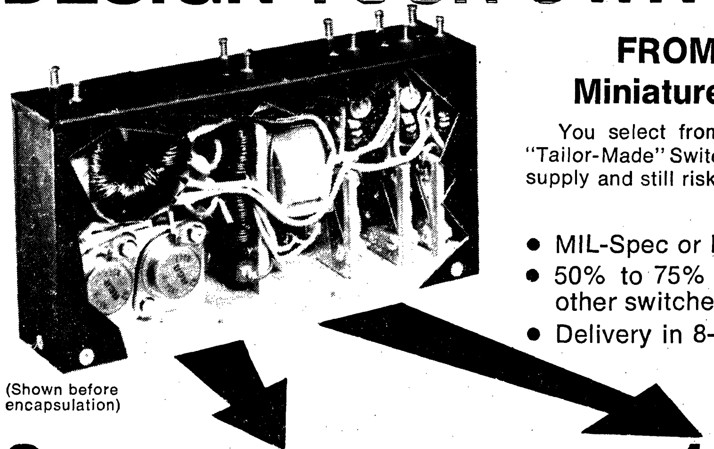
HIGH RELIABILITY STANDARD & CUSTOM POWER SYSTEMS

ARNOLD MAGNETICS

AC-DC/DC-DC MODULAR MINIATURIZED
SWITCHING POWER SUPPLIES

DESIGN YOUR OWN POWER SUPPLY



(Shown before encapsulation)

FROM OFF-THE-SHELF MODULES!
Miniature Packages to 400 Watts Output

You select from over 120 Standard Sub-Modules to design your own "Tailor-Made" Switching Power Supply. Why wait many months for a "custom" supply and still risk the failure of an unproven circuit or thermal design?

- MIL-Spec or Industrial
- 50% to 75% smaller than other switchers
- Delivery in 8-12 weeks ARO
- From 1 to 10 DC Outputs — DC Input AC or DC Inputs
- Power Density to 5.33 Watts/cubic inch
- Encapsulated for Reliability: MIL-STD-810C, MIL-E-5400, MIL-E-16400

1. SELECT OUTPUT REGULATORS

(All outputs adjustable ±5% from nominal voltage. Outputs are isolated and can be connected in positive or negative polarity.)

Specify Nominal VDC Output	Output Current (maximum)	Model	Regulator Length (Inches)	Worst Case Efficiency
From 2.0 to 3.9	1.0	ARS**	0.6	30%
	2.0	ARA	0.6	30%
	3.0	ARC	1.2	30%
	5.0	ARF	2.1	60%
	10.0	ARM	2.1	60%
	20.0*	ARP	2.7	60%
From 4.0 to 6.0	1.5	ARS**	0.6	35%
	3.5	ARA	0.6	45%
	6.0	ARC	1.2	45%
	10.0	ARF	2.1	70%
	20.0	ARM	2.1	70%
	40.0*	ARP	2.7	75%
From 6.1 to 16	1.0	ARS**	0.6	45%
	2.0	ARA	0.6	50%
	4.0	ARC	1.2	50%
	5.0	ARF	2.1	80%
	10.0	ARM	2.1	80%
	16.0*	ARP	2.7	80%
From 16.1 to 30	0.5	ARS**	0.6	60%
	1.5	ARA	0.6	65%
	2.5	ARC	1.2	65%
	3.0	ARF	2.1	80%
	5.0	ARM	2.1	80%
	8.0*	ARP	2.7	80%
From 30.1 to 55	0.5	ARB	0.6	65%
	1.5	ARK	1.2	65%
From 56 to 110	0.25	ARB	0.6	70%
	0.75	ARK	1.2	70%
From 111 to 160	0.15	ARB	0.6	70%
	0.3	ARK	1.2	70%
From 161 to 200	0.1	ARB	0.6	75%
	0.2	ARK	1.2	75%
From 201 to 250	0.05	ARB	0.6	75%
	0.10	ARK	1.2	75%
From 251 to 300	0.05	ARB	0.6	75%
	0.1	ARK	1.2	75%

* Higher currents also available.

2. SELECT INPUT DRIVER

(Use "E options" for ranges not shown)

AC INPUT

Input Voltage Range	Model	Output Power Rating (Watts)	Driver Length (Inches)
115 ±12 VAC 47-500 Hz	TL	100	4.2
	TH	200	4.8
	TV	300	8.1
	TW	400	9.6
115 ±12 VAC 340-500 Hz	BL*	100	4.5

DC INPUT

Input Voltage Range	Model	Output Power Rating (Watts)	Driver Length (Inches)
28 VDC (24-30 VDC)	NL	100	2.4
	NH	200	3.0
	NV	300	5.4
48 ±4 VDC	JL	100	2.4
	JH	200	2.4
	JV	300	Consult Factory
125 ±10 VDC (100-150 VDC using "E" option)	KL	100	2.4
	KH	200	2.4
	KV	300	Consult Factory

* Cannot be used with ARF, ARM or ARP Regulators.

3. SELECT OPTIONS

(Contact Factory for prices)

Option Letter	Description	Option Letter	Description
V	Output Overvoltage Protection	TS	Over-Temperature Shutdown
T	Extended Temperature Operation	SYN*	External Synchronization
E	Extended Input Voltage Range	LC*	TTL On/Off Control
TP	Input Transient Protection	D*	Power-Down Signal
R	Remote Sense	S*	Output Sequencing
A	Remote Voltage Adjustment	LP*	Programmable Outputs

* Minimum Order of 10 units or Small-Lot Charge for these Options.
** For ARS Regulator, do not exceed agreed upon output current rating.

ARNOLD MAGNETICS CORPORATION

11520 W. Jefferson Blvd., Culver City, California 90230 • Phone: (213) 390-3537, (213) 390-8837 • TWX: 910-343-6468

INSERT YOUR SPECIFICATIONS

USE SEPARATE SHEET FOR 7 OR MORE OUTPUT VOLTAGES

ARNOLD MAGNETICS

	MODEL i.e. ARA	VOLTS (Nominal)	AMPS (Maximum)	OUTPUT POWER	REGULATOR EFFICIENCY	REGULATOR INPUT POWER FROM DRIVER	REGULATOR LENGTH **(Include Options)**	**PRICE (Include Options)**
1.	______	______VDC ×	______A =	______Watts ÷	______% =	______Watts	______Inches	$______
2.	______	______VDC ×	______A =	______Watts ÷	______% =	______Watts	______Inches	$______
3.	______	______VDC ×	______A =	______Watts ÷	______% =	______Watts	______Inches	$______
4.	______	______VDC ×	______A =	______Watts ÷	______% =	______Watts	______Inches	$______
5.	______	______VDC ×	______A =	______Watts ÷	______% =	______Watts	______Inches	$______
6.	______	______VDC ×	______A =	______Watts ÷	______% =	______Watts	______Inches	$______
		TOTAL OUTPUT POWER		______Watts	**POWER REQUIRED FROM DRIVER**	______Watts (Add 10% to AC inputs for ripple)	______Inches TOTAL REGULATORS (Include options)	$______ TOTAL REGULATOR
							+ ______Inches DRIVER LENGTH (Include Options)	$______ DRIVER PRICE
						TOTAL MODULE LENGTH =	______Inches Driver and Regulators	$______ TOTAL PRICE

INPUT DRIVER	**MODEL** i.e. TH, NL	RATED OUTPUT POWER
	______	Watts

→ MUST BE GREATER THAN → POWER REQUIRED FROM DRIVER

CASE SELECTION

Arnold Magnetics Power Supplies are designed to be cooled by heat conduction through the mounting baseplate.

Provide **Safe Thermal Margins** in the selection of the Power Supply Case:

Please see next page for: OPERATING, ENVIRONMENTAL and MECHANICAL SPECIFICATIONS

A. Select a case size that will accommodate the sum of all the Regulators, Options and Driver Module, then...

TOTAL MODULE LENGTH ______INCHES ≤ CASE______CONTAINING______INCHES

B. Assure that the "Watts Dissipated through Baseplate" does not exceed **6.25 watts/square inch** for standard +71°C designs or **4.17 watts/square inch** for optional +85°C designs (calculations are made under worst-case conditions).

POWER REQ'D FROM DRIVER WATTS	÷	DRIVER EFFICIENCY 95% **90% for DC**	=	TOTAL INPUT POWER WATTS	−	TOTAL OUTPUT POWER WATTS	=	POWER DISSIPATION WATTS	÷	BASEPLATE AREA (from Table) ______IN^2	=	WATTS DISSIPATED THROUGH BASEPLATE WATTS/BASEPLATE IN^2 (Not to exceed 6.25 watts)

C. Contact factory for assignment of final model number. (For example TV-3018 TV-3 018)
This Model Number includes all voltage and current levels,
options and package size information.

Driver
No. of Outputs
Master List No.

THERMAL INTERFACE

Because Arnold Magnetics Power Supplies are cooled by conduction, always use thermal compound during installation. To assure reliability the thermal interface must be designed to maintain specified Baseplate Temperature under worst-case conditions. (See Note B above to determine power to be dissipated.) Heat transfer via forced air or natural convection will be minimal.

Please consult the Factory to discuss heat-sinking considerations.

ARNOLD MAGNETICS CORPORATION
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ARNOLD MAGNETICS

AC-DC/DC-DC MODULAR MINIATURIZED
SWITCHING POWER SUPPLIES

CURRENT APPLICATIONS

GOVERNMENT/MILITARY

- Space Shuttle — Flight Compartment Instrumentation
- UYK-40 Military Computer — Including Arnold UPS Power Supply
- Airborne Command Center Instrumentation — Over 140 Different Models in Use
- Radar Warning Training System
- Portable Dynamic Simulator (PDS) Threat Simulation System
- Tow Missile Test Set
- Stinger Missile Test Set
- F-16 Ground Support Equipment
- Aircraft Anti-Stall System
- M47 Weapons System
- Military Preparedness Data Bank
- Dockside EW Training System
- Mark 48 Torpedo Projectile Power Supply

HI-REL INDUSTRIAL

- Voice Controlled Wheel Chair
- Alaska Pipeline Monitor
- Deep Water Camera for Cable Recovery
- Medical Plasma Display
- Microwave Station Alarm System
- Oil Rig Control Computer
- Multi-Channel Aircraft Flight Recorder
- Nuclear Reactor Moderator System
- Telephone Switching and Test
- Ultra-Wide Band Oscilloscope
- Putman Wind Generator
- Turbine Control Electronics
- Auto Analysis Data Recorder
- Synthesized Sweeping Signal Generator (SSSG)
- Communication Frequency Synthesizer
- Power Switching Distribution Control

OPERATING SPECIFICATIONS

• REGULATOR SPECIFICATIONS

ARA, ARC, ARB, ARK
LINE REGULATION (for ±10% input change): 0.1% of E out +10 mV
LOAD REGULATION (½ to full load change): 0.1% of E out +10 mV.
TEMPERATURE COEFFICIENT: 0.01%/°C.

ARS, ARF, ARM, ARP
LINE REGULATION (for ±10% input change): 0.2% of E out +10 mV.
LOAD REGULATION (½ to full load change): 0.2% of E out +10 mV.
TEMPERATURE COEFFICIENT: 0.02%/°C.

• RIPPLE/NOISE

ARA, ARC, ARB, ARK
0.1% of E out +10 mV RMS.

ARS
0.25% of E out +10 mV RMS.
23 mV RMS max. for outputs from 2-4 VDC.

ARF, ARM, ARP
0.5% of E out +10 mV RMS.
35 mV RMS max. for outputs from 2-4 VDC.

- **Operating Temperature** (Baseplate): −10°C to +71°C (optional −55°C to +85°C).
- **Storage Temperature:** −65°C to +100°C.
- **Short Circuit Protection:** All outputs are short circuit protected and feature foldback current limiting.
- **Output Adjustment Range:** All outputs are adjustable over a plus or minus 5% range minimum.
- **Input Voltage Surge Protection** (AC Input Units): 140 VAC. Unit will turn off if surge exceeds 140 VAC. (See TP option).
- **Semiconductor Junction Temperature:** Maximum of 120°C at operating baseplate temperature of +71°C or optional +85°C.
- **Isolation:** The inputs, case and outputs are isolated (floating) from each other. Isolation test voltage is the greater of 50 VDC or 1.3 X E out.

ENVIRONMENTAL SPECIFICATIONS

(Test Reports Available)

- **Temperature Range:** Operating Temperature: −10°C to +71°C Baseplate Temperature. Optional −55°C to +85°C range. Non-Operating Storage Temperature: −65°C to +100°C.
- **High Temperature:** Per MIL-STD-810, Method 501, Procedure II.
- **Low Temperature:** Per MIL-STD-810, Method 502, Procedure I.
- **Temperature-Altitude:** Per MIL-STD-810, Method 504, Procedure I; the following details apply: −10°C to +71°C (and −55°C to +85°C) at Altitude: Sea level to 70,000 ft.
- **Humidity:** Per MIL-STD-810, Method 507, Procedure I.
- **Acceleration:** Per MIL-STD-810, Method 513, Procedure I and II, at a test level of 14 G.
- **Vibration:** Per MIL-STD-810, Method 514, Procedure I, at a test level of 15 G.
- **Shock:** Per MIL-STD-810, Method 516, Procedures I, II, III, V, and VI at a test level of 40 G.

MIL-STD 461A

Noise/Ripple Considerations

Qualification to the provisions of MIL-STD 461A is a system level concern. Arnold Magnetics Power Supplies have been included in many systems that have received MIL-STD 461A approval without additional filtering. Other systems may require moderate filtering external to the power supply to pass all provisions of the MIL-STD 461A tests.

For example, a single two-pole filter has been used with over 140 different Arnold models to achieve MIL-STD 461A system approvals. We can recommend a variety of filters and installation techniques that can assist in MIL-STD 461A approval.

Because of the more stringent AC input voltage line leakage specifications of MIL-STD 461B, please consult us on applications affected by that specification.

CASE SELECTION

Case Size	Total of Module Lengths (in.)	Baseplate Area	Case Dimensions (in.) (L)	(W)	(H)	Mounting Holes (in.) M	N	Quan.	Final Unit Wt. (oz.)	Fig. No.
AA	3.2	4.8	3.5	1.6	3.6	1.125	2.750	4	21	1
BA	4.7	7.1	5.0	1.6	3.6	1.125	4.250	4	30	1
CA	6.7	10.1	7.0	1.6	3.6	1.125	2.750	6	41	1
FA	8.2	12.4	8.5	1.6	3.6	1.125	3.500	6	50	1
DA	10.2	15.4	10.5	1.6	3.6	1.125	4.500	6	62	1
"DOUBLE WIDE" Packages below allow modules to be mounted side by side.										
AB	2x3.2	9.7	3.5	3.1	3.6	2.625	2.750	4	42	2
BB	2x4.7	14.2	5.0	3.1	3.6	2.625	4.250	4	60	2
CB	2x6.7	20.2	7.0	3.1	3.6	2.625	2.750	6	82	2
FB	2x8.2	24.8	8.5	3.1	3.6	2.625	3.500	6	100	2
DB	2x10.2	30.8	10.5	3.1	3.6	2.625	4.500	6	124	2
"TRIPLE WIDE" Packages below allow modules to be mounted three across.										
AC	3x3.2	14.4	3.5	4.6	3.6	4.126	2.750	4	63	2
BC	3x4.7	21.3	5.0	4.6	3.6	4.126	4.250	4	90	2
CC	3x6.7	30.3	7.0	4.6	3.6	4.126	2.750	6	123	2
FC	3x8.2	37.2	8.5	4.6	3.6	4.126	3.500	6	150	2
DC	3x10.2	46.2	10.5	4.6	3.6	4.126	4.500	6	186	2

All cases are black anodized aluminum with turret-style solder terminals, and Teflon insulation.

Figure 1

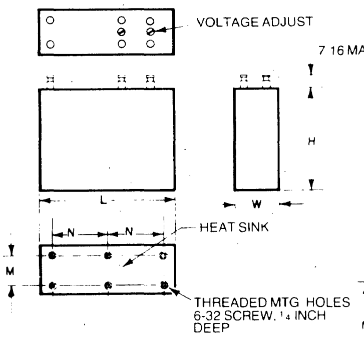
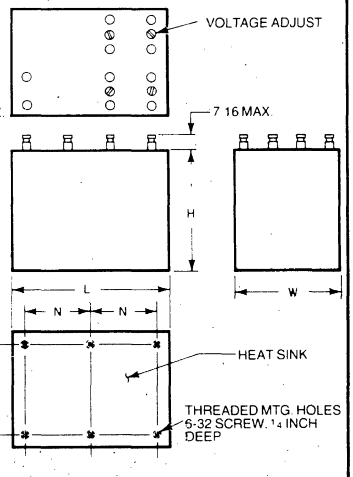


Figure 2



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AC-DC/DC-DC MODULAR MINIATURIZED
SWITCHING POWER SUPPLIES

ARNOLD MAGNETICS

IN-HOUSE TEST PROGRAM AT ARNOLD MAGNETICS
—Stress Testing Proves Reliability

"Readiness and Reliability to defend our Nation . . ."

Traditional MTBF Predictions for Power Supply Reliability can be quite misleading. The key to accurate MTBF Prediction is analysis under stress.

Beginning in March of 1978, Arnold's "Life-Time Analytic Stress Tests" (LAST) have been continually performed on our products to provide this necessary dimension of performance verification.

Some Switching Power Supplies have been shown to exhibit poor reliability when subjected to rapid load changes or when input power is cycled on and off. Many users of switching supplies have been disappointed by failures in field application after accepting calculated MTBF estimates.

Arnold's "Life-Time Analytic Stress Tests" (LAST) are designed to eliminate the disparity between calculated and actual operation. The LAST Test Program includes the continuous Input Power cycling to a Power Supply under a series of operating conditions:

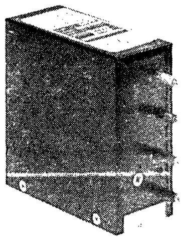
- Full Load, Half Load, and No Load conditions on All Outputs
- Multiple Short Circuits on Outputs
- Highly Reactive Loads on Outputs
- Input Power Over-Voltage and Under-Voltage
- Elevated Temperature Operation

During tests like these, the most extreme operating conditions are simulated. The tests are conducted 24 hours per day, 365 days per year. Designs must pass 1,000,000 On/Off Cycles without failure before they are introduced to our Customer. Arnold tests for reliability to assure that hardware is always in a state of readiness.

Arnold Magnetics' "Gold-Line" of High Reliability Switching Power Supplies have emerged from these stressful tests. Certain Design Improvements have been implemented that could not have been defined by paper analysis.

Arnold Magnetics' "GOLD-LINE" Switching Power Supplies . . . PROVEN RELIABILITY

HIGH VOLTAGE POWER SUPPLIES



PHU & SHU SERIES

- **Select any voltage from 2 VDC to 5,000 VDC**
- **Miniature designs with extreme reliability**
- **Meets MIL-STD 810C, MIL-E 5400, MIL-E 16400**

OPERATING SPECIFICATIONS

Line Regulation (±10% line change): 0.3% of E out maximum
Load Regulation (½ load to full load): 2.0% of E out maximum
Output Voltage Adjustment: ±5% minimum
Output Isolation: 3 X output voltage (1 kV minimum, 5 kV maximum)
Operating Baseplate Temperature: −10°C to +71°C
Storage Temperature: −65°C to +100°C
Package Size: Dimensions shown above apply to all models.

Output Voltages (VDC)	INPUT RANGES					
	115 ±10 VAC, 47-500 Hz		12 ±1 VDC		28 ±2 VDC	
	Amps	Model	Amps	Model	Amps	Model
2	5	PHU-2	2.5	SHU-2EE	5	SHU-2
5	5	PHU-5	2.5	SHU-5EE	5	SHU-5
12	3.3	PHU-12	1.0	SHU-12EE	3.3	SHU-12
15	2.6	PHU-15	1.0	SHU-15EE	2.6	SHU-15
24	1.6	PHU-24	0.8	SHU-24EE	1.6	SHU-24
28	1.4	PHU-28	0.7	SHU-28EE	1.4	SHU-28
30	1.3	PHU-30	0.5	SHU-30EE	1.3	SHU-30
50	0.8	PHU-50	0.4	SHU-50EE	0.8	SHU-50
100	0.4	PHU-100	0.2	SHU-100EE	0.4	SHU-100
250	0.16	PHU-250	0.08	SHU-250EE	0.16	SHU-250
300	0.13	PHU-300	0.06	SHU-300EE	0.13	SHU-300
500	0.08	PHU-500	0.04	SHU-500EE	0.08	SHU-500
750	0.05	PHU-750	0.02	SHU-750EE	0.05	SHU-750
1000	0.03	PHU-1000	0.02	SHU-1000EE	0.04	SHU-1000
2000	0.01	PHU-2000	0.01	SHU-2000EE	0.02	SHU-2000
3500	n/a	n/a	n/a	n/a	0.01	SHU-3500
5000	n/a	n/a	n/a	n/a	0.008	SHU-5000

Multiple Output Models

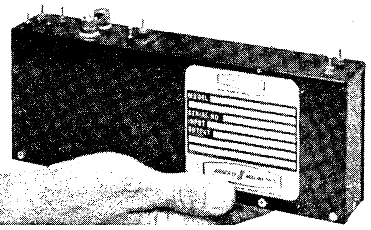
+5	2	PHU-30(CT)-5	1	SHU-30(CT)-5EE	2.0	SHU-30(CT)-5
+15	0.5		0.2		0.5	
−15	0.5		0.2		0.5	
+15	1.3	PHU-30(CT)	0.4	SHU-30(CT)EE	1.0	SHU-30(CT)
−15	1.3		0.4		1.0	

TV-1036:
ULTRA-MINIATURE SWITCHER

- **5 Volts/40 Amps!!**
- **4 Watts per Cubic Inch!!**

ARNOLD MAGNETICS introduces Model **TV-1036**, a new standard of high-density switching power. Providing 5 VDC at 40 amps from an AC source, the Model **TV-1036** performs to these specifications:

4.0 Watts per Cubic Inch Package measures 8.85″ x 1.57″ x 3.57″
Input Voltage: 103-127 VAC, 47-500 Hz
Output Voltage: 5 VDC at 40 amps. (**Triple Output** – Model **TV-3018** – also available: 5 VDC/35 amps, ±15 VDC @ 1 amp.)
Efficiency: 71%; remains constant over input voltage range
M.T.B.F.: 70,000 Hours @ 45°C Ground Base per MIL-HDBK217
Line Regulation: .1% (Line Variation ±10%)
Load Regulation: .1% +10 MV Full Load to No Load
Remote Sensing: Within .05%. Terminals are provided which correct for Load Lead Drop of up to .25 VDC. Load is protected if sensing leads are opened.
Ripple and Noise: .25% +10 MV RMS
100 MV P-P @ 10 MHZ bandwidth
150 MV P-P @ 100 MHZ bandwidth
Overvoltage Protection: Set at 120% of nominal output voltage
Semiconductor Junction Temperature: Maximum of 100°C at Operating Baseplate Temperature of +71°C



Transient Response: Output voltage returns to within 1% in less than 1.5 millisec during change from Full Load to 25% Load or No Load to Full Load. Maximum transient excursion for 25% load change: 500 millivolts.
Temperature Coefficient: 0.01% per °C
Carry Over Time: 15 milliseconds at nominal line with full load
Input Voltage Surge Protection: 145 VAC. Unit will turn off if surge exceeds 145 VAC
Thermal Protection: Internal Thermostat shuts off output during over-temperature condition. Automatic reset to normal operation when internal temperature is within safe limits.
Inrush Current Limiting: 35 amps maximum
Turn on and Turn Off Transient: No overshoot or undershoot outside of regulation band
Operating Temperature Range: −10 to +71°C Baseplate without derating
Input, Case and Outputs are isolated (floating) from each other.

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POWER SUPPLIES

MODEL NUMBER	NOTES	MAX OUTPUT	+5V	−5V	+12V	+12V	−12V	+24V	MOUNTING	DIMENSIONS
AC8151-01	1	38	2.5		2.0		0.1		(OPEN PCB)	2.0 x 3.9 x 6.3
AC8254		43	2.0	0.2				1.3	(OPEN PCB)	2.25 x 4.25 x 7.75
AC8353		70	3.0				0.17	2.2	(OPEN PCB)	2.4 x 6.2 x 7.4
AC9232-01	1	50	6.0	0.5	2.5		0.5		(BOX)	2.4 x 4.5 x 8.0
AC9250		50	6.0	0.5	2.0		1.0		(OPEN PCB)	2.0 x 4.25 x 7.75
AC9252-01	1	50	6.0	0.5	2.5		0.5		(OPEN PCB)	1.75 x 4.25 x 7.75
AC9262-01	1	50	6.0	0.5	2.5		0.5		(L BRACKET)	2.4 x 4.5 x 8.0
AC9335-01	1	65	6.0		1.5	2.1	0.1		(BOX)	2.4 x 4.5 x 8.0
AC9351		62	8.0	0.75	1.0		0.5		(OPEN PCB)	2.2 x 6.2 x 7.4
AC9354		75	4.7		2.0	2.0	0.5		(OPEN PCB)	2.3 x 6.2 x 7.4
AC9355-01	1	65	6.0		1.5	2.1	0.1		(OPEN PCB)	1.9 x 4.25 x 7.75
AC9357	1	70	8.0	0.7	3.5		1.0		(OPEN PCB)	1.9 x 4.25 x 7.75
AC9365-01	1	65	6.0		1.5	2.1	0.1		(L BRACKET)	2.4 x 4.5 x 8.0
AC9431		100	12.0	0.5	4.0		0.5		(L BRACKET)	2.4 x 6.5 x 8.0
AC9433	2,3	100	10.0		3.5	1.5	0.7		(BOX)	2.4 x 4.45 x 8.0
AC9461		100	12.0	0.5	4.0		0.5		(L BRACKET)	2.4 x 6.5 x 8.0
AC9463	2,3	100	10.0		3.5	1.5	0.7		(L BRACKET)	2.4 x 4.45 x 8.0
AC9531	2	128	10.0		3.5	2.5	0.5		(BOX)	2.6 x 5 x 10.5
AC9534	2,3	130	15.0		5.0	1.5	1.0		(L BRACKET)	2.5 x 5.0 x 8.5
AC9561		128	10.0		3.5	2.5	0.5		(L BRACKET)	2.6 x 5 x 10.5
AC9564	2,3	130	15.0		5.0	1.5	1.0		(L BRACKET)	2.5 x 5.0 x 8.5
AC9664		140	13.4		1.5	.75	0.2	2.0	(L BRACKET)	2.5 x 6.7 x 10.0

1 VDE Approved
2 Pending VDE Approval

3 New Models

We specialize in custom power supplies

INPUT VOLTAGES TO ALL UNITS ARE STRAP SELECTABLE AT 115/230 VAC

DC-DC CONVERTERS

MODEL NUMBER	PKG.	VOLTS	REG. (%)	OUTPUT CURRENT (mA) min.	max.	eff. (%)	TEMP. COEF. (%/°C)	REGULATION line (%)	load (%)	RIPPLE (mVp-p)
AD1P12A10	A1	+12	±3	25	84	75	0.05	0.8	1.0	500
AD1P15A10	A1	+15	±3	20	68	75	0.05	0.8	1.0	500
AD1N05A10	A2	− 5	±3	60	200	65	0.08	0.8	1.0	500
AD1N12A10	A2	−12	±3	25	84	75	0.08	0.8	1.0	500
AD1N15A10	A2	−15	±3	20	68	75	0.08	0.8	1.0	500
AD1P26A05	A2	+26	±3	6	19	75	0.08	0.8	1.0	500
AD1D12A10	A3	±12	±4	12	42	75	0.08	0.8	1.5	500
AD1D15A10	A3	±15	±4	10	34	75	0.08	0.8	1.5	500

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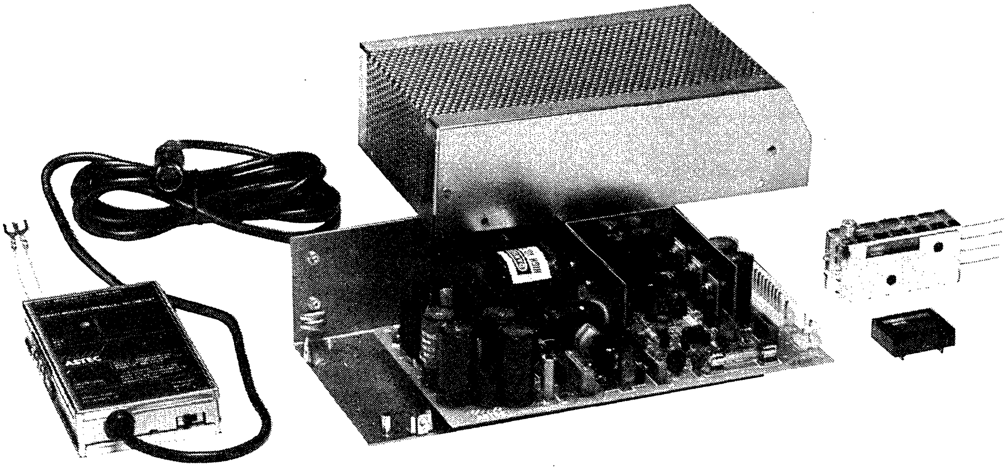
ASTEC
A BSR COMPANY

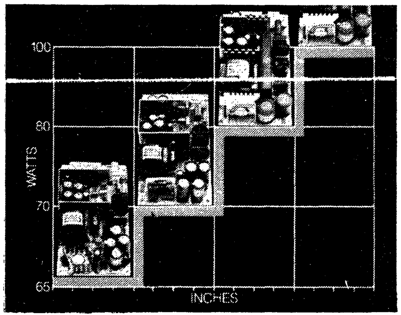
RF MODULATORS

MODEL NUMBER	VIDEO APPLICATION	AUDIO SUBCARRIER	MARKET	CHAN. NO.	CARRIER FREQUENCY	CHAN. NO.	CARRIER FREQUENCY	MOUNTING	COMMENTS
UM1233	UHF COLOR	NONE	EUROPE/UK (PAL)	E36	591.25 MHz			PCB	LOW PROFILE
UM1285-8	VHF COLOR	4.5 MHz	US (NTSC)	A3	61.25 MHz	A4	67.25 MHz	PCB	VSB FILTER
UM1285E3-4	VHF COLOR	5.5 MHz	EUROPE (PAL)	A3	61.25 MHz	A4	67.25 MHz	PCB	VSB FILTER
UM1286	UHF COLOR	6.0 MHz	UK (PAL)	E36	591.25 MHz			PCB	
UM1289T	VHF COLOR	4.5 MHz	US (NTSC)	A3	61.25 MHz	A4	67.25 MHz	PCB	S.A.W. OSCILLATOR, HIGH PERFORMANCE
UM1381-01	VHF COLOR	4.5 MHz	US (NTSC)	A3	61.25 MHz	A4	67.25 MHz	STANDALONE	FCC APPROVAL
UM1622	VHF COLOR	NONE	US (NTSC)	A3	61.25 MHz	A4	67.25 MHz	PCB	LOW PROFILE
UM1683D	VHF COLOR	4.5 MHz	US (NTSC)	A3	61.25 MHz	A4	67.25 MHz	PCB	S.A.W. OSCILLATOR, HIGH PERFORMANCE
UM1684	VHF COLOR	4.5 MHz	US (NTSC)	A3	61.25 MHz	A4	67.25 MHz	PCB	ANTENNA SWITCH
UM2001	VHF COLOR	4.5 MHz	US (NTSC)	A3	61.25 MHz	A4	67.25 MHz	PCB	MINIATURE, HIGH PERFORMANCE
UM2002	VHF COLOR	4.5 MHz	US (NTSC)	A3	61.25 MHz	A4	67.25 MHz	PCB	MINIATURE, HIGH PERFORMANCE
UM2003	VHF COLOR	4.5 MHz	US (NTSC)	A3	61.25 MHz	A4	67.25 MHz	PCB	MINIATURE, HIGH PERFORMANCE



STEP UP THE POWER. KEEP THE FOOTPRINT.

Astec introduces "same-size" power supplies - from 65 to 100 watts



Say goodbye to power upgrade problems. And to power-related design worries. Astec just ended watts-per-square-inch tradeoffs.

Our new 70-, 80- and 100-watt power supplies have the **same tiny footprint** of our original 65-watt unit.

So now you've got a lot more going when it comes to design options. Like easy upgrading of existing designs. And extended flexibility in new designs.

More good news. The Astec "watts-per-square-inch" revolution is just beginning. Join it. Call or write Astec today—

ASTEC USA
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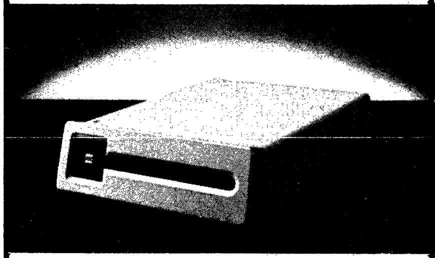
Santa Clara, CA
95051 U.S.A.
Tel: (408) 748-1200
Telex: 474-5018 ASTEC UI
Fax: (408) 727-8281
ASTEC
A BSR COMPANY

ADC 1200 MODEM



ADC 1200 is an expandable 1200/300 baud modem with an RS-232 interface for use with almost all personal computers. The ADC 1200 combines LSI microprocessors with advanced digital demodulation techniques to produce a modem that offers far more, yet costs far less.

SPECIFICATIONS:

Rear Panel: Power cord connector, on-off switch, speaker volume control, RS-232 connector, (2) RJ11C telephone jacks.

Configuration Switch Bank: 10-section DIP configuration switch accessible through cutout in bottom panel.

Status Indicator Lights: HS on = 1,200 baud; AA on = auto answer; DC on = carrier detected; OH on = phone off hook; RD on = receiving data; SD on = sending data; TR on = terminal or computer ready; MR on = ADC 1200 ready.

Dimensions: 11.5 x 6.5 x 2.3 inches. Case designed for visibility of indicators while telephone placed on top.

Power: Internal, 110VAC @ 3W, 3-wire grounded cable.

ADC 1200 OPTIONS
PROCESSOR (Optional)

Memory: 16K increments, to a maximum of 64K. Dynamically allocated between phone directory and text buffer. First 2K protected by battery backup (clock, system parameters, directory).

Clock: battery backup. Can record duration of outgoing calls.

Telephone Directory: Numbers, dialing code, and up to 12 reference characters each, to automate dialing.

Text Transfer Buffer: Stores messages in modem for transmission at preset time to pre-selected destination. Auto-answer mode records and time-stamps incoming messages within the modem's memory. Command extensions permit message retrieval later.

Installation: Plug-in circuit board mounts inside ADC 1200 case.

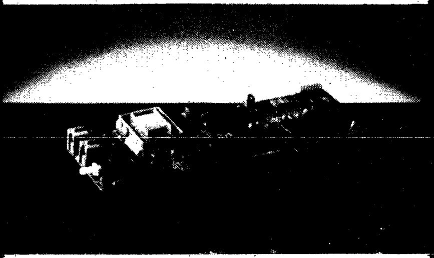
ADC 1200 ALPHANUMERIC
DISPLAY (Optional)

Display: 12 LED characters.

Uses: Displays messages on operating status, diagnostics, phone number, date and time, message-waiting status, etc.

Installation: (3) 4-character LED chips plug into sockets included at front of modem.

ASTEC 1200A MODEM



The Astec 1200A is a 1200/300 baud intelligent autodial modem card for the Apple II, II+ or IIe. Just plug the Astec 1200A card into the Apple II motherboard and connect the telephone cord. The internal software in its on-board ROM consists of a simple-to-use, yet powerful, menu driven terminal program. With a few keystrokes, you'll be on-line and communicating. A telephone may be plugged into the 1200A to facilitate voice as well as data transmission.

The on-board software has these useful features: Capture mode, text transfer via Xmodem protocol and line-by-line, buffered printer support, terminal mode for 1200 baud scrolling with no lost characters.

SPECIFICATIONS

Configuration Switch Bank: 6-Section DIP configuration switches located near speaker on CPU board.

Dimensions: (2 pieces) 2.75 x 9.3 inches.

Power Requirements: ±12V @ 40 ma, +5V @ 500 ma.

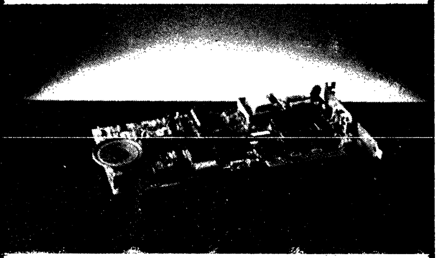
Receive Sensitivity: −50 dBm at 300 baud; −46 dBm at 1200 baud.

Transmit Sensitivity: −10 dBm.

Phone Connections: (2) RJ11C telephone jacks; one for telephone line connect and one for telephone (eliminates need for "T" connector). Telephone disconnected by built-in exclusion switch during data communication.

Registration: Registered with the FCC for direct connection to the nationwide telephone system; phone connectors fit RJ11C, RJ11W, RJ12C, RF12W, RJ13C or RJ13W modular phone jacks.

ASTEC 1200B MODEM



Astec 1200B is a 1200/300 baud card modem which plugs into the IBM PC or XT. If you have an IBM compatible computer with dedicated COM 1 and COM 2 serial port, don't worry. The Astec 1200B has a "COM 3" address to prevent conflicts, allowing it to be installed in most IBM compatibles as well.

The unit has a host of features such as auto-answer and auto-dial, programmable intelligent dialing, built-in speaker with volume control, help commands, extensive diagnostics, separate voice and data jacks, Hayes command set compatibility—and more. No additional interface is needed since the 1200B looks like an IBM compatible serial port.

The Astec 1200B is supplied with a sophisticated communications package from Mycroft Labs called "Mite" which provides for transfer of any type of text and binary files. Five error checking protocols are included to ensure compatibility between different software packages that the PC might be connected with on the remote end.

SPECIFICATIONS

Configuration Switch Bank: B section DIP.

Dimensions: 2.75 x 8.2 inches.

Power Requirements: ±12V @ 40 ma, +5V @ 600 ma.

Receive Sensitivity: −50 dBm at 300 baud; −46 dBm at 1200 baud.

Transmit Sensitivity: −10 dBm.

Phone Connections: (2) RJ11C telephone jacks; one for telephone line connect and one for telephone (eliminates need for "T" connector). Telephone disconnected by built-in exclusion switch during data communication.

Registration: Registered with the FCC for direct connection to the nationwide telephone system; phone connectors fit RJ11C, RJ11W, RJ12C, RF12W, RJ13C or RJ13W modular phone jacks.

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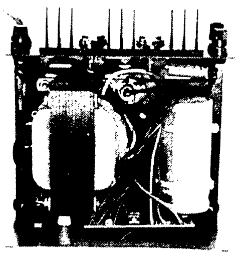
Fax: (408) 727-8281

ASTEC
A BSR COMPANY

ASTRON CORPORATION

2852 Walnut Ave., Unit E
Tustin, CA 92680
(714) 832-7770



INSIDE VIEW – RS-12A

ASTRON POWER SUPPLIES

• HEAVY DUTY • HIGH QUALITY • RUGGED • RELIABLE •

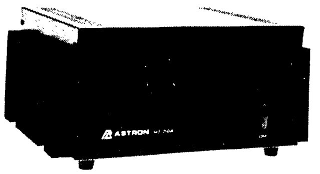
RS and VS SERIES

SPECIAL FEATURES

- SOLID STATE ELECTRONICALLY REGULATED
- FOLD-BACK CURRENT LIMITING Protects Power Supply from excessive current & continuous shorted output.
- CROWBAR OVER VOLTAGE PROTECTION on all Models except RS-4A.
- MAINTAIN REGULATION & LOW RIPPLE at low line input Voltage.
- HEAVY DUTY HEAT SINK • CHASSIS MOUNT FUSE
- THREE CONDUCTOR POWER CORD
- ONE YEAR WARRANTY • MADE IN U.S.A.

PERFORMANCE SPECIFICATIONS

- INPUT VOLTAGE: 105 - 125 VAC
- OUTPUT VOLTAGE: 13.8 VDC ± 0.05 volts (Internally Adjustable: 11-15 VDC)
- RIPPLE: Less than 5mv peak to peak (full load & low line)

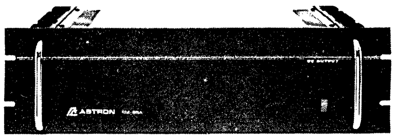


MODEL RS-50A

MODEL RS-50M

MODEL VS-50M

RM-A SERIES

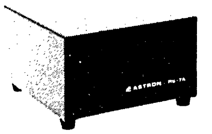


MODEL RM-35A

19" X 5¼ RACK MOUNT POWER SUPPLIES

MODEL	Continuous Duty (Amps)	ICS* (Amps)	Size (IN) H x W x D	Shipping Wt. (lbs.)
RM-35A	25	35	5¼ x 19 x 12½	38
RM-50A	37	50	5¼ x 19 x 12½	50
• Seperate Volt and Amp Meters				
RM-35 M	25	35	5¼ x 19 x 12½	38
RM-50 M	37	50	5¼ x 19 x 12½	50

RS-A SERIES



MODEL RS-7A

MODEL	Continuous Duty (Amps)	ICS* (Amps)	Size (IN) H x W X D	Shipping Wt. (lbs.)
RS-4A	3	4	3¾ x 6½ x 9	5
RS-7A	5	7	3¾ x 6½ x 9	9
RS-7B	5	7	4 x 7½ x 10¾	10
RS-10A	7.5	10	4 x 7½ x 10¾	11
RS-12A	9	12	4½ x 8 x 9	13
RS-20A	16	20	5 x 9 x 10½	18
RS-35A	25	35	5 x 11 x 11	27
RS-50A	37	50	6 x 13¾ x 11	46

RS-M SERIES

MODEL RS-35M

- Switchable volt and Amp meter

MODEL	Continuous Duty (Amps)	ICS* (Amps)	Size (IN) H x W x D	Shipping Wt (lbs)
RS-12M	9	12	4½ x 8 x 9	13
RS-20M	16	20	5 x 9 x 10½	18
RS-35M	25	35	5 x 11 x 11	27
RS-50M	37	50	6 x 13¾ x 11	46

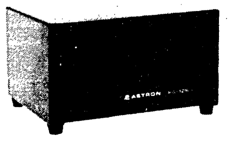
VS-M SERIES

MODEL VS-20M

- Seperate Volt and Amp Meters
- Output Voltage adjustable from 2-15 volts
- Current limit adjustable from 1.5 amps to Full Load

MODEL	Continuous Duty (Amps) @13.8VDC	@10VDC	@5VDC	ICS* (Amps) @13.8V	Size (IN) H x W x D	Shipping Wt (lbs)
VS-20M	16	9	4	20	5 x 9 x 10½	20
VS-35M	25	15	7	35	5 x 11 x 11	29
VS-50M	37	22	10	50	6 x 13¾ x 11	46

RS-S SERIES



MODEL RS-12S

- Built in speaker

MODEL	Continuous Duty (Amps)	ICS* Amps	Size (IN) H x W x D	Shipping Wt. (lbs.)
RS-7S	5	7	4 x 7½ x 10¾	10
RS-10S	7.5	10	4 x 7½ x 10¾	12
RS-10L (for LTR)	7.5	10	4 x 9 x 13	13
RS-12S	9	12	4½ x 8 x 9	13
RS-20S	16	20	5 x 9 x 10½	18

*ICS—Intermittent Communication Service (50% Duty Cycle 5 min. on 5 min. off)

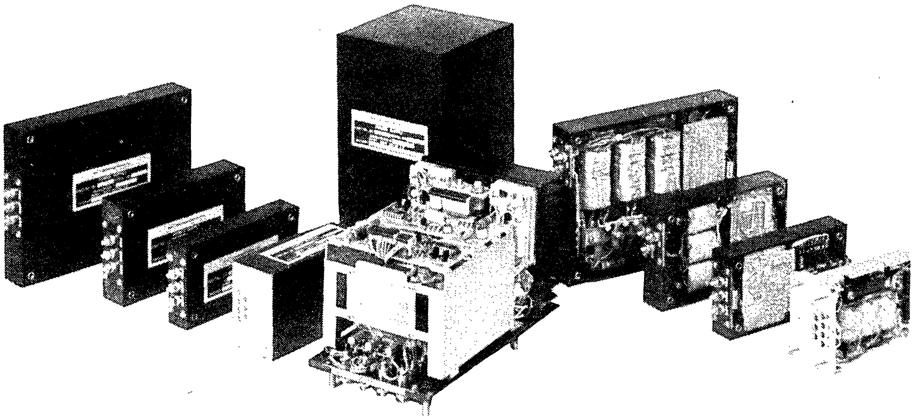
MINIGLOSSARIES
FORMULAS • CHARTS
PRODUCT SELECTION GUIDES
FORMS
CODES

TECHNICAL INFORMATION

WHERE TO FIND THEM IN THE 85/86 EDITION OF EEM

Abbreviations/Acronyms .... **A**•1166, **B**•1012, **C**•1028, **D**•1016
ASCII Code .... **D**•1087
Batteries, Product Selection Guide .... **D**•1413
Batteries & Fuel Cells, Characteristics .... **D**•1430
Cabinets, Enclosures, Racks, & Chassis, Product Selection Guide .... **C**•1003
Capacitors, Basic Formulas .... **A**•1093
Capacitors, Miniglossary .... **A**•1066
Capacitors, Product Selection Guide .... **A**•1003
Circuit Boards (Printed) Product Selection Guide .... **C**•1099
Coils, Chokes, Inductors, Product Selection Guide .... **A**•1205
Conductors, Maximum Current Capacity of Copper & Aluminum .... **C**•1863
Connectors, Miniglossary .... **C**•1129
Connectors, Terminals, & Sockets, Product Selection Guide .... **C**•1105
Crystals, Oscillators, Crystal & Piezoelectric Filters, Product Selection Guide .... **A**•1309
Delay Lines, Product Selection Guide .... **A**•1459
Discrete Semiconductors, Product Selection Guide .... **A**•2067
Displays, Readouts, Lamps, & Lights, Product Selection Guide .... **B**•1015
EBCDIC Code .... **D**•1092
Encapsulation, Miniglossary .... **C**•1086
Fans, Blowers, Cooling Equipment, & Heat Exchangers, Product Selection Guide .... **C**•1623
Filters, Product Selection Guide .... **A**•1583
Instruments, Graphic Recording Product Selection Guide .... **D**•1401
Instruments, Panel Meters, Product Selection Guide .... **D**•1329
Instruments, Test & Measuring Product Selection Guide .... **D**•1175
Interconnection Systems, Product Selection Guide .... **C**•1699
Keyboards & Keypads, Product Selection Guide .... **B**•1705
Logofinder & Trademark Directories .... **B**•901
Microwave Components, Product Selection Guide .... **A**•1701
Military Qualified Products Lists .... **B**•1003
Motors, Drives, & Rotating Components, Product Selection Guide .... **B**•1129
Opto Semiconductors, Miniglossary .... **B**•1214
Oscilloscopes, Product Selection Guide .... **D**•1385
Panel Hardware, Product Selection Guide .... **C**•1589
Potentiometers, Trimmers, Controls, & Rheostats, Product Selection Guide .... **A**•1991
Power Supplies, Miniglossary .... **D**•1462
Power Supplies, AC, Product Selection Guide .... **D**•1877
Power Supplies, DC, Product Selection Guide .... **D**•1447
Protective Components (Fuses, Circuit Breakers, etc.), Product Selection Guide .... **B**•1225
Relay Contact Forms .... **B**•1317
Relays, Electromechanical, Miniglossary .... **B**•1308
Relays, Product Selection Guide .... **B**•1261
Resistor Color Codes .... **A**•1828
Resistors, Product Selection Guide .... **A**•1785
Servo Components, Miniglossary .... **D**•1985
Solenoids, Product Selection Guide .... **B**•1463
Switches, Product Selection Guide .... **B**•1477
Thermal Components, Product Selection Guide .... **B**•1741
Thermal Conductivity of Dielectrics at Room Temperature .... **B**•1744
Thyristors/High Power Diodes, Miniglossary .... **A**•2076
Transducers & Encoders, Product Selection Guide .... **B**•1777
Transformers, Product Selection Guide .... **A**•2099
Wire & Cable, Product Selection Guide .... **C**•1743
Wire Gauges—Diameter, Area, Copper Weight .... **C**•1844

HIGH PERFORMANCE MILITARY POWER SUPPLIES



Send for further information or call the toll free number below.

Power Supply

FEATURES

- Qualified and Proven Mil Spec Designs
- Miniature, High Power Density Packaging
- Switching and Linear Designs
- High Reliability
- Overload Protection with Automatic Recovery
- Single or Multiple Outputs
- Conductor and Air-Cooled Designs
- Available in Standard or Custom designs

Switching Power Supplies

A complete line of customized switching power supplies provides the capability of multiple, high-power outputs with the ultimate in power-to-size ratio. Fully protected and designed for stringent EMI requirements. Design available for up to 1500 watts.

Linear Power Supplies

When low noise is the critical factor, Astrosystems' linear series-regulated supplies feature high-power density packaging with minimum thermal stress. Standard designs available for a wide range of output voltages and power levels.

Custom/Standard Supplies

Modular design and plug-in circuitry facilitate special designs. Our engineering department will customize these units to your exact requirements. Send us your specs or call the toll free number below.

Programmable Power Supplies

Astrosystems also designs and manufactures programmable DC and AC power supplies. These precision power sources are programmable using an IEEE 488 bus and the latest version of CIIL language.

astrosystems, inc.

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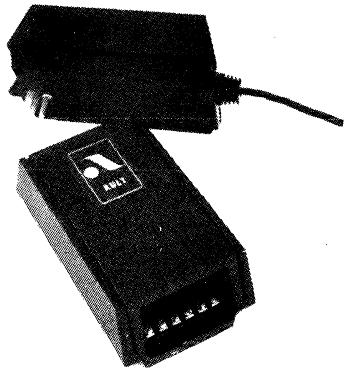
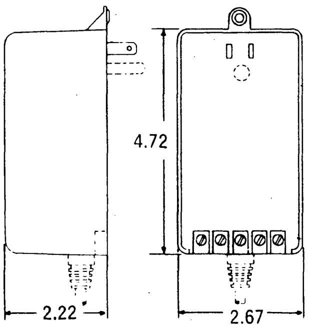
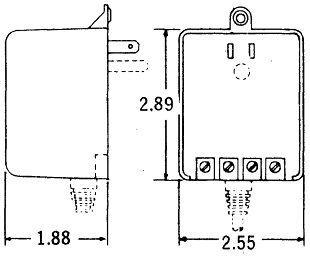
AULT INCORPORATED
EXTERNAL POWER SOURCES



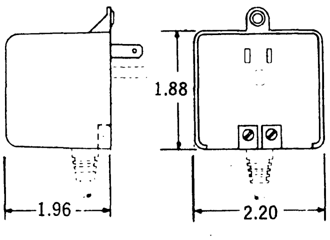
SWITCHER CASE SIZE 9
6.5" x 3.75" x 2.25"



CASE SIZE "7"



CASE SIZE "5"



CASE SIZE "3"

CONSIDER THE AULTERNATIVES

EXTERNAL SWITCHER SPECIFICATIONS

SINGLE OUTPUT

Model	Output VDC	Output Current (Amps)	Regulation %	Max. Ripple	Minimum Load (Amps)
9305-000-401	5.2	5.0	±2	50 mV P-P	None
9306-000-401	6	4	±2	50 mV P-P	None
9312-000-401	12	2	2	50 mV P-P	None
9348-000-401	48	.5	±2	50 mV P-P <20d Brn on C Message Weighted Scale	None
9000-348-401	48	1.25	±.5	50 mV P-P <30d Brn on C Message Weighted Scale	None

MULTIPLE OUTPUT

9712-000-401	±12	0.8 each	±5	50 mV P-P	None
9712-305-401	+5.1 +12 −12	3 .5 .2	±2 ±5 ±5	50 mV P-P 50 mV P-P 50 mV P-P	.6 None if +5 >1A .07A each if +5=.6A
9305-312-401	+5.1 +12	2.7 .8	±2 ±5	50 mV P-P 50 mV P-P	.6 None if +5 >1A 14A if +5=.6A
9715-305-401	+5.1 +15 −15	3 .350 .200	±2 ±5 ±5	50 mV P-P 50 mV P-P 50 mV P-P	.6 None if +5 >1A .55A each if +5=.6A
9305-712-401	5 +12 −12	5 1.5 .5	+5, −2 +10, −5 ±5	50 mV P-P 100 mV P-P 100 mV P-P	None

Input: 90-130 VAC/47 to 63 Hz
Operating Temperature: 0° to +50°C
Transient Response: 500 microseconds for 50% load change typical.
Protection: Overcurrent and short circuit protected, 5V overvoltage crowbar, automatic resetting from overcurrent.
EMI: Meets FCC Docket 20780 Class B.
Enclosure: High impact resistant molded lexan plastic.
Weight: 19 oz.
Hold-up Time: 16 MS min at 120 VAC
Storage Temperature: −55°C to +85°C
UL: Listed
Warranty: 1 year
Short Circuit Protection: Indefinite at 50°C
Relative Humidity: 5% to 80% non-condensing

External transformers, battery chargers, linear and switching power supplies provide several advantages over conventional built in power sources as listed below:

FEATURES

- Wall plug-in and desktop styles
- *Single and multiple output models available*
- UL Listed
- Impact resistant Lexan 141-701 thermoplastic enclosure
- AC blades zinc plated solid brass with tapered tip
- Available with input and/or output cord(s) and connector
- One year Warranty
- Sealed construction
- Private label hot stamping available
- Some available with 230V/50 Hz input for European use

BENEFITS

- Eliminate UL considerations because hazardous voltages are kept out of your product
- Increase space for other components in your product
- Increase aesthetic appearance and portability by reducing the size and weight of your product
- Keep power source heat out of your product for increased life
- Tamperproof power source
- Reduce design time for your product
- International uniformity of your product

BATTERY CHARGERS

Battery chargers for Gel-Cel and Sealed Lead Acid batteries are available in 6, 12 and 24 volt charge models for fixed voltage (float) and automatic fast charge applications.

FLOAT STYLE

BATTERY VOLTAGE	MAXIMUM FAST CHARGE		VOLTAGE AT END OF CHARGE	RATED CURRENTS AVAILABLE UL 1310	RATED CURRENTS AVAILABLE UL 544	CASE SIZE** (SAME ORDER)
6	None		6.9	.4, .6	.4, .5	3, 5, 3, 5
12	None		13.8	.3, .5	.3, .375	3, 5, 3, 5
24	None		27.6	.2	.2	3, 3

AUTOMATIC FAST CHARGE

	TYPE 1*	TYPE 2*				
6	7.2	7.45	6.9	.4, .6, 1.5, 3.0	.4, .5	3, 5, 7, 7, 3, 5
12	14.4	14.9	13.8	.3, .5, 1.25, 2.75	.3, 3.75	3, 5, 7, 7, 3, 5
24	28.8	29.8	27.6	.25, .5, 1.5	.2	3, 7, 7, 3

* Type 1: For Gel Cell Batteries. Type II: For Sealed Lead Acid Batteries.
** Case sizes are listed in the same order as the rated currents.

AULT INCORPORATED
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Telephone: (612) 560-9300 / TWX: 910-576-3435

AULT INCORPORATED
EXTERNAL POWER SOURCES

CONSIDER THE AULTERNATIVES EXTERNAL POWER SOURCES

LINEAR DC POWER SUPPLIES

UL Listed, Input Voltage: 105-129 VAC, 60 Hz
Operating Temperature: 0° to +40°C
All UL Listed

SINGLE OUTPUT MODELS
10 MV RMS Ripple, ±5% Overall Reg.

MODEL	OUTPUT VDC	AMPS	CASE SIZE
3305-000-400	5	.3	3
5305-000-400	+5	.5	5
7305-000-400	5	1.25	7
7306-000-400	6	1.2	7
3312-000-400	12	.12	3
5312-000-400	12	.4	5
7312-000-400	12	.8	7
5314-000-500	14.2	.5	5
5324-000-400	24	.25	5
7324-000-400	24	.5	7
5348-000-400	48	.1	5
7000-348-400	48	.25	7

MULTIPLE OUTPUT MODELS-LINEAR
10 MV RMS RIPPLE, ±5% Overall Reg.

MODEL	OUTPUT VDC	AMPS	CASE SIZE
5712-000-400	±12	.2 ea.	5
7712-000-400	±12	.4 ea.	7
5715-000-400	±15	.15 ea.	5
7324-199-400	24 100 VAC/ 30 Hz	.125 .020	7
5324-110-400	24 10 VAC	.2 .1	5
5712-305-401	+5 ±12	.5 .130 ea.	5
7712-305-401	+5 ±12	.6 .2 ea.	7
7612-305-401	+5 ±12	1.0 .25 ea.	7
9612-305-409	+5 ±12	2.0 .25 ea.	9

OPTIONS: Input cord, output cord, output connector, ground pin, hot stamping, 220 VAC/ 50 Hz.

SINGLE OUTPUT MODELS
Unregulated-Filtered/3.2 V.P.P. RIPPLE

MODEL	OUTPUT VDC	AMPS	CASE SIZE
3312-000-000	12	.35	3
5312-000-000	12	1.2	5
5323-000-000	23	.5	5
5316-000-000	16	.8	5
7323-000-000	23	1	7

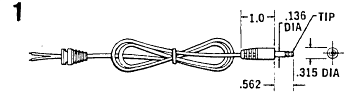
AC TRANSFORMERS — WALL PLUG-IN STYLES

The following are all available with optional input cord, output cord, connectors, earth ground, center tap and custom hot stamped with your company logo. Standard models have output screw terminals. All versions are UL 1310 listed, some are CSA Approved.

VA	VOLTAGES AVAILABLE	CASE SIZE
7.5	24	3
9.6	24	3
10	6, 7, 10, 12, 14, 16, 18, 20, 22, 24	3
11.3	22.5	3

VA	VOLTAGES AVAILABLE	CASE SIZE
12	18.5	3
16	10, 12, 14, 16, 18, 20, 22, 24	3
20	12, 14, 16, 18, 22, 24	3
40	10, 12, 14, 16, 18, 20, 24, 26	5

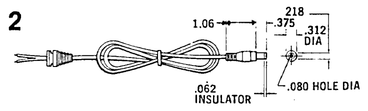
1



1.0
.136 TIP DIA
.315 DIA
.562

DESCRIPTION: 22 GA., 6′, 2 cond. flexible cord, black, molded strain relief. Switchcraft 750 Style Plug
MATING CONNECTOR: Switchcraft No. 41

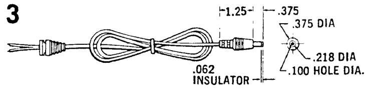
2



1.06
.375
218
.312 DIA
.062 INSULATOR
.080 HOLE DIA

DESCRIPTION: 20 GA., 8′, 2 cond. flexible cord, black, molded strain relief. Switchcraft S760 Style Plug.
MATING CONNECTOR: Switchcraft PC722A, 722A

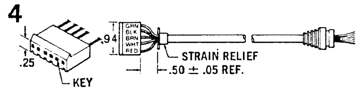
3



1.25
.375
.375 DIA
.218 DIA
.062 INSULATOR
.100 HOLE DIA.

DESCRIPTION: 18-20 GA., 8′, 2 cond. flexible cord, black, molded strain relief. Switchcraft 760 Style Plug.
MATING CONNECTOR: Switchcraft PC712A, 712A

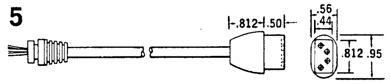
4



.94
GRN
BLK
BRN
WHT
RED
.25
KEY
STRAIN RELIEF
.50 ± .05 REF.

DESCRIPTION: 18-22 GA., 7′, 5 cond. flexible cable, gray, molded strain relief. Molex 09-50-3061 Pin No. 08-56-0105
MATING CONNECTOR: Several Styles Available From Molex

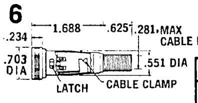
5



.812
1.50
.56
.44
.812
.95

DESCRIPTION: 22 GA., 8′, 3 cond. (4 conductor available on special order). Molded vinyl strain relief and receptacle.
MATING CONNECTOR: Tower No. 1078-3.

6



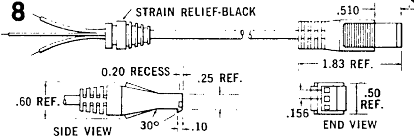
1.688
.625
.281 MAX CABLE DIA
.234
.703 DIA
.551 DIA
LATCH
CABLE CLAMP

Part No.	Contacts
SL-40-2F	2
SL-40-3F	3
SL-40-4F	4
SL-40-5F	5

DESCRIPTION: Non-reflective metal shell, coupling ring, Efficient cable clamp and strain relief. Switchcraft SLIM-LINE Series.

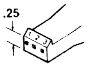
MATING CONNECTOR: Switchcraft SL10- * M Flange Mount; SL17- * M Rear Panel Mount; SL18- * M Front Panel Mount

8



STRAIN RELIEF-BLACK
.510
1.83 REF.
0.20 RECESS
.25 REF.
.60 REF.
SIDE VIEW
30°
.10
.50 REF.
.156
END VIEW

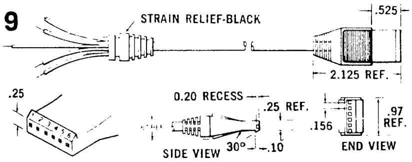
Pin	Transformer	Power Supply
1	AC	+
2	GND or CT	Common
3	AC	Earth Ground



PIN OUT CODE

DESCRIPTION: 18-20 GA., 7′, 3 conductor, black, molded vinyl strain relief and connector.
MATING CONNECTOR: .045 square pin wafer, on .156 centers straight and right angle styles available.
Ref; Molex series 2420, 2630
Amp MTA-156
Post Header (Sq. Pin)
▲ See note below

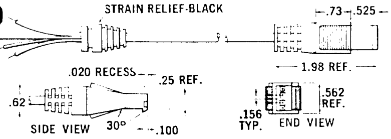
9



STRAIN RELIEF-BLACK
.525
2.125 REF.
.25
0.20 RECESS
.25 REF.
.156
.97 REF.
SIDE VIEW
30°
.10
END VIEW

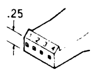
DESCRIPTION: 18-22., 7′, 5 conductor, molded vinyl strain relief and connector.
▲ See note below

10



STRAIN RELIEF-BLACK
.73
.525
1.98 REF.
.020 RECESS
.25 REF.
.62
SIDE VIEW
30°
.100
.562 REF.
.156 TYP.
END VIEW

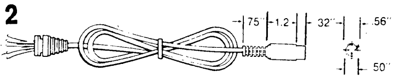
Pin	Transformer	Pin	Power Supply
1	GND	1	DC
2	AC	2	Common
3	AC	3	DC
4	CT	4	GND



PIN OUT CODE

DESCRIPTION: 18-22 GA., 7′, conductor, black, molded vinyl strain relief and connector.
▲ See note below

12



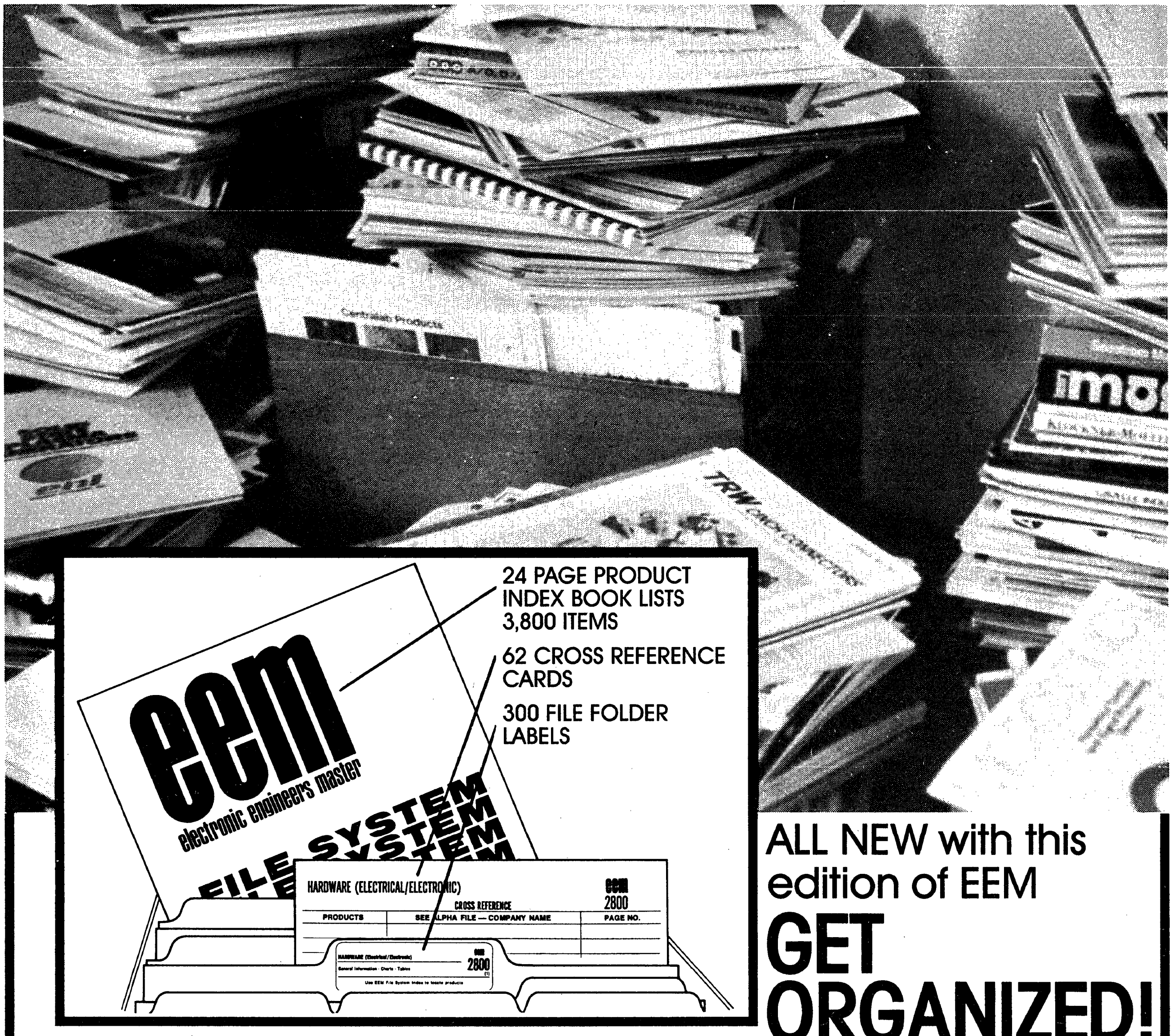
.75
1.2
.32
.56
.50

DESCRIPTION: DIN 5 cond., 180° male plug, on 18GA., 5 cord, 7′ cable, black, molded strain relief.
MATING CONNECTOR: Several styles of straight and right P.C. mount and panel mount available from Switchcraft.
▲ See note below

TYPICAL APPLICATIONS: Modems, Microprocessor Controlled Systems, Telecommunications, Operational Amplifiers, Computer Peripherals, Test Equipment, Security Systems, Multiplexers, Teller Terminals.

▲ Contact Factory for Exact Wire Size, Length & Insulation Color For Your Specific Application

AULT INCORPORATED
Dept. EM, 1600 Freeway Boulevard / Minneapolis, Minnesota 55430
Telephone: (612) 560-9300 / TWX: 910-576-3435


24 PAGE PRODUCT INDEX BOOK LISTS 3,800 ITEMS
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HARDWARE (ELECTRICAL/ELECTRONIC)
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eem
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PRODUCTS
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PAGE NO.
TRW

ALL NEW with this edition of EEM

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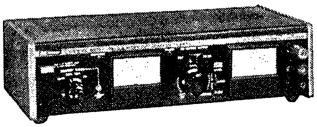
B+K PRECISION DYNASCAN CORPORATION / POWER SUPPLIES

Dept. EM, 6460 West Cortland Avenue, Chicago, Illinois 60635 • (312) 889-9087 • Telex: 25-3475

LABORATORY POWER SUPPLIES



Model 1601 / $389.00

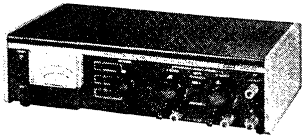
FEATURES

• Isolated 0-50 VDC, continuously variable; 02 A in four ranges • Fully automatic shutdown, adjustable current limit • Perfect for solid state servicing.

SPECIFICATIONS

Input Voltage: 105-125 VAC, 60 Hz.
Output Voltage: 0-50 VDC, continuously variable; two ranges, 0-25 and 0-50 VDC.
Output Current: 02 A in four ranges — 0-50 mA, 0-0.2 A, 0-0.5 A, 0-2 A.
Load Regulation: Minimum, 0.05%; maximum, 0.1%; typical, 0.07%.
Line Regulation: 0.02% typical from 105 to 125 VAC with output of 50 VDC and 2 A.
Ripple: 5 mV peak-to-peak.
Temperature Coefficient: .002% of output voltage per °C.
Size (HxWxD): 9.8 x 35 x 25 cm (3.8 x 14.13 x 10″).
Net Weight: 5 kg. (11 lbs.).

TRI-OUTPUT AUTO-TRACKING LAB POWER SUPPLY



Model 1650 / $399.00

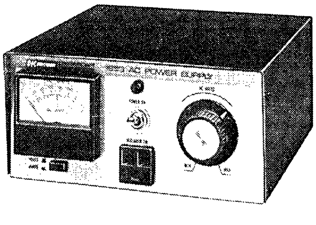
FEATURES

• Functions as three separate power supplies • 5 VDC, 5 A fixed output • Two separate 0 to 25 VDC outputs at 0.5 A • Fully automatic, current-limited overload protection • Unique tracking circuit allows automatic tracking of variable DC outputs • + and − terminals of each output are fully isolated, even when in automatic tracking mode • All three outputs may be connected in series or parallel for higher voltage or current requirements. Our Model 1650 tri-output power supply was designed for modern solid-state applications were both linear and digital circuits are encountered. In one package, this unit combines the features of a separate 5 VDC fixed-output supply and two 0-25 VDC variable supplies. The 5 volt output is rated at 5 amps, to satisfy power requirements of complex digital devices.

SPECIFICATIONS

Input Voltage: 105-125 VAC, 60 Hz.
OUTPUT VOLTAGES
5 Volt Supply: 5 Volts DC ±5%.
A Supply: 0 to 25 VDC.
B Supply: 0 to 25 VDC.
OUTPUT CURRENT
5 Volt Supply: 5 A max; A & B Supplies: 0.5 A current lim.
REGULATION
Load: 0.1% (25 mV) variation to full-load on 25 V supplies. 3% (150 mV) variation from 10 mA. to 5 A change in load current on 5-volt supply.
Line: 0.2% (50 mV) for a line voltage change of 20-volts on 25 V supplies. 0.4% (20 mV) for a line voltage change of 20 volts on 5 V supply.
NOISE RIPPLE
All supplies: 5 mV rms. (not applicable to "A" in track mode).
GENERAL
Current limiting: Limiting for each 0-25 V supply fixed slightly above rated current for short-circuit protection. The 0-5 V supply has automatic fold-back to 2.5 A short-circuit.
TRACKING
(0-25 V Supplies): "A" Supply Tracks "B" supply at a fixed or selected ratio. Applies whether the supplies are connected in series, back-to-back or are completely isolated.
Tracking Error: ±1% of rated voltage (±250 mV).
Size (HxWxD): 9.8 x 35 x 25 cm (3.88 x 14.13 x 10″).
Weight: 10 kg (22 lbs.) CSA listed.

NEW ISOLATED-VARIABLE AC POWER SUPPLIES



Model 1653 / $165.00

FEATURES

• Variable isolated 0-150 VAC, 2 amp continuous output • Displays voltage or current readings • Isolation transformer to eliminate shock hazard while servicing "hot chassis" equipment • Compact, rugged.

DESCRIPTION

B&K-PRECISION Model 1653 is an isolated-variable (0-150 V) AC power supply with a built-in transformer to eliminate shock hazard while servicing "hot chassis" equipment. It displays voltage and current readings.

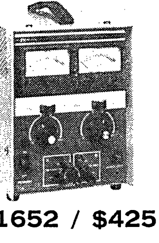
APPLICATIONS

Performance testing at normal, low and high line voltages . . . troubleshooting equipment that blows fuses at normal line voltage . . . bench testing and repair of equipment which operates at other than 120 VAC (e.g. 24 VAC Class II industrial control equipment) . . . troubleshooting of defects that occur only at low or high line voltages . . . testing excessive or normal current drain in equipment . . . incoming inspection of equipment to verify its electrical load specification.

SPECIFICATIONS

Voltage Adjustment Range: 0-150 VAC, with input at 120 VAC.
Output Isolation: Leakage less than 0.1 mA (25° C, 50% relative humidity).
Current Range: 0-2 A.
Maximum Current (Isolated): 2 A continuous.
Voltage/Current Sensing: Sine wave average, calibrated in RMS.
Meter: 3½″ overrange protected.
Meter Accuracy: ±5% of full scale.
Power Requirement: 120 VAC ±10%, 60 Hz, 300 VA.
Dimensions: 8.5x3.75x8″ (21.6x9.5x 20.3 cm).
Weight: 12 lbs. (5.5 kg.).

DUAL-OUTPUT LOW-VOLTAGE POWER SUPPLY



Model 1652 / $425.00

FEATURES

• More capabilities than two separate supplies • Automatic tracking of A and B outputs • Two 0 to 25 volt, 1.5 amp outputs • Outputs may be connected in series or parallel combination for added current or voltage • Complete overload and reverse polarity protection.

APPLICATIONS

Power linear or CMOS integrated circuits . . . engineering lab applications . . . production testing . . . service requirements . . . classroom and laboratory applications . . . microcomputer projects.

The Model 1652 provides two variable A and B, 0 to 25 volts outputs at 0 to 1.5 amps each. It's well suited for applications involving both analog and MOS digital circuits.

Both supplies can be operated independently or in a tracking mode. In the tracking mode, the B supply can be preset to any percentage of the A supply voltage from 0 to 100%.

SPECIFICATIONS

Input Power Requirements: 100, 120, 220, or 240 VAC ±10%, 50/60 Hz; 130 W max.

OUTPUTS

A Supply: 0-to-25 VDC at 0-to-1.5 amps. Cont. variable. B Supply: 0-to-25 VDC at 0-to-1.5 amps in indep. mode; 0 to 100% of A supply voltage at 0-to-1.5 amps in tracking mode. Cont. variable. Ripple Voltage: <2.5 mV rms. Regulation Load: Within ±0.1% or ±20 mV. Line: Output variation ±0.1% for line variation of ±10%. Current Limiting: Current limiting at approx. 1.8 amps.

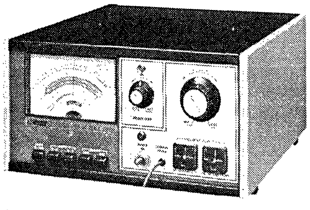
GENERAL

Tracking: B supply voltage tracks A supply voltage at selected ratio, cont. variable, 0 to 100%. Tracking Error: Within ±1% ±250 mV in the 2-to-23 volt range. Reverse Pol. Protection: Diode protected. Isolation: Each supply may be floated independently, including tracking mode. Max. voltage diff. between supplies is 250 volts (DC-AC peak). Metering: Built-in meters for A supply and B supply. Switchable to voltage or current. 0-to-27 volt and 0-to-2.0 amp ranges. Operating Temp.: 0° to +40°C (32° to 104°F) at full rated load. Max. current is derated 50 mA per degree C above +40° to a max. operating temp. of 50°C. Series Operation: Outputs may be conn. in series for 0-to-50 volt, 0-to-1.5 amp DC output. Parallel Operation: Outputs may be conn. in parallel (cur. equalizing resistors req.) for 0-to-25 volt, 0-to-3 amp output. Dimensions (HxWxD): 219 x 162 x 241 mm (8⅝ x 6⅜ x 9½″). Weight: 5.75 kg (12¾ lbs.). Model 1652 includes power cord, fuse for alternate line voltage, instruction manual, schematic diagram and parts list.

OPTIONAL ACCESSORY

Rack Mounting Kit RM-16.

ISOLATED-VARIABLE AC POWER SUPPLY



Model 1655 / $350.00

FEATURES

• Power line leakage tester • Variable-isolated output — 0-150 VAC • 3 amp continuous, 4 amp intermittent output • Built-in solid state soldering iron temperature control • Expanded leakage scale • Circuit breaker overload protection • Display volts, amps, VA, leakage • Two volt-amp ranges (0-240, 0-480) for convenient load requirements.

DESCRIPTION

B&K-PRECISION MODEL 1655 is an isolated-variable (0-150V) AC power supply with a built-in isolation transformer. It includes a leakage test capability and a built-in solid state soldering iron temperature control.

APPLICATIONS

Power line to chassis leakage testing to verify compliance to OSHA, UL and CSA leakage requirements . . . locate dielectric breakdowns with leakage test. Ideal OEM and MRO instrument. Performance testing at normal, low and high line voltages . . . troubleshooting.

SPECIFICATIONS

Voltage Adjust. Range: 0-150 VAC, with input at 120 VAC. Output Isolation: Leakage <0.1 mA (25°C, 50% rel. humidity). Current Ranges: 0-2 A, 0-4 A. Max. Current (Isolated): 3 A cont., 4 A intermittent (0-130 V). Peak Current (Inrush): 30 A max. (inrush limited to one cycle at 30 A). Voltage/Current Sensing: Sinewave average, calibrated in rms. Volt-Amp Ranges: 0-240 VA, 0-480 VA (voltage set at 120). Leakage Range: 0 to 5,000 μA (expanded in 100-500 μA portion, compressed to 5 mA full scale). Solder Iron Temp. Control: 70%-99% of power line (100 W max.) Power: 120 VAC ±10%, 60 Hz, 600 VA at max. output. Dimensions (HxWxD): 30.5 x 15.2 x 28.0 cm (12 x 6 x 11″). Weight: 10 kg (22 lbs.).

precision laboratory and system high voltage power supplies

SERIES 205A/210

MODEL 210-30R
High Voltage Power Supply
ON
POSITIVE
NEGATIVE
METER
OUTPUT VOLTAGE IS THE SUM OF THE DIAL SETTINGS

The Series 205A and 210 are a family of regulated precision high voltage power supplies. The output voltage is continuously adjustable by means of the calibrated direct reading front panel voltage controls over the full range from 0 to maximum voltage. Output voltage can also be remotely programmed over the full voltage range either from an external 0 to −5 volt source or using an external potentiometer.

A 3½″ front panel meter provides a continuous reading of output voltage or current. Remote current and voltage monitoring signals are available at the PROGRAMMING/MONITOR connector.

Reversible polarity Models 01R, 03R, and 05R have a rear panel polarity selector switch. All other reversible polarity models contain an easily accessible internal switching module. Front panel LEDs indicate the position of the polarity switch. All other units are single polarity, either positive or negative as ordered, and cannot be reversed.

SPECIFICATIONS ALL MODELS	
Input 205A **210**	115V @ 1A, 230V @ ½A, 50/60 Hz 115V @ 5A, 230V @ 2.5A, 50/60 Hz
Regulation	0.001% for ±10% line, 0.005% load
Stability	0.01%/hr., 0.02%/8 hr.
Temp. Coeff.	50 ppm/°C, 0 to 50°C
Resolution and Resettability	0.2 volt (10V on 50kV and 75kV models)
Calibration Accuracy	0.25% of dial reading plus 0.05% of max. voltage (plus 1% of max. voltage on 50 kV and 75kV models)
Protection	Short circuit and arc protected, self restoring

SIZE: All models are 19″ (483mm) wide; 205A-01 thru 205A-20 are 3½″ (83mm) H x 9⅝″ (245mm) D; 205A-30, 205A-50, and all 210 are 5¼₃₂″ (133mm) H x 15″ (381mm) D.

- **Precision High Voltage Power Supplies**
- **Output Voltage to 75kV**
- **Reversible Polarity up to 50kV**
- **Remote Analog Programming and Monitoring**
- **IEEE-488 Interface and Digital Programming Options Available**

Model*	Output Volts	Output mA	Ripple pk-pk
205A-01R	0 to ±1000	0 to 30	10mV
205A-03R	0 to ±3000	0 to 10	30mV
205A-05R	0 to ±5000	0 to 5	50mV
205A-10P, N, R	0 to 10,000	0 to 2.5	100mV
205A-20P, N, R	0 to 20,000	0 to 1	300mV
205A-30P, N, R	0 to 30,000	0 to 0.5	400mV
205A-50P, N, R	0 to 50,000	0 to 0.3	2V
210-01R	0 to ±1000	0 to 225	50mV
210-03R	0 to ±3000	0 to 75	100mV
210-05R	0 to ±5000	0 to 40	200mV
210-10P, N, R	0 to 10,000	0 to 15	500mV
210-20P, N, R	0 to 20,000	0 to 7	1V
210-30P, N, R	0 to 30,000	0 to 4.5	1.5V
210-50P, N, R	0 to 50,000	0 to 2.5	5V
210-75P, N	0 to 75,000	0 to 2	5V

ORDERING INFORMATION

* Specify output voltage polarity where choice is offered by selecting the appropriate suffix P for positive, N for negative, or R for reversible.

CONNECTORS

All models are supplied with a mating high voltage connector plus one set of mating connectors for remote monitoring and programming.

REMOTE DIGITAL COMPUTER PROGRAMMING OPTIONS SERIES 205A/210

All units in the Series 205A and 210 can be provided with an option for remote digital programming of the high voltage output. The addition of this option allows for the unit to be computer programmed with either 16 bit binary (option CBNY) or 4 decade BCD (option CBCD) TTL compatible input. The digital programming connector (Amphenol 57-30240) which accepts the remote binary coded input is located on the rear panel. A mating connector is provided.

IEEE-488 INTERFACE MODEL 200-C488

MODEL 200-C488

The Model 200-C488 allows any of the BERTAN Series 205A or Series 210 High Voltage Power Supplies to be operated on the IEEE-488 bus. Output voltage, voltage limit, and current limit can be set via the bus. Voltage and current measurements can be taken on request.

- **Full Talker/Listener Capability**
- **Operates With Any Series 205A or Series 210 Power Supply**

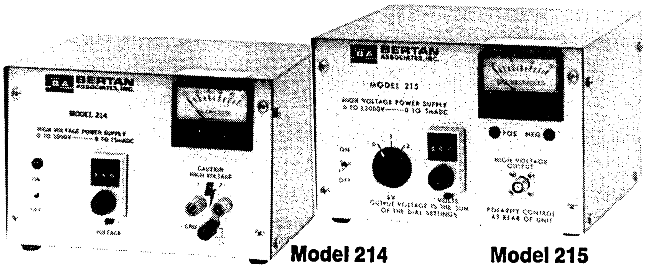
The user can program for power supply shut down on voltage and/or current overload conditions.

The 200-C488 mounts in a standard 19″ wide rack, 3½″ high. Input line voltage is either 115 or 230V ac (switch selectable), 50/60Hz.

BERTAN ASSOCIATES, Inc. 121 New South Rd., Hicksville, NY 11801 • (516) 433-3110 • TWX 510-221-2144

laboratory power supplies and test instruments

SERIES 214/215



Model 214 Model 215

- **Compact Bench Top Regulated High Voltage Power Supply**
- **Positive or Negative Polarity**
- **Short Circuit and Arc Protected**

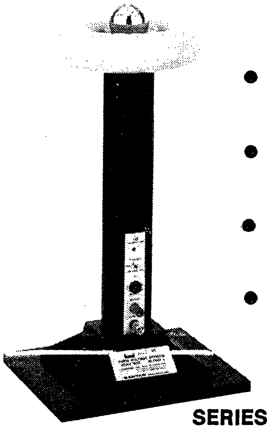
The Models 214 and 215 are general purpose laboratory instruments for use with positive or negative polarity photomultiplier tubes, high resolution CRT displays, solid state detectors, ionization chambers, proportional counters, lasers and other devices requiring an accurate and stable source of high voltage. The Model 214 is also applicable for ultrasonic transducers and video generator circuits.

The Model 214 and 215 are fully self-contained solid state units with an output voltage meter provided on the front panel. The Model 214 has a floating output (up to 1000V above ground) and can be used as a positive or negative source. The Model 215 features a polarity switch with LED polarity indicators and an output of 0 to ±3000V.

Specification	Model 214	Model 215
Output Voltage	0 to 1000V	0 to ±3000V
Output Current	0 to 15mA	0 to 5mA
Ripple	15mV pk-pk	15mV pk-pk
High Voltage Output Connector	3 Binding Posts (+, −, Gnd)	UG-931/U, Mating UG-932/U Provided

GENERAL SPECIFICATIONS	
Input	115V @ ½A, 230V @ ¼A, 50/60 Hz
Regulation	0.001% for ±10% line, 0.005% load
Stability	0.001% per hr., 0.02% per 8 hrs.
Temp. Coeff.	50 ppm/°C, 0 to +50°C
Resolution and Resettability	200mV
Calibration Accuracy	0.25% of dial reading +0.05% of maximum voltage
Size	7⅝"Wx7½"Dx5$\frac{1}{32}$"H (194x191x128mm)
Weight	8 pounds (3.6 kgms)

LABORATORY TEST INSTRUMENTS



SERIES HVD

- **Precision Resistive Divider Network**
- **1V Output per 10kV Input**
- **±0.2% Accuracy @ 23 ±2°C**
- **±25 ppm/C° Temp. Coeff.**

Model	Maximum Applied Voltage	Divider Impedance
HVD-10	10kV	100 Meg
HVD-30	30kV	300 Meg
HVD-60	60kV	600 Meg

MODEL HVL-25

MODEL HVL-25

- **Electronic High Voltage Load**
- **+25kV, 3mA Maximum**
- **Programmable Static and Dynamic Modes**
- **Front Panel and Remote Monitoring and Control**
- **12"H x 8"W x 9"D (305 x 203 x 229mm)**

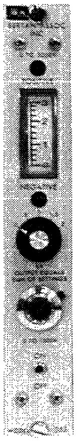
The HVL-25 is a versatile electronic load for testing high voltage power supplies. It is suitable for laboratory or inspection use and provides a convenient way to measure load regulation, dynamic response, and ripple voltage.

The current modes can be controlled from the front panel or remotely programmed. The remote programming and monitoring outputs allow for integration of the HVL-25 into automatic test equipment systems.

BERTAN ASSOCIATES, Inc. 121 New South Rd., Hicksville, NY 11801 • (516) 433-3110 • TWX 510-221-2144

nuclear instrumentation modules

SERIES NIM



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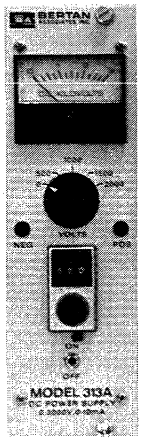
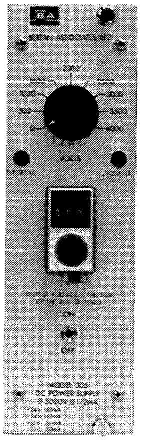


313A



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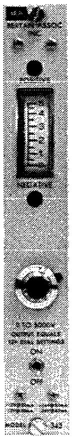

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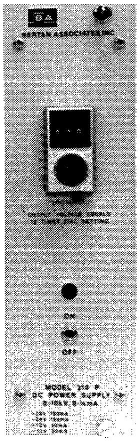


310P

- **Single and Dual Width NIM Modules per AEC TID 20893**
- **Output Voltage to 10kV**
- **High Stability**
- **AC or DC Input**
- **Reversible Polarity**
- **Low Ripple and Noise**
- **Remotely Programmable**
- **Custom and OEM Designs Available**

AC LINE POWERED MODELS

Model	Output Voltage	Output Current	Ripple pk-pk	Size
NIM 353	0 to ±3000V	0 to 2mA	5mV	S
NIM 355	0 to ±5000V	0 to 1mA	10mV	S
NIM 313A	0 to ±3000V	0 to 10mA	10mV	D
NIM 315	0 to ±5000V	0 to 5mA	25mV	D
NIM 320N	0 to −10,000V	0 to 2mA	100mV	D
NIM 320P	0 to +10,000V	0 to 2mA	100mV	D

INPUT POWER: 115/230V ±10%, 50/60 Hz, line power cord furnished

WEIGHT: Models 353 and 355 — 4.5 lbs. (2.1 kgms)
Models 313A thru 320 — 10.2 lbs. (4.6 kgms)

DC NIM BIN POWERED MODELS

Model	Output Voltage	Output Current	Ripple pk-pk	Size
NIM 342	0 to ±2000V	0 to 1mA*	2mV	S
NIM 345	0 to ±5000V	0 to 300μA*	5mV	S
NIM 301	0 to ±1000V	0 to 3mA	1mV	D
NIM 303	0 to ±3000V	0 to 1mA	3mV	D
NIM 305	0 to ±5000V	0 to 500μA	5mV	D
NIM 310N	0 to −10,000V	0 to 250μA	20mV	D
NIM 310P	0 to +10,000V	0 to 250μA	20mV	D

* Double output current is available with increased input current.

INPUT POWER: Single Width Models:
±12V dc @ 50mA and ±24V dc @ 83mA
Double Width Models:
±12V dc @ 50mA and ±24V dc @ 150mA

WEIGHT: Models 342 and 345 — 3.3 lbs (1.5 kgms)
Models 301 thru 310 — 5.2 lbs. (2.4 kgms)

SPECIFICATIONS ALL MODELS	
Regulation	0.001% line, 0.002% load
Stability	0.01%/hr., 0.02%/8 hrs.
Temp. Coeff.	50 ppm/°C, 0 to 50°C
Accuracy	0.25% of dial reading plus 0.05% of maximum voltage
Protection	Short circuit proof, arc protected
HV Output Connector	Kings 1707-1 SHV all units except 10kV models Kings 1064-1 for 10kV models Mating connectors must be ordered separately
Size	Single Width Models (S) 1.35″Wx8.7″Hx9.7″D (34x221x246mm) Double Width Models (D) 2.7″Wx8.7″Hx9.7″D (69x221x246mm)

BERTAN ASSOCIATES, INC. is the major manufacturer of regulated precision High Voltage Power Supplies in NIM configurations. A variety of models in standard single width and dual width NIM modules for insertion into a standard AEC NIM Bin are available. The inherent stability and low noise in the SERIES NIM makes these units ideally suited as a high voltage source for sensitive nuclear detectors.

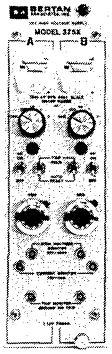
All units in the SERIES NIM (except for the 10kV models) have reversible polarity. Dual width units have a screwdriver operated polarity selector switch accessible at the top of the unit. Single width units employ a selector plug located inside the unit. Polarity selection is indicated by front panel LEDs.

Each BERTAN power supply is fully tested and burned in prior to shipment. All products have a one year warranty.

BERTAN ASSOCIATES, Inc. 121 New South Rd., Hicksville, NY 11801 • (516) 433-3110 • TWX 510-221-2144

NIM precision dual output power supplies

SERIES MWPC



- **Independent Dual Outputs**
- **Output Voltage Models to 10kV**
- **Local Control and Remote Programming**
- **Accurate Voltage and Current Monitoring**
- **0.001% Regulation**
- **50 ppm/°C Temperature Coefficient**
- **Short Circuit and Arc Protected**

Model*	Each Output Voltage	Each Output Current	Ripple pk-pk	HV Connectors
375P, N, X	0 to 5000V	0 to 500μA	50mV	KINGS 1707-1
377P, N, X	0 to 7500V	0 to 500μA	50mV	KINGS 1064-1
380P, N, X	0 to 10,000V	0 to 300μA	50mV	KINGS 1064-1

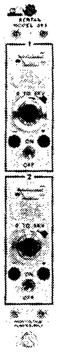
* Suffix P denotes both outputs positive, N denotes both outputs negative, and X denotes 1 output of each polarity.

POWER INPUT: ±12V dc @ 900mA via standard NIM bin connector

WEIGHT: 6.3 lbs. (2.9 kgms)

The BERTAN MWPC Series are precision High Voltage Power Supplies designed for use with multiwire proportional chambers. They utilize BERTAN's proprietary linear circuitry for the development of highly stable, regulated, low noise output voltages. Each dual width NIM MWPC power supply delivers two equally rated outputs of either the same or opposite polarity. Each output is completely independent of the other, allowing greater local and remote programming flexibility. Fast and slow overcurrent detectors protect sensitive MWPC loads. The precision output current monitor auto-nulling circuitry eliminates the need for zero offset adjustment.

SERIES 362/365



- **Independent Dual Outputs**
- **Output Voltage Models to 5kV**
- **Reversible Polarity**
- **Local Control and Remote Programming**
- **0.001% Regulation**
- **50 ppm/°C Temperature Coefficient**
- **Short Circuit and Arc Protected**

Model	Each Output Voltage	Each Output Current	Ripple pk-pk	HV Connectors
NIM 362	0 to ±2000V	0 to 1mA	10mV	KINGS 1707-1
NIM 365	0 to ±5000V	0 to 300μA	25mV	KINGS 1707-1
NIM 362/5	Model 362/5 contains one ±2000V @ 1mA power supply and one ±5000V @ 300μA power supply.			

WEIGHT: 4.5 lbs. (2.1 kgms)

INPUT POWER: ±12V dc @ 60mA, ±24V dc @ 150mA* via standard NIM bin connector

* If input current is limited to 83mA, the maximum output current is 250μA from the ±2000V power supply and 100μA from the ±5000V power supply.

The BERTAN Single Width NIM Series 362/365 contains two independent high voltage power supplies. The models are designed for use with sensitive detectors where stability and low noise are critical requirements. Each output can be independently controlled or programmed and monitored. Polarity reversal is achieved by selector switches located inside the unit. The polarity of each output is indicated by front panel polarity LEDs. Each BERTAN power supply is fully tested and burned in prior to shipment. All products have a one year warranty.

BERTAN ASSOCIATES, Inc. 121 New South Rd., Hicksville, NY 11801 • (516) 433-3110 • TWX 510-221-2144

single output high voltage modules

SERIES 602B, 603, 605C, 606C, and 612A

602B
605C
606C
603
612A

- **Compact Precision Modules**
- **Remotely Programmable or Internally Controlled**
- **Voltage Monitor Output**
- **0.001% Regulation**
- **0.01%/hr, 0.02%/8 hrs Stability**
- **50 ppm/°C Temp. Coeff, 0 to 50°C**
- **Short Circuit and Arc Protected**

AC INPUT SERIES 602B & 603

Model*	Output Voltage	Output Current	Ripple pk-pk	HV Conn.
602B-15P, N	0 to 1500V	0 to 10mA	15mV	MHV
602B-30P, N	0 to 3000V	0 to 5mA	30mV	MHV
602B-50P, N	0 to 5000V	0 to 2mA	50mV	MHV
602B-100P, N	0 to 10,000V	0 to 1mA	100mV	8101FP(1)
602B-150P, N	0 to 15,000V	0 to 0.6mA	450mV	8101FP(1)
602B-200P, N	0 to 20,000V	0 to 0.4mA	800mV	8111SFP(1)
603-15P, N	0 to 1500V	0 to 20mA	15mV	SHV
603-30P, N	0 to 3000V	0 to 10mA	30mV	SHV
603-50P, N	0 to 5000V	0 to 5mA	50mV	SHV
603-100P, N	0 to 10,000V	0 to 2mA	100mV	8101FP(1)
603-150P, N	0 to 15,000V	0 to 1.5mA	450mV	8101FP(1)

602B INPUT: 115V @ ½A/230V @ ¼A ±10%, 50/60 Hz
603 INPUT: 115V @ 1A/230V @ ½A ±10%, 50/60 Hz
SIZE & WEIGHT: See chart below

DC INPUT SERIES 605C & 606C

Model*	Output Voltage	Output Current	Ripple pk-pk	HV Conn.(1)
605C-15P, N	0 to 1500V	0 to 6mA	15mV	8101FP
605C-30P, N	0 to 3000V	0 to 3mA	30mV	8101FP
605C-50P, N	0 to 5000V	0 to 1.5mA	50mV	8101FP
605C-100P, N	0 to 10,000V	0 to .75mA	100mV	8101FP
605C-150P, N	0 to 15,000V	0 to .4mA	450mV	8101FP
606C-15P, N	0 to 1500V	0 to 20mA	15mV	8101FP
606C-30P, N	0 to 3000V	0 to 10mA	30mV	8101FP
606C-50P, N	0 to 5000V	0 to 5mA	50mV	8101FP
606C-100P, N	0 to 10,000V	0 to 2mA	100mV	8101FP
606C-150P, N	0 to 15,000V	0 to 1.5mA	450mV	8101FP

605C INPUT: +28V dc ±10% @ 0.75A
606C INPUT: +28V dc ±10% @ 2A
SIZE & WEIGHT: See chart below

AC INPUT SERIES 612A

Model*	Output Voltage	Output Current	Ripple pk-pk
612A-200P, N	0 to 20,000V	0 to 1mA	200mV
612A-300P, N	0 to 30,000V	0 to 0.5mA	300mV
612A-500P, N	0 to 50,000V	0 to 0.3mA	800mV

INPUT: 115V @ ¾A/230V @ ⅜A ±10%, 50/60 Hz
SIZE & WEIGHT: See chart below

ADDITIONAL FEATURES FOR SERIES 612A

- **Outputs to 50 kV**
- **Applications Include Electron Beam, Ion Beam, and CRT Systems**
- **Voltage and Current Monitoring**
- **Mating High Voltage Connector and Programming/Monitor Connector Provided**

SIZE AND WEIGHT—ALL MODELS

	602B-all except -200	602B-200	603-all	605C-all	606C-all	612A-all
Size HxWxD	5x3x8⅝" 127x76x219mm	5x4x9⅝" 127x102x244mm	5x5½x8½" 127x140x216mm	5x2¾x4¾" 127x70x121mm	5x5½x4½" 127x140x114mm	4⅞x8⅜x9¾" 124x213x248mm
Weight	6.75 lbs. 3.1 kgms	8 lbs. 3.6 kgms	8 lbs. 3.6 kgms	3 lbs. 1.4 kgms	3.5 lbs. 1.6 kgms	9 lbs. 4.1 kgms

ORDERING INFORMATION

* Specify output voltage polarity by selecting the appropriate suffix P for positive or N for negative.

(1) Mating connector assembled to 39" (1 meter) of unshielded high voltage cable is supplied with each unit having an 8101FP or 8111SFP HV connector.

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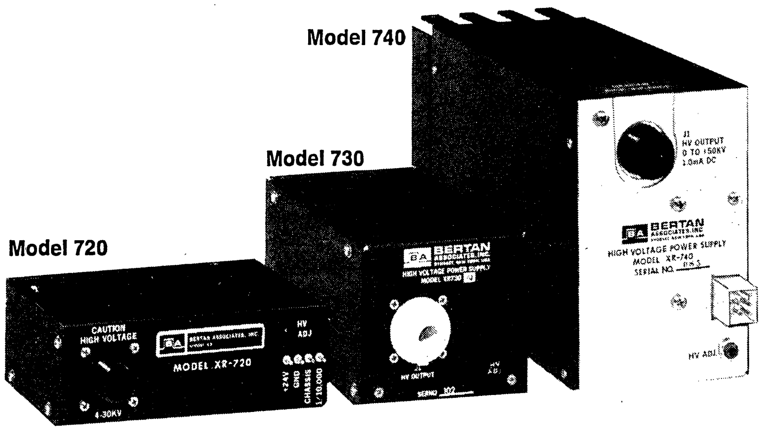
single output high voltage modules

SERIES 720, 730, and 740



- **Applications Include:**
  - **X-Ray**
  - **CRT**
  - **Electron and Ion Beam**
- **Positive or Negative HV Output**
- **Regulated Outputs to 50,000 Volts**
- **Remote Programming and Monitoring**
- **Low Ripple and Noise**
- **Short Circuit and Arc Protected**

The Series 720, 730, and 740 High Voltage Power Supplies provide performance characteristics ideally suited to the operation of CRTs, Electron Beam, and X-RAY Sources. All units are regulated, fully adjustable, and easily satisfy system or bench-top operation requirements.

CONTROL AND PROGRAMMING

High voltage output for all Series 720, 730 and 740 power supplies is controlled by a local HIGH VOLTAGE ADJUST potentiometer. 730 and 740 models also feature remote programming using either a 0 to +5 volt command voltage, or a remote potentiometer and the unit's internal reference.

MONITORING

All units offer a monitor output proportional to the output high voltage (+5V at max. output voltage). Performance of the high voltage is not affected by loading of the monitor output. Additionally, Series 730 and 740 contain an isolated high voltage return (1k Ω to ground) to provide true output current monitoring.

GENERAL SPECIFICATIONS	
Input	28V DC, ±5% @ 1A Model 720A 2A Model 730A 4A Model 740A
Regulation	Line: 0.002% Load: 0.01%
Ripple	0.05% pk-pk (0.02% for 730)
Temp. Coeff.	100 ppm/°C, 0 to +50°C
Mounting	Threaded inserts in base of unit

Model*	Maximum Output		Size H"xW"xD" (mm)	Weight	Connectors	
	Voltage	Current			Input, Control and Monitoring	HV Output
720A-10P, N **720A-30P, N**	10kV 30kV	1.2mA 300μA	2⅛x6x3¾ (54x152x95)	3 lbs. 1.4 kgms	Solder Terminals	LGH-2I
730A-30P, N	30kV	500μA	3¾x6x3¼ (95x152x83)	3 lbs. 1.4 kgms	9 Pin Connector†	LGH-2I
740A-30P, N **740A-50P, N**	30kV 50kV	2mA 1mA	6x4x9½ (152x102x241)	8 lbs. 3.6 kgms	9 Pin Connector†	LGH-2I LGH-4I

† Mating Connector Supplied

ORDERING INFORMATION

* Specify output voltage polarity by selecting the appropriate suffix P for positive or N for negative.

SPECIAL REQUIREMENTS

In addition to our large selection of standard units, we can custom design a unit to meet your specific needs.

Call the factory for additional information and application engineering assistance.

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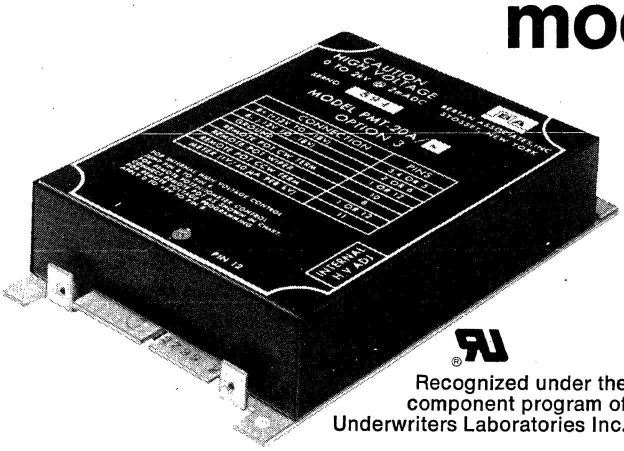
photomultiplier power supply modules



Recognized under the component program of Underwriters Laboratories Inc.

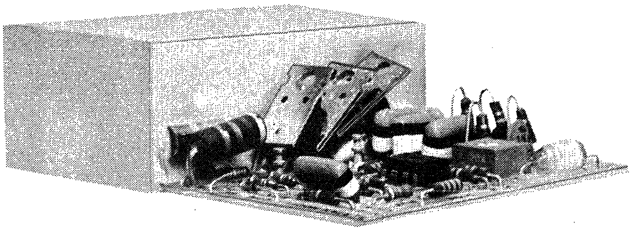
- **High Performance Regulated DC-DC Modules**
- **Up to 7500 Vdc Output**
- **Internal Voltage Control**
- **Remote Voltage Programming**
- **Remote Voltage Monitoring**
- **Short Circuit & Arc Protected**
- **Available from Stock**

Model*	Output		Ripple pk-pk
	Voltage	Current	
PMT-05A-P, N	0 to 500V	0 to 8mA	5mV
PMT-10A-P, N	0 to 1000V	0 to 4mA	4mV
PMT-20A-P, N	0 to 2000V	0 to 2mA	2mV
PMT-50A-P, N	0 to 5000V	0 to 0.5mA	10mV
PMT-75A-P, N	0 to 7500V	0 to 0.25mA	50mV

ORDERING INFORMATION

* Specify output voltage polarity by selecting the appropriate suffix P for positive or N for negative. Add option (#1 or #3) to determine input voltage.

GENERAL SPECIFICATIONS	
Input	Option #1: +24 to +30V dc @ 350mA max. Option #3: ±12 to ±18V dc @ 350mA max.
Regulation	0.001% line, 0.001% load
Stability	0.005%/hr, 0.02%/8 hrs. (after 30 min. warmup)
Temp. Coeff.	50 ppm/°C, 0 to 50°C
H.V. Output Connector	18" flying lead, shielded (RG59A/U)
Size	3⅞"x6 5/16"x1¼" (98x160x32mm)



- **Low Cost DC-DC Module**
- **Remote Voltage Programming**
- **Short Circuit Proof & Arc Protected**

Model*	Output		Ripple pk-pk
	Voltage	Current	
PMT-1500P, N	0 to 1500V	0 to 1mA	25mV
PMT-2500P, N	0 to 2500V	0 to 0.5mA	25mV

ORDERING INFORMATION

* Specify output voltage polarity by selecting the appropriate suffix P for positive or N for negative.

GENERAL SPECIFICATIONS	
Input	+15V dc ±5% @ 250mA max.
Regulation	100mV for ±1% line, 100mV load
Stability	0.005%/hr, 0.02%/8 hrs (after 30 min. warmup)
Temp. Coeff.	100 ppm/°C, 0 to 50°C
Connections	.080 dia. pins, input and HV output
Size	2⅝"x3½"x1" (66.7x88.9x25.4mm)

CUSTOM AND OEM PMT HIGH VOLTAGE POWER SUPPLIES

Other input and output voltage and current ranges, custom configurations and connectors, and special programming and monitoring features can be provided. Although the standard PMT power supply modules described above are economically priced, generous discounts are available for large quantity users. Please consult the factory or our local representative for special quantity pricing or for your custom requirements.

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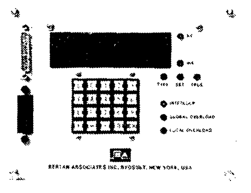
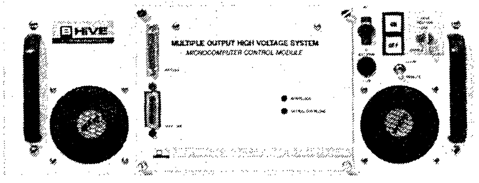
multiple output high voltage system



LOCAL CONTROL/ MONITOR MODULE
Optional module that allows local front panel control. All functions are available from the Key Pad. All data can be observed on the digital display.


B HiVE
MULTIPLE OUTPUT HIGH VOLTAGE SYSTEM
MICROCOMPUTER CONTROL MODULE

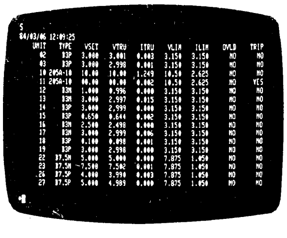
The B-HiVE is a multiple output High Voltage Power Supply Enclosure that can be configured to perform a wide range of power, control, and monitoring functions.

Up to 16 plug-in modules called B-MODs and B-PACs populate the B-HiVE. B-MODs are dual output high voltage supplies with independently controlled and monitored outputs. B-PACs are dual channel general purpose analog controllers that allow the B-HiVE to interface with the BERTAN Series 205A/210 (for outputs up to 100kV) and Series MWPC supplies or with general purpose analog control and measurement devices (low voltage power supplies, electronic loads, various sensors, etc.).

The built-in dedicated B-COMP microcomputer identifies each module by type and location, and adapts its own logic and control functions accordingly. Output, monitoring and overload protection can be programmed remotely, using the IEEE-488 (GPIB) and/or RS232C ports, or locally with the optional Key Pad.

The IEEE-488 port allows up to 15 B-HiVEs to be operated from a single GPIB controller. CAMAC control is accomplished using readily available GPIB/CAMAC or RS232C port, or to an auxiliary port on the display terputer, the B-HiVE becomes a sophisticated automatic test station for applications requiring precise control and monitoring of high performance high voltage sources and other programmable instrumentation.

Any Standard ASCII terminal can be used to provide complete control and monitoring of the B-HiVE via the RS232C port.



```
S
84/03/06 12:09:25
    UNIT    TYPE   VSET   VTRU   ITRU   VLIM   ILIM   OVLD   TRIP
     02      B3P  3.000  3.001  0.003  3.150  3.150     NO     NO
     03      B3P  3.000  2.998  0.001  3.150  3.150     NO     NO
     10  205A-10  10.00  10.00  1.249  10.50  2.625     NO     NO
     11  205A-10  00.00  00.00  0.002  10.50  2.625     NO    YES
     12      B3N  1.000  0.996  0.000  3.150  3.150     NO     NO
     13      B3N  3.000  2.997  0.015  3.150  3.150     NO     NO
     14      B3P  3.000  2.999  0.000  3.150  3.150     NO     NO
     15      B3P  0.650  0.644  0.002  3.150  3.150     NO     NO
     16      B3N  2.500  2.498  0.000  3.150  3.150     NO     NO
     17      B3N  3.000  2.999  0.006  3.150  3.150     NO     NO
     18      B3P  0.100  0.098  0.001  3.150  3.150     NO     NO
     19      B3P  3.000  2.998  0.000  3.150  3.150     NO     NO
     22    B7.5N  5.000  5.000  0.000  7.875  1.050     NO     NO
     23    B7.5N -7.500  7.502  0.001  7.875  1.050     NO     NO
     26    B7.5P  4.000  3.990  0.003  7.875  1.050     NO     NO
     27    B7.5P  5.000  4.989  0.000  7.875  1.050     NO     NO
```

A block status report lists all the above information for any group of modules.

A global status report show the status of every output in the B-HiVE.

An overload display shows the time the overload occurred and the channel(s) affected. An audible alarm alerts the user to this condition.

Any printer equipped to operate from an RS232C serial interface can be used to record operation of the B-HiVE. The printer is connected directly to the B-HiVE's RS232C port, or to an auxiliary port on the display terminal or remote computer. Overload or trip condition reports are immediately sent to the printer.

All command entries from the B-COMP and all status dumps can be logged automatically on the B-PRINT. The B-COMP optional calendar/clock card (B-CLK) allows for unattended data logging at programmable intervals. The B-CLK also outputs the date and time automatically on every data output.

- **Up to 32 Independently Controlled High Voltage Outputs**
- **Plug-In High Voltage Modules**
- **Plug-In Universal Control/Monitor Modules**
- **IEEE-488 Talker/Listener**
- **RS232C Interface**
- **Battery Back-Up CMOS Memory**
- **Automatic Data Logging Output**
- **ATE Applications**
- **Detector Array Applications**

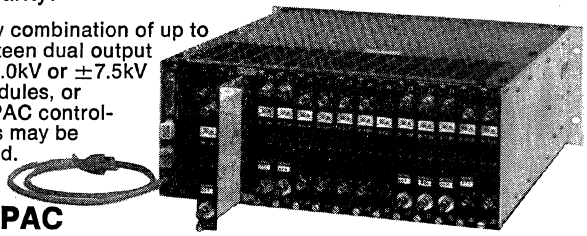
BERTAN ASSOCIATES can provide a Display Terminal and/or Printer configured and tested to operate with the B-HiVE. The appropriate hardware (ports, buffers, etc.), and software is included to allow operation of either or both units and provides full monitoring, control, and data logging capability.

B-MOD HIGH VOLTAGE MODULES

Each B-MOD high voltage module provides two fixed polarity, high voltage outputs. Positive or negative modules, 3kV @ 3mA or 7.5kV @ 1mA are available. B-MOD outputs can be addressed, controlled and monitored individually or in groups.

	B3P, B3N	B7.5P, B7.5N
Voltage Output	0 to 3kV	0 to 7.5kV
Current Output	3mA Max.	1mA Max.
Line Regulation	0.001%	0.001%
Load Regulation	0.005%	0.005%
Ripple	100 mV p-p	100mV p-p

Both outputs are fixed positive (P) or negative (N) polarity.



Any combination of up to sixteen dual output ±3.0kV or ±7.5kV modules, or B-PAC controllers may be used.

B-PAC

The B-PAC can monitor and control BERTAN Series 205A/210 and MWPC High Voltage Power Supplies. Fully loaded with B-PACs configured in this manner, the B-HiVE can deliver 32 outputs at up to 100kV each, with power outputs as high as 250W each. The B-PAC can also be used as a dual channel general purpose analog controller that provides flexibility in ATE applications. Each B-PAC channel provides one analog voltage output and accepts two analog inputs. This allows control of any power supply or other equipment using analog control signals of either polarity. Monitoring can be performed not only for power supplies, but also for high voltage dividers, electronic loads and other instrumentation. A B-HiVE loaded with 16 B-PACs can independently program 32 outputs and monitor 64 inputs.

Contact your local sales representative or a BERTAN application engineer for assistance in configuring a system to your exact requirements. A 6 page detailed brochure on the B-HiVE is available upon request.

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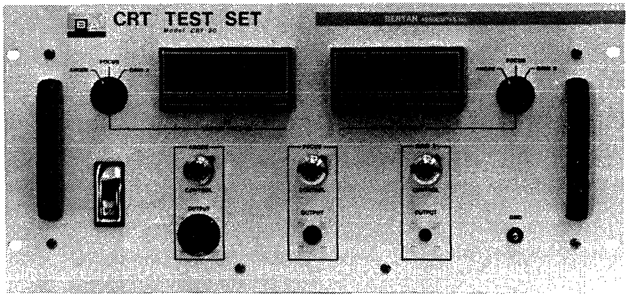
CRT test sets and system power supplies

MODEL CRT-30 AND CRT-50



IEEE-488 INTERFACE AVAILABLE

	Output		HV Connector
	Voltage	Current	
Anode			
CRT-30	0 to +30,000V	0 to 2mA	LGH-2I
CRT-50	0 to +50,000V	0 to 2mA	LGH-4I
Focus	0 to +10,000V	0 to 1mA	LGH-1I
G2	0 to +1000V	0 to 1mA	LGH-½I

GENERAL SPECIFICATIONS	
Input	115/230V ±10%, 50/60 Hz
Regulation	0.01% line, 0.01% load
Ripple & Noise	0.01% pk-pk
Temp. Coeff.	100 ppm/°C, 0 to +50°C
Calibration Accuracy	0.25% of setting +0.2% of maximum voltage
Size	19"Wx8¾"Hx15"D (483x222x381mm)

Mating connectors with "flying lead" high voltage cable are included for each of the high voltage outputs.

ORDERING INFORMATION

When ordering, place the suffix of any option(s) you require after the model number. For example, a CRT-30 with dynamic focus and G1 options would be ordered as: CRT-30-DY-G1. For IEEE-488 interfacing the Model 300-C488 must be ordered separately.

For application assistance, or for a quotation on your custom requirements, please contact the local BERTAN representative or an application engineer at the factory.

The BERTAN CRT-30/50 is a three output high voltage power supply system specifically configured for versatile laboratory, CRT test, or system applications. The precision regulated anode, focus and G2 power supplies are short circuit proof and arc protected. Calibrated controls and digital displays provide independent control and monitoring of each output voltage and current. A wide range of options are available, including auxiliary outputs, dynamic focus, digital programming, and a comprehensive IEEE-488 Talker/Listener interface.

Custom units can be provided to meet individualized system applications. Special system interfacing, additional or different output voltages, improved specifications, and special connectors are typical custom requirements which can be incorporated with a minimum of additional cost and time delay.

OPTIONS

REMOTE PROGRAMMING & MONITORING (OPTION REM)

Remote analog programming of the high voltage outputs by means of three independent external 0 to +5V dc command inputs. This option also includes six monitor outputs, each proportional to one of the output voltages and currents.

FILAMENT OUTPUT (OPTION FL)

5 to 7.5 volts, adjustable, @ 1.25A dc maximum.

G1 OUTPUT (OPTION G1)

−3 to −150 volts, adjustable, @ 1mA dc maximum.

DYNAMIC FOCUS (OPTION DY)

0 to 250 volts @ 25V/μsec for a 0 to 5 volt control input. (This option deletes the capability to monitor focus current output.)

REMOTE DIGITAL PROGRAMMING (OPTIONS Y AND D)

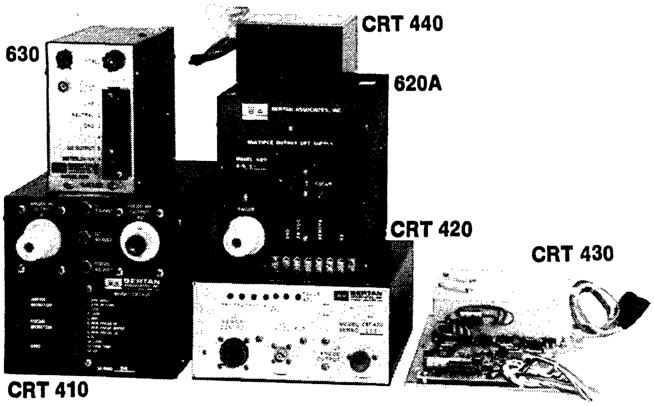
Two options are available which permit remote 16 bit TTL compatible digital programming. These utilize either 16 bit binary (option Y) or 4 decade BCD (option D) coding. Any one or two or all three outputs may be equipped for these options. (Must be ordered with option REM.)

IEEE-488

The Model 300-C488, intelligent IEEE-488 interface, is available for use with the Model CRT 30/50. This unit provides complete control and monitoring, and can be programmed to provide additional protective and system capability. Refer to the 300-C488 product sheet for detailed information.

CRT multi-output power supplies

MODELS 410, 420, 430, 440, 620A, AND 630



BERTAN multi-output CRT power supply modules are field proven units providing outstanding perfomance and reliability in many OEM and system development applications. All units are arc protected, current limited, and self-restoring. The chart below lists the output capabilities, input requirements, and sizes of standard BERTAN units usually available from stock. For detailed specifications on regulation, ripple, etc., please request the detailed product literature.

	Model					
	410	420	430	440	620A	630
Anode	+10 to +26kV @ 50μA Max.	+10kV @ 50μA	+16 to +22kV @ 500μA	+5 to +15kV @ 200μA	0 to +20kV @ 250μA	—
Focus	+2.5 to +7.5kV @ 500μA	+2 to +3.5kV @ 500μA	+4 to +6kV @ 300μA	+250 to +750V @ 1mA	0 to +5kV @ 500μA	0 to +5kV @ 2mA
Dynamic Focus	0 to +300V @ 10V/μsec 0 to +5V Input	0 to +250V @ 2V/μsec 0 to +5V Input	0 to +300V @ 60 Hz 0 to +3V Input	—	—	0 to +250V @25V/μsec 0 to +5V
G2	+300 to +1000V @ 100μA	+300V @ 500μA	+550 to +750V @ 1mA	—	0 to +500V @ 1mA	+300V 500μA
G1	0 to −100V @ 100μA	−10 to −70V @ 100μA	—	−150V @ 1mA	—	—
FIL	—	+6.3V dc @ .75A	—	—	—	—
Input	±15V dc & +24V dc	115V 50/60 Hz	+28V dc	+28V dc	+28V dc or 115V/230V 50/60 Hz	115/230V 50/60 Hz
Size (mm)	6″x10″x6″ (152x254x152)	6¾″x9⅜″x3⅜″ (171x238x86)	6″x12″x2″ (152x305x51)	3¾″x5″x1¾″ (95x127x44)	5″x9″x6″ (127x229x152)	3¹⁄₁₆″x8⅝″x5″ (78x219x127)

The CRT 410 includes precision anode, focus, G2, and G1 power supplies each independently adjustable. Calibrated test points are provided for monitoring the anode and focus outputs.

The CRT 420 is a complete high performance six output power supply, including the time delay and logic circuitry to assure total system performance and reliability.

The CRT 430 provides extremely versatile performance in an economical package. The anode and focus outputs are independently adjustable and the G2 output tracks the anode voltage. A capacitively coupled high speed dynamic focus input is provided in addition to the 60 Hz 300V dynamic output amplifier.

The CRT 440 is an economical package designed for high volume applications requiring performance and reliability. The focus output tracks the anode voltage.

The CRT 620A is available for either AC or DC input. The anode and focus supplies are independently adjustable and include output voltage monitoring. The G2 output tracks the anode voltage.

The Model 630 is an adjustable focus power supply with high speed dynamic correction capability and a fixed voltage G2 output. Local control, remote programming, dynamic waveform amplifier, and output monitoring are included for the focus output. The Model 630 can be combined with a BERTAN single output high voltage module (for anode voltage) to obtain a complete high resolution CRT power supply system.

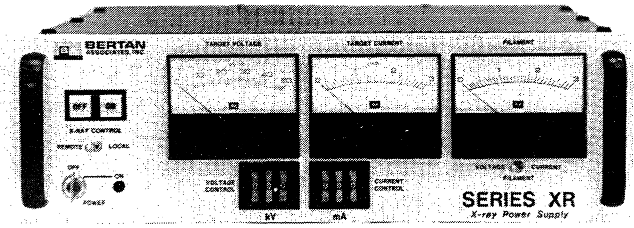
Custom units to meet your specific requirements can be readily provided based upon the BERTAN standard modules or designed to your exact mechanical and electrical specifications. Multi-output CRT power supply systems can also be assembled using a combination of BERTAN single output modules. Please consult our local representative or contact the factory directly for engineering assistance.

BERTAN ASSOCIATES, Inc. 121 New South Rd., Hicksville, NY 11801 • (516) 433-3110 • TWX 510-221-2144

x-ray source power supply and control system

SERIES XR

- **Target Voltage to 75kV**
- **Independent Control of Target Voltage and Current**
- **Front Panel Control or Remote Programming**
- **Filament Power Supply with Automatic Warm-Up**
- **Short Circuit and Arc Protected**
- IEEE-488 **IEEE-488 Interface Available**



IEEE-488

Each model in the BERTAN XR-Series is a solid-state power supply and control system designed for the operation of filamentary X-RAY sources. The units contain the necessary power supplies, control, logic and safety circuits to provide independent control of the X-RAY source target voltage and target current.

Target current is controlled by the automatic adjustment of the filament power. A safety timer sets the filament current at a warm-up level for one minute at turn-on or following any interruption of the interlock or line power.

The target voltage and target current are independently settable from the front panel or via remote analog programming inputs (0 to −5 volts). The analog programming input signals are applied via the rear panel Interlock and Remote Analog Programming connector.

Digital programming is optional. 16 bit binary (option CBNY) or 4-decade BCD (option CBCD) programming interfaces can be provided for either or both, target voltage and target current. These interfaces are installed in the unit and programmed via the Remote Digital Programming connector.

IEEE-488 INTERFACE

Programming the XR-Series via the IEEE-488 bus can be accomplished using a BERTAN Model 300-C488 interface. This intelligent interface permits programming and limit setting of target voltage and current. The Model 300-C488 also provides many additional operating features of particular value in system and test applications. Please request a detailed specification for additional information.

CUSTOM DESIGNS

Custom designed units can be provided to meet specialized system, test, or laboratory applications. OEM inquiries are invited. For additional information please contact our local representative or contact the factory directly.

Model	Target		HV Connector
	Voltage	Current	
XR-30	0 to +30,000V	0 to 4.5mA	LGH-2I
XR-50	0 to +50,000V	0 to 2.5mA	LGH-4I
XR-75	0 to +75,000V	0 to 2mA	BA 206906*

* Mating connector and cable assembly provided with each XR-75.

SPECIFICATIONS, ALL MODELS	
Target Voltage	
Regulation	0.001% line, 0.005% load
Ripple	0.01% pk-pk
Stability	0.01%/hr., 0.02%/8 hrs.
Temp. Coeff.	50 ppm/°C, 0 to 50°C
Accuracy	0.25% of setting plus 0.05% of maximum voltage
Target Current	
Regulation	0.002% line, 0.01% load
Stability	0.02%/hr., 0.04%/8 hrs.
Temp. Coeff.	100 ppm/°C, 0 to 50°C
Accuracy	0.5% of setting plus 0.1% of maximum current
Filament Power	
Output Voltage	0 to 3V dc
Output Current	2.5A dc maximum
(Filament power is automatically controlled to satisfy the commanded value of Target Current)	
Input Power	115/230V ±10%, 6¼/3A, 50/60 Hz
Size	5.25"Hx18"Dx19"W (133x457x483mm)
Weight	48 lbs. (22 kgms)
Connectors	HV — See chart above Filament — (Mating connector provided) Interlock/Remote — (Mating connector provided) Remote Digital (optional) — (Mating connector provided)

BERTAN ASSOCIATES, Inc. 121 New South Rd., Hicksville, NY 11801 • (516) 433-3110 • TWX 510-221-2144

x-ray source power supply module

SERIES 710

BERTAN
ASSOCIATES, INC.
HIGH VOLTAGE POWER SUPPLY
SERIES- 710
50P-D20N
J1
HIGH VOLTAGE
OUTPUT
DETECTOR
X RAY
SOURCE
HV ADJUST
J2
+28V 1
GND 2
NC 3
GND

- **X-Ray Source and Detector HV Outputs**
- **X-Ray Source HV Output to 50kV**
- **Positive or Negative HV Outputs**
- **Internal Control or Remote Programmable**
- **Output Voltage and Current Monitoring**
- **Low Ripple and Noise**
- **Short Circuit and Arc Protected**

The Series 710 provides both the X-RAY source high voltage and the detector high voltage required by high performance analytical instrumentation. A wide range of X-RAY source and detector voltage outputs is available to meet most applications.

CONTROL AND PROGRAMMING

Control features allow for adjustment of the output voltages using the internal voltage controls, or independent remote programming of the two high voltage outputs.

MONITORING

Monitor outputs are provided to allow for remote monitoring of the X-RAY source high voltage, the detector high voltage and the X-RAY source current.

X-RAY SOURCE HV OUTPUT

Model*	Output		HV Connector
	Voltage	Current	
710-20P, N	0 to 20,000V	0 to 1.5mA	LGH-2I
710-30P, N	0 to 30,000V	0 to 1mA	LGH-2I
710-50P, N	0 to 50,000V	0 to 0.5mA	LGH-4I

* Select P for positive polarity output or N for negative.

REGULATION: 0.005% line, 0.03% load

RIPPLE: 0.01% pk-pk (0.02% for 710-50P, N)

TEMP. COEFF.: 100 ppm/°C, 0 to 50°C

MONITOR: +1V per 10kV output
0.1V per 100μA output

ORDERING INFORMATION

The model number should be selected based upon the voltage and polarity required by the X-RAY source. The option is selected next to satisfy the detector requirements. An X-RAY source requiring up to +50kV and a detector requiring −1600V would be satisfied by a Model 710-50P Option 20N. (If the detector output is not required, specify Option 0.)

GENERAL SPECIFICATIONS	
Input Power	+28V dc ±5% @ 2.5A
Size	4⅞"Hx8⅜"Wx10¼"D (124x213x260mm)
Weight	19 lbs. (8.6 kgms)
Mounting	Two 10-32 threaded inserts in base of unit
Connectors	Input power via terminal strip Programming and Monitoring via 9-pin connector (Mating connector included) HV connectors — See charts below (Mating connectors not included)

DETECTOR HV OUTPUT

Option*	Output		HV Connector
	Voltage	Current	
10P, N	0 to 1000V	0 to 4mA	UG 931/U
20P, N	0 to 2000V	0 to 2mA	UG 931/U
50P, N	0 to 5000V	0 to 0.5mA	UG 931/U
75P, N	0 to 7500V	0 to 0.25mA	UG 931/U

* Select P for positive polarity output or N for negative.

REGULATION: 0.005% line, 0.005% line

RIPPLE: 0.001% pk-pk

TEMP. COEFF.: 50 ppm/°C, 0 to 50°C

MONITOR: 1V per kV output

SPECIAL REQUIREMENTS

In addition to the large selection of standard units available, a custom design can be provided to meet special requirements.

Please contact our local representative or call the factory directly for additional information or application engineering assistance.

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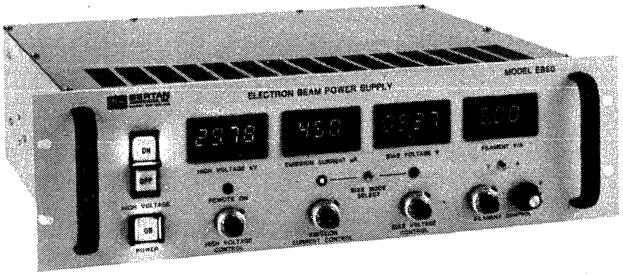
electron beam and ion beam power supplies

SERIES EB AND SERIES IB



IEEE-488

- **Beam, Bias, & Filament High Performance Power Supply System**
- **Two User Selectable Bias Regulation Modes Including Constant Beam Current**
- **Three User Selectable Filament Regulation Modes**
- **Digital Front Panel Metering of All Outputs**
- **Remote Programming & Monitoring of All Outputs**
- **Arc and Short Circuit Protected**
- **IEEE-488 Interface Available**

Series EB and Series IB are triple output high voltage power supply systems specifically developed for precision electron beam and ion beam applications. Each model contains three independently adjustable power supplies for beam acceleration, bias, and filament. The isolated bias and filament power outputs "float" on the high voltage acceleration output.

Output voltages and currents are precisely controlled from the front panel or by remote programming. The isolated bias supply can either be voltage regulated or controlled by an internal feedback circuit to maintain constant current from the beam supply.

The filament supply has a symmetrically bipolar DC output with respect to the beam voltage and can be operated in a constant voltage, constant current, or constant power mode. This versatility enables the user to select the mode of operation which will maximize filament life and system performance.

CUSTOM AND OEM REQUIREMENTS

In addition to the standard models described above, BERTAN has designed units to meet specific custom and OEM requirements. These requirements may include special control, programming, or monitoring circuits and tight performance specifications. Please contact your local BERTAN representative or call the factory directly for application or technical assistance.

IEEE-488 INTERFACE

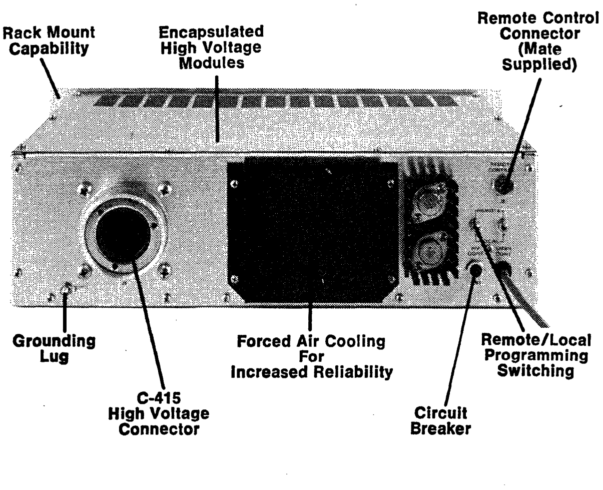
The BERTAN Model 300-C488 allows any model in the Series EB or Series IB to be fully controlled and monitored under IEEE-488 bus control. This intelligent interface also provides additional operating features and system capabilities. Please request product literature or consult a BERTAN application engineer for additional information.

	Beam Power Supply		*Bias Power Supply	
Model	Voltage	Current	Voltage	Current
EB-30	0 to −30,000V	0 to 500μA	0 to −1000V	0 to 50μA
EB-50	0 to −50,000V	0 to 250μA	0 to −2000V	0 to 50μA
IB-30	0 to +30,000V	0 to 500μA	0 to +2000V	0 to 50μA
IB-50	0 to +50,000V	0 to 250μA	0 to +2000V	0 to 50μA

SPECIFICATIONS ALL MODELS	
Filament*	(Control mode selectable)
Voltage	0 to 5V dc
Current	0 to 5A dc
Power	0 to 25W
Input Power	115/230V ±10%, 47-63 Hz, 2A
Size	19″Wx5¼″Hx17″D (483x133x432mm)
Weight	55 lbs. (25 kgms.)

* Bias Power Supply and Filament Power Supply will "float" at the Beam Power Supply high voltage output.

REAR PANEL


Rack Mount Capability
Encapsulated High Voltage Modules
Remote Control Connector (Mate Supplied)
Grounding Lug
Forced Air Cooling For Increased Reliability
Remote/Local Programming Switching
C-415 High Voltage Connector
Circuit Breaker

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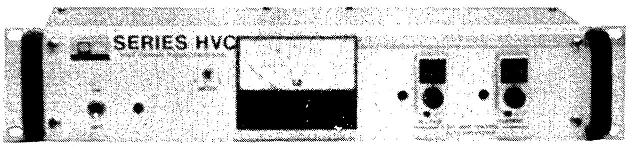
high voltage power supply controller

MODEL HVC HIGH VOLTAGE CONTROLLER



The BERTAN Model HVC provides voltage and current control of the single output high voltage power supplies in the Series 205A, 210 and 612A. The Model HVC interfaces directly to the power supply by means of a control cable which connects to the power supply remote control/monitor connector. The required connectors and interfacing cable are provided with each Model HVC.

INPUT: 115/230V ±10%, 10 VA, 50/60 Hz

SIZE: 19"x3.5"x7" (483x89x178mm)

WEIGHT: 8 lbs. (3.6 kgms)

- **Output Voltage & Current Controller for Standard BERTAN Power Supplies**
- **Independent Voltage & Current Control with Automatic Crossover**
- **Remote Programming Inputs**
- **Remote Voltage & Current Monitoring Outputs**
- **Front Panel Constant Voltage & Constant Current LED Mode Indicators**

ORDERING INFORMATION

When ordering a Model HVC, specify which model high voltage power supply it will be used to control. This is necessary to assure the correct interfacing is provided and that the HVC front panel meter and controls are compatible.

500 watt output switching high voltage power supplies

SERIES HVS-505RM

BERTAN manufactures a wide range of switching high voltage power supplies for many different custom and OEM applications. Typical examples are high powered units similar to the Series HVS-505RM described below or small compact high temperature modules where efficiency and reliability are critical system requirements.

Model*	Output		Ripple Pk-Pk
	Voltage	Current	
-05P, N	25 to 500V	50 to 1.5A	500mV
-10P, N	50 to 1000V	25 to 700mA	1V
-50P, N	250 to 5000V	5 to 150mA	5V

* ORDERING INFORMATION

Specify the Series, then the Model from the chart above, including the appropriate suffix to specify polarity. For a -1000V output unit you would specify HVS-505RM-10N.

- **500 Watt Output High Voltage Power Supply Series**
- **80% Efficiency at Maximum Power Output**
- **Remote Programming Capability**
- **Remote Voltage & Current Monitor Outputs**
- **Compact 19" Rack Mount Units, Ideal for Laboratory or System Applications**
- **Short Circuit & Arc Protected**

GENERAL SPECIFICATIONS	
Input	115V ±10%, 6.5A, 50/60 Hz
Regulation	.05% line, .05% load.
Stability	0.1% +0.03% of max/8 hrs.
Size	19"Wx5¼"Hx15"D (483x133x381mm)
Weight	26 lbs (11.8 kgms)

COMPANY PROFILE

Since 1969, BERTAN ASSOCIATES, INC. has been dedicated to the design, development and manufacture of precision high voltage instrumentation. The company's outstanding technical staff has designed and introduced increasingly innovative and sophisticated proprietary high voltage systems which have won it recognition as the world leader in its field.

BERTAN's power supplies and instrumentation are in use in virtually every industry where high voltage is required. These include precision cathode ray tube applications, automatic test equipment, medical and laboratory instrumentation, nuclear and electro-optical instrumentation, semiconductor manufacture, X-ray and analytical instrumentation, scanning electron microscopes, etc.

The company's extensive line of standard catalog instruments is generally available for delivery from stock. Where a standard catalog unit cannot satisfy customer requirements, BERTAN's engineering and manufacturing staff, utilizing an in-house CAE/CAD system with its vast library of standard and custom high voltage designs, can provide a suitable custom designed power supply or system with minimum lead time and cost. The company's Quality Control program conforms with MIL-I-45208A.

To support its products in the field, the company maintains a fully staffed Customer Service organization. Customers are also supported throughout the world by an extensive network of technical sales representatives.

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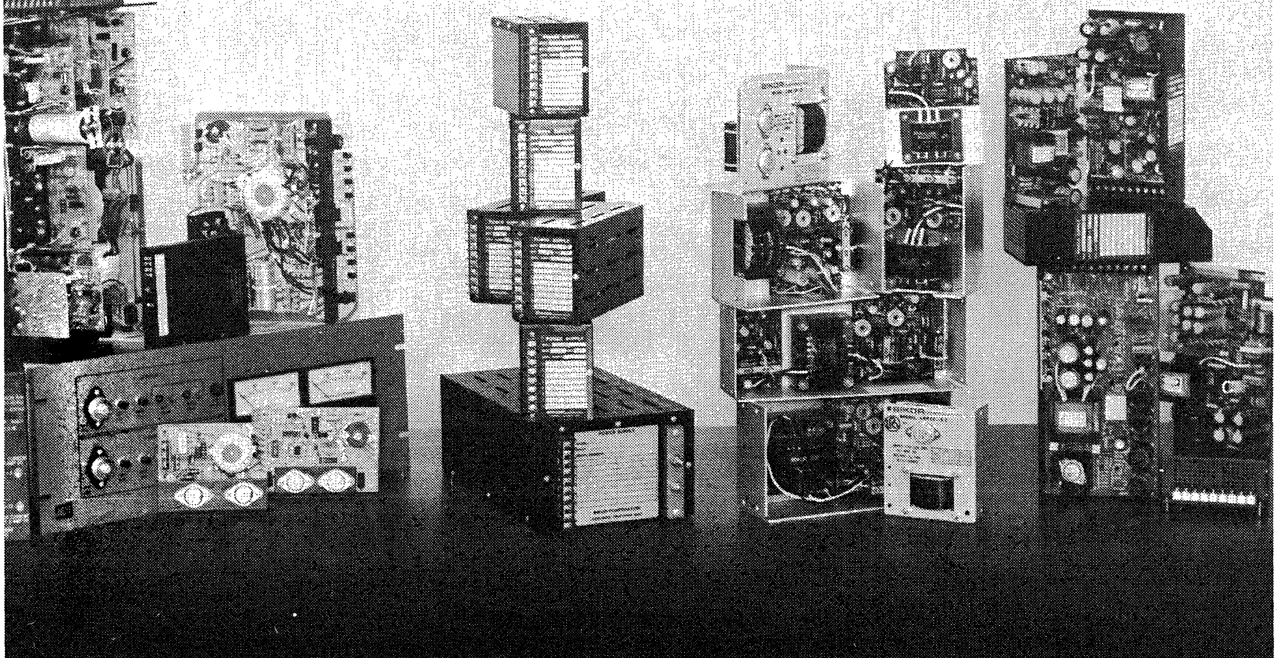
We've been building towers of strength for years. Until now we kept it quiet.

COST-EFFICIENT CUSTOMIZED CONFIGURATIONS

ACROSS-THE-BOARD DC/DC AND AC/DC MODULAR SYSTEMS

AC-DC/DC UPS SYSTEMS

MULTI-OUTPUT SWITCHERS



Drawing on more than 30 standard sub-assembly module designs and over a decade of specialized power conditioning expertise, BIKOR is in a position to provide customized solutions that best fit your particular requirements – even on fairly limited production runs – and it's done accurately, quickly and at economically attractive prices.

- **AC/DC Battery Back-up Systems – available with or without batteries and battery chargers.**
- **Broad range of standard enclosures and sub-modules result in lower costs.**
- **Configurations can range from miniature 6-Watt units, all the way up to 3KW power assemblies for telecommunications applications.**
- **DC/DC single amd multi-output regulated and unregulated units – 12Vdc; 24Vdc; 48Vdc; 110Vdc; and 220Vdc inputs.**

For over 10 years, BIKOR has been systematically building up the most comprehensive line of modular systems in the power conditioning field. The result. You can now choose from hundreds of cost-consciously priced DC/DC and AC/DC models to best fit your particular application requirements.

- **Unregulated and regulated single and multi-output DC/DC units – 12Vdc; 24Vdc; 48Vdc; 110Vdc and 220Vdc input versions.**
- **115VAC or dual 115VAC/230VAC input, single and multiple output AC/DC line and load regulated types.**
- **Output voltages range from 2Vdc to 250Vdc. Currents from 100mA to 50A.**

Offering as standards those most sought after features normally only available as extra charge options with other brands, BIKOR's open-frame "L" Series will prove a boon for the discriminating seeker of peak-performance power supplies at bargain prices.

- **Single, dual, triple and multi-output types (ideal for micro-computer based equipment).**
- **115VAC/230VAC inputs.**
- **Tight regulation of both line and load.**
- **Reverse voltage, overvoltage, and overload protection.**
- **Built-in remote sensing.**
- **Meets UL and CSA standards.**
- **Wide range of case sizes and voltage/ current output combinations.**

These premium switching-mode units provide protection against brown-outs. Their reliable peak-performance – yet small size and light weight – combine with cost-conscious price tags to provide best-buy solutions for most every application where weight, compactness, prime quality, and reliability are called for.

- 150 to 500-Watt output versions – In PC board, "L" bracket and enclosed housings.
- **Built to UL, CSA and VDE safety standards.**
- **Built-in protection against overvoltage, overloads and short circuits.**
- **90-130VAC and 180-260VAC input ranges.**

For technical and local sales/stocking information contact our headquarters at:

BIKOR CORPORATION

1504 W. 228TH ST., TORRANCE, CA 92718 ☐ PHONE NO.: (213) 539-6320 ☐ TWX: 910-349-6667

CATALOG

SWITCHING POWER ON THE SHELF

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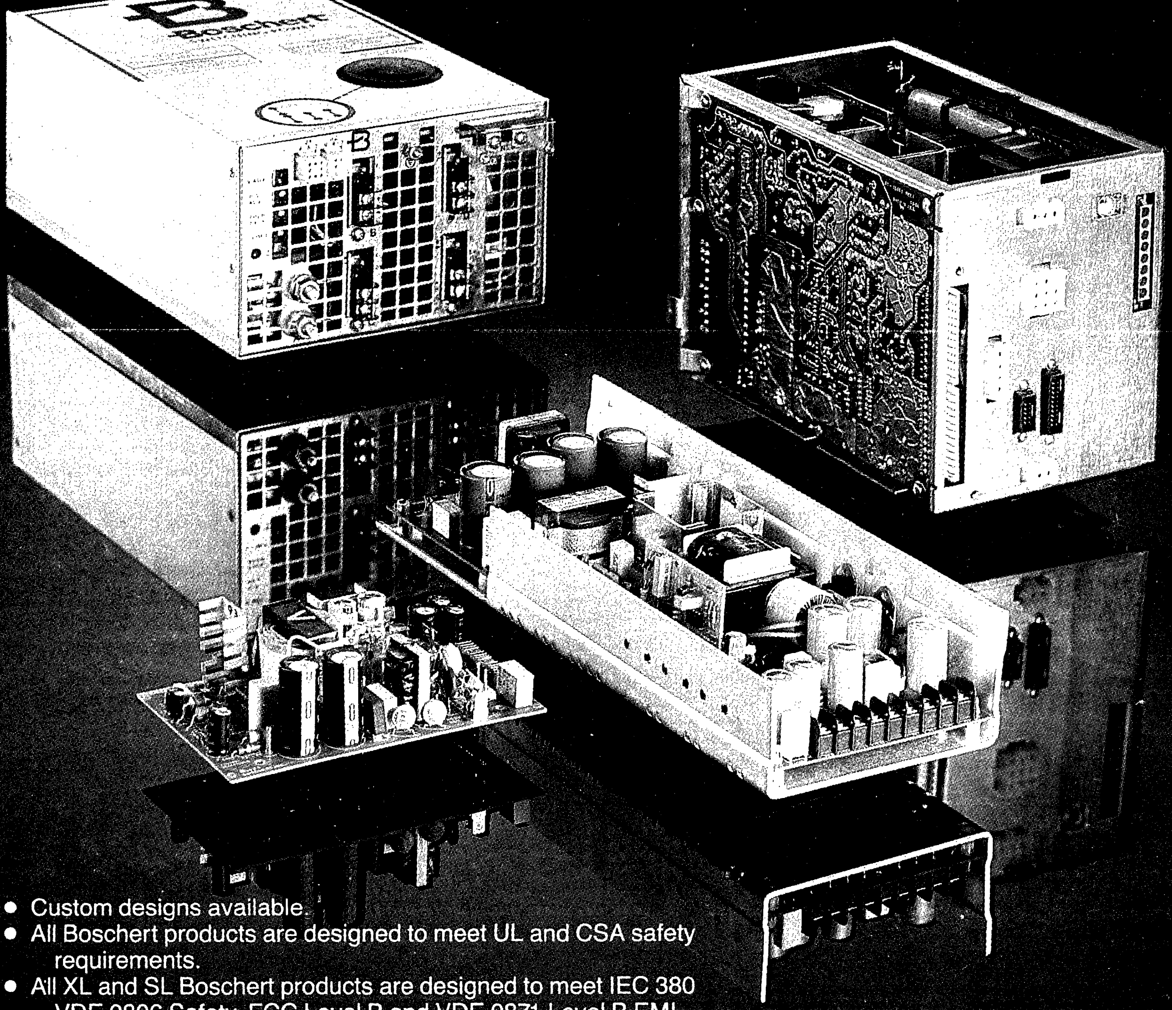
ita Avenue
e, California 94088-3426
408/732-2440 TWX 910-339-9241



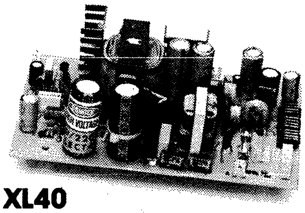
- Custom designs available.
- All Boschert products are designed to meet UL and CSA safety requirements.
- All XL and SL Boschert products are designed to meet IEC 380 VDE 0806 Safety, FCC Level B and VDE 0871 Level B EMI, and are available in versions designed to meet British Telecom Safety.
- All Boschert AC to DC products have user selectable 110/220 VAC inputs.
- Multiple Output and Single Output Switchers have a one-year warranty. High Power Products have a two-year warranty.

VDE FCC

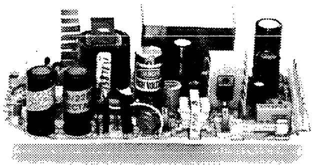
Boschert

LOW TO MEDIUM POWER – 25 TO 500 WATTS

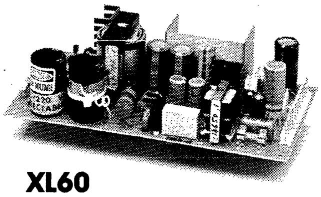
XL SERIES MULTIPLE OUTPUTS – WORLDWIDE SAFETY SPECS



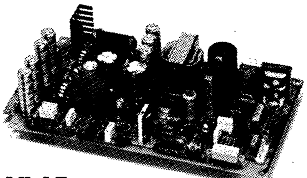
XL40
Input: 110 VAC/220 VAC Strappable
Weight: 0.9 lbs. (0.4 Kg)
Size: 6.3" x 3.94" x 2.06"
(160 mm x 100 mm x 52.3 mm)



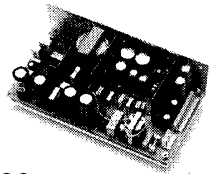
XL50
Input: 110 VAC/220 VAC Strappable
Weight: 1.1 lbs. (0.5 Kg)
Size: 7.75" x 4.25" x 2.00"
(197 mm x 108 mm x 51 mm)



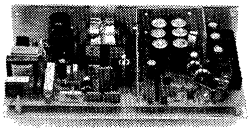
XL60
Input: 110 VAC/220 VAC Strappable
Weight: 1.2 lbs. (0.5 Kg)
Size: 8.25" x 4.25" x 2.25"
(210 mm x 108 mm x 57 mm)



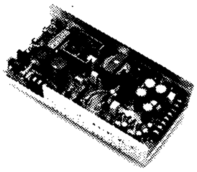
XL65
Input: 110 VAC/220 VAC Strappable
Weight: 1.2 lbs. (0.5 Kg)
Size: 9.44" x 5.00" x 2.00"
(239 mm x 127 mm x 51 mm)



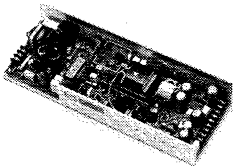
XL80
Input: 110 VAC/220 VAC Strappable
Weight: 2.2 lbs. (1.0 Kg)
Size: 8.25" x 4.45" x 2.50"
(210 mm x 113 mm x 64 mm)



XL100/125
Input: 110 VAC/220 VAC Strappable
Weight: 3.5 lbs. (1.6 Kg)
Size: 10.50" x 5.00" x 2.50"
(267 mm x 127 mm x 64 mm)

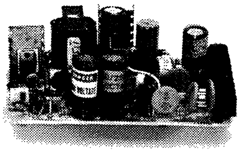


XL160
Input: 90-132 VAC/180-265 VAC Strappable
Weight: 2.9 lbs. (1.3 Kg)
Size: 10.5" x 5.0" x 2.50"
(266.7 mm x 127.0 mm x 63.5 mm)

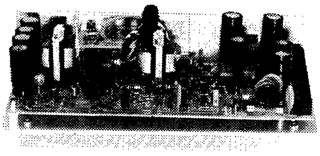


XL200
Input: 90-132 VAC/180-265 VAC Strappable
Weight: 4.5 lbs. (2.1 Kg)
Size: 14.0" x 5.0" x 2.50"
(355.6 mm x 127.0 mm x 63.5 mm)

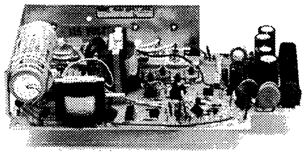
OL SERIES MULTIPLE OUTPUTS – US/CANADIAN SAFETY SPECS ONLY



OL25
Input: 110 VAC/220 VAC Strappable
Weight: 0.91 lbs. (0.41 Kg)
Size: 6.30" x 3.94" x 2.30"
(160 mm x 100 mm x 58 mm)



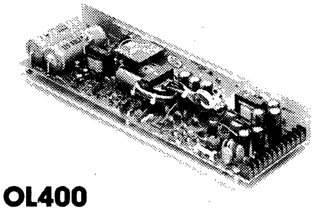
OL130
Input: 110 VAC/220 VAC Strappable
Weight: 2.5 lbs. (1.1 Kg)
Size: 10.50" x 5.00" x 2.50"
(267 mm x 127 mm x 64 mm)



OL153
Input: 110 VAC
Weight: 2 lbs. (0.9 Kg)
Size: 10.02" x 5.56" x 2.25"
(255 mm x 141 mm x 56 mm)

OL200
Input: 110 VAC/220 VAC Strappable
Weight: 4 lbs. (1.8 Kg)
Size: 15.00" x 4.95" x 2.45"
(381 mm x 126 mm x 62 mm)

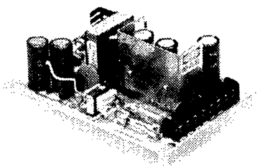
OL301
Input: 110 VAC/220 VAC Strappable
Weight: 4.25 lbs. (1.9 Kg)
Size: 11.75" x 7.62" x 2.50"
(298 mm x 194 mm x 64 mm)



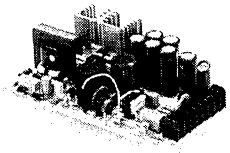
OL400
Input: 110 VAC/220 VAC Strappable
Weight: 5 lbs. (2.3 Kg)
Size: 16.75" x 5.20" x 2.50"
(425 mm x 132 mm x 64 mm)

Boschert

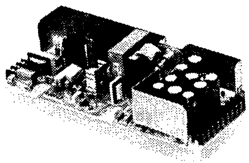
SL SERIES – SINGLE OUTPUT – WORLDWIDE SAFETY SPECS



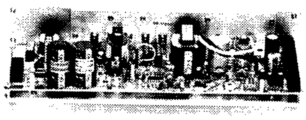
SL30
Input: 110 VAC/220 VAC Strappable
Weight: 0.97 lbs. (0.44 Kg)
Size: 6.50" x 4.60" x 2.20"
(165 mm x 117.5 mm x 56 mm)



SL60
Input: 110 VAC/220 VAC Strappable
Weight: 1.34 lbs. (0.61 Kg)
Size: 8.00" x 4.60" x 2.20"
(203 mm x 117.5 mm x 56 mm)



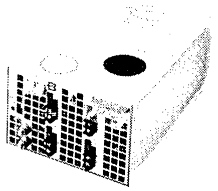
SL120
Input: 110 VAC/220 VAC Strappable
Weight: 2.56 lbs. (1.16 Kg)
Size: 11.50" x 4.60" x 2.20"
(292.1 mm x 117.5 mm x 56 mm)



SL220
Input: 110 VAC/220 VAC Strappable
Weight: 4.4 lbs. (2 Kg)
Size: 14.50" x 4.90" x 2.50"
(368 mm x 124 mm x 64 mm)

HIGH POWER – 500 TO 1500 WATTS – WORLDWIDE SAFETY SPECS

MULTIPLE OUTPUTS



XL750
Input: 110 VAC/220 VAC Strappable
Weight: 20 lbs. (9.1 Kg)
Size: 5.10" x 8.00" x 12.50"
(129.5 mm x 203.2 mm x 317.5 mm)

SINGLE OUTPUTS

HL1000
Input: 110 VAC/220 VAC Strappable
Weight: 18 lbs. (8.2 Kg)
Size: 5.00" x 8.00" x 11.00"
(127 mm x 203.2 mm x 279.4 mm)

Custom designs are available in OEM quantities. Contact the factory for more information. All Boschert power supplies, except the OL series, are designed to meet and/or approved for UL, CSA and VDE 0806 safety specs. Contact factory for specific models.

SWITCHING POWER SELECTION GUIDE

HIGH POWER PRODUCTS – 500-1500 WATTS

MULTIPLE OUTPUT

Model Number	Output Voltages and Maximum Current								Maximum Continuous Output Power
	5V	5V	12V	12V	15V	15V	24V	24V	
XL750-4601	10-100A	0-10A	0-10A	0-6A					750W
XL750-4604	10-100A	0-10A			0-8A	0-8A			750W
XL750-4605	10-100A				0-8A	0-8A	0-4A		750W
XL750-4606	10-100A	0-10A	0-6A	0-6A			0-4A		750W
XL750-4607	10-100A		0-6A	0-6A			0-4A	0-4A	750W
XL750-4608	10-100A		0-10A	0-10A					750W
XL750-4609	10-100A				0-8A	0-8A			750W
XL750-4610	10-100A		0-10A				0-5A		750W

All XL750 outputs are floating and may be used with either polarity. All outputs are well regulated. Limited two year warranty.

SINGLE OUTPUT

Model Number	Output Adjustment Range	Rated Current at 50°C	Maximum Continuous Output Power
HL1000-4605	4.5V-5.5V	200A	1000W

Limited two year warranty.

SWITCHING POWER SELECTION GUIDE

Boschert

LOW TO MEDIUM POWER – 25 TO 500 WATTS

Model Number	Output Voltages and Maximum Current								Maximum Continuous Output Power
	+5V	−5V	+12V	+12V	−12V	+15V	−15V	+24V	
* **OL25-3001**	3.5A	0.5A	1A		0.5A				25W
XL40-3601	2.5A		2A		0.5A				40W
XL50-3601	6A	0.7A	3A		0.7A				60W
XL50-3602	6A		0.7A		0.7A			2A	60W
XL50-3603	6A		3A	1.5A	0.7A				60W
XL50-3604	6A	0.7A				2A	0.7A		60W
XL50-3655	7.3A		2.5A	2A	0.5A				65W
XL60-3601	6A	0.7A	3.5A		0.7A				70W
XL60-3602	6A		0.7A		0.7A			2A	70W
XL60-3603	6A		3A	1.5A	0.7A				70W
XL65-3620	6A	0.5A	3A		1.5A			1.2A	65W
XL80-3601	8A	0.7A	3.5A		0.7A				80W/100W[1]
XL80-3603	8A		3A	1.5A	0.7A				80W/100W[1]
XL100-3601	10A	0.7A	4A		0.7A				100W
XL100-3602	10A		4A		0.7A			3A	100W
XL100-3603	10A		4A	1.5A	0.7A				100W
XL125-3601	15A	0.7A	5A		0.7A				130W
XL125-3602	15A		4A		0.7A			4A	130W
XL125-3603	15A		4A	1.5A	0.7A				130W
* **OL130-3001**	15A	0.7A	3A		2A				130W
* **OL130-3022**	15A		3A		2A			2A	130W
* **OL153-1025**	20A					4A	4A	4A	180W[1]
* **OL153-1033**	20A		4A		4A			4A	180W[1]
* **XL160-3401**	15A/22A[1]	1A	4A/5A[1]/8A[2]		2A/2.5A[1]/5A[2]				160W/185W[1]
* **XL160-3402**	15A/22A[1]		4A/5A[1]/8A[2]		2A/2.5A[1]/5A[2]			2A/2.5A[1]/5A[2]	160W/185W[1]
* **XL160-3403**	15A/22A[1]		4A/5A[1]/8A[2]	2A/2.5A[1]/5A[2]	2A/2.5A[1]/5A[2]				160W/185W[1]
* **XL160-3405**	15A/22A[1]					4A/8A[2]	2A/2.5A[1]/5A[2]	2A/2.5A[1]/5A[2]	160W/185W[1]
* **XL160-3411**	15A/22A[1]		5A/6A[1]/8A[2]	1A	0.7A/1A[1]				160W/185W[1]
* **OL200-3006**	20A/25A[1]	3A/4A[1]	3A/4A[1]		3A/4A[1]				200W
* **OL200-3024**	20A/25A[1]		3A/4A[1]		3A/4A[1]			4A	200W
XL200-3601	20A/30A[1]	3A/4A[1,3]	5A/6A[1]/8A[2]		2A/3A[1]/5A[2]				180W/210W[1]
XL200-3602	20A/30A[1]		5A/6A[1]/8A[2]		2A/3A[1]/5A[2]			4A/5A[1]/7A[2,3]	180W/210W[1]
XL200-3603	20A/30A[1]		5A/6A[1]/8A[2]	4A/5A[1]/8A[2,3]	2A/3A[1]/5A[2]				180W/210W[1]
XL200-3605	20A/30A[1]					4A/5A[1]/6.5A[2]	2A/2.5A[1]/4A[2]	4A/5A[1]/7A[2]	180W/210W[1]
* **OL301-3026**	20A		4A		4A	4A	4A	4A	300W[1]
* **OL400-3015**	45A	4A	10A		10A			4A	400W[1]
* **OL400-3026**	45A	4A				10A	10A	4A	400W[1]

Limited one year warranty.
Shaded outputs are tightly regulated.
1. Forced air required.
2. Peak value. For further information, contact the factory.
3. Floating output can be used with either polarity.

Model Number	Description
3T12AP-6130	10V-60V input, output adjustable from 4.5V-30V @ 12A
3T20AP-6115	10V-60V input, output adjustable from 4.5V-15V @ 20A
3T5AN-6130	10V-60V input, output adjustable from −4.5V −30V @ 5A

Limited one year warranty.

Output Voltage	30W		60W		120W		220W	
	Model	Current	Model	Current	Model	Current	Model	Current
4.5V-5.5V	**SL30-3605**	6A	**SL60-3605**	12A	**SL120-2605**	20A	**SL220-3605**	44A
11.5V-18V	**SL30-3612**	2.5A	**SL60-3612**	5A	**SL120-3612**	10A	**SL220-3612**	20A
18V-30V	**SL30-3624**	1.25A	**SL60-3624**	2.5A	**SL120-3624**	5A	**SL220-3624**	10A

Limited one year warranty.
*These models need external filters. All others contain internal EMI filters. Contact factory for EMI specs of individual models.

EEM
PRODUCT SELECTION GUIDES

Use the EEM Product Selection Guides. There are 34 Guides in this edition of EEM. See page 2 (A•2, B•2, C•2, D•2) of each volume to locate the Product Selection Guides that pertain to your needs.

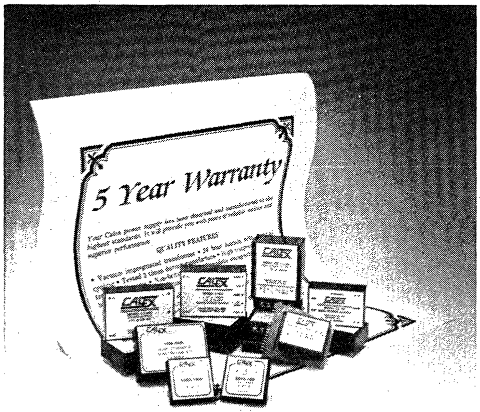
CALEX

CALEX MFG. CO., INC., 3355 Vincent Road, Pleasant Hill, CA 94523
Telephone: (415) 932-3911 Telex: 338 506

AC/DC LINEAR POWER SUPPLY

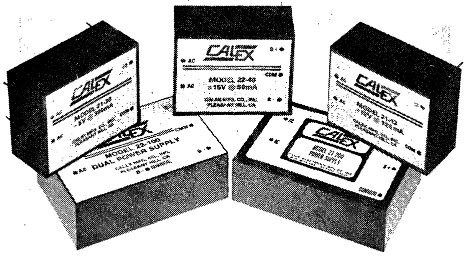
5 YEAR WARRANTY

SINGLE, DUAL & TRIPLE OUTPUT STANDARD 2.5" x 3.5"



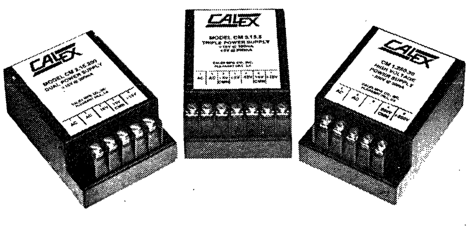
	Output Voltage	Output Current	Voltage Accuracy	Line & Load Regulations	Noise & Ripple	Case Size	Model Number	Price (1–9)
Single Outputs	+5	500mA	±1%	±0.05%	1mVrms	B1	1.5.500	$ 70.00
	+5V	1000mA	±1%	±0.05%	1mVrms	B2	1.5.1000	92.00
	** +5V	1000mA	±1%	±0.05%	1mVrms	B2	1.5.1000DV	101.00
	* +5V	1000mA	±1%	±0.05%	1mVrms	B2	7009	115.00
	+5V	2000mA	±1%	±0.05%	2mVrms	B3	1.5.2000	115.00
	+9V	1000mA	±0.5%	±0.05%	2mVrms	B3	1.9.1000	110.00
	+12V	480mA	±0.5%	±0.02%	2mVrms	B2	1.12.480	105.00
	+12V	750mA	±0.5%	±0.02%	2mVrms	B3	1.12.750	115.00
	+15V	400mA	±0.5%	±0.02%	2mVrms	B2	1.15.400	92.00
	+15V	600mA	±0.5%	±0.02%	2mVrms	B3	1.15.600	115.00
	+18V	500mA	±0.5%	±0.02%	2mVrms	B3	1.18.500	110.00
	+24V	374mA	±0.5%	±0.02%	2mVrms	B3	1.24.375	115.00
Dual Outputs	±5V	±750mA	±1%	±0.05%	2mVrms	B3	2.5.750	115.00
	±12V	±120mA	±0.5%	±0.02%	1mVrms	B1	2.12.120	70.00
	±12V	±240mA	±0.5%	±0.02%	1mVrms	B2	2.12.240	92.00
	** ±12V	±240mA	±0.5%	±0.02%	1mVrms	B2	2.12.240DV	101.00
	±12V	±360mA	±0.5%	±0.02%	2mVrms	B3	2.12.360	115.00
	±15V	±50mA	±0.5%	±0.02%	1mVrms	B1	2.15.50	63.00
	±15V	±100mA	±0.5%	±0.02%	1mVrms	B1	2.15.100	70.00
	±15V	±200mA	±0.5%	±0.02%	1mVrms	B2	2.15.200	92.00
	** ±15V	±200mA	±0.5%	±0.02%	1mVrms	B2	2.15.200DV	101.00
	* ±15V	±200mA	±0.5%	±0.02%	1mVrms	B2	7010	130.00
	±15V	±350mA	±0.5%	±0.02%	2mVrms	B3	2.15.350	115.00
Triple Outputs	±12V & +5V	+100mA 600mA	±1%	±0.05%	2mVrms	B2	3.12.5	112.00
	±15V & +5V	+100mA 500mA	±1%	±0.05%	2mVrms	B2	3.15.5	112.00
	±12V & +5V	+125mA 1A	±1%	0.1%	2mVrms	B3	3.12.1000	140.00
	±15V & +5V	+100mA 1A	±1%	±0.1%	2mVrms	B3	3.15.1000	140.00

* UL 544 Approved
** Dual AC Input 115/230VAC



SUBMINIATURE SERIES

Output Voltage	Output Current	Voltage Accuracy	Line & Load Regulation	Noise & Ripple	Temperature Coefficient	Case Size	Model Number	Price (1–9)
+5V	300mA	±1%	±0.1%	2mVrms	±0.02%/°C	C	21-30	$ 58.00
+12V	120mA	±0.5%	±0.1%	2mVrms	±0.02%/°C	C	21-12	58.00
+15V	200mA	±0.5%	±0.01%	2mVrms	±0.01%/°C	A	21-200	79.00
±15V	+50mA	±0.5%	±0.01%	2mVrms	±0.02%/°C	C	22-40	58.00
±15V	+100mA	±0.5%	±0.02%	2mVrms	±0.01%/°C	A	22-100	79.00



CHASSIS MOUNT

	Output Voltage	Output Current	Voltage Accuracy	Line & Load Regulation	Noise & Ripple	Temperature Coefficient	Model Number	Price (1–9)
Single Outputs	+5V	500mA	±1%	±0.05%	1mVrms	±0.01%/°C	CM 1.5.500	$ 80.00
	+5V	1000mA	±1%	±0.05%	1mVrms	±0.02%/°C	CM 1.5.1000	104.00
	+12V	500mA	±1%	±0.05%	1mVrms	±0.01%/°C	CM 1.12.500	104.00
	+15V	400mA	±1%	±0.05%	1mVrms	±0.01%/°C	CM 1.15.400	104.00
	+250V	30mA	±3%	±2%	1mVrms	±0.05%/°C	CM 1.250.30	104.00
Dual	±12V	±120mA	±0.5%	±0.02%	1mVrms	±0.01%/°C	CM 2.12.120	80.00
	±12V	±240mA	±0.5%	±0.02%	1mVrms	±0.01%/°C	CM 2.12.240	104.00
	±15V	±50mA	±0.5%	±0.02%	1mVrms	±0.01%/°C	CM 2.15.50	76.00
	±15V	±100mA	±0.5%	±0.02%	1mVrms	±0.01%/°C	CM 2.15.100	80.00
	±15V	±200mA	±0.5%	±0.02%	1mVrms	±0.01%/°C	CM 2.15.200	104.00
Triple	±15V & +5V	+15V@100mA +5V@500mA	±1%	±0.05%	2mVrms	±0.01%/°C	CM 3.15.5	122.00
	±12V & +5V	+12V@100mA +5V@600mA	±1%	±0.05%	2mVrms	±0.01%/°C	CM 3.12.5	122.00

CASE SIZES

A- 3" x 2" x 1"
(76.2mm x 50.8mm x 25.4mm)

B1- 3.5" x 2.5" x .875"
(88.9mm x 63.5mm x 22.2mm)

B2- 3.5" x 2.5" x 1.25"
(88.9mm x 63.5mm x 31.8mm)

B3- 3.5" x 2.5" x 1.56"
(88.9mm x 63.5mm x 39.6mm)

C- 2.25" x 1.75" x 1"
(57.15mm x 44.75mm x 25.4mm)

CM- 4" x 2.7" x 1.4"
(101.6mm x 68.6mm x 35.56mm)

Input Voltage:
115 ± 10VAC
100 ± 10VAC (add " - 100" to Model No.)
220 ± 20VAC (add " - 220" to Model No.)
230 ± 20VAC (add " - 230" to Model No.)
240 ± 20VAC (add " - 240" to Model No.)
(no additional charge)

Input Frequency Range:
50 to 60Hz
400 Hz Consult Factory

Isolation: 1250Vrms
Resistance: 50M
Capacitance: 250pF

Over Voltage Protection:
Standard on all B Case 5Volt Singles above 2Watts except 7009.

Temperature Coefficient:
±0.01%/°C

Storage Temperature:
−25°C to +85°C

Maximum Operating Case Temperature:
+71°C

Short Circuit Protection:
Foldback Current Limiting
or Constant Current Limiting

DC/DC CONVERTERS

3355 Vincent Rd., Pleasant Hill, CA 94523 (415) 932-3911 Telex: 338 506 CALEX

QUALITY PRODUCTS SINCE 1962

The CALEX lines of 1.8, 3, 4.5, 6, and 12 Watt DC/DC Converters are designed for applications where analog voltages are needed in digital systems, when negative voltages are required, for field portable and battery operated equipment, and where isolated positive or negative voltage sources are necessary in instrumentation systems. These units cover input voltages from 5 to 48 volts, are low noise, and have efficiencies up to 85%. CALEX can also design custom OEM DC/DC units to fit your special needs. Contact the factory for details (415) 932-3911.

FEATURES

- 5 Year Warranty
- 6-sided shielded cases
- 100% burn-in & testing
- Input/output isolation
- Stock delivery
- Very low input/output noise
- Low profile cases
- LC type input filters
- Dual tracking outputs
- Short circuit protection
- Fully specified
- Vacuum encapsulated

CALEX
12S5.1000
CALEX
24S12.500
CALEX
48S15.400

Prices subject to change without notice. For quantity discounts and OEM contract details consult CALEX Sales Dept. (415) 932-3911 or our representative in your area.

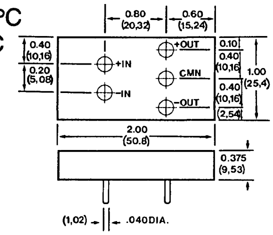
MINIATURE 1.8 WATTS 5 VOLT DUAL OUTPUT 1" x 2" x 0.375" HIGH

	OUTPUT VOLTAGE DC	OUTPUT CURRENT mA	CASE SIZE	MODEL NUMBER	PRICE (1-9)
5 VOLT	± 12	± 75	E	5D12.075	$58.00
	± 15	± 60	E	5D15.060	58.00

SPECIFICATIONS

Operating temp.: −25° to +71°C
Storage temp.: −55° to +85°C
Line & Load reg. typ.: 0.1%
Noise typ.: 10mVp-p
Isolation: 500VDC minimum
Input Range: 4.65–5.5 VDC

CASE SIZE E


0.80 (20,32)
0.60 (15,24)
0.40 (10,16)
0.20 (5,08)
+OUT
+IN
CMN
-IN
-OUT
0.10
0.40 (10,16)
0.40 (10,16)
(2,54)
1.00 (25,4)
2.00 (50.8)
0.375 (9,53)
(1,02)
.040 DIA.

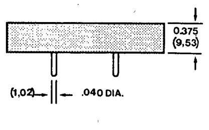
CALEX
5D12.075
DC/DC

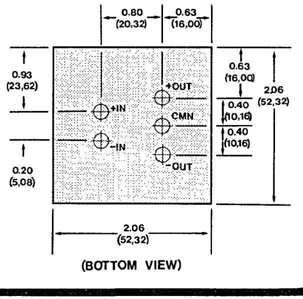
2" x 2" x 0.375" HIGH 5 VOLT INPUT SINGLE & DUAL OUTPUT

	OUTPUT VOLTAGE DC	OUTPUT CURRENT mA	CASE SIZE	MODEL NUMBER	PRICE (1-9)
5 VOLT INPUT	5	600	D	5S5.600	$88.00
	5	1000	D	5S5.1000	97.00
	12	250	D	5S12.250	88.00
	12	450	D	5S12.450	97.00
	15	200	D	5S15.200	88.00
	15	350	D	5S15.350	97.00
	± 12	± 125	D	5D12.125	98.00
	± 12	± 185	D	5D12.185	107.00
	± 15	± 100	D	5D15.100	98.00
	± 15	± 150	D	5D15.150	107.00

CALEX
5D15.150
CALEX
5D12.185

CASE SIZE D


0.375 (9,53)
(1,02)
.040 DIA.


0.80 (20,32)
0.63 (16,00)
0.93 (23,62)
0.20 (5,08)
+OUT
+IN
CMN
-IN
-OUT
0.63 (16,00)
2.06 (52,32)
0.40 (10,16)
0.40 (10,16)
2.06 (52,32)
(BOTTOM VIEW)

SPECIFICATIONS

Operating temp.: −25° to +71°C
Storage temp.: −55° to +85°C
Line & Load typ.: 0.02%
Noise typ.: 10mVp-p
Isolation: 500VDC minimum
Input Range: 4.75–5.5VDC

CALEX MFG. CO., INC. 3355 Vincent Rd., Pleasant Hill, CA 94523 (415) 932-3911 Telex: 338 506

DC/DC CONVERTERS

3 WATT to 6 WATT 2″ x 2″ x 0.375″ CASE SIZE
12, 24, 28 & 48 VOLT DC INPUTS
SINGLE 5V, 12V & 15V OUTPUTS
DUAL ± 12V & ± 15V OUTPUTS

	OUTPUT VOLTAGE DC	OUTPUT CURRENT mA	CASE SIZE	MODEL NUMBER	PRICE (1-9)
12 VOLTS INPUT	5	600	D	12S5.600	$ 88.00
	5	1000	D	12S5.1000	97.00
	12	250	D	12S12.250	88.00
	12	500	D	12S12.500	97.00
	15	200	D	12S15.200	88.00
	15	400	D	12S15.400	97.00
	± 12	± 125	D	12D12.125	98.00
	± 12	± 250	D	12D12.250	107.00
	± 15	± 100	D	12D15.100	98.00
	± 15	± 200	D	12D15.200	107.00

	OUTPUT VOLTAGE DC	OUTPUT CURRENT mA	CASE SIZE	MODEL NUMBER	PRICE (1-9)
24 VOLTS INPUT	5	600	D	24S5.600	$ 88.00
	5	1000	D	24S5.1000	97.00
	12	250	D	24S12.250	88.00
	12	500	D	24S12.500	97.00
	15	200	D	24S15.200	88.00
	15	400	D	24S15.400	97.00
	± 12	± 125	D	24D12.125	98.00
	± 12	± 250	D	24D12.250	107.00
	± 15	± 100	D	24D15.100	98.00
	± 15	± 200	D	24D15.200	107.00

12 WATT DC/DC CONVERTERS

SINGLE & DUAL OUTPUTS 3:1 INPUT RANGE

FEATURES

- Six-sided continuous shield
- OVP all outputs (singles)
- 500 VDC min. isolation (input-output)
- Efficiency greater than 70%

2.5″ x 3.5″ x 0.875″ B1 CASE SIZE

Ultra-wide input range makes these units ideally suited for battery applications, process control environments and the telecommunications industry. Same pin out and footprint as industry standards.

SINGLE OUTPUT UNITS

INPUT VOLTAGE RANGE VDC	OUTPUT VOLTAGE VDC	OUTPUT CURRENT mA	MODEL NUMBER	PRICE (1-9)
9–27	5	2000	12S5.2000	$114.00
9–27	12	1000	12S12.1000	114.00
9–27	15	800	12S15.800	114.00
12-36	5	2000	24S5.2000	114.00
12-36	12	1000	24S12.1000	114.00
12-36	15	800	24S15.800	114.00
24–72	5	2000	48S5.2000	114.00
24–72	12	1000	48S12.1000	114.00
24–72	15	800	48S15.800	114.00

Case dimensions for 12 Watt units shown on facing page (B1).

CALEX
28D12.125
DC/DC CONVERTER
CALEX
28D12.250
DC/DC CONVERTER

	OUTPUT VOLTAGE DC	OUTPUT CURRENT mA	CASE SIZE	MODEL NUMBER	PRICE (1-9)
28 VOLTS INPUT	5	600	D	28S5.600	$ 88.00
	5	1000	D	28S5.1000	97.00
	12	250	D	28S12.250	88.00
	12	500	D	28S12.500	97.00
	15	200	D	28S15.200	88.00
	15	400	D	28S15.400	97.00
	± 12	± 125	D	28D12.125	98.00
	± 12	± 250	D	28D12.250	107.00
	± 15	± 100	D	28D15.100	98.00
	± 15	± 200	D	28D15.200	107.00

	OUTPUT VOLTAGE DC	OUTPUT CURRENT mA	CASE SIZE	MODEL NUMBER	PRICE (1-9)
48 VOLTS INPUT	5	600	D	48S5.600	$ 88.00
	5	1000	D	48S5.1000	97.00
	12	250	D	48S12.250	88.00
	12	500	D	48S12.500	97.00
	15	200	D	48S15.200	88.00
	15	400	D	48S15.400	97.00
	± 12	± 125	D	48D12.125	98.00
	± 12	± 250	D	48D12.250	107.00
	± 15	± 100	D	48D15.100	98.00
	± 15	± 200	D	48D15.200	107.00

For case dimensions see preceding page.

CALEX
24D15.400
DC/DC CONVERTER
24 VDC IN ± 15 VDC OUT
@ 400mA
CALEX
12S5.2000
DC/DC CONVERTER
12 VDC IN 5 VDC OUT
@ 2000mA

DUAL OUTPUT UNITS

INPUT VOLTAGE RANGE	OUTPUT VOLTAGE VDC	OUTPUT CURRENT mA	MODEL NUMBER	PRICE (1-9)
9–27	± 12	± 500	12D12.500	$124.00
9–27	± 15	± 400	12D15.400	124.00
12-36	± 12	± 500	24D12.500	124.00
12-36	± 15	± 400	24D15.400	124.00
24–72	± 12	± 500	48D12.500	124.00
24–72	± 15	± 400	48D15.400	124.00

DC/DC CONVERTERS

3355 Vincent Rd., Pleasant Hill, CA 94523 (415) 932-3911 Telex: 338 506

TRIPLE OUTPUT
WIDE INPUT RANGE 2:1 and 4:1

FEATURES

- 5 Year Warranty
- No derating to 80°C case temp.
- 500 VDC input/output isolation
- 100% burn-in & testing
- Overvoltage protection on all outputs
- 6-sided shielded case
- Efficiency 70 to 80%
- Short circuit protection
- Low noise
- Remote on/off control
- Low profile XC case

CALEX
12T5.12UW
DC/DC CONVERTER
TRIPLE OUTPUT
CALEX
24T5.15SW
DC/DC CONVERTER
TRIPLE OUTPUT
CALEX
48T5.15UW
DC/DC CONVERTER

SW SERIES 2:1 INPUT VOLTAGE RANGE

INPUT VOLTAGE	OUTPUT VOLTAGE	INPUT CURRENT		IDLE CURRENT mA	MODEL NUMBER	PRICE (1–9)
		MIN LOAD	FULL LOAD			
12	+5 and ±12	430	1600	6	12T5.12SW	$125.00
12	+5 and ±15	510	1600	6	12T5.15SW	125.00
24	+5 and ±12	210	780	8	24T5.12SW	125.00
24	+5 and ±15	250	780	8	24T5.15SW	125.00
48	+5 and ±12	110	380	10	48T5.12SW	125.00
48	+5 and ±15	120	380	10	48T5.15SW	125.00

SW-INPUT VOLTAGE RANGE TABLE: (VOLTS)

NOMINAL	MINIMUM	TYPICAL	MAXIMUM	MAX OVER VOLTAGE
12	9.0	12.0	18.0	25
24	18.0	24.0	36.0	45
48	36.0	48.0	72.0	85

SW-OUTPUT CURRENT RANGE TABLE: (mA)

OUTPUT	MINIMUM LOAD	MAXIMUM LOAD	OVP (VOLTS)
+5	250	1500	6.8
±12	100	310	15.0
±15	100	250	18.0

UW SERIES 4:1 INPUT VOLTAGE RANGE

INPUT VOLTAGE	OUTPUT VOLTAGE	INPUT CURRENT mA		IDLE CURRENT mA	MODEL NUMBER	PRICE (1–9)
		MIN LOAD	FULL LOAD			
12	+5 and ±12	245	908	6	12T5.12UW	$130.00
12	+5 and ±15	278	908	6	12T5.15UW	130.00
48	+5 and ±12	66	230	10	48T5.12UW	130.00
48	+5 and ±15	70	230	10	48T5.15UW	130.00

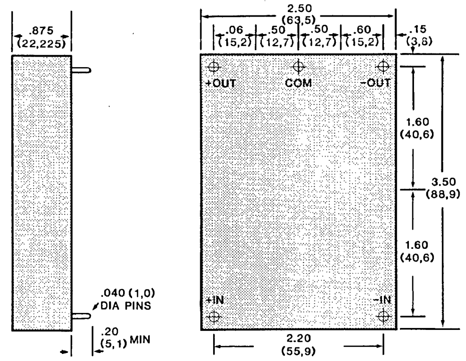
UW-INPUT VOLTAGE RANGE TABLE: (VOLTS)

NOMINAL	MINIMUM	TYPICAL	MAXIMUM	MAX OVER VOLTAGE
12	9.0	12.0	36.0	45
48	18.0	48.0	72.0	85

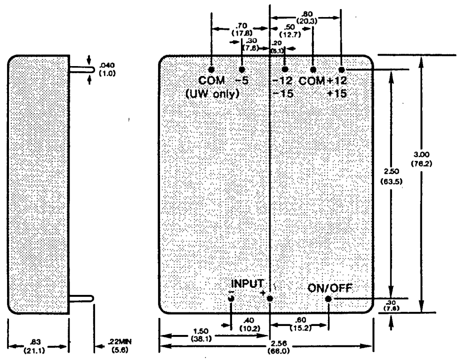
UW-OUTPUT CURRENT RANGE TABLE: (mA)

OUTPUT	MINIMUM LOAD	MAXIMUM LOAD	OVP (VOLTS)
+5	250	800	6.8
±12	50	185	15.0
±15	50	150	18.0

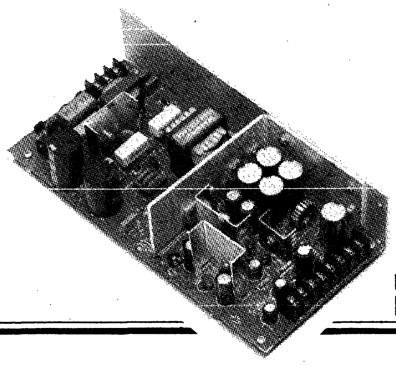
CASE DIMENSIONS
12 WATT CASE – CASE SIZE B1


.875
(22,225)
.040 (1,0)
DIA PINS
.20
(5,1) MIN
2.50
(63,5)
.06
(15,2)
.50
(12,7)
.50
(12,7)
.60
(15,2)
.15
(3,8)
+OUT
COM
-OUT
1.60
(40,6)
3.50
(88,9)
1.60
(40,6)
+IN
-IN
2.20
(55,9)

TRIPLE CASE – CASE SIZE XC


.040
(1.0)
.83
(21.1)
.22MIN
(5.6)
.70
(17.8)
.30
(7.6)
.80
(20.3)
.50
(12.7)
.20
(5.1)
COM
(UW only)
-5
-12
-15
COM
+12
+15
3.00
(76.2)
2.50
(63.5)
INPUT
-
+
ON/OFF
.30
(7.6)
1.50
(38.1)
.40
(10.2)
.60
(15.2)
2.56
(66.0)

Contact factory for other models, special voltages or for detailed data (415) 932-3911.



CADC CALIFORNIA DC
Switching Power Supplies

MODEL NO.
LR 150

LR SERIES MODEL DESCRIPTION

TOTAL POWER	MODEL NUMBER	OUTPUTS					DIMENSIONS L x W x H
		MAIN	AUX. #1	#1 SURGE	AUX. #2	AUX. #3	
20W	LR1025	5V @ 1.0A	+12V @ 1.2A	2.5A	—	—	5.5 x 3.5 x 2
33W	LR1029	5V @ 3.0A	+12V @ 1.5A	2.5A	—	—	5.5 x 3.5 x 2
30W	LR2400	5V @ 2.0A	+12V @ 1.5A	—	−12V @ 0.1A	—	4 x 2 x 1.8
40W	LR3500	5V @ 3.0A	+12V @ 2.0A	—	−12V @ 0.1A	—	5 x 3 x 2
40W	LR4000	5V @ 4.0A	+12V @ 2.5A	—	−12V @ 0.5A	—	6.3 x 3.9 x 2
65W	LR4300	5V @ 6.0A	+12V @ 2.5A	6.0A	−12V @ 0.6A	−5V @ 0.6A	6.3 x 3.9 x 2
65W	LR5300	5V @ 6.0A	+12V @ 3.0A	6.0A	−12V @ 0.6A	−5V @ 0.6A	8.25 x 4.25 x 2.2
65W	LR5301-08A	5V @ 6.0A	+12V @ 3.0A +24V @ 1.6A	6.0A	+12V @ 0.6A	−12V @ 0.6A	8.25 x 4.25 x 2.2
65W	LR5301-15	5V @ 6.0A	+12V @ 3.0A	6.0A	−12V @ 0.6A	—	8.25 x 4.25 x 2.2
65W	LR5301-16	5V @ 5.0A	+15V @ 0.5A	—	−15V @ 0.5A	−5V @ 0.5A	8.25 x 4.25 x 2.2
65W	LR5301-32	5V @ 6.0A	+12V @ 2.5A	6.0A	+12V @ 1.5A	−12V @ 0.5A	8.25 x 4.25 x 2.2
65W	LR5301-34	5V @ 6.0A	+18V @ 1.0A	—	−18V @ 1.0A	—	8.25 x 4.25 x 2.2
65W	LR5301-36	5V @ 8.0A	+12V @ 2.5A	6.0A	—	−12V @ 0.5A	8.25 x 4.25 x 2.2
65W	LR5301-39	5V @ 9.0A	+12V @ 2.5A	6.0A	−12V @ 0.5A	—	8.25 x 4.25 x 2.2
100W	LR5401-01	5V @ 10.0A	+12V @ 4.0A	6.0A	—	−12V @ 0.5A	8.25 x 4.25 x 2.2
100W	LR5401-02	5V @ 10.0A	+12V @ 4.0A	6.0A	+12V @ 1.5A	−12V @ 0.5A	8.25 x 4.25 x 2.2
100W	LR5401-03	5V @ 10.0A	+12V @ 4.0A	6.0A	−12V @ 1.0A	−5V @ 0.5A	8.25 x 4.25 x 2.2
100W	LR5500	5V @ 10.0A	+12V @ 4.0A	6.0A	+12V @ 1.2A	−5V @ 0.6A	8.0 x 5.0 x 2.2
100W	LR5501-03	5V @ 10.0A	+12V @ 4.0A	6.0A	−12V @ 0.6A	−5V @ 0.5A	8.0 x 5.0 x 2.2
100W	LR5501-06	5V @ 10.0A	+12V @ 4.0A	6.0A	+12V @ 1.5A	−12V @ 0.5A	8.0 x 5.0 x 2.2
100W	LR5501-09	5V @ 10.0A	+24V @ 2.5A	—	+12V @ 1.5A	−12V @ 0.6A	8.0 x 5.0 x 2.2
150W	LR150	5V @ 20.0A	+12V @ 4.0A	6.0A	+12V @ 1.5A	−12V @ 0.6A	10.5 x 5.0 x 2.2
200W	LR200	5V @ 20.0A	+12V @ 7.3A	—	−12V @ 0.3A	−5V @ 0.3A	8.1 x 5.65 x 2.2
200W	LR1041	5V @ 20.0A	+12V @ 7.3A	—	−12V @ 0.3A	−5V @ 0.3A	8.35 x 6.0 x 6.0
250W	LR250	5V @ 30.0A	+12V @ 7.0A	10.0A	−12V @ 0.5A	—	12.0 x 5.0 x 2.2

- Other main and auxiliary voltages can be specified and may be available. Please consult factory.
- All units designed to meet UL478, CSA C22.2-154, VDE 0806 (VDE 0730) and FCC Class B. Please consult factory for current status of agency approvals.

California DC offers a broad range of switching power supplies designed to provide reliable power under a variety of operating conditions. Hundreds of thousands of units in customer systems are powering TTL, CMOS, and ECL logic; removable and fixed media drives; CRT monitors; impact and non-impact printer mechanisms; and a number of additional applications. Let our experience work for you, whether your requirements demand off-the-shelf power supplies, custom designs, or modified standard products. Our applications and field support are second to none — dedicated to ensuring the best solution for your systems needs.

STANDARD FEATURES

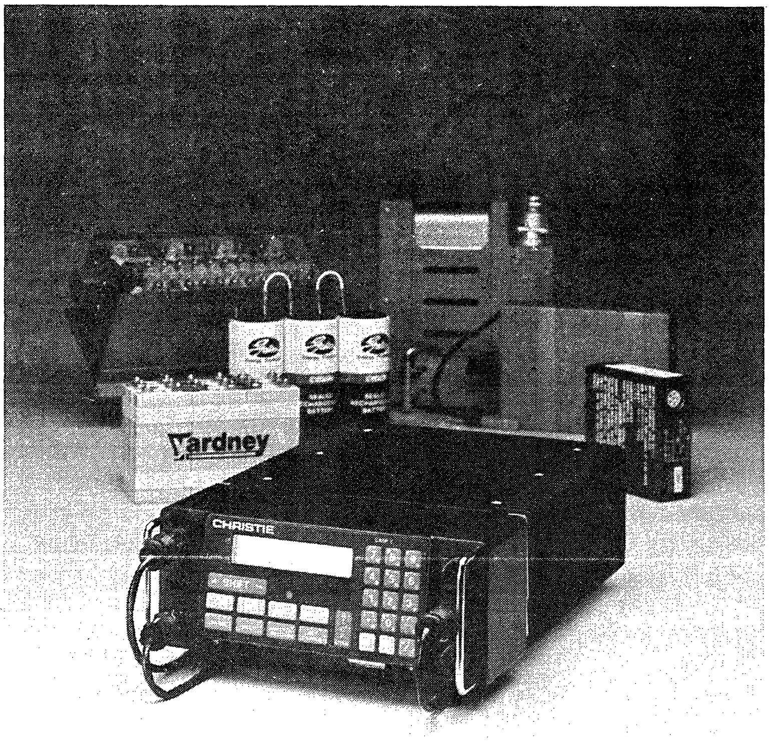
- Cost effective, reliable designs
- Dual input voltage, jumper selectable
- ±20% line tolerance
- 20 msec hold up
- Overvoltage protection, main output
- Overpower limit
- 65% minimum efficiency at full load
- 1% peak-to-peak output ripple and noise
- Inrush current limit on turn-on
- 50°C full output

CADC CALIFORNIA DC

2150 ANCHOR COURT • NEWBURY PARK, CALIFORNIA 91320
PHONE: (805) 499-3621 • MARKETING HOTLINE: (213) 706-8221

CASP™

CHARGER • ANALYZER • SEQUENCER • POWER SUPPLY



ELIMINATE BATTERY PROBLEMS

CASP, with its unique reFLEX charging as well as computer diagnostics and treatment, ensures that batteries are quickly charged, fully reliable, have increased capacity and an extended life.

VERSATILITY

CASP automatically charges or analyzes any type of battery—sealed nickel-cadmium, vented aircraft nickel-cadmium, sealed and vented lead-acid, silver-zinc or any other type such as rechargeable lithium. That means that CASP can never become obsolete.

CASP also shows digital voltage, current, time, ampere-hour and other information on its LCD. It can store it, recall it, print it and even graph it. It can also turn into a 350-watt programmable dc power supply [battery eliminator] upon command.

CONVENIENCE

CASP automatically handles up to 6 assorted batteries or 6 power supply outputs; it operates on any mains power anywhere in the world [90 to 265 volts, 47 to 440 Hz]; and it can even work on an input of 12 or 28 volts dc with an optional plug-in module. Its color-coded keyboard with its single function as well as alpha-numeric keys make it simple to operate, and its relatively small size and light weight make it easily portable. In addition, it has an I/O port which may be used for connection of a bar code reader or a computer printer.

ULTRA-FAST, HIGHER CAPACITY, LONGER LIFE

Christie batteries can be recharged in 20 minutes or less; other ni-cads may take somewhat longer. Batteries are more fully charged, stay cooler, have less cell imbalance, mostly overcome battery memory or capacity fading, and outlive other batteries—all due to Christie's reFLEX charging process.

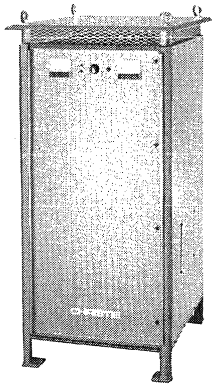
In the case of ni-cads, the secret to all these benefits is the repeated interjection of reFLEX negative/discharge pulses during charging. Just like burping a baby that is being bottle-fed, so reFLEX burps the battery during charging to get rid of its gases. This, together with large positive pulses, raises the charging efficiency so significantly that more charging energy goes into the battery rather than into heat. In fact, the time saved is just the by-product.

CHRISTIE

ELECTRIC CORP.

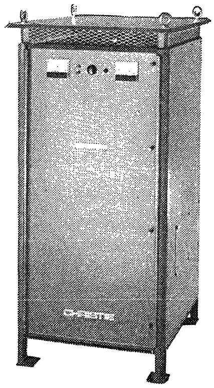
20665 Manhattan Place • Torrance, California 90501 U.S.A. • 213-320-0808 • 800-421-2955 • TWX 910-349-6260

K-SERIES



Line	Model No.(1) (Stationary Style)	D-C Volts Output		D-C Amps Continuous	D-C Voltage Regulation			Voltage Ripple rms	Response Time(4) Millisec.	Input A-C Volts 3-Phase 57-63 Hz	Approx. Max. A-C Amps per Phase		Net Weight Lbs. (Stationary)
		Nominal	Continuous Range		Static(2) ±	Dynamic(3) ±					at 220v. Suffix "2"	at 440v Suffix "4"	
						½ Load	Full Load						
1	MH16-200K2S	14	11-16	200	0.5%	3.5v.	5v.	1%	100	208/220(5)	20	—	310
2	MH16-300K2S			300	0.5%	3.5v.	5v.	1%	100	208/220(5)	30	—	330
3	1C15-1000K4S	14	12-15	1000	0.5%			1%	100	440/480	—	43	700
4	MH32-100K24S	28	22-32	100	0.25%	4v.	6v.	1%	50	208/220/440(7)	22	11	245
5	MH32-200K24S			200	0.25%	4v.	6.5v.	1%	50(8)	208/220/440(7)	38	19	310
6	MH32-300K24S			300	0.25%	4v.	6.5v.	1%	50(8)	208/220/440(7)	55	27.5	370
7	1C36-400K4S	28	26-36	400	0.25%	5v.	8v.	1%	100	440/480(6)	—	42	650
8	1C36-500K4S			500	0.25%	5v.	8v.	1%	100	440/480(6)	—	52	720
9	1C36-600K4S			600	0.25%	5v.	8v.	1%	100	440/480(6)	—	63	780
10	2C36-800K4S			800	0.25%	5v.	8v.	1%	100	440/480(6)	—	84	980
11	2C36-1000K4S			1000	0.25%	6v.	9v.	1%	100	440/480(6)	—	100	1220
12	2C36-1200K4S			1200	0.25%	7v.	10v.	1%	100	440/480(6)	—	125	1325
13	2C32-1500K4S	28	26-32	1500	0.25%	5v.	8v.	1%	140	440/480(6)	—	130	1400
14	MH36-100KK2S	30	15-36	100	0.5%	4v.	6v.	1%	50	208/220(5)	23	—	280
15	MH36-200KK2S			200	0.5%	4v.	7v.	1%	50(8)	208/220(5)	42	—	325
16	1C36-400KK4S			400	0.5%	6v.	9v.	1%	100	440/480(6)	—	45	750
17	MH64-100K2S	60	44-64	100	0.25%	8v.	12v.	1%	50	208/220(5)	37	—	320
18	1C64-200K4S			200	0.5%	8v.	12v.	1%	100	440/480(6)	—	36	650
19	1C64-300K4S			300	0.5%	10v.	15v.	1%	100	440/480(6)	—	53	800
20	MH135-40K2S	120	110-135	40	0.25%	9v.	15v.	1%	50	208/220(5)	30	—	285
21	MH135-60K2S			60	0.25%	9v.	15v.	1%	50	208/220(5)	44	—	325
22	1C135-100K4S			100	0.5%	15v.	25v.	1%	100	440/480(6)	—	33	615
23	1C135-200K4S			200	0.5%	15v.	25v.	1%	100	440/480(6)	—	65	850
24	2C135-300K4S			300	0.5%	20v.	30v.	1%	100	440/480(6)	—	95	1100
25	2C280-100K4S	250	220-280	100	0.5%	30v.	50v.	1%	100	440/480(6)	—	65	850

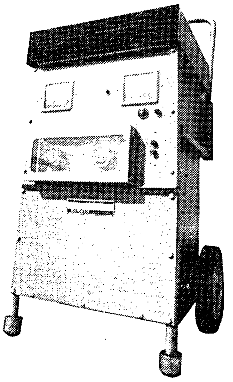
SCO



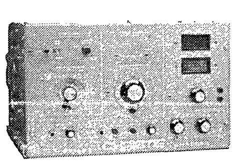
	Line	MODEL NO.(1) (Stationary Style)	D-C VOLTS OUTPUT		D-C AMPS CONT.	OUTPUT KW	D-C VOLTAGE REGULATION		Current Regulation ±	Voltage Ripple rms	RESPONSE TIME Millisec(4)		INPUT				Approx. Net Weight lbs.
			Nominal	Continuous Range			Static(2) ± Greater of	Dynamic(3)			NL-FL	FL-NL	A-C Volts ±10% 57-63 Hz.	1-ph. or 3-ph.	Approx. Max. Amps/Phase at 230v.	Approx. Max. Amps/Phase at 460v.	
SCO	1	SC015-100-12S	12	2-15	0-100	1.5	0.2% or 25mv.	3v.	1a.(5)	0.5% or 50mv.	50-75	150	115/230	1-ph.	15(7)	—	120
	2	SC036-50-12S	28	2-37	0-50	1.8	0.25% or 70mv.	5v.	1.5a.(5)	1% or 200mv.	50-75	150	115/230		13(7)	—	110
EE	3	1C015-1000EE4S	12	0-15	1000	15	0.2% or 30mv	5v	850ma	40mv	100	200	460	3-ph.	—	35	615
	4	2C030-1500EE4S	24	0-30	1500	45	0.1% or 25mv	5v.	1.5a	30mv.	50	125	460		—	90	1575
	5	1R040-150EE24S	28	0-40	150	6	0.1% or 25mv.	3v.	125ma.	30mv.	50	100	208/230 460		28	14	300
	6	3R040-300EE24S			300	12	0.1% or 25mv.	3v.	250ma	30mv.	50	100	208/230 460		56	28	410
	7	1C040-600EE4S			600	24	0.1% or 25mv.	3v.	500ma.	30mv.	50	125	460		—	54	660
	8	1C031-700EED4S(6)	28 56	0-31 0-62	700 350	22	0.1% or 50mv.	5v. 10v.	700ma. 350ma.	30mv. 60mv.	50	500	460		—	44	660
	9	3R080-150EE2S	60	0-80	150	12	0.1% or 100mv.	8v.	150ma.	320mv.	50	150	230		55	—	400
	10	1C0135-150EE4S	120	0-135	150	20	0.1% or 100mv.	10v.	125ma.	100mv.	50	125	460		—	46	650
	11	2C0135-300EE4S			300	40	0.1% or 100mv.	10v.	250ma.	100mv.	50	125	460		—	92	775

RECTODYNE

Series	Characteristic	D-C Volts	D-C Amps Continuous	Model Number(1)	No. of Voltage Control Steps	D-C Voltage Regulation(2) ±	Approximate Voltage Ripple RMS	Input A-C Volts 3-Phase 60 Hz	Approx. Max. A-C Amps per Phase		Approx. Net Weight Lbs.	Line
									230V., 3-Ph.	460V., 3-Ph.		
A	FIXED VOLTAGE & UNREGULATED (low impedance)	28	100	MH28-100A2S	6	7.5%	1%	208/230V.(4)	10	—	130	1
			200	MH28-200A2S	6	7.5%	1%	208/230V.(4)	18	—	225	2
RA or T	FIXED VOLTAGE & LOAD REGULATED (no line regulation) INCLUDING AIRCRAFT STARTING & SERVICING	28	100	MH28-100RA2M	6	2%	1%	208/230V.(4)	10	—	140	10
			200	MH28-200RA24M	6	2%	1%	208/230/ — V.	18	—	235	11
			300	MH28-300RA24M	6	2%	1%	208/230/460V.	26	—	260	12
			400	H28-400RA24M	6	2%	1.5%	208/230/460V.	35	17.5	315	13
			600	H28-600RA4M	6	2%	1.5%	416/460V.(5)	—	25	465	14
			1000	A28-1000TJA4M	6	3.75%	1.5%	416/460V.	—	42.5	575	15
A	FIXED VOLTAGE & UNREGULATED (low impedance)	120	40	MH120-40A2S	6	3.5%	1%	208/230V.(4)	14	7	180	17
			80	MH120-80A2S	6	3.5%	1%	208/230V.(4)	30	—	320	19
			125	MH120-125A2S	6	3.5%	1%	208/230V.(4)	46	—	360	20
			200	H120-200A4S	6	3.5%	1%	416/460V.(5)	—	37.5	400	21
			400	1C120-400A4S(3)	6	3%	1%	416/460V.(5)	—	70	500	22
		240	200	1C240-200A4S(3)	6	3%	1%	416/460V.(5)	—	70	500	23

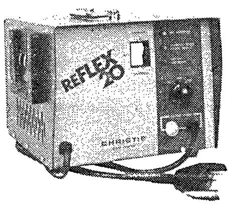


RF 80



- Up to 90 % faster than conventional methods. Aircraft batteries can be charged in 1 hour instead of as many as 14 hours—AND THE BATTERY STAYS COOL.
- Produces higher battery capacity [over 130% capacity not unusual]. The depolarization pulses of the ReFLEX charging process reduce battery impedance, gassing, heating and electrolyte losses.
- Increases battery life due to over 90% charging efficiency.
- Frequently rejuvenates batteries that otherwise fail specifications.
- Better cell balance, less "memory," negligible heating and gassing.
- Charges battery of unknown state-of-charge—no need to discharge battery first.
- Saves on manpower, time and battery inventory.
- The only true cell balance test available anywhere.
- Unique color bar display showing battery state-of-charge.
- Digital voltage and current readouts.
- Cell fatigue testing—saves 18 hours over other methods.

REFLEX-20



The ReFLEX-20 "Burping" Charger*-and-Battery system will fully [not 80% or 90%] recharge a completely discharged nickel-cadmium battery in 20 minutes [not hours]. It will recharge a partially discharged battery in proportionately less time [in as little as seconds].

At the same time, ReFLEX-20 results in a battery with longer, not shorter life, with more actual ampere-hours, with greater reliability and with less capacity fading ["memory"]. It can do this without overheating the battery due to its typically 95% [not 70%] charging efficiency.

What makes all this possible?
- The patented "burping" charger
- The patented state-of-charge sensing system
- The super ni-cad battery packs

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COMMONLY USED ELECTRICAL/ELECTRONIC ABBREVIATIONS AND ACRONYMS

A
AC alternating current
A/D analog to digital
ADC analog to digital converter
ADP automatic data processing
AF audio frequency
AFC automatic frequency control
ALGOL algorithmic language
AM amplitude modulation
AND a logical operator
AQL acceptable quality level
ASCII American national standard code for information interchange
AWG American wire gauge

B
BALUN balanced to unbalanced
BASIC beginners' all-purpose symbolic instruction
BCD binary-coded decimal
BNC baby "N" connector
BUS basic utility system

C
CAD computer aided design
CAM computer aided manufacture
CATV cable television or community antenna television
CERMET ceramic metal element
Comm. communications
CMOS complementary metal-oxide semiconductor
CPS characters per second
CPU central processing unit

D
D/A digital to analog
DAC digital to analog converter
DC direct current
DIAC bidirectional trigger diode
DIL dual in-line
DIN Deutsche Industrie Normenausschuss
DIP dual in-line package
DPM digital panel meter
DTL diode transistor logic

E
EDP electronic data processing
EBCDIC extended binary coded decimal interchange code
EEPROM electrically erasable PROM
EMC electromagnetic compatibility
EMI electromagnetic interference
EMP electromagnetic pulse
EPROM electrically programmable ROM
ESR equivalent series resistance

F
FEP fluorinated ethylene propylene Copolymar, 200° Teflon
FET field-effect transistor
FM frequency modulation
FORTRAN formula translator

G
GaAsFET gallium arsenide field effect transistor
GPIB general purpose interface bus

H
HF high frequency (3 to 30 MHz)
HIPOT test, measurement and diagnostic equipment
HLL high level language
HV high voltage
Hz Hertz

I
IC integrated circuit
IDC insulation displacement contact
IF intermediate frequency
IO input/output (devices)
IR insulation resistance (or) infrared

J
JFET junction field effect transistor
JMOS junction metal oxide semiconductor

K
kHz kilohertz (10^3 hertz)
KSR keyboard send receive

L
LC inductance capacitance
LCD liquid crystal display
LED light-emitting diode
LF low frequency (30 to 300 kHz)
LIF low insertion force
LNA low noise amplifier
LNB low noise band
LSI large scale integration
LVDT linear velocity displacement transformer

M
MASER microwave amplification by stimulated emission of radiation
MATV master antenna television
μF microforad
MHz megahertz
MIPS million instructions per second
MIB microcomputer interface board
MOS metal oxide semiconductor
MOSFET metal oxide semiconductor field effect transistor
MOSIGT metal-oxide semiconductor insulated-gate transistor
MOV metal oxide varistor
MPU microprocessor unit
MSI medium scale integration

N
NBS National Bureau of Standards
NEMP nuclear electromagnetic pulse
NIM nuclear instrumentation module
NOR not OR
NTC negative temperature coefficient

O
OCR optical character reader
OEM original equipment manufacturer
OR a logical operator

P
PC printed circuit
PCB printed circuit board
pF picofarad
PGA pin grid array
PIN positive-intrinsic-negative (transistor)
PLA programmable logic array
PLL phased lock loop
PPI plan position indicator
PROM programmable read only memory
PTC positive temperature coefficient
PUT programmable unijunction transistor

Q
QAM quadrature amplitude modulation
Q (meter) quality-factor meter

R
RAM random access memory
RC resistance-capacitance
RFI radio frequency interference
RMS root mean square
ROM read only memory
RF radio frequency
RFC radio-frequency choke
RFI radio-frequency interference
RTD resistance-temperature detector
RTL resistor transistor logic
RTV room temperature vulcanizing
RW read/write

S
SAS silicon asymmetrical switch
SBC single board (micro) computer
SBS silicon bilateral switch
SCR silicon-controlled rectifier
SCS silicon controlled switch
SDA source & detector assemblies
SIDAC bidirectional voltage-triggered switch
SIP single in-line package
SSI small scale integration
SSR solid state relay
STL Schottky transistor logic
SUS silicon unilateral switch

T
TC temperature coefficient
TCXO temperature compensated crystal oscillator
TFE tetrafluoride ethylene propylene Copolymer, 250° Teflon
TRIAC bidirectional AC switch
TTL transistor-transistor logic
TTY teletypewriter

U
UHF ultra high frequency (300 MHz to 3 GHz)
UJT silicon unijunction transistor
UL Underwriters Laboratory
UPS uninterruptible power supply

V
VAC volts (of) alternating current
VAR volt-ampere reactive
VCR video cassette recorder
VDC volts (of) direct current
VHF very high frequency
VHSIC very high speed integrated circuit
VLF very low frequency (3 to 30 kHz)
VLSI very large scale integration
VME virtual machine environment
VRM voice recognition module
VTVM vacuum tube volt meter
VU volume unit
VSWR voltage standing wave ratio

W
WPS word processing software

Y
YIG yttrium iron garnet

Z
ZIF zero insertion force

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Power Supply Catalog

PM301
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1986

- Linear Power Supplies
- Switching Power Supplies
- DC/DC Converters

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PRODUCT SELECTION GUIDE

AC/DC Linear Power Supplies

OUTPUT POWER	OUTPUT VOLTAGES	INPUT VOLTAGES	FEATURES	SERIES	PAGE
SINGLE OUTPUT MODELS					
1-2.4W	5, 10, 12, 15, 18, 20, 24, 28 VDC	115, 100, 220, 240 VAC	PC-Mountable	PM500	10
2.5-10W	5, 12, 15, 24 VDC	115, 100, 220, 240 VAC	Chassis-Mountable	PM300	11
2.5-10W	5, 12, 15, 24 VDC	115, 100, 220, 240 VAC	PC-Mountable	PM500	10
15-120W	5, 12, 15, 24 VDC	115, 100, 220, 230, 240 VAC	Open-Frame	PL100	9
DUAL OUTPUT MODELS					
0.6-10.8W	±12, ±15, ±18, ±24 VDC	115, 100, 220, 240 VAC	PC-Mountable	PM500	10
2.9-15W	±12, ±15 VDC	115, 100, 220, 240 VAC	Chassis-Mountable	PM300	11
24-90W	±12, ±15, 5 & 9-12, 5 & 24	115, 100, 220, 230, 240 VAC	Open-Frame	PL100	9
TRIPLE OUTPUT MODELS					
5.4-9.5W	±12 & 5, ±15 & 5 VDC	115, 100, 220, 240 VAC	Chassis-Mountable	PM300	11
5.4-9.5W	±12 & 5, ±15 & 5 VDC	115, 100, 220, 240 VAC	PC-Mountable	PM500	10
39-105W	±12 & 5, ±15 & 5 VDC	115, 100, 220, 230, 240 VAC	Open-Frame	PL100	9

DC/DC Converters

OUTPUT POWER	OUTPUT VOLTAGES	INPUT VOLTAGES	FEATURES	SERIES	PAGE
SINGLE OUTPUT MODELS					
0.5-1W	5, 12, 15 VDC	5, 12 VDC	24 Pin DIP	PM600	19
1-1.5W	5, 12, 15 VDC	5, 12, 15, 24, 28, 48 VDC	Six Side Shield	H	29
1.1-1.5W	5, 12, 15 VDC	5, 12 VDC	Unregulated 24 Pin DIP	EM600	18
2.5-3W	5, 12, 15 VDC	24, 48 VDC	24 Pin DIP	DR	24
3-6W	5, 6, 12, 15 VDC	5, 12, 24, 28, 48 VDC	High Performance	F	29
3W	5, 12, 15 VDC	5, 12, 24, 28, 48 VDC	High Performance	PM700	20
5-6W	5, 12, 15 VDC	5, 12, 24, 28, 48 VDC	High Performance	PM900	21
5-7.5W	5, 12, 15 VDC	5, 12 VDC	Unregulated	EM900	18
5W	5 VDC	7-32*	Non-Isolated	WF	28
6W	5, 12 VDC	5, 12, 24, 28, 48 VDC	Unregulated	K	23
10W	5, 12, 15 VDC	5, 12, 24, 28, 48 VDC	High Performance	M	29
10W	5, 12, 15 VDC	5, 12, 24, 28, 48 VDC	High Performance	PM800	22
15-45W	5, 12, 15 VDC	7-40*, 14-40*, 17-40* VDC	High Performance	LWM	28
15-30W	5, 12, 15 VDC	9-18*, 18-36*, 36-72*	Economy	WR	26
25W	5, 12, 15 VDC	12, 24, 28, 48 VDC	High Performance	P	29
25-30W	5, 12, 15 VDC	9-36*, 20-72*	High Performance	WP	25
55-60W	5, 12, 15 VDC	12, 24, 48 VDC	High Performance	WRK	32
DUAL OUTPUT MODELS					
1W	±12, ±15 VDC	5, 12 VDC	24 Pin DIP	PM600	19
1.5W	±12, ±15 VDC	5, 12 VDC	Unregulated 24 Pin DIP	EM600	18
1.5-1.8W	±12, ±15 VDC	5, 12, 24, 28, 48 VDC	High Performance	A	30
1.5-1.8W	±12, ±15 VDC	5, 12 VDC	Economy	EA	23
2.5-3W	±5, ±12, ±15 VDC	24, 48 VDC	24 Pin DIP	DR	24
3W	±12, ±15 VDC	5, 12, 24, 28, 48 VDC	High Performance	PM700	20
3.6-4.5W	±12, ±15 VDC	5, 12, 24, 28, 48 VDC	High Performance	A	30
6W	±12, ±15 VDC	5, 12, 24, 28, 48 VDC	High Performance	PM900	21
6W	±15, ±18 VDC	5, 12, 24, 28, 48 VDC	Unregulated	J	23
7.5W	±12, ±15 VDC	5, 12, 24, 28, 48 VDC	High Performance	BA	30
9W	±12, ±15 VDC	5, 12 VDC	Unregulated	EM900	18
10W	±12, ±15 VDC	5, 12, 24, 28, 48 VDC	High Performance	N	30
12W	±12, ±15 VDC	5, 12, 24, 28, 48 VDC	High Performance	PM800	22
25W	±12, ±15 VDC	12, 24, 28, 48 VDC	High Performance	R	22
30W	±12, ±15 VDC	9-18*, 18-36*, 36-72*	Economy	WR	26
55-60W	5 & 5, 5 & 12, 12 & 12, 15 & 15 VDC	12, 24, 48 VDC	High Performance	WRK	32
TRIPLE OUTPUT MODELS					
9W	±12 & 5, ±15 & 5 VDC	5, 12, 24, 28, 48 VDC	High Performance	C	31
15W	±12 & 5, ±15 & 5, ±5 & 12 VDC	9-18*, 18-36*, 36-72*	Economy	ES	27
25W	±12 & 5, ±15 & 5 VDC	12, 24, 28, 48 VDC	High Performance	S	31
55-60W	±12 & 5, ±15 & 5, ±5 & 12, ±5 & 15 VDC	12, 24, 48 VDC	High Performance	WRK	33
QUAD OUTPUT MODELS					
55-60W	±5 & 12, ±5 & 15 VDC	12, 24, 48 VDC	High Performance	WRK	33

* voltage Range.
All Units Isolated and Regulated Unless Otherwise Noted.

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AC/DC Switching Power Modules

OUTPUT POWER	OUTPUT VOLTAGES	INPUT VOLTAGES	FEATURES	SERIES	PAGE
		SINGLE OUTPUT MODELS			
15W	5, 12, 15 VDC	115, 230 VAC	Chassis-Mountable	HM300	12
15W	5, 12, 15 VDC	115, 230 VAC	PC-Mountable	HM500	12
25W	5, 12, 15 VDC	115, 230 VAC	Chassis-Mountable	HE300	12
25W	5, 12, 15 VDC	115, 230 VAC	PC-Mountable	HE500	12
		DUAL OUTPUT MODELS			
15W	±12, ±15 VDC	115, 230 VAC	Chassis-Mountable	HM300	12
15W	±12, ±15 VDC	115, 230 VAC	PC-Mountable	HM500	12

AC/DC Switching Power Supplies

OUTPUT POWER	OUTPUT VOLTAGES	INPUT VOLTAGES	FEATURES	SERIES	PAGE
		SINGLE OUTPUT MODELS			
30W	5 VDC	115/230 VAC	Open-Frame	80007	6
36-45W	12-15, 24-30 VDC	115/230 VAC	Metal-Cased	HE200	13
60W	12, 15, 24 VDC	115/230 VAC	Open-Frame	80007	6
60W	5 VDC	115/230 VAC	Open-Frame	80011	6
70W	5, 12, 15, 24 VDC	115/230 VAC	Metal-Cased	HE200	14
100W	5, 12, 15, 24 VDC	115/230 VAC	Metal-Cased	HE200	14
100W	12, 15, 24 VDC	115/230 VAC	Open-Frame	80011	6
150W	5, 12, 15, 24 VDC	115/230 VAC	Open-Frame	80012	6
150W	5, 12, 15, 24 VDC	115/230 VAC	Metal-Cased	HE200	15
200W	5, 12, 15, 24 VDC	115/230 VAC	Metal-Cased	HE200	15
1500W	2, 5, 12, 15, 24, 28, 48 VDC	115/230 VAC	Metal-Cased	Hi-Power	17
		DUAL OUTPUT MODELS			
36-45W	±12-±15 VDC (adjustable)	115/230 VAC	Metal-Cased	HE200	13
100W	±5, ±12, ±15 VDC	115/230 VAC	Metal-Cased	HE200	14
150W	±5, ±12, ±15 VDC	115/230 VAC	Metal-Cased	HE200	15
800W	5 & 2, 5, 12, 15, 24, 28 VDC	115/230 VAC	Metal-Cased	Hi-Power	16
1200W	5 & 2, 5, 12, 15, 24, 28 VDC	115/230 VAC	Metal-Cased	Hi-Power	16
1500W	5 & 2, 5, 12, 15, 24, 28 VDC	115/230 VAC	Metal-Cased	Hi-Power	17
		TRIPLE OUTPUT MODELS			
20W	±12 & 5, ±15 & 5, ±5 & 12 VDC	115/230 VAC	Open-Frame	80015, 16	4
40W	±12 & 5, ±15 & 5, ±5 & 12, ±5 & 24 VDC	115/230 VAC	Open-Frame	80017	4
40W	+5/+12/−12, +5/+12/−5 VDC	115/230 VAC	Open-Frame	80013	5
50W	+5/+12/−12, +5/+12/−5 VDC	115/230 VAC	Open-Frame	80003	5
70W	±12 & 5, ±15 & 5 VDC	115/230 VAC	Metal-Cased	HE200	14
75W	+5/+12/−12 VDC	115/230 VAC	Open-Frame	80002	7
100W	±12 & 5, ±15 & 5 VDC	115/230 VAC	Metal-Cased	HE200	14
150W	±12 & 5, ±15 & 5 VDC	115/230 VAC	Metal-Cased	HE200	15
800W	5 & 2, 5, 12, 15, 24, 28 VDC	115/230 VAC	Metal-Cased	Hi-Power	16
1200W	5 & 2, 5, 12, 15, 24, 28 VDC	115/230 VAC	Metal-Cased	Hi-Power	16
1500W	5 & 2, 5, 12, 15, 24, 28 VDC	115/230 VAC	Metal-Cased	Hi-Power	17
		QUAD OUTPUT MODELS			
40-50W	+5/+12/−12/−5, +5/+15/−15/−5, +8/+16/−16/−5 VDC	115/230 VAC	Open-Frame	80009, 80010	5
65W	+5/+12 (adj.)/−12/−5, +5/+15 (adj.)/−15/−5 VDC	115/230 VAC	Open-Frame	80004	5
70W	+5/±12/±15/−5 or +24 VDC	115/230 VAC	Metal-Cased	HE200	14
90W	+5/+12/+12/−12, +5/−24/+12/−12 VDC	115/230 VAC	Open-Frame	80001 70021	6
90W	+5/+12/+12/−12, +5/+12/+24/−12, +5/+12/+12/−5, +5/+12,+24/−5 VDC	115/230 VAC	Open-Frame	80005	5
100W	+5/±12/±15/−5 or +24 VDC	115/230 VAC	Metal-Cased	HE200	14
150W	+5/±12/±15/−5 or +24 VDC	115/230 VAC	Metal-Cased	HE200	15
800W	5 & 2, 5, 12, 15, 24, 28 VDC	115/230 VAC	Metal-Cased	Hi-Power	16
1200W	5 & 2, 5, 12, 15, 24, 28 VDC	115/230 VAC	Metal-Cased	Hi-Power	16
1500W	5 & 2, 5, 12, 15, 24, 28 VDC	115/230 VAC	Metal-Cased	Hi-Power	17
		FIVE OUTPUT MODELS			
65W	+5/+12/−12/−5/+12, +5/+12/−12/−5/+24 VDC	115/230 VAC	Open-Frame	80002	7
85W	+5/±12/+24/−12/−5, +5/±15/+24/−15/−5 VDC	115/230 VAC	Open-Frame	80006	6
90W	+5/+12/−12/−5/+12, +5/+12/−12/−5/+24 VDC	115/230 VAC	Open-Frame	80002	7
150W	+5/+12/+12/−12/−5, +5/+15/+15/−15/−5, +5/+24/+12/−12/−5, +5/+24/+15/−15/−5, +5/+12/+24/−12/−5, +5/+12/+24/−12/−5 VDC	115/230 VAC	Open-Frame	80008	7
350W	±5, ±12 & 24 VDC	115/230 VAC	Open-Frame	80028	8

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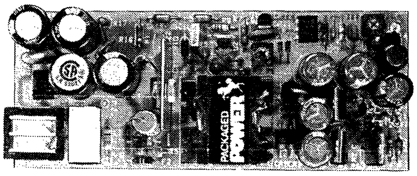

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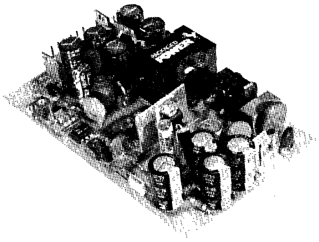
- OVP/Short-Circuit Protection
- 16 mS Holdup Time
- On-Board Fusing
- 100% Burn-In @ 60°C
- 110/220 Input (Selectable)

MAX. (1) WATTS	OUTPUT #1	OUTPUT #2	OUTPUT #3	INPUT FILTER	MODEL NO.	PKG.
20	+5V @ 2.2A	+12V @ 0.35A	−12V @ 0.35A	√	80015-01	MM
20	+5V @ 2.2A	+15V @ 0.35A	−15V @ 0.35A	√	80015-02	MM
20	+5V @ 2.2A	+12V @ 0.35A	−5V @ 0.35A	√	80015-03	MM
20	+5V @ 3.0A	+12V @ 0.35A	−12V @ 0.35A	√	80016-01	NN
20	+5V @ 3.0A	+15V @ 0.35A	−15V @ 0.35A	√	80016-02	NN
20	+5V @ 3.0A	+12V @ 0.35A	−5V @ 0.35A	√	80016-03	NN
20	+5V @ 2.2A	+12V @ 0.35A	−12V @ 0.35A	√	80020-01	OO
20	+5V @ 2.2A	+15V @ 0.35A	−15V @ 0.35A	√	80020-02	OO
20	+5V @ 2.2A	+12V @ 0.35A	−5V @ 0.35A	√	80020-03	OO
20	+5V @ 2.2A	+12V @ 1.5A	−12V @ 0.35A	√	80021-01	OO
20	+5V @ 2.2A	+15V @ 1.3A	−15V @ 0.35A	√	80021-02	OO
20	+5V @ 2.2A	+12V @ 1.5A	−5V @ 0.35A	√	80021-03	OO

(1) Maximum Rated Output Load. Each Output Can Provide up to the Load Indicated, but Total Watts May Not Exceed Maximum Shown.
(2) 80015, 16 are UL Recognized, CSA Certified.
(3) 80020, 21 are VDE, IEC Approved.
* Output has Linear, Three Terminal Post Regulator.
** 1.5A Peak Current Capability for Small Disk Drive.

PACKAGE DIMENSIONS		
MM	5.00 x 2.0 x 1 In. (max.)	(127 x 51 x 26 mm)
NN	5.00 x 2.0 x 1 In. (max.)	(127 x 51 x 26 mm)

NOTE: MM: PC Mountable
NN, OO: Molex Connector



40W Multi Output Switchers

- Very Low Profile
- Input Transient Protection
- Low Radiation
- Soft-Start Circuitry
- 100% Computer Tested
- MTBF 60,000 Hrs. or Greater
- AC Line Filter
- OVP/Short-Circuit Protection
- 10 mS Holdup Time
- On-Board Fusing
- 100% Burn-In @ 60°C
- 110/220 Input (Selected)

MAX. (1) WATTS	OUTPUT #1	OUTPUT #2	OUTPUT #3	INPUT FILTER	MODEL NO.	PKG.
40	+5V @ 3.0A	+12V @ 2.0A	−12V @ 0.35A	√	80017-01	OO
40	+5V @ 3.0A	+15V @ 2.0A	−15V @ 0.35A	√	80017-02	OO
40	+5V @ 3.0A	+12V @ 2.0A	−5V @ 0.35A	√	80017-03	OO
40	+5V @ 3.0A	+12V @ 2.0A	−12V @ 0.35A	√	80017-04	OO
40	+5V @ 3.0A	+15V @ 2.0A	−15V @ 0.35A	√	80017-05	OO
40	+5V @ 3.0A	+12V @ 2.0A	−5V @ 0.35A	√	80017-06	OO
30	+5V @ 6.0A			√	80023-01	OO
40	+12V @ 3.5A			√	80023-02	OO
40	+15V @ 2.5A			√	80023-03	OO
40	+24V @ 1.5A			√	80023-04	OO

(1) Maximum Rated Output Load. Each Output Can Provide up to the Load Indicated, but Total Watts May Not Exceed Maximum Shown.
(2) Output #2 and #3 have Linear, Three Terminal Post Regulator.
(3) 80017-01, 02, 03 are UL Recognized, CSA Certified.
(4) All Other Models are VDE, IEC Approved

PACKAGE DIMENSIONS		
00	5.00 x 3.00 x 1.2 In. (max.)	(127 x 76 x 31 mm)

- All 5 Volt Outputs Overvoltage Protected.
- Operating Temperature Range: 0°C to 70°C. Full Rating up to 60°C. From 60°C to 70°C, derate Linearly to 50% of Full Rating.
- All models feature power foldback output protection, input transient protection, 30 KHz switching rate, soft-start, no turn-on overshoot and 32 msec. hold-up time.
- Input Voltage Range: User-Selectable from 90 VAC to 135 VAC or 180 VAC to 270 VAC. Single-Wire Jumper.

TWO-YEAR WARRANTY

Specifications Subject to Change Without Notice.

SOME MODELS MAY NOT BE AVAILABLE FROM STOCK. CONSULT FACTORY FOR AVAILABILITY.

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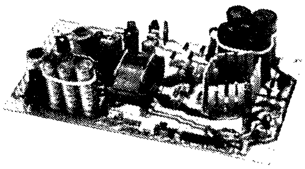


50-90W Multi Output Switchers

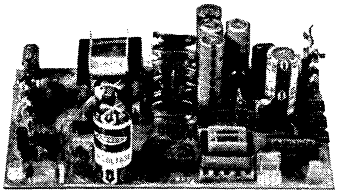
- 3 and 4 Outputs
- Input Filter
- Power Foldback Protected
- 70% Efficiency
- TUV Certified
- 50 mV P-P Max. Ripple
- Soft-Start

MAX. (1) WATTS	OUTPUT #1	OUTPUT #2	OUTPUT #3	OUTPUT #4	INPUT FILTER	MODEL NO. (2)	PKG.
50	+5V @ 6A	+12V @ 1A*	−12V @ 1A*	——	√	80003-01	BA
50	+5V @ 6A	+12V @ 1A*	−5V @ 0.5A*	——	√	80003-02	BA
65	+5V @ 5A	+12V @ 2A* (Adjustable)	−12V @ 1A*	−5V @ 0.5A*	√	80004-01	BB
65	+5V @ 5A	+15V @ 2A* (Adjustable)	−15V @ 1A*	−5V @ 0.5A*	√	80004-02	BB
90	+5V @ 6A	+12V @ 1A*	+12V @ 2.5A†	−12V @ 1A*	√	80005-01	CB
90	+5V @ 6A	+12V @ 1A*	+24V @ 1.25A†	−12V @ 1A*	√	80005-02	CB
90	+5V @ 6A	+12V @ 1A*	+12V @ 2.5A†	−5V @ 0.5A*	√	80005-03	CB
90	+5V @ 6A	+12V @ 1A*	+24V @ 1.25A†	−5V @ 0.5A*	√	80005-04	CB

(1) User May Draw up to Current Shown for Each Output, but Total Watts May Not Exceed Maximum Shown.
(2) All Models are Designed to VDC 0806.
* Linear Post Regulator on Output.
† ±10% Regulation with High Peak Capability for Disk Drive.

PACKAGE DIMENSIONS		
BA	7.75 x 4.25 x 2.40 In. (max.)	(197 x 108 x 61 mm)
BB	7.75 x 4.25 x 2.40 In. (max.)	(197 x 108 x 61 mm)
CB	8.36 x 4.25 x 2.40 In. (max.)	(212.3 x 108 x 61 mm)

NOTE: Molex Connectors.



40/50W Multi Output Switchers

- 3 and 4 Outputs
- 70% Efficiency
- Soft-Start
- 32 mS Holdup Time
- Power Foldback Protected
- Input Transient Protected

MAX. (1) WATTS	OUTPUT #1	OUTPUT #2	OUTPUT #3	OUTPUT #4	INPUT FILTER	MODEL NO. (2)	PKG.
40	+5V @ 3.5A	+12V @2A (3A PEAK)	−12V @ 1A*	——	√	80013-01	HH
40	+5V @ 3.5A	+12V @2A (3A PEAK)	−5V @ 250 mA*	——	√	80013-02	HH
40	+5V @ 3A	+12V @ 1A*	−12V @ 1A*	−5V @ 0.5A*		80009-01	AA
40	+5V @ 3A	+15V @ 1A*	−15V @ 1A*	−5V @ 250 mA*		80009-02	AA
40	+5V @ 3A	+12V @ 1A*	−12V @ 1A*	−5V @ 0.5A*		80010-01	AB
40	+5V @ 3A	+15V @ 1A*	−15V @ 1A*	−5V @ 250 mA*		80010-02	AB
50	+5V @ 5A	+12V @ 1A*	−12V @ 1A*	−5V @ 0.5A*		80009-04	AA
50	+5V @ 5A	+15V @ 1A*	−15V @ 1A*	−5V @ 250 mA*		80009-05	AA
50	+5V @ 5A	+12V @ 1A*	−12V @ 1A*	−5V @ 0.5A*		80010-04	AB
50	+5V @ 5A	+15V @ 1A*	−15V @ 1A*	−5V @ 250 mA*		80010-05	AB

S100 BUS POWER SUPPLIES

40	+8V @ 3A	+16V @ 1A	−16V @ 1A	−5V @ 250 mA*		80009-03	AA
40	+8V @ 3A	+16V @ 1A	−16V @ 1A	−5V @ 250 mA*		80010-03	AB
50	+8V @ 5A	+16V @ 1A	−16V @ 1A	−5V @ 250 mA*		80009-06	AA
50	+8V @ 5A	+16V @ 1A	−16V @ 1A	−5V @ 250 mA*		80010-06	AB

(1) User May Draw up to Current Shown for Each Output, but Total Watts May Not Exceed Maximum Shown.
(2) 80013 Series TUV Certified.
* Linear Post Regulator on Output.

PACKAGE DIMENSIONS		
AA	5.93 x 3.83 x 2.40 In. (max.)	(150.6 x 97.3 x 61 mm)
AB	5.93 x 3.83 x 2.40 In. (max.)	(150.6 x 97.3 x 61 mm)
HH	6.30 x 3.94 x 2.40 In. (max.)	(160 x 100.1 x 61 mm)

NOTE: AA: Barrier Strip Connector.
AB: Molex Connector.
HH: Molex Connector.

- All 5 Volt Outputs Overvoltage Protected.
- Operating Temperature Range: 0°C to 70°C. Full Rating up to 60°C. From 60°C to 70°C, derate Linearly to 50% of Full Rating.
- All models feature power foldback output protection, input transient protection, 30 KHz switching rate, soft-start, no turn-on overshoot and 32 msec. hold-up time.
- Input Voltage Range: User-Selectable from 90 VAC to 135 VAC or 180 VAC to 270 VAC. Single-Wire Jumper.
- All models are UL Recognized® and CSA Certified.

TWO-YEAR WARRANTY

Specifications Subject to Change Without Notice.

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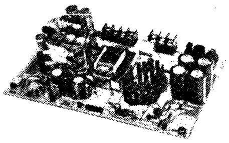


30-150W Single Output Switchers

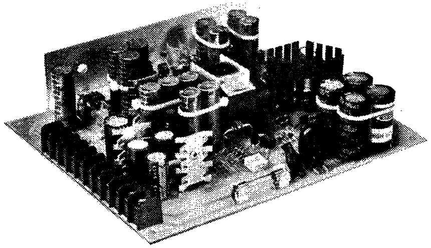
- OVP Crowbar On All Outputs
- Soft-Start
- 70% Efficiency
- 32 mS Holdup Time
- 50 mV P-P Max. Ripple
- Power Foldback Protected

MAX. WATTS	OUTPUT VOLTAGE	OUTPUT CURRENT	REGULATION LINE	REGULATION LOAD	OVP	RIPPLE AND NOISE (MAX.)	INPUT FILTER	MODEL NO. (1)	PKG.
30	5V	6A	±0.2%	±0.5%	√	50 mV P-P	√	80007-01	JJ
60	12V	5A	±0.2%	±0.5%	√	50 mV P-P	√	80007-02	JJ
60	15V	4A	±0.2%	±0.5%	√	50 mV P-P	√	80007-03	JJ
60	24V	2.5A	±0.2%	±0.5%	√	50 mV P-P	√	80007-04	JJ
60	5V	12A	±0.2%	±0.5%	√	50 mV P-P	√	80011-01	KK
100	12V	8A	±0.2%	±0.5%	√	50 mV P-P	√	80011-02	KK
100	15V	6A	±0.2%	±0.5%	√	50 mV P-P	√	80011-03	KK
100	24V	4A	±0.2%	±0.5%	√	50 mV P-P	√	80011-04	KK
150	5V	30A	±0.2%	±1.0%	√	50 mV P-P	√	80012-01	LL
150	12V	12A	±0.2%	±1.0%	√	50 mV P-P	√	80012-02	LL
150	15V	10A	±0.2%	±1.0%	√	50 mV P-P	√	80012-03	LL
150	24V	6A	±0.2%	±1.0%	√	50 mV P-P	√	80012-04	LL

NOTE: (1) All Above Models are TUV Certified.

PACKAGE DIMENSIONS		
JJ	5.50 x 4.00 x 2.40 In. (max.)	(139.7 x 101.6 x 61mm)
KK	8.38 x 5.10 x 2.40 In. (max.)	(212.9 x 129.5 x 61 mm)
LL	8.68 x 6.35 x 2.40 In. (max.)	(220.5 x 161.1 x 61 mm)

NOTE: JJ: Molex Connector.
KK, LL: Barrier Strip Connector.



85/90W Multi Output Switchers

- 4 and 5 Outputs
- Soft-Start
- Power Foldback Protected
- 30 KHz Switching
- No Turn-On Overshoot
- 70% Efficiency

MAX. (1) WATTS	OUTPUT #1	OUTPUT #2	OUTPUT #3	OUTPUT #4	OUTPUT #5	INPUT FILTER	MODEL NO.	PKG.
UNIVERSAL SERIES								
85	+5V @ 6A	+12V @ 3A*	+24V @ 2A*	−12V @ 1A*	−5V @ 0.5A*		80006-01	FF
85	+5V @ 6A	+15V @ 3A*	+24V @ 2A*	−15V @ 1A*	−5V @ 0.5A*		80006-02	FF
SMALL BUSINESS SYSTEM SERIES (2)								
90	+5V @ 10A	+12V @ 2.5A	+12V @ 1A*	−12V @ 1A*	——	√	80001-01	GG
90	+5V @ 10A	+24V @ 1.25A	+12V @ 1A*	−12V @ 1A*	——	√	80001-02	GG
90	+5V @ 7A	+12VDC @ 3A	+12V @ 1.25A*	−12V @ .75A*	——	——	70021	GG

(1) User May Draw up to Current Shown for Each Output, but Total Watts May Not Exceed Maximum Shown.
(2) 80001 is TUV Certified.
* Linear Post Regulator on Output.

PACKAGE DIMENSIONS		
FF	7.75 x 6.50 x 2.40 In. (max.)	(196.9 x 165.1 x 61 mm)
GG	8.50 x 4.88 x 2.40 In. (max.)	(215.9 x 124 x 61 mm)

NOTE: FF: Barrier Strip Connector
GG: Molex Connector

- All 5 Volt Outputs Overvoltage Protected.
- Operating Temperature Range: 0°C to 70°C. Full Rating up to 60°C. From 60°C to 70°C, derate Linearly to 50% of Full Rating.
- All models feature power foldback output protection, input transient protection, 30 KHz switching rate, soft-start, no turn-on overshoot and 32 msec. hold-up time.
- Input Voltage Range: User-Selectable from 90 VAC to 135 VAC or 180 VAC to 270 VAC. Single-Wire Jumper.
- All models are UL Recognized ® and CSA Certified.

TWO-YEAR WARRANTY

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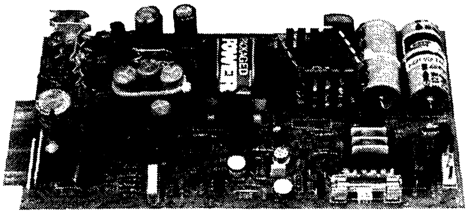


65-90W Multi Output Switchers

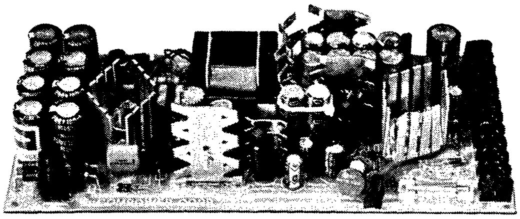
- 3 and 5 Outputs
- Input Filter
- Soft-Start
- 50 mV P-P Max. Ripple
- 32 mSec Hold-Up
- 70% Efficiency

MAX. (1) WATTS	OUTPUT #1	OUTPUT #2	OUTPUT #3	OUTPUT #4	OUTPUT #5	INPUT FILTER	MODEL NO.	PKG.
65	+5V @ 6A	+12V @ 1A*	−12V @ 1A*	−5V @ 0.5A*	+12V @ 2.5A†	√	80002-01	DD
65	+5V @ 6A	+12V @ 1A*	−12V @ 1A*	−5V @ 0.5A*	+24V @ 1.25A†	√	80002-02	DD
75	+5V @ 6A	+12V @ 3.5A* (5A Peak)	−12V @ 1A*	——	——		80002-03	DD
90	+5V @ 6A	+12V @ 1A*	−12V @ 1A*	−5V @ 0.5A*	+12V @ 2.5A†	√	80002-04	DD
90	+5V @ 6A	+12V @ 1A*	−12V @ 1A*	−5V @ 0.5A*	+24V @ 1.25A†	√	80002-05	DD

(1) User May Draw up to Current Shown for Each Output, but Total Watts May Not Exceed Maximum Shown.
* Linear Post Regulator on Output.
† ±10% Regulation with High Peak Capability for Disk Drive.

PACKAGE DIMENSIONS		
DD	9.45 x 5.00 x 2.40 In. (max.)	(240 x 127 x 61 m))

NOTE: Edge Connector (outputs).
Molex Connector (input).



150W Multi Output Switchers

- 5 Outputs
- 70% Efficiency
- Input Filter
- 50 mV P-P Max. Ripple
- OVP on 5V Output
- 30 KHz Switching
- TUV Certified

MAX. (1) WATTS	OUTPUT #1	OUTPUT #2	OUTPUT #3	OUTPUT #4	OUTPUT #5	MODEL NO.	PKG.
150	+5V @ 15A	+12V @ 3A†	+12V @ 2A*	−12V @ 1A*	−5V @ 150 mA*	80008-01	EE
150	+5V @ 15A	+24V @ 3A†	+12V @ 2A*	−12V @ 1A*	−5V @ 150 mA*	80008-03	EE
150	+5V @ 15A	+12V @ 3A†	+24V @ 2A*	−12V @ 1A*	−5V @ 150 mA*	80008-05	EE
150	+5V @ 15A	+12V @ 3A†	+24V @ 2A†	−12V @ 1A*	−5V @ 150 mA*	80008-06	EE

(1) User May Draw up to Current Shown for Each Output, but Total Watts May Not Exceed Maximum Shown.
* Linear Post Regulator on Output.
† ±10% Regulation with High Peak Capability for Disk Drive.

PACKAGE DIMENSIONS		
EE	10.18 x 4.75 x 2.40 In. (max.)	(258.6 x 120.7 x 61 mm)

NOTE: Barrier Strip Connectors

- All 5 Volt Outputs Overvoltage Protected.
- Operating Temperature Range: 0°C to 70°C. Full Rating up to 60°C. From 60°C to 70°C, derate Linearly to 50% of Full Rating.
- All models feature power foldback output protection, input transient protection, 30 KHz switching rate, soft-start, no turn-on overshoot and 32 msec. hold-up time.
- Input Voltage Range: User-Selectable from 90 VAC to 135 VAC or 180 VAC to 270 VAC. Single-Wire Jumper.
- All models are UL Recognized and CSA Certified.

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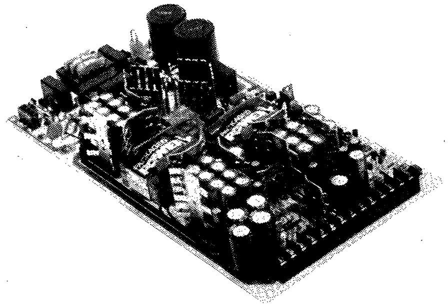

350W Multi Output Switchers

- Dual Channel Flyback Design
- Soft-Start Circuitry
- Input Line Filter
- Input Transient Protection
- On-Board Fusing
- 32 mSec Holdup Time
- UL, CSA, IEC & VDE Pending
- Meets FEC & VDE Radiation/Conduction

MAX. (1) WATTS	OUTPUT #1	OUTPUT #2	OUTPUT #3	OUTPUT #4	OUTPUT #5	UL CSA	VDE IEC	MODEL NO.	PKG.
350	+5V @ 30A	+12V @ 10A	−12V @ 1A	+24V @ 5A**	−5V @ 0.1A*	√		80028-01	MS
350	+5V @ 30A	+12V @ 10A	−12V @ 1A	+24V @ 5A**	−5V @ 0.1A*		√	80028-02	MS

NOTES: (1) Maximum Rated Output Load. Each Output Can Provide up to the Load Indicated, but Total Watts May Not Exceed Maximum Shown.
* Output has Linear, Three-Terminal Post Regulator.
** Output has High Peak Current Capability for Disk Drive.

PACKAGE DIMENSIONS		
MS	13 x 7 x 2.25 in.	(330 x 178 x 57 mm)

- All 5 Volt Output Overvoltage Protected.
- Operating Temperature Range: 0°C to 70°C. Full Rating up to 60°C. From 60°C to 70°C, derate Linearly to 50% of Full Rating.
- All models feature power foldback output protection, input transient protection, 30 KHz switching rate, soft-start, no turn-on overshoot and 32 msec. hold-up time.
- Input Voltage Range: User-Selectable from 90 VAC to 135 VAC or 180 VAC to 270 VAC. Single-Wire Jumper.

Specifications Subject to Change Without Notice.

TWO-YEAR WARRANTY

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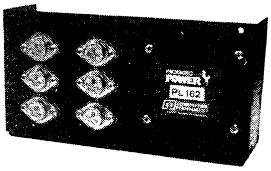

15-120W Open-Frame Linear Power Supplies

- User-Selectable Input Voltage: 100/115/220/230/240 VAC
- Up to 65% Efficiency
- UL Recognized, CSA Certified
- VDE Transformers
- 3750 VAC Isolation
- Designed to Meet VDE

OUTPUT VOLTAGE	OUTPUT CURRENT	REGULATION LINE*	REGULATION LOAD	RIPPLE AND NOISE	CASE SIZE	MODEL NUMBER
SINGLE OUTPUT MODELS						
5V	3A	±.05%	±.05%	1.0 mV RMS	B	PL110
	6A	±.05%	±.05%	1.0 mV RMS	C	PL111
	9A	±.05%	±.05%	1.0 mV RMS	N	PL112
	12A	±.05%	±.05%	1.0 mV RMS	D	PL113
	18A	±.05%	±.05%	1.0 mV RMS	E	PL114
12V	1.8A	±.05%	±.05%	1.0 mV RMS	B	PL120
	3.4A	±.05%	±.05%	1.0 mV RMS	C	PL121
	6.8A	±.05%	±.05%	1.0 mV RMS	D	PL122
	10.2A	±.05%	±.05%	1.0 mV RMS	E	PL123
15V	1.5A	±.05%	±.05%	1.0 mV RMS	B	PL130
	3A	±.05%	±.05%	1.0 mV RMS	C	PL131
	6A	±.05%	±.05%	1.0 mV RMS	D	PL132
24V	1.2A	±.05%	±.05%	1.0 mV RMS	B	PL140
	2.4A	±.05%	±.05%	1.0 mV RMS	C	PL141
	4.8A	±.05%	±.05%	1.0 mV RMS	D	PL142
DUAL OUTPUT MODELS						
±12V	±1A	±.05%	±.05%	1.0 mV RMS	AA	PL150
	±1.8A	±.05%	±.05%	1.0 mV RMS	BB	PL151
	±3.4A	±.05%	±.05%	1.0 mV RMS	CC	PL152
±15V	±0.8A	±.05%	±.05%	1.0 mV RMS	AA	PL160
	±1.5A	±.05%	±.05%	1.0 mV RMS	BB	PL161
	±3.0A	±.05%	±.05%	1.0 mV RMS	CC	PL162
TRIPLE OUTPUT MODELS						
5V/±12V	3/±1A	±.05%	±.05%	1.0 mV RMS	BB	PL170
	6/±1.8A	±.05%	±.05%	1.0 mV RMS	CBB	PL171
	12/±1.8A	±.05%	±.05%	1.0 mV RMS	CBB	PL172
5V/±15V	3/±0.8A	±.05%	±.05%	1.0 mV RMS	BB	PL180
	6/±1.5A	±.05%	±.05%	1.0 mV RMS	CBB	PL181
	12/±1.5A	±.05%	±.05%	1.0 mV RMS	CBB	PL182

* Per ±10% Input Change

INPUT VOLTAGE RANGES

NOMINAL INPUT	INPUT VOLTAGE RANGE
100 VAC	90-110 VAC
115 VAC	105-125 VAC
220 VAC	200-240 VAC
230 VAC	210-264 VAC
240 VAC	210-264 VAC

ALL MODELS HAVE OPERATING TEMPERATURE RANGE OF 0°C TO 70°C AND STORAGE TEMPERATURE RANGE OF −25°C TO +85°C

TWO-YEAR WARRANTY

Specifications Subject to Change Without Notice.

PACKAGE DIMENSIONS

CASE	DIMENSIONS INCHES (LxWxH)	DIMENSIONS MM (LxWxH)	MOUNTING SURFACES
B	4.88 x 4.00 x 1.62	123.9 x 101.6 x 41.1	3
C	5.62 x 4.88 x 2.50	142.7 x 123.9 x 63.5	3
D	9.00 x 4.88 x 2.75	228.6 x 123.9 x 69.8	4
E	14.00 x 4.88 x 2.75	355.6 x 123.9 x 69.8	4
N	7.00 x 4.88 x 2.75	177.8 x 123.9 x 69.8	4
AA	6.50 x 4.00 x 1.63	165.1 x 101.6 x 41.1	3
BB	7.00 x 4.88 x 2.50	177.8 x 123.9 x 63.5	3
CC	9.38 x 4.88 x 2.75	238.3 x 123.9 x 69.8	4
CBB	11.00 x 4.88 x 2.75	279.4 x 123.9 x 69.8	4

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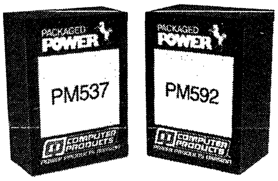

1-10W Linear Power Modules

- PC-Mountable
- Excellent Regulation
- Low Ripple and Noise
- Single, Dual, Triple Outputs
- Compact Encapsulated Package

OUTPUT VOLTAGE	OUTPUT CURRENT	REGULATION		RIPPLE AND NOISE	CASE SIZE	MODEL NUMBER
		LINE	LOAD			
PC-MOUNTABLE PM500 SERIES						
5V	250 mA	±.02%	±.04%	1.0 mV RMS	B1	PM533
	250 mA	±.05%	±.05%	0.5 mV RMS	H	PM529
	500 mA	±.02%	±.04%	1.0 mV RMS	B1	PM534
	1000 mA	±.02%	±.04%	1.0 mV RMS	B2	PM542
	2000 mA	±.02%	±.05%	1.0 mV RMS	B3	PM545
10V	120 mA	±.02%	±.02%	0.5 mV RMS	A	PM587
12V	100 mA	±.02%	±.02%	0.5 mV RMS	A	PM563
	240 mA	±.02%	±.02%	0.5 mV RMS	B2	PM515
	400 mA	±.02%	±.02%	1.0 mV RMS	B3	PM516
	600 mA	±.02%	±.02%	1.0 mV RMS	B3	PM517
15V	100 mA	±.02%	±.02%	0.5 mV RMS	A	PM576
	200 mA	±.02%	±.02%	0.5 mV RMS	B2	PM554
	350 mA	±.02%	±.02%	1.0 mV RMS	B3	PM555
	500 mA	±.02%	±.02%	1.0 mV RMS	B3	PM556
18V	65 mA	±.02%	±.02%	1.0 mV RMS	A	PM560
20V	60 mA	±.02%	±.02%	1.0 mV RMS	A	PM574
24V	50 mA	±.02%	±.02%	1.0 mV RMS	A	PM585
	100 mA	±.02%	±.02%	1.0 mV RMS	B2	PM566
	200 mA	±.02%	±.02%	1.0 mV RMS	B3	PM567
	400 mA	±.02%	±.02%	1.0 mV RMS	B3	PM568
28V	40 mA	±.02%	±.02%	1.0 mV RMS	A	PM562
±12V	±25 mA	±.20%	±.20%	2.0 mV RMS	B1	PM509
	±50 mA	±.02%	±.02%	0.5 mV RMS	B1	PM510
	±120 mA	±.02%	±.02%	0.5 mV RMS	B1	PM536
	±240 mA	±.02%	±.02%	0.5 mV RMS	B2	PM537
	±400 mA	±.02%	±.02%	0.5 mV RMS	B3	PM597
±15V	±25 mA	±.20%	±.20%	2.0 mV RMS	B1	PM538
	±65 Am	±.02%	±.02%	0.5 mV RMS	B1	PM553
	±100 mA	±.02%	±.02%	0.5 mV RMS	B1	PM505
	±150 mA	±.02%	±.02%	0.5 mV RMS	B2	PM570
	±200 mA	±.02%	±.02%	0.5 mV RMS	B2	PM565
	±350 mA	±.02%	±.02%	1.0 mV RMS	B3	PM501
±18V	±25 mA	±.20%	±.20%	1.0 mV RMS	B1	PM511
	±50 mA	±.02%	±.02%	0.5 mV RMS	B2	PM512
	±100 mA	±.02%	±.02%	0.5 mV RMS	B2	PM513
±24V	±50 mA	±.02%	±.02%	0.5 mV RMS	B1	PM531
	±100 mA	±.02%	±.02%	0.5 mV RMS	B2	PM514
5V/±12V	300/±180 mA	±.02%	±.05%/±.02%	0.5 mV RMS	B2	PM595
	500/±120 mA	±.02%	±.05%/±.02%	0.5 mV RMS	B2	PM591
	1000/±150 mA	±.02%	±.10%/±.02%	1.0/0.5 mV RMS	B3	PM592
5V/±15V	300/±150 mA	±.02%	±.05%/±.02%	0.5 mV RMS	B2	PM594
	500/±100 mA	±.02%	±.05%/±.02%	0.5 mV RMS	B2	PM590
	1000/±150 mA	±.02%	±.10%/±.02%	1.0/0.5 mV RMS	B3	PM593

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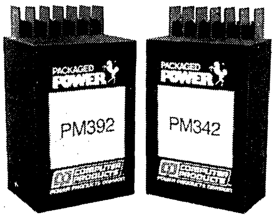

2.4-15W Linear Power Modules

- Chassis-Mountable
- Excellent Regulation
- Low Ripple and Noise
- Single, Dual, Triple Outputs
- Compact Encapsulated Package

OUTPUT VOLTAGE	OUTPUT CURRENT	REGULATION		RIPPLE AND NOISE	CASE SIZE	MODEL NUMBER
		LINE	LOAD			
CHASSIS-MOUNTABLE PM300 SERIES						
5V	500 mA	±.05%	±.01%	2.0 mV RMS	C1	PM334
	1000 mA	±.05%	±.15%	2.0 mV RMS	C1	PM342
	2000 mA	±.05%	±.15%	2.0 mV RMS	C2	PM345
12V	240 mA	±.05%	±.05%	1.0 mV RMS	C1	PM315
	400 mA	±.05%	±.05%	1.0 mV RMS	C2	PM316
	600 mA	±.05%	±.05%	1.0 mV RMS	C2	PM317
15V	200 mA	±.05%	±.05%	1.0 mV RMS	C1	PM354
	350 mA	±.05%	±.05%	1.0 mV RMS	C2	PM355
	500 mA	±.05%	±.05%	1.0 mV RMS	C2	PM356
24V	100 mA	±.05%	±.05%	1.0 mV RMS	C1	PM366
	200 mA	±.05%	±.05%	1.0 mV RMS	C1	PM367
	400 mA	±.05%	±.05%	1.0 mV RMS	C2	PM368
±12V	±120 mA	±.05%	±.05%	1.0 mV RMS	C1	PM336
	±240 mA	±.05%	±.05%	1.0 mV RMS	C1	PM337
	±400 mA	±.05%	±.05%	1.0 mV RMS	C2	PM397
±15V	±100 mA	±.05%	±.05%	1.0 mV RMS	C1	PM302
	±200 mA	±.05%	±.05%	1.0 mV RMS	C1	PM365
	±350 mA	±.05%	±.05%	1.0 mV RMS	C2	PM301
	±500 mA	±.05%	±.05%	1.0 mV RMS	C2	PM396
5V/±12V	300/±180 mA	±.05%	±0.1%/±.05%	1.0 mV RMS	C1	PM395
	500/±120 mA	±.05%	±0.1%/±.05%	1.0 mV RMS	C1	PM391
	1000/±150 mA	±.02%	±0.1%/±.05%	1.0/0.5 mV RMS	C2	PM392
5V/±15V	300/±150 mA	±.05%	±0.1%/±.05%	1.0 mV RMS	C1	PM394
	500/±100 mA	±.05%	±0.1%/±.02%	1.0 mV RMS	C1	PM390
	1000/±150 mA	±.02%	±0.1%/±.05%	1.0/0.5 mV RMS	C2	PM393

CASE DIMENSIONS		
A	2.25 x 1.75 x 1.00 Inches	(57.2 x 44.5 x 25.4 mm)
B1	3.50 x 2.50 x 0.88 Inches	(88.9 x 63.5 x 22.4 mm)
B2	3.50 x 2.50 x 1.25 Inches	(88.9 x 63.5 x 31.8 mm)
B3	3.50 x 2.50 x 1.62 Inches	(88.9 x 63.5 x 41.1 mm)
C1	4.00 x 2.70 x 1.45 Inches	(101.6 x 68.6 x 36.8 mm)
C2	4.00 x 2.70 x 2.00 Inches	(101.6 x 68.6 x 50.8 mm)
H	3.00 x 2.00 x 1.00 Inches	(76.2 x 50.8 x 25.4 mm)

ALL MODELS HAVE OPERATING TEMPERATURE RANGE OF −25°C TO +71°C AND STORAGE TEMPERATURE RANGE OF −25°C to +85°C

	INPUT VOLTAGE	SUFFIX
LINEAR POWER MODULE OPTIONS	115 ±10 VAC	(NONE)
	100 ±10 VAC	J
	220 ±20 VAC	D
	240 ±20 VAC	K

Recognized by Underwriters Laboratories, Inc. ®UL

Certified by Canadian Standards Association

TWO-YEAR WARRANTY

Specifications Subject to Change Without Notice.

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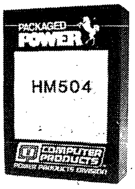
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HM504
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15W Hybrid Power Modules

- Switcher Efficiency
- OVP on 5V Output
- Linear Post Regulation
- Wide Input Voltage Range

OUTPUT VOLTAGE	OUTPUT CURRENT	REGULATION*		RIPPLE AND NOISE	CASE SIZE	MODEL NUMBER
		LINE	LOAD			
PC-MOUNTABLE HM500 SERIES						
5V	3.00A	±0.05%	±0.15%	50 mV P-P	B2	HM530
12V	1.25A	±0.05%	±0.1%	50 mV P-P	B2	HM503
15V	1.00A	±0.05%	±0.1%	50 mV P-P	B2	HM504
±12V	±625 mA	±0.05%	±0.05%	50 mV P-P	B2	HM551
±15V	±500 mA	±0.05%	±0.05%	50 mV P-P	B2	HM552
CHASSIS-MOUNTABLE HM300 SERIES						
5V	3.00A	±0.05%	±0.2%	100 mV P-P	C1	HM330
12V	1.25A	±0.05%	±0.1%	100 mV P-P	C1	HM303
15V	1.00A	±0.05%	±0.1%	100 mV P-P	C1	HM304
±12V	±625 mA	±0.05%	±0.1%	100 mV P-P	C1	HM351
±15V	±500 mA	±0.05%	±0.1%	100 mV P-P	C1	HM352

** Linear post regulator on all outputs.*

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HE361
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HE583
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25W Switching Power Modules

- High Efficiency
- Good Regulation
- Six-Sided Continuous Shielding
- Current Limited
- Most Watts Per Cubic Inch
- Pi & Balun Input Filter
- Remote Sensing on Chassis-Mount

OUTPUT VOLTAGE	OUTPUT CURRENT	REGULATION		RIPPLE AND NOISE	CASE SIZE	MODEL NUMBER
		LINE	LOAD			
PC-MOUNTABLE						
5V	5.0A	±0.05%	±0.1%	100 mV P-P	B2	HE581
12V	2.2A	±0.05%	±0.1%	100 mV P-P	B2	HE583
15V	1.8A	±0.05%	±0.1%	100 mV P-P	B2	HE584
CHASSIS MOUNTABLE						
5V	5.0A	±0.05%	±0.1%	100 mV P-P	C1	HE381
12V	2.2A	±0.05%	±0.1%	100 mV P-P	C1	HE383
15V	1.8A	±0.05%	±0.1%	100 mV P-P	C1	HE384

Specifications Subject to Change Without Notice.

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HE252E
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POWER PRODUCTS DIVISION

36-100W Switching Power Supplies

- High Efficiency
- Low Ripple and Noise
- Remote Sensing on 5V Outputs
- OVP on 5V Outputs

OUTPUT VOLTAGE	OUTPUT CURRENT	REGULATION		RIPPLE AND NOISE	CASE SIZE	MODEL NUMBER
		LINE	LOAD			
CHASSIS-MOUNTABLE HE200 SERIES						
5V	10A	±0.1%	±0.1%	25 mV P-P	D	HE237
5V	20A	±0.1%	±0.1%	50 mV P-P	E	HE252
12V to 15V	3A	±.02%	±0.1%	20 mV P-P	D	HE212
24V to 30V	1.5A	±.02%	±0.1%	20 mV P-P	D	HE224
±12V to ±15V	±1.5A	±.02%	±.05%	10 mV P-P	D	HE215

OPTIONS

HYBRID POWER MODULES HM500/300 SERIES		SWITCHING POWER MODULES HE500/300 SERIES		SWITCHING POWER MODULES NEW HE500/300 SERIES		SWITCHING POWER SUPPLIES HE200 SERIES	
INPUT VOLTAGE	SUFFIX	INPUT VOLTAGE	SUFFIX	INPUT VOLTAGE	SUFFIX	INPUT VOLTAGE	SUFFIX
90-130 VAC	(NONE)	100-130 VAC	(NONE)	90-130 VAC	(NONE)	90-130 VAC	(NONE)
180-260 VAC	E	200-260 VAC	E	180-260 VAC	E	180-260 VAC	E

ALL MODELS HAVE OPERATING TEMPERATURE RANGE OF −25°C TO +71°C AND STORAGE TEMPERATURE RANGE OF −25°C to +85°C

CASE DIMENSIONS		
B2	3.50 x 2.50 x 1.25 Inches	(88.9 x 63.5 x 31.8 mm)
C1	4.00 x 2.70 x 1.45 Inches	(101.6 x 68.6 x 36.8 mm)
D	6.50 x 4.50 x 1.50 Inches	(165.1 x 114.3 x 38.1 mm)
E	6.50 x 4.50 x 3.19 Inches	(165.1 x 114.3 x 81 mm)

TWO-YEAR WARRANTY

Specifications Subject to Change Without Notice.

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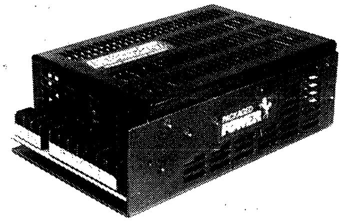

70-200W Switching Power Supplies

- Jumper Selectable 115/230 VAC Input
- Designed to Meet FCC, VDE Class A EMI
- VDE Pending
- 70% Efficiency Minimum
- Remote Sense on Single Output Models
- Short Circuit Protection
- Soft Start
- Single, Dual, Triple and Quad Output Models
- UL Recognized, CSA Certified

MAX. WATTS	OUTPUT #1	OUTPUT #2	OUTPUT #3	OUTPUT #4	INPUT EMI FILTER	MODEL Number	PKG.
			SINGLE OUTPUT MODELS				
70	5V @ 14A				✓	HE201	J1
70	12V @ 6A				✓	HE202	J1
70	15V @ 5A				✓	HE203	J1
70	24V @ 3A				✓	HE204	J1
100	5V @ 20A				✓	HE205	J2
100	12V @ 8.5A				✓	HE206	J2
100	15V @ 7A				✓	HE207	J2
100	24V @ 4.5A				✓	HE208	J2
			DUAL OUTPUT MODELS				
100	5V @ 16A	−5V @ 4A			✓	HE222	J2
100	12V @ 7A	−12V @ 3A			✓	HE223	J2
100	15V @ 6A	−12V @ 3A			✓	HE225	J2
			TRIPLE OUTPUT MODELS				
70	5V @ 8A	+12V @ 1.5A	−12V @ 1.5A		✓	HE229	J1
70	5V @ 8A	+15V @ 1.5A	−12V @ 1.5A		✓	HE230	J1
100	5V @ 12A	+12V @ 1.5A	−12V @ 1.5A		✓	HE231	J2
100	5V @ 12A	+15V @ 1.5A	−15V @ 1.5A		✓	HE232	J2
			QUAD OUTPUT MODELS				
70	5V @ 8A	+12V @ 1.5A	−12V @ 1.5A	−5V @ 1A	✓	HE236	J1
70	5V @ 8A	+12V @ 1.5A	−12V @ 1.5A	+24V @ 1.5A	✓	HE238	J1
70	5V @ 8A	+15V @ 1.5A	−15V @ 1.5A	−5V @ 1A	✓	HE240	J1
70	5V @ 8A	+15V @ 1.5A	−15V @ 1.5A	+24V @ 1.5A	✓	HE241	J1
100	5V @ 12A	+12V @ 1.5A	−12V @ 1.5A	−5V @ .5A	✓	HE242	J2
100	5V @ 12A	+12V @ 1.5A	−12V @ 1.5A	+24V @ 1A	✓	HE243	J2
100	5V @ 12A	+15V @ 1.5A	−15V @ 1.5A	−5V @ .5A	✓	HE244	J2
100	5V @ 12A	+15V @ 1.5A	−15V @ 1.5A	+24V @ 1A	✓	HE245	J2

Specifications Subject to Change Without Notice.

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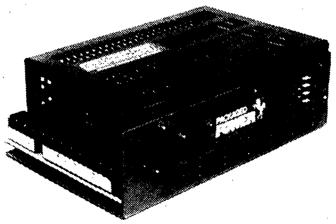

70-200W Switching Power Supplies (Cont.)

- Jumper Selectable 115/230 VAC Input
- Designed to Meet FCC, VDE Class A EMI
- VDE Pending
- 70% Efficiency Minimum
- Remote Sense on Single Output Models
- Short Circuit Protection
- Soft Start
- Single, Dual, Triple and Quad Output Models
- UL Recognized, CSA Certified

MAX. WATTS	OUTPUT #1	OUTPUT #2	OUTPUT #3	OUTPUT #4	INPUT EMI FILTER	MODEL NUMBER	PKG.
SINGLE OUTPUT MODELS							
150	5V @ 30A				✓	HE209	J3
150	12V @ 12.5A				✓	HE210	J3
150	15V @ 10A				✓	HE211	J3
150	24V @ 6.5A				✓	HE213	J3
200	5V @ 40A				✓	HE214	J3
200	12V @ 17A				✓	HE216	J3
200	15V @ 13.5A				✓	HE217	J3
200	24V @ 8.5A				✓	HE218	J3
DUAL OUTPUT MODELS							
150	5V @ 24A	−5V @ 6A			✓	HE226	J3
150	12V @ 10A	−12V @ 5A			✓	HE227	J3
150	15V @ 9A	−15V @ 5A			✓	HE228	J3
TRIPLE OUTPUT MODELS							
150	5V @ 20A	+12V @ 1.5A	−12V @ 1.5A		✓	HE233	J3
150	5V @ 20A	+15V @ 1.5A	−15V @ 1.5A		✓	HE234	J3
QUAD OUTPUT MODELS							
150	5V @ 20A	+12V @ 1.5A	−12V @ 1.5A	−5V @ .5A	✓	HE246	J3
150	5V @ 20A	+12V @ 1.5A	−12V @ 1.5A	+24V @ 1A	✓	HE247	J3
150	5V @ 20A	+15V @ 1.5A	−15V @ 1.5A	−5V @ .5A	✓	HE248	J3
150	5V @ 20A	+15V @ 1.5A	−15V @ 1.5A	+24V @ 1A	✓	HE249	J3

OTHER SPECIFICATIONS

Ripple and Noise 20MHz BW	1% P-P Max.
Line/Load Regulation	±0.2%
Hold-up Time	30mS
Input Voltage Range, 115 VAC	90-130 VAC
Input Voltage Range, 230 VAC	180-260 VAC
Input Frequency	47-450 Hz.
Operating Temperature	0°-71°C

CASE DIMENSIONS	
Package J1	4.88 x 2.50 x 7.75 Inches
Package J2	4.88 x 2.75 x 10.75 Inches
Package J3	4.88 x 2.75 x 12.75 Inches

Please Consult Factory for Custom Models.

QUICK TURNAROUND
ON SPECIAL & CUSTOM SUPPLIES
SWITCHERS • LINEARS • DC/DC CONVERTERS
Call Power Products with Your Requirements

TWO-YEAR WARRANTY

Specifications Subject to Change Without Notice.

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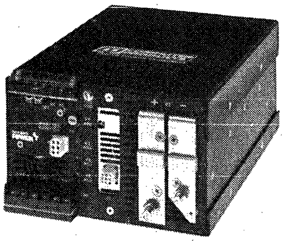


500-1500 Watt Switching Power Supplies

- Field Selectable 115/230 VAC
- Remote Sense on All Outputs
- Soft-Start Circuitry
- Remote Inhibit
- Overload & Overvoltage Protection
- DC O.K. Signal
- Power Fail Detect
- 70-75% Efficiency
- UL & CSA
- Two Year Warranty

500 WATT DUAL, TRIPLE AND QUAD OUTPUT

MAX. WATTS	MAIN OUTPUT	AUX. #1 OUTPUT	AUX. #2 OUTPUT	AUX. #3 OUTPUT
MAXIMUM TOTAL OUTPUT POWER CANNOT EXCEED 500W	5V @ 60A	2V @ 10A	2V @ 5A	2V @ 3A
		5V @ 10A	5V @ 5A	5V @ 3A
		12V @ 10A	12V @ 5A	12V @ 3A
		15V @ 10A	15V @ 5A	15V @ 3A
		24V @ 6A	24V @ 5A	24V @ 3A
		28V @ 6A	28V @ 5A	28V @ 3A

CASE DIMENSIONS	
500W Single	5″ x 8″ x 10″
500W Multiple	5″ x 8″ x 10″
800W Single	5″ x 8″ x 10″
1200W Single	5″ x 8″ x 10″

500, 800, 1200 WATT SINGLE OUTPUT

500 WATT	800 WATT	1200 Watt
2V @ 160A	2V @ 180A	2V @ 240A
5V @ 100A	5V @ 160A	5V @ 240A
12V @ 42A	12V @ 67A	12V @ 100A
15V @ 33A	15V @ 54A	15V @ 80A
24V @ 21A	24V @ 34A	24V @ 50A
28V @ 18A	28V @ 29A	28V @ 42A
48V @ 10A	48V @ 17A	48V @ 25A

800 WATT DUAL, TRIPLE AND QUAD OUTPUT

MAX. WATTS	MAIN OUTPUT	AUX. #1 OUTPUT	AUX. #2 OUTPUT	AUX. #3 OUTPUT
MAXIMUM TOTAL POWER CANNOT EXCEED 800W	5V @ 120A	2V @ 15A	2V @ 10A	2V @ 6A
		5V @ 15A	5V @ 10A	5V @ 6A
		12V @ 10A	12V @ 10A	12V @ 6A
		15V @ 10A	15V @ 10A	15V @ 6A
		24V @ 10A	24V @ 10A	24V @ 6A
		28V @ 10A	28V @ 10A	28V @ 6A

Outputs are isolated and may be referenced to + or −.

1200 WATT DUAL, TRIPLE AND QUAD OUTPUT

MAX. WATTS	MAIN OUTPUT	AUX. #1 OUTPUT	AUX. #2 OUTPUT	AUX. #3 OUTPUT
MAXIMUM TOTAL POWER CANNOT EXCEED 1200W	5V @ 175V	2V @ 20A	2V @ 10A	2V @ 6A
		5V @ 20A	5V @ 10A	5V @ 6A
		12V @ 20A	12V @ 10A	12V @ 6A
		15V @ 15A	15V @ 10A	15V @ 6A
		24V @ 10A	24V @ 6A	24V @ 6A
		28V @ 10A	28V @ 6A	28V @ 6A

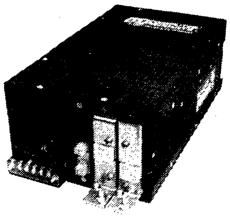
Outputs are isolated and may be referenced to + or −.

CASE DIMENSIONS	
800 Watt Multiple	5″ x 8″ x 12.85″
1200 Watt Multiple	5″ x 8″ x 14.50″

FOR OTHER OUTPUT VOLTAGES CONSULT FACTORY

TWO-YEAR WARRANTY

Specifications Subject to Change Without Notice.



500-1500 Watt Switching Power Supplies (cont.)

- Field Selectable 115/230 VAC
- Remote Sense on All Outputs
- Soft-Start Circuitry
- Remote Inhibit
- Overload & Overvoltage Protection
- DC O.K. Signal
- Power Fail Detect
- 70-75% Efficiency
- UL & CSA
- Two Year Warranty

MULTIPLE OUTPUT MODEL NUMBER CONSTRUCTION GUIDE

X X — X X X X — X X X X X

WATTS
NO. OF OUTPUTS
MAIN OUTPUT
AUX. #1 OUTPUT
AUX. #2 OUTPUT
AUX. #3 OUTPUT
OPTIONS

8 = 800W
12 = 1200W
15 = 1500W

S = SINGLE
D = DUAL
T = TRIPLE
Q = QUAD

0 = 2V
1 = 5V
4 = 12V
5 = 15V
7 = 24V
8 = 28V
9 = 48V

A = VDE EMI FILTER
B = SCR CROWBAR — MAIN
C = SCR CROWBAR — AUX. (SPECIFY)
D = ELECTRONIC SOFT START
E = REVERSE AIR FLOW

1500 WATT SINGLE OUTPUT

MAX. WATTS	OUTPUT	MODEL NUMBER
MAXIMUM TOTAL POWER CANNOT EXCEED 1500W	2V @ 330A	15S-0
	5V @ 300A	15S-1
	12V @ 125A	15S-4
	15V @ 100A	15S-5
	24V @ 62A	15S-7
	28V @ 53A	15S-8
	48V @ 31A	15S-9

Outputs are isolated and may be referenced to + or −.

1500 WATT DUAL, TRIPLE AND QUAD OUTPUT

MAX. WATTS	MAIN OUTPUT	AUX. #1 OUTPUT	AUX. #2 OUTPUT	AUX. #3 OUTPUT
MAXIMUM TOTAL POWER CANNOT EXCEED 1500W	5V @ 225A	2V @ 25A	2V @ 10A	2V @ 10A
		5V @ 20A	5V @ 10A	5V @ 10A
		12V @ 20A	12V @ 10A	12V @ 10A
		15V @ 15A	15V @ 10A	15V @ 10A
		24V @ 10A	24V @ 6A	24V @ 6A
		28V @ 10A	28V @ 6A	28V @ 6A

Outputs are isolated and may be referenced to + or −.

CASE DIMENSIONS	
1500 Watt Single	5″ x 8″ x 15.72″
1500 Watt Multiple	5″ x 8″ x 18.32″

FOR OTHER OUTPUT VOLTAGES CONSULT FACTORY

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2981 GATEWAY DRIVE
POMPANO BEACH, FL 33069-4803
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EM643
COMPUTER PRODUCTS
POWER PRODUCTS DIVISION

EM671
COMPUTER PRODUCTS
POWER PRODUCTS DIVISION

1.1-1.5W DC/DC Converters

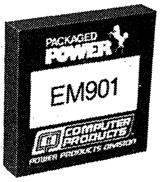
24-PIN DIP COMPATIBLE ECONOMY

- PC-Mountable
- Unregulated Outputs
- 70% Efficiency
- Internal Input Filtering Available

INPUT VOLTAGE	OUTPUT VOLTAGE/mA	REGULATION LINE*	REGULATION LOAD†	REFLECTED RIPPLE	EFFICIENCY	CASE SIZE	MODEL NUMBER
ECONOMY EM600 SERIES WITH INPUT FILTER							
5V	5V/220 mA	1.2%	8%	90 mA P-P	70%	F	EM621
	12V/125 mA	1.2%	6%	90 mA P-P	70%	F	EM623
	15V/100 mA	1.2%	6%	90 mA P-P	70%	F	EM624
12V	5V/220 mA	1.2%	6%	90 mA P-P	70%	F	EM631
	12V/125 mA	1.2%	6%	90 mA P-P	70%	F	EM633
	15V/100 mA	1.2%	6%	90 mA P-P	70%	F	EM634
5V	±12V/±62 mA	1.2%	6%	90 mA P-P	70%	F	EM671
	±15V/±50 mA	1.2%	6%	90 mA P-P	70%	F	EM672
12V	±12V/±62 mA	1.2%	6%	90 mA P-P	70%	F	EM681
	±15V/±50 mA	1.2%	6%	90 mA P-P	70%	F	EM682
ECONOMY EM600 SERIES WITHOUT INPUT FILTER							
5V	5V/220 mA	1.2%	8%	2500 mA P-P	70%	F	EM641
	12V/125 mA	1.2%	6%	2500 mA P-P	70%	F	EM643
	15V/100 mA	1.2%	6%	2500 mA P-P	70%	F	EM644
12V	5V/220 mA	1.2%	6%	2500 mA P-P	70%	F	EM646
	12V/120 mA	1.2%	6%	2500 mA P-P	70%	F	EM648
	15V/100 mA	1.2%	6%	2500 mA P-P	70%	F	EM649
5V	±12V/±62 mA	1.2%	6%	2500 mA P-P	70%	F	EM691
	±15V/±50 mA	1.2%	6%	2500 mA P-P	70%	F	EM692
12V	±12V/±62 mA	1.2%	6%	2500 mA P-P	70%	F	EM696
	±15V/±50 mA	1.2%	6%	2500 mA P-P	70%	F	EM697

* Per 1.0% Change in Input Voltage.
† From 100% Load to 20% Load.

PACKAGED POWER
EM952
COMPUTER PRODUCTS
POWER PRODUCTS DIVISION


PACKAGED POWER
EM901
COMPUTER PRODUCTS
POWER PRODUCTS DIVISION

5-9W DC/DC Converters

LOW-COST UNREGULATED

- PC-Mountable
- Pi Input Filter
- Excellent Isolation
- High Efficiency

INPUT VOLTAGE	OUTPUT VOLTAGE/mA	REGULATION LINE*	REGULATION LOAD†	REFLECTED RIPPLE	EFFICIENCY	CASE SIZE	MODEL NUMBER
ECONOMY EM900 SERIES							
5V	5V/1000 mA	1.2%	8%	75 mA P-P	70%-85%	G	EM901
	12V/600 mA	1.2%	8%	75 mA P-P	70%-85%	G	EM903
	15V/500 mA	1.2%	8%	75 mA P-P	70%-85%	G	EM904
12V	5V/1000 mA	1.2%	8%	75 mA P-P	70%-85%	G	EM911
	12V/600 mA	1.2%	8%	75 mA P-P	70%-85%	G	EM913
	15V/500 mA	1.2%	8%	75 mA P-P	70%-85%	G	EM914
5V	±12V/±375 mA	1.2%	8%	75 mA P-P	70%-85%	G	EM951
	±15V/±300 mA	1.2%	8%	75 mA P-P	70%-85%	G	EM952
12V	±12V/±375 mA	1.2%	8%	75 mA P-P	70%-85%	G	EM961
	±15V/±300 mA	1.2%	8%	75 mA P-P	70%-85%	G	EM962

* Per 1.0% Change in Input Voltage.
† From 100% Load to 20% Load.

Specifications Subject to Change Without Notice.

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2981 GATEWAY DRIVE
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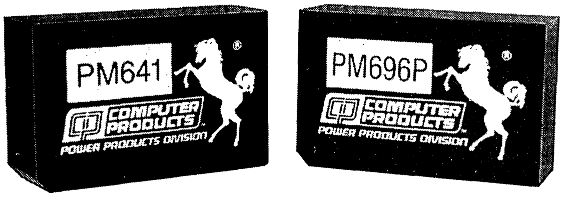

½-1W DC/DC Converters

24-PIN DIP COMPATIBLE

- PC-Mountable
- Regulated Outputs
- Low Ripple and Noise
- Internal Input Filtering Available

INPUT VOLTAGE	OUTPUT VOLTAGE/mA	REGULATION LINE	REGULATION LOAD	REFLECTED RIPPLE	EFFICIENCY	CASE SIZE	MODEL NUMBER
PM600 SERIES WITH INTERNAL FILTER							
5V	5V/100 mA	±0.3%	±0.4%	15 mA P-P	50%	F	PM621
	12V/80 mA	±0.3%	±0.4%	15 mA P-P	50%	F	PM623
	15V/65 mA	±0.3%	±0.4%	15 mA P-P	50%	F	PM624
12V	5V/100 mA	±0.3%	±0.4%	45 mA P-P	50%	F	PM631
	12V/80 mA	±0.3%	±0.4%	45 mA P-P	50%	F	PM633
	15V/65 mA	±0.3%	±0.4%	45 mA P-P	50%	F	PM634
5V	±12V/±40 mA	±0.3%	±0.4%	15 mA P-P	50%	F	PM671
	±15V/±33 mA	±0.3%	±0.4%	15 mA P-P	50%	F	PM672
12V	±12V/±40 mA	±0.3%	±0.4%	45 mA P-P	50%	F	PM681
	±15V/±33 mA	±0.3%	±0.4%	45 mA P-P	50%	F	PM682
PM600 SERIES UNFILTERED							
5V	5V/100 mA	±0.3%	±0.4%	1500 mA P-P	50%	F	PM641
	12V/80 mA	±0.3%	±0.4%	1500 mA P-P	50%	F	PM643
	15V/65 mA	±0.3%	±0.4%	1500 mA P-P	50%	F	PM644
12V	5V/100 mA	±0.3%	±0.4%	1500 mA P-P	50%	F	PM646
	12V/80 mA	±0.3%	±0.4%	1500 mA P-P	50%	F	PM648
	15V/65 mA	±0.3%	±0.4%	1500 mA P-P	50%	F	PM649
5V	±12V/±40 mA	±0.3%	±0.4%	1500 mA P-P	50%	F	PM691
	±15V/±33 mA	±0.3%	±0.4%	1500 mA P-P	50%	F	PM692
12V	±12V/±40 mA	±0.3%	±0.4%	1500 mA P-P	50%	F	PM696
	±15V/±33 mA	±0.3%	±0.4%	1500 mA P-P	50%	F	PM697

CASE DIMENSIONS		
F	1.25 x 0.80 x 0.4 Inches	(31.8 x 20.3 x 9.8 mm)
G	2.00 x 2.00 x 0.4 Inches	(50.8 x 50.8 x 9.8 mm)

OPTIONS	PM600 SERIES DC/DC CONVERTERS	OPTION	SUFFIX
		EXTERNAL BALANCE PIN	P
		ALTERNATE PIN CONFIGURATION	R

ALL MODELS HAVE OPERATING TEMPERATURE RANGE OF −25°C TO +71°C AND STORAGE TEMPERATURE RANGE OF −25°C to +85°C

TWO-YEAR WARRANTY

Specifications Subject to Change Without Notice.

COMPUTER PRODUCTS
POWER PRODUCTS DIVISION

2981 GATEWAY DRIVE
POMPANO BEACH, FL 33069-4803
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PACKAGED POWER

PACKAGED
POWER
PM741
COMPUTER PRODUCTS
POWER PRODUCTS DIVISION

3W DC/DC Converters

- Excellent Regulation
- Low Ripple and Noise
- 500 VDC Isolation
- No Derating to 71°C
- 3 Available Pin-Outs

INPUT VOLTAGE	OUTPUT VOLTAGE/mA	REGULATION		REFLECTED RIPPLE	EFFICIENCY	CASE SIZE	MODEL NUMBER
		LINE	LOAD				
3-WATT GENERAL PURPOSE PM700 SERIES							
5V	5V/600 mA	±0.02%	±0.04%	32 mA P-P	60%	G	PM701
	12V/250 mA	±0.02%	±0.04%	31 mA P-P	60%	G	PM703
	15V/200 mA	±0.02%	±0.04%	30 mA P-P	60%	G	PM704
12V	5V/600 mA	±0.02%	±0.04%	24 mA P-P	60%	G	PM711
	12V/250 mA	±0.02%	±0.04%	23 mA P-P	60%	G	PM713
	15V/200 mA	±0.02%	±0.04%	22 mA P-P	60%	G	PM714
24V	5V/600 mA	±0.02%	±0.04%	22 mA P-P	60%	G	PM721
	12V/250 mA	±0.02%	±0.04%	22 mA P-P	60%	G	PM723
	15V/200 mA	±0.02%	±0.04%	21 mA P-P	60%	G	PM724
28V	5V/600 mA	±0.02%	±0.04%	21 mA P-P	60%	G	PM731
	12V/250 mA	±0.02%	±0.04%	21 mA P-P	60%	G	PM733
	15V/200 mA	±0.02%	±0.04%	20 mA P-P	60%	G	PM734
48V	5V/600 mA	±0.02%	±0.04%	21 mA P-P	60%	G	PM741
	12V/250 mA	±0.02%	±0.04%	20 mA P-P	60%	G	PM743
	15V/200 mA	±0.02%	±0.04%	19 mA P-P	60%	G	PM744
5V	±12V/±125 mA	±0.02%	±0.02%	34 mA P-P	60%	G	PM751
	±15V/±100 mA	±0.02%	±0.02%	33 mA P-P	60%	G	PM752
12V	±12V/±125 mA	±0.02%	±0.02%	25 mA P-P	60%	G	PM761
	±15V/±100 mA	±0.02%	±0.02%	24 mA P-P	60%	G	PM762
24V	±12V/±125 mA	±0.02%	±0.02%	23 mA P-P	60%	G	PM771
	±15V/±100 mA	±0.02%	±0.02%	22 mA P-P	60%	G	PM772
28V	±12V/±125 mA	±0.02%	±0.02%	22 mA P-P	60%	G	PM781
	±15V/±100 mA	±0.02%	±0.02%	21 mA P-P	60%	G	PM782
48V	±12V/±125 mA	±0.02%	±0.02%	21 mA P-P	60%	G	PM791
	±15V/±100 mA	±0.02%	±0.02%	20 mA P-P	60%	G	PM792

CASE DIMENSIONS		
G	2.00 x 2.00 x 0.4 Inches	(50.8 x 50.8 x 9.8 mm)

INPUT VOLTAGE RANGES

INPUT VOLTAGE	DERATE 2.5%/°C FROM 50°C to 71°C	NO DERATING −25°C to +71°C
5V	4.4-6.5V	4.5-5.5V
12V	10.56-15.6V	10.8-13.2V
24V	21.12-31.2V	21.6-26.4V
28V	24.64-36.4V	25.2-30.8V
48V	42.24-62.4V	43.2-52.8V

ALL MODELS HAVE OPERATING TEMPERATURE RANGE OF −25°C TO +71°C AND STORAGE TEMPERATURE RANGE OF −40°C to +125°C

TWO-YEAR WARRANTY

Specifications Subject to Change Without Notice.

COMPUTER PRODUCTS™
POWER PRODUCTS DIVISION

2981 GATEWAY DRIVE
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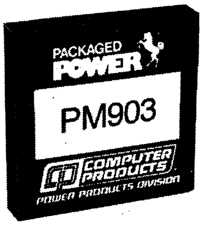

5W DC/DC Converters

HIGH PERFORMANCE

- High Efficiency
- Excellent Regulation
- EMI/RFI Six-Sided Shielding
- 3 Available Pin-Outs

INPUT VOLTAGE	OUTPUT VOLTAGE/mA	REGULATION		REFLECTED RIPPLE	EFFICIENCY	CASE SIZE	MODEL NUMBER
		LINE	LOAD				
5-WATT HIGH-PERFORMANCE PM900 SERIES							
5V	5V/1000 mA	±.02%	±.04%	54 mA P-P	61%	G	PM901
	12V/470 mA	±.02%	±.04%	61 mA P-P	61%	G	PM903
	15V/400 mA	±.02%	±.04%	64 mA P-P	61%	G	PM904
12V	5V/1000 mA	±.02%	±.04%	22 mA P-P	61%	G	PM911
	12V/470 mA	±.02%	±.04%	26 mA P-P	61%	G	PM913
	15V/400 mA	±.02%	±.04%	27 mA P-P	61%	G	PM914
24V	5V/1000 mA	±.02%	±.04%	22 mA P-P	61%	G	PM921
	12V/470 mA	±.02%	±.04%	25 mA P-P	61%	G	PM923
	15V/400 mA	±.02%	±.04%	27 mA P-P	61%	G	PM924
28V	5V/1000 mA	±.02%	±.04%	22 mA P-P	61%	G	PM931
	12V/470 mA	±.02%	±.04%	25 mA P-P	61%	G	PM933
	15V/400 mA	±.02%	±.04%	26 mA P-P	61%	G	PM934
48V	5V/1000 mA	±.02%	±.04%	22 mA P-P	61%	G	PM941
	12V/470 mA	±.02%	±.04%	25 mA P-P	61%	G	PM943
	15V/400 mA	±.02%	±.04%	27 mA P-P	61%	G	PM944
5V	±12V/±230 mA	±.02%	±.02%	58 mA P-P	62%	G	PM951
	±15V/±190 mA	±.02%	±.02%	60 mA P-P	62%	G	PM952
12V	±12V/±230 mA	±.02%	±.02%	24 mA P-P	62%	G	PM961
	±15V/±190 mA	±.02%	±.02%	25 mA P-P	62%	G	PM962
24V	±12V/±230 mA	±.02%	±.02%	24 mA P-P	62%	G	PM971
	±15V/±190 mA	±.02%	±.02%	25 mA P-P	62%	G	PM972
28V	±12V/±230 mA	±.02%	±.02%	23 mA P-P	62%	G	PM981
	±15V/±190 mA	±.02%	±.02%	24 mA P-P	62%	G	PM982
48V	±12V/±230 mA	±.02%	±.02%	24 mA P-P	62%	G	PM991
	±15V/±190 mA	±.02%	±.02%	25 mA P-P	62%	G	PM992

INPUT VOLTAGE RANGES VS. PERCENTAGE OF RATED OUTPUT LOAD

INPUT VOLTAGE	5V	12V	24V	28V	48V
100% Load	4.65-5.5V	11.16-13.2V	22.32-26.4V	26.04-30.8V	44.64-52.8V
80% Load	4.50-6.0V	10.80-14.4V	21.60-28.8V	25.20-33.6V	43.20-57.6V
60% Load	4.40-6.5V	10.56-15.6V	21.12-31.2V	24.64-36.4V	42.24-62.4V

CASE DIMENSIONS		
G	2.00 x 2.00 x 0.4 Inches	(50.8 x 50.8 x 9.8 mm)

ALL MODELS HAVE OPERATING TEMPERATURE RANGE OF −25°C TO +71°C AND STORAGE TEMPERATURE RANGE OF −40°C to +125°C

TWO-YEAR WARRANTY

Specifications Subject to Change Without Notice.

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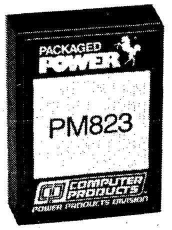

10W DC/DC Converters

HIGH PERFORMANCE

- PC-Mountable
- High Efficiency
- Excellent Regulation
- EMI/RFI Six-Sided Shielding

INPUT VOLTAGE	OUTPUT VOLTAGE/mA	REGULATION		REFLECTED RIPPLE	EFFICIENCY	CASE SIZE	MODEL NUMBER
		LINE	LOAD				
10 WATT HIGH-PERFORMANCE PM800 SERIES							
5V	5V/2000 mA	±.02%	±.05%	108 mA P-P	61%	B1	PM801
	12V/940 mA	±.02%	±.05%	122 mA P-P	61%	B1	PM803
	15V/800 mA	±.02%	±.05%	130 mA P-P	61%	B1	PM804
12V	5V/2000 mA	±.02%	±.05%	45 mA P-P	61%	B1	PM811
	12V/940 mA	±.02%	±.05%	51 mA P-P	61%	B1	PM813
	15V/800 mA	±.02%	±.05%	54 mA P-P	61%	B1	PM814
24V	5V/2000 mA	±.02%	±.05%	32 mA P-P	61%	B1	PM821
	12V/940 mA	±.02%	±.05%	36 mA P-P	61%	B1	PM823
	15V/800 mA	±.02%	±.05%	38 mA P-P	61%	B1	PM824
28V	5V/2000 mA	±.02%	±.05%	33 mA P-P	61%	B1	PM831
	12V/940 mA	±.02%	±.05%	37 mA P-P	61%	B1	PM833
	15V/800 mA	±.02%	±.05%	39 mA P-P	61%	B1	PM834
48V	5V/2000 mA	±.02%	±.05%	32 mA P-P	61%	B1	PM841
	12V/940 mA	±.02%	±.05%	36 mA P-P	61%	B1	PM843
	15V/800 mA	±.02%	±.05%	38 mA P-P	61%	B1	PM844
5V	±12V/±525 mA	±.02%	±.02%	132 mA P-P	62%	B1	PM851
	±15V/±412 mA	±.02%	±.02%	130 mA P-P	62%	B1	PM852
12V	±12V/±525 mA	±.02%	±.02%	55 mA P-P	62%	B1	PM861
	±15V/±412 mA	±.02%	±.02%	54 mA P-P	62%	B1	PM862
24V	±12V/±525 mA	±.02%	±.02%	39 mA P-P	62%	B1	PM871
	±15V/±412 mA	±.02%	±.02%	38 mA P-P	62%	B1	PM872
28V	±12V/±525 mA	±.02%	±.02%	40 mA P-P	62%	B1	PM881
	±15V/±412 mA	±.02%	±.02%	39 mA P-P	62%	B1	PM882
48V	±12V/±525 mA	±.02%	±.02%	39 mA P-P	62%	B1	PM891
	±15V/±412 mA	±.02%	±.02%	38 mA P-P	62%	B1	PM892

INPUT VOLTAGE RANGES VS. PERCENTAGE OF RATED OUTPUT LOAD

INPUT VOLTAGE	5V	12V	24V	28V	48V
100% Load	4.65-5.5V	11.16-13.2V	22.32-26.4V	26.04-30.8V	44.64-52.8V
80% Load	4.50-6.0V	10.80-14.4V	21.60-28.8V	25.20-33.6V	43.20-57.6V
60% Load	4.40-6.5V	10.56-15.6V	21.12-31.2V	24.64-36.4V	42.24-62.4V

CASE DIMENSIONS		
B1	3.50 x2.50 x 0.88 Inches	(88.9 x 63.5 x 22.4 mm)

ALL MODELS HAVE OPERATING TEMPERATURE RANGE OF −25°C TO +71°C AND STORAGE TEMPERATURE RANGE OF −40°C to +125°C

TWO-YEAR WARRANTY

Specifications Subject to Change Without Notice.

COMPUTER PRODUCTS™
STEVENS-ARNOLD DIVISION

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SOUTH BOSTON, MA 02127
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PACKAGED POWER®

COMPUTER PRODUCTS
STEVENS-ARNOLD DIVISION
EA05D12/60R

1.8-6W Economy DC/DC Converters

ISO-PAK® SINGLE & DUAL OUTPUT

- Isolated
- Low Cost
- Low Profile (.38″)
- Compact Size
- Efficiency to 80%

OUTPUT VOLTAGE	OUTPUT CURRENT	REGULATION		FL EFF.	CASE SIZE	MODEL SERIES
		LINE	LOAD			
±12 VDC	±60 mA	1%/1%	±0.5%	60%	R	EA*D12/60R
±15 VDC	±60 mA	1%/1%	±0.5%	60%	R	EA*D15/60R
	±200 mA	1%/1%	±10%	80%	W	J*D15/200W
±18 VDC	±165 mA	1%/1%	±10%	80%	W	J*D18/165W
5 VDC	1000 mA	1%/1%	±10%	75%	W	K*S05/1000W
12 VDC	500 mA	1%/1%	±10%	75%	W	K*S12/500W

NOTE: Other Input/Output Combinations Available — Consult Factory.
* Select Desired Nominal Input Voltage (Table Below) and Insert in Place of Asterisk to Complete Model Number.

INPUT VOLTAGE RANGES	
NOMINAL	INPUT RANGE
5 VDC	4.65-5.5 VDC (EA)
5 VDC	4.5-5.5 VDC (K, J)
12 VDC	10-14 VDC (K, J)
24 VDC	21-28 VDC (K)
48 VDC	42-56 VDC (K)

CASE DIMENSIONS		
R	2.0 x 1.0 x 0.38 In.	(51 x 25 x 9.6 mm)
W	2.0 x 1.0 x 0.38 In.	(51 x 25 x 9.6 mm)

OTHER VOLTAGE AND CURRENT COMBINATIONS AVAILABLE — PLEASE CONSULT FACTORY.
OPERATING TEMPERATURE RANGE: −25°C TO +71°C. NO DERATING.
100% BURN-IN @ FULL LOAD

We Specialize in Specials

Design Capabilities

- 1 to 500 Watts
- Single & Multiple Outputs
- Standard, Wide, or Ultra-Wide Input Ranges
- Encapsulated, Cased or Open-Card Design
- Special Options to Standard Products

WE OFFER THE LEADING EDGE OF TECHNOLOGY IN DESIGN AND PERFORMANCE.

FOR MORE INFORMATION CONTACT OUR APPLICATIONS DEPT. AT 617-268-1170 OR THE LOCAL SALES OFFICE NEAREST YOU.

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Specifications Subject to Change Without Notice.

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STEVENS-ARNOLD DIVISION

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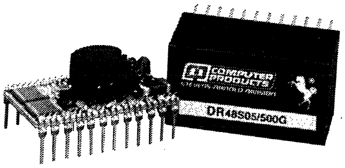

NEW! 3 Watt Hybrid DIP DC/DC Converters

- Wide 2:1 Input Range
- 77% Min. Efficiency
- 200 KHz Switching
- Pi Input Filter
- 500 VDC Isolation
- No Derating
- OVP & Short-Circuit Protection

OUTPUT VOLTAGE	OUTPUT CURRENT	REGULATION		FL EFF	CASE SIZE	MODEL SERIES
		LINE	LOAD			
SINGLE OUTPUT MODELS						
5 VDC	+500 mA	±1.0%	±3.0%	77	G	DR24S05/500G
12 VDC	+250 mA	±1.0%	±3.0%	80	G	DR24S12/250G
15 VDC	+200 mA	±1.0%	±3.0%	80	G	DR24S15/200G
5 VDC	+500 mA	±1.0%	±3.0%	79	G	DR48S05/500G
12 VDC	+250 mA	±1.0%	±3.0%	82	G	DR48S12/250G
15 VDC	+200 mA	±1.0%	±3.0%	82	G	DR48S15/200G
DUAL OUTPUT MODELS						
±5 VDC	±250 mA	±1.0%	±3.0%	77	G	DR24D05/250G
±12 VDC	±125 mA	±1.0%	±3.0%	80	G	DR24D12/125G
±15 VDC	±100 mA	±1.0%	±3.0%	80	G	DR24D15/100G
±5 VDC	±250 mA	±1.0%	±3.0%	79	G	DR48D05/250G
±12 VDC	±125 mA	±1.0%	±3.0%	82	G	DR48D12/125G
±15 VDC	±100 mA	±1.0%	±3.0%	82	G	DR48D15/100G

INPUT VOLTAGE RANGES	
NOMINAL	**INPUT RANGE**
24 VDC	18-36 VDC
48 VDC	36-72 VDC

CASE DIMENSIONS		
G	1.25 x 0.8 x 0.5 In.	(32 x 20 x 12.7 mm)

ALL SPECIFICATIONS PRELIMINARY
(Subject to Change Without Notice)

OTHER VOLTAGE AND CURRENT COMBINATIONS AVAILABLE — PLEASE CONSULT FACTORY.
OPERATING TEMPERATURE RANGE: −25°C TO +71°C. NO DERATING.
100% BURN-IN @ FULL LOAD

TWO-YEAR WARRANTY

Specifications Subject to Change Without Notice.

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STEVENS-ARNOLD DIVISION

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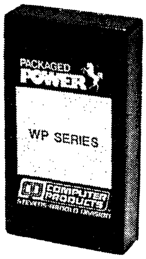

25W DC/DC Converters Ultra-Wide Input Range

ISO-PAK® SINGLE OUTPUT

- 4:1 Input Range
- Efficiency to 85%
- Direct Output Paralleling
- Adjustable Output ±10%
- Remote On-Off Control
- 100 kHz Switching
- Isolated

OUTPUT VOLTAGE	OUTPUT CURRENT	REGULATION		FL EFF.	CASE SIZE	MODEL SERIES
		LINE	LOAD			
24 VDC INPUT MODELS						
5 VDC	5000 mA	±0.5%	±0.5%	77%	U	WP24S05/5000U
6 VDC	4500 mA	±0.5%	±0.5%	78%	U	WP24S06/4500U
12 VDC	2500 mA	±0.5%	±0.5%	84%	U	WP24S12/2500U
15 VDC	2000 mA	±0.5%	±0.5%	85%	U	WP24S15/2000U
48 VDC INPUT MODELS						
5 VDC	5000 mA	±0.5%	±0.5%	77%	U	WP48S05/5000U
6 VDC	4500 mA	±0.5%	±0.5%	78%	U	WP48S06/4500U
12 VDC	2500 mA	±0.5%	±0.5%	84%	U	WP48S12/2500U
15 VDC	2000 mA	±0.5%	±0.5%	85%	U	WP48S15/2000U

INPUT VOLTAGE RANGES	
NOMINAL	**INPUT RANGE**
24 VDC	9-36 VDC
48 VDC	20-72 VDC

CASE DIMENSIONS		
U	4.56 x 2.56 x .83 In.	(116 x 65 x 21 mm)

OTHER VOLTAGE AND CURRENT COMBINATIONS AVAILABLE — PLEASE CONSULT FACTORY.
OPERATING TEMPERATURE RANGE: −25°C TO +71°C. NO DERATING.
100% BURN-IN @ FULL LOAD.

TWO-YEAR WARRANTY

Specifications Subject to Change Without Notice.

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WR24D12/1250U
COMPUTER PRODUCTS
STEVENS-ARNOLD DIVISION

15 & 30W DC/DC Converters Wide Input Range

ISO-PAK® SINGLES & DUALS

- 2:1 Input Range
- Economically Priced
- Efficiency to 86%
- Remote On-Off Control
- 100 kHz Switching Frequency
- Isolated Output

OUTPUT VOLTAGE	OUTPUT CURRENT	REGULATION		FL EFF.	CASE SIZE	MODEL SERIES
		LINE	LOAD			
5 VDC	3000 mA	±0.2%	±1%	75%	XC	WR12S05/3000XC
	3000 mA	±0.2%	±1%	77%	XC	WR24S05/3000XC
	3000 mA	±0.2%	±1%	77%	XC	WR48S05/3000XC
	5000 mA	±0.2%	±1%	75%	U	WR12S05/5000U
	5000 mA	±0.2%	±1%	77%	U	WR24S05/5000U
	5000 mA	±0.2%	±1%	78%	U	WR48S05/5000U
12 VDC	1250 mA	±0.2%	±1%	78%	XC	WR12S12/1250XC
	1250 mA	±0.2%	±1%	80%	XC	WR24S12/1250XC
	1250 mA	±0.2%	±1%	80%	XC	WR48S12/1250XC
	2500 mA	±0.2%	±1%	78%	U	WR12S12/2500U
	2500 mA	±0.2%	±1%	80%	U	WR24S12/2500U
	2500 mA	±0.2%	±1%	81%	U	WR48S12/2500U
15 VDC	1000 mA	±0.2%	±1%	78%	XC	WR12S15/1000XC
	1000 mA	±0.2%	±1%	80%	XC	WR24S15/1000XC
	1000 mA	±0.2%	±1%	80%	XC	WR48S15/1000XC
	2000 mA	±0.2%	±1%	78%	U	WR12S15/2000U
	2000 mA	±0.2%	±1%	80%	U	WR24S15/2000U
	2000 mA	±0.2%	±1%	81%	U	WR48S15/2000U
±12 VDC	±625 mA	±0.2%	±1%	82%	XC	WR12D12/625XC
	±625 mA	±0.2%	±1%	84%	XC	WR24D12/625XC
	±625 mA	±0.2%	±1%	86%	XC	WR48D12/625XC
	±1250 mA	±0.2%	±1%	82%	U	WR12D12/1250U
	±1250 mA	±0.2%	±1%	84%	U	WR24D12/1250U
	±1250 mA	±0.2%	±1%	86%	U	WR24D12/1250U
±15 VDC	±500 mA	±0.2%	±1%	82%	XC	WR12D15/500XC
	±500 mA	±0.2%	±1%	84%	XC	WR24D15/500XC
	±500 mA	±0.2%	±1%	86%	XC	WR48D15/500XC
	±1000 mA	±0.2%	±1%	82%	U	WR12D15/1000U
	±1000 mA	±0.2%	±1%	84%	U	WR12D15/1000U
	±1000 mA	±0.2%	±1%	86%	U	WR12D15/1000U

INPUT VOLTAGE RANGES	
NOMINAL	INPUT RANGE
12 VDC	9-18 VDC
24 VDC	18-36 VDC
48 VDC	36-72 VDC

CASE DIMENSIONS		
U	4.56 x 2.56 x 0.83 In.	(116 x 65 x 21 mm)
XC	3.0 x 2.56 x 0.83 In.	(76 x 65 x 21 mm)

OTHER VOLTAGE AND CURRENT COMBINATIONS AVAILABLE — PLEASE CONSULT FACTORY.
OPERATING TEMPERATURE RANGE: −25°C TO +71°C. NO DERATING.
100% BURN-IN @ FULL LOAD

TWO-YEAR WARRANTY

Specifications Subject to Change Without Notice.

COMPUTER PRODUCTS
STEVENS-ARNOLD DIVISION

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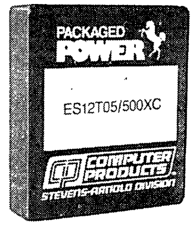

15W DC/DC Converters Wide Input Range

ISO-PAK® TRIPLE OUTPUT

- 2:1 Input Range
- Economically Priced
- Efficiency to 82%
- 100 kHz Switching Frequency
- Short-Circuit Protected
- Isolated Output

OUTPUT VOLTAGE	OUTPUT CURRENT	REGULATION		FL EFF.	CASE SIZE	MODEL SERIES
		LINE	LOAD			
+5 VDC ±12 VDC	SEE TABLE 1 BELOW	±0.5%	±3.0%	78%	XC	ES12T12/310XC
		±0.5%	±3.0%	80%	XC	ES24T12/310XC
		±0.5%	±3.0%	82%	XC	ES48T12/310XC
+5 VDC ±15 VDC	SEE TABLE 1 BELOW	±0.5%	±3.0%	78%	XC	ES12T15/250XC
		±0.5%	±3.0%	80%	XC	ES24T15/250XC
		±0.5%	±3.0%	82%	XC	ES48T15/250XC
+5 VDC +12 VDC −5 V	SEE TABLE 1 BELOW	±0.5%	±3.0%	78%	XC	ES12T05/500XC
		±0.5%	±3.0%	80%	XC	ES24T05/500XC
		±0.5%	±3.0%	82%	XC	ES48T05/500XC

TABLE 1

OUTPUT LOADING & PROTECTION TABLE					
OUTPUT	OUTPUT VOLTAGE	OUTPUT CURRENT			OVP (±5%)
		MIN.	NOM.	MAX.	
1	+5V	250 mA	1.5A	2.0A	6.8V
2 & 3	+12V or −12V	100 mA	310 mA	500 mA	15.0V
2 & 3	+15V or −15V	100 mA	250 mA	500 mA	18.0V
2 & 3	+12V, −5V	.1/.1A	.31/.5A	.5/.5A	6.8V

CASE DIMENSIONS		
XC	3.0 x 2.56 x 0.83 In.	(76 x 65 x 21 mm)

NOTES:
1. Max. total power from all outputs limited to 15 watts. No output may exceed max. current shown.
2. Min. current on each output required to maintain regulation spec.
3. Load regulation is specified from min. to nom. load on each output with nom. load on other outputs.
4. Will not cause the equipment to fail FCC requirements.
5. Specifications apply at 25°C ambient.

INPUT VOLTAGE RANGES	
NOMINAL	INPUT RANGE
12 VDC	9-18 VDC
24 VDC	18-36 VDC
48 VDC	36-72 VDC

OTHER VOLTAGE AND CURRENT COMBINATIONS AVAILABLE — PLEASE CONSULT FACTORY.
OPERATING TEMPERATURE RANGE: −25°C TO +71°C. NO DERATING.
100% BURN-IN @ FULL LOAD

TWO-YEAR WARRANTY

Specifications Subject to Change Without Notice.

COMPUTER PRODUCTS™
STEVENS-ARNOLD DIVISION

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LWM12S05/3000XA
COMPUTER PRODUCTS
STEVENS-ARNOLD DIVISION

15-45W DC/DC Converters High Power Density

SWITCH-PAK® SINGLE OUTPUT

- Ultra Wide Input
- 4:1 Input Range
- 75 kHz Switching Frequency
- Efficiency to 89%
- Low Profile
- Non-Isolated

OUTPUT VOLTAGE	OUTPUT CURRENT	REGULATION		FL EFF.	CASE SIZE	MODEL SERIES
		LINE	LOAD			
5 VDC	3000 mA	±0.5%	±0.5%	80%	XA	LWM12S05/3000XA
	5000 mA	±0.5%	±0.5%	80%	XC	LWM12S05/5000XC
12 VDC	2000 mA	±0.5%	±0.5%	85%	XA	LWM24S12/2000XA
	3500 mA	±0.5%	±0.5%	87%	XC	LWM24S12/3500XC
15 VDC	1500 mA	±0.5%	±0.5%	87%	XA	LWM24S15/1500XA
	3000 mA	±0.5%	±0.5%	89%	XC	LWM24S15/5000XC

PACKAGED POWER
WF SERIES
WIDE INPUT DC/DC SUPPLY 5VDC, 1AMP
Stevens-Arnold
Subsidiary of Computer Products Inc.

5W DC/DC Converters Ultra-Wide Input Range

SWITCH-PAK® SINGLE OUTPUT

- 4:1 Input Range
- Efficiency to 75%
- Non-Isolation
- Six-Sided Shielding

OUTPUT VOLTAGE	OUTPUT CURRENT	REGULATION		FL EFF.	CASE SIZE	MODEL SERIES
		LINE	LOAD			
5 VDC	1000 mA	±0.5%	±1.0%	75%	Z	WF12S05/1000Z

INPUT VOLTAGE RANGES	
NOMINAL	INPUT RANGE
12 VDC	7-32 VDC (WF)
12 VDC	7-40 VDC (LWM)
24 VDC	14-40 VDC (LWM)
24 VDC	17-40 VDC (LWM)

CASE DIMENSIONS		
Z	2.0 x 2.0 x 0.38 In.	(51 x 51 x 9.6 mm)
XA	2.56 x 3.0 x 0.38 In.	(65 x 76 x 9.6 mm)
XC	2.56 x 3.0 x 0.83 In.	(65 x 76 x 21 mm)

OTHER VOLTAGE AND CURRENT COMBINATIONS AVAILABLE — PLEASE CONSULT FACTORY.
OPERATING TEMPERATURE RANGE: −25°C TO +71°C. NO DERATING.
100% BURN-IN @ FULL LOAD

TWO-YEAR WARRANTY

Specifications Subject to Change Without Notice.

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COMPUTER PRODUCTS
STEVENS-ARNOLD DIVISION
H05S05/200W

1-25W DC/DC Converters High Performance

ISO-PAK® SINGLE OUTPUT

- Linear Performance
- Low Noise
- Isolated
- Regulated
- Six-Sided Shielding
- Efficiency to 71%

OUTPUT VOLTAGE	OUTPUT CURRENT	REGULATION LINE	REGULATION LOAD	FL EFF.	CASE SIZE	MODEL SERIES
5 VDC	200 mA	±1.0%	±1.0%	46%	W	H*S05/200W
	600 mA	±0.1%	±0.2%	60%	Z	F*S05/600Z
	1000 mA	±0.1%	±0.1%	67%	Z	F*S05/1000Z
	2000 mA	±0.2%	±0.2%	65%	X	M*S05/2000X
	5000 mA	±0.2%	±0.2%	63%	V	P*S05/5000V
12 VDC	125 mA	±1.0%	±1.0%	56%	W	H*S12/125W
	300 mA	±0.1%	±0.2%	65%	Z	F*S12/300Z
	500 mA	±0.1%	±0.1%	67%	Z	F*S12/500Z
	1000 mA	±0.2%	±0.2%	71%	X	M*S12/1000X
	2000 mA	±0.2%	±0.2%	67%	V	P*S12/2000V
15 VDC	100 mA	±0.1%	±1.0%	59%	W	H*S15/100W
	200 mA	±0.1%	±0.2%	60%	Z	F*S15/200Z
	350 mA	±0.1%	±0.1%	69%	Z	F*15/350Z
	670 mA	±0.2%	±0.2%	71%	X	M*S15/670X
	1600 mA	±0.2%	±0.2%	66%	V	P*S15/1600V

NOTE: P Series not available with 5 Volt Input.
* Select Desired Nominal Input Voltage (Table Below) and Insert in Place of Asterisk to Complete Model Number.

INPUT VOLTAGE RANGES	
NOMINAL	
5 VDC	4.5-5.5 VDC
12 VDC	10-14.5 VDC
24 VDC	21-28 VDC
28 VDC	24-32 VDC
48 VDC	42-56 VDC

CASE DIMENSIONS		
V	6.32 x 4.32 x .81 In.	(161 x 110 x 21 mm)
W	1.0 x 2.0 x 0.38 In.	(25 x 51 x 9.6 mm)
X	3.0 x 2.56 x 0.75 In.	(76 x 65 x 19 mm)
Z	2.0 x 2.0 x 0.38 In.	(51 x 51 x 9.6 mm)

OTHER VOLTAGE AND CURRENT COMBINATIONS AVAILABLE — PLEASE CONSULT FACTORY.
OPERATING TEMPERATURE RANGE: −25°C TO +71°C. NO DERATING.
100% BURN-IN @ FULL LOAD

TWO-YEAR WARRANTY

Specifications Subject to Change Without Notice.

COMPUTER PRODUCTS™
STEVENS-ARNOLD DIVISION

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BA SERIES
COMPUTER PRODUCTS
STEVENS-ARNOLD DIVISION

1.5-25W DC/DC Converters High Performance

ISO-PAK® DUAL OUTPUT

- Linear Performance
- Low Noise
- Isolated
- Regulated
- Six-Sides Shielding
- Efficiency to 71%

OUTPUT VOLTAGE	OUTPUT CURRENT	REGULATION		FL EFF.	CASE SIZE	MODEL SERIES
		LINE	LOAD			
±12 VDC	±310 mA	±0.1%	±0.1%	65%	L	BA*D12/310L
±15 VDC	±250 mA	±0.1%	±0.1%	66%	L	BA*D15/250L

OUTPUT VOLTAGE	OUTPUT CURRENT	REGULATION		FL EFF.	CASE SIZE	MODEL SERIES
		LINE	LOAD			
±12 VDC	±60 mA	±0.07%	±0.07%	52%	Z	A*D12/60Z
	±150 mA	±0.07%	±0.07%	65%	Z	A*D12/150Z
	±330 mA	±0.1%	±0.1%	65%	X	N*D12/330X
	±830 mA	±0.1%	±0.1%	67%	V	R*D12/830V
±15 VDC	±60 mA	±0.07%	±0.07%	57%	Z	A*D15/60Z
	±150 mA	±0.07%	±0.07%	67%	Z	A*D15/150Z
	±330 mA	±0.1%	±0.1%	71%	X	N*D15/330X
	±830 mA	±0.1%	±0.1%	69%	V	R*D15/830V

NOTE: R Series not available with 5 Volt Input.
* Select Desired Nominal Input Voltage (Table Below) and Insert in Place of Asterisk to Complete Model Number.

INPUT VOLTAGE RANGES	
NOMINAL	
5 VDC	4.5-5.5 VDC
12 VDC	10-14.5 VDC
24 VDC	21-28 VDC
28 VDC	24-32 VDC
48 VDC	42-56 VDC

CASE DIMENSIONS		
V	6.32 x 4.32 x .81 In.	(161 x 110 x 21 mm)
L	1.95 x 1.95 x 0.88 In.	(51 x 51 x 22 mm)
X	3.0 x 2.56 x 0.75 In.	(76 x 65 x 19 mm)
Z	2.0 x 2.0 x 0.38 In.	(51 x 51 x 9.6 mm)

OTHER VOLTAGE AND CURRENT COMBINATIONS AVAILABLE — PLEASE CONSULT FACTORY.
OPERATING TEMPERATURE RANGE: −25°C TO +71°C. NO DERATING.
100% BURN-IN @ FULL LOAD

TWO-YEAR WARRANTY

Specifications Subject to Change Without Notice.

COMPUTER PRODUCTS™
STEVENS-ARNOLD DIVISION

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PACKAGED POWER®

PACKAGED POWER
C12T15/165X
COMPUTER PRODUCTS
STEVENS-ARNOLD DIVISION

10 & 25W DC/DC Converters High Performance

ISO-PAK® TRIPLE OUTPUT

- Linear Performance
- Low Noise
- Isolated
- Regulated
- Six-Sided Shielding
- Efficiency to 65%

OUTPUT VOLTAGE	OUTPUT CURRENT	REGULATION LINE	REGULATION LOAD	FL. EFF.	CASE SIZE	MODEL SERIES
5 VDC ±12 VDC	750/±165 mA	±0.1%	±0.1%	51%	X	C05T12/165X
	750/±165 mA	±0.1%	±0.1%	51%	X	C12T12/165X
	750/±165 mA	±0.1%	±0.1%	51%	X	C24T12/165X
	750/±165 mA	±0.1%	±0.1%	51%	X	C28T12/165X
	750/±165 mA	±0.1%	±0.1%	51%	X	C48T12/165X
5 VDC ±15 VDC	750/±165 mA	±0.1%	±0.1%	54%	X	C05T15/165X
	750/±165 mA	±0.1%	±0.1%	54%	X	C12T15/165X
	750/±165 mA	±0.1%	±0.1%	54%	X	C24T15/165X
	750/±165 mA	±0.1%	±0.1%	54%	X	C28T15/165X
	750/±165 mA	±0.1%	±0.1%	54%	X	C48T15/165X
5 VDC ±12 VDC	3000/±330 mA	±0.2% ±0.1%	±0.2% ±0.1%	60%	V	S12T12/330V
	3000/±330 mA	±0.2% ±0.1%	±0.2% ±0.1%	65%	V	S24T12/330V
	3000/±330 mA	±0.2% ±0.1%	±0.2% ±0.1%	65%	V	S28T12/330V
	3000/±330 mA	±0.2% ±0.1%	±0.2% ±0.1%	65%	V	S48T12/330V
5 VDC ±15 VDC	3000/±330 mA	±0.2% ±0.1%	±0.2% ±0.1%	61%	V	S12T15/330V
	3000/±330 mA	±0.2% ±0.1%	±0.2% ±0.1%	65%	V	S24T15/330V
	3000/±330 mA	±0.2% ±0.1%	±0.2% ±0.1%	65%	V	S28T15/330V
	3000/±330 mA	±0.2% ±0.1%	±0.2% ±0.1%	65%	V	S48T15/330V

NOTE: S Series not available with 5 Volt Input.

INPUT VOLTAGE RANGES	
NOMINAL	INPUT RANGE
5 VDC	4.5-5.5 VDC
12 VDC	10-14.5 VDC
24 VDC	21-28 VDC
28 VDC	24-32 VDC
48 VDC	42-56 VDC

CASE DIMENSIONS		
V	6.32 x 4.32 x .81 In.	(161 x 110 x 21 mm)
X	3.0 x 2.56 x 0.75 In.	(76 x 65 x 19 mm)

OTHER VOLTAGE AND CURRENT COMBINATIONS AVAILABLE — PLEASE CONSULT FACTORY.
OPERATING TEMPERATURE RANGE: −25°C TO +71°C. NO DERATING.
100% BURN-IN @ FULL LOAD.

TWO-YEAR WARRANTY

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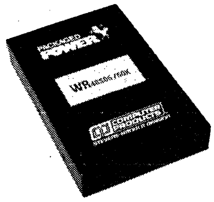

50-60W Single & Dual Output Wide Input DC/DC Converters

- Low Profile 0.91 Inch
- Wide 2:1 Input Range
- PCB or Chassis Mount
- No Heat Sinking Required
- Environmentally Protected
- No Minimum Loading
- 500 VDC Isolation

OUTPUT #1	OUTPUT #2	REGULATION		FL EFF	CASE SIZE	MODEL SERIES
		LINE	LOAD			
SINGLE OUTPUT MODELS						
5V @ 10.0A	—	±0.5%	±1.0%	80	K	WR12S05/50K
12V @ 5.0A	—	±0.5%	±1.0%	82	K	WR12S12/60K
15V @ 4.0A	—	±0.5%	±1.0%	82	K	WR12S15/60K
5V @ 10.0A	—	±0.5%	±1.0%	81	K	WR24S05/50K
12V @ 5.0A	—	±0.5%	±1.0%	83	K	WR24S12/60K
15V @ 4.0A	—	±0.5%	±1.0%	83	K	WR24S15/60K
5V @ 10.0A	—	±0.5%	±1.0%	82	K	WR48S05/50K
12V @ 5.0A	—	±0.5%	±1.0%	84	K	WR48S12/60K
15V @ 4.0A	—	±0.5%	±1.0%	84	K	WR48S15/60K
DUAL OUTPUT MODELS						
5V @ 5.0A	5V @ 5.0A	±0.5%	±1.0%	80	K	WR12D05/50K
12V @ 2.5A	12V @ 2.5A	±0.5%	±1.0%	82	K	WR12D12/60K
15V @ 2.0A	15V @ 2.0A	±0.5%	±1.0%	82	K	WR12D15/60K
5V @ 5.0A	12V @ 2.5A	±0.5%	±1.0%	81	K	WR12D05-12/55K
5V @ 5.0A	5V @ 5.0A	±0.5%	±1.0%	81	K	WR24D05/50K
12V @ 2.5A	12V @ 2.5A	±0.5%	±1.0%	83	K	WR24D12/60K
15V @ 2.0A	15V @ 2.0A	±0.5%	±1.0%	83	K	WR24D15/60K
5V @ 5.0A	12V @ 2.5A	±0.5%	±1.0%	81	K	WR24D05-12/55K
5V @ 5.0A	5V @ 5.0A	±0.5%	±1.0%	82	K	WR48D05/50K
12V @ 2.5A	12V @ 2.5A	±0.5%	±1.0%	84	K	WR48D12/60K
15V @ 2.0A	15V @ 2.0A	±0.5%	±1.0%	84	K	WR48D15/60K
5V @ 5.0A	12V @ 2.5A	±0.5%	±1.0%	82	K	WR48D05-12/55K

NOTE: (1) To obtain an optional heat sink or barrier strip, add to the model number, either the suffix "1" for a heat sink OR the suffix "3" for a barrier strip.

INPUT VOLTAGE RANGES	
NOMINAL	**INPUT RANGE**
12 VDC	9-18 VDC
24 VDC	18-36 VDC
48 VDC	36-72 VDC

CASE DIMENSIONS: CASE K	
No Heat Sink or Barrier Strip	3.5 x 5.5 x 0.91 inches (80 x 139.7 x 23.1 mm)
With Barrier Strip	3.5 x 5.5 x 1.3 inches (89 x 140 x 33 mm)
With Heat Sink	3.5 x 5.5 x 1.37 inches (89 x 140 x 35 mm)

OTHER VOLTAGE AND CURRENT COMBINATIONS AVAILABLE— PLEASE CONSULT FACTORY.
OPERATING TEMPERATURE RANGE: −25°C TO +71°C. NO DERATING.
100% BURN-IN @ FULL LOAD

TWO-YEAR WARRANTY

Specifications Subject to Change Without Notice.

COMPUTER PRODUCTS™
STEVENS-ARNOLD DIVISION

7 ELKINS STREET
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PACKAGED POWER™

50-60W Triple & Quad Output Wide Input DC/DC Converters

- Low Profile 0.91 Inch
- Wide 2:1 Input Range
- PCB or Chassis Mount
- No Heat Sinking Required
- Environmentally Protected
- No Minimum Loading
- 500 VDC Isolation

OUTPUT #1 PRIMARY	OUTPUT #2 PRIMARY	OUTPUT #3 AUXILIARY	OUTPUT #4	REGULATION		FL EFF	CASE SIZE	MODEL SERIES
				LINE	LOAD			
TRIPLE OUTPUT MODELS								
+5V @ 5.0A	−12V @ 1.25A	+12V @ 1.25A	—	±0.5%	±1.0%	80	K	WR12T05-12/55K
+5V @ 5.0A	−15V @ 1.0A	+15V @ 1.0A	—	±0.5%	±1.0%	80	K	WR12T05-15/55K
+12V @ 2.5A	−5V @ 0.5A	+5V @ 0.5A	—	±0.5%	±1.0%	81	K	WR12T12-05/55K
+15V @ 2.0A	−5V @ 0.5A	+5V @ 0.5A	—	±0.5%	±1.0%	81	K	WR12T15-05/55K
+5V @ 5.0A	−12V @ 1.25A	+12V @ 1.25A	—	±0.5%	±1.0%	81	K	WR24T05-12/55K
+5V @ 5.0A	−15V @ 1.0A	+15V @ 1.0A	—	±0.5%	±1.0%	81	K	WR24T05-15/55K
+12V @ 2.5A	−5V @ 0.5A	+5V @ 0.5A	—	±0.5%	±1.0%	82	K	WR24T12-05/55K
+15V @ 2.0A	−5V @ 0.5A	+5V @ 0.5A	—	±0.5%	±1.0%	82	K	WR24T15-05/55K
+5V @ 5.0A	−12V @ 1.25A	+12V @ 1.25A	—	±0.5%	±1.0%	82	K	WR48T05-12/55K
+5V @ 5.0A	−15V @ 1.0A	+15V @ 1.0A	—	±0.5%	±1.0%	82	K	WR48T05-15/55K
+12V @ 2.5A	−5V @ 0.5A	+5V @ 0.5A	—	±0.5%	±1.0%	83	K	WR48T12-05/55K
+15V @ 2.0A	−5V @ 0.5A	+5V @ 0.5A	—	±0.5%	±1.0%	83	K	WR48T15-05/55K
QUADRUPLE OUTPUT MODELS								
−5V @ 0.5A	+5V @ 5.0A	−12V @ 1.25A	+12V @ 1.25A	±0.5%	±1.0%	81	K	WR12Q05-12/55K
−5V @ 0.5A	+5V @ 5.0A	−15V @ 1.0A	+15V @ 1.0A	±0.5%	±1.0%	81	K	WR12Q05-15/60K
−5V @ 0.5A	+5V @ 5.0A	−12V @ 1.25A	+12V @ 1.25A	±0.5%	±1.0%	82	K	WR24Q05-12/55K
−5V @ 0.5A	+5V @ 5.0A	−15V @ 1.0A	+15V @ 1.0A	±0.5%	±1.0%	82	K	WR24Q05-15/60K
−5V @ 0.5A	+5V @ 5.0A	−12V @ 1.25A	+12V @ 1.25A	±0.5%	±1.0%	83	K	WR48Q05-12/55K
−5V @ 0.5A	+5V @ 5.0A	−15V @ 1.0A	+15V @ 1.0A	±0.5%	±1.0%	83	K	WR48Q05-15/60K

NOTE: (1) To obtain an optional heat sink or barrier strip, add to the model number, either the suffix "1" for a heat sink OR the suffix "3" for a barrier strip.

INPUT VOLTAGE RANGES

NOMINAL	INPUT RANGE
12 VDC	9-18 VDC
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CASE DIMENSIONS: CASE K

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100% BURN-IN @ FULL LOAD

TWO-YEAR WARRANTY

Specifications Subject to Change Without Notice.

ORDERING INFORMATION

Please use this information when ordering any of the products featured on the preceding 31 pages.

ORDER HOTLINES

For immediate order placement call the appropriate Order Hotline:

Compower Division
(408) 942-1600 (Western Time)

Power Products Division
(305) 975-7660 (Eastern Time)

Stevens-Arnold Division
(617) 268-1170 (Eastern Time)

ORDER PLACEMENT

When ordering any product in this catalog, be sure to specify the complete part number or model number, including suffix letter if you desire a non-standard input voltage and/or pin configuration. Orders may be placed with your local distributor, area field sales representative (see list on opposite page) or directly with the factory.

For small quantity orders contact your closest distributor or local sales representative. For information regarding your closest distributor call (305) 974-5500. When ordering products directly from the factory, place each order separately with the division that manufactures those products; products made by the Power Products Division are *not* available through Stevens-Arnold or Compower and vice versa. Orders may be placed by mail, telephone, Telex or TWX.

PRICES

All prices quoted are F.O.B. manufacturer in U.S. dollars. Applicable federal, state, and local taxes are extra. Prices subject to change without notice.

DISCOUNTS

Substantial discounts are available for large quantities. Consult your area representative or contact the manufacturer directly for quantity pricing.

TERMS

Terms of payment are 30 days from date of shipment subject to prior credit approval.

MINIMUM ORDER

Minimum net billing per order . . . $50.00.

QUOTATIONS

Price and delivery quotations made by Power Products Division, Stevens-Arnold Division, Compower Division, or their authorized field sales representatives are valid for thirty (30) days, unless specified otherwise.

DELIVERY

All orders placed with Power Products Division, Stevens-Arnold Division, Compower Division, or their authorized field sales representatives are acknowledged within one week after receipt of customer's written purchase order by a Customer Acknowledgement copy of the Sales Order form. The copy contains all information pertinent to the sale including standard terms and conditions, plus the scheduled shipping date. Unless a specific method of shipment is indicated by the customer, the best available method will be used.

WARRANTY

All products carry a TWO-YEAR warranty against defects in materials and workmanship.

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We manufacture many special and custom power supplies and DC/DC converters. For further help on your requirement call one of our divisions or your local sales office.

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POWER CONVERSION GROUP

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POWER CONVERSION GROUP

MINIGLOSSARIES FORMULAS • CHARTS PRODUCT SELECTION GUIDES FORMS CODES TECHNICAL INFORMATION

WHERE TO FIND THEM IN THE 85/86 EDITION OF EEM

Abbreviations/Acronyms	**A**•1166, **B**•1012, **C**•1028, **D**•1016
ASCII Code	**D**•1087
Batteries, Product Selection Guide	**D**•1413
Batteries & Fuel Cells, Characteristics	**D**•1430
Cabinets, Enclosures, Racks, & Chassis, Product Selection Guide	**C**•1003
Capacitors, Basic Formulas	**A**•1093
Capacitors, Miniglossary	**A**•1066
Capacitors, Product Selection Guide	**A**•1003
Circuit Boards (Printed) Product Selection Guide	**C**•1099
Coils, Chokes, Inductors, Product Selection Guide	**A**•1205
Conductors, Maximum Current Capacity of Copper & Aluminum	**C**•1863
Connectors, Miniglossary	**C**•1129
Connectors, Terminals, & Sockets, Product Selection Guide	**C**•1105
Crystals, Oscillators, Crystal & Piezoelectric Filters, Product Selection Gude	**A**•1309
Delay Lines, Product Selection Guide	**A**•1459
Discrete Semiconductors, Product Selection Guide	**A**•2067
Displays, Readouts, Lamps, & Lights, Product Selection Guide	**B**•1015
EBCDIC Code	**D**•1092
Encapsulation, Miniglossary	**C**•1086
Fans, Blowers, Cooling Equipment, & Heat Exchangers, Product Selection Guide	**C**•1623
Filters, Product Selection Guide	**A**•1583
Instruments, Graphic Recording Product Selection Guide	**D**•1401
Instruments, Panel Meters, Product Selection Guide	**D**•1329
Instruments, Test & Measuring Product Selection Guide	**D**•1175
Interconnection Systems, Product Selection Guide	**C**•1699
Keyboards & Keypads, Product Selection Guide	**B**•1705
Logofinder & Trademark Directories	**B**•901
Microwave Components, Product Selection Guide	**A**•1701
Military Qualified Products Lists	**B**•1003
Motors, Drives, & Rotating Components, Product Selection Guide	**B**•1129
Opto Semiconductors, Miniglossary	**B**•1214
Oscilloscopes, Product Selection Guide	**D**•1385
Panel Hardware, Product Selection Guide	**C**•1589
Potentiometers, Trimmers, Controls, & Rheostats, Product Selection Guide	**A**•1991
Power Supplies, Miniglossary	**D**•1462
Power Supplies, AC, Product Selection Guide	**D**•1877
Power Supplies, DC, Product Selection Guide	**D**•1447
Protective Components (Fuses, Circuit Breakers, etc.), Product Selection Guide	**B**•1225
Relay Contact Forms	**B**•1317
Relays, Electromechanical, Miniglossary	**B**•1308
Relays, Product Selection Guide	**B**•1261
Resistor Color Codes	**A**•1828
Resistors, Product Selection Guide	**A**•1785
Servo Components, Miniglossary	**D**•1985
Solenoids, Product Selection Guide	**B**•1463
Switches, Product Selection Guide	**B**•1477
Thermal Components, Product Selection Guide	**B**•1741
Thermal Conductivity of Dielectrics at Room Temperature	**B**•1744
Thyristors/High Power Diodes, Miniglossary	**A**•2076
Transducers & Encoders, Product Selection Guide	**B**•1777
Transformers, Product Selection Guide	**A**•2099
Wire & Cable, Product Selection Guide	**C**•1743
Wire Gauges—Diameter, Area, Copper Weight	**C**•1844

CONDOR INC.
D.C. POWER SUPPLIES

DC POWER SUPPLIES

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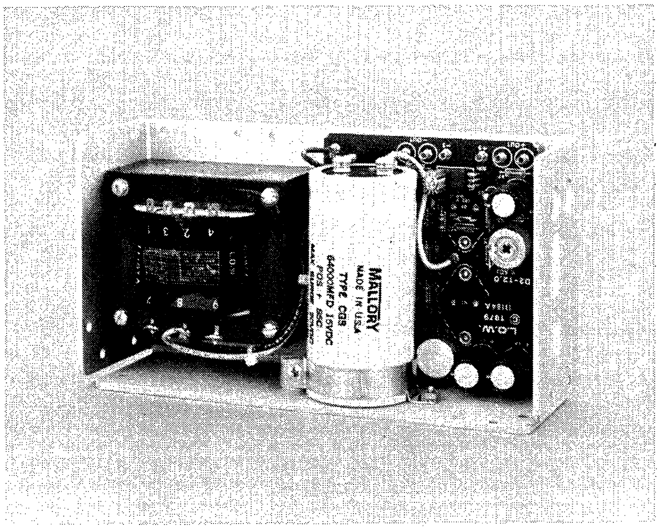
INDEX TO PRODUCTS

PAGE	PRODUCT	DESCRIPTION
1	LINEAR	SPECIFICATIONS AND INDEX
2	LINEAR	RATINGS, SINGLE-DUAL-TRIPLE OUTPUTS
3	LINEAR	RATINGS, QUAD, PRINTER, & DISC DRIVE POWER
4	LINEAR	RATINGS, VDE TYPE, AND WARRANTY POLICY
5 & 6	LINEAR	OUTLINE & MOUNTING DRAWINGS
7	SWITCHING	SPECIFICATIONS, SINGLE AND MULTI SDS/SDM
8	SWITCHING	RATINGS, SDS SINGLE OUTPUT
9	SWITCHING	RATINGS, SDM MULTI OUTPUT
10	SWITCHING	OUTLINE & MOUNTING DRAWINGS, SDS/SDM
11	SWITCHING	SPECS, V-SERIES MULTI OUTPUT
12	SWITCHING	RATINGS,V-SERIES
13	SWITCHING	OUTLINE & MOUNTING DRAWINGS

LINEAR POWER SUPPLIES



FEATURES

- ☐ 115/230 VAC INPUT
- ☐ OVP ON 5V OUTPUTS
- ☐ ±.05% REGULATION
- ☐ INDUSTRY STANDARD SIZE
- ☐ FOLDBACK CURRENT LIMIT
- ☐ FULL RATED TO 50°C
- ☐ I.C. REGULATED DESIGN
- ☐ 2 HOUR BURN-IN — ALL UNITS UNDERGO:
  1. Full function test
  2. Minimum 2 hr. burn-in
  3. Final full function test
- ☐ TWO YEAR WARRANTY
- ☐ UL478/CSA C22.2
- ☐ 143 MODELS

SPECIFICATIONS

AC Input:	115/230 VAC ±10%, 47-440 Hz. (Derate output current 10% for 50 Hz operation.)
DC Output:	See Voltage/Current Rating Chart. Adjustment range, ±5% minimum.
Line Regulation:	±.05% for a 10% change.
Load Regulation:	±.05% for a 50% load change.
Output Ripple:	2 to 15V unit: 5.0 mV PK-PK maximum; 20 to 200V unit: .02% PK-PK maximum.
Transient Response:	50 μseconds for 50% load change.
Short Circuit & Overvoltage Protection:	Automatic current limit/foldback.
Overvoltage Protection:	Built-in on all 5V models. Set at 6.2V ±.4V. Other models use optional overvoltage protection.
Remote Sensing:	Provided on all models, 3 amps and above, open sense lead protection built-in.
Stability:	±.05% for 24 hours after warm up.
Temperature Rating:	0°C to 50°C full rated, derated linearly to 40% at 70°C.
Temp. Coefficient:	±.01%/°C maximum.
Efficiency:	5V units: 45%, 12 & 15V units: 55%, 20 & 24V: 60%.
Vibration:	Per Mil-Std-810B, Method 514, Procedure 1, curve AB (to 50 Hz).
Shock:	Per Mil-Std-810B. Method 516, Procedure V.
Remote Programming:	Capability included on remote sense models.
Inhibit:	F & G units.

CONDOR INC.
D.C. POWER SUPPLIES

DC POWER SUPPLIES

OUTSIDE CA DIAL TOLL-FREE
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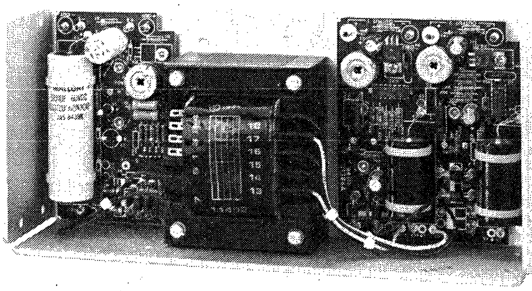
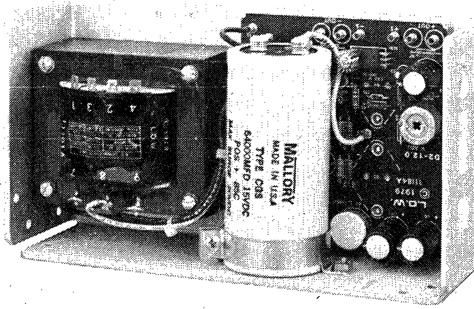
LINEAR POWER SUPPLIES





SINGLE OUTPUT (55 MODELS)

VOLTAGE	CURRENT	MODEL	CASE	PRICE 1-9 PC.
2V	1.2	A2-1.2	A	—
	3	B2-3	B	—
	6	C2-6	C	—
	9	N2-9	N	—
	12	D2-12	D	—
	18	E2-18	E	—
5V	1.2	A5-1.2/OVP	A	$ 24.00
	3	B5-3/OVP	B	30.00
	6	C5-6/OVP	C	52.00
	9	N5-9/OVP	N	72.00
	12	D5-12/OVP	D	82.00
	15	RD5-15/OVP	D	105.00
	18	E5-18/OVP	E	117.00
	23	RE5-23/OVP	E	135.00
	25	F5-25/OVP	F	154.00
	35	G5-35/OVP	G	190.00
*Requires Fan Cooling	40	RG5-40/OVP	G	200.00
	50	G5-50/OVF*	G	205.00
12V	.50	A12-.5	A	24.00
	1.7	B12-1.7	B	30.00
	3.4	C12-3.4	C	47.00
	5.1	N12-5.1	N	67.00
	6.8	D12-6.8	D	77.00
	10.2	E12-10.2	E	107.00
	16	F15-15	F	154.00
15V	.5	A15-.5	A	24.00
	1.5	B15-1.5	B	30.00
	3	C15-3	C	47.00
	4.5	N15-4.5	N	67.00
	6	D15-6	D	77.00
	9	E15-9	E	107.00
	15	F15-15*	F	154.00
24V	.225	A24-.225	A	$ 24.00
	1.2	B24-1.2	B	30.00
	1.5	B24-1.5	B	32.00
	2.4	C24-2.4	C	47.00
	3.6	N24-3.6	N	67.00
	4.8	D24-4.8	D	77.00
	7.2	E24-7.2	E	107.00
	12	F24-12	F	154.00
28V	.2	A28-.2	A	24.00
	1	B28-1	B	30.00
	2	C28-2	C	47.00
	3	N28-3	N	67.00
	4	D28-4	D	77.00
	6	E28-6	E	107.00
	10	F24-12*	F	154.00
48V	.5	B48-.5	B	34.00
	1	C48-1	C	54.00
	3	D48-3	D	84.00
	4	E48-4	E	114.00
120V	.15	B120-.15	B	38.00
150V	.15	B150-.15	B	38.00
175-210V	.12	B200-.12	B	38.00
240-260V	.1	B250-.1	B	38.00

DUAL OUTPUT (14 MODELS)

OUTPUT NO. 1	OUTPUT NO. 2	MODEL	CASE	PRICE 1-9 PIECES
5V @ 1.5A	5V @ 1.5A	AA5-1.5/OVP	AA	$ 50.00
3A	3A	BB5-3/OVP	BB	65.00
6A	6A	CC5-6/OVP	CC	92.00
5V @ 2A	9-15V @ .5A	AA512	AA	47.00
3A	1.25A	BB512	BB	57.00
6A	2.5A	CC512	CC	92.00
5V @ 2A	18-24V @ .3A	AA524	AA	47.00
3A	.8A	BB524	BB	57.00
6A	2A	CC524	CC	92.00
5V @ 2A	24V unreg** @ .5A, 2.5A PK	AA524-AIM65	AA	47.00
+12V @ 1A or 15V @ .8A	−12V @ 1A or −15V @ 8*	AA15-.8	AA	41.00
+12V @ 1.7A or 15V @ 1.5A	−12V @ 1.7A or 15V @ 1.5*	BB15-1.5	BB	52.00
+12V @ 3.4A or 15V @ 3A	−12V @ 3.4A or −15V @ 3A*	CC15-3	CC	85.00
15V @ 5A	15V @ 5A	DD15-5	E	132.00
+18V @ .4A or 24V @ .6A	−18V @ .4A or −24V @ .6	AA24-6	AA	41.00

No. 3 output usable at −5V, rate at ½ 15V current rating.

*** NON-STOCK: Requires setup fee of $250 per release if less than 50 pieces per order. No setup fee on orders over 50 pieces with 50 pieces minimum per release.

QUANTITY DISCOUNTS: 10-24 (5% off 1-9), 25-49 (10% off 1-9), 50-99 (10% off 1-9), 100-249 (20% off 1-9).

CONDOR INC.
D.C. POWER SUPPLIES

DC POWER SUPPLIES

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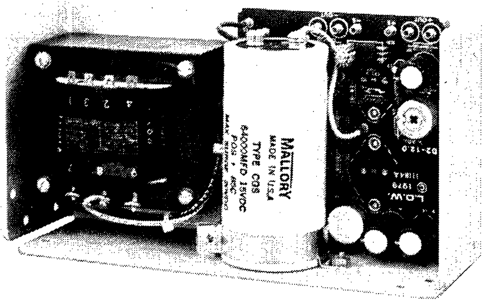
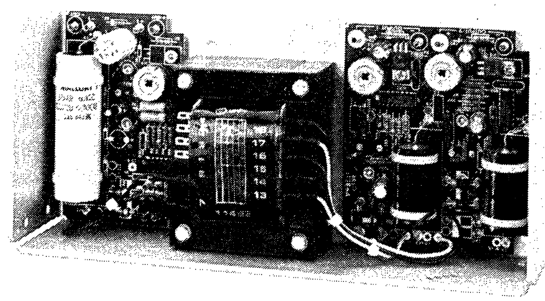
LINEAR POWER SUPPLIES





TRIPLE OUTPUT (9 MODELS)

OUTPUT NO. 1	OUTPUT NO. 2	OUTPUT NO. 3	MODEL	CASE	PRICE 1-9 PIECES
5V @ 2A	+12 TO 15V @ .4/.4A	−12 TO 15V @ .4/.4A	TAA-16W	AA	$ 52.00
3A	1/.8A	1/.8A	BAA-40W	BAA	73.00
3A	3.4/3.0A	3.4/3.0A	CBB-105W	CBB	97.00
6A	1/.8A	1/.8A	TD60W	D	87.00
6A	1.7/1.5A	1.7/1.5A	CBB-75W	CBB	97.00
9A	1.7/1.5A	1.7/1.5A	NBB-90W	NBB	127.00
12A	1.7/1.5A	1.7/1.5A	DBB-105W	DBB	132.00
12A	3.4/3A	3.4/3A	DCC-140W	DBB	152.00
12A	3.4/3A	3.4/3A	DCC-150W	DCC	152.00

DISC DRIVE — PRINTER — 3 & 5 OUTPUT

DISC DRIVE AND PRINTER SERIES — 7 MODELS

OUTPUT NO. 1	OUTPUT NO. 2	OUTPUT NO. 3	MODEL	CASE	PRICE 1-9 PCS
24V, 1.5A (1.7 PK)	5V, 2A	5V, 5A	FBAA-45W	BAA	$ 73.00
24V, 3A (3.5 PK)	5V, 3A	5V, 1A	FCBB-90W	CBB	97.00
24V, 3A (3.5 PK)	5V, 3A	12V, 1.7A	FCBB-512	CBB	97.00
24V, 5A (6A PK)	5V, 3A	5V, 1A	FNBB-140W	NBB	127.00
12V, 1.1A (1.7A PK)	5V, .7A	NA	FAA512	AA	47.00
12V, 4A W/OVP	5V, 2A	NA	FBB512	BB	77.00
12V, 5A (12A PK)	5V, 6A	NA	FD-125	FD	127.00**

* 6A Peak for 20 Seconds, 5% duty cycle at peak rating.

3 & 5 OUTPUT FIXED DISC SERIES — 7 MODELS

OUTPUT NO. 1	OUTPUT NO. 2	OUTPUT NO. 3	OUTPUT NO. 4	OUTPUT NO. 5	MODEL	CASE	PRICE 1-9 PCS
+5V @ 15A	+24V @ 2/4.5 PK	+12V @ .8A	−5V @ .8A	−12V @ 1A	FDBB-149	DBB	$174.00
+5V @ 9A	+24V @ 2/4.5A PK	+12V @ .8A	−5V @ .8A	−12V @ 1A	FNBB-119	NBB	145.00
+5V @ 6A	+24V @ 1.5/4.5A PK	+12V @ .8A	−5V @ .8A	−12V @ .8A	FCBB-89	CBB	***
+5V @ 15A	+24V @ 2/4.5A PK	NA	NA	−5 or −12V @ 1.2A	FDBB-148	DBB	154.00
+5V @ 9A	+24V @ 3.5/5.5A PK	NA	NA	−5 or −12V @ 1.2A	FNBB-120	NBB	127.00
+5V @ 9A	+24V @ 2/4.5A PK	NA	NA	−5 or −12V @ 1.2A	FNBB-118	NBB	127.00
+5V @ 6A	+24V @ 1.5/4.5A PK	NA	NA	−5 or −12V @ .8A	FCBB-88	CBB	***

QUAD OUTPUT MICROPROCESSOR (6 MODELS)

OUTPUT NO. 1	OUTPUT NO. 2	OUTPUT NO. 3	OUTPUT NO. 4	MODEL	CASE	PRICE 1-9 PCS
+5V @ 2A W/OVP	−5V @ .4A*	+12V @ .4A	−12V @ .4A*	MPS-16W	AA	$ 65.00
3A W/OVP	.5A*	1.0A	1.0*	MPS-40W	BAA	85.00
4A	.5A	.5A	.2	MPS-30W	BAA**	***
6A W/OVP	.5A	1.7A W/OVP	1.2 W/OVP	MPS-75W	CBB	***
9A W/OVP	.5A	1.7 W/OVP	1.2 W/OVP	MPS-90W	NBB	***
15A W/OVP	.5A	3.4A W/OVP	2.5 W/OVP	MPS-140W	DBB	152.00

* Total current these outputs must be less than −12V rating. ** Without end flanges, no OVP's on this unit.
OVP on 5V outputs @ 6.2 ±.4 VDC. OVP on 12V outputs @ 15 ±.1 VDC.
*** NON-STOCK: Requires setup fee of $250 per release if less than 50 pieces per order.
No setup fee on orders over 50 pieces with 50 pieces minimum per release.
QUANTITY DISCOUNTS: 10-24 (5%off), 25-49 (10% off), 50-99 (15% off), 100-249 (20% off).

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CONDOR INC.
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LINEAR POWER SUPPLIES

VDE LINEARS (46 MODELS)

MODEL	+5V	+12V	+15V	+24V	+28V	CASE	PR 1-9
SINGLE OUTPUT							
B5-3/OVP-A	3.0A					B	$ 32.00
B12-1.7-A		1.7A				B	32.00
B15-1.5-A			1.5A			B	32.00
B24-1.2-A				1.2A		B	32.00
B28-1-A					1.0A	B	32.00
C5-6/OVP-A	6.0A					C	54.00
C12-3.4-A		3.4A				C	49.00
C15-3-A			3.0A			C	49.00
C24-2.4-A				2.4A		L	49.00
C28-2-A					2.0A	L	49.00
N5-9/OVP-A	9.0A					N	74.00
N12-5.1-A		5.1A				N	69.00
N15-4.5-A			4.5A			N	69.00
N24-3.6-A				3.6A		N	69.00
N28-3-A					3.0A	N	69.00
D5-12/OVP-A	12.0A					D	84.00
D12-6.8-A		6.8A				D	79.00
D15-6-A			6.0A			D	79.00
D24-4.8-A				4.8A		D	79.00
D28-4-A					4.0A	D	79.00
E5-18/OVP-A	18.0A					E	119.00
E12-10.2-A		10.2A				E	109.00
E15-9-A				9.0A		E	109.00
E24-7.2A				7.2A		E	109.00
G5-50/OVP-A							215.00

MODEL	+5V	+12V	+15V	+24V	−5V	−12V	−15V	CASE	PRICE
DUAL OUTPUTS									
AA15-0.8-A		1.0A	or 0.8A		0.4A**	or 1.0	or 0.8A	AA	$ 42.00
BB15-1.5A		1.7A	or 1.5A		0.7A**	or 1.7	or 1.5A	BB	54.00
CC15-3-A		3.4A	or 3.0A			3.4	or 3.0A	CC	87.00
DD15-5/OVP-A		5.0A	or 5.0A			5.0	or 5.0A	E	138.00
AA512-A	2.0A	0.5A*	or 0.5A*					AA	49.00
BB512-A	3.0A	1.25A*	or 1.25*					BB	59.00
CC512-A	6.0A	2.5A*	or 2.5A*					CC	94.00
AA52A-AIM65A	2.0A			.5 (2.5 PK) (unreg.)				AA	52.00
TRIPLE OUTPUTS									
TAA-16W-A	2.0A	0.4A*	or 0.4A		0.4**	or 0.4	or 0.4A	AA	54.00
BAA-40W-A	3.0A	1.0A	or 0.8A		0.4**	or 1.0	or 0.8A	BAA	75.00
TD-60W-A	6.0A	1.0A	or 1.0A		0.4**	or 1.0	or 1.0A	D	89.00
CBB-75W-A	6.0A	1.7A	or 1.5A		0.7**	or 1.7	or 1.5A	CBB	99.00
NBB-90-A	9.0A	1.7A	or 1.5A		0.7**	or 1.7	or 1.5A	NBB	129.00
DBB-105W-A	12.0A	1.7A	or 1.5A		0.7**	or 1.7	or 1.5A	DBB	134.00
DCC-140WA	12.0A	3.4A	or 3.0A			or 3.4A	or 3.0A	DBB	154.00
DCC-150WA	12.0A	3.4A	or 3.0A			or 3.4A	or 3.0A	DCC	154.00
DISK DRIVES									
FNBB-120-A	9.0A			3.5 (5.5 PK)	1.2**	or 1.2A		NBB	129.00
FBB12-A	2.0A	4.0A						NBB	79.00
FBAA45W-A	1.0A			1.5 (1.7 PK)	0.5A			B	75.00
FCBB-90W-A	3.0A			3.0 (3.4 PK)	1.0A			CBB	99.00
FNBB-140W-A	3.0A			5.0 (6.0 PK)	1.0A			NBB	129.00

* 9 to 15V Floating Output ** Requires jumper on PCB for −5V.

The forty-six models in Condor's new INTERNATIONAL SERIES will take care of just about all your needs, and they are *priced lower* than the competition. General specifications are on the front cover. Here are more features:

A MODEL FOR EVERY APPLICATION
Twenty-five singles, seven duals, six triples, six disc drive models, all with industry standard cases.

MEETS INTERNATIONAL REQUIREMENTS
All are designed to meet requirements of IEC, VDE, BPO, CEE and ECMA, and are UL recognized and CSA certified.

WIDEST CHOICE OF INPUT VOLTAGES AND FREQUENCIES

100, 120, 220, 230* and 240 Volt AC, +10%, −13%, 50-440 Hz, which enables them to be used for a wide variety of applications including aircraft and military ground support equipment.

If you don't need international capability, take a look at the rest of this catalog. One of Condor's over 230 other open frame models will surely meet your needs. Call or write the factory, your local Condor representative or distributor (see EEM for Rep./Dist. listings) for the whole story.

* +15%, −10% @ 230 VAC.

TWO YEAR WARRANTY

CONDOR will repair or replace any power supply of its manufacture that does not perform to published specifications as a result of defective materials or workmanship for a period of 2 years from the date of original purchase. No other obligations or liabilities are implied or expressed. Returns must be freight prepaid to CONDOR, INC., 201 FLYNN RD., CAMARILLO, CA 93010.

RETURN POLICY

REPAIRS:

Condor will expeditiously repair and return at no charge to our customers any units that do not meet specifications as a result of defects in materials or workmanship.* A brief memo describing the problem will accompany each shipment.

NO DEFECT:

Approximately 50% of the power supplies returned to Condor do not have a defect. Condor will test. burn-in, torque screws, hipot, and completely retest units in all production test parameters prior to reboxing for shipment. Condor will bill customer $15.00 minimum labor and handling for each NO DEFECT power supply, in addition to appropriate freight charges.

CUSTOMER DAMAGED UNITS:

Condor will submit repair estimates to the customer if these costs exceed 30% of the power supply value. When repair costs are 30% or less, repairs will be made and billed to customer without prior notice.

* Please call factory for RMA # to insure acceptance at Condor receiving.

CONDOR INC.
D.C. POWER SUPPLIES

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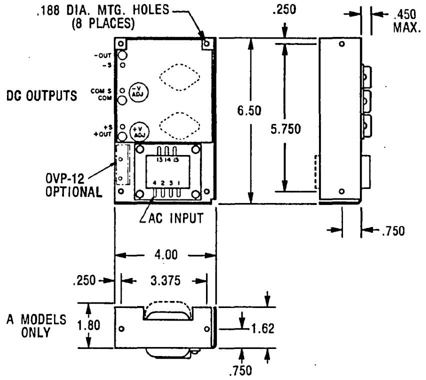
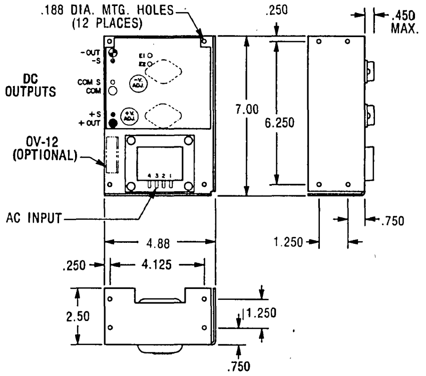
LINEAR POWER SUPPLIES MOUNTING DRAWINGS AND DIMENSIONS

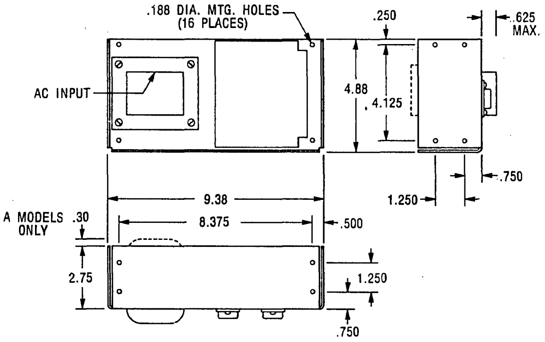
AA UNIT WEIGHT: 2 LBS.


.188 DIA. MTG. HOLES (8 PLACES)
.250
.450 MAX.
DC OUTPUTS
-OUT -S
COM S COM
+S +OUT
+V ADJ
6.50
5.750
OVP-12 OPTIONAL
AC INPUT
.750
4.00
.250
3.375
A MODELS ONLY
1.80
1.62
.750

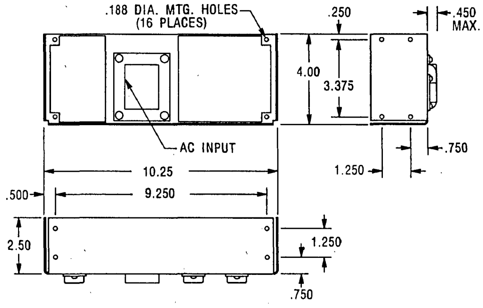
BB UNIT WEIGHT: 4 LBS.


.188 DIA. MTG. HOLES (12 PLACES)
.250
.450 MAX.
DC OUTPUTS
-OUT -S
COM S COM
+S +OUT
+V ADJ
7.00
6.250
OV-12 (OPTIONAL)
AC INPUT
.750
1.250
4.88
.250
4.125
2.50
1.250
.750

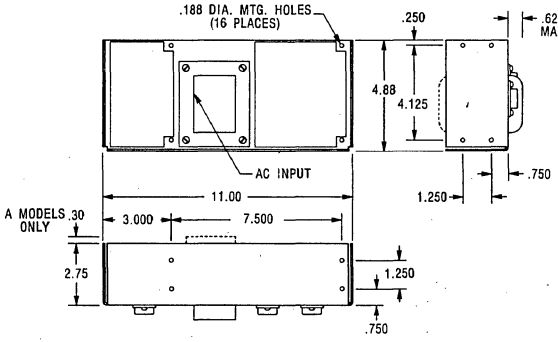
CC UNIT WEIGHT: 7 LBS.


.188 DIA. MTG. HOLES (16 PLACES)
.250
.625 MAX.
AC INPUT
4.88
4.125
.750
1.250
9.38
8.375
.500
A MODELS ONLY .30
2.75
1.250
.750

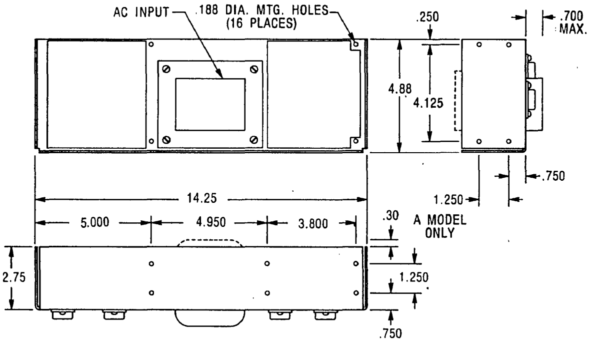
BAA UNIT WEIGHT: 5 LBS.


.188 DIA. MTG. HOLES (16 PLACES)
.250
.450 MAX.
4.00
3.375
AC INPUT
.750
1.250
10.25
.500
9.250
2.50
1.250
.750

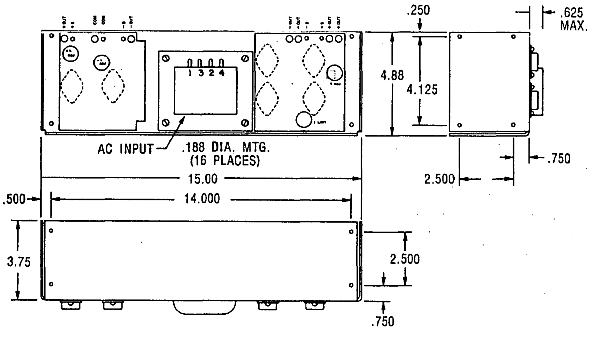
CBB UNIT WEIGHT: 8 LBS.


.188 DIA. MTG. HOLES (16 PLACES)
.250
.625 MAX.
4.88
4.125
AC INPUT
.750
1.250
11.00
A MODELS ONLY .30
3.000
7.500
2.75
1.250
.750

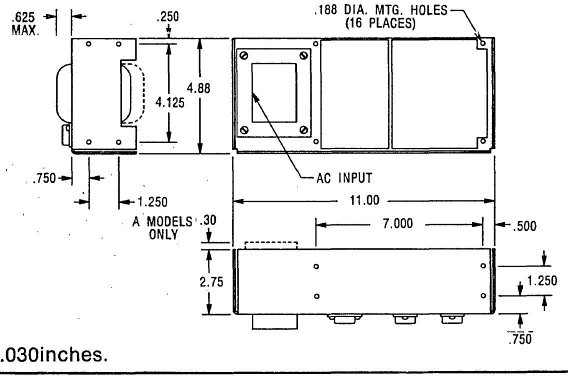
DBB UNIT WEIGHT: 11 LBS.


AC INPUT
.188 DIA. MTG. HOLES (16 PLACES)
.250
.700 MAX.
4.88
4.125
.750
1.250
14.25
5.000
4.950
3.800
.30 A MODEL ONLY
2.75
1.250
.750

DCC UNIT WEIGHT: 12 LBS.


.250
.625 MAX.
4.88
4.125
AC INPUT
.188 DIA. MTG. (16 PLACES)
.750
2.500
15.00
.500
14.000
3.75
2.500
.750

NBB UNIT WEIGHT: 9 LBS.


.625 MAX.
.250
.188 DIA. MTG. HOLES (16 PLACES)
4.88
4.125
AC INPUT
.750
1.250
11.00
A MODELS ONLY .30
7.000
.500
2.75
1.250
.750

NOTE: Internal dimensions +0.010 inches. All other dimensions +0.030inches.

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CONDOR INC.
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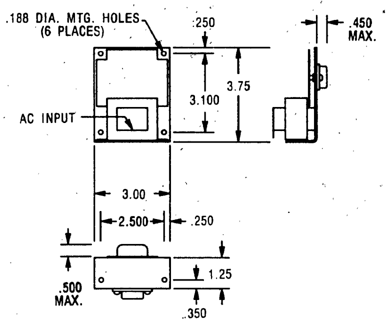
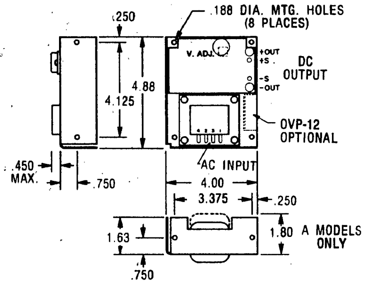
LINEAR POWER SUPPLIES

MOUNTING DRAWINGS AND DIMENSIONS

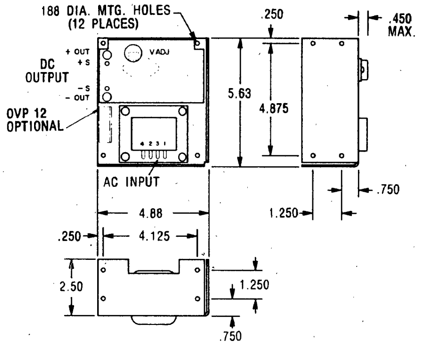
A UNIT WEIGHT: 3 LBS.


.188 DIA. MTG. HOLES (6 PLACES)
.250
.450 MAX.
AC INPUT
3.100
3.75
3.00
2.500
.250
.500 MAX.
1.25
.350

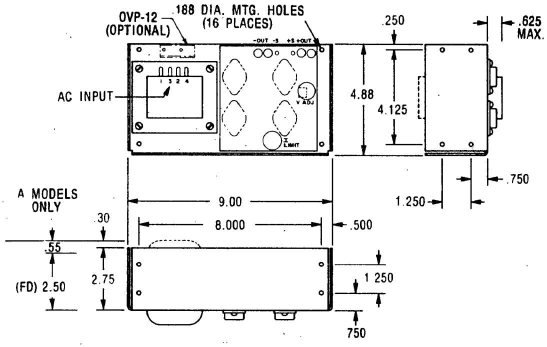
B UNIT WEIGHT: 2 LBS.


.250
.188 DIA. MTG. HOLES (8 PLACES)
V. ADJ.
+OUT
+S
-S
-OUT
DC OUTPUT
4.88
4.125
OVP-12 OPTIONAL
AC INPUT
.450 MAX.
.750
4.00
3.375
.250
1.63
1.80
A MODELS ONLY
.750

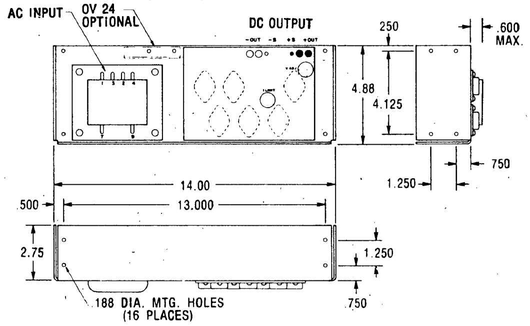
C UNIT WEIGHT: 4 LBS.


188 DIA. MTG. HOLES (12 PLACES)
.250
.450 MAX.
+ OUT
+ S
DC OUTPUT
- S
- OUT
V ADJ
OVP 12 OPTIONAL
5.63
4.875
AC INPUT
.750
1.250
4.88
.250
4.125
2.50
1.250
.750

D & FD UNIT WEIGHT: 7.5 LBS.

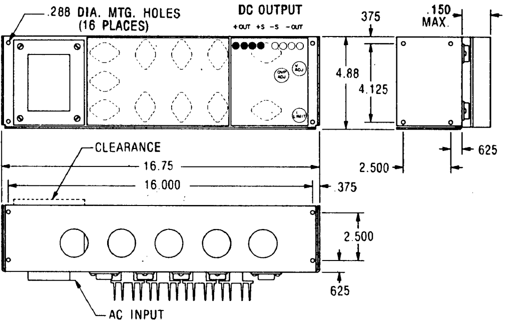

OVP-12 (OPTIONAL)
.188 DIA. MTG. HOLES (16 PLACES)
-OUT -S +S +OUT
.250
.625 MAX.
AC INPUT
V ADJ
I LIMIT
4.88
4.125
.750
1.250
A MODELS ONLY
9.00
8.000
.500
.30
.55
2.75
(FD) 2.50
1 250
750

E UNIT WEIGHT: 10 LBS.

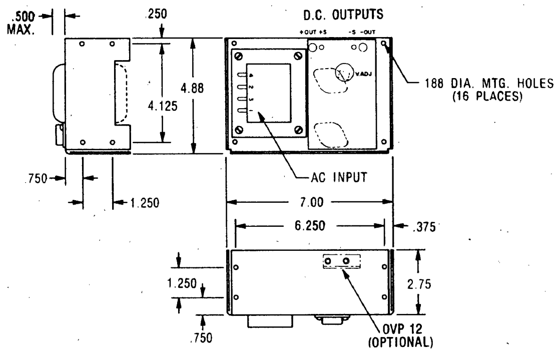

AC INPUT
OV 24 OPTIONAL
DC OUTPUT
-OUT -S +S +OUT
250
.600 MAX.
4.88
4.125
750
1.250
14.00
13.000
.500
2.75
1.250
.188 DIA. MTG. HOLES (16 PLACES)
.750

F & G

UNIT WEIGHT:
F5: 14 LBS.
F15-24: 18 LBS.
G5: 19 LBS.


.288 DIA. MTG. HOLES (16 PLACES)
DC OUTPUT
+OUT +S -S -OUT
375
.150 MAX.
OVP ADJ
I LIMIT
4.88
4.125
625
2.500
CLEARANCE
16.75
16.000
.375
.30
3 50
2.500
625
AC INPUT

N UNIT WEIGHT: 7 LBS.


.500 MAX.
.250
D.C. OUTPUTS
+OUT +S -S -OUT
V ADJ
188 DIA. MTG. HOLES (16 PLACES)
4.88
4.125
AC INPUT
.750
1.250
7.00
6.250
.375
1.250
2.75
.750
OVP 12 (OPTIONAL)

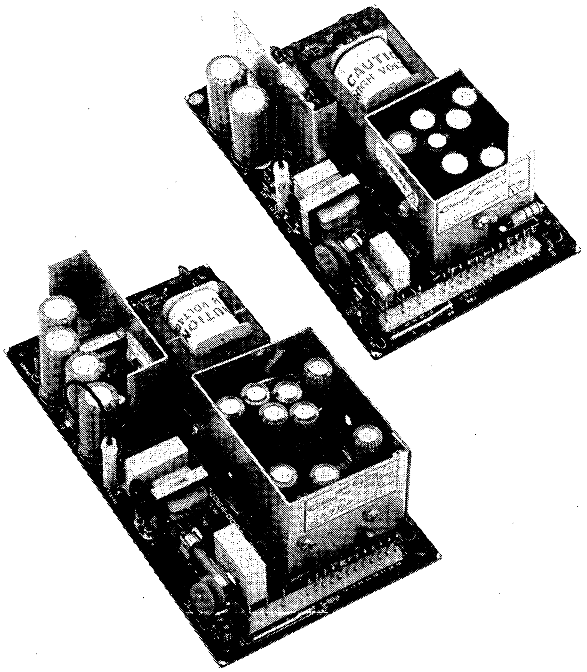
NOTE: Internal dimensions ±0.010 inches. All other dimensions ±0.030 inches.

CONDOR INC.
D.C. POWER SUPPLIES

DC POWER SUPPLIES

OUTSIDE CA DIAL TOLL-FREE
1-800-235-5929

SDM/SDS SERIES



FEATURES

- ☐ 29 Multi Output, 20 Single Output Models — 5 Power Levels, 45 to 200 Watts
- ☐ Meets IEC, VDE, UL, CSA Requirements
- ☐ Meets the Toughest Domestic and International Safety Requirements, 4000 VAC Isolation and All VDE Spacings
- ☐ Meets the Most Stringent Domestic and International EMI Requirements FCC Class B and VDE 0871 Class B (Down to 150 KHz)
- ☐ Choice of Tightly Regulated or High Peak Current Auxiliary Outputs
- ☐ Extremely Versatile Output Configurations for Varied Applications
- ☐ LED "ON" Indicator Simplifies System Troubleshooting
- ☐ Superior light load operating on without audible noise
- ☐ Industry Standard Packages with Extra Power
- ☐ Multi-Output . . . Up to 5 Outputs
- ☐ Powerfail and Logic Inhibit on 140 Watt and 200 Watt Multi-Output Units
- ☐ Worldwide AC Input Ranges 90-132/180-264 VAC.
- ☐ Full Load Burn-In and 2 Year Warranty

SPECIFICATIONS

AC Input:	90-132 VAC or 180 to 264 VAC user selectable. 47-63 Hz single phase.
DC Outputs:	See output rating chart.
Hold Up Time:	20 mS minimum @ full load and nominal input voltage.
Powerfail Signal:	TTL or CMOS compatible signal goes low 8 mS before output drops out of regulation due to loss of AC power. This signal is provided on the SDS140 and SDS200 models only.
Logic Inhibit Input:	The output voltages are inhibited to less than 1.3 VDC when this TTL compatible input is driven high. This input is provided on the SDM/SDS140 and SDM/SDS 200 models only.
Output Regulation: SDM SERIES	See output rating chart for individual output regulation ratings. Regulation ratings shown are for combined line and load variations with the line varied from either 90-132 or 180-264 VAC and the load on the output under test varied from 50% to either 20% or 100% with the other loads held constant at 50%.
SDS SERIES	±.1% for combined line and load variations with the line varied from either 90-132 or 180-264 VAC and the load varied from 5% to 100%.
Minimum Load:	A minimum load is required on the +5V output to maintain proper operation of the other outputs. SDM45: 1A, SDM80: 2A, SDM110: 3A, SDM-140: 4A, SDM200: 6A.
Output Noise and Ripple:	0.3% RMS, 1.0% P-P maximum on all outputs.
Transient Response:	+5V output only. 500 microseconds typical response time for a 50% to 100% or 100% to 50% load change. Maximum voltage deviation: ±4.0%.
Temp. Coefficient:	.03%/°C typical for all outputs.
Overvoltage Protection: SDM Series	Built-in on +5V outputs with firing point set at 6.2V ±0.6V.

Overvoltage Protection: SDS Series	Built in on all units with firing poit set as follows: 5V Units = 6.2V ±0.6V, 12V Units = 14V ± 1.0V, 15V Units = 19V ±1.2V, 24V Units = 28V ±1.5V.
Voltage Adjustment: SDM Series	Built in potentiometer adjusts voltage from 4.5V to overvoltage firing point (6.2V nominal).
SDS SERIES	Built in potentiometer adjusts voltage from −10% of nominal to overvoltage firing point.
Current Limit Adjustment:	Built in potentiometer factory set to begin current limiting at the following peak power outputs minimum under nominal line conditions. SDM45: 58 watts, SDM80: 100 watts, SDM110: 138 watts, SDM 140: 175 watts, SDM-200: 250 watts. SDS units at 125% of rated current.
Efficiency:	70% ±5% depending on model and load distribution. Measured at 100% of rated power.
Overshoot:	No output overshoot on turn-on or turn-off.
Overload Protection:	Fully protected against output overload and short circuit. Automatic recovery after removal of fault.
Reverse Voltage Protection:	All outputs protected against inadvertant application of reverse voltage.
Input Protection:	Internal AC fuse provided on all units.
Inrush Current:	Inrush current is limited by an internal thermistor for maximum protection of input rectifiers.
Temperature Rating:	0 to +50°C at full rated output power with natural convection cooling in a non-restricted environment. For operation in a confined space moving air is recommended. For operation above 50°C it is important that the cooling vs loading profile is such that the heat sinks do not operate above 90°C for extended periods.

CONDOR INC.
D.C. POWER SUPPLIES

DC POWER SUPPLIES

OUTSIDE CA DIAL TOLL-FREE
1-800-235-5929

SDS/SINGLE OUTPUT

OUTPUT RATING CHART

45 WATTS (58W PK) $90.00 @ 1-9 PC; $47.74 @ O.E.M. QTY.

MODEL	VOLTAGE	NOMINAL CURRENT	PEAK CURRENT	1-9 PC PRICE
SDS45-5	5V	9.0A	11.3A	$ 90.00
SDS45-12	12V	3.8A	4.8A	90.00
SDS45-15	15V	3.0A	3.8A	90.00
SDS45-24	24V	1.9A	2.4A	90.00

SIZE: 3.94 x 6.30 x 1.83

80 WATTS (100W PK) $100.00 @ 1-9 PC; $53.49 @ O.E.M. QTY.

SDS80-5	5V	16.0A	20.0A	$100.00
SDS80-12	12V	6.7A	8.4A	100.00
SDS80-15	15V	5.3A	6.6A	100.00
SDS80-24	24V	3.4A	4.3A	100.00

SIZE: 4.25 x 7.75 x 1.90

110 WATTS (138W PK) $125.00 @ 1-9 PC; $65.28 @ O.E.M. QTY.

SDS110-5	5V	22.0A	27.5A	$125.00
SDS110-12	12V	9.2A	11.5A	125.00
SDS110-15	15V	7.3A	9.1A	125.00
SDS110-24	24V	4.6A	5.8A	125.00

SIZE: 4.75 x 8.80 x 1.90

140 WATTS(175W PK) $155.00 @ 1-9 PC; $84.55 @ O.E.M. QTY.

SDS140-5	5V	28.0A	35.0A	$155.00
SDS140-12	12V	11.7A	14.6A	155.00
SDS140-15	15V	9.4A	11.8A	155.00
SDS140-24	24V	5.9A	7.4A	155.00

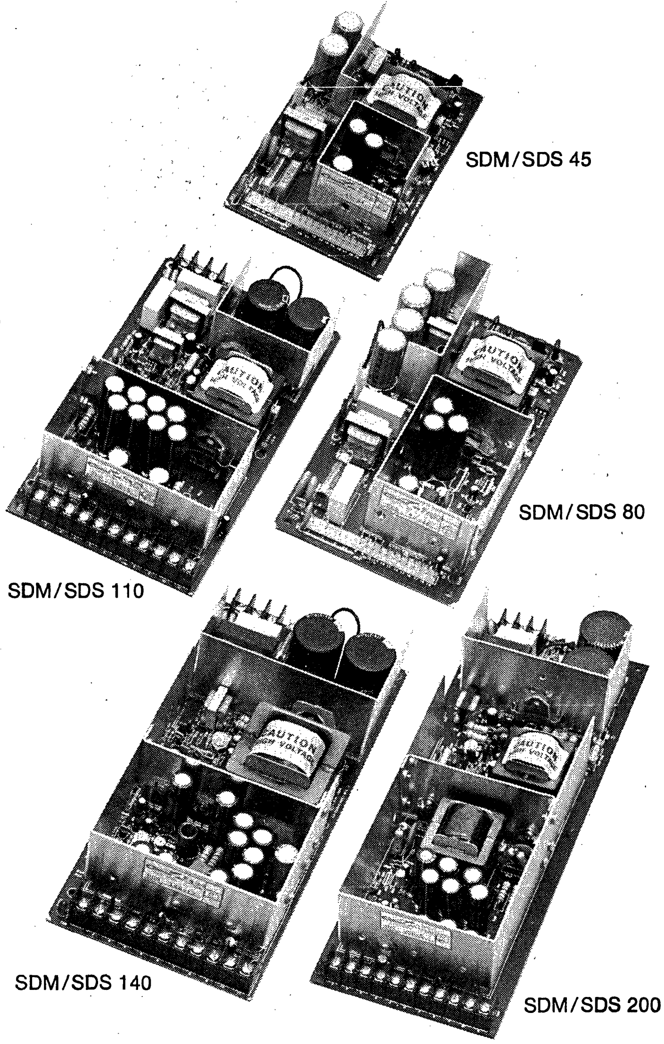
SIZE: 4.75 x 10.3 x 2.20

200 WATTS (250W PK) $180.00 @ 1-9 PC; $95.41 @ O.E.M. QTY.

SDS200-5	5V	40.0A	50.0A	$180.00
SDS200-12	12V	16.7A	20.9A	180.00
SDS200-15	15V	13.4A	16.8A	180.00
SDS200-24	24V	8.4A	10.5A	180.00

SIZE: 4.75 x 12.8 x 2.45

O.E.M. PRICES: 10,000 PC, 1,000 PC Firm Minimum Schedule One Year, Letter of Credit Required.
(Other voltages are available from the factory on special order)



SDM/SDS 45

SDM/SDS 80

SDM/SDS 110

SDM/SDS 140

SDM/SDS 200

INTERNATIONAL SAFETY SPECIFICATIONS

INTERNATIONAL SERIES SAFETY DESIGN PARAMETERS

Safety Spacings:
- Primary to secondary circuitry: 8.0 MM
- Primary to ground circuitry: 4.0 MM
- Secondary to ground circuitry: 4.0 MM

Leakage current:
- Input to ground: 0.5 MA RMS

Dielectric withstanding voltage:
- Input to output: 4000 VAC RMS
- Input to ground: 4000 VAC RMS
- Output to ground: 500 VAC RMS

These safety design parameters meet or exceed the requirements of the following international safety specifications:

BPO STD #26
CEE-10 Part 2, Class 1 & 2
CSA 22.2, No's 143 & 154
ECMA-57, Class 1 & 2
IEC 380, Class 1 & 2
IEC 435, Class 1 & 2
VDE 0730 Part 2P, Class 1 & 2
VDE 0806, Class 1 & 2
UL 478
UL1012

INTERNATIONAL EMI SPECIFICATIONS

INTERNATIONAL SERIES EMI DESIGN PARAMETERS:

All Condor International Series Switching Supplies are designed with built-in EMI filters on the input line to reduce conducted emissions to the following maximum levels.

150 KHz to 450 KHz	54 DB V
450 KHz to 30 MHz	48 DB V

These EMI design parameters meet or exceed the requirements of the following EMI specifications down to 150 KHz:
- FCC 20870, Class A & B
- VDE 0871, Class A & B

The Level B specifications are the most stringent in the industry.

CONDOR INC.
D.C. POWER SUPPLIES

DC POWER SUPPLIES

OUTSIDE CA DIAL TOLL-FREE
1-800-235-5929

SDM/MULTIPLE OUTPUT

VOLTAGE RATING CHARTS

45 WATTS (58W PK) $95.00 @ 1-9 PC; $51.52 @ O.E.M. QTY.

MODEL	VOLTAGE	CURRENT	INITIAL SET-TING (+/−)	OUTPUT REGU-LATION (+/−)	NOTES
SDM45A	+ 5V	5.0A	Adj.	1.5%	B
	+12V	2.0A (4A PK)	3%	1.5%	B
	−12V	1.0A	4%	1.5%	C
SDM45B	+ 5V	5.0A	Adj.	0.5%	A
	+12V	1.0A	4%	1.0%	C
	−12V	1.0A	4%	1.0%	C
SDM45F	+ 5V	5.0A	Adj.	0.5%	A
	+15V	1.0A	4%	1.0%	C
	−15V	1.0A	4%	1.0%	C

SIZE: 6.3 x 3.94 x 1.83

80 WATTS (100W PK) $105.00 @ 1-9 PC; $57.10 @ O.E.M. QTY.

MODEL	VOLTAGE	CURRENT	INITIAL SET-TING (+/−)	OUTPUT REGU-LATION (+/−)	NOTES
SDM80A	+ 5V	9.0A	Adj.	0.5%	A
	+12V	3.0A (5A PK)	3.0%	3.0%	D
	−12V	2.0A	3.0%	3.0%	D
	− 5V	0.6A	4.0%	1.0%	C
SDM80B	+ 5V	9.0A*	Adj.	1.5%	B, F
	+12V	3.0A (5A PK)	3.0%	1.5%	B, F
	−12V	1.0A	4.0%	1.0%	C
	− 5V	0.6A	4.0%	1.0%	C
SDM80C	+ 5V	9.0A	Adj.	0.5%	A
	+12V	1.0A	4%	1.0%	C
	−12V	1.0A	4%	1.0%	C
	− 5V	0.6A	4%	1.0%	C
SDM80E	+ 5V	7.0A	Adj.	0.5%	A
	+15V	3.0A (5A PK)	4%	3.0%	D
	−15V	2.0A	4%	3.0%	D
	− 5V	0.6A	4%	1.0%	C
SDM80F	+ 5V	9.0A	Adj.	0.5%	A
	+15V	1.0A	4%	1.0%	C
	−15V	1.0A	4%	1.0%	C
	− 5V	0.6A	4%	1.0%	C

SIZE: 7.75 x 4.25 x 1.90

110 WATTS (138W PK) $130.00 @ 1-9 PC; $70.83 @ O.E.M. QTY.

MODEL	VOLTAGE	CURRENT	INITIAL SET-TING (+/−)	OUTPUT REGU-LATION (+/−)	NOTES
SDM110A	+ 5V	12.0A	Adj.	0.5%	A
	+12V	3.0A (5A PK)	3%	3.0%	D
	+12V Isolated	3.0A (5A PK)	3%	3.0%	D, E
	−12V	3.0A	3%	3.0%	D
	− 5V	0.6A	4%	1.0%	C
SDM110B	+ 5V	12.0A*	Adj.	1.5%	B, G
	+12V	3.0A*(5A PK)	3%	1.5%	B, G
	+12V Isolated	3.0A (5A PK)	3%	3.0%	D, E
	−12V	1.0A	4%	1.0%	C
	− 5V	0.6A	4%	1.0%	C
SDM110C	+ 5V	12.0A	Adj.	0.5%	A
	+12V	3.0A (5A PK)	3%	3.0%	D
	+12V Isolated	1.0A	4%	1.0%	C, E
	−12V	1.0A	4%	1.0%	C
	− 5V	0.6A	4%	1.0%	C
SDM110D	+ 5V	12.0A	Adj.	0.5%	A
	+12V	3.0A (5A PK)	3%	3.0%	D
	+5V Isolated	3.0A (May be paralleled with +5V for 15A)			E
	−12V	1.0A	4%	1.0%	C
	− 5V	0.6A	4%	1.0%	C
SDM110E	+ 5V	10.A	Adj.	0.5%	A
	+15V	3.0A (5A PK)	4%	3.0%	D
	+15V Isolated	3.0A (5A PK)	4%	3.0%	D, E
	−15V	3.0A	4%	3.0%	D
	− 5V	0.6A	4%	1.0%	C
SDM110F	+ 5V	12.0	Adj.	0.5%	A
	+12V	1.0A	3%	1.0%	D, E
	+12V Isolated	3.0A (5A PK)	4%	3.0%	C
	−15V	1.0A	4%	1.0%	C
	− 5V	0.6A	4%	1.0%	C
SDM110G	+ 5V	12.0A	Adj.	0.5%	A
	+12V	3.0A (5A PK)	3%	3.0%	D
	+24V Isolated	1.5A (3A PK)	5%	3.0%	D, E
	−12V	3.0A	3%	3.0%	D
	− 5V	0.6A	4%	1.0%	C

SIZE: 8.80 x 4.71 x 1.90

O.E.M. PRICES: 10,000 PC. Minimum Firm Schedule One Year.
Letter of Credit Required.

140 WATTS (175W PK) $170.00 @ 1-9 PC; $89.50 @ O.E.M. QTY.

MODEL	VOLTAGE	CURRENT	INITIAL SET-TING (+/−)	OUTPUT REGU-LATION (+/−)	NOTES
SDM140A	+ 5V	15.0A	Adj.	0.5%	A
	+12V	3.0A (5A PK)	3%	3.0%	D
	+12V Isolated	3.0A (5A PK)	3%	3.0%	D, E
	−12V	3.0A	3%	3.0%	D
	− 5V	0.6A	4%	1.0%	C
SDM140B	+ 5V	15.0A	Adj.	1.5%	B, H
	+12V	3.0A*(5A PK)	3%	1.5%	B, H
	+12V Isolated	3.0A (5A PK)	3%	3.0%	D, E
	−12V	1.0A	4%	1.0%	C
	− 5V	0.6A	4%	1.0%	C
SDM140C	+ 5V	15.0A	Adj.	0.5%	A
	+12V	3.0A (5A PK)	3%	3.0%	D
	+12V Isolated	1.0A	4%	1.0%	C, E
	−12V	1.0A	4%	1.0%	C
	− 5V	0.6A	4%	1.0%	C
SDM140D	+ 5V	15.0A	Adj.	0.5%	A
	+12V	3.0A (5A PK)	3%	3.0%	D
	+5V Isolated	6.0A (May be paralleled with +5V for 21A)			D, E
	−12V	1.0A	4%	1.0%	C
	− 5V	0.6A	4%	1.0%	C
SDM140E	+ 5V	12.0A	Adj.	0.5%	A
	+15V	3.0A (5A PK)	4%	3.0%	D
	+15V Isolated	3.0A (5A PK)	4%	3.0%	D, E
	−15V	3.0A	4%	3.0%	D
	− 5V	0.6A	4%	1.0%	C
SDM140F	+ 5V	15.0	Adj.	0.5%	A
	+12V	1.0A	3%	1.0%	D, E
	+12V Isolated	3.0A (5A PK)	4%	3.0%	C
	−15V	1.0A	4%	1.0%	C
	− 5V	0.6A	4%	1.0%	C
SDM140G	+ 5V	15.0A	Adj.	0.5%	A
	+12V	3.0A (5A PK)	3%	3.0%	D
	+24V Isolated	2.5A (4A PK)	5%	3.0%	D, E
	−12V	3.0A	3%	3.0%	D
	− 5V	0.6A	4%	1.0%	C

SIZE: 10.30 x 4.75 x 2.20

200 WATTS (250W PK) $200.00 @ 1-9 PC; $104.22 @ O.E.M. QTY.

MODEL	VOLTAGE	CURRENT	INITIAL SET-TING (+/−)	OUTPUT REGU-LATION (+/−)	NOTES
SDM200A	+ 5V	20.0A	Adj.	0.5%	A
	+12V	5.0A (8A PK)	3%	3.0%	D
	+12V Isolated	5.0A (8A PK)	3%	3.0%	D, E
	−12V	3.0A	3%	3.0%	D
	− 5V	0.6A	4%	1.0%	C
SDM200B	+ 5V	20.0A*	Adj.	1.5%	B, J
	+12V	5.0A*(8A PK)	3%	1.5%	B, J
	+12V Isolated	5.0A (8A PK)	3%	3.0%	D, E
	−12V	1.2A	4%	1.0%	C
	− 5V	0.6A	4%	1.0%	C
SDM200C	+ 5V	20.A	Adj.	0.5%	A
	+12V	5.0A (8A PK)	3%	3.0%	D
	+12V Isolated	1.2A	4%	1.0%	C, E
	−12V	1.2A	4%	1.0%	C
	− 5V	0.6A	4%	1.0%	C
SDM200D	+ 5V	20.0A	Adj.	0.5%	A
	+12V	5.0A (8A PK)	3%	3.0%	D
	+5V Isolated	7.0A (May be paralleled with +5V for 27A)			D, E
	−12V	1.2A	4%	1.0%	C
	− 5V	0.6A	4%	1.0%	C
SDM200E	+ 5V	16.0A	Adj.	0.5%	A
	+15V	5.0A (8A PK)	4%	3.0%	D
	+15V Isolated	5.0A (8A PK)	4%	3.0%	D, E
	−15V	5.0A	4%	3.0%	D
	− 5V	0.6A	4%	1.0%	C
SDM200F	+ 5V	20.0A	Adj.	0.5%	A
	+12V	1.0A	3%	3.0%	D, E
	+15V Isolated	5.0A (8A PK)	4%	1.0%	C
	−15V	1.0A	4%	1.0%	C
	− 5V	0.6A	4%	1.0%	C
SDM200G	+ 5V	20.0A	Adj.	0.5%	A
	+12V	5.0A (8A PK)	3%	3.0%	D
	+24V Isolated	4.0A (6A PK)	5%	3.0%	D, E
	−12V	5.0A	3%	3.0%	D
	− 5V	0.6A	4%	1.0%	C

SIZE: 12.80 x 4.75 x 2.45

NOTES:

A: Full regulated output. Voltage adjustable from 4.5V to OVP trip point. Initial setting of +5.0V is ±1.0%.

B: Dual sensed regulated output. +5V and +12V outputs (*) are sensed in combination to provide tighter regulation of the +12V output. An additional cross regulation factor of ±2.0% must be added in those applications where the main +5V output varies ±25%. Initial setting of +5V output is ±1.0%.

C: Fully regulated output utilizing fixed, 3 terminal regulator.

D: Quasi-regulated output requires 20% minimum load to meet regulation specs. An additional cross regulation factor of ±3% must be added in those applications where the main ±5V output varies ±25%.

E: Fully isolated output. May be connected in series with any output, and may be connected for (−) or (+) output. May be paralleled when same output voltage and reg type. (Quasi-Reg and 3-pin outputs will not share loads if connected together.)

F: The total current for the +5V* and +12V* outputs must not exceed 10A (14A PK).

G: The total current for the +5V* and +12V* outputs must not exceed 13A (17A PK).

H: The total current for the +5V* and +12V* outputs must not exceed 15A (20A PK)

J: The total current for the +5V* and +12V* outputs must not exceed 20A (28A PK).

CONDOR INC.
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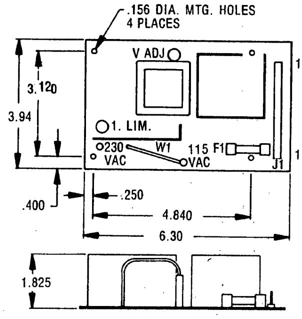
SDM/SDS SERIES
OUTLINE AND MOUNTING NOTE: ALL DIMENSIONS IN INCHES

SDM45/SDS45 WT. 1.1



.156 DIA. MTG. HOLES
4 PLACES
V ADJ
3.120
3.94
19
I. LIM.
230 VAC
W1
115 VAC
F1
J1
1
.400
.250
4.840
6.30
1.825

Input: J1

90-132/180-264 VAC 47-63 Hz

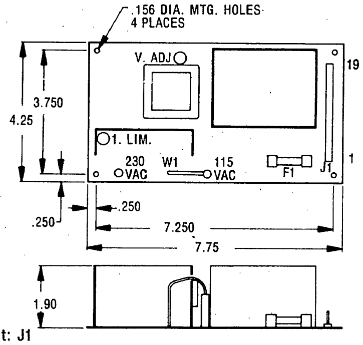
For 90-132 VAC Input Connect W1 to Terminal 115 VAC Fuse F1 at 2.0A

For 180-264 VAC Input Connect W1 to Terminal 230 VAC Fuse F1 at 1.0A

Pin 1)	AC Gnd	J1: Connector – Amp
Pin 2)	Key	P.C.B. Header – P/N 1-85830-9
Pin 3)	AC Hot	Connector Mate – Amp
Pin 4)	Key	Housing P/N 87025-6
Pin 5)	AC Neutral	Housing Receptacle – P/N 102104-3
Pin 6)	Key	Key – P/N 87116-2

Output: J1	SDS45	Output: J1 SDM45
Pin 7)	Key	Key
Pin 8)	N/C	−12 VDC
Pin 9)	N/C	N/C
Pin 10)	−Sense	N/C
Pin 11)	−Output	Common
Pin 12)		Common
Pin 13)		Common
Pin 14)	+Output	+5 VDC
Pin 15)		+5 VDC
Pin 16)		+5 VDC
Pin 17)	+Sense	N/C
Pin 18)	N/C	+12 VDC
Pin 19)	N/C	N/C

SDM80/SDS80 WT. 1.5



.156 DIA. MTG. HOLES
4 PLACES
V. ADJ
3.750
4.25
19
I. LIM.
230 VAC
W1
115 VAC
F1
J1
1
.250
.250
7.250
7.75
1.90

Input: J1

90-132/180-264 VAC 47-63 Hz

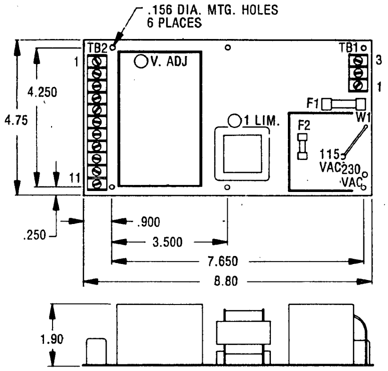
For 90-132 VAC Input Connect W1 to Terminal 115 VAC Fuse F1 at 3.0A

For 180-264 VAC Input Connect W1 to Terminal 230 VAC Fuse F1 at 1.5A

Pin 1)	AC Gnd	J1: Connector – Amp
Pin 2)	Key	P.C.B. Header – P/N 1-85830-9
Pin 3)	AC Hot	Connector Mate – Amp
Pin 4)	Key	Housing P/N 87025-6
Pin 5)	AC Neutral	Housing Receptacle – P/N 102104-3
Pin 6)	Key	Key – P/N 87116-2

Output: J1	SDS80	Output: J1 SDM80
Pin 7)	Key	Key
Pin 8)	N/C	−12 VDC
Pin 9)	N/C	−5 VDC
Pin 10)	−Sense	N/C
Pin 11)	−Output	Common
Pin 12)		Common
Pin 13)		Common
Pin 14)	+Output	+5 VDC
Pin 15)		+5 VDC
Pin 16)		+5 VDC
Pin 17)	+Sense	N/C
Pin 18)	N/C	+12 VDC
Pin 19)	N/C	N/C

SDM110/SDS110 WT. 1.9



.156 DIA. MTG. HOLES
6 PLACES
TB2
TB1
V. ADJ
1
11
3
1
F1
W1
F2
I LIM.
115 VAC
230 VAC
4.250
4.75
.250
.900
3.500
7.650
8.80
1.90

Input: TB1

90-132/180-264 VAC 47-63 Hz

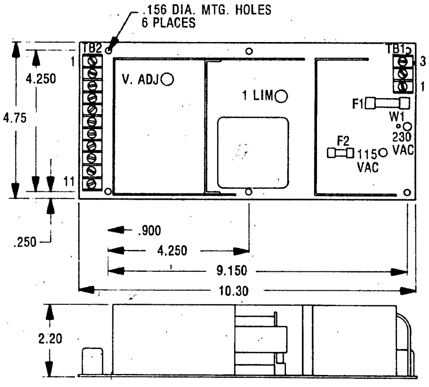
For 90-132 VAC Input Connect W1 to Terminal 115 VAC Fuse F1 at 3.0A

For 180-264 VAC Input Connect W1 to Terminal 230 VAC Fuse F1 at 1.5A

TB1, 2: Terminal Block – .375 Centers 6-32 Screws
1) AC Hot
2) AC Neutral
3) AC Gnd

Output: TB2	SDS110	Output: TB2 SDM110
1)	N/C	N/C
2)	N/C	N/C
3)	N/C	12 VDC + } Isolated Output
4)	+Sense	12 VDC − } Isolated Output
5)	+Output	+12 VDC
6)		+5 VDC
7)		+5 VDC
8)	−Output	Common
9)		Common
10)		−5 VDC
11)	−Sense	−12 VDC

SDM140/SDS140 WT. 2.7



.156 DIA. MTG. HOLES
6 PLACES
TB2
TB1
V. ADJ
1 LIM
1
11
3
1
F1
W1
230 VAC
F2
115 VAC
4.250
4.75
.250
.900
4.250
9.150
10.30
2.20

Input: TB1

90-132/180-264 VAC 47-63 Hz

For 90-132 AC Input Connect W1 to Terminal 115 VAC Fuse F1 at 5.0A

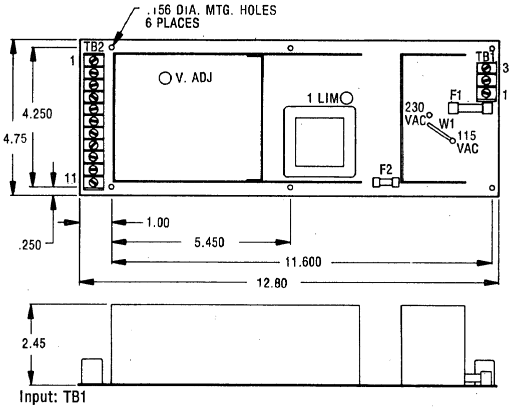
For 180-264 VAC Input Connect W1 to Terminal 230 VAC Fuse F1 at 2.5A

TB1, 2: Terminal Block – .375 Centers 6-32 Screws

1) AC Hot 2) AC Neutral 3) AC Gnd

Output: TB2	SDS140	Output: TB2 SDM140
1)	Logic Inhibit	Logic Inhibit
2)	Power Fail	Power Fail
3)	N/C	12 VDC + } Isolated Output
4)	+Sense	12 VDC − } Isolated Output
5)	+Output	+12 VDC
6)		+5 VDC
7)		+5 VDC
8)	−Output	Common
9)		Common
10)		−5 VDC
11)	−Sense	−12 VDC

SDM200/SDS200 WT. 3.3



.156 DIA. MTG. HOLES
6 PLACES
TB2
TB1
V. ADJ
1 LIM
1
11
3
1
F1
230 VAC
W1
115 VAC
F2
4.250
4.75
.250
1.00
5.450
11.600
12.80
2.45

Input: TB1

90-132/180-264 VAC 47-63 Hz

For 90-132 VAC Input Connect W1 to Terminal 115 VAC Fuse F1 at 5.0A

For 180-264 VAC Input Connect W1 to Terminal 230 VAC Fuse F1 at 2.5A

TB1, 2: Terminal Block – .375 Centers 6-32 Screws

1) AC Hot 2) AC Neutral 3) AC Gnd

Output: TB2	SDS200	Output: TB2 SDM200
1)	Logic Inhibit	Logic Input
2)	Power Fail	Power Fail
3)	N/C	12 VDC + }
4)	+Sense	12 VDC − }
5)	+Output	+12 VDC
6)		+5 VDC
7)		+5 VDC
8)	−Output	Common
9)		Common
10)		−5 VDC
11)	−Sense	−12 VDC

OPTIONS

1. Angle bracket chassis kits (chassis, standoffs, hardware and assembly drawing) are available for the SDM/SDS series to facilitate mounting at right angles to the power supply circuit board surface.

SDM45/SDS45 Series 08-30466-0045	$12.00
SDM80/SDS80 Series 08-30466-0080	$12.00
SDM110/SDS110 Series 08-30466-0110	$12.00
SDM140/SDS140 Series 08-30466-0140	$15.00
SDM200/SDS200 Series 08-30466-0200	$18.00

2. Connector kit (AMP connector with pins) for SDM45/SDS-45 and SDM80/SDS80 units only.

Connector kit 18-30234-2019	$8.00

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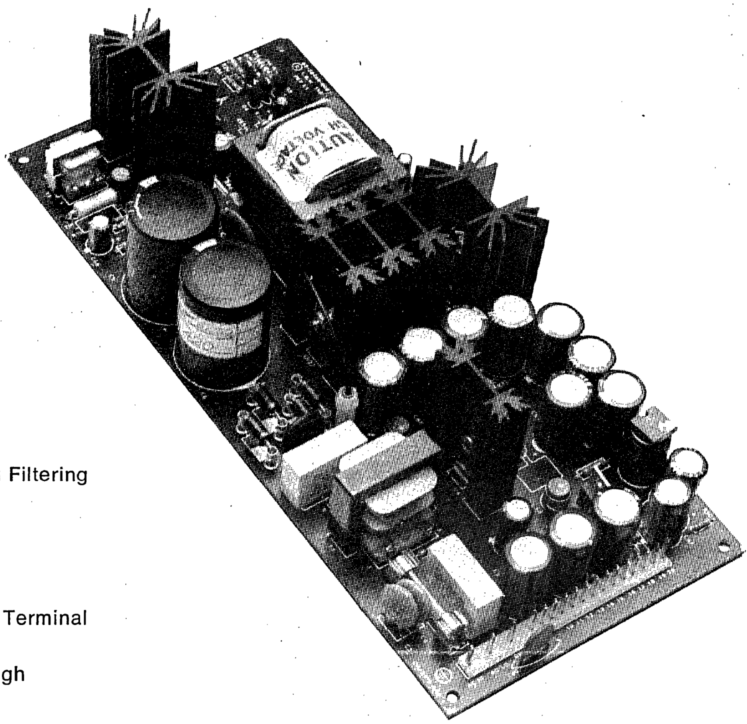
CONDOR'S NEW "VALUE LINE" WORLD STANDARD SWITCHING POWER SUPPLIES



FEATURES

- ☐ 15 Models . . . 3 Power Levels . . . 85 to 125 Watts
- ☐ Multi-Output . . . Up to 5 Outputs
- ☐ Clean, Low Cost, Open Frame Design
- ☐ VDE, IEC, UL, and CSA Construction
- ☐ FCC Class A and VDE 0871 Class A Conducted EMI Filtering
- ☐ Industry Standard Packages with Extra Power
- ☐ Worldwide AC Input Ranges 90-132/180-264 VAC
- ☐ Full Load Burn-In and 2 Year Warranty
- ☐ High Peak Current Disk Drive Outputs as well as 3 Terminal Type Closely Regulated Outputs
- ☐ Extremely Versatile Output Configurations for Tough Applications

SPECIFICATIONS

AC Input:	90-132 VAC or 180 to 264 VAC user selectable. 47-63 Hz single phase.
DC Outputs:	See output rating chart.
Hold Up Time:	20 MS minimum @ full load and nominal input voltage.
Output Regulation:	See output rating chart for individual output regulation ratings. Regulation ratings shown are for combined line and load variations with the line varied from either 90-132 or 180-264 VAC and the load on the output under test varied from 50% to either 20% or 100% with the other loads held constant at 50%.
Minimum Load:	A minimum load is required on the +5V output to maintain proper operation of the other outputs. VFA series: 2A, VHA series: 2.5A, VKA series: 3A. Operation down to no load will not cause damage and the +5V output will generally remain within regulation.
Ouput Noise and Ripple:	0.5% RMS, 1.5% P-P maximum on all outputs.
Transient Response:	+5V output only. 1.0 milliseconds typical response time for a 50% to 100% or 100% to 50% load change. Maximum voltage deviation: 6.0%.
Temp. Coefficient:	0.03% typical for all outputs.
Overvoltage Protection:	Built in on +5V outputs with firing point set at 6.2V ±0.6V

Voltage Adjustment:	Built in potentiometer adjusts voltage from 4.5V to overvoltage firing point (6.2V nominal).
Current Limit Adjustment:	Built in potentiometer factory set to begin current limiting at the following peak power outputs minimum under nominal line conditions. VFA series: 130 watts, VHA series: 140 watts, VKA series: 155 watts.
Efficiency:	70% ±5% depending on model and load distribution. Measured at 100% of rated power.
Overshoot:	No output overshoot on turn on or turn off.
Overload Protection:	Fully protected against output overload and short circuit. Automatic recovery after removal of fault.
Reverse Voltage:	All outputs protected against inadvertant application of reverse voltage.
Input Protection:	Internal AC fuse provided on all units.
Inrush Current:	Inrush current is limited by an internal thermistor for maximum protection of input rectifiers. Peak inrush current averaged over first half cycle = 12A (115 VAC input), 24A (230 VAC input).
Temperature:	0 to +50°C at full rated output power with natural convection cooling in a non-restricted environment. For operation in a confined space moving air is recommended. For operation above 50°C it is important that the cooling versus loading profile is such that the heat sinks do not operate above 100°C for extended periods.

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DC POWER SUPPLIES

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VALUE LINE

OUTPUT RATING CHART

VFA 85 WATTS

(130W PK) $95.00 @ 1-9 PC: $52.80 @ O.E.M. QTY.

MODEL	OUT-PUT	VOLTAGE	CURRENT	INIT. SET-TING (+/−)	OUT-PUT REG. (+/−)	NOTES
VFA420	1	+ 5V	8.0A	Adj.	0.5%	A
	2	+12V	2.5A (4.5A PK)	3.0%	4.0%	B
	3	12V Isolated	2.5A (4.5A PK)	3.0%	4.0%	B, D
	4	−12V	2.5A	3.0%	4.0%	B
VFA421	1	+ 5V	8.0A	Adj.	0.5%	A
	2	+12V	2.5A (4.5A PK)	3.0%	4.0%	B
	3	12V Isolated	2.5A (4.5A PK)	3.0%	4.0%	B, D
	4	− 5V	2.5A	3.0%	4.0%	B
VFA423	1	+ 5V	6.0A	Adj.	0.5%	A
	2	+15V	2.5A (3.5A PK)	3.0%	4.0%	B
	3	12V Isolated	2.5A (3.5A PK)	3.0%	4.0%	B, D
	4	− 5V	2.5A	3.0%	4.0%	B
VFA430	1	+ 5V	8.0A	Adj.	0.5%	A
	2	+12V	2.5A (4.5A PK)	3.0%	4.0%	B
	3	24V Isolated	2.0A (4.5A PK)	5.0%	4.0%	B, D
	4	−12V	2.5A	3.0%	4.0%	B

SIZE: 4.25 x 7.75 x 1.90

VHA 100 WATTS

(140W PK) $115.00 @ 1-9 PC: $62.88 @ O.E.M. QTY.

VHA420	1	+ 5V	10.0A	Adj.	0.5%	A
	2	+12V	3.0A (4.5A PK)	3.0%	4.0%	B
	3	12V Isolated	3.0A (4.5A PK)	3.0%	4.0%	B, D
	4	−12V	2.0A	3.0%	4.0%	B
	5	− 5V	0.5A	4.0%	1.0%	C
VHA423	1	+ 5V	7.0A	Adj.	0.5%	A
	2	+15V	2.5A (4.0A PK)	3.0%	4.0%	B
	4	−15V	2.5A (4.0A PK)	3.0%	4.0%	B
	5	− 5V	0.2A	4.0%	1.0%	C
VHA426	1	+ 5V	10.0A	Adj.	0.5%	A
	2	+12V	3.0A (4.5A PK)	3.0%	4.0%	B
	3	12V Isolated	1.0A	4.0%	1.0%	C, D
	4	−12V	1.0A	4.0%	1.0%	C
	5	− 5V	0.2A	4.0%	1.0%	C
VHA427	1	+ 5V	10.0A	Adj.	0.5%	A
	2	+12V	3.0A (4.5A PK)	3.0%	4.0%	B
	3	15V Isolated	1.0A	4.0%	1.0%	C, D
	4	−15V	1.0A	4.0%	1.0%	C
	5	− 5V	0.2A	4.0%	1.0%	C
VHA428	1	+ 5V	13.0A	Adj.	0.5%	A
	3	12V Isolated	3.0A (4.5A PK)	3.0%	4.0%	B, D
	4	−12V	2.0A	3.0%	4.0%	B
	5	− 5V	0.5A	4.0%	1.0%	C
VHA430	1	+ 5V	10.0A	Adj.	0.5%	B
	2	+12V	3.0A (4.5A PK)	3.0%	4.0%	B
	3	24V Isolated	2.5A (4.5A PK)	5.0%	4.0%	B, D
	4	−12V	2.0A	3.0%	4.0%	B
	5	− 5V	0.5A	4.0%	1.0%	C

SIZE: 4.6 x 8.40 x 2.20

VKA 125 WATTS

(155W PK) $125.00 @ 1-9 PC: $68.21 @ O.E.M. QTY.

MODEL	OUT-PUT	VOLTAGE	CURRENT	INIT. SET-TING (+/−)	OUT-PUT REG. (+/−)	NOTES
VKA420	1	+ 5V	15.0A	Adj.	0.5%	A
	2	+12V	4.0A (6.0A PK)	3.0%	4.0%	B
	3	12V Isolated	3.0A	3.0%	4.0%	B, D
	4	−12V	3.0A	3.0%	4.0%	B
	5	− 5V	0.5A	4.0%	1.0%	C
VKA423	1	+ 5V	10.A	Adj.	0.5%	A
	2	+15V	3.0A (4.0A PK)	3.0%	4.0%	B
	4	−15V	3.0A (4.0A PK)	3.0%	4.0%	B
	5	− 5V	0.4A	4.0%	1.0%	C
VKA426	1	+ 5V	15.0A	Adj.	0.5%	A
	2	+12V	4.0A (6.0A PK)	3.0%	4.0%	B
	3	12V Isolated	1.0A	4.0%	1.0%	C, D
	4	−12V	1.0A	4.0%	1.0%	C
	5	− 5V	0.2A	4.0%	1.0%	C
VKA427	1	+ 5V	15.0A	Adj.	0.5%	A
	2	+12V	4.0A (6.0A PK)	3.0%	4.0%	B
	3	15V Isolated	1.0A	4.0%	1.0%	C, D
	4	−15V	1.0A	4.0%	1.0%	C
	5	− 5V	0.2A	4.0%	1.0%	C
VKA430	1	+ 5V	15.0A	Adj.	0.5%	A
	2	+12V	4.0A (6.0A PK)	3.0%	4.0%	B
	3	24V Isolated	3.0A (4.5A PK)	5.0%	4.0%	B, D
	4	−12V	3.0A	3.0%	4.0%	B
	5	− 5V	0.5A	4.0%	1.0%	C

SIZE: 4.6 x 10.4 x 2.20

NOTES:

A: Fully regulated output. Voltage adjustable from 4.5V to OVP trip point. Initial setting of +5.0V is ±1.0%.

B: Quasi-Regulated output requires 20% minimum load to meet regulation specs. An additional cross regulation factor of ±3.0% must be added in those applications where the main +5V output varies ±25%.

C: Fully regulated output utilizing fixed, 3 terminal regulator.

D. Fully isolated output. May be connected in series with +12V output for +24V applications. May be connected in parallel with +12V output for higher current applications such as powering multiple disk drives.

INTERNATIONAL SAFETY AND EMI SPECIFICATIONS

SAFETY SPECIFICATIONS: All models are designed to meet the following safety specifications: UL478, UL1012, CSA 22.2 No's 143 & 154, IEC 380 Class 1 & 2, IEC 435 Class 1 & 2, VDE 0730. Part 2P Class 1 & 2, VDE 0806 Class 1 & 2, VDE 0805 proposed.

EMI SPECIFICATIONS: All "V" series models are designed with built in EMI filters to meet or exceed the conducted emissions requirements of FCC 20870, Class A, and VDE 0871, Class A.

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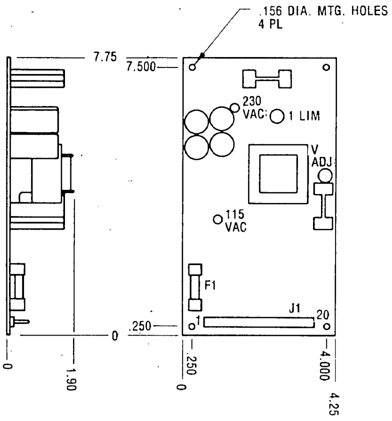
VALUE LINE
OUTLINE AND MOUNTING

NOTE: ALL DIMENSIONS IN INCHES

VFA

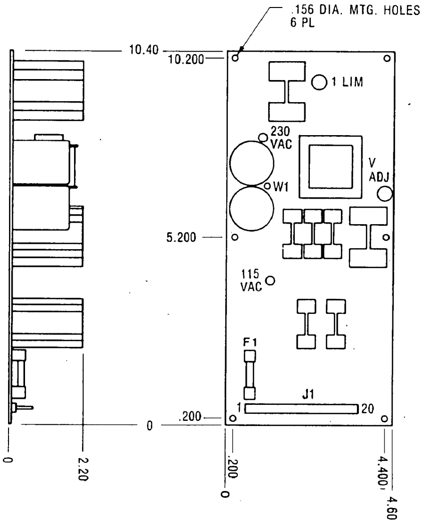
WT. 1.5 LBS.



Input: J1
90-132/180-264 VAC 47-63 Hz
For 90-132 VAC Input Connect
W1 to Terminal 115 VAC
Fuse F1 at 3.0A
For 180-264 VAC Input Connect
W1 to Terminal 230 VAC
Fuse F1 at 1.5A
Pin 1) AC Hot
Pin 2) N/C
Pin 3) AC Neutral
Pin 4) N/C
Pin 5) AC Gnd
Output: J1
Pin 6) Key
Pin 7) NC
Pin 8) Common
Pin 9) Output #4 (−)
Pin 10) Common
Pin 11) Output #3 (RTN)
Pin 12) Output #3 (+)
Pin 13) Common
Pin 14)
Pin 15)} Output #2 (+)
Pin 16)
Pin 17)} Common
Pin 18)
Pin 19)} Output #1 (+)
Pin 20)
J1: Connector
Amp P.C.B. Header –
P/N 87025-8
Mating Connector
Amp Housing P/N 87025-8
Crimp Receptable P/N 102103-3
Key – P/N 87116-2
Weight: 1.2

VKA

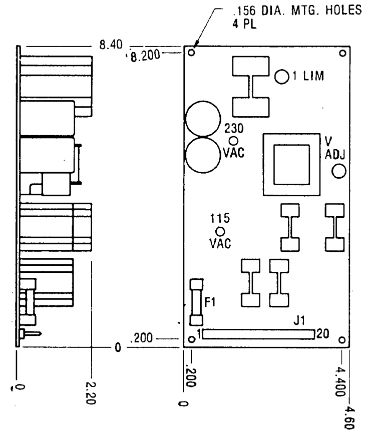
WT. 1.9 LBS.



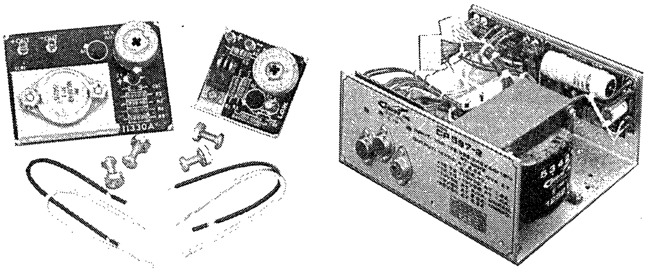
Input: J1
90-132/180-264 VAC
47-63 Hz
For 90-132 VAC Input
Connect W1 to Terminal
115 VAC Fuse F1
at 5.0A
For 180-264 VAC Input
Connect W1 to Terminal
230 VAC Fuse F1
at 2.5A
Pin 1) AC Hot
Pin 2) N/C
Pin 3) AC Neutral
Pin 4) N/C
Pin 5) AC Gnd
Output: J1
Pin 6) Key
Pin 7) Output #4 (−)
Pin 8) Common
Pin 9) Output #5 (−)
Pin 10) Common
Pin 11) Output #3 (RTN)
Pin 12) Output #3 (+)
Pin 13) Common
Pin 14)
Pin 15)} Output #2 (+)
Pin 16)
Pin 17)} Common
Pin 18)
Pin 19)} Output #1 (+)
Pin 20)
J1: Connector
Amp P.C.B. Header –
P/N 2-85830-0
Mating Connector
Amp Housing P/N 87025-8
Crimp Receptacle
P/N 102103-3
Key – P/N 87116-2
Weight: 1.9

VHA

WT. 1.6 LBS.



Input: J1
90-132/180-264 VAC 47-63 Hz
For 90-132 VAC Input Connect
W1 to Terminal 115 VAC
Fuse F1 at 3.0A
For 180-264 VAC Input Connect
W1 to Terminal 230 VAC
Fuse F1 at 1.5A
Pin 1) AC Hot
Pin 2) N/C
Pin 3) AC Neutral
Pin 4) N/C
Pin 5) AC Gnd
Output: J1
Pin 6) Key
Pin 7) Output #4(−)
Pin 8) Common
Pin 9) Output #5 (−)
Pin 10) Common
Pin 11) Output #3 (RTN)
Pin 12) Output #3 (+)
Pin 13) Common
Pin 14)
Pin 15)} Output #2 (+)
Pin 16)
Pin 17)} Common
Pin 18)
Pin 19)} Output #1 (+)
Pin 20)
J1: Connector
Amp P.C.B. Header –
P/N 85830-0
Mating Connector
Amp Housing P/N 87025-8
Crimp Receptable P/N 102103-3
Kev – P/N 87116-2
Weight: 1.6



SPECIAL PRODUCTS

OVP modules are available for use on any output not provided with Built-in OVP. Mounting holes are provided to accommodate these modules within the outline and mounting dimensions of each Power Supply. OVP-24 is used on E and F Models, OVP-12, is used on all other units. One OVP-12 protects both outputs on ±12V and ±15V supplies.

CUSTOM DESIGNS AND MODIFIED STANDARDS

The CONDOR design team is ready to help solve your power supply problems with custom designs or modified standards, either linear or switching. Call CONDOR or our local representatives for fast, expert assistance.

OPTIONS

1. An angle bracket chassis is available for all models to facilitate mounting at right angles to the power supply circuit board surface.
   VFA Series P/N 08-30466-0085 .... $10.00
   VHA Series P/N 08-30466-0100 .... $12.00
   VKA Series P/N 08-30466-0125 .... $14.00
2. A mating AMP connector with pins is available for all models: Condor P/N 18-30234-2020, Price $8.00.

CONDOR INC.
D.C. POWER SUPPLIES

CONVERTER CONCEPTS

THE LEADER IN WORLDWIDE SWITCHER TECHNOLOGY

Industrial Parkway, Pardeeville, WI 53954, Phone 608/429-2144, Twx 910-280-2630

15 TO 165 WATT SWITCHING POWER SUPPLIES AND UPS • ULTRA-WIDE INPUT RANGES • ALL WORLD VOLTAGES

The Company and the Product

Converter Concepts, Inc. specializes in switching power supplies with ultra-wide inputs for truly worldwide use in a variety of OEM markets. Our mission is to design, manufacture and market switchers and uninterruptible power supplies (UPS) of the utmost quality, efficiency, and reliability. . . *a component in which you can have complete confidence.*

Converter Concepts has been producing switching power supplies since 1976. We are the **only** producer of 15 to 165 watt switching power supplies that operate **continuously** on any voltage worldwide from 90 to 265 VAC or 10 to 40 VDC and 20 to 60 VDC — **without the switches, jumpers, taps or other modifications needed by other switchers.** And we offer AC-to-DC and DC-to-DC converters in the same type of compact package.

Automatic Continuous Compensation

CCI's unique **Versatron** converter circuit automatically compensates for extremely wide input variations while maintaining constant output voltage. Input voltage variations as much as 5:1 can be accommodated by employing this versatile approach.

Terms of Sale

10% of Net in 20 days. 90% of Net in 30 days. Applicable taxes extra.

F.O.B. Shipping Point.

Converter Concepts, Inc. reserves the right to change specifications without notice.

How to Order

The charts on this page *demonstrate* the CCI ordering system. To create a part number, replace all the "Xs" in the chart (below left) with numbers and letters derived from *series specific power supply listings and option charts.* Orders may be placed through CCI sales representatives or factory direct.

Note: Not all options are available on all series. Confirm option codes through your area sales representative or the factory.

Sample Part Number

VT100-243-10/EL

Orders: Standard series, 100 watts, dual output, +5V @ 2.4 - 12A +12V @ .05 - 3A, 20-60 VDC input enclosed frame, terminal block.

With these options: Remote sense, logic shutdown, reverse polarity protection, thermal shutdown.

Series	Total Power	—	No. of Outputs	Output Range	Input	—	Package	Termination	/	Group 1 Options	Group 2 Options
X	X	—	X	X	X	—	X	X	/	X	X
VT Standard **VX** Heat Sink (open frame only) **VI** International **VF** Failsafe **LS/VT** Compatible UPS	15 25 50 65 75 100 120 165 25 75 100		1 2 3 4 See series specific output charts	2 4 5 6 7 8 See series specific output charts	1 2 3 4 5 See series specific input charts		0 Open Frame 1 Enclosed 2 P.C. Board	0 Terminal Block 1 Square Pin 2 Wire Holes Only		A B C D E F G H I J K See group 1 charts	A B C D E F G H I J K L M N O See group 2 charts
			Comprises Model No.								

GROUP 1 OPTIONS	Remote Sense	Logic Shut-down	Over Voltage Protection	Power Fail Detect
A	●			
B		●		
C			●	
D				●
E	●	●		
F	●		●	
G	●			●
H		●	●	
I		●		●
J	●	●	●	
K	●	●		●
X	NO OPTIONS			

GROUP 2 OPTIONS	Rug-gedized	Reverse Polarity Protection	Thermal Shut-down	LS/VT UPS
A	●			
B		●		
C			●	
D				●
E	●	●		
F	●		●	
G	●			●
H	●	●		●
I	●		●	●
J	●	●	●	
K	●	●	●	●
L		●	●	
M		●		●
N		●	●	●
O			●	●
X	NO OPTIONS			

Input Chart

Input	AC		DC
1	90-265	or	100-380
2			10-40
3			20-60
4	90-265	&	20-60
5	90-265	&	80-140

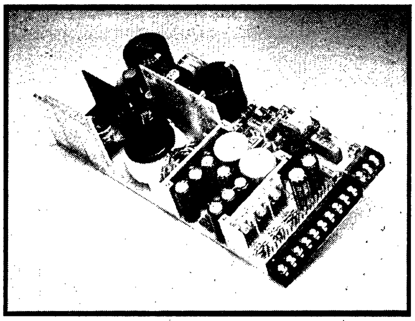
VT/VX 15, 25, 50: Type 1, 2, 3 inputs available
VT/VX 75, 100: Type 1, 3 inputs available
VI 65, 120, 165: Type 1 input available
VF 65, 100: Type 4, 5 inputs available

CONVERTER CONCEPTS

THE LEADER IN WORLDWIDE SWITCHER TECHNOLOGY

Industrial Parkway, Pardeeville, WI 53954, Phone 608/429-2144, Twx 910-280-2630

VI SERIES SWITCHERS • NEW PRODUCT • VERSATRON INTERNATIONAL



Features

- Open and Enclosed Package
- Meets International Safety Standards
- Ultra-Wide Input Range
- Up to Four Outputs

Specifications Common to VI Series

Efficiency AC Input:
Single Output: 80% Typical 70% Min.
Multiple Output: 75% Typical 65% Min.

Safety Standards: Meets UL 478, 1012; VDE 0804, 0806, Class I SELV; IEC 380

Turn-On Overshoot: None

Turn-On Time: 200 msec.

Turn-Off Overshoot: None

Ripple: All Outputs 2X Line Frequency. 15 mV pk-pk Max. 20 kHz 15 mV pk-pk Max.

Switching Noise: 2 MHz @ 20 kHz Rep. Rate. 50 mV pk-pk Max.

Isolation & Spacing: Input to Output:
Hipot: 2500 VAC. Creepage Spacing: 8 mm

Input to Case (Chassis):
Hipot: 2500 VAC. Creepage Spacing: 4 mm

Output to Case (Chassis):
Hipot: 500 VAC. Creepage Spacing: 2 mm

Short Circuit Protection: Current limited for overload and short circuit protection. Normal operation returns upon removal of overload.

Temperature Coefficient: 0.02%/°C

Multiple Output Regulation Specifications:
Regulation: Line, All Outputs: 0.1%
Regulation: Load, Output No. 1:
0 Load - Full Load 2%; 20% Load - Full Load 0.5%

Note: Output No. 1 must have a minimum load of 20% of full load for all other outputs to maintain regulation.

All Other Outputs: 0 Load - Full Load 1.0% to 1.5A; greater than 1.5A, 2.0%

VI 65 Specifications, Input and Output Ranges

Turn-On Surge Current: AC Input 5A Max.

Hold-Up Time: 90 VAC Input (low line) 9 msec. 115 VAC Input (nominal line) 16 msec. 250 VAC Input 140 msec.

Operating Temp: −20°C to +80°C Base Plate Full Load. −20°C to +55°C Free Air Full Load. Derate linearly to 50% output at 80°C.

Weight: 2.7 lbs. (1.23 kg.)

Size: 2.25" x 4.75" x 9"
57.2 x 120.7 x 228.6 mm

INPUT VOLTAGE RANGE (SERIES SPECIFIC)

Input	AC	DC	Freq. in Hz
1	90-265	100-380	44-440

OUTPUT RANGE (SERIES SPECIFIC)

Model No.	Output	Volts	Amps	Adjustment
14	V1	+5	0-12	+20 −5%
15	V1	+12	0-5	+20 −5%
16	V1	+15	0-4.5	+20 −5%
17	V1	+24	0-2.5	+20 −5%
18	V1	+48	0-1.5	+20 −5%
22	V1	+5	2.4-12	+20 −5%
	V3	−5	.05-1	±5% Fixed
24	V1	+5	1.4-7	+20 −5%
	V2	+12	.05-2.5	±5% Fixed
26	V1	+12	.7-3.5	+20 −5%
	V3	−12	.05-1.5	±5% Fixed
27	V1	+15	.5-2.5	+20 −5%
	V3	−15	.05-1.5	±5% Fixed
32	V1	+5	1-5	+20 −5%
	V2	+12	.05-2.5	±5% Fixed
	V3	−5	.05-1	±5% Fixed
34	V1	+5	1.6-8	+20 −5%
	V2	+12	.05-1	±5% Fixed
	V3	−12	.05-1	±5% Fixed
37	V1	+5	1.6-8	+20 −5%
	V2	+15	.05-1	±5% Fixed
	V3	−15	.05-1	±5% Fixed
44	V1	+5	1.4-7	+20 −5%
	V2	+12	.05-1	±5% Fixed
	V3	−12	.05-1	±5% Fixed
	V4	−5	.05-1	±5% Fixed
45	V1	+5	1-5	+20 −5%
	V2	+12	.05-.5	±5% Fixed
	V3	−12	.05-.5	±5% Fixed
	V4	+24	.05-1	±5% Fixed

VI 120 Specifications, Input and Output Ranges

Turn-On Surge Current: AC Input 8A Max.

Hold-Up Time: 90 VAC Input (low line) 9 msec. 115 VAC Input (nominal line) 16 msec. 250 VAC Input 120 msec.

Operating Temp: −20°C to +80°C Base Plate Full Load. −20°C to +45°C Free Air Full Load. Derate linearly to 50% output at 80°C.

Weight: 3.0 lbs (1.36 kg)

Size: 3" x 4.75" x 9"
76.2 x 120.7 x 228.6 mm.

INPUT VOLTAGE RANGE (SERIES SPECIFIC)

Input	AC	DC	Freq. in Hz
1	90-265	100-380	44-440

OUTPUT RANGE (SERIES SPECIFIC)

Model No.	Output	Volts	Amps	Adjustment
14	V1	+5	0-20	+20 −5%
15	V1	+12	0-10	+20 −5%
16	V1	+15	0-8	+20 −5%
17	V1	+24	0-5	+20 −5%
18	V1	+48	0-2.5	+20 −5%
24	V1	+5	2.4-12	+20 −5%
	V2	+12	.05-5	±5% Fixed
26	V1	+12	1-5	+20 −5%
	V3	−12	.05-5	±5% Fixed
27	V1	+15	.8-4	+20 −5%
	V3	−15	.05-4	±5% Fixed
34	V1	+5	2.4-12	+20 −5%
	V2	+12	.05-2.5	±5% Fixed
	V3	−12	.05-1.5	±5% Fixed
37	V1	+5	2.4-12	+20 −5%
	V2	+15	.05-2.5	±5% Fixed
	V3	−15	.05-1.5	±5% Fixed
44	V1	+5	2.4-12	+20 −5%
	V2	+12	.05-2.5	±5% Fixed
	V3	−12	.05-1.5	±5% Fixed
	V4	−5	.05-1.5	±5% Fixed
45	V1	+5	2-10	+20 −5%
	V2	+12	.05-1	±5% Fixed
	V3	−12	.05-1	±5% Fixed
	V4	+24	.05-2	±5% Fixed
46	V1	+24	.6-3	+20 −5%
	V2	+12	.05-1	±5% Fixed
	V3	−12	.05-1	±5% Fixed
	V4	+5	.05-3	±5% Fixed
47	V1	+5	2-10	+20 −5%
	V2	+15	.05-1	±5% Fixed
	V3	−15	.05-1	±5% Fixed
	V4	+24	.05-1.8	±5% Fixed
48	V1	+48	.3-1.5	+20 −5%
	V2	+12	.05-1	±5% Fixed
	V3	−12	.05-1	±5% Fixed
	V4	+5	.05-3	±5% Fixed

VI 165 Specifications, Input and Output Ranges

Turn-On Surge Current: AC Input 10A Max.

Hold-Up Time: 90 VAC Input (low line) 9 msec. 115 VAC Input (nominal line) 15 msec. 250 VAC Input 120 msec.

Operating Temp: −20°C to +80°C Base Plate Full Load. −20°C to +45°C Free Air Full Load. Derate linearly to 50% output at 80°C.

Weight: 3.5 lbs. (1.59 kg)

Size: 3" x 5.25" x 10"
76.2 x 133.4 x 254 mm

Reference only;
Release pending

INPUT VOLTAGE RANGE (SERIES SPECIFIC)

Input	AC	DC	Freq. in Hz
1	90-265	100-380	44-440

OUTPUT RANGE (SERIES SPECIFIC)

Model No.	Output	Volts	Amps	Adjustment
24	V1	+5	4-20	+20 −5%
	V2	+12	.05-5	+20 −5%
25	V1	+5	4-20	+20 −5%
	V2	+15	.05-4	±5% Fixed
26	V1	+5	4-20	+20 −5%
	V2	+24	.05-2.5	±5% Fixed
27	V1	+15	1.2-6	+20 −5%
	V3	−15	.05-5	±5% Fixed
28	V1	+12	1.4-7	+20 −5%
	V3	−12	.05-7	±5% Fixed
34	V1	+5	3-15	+20 −5%
	V2	+12	.05-5	±5% Fixed
	V3	−12	.05-2.5	±5% Fixed
37	V1	+5	3-15	+20 −5%
	V2	+15	.05-3	±5% Fixed
	V3	−15	.05-3	±5% Fixed
44	V1	+5	2-15	+20 −5%
	V2	+12	.05-2.5	±5% Fixed
	V3	−12	.05-1.5	±5% Fixed
	V4	−5	.05-3	±5% Fixed
45	V1	+5	3-15	+20 −5%
	V2	+12	.05-1.5	±5% Fixed
	V3	−12	.05-1	±5% Fixed
	V4	+24	.05-2.5	±5% Fixed
47	V1	+5	3-15	+20 −5%
	V2	+15	.05-1	±5% Fixed
	V3	−15	.05-1	±5% Fixed
	V4	+24	.05-2.5	±5% Fixed
48	V1	+48	.4-2	+20 −5%
	V2	+12	.05-1.5	±5% Fixed
	V3	−12	.05-1.5	±5% Fixed
	V4	+5	.05-3	±5% Fixed

CONVERTER CONCEPTS

THE LEADER IN WORLDWIDE SWITCHER TECHNOLOGY

Industrial Parkway, Pardeeville, WI 53954, Phone 608/429-2144, Twx 910-280-2630

VT & VX SERIES SWITCHERS

VT 15 & VX 15 Specs

Turn-On Surge Current: AC Input 10A Max.

Hold-Up Time: 90 VAC Input (low line) 9 msec. 115 VAC Input (nominal line) 16 msec. 250 VAC Input 104 msec.

Operating Temp: −20°C to +80°C Base Plate Full Load. −20°C to +55°C Free Air Full Load. Derate linearly to 50% output at 80°C.

Weight: 1.2 lbs. (0.54 kg)

Size: VT 15: 2.063" x 4.187" x 4.562"
52.4 x 106.4 x 115.9 mm

Size: VX 15: 2.125" x 3.581" x 4.500"
54.0 x 91.0 x 114.3 mm

INPUT VOLTAGE RANGE (SERIES SPECIFIC)

Input Option	Input Voltage Range		Frequency in Hz	Fusing
	AC	DC		
1	90-265	100-380	44-440	.75A Slow Blow
2		10-40		6A Slow Blow
3		20-60		3A Slow Blow

OUTPUT RANGE (SERIES SPECIFIC)

Model No.	Output	Volts	Amps	Adjustment
14	V1	+5	0-3	+20 -5%
16	V1	+12	0-1.5	+20 -5%
17	V1	+15	0-1	+20 -5%
18	V1	+28	0-.5	+20 -5%
22	V1 V3	+5 -5	.5-2.5 .05-.5	+20 -5% ±5% Fixed
24	V1 V2	+5 +12	.4-2 .05-.25	+20 -5% ±5% Fixed
26	V1 V3	+12 -12	.2-1 .05-.25	+20 -5% ±5% Fixed
27	V1 V3	+15 -15	.15-.75 .05-.25	+20 -5% ±5% Fixed
32	V1 V2 V3	+5 +12 -5	.4-2 .05-.25 .05-.25	+20 -5% ±5% Fixed ±5% Fixed
34	V1 V2 V3	+5 +12 -12	.4-2 .05-.25 .05-.25	+20 -5% ±5% Fixed ±5% Fixed
37	V1 V2 V3	+5 +15 -15	.4-2 .05-.25 .05-.25	+20 -5% ±5% Fixed ±5% Fixed

VT 25 & VX 25 Specs

Turn-On Surge Current: AC Input 5A Max.

Hold-Up Time: 90 VAC Input (low line) 14 msec. 115 VAC Input (nominal line) 25 msec. 250 VAC Input 150 msec.

Operating Temp: −20°C to +80°C Base Plate Full Load. −20°C to +55°C Free Air Full Load. Derate linearly to 50% output at 80°C.

Weight: 1.4 lbs. (0.63 kg)

Size: VT 25: 2.063" x 4.187" x 6.062"
52.4 x 106.4 x 154.0 mm

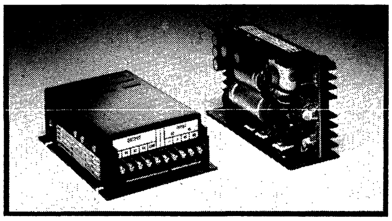
Size: VX 25: 2.125" x 3.581" x 6.000" ® *
54.0 x 91.0 x 152.4 mm

INPUT VOLTAGE RANGE (SERIES SPECIFIC)

Input Option	Input Voltage Range		Frequency in Hz	Fusing
	AC	DC		
1	90-265	100-380	44-440	.5A Slow Blow
2		10-40		5A Slow Blow
3		20-60		3A Slow Blow

OUTPUT RANGE (SERIES SPECIFIC)

Model No.	Output	Volts	Amps	Adjustment
14	V1	+5	0-5	+20 -5%
16	V1	+12	0-2.5	+20 -5%
17	V1	+15	0-2	+20 -5%
18	V1	+28	0-1	+20 -5%
22	V1 V3	+5 -5	.8-4 .05-.5	+20 -5% ±5% Fixed
24	V1 V2	+5 +12	.8-4 .05-1	+20 -5% ±5% Fixed
26	V1 V3	+12 -12	.3-1.5 .05-.5	+20 -5% ±5% Fixed
27	V1 V3	+15 -15	.2-1 .05-.5	+20 -5% ±5% Fixed
32	V1 V2 V3	+5 +12 -5	.8-4 .05-.5 .05-.5	+20 -5% ±5% Fixed ±5% Fixed
34	V1 V2 V3	+5 +12 -12	.8-4 .05-.5 .05-.5	+20 -5% ±5% Fixed ±5% Fixed
37	V1 V2 V3	+5 +15 -15	.8-4 .05-.5 .05-.5	+20 -5% ±5% Fixed ±5% Fixed



Specifications Common to VT/VX Series

Efficiency AC Input:
Single Output: 80% Typical 70% Min.
Multiple Output: 75% Typical 65% Min.

Efficiency DC Input:
Single Output: 75% Typical 55% Min.
Multiple Output: 70% Typical 50% Min.

Turn-On Overshoot: None

Turn-On Time: 200 msec

Turn-Off Overshoot: None

Ripple: All Outputs 2X Line Frequency: 10 mV pk-pk Max. 20 kHz 10mV pk-pk Max.

Switching Noise: 2 MNz @ 10 kHz Rep. Rate. 50 mV pk-pk Max.

Transient Reponse: 0.5V excursion for 50% to 100% or 100% to 50% load change with return to regulation in 2 msec. Load change 1 A/μ sec.

Temp. Coefficient: 0.02%/°C

Isolation: Input to output or input to case: 1.5 kVAC input. 250 VDC input. 250 VDC output to case.

Short Circuit Protection: Current limited for overload and short circuit protection. Normal operation returns upon removal of overload.

Multiple Output Regulation Specifications: Regulation: Line, All Outputs: 0.1%; Regulation: Load, Output No. 1: 0 Load - Full Load 2%; 20% Load - Full Load 0.5%

Note: Output No. 1 must have a minimum load of 20% of full load for all other outputs to maintain regulation.

All Other Outputs: 0 Load - Full Load 1.0% to 1.5A; greater than 1.5A, 2.0%

VT 50 & VX 50 Specs

Turn-On Surge Current: AC Input 5A Max.

Hold-Up Time: 90 VAC Input (low line) 11 msec. 115 VAC Input (nominal line) 20 msec. 250 VAC Input 180 msec.

Operating Temp: −20°C to +80°C Base Plate Full Load. −20°C to +55°C Free Air Full Load. Derate linearly to 50% output at 80°C.

Weight: 2.0 lbs. (0.91 kg)

Size: VT 50: 2.063" x 4.187" x 8.063"
52.4 x 106.4 x 204.8 mm

Size: VX 50: 2.125" x 3.581" x 8.000" ® *
54.0 x 91.0 x 203.2 mm

INPUT VOLTAGE RANGE (SERIES SPECIFIC)

Input Option	Input Voltage Range		Frequency in Hz	Fusing
	AC	DC		
1	90-265	100-380	44-440	1A Slow Blow
2		10-40		10A Slow Blow
3		20-60		5A Slow Blow

OUTPUT RANGE (SERIES SPECIFIC)

Model No.	Output	Volts	Amps	Adjustment
14	V1	+5	0-10	+20 -5%
16	V1	+12	0-5	+20 -5%
17	V1	+15	0-4	+20 -5%
18	V1	+28	0-2	+20 -5%
22	V1 V3	+5 -5	1.8-9 .05-1	+20 -5% ±5% Fixed
24	V1 V2	+5 +12	1.6-8 .05-1	+20 -5% ±5% Fixed
26	V1 V3	+12 -12	.6-3 .05-1	+20 -5% ±5% Fixed
27	V1 V3	+15 -15	.4-2 .05-1	+20 -5% ±5% Fixed
32	V1 V2 V3	+5 +12 -5	1.2-6 .05-1 .05-1	+20 -5% ±5% Fixed ±5% Fixed
34	V1 V2 V3	+5 +12 -12	1-5 .05-1 .05-1	+20 -5% ±5% Fixed ±5% Fixed
37	V1 V2 V3	+5 +15 -15	1-5 .05-.8 .05-.8	+20 -5% ±5% Fixed ±5% Fixed

VT 75 & VX 75 Specs

Turn-On Surge Current: AC Input 5A Max.

Hold-Up Time: 90 VAC Input (low line) 9 msec. 115 VAC Input (nominal line) 16 msec. 250 VAC Input 100 msec.

Operating Temp: −20°C to +80°C Base Plate Full Load. −20°C to +45°C Free Air Full Load. Derate linearly to 50% output at 80°C.

Weight: 2.0 lbs. (0.91 kg)

Size: VT 75: 2.063" x 4.187" x 8.063"
52.4 x 106.4 x 204.8 mm

Size: VX 75: 2.125" x 3.581" x 8.000" ® *
54.0 x 91.0 x 203.2 mm

INPUT VOLTAGE RANGE (SERIES SPECIFIC)

Input Option	Input Voltage Range		Frequency in hz.	Fusing
	AC	DC		
1	90-265	100-380	44-440	1.5A Slow Blow
3		20-60		6A Slow Blow

OUTPUT RANGE (SERIES SPECIFIC)

Model No.	Output	Volts	Amps	Adjustment
14	V1	+5	0-15	+20 -5%
16	V1	+12	0-6	+20 -5%
17	V1	+15	0-5	+20 -5%
18	V1	+28	0-3	+20 -5%
22	V1 V3	+5 -5	2.8-14 .05-1	+20 -5% ±5% Fixed
24	V1 V2	+5 +12	1.6-8 .05-3	+20 -5% ±5% Fixed
26	V1 V3	+12 -12	1-5 .05-1	+20 -5% ±5% Fixed
27	V1 V3	+15 -15	.8-4 .05-1	+20 -5% ±5% Fixed
32	V1 V2 V3	+5 +12 -5	1-5 .05-3 .05-1	+20 -5% ±5% Fixed ±5% Fixed
34	V1 V2 V3	+5 +12 -12	2-10 .05-1 .05-1	+20 -5% ±5% Fixed ±5% Fixed
37	V1 V2 V3	+5 +15 -15	2-10 .05-.8 .05-.8	+20 -5% ±5% Fixed ±5% Fixed

® * Only 90-250 VAC Input UL recognized

VT 100 & VX 100 Specs

Turn-On Surge Current: AC Input 8A Max.

Hold-Up Time: 90 VAC Input (low line) 5 msec. 115 VAC Input (nominal line) 15 msec. 250 VAC Input 130 msec.

Operating Temp: −20°C to +80°C Base Plate Full Load. −20°C to +45°C Free Air Full Load. Derate linearly to 50% output at 80°C.

Weight: 2.6 lbs. (1.16 kg)

Size: VT 100: 2.063" x 4.187" x 10.063"'
52.4 x 106.4 x 255.6 mm

Size: VX 100: 2.125" x 3.581" x 10.000"
54.0 x 91.0 x 254.2 mm

INPUT VOLTAGE RANGE (SERIES SPECIFIC)

Input Option	Input Voltage Range		Frequency in hz.	Fusing
	AC	DC		
1	90-265	100-380	44-440	2A Slow Blow
3		20-60		10A Slow Blow

OUTPUT RANGE (SERIES SPECIFIC)

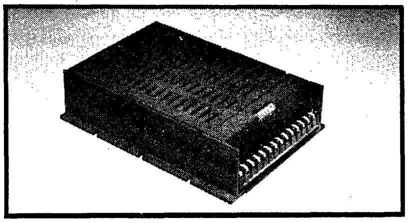
Model No.	Output	Volts	Amps	Adjustment
14	V1	+5	0-20	+20 -5%
16	V1	+12	0-8	+20 -5%
17	V1	+15	0-6	+20 -5%
18	V1	+24	0-4	+20 -5%
24	V1 V2	+5 +12	2.4-12 .05-3	+20 -5% ±5% Fixed
26	V1 V2	+12 -12	1-5 .05-3	+20 -5% ±5% Fixed
27	V1 V2	+15 -15	1-4 .05-2	+20 -5% ±5% Fixed
34	V1 V2 V3	+5 +12 -12	2.8-14 .05-1.5 .05-1	+20 -5% ±5% Fixed ±5% Fixed
37	V1 V2 V3	+5 +15 -15	2.8-14 .05-1.5 .05-1	+20 -5% ±5% Fixed ±5% Fixed
44	V1 V2 V3 V4	+5 +12 -12 -5	2-10 .05-2.5 .05-1 .05-1	+20 -5% ±5% Fixed ±5% Fixed ±5% Fixed
45	V1 V2 V3 V4	+5 +24 +12 -12	2-10 .05-1 .05-1 .05-1	+20 -5% ±5% Fixed ±5% Fixed ±5% Fixed

CONVERTER CONCEPTS

THE LEADER IN WORLDWIDE SWITCHER TECHNOLOGY

Industrial Parkway, Pardeeville, WI 53954, Phone 608/429-2144, Twx 910-280-2630

VF SERIES SWITCHERS • NEW PRODUCT • VERSATRON FAIL-SAFE



Specifications Common to VF Series

Efficiency AC Input:
Single Output: 75% Typical 70% Min.
Multiple Output: 70% Typical 65% Min.

Efficiency DC Input:
Single Output: 70% Typical 60% Min.
Multiple Output: 65% Typical 55% Min.

Safety Standards: Meets UL 478, 1012

Turn-On Overshoot: None

Turn-On Time: 200 msec.

Turn-On Overshoot: None

Hold-Up Time: 16 msec. without battery backup

Ripple: All Outputs 2X Line Frequency: 10 mV pk-pk Max. 20 kHz 10 mV pk-pk Max.

Switching Noise: 2 MHz @ 20 kHz Rep. Rate. 50 mV pk-pk Max.

Power Transfer Transient: V1 excursion ±2% Max. at input power transfer; Max. settling time, 30 msec.; Voltage Offset: AC to DC operation, 2% Max.

Transient Response: 0.5V excursion for 50% to 100% or 100% to 50% load change with return to regulation in 2 msec. Load change 1 A/μ sec.

Temp. Coefficient: 0.02%/°C

Operating Temp: −20°C to +80°C Base Plate Full Load. −20°C to +55°C Free Air Full Load. Derate linearly to 50% output at 80°C.

Isolation: (AC & DC) Input to output or input to case (chassis): 1.5 kVAC
1.5 kVAC AC input to DC input
500 VAC output to case (chassis)

Short Circuit Protection: Current limited for overload and short circuit protection. Normal operation returns upon removal of overload.

Multiple Output Regulation Specifications:
Regulation: Line. All Outputs: 0.5%
Regulation: Load. Output No. 1: 0 Load - Full Load 2%. 20% Load - Full Load 0.5%

Note: Output No. 1 must have a minimum load of 20% of full load for all other outputs to maintain regulation.

All Other Outputs: 0 Load - Full Load 1.0% to 1.5A: greater than 1.5A, 2.0%

VF 65 Specifications Input and Output Ranges

Turn-On Surge Current: Input 5A Max.

Weight: 2.5 lbs. (1.13 kg)

Size: 2.25" x 6.00" x 10"
57.1 x 152.3 x 253.8 mm

INPUT VOLTAGE RANGE (SERIES SPECIFIC)

Input	AC	External DC or Battery
4	90-265	20-60
5	90-265	80-140

OUTPUT RANGE (SERIES SPECIFIC)

Model No.	Output	Volts	Amps	Adjustment
14	V1	+5	0-12	+20 −5%
15	V1	+12	0-5	+20 −5%
16	V1	+15	0-4.5	+20 −5%
17	V1	+24	0-2.5	+20 −5%
18	V1	+48	0-1.5	+20 −5%
22	V1	+5	2.4-12	+20 −5%
	V3	−5	.05-1	±5% Fixed
24	V1	+5	1.4-7	+20 −5%
	V2	+12	.05-2.5	±5% Fixed
26	V1	+12	.7-3.5	+20 −5%
	V3	−12	.05-1.5	±5% Fixed
27	V1	+15	.5-2.5	+20 −5%
	V3	−15	.05-1.5	±5% Fixed
32	V1	+5	1-5	+20 −5%
	V2	+12	.05-2.5	±5% Fixed
	V3	−5	.05-1	±5% Fixed
34	V1	+5	1.6-8	+20 −5%
	V2	+12	.05-1	±5% Fixed
	V3	−12	.05-1	±5% Fixed
37	V1	+5	1.6-8	+20 −5%
	V2	+15	.05-1	±5% Fixed
	V3	−15	.05-1	±5% Fixed
44	V1	+5	1.4-7	+20 −5%
	V2	+12	.05-1	±5% Fixed
	V3	−12	.05-1	±5% Fixed
	V4	−5	.05-1	±5% Fixed
45	V1	+5	1-5	+20 −5%
	V2	+12	.05-.5	±5% Fixed
	V3	−12	.05-.5	±5% Fixed
	V4	+24	.05-1	±5% Fixed

Features

- Open and Enclosed Package
- 65 and 100 Watt Switching Fail Safe Power Supply
- Most Advanced Low Power UPS Available
- Ultra-Wide AC and DC Input Range
- Integral Battery Charger

VF 100 Specifications Input and Output Ranges

Turn-On Surge Current: AC Input 8A Max.

Weight: 3.0 lbs. (1.35 kg)

Size: 3.00" x 6.00" x 10"
76.2 x 152.3 x 253.8 mm

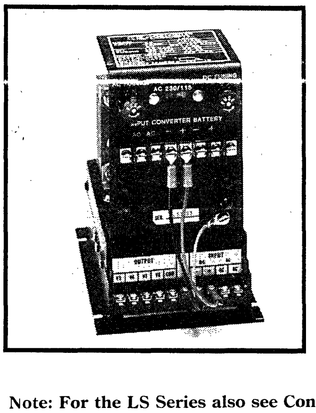
INPUT VOLTAGE RANGE (SERIES SPECIFIC)

Input	AC	External DC or Battery
4	90-265	20-60
5	90-265	80-140

OUTPUT RANGE (SERIES SPECIFIC)

Model No.	Output	Volts	Amps	Adjustment
14	V1	+5	0-20	+20 −5%
16	V1	+12	0-8	+20 −5%
17	V1	+15	0-6	+20 −5%
18	V1	+24	0-4	+20 −5%
24	V1	+5	2.4-12	+20 −5%
	V2	+12	.05-3	±5% Fixed
26	V1	+12	1-5	+20 −5%
	V3	−12	.05-3	±5% Fixed
27	V1	+15	1-4	+20 −5%
	V3	−15	.05-2	±5% Fixed
34	V1	+5	2.8-14	+20 −5%
	V2	+12	.05-1.5	±5% Fixed
	V3	−12	.05-1	±5% Fixed
37	V1	+5	2.8-14	+20 −5%
	V2	+15	.05-1.5	±5% Fixed
	V3	−15	.05-1	±5% Fixed
44	V1	+5	2-10	+20 −5%
	V2	+12	.05-2.5	±5% Fixed
	V3	−12	.05-1	±5% Fixed
	V4	−5	.05-1	±5% Fixed
45	V1	+5	2-10	+20 −5%
	V2	+12	.05-1	±5% Fixed
	V3	−12	.05-1	±5% Fixed
	V4	+24	.05-1	±5% Fixed

LS SERIES • VT COMPATIBLE UPS WITH INTEGRAL BATTERY CHARGER



LS 25 Specifications

Input: AC - 115/230 ± 10% AC 50/60 Hz, DC - External 24 volt battery

Output: DC - 24V @ 2 amps unregulated

Transition Time: Line → Battery 1 μ sec. Battery → Line 1 μ sec.

Operating Temp: −20°C to +55°C

Isolation: AC Input → DC Output: 1.5 kV

Internal Fusing: 1A slow blow 115 VAC 0.5A slow blow 230 VAC 4A slow blow DC Output

Weight: 3.0 lbs. (1.36 kg) unmounted. 4.4 lbs. (1.98 kg) mounted on VT 25 converter

Size: 6.375" x 4.187" x 6.063" mounted 162.0 x 106.3 x 154.0 mm mounted.

LS 75 Specifications

Input: AC - 115/230 ± 10% AC 50/60 Hz, DC - External 24 volt battery

Output: DC - 36V @ 3 amps unregulated

Transition Time: Line → Battery 1 μ sec. Battery → Line 1 μ sec.

Operating Temp: −20°C to +45°C

Isolation: AC Input → DC Output; 1.5 kV

Internal Fusing: 2A slow blow 115 VAC 1A slow blow 230 VAC 6A slow blow DC Output

Weight: 5.0 lbs. (2.26 kg) unmounted 7.0 lbs. (3.20 kg) mounted on VT 50 or VT 75 converter

Size: 6.375" x 4,187" x 8.063" mounted 162.0 x 106.3 x 204.8 mm mounted.

LS 100 Specifications

Input: AC - 115/230 ± 10% C 50/60 Hz, DC – External 24 volt battery

Output: DC - 36V @ 5 amps unregulated.

Transition Time: Line → Battery 1 μ sec. Battery → Line 1 μ sec.

Operating Temp: −20°C to +45°C

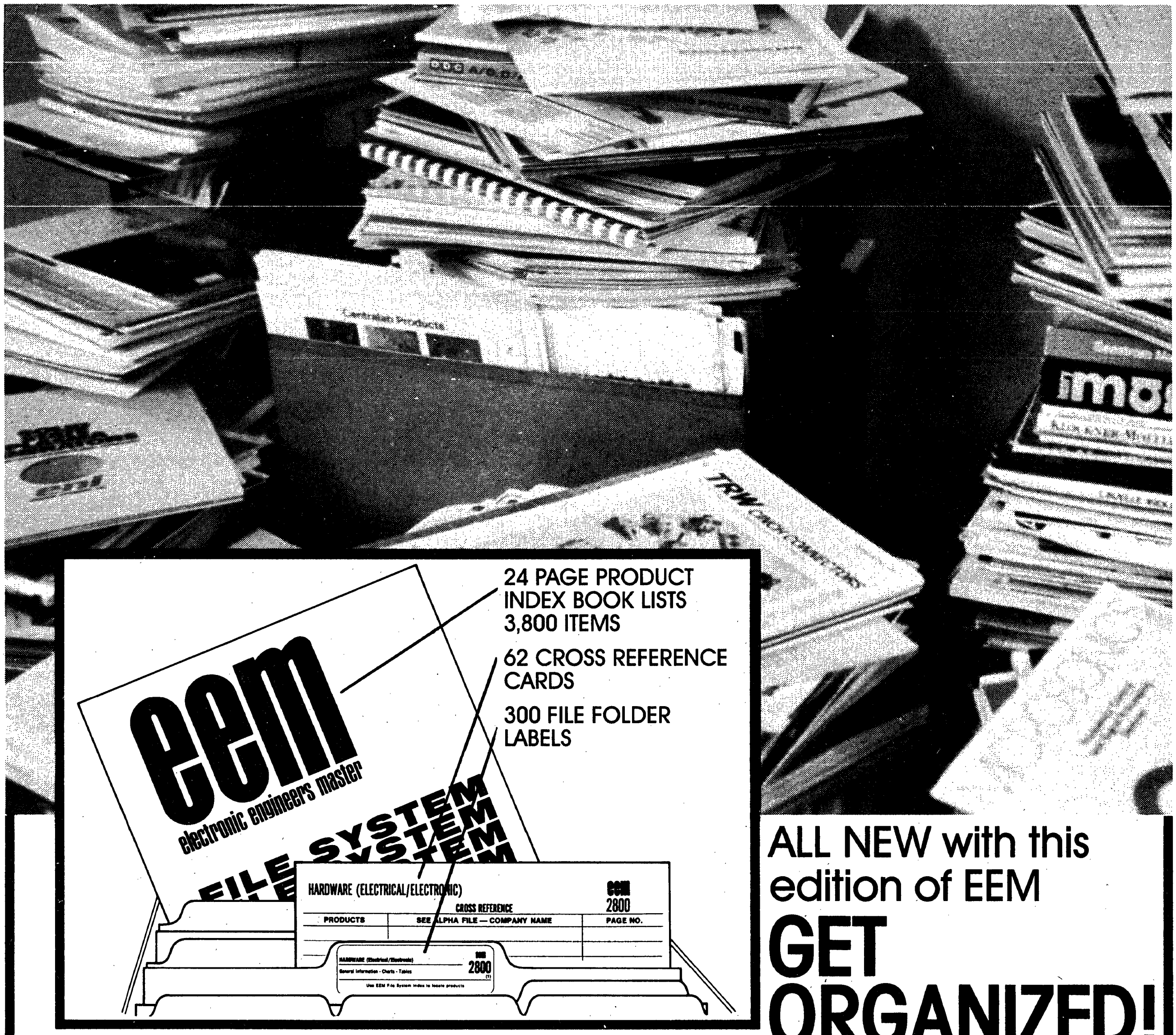
Isolation: AC Input → DC Output: 1.5 kV

Internal Fusing: 3A slow blow 115 VAC 1.5A slow blow 230 VAC 10A slow blow DC Output

Weight: 9.25 lbs. (4.16 kg) unmounted. 11.85 lbs. (5.33 kg) mounted on VT 100 converter.

Size: 6.375" x 4.187" x 10.063" mounted 162.0 x 106.3 x 255.6 mm mounted.

Note: For the LS Series also see Converter Concepts VT 25, 50, 75 and VT 100 for specifications on compatible single and multiple output DC-to-DC converters.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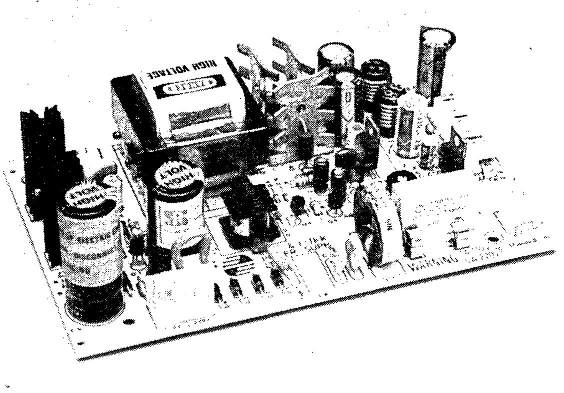
D. C. SWITCHING POWER SUPPLIES

STANDARD FEATURES

- Dual range AC input
- Overvoltage, overload and short circuit protected
- 65%–80% efficiency
- Meets UL and CSA safety requirement
- 40,000 hour MTBF
- Output flexibility from 40W to 120W utilizes the flyback technology and 120W to 250W utilizes the half-bridge approach
- Input surge protected
- Adjustable main output voltage



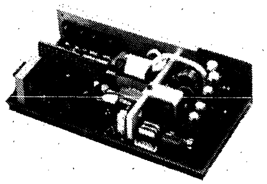
OUTPUT RATINGS FOR STANDARD SWITCHING POWER SUPPLIES

	VOLT	CURRENT	VOLT	CURRENT	VOLT	CURRENT	VOLT	CURRENT
40W	+5V	2.5A	+12V	2.0A	−12V	0.1A	–	–
75W	+5V	5.0A	+12V	4.5A 6.0A SURGE	–	–	–	–
80W	+5V	8.0A	+12V	3.0A 4.0A SURGE	−5V	0.5A	−12V	0.5A
130W	+5V	10.0A	+12V	6.5A 10.0A SURGE	–	–	–	–
150W	+5V	15.0A	+12V	4.5A 9.0A SURGE	−5V	0.5A	−12V	0.5A

	OUTPUT 1			OUTPUT 2			OUTPUT 3			OUTPUT 4		
		CURRENT			CURRENT			CURRENT			CURRENT	
	VOLT	MIN	MAX	VOLT	MIN	MAX	VOLT	MIN	MAX	VOLT	MIN	MAX
70W	A +5V	2.0A	6.0A	+12V	0.5A	2.5A	−5V	OA	0.6A	−12V	OA	0.6A
	B +5V	2.0A	6.0A	+24V	0.3A	1.25A	+12V	OA	0.6A	−12V	OA	0.6A
	C +5V	2.0A	6.0A	+12V	0.5A	2.5A	+24V	OA	0.6A	−12V	OA	0.6A
	D +5V	2.0A	6.0A	+12V	0.3A	2.0A	+12V	OA	1.5A	−12V	OA	0.6A
130W	A +5V	2.0A	15A	+12V	1.0A	5A	−12V	OA	0.7A	−5V	OA	0.7A
	B +5V	2.0A	15A	+12V	0.4A	4A	−12V	OA	0.7A	+24V	1.0A	4.0A
	C +5V	2.0A	15A	+12V	0.8A	4A	−12V	OA	0.7A	+12V	0.5A	1.5A
	D +5V	2.0A	15A	+12V	1.0A	3A	−12V	OA	2.0A	−5V	OA	0.7A
150W	A +5V	2.0A	15A	+12V	1.0A	5A	−12V	OA	0.7A	−5V	OA	0.7A
	B +5V	2.0A	15A	+12V	0.4A	4A	−12V	OA	0.7A	+24V	1.0A	4.0A
	C +5V	2.0A	15A	+12V	0.8A	4A	−12V	OA	0.7A	+12V	0.5A	1.5A
	D +5V	2.0A	15A	+12V	1.0A	3A	−12V	OA	2.0A	−5V	OA	0.7A

***CUSTOM OEM DESIGNS UP TO 250 WATTS**

CES | SWITCHING POWER SUPPLIES | CUSTOM



- ✱ HIGH QUALITY
- ✱ CUSTOM DESIGNED
- ✱ POWER SUPPLIES
- ✱ MOST ATTRACTIVE PRICING

Quality, Lower Pricing and the Availability of Custom Designs are just a few of the many reasons to place your next Power Supply order with Cost Effective Systems, Inc. We offer a full line of Dependable Highly Regulated Power Supplies in the 5 to 200 Watt range. Additionally, we have the flexibility of meeting short order runs as well as high production jobs. The core of our product line is based on 6 pre-defined power ratings configurations. The CES Series can be custom fitted with a wide choice of standard user specified Electrical and Mechanical options. Therefore, practically any combination of output voltages, currents and regulations can be designated.

OUR STANDARD SPECIFICATIONS ARE AS FOLLOWS:

1.	DC Output Line Reg:	0.2% over entire input range.
2.	Load Regulation:	0.5% from no load to full load for 5 volt output only. ±3.5% from 20% load to full load for all other outputs.
3.	Minimum Load:	10% of rated load on 5V output is required.
4.	Ripple and Noise:	60 Hz components — 0.4% all outputs. Switching frequency components are less than 30 mV on all outputs.
5.	Temp. Coefficient:	±0.02% /C.
6.	Efficiency:	Up to 80%, 65% minimum.
7.	Hold-Up Time:	Supply remains in regulation for 20 msec after removal of normal AC power under full load.
8.	Polarity:	Return terminals may be grounded or left floating up to 400V DC with respect to chassis ground.
9.	AC Input Line:	90-130V AC or 180-260V AC, 47-440 Hz strapple.
10.	Inrush Current:	The AC input inrush current is limited by a negative temperature coefficient thermistor.
11.	Overshoot:	No overshoot on turn on, turn off or power failure.
12.	Slew Rate Response:	2% maximum deviation for 50% load change at 5A/μsec.
13.	Overload Protection:	Non-reentrant shutdown results when a power level exceeding 115-130% of the maximum rated output level is reached. Shutdown will also occur in response to the presence of an overvoltage condition on the 5 Volt output. Shutdown results in all output levels dropping to 0 Volts. Internal failure protection is provided by fuse.
14.	Overvoltage Protection:	Standard on 5 Volt output pre-set at 6.5 ±0.3 Volts.
15.	Ambient Operating Temp.:	Continuous duty 0 to 70 C ambient; derate power ratings linearly from 100% @ 40 C to 50% @ 70 C.
16.	Storage Temp.:	−30 C to +85 C.
17.	Cooling:	Convection cooled.
18.	Input & Output Connections:	Input . . . via terminal block. Output . . . via terminal block.
19.	Isolation:	15 megohm minimum, at 1500V AC.
20.	RFI Filtering:	Independent LC section on each side of the AC line.
21.	Physical Data:	Size: Contact us for specific sizing. Construction: Rugged ⅛ Aluminum chassis or PCB type.
22.	Guarantee:	Full 1 year warranty.

40W MODEL	+5V	+12V	+12V	−12V	−5V	+24V	OEM PRICE EA.
CES 40-01	2.5A	2A		0.5A			59.00
CES 40-02	5A	1A	1A				59.00
CES 40-03	5A	0.5A	0.5A		0.5A		59.00
CES 40-04	5A	1A		1A	0.5A		59.00
60W MODEL							
CES 60-01	6A	2A	1A		0.5A		79.00
CES 60-02	6A	2.5A		0.5A	0.5A		79.00
CES 60-03	8A	1A		0.5A	1A		79.00
80W MODEL							
CES 80-01	6A	2.5A	1A	0.5A			95.00
CES 80-02	8A	1.5A		1.5A	1A		95.00
CES 80-03	8A	2.5A		0.6A	0.6A		95.00
CES 80-04	8A	1A		0.6A		1A	95.00
CES 80-05	8A	2A		1.5A	1A		95.00
100W MODEL							
CES 100-01	8A	3A	2A	0.5A			110.00
CES 100-02	10A	3A		1A	0.5A		110.00
CES 100-03	10A	1.5A		1.5A		1A	110.00
120W MODEL							
CES 120-01	10A	1.5A		1.5A		1.5A	129.00
CES 120-02	10A	4A		1.5A	1A		129.00
CES 120-03	12A	3A	1.5A		1A		129.00
150W MODEL							
CES 150-01	15A	4A	1.5A	1.5A			185.00
CES 150-02	15A	4A		3A	0.5A		185.00
CES 150-03	15A	1.5A		1.5A		2A	185.00
CES 150-04	15A	4A		1.5A	1.5A		185.00

PLEASE SPECIFY THE FOLLOWING INFORMATION FOR CUSTOM DESIGNS:

1. INPUT VOLTAGE: _____AC ± _____%.
2. FREQUENCY: _____HZ.
3. OUTPUT: _____VDC _____A.
   _____VDC _____A.
   _____VDC _____A.
   _____VDC _____A.
4. LOAD REGULATION: _____%.
5. LINE REGULATION: _____%.
6. RIPPLE & NOISE: MAIN OUTPUT_____MVDC
7. FRAME: AUX OUTPUT_____MVDC.
8. OTHER SPECIFICATIONS: _____
9. QUANTITY AND DELIVERY SCHEDULE PROJECTION: _____

WALL PLUG-IN AND DESKTOP STYLE POWER SUPPLIES ARE AVAILABLE:

Model: DV-122 OEM PRICE: $35 each
Input: 115 VAC, 60 HZ
Output: +12VDC, 0VDC, −12VDC
Amperage: ±0.5VDC min.
Output Reg.: 1A
Protection: Thermosetting protection at 90 C
Diodes: 3A

Call for availability and pricing on other models in our DV-Line.

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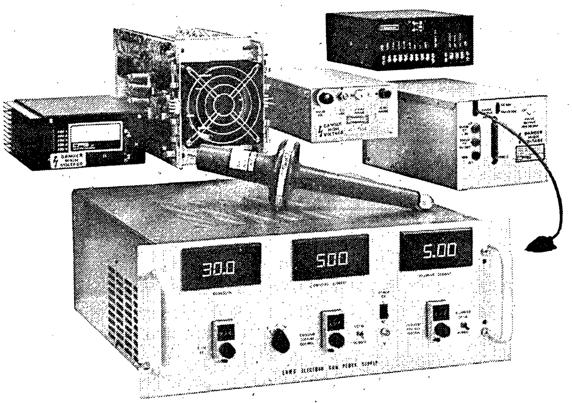
High Voltage - High Precision POWER SUPPLIES from CPS



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FEATURES • Output voltages to 50 kV • Low ripple, precision regulation—high stability • Remote programming and metering models • Short circuit and arc protection • Self restoring • Multiple output voltage options • Solid state design • UL approved.

CPS offers a full range of standard and custom high voltage power supplies for commercial, industrial and mil-spec OEM's having applications requiring high-precision control of an electron beam. All power supply designs feature state-of-the-art production-proven techniques. Many years of experience in encapsulation of high voltage components provide compact packaging without compromise of performance reliability. All designs incorporate short-circuit and arc protection.

GENERAL PURPOSE—PRECISION & ULTRA PRECISION HIGH VOLTAGE POWER SUPPLIES

Series*	Output Voltage	Output Current	Regulation (±%)		Ripple (P-P)	Stability (%)		Temp. Coeff.** PPM/°C	Input Power	Operating Temperature Range (°C)	Features	Size (Inches) H W D
			Line	Load		1-Hour	8-Hour					
100	1 to 30kV	500 μA	0.001	0.001	200mV	0.005	0.01	25	115/220 Vac 47-65 Hz	0 to +50	Single and bipolar output versions; output voltage programmable remotely; output metering. Model 100R—Reversible polarity.	4-21/32 x 8 x 10-3/4
100R	1 to 30kV	1.0 mA	0.001	0.001	200mV	0.005	0.01	25				5-1/4 x 19 x 13-9/16
101	1 to 50kV	500 μA	0.001	0.001	500mV	0.005	0.01	25				5-1/4 x 19 x 13-9/16
130	1 to 30kV	500 μA	0.001	0.001	200mV	0.005	0.01	25				4-19/32 x 8 x 10-3/32
131	1 to 50kV	500 μA	0.001	0.001	500mV	0.005	0.01	25				5-1/4 x 19 x 13-9/16
132	1 to 30kV	500 μA	0.01	0.01	3V	0.05	0.1	250				4-19/32 x 8 x 10-3/32
133	1 to 50kV	500 μA	0.01	0.01	5V	0.05	0.1	250				5-1/4 x 19 x 13-9/16
136	1 to 30kV	500 μA	0.0002	0.0002	60mV	0.0002	–	5				5-1/4 x 19 x 13-9/16
5001A-2	1 to 2.0kV	5.0 mA	0.01	0.01	200mV	0.01	0.02	250	100/115/220 Vac, 47 to 440 Hz	0 to +50	Output voltage programmable remotely. UL approved.	2-11/16 x 5-1/2 x 9
5001A-5	1 to 5.0kV	2.0 mA	0.01	0.01	500mV	0.01	0.02	250				
5001A-10	1 to 10.0kV	1.0 mA	0.01	0.01	1V	0.01	0.02	250				
5001A-20	1 to 20.0kV	250 μA	0.01	0.01	2V	0.01	0.02	250				
5003A-DC	1V to 2kV	5.0 mA, 20 mA, 10 mA,	0.01	0.01	5mV	0.01	0.02	100	24-28 Vdc @ 900 mA	0 to +60	Output voltage programmable remotely. UL approved.	4-1/2 x 2-1/2 x 7-1/2
5003A-AC	1V to 2kV	5.0 mA, 10 mA,	0.01	0.01	5mV	0.01	0.02	100	100/115/220 Vac, 47 to 65 Hz			7 x 3-3/8 x 7-1/2

**Above items available in positive or negative versions.*

MULTIPLE OUTPUT—HIGH VOLTAGE POWER SUPPLIES FOR COMMERCIAL & MILITARY APPLICATIONS

1487												
(Anode)	+15kV to ±5%	30μA	.01	.01	.1	.1	–	100	+28 Vdc ±10%	-54°C to +71°C	Full MIL Spec, Airborne application	3.83 x 4 x 6
(Focus)	3.2 to 5.3	300μA	.01	.01	.1	.1	–	100				
(G2)	+500V ±5%	50μA	.01	.01	.1	.1	–	100				
1617											Output voltage programmable remotely; HV output monitor; can be dynamically modulated; static focus externally programmable.	2-3/4 x 6-1/4 x 9
(Anode)	+20kV	200 μA	0.03	0.03	5V	0.01	0.02	100	+28 Vdc	0 to +70		
(Focus)	+3 to 5.5kV	500 μA	0.03	0.03	5V	0.01	0.02	100				
(G-2)	+300V	1.0 mA	0.05	0.05	1V	0.01	0.02	100				
1786											Provision for dynamic focus.	6-1/2 x 7 x 9-1/2
(Anode)	+19kV	250 μA	0.02	0.005	2V	0.01	0.02	250	115 Vac ± 15 Vac	0 to +50		
(Focus)	+4 to 5.25kV	2 mA	0.01	0.005	500 mV	0.01	0.02	250				
1805											Dynamic focus 0 to +300V. Replaceable modules.	5 x 6 x 10
(Anode)	+18kV	400 μA	0.02	0.03†	3V	–	0.2	200	± 15 Vdc ± 2% @ 1.0 amp	0 to +50		
(Focus)	+2 to 5kV	400 μA	2.0V†	1.0 †	8V	–	0.2	200				
(G-1)	-110V	1 mA	0.1 †	0.3 †	<50 mV	–	0.2	200				
(G-2)	+300 to +500V	100 μA	1.0 †	3.0 †	0.1%†	–	1.0	1000				
1871												
(Anode)	+18kV	500μA	.01	.01	.1	.01	–	100	+25 Vdc ±15%	-55°C to 75°C	Hybrids Processed to MIL 883, Airborne application	4.85 x 4.65 x 1.6
(Focus)	+2.8 to 3.9	5μA	.01	.01	.1	.001	–					
(G2)	+180 to +550	5μA	.01	.01	.1		–					
6001											Self-biasing, regulated grid and unregulated cathode. (Option 1405: unregulated grid, regulated cathode.)	5-1/4 x 19 x 16
(Anode)	-1kV to -30kV	500 μA	0.001	0.001	200mV	0.005	0.01	25	115/220 Vac, 47-440 Hz	0 to +50		
(Filament)	0 to +8V	5 A	–	–	0.25% rms	0.005	0.01	25				
6002											Self-biasing, regulated grid and unregulated cathode. (Option 1405: unregulated grid, regulated cathode.)	5-1/4 x 19 x 16
(Anode)	-1kV to -50kV	500 μA	0.001	0.001	500 mV	0.005	0.01	25	115/220 Vac, 47-440 Hz	0 to +50		
(Filament)	0 to +8V	5 A	–	–	0.25% rms	0.005	0.01	25				
6004									115/220 Vac, 47-440 Hz; 220 Vac opt.	0 to +50	Closed loop emission current regulation.	7 x 19 x 16
(Anode)	-1kV to -30kV	500 μA	200mV	<50V	200 mV	0.005	0.01	25				
(Filament)	0 to 5.0V	5 A	<1%	–	250 mV	–	400 mV	–				

SLEWING HIGH VOLTAGE POWER SUPPLIES FOR BEAM PENETRATION CRT APPLICATIONS

Series	Output Voltage	Output Current	Regulation (±%)		Ripple (P-P)	Stability (%)		Temp. Coeff.** PPM/°C	Input Power	Operating Temperature Range (°C)	Slewing Time (μ sec)	Output Load (capacitance)	Size (Inches) H W D
			Line	Load		1-Hour	8-Hour						
7010 7011*/	+8kV to +18kV	500μA	0.01	0.1	0.1%	0.1	0.2	100	+28 Vdc ±10% @ 2.0 amp	0 to +50	200	700 pf	3 x 5-3/4 x 7-7/8
7020													
(Anode)	+9kV to +18kV	1mA	0.01	0.1	0.1%	0.1	0.2	100	+28 Vdc ±10% @ 2.0 amp	0 to +50	200	500 pf	4-1/2 x 5-29/32 x 6
(Focus)	+2.4kV to +3.4kV	25μA	0.01	0.1	0.1%	–	–	100			200	10 pf	
(G2)	+720V to +1080V	50μA	0.01	0.1	0.1%	–	–	–			–	–	
7030													
(Anode #1)	+15kV ±5%	250μA	0.05	0.1	0.05%	0.1	0.2	200	±24 Vdc ±10% @ 2.5 amp		–	–	7 x 5-7/16 x 11-7/8
(Anode #2)	+9kV to +18kV	750μA	0.05	0.1	0.1%	0.05	0.05	100		0 to +50	300	500 pf	
(Focus)	+2.2kV to +3.5kV	300μA†	0.05	0.1	0.1%	–	–	200			–	–	
(G1)	-55V	25μA	0.1	0.1	0.3%	–	–	–			–	–	
(G2)	+350V to +700V	25μA	0.1	0.6	0.3%	–	–	–			–	–	

***Specifications apply after 30 minute warm-up. †Maximum */ Mil-spec *† Over Maximum Switching Range*

CPS

A Division of VG Systems, Inc.

For complete information and applications assistance, contact the precision high voltage power supply specialists at:

110 Wolfe Road • Sunnyvale, California 94086 • Phone (408) 738-0530 Telex 357-450

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EEM PRODUCT SELECTION GUIDES

Use the EEM Product Selection Guides. There are 34 Guides in this edition of EEM. See page 2 (A•2, B•2, C•2, D•2) of each volume to locate the Product Selection Guides that pertain to your needs.

DC to DC Converters

MODEL NUMBERS

CASE UNITS

1.5" x 3" Extruded Aluminum

REGULATED

Basic Model No.	IN MAX	Case Depth	Mounting Dim.
PS 331	.60	1.50	.70 x 1.20
PS 332	1.00	2.30	1.50 x 1.20
PS 333	2.00	3.80	2.50 x 1.20
PS 334	4.00	7.00	5.00 x 1.20

UNREGULATED

Basic Model No.	IN MAX	Case Depth	Mounting Dim.
PS 336	.60	1.00	℄ x 1.20
PS 337	1.00	1.30	℄ x 1.20
PS 338	2.00	2.00	1.20 x 1.20
PS 339	4.00	3.50	2.00 x 1.20

PC CARDS .75" Thick

REGULATED

Basic Model No.	I_{IN}	Hgt.	Lgth.	Mounting Dim. Fr. Edge CtoC
PS 341	.60	2.50	3.50	.60 x 1.00
PS 342	1.00	2.50	4.00	.60 x 1.00
PS 343	2.00	2.50	5.00	2.20 x 0.80
PS 344	4.00	3.00	8.00	2.50 x 2.00

UNREGULATED

Basic Model No.	I_{IN}	Hgt.	Lgth.	Mounting Dim. Fr. Edge CtoC
PS 346	.60	2.50	2.50	.60 x 0.50
PS 347	1.00	2.50	3.00	.60 x 1.00
PS 348	2.00	2.50	3.00	.60 x 1.00
PS 349	4.00	3.00	5.50	1.20 x 1.50

RECTIFIER SYSTEMS

	Output Voltage
AC—AC Square Wave	2 to 1500VAC
FW—Full Wave	5 to 35VDC
BCT—Bridge Center Tap	5 to 60VDC
B—Bridge	36 to 1500VDC
VD—Voltage Doubler	1501 to 3000VDC
VQ—Voltage Quadrupler	3001 to 6000VDC

QUANTITY DISCOUNTS

	Unit Price
1-3	
4-29	LESS 10%
30-99	LESS 20%
100-499	LESS 30%
500-999	LESS 40%

Discounts on larger quantities negotiable.
Discounts applicable only on scheduled quantities.
Contract not to exceed one (1) year.
Delivery destination U.S.A.

ORDERING INFORMATION

PS 333 — 22 — 3000 — VQ +F — P

❶ ❷ ❸ ❹ ❺ ❻

❶ **Basic Model Number Determines Wattage, Size and Mounting.**

❷ **Input Voltage: This number indicates $E_{IN\ MIN}$ on the regulated units and E_{IN} Nom. on the unregulated units.**

❸ **Output Voltage: May be any voltage between 2 volts and 1500 volts AC or between 5 volts and 6000 volts DC.**

❹ **Rectifier System: Select for applicable output voltage, refer to rectifier systems above.**

❺ **When a positive ground is required add +F after rectifier system. Nothing is added for negative ground.**

❻ **Modifications:**
—P for program connection.
—E for enable operation.

A On output voltages less than 20 volts the switching spikes will be about 100 mv p-p. These can be easily reduced by adding a capacitor on the output terminals.

B Because of common mode ripple it is necessary to know when a positive ground system is used (see ordering information).

C The conversion frequency will be approximately 25KHz at nominal input and output voltages.

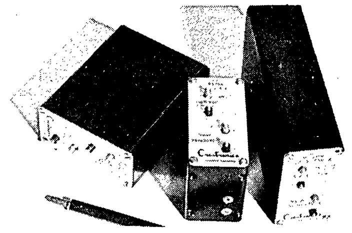
ISOLATION

All outputs greater than 100 VDC will be isolated to 6000 VDC. All outputs less than 99 VDC will be isolated to 100 VDC. Isolation resistance will be greater than 10K Meg. For special isolation requirements call our engineering department.

Reliability

Short Circuit Protected

Filtered Input



Crestronics Inc. DC to DC Converters are designed as a power supply for electronic circuits with a minimum of interference in the audio and rf ranges. The 25KHz conversion employed eliminates all audio range problems and an internal input filter reduces the rfi conductance noise to a level of less than 30 mv P-P/AMP across a one ohm resistor in series with the input.

REGULATED UNITS

1.0 INPUT

1.1 Voltage - -$E_{IN\ MIN}$ - - Customer may specify any input voltage between 11 and 28 volts DC. $E_{IN\ MIN}$ is the lowest input voltage applied. This should include the lowest excursion of ripple.

1.2 Input Voltage Differential - - ΔE_{IN} - - The normal ΔE_{IN} is 4 volts DC. For ΔE_{IN} greater than 4 volts derate the input current to

$$I \text{ derate} = \frac{6\ I_{IN\ MAX}}{\Delta E_{IN} + 2}$$

1.3 Input Current - - $I_{IN\ MAX}$ - - See Model Numbers
$I_{IN\ MAX}$ shall be derated for a ΔE_{IN} greater than 4 volts—See 1.2
$I_{IN\ MAX}$ shall be derated for greater than 70° operation—See 10.2

2.0 OUTPUT

2.1 Voltage - - E_o - - Customer may specify output voltage up to 1500 VAC ⊓⊔ or 6000 VDC. See ordering information ≠❸

2.1.1 The output voltage is screwdriver adjustable from —20% to +5% of nominal.

3.0 REGULATION

3.1 Line .... .01%/ △ input volt
3.2 Temperature .... (.02%/°C) —2mv/°C
3.3 Load .... 100% to 10%
For 30 VDC & Over 3%
For 29 VDC & under .... $\% = \frac{(.02\ E_o) + .3}{E_o \times 10^{-2}}$
3.4 Ripple - - .3% P-P Max

4.0 EFFICIENCY - - Efficiency is expressed in % as $\frac{(.7\ E_{IN\ MIN}\ I_{IN}) - I_o}{E_{IN\ MIN}\ I_{IN} \times 10^{-2}}$

UNREGULATED UNITS

5.0 INPUT

5.1 Voltage - - E_{IN} - - Customer may specify any input voltage between 5 and 35 VDC
5.2 Current - - I_{IN} - - See Model Numbers

6.0 OUTPUT

6.1 Voltage - - E_o - - Customer may specify any output voltage up to 1500 VAC or 6000 VDC.

E_o is proportional to E_{IN} Ratio $= \frac{E_{IN} - 1}{E_o}$

E_o shall not exceed 1.1 E_o

6.2 Ripple - - .3% P-P Max

7.0 REGULATION

7.1 Line - - - - Directly proportional
7.2 Load - - - 100% to 10% $\% = \frac{(.05\ E_o) + .3}{E_o \times 10^{-2}}$

8.0 EFFICIENCY - - Efficiency is expressed in % as $\frac{(.75\ E_{IN}\ I_{IN}) - I_o}{E_{IN}\ I_{IN} \times 10^{-2}}$

GENERAL

9.0 TEMPERATURE —30°C to 100°C

9.1 Temperature measured at mounting surface
9.2 For temperature greater than 70°C — Derate input $I_{IN\ MAX}$ 1%/°C

10.0 CASE .... Black Anodized Extruded Aluminum
10.1 Back Plate .... Clear Anodized Aluminum
10.2 Name Plate .... Metal Photo Corp.
10.3 Size .... See Model
10.4 Mounting .... See Model
10.5 Weight .... 1.7 gram per cubic CM

11.0 TO DETERMINE INPUT CURRENT $I_{IN} = \frac{(E_o\ I_o) + I_o}{.7\ E_{IN\ MIN}}$

12.0 PROGRAMMABLE - - - - "P" Suffix with E_o set at nominal, E_o will be approximately1%/.1ua or 1%/.1V. From the summing junction, approximately 7.0 volts.

13.0 ENABLE - - - - "E" Suffix unit will normally be inhibited with ½ E_{IN} on enable lead. Unit will be Enabled when Enable lead is within 1V of negative input. Enable current will be $\frac{E_{IN}}{10K}$

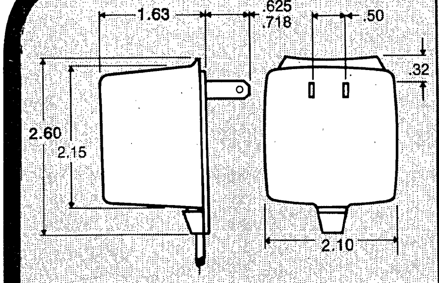
Stil Crestronics

A Division of Applied Electro Technology Int.

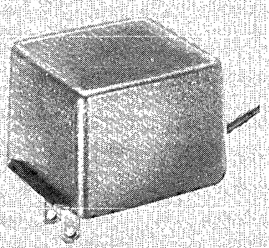
2220 South Anne Street / Santa Ana, California 92704
TM 714/556-6570 / TWX 910-595-1797

D & B POWER, INC.

Wall Plug-in Power Sources

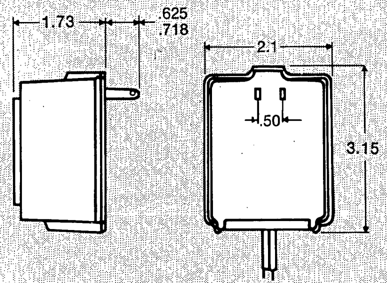


'C' SIZE



SPECIFICATIONS

AC/AC RANGE: 6 VA to 12 VA
AC/DC FILTERED RANGE: 4 Watts (Filtered) to 9 Watts (Unfiltered)
REGULATED RANGE: 5 VDC-24 VDC up to 150 ma.
LEAD-ACID (CYCLIC): 2V — 6V (11 V.N.L.) 8V — 12V (21 V.N.L.) up to 9 Watts
LEAD-ACID (REGULATED): 2.35V/cell No load; Average: 250 ma. up to 4 Watts
NICAD: AA — up to 20 cells Sub C — up to 20 cells, C — up to 20 cells D — up to 14 cells, F — up to 9 cells



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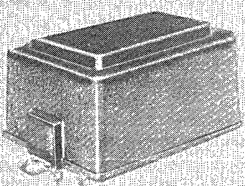
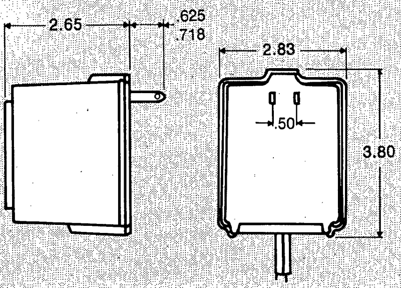
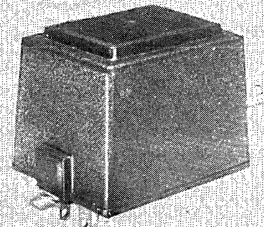


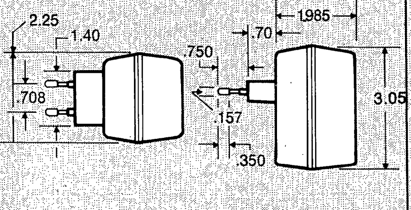
AC/AC RANGE: 6 VA, 12 VA, 20 VA
AC/DC FILTERED RANGE: 4 Watts to 13 Watts, all available with filter
REGULATED RANGE: 5 VDC — 24 VDC up to 250 ma.
LEAD-ACID (CYCLIC): 2V — 6V (11 V.N.L.) 8V — 12V (21 V.N.L.) Average: up to 13 Watts
LEAD-ACID (REGULATED): 2.35V/cell, no load Average: 500 ma. up to 9 Watts
NICAD: AA — up to 25 cells, Sub C — up to 20 cells, C — up to 20 cells, D — up to 18 cells, F — up to 10 cells



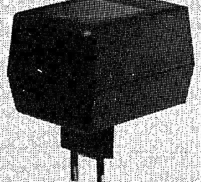
'E' SIZE



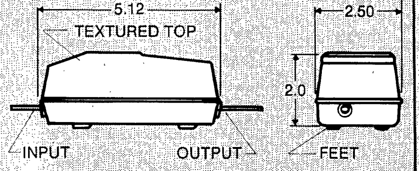
AC/AC RANGE: 20 VA, 30 VA, 37 VA, 56 VA
AC/DC FILTERED RANGE: 13 Watts, 19 Watts 35 Watts filtered
REGULATED RANGE: 5 VDC — 12 VDC up to 1 amp., 15 VDC — 24 VDC up to 750 ma. 25 VDC — 35 VDC up to 500 ma., 35 VDC — 50 VDC up to 350 ma.
LEAD-ACID (CYCLIC): 2V — 12V up to 35 Watts, 20% N.L. — full-load regulation
LEAD-ACID (REGULATED): 2.35V/cell N.L. up to 12 Watts (1 amp max.)
NICAD: D — up to 40 cells



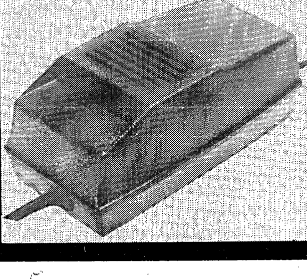
'C' EURO WALL STYLE



AC/AC RANGE: Up to 20 VA
AC/DC FILTERED RANGE: Up to 13 Watts filtered
REGULATED RANGE: Up to 250 ma at specified voltage not to exceed 24 VDC
LEAD-ACID (CYCLIC): 2V — 6V (11 V.N.L.) up to 13 Watts, 8V — 12V (21 V.N.L.) up to 13 Watts
LEAD-ACID (REGULATED): 2.35V/cell N.L., Average: 500 ma. up to 9 Watts
NICAD: AA — up to 25 cells, Sub C — up to 20 cells, C — up to 20 cells, D — up to 18 cells, F — up to 10 cells



DPC DESK TOP



AC/AC RANGE: 6 VA, 12 VA, 20 VA
AC/DC FILTERED RANGE: 4 Watts, 9 Watts, 13 Watts, all available with filter
REGULATED RANGE: 5 VDC — 24 VDC up to 250 ma.
LEAD-ACID (CYCLIC): 2V — 6V (11 V.N.L.), 8V — 12V (21 V.N.L.) Average: up to 9 Watts
LEAD-ACID (REGULATED): 2.35V/cell, no load Average: 500 ma. up to 9 Watts
NICAD: AA — up to 25 cells, Sub C — up to 20 cells, C — up to 20 cells, D — up to 18 cells, F — up to 10 cells

D & B POWER, INC.

- ☐ Converters AC-AC/AC-DC
- ☐ Regulated DC Supplies
- ☐ Battery Chargers

TYPICAL ELECTRICAL AND MECHANICAL STANDARDS

ELECTRICAL

INPUT
120 VAC 60 Hz (Standard); 240 VAC 50/60 Hz & 120/240 VAC 50/60 Hz Switchable available as options.

OUTPUT
±.5 VDC Typical tolerance.

REGULATED UNITS
±2% standard line and load regulation.

STANDARD CHARGE RATE
C/10, C/5 & C/1 available

MECHANICAL

HOUSING MATERIAL
Black ABS, self extinguishing.

OUTPUT CORDS
All industry standard miniature molded cordsets are stocked at D and B Power.

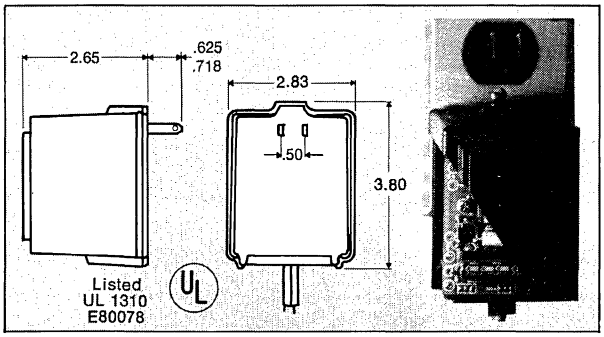
OPTIONS

1. L.E.D. charge or power-on indicator light
2. Ground pin — can be carried through with secondary
3. Center-tapped secondary on AC/AC
4. European input desk-top for D_2 and E power
5. Japanese or other World-Wide input voltages and frequencies
6. Switchable 120 VAC/240 VAC 50/60 Hz available in all case sizes
7. ± DC non-regulated and regulated outputs
8. Custom Hot-Stamping facilities
9. UL and CSA designs
10. UL and/or CSA submittals upon request
11. Custom designs to meet your exact requirements are available on request
12. D & B Power qualified to MIL-STD MIL-C-45662A and MIL-I-45208

Custom Products

MPPS 512

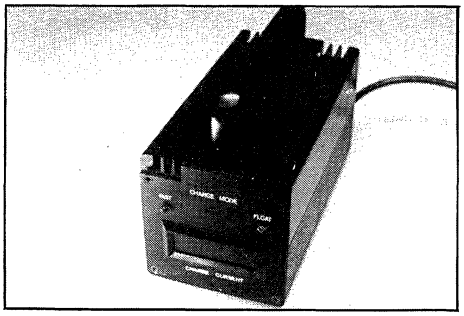
REGULATED, MULTIPLE OUTPUT MICRO PROCESSOR POWER SUPPLY



MECHANICAL DATA: Wall plug-in with ground pin and five (5) conductor output cord.

ELECTRICAL DATA: Input: 117 VAC ±10%, 60 Hz. Output: 1) +5 VDC @ 750 ma., Line Regulation 0.1% Load Regulation 2%, 10 MV RMS MAX Ripple. 2) +12 VDC @ 150 ma., Line Regulation 0.1%, Load Regulation 1%, 1 MV RMS MAX Ripple. 3) — 12 VDC @ 150 ma., Line Regulation 0.1% Load Regulation 1%, 10 MV RMS MAX Ripple. 4) UL Approved. 5) Euro inputs available.

CHARGERS MULTI-STAGE NICAD AND MULTI-STAGE LEAD-ACID



NICAD: Fast charge @ C/5 or C/1, float at C/10 Discharge circuit available

LEAD-ACID: 2.45V/cell fast charge, 2.30V/cell float

BOTH UNITS: L.E.D. indicator, nominal input voltage = 117 VAC 60 Hz ±10%, 230 VAC 50 Hz available

D & B POWER, INC.

204 N. FEHR WAY, BAY SHORE, NY 11706
P.O. BOX 40M
(516) 586-5955

eem

COMMONLY USED ELECTRICAL/ELECTRONIC ABBREVIATIONS AND ACRONYMS

A
AC alternating current
A/D analog to digital
ADC analog to digital converter
ADP automatic data processing
AF audio frequency
AFC automatic frequency control
ALGOL algorithmic language
AM amplitude modulation
AND a logical operator
AQL acceptable quality level
ASCII American national standard code for information interchange
AWG American wire gauge

B
BALUN balanced to unbalanced
BASIC beginners' all-purpose symbolic instruction
BCD binary-coded decimal
BNC baby "N" connector
BUS basic utility system

C
CAD computer aided design
CAM computer aided manufacture
CATV cable television or community antenna television
CERMET ceramic metal element
Comm. communications
CMOS complementary metal-oxide semiconductor
CPS characters per second
CPU central processing unit

D
D/A digital to analog
DAC digital to analog converter
DC direct current
DIAC bidirectional trigger diode
DIL dual in-line
DIN Deutsche Industrie Normenausschuss
DIP dual in-line package
DPM digital panel meter
DTL diode transistor logic

E
EDP electronic data processing
EBCDIC extended binary coded decimal interchange code
EEPROM electrically erasable PROM
EMC electromagnetic compatibility
EMI electromagnetic interference
EMP electromagnetic pulse
EPROM electrically programmable ROM
ESR equivalent series resistance

F
FEP fluorinated ethylene propylene Copolymar, 200° Teflon
FET field-effect transistor
FM frequency modulation
FORTRAN formula translator

G
GaAsFET gallium arsenide field effect transistor
GPIB general purpose interface bus

H
HF high frequency (3 to 30 MHz)
HIPOT test, measurement and diagnostic equipment
HLL high level language
HV high voltage
Hz Hertz

I
IC integrated circuit
IDC insulation displacement contact
IF intermediate frequency
IO input/output (devices)
IR insulation resistance (or) infrared

J
JFET junction field effect transistor
JMOS junction metal oxide semiconductor

K
kHz kilohertz (10^3 hertz)
KSR keyboard send receive

L
LC inductance capacitance
LCD liquid crystal display
LED light-emitting diode
LF low frequency (30 to 300 kHz)
LIF low insertion force
LNA low noise amplifier
LNB low noise band
LSI large scale integration
LVDT linear velocity displacement transformer

M
MASER microwave amplification by stimulated emission of radiation
MATV master antenna television
μF microforad
MHz megahertz
MIPS million instructions per second
MIB microcomputer interface board
MOS metal oxide semiconductor
MOSFET metal oxide semiconductor field effect transistor
MOSIGT metal-oxide semiconductor insulated-gate transistor
MOV metal oxide varistor
MPU microprocessor unit
MSI medium scale integration

N
NBS National Bureau of Standards
NEMP nuclear electromagnetic pulse
NIM nuclear instrumentation module
NOR not OR
NTC negative temperature coefficient

O
OCR optical character reader
OEM original equipment manufacturer
OR a logical operator

P
PC printed circuit
PCB printed circuit board
pF picofarad
PGA pin grid array
PIN positive-intrinsic-negative (transistor)
PLA programmable logic array
PLL phased lock loop
PPI plan position indicator
PROM programmable read only memory
PTC positive temperature coefficient
PUT programmable unijunction transistor

Q
QAM quadrature amplitude modulation
Q (meter) quality-factor meter

R
RAM random access memory
RC resistance-capacitance
RFI radio frequency interference
RMS root mean square
ROM read only memory
RF radio frequency
RFC radio-frequency choke
RFI radio-frequency interference
RTD resistance-temperature detector
RTL resistor transistor logic
RTV room temperature vulcanizing
RW read/write

S
SAS silicon asymmetrical switch
SBC single board (micro) computer
SBS silicon bilateral switch
SCR silicon-controlled rectifier
SCS silicon controlled switch
SDA source & detector assemblies
SIDAC bidirectional voltage-triggered switch
SIP single in-line package
SSI small scale integration
SSR solid state relay
STL Schottky transistor logic
SUS silicon unilateral switch

T
TC temperature coefficient
TCXO temperature compensated crystal oscillator
TFE tetrafluoride ethylene propylene Copolymer, 250° Teflon
TRIAC bidirectional AC switch
TTL transistor-transistor logic
TTY teletypewriter

U
UHF ultra high frequency (300 MHz to 3 GHz)
UJT silicon unijunction transistor
UL Underwriters Laboratory
UPS uninterruptible power supply

V
VAC volts (of) alternating current
VAR volt-ampere reactive
VCR video cassette recorder
VDC volts (of) direct current
VHF very high frequency
VHSIC very high speed integrated circuit
VLF very low frequency (3 to 30 kHz)
VLSI very large scale integration
VME virtual machine environment
VRM voice recognition module
VTVM vacuum tube volt meter
VU volume unit
VSWR voltage standing wave ratio

W
WPS word processing software

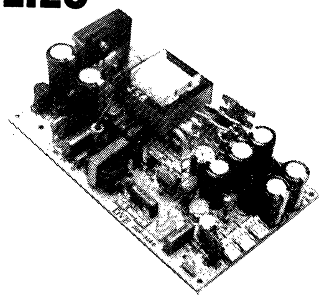
Y
YIG yttrium iron garnet

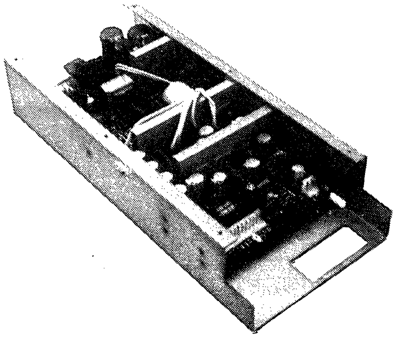
Z
ZIF zero insertion force

DVE®

Please Contact
DEE VAN ENTERPRISE CO., LTD.
407 S. Palm Avenue/Alhambra, CA 91803 TWX: 910-589-1607
Phone: 818/289-0310 FAX: 818-281-0232

POWER SUPPLIES ADAPTORS





FEATURES:

- UP TO 4 REGULATED OUTPUTS.
- SELECTABLE AUXILIARY OUTPUT.
- HIGH EFFICIENCY.
- 110/220 VAC INPUT SELECTABLE.
- 20 mSEC HOLD-UP TIME.
- 24 HOUR BURN-IN.

GENERAL SPECIFICATIONS:

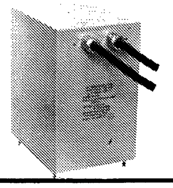
AC INPUT:	Standard Dual Range: 90-130 VAC or 180-260 VAC, 47-63 Hz, Single Phase. Voltage Range selectable by a Jumpers
DC OUTPUT:	See Voltage/Current Rating Chart, adjustment.
HOLD UP TIME:	20 mS min.
EFFICIENCY:	70% min. at full load.
OUTPUT NOISE AND RIPPLE:	1% + 50 mVPP max.
STABILITY:	Output voltage 0.1% max. for 24 hours following an initial 30 minute warmup period.
TRANSIENT RESPONSE:	50% max. from nominal voltage set point.
OVER LOAD PROTECTION:	Over load protection limits output to 110%-125% of full load current.
REGULATION:	Line: ±0.8% max. for a full line change of 90-130 VAC or 180-260 VAC. Load: ±0.5% max. to min. load change.
OVER VOLTAGE PROTECTION:	Over voltage protection controls output to 120%-140% of rating voltage at main output.
INPUT PROTECTION:	AC input fuse provided, internally located.
TEMP RATING:	Operating: 0°C to +50°C at full output current. Consult factory for operating information for operation between +50°C to 70°C. Storage −40°C to +80°C.
CONSTRUCTION:	Aluminum chassis and case or open frame type.
INSULATION RESISTANCE:	20 MΩ at 500 VDC between input terminals or output terminals to chassis or case.
DIELECTRIC VOLTAGE WITHSTAND:	Between input output: 2200 VDC. Between input chassis: 2200 VDC. Between output chassis: 750 VAC.

VOLTAGE/CURRENT RATING CHART

MODEL	MAIN OUTPUT	Aux. 1	Aux. 2	Aux. 3	MAX POWER	L mm	W mm	H mm	REMARK	MOUNTING LOCATION Amm	Bmm
DSP-338	+5V 0.45-3A	+12V 0.3-2A	−12V 0.25A	−5V 0.25A	40W	160	100	45	PCB Ass'y	154	90
DSP-338C	+5V 0.45-3A	+12V 0.3-2A	−12V 0.25A	−5V 0.25A	40W	200	100	65	Plastic Housing	154	90
DSP-5123F	+5V 5A	+12V 2A	−12V 1A major	−5V 1A max	60W	220	102	57	Open Frame	172.5	88
DSP-5123H	+5V 10A	+12V 3.5A	−12V 0.5A	−5V 0.5A	130W	200	115	60	Open Frame	192	110
DSP-175	+5V 20A	+12V 4A/5A +15V P +24V	−5V 3A −12V −15V −24V	−5V 0.8A +12V 3A +15V +24V	175W (200W P)	251	130	57	Open Frame	200	90
DSP-150	+5V 15A	+12V 4A +15V 4A +24V 4A	−5V 3A −12V 3A −15V 3A −24V 3A	−5V 0.8A +12V 3A +15V 3A +24V 3A	150W	251	130	57	Open Frame	200	90
DSP-5127	+5V 5A	+12V 2A max	+24V 1.5-7A	−12V 1A max	210W	305	130	60	Open Frame	120	80
DSP-200	+5V 25A	+12V 5A +15V 5A +24V 5A	+5V 3A −12V 3A −15V 3A −24V 3A	−5V 0.8A +12V 3A +15V 3A +24V 3A	200W	330	130	62	Open Frame	270	90
DSP-250	+5V 30A	+12V 5A/8A +15V P +24V	−5V 3A −12V −15V −24V	−5V 0.8A +12V 3A +15V +24V	200W (250 P)	330	130	62	Open Frame	270	90

DEL: Prime suppliers of both high-voltage modular power

Unregulated Modules Compact High Voltage—Series "S"

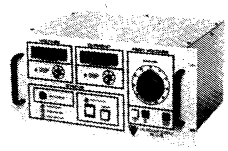


- ▼ Output: Two shielded poly-ethylene cables insulated for reversible polarity
- ▼ Construction: Solid state rectifiers, all units hermetically sealed in epoxy, vacuum filled, metal case

Input: 0-115-125V, 50/60Hz
400 Hz available upon request
Output: Variable with input ac line

Output Range (kV)	Current (mA)	Ripple %rms/mA @ 60Hz
0 to 2.5-60	5	0.25
0 to 1-30	5	0.25
0 to 1-40	10	0.15

Rack Mounted Power Supplies RIU Series 875 and 1400

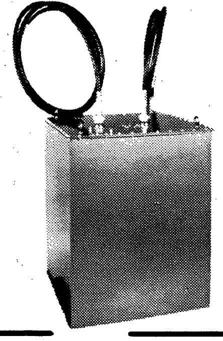


- ▼ Easy to read 3 digit DPM for voltage and current
- ▼ Adjustable overcurrent and overvoltage
- ▼ All solid state technology
- ▼ Low RMS ripple
- ▼ External and HV interlock
- ▼ Zero start interlock and bypass
- ▼ Polarity reversible (Below 60KVDC)

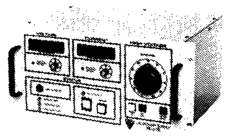
Input: 105-125VAC 50/60 Hz
Output: Continuously adjustable 0-100%

Output Voltage	Output Current
0-1KVDC	25-1500MADC
0-2.5KVDC	10-1000MADC
0-5KVDC	10-300MADC
0-10KVDC	10-100MADC
0-20KVDC	5-75MADC
0-30KVDC	5-10MADC
0-40KVDC	3MADC
0-60KVDC	1MADC
0-90KVDC	1MADC

High Voltage DC Supplies Series "HVOU"

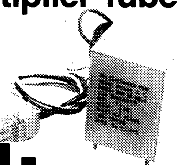


- ▼ Input, 120 & 208VAC, 50/60Hz
- ▼ Front Panel DPM's
- ▼ Adjustable overcurrent and overvoltage
- ▼ Continuously adjustable 0-100%
- ▼ Remote polarity reversible
- ▼ Fully instrumented
- ▼ Fully interlocked



Standard Voltage & Currents	
Output Voltage (KV)	**Output Current (MA)**
0-40	10 to 250
0-50	8 to 200
0-75	5.5 to 130
0-100	4 to 100
0-150	2.5 to 66

DC-DC Proportional Converters for Photomultiplier Tube—Series "PMS"



- ▼ Reverse polarity protected
- ▼ Output isolated
- ▼ Momentary short circuit protected
- ▼ Small size
- ▼ Low cost

Model Number	Input Range (dc volts)	Output Range (dc volts)	Size D&L
PMS 1-1	3 to 15	300 to 1500@1mA	1 X 2¼
PMS 1-4	3 to 19	300 to 2000@1mA	1 X 2¼
PMS 1-6	3 to 15	400 to 2500@0.5mA	1 X 2¼
PMS 1-7-7	4 to 12	500 to 1500@0.5mA	2.4 X 1.5 X 0.812
PMSB 2-.025	3 to 12	300 to 2000@0.025mA	1 X 2¼
PMS 3-.5	3 to 15	300 to 3000@0.5mA	1¼ X 2⅜
PMS 5-.5	3 to 15	500 to 5000@0.5mA	1⁷⁄₁₆ X 3⅛
PMS 10-.025*	3 to 10	3kV to 10kV@0.025mA	2.07 X 2.32 X 3.13

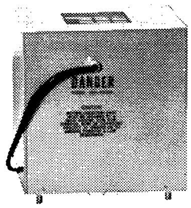
*Specify positive or negative output

DEL

DEL ELECTRONICS CORPORATION
250 East Sandford Boulevard, Mount Vernon, New York 10550
Phone: 914/699-2000 TWX 710-562-0130

standard and custom-designed supplies, transformers, capacitors.

Highly Regulated Adjustable Hermetic Sealed, Epoxy Filled Series "CARDE"

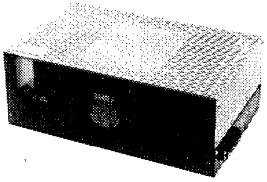


- Adjustable output (50 to 100%) (Resistance programmed)
- Short circuit proof—foldback
- Designed to meet environmental requirements of MIL-E-16400

Input: 115V ±10%, 47-420Hz
Output: Line and load regulation ±0.005%
Ripple: 0.03% rms
Temp. coeff: 0.02%/°C
Temp. range: −25°C to 65°C
Polarity: specify pos. or neg.

Outputs			
Voltage Range (dc)	**Current Max.**	**Voltage Range (dc)**	**Current Max.**
600V to 1200V	8mA	5.0kV to 10kV	1mA
1200V to 2500V	4mA	7.5kV to 15kV	0.6mA
2.5kV to 5.0kV	2mA	10kV to 20kV	0.5mA
3.5kV to 7.0kV	1.4mA		

Highly Regulated Adjustable Industrial Grade—Series "HARD"



- High frequency design Low energy storage
- Adjustable output (50 to 100%) (Resistance programmed)
- Short circuit proof

Input: 115V ±10%, 50/400Hz
Output: Line and load regulation: ±0.005%
Temp. coeff: ±0.02%/°C
Temp. range: −20°C to 55°C
Polarity: specify pos. or neg.
Ripple: 0.03% rms

Outputs			
Voltage Max.	**Current Max.**	**Voltage Max.**	**Current Max.**
1200V	2,10,20mA	15kV	0.25, 0.5, 1mA
2500V	1, 4, 8mA	20kV	0.2, 0.5, 1mA
5000V	0.5, 2, 4mA	30kV	0.75mA
10kV	0.25, 1, 2mA	40kV	0.5mA

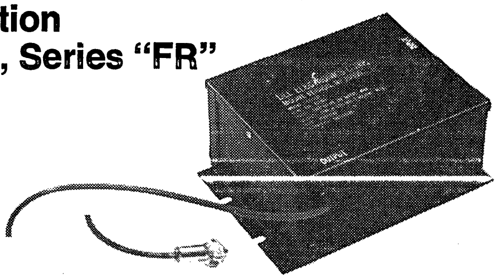
Highly Regulated Adjustable Compact Size—Series "PMSR"

- DC-DC converter
- Adjustable output (Resistance programmed)
- Short circuit proof

Input: ±15V dc
Output: Regulation: line and load ±0.002%
Polarity: specify pos. or neg.
Temp. coeff: 100ppm/°C
Temp. range: 0 to 60°C
Ripple: 25mV, peak to peak max.

Model #	Volts	Current	Size
PMSR-1.5-1.5-6P	600-1500V	0-1.5mA	1.25 X 2.5 X 4.0
PMSR-1.5-1.5-6N	600-1500V	0-1.5mA	1.25 X 2.5 X 4.0

Ferro-Resonant HV Line Regulation Power Supplies, Series "FR"



- Simple reliable design
- Low cost
- 1% line regulation
- Short circuit proof

Input: 115VAC + 10%, 50 or 60 Hz
Output: Models to 20KVDC & 600 Watts
Line Regulation: ±1%
Load Regulation: ±10% NL to FL.

DEL

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250 East Sandford Boulevard, Mount Vernon, New York 10550
Phone: 914/699-2000 TWX 710-562-0130

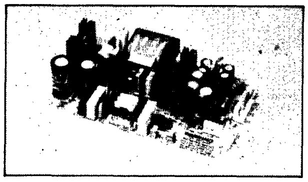
DELTA

SWITCHING POWER SUPPLIES

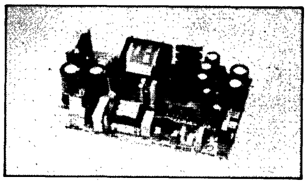
ЯU SP TÜV

FEATURES

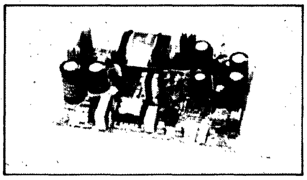
- All power supplies designed in accordance with UL 478, UL 1012, CSA 22.2 No. 154, VDE 0804, VDE 0806, IEC 380, IEC 435
- Input EMI filtered to pass VDE 0871 class B level for most of the listed power supplies
- 100% dynamic burn in
- 100% auto function tested before and after burn in
- Over voltage protection for +5V, short circuit protection for all outputs
- High efficiency, 70% typical
- 120/240 volts, 50/60 Hz input jumper selectable
- Fast load transient response
- Low output ripple
- Convection or internal fan cooling



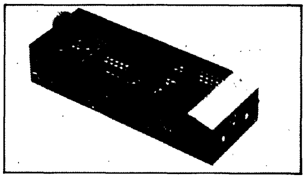
30AP



40BP



40CP



40EB

Part No.	Max. Power Output (Watts)	±5V				+12V				+12V				−12V				−5V				Agency Approval (As of June 1985)	
		Imin A	Imax A	Tol. %	Ripple MVp-p	Imin A	Imax A	Tol. %	Ripple MVp-p	Imin A	Imax A	Tol. %	Ripple MVp-p	Imin A	Imax A	Tol. %	Ripple MVp-p	Imin A	Imax A	Tol. %	Ripple MVp-p	Approved	In Process
DPS-30AP	31	1.0	5.0	±3	50	0	0.25	±5	150					0	0.25	±5	150					ЯU SP TÜV	
DPS-40BP	39	0.45	2.5	±3	50	0.4	2.0	±5	150					0.04	0.2	±10	150					ЯU SP TÜV	VDE
DPS-40CP	35	1.0	3.0	±3	50	0	0.2	±5	120	+15V 0.4	+15V 1.0	±5	150	0.02	0.2	±5	120					ЯU SP TÜV	
DPS-40EB	37	0.8	4.0	±3	50	0.04	1.2	±5	120					0.04	0.2	±10	240						
DPS-50AP	50	1.2	5.0	±2	50	0.5	2.0	±5	120					0	0.5	±5	120	0	0.5	±5	50	ЯU SP	
DPS-50AL	50	1.2	5.0	±2	50	0.5	2.0	±5	120					0	0.5	±5	120	0	0.5	±5	50	ЯU	
DPS-50AB	50	1.2	5.0	±2	50	0.5	2.0	±5	120					0	0.5	±5	120	0	0.5	±5	50		
DPS-50CP	50	0.6	4.0	±3	50	0.3	2.0	±5	120					0	0.5	±5	120					ЯU SP	
DPS-50DP	62	1.5	7.5	±2	100	0.3	1.5	±5	240					0.125	0.5	±5	240						UL, CSA, TUV
DPS-65AP	65	1.5	6.0	±2	50	0.5	2.1	±5	120	0.4	1.5	±5	120	0.04	0.25	±5	120						UL, CSA, TUV
DPS-75AP	75	4.0	8.0	±2	50	0.3	2.0	±5	120					0.04	0.5	±5	120	0	0.75	±5	50	ЯU	
DPS-75BP	75	2.0	4.65	±3	50	0.36	1.8	±5	120	0.4	2.0	±5	120	0.25	0.5	±5	120					ЯU	
DPS-75CP	75	2.0	8.0	±3	50	0.3	2.0	±5	120	0	1.5	±5	120	0	0.3	±5	120	0	0.3	±5	50	ЯU	
DPS-75DP	67	1.5	5.5	±2	50	±9V 0.1	±9V 0.4	±8	150	+24V 0.8	+24V 1.5	±5	240										UL, CSA, TUV
DPS-80AP	83	2.0	7.65	±3	50	0.03	2.1	±10	150	0.7	1.5	±5	150	0.03	0.2	±5	150						UL, CSA, TUV
DPS-85AB	87	4.0	9.0	±3	50	0.5	3.0	±5	120					0.05	0.5	±5	120					ЯU SP TÜV	
DPS-100AL	100	2.0	10.0	±3	50	1.0	3.0	±5	150					0.2	1.0	±5	120	0.1	0.5	±5	50	ЯU SP	
DPS-100BB	100	2.0	10.0	±3	50	0.5	4.0	±5	120					0.06	0.5	±10	200	0.06	0.5	±10	150	ЯU SP	
DPS-100BL	100	2.0	10.0	±3	50	0.5	4.0	±5	150					0.06	0.5	±10	150	0.06	0.5	±10	100	ЯU SP TÜV	
DPS-100CB	100	2.0	10.0	±3	100	0.5	4.0	±5	150					0.06	0.5	±10	150	0.06	0.5	±10	150		
DPS-110AP	110	2.0	10.0	±2	50	0.8	3.5	±5	120	0.3	1.5	±5	120	0	0.2	±5	120					ЯU SP TÜV	
DPS-110BB	135	2.0	12.0	±2	50	0.3	3.5	±5	120	+15V 0	+15V 1.5	+33 −0	500	0	1.3	±5	120					ЯU	TUV
DPS-110CP	122	3.0	10.0	±3	100	0.8	3.5	±5	120	0.3	1.5	±5	120	0.3	1.0	±5	120					ЯU SP TÜV	
DPS-230AB	225	4.0	20.0	±3	100	1.5	7.5	±5	150	+15V 0	+15V 1.5	+33 −0	500	0.1	0.5	±5	120	0.1	0.5	±5	50		UL, CSA, TUV
DPS-350AP	350	8.0	40.0	±2	75	2.0	10.0	±2	120					0	0.5	±5	120	0	0.5	±5	50		

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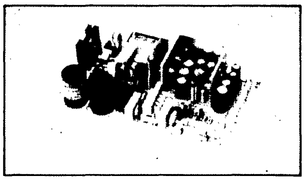
TEL: (408) 262-2002 TELEX: "4992342 DELTAITTHY"

DELTA

SWITCHING POWER SUPPLIES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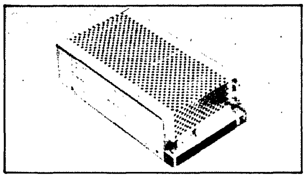
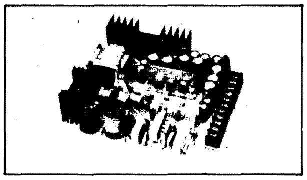
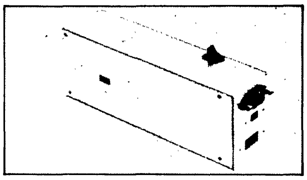

50AB


75CP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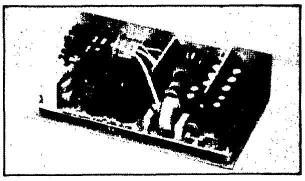
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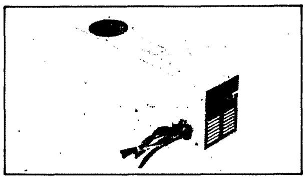
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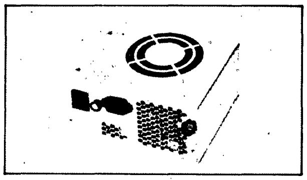
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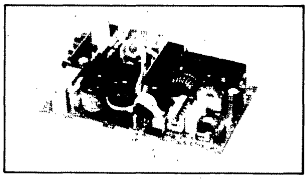

110CP

Package Type	Dimensions LxWxH (Inch)	Dimensions LxWxH (mm)
Open PCB	7.0x4.0x1.75	178x102x45
Open PCB	6.3x3.9x2.0	160x100x50
Open PCB	6.9x4.5x2.2	175x115x56
Boxed	8.7x3.1x1.8	220x80x46
Open PCB	7.75x4.25x1.75	197x108x44
L Frame	8.0x4.4x2.4	203x112x61
Boxed	8.0x4.4x2.4	203x112x61
Open PCB	6.3x4.0x1.6	160x102x40
Open PCB	7.75x4.25x1.75	197x108x44
Open PCB	7.75x4.25x1.75	197x108x44
Open PCB	7.4x6.2x2.2	188x158x56
Open PCB	7.4x6.2x2.2	188x158x56
Open PCB	7.4x6.2x2.2	188x158x56
Open PCB	7.0x4.0x1.75	178x102x45
Open PCB	7.8x4.3x1.8	197x108x44
Boxed	10.0x3.8x2.5	254x97x64
L Frame	9.5x5.0x2.5	241x127x64
Boxed	14.2x4.72x3.54	360x120x90
L Frame	9.3x4.6x2.5	236x115x64
Boxed	8.5x5.2x4.7	216x130x118
Open PCB	8.5x5.0x2.25	216x127x57
Boxed	8.3x6.7x3.7	210x170x94
Open PCB	8.5x5.0x2.25	216x127x57
Boxed	9.4x5.3x6.3	239x135x159
Open PCB	10x9x2.64	254x228x67

GENERAL SPECIFICATIONS

EFFICIENCY

70% typical at full load

INPUT CHARACTERISTICS

INPUT VOLTAGE:
90 ~ 132 VAC or 180 ~ 265 VAC, jumper selectable, 47 ~ 63 Hz, single phase

IN RUSH CURRENT:
25 amperes, 5 ms maximum at normal line input, full load & 25°C ambient cold start condition

HOLDING TIME:
1 cycle minimum under full load condition

CONDUCTED EMI:
Internally filtered to meet FCC Docket 20708, part 15 & VDE 0871 requirements

AC LEAKAGE:
0.75 mA maximum over AC input voltage range

OUTPUT CHARACTERISTICS

RIPPLE & NOISE:
See table for Individual power supply

TEMPERATURE EFFECT:
0° ~ 50°C, 0.02% per °C maximum for all outputs

VOLTAGE REGULATION
See table for individual power supply

LOAD TRANSIENT RESPONSE

2% maximum for 50% to 100% load change

ISOLATION at 25°C, 75% RH)

BETWEEN INPUT & OUTPUT TERMINALS:
1.5K VAC, 60 Hz for one minute

BETWEEN INPUT & CHASSIS:
1.5K VAC, 60 Hz for one minute

BETWEEN OUTPUT TERMINALS & CHASSIS:
500 VAC, 60 Hz for one minute
500 VDC, 50 megaohms minimum

CIRCUIT PROTECTION

OVERCURRENT PROTECTION:
Protected against short circuits or over conditions

OVERVOLTAGE PROTECTION:
Standard on +5V output set at 6.2V ±0.5V

ENVIRONMENT

OPERATING:
TEMPERATURE: 0° to 50°C full load, linear derating to 50% load at 70°C
HUMIDITY: 8 ~ 90% RH
STORAGE:
TEMPERATURE: −30°C ~ 85°C
HUMIDITY: 5 ~ 95% RH
VIBRATION:
3.3 principal axes 2.2G cycling or dwell type. 30 minutes for each axis.
ALTITUDE:
Operate properly at any altitude between 0 ~ 10,000 ft.

SAFETY

All power supplies designed to meet UL 478, UL 1012, CSA 22.2 No. 154, VDE 0806, ICE 380 & IEC 435 requirements

DELTA ELECTRONIC INDUSTRIAL CO., LTD.

9th FL., ASIA ENTERPRISE CENTER, NO. 602, MIN CHUAN E. RD., TAIPEI, TAIWAN, R.O.C.
TEL: (02) 7169762, 7314822, 7517790 TELEX: "26524 DELTATRO" FAX: (02) 7169764
USA OFFICE: DELTA PRODUCTS CORP.
351 FAIRVIEW WAY, MILPITAS, CA 95035
TEL: (408) 262-2002 TELEX: "4992342 DELTAITTHY"

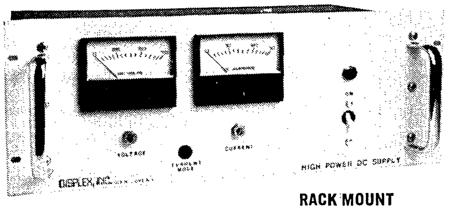
MINIGLOSSARIES
FORMULAS • CHARTS
PRODUCT SELECTION GUIDES
FORMS TECHNICAL
CODES INFORMATION

WHERE TO FIND THEM IN THE 85/86 EDITION OF EEM

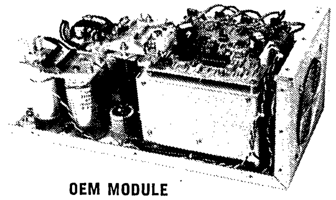
Abbreviations/Acronyms .... **A**•1166, **B**•1012, **C**•1028, **D**•1016
ASCII Code .... **D**•1087
Batteries, Product Selection Guide .... **D**•1413
Batteries & Fuel Cells, Characteristics .... **D**•1430
Cabinets, Enclosures, Racks, & Chassis, Product Selection Guide .... **C**•1003
Capacitors, Basic Formulas .... **A**•1093
Capacitors, Miniglossary .... **A**•1066
Capacitors, Product Selection Guide .... **A**•1003
Circuit Boards (Printed) Product Selection Guide .... **C**•1099
Coils, Chokes, Inductors, Product Selection Guide .... **A**•1205
Conductors, Maximum Current Capacity of Copper & Aluminum .... **C**•1863
Connectors, Miniglossary .... **C**•1129
Connectors, Terminals, & Sockets, Product Selection Guide .... **C**•1105
Crystals, Oscillators, Crystal & Piezoelectric Filters, Product Selection Gude .... **A**•1309
Delay Lines, Product Selection Guide .... **A**•1459
Discrete Semiconductors, Product Selection Guide .... **A**•2067
Displays, Readouts, Lamps, & Lights, Product Selection Guide .... **B**•1015
EBCDIC Code .... **D**•1092
Encapsulation, Miniglossary .... **C**•1086
Fans, Blowers, Cooling Equipment, & Heat Exchangers, Product Selection Guide .... **C**•1623
Filters, Product Selection Guide .... **A**•1583
Instruments, Graphic Recording Product Selection Guide .... **D**•1401
Instruments, Panel Meters, Product Selection Guide .... **D**•1329
Instruments, Test & Measuring Product Selection Guide .... **D**•1175
Interconnection Systems, Product Selection Guide .... **C**•1699
Keyboards & Keypads, Product Selection Guide .... **B**•1705
Logofinder & Trademark Directories .... **B**•901
Microwave Components, Product Selection Guide .... **A**•1701
Military Qualified Products Lists .... **B**•1003
Motors, Drives, & Rotating Components, Product Selection Guide .... **B**•1129
Opto Semiconductors, Miniglossary .... **B**•1214
Oscilloscopes, Product Selection Guide .... **D**•1385
Panel Hardware, Product Selection Guide .... **C**•1589
Potentiometers, Trimmers, Controls, & Rheostats, Product Selection Guide .... **A**•1991
Power Supplies, Miniglossary .... **D**•1462
Power Supplies, AC, Product Selection Guide .... **D**•1877
Power Supplies, DC, Product Selection Guide .... **D**•1447
Protective Components (Fuses, Circuit Breakers, etc.), Product Selection Guide .... **B**•1225
Relay Contact Forms .... **B**•1317
Relays, Electromechanical, Miniglossary .... **B**•1308
Relays, Product Selection Guide .... **B**•1261
Resistor Color Codes .... **A**•1828
Resistors, Product Selection Guide .... **A**•1785
Servo Components, Miniglossary .... **D**•1985
Solenoids, Product Selection Guide .... **B**•1463
Switches, Product Selection Guide .... **B**•1477
Thermal Components, Product Selection Guide .... **B**•1741
Thermal Conductivity of Dielectrics at Room Temperature .... **B**•1744
Thyristors/High Power Diodes, Miniglossary .... **A**•2076
Transducers & Encoders, Product Selection Guide .... **B**•1777
Transformers, Product Selection Guide .... **A**•2099
Wire & Cable, Product Selection Guide .... **C**•1743
Wire Gauges—Diameter, Area, Copper Weight .... **C**•1844

BATTERY CHARGER/ELIMINATORS

FEATURES:
- Exceptionally compact.
- Low operating cost.
- Light weight.
- Current regulation optimized for long battery life.



RACK MOUNT



OEM MODULE

All models are available in standard rack mount configuration or optional open-frame modules for OEM applications:

Power Input—Single phase:
120 or 230 VAC, 47-63 Hz
Three phase:
208 VAC, 47-63 Hz

	W	D	H	Wgt
Sizes—A:	17″	10″	7″	25 lbs.
B:	17″	16″	8.75″	35 lbs.

VOLTAGE OUTPUT	CURRENT OUTPUT			
	1 ph. input		3 ph. input	
	(Amp)	(Size)	(Amp)	(Size)
12 VDC	100	B	200	B
24 VDC	60	A	100	B
48 VDC	30	A	60	B
72 VDC	20	A	40	B
96 VDC	15	A	30	B
120 VDC	12.5	A	24	B
144 VDC	10	A	20	B
168 VDC	9	A	17	B
192 VDC	8	B	15	B
240 VDC	6	B	12	B
360 VDC	4	B	8	B
480 VDC	3	B	6	B

QPS QUALITY POWER SUPPLIES

MIL-STANDARDS

Made-to-order according to the most stringent MIL-STANDARDS for use in airborne equipment, communications equipment, computers, CRTs, TWTs and more.

MORE POWER IN LESS VOLUME

We offer more power in less volume, with high reliability and top efficiency.

Features:
- Multiple outputs
- High reliability
- Compact
- Lightweight
- Efficient

Typical products:

DC/DC
low voltage power supply
model L-3001

For use in telecommunication equipment

INPUTS

43VDC to 75VDC

OUTPUTS

All Outputs In DC:	+ 5V 2.5A +15V 0.7A −15V 0.7A
Line Regulation:	0.4% maximum over entire input voltage range
Load Regulation:	0.4% maximum from no load to full load at +5V output and ±1% at ±15 V outputs
Ripple and Noise:	1% or 50mV PTP maximum, whichever is greater
Overshoots and Undershoots:	2% peak deviation for a 25% load change at 5A/μs
Hold-Up Time:	Output remains in regulation for a minimum of 10ms after loss of nominal input power

EFFICIENCY

70% minimum at minimum input voltage and full load, typical >75%

RELIABILITY

MTBF: MTBF of 60,000 hours

PHYSICAL DESCRIPTION

Size: 230 x 195 x 75mm (9.05″ x 7.67″ x 2.95″)
Weight: 2 Kg (4.4 lbs.

AC/DC
low voltage power supply
model L-3002

For airborne military equipment

INPUTS

Voltage: 115V AC 400 Hz per MIL-STD-704D

OUTPUTS

Voltages and Current:	$V_1 = +5$ VDC ±1% 2.25A $V_2 = -5$ VDC ±1% 1.5A $V_3 = +15$VDC ±1% 2.25A
Ripple:	Maximum ripple is 1% PTP of the nominal output voltage at any load

EFFICIENCY

75% minimum in entire temperature range and in output voltage limits as per MIL-STD-704D

PROTECTION

Output Over Voltage:	On all outputs
Overload:	Each output is protected to 120% of maximum current

RELIABILITY

MTBF: MTBF of 50,000 hours as per MIL HDBK-217D at AUF environment

PHYSICAL DESCRIPTION

Size:	178 x 127 x 51 mm (7″ x 5″ x 2″)
Weight:	1.3 kg (2.87 lbs.)

DC/DC
high voltage power supply
model H-5001

For military applications

INPUTS

DC Inputs:	+15, ±0.75V/−15,±0.75V
Input Current:	Up to 140 mA

OUTPUTS

Voltage All DC:	7.5KV 375V fixed	1.0KV to 1.4KV adj	200 to 450V Adjustable	−75V ±3.25V fixed
Current:	20μA	200μA	10μA	1.5mA
Regulation:	±1.0%	±0.1%	±0.1%	±5.0%
Ripple Under Constant Full Load:	7.5 Vpp	1.5 Vpp	0.3 Vpp	3.75 Vpp
Maximum Temperature Coefficient:	100 ppm/°C	50 ppm/°C	200 ppm/°C	1000 ppm/°C

PROTECTION

Short Circuit And Arcing:	Each output can withstand a short circuit (<100Ω) indefinitely, and no damage is incurred as a result of arcing in CRT from or to any output
Current Limiting:	Each output is overload protected, returning to normal operation when overload condition terminates
Over Voltage:	Absolute value of any output never exceeds 130% of specified maximum value under all failure conditions
Corona:	No damage or degradation in performance due to effects of self-or externally-induced corona, no self-induced corona that interferes with or degrades performance of adjacent components

RELIABILITY

MTBF: Minimum MTBF of 35,000 hours as per MIL HDBK-217-D when used in GM environment

PHYSICAL DESCRIPTION

Size: 114 x 64 x 44mm (4.5″ x 2.5″ x 1.75″)
Weight: 540 grams (1.2 lbs.)

DISPLEX, INC.
A SUBSIDIARY OF NORTH HILLS ELECTRONICS INC.

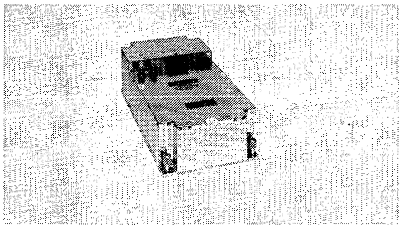
1 ALEXANDER PLACE, GLEN COVE, NEW YORK 11542-3796
TELEPHONE: (516) 671-4400 • TELEX: 46-6886 (NORTHILLS CI)

EG&G ALMOND INSTRUMENTS

LEADERSHIP IN MILITARY POWER SUPPLIES

MIL-Q-9858A

CUSTOM AND STANDARD DESIGNS



SHIPBOARD SWITCHING POWER SUPPLY

P/N 2-12150-01

Input Power: 115VAC, 60Hz, 3φ per MIL-STD-1399, Sec. 103, Type I

Outputs	Reg.	Noise
+5VDC @ 70A	±1%	50mVp-p
−5VDC @ 1A	±1%	50mVp-p
+12VDC @ 1A	±1%	120mVp-p
−12VDC @ 2A	±1%	120mVp-p

Size: 10 x 6.25 x 3 inches

Weight: 12 pounds

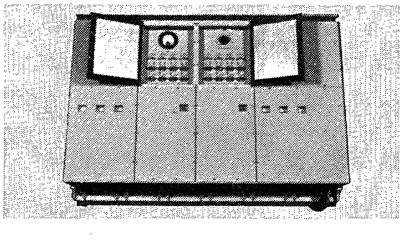
Environment: (MIL-E-16400):
Temp: 0 to 75°C
Humidity: to 95%
Fungus: MIL-STD-810
Vibration: MIL-STD-167
Shock: 75g's

Cooling: Convection/Conduction

Efficiency: 66%

EMI: MIL-STD-461 Notice 1

MTBF: 40,000 hours



SUBMARINE SWITCHING POWER SUPPLY

P/N 2-14400-01

Input Power: 115VAC, 60Hz, 3φ per MIL-STD-1399, Sec. 103, Type I

Outputs*	Reg.	Noise
+5VDC @ 80A	±0.1%	75mVp-p
−28VDC @ 2A	±0.4%	300mVp-p
+15VDC @ 4A	±0.4%	150mVp-p
−15VDC @ 4A	±0.4%	150mVp-p

Size: 49.5 x 35 x 8 inches *Fully redundant

Weight: 320 lbs.

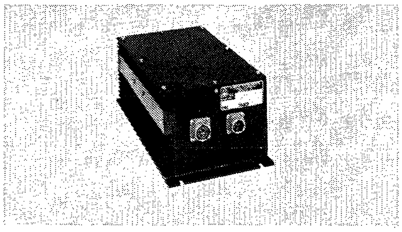
Environment: (MIL-E-16400)
Temp.: −20°C to +70°C
Humidity: 0 to 95%, MIL-STD-810
Vibration: MIL-STD-167-1
Shock: MIL-STD-901C, Class I

Cooling: Conduction/Convection

Efficiency: 70%

EMI: MIL-STD-461

MTBF: 80,000 hours, each redundant regulator



MILITARY POWER SUPPLY

P/N 2-10568

Input Power: 115 ±10VAC, 47-420Hz, 1φ

Output	Reg.	Noise
+28VDC @ 14A	±0.5%	50mVp-p

Size: 11.5 x 6 x 5 in. (incl. mtg. flanges)

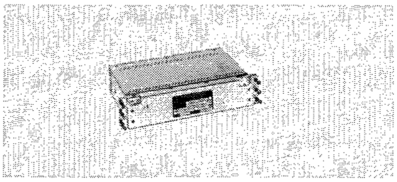
Weight: 14 pounds

Environment:
Temp: −20°C to +55°C
Magnetic Radiation—Less than 0.5 gauss one inch from top surface

Cooling: Circulating air

Efficiency: 60%

Provides power for military magnetic tape recorders which are used in military programs — for ship, ground and aircraft applications.



AIRBORNE POWER SUPPLY

P/N 2-11470

Input Power: +28VDC per MIL-STD-704

Outputs	Reg.	Noise
+20VDC @ .69A	±5%	100mVp-p
+12VDC @ .975A	±5%	100mVp-p
+5VDC @ 11.28A	±5%	100mVp-p
−14.7VDC @ 2.3A	±2%	100mVp-p

Size: 7.63 x 5.6 x 1.69 inches (incl. mounting flanges)

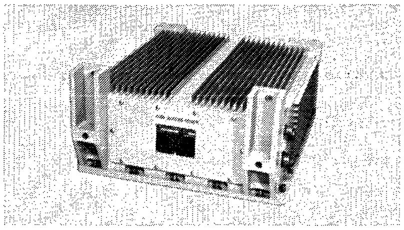
Weight: 4 pounds

Environment:
Temp.: −54°C to 100°C
Altitude: 0.560 to 15.5 psia
Acceleration: ±10g's, all axes
Vibration: MIL-E-5400, Curve IV
Shock: MIL-T-5422, 30g's
Explosive Atmosphere: MIL-E-5400
Humidity: MIL-T-5422, Para. 4.4
Salt Spray: MIL-T-5422, Para. 4.5
Sand & Dust: MIL-T-5422, Para. 4.7
Fungus: MIL-T-5422, Para. 4.8

Cooling: Conduction through mounting flanges

EMI: MIL-STD-461A (CE01, CE03, RS02, RS03, RE02, CS01, CS02)

MTBF: 27,000 hours



SHIPBOARD SWITCHING POWER SUPPLY

P/N 5498058

Input Power: 115VAC, 60 or 400Hz, 3φ per MIL-STD-1399, Sec. 103, Type I

Outputs	Reg.	Noise
±20VDC @ 2.5A	±1%	3% Max.
±28.5VDC @ 10A	±1%	3% Max.
±30VDC @ 10A	±1.5%	3% Max.
±33VDC @ 10A	±1%	3% Max.
+33VDC @ 10A	±1%	3% Max.

Size: 26 x 1.6 x 9.1 inches

Weight: 185 pounds

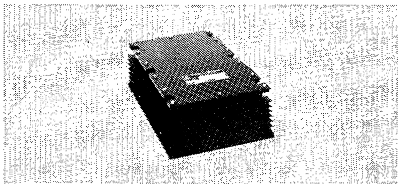
Environment: (MIL-E-16400G)
Temp.: 0° to 50°C
Humidity: 0 to 95%, MIL-STD-810
Vibration: MIL-STD-167-1
Shock: MIL-STD-901C

Cooling: Conduction/Convection

Efficiency: 75%

EMI: MIL-STD-461A

MTBF: 90,000 hours, each regulator



SHIPBOARD POWER SUPPLY

P/N 2-10500

Input Power: 115VAC, 400Hz, 3φ per MIL-STD-761 Type I Power

Output	Reg.	Noise
5VDC @ 15A	±2%	28mVp-p

Size: 9.9 x 6 x 3 inches

Weight: 14 pounds

Environment:
Temp: −40°C to +80°C
Humidity: 0 to 95%
Shock: MIL-S-901 Class I
Vibration: MIL-STD-740
Noise: MIL-STD-740

Cooling: Combination convection & cold plate

Efficiency: 45%

EMI: MIL-STD-461

MTBF: 70,000 hours

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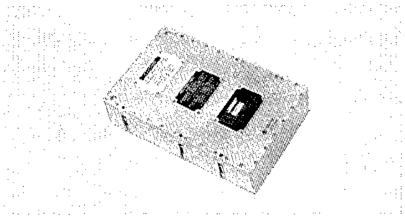
EG&G ALMOND INSTRUMENTS

LEADERSHIP IN MILITARY POWER SUPPLIES

MIL-Q-9858A

CUSTOM AND STANDARD DESIGNS



NAVY STANDARD POWER SUPPLY PROGRAM (SPSP)

P/N 56433/7 & /8

Input Power: 115VAC, 60Hz, 3φ or 155VDC per DoD-STD-1399 Sec. 300

Outputs	Reg.	Noise
+5VDC @ 20 or 50A	±1%	100mVp-p
±15VDC @ 2A	±1%	100mVp-p

Size: 6.80 x 10.80 x 2.48 inches

Weight: 14 lbs.

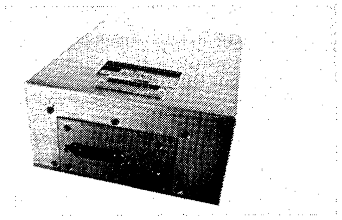
Environment: (MIL-E-16400)
Temp.: −10°C to +60°C
Temp. Transient: (1 hour) +80°C
Shock: MIL-STD-901C, Class I
Vibration: MIL-STD-202
Humidity: 0 to 95%, MIL-STD-810
Salt Fog: MIL-STD-810
Thermal Shock: MIL-STD-202

Cooling: Cold plate

Efficiency: 70%

MTBF: 100,000 hours

EMI: MIL-STD-461, Class A4 & A5



SHIPBOARD SWITCHING POWER SUPPLY

P/N 2-15800-01

Input Power: 115VAC, 50 to 400Hz, 1φ per MIL-STD-1399A Sec. 103, Type I

Outputs	Reg.	Noise
+5VDC @ 20A	±1%	50mVp-p
−15VDC @ 2.5A	±1%	150mVp-p

Size: 7 x 6 x 3 inches

Weight: 7.5 lbs.

Environment: (MIL-E-16400)
Temp.: −20°C to +85°C (Baseplate)
Shock: MIL-STD-901, Class I
Vibration: MIL-STD-167-1, Type I
Humidity: 0 to 95%, MIL-STD-810

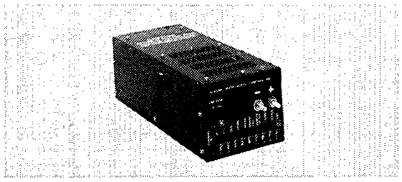
Cooling: Cold plate

Efficiency: 70%

MTBF: 30,000 hours

Redundancy: Built-in Diode OR-ing

INDUSTRIAL — COMPUTER GRADE — MARINE APPLICATIONS



SINGLE OUTPUT SWITCHING POWER SUPPLY

Input Power: 115/230VAC, 47-63 Hz, 1φ

Output Power: 5, 12, 15, 18 24, & 28VDC (output 375 watts)

Size: 12 x 5 x 4.18 inches

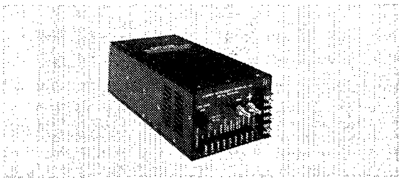
Weight: 8.5 pounds

Environment:
Temp: −10°C to +60°C (No derating)
Vibration: MIL-STD-167 Type I
Shock: MIL-STD-202, Method 213, Cond. A
Non-corrosive construction

Cooling: Internal fan

Efficiency: To 83%

MTBF: Greater than 40,000 hours



DUAL OUTPUT SWITCHING POWER SUPPLY

Input Power: 115/230VAC, 47-63 Hz, 1φ

Output Power: 5, 12, 15, 18 24, & 28VDC (combined output 375 watts)

Size: 12 x 6.12 x 4.18 inches

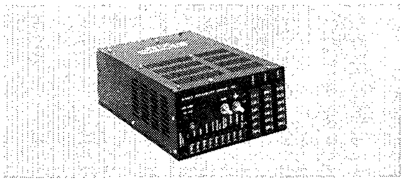
Weight: 10 pounds

Environment:
Temp: −10°C to +60°C (No derating)
Vibration: MIL-STD-167 Type I
Shock: MIL-STD-202, Method 213, Cond. A
Non-corrosive construction

Cooling: Internal fan

Efficiency: To 70% +

MTBF: Greater than 40,000 hours



TRIPLE OR QUAD OUTPUT SWITCHING POWER SUPPLY

Input Power: 115/230VAC, 47-63 Hz, 1φ

Output Power: 5, 12, 15, 18 24, & 28VDC (combined output 375 watts)

Size: 12 x 8.12 x 4.18 inches

Weight: 11.7 pounds

Environment:
Temp: −10°C to +60°C (No derating)
Vibration: MIL-STD-167 Type I
Shock: MIL-STD-202, Method 213, Cond. A
Non-corrosive construction

Cooling: Internal fan

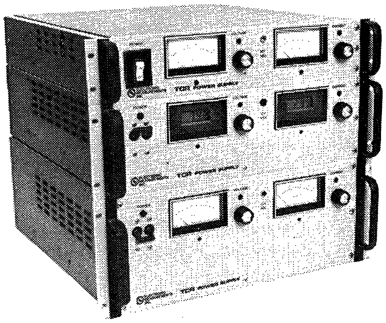
Efficiency: To 70% +

MTBF: Greater than 40,000 hours

1330 E. Cypress St., Covina, CA 91724 • (818) 967-9521 • TWX 910-584-1320

SCR-REGULATED DC POWER SUPPLIES

TCR SERIES SINGLE-PHASE MODELS



MAJOR SPECIFICATIONS

AC input voltage:
105-130V, 47-63 Hz (600, 1000 and 1800W Models)
190-253V, 47-63 Hz (2800W Model) 190-253V
Input options available on 600, 1000 and 1800W Models.

DC output:
Zero to value shown in model designation (volts-phase-amps. See chart.) Regulation 0.1%.

Options:
Over voltage protection $75 (600-1000W units); $95 (1800W unit); $110 (2800W unit); 190-253 volt input (600 and 1000W units) $40; (1800W units) $60. Digital panel meters available at no additional cost.

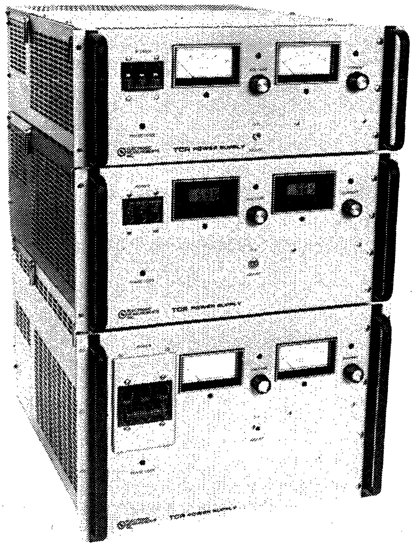
Sizes:
600 and 1000 watt: 3½″ High, 19″ rack by 18½″ Deep
1800 watt: 5¼″ High, 19″ rack by 18½″ Deep
2800 watt: 7″ High, 10″ rack by 18½″ Deep

Model	Ripple mV RMS	* Price
TCR 7.5S70	80	$ 785
TCR 7.5S115	80	985
TCR 7.5S200	80	1350
TCR 7.5S300	80	1650
TCR 10S50	80	785
TCR 10S90	80	985
TCR 10S165	80	1350
TCR 10S240	80	1650
TCR 20S30	80	785
TCR 20S50	80	985
TCR 20S90	80	1350
TCR 20S135	80	1650
TCR 40S15	100	785
TCR 40S25	75	985
TCR 40S45	100	1350
TCR 40S70	100	1650

Model	Ripple mV RMS	* Price
TCR 60S10	120	$ 785
TCR 60S18	75	985
TCR 60S30	90	1350
TCR 60S45	90	1650
TCR 80S8	150	785
TCR 80S13	80	985
TCR 80S23	120	1350
TCR 80S34	100	1650
TCR 150S4	300	785
TCR 150S7	150	985
TCR 150S12	200	1350
TCR 150S18	200	1650
TCR 300S2	500	785
TCR 300S3	250	985
TCR 300S6	300	1350
TCR 300S9	300	1650
TCR 600S1	1000	785
TCR 600S1.6	700	985
TCR 600S3	700	1350
TCR 600S4.5	750	1650

*** ALL PRICES SUBJECT TO CHANGE WITHOUT NOTICE**

TCR SERIES THREE-PHASE MODELS



MAJOR SPECIFICATIONS

AC input voltage:
188-242 VAC 3ϕ 50/60 Hz Standard. Optional nominal inputs 200V, 380V, 415V 440/460/480.

DC output:
Zero to value shown in model designation (volts-phase-amps). See chart. Regulation 0.1%.

Options:
Over voltage protection $190. Optional inputs $200 except 380V, no charge. Digital panel meters available at no additional cost.

Sizes:
2.5 KW: 7″ High, 19″ rack by 23.25 (includes output terminal)
5.0 KW: 8.75″ High, 19″ rack by 23.25 (includes output terminal)
10.0 KW: 12.25″ High, 19″ rack by 24.25 (includes output terminal)

Model	Ripple CV (mV RMS)	* Price
TCR 7.5T300	30	$2295
TCR 6T600	30	2800
TCR 6T900	30	3890
TCR 10T250	35	2295
TCR 10T500	35	2800
TCR 10T750	35	3890
TCR 20T125	20	2295
TCR 20T250	20	2800
TCR 20T500	20	3890
TCR 30T100	15	2295
TCR 30T200	15	2800
TCR 40T60	15	2295
TCR 40T125	15	2800
TCR 40T250	15	3890
TCR 50T200	18	3890

Model	Ripple CV (mV RMS)	* Price
TCR 80T30	25	$2295
TCR 80T60	25	2800
TCR 100T100	40	3890
TCR 120T20	40	2295
TCR 120T40	40	2800
TCR 160T15	60	2295
TCR 160T30	60	2800
TCR 160T60	60	3890
TCR 250T10	90	2295
TCR 250T20	90	2800
TCR 250T40	90	3890
TCR 500T5	125	2295
TCR 500T10	125	2800
TCR 500T20	125	3890

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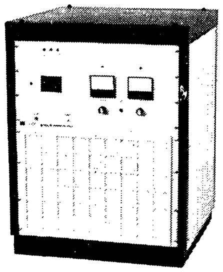
TELEX: 132-424

EMHP SERIES THREE-PHASE MODELS 20, 30, 60 KILOWATTS



APPLICATIONS

- Electromagnets
- Magnetic beam bending
- Cryogenic magnets
- Precision electroplating
- DC motor power
- Large relay systems
- Inverter power source
- High energy electronic systems
- Electrochemical processes
- High-power illumination systems
- Thermodynamic and thermonuclear research
- Battery charging
- Industrial DC power

FEATURES

- Low cost
- Quick delivery time
- High efficiency
- High performance

MAJOR SPECIFICATIONS

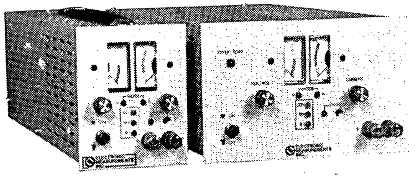
AC Input Voltage: 460 VAC ±10%, 60 Hz. Optional inputs available.

DC Output: Regulation, 0.1%; stability, 0.05%.
Size 1: 30″H x 22¼″W x 27¾″D
Size 2: 34⅝″H x 27½″W x 29¼″D
Size 3: 44½″H x 27½″W x 33¼″D

Model	Voltage (V)	Current (A)	Voltage Ripple (mV rms)	Current Ripple (mA rms)	Typical Price ($)*
SIZE 1 (20 KW maximum)					
EMHP 10-1000	0-10	0-1000	50	5	6250
EMHP 20-750	0-20	0-750	60	2.25	6250
EMHP 30-600	0-30	0-600	70	1.4	6250
EMHP 40-450	0-40	0-450	80	0.9	6250
EMHP 60-300	0-60	0-300	100	0.5	6250
EMHP 80-250	0-80	0-250	120	0.4	6250
EMHP 150-130	0-150	0-130	180	0.2	6250
EMHP 300-60	0-300	0-60	300	0.06	6250
EMHP 600-30	0-600	0-30	400	0.02	6250
SIZE 2 (30 KW maximum)					
EMHP 10-1500	0-10	0-1500	50	7.5	8250
EMHP 20-1000	0-20	0-1000	60	3.0	8250
EMHP 30-800	0-30	0-800	70	2.0	8250
EMHP 40-600	0-40	0-600	80	1.2	8250
EMHP 60-500	0-60	0-300	100	0.8	8250
EMHP 80-375	0-80	0-375	120	0.6	8250
EMHP 150-200	0-150	0-200	180	0.25	8250
EMHP 300-100	0-300	0-100	300	0.10	8250
EMHP 600-50	0-600	0-50	400	0.03	8250
SIZE 3 (60 KW maximum)					
EMHP 10-3000	0-10	0-3000	50	15	14750
EMHP 20-1500	0-20	0-1500	60	4.5	14750
EMHP 30-1250	0-30	0-1250	70	3.0	14750
EMHP 40-1000	0-40	0-1000	80	2.0	14750
EMHP 60-750	0-60	0-750	100	1.3	14750
EMHP 80-600	0-80	0-600	120	0.9	14750
EMHP 150-350	0-150	0-350	180	0.42	14750
EMHP 300-200	0-300	0-200	300	0.20	14750
EMHP 600-100	0-600	0-100	400	0.07	14750

* Each application is priced at time of order. Please consult factory for complete details.

ATR SERIES LINEAR POWER SUPPLIES



FEATURES:

ATR-100 and ATR-250 are 100 and 250 watt, wide range, linear, DC power supplies. Through a unique switching circuit these units produce essentially a constant power output capability at 8V, 18V and 32V outputs so that as the output voltage requirement is lower the available current output is higher. The units are fully metered, programmable and have a self contained OVP circuit.

MAJOR SPECIFICATIONS

AC Input: 105-125V, 47-63 Hz (Optional inputs)

DC Output:	**ATR-100**	**ATR-250**
	0-8V, 0-10A	0-8V, 0-25A
	0-18V, 0-5A	0-18V, 0-13A
	0-32V, 0-3A	0-32V, 0-7A
REGULATION:	**Line**	**Load**
Constant Voltage:	0.01% +2mV	0.01% +3mV
Constant Current:	0.01% +2mA	0.01% +3mA
Ripple:	**Constant Voltage**	**Constant Current**
	1mV RMS	5mA RMS
	5mV P/P	—

Temp Coefficient: 0.02% +400 microV/°C

Operating Temp: 0°C to +40°C at full rating

Storage Temp: −40°C to +85°C

Over Voltage Protection: Adjustable from 2.5V to 36V

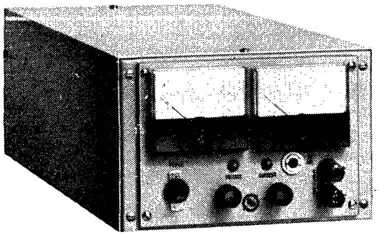
Cooling: Fan cooled, thermostatically-protected

Weight: 18 lbs. (ATR-100); 32 lbs. (ATR-250)

Size: 4″Wx5″Hx18″D (ATR-100); 8″Wx5″Hx18″D (ATR-250)

Rack adapter systems available.
ATR-100: $495* ATR-250: $695*

HCR SERIES DC MODELS — 250 WATTS



MAJOR SPECIFICATIONS

AC Input Voltage: 105-130V, 47-63 Hz or 190-253V, 47-63 Hz. Optional inputs available.

DC Output: Regulation, voltage mode — ±0.1%; regulation, current mode — ±0.25%, 8 hours; temperature coefficient — 0.02%/°C.

Weight: 45 lbs.

Size: 5″H x 7⅝″W x 18½″D

Rack Adaptors: Available for 1 & 2 units. Price: $495*

Output Voltage (V)	Output Current (A)	Voltage Ripple (mV rms)	Current Ripple (mA rms)	Model	Price* ($)
0-7.5	0-30	80	450	HCR 7.5-30	550
0-10	0-25	80	275	HCR 10-25	550
0-20	0-13	80	55	HCR 20-13	550
0-30	0-8	90	45	HCR 30-8	550
0-40	0-6	100	27	HCR 40-6	550
0-60	0-4	120	15	HCR 60-4	550
0-80	0-3	150	9	HCR 80-3	550
0-150	0-2	300	3	HCR 150-2	550
0-300	0-0.9	500	1.5	HCR 300-0.9	550

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DC POWER SUPPLIES

ARC LAMP POWER SUPPLIES

FEATURES

- Three series (1) Solid State Switching for scientific applications (2) Primary SCR, single or three phase for industrial, stage & studio or U-V curing (3) Secondary SCR, single or three phase supplies for krypton Arc Lamps
- 35W to 10 KW, CC or CP mode, output voltages 14 VDC to 220 VDC
- 75 to 85% efficiencies
- Low ripple and regulation—better than 1%
- Low energy starting with input surge protection
- No audible noise

APPLICATIONS

- Optical instrumentation
- Medical
- Graphic arts
- Image projection
- Stage & studio

TOS SERIES TRIPLE OUTPUT

- Logic & Analog Power
- Isolated Outputs
- Series or Parallel
- Two 118W Models
- Compact & Rugged

MAJOR SPECIFICATIONS

AC Input Voltage: 105/125 VAC or 230 VAC @ 47-400 Hz internal switch for selecting primary input

DC Output:	**TOS 40205**	**TOS 20205**
No. 1	3-7 VDC @ 3A	3-7 VDC @ 3A
No. 2	0-20 VDC @ 2.5A	0-20 VDC @ 2.5A
No. 3	0-40 VDC @ 1.25A	0-20 VDC @ 2.5A

Regulation:	**Line**	**Load**
No. 1	2 mv CV, .4 ma CC	2 mv CV, .4 ma CC
No. 2 & 3	0.5% CV, .4 ma CC	.05% CV, .4 ma CC

Ripple: CV output 1.10 mv P-P; 2 & 3 outputs 3 mv CC 4 ma all outputs

Weight: 14 lbs **Size:** 5″Wx7″Hx11″D **Price:** $575 ea*

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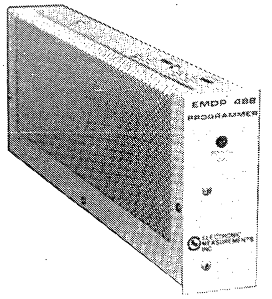
EMDP IEEE DIGITAL PROGRAMMER



MAJOR SPECIFICATIONS

An interface/control unit to remotely control outputs of E/M power supplies

Output: one to six independent, unipolar analog sources, mutually isolated for potentials not to exceed 800 VDC

Message: ASCII/ISO 7 bit code

Programming Range: (1) 0 to 5 VDC or (2) 0 to 10 VDC

Output Resolution: Standard .001 x full scale or High .0001 x full scale

Model	Rack Size	Resolution	Output	Price*
EMDP-100/3	1/8	Standard	Single Analog	$ 695
EMDP-100/4	1/8	High	Single Analog	750
EMDP-200 3/3	1/8	3 digit both channels	Dual Analog	795
EMDP-200 4/4	1/8	4 digit both channels	Dual Analog	895
EMDP-600	Full	as above per card	1-6 channels, 1-3 IEEE bus address 3 dual channels 1 bus address each card	2685

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POWER SUPPLIES

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- SCR REGULATED POWER SUPPLIES
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- BURN-IN POWER SUPPLIES
- LABORATORY, SYSTEMS, ATE POWER SUPPLIES
- INDUSTRIAL DC SUPPLIES
- CUSTOM AND SPECIAL SUPPLIES
- IEEE 488 INTERFACE SYSTEMS
- ARC LAMP AND LASER POWER SUPPLIES
- DC SPUTTERING POWER SUPPLIES

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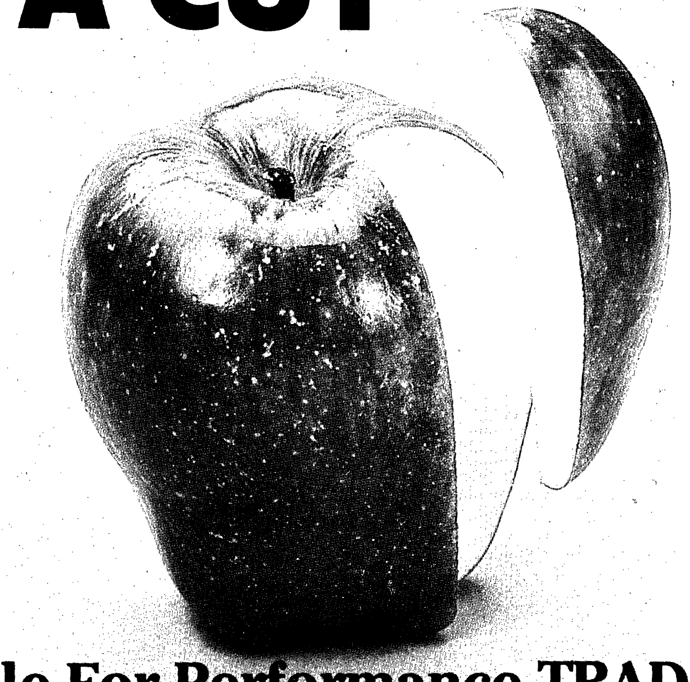
ELPAC... A CUT ABOVE!



Why Settle For Performance TRADE-OFF'S in your Power Supply?

At Elpac you can have it all, high efficiency with peak load capability, tight regulation on all outputs (no minimum load required) and all available without compromising either cost or quality!

To support this commitment, we are offering a new family of switching power supplies that are "A Cut Above" the competition - THE EDS SERIES!

When peak load capability and high efficiency are required the typical trade off is regulation. Additionally, when auxiliary outputs require tight regulation, effciency is sacrificed. The EDS series, however, offer efficiencies of 80% minimum, post load regulation of ± .5%, peak load capabilities, space saving packaging plus economical pricing.* All this makes ELPAC "A Cut Above" the competition.

*AS LOW AS .74 PER WATT!

Model Number	OUTPUTS			
	1	2	3	4
EDS 135-1	5v/12A	12v/5A (7A pk)	-	-
EDS 150-1	5v/15A	12/15v Adj 5A (6A pk)	−12/−15v Adj .5A	-
EDS 170-1	5v/18A	12/15v Adj 1.5A	−12/−15 Adj 1.5A	24v/1A (2A pk)
EDS 180-1	5v/22A	12/15v Adj 2.5A	−12/−15 Adj 2A	−5v/.5A
EDS 200-1	5v/20A	12/15v Adj 2A	−12/−15v Adj 2A	24v/2A (4A pk)

NOTE: All power ratings are with minimum airflow.

Call today for specific information on this NEW EDS Series, or our other Switching, Linear, Wallmount, Unregulated, DC/DC Converters, or Custom Power Supplies. All available at over 250 distributor locations worldwide.

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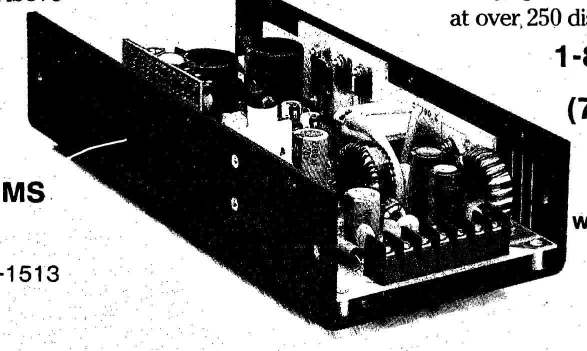
Outside California
(714) 979-4440
Inside California



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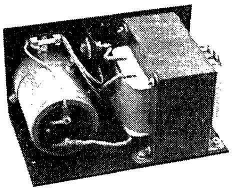
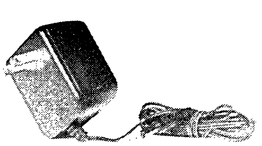
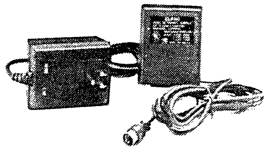


BFS-U SERIES
Universal Open Frame
Unregulated Power Supplies
Input: 100/110/120/200/210/
220/230/250 VAC 47-440 Hz
15 to 500 Watts

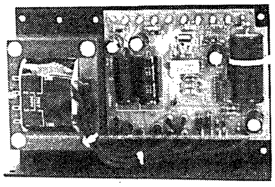


PS SERIES
Low Power Single Output
Unregulated Wallmount
Power Supplies
Input: 117 & 120 VAC, 60 Hz
U.L. Listed
1 to 7 Watts

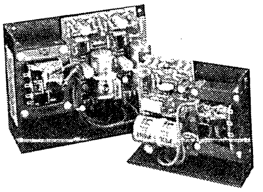


WM SERIES
Low Power Multiple
Output Wallmount Linear
Power Supplies
Input: 115 VAC, 60 Hz
Microprocessor Compatible
5 to 22 Watts

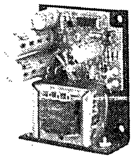
DC/DC CONVERTERS
Output: 12v, 15v, 28v
Power: 0.3 Watts to 6 Watts
For Distributed Power Within
Your System
0.2 to 10 Watts



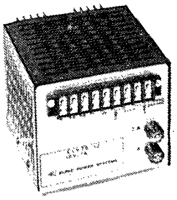
μPS SERIES
Multiple Output Linear
Power Supplies
Input: 105-125/210-250 VAC
47-440 Hz
14 to 110 Watts
Microprocessor Compatible



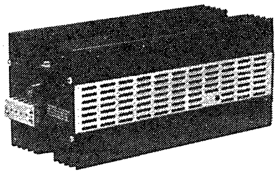
OLV SERIES
Open-Frame Single Output
Linear Power Supplies
Input: 105-125/210-250 VAC
47-440 Hz
3 to 60 Watts



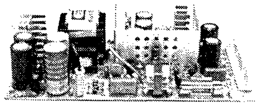
SOLV SERIES
Slim Open-Frame
Single Output Linear
Power Supplies
Input: 105-125/210-250 VAC
47-440 Hz
6 to 60 Watts



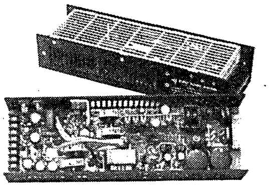
ELV SERIES
Enclosed Single Output
Linear Power Supplies
Input: 120/240 VAC
47-440 Hz
25 to 250 Watts



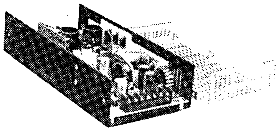
ES SERIES
Single & Multiple Output
Switch-Mode Power Supplies
Input: 90-132/180-250 VAC
47-450 Hz
100 to 260 Watts



EL SERIES
Economical Multiple
and Single Output
Switchers
Input: 90-132 VAC/180-250
VAC 47-440 Hz
15 to 75 Watts



MASS SERIES
Magnetic Amplifier Switching
Power Supplies
Input: 90-132/180-250 VAC
47-440 Hz
200 to 300 Watts
12 Multiple Output Models
available.



EDS SERIES
High Regulation Open-Frame
Multiple Output Switchers
Input: 90-132/180-250 VAC
47-440 Hz
135 to 200 Watts
Ideal for Disk Systems

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ELPAC POWER SYSTEMS
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ELPAC POWER SUPPLY SELECTOR
UNREGULATED & LINEAR POWER SUPPLIES

UNREGULATED POWER SUPPLIES (SINGLE OUTPUT)

MODEL NUMBER	OUTPUT VOLTAGES AND CURRENT 7V	12V	16V	24V	48V	MAXIMUM POWER
BFS-U 15	1.8A	1.2A	0.9A	0.6A	0.3A	15W
BFS-U 30	3A	2.4A	1.8A	1.2A	0.6A	30W
BFS-U 60	6A	4.8A	3.6A	2.4A	1.2A	60W
BFS-U 100	10A	7A	6A	3.5A	1.8A	100W
BFS-U 200	20A	15A	12.5A	7.5A	4A	200W
BFS-U 500	-	-	-	20A	10A	500W

LINEAR REGULATED POWER SUPPLIES (SINGLE OUTPUT)

OLV SERIES (SINGLE OUTPUT) (OPEN FRAME)

	OLV15 2 lbs		**OLV30** 5 lbs		**OLV60** 9 lbs		**OLV90** 13 lbs		**OLV120** 18 lbs		**OLV240** 34 lbs	
	H W L		H W L		H W L		H W L		H W L		H W L	
	4.0 x 2.75 x 4.5		5.75 x 3.50 x 4.88		7.00 x 4.75 x 4.88		4.75 x 5.00 x 11.25		3.00 x 12.25 x 13.00		7.50 x 13.00 x 5.38	
OUTPUT VOLTAGE	CURRENT	POWER	CURRENT	POWER	CURRENT	POWER	CURRENT	POWER	CURRENT	POWER	CURRENT	POWER
5V	3A	15W	6A	30W	12A	60W	18A	90W	24A	120W	50A	250W
12V	1.5A	18W	4A	48W	8A	96W	12A	144W	16A	192W	32A	384W
15V	1.2A	18W	3.3A	49.5W	6.6A	99W	9.8A	147W	13A	195W	26A	390W
24V	0.75A	18W	2A	48W	4A	96W	6A	144W	8A	192W	16A	384W

SOLV SERIES (SINGLE OUTPUT) (SLIM OPEN FRAME)

	SOLV6 1.5 lbs		**SOLV15** 2 lbs		**SOLV30** 5 lbs		**SOLV45** 8 lbs		**SOLV60** 9 lbs	
	H W L		H W L		H W L		H W L		H W L	
	1.25 x 3.75 x 3.00		4.00 x 4.87 x 2.07		4.87 x 3.00 x 5.62		4.87 x 2.87 x 7.00		4.87 x 3.35 x 9.00	
OUTPUT VOLTAGE	CURRENT	POWER	CURRENT	POWER	CURRENT	POWER	CURRENT	POWER	CURRENT	POWER
5V	1.2A	6W	3A	15W	6A	30W	9A	45W	12A	120W
12V	0.6A	7.2W	1.5A	18W	4A	48W	6A	72W	8A	96W
15V	0.6A	9W	1.2A	18W	3.3A	49.5W	5A	75W	6.6A	99W
24V	-	-	0.75A	18W	2A	48W	3A	72W	4A	96W
48V	-	-	-	-	1A	48W	-	-	2A	96W

ELV SERIES (SINGLE OUTPUT) (ENCLOSED)

	ELV25 7 lbs		**ELV75** 10 lbs		**ELV125** 18 lbs		**ELV250** 32 lbs	
	H W L		H W L		H W L		H W L	
	4.00 x 5.50 x 6.56		5.35 x 5.75 x 8.19		6.12 x 6.50 x 11.00		6.00 x 10.50 x 11.00	
OUTPUT VOLTAGE	CURRENT	POWER	CURRENT	POWER	CURRENT	POWER	CURRENT	POWER
5V	5A	25W	15A	75W	25A	125W	50A	250W
12V	2.6A	31.2W	7A	84W	12A	144W	20A	240W
24V	1.5A	36W	4A	96W	6A	144W	10.4W	249W

LINEAR REGULATED POWER SUPPLIES (MULTIPLE OUTPUTS)

UPS SERIES DUAL OUTPUTS (OPEN FRAME)

	UPS14 2 lbs		**UPS18** 2 lbs		**UPS21** 3 lbs		**UPS30** 6 lbs		**UPS60** 9 lbs	
	H W L		H W L		H W L		H W L		H W L	
	4.40 x 2.25 x 3.25		4.75 x 2.25 x 4.00		4.00 x 2.04 x 6.40		4.87 x 3.00 x 7.00		4.87 x 3.30 x 9.38	
OUTPUT VOLTAGE	CURRENT	POWER	CURRENT	POWER	CURRENT	POWER	CURRENT	POWER	CURRENT	POWER
5V/5V	.8A/.8A	8W	-	-	3A/.8A	17.5W	3A/3A	30W		-
5V/12V	.8A/.5A	10W	-	-	3A/.5A	21W	3A/1.5W	33W	6A/4A	78W
5V/15V	.8A/.5A	11.5W	-	-	3A/.5A	22.5W	3A/1.2W	33W	-	-
5V/24V	.8A/.25A	10W	-	-	3A/.25A	21W	3A/.75W	33W	-	-
12V/12V	.5A/.5A	12W	.7A/.7A	16.8W	1.5A/.5A	24W	1.5A/1.5A	36W	4A/4A	96W
12V/15V	.5A/.5A	13.5W	-	-	1.5A/.5A	25.5W	1.5A/1.2A	36W	-	-
15V/15V	.5A/.5A	15W	.5A/.5A	15W	1.2A/.5A	25.5W	1.2A/1.2A	36W	3.3A/3.3A	99W

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UPS SERIES TRIPLE OUTPUTS (OPEN FRAME)

OUTPUT VOLTAGE	**UPS27** 4 lbs		**UPS35** 4 lbs		**UPS45** 7 lbs		**UPS65** 8 lbs		**UPS90** 10 lbs		**UPS110** 14 lbs	
	H W L 4.87 x 2.00 x 8.00		H W L 7.00 x 2.38 x 5.75		H W L 4.87 x 2.75 x 10.5		H W L 4.87 x 2.75 x 11.00		H W L 4.87 x 2.75 x 14.25		H W L 4.75 x 5.35 x 13.00	
	CURRENT	POWER	CURRENT	POWER	CURRENT	POWER	CURRENT	POWER	CURRENT	POWER	CURRENT	POWER
5V/5V/12V	3A/.8A/.5A	25W	3A/.8A/.5A	25W	3A/3A/1.5A	40.5W	-	-	-	-	-	-
5V/9V/12V	-	-	-	-	3A/2A/1.5A	51W	6A/2A/1.5A	66W	12A/2A/1.5A	96W	18A/2A/1.5A	126W
5V/12V/12V	3A/.5A/.5A	27W	3A/.5A/.5A	27W	3A/1.5A/1.5A	51W	6A/1.5A/1.5A	66W	12A/1.5A/1.5A	96W	18A/1.5A/1.2A	126W
5A/12V/15V	3A/.5A/.5A	28W	3A/.5A/.5A	28W	3A/1.5A/1.2A	51W	6A/1.5A/1.2A	66W	12A/1.5A/1.2A	96W	18A/1.5A/1.5A	126W
5A/15V/24V	3A/.5A/.25A	27W	3A/.5A/.25A	27W	3A/1.5A/.75A	51W	6A/1.5A/.75A	66W	12A/1.5A/.75A	96W	18A/1.5A/.75A	126W
5A/15V/15V	3A/.5A/.5A	30W	3A/.5A/.5A	30W	3A/1.2A/1.2A	51W	6A/1.2A/1.2A	66W	6A/1.2A/1.2A	96W	12A/1.2A/1.2A	126W

WM SERIES WALLMOUNT POWER SUPPLIES (TRIPLE OUTPUTS)

MODEL NUMBERS	OUTPUT VOLTAGE & CURRENT +5V	−5V	+12V	−12V	MAX POWER
WM053	380mA	180mA	180mA	-	4
WM063	380mA	-	180mA	180mA	6
WM093	860mA	300mA	300mA	-	9

MODEL NUMBERS	OUTPUT VOLTAGE & CURRENT +5V	−5V	+12V	−12V	MAX POWER
WM113 *	860mA	-	300mA	300mA	11W
WM220 *	2.0A	-	.5A	.5A	22W

* TABLE TOP AVAILABLE
** TABLE TOP

SWITCHING POWER SUPPLIES

ES SERIES (SINGLE OUTPUT)

OUTPUT VOLTAGE	**ES100** 3.2 lbs H W L 2.38 x 5.25 x 7.65		**ES150** 4.9 lbs H W L 2.60 x 4.87 x 13.50		**ES200** 6.5 lbs H W L 3.50 x 4.87 x 13.50		**EPS250** 7 lbs H W L 3.44 x 4.75 x 12.75	
	CURRENT	POWER	CURRENT	POWER	CURRENT	POWER	CURRENT	POWER
5V	20A	100W	30A	150W	40A	200W	50A	250W
12V	8A	96W	12.5A	150W	16.5A	198W	20A	240W
15V	6.5A	97W	10A	150W	13A	195W	16A	240W
24V	4A	96W	6A	144W	8A	192W	10A	240W

ES SERIES (MULTIPLE OUTPUTS)

MODEL NUMBER	WT	SIZE H W L	OUTPUT VOLTAGE & MAXIMUM CURRENT +5V	−5V	+12V	−12V	+15V	−15V	MAXIMUM POWER
ES130	4.51 lbs	2.38 x 5.25 x 10.75	20A	.5A	1.5A	1.5A	-	-	138.5W
ES130	4.51 lbs	2.38 x 5.25 x 10.75	20A	.5A	-	-	1.2A	1.2A	138.5W
ES260	10.41 lbs	4.75 x 4.87 x 13.50	35A	1A	4A	4A	-	-	272W
ES260	10.41 lbs	4.75 x 4.87 x 13.50	35A	1A	-	-	3A	3A	266W

EL SERIES (SINGLE OUTPUT)

MODEL NUMBER	SIZE H W L	OUTPUT VOLTAGE & CURRENT +5V	+12V	+24V	MAXIMUM POWER
EL10151	1.75 x 4.0 x 4.87	3A	-		15W
EL10152	1.75 x 4.0 x 4.87	-	1.25A		96W
EL10153	1.75 x 4.0 x 4.87	-	-	.62A	15W
EL10301	2.125 x 4.63 x 6.5	6A	-	-	30W
EL10302	2.125 x 4.63 x 6.5	-	2.5A	-	30W
EL10303	2.125 x 4.63 x 6.5	-	-	1.25A	30W

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EL SERIES (MULTIPLE OUTPUTS)

MODEL NUMBER	SIZE H W L	OUTPUT VOLTAGE & MAXIMUM CURRENT +5V	−5V	+12V	−12V	−12V	MAXIMUM POWER
EL30401	1.90 x 3.90 x 6.30	2.5A	-	2A	-	.1A	37W
EL30401-1	1.90 x 3.90 x 6.30	3.5A	-	2A	-	.6A	40W
EL40501	1.85 x 4.40 x 7.20	6A	.5A	2.5A	-	.5A	50W
EL40502	1.85 x 4.40 x 7.20	6A	.5A	2.5A	-	.5A	50W
EL40503	1.85 x 4.40 x 7.20	6A	-	2.5A	1A	.5A	50W
EL40504	1.85 x 4.40 x 7.20	6A	-	2.5A	1A	.5A	50W
EL40651	2.00 x 4.25 x 8.00	6A	1A	3A	-	1A	65W
EL40652	2.00 x 4.25 x 8.00	6A	1A	3A	-	1A	65W
EL50751	1.70 x 4.25 x 8.20	5A	.5A	2.5A	2A	.5A	75W
EL50752	1.70 x 4.25 x 8.26	5A	.5A	2.5A	2A	.5A	75W

MASS300 SERIES MAGNETIC AMPLIFIER (MULTIPLE OUTPUTS)

MODEL NUMBER	SIZE H W L	OUTPUT VOLTAGE & MAXIMUM CURRENT +5V	−5V	+12V	+12V	−12V	+15V	−15V	+24V	+28V	MAXIMUM POWER
MASS300-1	2.50 x 4.95 x 15.00	25A	-	-	4A/6APK	4A/6APK	-	-	4A/6APK	-	300W
MASS300-2	2.50 x 4.95 x 15.00	25A	.5A	-	4A/6APK	4A/6APK	-	-	4A/6APK	-	300W
MASS300-3	2.50 x 4.95 x 15.00	25A	-	-	-	-	4A/6APK	4A/6APK	4A/6APK	-	300W
MASS300-4	2.50 x 4.95 x 15.00	25A	-	-	-	-	4A/6APK	4A/6APK	-	-	300W
MASS300-5	2.50 x 4.95 x 5.00	25A	-	-	4A/6APK	4A/6APK	-	-	-	4A/6APK	300W
MASS300-6	2.50 x 4.95 x 15.00	35A	-	-	6A/8APK	4A/6APK	-	-	-	-	300W
MASS300-7	2.50 x 4.95 x 15.00	30A	-	6A/9APK	4A/6APK	4A/6APK	-	-	-	-	300W

MASS210 SERIES MAGNETIC AMPLIFIER (MULTIPLE OUTPUTS)

MODEL NUMBER	SIZE H W L	OUTPUT VOLTAGE & MAXIMUM CURRENT +5V	−5V	+12V	−12V	+12V	+24V	+28	MAXIMUM POWER
MASS210-1	2.50 x 5.00 x 13.00	15A	-	6A/8APK	-	1A/1.5APK	-	-	210W
MASS210-2	2.50 x 5.00 x 13.00	15A	-	6A/8APK	-	1A/1.5APK	4A/6APK	-	210W
MASS210-1	2.50 x 5.00 x 13.00	15A	-	6A/8APK	-	1A/1.5APK	-	-	210W
MASS210-3	2.50 x 5.00 x 13.00	15A	.5A/.75APK	6A/8APK	-	1A/1.5APK	-	-	210W
MASS210-4	2.50 x 5.00 x 13.00	15A	-	6A/8APK	-	1A/1.5APK	-	3A/5APK	210W
MASS210-5	2.50 x 5.00 x 13.00	15A	-	6A/8APK	4A/6APK	1A/1.5APK	-	-	210W

EDS SERIES (MULTIPLE OUTPUTS)

MODEL NUMBER	SIZE H W L	OUTPUT VOLTAGE & MAXIMUM CURRENT +5V	−5V	+12V	+12/15V adj	−12V	−12/15 adj	+24	MAXIMUM POWER*
EDS135-1	2.50 x 5.00 x 11.50	12A	-	5A/7APK	-	-	-	-	144W
EDS150-1	2.50 x 5.00 x 11.50	15A	-	-	5A (6A pk)	-	0.5A	-	150W
EDS170-1	2.50 x 5.00 x 12.00	20A	-	-	1.5A	-	1.5A	1A (2A pk)	170W
EDS180-1	2.50 x 5.00 x 12.50	22A	.5A	-	2.5A	-	.2A	-	180W
EDS190-1	2.50 x 5.00 x 13.00	15A	0.5A	-	4A (6A pk)	1.5A	2A	-	190W
EDS200-1	2.50 x 5.00 x 12.50	20A	-	-	2A	-	.2A	2A/4APK	210W

*With 50 CFM air

DC/DC CONVERTERS (3 to 7V Unregulated Input) **Consult Factory for Additional Models.**

MODEL NUMBER	REGULATED OUTPUT VOLTAGE AND CURRENT +5V	+12V	−12V	+15V	−15V	MAXIMUM POWER	MODEL NUMBER	REGULATED OUTPUT VOLTAGE AND CURRENT +5V	+12V	−12V	+15V	−15V	MAXIMUM POWER
CC3801		21mA				250MW	CP3601	250mA					1.5W
CC3802				17mA		250MW	CP3607		150mA				1.5W
CC3852			21mA			250MW	CB3801		25mA				300MW
CC3853					17mA	250MW	CB3811			25mA			300MW
CA3708		15mA				200MW	CB3802				20mA		300MW
CA3709				13mA		200MW	CB3812				20mA		300MW
CA3722			10mA			200MW	CK3601	600mA					300MW
CA3725					8mA	200MW	CK3607		250mA				3W
CL3801		125mA				1.5W	CK3610				200mA		3W
CL3811			125mA			1.5W	CP4601		60mA	60mA			1.5W
CL3802				100mA		1.5W	CP4604				50mA	50mA	1.5W
CL3812					100mA	1.5W							

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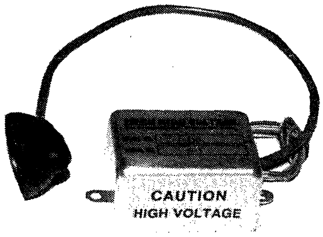
EMCO High Voltage Co.

POWER SUPPLIES CUSTOM / STANDARD

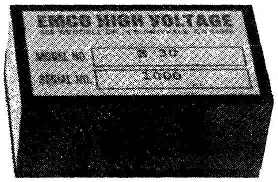
MINIATURE C.R.T. 12,000 VOLTS



HIGH VOLTAGE OUTPUT: +12.000 Volts DC @ 50 UA
OUTPUT NO. 2: +400 Volts @ 500UA (±10%)
OUTPUT NO. 3: -100 Volts @ 500UA (±10%)
REGULATION: Output Tracks Input Voltage (5% @ 5UA)
RIPPLE: 0.05% CL=500PF
INPUT VOLTAGE: +15 Volts DC
SIZE: 1.25" X 2.0" X 2.5"
* OTHER INPUTS AND OUTPUTS ARE AVAILABLE

MODEL 350

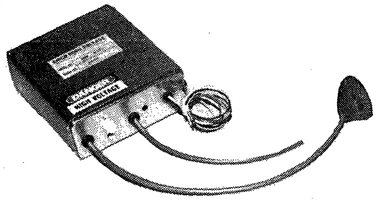
P.C. MOUNT DC/DC CONVERTERS



INPUT VOLTAGE: 4 thru 12 Volts DC
OUTPUT VOLTAGE: 500 thru 1.500 Volts DC @ 2MA
RIPPLE: .05% PK to PK
REGULATION: Output Proportional to Input
* PLUS and MINUS INUPT/OUTPUT
* INPUT/OUTPUT ISOLATION: 3,500 Volts
* RFI FILTERING
* SHORT CIRCUIT PROTECTION
* FLOATING INPUT/OUTPUT
SIZE: 2.5" X 1.5" X .85"

MODEL E15

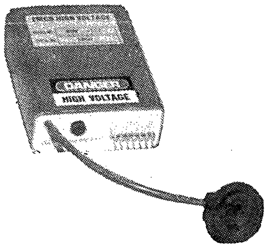
PRECISION COLOR CRT



HIGH VOLTAGE OUTPUT: +25.000 Volts DC @ 1.5MA
Adjustment Range: ±300 Volts
REGULATION: Line — .05%
Load — (Static) 0.1%
Load — (Dynamic) 0.1%/100UA
RIPPLE: 0.1% (P-P) CL=1000PF
TEMP. COEFFICIENT: 200 PPM/°C
FOCUS VOLTAGE: Adjustable from 22% to 36% of Anode Voltage @ ±20UA
G1 VOLTAGE: Fixed — 120 Volts DC ±10% @ 1MA
G2 VOLTAGE: Adjustable from 0 to 750 Volts DC ±10% @ ±20UA
INPUT VOLTAGE: +28 Volts DC ±10%
SIZE: 5.1" X 4.2" X 1.7"
* SHORT CIRCUIT PROTECTION
* ARC OVER AND OVER VOLTAGE PROTECTED
* EXCELLENT DYNAMIC RESPONSE AND STABLE PERFORMANCE

MODEL EHV

REGULATED 18,000 VOLTS



OUTPUT VOLTAGE: +18.000 Volts DC @ 500UA
(Adjustable ±5%)
REGULATION: Line — .05%
Load (Static) — .05%
Load (Dynamic) — 5 Volts @ 100UA
RIPPLE: .05% (P-P) CL=1000PF
OUTPUT NO. 2: +1,000 Volts DC @ 1MA
OUTPUT NO. 3: -100 Volts DC @ 5MA
INPUT VOLTAGE: +24 Volts DC
INPUT REGULATION: .005%
SIZE: 4.2" X 3.1" X 1.2"
* OVERVOLTAGE PROTECTION
* SHUTDOWN CONTROL CIRCUIT
* FULLY ENCAPSULATED

MODEL EHT

APPLICATIONS

X-Ray
Photomultiplier
Video
Computer
Capacitor Charging
Electronic Accelerator
Sem-ion Sources
Image Intensifiers

Cad/Cam
Shadow Mask
CRT
Laser
Medical
Airborne Navigation
Marine Navigation
Military Equipment
Energy Storage

CAPABILITIES

OUTPUTS: +5 Volts thru +30,000 Volts DC

CURRENT: Up to 10 AMPS

INPUTS: +5 to +40 Volts DC
110/220 Volts AC 50-400 HZ

REGULATION, RIPPLE & NOISE: .001%

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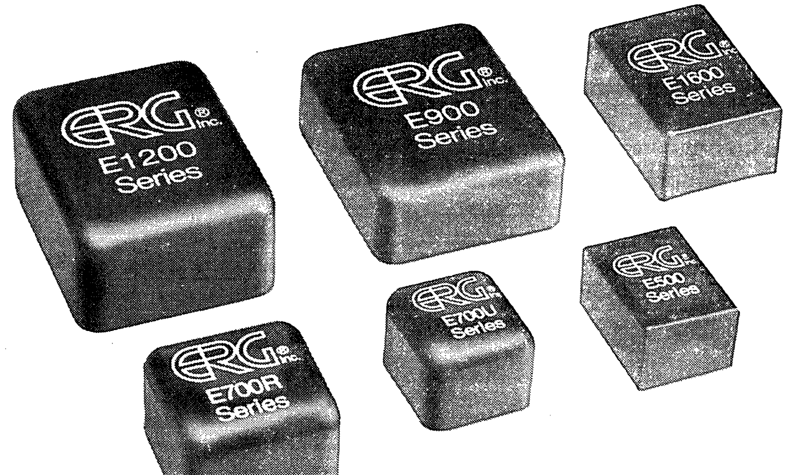
DC-DC Converters

for power on the P.C. board up to 25W



Made in U.S.A.

ERG converter savings add up!

ERG
Endicott Research Group, Inc.

Ideal for any end-use where up to 25W is needed from battery or other low-voltage source. No reason to design "special" multiple output power supplies for your unique application! Mount up to 4.2W per cu. in. on your P.C. board. Operating efficiencies to 85%.
For as little as $1/W! We'll **transform** the way you look at DC-DC conversion!

- Adapts single output on main DC switched mode power supply into additional outputs as needed—no more than you need, no less than you want.
- Eliminates extensive bussing of alternate voltages throughout main frame of the end-product.
- Easily added on to existing designs when new capabilities and new voltage needs are anticipated.
- You don't pay for regulation when you don't need it.
- The **flexibility** of custom with the **economy** of standard.

Match our converter to your power need!

Your Power Requirements	ERG Converter Series	Options	Input	Output†	Size	Weight	Package
Up to 3W	E700	Single, center tap (± voltages) Unregulated, regulated (single output only)	5,9,12,15 V DC standard (to 48 available)	5-500 V DC (your choice)	unregulated: 1.1" (27.94 mm) × 1.2" (30.48 mm) × .91" (23.11 mm) high regulated: 1.43" (36.32 mm) × 1.50" (38.10 mm) × 1.03" (26.16 mm) high	30 gms. unregulated 40 gms. regulated	Plastic
	E500*	Single, center tap (± voltages)	5,9,12,15 V DC standard (to 48 available)	5-500 V DC (your choice)	1.00" (25.40 mm) × 1.38" (35.05 mm) × 0.70" (17.78 mm) high	20 gms.	Plastic
Up to 6W	E1600	Center tap (± voltages) available	5,9,12,15 V DC standard (to 48 available)	5-500 V DC (your choice)	1.30" (33.02 mm) × 1.88" (47.75 mm) × .82" (20.83 mm) high	44 gms.	Plastic
Up to 12W	E900	Dual output	5,12,15 V DC standard (to 48 available)	5-500 V DC (your choice)	2" (50.80 mm) × 2.5" (63.50 mm) × .98" (24.9 mm) high	122 gms.	Aluminum
Up to 25W	E1200	Single output only	12,15 V DC standard (others available)	5-500 V DC (your choice)	2" (50.80 mm) × 2.5" (63.50 mm) × 1.19" (30.23 mm)	185 gms.	Aluminum

*For high-volume requirements, E500 delivers same performance as E700 at significantly lower unit cost!
Mounting: P.C. board standard
Encapsulation: All ERG converters are fully encapsulated
Isolation (in/out): 600V RMS (60 Hz. breakdown for 1 min.) standard
Temperature: 0–70° C. standard. Wider ranges available. 85° C. case max. 25° C. temp. rise typical for E1200
†Output power may be derated up to 50%, dependent on output voltage, output current and temperature.
All specifications subject to change without notice.

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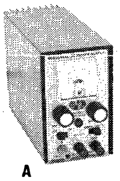
REGULATED & SEMI-REGULATED POWER SUPPLIES

Ruggedly-constructed, low voltage D.C. power supplies for use in design, development, testing of transistor circuitry . . . for servicing and operating auto, aircraft, marine-craft radio, electronic equipment . . . for production line testing, industrial and educational laboratory work and many other applications.

Precision made and engineered to give unequalled performance life per dollar. Features include: Voltage regulation, AC ripple filtering, adjustable output voltage, large easy-to-read meters, isolated output terminals, 1-year warranty.

INPUT—*Regulated Models:* 105-125 V. AC. 60 Hz *Industrial and General Purpose Models:* 117 V. AC 60 Hz. Models available to fit W.E. and EIA racks. Custom-design or modification of standard units to your specs.

INVERTER — Transistorized. Converts 12 V. DC to 117 V. AC, 60 Hz to operate equipment from car, truck or boat battery, or other 12 V. DC source for camping, traveling, boating. Reverse polarity and short circuit protection.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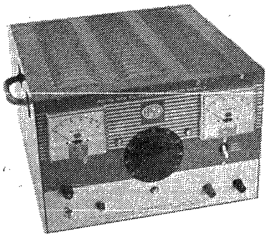
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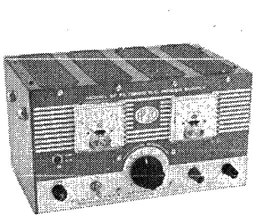
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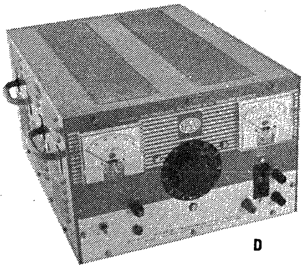
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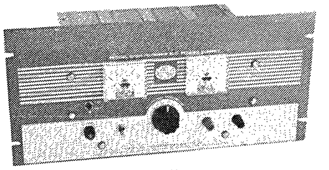
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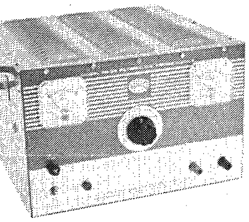
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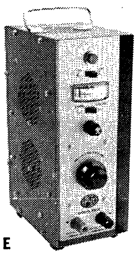
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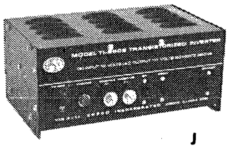
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REGULATED

Model	Figure	Output DC Volts	Output Current	Line Reg.**	Load Reg.*	Max. Ripple, RMS	Meters††	DC Imp. Ohms*	Size (H x W x C)	Wt. Lbs.	Net Price
PSR-12-25	A	0-25	0-500mA	0.01% +2mV	0.01%	100μV	0-30V/600mA	.006	5¼ x 3⅛ x 9⅛	6	$235.50
PSR-12-50	A	0-50	0-250mA	0.01% +2mV	0.01%	100μV	0-60V/300mA	.02	5¼ x 3⅛ x 9⅛	6	235.50

INDUSTRIAL

Model	Figure	Output DC Voltage	Output Amps.	Load Regulation* (V/A)†	Max. Ripple %	Meters††	DC Impedance Ohms*	Size (H x W x D)	Wt. Lbs.	Net Price
EF	B	0-28 0-14	0-5 0-5	0.9 (1-5A) 0.6 (1-5A)	1.0 1.0	0-50V, 0-6A	0.9 (1-5A) 0.6 (1-5A)	7 x 12 x 8½	21	$299.50
EFB	B	0-32 0-16	0-4 0-8	1.25 1.0	0.1 0.1	0-40/20V, 0-10A	1.25 1.0	7 x 12 x 8½	26	339.50
EFBR‡		0-32 0-16	0-4 0-8	1.25 1.0	0.1 0.1	0-40/20V, 0-10A	1.25 1.0	8¾ x 19 x 8½	34	392.50
GFL	C	0-125	0-5	1.5	0.5	0-150V, 0-5A	1.5	9¾ x 14¼ x 14¼	88	**729.50**
GFLR‡	H	0-125	0-5	1.5	0.5	0-150V, 0-5A	1.5	10½ x 19 x 14¼	100	**794.50**
NFB	C	0-32	0-15	0.4	0.75	0-50V, 0-25A	0.4	9¾ x 14¼ x 14¼	84	**679.50**
NFBR‡	H	0-32	0-15	0.4	0.75	0-50V, 0-25A	0.4	10½ x 19 x 14¼	97	**729.50**
PS-5	C	0-55	0-10	0.8	0.5	0-75V, 0-15A	0.7	9¾ x 14¼ x 14¼	70	**649.50**
PS-5R‡	H	0-55	0-10	0.8	0.5	0-75V, 0-15A	0.7	10½ x 19 x 14¼	89	**699.50**
PS-1000-32	D	0-32	0-30	0.2	0.75	0-50V, 0-30A	0.2	9¾ x 14¼ x 19¼	113	**945.50**
PS-1000-55	D	0-55	0-20	0.5	0.5	0-75V, 0-30A	0.5	9¾ x 14¼ x 19¼	113	**945.50**
PS-1000-125	D	0-125	0-8A	1.0	Less than 1%	0-150V, 0-10A	1.0	9¾ x 14¼ x 19¼	113	**945.50**

GENERAL PURPOSE

Model	Figure	Output DC Voltage	Output Amps.	Load Regulation* (V/A)†	Max. Ripple %	Meters††	DC Impedance Ohms*	Size (H x W x D)	Wt. Lbs.	Net Price
D-612T	B	0-16 0-8	0-10 0-10	0.44 (3-10A) 0.3 (3-10A)	0.5 @ 5A 2 @ 10A	0-20V, 0-10A	0.44 (3-10A) 0.3 (3-10A)	7 x 12 x 8½	22	$229.50
H	B	12 (adj.) 6 (adj.)	0-10 0-20	0.23 (3-10A) 0.15 (3-20A)	5 5	0-20V, 0-30A	0.23 (3-10A) 0.15 (3-20A)	7 x 12 x 8½	30	256.50
EC-1	E	12 (adj.)	0-5	1.4	0.5	None	1.4	10¾ x 4⅜ x 6½	11	**108.50**
EC-2	E	0-16	0-5	1.8	0.5	0-20V, 10A	1.8	10¾ x 4⅜ x 6½	11	**169.50**
PS-30	F	12 (adj.)	0-30	0.12 (6-30A)	1	0-20V, 0-50A	0.27	9¾ x 14¼ x 14¼	68	**509.50**
PS-50	F	12 (adj.)	0-50	0.17	0.5	0-20V, 0-50A	0.17	9¾ x 14¼ x 19¼	106	**689.50**

INVERTER

TI250B	J	**Input:** 12 vdc. **Output:** 117 vac, 60 Hz, 250 VA max. **Voltage Regulation:** 15% max. no load to full load constant battery voltage. **Frequency Regulation:** 4 Hz max. no load to full load.	4½ x 10 x 7½	13	**189.50**

‡Rack mounted version.
*No-load to full-load unless otherwise specified.

†Output voltage change for each ampere of output current change, except on regulated units, % applies for either line or load.
††All 2% accuracy except 5% for general purpose units. Rectifiers: Selenium and Silicon ("avalanche" characteristics on Industrial units).
**From 105-125 VAC.

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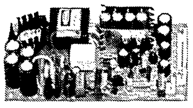
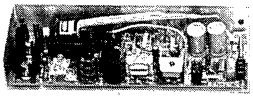
SWITCHING POWER SUPPLIES

CUSTOM — STANDARD



SINGLE OUTPUT



MULTIPLE OUTPUT

The "ERA" International Series of open or closed frame switching power supplies have been designed to meet the toughest international standards for safety, isolation and EMI/RFI specifications. All designs feature additional peak power capabilities to accommodate initial "turn-on/spin-up" loads experienced by various computer peripherals such as Winchester Discs, streaming tape drives, printers, etc.

Designs compliant to full military specifications including "Tempest" and "Nuclear Hardened" can be custom designed to your specifications.

FEATURES

- Overload protection
- Logic inhibit on many models
- Brownout protection
- Convection cooled
- One year warranty
- AC transient suppressor
- Cover available
- FR4 Glass epoxy printed circuit board
- User selectable 115/230 VAC dual input
- Remote or local sensing on most models
- Meets VDS 0806 safety design standards
- Complies with UL 478 and CSA C22.2 154
- Input filter conforms to VDE 0671/6.78 and FCC 20780 Part 15, Subpart J

SINGLE OUTPUT SPECIFICATIONS

Parameter	Conditions	Limits
AC Input	47-63 Hz (consult factory for 400 Hz)	90-132/180-250 VAC (user selectable)
DC Output	See Ordering Information Chart	
DC Output Adjustment		±10%
Line Regulation	Within specified AC limits	±0.5%
Load Regulation	No load to full load	±0.5%
Noise and Ripple	DC — 50 MHz	75 mV peak-to-peak maximum
Hold-up Time	Based upon nominal input voltage and full load	20 ms
Transient Response	50 to 100% load change	2% in 1.0ms
Efficiency	According to output voltage	70-80%
Remote/Local Sensing	Provision included for improved overall regulation	
Overload Protection		Built-in fold back limiting
Short Circuit Protection	Automatic electronic circuit	Preset value
Overvoltage Protection	Built-in, fixed	
Overshoot	No voltage spikes on turn-on turn-off or power failure	
Input Surge Current	Peak (cold start)	20A (115 VAC) 40A (220 VAC)
Logic Inhibit Function	Reference to (—) negative sense terminal	4.5 to 5.5V
Polarity	Either positive, negative floating	Up to 300 VDC
Soft Start	Provides input current limiting at turn-on	
Parallel Operation	Consult factory	
Long Term Stability	For 8 hrs after 20 min warm-up	0.1%
Ambient Operating Temperature	Continuous Duty Full rating Derate linearity to 50% of full rating at +71°C	0°C to +71°C 0°C to +50°C
Storage Temperature		—20°C to +85°C
Quality Control	According to MIL-I-45208	

ERA Model	Output*		Case Size	ERA Model	Output*		Case Size
	VDC	Amp @ 40°C			VDC	Amp @ 40°C	
SW5A6	5	6	A	SW15B4	15	4	B
SW5B10	5	10	B	SW15C8	15	8	C
SW5C20	5	20	C	SW15D14	15	14	D
SW5D30	5	30	D	SW15E16	15	16	E
SW5E40	5	45	E	SW15F24	15	24	F
SW5F60	5	60	F	SW24B2.5	24	2.5	B
SW12B5	12	5	B	SW24C5	24	5	C
SW12C10	12	10	C	SW24D7	24	7	D
SW12D16	12	16	D	SW24E10	24	10	E
SW12E20	12	20	E	SW24F15	24	15	F
SW12F30	12	30	F				

*** Available in + or — voltages**

CONSULT FACTORY FOR CUSTOM DESIGNS

ERA TRANSPAC CORP.

50 Grapnic Place. Moonachie, NJ 07074 / TWX: 710-990-5064
(201) 641-3650

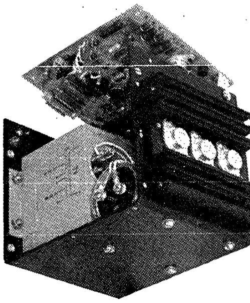
MULTIPLE OUTPUT SPECIFICATIONS

Parameter	Conditions	Limits
AC Input	47-440 Hz	90-132/180-250 VAC (user selectable)
Input Line Regulation	All outputs 90-12/180-250 VAC	±0.4% max
Load Regulation	+5V output 20% to 100% max rated load All other outputs 20% to 100% max rated load	±0.2% max ±3% max
Centering (initial setting) on Auxiliary Outputs	All outputs 50% max rated load, +5V adjusted to 5.00V	±5% max ±3% typical
Cross Regulation	+5V output/Change any other outputs from 50% to 100% max rated load Any other output/Change +5V output from 50% to 100% max rated load Change some other output from 20% to 100% max rated load	±1% max 3.5± max ±1% max
Noise and Ripple	Any output peak to peak (DC-20 MHz)	2% max 40 mV max RMS
Hold-up Time	Based upon nominal input voltage and maximum output power	20 ms min
Efficiency	Rated at maximum continuous power and nominal line input	75% typical
Overvoltage Protection Threshold	+5V output	6.25V ±0.75V
Ambient Operating Temperature	Same as single output	
Mean Time Between Failure	Per MIL-HDBK-217C	50,000 hrs
DC Output Adjustability	+5V output	4.5 to OVP trip point
Input Surge Current	Peak (cold start)	15-30 Amps (150 VAC) 30-60 Amps (220 VAC)
Temp. Coefficients of Outputs	—5V output All other outputs	0.4%/°C typical 0.05%/°C typical
Short Circuit Protection	Will withstand without damage, a continuous short; will automatically return to regulation upon removal of short.	
Overload Protection	Maximum current cannot be drawn from all outputs at the same time. The overcurrent protection feature will reduce all output voltage to a safe dissipation level when the average power rating exceeds 125% of maximum power. The overload feature will also protect against short circuit of any output.	

Model Number	Output Voltage & Maximum Current								Max Cont Output Pwr (W)	Case Size
	+5V	—5V	+12V	+12V	—12V	+15V	—15V	+24V		
ERA 30-2001	3.0	3.0							30	G
ERA 30-2002	3.0		1.2						30	G
ERA 40-2001	4.0		3.0						40	A
ERA 60-2001	6.0		3.0						60	H
ERA 30-3001	3.0		0.6	0.6					30	G
ERA 40-3001	4.0	1.0	3.0						40	A
ERA 40-3002	4.0		3.0		1.0				40	A
ERA 40-3003		1.0	3.0		1.0				40	A
ERA 60-3001	6.0		3.0		1.0				60	H
ERA 60-3002	6.0	0.5	3.0						60	H
ERA 70-3001	8.0		2.0		1.0				70	H
ERA 70-3002	8.0					2.0	1.0		70	H
ERA 100-3002	10.0		4		0.5				100	R
ERA 100-3003	10.0	0.5	4						100	R
ERA 100-3004	10.0				0.5			2	100	R
ERA 100-3001	8.0		3					1	100	R
ERA 125-3001	11.0		4.0		1.0				125	I
ERA 200-3001	20.0		6.0		1.2				200	P
ERA 300-3001	45.0		3.0		3.0				300	N
ERA 40-4001	4.0		2.0	1.0	1.0				40	A
ERA 40-4002	5.0		3.0	1.0	1.0				40	A
ERA 50-4001	6.0		2.0	1.0	1.0				50	K
ERA 50-4002	6.0	1.0	2.0		1.0				50	K
ERA 60-4001	6.0	0.5	3.0		1.0				60	H
ERA 60-4002	6.0		3.0	1.0	1.0				60	H
ERA 100-4003	10.0	0.5	4		0.5				100	R
ERA 100-4001	8.0		4	0.5	0.5				100	R
ERA 100-4002	8.0		4		0.5				100	R
ERA 130-4001	11.0	1.0	3.0		2.0				130	L
ERA 130-4002	11.0		3.0		2.0			2.0	130	L
ERA 130-4003	11.0	1.0				3.0	2.0		130	L
ERA 130-4004	11.0					3.0	2.0	2.0	130	L
ERA 170-4001	15.0		6.0	2.0	2.0				170	M
ERA 170-4002	15.0	2.0	6.0		2.0				170	M
ERA 170-4003	15.0		6.0		2.0			2.0	170	M
ERA 170-4004	15.0	2.0				6.0	2.0		170	M
ERA 170-4005	15.0		2.0			6.0	2.0		170	M
ERA 170-4006	15.0					6.0	2.0	2.0	170	M
ERA 185-4001	25.0		4.0	2.0	4.0				185	J
ERA 185-4002	25.0	2.0	4.0		4.0				185	J
ERA 185-4003	25.0			2.0		4.0	4.0		185	J
ERA 185-4004	25.0	2.0				4.0	4.0		185	J
ERA 185-4005	25.0		4.0		4.0			2.0	185	J
ERA 185-4006	25.0					4.0	4.0	2.0	185	J
ERA 200-4001	20.0	1.2	6.0		1.2				200	P
ERA 200-4002	20.0		6.0		1.2			4.0	200	P
ERA 200-4003	20.0		6.0	3.0	1.2				200	P
ERA 300-4001	45.0		3.0	3.0	3.0				300	N
ERA 300-4002	45.0		3.0		3.0			3.0	300	N
ERA 300-4003	45.0	3.0	3.0		3.0				300	N

MILITARY POWER SUPPLIES

CUSTOM — STANDARD



75°C
FREE AIR
RATING

MEETS COMPONENT, WORKMANSHIP AND ENVIRONMENTAL REQUIREMENTS OF MIL-E-4158, MIL-E-5400, MIL-E-16400, MIL-E-5272, MIL-T-21200

Transpac MS Series DC Power Modules are capable of meeting the highest military requirements. These units incorporate full MIL components where applicable and are designed to meet full military environmental and component specifications. Transformers are per MIL-T-27A, semiconductors are MIL-STD-701 or MIL-S-19500 preferred types. Tantalum foil capacitors per MIL-C-39006/1 are used throughout except in the filter sections of higher current types where MIL-C-62 or MIL-C-39018/4 military grade electrolytic capacitors are used. These units have been fully tested to meet the component, workmanship, and environmental requirements of MIL-E-4158, MIL-E-5400, MIL-E-16400, MIL-E-5272, MIL-T-21200 and are supplied with an independent testing laboratory certification as to compliance for representative models. Units utilizing "JAN-TX" parts can be supplied on special order.

CERTIFIED **Certificate of Conformity by Independent Laboratory supplied on request**

Input: 103.5-126.5 VAC (standard) or 108-132 VAC (specify), 47-440 Hz

Ripple: Less than 800 µV RMS except 50 through 310 VDC where ripple is less than 0.005% RMS

Line Regulation: Less than ±0.01% or 5 MV, whichever is greater, for full input change

Load Regulation: Less than 0.05% or 8 MV for 0-100% load change

Transient Response: Less than 50 µsec for step line or load change

Maximum Case Temperature: 115°C

Free Air Operating Temperature: −55°C to +75°C (full tantalum type up to 1 ampere most models) −40°C to +75°C (semitantalum type above 1 ampere) full ratings, no external heat sinking

Temperature Coefficient: Less than 0.01% per degree C or 3 MV

Long Term Stability: Within 10 MV or 0.1%, whichever is greater for 8 hours (line, load, temperature constant)

Interconnection: Series or parallel operation

Voltage Adjustment: External screwdriver voltage control

Remote Voltage Control: Provision for external control of output voltage

Remote Sensing: Remote sensing facilities provided

Short Circuit Protection: Automatic short circuit protection and automatic recovery

Overvoltage Protection: Fixed 5 volt and dual output units add suffix (-O) to model number. For other MS units order model OV448M

Polarity: Ungrounded or +/− grounded

Transistor Types: MIL-STD-701 and MIL-S-19500

Military Specs: MIL-E-4158, MIL-E-5400, MIL-E-16400, MIL-E-5272, MIL-T-21200 where applicable

SINGLE OUTPUT

Output Voltage (DC)	Current	Size - W x D x H (Inches)	Weight (Lbs.)	Model
5VDC	1 Amp	4 x 4 3/4 x 5 15/16	6.1	MS51
5VDC	3 Amp	5 3/4 x 7 3/16 x 5 1/4	11.3	MS53
5VDC	6 Amp	6 x 8 15/16 x 6 5/16	22.5	MS56
5VDC	12 Amp	6 15/16 x 10 5/8 x 6 5/16	23.2	MS512
5VDC	20 Amp	4 15/16 x 7 1/2 x 14 7/8	32.0	MS520
0-7VDC	500 MA	3 5/16 x 4 3/16 x 5 1/2	4.8	MS07P5
0-7VDC	1 Amp	4 x 4 3/4 x 5 15/16	6.1	MS071
0-7VDC	2 Amp	5 3/4 x 7 3/16 x 5 1/4	11.3	MS072
0-7VDC	4 Amp	6 x 8 15/16 x 6 5/16	23.7	MS074
0-7VDC	8 Amp	6 x 10 5/16 x 6 5/16	24.1	MS078
0-10VDC	50 MA	3 x 3 x 3 1/4	1.6	MS01P05
10-20VDC	250 MA	3 1/4 x 3 1/4 x 4 31/32	3.9	MS10P3
11-12VDC	4 Amp	6 x 8 15/16 x 6 5/16	23.7	MS124
11-12VDC	8 Amp	6 x 10 5/16 x 6 5/16	24.1	MS128
11-13VDC	500 MA	3 5/16 x 4 3/16 x 5 1/2	4.8	MS12P5
11-13VDC	1 Amp	4 x 4 3/4 x 5 15/16	6.1	MS121
11-13VDC	2 Amp	5 3/4 x 7 3/16 x 5 1/4	11.2	MS122
14.5-15.5VDC	500 MA	3 5/16 x 4 3/16 x 5 1/2	4.8	MS15P5
14.5-15.5VDC	1 Amp	4 x 4 3/4 x 5 15/16	6.1	MS151
14.5-15.5VDC	2 Amp	5 3/4 x 7 3/16 x 5 1/4	11.3	MS152
14.5-15.5VDC	4 Amp	6 x 8 15/16 x 6 5/16	23.7	MS154
14.5-15.5VDC	8 Amp	6 15/16 x 10 5/8 x 6 5/16	24.8	MS158
17-18VDC	4 Amp	6 x 8 15/16 x 6 5/16	23.7	MS184
17-18VDC	8 Amp	6 15/16 x 10 5/8 x 6 5/16	24.8	MS188
17-19VDC	500 MA	3 5/16 x 4 3/16 x 5 1/2	4.8	MS18P5
17-19VDC	1 Amp	4 x 4 3/4 x 5 15/16	6.1	MS181
17-19VDC	2 Amp	5 3/4 x 7 3/16 x 5 1/4	11.3	MS182
19-21VDC	5 Amp	6 15/16 x 10 5/8 x 6 5/16	24	MS205V25R
20-30VDC	50 MA	3 x 3 x 3 1/4	1.6	MS20P05
20-30VDC	250 MA	3 1/4 x 3 1/4 x 4 31/32	3.9	MS20P3
23-24VDC	4 Amp	6 x 8 15/16 x 6 5/16	23.7	MS244
23-24VDC	8 Amp	6 15/16 x 10 5/8 x 6 5/16	24.1	MS248
23-25VDC	500 MA	3 5/16 x 4 3/16 x 5 1/2	4.8	MS24P5
23-25VDC	1 Amp	4 x 4 3/4 x 5 15/16	6.1	MS241
23-25VDC	2 Amp	5 3/4 x 7 3/16 x 5 1/4	11.3	MS242
27-28VDC	4 Amp	6 x 8 15/16 x 6 5/16	23.7	MS284
27-28VDC	8 Amp	6 15/16 x 10 5/8 x 6 5/16	24.1	MS288

SINGLE OUTPUT (CONTINUED)

Output Voltage (DC)	Current	Size - W x D x H (Inches)	Weight (Lbs.)	Model
27-29VDC	500 MA	3 5/16 x 4 3/16 x 5 1/2	4.8	MS28P5
27-29VDC	1 Amp	4 x 4 3/4 x 5 15/16	6.1	MS281
27-29VDC	2 Amp	5 3/4 x 7 3/16 x 5 1/4	11.3	MS282
30-40VDC	250 MA	3 5/16 x 4 3/16 x 5 1/2	4.8	MS30P3
31-32VDC	4 Amp	6 15/16 x 9 1/4 x 6 5/16	23.9	MS324
31-33VDC	500 MA	3 5/16 x 4 3/16 x 5 1/2	4.8	MS32P5
31-33VDC	1 Amp	4 x 4 3/4 x 5 15/16	6.1	MS321
40-50VDC	50 MA	3 1/4 x 3 1/4 x 4 31/32	3.9	MS40P05
40-50VDC	250 MA	3 5/16 x 4 3/16 x 5 1/2	4.8	MS40P3
44-45VDC	4 Amp	6 15/16 x 9 1/4 x 6 5/16	23.9	MS454
44-46VDC	500 MA	4 x 4 3/4 x 5 15/16	6.1	MS45P5
44-46VDC	1 Amp	5 3/4 x 7 3/16 x 5 1/4	11.3	MS451
44-46VDC	2 Amp	6 x 8 15/16 x 6 5/16	23.7	MS452
50-60VDC	50 MA	3 1/4 x 3 1/4 x 4 31/32	3.9	MS50P05
50-60VDC	250 MA	3 5/16 x 4 3/16 x 5 1/2	4.8	MS50P3
60-70VDC	100 MA	3 1/4 x 3 1/4 x 4 31/32	3.9	MS60P1
70-80VDC	100 MA	3 1/4 x 3 1/4 x 4 31/32	3.9	MS70P1
80-90VDC	100 MA	3 1/4 x 3 1/4 x 4 31/32	3.9	MS80P1
90-100VDC	100 MA	3 1/4 x 3 1/4 x 4 31/32	3.9	MS90P1
100-110VDC	100 MA	3 1/4 x 3 1/4 x 4 31/32	3.9	MS100P1
150-160VDC	100 MA	5 x 5 3/4 x 6	9.5	MS150P1
200-210VDC	100 MA	5 x 5 3/4 x 6	9.5	MS200P1
247.5-260VDC	100 MA	5 x 5 3/4 x 6	9.5	MS250PIR†
250-260VDC	100 MA	5 x 5 3/4 x 6	9.5	MS250P1
300-310VDC	100 MA	5 x 5 3/4 x 6	9.5	MS300P1

DUAL OUTPUT

Output Voltage (DC)	Current	Size - W x D x H (Inches)	Model
±12VDC	500 MA	5 3/4 x 7 3/16 x 5 1/4	MS12P5-2
±12VDC	1 Amp	6 x 8 15/16 x 6 5/16	MS121-2
±12VDC	2 Amp	6 15/16 x 9 1/4 x 6 5/16	MS122-2
±15VDC	500 MA	5 3/4 x 7 3/16 x 5 1/4	MS15P5-2
±15VDC	1 Amp	6 x 8 15/16 x 6 5/16	MS151-2
±15VDC	2 Amp	6 15/16 x 9 1/4 x 6 5/16	MS152-2

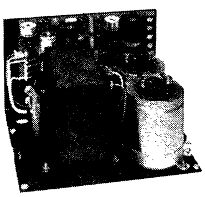
ERA TRANSPAC CORP.

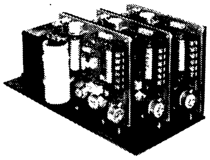
50 Graphic Place, Moonachie, NJ 07074 / TWX: 710-990-5064
(201) 641-3650

COMMERCIAL POWER SUPPLIES

CUSTOM — STANDARD

OE SERIES





OEM OPEN FRAME DC MODULAR POWER SUPPLIES 5 to 28 V, 800 mA to 100 AMPS

Overvoltage and Overcurrent Protection
Full Heat Sinking
Optional Dual 115-230, 208, or 230 VAC Input
Fully Repairable
Logic Inhibit Circuitry
Remote Sensing

INPUT

105-125 VAC, 47-63 Hz
380-420 Hz, 1 ϕ

OPERATING DATA

Temperature Range: −20 to +71°C derated as follows (percent of rated load): +40°C/100%. +50°C/75%. +60°C/50%. +71°C/40%.

Case Temperature (max): 120°C measured at base of power transistor

Line Derating: Input 47-53 Hz derated by 10%

OUTPUT

Line Regulation: Within 0.05% +5 mV for ±10% input change

Load Regulation: Within 0.05% ±5 mV for 0-100% load change

Ripple: Less than 1.0 mV RMS

Polarity: Ungrounded or +1 — grounded

Response: Less than 50 sec for 10-100% load change

SINGLE OUTPUT

ERA Model*	Output Volt.	Current (40°C)	Case Size	Wt. (lbs.)	ERA Model*	Output Volt.	Current (40°C)	Case Size	Wt. (lbs.)
OE53/5	5 VDC	3 AMP	OEA	3.5	OE535/15	15 VDC	14.6 AMP	OEJ**	19
OE56/5	5 VDC	6 AMP	OEB	4	OE565/15	15 VDC	29 AMP	OEK**	27
OE512/5	5 VDC	12 AMP	OEC	8	OE5100/15	15 VDC	44 AMP	OEL**	41
OE520/5	5 VDC	20 AMP	OED	13	OE53/24	24 VDC	900 MA	OEA	2.5
OE535/5	5 VDC	35 AMP	OEJ**	19	OE56/24	24 VDC	1.8 AMP	OEB	4
OE565/5	5 VDC	65 AMP	OEK**	27	OE512/24	24 VDC	3.8 AMP	OEC	8
OE5100/5	5 VDC	100 AMP	OEL**	41	OE520/24	24 VDC	7.5 AMP	OED	13
OE53/12	12 VDC	1.5 AMP	OEA	2.5	OE535/24	24 VDC	10 AMP	OEJ**	19
OE56/12	12 VDC	3.3 AMP	OEB	4	OE565/24	24 VDC	19 AMP	OEK**	27
OE512/12	12 VDC	6.5 AMP	OEC	8	OE5100/24	24 VDC	29 AMP	OEL**	41
OE520/12	12 VDC	12.8 AMP	OED	13	OE53/28	28 VDC	800 MA	OEA	2.5
OE535/12	12 VDC	18 AMP	OEJ**	19	OE56/28	28 VDC	1.5 AMP	OEB	4
OE565/12	12 VDC	25 AMP	OEK**	27	OE512/28	28 VDC	3.3 AMP	OEC	8
OE5100/12	12 VDC	53 AMP	OEL**	41	OE520/28	28 VDC	6.5 AMP	OED	13
OE53/15	15 VDC	1 AMP	OEA	2.5	OE53/28	28 VDC	11 AMP	OEJ**	19
OE56/15	15 VDC	2.5 AMP	OEB	4	OE565/28	28 VDC	16 AMP	OEK**	27
OE512/15	15 VDC	5.3 AMP	OEC	8	OE5100/28	28 VDC	25 AMP	OEL**	41
OE520/15	15 VDC	10.5 AMP	OED	13					

DUAL OUTPUT

ERA Model	Output Voltage No. 1	Current No. 1 (40°C)	Output Voltage No. 2	Current No. 2 (40°C)	Case Size	Weight (lbs.)
OE56-12-T‡	12 VDC	1 AMP	12 VDC	1 AMP	OEM	4
OE56-15-T‡	15 VDC	1 AMP	15 VDC	1 AMP	OEM	4
OE53-12/2	12 VDC	1.5 AMP	12 VDC	1.5 AMP	OEE	4.5
OE53-15/2	15 VDC	1.3 AMP	15 VDC	1.3 AMP	OEE	4.5
OE56-12/2	12 VDC	3.2 AMP	12 VDC	3.2 AMP	OEF	5.5
OE56-15/2	15 VDC	2.9 AMP	15 VDC	2.9 AMP	OEF	5.5

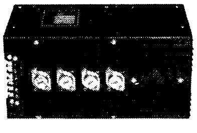
TRIPLE OUTPUT

ERA Model	Output Voltage No. 1	Current No. 1 (40°C)	Output Voltage No. 2	Current No. 2 (40°C)	Output Voltage No. 3	Current No. 3 (40°C)	Case Size	Weight (lbs.)
OE56-12/3	5 VDC	6 AMP	12 VDC	1.5 AMP	12 VDC	1.5 AMP	OEG	9
OE56-15/3	5 VDC	6 AMP	15 VDC	1 AMP	15 VDC	1 AMP	OEG	9
OE512-12/3	5 VDC	12 AMP	12 VDC	3.5 AMP	12 VDC	3.5 AMP	OEH	14
OE512-15/3	5 VDC	12 AMP	15 VDC	3 AMP	15 VDC	3 AMP	OEH	14

* For dual 115/230 VAC input, add suffix -Z to Model No.; for 208 VAC input, add -Y to Model No.; for 230 VAC input, add -X to Model No.

** All OEJ, OEK and OEL case sizes are Form, Fit, and Function of ACDC HCM Series. All OEJ, OEK and OEL supplies are also available with overvoltage protection. To specify this feature add the suffix -0 to the Model No.

S, D, T SERIES



OPEN FRAME DC MODULAR POWER SUPPLIES 5 TO 28 V, 1 TO 35 AMPS

Single, Dual and Triple Outputs
Open-Frame Construction with Optional Covers
0.05 Percent Regulation
Overload Protection with Automatic Recovery
Optional Overvoltage Protection
Remote Sensing, Remote Voltage Adjustment

INPUT

05-125 VAC, 47-420 Hz
00 and 210-250 VAC available

OPERATING DATA

Construction: Black anodized aluminum chassis and heat sink. All adjustments readily accessible, unit is fully repairable

Mounting: Provisions made for mounting on live surfaces

Connector: Barrier strip

Covers (Optional): Add suffix (— C) to Model Number.

OUTPUT

Load Regulation: Within 0.05% +5 mV, for 100% load change

Ripple: Less than 1.0 mV RMS

Polarity: Ungrounded or +1 — grounded.

Transient Response: Within 50 sec after a 50% load step change

Temperature Coefficient: 0.01% +1 mV/per °C

Output Impedance: DC-1 KHz: $0.001R_L$ or 0.005 ohm max. 1 KHz-100 KHz: $0.005R_L$ or 0.5 ohm max.

"S" SERIES SINGLE OUTPUT

ERA Model Number (Add -0 for OVP)	Output Voltage	Adj. Range ±V	40°C	55°C	71°C
S5H3	5	.25	3	2.5	1.9
S5A5P7			5.7	4.8	3.7
S5B10			10	8.5	6.5
S5C17			17	14.5	11.0
S5D25			25	21.2	16.3
S5E35			35	29.8	22.8
S12H1P7	12	.5	1.7	1.4	1.1
S12A3P2			3.2	2.7	2.1
S12B5P8			5.8	4.9	3.8
S12C9P5			9.5	8.1	6.2
S12D13			13.0	11.1	8.5
S12E18P5			18.5	15.7	12.0
S15H1P5	15	.5	1.5	1.3	1.0
S15A2P7			2.7	2.3	1.7
S15B5			5.0	4.2	3.2
S15C8P2			8.2	7.0	5.3
S15D11P2			11.2	9.5	7.3
S15E15P8			15.8	13.4	10.3
S24H1	24	1	1.0	.85	.65
S24A1P8			1.8	1.5	1.2
S24B3P3			3.3	2.8	2.1
S24C5P4			5.4	4.6	3.5
S24D7P5			7.5	6.4	4.9
S24E10P6			10.6	9.0	6.9
S28A1P6	28	1	1.6	1.4	1.0
S28B2P9			2.9	2.5	1.9
S28C4P7			4.7	4.0	3.1
S28D6P7			6.7	5.7	4.4
S28E9P3			9.3	7.9	6.1

"D" SERIES DUAL OUTPUT

ERA Model Number (Add -0 for OVP)	Output Voltage	Adj. Range ±V	40°C	55°C	71°C
D12A1P5	±12	.5	1.5	1.3	1.0
D12B2P7			2.7	2.3	1.8
D15A1P3	±12	.5	1.3	1.1	0.8
D15B2P4			2.4	2.0	1.6

* Isolated from line and ground, fully adjustable. Positive voltage adjustable controls both outputs. Negative voltage adjustment controls negative only.

"T" SERIES TRIPLE OUTPUT

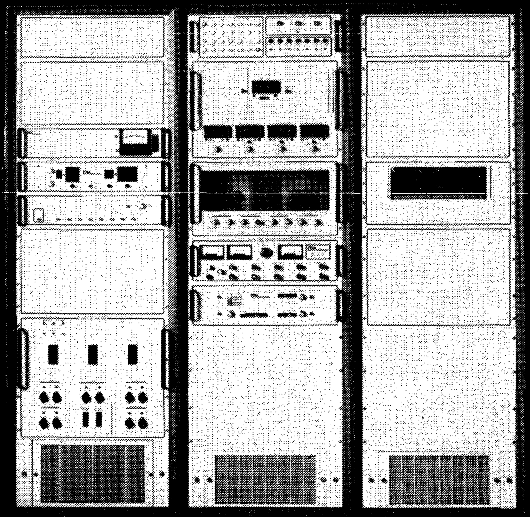
T101	5	0.25	3.0	2.6	2.0
	±12	.5	.75	.64	.49
T102	5	0.25	3.0	2.6	2.0
	±15	.5	.64	.54	.42
T201	5	0.25	5.0	4.2	3.2
	±12	0.5	1.0	0.85	.65
T202	5	0.25	5.0	4.2	3.2
	±15	0.5	0.85	0.72	0.55
T301	5	0.2	10.0	8.4	6.4
	±12	0.5	1.0	0.85	.65
T302	5	0.25	10.0	8.4	6.4
	±15	0.5	0.85	0.72	.55

* Three outputs isolated from line and ground. Dual outputs are internally connected in a tracking configuration. Output B voltage adjustment controls both outputs. Output C voltage adjustment controls negative output only.

ERA TRANSPAC CORP.
50 Graphic Place, Moonachie, NJ 07074 / TWX: 710-990-5064
(201) 641-3650

WHEN YOU NEED REGULATED HV POWER YOU NEED ETM!

WHY?



The ETM HV Power Supplies

REGULATED HIGH VOLTAGE

Output Power:
- CUSTOM UNITS
  5kW—500kW
- STANDARD UNITS
  10kV—100kV
  500mA—5A

Regulation:
+/− 2 volts

Ripple:
2 volts peak-to-peak

COLLECTOR DEPRESSORS:

Dissapation:
To 100kW typical

Regulation:
+/− 0.1% typical

Ripple:
+/− 0.1% peak-to-peak

HEATER SUPPLIES:

Output: 10—20 Volts
AC or DC
5 Amps typical

Regulation: +/−2 %

Ripple: 100mV peak-to-peak

ETM Grid Modulators

ETM Grid Modulators are versatile and designed for pulsing grids of Traveling Wave Tubes. They operate under CW, Pulse, and Pulse Burst modes. Available in Rack Mount and Stand Alone designs, may be automated with ETM'S IEEE-488 computer interface.

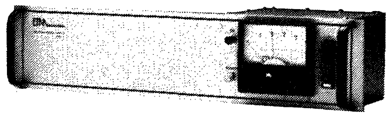
ANODE MODULATORS and other Modulator designs available.

Pulse Swing: 2000 volts
Rise & Fall Time: 200 nsec with 100 picofarad load
Pulse Width: 1 usec to CW
Repetition Rate: 10Hz—100 kHz

The ETM Model CPI Computer Interface

The ETM Model CPI-488 Series Computer Interface Systems allow a customer computer to evaluate voltage and current parameters, and to control the operation of ETM power supplies.

The CPI-488 systems are compatible with a sub-set of the IEEE-488 I/O bus.



Ion Pump Power Supplies

The ETM Model IPPS is designed to provide the voltage for an ion pump, used for degassing microwave tubes and other vacuum systems and products.

The design uniquely reduces the chances of serious operator injury.

Both Bench Type and Rack-Mount versions are available.

Metering: High Limit Trip Set, Continuously Adjustable. Analog, push-button control of customer specified ranges. SPDT switch contacts available.

Voltage: Up to 5kV, 3.5kV typical. Shall sustain 1500 volts while supplying 1 mA of current.

Current: Up to 2.0 milliamperes at any output voltage.

ETM ELECTROMATIC INCORPORATED

470 San Antonio Avenue
Palo Alto, CA 94306
415-494-1505

EVI, INC.

PRECISION LOW NOISE POWER SUPPLY

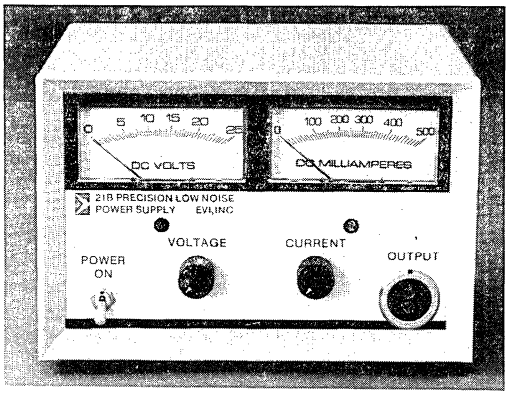
DEVELOPMENT LABORATORY AND RESEARCH APPLICATION

A precision lab power supply that is a nearly perfect voltage source. Responds in nanoseconds to large load transients. Meets all of the following criteria:

EVI MODEL 21 B 0–25 VOLTS DC 0.4 AMPERES

• TOTAL OUTPUT NOISE AND HUM	<1 MICROVOLT
• OUTPUT VOLTAGE CHANGE VS. TEMP(1)	<0.0001%/°C
• OUTPUT CHANGE VS. LINE VOLTAGE(2)	<1 MICROVOLT
• OUTPUT RESISTANCE(3)	1 MICRO OHM
• DYNAMIC LOAD RESPONSE(4)	0.15 MICROSECONDS
• 8 HOUR DRIFT	<0.0001%

OPTION NUMBER	DESCRIPTION
	OUTPUT CONNECTOR
(Standard)	Banana (+, −, grnd.)
01C	2 Conductor Shielded (LEMO)
02C	4 Conductor Shielded (LEMO)
03C	2 Conductor BNC
	POWER LINE
01P	115/230 VAC Selectable
	VOLTAGE ADJUST
(Standard)	Ten Turn Potentiometer
01V	Three Turn Potentiometer
	IEEE 488
01I	16 Bit, 381 uv/Step(5)
	RS 232
01R	16 Bit, 381 uv/Step(5)



- **MODULAR FIXED OUTPUT VERSIONS**
- **PRECISION CURRENT SOURCE (JAN '86)**
- **CUSTOM DESIGN CAPABILITY**

---

(1) Less than 1 part per million per degree Celsius (°C) or less than 1 microvolt per °C, whichever is larger.
(2) Low line to high line 105-130 VAC.
(3) 4 wire output.
(4) Output voltage returns to within 10 millivolts—step load change of ±0.4 amperes.
(5) Consult factory.

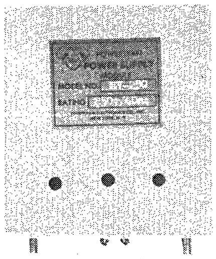
EVI, INCORPORATED
8970 F ROUTE 108, OAKLAND CENTER
COLUMBIA, MARYLAND 21045 301-964-1662

FERROTRAN

SOLID STATE POWER SUPPLY MODULES

AC TO DC REGULATED POWERTRAN POWER SUPPLY MODULES GUARANTEED FOR 3 YEARS.

FIXED VOLTAGE MODULES — REGULATED



HV-250
250V @ 40ma
Case: 3 1/16"x2 5/8"x3 1/2"
Price $75

Input volts — 115 v.a.c.; single d.c. reg. output voltage; MIL-T-27 case; 4-pin connector; hooked pins; studs for fastening to chassis.

Model	D.C. Volts	D.C. Current	% Reg.	% Rip.	Case	Price
ML-5	5	150ma	.5	.2	EB	**$40**
E-5	5	250	.3	.01	FB	**45**
EH-5	5	500	.5	.1	GB	**50**
EHC-5	5	1a	.5	.2	HB	**65**
ELC-5	5	2a	.5	.2	JB	**70**
EMC-5	5	3a	.8	.8	JB	**75**
ML-6	6	125	.5	.1	EB	**40**
E-6	6	200	.3	.01	FB	**45**
EH-6	6	450	.3	.1	GB	**50**
EHC-6	6	900	.5	.2	HB	**65**
ELC-6	6	1.8a	.5	.2	JB	**70**
EMC-6	6	2.5	1.0	.3	JB	**75**
ML-10	10	100	.5	.1	EB	**45**
E-10	10	175	.2	.1	FB	**50**
EH-10	10	350	.2	.3	GB	**55**
EHC-10	10	600	.5	.2	HB	**67**
ELC-10	10	1.2a	.5	.2	JB	**72**
EMC-10	10	1.6	1.0	.3	JB	**75**
ML-12	12	100	.5	.2	EB	**40**
E-12	12	150	.2	.2	FB	**45**
EH-12	12	325	.2	.1	GB	**50**
EHC-12	12	550	.5	.2	HB	**65**
ELC-12	12	1.1a	.5	.2	JB	**70**
EMC-12	12	1.5	1.0	.3	JB	**75**
ML-15	15	80	1.0	.2	EB	**40**
E-15	15	150	.2	.05	FB	**45**
EH-15	15	300	.2	.1	GB	**50**
EHC-15	15	500	.5	.2	HB	**65**
ELC-15	15	1.0a	.5	.2	JB	**75**
ML-20	20	75	1.0	.2	EB	**45**
E-20	20	120	.2	.1	FB	**50**
EH-20	20	250	.2	.1	GB	**55**
EHC-20	20	450	.5	.2	HB	**67**
ELC-20	20	900	.5	.2	JB	**72**
ML-24	24	65	1.0	.2	EB	**40**
E-24	24	120	.2	.1	FB	**45**
EH-24	24	225	.2	.1	GB	**50**
EHC-24	24	400	.2	.1	HB	**65**
ELC-24	24	800	.5	.2	JB	**75**
ML-28	28	50	1.0	.2	EB	**45**
E-28	28	120	.2	.1	FB	**50**
EH-28	28	200	.2	.1	GB	**55**
EHC-28	28	300	.2	.1	HB	**67**
ELC-28	28	700	.5	.1	JB	**72**

Model	D.C. Volts	D.C. Current	% Reg.	% Rip.	Case	Price
ML-30	30	50ma	1.0	.1	EB	**$45**
E-30	30	100	.3	.01	GB	**50**
EH-30	30	200	.2	.1	GB	**55**
EHC-30	30	275	.2	.1	HB	**67**
ELC-30	30	600	.5	.1	JB	**72**
M-35	35	40	1.5	.15	EB	**50**
M-40	40	40	1.5	.22	EB	**50**
M-45	45	35	1.5	.2	EB	**50**
MC-45	45	100	1.5	.1	HB	**60**
M-50	50	40	1.5	.2	EB	**50**
HV-50	50	100	1.5	.2	GB	**60**
M-60	60	35	1.5	.2	EB	**50**
HV-60	60	80	1.5	.15	GB	**60**
HVA-60	60	120	1.5	.20	JB	**75**
M-75	75	30	1.5	.2	EB	**50**
HV-75	75	60	1.3	.1	GB	**65**
M-100	100	4	1.5	.1	EB	**50**
HM-100	100	10	1	.05	GB	**60**
HV-100	100	60	1.5	.1	GB	**70**
HVA-100	100	100	1.5	.20	JB	**80**
HM-120	120	10	1.5	.1	GB	**65**
HV-120	120	55	1.3	.12	HB	**75**
HM-150	150	8	1	.05	GB	**60**
HV-150	150	40	1	.1	HB	**75**
HVA-150	150	80	1.5	.2	JB	**85**
HM-175	175	10	1.5	.1	GB	**65**
HV-175	175	40	1.2	.12	HB	**75**
M-200	200	2	1.5	.1	EB	**50**
HM-200	200	10	1.0	.01	GB	**60**
HV-200	200	40	1.3	.12	HB	**75**
HVA-200	200	100	1.5	.20	JB	**90**
HM-250	250	6	1	.05	GB	**60**
HV-250	250	40	1.5	.05	JB	**75**
HV-250A	250	40	1.6	.05	HA	**76**
HVA-250	250	80	1.5	.20	JB	**90**
HM-300	300	5	1	.05	GB	**60**
HV-300	300	35	1.5	.1	JB	**80**
HV-300A	300	35	1.6	.2	HB	**81**
HVA-300	300	70	1.5	.2	JB	**90**
HM-400	400	4	1	.05	GB	**65**
HV-400	400	20	1.5	.2	JB	**80**
HV-400A	400	20	1.5	.2	HB	**81**
HVA-400	400	40	1.5	.2	JB	**90**
HM-500	500	4	1	.05	GB	**65**
HV-500	500	15	1.5	.2	JB	**85**
HV-500A	500	15	1.6	.3	HA	**86**
HVA-500	500	30	1.5	.2	JB	**90**
HM-750	750	2	1	.1	HB	**75**
HV-750	750	8.5	1.2	.3	JB	**95**
HVE-750	750	12	1.2	.3	JB	**100**
HM-1000	1000	1	1	.1	HB	**75**
HV-1000	1000	5	1.3	.3	JB	**95**
HVE-1000	1000	8	1.3	.3	JB	**110**

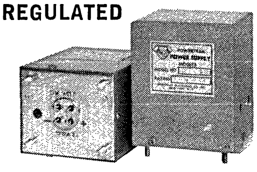
Units with voltage values in between those shown above are available. Add $5 to the prices shown above. Units with 220VAC inputs are available for an additional charge of $10.

NEW!!
THE "B" SERIES

A new generation of flat high voltage power supplies similar in shape to our SMF Series; input volts — 115 V.A.C.; 4 pin connector fastens to chassis with 4 ea. 8-32 screws going into 4 ea. blind inserts; case size — 3 9/16" x 3 1/16" x 1 3/4".

Model	D.C. Volts	D.C. Current	% Reg.	% Rip.	Price
HV-250B	250V	40ma	1.8	.2	**$85**
HV-300B	300	35	1.8	.3	**90**
HV-400B	400	20	1.8	.4	**90**
HV-500B	500	15	1.7	.6	**95**
HV-750B	750	8.5	1.5	.6	**105**
HV-1000B	1000	5	1.5	.6	**105**

ADJUSTABLE OUTPUT MODULES
REGULATED



MV-12
11 to 13V
@ 200ma
2 3/4"x2 3/8"x2 13/16"
$65 ea.

Input volts — 115VAC; adjustable output voltage thru control on stud side of case; 4-pin connector.

Model	D.C. Volts	D.C. Current	% Reg.	% Rip.	Case	Price
HCV-5	4.5-5.5	1	.4	.2	JB	**82**
MV-6	5.8-7	200	.6	.2	GB	**65**
HCV-6	5.5-6.8	1	.4	.2	JB	**75**
MV-10	9-12	200	.4	.03	GB	**65**
HCV-10	8.5-11.8	1	.4	.1	JB	**75**
MV-12	11-13	200	.2	.025	GB	**65**
MCS-12	11-13	400	.5	.05	HB	**70**
HCV-12	11-14	1	.4	.05	JB	**75**
MCS-15	14-16	350	.5	.05	HB	**70**
HCV-15	14-18	800	.4	.1	JB	**75**
MCS-20	19-22	350	.5	.05	HB	**70**
HCV-20	18-22	700	.4	.3	JB	**75**
MV-24	23-26	180	.5	.04	GB	**68**
HCV-24	23-26	700	.4	.3	JB	**76**
MCS-28	27-29	300	.4	.04	HB	**72**
HCV-28	26.5-29	600	.25	.3	JB	**76**
MV-30	28-32	150	.5	.04	GB	**68**
MCS-30	28-32	300	.4	.04	HB	**72**
HCV-30	29-31	500	.3	.3	JB	**76**
MCV-50	45-55	15	.8	.3	HB	**75**
MCV-100	95-105	14	.8	.3	HB	**80**
MCV-150	147-154	12	.8	.3	HB	**80**
MCV-200	195-204	10	.8	.3	HB	**85**

MIL-SPEC MODULES

Meets MIL-E-5272C; Temperature −65°C to +75°C. All power supplies described on this page may be militarized. Below are representative units.

Model	D.C. Volts	D.C. Current	% Reg.	% Rip.	Case	Price
ME-5	5	250ma	.5	.01	FB	**$150**
MEH-12	12	325	.3	1	GB	**140**
MAS-15	15, 15	15	.6	0.1	GB	**100**
MSM-24	24	10	.4	0.06	SMF	**110**
MELC-28	28	.6a	.4	.6	JB	**190**

CASE DIMENSIONS

	L	W	H		L	W	H
EB	1 15/16	1 13/16	2 7/16	**HA**	3 1/16	2 5/8	4 1/4
FB	2 5/16	2 1/16	2 1/2	**HB**	3 1/16	2 5/8	3 3/16
GA	2 3/4	2 3/8	2 13/16	**JA**	3 9/16	3 1/16	4 7/8
GB	2 3/4	2 3/8	2 13/16	**JB**	3 9/16	3 1/16	3 7/8

ALL LINEAR POWER SUPPLIES — NO NOISE — NO EMI — STABLE FOR YEARS & YEARS

FERROTRAN ELECTRONICS COMPANY, INC.
11 W. 25TH STREET ■ NEW YORK, N.Y. 10010 ■ PHONE 212-691-3610

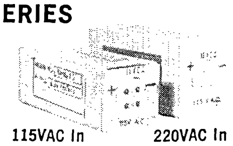
OUR 27th YEAR MAKING FINE POWER SUPPLIES

FERROTRAN

SOLID STATE POWER SUPPLY MODULES

AC TO DC REGULATED POWERTRAN POWER SUPPLY MODULES GUARANTEED FOR 3 YEARS.

SML & SMF SERIES



115VAC In 220VAC In

SML-15
15V @ 60ma
Case: 3″x1¼″x1$\frac{3}{16}$″
$50 ea.

Input volts — 115VAC; 4-pin connector; fastens to chassis with 2 ea. 4-40 screws going into 2 ea. blind inserts.

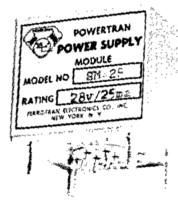
Model	D.C. Volts	D.C. Current	% Reg.	% Rip.	Price
SML-5	5	125ma	.5	.10	**$50**
SML-6	6	100	.5	.10	**50**
SML-10	10	80	.5	.20	**55**
SML-12	12	65	.5	.20	**50**
SML-15	15	60	.8	.20	**50**
SML-20	20	55	.5	.20	**55**
SML-24	24	50	.8	.30	**50**
SML-28	28	45	.8	.30	**55**
SML-30	30	40	.8	.30	**55**
SMF-50	50	15	1.5	.20	**55**
SMF-70	70	10	1.2	.10	**55**
SMF-100	100	4	1.5	.20	**58**
SMF-150	150	3	1.0	.10	**58**
SMF-200	200	3	1.0	.10	**58**
SMF-250	250	3	1.0	.10	**60**
SMF-300	300	3	1.0	.10	**60**
SMF-400	400	3	1	.1	**65**
SMF-500	500	3	1	.1	**70**
SMF-750	750	2	1	.1	**70**
SMF-1000	1000	1	1	.1	**75**

SMF-400 } SMF-500 3″x1¼″x1½″ **SMF-750 } SMF-1000** 2⅜″x1$\frac{15}{16}$″x1⅞″

This series also available with a 220VAC input case: 3″ x 1¼″ x 1½″. Add $10 to prices shown above. Order as SML-5-2, SML-6-2, etc.

Available with printed circuit pins. Order as SML-5-PC, SML-6-PC, etc. No additional charge.

FERROTRAN SUBMINIATURE MODELS
SM SERIES



SM-28
$55

Case; 1⅝″ x 1⅞″ x 1⅝″; Mounts on a chassis with 4 ea. 6-32 studs. ⅝″ diam. connector in cover. 4 pin connector. Input volts — 115VAC.

Specifications and prices are the same as for SML and SMF units. i.e.; SM-28 corresponds to SML-28; price $55.; only difference is case style.

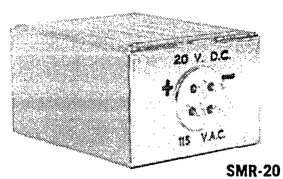
SMR — DUAL OUTPUT

Same case style as SMR units but with 2 ea. isolated outputs which are floating; input volts — 115VAC.

Model	D.C. Volts	D.C. Current	% Reg.	% Rip.	Price
SMMR-5	5, 5	150ma	.5	.2	**$65**
SMMR-6	6, 6	140	.4	.2	**65**
SMMR-10	10, 10	130	.3	.3	**70**
SMMR-12	12, 12	120	.3	.2	**65**
SMMR-15	15, 15	100	.3	.1	**65**
SMMR-20	20, 20	80	.3	.1	**70**
SMMR-24	24, 24	80	.3	.1	**65**
SMMR-28	28, 28	75	1.0	.1	**70**
SMMR-30	30, 30	75	1.0	.1	**70**

We can manufacture special units at any intermediate voltage up to 2000 volts with single, dual or triple outputs. Try our custom design!!

SMR — SERIES



SMR-20
$60

Input volts — 115VAC; mounts on a chassis with 2 ea. 4-40 screws going into 2 ea. blind inserts. Case: 2$\frac{7}{16}$″ x 1$\frac{15}{16}$″ x 1⅜″; 4 pin connector.

Model	D.C. Volts	D.C. Current	% Reg.	% Rip.	Price
SMR-5	5	300 ma	1.4	.2	**$55**
SMR-6	6	300	1.4	.2	**55**
SMR-10	10	275	1.3	.2	**60**
SMR-12	12	250	1.2	.1	**55**
SMR-15	15	225	1.2	.1	**55**
SMR-20	20	200	1.2	.1	**60**
SMR-24	24	175	1.4	.1	**55**
SMR-28	28	150	1.3	.1	**60**
SMR-30	30	140	1.4	.1	**60**
SMR-50	50	50	1.5	.1	**60**
SMR-100	100	20	1.5	.1	**60**
SMR-150	150	15	1.5	.1	**65**
SMR-200	200	12	1.5	.1	**65**
SMR-250	250	10	1.5	.1	**65**
SMR-300	300	8	1.5	.1	**65**

UNREGULATED MODULES:

Input volts — 115VAC; MIL-T-27 case; 4 pin connector. *Ideal raw DC supplies containing transformer,* rectifiers and capacitor filter.

Model	D.C. Volts	D.C. Current	Case	Price
SU-5A	5	2.0a	HA	**$30**
SU-6B	6	2.0	HA	**30**
SU-12B	12	.5	HA	**30**
SU-15A	15	1.0	HA	**30**
SU-28A	28	.8	HA	**30**
SU-60	60	.38	HA	**30**
SU-100	100	.2	HA	**40**
SU-120A	120	.2	HA	**30**
SU-150	150	.1	HA	**30**
SU-200A	200	.09	HB	**40**
SU-250	250	.065	HB	**40**
SU-300	300	.06	HB	**55**
SU-400	400	.06	HB	**55**
SU-500	500	.05	JB	**65**
SU-750	750	.03	JB	**70**
SU-1000	1000	.02	JB	**70**
SU-1400	1400	5	JB	**70**
SU-2000	2000	2	JB	**70**

NEW!! MINIATURE MODULES

Input volts — 115VAC; single DC regulated output voltage; 4-pin connector; hooked pins; fastened to chassis with 2 blind inserts;

Model	DC Volts	DC Current	% Reg.	% Rip.	Price
EJ-5	5	500ma	1.0	.3	**$60**
EJ-6	6	400	1.0	.3	**60**
EJ-10	10	350	1.0	.2	**64**
EJ-12	12	300	1.0	.2	**60**
EJ-1	15	250	1.0	.2	**60**
EJ-20	20	225	1.0	.2	**64**
EJ-24	24	200	1.0	.2	**60**

Case Size: 2⅜″x 1$\frac{15}{16}$″x11⅞″. Case similar in shape to SMF units shown above.

Model	DC Volts	DC Current	% Reg.	% Rip.	Price
EJ-28	28	175ma	1.0	.2	**$60**
EJ-30	30	160	1.0	.2	**60**
EJ-40	40	120	1.2	.3	**65**
EJ-50	50	80	1.5	.4	**65**
EJ-75	75	50	1.5	.2	**70**
EJ-100	100	25	2.0	.25	**70**
EJ-120	120	22	2.0	.25	**70**
EJ-150	150	20	2.5	.25	**70**
EJ-175	175	20	2.0	.25	**70**
EJ-200	200	20	2.0	.25	**70**

DUAL OUTPUT MODULES:

Input volts — 115VAC; matched regulated D.C. outputs; current shown available from each tap; 6-pin hooked connector. All-steel MIL-T-27 cases; screw type studs for fastening to the chassis; grey paint.

Model	D.C. Volts	D.C. Current	% Reg.	% Rip.	Case	Price
EE-5	5, 5	150ma	.5	.10	FB	**$55**
EEH-5	5, 5	300	.3	.01	GB	**65**
EEC-5	5, 5	1a	.2	.05	JB	**90**
EE-6	6, 6	150	.4	.10	FB	**55**
EEH-6	6, 6	300	.3	.01	GB	**65**
EEC-6	6, 6	750	.2	.05	JB	**90**
EEH-10	10, 10	250	.3	.01	GB	**65**
EEC-10	10, 10	400	.3	.05	JB	**90**
EE-12	12, 12	120	.3	.05	FB	**55**
EEH-12	12, 12	225	.3	.01	GB	**65**
EEC-12	12, 12	400	.2	.05	JB	**90**

Model	D.C. Volts	D.C. Current	% Reg.	% Rip.	Case	Price
MM-15	15, 15	55ma	1	.006	GB	**$60**
EE-15	15, 15	100	.3	.04	FB	**55**
EEH-15	15, 15	200	.3	.01	GB	**65**
EEC-15	15, 15	350	.2	.05	JB	**90**
EEH-20	20, 20	150	.3	.01	GB	**65**
EEC-20	20, 20	250	.3	.05	JB	**90**
EE-24	24, 24	100	.3	.05	FB	**55**
EEH-24	24, 24	150	.3	.01	GB	**65**
EEC-24	24, 24	220	.3	.05	JB	**90**
EE-28	28, 28	80	1	.01	FB	**60**
EEC-28	28, 28	200	3	.05	JB	**90**

Model	D.C. Volts	D.C. Current	% Reg.	% Rip.	Case	Price
EE-30	30, 30	75ma	1	.01	FB	**$60**
EEH-30	30, 30	100	2	.04	GB	**65**
HMC-45	45, 45	80	1.5	.15	HB	**65**
HHV-50	50, 50	40	1	.2	HB	**65**
HHV-60	60, 60	40	1	.2	JB	**75**
HHV-70	70, 70	40	1	.2	JB	**80**
HHV-100	100, 100	30	1	.08	JB	**82**
HHV-120	120, 120	25	1	.05	JB	**82**
HHV-150	150, 150	20	1	.05	JB	**85**
HHV-200	200, 200	18	1.2	.05	JB	**85**
HHV-300	300, 300	15	1.2	.05	JB	**85**

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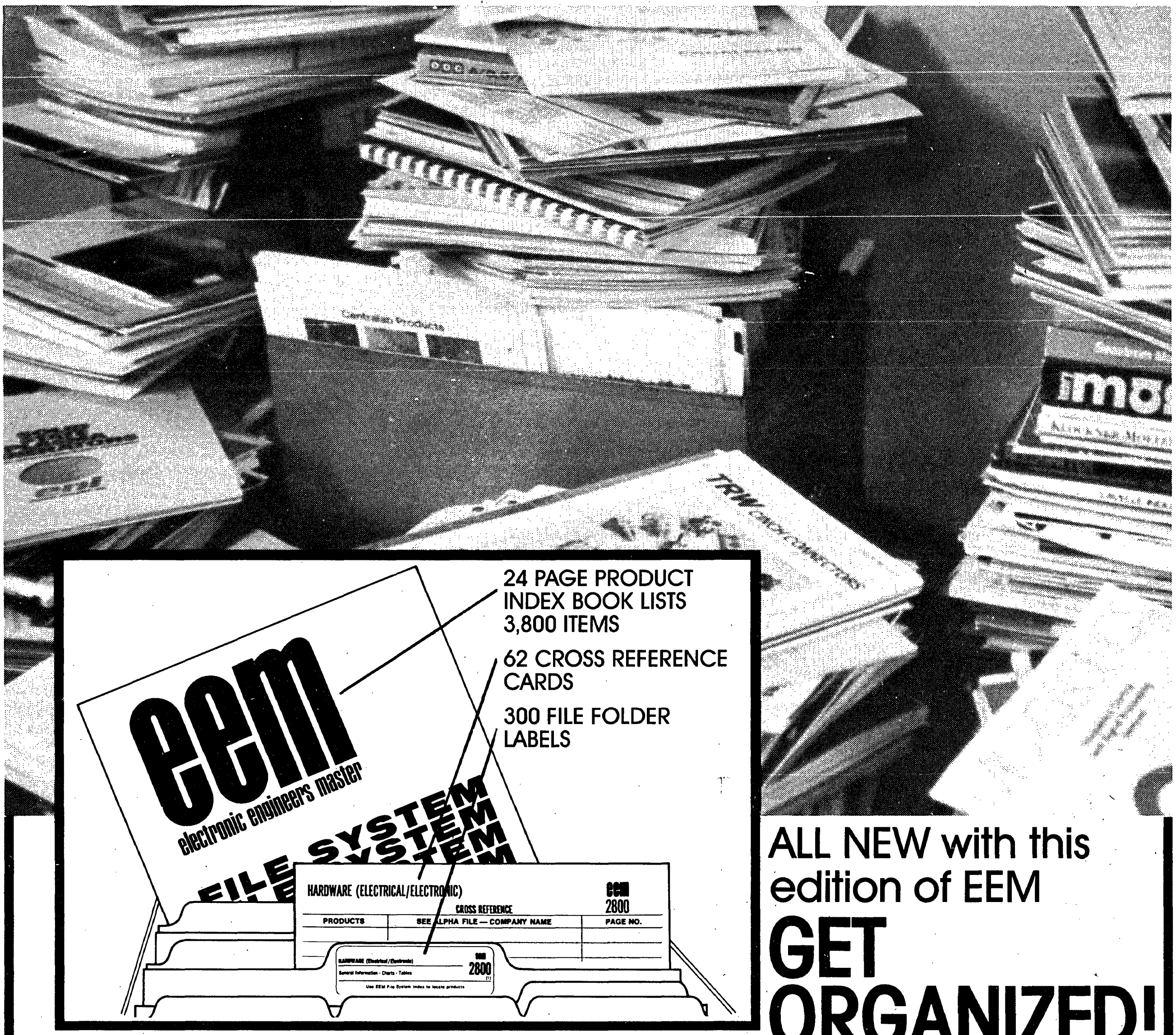
OUR 27th YEAR MAKING FINE POWER SUPPLIES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FCI SWITCHING POWER SUPPLIES

SINGLE OUTPUT - Open Frame

Models FK15, 25 and 50

DIRECT REPLACEMENT FOR LAMBDA'S LUS-8, 9 and 10

Specifications

Input Voltage: AC85 ~ 132V 1 ϕ, or DC 110 ~ 170V
Frequency: 48 ~ 440Hz or DC

Selection Guide

	VOLTAGE				CASE SIZE AND WEIGHT			
MODEL NO.	5V	12V	15V	24V	H (mm)	D (mm)	W (mm)	Wt (kg)
FK15	3A	1.3A	1A	0.7A	97	99.5	35	0.30
FK25	5A	2.1A	1.7A	1.1A	97	124.5	35	0.40
FK50	10A	4.2A	3.4A	2.1A	97	161	37	0.45

TRIPLE OUTPUT - Open Frame

Models FKMC15 and 30*

Specifications:

Input Voltage: AC85 ~ 132 or DC 110 ~ 170V
Frequency: 48 ~ 440Hz or DC

Selection Guide

	VOLTAGE			CASE SIZE AND WEIGHT			
MODEL NO.	5V	+12V	−12V	H (mm)	D (mm)	W (mm)	Wt (kg)
FKMC15	.5-2A	.3A	.2A	92	120.5	33.5	.4
FKMC30	.7-3A	1.2A	.3A	97	161.5	40.5	.5

*Cover Optional.

Models FMC75, 100 and 135
Field Selectable (Dual Input Voltage)

Specifications

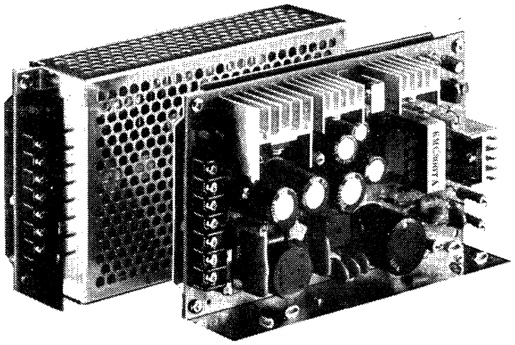
Input Voltage: AC85 ~ 132 or AC 170 ~ 264V
Frequency: 48 ~ 440Hz

Selection Guide

	VOLTAGE					CASE SIZE AND WEIGHT			
MODEL NO.	5V	+12V	+12V	−12V	6.3VAC	H (mm)	D (mm)	W (kg)	Wt (kg)
FMC75	2-6A	0.5-2A	0-1.2A	0-0.5A	–	66	191	161	1.3 max
FMC100	3-10A	.5-2.5A	0-1.2A	0-0.5A	–	66	267	127	1.5 max
FMC135	4-12A	.5-3.5A	0-1.2A	0-1.2A	0.05A	71	285	145	2.0 max

Meets UL 114, UL 478, CSA C22.2, VDE 0806 and IEC 380 specifications.

We also have: • fully enclosed power supplies from 15 to 300W
• uninterruptable power supplies. Please call us for a quote.



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GAMMA HIGH VOLTAGE RESEARCH INC.

Designers/Manufacturers—High Voltage Power Supplies
152 SOUTH MacQUESTEN PKWY., MT. VERNON, NY 10550 • TEL. 914 667-5050

HIGH VOLTAGE POWER SUPPLIES MODULAR

SERIES MC

3 Models Covering the range of 50VDC to 3000VDC

ELECTRICAL CHARACTERISTICS:

Input Voltage:	1.75 to 12VDC
Input Current:	400mA
Output Voltage:	Proportional to Input (see table)
Output Current:	3 Watts maximum (see table)
Load Regulation:	5% (½ load to full load)
Ripple:	1% p-p (typical)
Insulation Strength:	3000V Input/Output

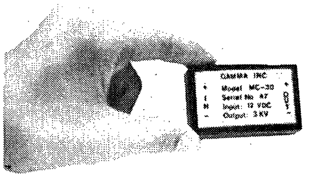
PHYSICAL CHARACTERISTICS:

Dimensions:	1.5″ x 2.5″ x 0.75″
Volume:	2.8 cu. in.
Weight:	4 oz.
Packaging:	Solid encapsulation
Terminations*:	4 P.C. Pins (.043 Dia holes)

ENVIRONMENTAL CHARACTERISTICS:

Temperature Range:	−20°C to +60°C

MINIATURE HIGH VOLTAGE POWER SUPPLIES



MODEL GUIDE:

MODEL	OUTPUT VOLTAGE RANGE	OUTPUT CURRENT
MC-5	50VDC to 500VDC	6mA
MC-15	150VDC to 1500VDC	2mA
MC-30	300VDC to 3000VDC	1mA

SERIES RC

7 Models Covering the range of 0-3KV to 0-30KV at 10 Watts

ELECTRICAL CHARACTERISTICS:

Input Voltage:	+28VDC ±10%
Output Voltage:	Programmable from zero to maximum rated voltage from either an external 5K ohm potentiometer or a zero to +10 volt low voltage ground referenced source
Output Current:	10 Watts maximum
Line Regulation:	0.01% maximum
Load Regulation:	0.01% maximum
Ripple:	0.05% maximum
Temp. Coefficient:	0.01%/°C
Stability:	0.01%/8 hours
Monitor Outputs:	1) Voltage Monitor (Optional) 2) Current Monitor (Optional)
Programming:	
Method 1.	Resistance: External 5K ohm potentiometer
Method 2.	Voltage: Zero to +10 Volts

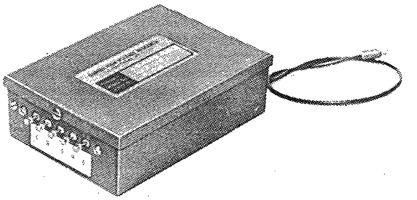
PHYSICAL CHARACTERISTICS:

Dimensions:	3½″ x 5⅛″ x 1⁹⁄₁₆″ (up to 15KV) 3¾″ x 6″ x 2¾″ (20 & 30KV)
Weight:	2½ lbs (up to 15KV) 3½ lbs (20 & 30KV)
Packaging:	Solid encapsulation, metal case with metal inserts in base
Input Connector:	Terminal strip.
Output Termination:	12″ flying lead

ENVIRONMENTAL CHARACTERISTICS:

Temperature Range:	0 to 50°C

REGULATED DC/DC HIGH VOLTAGE POWER SUPPLIES



MODEL GUIDE:

MODEL	OUTPUT VOLTAGE	OUTPUT CURRENT
RC10-3	0-3KV	3.3mA
RC10-5	0-5KV	2.0mA
RC10-10	0-10KV	1.0mA
RC10-15	0-15KV	0.66mA
RC10-20	0-20KV	0.5mA
RC10-25	0-25KV	0.4mA
RC10-30	0-30KV	0.33mA

All units are available in positive or negative polarity. Add P or N as suffix to Model Number to indicate polarity desired.

SERIES UC

7 Models Covering the range of 0-3KV to 0-30KV at 5 Watts

ELECTRICAL CHARACTERISTICS:

Input Voltage:	+24VDC ±10%
Input Current:	400mA maximum
Output Voltage:	Adjustable from zero to rated voltage by adjustment of DC input voltage
Output Current:	5 Watts maximum (see table)
Load Regulation:	20% maximum (½ load to full load)
Ripple:	0.1% per watt

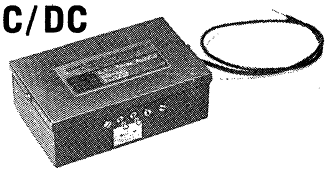
PHYSICAL CHARACTERISTICS:

Dimensions:	2¾″ x 4½″ x 1⁹⁄₁₆″ (up to 15KV) 3½″ x 5⅛″ x 1⁹⁄₁₆″ (20, 25 & 30KV)
Weight:	1½ lbs. (up to 15 KV) 2½ lbs. (20, 25 & 30KV)
Packaging:	Solid encapsulation, metal case with metal inserts in base
Terminations:	Two terminals for DC input. 12″ flying lead for H.V. output

ENVIRONMENTAL CHARACTERISTICS:

Temperature Range:	0 to 50°C

PROPORTIONAL DC/DC HIGH VOLTAGE POWER SUPPLIES



MODEL GUIDE:

MODEL	OUTPUT VOLTAGE	OUTPUT CURRENT
UC5-3	0-3KV *	1.6mA
UC5-5	0-5KV *	1.0mA
UC5-10	0-10KV*	0.5mA
UC5-15	0-15KV	0.33mA
UC5-20	0-20KV	0.25mA
UC5-25	0-25KV	0.2mA
UC5-30	0-30KV	0.166mA

All Models available in positive or negative polarity. Add P or N as suffix to Model Number to indicate polarity desired. * 3KV, 5KV and 10KV Models can be provided with reversible polarity (consult factory).

GAMMA HIGH VOLTAGE RESEARCH INC.
Designers/Manufacturers—High Voltage Power Supplies
152 SOUTH MACQUESTEN PKWY., MT. VERNON, NY 10550 • TEL. 914 667-5050

HIGH VOLTAGE POWER SUPPLIES
REGULATED CONSTANT VOLTAGE CONSTANT CURRENT

1KV to 200KV
300W to 1KW

SERIES RR

SPECIFICATIONS

Input Voltage: Up to 300W: 105-125 RMS at 5 Amps maximum (50 to 60 Hz) 500W & 1000W: 15 Amps maximum

Output Voltage: Continuously adjustable from zero to maximum output voltage rating of power supply. See Model selection guide.

Voltage Regulation*: Line: Better than ±0.005% over specified input range.
Load: Up to 500W: 0.005% for full load change. 1000W:0.01% for full load change.

Current Regulation*: Line: Better than ±0.005% over specified input range.
Load: Better than 75μA for a 75% change in compliance voltage.

Ripple: 60 and 150 Watt units: 0.02%
300, 500 and 1000 Watt units: 0.05%

Temp. Coefficient*: 100ppm/°C over the range of 0 to 60°C.

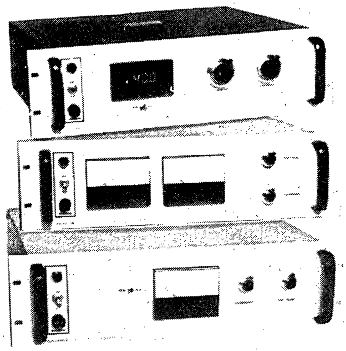
Stability*: 0.01%/hour. 0.03%/8 hours.

* For voltage range from 10% to 100% of rated output.

Controls:
1. Power (HV ON)
2. Output Voltage (10-turn potentiometer)
3. Output Current: (10-turn potentiometer)

Indicators:
1. Power (HV ON)
2. Output Voltage (meter ±2% of full scale)
3. Output Current (meter ±2% of full scale)

Connectors:
1. High Voltage: All models are provided with 6 feet of shielded high voltage cable. The cables are fitted with bushings to mate with a re-entrant receptacle.
2. Input: 3-wire line cord
3. Low Voltage: Rear mounted barrier terminal block for:
   a) External Interlock
   b) Voltage Programming
   c) Current Programming
   d) V/I monitors



SIZE/WEIGHT. ALL UNITS ARE 16″ DEEP X 19″ WIDE

HEIGHT	60, 150 and 300 Watts			500 and 1000 Watts		
	FIXED	REVERSIBLE	FIXED	WEIGHT	REVERSIBLE	WEIGHT
5¼″	Up to 60KV	Up to 40KV	35 lbs. max.	—	—	—
10½″	80 to 125KV	50 to 125KV	75 lbs. max.	Up to 125KV	Up to 60KV	75 lbs. max.
15¾″	—	—	—	—	80 to 125KV	90 lbs. max.

FEATURES

LOW STORED ENERGY: The use of high frequency (>20KHz), high voltage power supply techniques allows stored energy to be minimized thus insuring maximum safety to operating personnel and sensitive loads.

PROGRAMMING OUTPUT VOLTAGE & OUTPUT CURRENT: This feature allows output voltage or output current to be remotely programmed from either an external voltage source or with external potentiometers from the internal reference voltage. A zero to +5V voltage source is required for full scale programming. Internal circuitry insures that the output voltage and output current cannot be externally programmed beyond the maximum settings of the front panel controls.

CONSTANT VOLTAGE/CONSTANT CURRENT WITH AUTOMATIC CROSSOVER: Dual control loops allow either voltage or current to be precisely regulated. Each parameter is controlled and limited by a ten-turn potentiometer on the front panel. The constant voltage/constant current automatic crossover feature allows the power supply to be used as a voltage regulated current limited system or as a current regulated voltage limited system. Thus, both output voltage and output current are totally under operator control under all load conditions, including overload and arc-over conditions.

OVERLOAD, ARC-OVER & SHORT CIRCUIT PROTECTION: Full protection against any overload condition is inherent in the constant voltage/constant current design concept. This is augmented by the liberal use of surge limiting resistors and reactive limiting.

VOLTAGE REGULATION: Line and load regulation is better than 0.005%.
NOTE: On 100 Watt units load regulation is better than 0.01%.

CURRENT REGULATION: Current regulation is better than 75μA.

RIPPLE: At 150 Watts ripple of 0.02%. At 300, 500 and 1000 Watts ripple of 0.005%.

EFFICIENCY: Efficiency is typically greater than 75% at full load.

EXTERNAL POLARITY REVERSAL (Reversible Units Only): A reversing switch mechanism located at the rear of the power supply facilitates polarity reversal.

EXTERNAL INTERLOCK/OUTPUT INHIBIT: Circuitry is provided so that the user can, if desired, inhibit output voltage. External contact closure located on the rear terminal strip will enable the power supply. Open contacts will inhibit the power supply.

FLOATING GROUND: This feature allows the low end return of the power supply to be isolated with respect to chassis ground. Consult factory.

REMOTE OUTPUT VOLTAGE & CURRENT MONITORING: Voltage monitoring and true output current monitoring signals are provided at the rear terminal strip.

MODULAR CONSTRUCTION: Modular construction techniques are used throughout this design thus reducing downtime in critical applications.

OPTIONS

ZERO VOLTAGE START INTERLOCK (ZVS): To prevent accidental damage to loads, the output voltage control must be set to zero before the high voltage can be applied.

VARIABLE OVERVOLTAGE PROTECTION (VOV): This option causes the power supply to shut down when the output voltage exceeds the setting of the overvoltage control potentiometer located at the rear of the power supply (adjustable from 20% to 110% of maximum rated output voltage.)

VARIABLE OVERLOAD TRIPOUT (VOL): This opion causes the power supply to shut down when the output current equals the setting of the front panel current control (adjustable from 20% to 110% of maximum output current of the power supply.)

DIGITAL PANEL METER: SINGLE METER (SDPM) — TWO METERS (DDPM): A single 3½ digit meter reading both voltage and current is available. This meter replaces the two analog meters normally provided. Two 3½ digit meters can also be provided in place of the two analog meters normally provided.

SLOW START (SS): The slow start option enables the output voltage of the power supply to ramp to its maximum output voltage setting at a linear rate. This rate can be factory set from one to fifteen seconds.

SLAVED BI-POLAR OPERATION (SBP): Any two power supplies of the same voltage rating may be operated as a Bi-Polar pair. One power supply acting as the master controller will control both power supplies from zero to maximum rated output voltage. The output voltages of both power supplies will track each other within 2% from 10% to maximum rated output voltage. Each power supply is also capable of operating independently.

PARALLEL OPERATION (PO): Any two supplies of the same voltage rating, current rating and polarity may be paralleled. The supplies may also be operated independently.

AUXILIARY OUTPUT/FOCUS TAP (FT): This option provides an independent auxiliary output which is variable from zero to maximum rated voltage up to 15KV at 300μA maximum. Control is achieved via front panel mounted potentiometer. For other voltages and power levels consult factory. Multiple auxiliary outputs are also available. Consult factory.

REMOTE CONTROL PANEL (RCP): Any standard model can be supplied with a control panel remote from the basic power supply. 20 feet of appropriately shielded interconnection is provided. This remote control panel replaces the front panel normally provided on standard units.

220 VOLT INPUT — 50/60 Hz (220): 220 volt, 50-60 Hz input is available.

BENCH CABINET (BC): A deluxe style cabinet is available for all models.

ORDERING INFORMATION: ADD LETTERS IN PARENTHESIS AS SUFFIX TO MODEL NUMBER.

MODEL SELECTOR GUIDE*

OUTPUT VOLTAGE (kV)	60 WATT MODELS		150 WATT MODELS		300 WATT MODELS		500 WATT MODELS		1000 WATT MODELS	
	MODEL	(mA) RATING	MODEL	(mA) RATING	MODEL	(mA) RATING	MODEL	(mA) RATING	MODEL	(mA) RATING
0-1.5	RR1.5-40	40	RR1.5-100	100						
0-3	RR3-20	20	RR3-50	50	RR3-100	100	RR3-150	150		
0-5	RR5-12	12	RR5-30	30	RR5-60	60	RR5-100	100	RR5-200	200
0-10	RR10-6	6	RR10-15	15	RR10-30	30	RR10-50	50	RR10-100	100
0-15	RR15-4	4	RR15-10	10	RR15-20	20	RR15-33	33	RR15-65	65
0-20	RR20-3	3	RR20-7.5	7.5	RR20-15	15	RR20-25	25	RR20-50	50
0-30	RR30-2	2	RR30-5	5	RR30-10	10	RR30-17	17	RR30-33	33
0-40	RR40-1.5	1.5	RR40-3.75	3.75	RR40-7.5	7.5	RR40-12.5	12.5	RR40-25	25
0-50	RR50-1.25	1.25	RR50-3	3	RR50-6	6	RR50-10	10	RR50-20	20
0-60	RR60-1	1	RR60-2.5	2.5	RR60-5	5	RR60-8.5	8.5	RR60-17	17
0-80	RR80-.75	0.75	RR80-1.8	1.8	RR80-3.75	3.75	RR80-6.5	6.5	RR80-12.5	12.5
0-100	RR100-.6	0.6	RR100-1.5	1.5	RR100-3	3	RR100-5	5	RR100-10	10
0-125	RR125-.5	0.05	RR125-1.2	1.2	RR125-2.5	2.5	RR125-4	4	RR125-8	8

All units are available in positive, negative or reversible polarity. Add P, N or R as suffix to Model Number to indicate polarity desired.
* Lower and higher power models are available. Consult factory.

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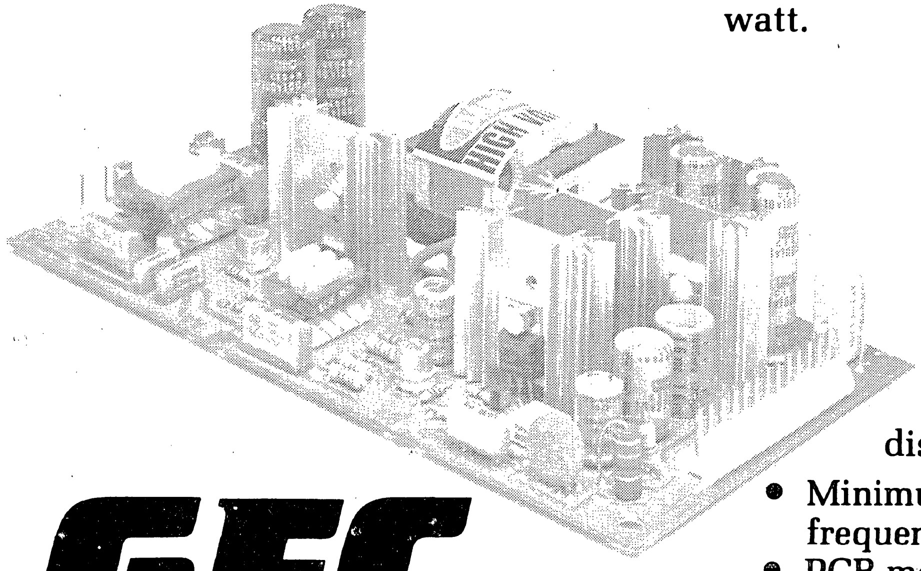
EEM PRODUCT SELECTION GUIDES

Use the EEM Product Selection Guides. There are 34 Guides in this edition of EEM. See page 2 (A•2, B•2, C•2, D•2) of each volume to locate the Product Selection Guides that pertain to your needs.

VDE type Flyback Switchers

These 50 to 130 watt Flyback Switchers use fewer parts than conventional switching power supplies. This means smaller, lighter, less costly supplies per watt.



Features

- Molex type quick disconnect connectors.
- Minimum 25kHZ switching frequency.
- PCB mount
- Separate AC and DC terminals.
- 2 year Warranty.

GFC
HAMMOND

1690 Walden Ave., Buffalo,
New York 14225 (716) 894-5710

Model	Output 1	Output 2	Output 3	Output 4	Output 5	Size
GFXL 50-00	+5V@6A	+12V@2.5/4Apk	-12V@1A	-5V@0.5A	Is isolated from other outputs	L = 7.75 in.
GFXL 50-01	+5V@6A	+15V@2.5/4Apk	-15V@1A	-5V@0.5A		W = 4.25 in.
GFXL 50-02	+5V@6A	+12V@2.5/4Apk	-12V@1A	+12V@1A		H = 1.75 in.
GFXL 75-00	+5V@8A	+12V@2.5/4Apk	-12V@1A	-5V@1A		
GFXL 75-01	+5V@8A	+15V@2.5/4Apk	-15V@1A	-5V@1A		
GFXL 75-02	+5V@8A	+12V@2.5/4Apk	-12V@2A	+12V@1A		
GFXL 100-00	+5V@10A	+12V@3/4.5Apk	-12V@2A	-5V@1A	+24V@2/4Apk	L = 8.50 in.
GFXL 100-01	+5V@10A	+15V@3/4.5Apk	-15V@2A	-5V@1A	+24V@2/4Apk	W = 4.75 in.
GFXL 100-02	+5V@10A	+12V@3/4.5Apk	-12V@2A	-5V@1A	+12V@4/6Apk	H = 2.00 in.
GFXL 130-00	+5V@15A	+12V@3/4.5Apk	-12V@2A	-5V@1A	+24V@2/4Apk	L = 9.50 in.
GFXL 130-01	+5V@15A	+15V@3/4.5Apk	-15V@2A	-5V@1A	+24V@2/4Apk	W = 5.00 in.
GFXL 130-02	+5V@15A	+12V@3/4.5Apk	-12V@2A	-5V@1A	+12V@4/6Apk	H = 2.50 in.

- Load regulation in shaded area 0.2%, unshaded 2.5%.

Lightweight, Compact, Air-insulated, High Voltage DC Power Supplies. Hundreds of Standard Models from 0-5KV to 0-400KV 0-1 Watt to 0-5 Killowatts

Advantages of "RF" Based Designs

High voltage regulated DC power supplies which utilize circuit designs based on radio frequency (RF) high voltage generators have several significant advantages over power supplies based on line frequency operation. These include simplicity of regulating circuitry, greater efficiency and economy, reduced packaging size and weight, and most importantly, lower amounts of stored energy.

Stored Energy

Simply put, in an RF design, for a given ripple requirement, the amount of capacitance required is on the order of 1/500 of that required for the same ripple in a 60 cycle power supply. This is derived from the fact that ripple is inversely proportional to generator frequency; in Glassman Power Supplies, the 30K Hz operating frequency is approximately 500 times line frequency. Since stored energy is directly proportional to capacitance, it follows that the stored energy in Glassman Supplies (with the same ripple factor as a 60 cycle supply) is less by a factor of 500. This ratio of stored energy is huge, resulting in significant reduction of hazardous conditions for personnel and equipment.

Regulation

The high frequency of the RF supply simplifies the closed loop regulator design, and response time in the order of 1 millisecond is relatively easy to achieve when compared to servo regulators and/or phase controlled SCR primary regulators. The degree of regulation and speed of response is considerably better in the RF supplies than in line frequency based regulator circuits.

Efficiency, Size, and Weight

Only the series regulator is capable of achieving comparable regulation characteristics to the RF designs. These circuits, however, are notoriously inefficient. In regard to weight and size, we have already pointed out how filter capacitors are much smaller at the higher frequencies of the RF design. The same applies to inductive elements such as the high voltage transformer. Lighter, smaller components reflect in reduced package size and, obviously more economical equipment.

Typical Specifications

Voltage Regulation: Load, better than 0.005% for full load variation; line better than ±0.005% over specified input range.**

Current Regulation: Load, better than 100 microamperes from short circuit to rated voltage at any load condition. Line, better than ±0.005% over specified input range.**

Ripple: 0.1% rms of rated voltage at full load. Ripple voltage is proportional to load current and decreases linearly to 0.01% rms of rated voltage at no load.*

Stability: 0.01% per hour after ½-hour warm-up. 0.05% per 8 hours.**

Temperature Coefficient: 0.01%/°C.*

Ambient Temperature: −20°C to +60°C, operating; −40°C to +85°C, storage.

Protection: Automatic current regulation protects power supply against all overload conditions, including arcs and short circuits.

* Some specifications vary on particular models. Check factory or individual product data sheet.
** Or ±1 volt, whichever is greater.

Features/Options		MG	MX	EG	LG	WH	PG	PH
		Models						
Remote Voltage Program		S	S	N/A	S	S	S	S
Remote Voltage Monitor		S	S	N/A	S	S	S	S
Remote Current Program		N/A	S	N/A	S	S	S	S
Remote Current Monitor		S	S	N/A	S	S	S	S
True Load Monitor		N/A	S	N/A	S	S	S	S
Current Adjust		N/A	N/A	N/A	O	S	S	S
Ten-Turn Counting Dials	Voltage	N/A	N/A	O	S	S	S	S
	Current	N/A	N/A	N/A	N/A	S	S	S
Shielded High Voltage Output Cable (8′)		S	S	S	S	S	S	S
Panel Meters		N/A	N/A	S	S	S	S	S
External Interlock Terminals		N/A	S	N/A	S	S	S	S

S = Standard O = Optional N/A = Not Available

STANDARD CATALOG PRODUCTS

MODEL LINES	OUTPUT VOLTAGE - KV																			
	KV	3	5	10	15	20	25	30	35	40	50	60	80	100		150	200	250	300	400
MG SERIES	µA		200	200	200	100	100	100	100	100	50									
MX SERIES	MA		10	5	3	2.5	2	1.5	1.5	1.2	1	0.8								
EG SERIES	MA		6	3	2	1.5		1		0.75	0.6	0.5								
LG SERIES	MA		20	15		7.5		5		3.5	3	2.5	1.5	1		3				
WH SERIES	MA	75	60	30		15		10		7.5	6	5								
PG SERIES	MA	250	100	50 100		25 50		16 32		12 25	10 20	8 16	6 12	4 7.5	5 10	3 6	2.5 5	1 2	1 2	1
PH SERIES	MA	750	500	300	200	150		100		75	60	50	35	25		20	15	5	5	

MOST MODELS CAN BE TAILORED TO MEET YOUR REQUIREMENTS IF THE STANDARD PRODUCT LINE DOES NOT MEET YOUR NEEDS.

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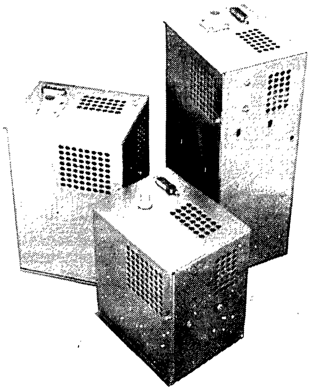
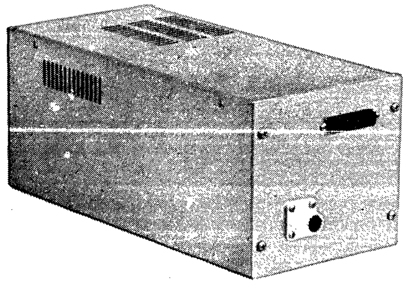
MG SERIES MODELS



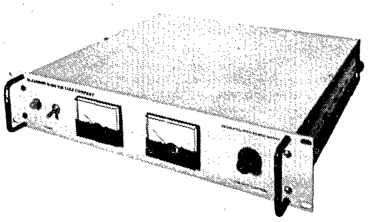
Positive Polarity Model	Negative Polarity Model	Output Voltage	Output Current	Case Size (inches)
MG5P200	MG5N200	0-5 KV	200uA	4 x 5 x 6
MG10P200	MG10N200	0-10KV	200uA	4 x 5 x 8
MG15P200	MG15N200	0-15KV	200uA	4 x 5 x 8
MG20P100	MG20N100	0-20KV	100uA	4 x 5 x 8
MG25P100	MG25N100	0-25KV	100uA	4 x 5 x 8
MG30P100	MG30N100	0-30KV	100uA	4 x 5 x 11
MG35P100	MG35N100	0-35KV	100uA	4 x 5 x 11
MG40P100	MG40N100	0-40KV	100uA	4 x 5 x 11
MG50P50	MG50N50	0-50KV	50uA	4 x 5 x 11

MX SERIES MODELS



Positive Polarity Model	Negative Polarity Model	Output Voltage	Output Current	Size (Inches)
MX5P10	MX5N10	0-5 KV	10 mA	4¾ x 5 3/16 x 11
MX10P5	MX10N5	0-10KV	5 mA	4¾ x 5 3/16 x 11
MX15P3	MX15N3	0-15KV	3 mA	4¾ x 5 3/16 x 11
MX20P2.5	MX20N2.5	0-20KV	2.5mA	4¾ x 5 3/16 x 11
MX25P2	MX25N2	0-25KV	2 mA	4¾ x 5 3/16 x 11
MX30P1.5	MX30N1.5	0-30KV	1.5mA	4¾ x 5 3/16 x 11
MX35P1.5	MX35N1.5	0-35KV	1.5mA	4¾ x 5 3/16 x 11
MX40P1.2	MX40N1.2	0-40KV	1.2mA	4¾ x 5 3/16 x 11
MX50P1	MX50N1	0-50KV	1 mA	4¾ x 5 3/16 x 11
MX60P.8	MX60N.8	0-60KV	.8mA	4¾ x 5 3/16 x 11

EG SERIES MODELS



Reversible Polarity Model	Positive Polarity Model	Negative Polarity Model	Output Voltage	Output Current	Panel Height
EG5R6	EG5P6	EG5N6	0-5 KV	6.0 mA	3½″
EG10R3	EG10P3	EG10N3	0-10KV	3.0 mA	3½″
EG15R2	EG15P2	EG15N2	0-15KV	2.0 mA	3½″
EG20R1.5	EG20P1.5	EG20N1.5	0-20KV	1.5 mA	3½″
EG30R1	EG30P1	EG30N1	0-30KV	1.0 mA	3½″
EG40R0.75	EG40P0.75	EG40N0.75	0-40KV	0.75mA	3½″
EG50R0.6	EG50P0.6	EG50N0.6	0-50KV	0.6 mA	3½″
EG60R0.5	EG60P0.5	EG60N0.5	0-60KV	0.5 mA	3½″

EG Series Options

Symbol	Description	Symbol	Description
220	220 Volt Input	RV	Remote Voltage Programming Terminal
100	100 Volt Input	TT	Ten Turn Front Panel Voltage Control

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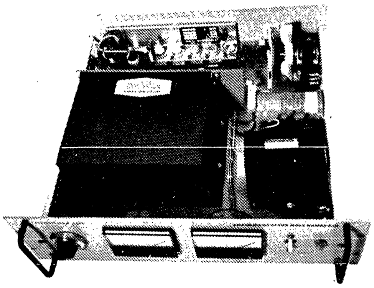
LG SERIES MODELS

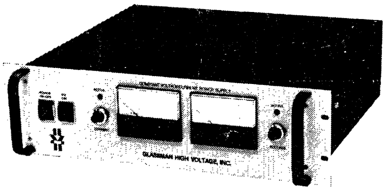


Reversible Polarity Model	Positive Polarity Model	Negative Polarity Model	Output Voltage	Current Output	Panel Height
LG5R20	LG5P20	LG5N20	0-5 KV	20.0mA	5¼″
LG10R15	LG10P15	LG10N15	0-10 KV	15.0mA	5¼″
LG20R7.5	LG20P7.5	LG20N7.5	0-20 KV	7.5mA	5¼″
LG30R5	LG30P5	LG30N5	0-30 KV	5.0mA	5¼″
LG40R3.5	LG40P3.5	LG40N3.5	0-40 KV	3.5mA	5¼″
LG50R3	LG50P3	LG50N3	0-50 KV	3.0mA	5¼″
LG60R2.5	LG60P2.5	LG60N2.5	0-60 KV	2.5mA	5¼″
LG80R1.5	LG80P1.5	LG80N1.5	0-80 KV	1.5mA	8¾″
LG100R1	LG100P1	LG100N1	0-100KV	1.0mA	8¾″

LG Series Options

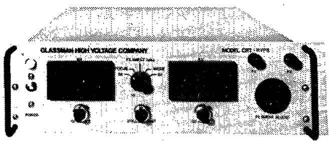
Symbol	Description
220	220 Volt Input
100	100 Volt Input
B	Bi-Polar Operation (Requires 2 power supplies)
C	Cabinet
CA	Current Adjust (rear)
CC	Current Control
CT	Current Trip

WH SERIES MODELS

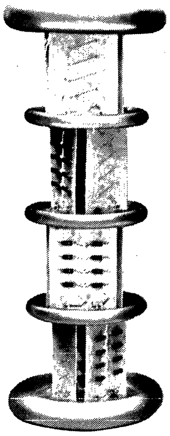


Reversible Polarity Model	Positive Polarity Model	Negative Polarity Model	Output Voltage	Output Current	Panel Height
WH3R75	WH3P75	WH3N75	0-3 KV	75 mA	5¼″
WH5R60	WH5P60	WH5N60	0-5 KV	60 mA	5¼″
WH10R30	WH10P30	WH10N30	0-10 KV	30 mA	5¼″
WH20R15	WH20P15	WH20N15	0-20 KV	15 mA	5¼″
WH30R10	WH30P10	WH30N10	0-30 KV	10 mA	5¼″
WH40R7.5	WH40P7.5	WH40N7.5	0-40 KV	7.5mA	5¼″
WH50R6	WH50P6	WH50N6	0-50 KV	6 mA	5¼″
WH60R5	WH60P5	WH60N5	0-60 KV	5 mA	5¼″

PRECISION TEST EQUIPMENT



MODEL CRT-HVPS
MODEL RD50A
MODEL RD100A
MODEL RD200A



See specifications in EEM section 2900 pages D•1234, D•1235

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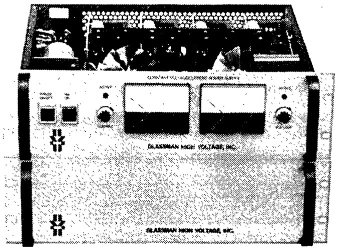
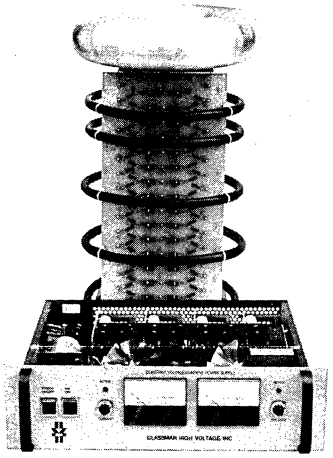
PG SERIES MODELS





Reversible Polarity Model	Positive Polarity Model	Negative Polarity Model	Output Voltage	Output Current	Panel Height
FULLY ENCLOSED MODELS					
PG3R250	PG3P250	PG3N250	0-3 KV	250 mA	10½″
PG5R100	PG5P100	PG5N100	0-5 KV	100 mA	10½″
PG10R50	PG10P50	PG10N50	0-10 KV	50 mA	10½″
PG10R100	PG10P100	PG10N100	0-10 KV	100 mA	10½″
PG20R25	PG20P25	PG20N25	0-20 KV	25 mA	10½″
PG20R50	PG20P50	PG20N50	0-20 KV	50 mA	10½″
PG30R16	PG30P16	PG30N16	0-30 KV	16 mA	10½″
PG30R32	PG30P32	PG30N32	0-30 KV	32 mA	10½″
PG40R12	PG40P12	PG40N12	0-40 KV	12 mA	10½″
PG40R25	PG40P25	PG40N25	0-40 KV	25 mA	10½″
PG50R10	PG50P10	PG50N10	0-50 KV	10 mA	10½″
PG50R20	PG50P20	PG50N20	0-50 KV	20 mA	10½″
PG60R8	PG60P8	PG60N8	0-60 KV	8 mA	10½″
PG60R16	PG60P16	PG60N16	0-60 KV	16 mA	10½″
PG80R6	PG80P6	PG80N6	0-80 KV	6 mA	10½″
PG80R12	PG80P12	PG80N12	0-80 KV	12 mA	10½″
PG100R4	PG100P4	PG100N4	0-100KV	4 mA	10½″
PG100R7.5	PG100P7.5	PG100N7.5	0-100KV	7.5 mA	10½″
OPEN STACK MODELS					
PG100R5	PG100P5	PG100N5	0-100KV	5 mA	5¼″
PG100R10	PG100P10	PG100N10	0-100KV	10 mA	5¼″
PG150R3	PG150P3	PG150N3	0-150KV	3 mA	5¼″
PG150R6	PG150P6	PG150N6	0-150KV	6 mA	5¼″
PG200R2.5	PG200P2.5	PG200N2.5	0-200KV	2.5mA	5¼″
PG200R5	PG200P5	PG200N5	0-200KV	5 mA	5¼″
PG250R1	PG250P1	PG250N1	0-250KV	1 mA	5¼″
PG250R2	PG250P2	PG250N2	0-250KV	2 mA	5¼″
PG300R1	PG300P1	PG300N1	0-300KV	1 mA	5¼″
PG400R1	PG400P1	PG400N1	0-400KV	1 mA	5¼″

PG - WH Series Options

Symbol	Description	Symbol	Description
220	220 Volt Input	400 HZ	400 Hz INPUT
100	100 Volt Input	DM	Digital Panel Meters
B	Bi-Polar Operation (Requires 2 power supplies)	TTL	Compatible "enable" line
CT	Current Trip	P	Parallel Operation

PH SERIES MODELS

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Reversible Polarity Model	Positive Polarity Model	Negative Polarity Model	Output Voltage	Output Current	Panel Height
PH3R750	PH3P750	PH3N750	0-3 KV	750 mA	21″
PH5R500	PH5P500	PH5N500	0-5 KV	250 mA	21″
PH10R300	PH10P300	PH10N300	0-10 KV	300mA	21″
PH15R200	PH15P200	PH15N200	0-15 KV	200mA	21″
PH20R150	PH20P150	PH20N150	0-20 KV	150mA	21″
PH30R100	PH30P100	PH30N100	0-30 KV	100mA	21″
PH40R75	PH40P75	PH40N75	0-40 KV	75mA	21″
PH50R60	PH50P60	PH50N60	0-50 KV	60mA	21″
PH60R50	PH60P50	PH60N50	0-60 KV	50mA	21″
PH80R35	PH80P35	PH80N35	0-80 KV	35mA	21″
PH100R25	PH100P25	PH100N25	0-100KV	25mA	21″

HIGHER OUTPUT VOLTAGES AVAILABLE CONSULT FACTORY

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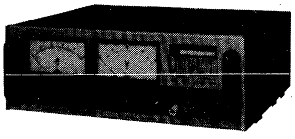
KIK – Supplies for Labs and Systems



Eight Series in 93 Models are Available

PAC Series (8 models)
General Purpose Power Supplies.
To 110 @ 1A-To 10A @ 16V.

PAD-L Series (45 models)
High Current, Low Noise, High Precision
To 1000V @ 0.2A-To 500A @ 16V.

PAB Series (17 models)
Low Cost Power Supplies
To 350V @ 0.2A-To 5A @ 8V.

PAB-A Series (5 models)
Digital Readout Economical
32 @ 2.0A to 18 @ 3A

PAL Series (6 models)
Highest Efficiency >70% Lightweight
16V @ 20, 40, 60A and
32V @ 10, 20, 30A.

POW Series (3 models)
Bi-Polar Power Supply/Amplifier
±35V @ ±1A, ±35V @ 5A,
±70V @ 2A.

PDM Series (5 models)
Dual Tracking Power Supplies
To ±60V @ ±0.5-To ±3A @ ±35V.

PAE Series System Supply (3 models)
High Speed — Low Noise Modes
0-35V @ 10 amps, 20 amps or 30 amps.

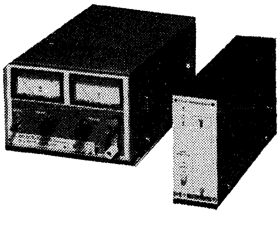
Operating Characteristics

Series	PAC	PADL	PAB	PABA	PAL	POW	PDM	PAE
Constant V	✓	✓	✓	✓	✓	✓	✓	✓
Constant I	✓	✓	✓	✓	✓	✓	✓	✓
Regulation %	.005	.005	.02	.02	.003	.03	.005	.003
Auto Crossover	✓	✓	✓	✓	✓	✓	✓	✓
Bi-Polar	—	—	—	—	—	✓	Dual Track	—
Parallel Operation	✓	✓	✓	✓	✓	—	✓	✓
Series Operation	✓	✓	✓	✓	✓	—	✓	✓
Over-Voltage	—	✓	—	—	✓	—	—	✓
Overcurrent	✓	✓	✓	✓	✓	✓	✓	✓
Overtemp	✓	✓	—	—	✓	—	—	✓
Remote Current	—	✓	—	✓	✓	—	—	✓
Remote Sensing (Sampling)	✓	✓	—	—	✓	—	✓	✓
Remote Voltage Programming	✓	✓	—	✓	✓	Amp	✓	✓
120V ±10%	✓	✓	✓	✓	✓	✓	✓	✓
240V ±10%	Avail	Some Models	Avail	Avail	✓	Avail	Avail	✓

Power Supply Programming Made Easy.

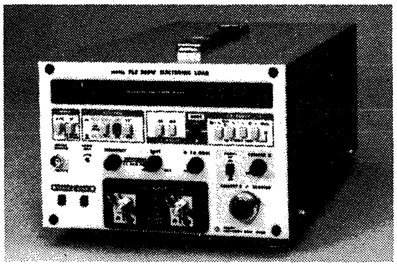
Kik's DPO 2000 Series of digital to analog converters (DAC's) can be interfaced with any GPIB controller or microprocessor. Model DPO 2212A features two 12 bit DAC channel (BCD 3 digits, resolution 0.1%) and one 8 bit DAC channel (binary, resolution - 0.4%). Model 2212 has a single 12 bit channel. All channels have a 0-10 volt output, optical isolation, and manual REMOTE/LOCAL switch. Both the 2212 and 2212A are independent units with internal power supplies.

Kik's DPO 200 and 100 series are IEEE-488 bus or 8 and 12 bit, single and dual DAC's. These compact units mount on the rear of most Kik supplies and use the supply's internal power to operate. This DAC series is also optically isolated.



DPO 2212	**$495.00**
DPO 2212A	**$795.00**
DPO 200 from	**$435.00**
DPO 100-PC from	**$245.00**

Electronic Load for General Purpose Power Supply Testing – Model PLZW



- Internal or external signal
- Internal square wave generator with variable duty cycle
- Operates in 3 modes – resistance, constant voltage, constant current
- 3 simultaneous display modes – voltage (digital) – current (digital) & peak power
- Resistance and average power displayed digitally
- Upper and lower current limit (in square wave mode) are independently controlled
- Max. capability—4 to 110 Volts; 30, 60 & 140 amps; 70 - 150 - 300- 700 watts

Kik
INTERNATIONAL CORP.
LEASING AVAILABLE

Call toll free (800) 421-5334
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Gardena, CA 90248
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HEWLETT
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The Choice in DC Power Supplies

- ***HP-IB (IEEE 488) System Power Supplies***
- ***Digitally Controlled Power Sources***
- ***Autoranging Power Supplies***
- ***General Purpose Lab & System Supplies***
- ***Multiprogrammers***
- ***Low-Cost Lab Supplies***
- ***High-Power, High-Efficiency Supplies***
- ***Precision Voltage & Current Sources***
- ***Bipolar Power Supply/Amplifiers***

Power Supplies for the Lab or System

Hewlett-Packard power supplies are available in many types, sizes and ratings. You can choose from benchtype supplies for circuit testing and development, HP-IB systems power supplies, high-power supplies used in industrial processes, and many special purpose supplies ranging from bioplar power supply/amplifiers to constant current sources. Most are covered briefly in this short-form listing and in much greater detail in the 120-page DC Power Supply Catalog which can be obtained free of cost from your local HP Field Engineer.

In selecting the best power supply for a given job, one usually looks to satisfy all the physical and electrical criteria first: voltage and current ratings, performance specifications, size, and operating features. However, there are other less tangible factors which affect the usability and long-range performance of a power supply. Reliability, for example, is closely related to design thoroughness and the use of quality parts. Service assistance in the form of helpful advice, excellent operating and service manuals, and worldwide availability of spare parts can help return a failed instrument to service in a minimum of time. These factors do not appear on a data sheet, but are closely related to a company's capability and responsibility towards its customers. When you purchase a power supply from Hewlett-Packard, you receive guaranteed product performance plus all the intangibles that add up to long-term value — and it usually costs no more.

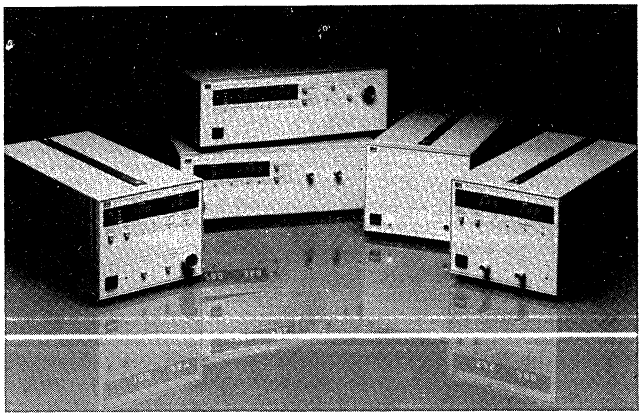
Ordering Information

Although Hewlett-Packard products are manufactured throughout the world, the Hewlett-Packard field office or distributor in your area is best equipped to handle all your needs concerning products described in this catalog, and for parts and service on Hewlett-Packard products you already own. A listing of field offices current at the time of publication, can be found on the back page of this section.

200-1,200 Watt HP-IB Systems Power Supplies with Autoranging

- HP-IB programming of voltage, current and OVP
- HP-IB measurement of voltage and current
- Read-back of status information
- Autoranging output
- Programmable "soft" limits
- Friendly programming format
- Digital panel meters
- Fast down-programming
- Compact and lightweight
- Self-test and diagnostics

A system power supply provides for remote control of output voltage and/or current, in addition to or instead of manual control. Hewlett-Packard offers a variety of dc power supplies which have been specifically designed for computer controlled systems. These supplies, when used on the HP-IB, provide many advanced system features and easy-to-use programmable capabilities. Request the "DC Power Supply Catalog" from your local HP Sales Office for complete details.



Ratings for HP-IB Power Supplies

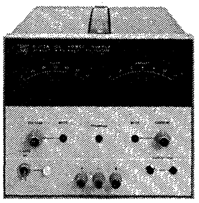
Volts	Amps	Output Power Watts Max.	HP Model	Price
0-20	0-120	0-1000	6031A	$3,100
0-60	0-50	0-1000	6032A	$3,100
0-20	0-30	0-200	6033A	$2,400
0-60	0-10	0-200	6038A	$2,400
0-200	0-17	0-1000	6030A	$3,100

HEWLETT PACKARD

20-200 Watt Lab/System Supplies

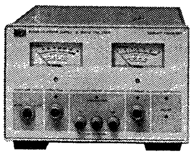
- Constant Voltage/Constant Current Operation
- Auto-Series, - Parallel, - Tracking
- Remote Programming and Sensing
- Single -, Dual -, Triple - Output Models
- Autoranging Models

6002A Autoranging



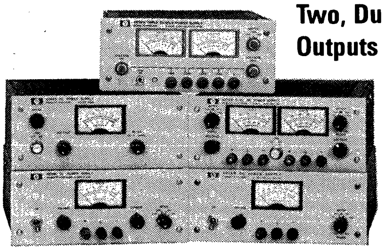
HP-IB

6024A Autoranging



6236B, 6237B CV/CL Triple Output

6205C CV/CL Two, Dual Range Outputs

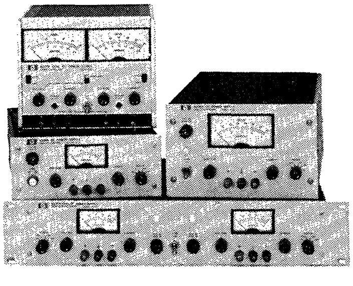


6206B

6200B 6209B CV/CC

6227B, 6228B

6281A, 6284A, 6289A, 6294A, 6299A



6282A, 6286A, 6291A, 6296A

6253A, 6255A

This series of low and medium-power Constant Voltage/Constant Current power supplies includes both single and dual output models. All supplies have separate front-panel voltage/current controls that allow the voltage and current outputs to be varied from zero to the maximum rated values. Crossover from constant voltage to constant current operation occurs automatically when the load current exceeds the value established by the current control setting.

The dual-output supplies each contain two identical, independently-adjustable supplies. By combining the versatility of a dual power supply with the flexibility of auto-series and auto-parallel operation, twice the maximum rated output voltage or current of each section can be obtained from the one supply. In addition, using the autotracking capability, opposite-polarity voltages can be obtained.

Autoranging supplies employ a regulation control that automatically yields a continuous span of voltage and current ratings within the basic power rating boundary. More current is available at lower voltages, and higher voltages are available at a given current level. Autoranging supplies have features for system applications and have the flexibility for multi-application or multi-user situations.

Ratings for Autoranging Supplies

Volts	Amps	Max. avail. Power	Model	PARD Rms/p-p	Price
0-20	0-30	200W	6023A	3mv/30mv	$1,550
0-20	0-120	1000W	6011A	8mv/50mv	$2,200
0-50	0-10	200W	6002A	1mv/10mv	$1,950*
0-60	0-10	200W	6024A	3mv/30mv	$1,220
0-60	0-50	1000W	6012B	5mv/40mv	$2,100
0-200	0-17	1000W	6010A	12mv/100mv	$2,100

*HP-IB (IEEE 488) control for Model 6002A is optional; add $560

**Load effect: 0.01%; source effect: 0.01%

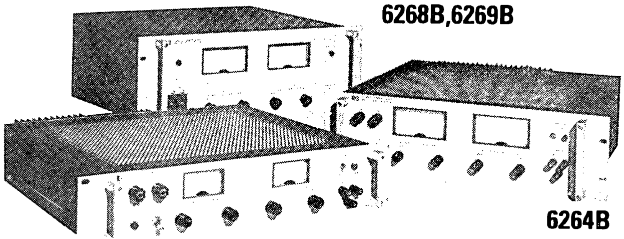
Ratings for Lab/System Supplies

Volts	Amps	Model	Load Effect	Source Effect	PARD Rms/p-p	Price
0-6/0±20 0-18/0±20	2.5/.5 1/.5	6236B 6237B	0.01% +2mV	0.01% +2mV	0.35mV/ 1.5mV	$700
0-7.5	0-5	6281A	5mV	0.01% +2mV	200μV/1mV	$850
0-10	0-10	6282A	0.01% +1mV	0.01% +1mV	500μV/25mV	$1,000
0-20/0-40	0-1.5/ 0-0.75	6200B	0.01% +4mV	0.01% +4mV	200μV/1mV	$600
0-20/0-40 0-20/0-40	0.6/0.3 0.6/0.3	6205C	0.01% +4mV	0.01% +4mV	.2mV/1mV	$650
0-20 0-20	0-3 0-3	6253A	0.01% +4mV	0.02% +2mV	200μV/1mV	$1,350
0-20	0-3	6284A	0.01% +4mV	0.01% +2mV	200μV/1mV	$700
0-20	0-10	6286A	0.01% +1mV	0.01% +1mV	500μV/25mV	$1,050
0-25 0-25	0-2 0-2	6227B	0.01% +1mV	1mV	250μV/4mV	$1,650
0-30/0-60	1/0.5	6206B	0.01% +4mV	0.01% +4mV	.2mV/1mV	$600
0-40 0-40	0-1.5 0-1.5	6255A	0.01% +2mV	0.01% +2mV	200μV/1mV	$1,350
0-40	0-1.5	6289A	0.01% +2mV	0.01% +2mV	200μV/1mV	$700
0-40	0-5	6291A	0.01% +1mV	0.01% +1mV	500μV/25mV	$1,050
0-50 0-50	0-1 0-1	6228B	0.01% +1mV	1mV	250μV/4mV	$1,650
0-60	0-1	6294A	0.01% +2mV	0.01% +2mV	200μV/1mV	$750
0-60	0-3	6296A	0.01% +1mV	0.01% +1mV	500μV/25mV	$1,050
0-100	0-750mA	6299A	0.01% +2mV	0.01% +2mV	200μV/1mV	$750
0-320	0-0.1	6209B	0.02% +2mV	0.02% +2mV	1mV/40mV	$770

HEWLETT PACKARD

200-2,000 Watt High-Performance Supplies for Systems or the Lab

- Constant Voltage/Constant Current Operation
- Built-in Overvoltage Protection
- Auto-Series, - Parallel, - Tracking

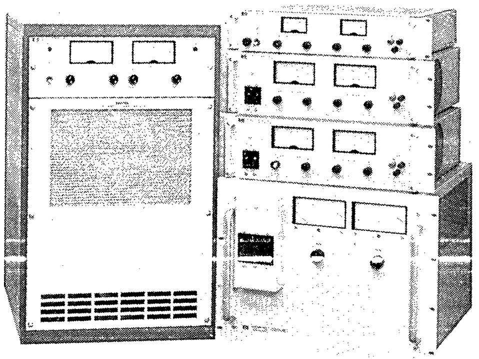


All models in this series employ a transistor series-regulator/triac preregulator circuit to achieve high efficiency, excellent regulation, low ripple and noise, and moderate programming speeds in a compact full-rack width package.

Separate coarse and fine voltage and current controls allow the voltage and current outputs to be varied from zero to the maximum rated value.

300-11,000 Watt High-Power, High-Efficiency Supplies

- Constant Voltage/Constant Current Operation
- Low Cost/Watt
- Up to 75% Efficiency
- Auto-Series, -Parallel, -Tracking



This series of SCR-regulated power supplies is designed for high-power applications requiring a fixed or variable DC source with moderate regulation and ripple. Typical applications include battery charging and discharging, computer mainframe and memory system power, life testing and aging of large quantities of components, etc.

Ratings for High-Efficiency Supplies

Volts	Amps	Model	Load Effect	Source Effect	PARD Rms/p-p	Price
0-10	0-50	6259B	0.01% +200μV	0.01% +200μV	500μV/ 5mV	$1,775
0-10	0-100	6260B	0.01% +200μV	0.01% +200μV	500μV/ 5mV	$2,105
0-20	0-10	6263B	0.01% +200μV	0.01% +200μV	200μV/ 10mV	$1,450
0-20	0-20	6264B	0.01% +200μV	0.01% +200μV	200μV/ 10mV	$1,500
0-20	0-50	6261B	0.01% +200μV	0.01% +200μV	500μV/ 5mV	$1,880
0-40	0-5	6266B	0.01% +200μV	0.01% +200μV	200μV/ 10mV	$1,400
0-40	0-10	6267B	0.01% +200μV	0.01% +200μV	200μV/ 10mV	$1,450
0-40	0-30	6268B	0.01% +200μV	0.01% +200μV	1mV/ 5mV	$1,830
0-40	0-50	6269B	0.01% +200μV	0.01% +200μV	1mV/ 5mV	$2,000
0-60	0-15	6274B	0.01% +200μV	0.01% +200μV	200μV/ 20mV	$1,600

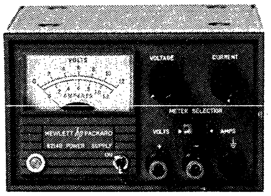
Ratings for High-Performance Supplies

Volts	Amps	Model	Load Effect	Source Effect	PARD Rms/p-p	Price
0-8	0-1000	6464C	0.05% +5mV	0.05% +5mV	80mV/ 1V	$8,700
0-15	0-200	6453A	0.2%+10mV Com		150mVrms	$4,400
0-16/ 0-18	0-600/ 0-500	6466C	0.05% +5mV	0.05% +5mV	180mV/ 1V	$8,600
0-36	0-100	6456B	0.2%+10mV Com		180mVrms	$4,000
0-36	0-300	6469C	0.05% +5mV	0.05% +5mV	180mV/ 1V	$8,000
0-40	0-25	6434B	40mV	18mV	40mV/ 500mV	$1,800
0-64	0-50	6459A	0.2%+10mV Com		160mVrms	$4,000
0-64	0-150	6472C	0.05% +100mV	0.05% +100mV	160mV/ 2V	$8,000
0-110	0-100	6475C	0.05% +100mV	0.05% +100mV	220mV/ 2V	$8,000
0-120	0-2.5	6443B	120mV	60mV	240mV/ 400mV	$1,350
0-220	0-50	6477C	0.05% +100mV	0.05% +100mV	330mV/ 2V	$8,000
0-300	0-35	6479C	0.05% +100mV	0.05% +100mV	330mV/ 3V	$8,000
0-400, 500,600	0-25, 20,15	6483C	0.05% +100mV	0.05% +100mV	600mV/ 5V	$8,400
1-600	5mA- 1.5A	6448B	1%+ 400mV	600mV	600mV/ 2V	$1,750

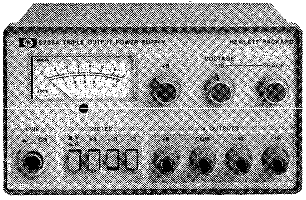
HEWLETT PACKARD

10-Watt General Purpose Bench Supplies

- Single, Dual & Triple Output Models
- Short-Circuit Proof
- Compact, Impact-Resistant Case



6212B, 6214B
6216B, 6218B
Single Output



6235A Triple Output
6234A Dual Output

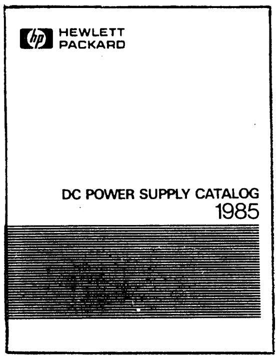
Ratings—Single, Dual & Triple Outputs

Volts	Amps	Model	Load Effect	Source Effect	PARD Rms/p-p	Price
0-6	1.0	**Triple** 6235A	10mV	15mV	1mV/5mV	$480
0to+18	0.2					
0to−18	0.2					
0-25	0.2	**Dual** 6234A	4mV	4mV	200μV/1mV	$450
0-25	0.2					
0-10	0-1	6214B	4mV	4mV	200μ/1mV	$370
0-25	0-0.4	6216B	4mV	4mV	200μ/1mV	$370
0-50	0-0.2	6218B	4mV	4mV	200μ/1mV	$370
0-100	0-0.1	6212B	8mV	4mV	200μ/1mV	$450

These popular low-cost bench supplies are designed for general laboratory use. All models have front-panel voltage controls, a combination volt/ammeter, and output binding posts. Output voltage is continuously variable from 0V to 15% above the maximum rated output of the supply. A meter function switch selects either output voltage or current for display on the panel meter. Models 6212B-6218B are Constant Voltage/Constant Current (CV/CC)-type supplies and have concentric coarse and fine current controls which allow the current limit point to be set to any value within the current rating. They can also be operated as constant current sources with 500μA load regulation.

SALES AND SERVICE OFFICES

CALL YOUR LOCAL HP OFFICE FOR IMMEDIATE ASSISTANCE AND ASK FOR INSTRUMENT SALES, OR WRITE FOR YOUR COPY!



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HEWLETT PACKARD
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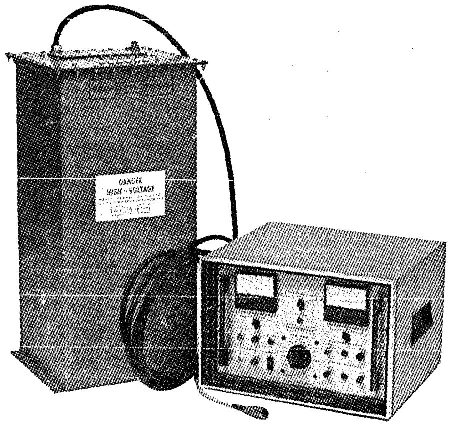
TECHNICAL INFORMATION

WHERE TO FIND THEM IN THE 85/86 EDITION OF EEM

Abbreviations/Acronyms	A•1166, B•1012, C•1028, D•1016
ASCII Code	D•1087
Batteries, Product Selection Guide	D•1413
Batteries & Fuel Cells, Characteristics	D•1430
Cabinets, Enclosures, Racks, & Chassis, Product Selection Guide	C•1003
Capacitors, Basic Formulas	A•1093
Capacitors, Miniglossary	A•1066
Capacitors, Product Selection Guide	A•1003
Circuit Boards (Printed) Product Selection Guide	C•1099
Coils, Chokes, Inductors, Product Selection Guide	A•1205
Conductors, Maximum Current Capacity of Copper & Aluminum	C•1863
Connectors, Miniglossary	C•1129
Connectors, Terminals, & Sockets, Product Selection Guide	C•1105
Crystals, Oscillators, Crystal & Piezoelectric Filters, Product Selection Gude	A•1309
Delay Lines, Product Selection Guide	A•1459
Discrete Semiconductors, Product Selection Guide	A•2067
Displays, Readouts, Lamps, & Lights, Product Selection Guide	B•1015
EBCDIC Code	D•1092
Encapsulation, Miniglossary	C•1086
Fans, Blowers, Cooling Equipment, & Heat Exchangers, Product Selection Guide	C•1623
Filters, Product Selection Guide	A•1583
Instruments, Graphic Recording Product Selection Guide	D•1401
Instruments, Panel Meters, Product Selection Guide	D•1329
Instruments, Test & Measuring Product Selection Guide	D•1175
Interconnection Systems, Product Selection Guide	C•1699
Keyboards & Keypads, Product Selection Guide	B•1705
Logofinder & Trademark Directories	B•901
Microwave Components, Product Selection Guide	A•1701
Military Qualified Products Lists	B•1003
Motors, Drives, & Rotating Components, Product Selection Guide	B•1129
Opto Semiconductors, Miniglossary	B•1214
Oscilloscopes, Product Selection Guide	D•1385
Panel Hardware, Product Selection Guide	C•1589
Potentiometers, Trimmers, Controls, & Rheostats, Product Selection Guide	A•1991
Power Supplies, Miniglossary	D•1462
Power Supplies, AC, Product Selection Guide	D•1877
Power Supplies, DC, Product Selection Guide	D•1447
Protective Components (Fuses, Circuit Breakers, etc.), Product Selection Guide	B•1225
Relay Contact Forms	B•1317
Relays, Electromechanical, Miniglossary	B•1308
Relays, Product Selection Guide	B•1261
Resistor Color Codes	A•1828
Resistors, Product Selection Guide	A•1785
Servo Components, Miniglossary	D•1985
Solenoids, Product Selection Guide	B•1463
Switches, Product Selection Guide	B•1477
Thermal Components, Product Selection Guide	B•1741
Thermal Conductivity of Dielectrics at Room Temperature	B•1744
Thyristors/High Power Diodes, Miniglossary	A•2076
Transducers & Encoders, Product Selection Guide	B•1777
Transformers, Product Selection Guide	A•2099
Wire & Cable, Product Selection Guide	C•1743
Wire Gauges—Diameter, Area, Copper Weight	C•1844

STANDARD HIGH VOLTAGE DC POWER SUPPLIES

Complete line of HV DC power supplies available with voltages up to 300 kV, listed according to power rating. Features are identical throughout the line.



Typical DC Power Supply

STANDARD FEATURES

(provided with all units)

- Output connected triple range voltage meter.
- Triple range current meter in return leg of HV circuit.
- Reversible polarity.
- Rated current available from zero to rated voltage.
- Solid state rectifiers.
- Continuously variable output voltage from zero to maximum.
- HV on and off pushbuttons.
- Meter recalibration potentiometers.

Hipotronics

Quality Products

These units are designed and manufactured with the highest quality components. They are available with fully instrumented control consoles or without controls for use in OEM equipment.

All critical components—transformers, capacitors, rectifier assemblies, tanks etc., are designed and manufactured by Hipotronics so that superior quality and on-time delivery schedules can be assured.

Model No.	Voltage (kV)	Current (mA)	Output	Input
801-1A	1	1 Amp	1 KILOWATT	115 VOLT, 50/60 Hz, SINGLE PHASE
803-330	3	330		
805-200	5	200		
810-100	10	100		
820-50	20	50		
825-40	25	40		
830-33	30	33		
850-20	50	20		
860-16	60	16		
875-13	75	13		
8100-10	100	10		
8120-8	120	8		
8150-6.5	150	6.5		
8200-5	200	5		
801-1.5A	1	1.5 Amp	1.5 KILOWATT	
803-500	3	500		
805-300	5	300		
810-150	10	150		
825-60	25	60		
830-50	30	50		
850-30	50	30		
875-20	75	20		
8100-15	100	15		
8120-12.5	120	12.5		
8150-10	150	10		
8200-7.5	200	7.5		
801-2.5A	1	2.5 Amp	2.5 KILOWATT	
803-830	3	830		
805-500	5	500		
810-250	10	250		
825-100	25	100		
850-50	50	50		
875-33	75	33		
8100-25	100	25		
8120-20	120	20		
8150-16	150	16		
8200-12.5	200	12.5		
8250-10	250	10		
8300-8	300	8		

Model No.	Voltage (kV)	Current (mA)	Output	Input
801-5A	1	5 Amp	5 KILOWATT	208/230 VOLT, 50/60 Hz, THREE PHASE (* = Single Phase)
803-1.6A	3	1.66 Amp		
805-1A	5	1 Amp		
810-500	10	500		
825-200 *	25	200		
850-100 *	50	100		
875-67 *	75	67		
8100-50 *	100	50		
8120-41.5*	120	41.5		
8150-33.3*	150	33.3		
8200-25 *	200	25		
8250-20 *	250	20		
8300-16.6*	300	16.6		
801-10A	1	10 Amp	10 KILOWATT	
803-3300	3	3.3 Amp		
805-2000	5	2 Amp		
810-1000	10	1 Amp		
825-400	25	400		
850-200 *	50	200		
875-130 *	75	130		
8100-100 *	100	100		
8120-80 *	120	80		
8150-65 *	150	65		
8200-50 *	200	50		
8250-40 *	250	40		
8300-33 *	300	33		

Model No.	Voltage (kV)	Current (mA)	Output	Input
801-15A	1	15 Amp	15 KILOWATT	480 VOLT, 50/60 Hz, THREE PHASE (* = Single Phase)
803-5A	3	5 Amp		
805-3A	5	3 Amp		
810-1.5A	10	1.5 Amp		
825-600	25	600		
850-300*	50	300		
875-200*	75	200		
8100-150*	100	150		
8120-125*	120	125		
8150-100*	150	100		
8200-75*	200	75		
8250-60*	250	60		
8300-50*	300	50		
801-25A	1	25 Amp	25 KILOWATT	
803-8.8A	3	8.8 Amp		
805-5A	5	5 Amp		
810-2.5A	10	2.5 Amp		
825-1A	25	1 Amp		
850-500	50	500		
875-335	75	335		
8100-250	100	250		
8120-200	120	200		
8150-170	150	170		
8200-125*	200	125		
8300-80*	300	80		
801-50A	1	50 Amp	50 KILOWATT	
803-16.6A	3	16.6 Amp		
805-10A	5	10 Amp		
810-5A	10	5 Amp		
825-2A	25	2 Amp		
850-1A	50	1 Amp		
875-670	75	670		
8100-500	100	500		
8120-420	120	420		
8150-335	150	335		
8200-250*	200	250		
8300-165*	300	165		

STANDARD SPECIFICATIONS THREE PHASE INPUT

Ripple—5% rms
(1% optional)
Regulation—10% NL/FL

*SINGLE PHASE INPUT

Ripple—2% rms
Regulation—15%-18% NL/FL

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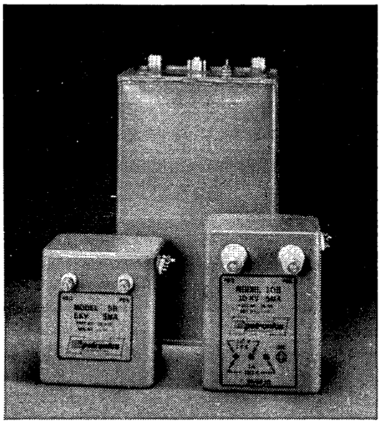
Hipotronics

HV DC POWER PACKS



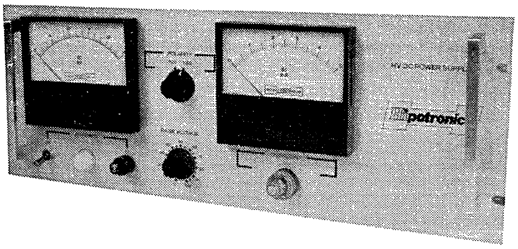
1. Power Packs:

Manufactured with all components rated at well above designated operating elevel and pre-assembly Hipot tested at 1.5 operating voltage. Power Packs are available from 2.5kV to 150kV.

Model No.	Input	Output	
		KV	MA
2.5B	115/220V	2.5	5
2.5C		2.5	10
5B		5	5
7.5C		7.5	10
10B		10	5
10C		10	10
15B		15	5
15C		15	10
20B		20	5
30B		30	5
30C		30	10
40A		40	2.0
50B		50	5
60A		60	2.0
100B		100	5
100C		100	10
150B		150	5

2. Metered Power Packs with simplified controls:

Provide complete output metering and overload protection system in a unit suitable for mounting in standard 19" relay racks. Current limited to 5mA.



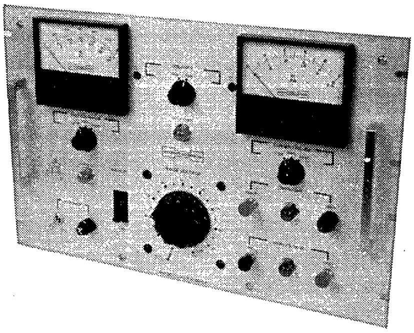
SPECIFICATIONS:

INPUT: 125 Volts [Output Voltages & Currents—Stated for **Nominal 117 Volt Input**].
REGULATION: 10% to 15% No Load to Full Load.
RIPPLE: 0.5% RMS per Milliampere Output.

Model No.	Output (kV)	Current (mA)	Ripple (%rms/mA)	Polarity	KV Meter Range (kV)	Current Meter Range (mA)
R2B	0-2	5	0.5	Reversible	0-2.5	0-5
R5B	0-5	5	0.5	Reversible	0-6	0-5
R10B	0-10	5	0.5	Reversible	0-12	0-5
R15B	0-15	5	0.5	Reversible	0-15	0-5
R20B	0-20	5	0.5	Reversible	0-25	0-5
R30B	0-30	5	0.5	Reversible	0-30	0-5
R50B	0-50	5	0.5	Reversible	0-50	0-5
R60A	0-60	2.0	0.5	Reversible	0-60	0-2.0

3. Power Packs with deluxe controls:

Provided with many safety and control features previously found only in higher power DC Supplies. Current in 2mA, 5mA, and 10mA.

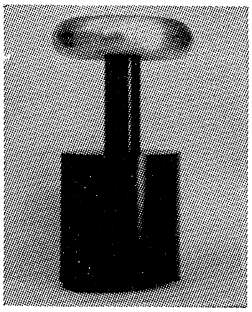


SPECIFICATIONS:

INPUT: 115 Volts, 50/60 Hz, Single Phase.
REGULATION: 15% No Load to Full Load.
RIPPLE: 0.5% RMS Per Milliampere Output.
HV OUTPUT: 20 Foot Shielded Cable.
POLARITY: Reversible

Model No.	Max kV	mA	kV Meter Ranges	mA Meter Ranges
82.5B	2.5	5	0-.5/1/2.5	0-1/2.5/5
82.5C	2.5	10	0-.5/1/2.5	0-2.5/5/10
85B	5	5	0-1/2.5/5	0-1/2.5/5
87.5C	7.5	10	0-1.5/3.75/7.5	0-2.5/5/10
810B	10	5	0-2.5/5/10	0-1/2.5/5
810C	10	10	0-2.5/5/10	0-2.5/5/10
815B	15	5	0-3.75/7.5/15	0-1/2.5/5
815C	15	10	0-3.75/7.5/15	0-2.5/5/10
820B	20	5	0-4/8/20	0-1/2.5/5
830C	30	10	0-6/12/30	0-2.5/5/10
830B	30	5	0-6/12/30	0-1/2.5/5
840A	40	2	0-8/20/40	0-.4/.8/2
850B	50	5	0-10/25/50	0-1/2.5/5
860A	60	2	0-12/30/60	0-.4/.8/2

ISOLATION TRANSFORMERS



Operate in Oil, Gas and Air (Rated in Air) for use in Laser, Accelerator & Laboratory Power Supplies and for Insulation, Cable, Hipot and Corona Testing.

MODEL	IT 100	IT 300
D.C. Isolation	100 KV	300 KV
INPUT/OUTPUT VOLTAGE	115:115V, 50/60 Hz or 220:220V, 50/60 Hz Single Phase	
KVA	1 KVA	

Hipotronics

HIPOTRONICS, INC., P.O. DRAWER A • BREWSTER, NY 10509 • (914) 279-8091 • TWX 710-574-2420

HITRAN
Division of AGEX

Key source for reliable magnetic components, power supplies and control systems for over 40 years.

200W TO 200KW STANDARD & SPECIALTY DC POWER SYSTEMS

STANDARD BATTERY CHARGERS

Industrial float type chargers, designed to automatically control charging rates for a wide variety of battery types. Filtered and unfiltered 600V class input. Single phase and three phase. 47 to 63 Hz. Outputs range from 12 to 260V at 6 to 600Adc.
Two series are available:
***SCR Series** constant voltage chargers automatically controlled by solid state integrated circuitry.*
***SR Series** constant voltage chargers automatically controlled by a saturable reactor (magnetic amplifier) and solid state integrated circuitry.*

Performance

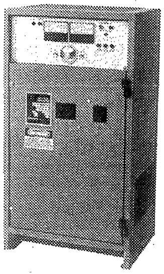
- Full rated output for both continuous and intermittant loads.
- Electronic current limiting at 110% of rated output.

Regulation.

- Continous taper charging as required.
- ± ½ % Load Regulation of DC voltages from no load to full load.
- ± ½ % of DC voltage setting maintained with input line variations of ± 10% voltage, and/or ± 5% frequency.
- ± 1% Output Regulation maintained against the combined variations of line, load and temperature.

Design Features

- Components selected for long life and reliability.
- Components derated to assure protection against voltage transients and short term overloads.
- No adjustment taps required.
- Lockable float/equalize controls on recessed front panel.
- Enclosures wall, floor or rack mountable.



Specialty SR Series Battery Charger

AC Input Voltage

120, 220, 240, 480 single phase, 47-63Hz and 208, 240, 380, 416, 480 three phase, 47-63Hz.

DC Output Ratings

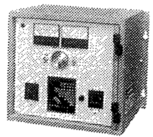
6-600 Adc at 12, 24, 48, 130 or 260 Vdc, nominal.

Standard Accessories

- DC Ammeter and Voltmeter.
- Potentiometers for float and equalize charge adjustments.
- AC input circuit breaker.
- Dual fused DC output.
- Front panel switch to change from float to equalize charging rate.
- Internal connection blocks for AC input, DC output and optional accessories.
- Protection diode to prevent damage due to improper connection of battery cables.

Optional Accessories

- DC circuit breaker to replace standard fusing.
- Equalize timer, 0-72 hour.
- Ground detection alarm relays and lights.
- HI & LO Vdc alarm relays and lights.
- Charger failure alarm relay and lights.
- Output filtering as required, 30mV RMS or less as charger or eliminator.
- And many more.



SCR Series Battery Charger

STANDARD PLASMA POWER SUPPLIES

DCS SERIES — Direct Current Sputtering

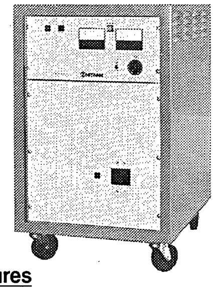
Designed for use in the vacuum sputtering, thin film deposition industry. Constant-current control, saturable reactor regulated, 600V class input, three phase, 50/60Hz, 600 and 1000Vdc at 3 to 25KW output. Special outputs to 75KW available.

Performance

- Input: 210/240 or 440/480V three phase 50/60Hz
- Output: 600/1000Vdc
- AC ripple less than 5%
- Current regulation better than 5%

Standard Features

- Tapped transformer secondaries
- Short circuit protection
- Transient supression
- Grounded B+ on chassis
- Forced air cooled
- Current rate signal interface ability



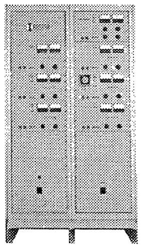
DCS-10000L

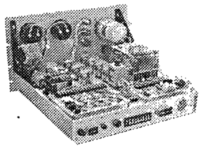
Optional Features

- Constant power or constant voltage
- Floating B+ to 50V off ground
- Free floating B+, (B− and B+ ground free)
- Multiple gun output
- Programmable timer (0.2 seconds to 60 hours)
- Remote control adapter kit
- Auto transformer for 380-415V input

Standard Models Available

KW	CATALOG NUMBER DCS-	CURRENT OUTPUT AT 600/1000VDC	CABINET DIMENSIONS H″ × W″ × D″
3	3000L	5A/3A	17.5 × 19 × 20
5	5000L	8.3A/5A	37 × 22 × 30
10	10000L	16.7A/10A	37 × 22 × 30
15	15000L	25A/15A	43 × 26 × 36
20	20000L	33.3A/20A	60 × 40 × 54
25	25000L	41.7A/25A	60 × 40 × 54





Chassis Mounted Control Circuitry

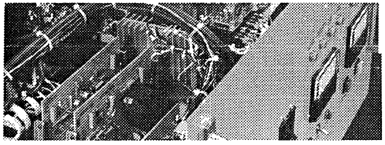
Specialty Plasma Power Supply

SPECIALTY POWER SYSTEMS

Also see our catalog pages under TRANSFORMERS and AC POWER SOURCES.

- Power converters - AC to DC, DC to AC, AC to AC, or DC to DC
- Rectifiers, Inverters, Regulators
- Low voltage
- High voltage to 50KV
- High current to 20,000 Amperes
- Frequency to 10KHz

Typical Specialty Power Supply Construction



- Variable-voltage
- Variable-frequency
- Phase-angle fired SCR controlled
- Saturable reactor controlled
- Unregulated, Regulated
- Voltage, Current or Power Regulation to ±0.1%

Route 31, RD 5-65 • Flemington, New Jersey 08822 • 201-782-5525 • Telex: 833701/AGEX/FLEM

Integrated Circuits Incorporated
10301 Willows Road, Redmond, WA 98052
(206) 882-3100 TWX: 910-443-2302

MINIATURE DC-DC CONVERTERS

When size is at a premium, performance is critical, and reliability is a must, ICI Miniature DC-DC Converters are the industry leaders.

Since 1969, ICI has been developing innovative designs of on-board power devices. ICI combines unique electrical design with proven thick-film hybrid processes to obtain maximum performance and power per cubic inch. With dedicated engineering and production, the power devices group conducts a continuous development program in DC-DC converter technology. This program assures state-of-the-art products for demanding applications. At ICI, every unit receives individual testing; every unit carries ICI's one-year warranty.

Standard models, normally shipped from inventory, are available for both military/airborne and industrial applications. With over 100 models in production and power ratings to 20 watts, the ICI product line provides the customer with a wide selection of devices for his application.

For military and airborne applications, ICI's metal-packaged hermetically-sealed units are available in several configurations—each series offering unique advantages.

For industrial applications, ICI's standard families of encapsulated designs provide a broad choice of models for operation over a temperature range of −20°C to +70°C.

And for custom applications, including MIL-STD-883 requirements, ICI can provide design expertise based on solid experience to achieve quick response and expedited delivery of an end-item that will do the job—and do it well.

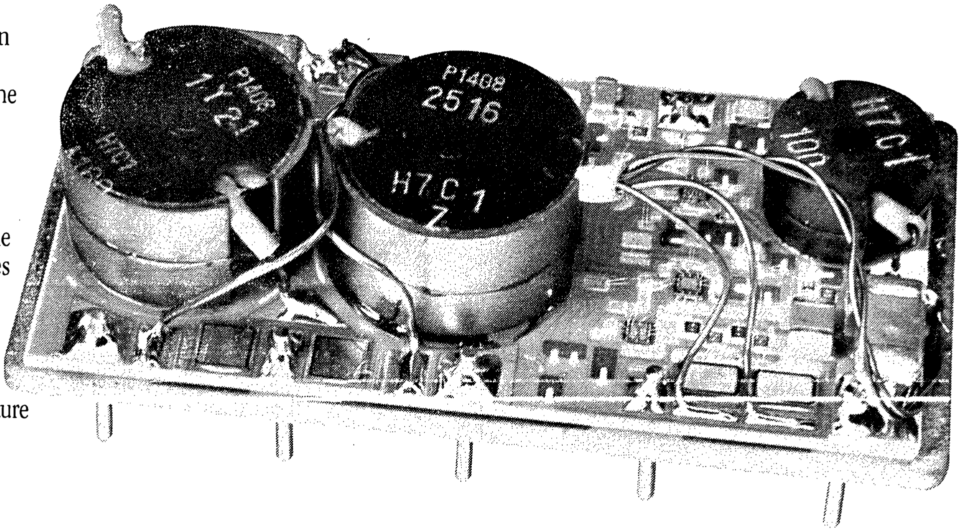
Integrated Circuits Incorporated . . . for the best in DC-DC converters.

Optional Environmental Screening

All ICI metal-packaged units are available with environmental screening, referenced to MIL-STD-883, per ICI's in-house screening procedure, as follows:

- Pre-cap internal visual inspection: Method 2017.
- Stabilization bake: 24 hours at 125°C, Method 1008, Cond. B.
- Temperature cycle: 10 times, −55°C/+125°C, Method 1010.
- Constant Acceleration: 500 g, Method 2001.
- Gross Leak: Method 1014.
- Fine Leak: Method 1014, Cond. A.
- Burn-in: 96 hour, at max. rated case temp., Method 1015
- Final electrical test: Per specification.
- Final external visual inspection: Method 2009

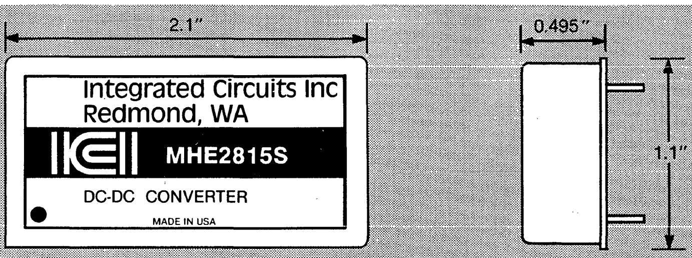
To order optional screening, add suffix /ES to part number. Example: MHE2805S/ES. Consult ICI for prices.



MHE SERIES

- **Up to 20 watts output power**
- **16 to 40 VDC input range**
- **Up to 86% typical efficiency**
- **-55°C to +85°C case temp. range**

The MHE models are high efficiency, isolated, regulated DC-DC converters that require no external components. Various output voltages are available in these hermetically-sealed, metal-packaged models that are suitable for military and airborne applications.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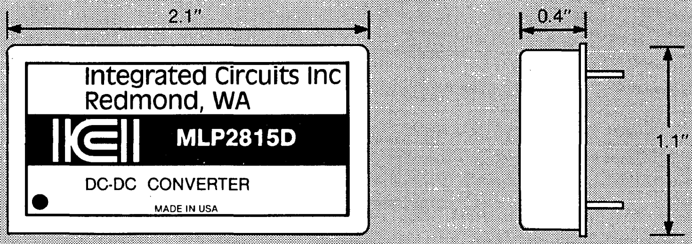
0.495"
1.1"
Integrated Circuits Inc
Redmond, WA
MHE2815S
DC-DC CONVERTER
MADE IN USA

PRICE GROUP	MODEL	VDC INPUT	OUTPUT @ FULL LOAD			MAX. WATTS
			VDC	mA	EFF. %	
M	MHE2805S	16.0 to 40.0	5.0	3000	81	15
	MHE2812S	16.0 to 40.0	12.0	1667	86	20
	MHE2815S	16.0 to 40.0	15.0	1333	86	20
	MHE2812D	16.0 to 40.0	± 12.0	± 625	78	15
	MHE2815D	16.0 to 40.0	± 15.0	± 500	78	15

MLP SERIES

- **Up to 15 watts output power**
- **Low profile: 0.4 inches high**
- **16 to 40 VDC input range**
- **-55°C to +85°C case temp. range**

The MLP series devices are similar to the MHE series except for a lower case profile. Isolation, regulated outputs, high efficiency, wide input voltage range, and metal hermetic package make the MLP series ideal for military, aerospace, or other high reliability applications.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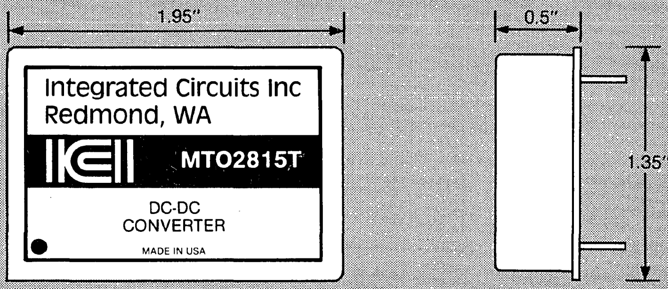
Integrated Circuits Inc
Redmond, WA
MLP2815D
DC-DC CONVERTER
MADE IN USA

PRICE GROUP	MODEL	VDC INPUT	OUTPUT @ FULL LOAD			MAX. WATTS
			VDC	mA	EFF. %	
M	MLP2805S	16.0 to 40.0	5.0	2000	81	10
	MLP2812S	16.0 to 40.0	12.0	1250	86	15
	MLP2815S	16.0 to 40.0	15.0	1000	86	15
	MLP2812D	16.0 to 40.0	± 12.0	± 417	78	10
	MLP2815D	16.0 to 40.0	± 15.0	± 333	78	10

MTO SERIES

- **15 watts—triple output**
- **16 to 40 VDC input range**
- **79% efficiency**
- **-55°C to +85°C case temp. range**

The MTO models have three output voltages, with a common ground. All three regulated outputs are fully isolated from the input. The full rated output power can be drawn from the +5 VDC output, or the dual outputs can be loaded up to the limits shown. Total output power must be limited to 15 watts. Metal, hermetic package.


1.95"
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1.35"
Integrated Circuits Inc
Redmond, WA
MTO2815T
DC-DC
CONVERTER
MADE IN USA

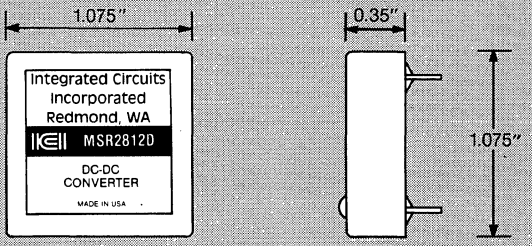
PRICE GROUP	MODEL	VDC INPUT	OUTPUT @ FULL LOAD			MAX. WATTS
			VDC	mA	EFF. %	
O	MTO2812T	16.0 to 40.0	+ 5.0 ± 12.0	2000 ± 208	77	15
	MTO2815T	16.0 to 40.0	+ 5.0 ± 15.0	2000 ± 167	79	15

MSR SERIES

- **Up to 4 watts output power**
- **16 to 32 VDC input range**
- **Up to 75% efficiency**
- **-55°C to +85°C case temp. range**

The MSR models offer the high efficiency and wide input range of flyback switching regulators, yet have full input/output isolation. There are single, dual and triple output models, with all outputs fully regulated. The packages are metal, hermetically-sealed.

NOTE: EXTERNAL OUTPUT CAPACITORS ARE REQUIRED.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1.075"
Integrated Circuits
Incorporated
Redmond, WA
MSR2812D
DC-DC
CONVERTER
MADE IN USA

PRICE GROUP	MODEL	VDC INPUT	OUTPUT @ FULL LOAD			MAX. WATTS
			VDC	mA	EFF. %	
K	MSR2805S	16.0 to 32.0	5.0	700	72	3.5
	MSR2812D	16.0 to 32.0	± 12.0	± 167	75	4.0
	MSR2815D	16.0 to 32.0	± 15.0	± 133	75	4.0
N	MSR28512T	16.0 to 32.0	+ 5.0 ± 12.0	300 ± 63	70	3.0
	MSR28515T	16.0 to 32.0	+ 5.0 ± 15.0	300 ± 50	70	3.0

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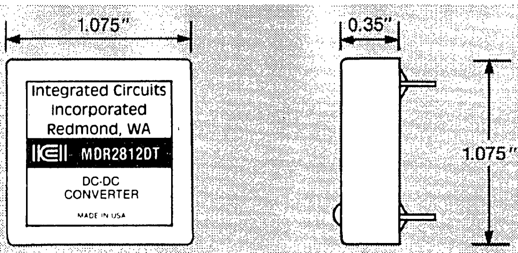
10301 Willows Rd. Redmond, WA 98052
(206) 882-3100 TWX: 910-443-2302

MDR SERIES

- **3 watts of output power**
- **Input voltages of 12, 24, and 28 VDC**
- **Regulated, isolated outputs**
- **-55°C to +85°C case temp. range**

The MDR series of DC-DC converters offers the excellent regulation and low output ripple provided by a series output regulator, in a hermetically-sealed metal package. No external components are required, and the outputs are fully isolated from the input.

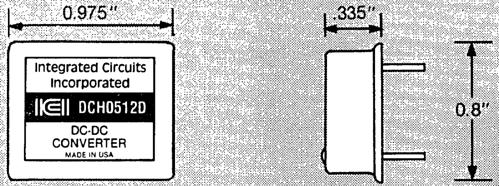


PRICE GROUP	MODEL	VDC INPUT	OUTPUT @ FULL LOAD			MAX. WATTS
			VDC	mA	EFF. %	
I	MDR1212DT	10.8 to 14.0	±12.0	±125	60	3.0
	MDR1215DT	10.8 to 14.0	±15.0	±100	60	3.0
	MDR2412DT	20.0 to 28.0	±12.0	±125	60	3.0
	MDR2415DT	20.0 to 28.0	±15.0	±100	60	3.0
	MDR2812DT	24.0 to 32.0	±12.0	±125	60	3.0
	MDR2815DT	24.0 to 32.0	±15.0	±100	60	3.0

DCH SERIES

- **Up to 3 watts output power**
- **Unregulated**
- **Input voltages of 5, 12, and 28 VDC**
- **-55°C to +100°C case temp. range**

The DCH series consists of isolated, unregulated models that deliver up to 3 watts of output power. They can be used with external series regulators or in applications not requiring well regulated voltages. The metal packages are hermetically sealed.



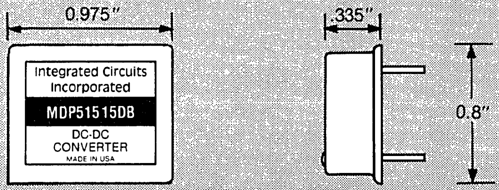
PRICE GROUP	MODEL	NOMINAL VDC INPUT	OUTPUT @ FULL LOAD			MAX. WATTS
			VDC	mA	EFF. %	
L	DCH0505S	5.0	5.0	400	67	2.0
	DCH0512S	5.0	12.0	208	72	2.5
	DCH0512D	5.0	±12.0	±104	72	2.5
	DCH0515D	5.0	±15.0	±83	72	2.5
	DCH1205S	12.0	5.0	500	70	2.5
	DCH1212S	12.0	12.0	250	72	3.0
	DCH1212D	12.0	±12.0	±125	72	3.0
	DCH1215D	12.0	±15.0	±100	72	3.0
	DCH1228S	12.0	28.0	107	75	3.0
	DCH1228D	12.0	±28.0	±53	75	3.0
	DCH2805S	28.0	5.0	500	68	2.5
	DCH2812S	28.0	12.0	250	75	3.0
	DCH2812D	28.0	±12.0	±125	75	3.0
	DCH2815D	28.0	±15.0	±100	75	3.0

MDP SERIES

- **Up to 1.5 watts output power**
- **Wide input voltage ranges**
- **High efficiency/non-isolated**
- **-55°C to +85°C case temp. range**

The MDP miniature switching regulators include models with one regulated output and one unregulated output, as well as models with dual regulated outputs. The input common is connected internally to the output common. They are contained in metal, hermetically-sealed packages.

NOTE: EXTERNAL OUTPUT CAPACITORS ARE REQUIRED.



PRICE GROUP	MODEL	VDC INPUT	OUTPUT VDC	EFF. %	MAX. WATTS
P	MDP50505DP	+3 to +7	+5 REGULATED/−5 UNREG.	75	1.25
	MDP505SN	+3 to +7	−5 REG. SINGLE OUTPUT	72	1.25
	MDP51205DP	+3 to +7	+12 REGULATED/−5 UNREG.	75	1.25
	MDP51212DP	+3 to +7	+12 REGULATED/−12 UNREG.	75	1.25
	MDP51212DN	+3 to +7	−12 REGULATED/+12 UNREG.	75	1.25
	MDP51212DB	+3 to +7	±12 REG./BALANCE UNREG.	75	1.25
	MDP51515DB	+3 to +7	±15 REG./BALANCE UNREG.	75	1.25
	MDP120505DP	+9 to +15	+5 REGULATED/−5 UNREG.	72	1.50
	MDP1205SN	+9 to +15	−5 REG. SINGLE OUTPUT	72	1.50
	MDP121205DN	+9 to +15	−12 REGULATED/+5 UNREG.	78	1.50
	MDP121212DB	+9 to +15	±12 REG./BALANCE UNREG.	80	1.50
	MDP121515DB	+9 to +15	±15 REG./BALANCE UNREG.	80	1.50
	MDP240505DP	+16 to +32	+5 REGULATED/−5 UNREG.	72	1.50
	MDP241212DP	+16 to +32	+12 REGULATED/−12 UNREG.	80	1.50
	MDP241212DN	+16 to +32	−12 REGULATED/+12 UNREG.	80	1.50
	MDP241212DB	+16 to +32	±12 REG./BALANCE UNREG.	80	1.50
	MDP241515DB	+16 to +32	±15 REG./BALANCE UNREG.	80	1.50

Integrated Circuits Incorporated

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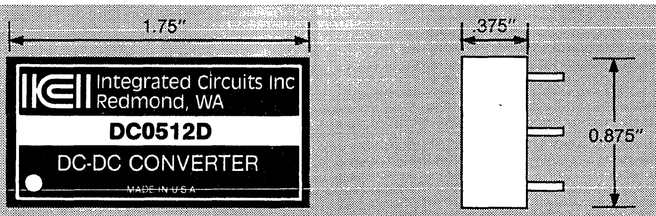
(206) 882-3100 TWX: 910-443-2302

DC SERIES

- **Up to 6.4 watts of output power @ 70°C**
- **Isolated, unregulated outputs**
- **Rugged encapsulated construction**
- **4 input voltage ranges**

The DC series of unregulated DC-DC converters consists of single and dual output models, in four input voltage ranges. They can be used with external regulators or in applications that do not require regulated voltages. Operating ambient temperature range for these plastic, encapsulated devices is −20°C to +70°C.

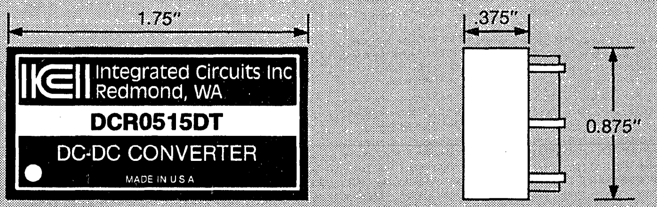


PRICE GROUP	MODEL	NOMINAL VDC INPUT	OUTPUT @ FULL LOAD			MAX. WATTS
			VDC	mA	EFF. %	
A	DC0512D	5	±12	±208	75	5.0
	DC0515D	5	±15	±167	77	5.0
	DC0525D	5	±25	±100	77	5.0
	DC1205S	12	5	1000	67	5.0
	DC1212D	12	±12	±267	77	6.4
	DC1215D	12	±15	±213	77	6.4
	DC1218D	12	±18	±178	77	6.4
	DC2805S	28	5	1000	73	5.0
	DC2812D	28	±12	±267	81	6.4
	DC2815D	28	±15	±213	81	6.4
	DC2818D	28	±18	±178	81	6.4
	DC4805S	48	5	1000	70	5.0
	DC4812S	48	12	530	80	6.4
	DC4812D	48	±12	±267	80	6.4
	DC4815D	48	±15	±213	80	6.4
	DC4818D	48	±18	±178	80	6.4

DCR SERIES

- **Up to 4 watts output power @ 70°C**
- **Isolated, regulated outputs**
- **Foldback current limiting**
- **High efficiency—no external components**

The DCR series features isolated, dual-tracking outputs and four different input voltage ranges. They have input pi filters for good ripple rejection and the non-saturating core design minimizes radiated and conducted noise. These plastic, encapsulated converters can be operated over an ambient temperature range of −20°C to +70°C.



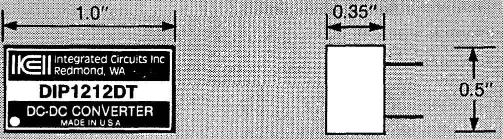
PRICE GROUP	MODEL	VDC INPUT	OUTPUT @ FULL LOAD			MAX. WATTS
			VDC	mA	EFF. %	
B	DCR0512DT	4.5 to 5.5	±12.0	±156	65	3.75
	DCR0515DT	4.5 to 5.5	±15.0	±125	65	3.75
	DCR1212DT	10.8 to 14.0	±12.0	±167	65	4.0
	DCR1215DT	10.8 to 14.0	±15.0	±133	65	4.0
	DCR2812DT	24.0 to 32.0	±12.0	±167	65	4.0
	DCR2815DT	24.0 to 32.0	±15.0	±133	65	4.0
	DCR4812DT	44.0 to 56.0	±12.0	±167	65	4.0
	DCR4815DT	44.0 to 56.0	±15.0	±133	65	4.0

DIP SERIES

- **Up to 1.5 watts output power**
- **High efficiency**
- **Wide input voltage ranges**
- **14 pin DIP compatible package**

The DIP switching regulator series consists of units that operate over a wide input voltage range, over a wide range of loads, with high efficiency. They are ideal for battery applications or wherever high efficiency and small size are important. The output common is connected internally to the input common. They are encapsulated in plastic packages and will operate over the ambient temperature range of −20°C to +70°C.

NOTE: EXTERNAL OUTPUT CAPACITORS ARE REQUIRED.



PRICE GROUP	MODEL	VDC INPUT	OUTPUT VDC	EFF. %	MAX. WATTS
D	DIP370505DP	+ 3 to + 7	+ 5 REGULATED/− 5 UNREG.	75	1.25
E	DIP371205DP	+ 3 to + 7	+ 12 REGULATED/− 5 UNREG.	75	1.25
	DIP371212DP	+ 3 to + 7	+ 12 REGULATED/− 12 UNREG.	75	1.25
	DIP371212DN	+ 3 to + 7	− 12 REGULATED/+ 12 UNREG.	75	1.25
	DIP371212DB	+ 3 to + 7	± 12 REG./BALANCE UNREG.	75	1.25
	DIP371515DB	+ 3 to + 7	± 15 REG./BALANCE UNREG.	75	1.25
D	DIP505SN	+ 3 to + 7	− 5 REG. SINGLE OUTPUT	72	1.25
	DIP1205SN	+ 9 to + 15	− 5 REG. SINGLE OUTPUT	72	1.50
	DIP1205SP	+ 9 to + 15	+ 5 REG. SINGLE OUTPUT	72	1.50
E	DIP121212DB	+ 9 to + 15	± 12 REG./BALANCE UNREG.	78	1.50
	DIP121515DB	+ 9 to + 15	± 15 REG./BALANCE UNREG.	78	1.50
D	DIP240505DP	+ 16 to + 32	+ 5 REGULATED/− 5 UNREG.	72	1.50
E	DIP241212DP	+ 16 to + 32	+ 12 REGULATED/− 12 UNREG.	80	1.50
	DIP241212DN	+ 16 to + 32	− 12 REGULATED/+ 12 UNREG.	80	1.50
	DIP241212DB	+ 16 to + 32	± 12 REG./BALANCE UNREG.	80	1.50
	DIP241515DB	+ 16 to + 32	± 15 REG./BALANCE UNREG.	80	1.50

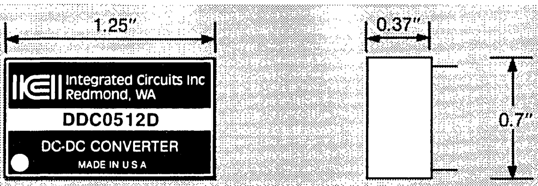
Integrated Circuits Incorporated

10301 Willows Rd. Redmond, WA 98052
(206) 882-3100 TWX: 910-443-2302

DDC SERIES

- **Up to 5 watts output power @ 70°C**
- **Isolated, unregulated outputs**
- **24 pin DIP compatible package**
- **4 input voltage ranges**

The DDC models are unregulated and are designed to be used in applications where regulated voltages are not needed, or with external regulators. The outputs are isolated from the input. They can be operated over an ambient temperature range of −20°C to +70°C, and they are encapsulated in plastic packages.

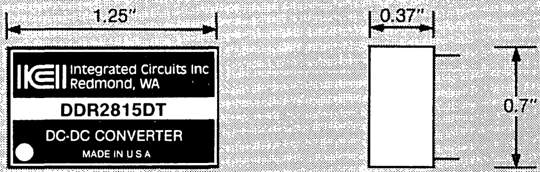


PRICE GROUP	MODEL	NOMINAL VDC INPUT	OUTPUT @ FULL LOAD			MAX. WATTS
			VDC	mA	EFF. %	
F	DDC0505S	5	5	800	63	4.0
	DDC0512D	5	±12	±167	75	4.0
	DDC0515D	5	±15	±133	75	4.0
	DDC1205S	12	5	1000	68	5.0
	DDC1212D	12	±12	±208	80	5.0
	DDC1215D	12	±15	±167	80	5.0
	DDC2805S	28	5	1000	70	5.0
	DDC2812D	28	±12	±208	83	5.0
	DDC2815D	28	±15	±167	83	5.0
	DDC4805S	48	5	1000	72	5.0
	DDC4812D	48	±12	±208	84	5.0
	DDC4815D	48	±15	±167	84	5.0

DDR SERIES

- **Up to 3 watts output power @ 70°C**
- **Isolated, regulated outputs**
- **24 pin DIP compatible package**
- **5 input voltage ranges**

The DDR series DC-DC converters are isolated and regulated. They have short-term short-circuit protection and are built with a non-saturating core design to minimize reflected ripple and radiated noise. The rugged plastic 24-pin DIP packages are rated for operation from −20°C to +70°C ambient.

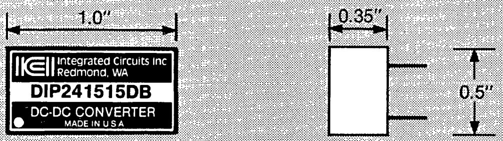


PRICE GROUP	MODEL	VDC INPUT	OUTPUT @ FULL LOAD			MAX. WATTS
			VDC	mA	EFF. %	
G	DDR0505S	4.5 to 5.5	5.0	400	45	2.0
H	DDR0512DT	4.5 to 5.5	±12.0	±104	52	2.5
	DDR0515DT	4.5 to 5.5	±15.0	±83	52	2.5
G	DDR1205S	10.8 to 14.0	5.0	500	45	2.5
H	DDR1212DT	10.8 to 14.0	±12.0	±125	55	3.0
	DDR1215DT	10.8 to 14.0	±15.0	±100	55	3.0
G	DDR2405S	20.0 to 28.0	5.0	500	45	2.5
H	DDR2412DT	20.0 to 28.0	±12.0	±125	55	3.0
	DDR2415DT	20.0 to 28.0	±15.0	±100	55	3.0
G	DDR2805S	24.0 to 32.0	5.0	500	45	2.5
H	DDR2812DT	24.0 to 32.0	±12.0	±125	55	3.0
	DDR2815DT	24.0 to 32.0	±15.0	±100	55	3.0
G	DDR4805S	44.0 to 56.0	5.0	500	45	2.5
H	DDR4812D	44.0 to 56.0	±12.0	±125	55	3.0
	DDR4815D	44.0 to 56.0	±15.0	±100	55	3.0

DIP__DT SERIES

- **1 watt output power @ 70°C**
- **Isolated, regulated outputs**
- **14 pin DIP compatible package**
- **5 input voltage ranges**

The DIP__ DT series converters can provide up to one watt of regulated, isolated output power. The ±12 VDC and ±15 VDC outputs are regulated by monolithic dual-tracking series regulators, which provide good regulation and ripple characteristics. Also available as non-catalog standards are 5 VDC output models that provide up to 0.5 watts. The plastic, encapsulated packages are rated for operation from −20°C to +70°C ambient.



PRICE GROUP	MODEL	VDC INPUT	OUTPUT @ FULL LOAD			MAX. WATTS
			VDC	mA	EFF. %	
C	DIP512DT	4.5 to 5.5	±12.0	±42	52	1.0
	DIP515DT	4.5 to 5.5	±15.0	±33	52	1.0
	DIP1212DT	10.8 to 14.0	±12.0	±42	55	1.0
	DIP1215DT	10.8 to 14.0	±15.0	±33	55	1.0
	DIP2412DT	20.0 to 28.0	±12.0	±42	55	1.0
	DIP2415DT	20.0 to 28.0	±15.0	±33	55	1.0
	DIP2812DT	24.0 to 32.0	±12.0	±42	55	1.0
	DIP2815DT	24.0 to 32.0	±15.0	±33	55	1.0
	DIP4812DT	44.0 to 56.0	±12.0	±42	55	1.0
	DIP4815DT	44.0 to 56.0	±15.0	±33	55	1.0

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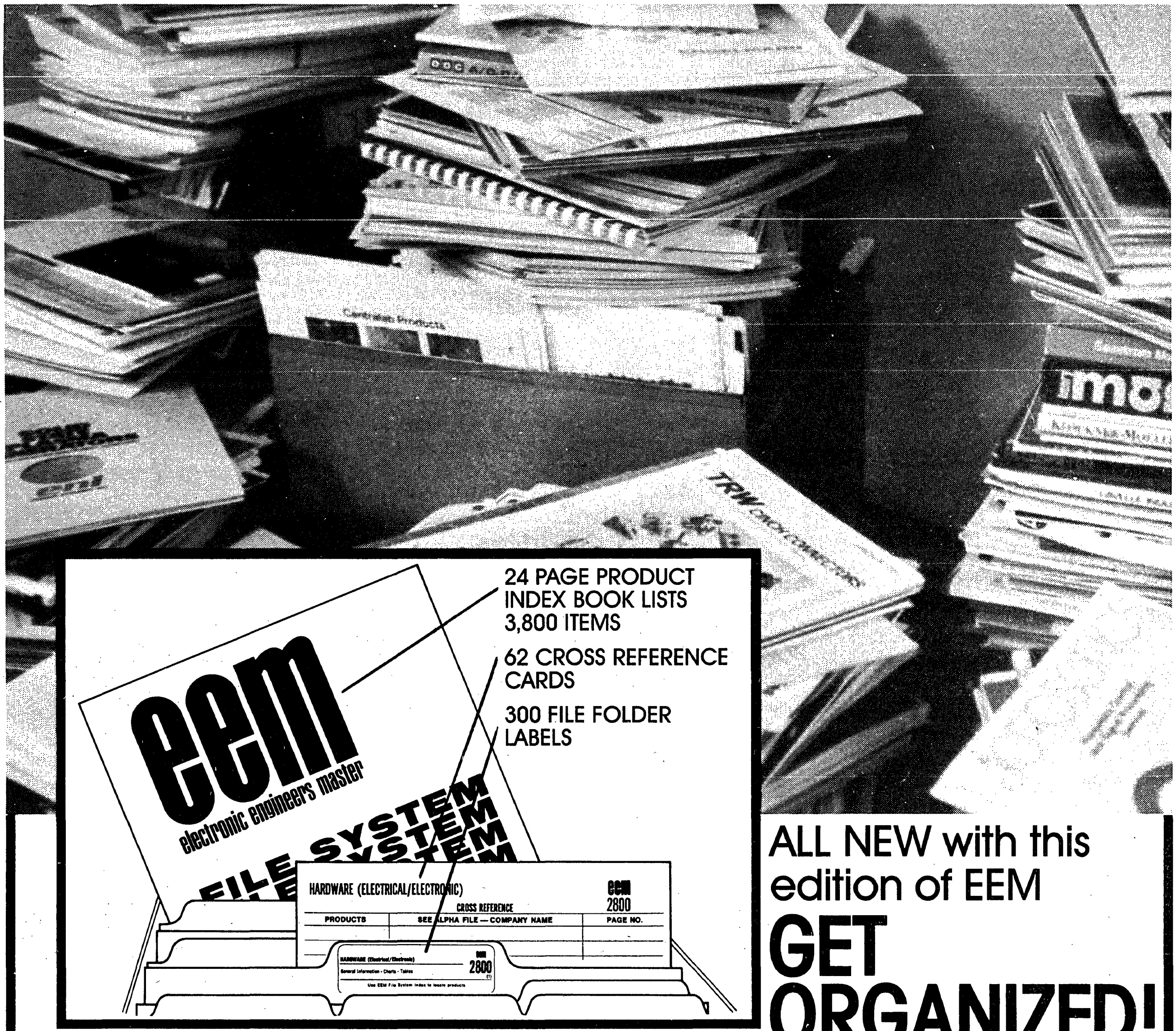
24 PAGE PRODUCT INDEX BOOK LISTS 3,800 ITEMS
62 CROSS REFERENCE CARDS
300 FILE FOLDER LABELS
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electronic engineers master
FILE SYSTEM
HARDWARE (ELECTRICAL/ELECTRONIC)
CROSS REFERENCE
eem 2800
PRODUCTS
SEE ALPHA FILE — COMPANY NAME
PAGE NO.
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ALL NEW with this edition of EEM

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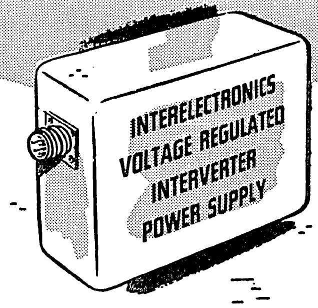
PROVEN RELIABILITY—

DC-DC, DC-AC, SOLID-STATE POWER INVERTERS

over 260,000 logged hours— voltage-regulated, frequency-controlled, for missile, telemeter, ground-support, 135°C all-silicon units available now—



Interelectronics all-silicon thyratron-like gating elements and cubic-grain toroidal magnetic components convert DC to any desired number of AC or DC outputs from 1 to 10,000 watts.

Ultra-reliable in operation (over 260,000 logged hours), no moving parts, unharmed by shorting output or reversing input polarity. High conversion efficiency (to 92%, including voltage regulation by Interelectronics patented reflex high-efficiency magnetic amplifier circuitry).

Wide input voltage range (1 to 250 volts DC). Wide input voltage regulation (output voltage maintained with variations up to 50% in input voltage).

Light weight (to 6 watts/oz.), compact (to 8 watts/cu. in.), low ripple (to 0.01 mv. p-p), excellent voltage regulation (to 0.1%), precise frequency control (to 0.2%) with Interelectronics extreme environment magnetostrictive standards or to 0.0001% with fork or piezoelectric standards.

Complies with MIL specs. for shock (100G 11 misc.), acceleration (100G 15 min.), vibration (100G 5 to 5,000 cps.), temperature (to 150 degrees C), RF noise (I-26600).

AC single and polyphase units supply sine waveform output (to 2% harmonics), will deliver up to ten times rated line current into a short circuit to actuate MIL type magnetic circuit breakers or fuses, will start gyros and motors with starting current surges up to ten times normal operating line current.

Now in use in major missiles, powering telemeter transmitters, radar beacons, electronic equipment. Single and polyphase units now power airborne and marine missile gyros, synchros, servos, magnetic amplifiers.

Interelectronics—first and most experienced in the solid-state power supply field produces its own all-silicon solid-state gating elements, all high flux density magnetic components, high temperature ultra-reliable film capacitors and components, has complete facilities and know how—has designed and delivered more working KVA than any other firm!

For complete engineering data, write Interelectronics today, or call (914) EL 8-8000 in Congers.

INTERELECTRONICS CORPORATION
550 U.S. Route 303, Congers, New York 10920

International High Voltage Electronics Inc.

Area 203 792-7820

98 Mill Plain Road
Danbury, CT 06811

Call us whenever you're considering a high-performance CRT display

First, review the typical state-of-the-art products cataloged here. Then, please call us up. We'll work with you to develop high-voltage power supply specifications that meet your CRT display requirements with an ideal price/performance balance.

All of the specifications on these two pages are typical. They can be tightened to meet your specific display requirements. On the other hand, when wider tolerances will be acceptable, we can usually reduce our price to you.

The case designs shown here are popular and practical. However, they can be modified in shape, fastener arrangement and electrical connection details to suit your equipment designs. Several or all of the high-voltage functional outputs can be provided from a single package or supplied separately in a variety of combinations.

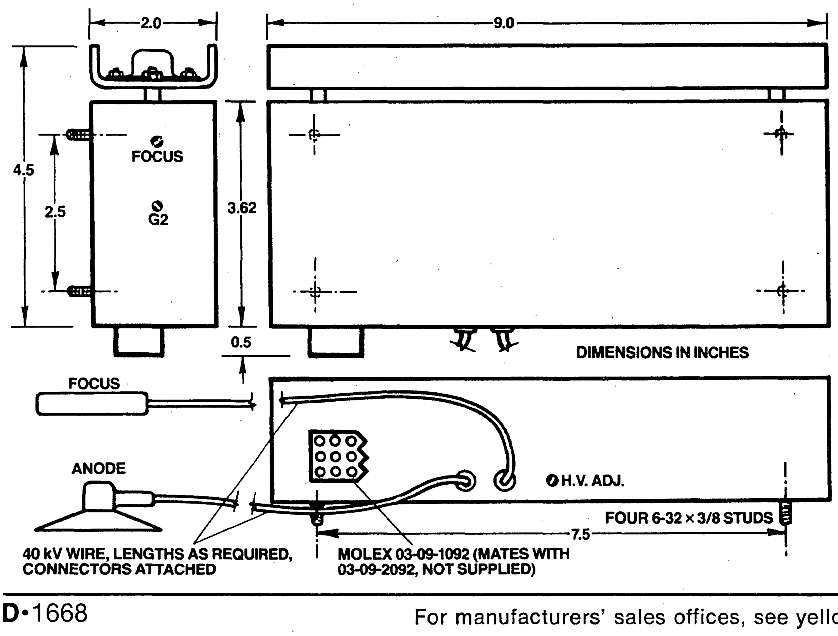
When you call, we will give you thoughtful answers. We want to make your systems successful.

HVS shadow-mask color CRT power supply 20 kV to 25 kV

This stable anode supply with low ripple reduces any "banding" tendency on the CRT screen. If desired, we can synchronize the power supply's internal oscillator with your sweep frequency.

The HVS supply responds to remote TTL startup and shutdown signals.

Circuits are protected against arcs and continuous shorts. Under fault conditions that would cause overvoltage or overcurrent, the supply shuts down, then attempts to restart. The cycle will repeat if the fault persists. This performance characteristic satisfies DHHS safety requirements.


2.0
9.0
FOCUS
G2
4.5
2.5
3.62
0.5
DIMENSIONS IN INCHES
FOCUS
ANODE
H.V. ADJ.
FOUR 6-32 × 3/8 STUDS
7.5
40 kV WIRE, LENGTHS AS REQUIRED, CONNECTORS ATTACHED
MOLEX 03-09-1092 (MATES WITH 03-09-2092, NOT SUPPLIED)

INPUTS

Input supply: 24 volts DC +10% −5%
Input current: 2.3 amperes
(Other available inputs to 33 volts DC)
TTL remote shutdown:
0=high voltage OFF
1=high voltage ON

OUTPUTS

ANODE VOLTAGE

Adjustable, 20 kV to 25 kV
Current: 1.2 milliampere at 25 kV
Ripple: less than 500 millivolts peak-to-peak
Line regulation: 0.05%
Load regulation, no-load to full-load: 0.05%
Temperature coefficient: 200 ppm/°C

FOCUS VOLTAGE

Adjustable, 5.5 kV to 6.5 kV
Typical ripple: less than 400 millivolts
(Focus voltage section accepts input from dynamic focus amplifier.)
Bandwidth for coupler: 40 Hz to 250 kHz
B+ power for external focus amplifier: 400 volts DC @ 4 milliamperes

G1 VOLTAGE

−200 volts DC, zener-regulated
Ripple: less than 200 millivolts
Current: 0 to 0.5 milliampere

G2 VOLTAGE

Adjustable, 0 to 825 volts DC
Ripple: less than 400 millivolts

SAFETY

Anode voltage cannot exceed 27 kV
Anode current cannot exceed 1.4 mA
Tolerates continuous short circuits
Outputs are arc-over protected

ENVIRONMENTAL

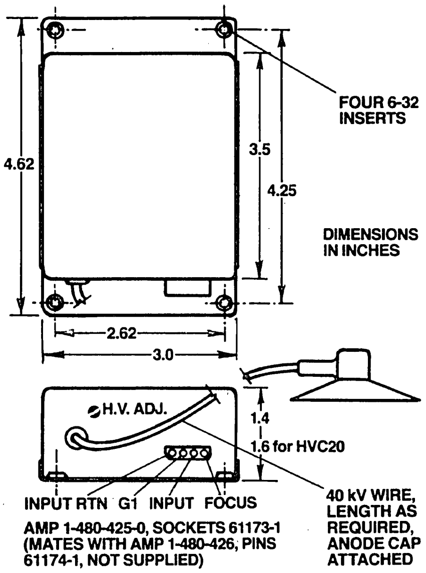
Operating temperature: 0°C to 60°C (case)
Storage temperature: −35°C to 90°C
Weight: 3.6 pounds

International High Voltage Electronics Inc.

Area 203 792-7820

98 Mill Plain Road
Danbury, CT 06811

HVC high-voltage CRT power supplies 5 kV to 20 kV


FOUR 6-32 INSERTS
4.62
3.5
4.25
DIMENSIONS IN INCHES
2.62
3.0
H.V. ADJ.
1.4
1.6 for HVC20
INPUT RTN G1 INPUT FOCUS
AMP 1-480-425-0, SOCKETS 61173-1 (MATES WITH AMP 1-480-426, PINS 61174-1, NOT SUPPLIED)
40 kV WIRE, LENGTH AS REQUIRED, ANODE CAP ATTACHED

	OUTPUT	
Model	Voltage, maximum	Current, maximum
HVC5	**5 kV**	800μA
HVC8	**8 kV**	500μA
HVC12	**12 kV**	400μA
HVC15	**15 kV**	300μA
HVC20	**20 kV**	250μA

Outputs are filtered and regulated precisely to prevent spurious patterns or distortions on the CRT display.

Refinements in circuit and package design protect against arcs, corona, temporary shorts to ground and propagation of electrostatic or electromagnetic interference.

You can select from five maximum anode voltages, 5 to 20 kV. Setting the exact anode voltage you want—zero to rated maximum—is a screwdriver adjustment. Auxiliary outputs, such as focus and G1 voltage, change proportionally when anode voltage is adjusted.

INPUT POWER

Nominal supply: 24 to 33 volts DC ±10%
Maximum current: 400ma

VOLTAGE OUTPUT

Ripple, peak-to-peak: 0.05% of voltage (anode and auxiliary voltages)
Transient response: 0.05% of voltage (per 100μA current change)
Line regulation: ±0.03%
Load regulation: ±0.03%
Temperature coefficient: 0.02%/°C

TYPICAL OPTIONS

Connectors and mounting to suit your design.
G1 and focus voltages to ±1 kV.
Ripple, peak-to-peak: 0.001% of voltage.
Ability to tolerate continuous short circuit.
Oscillator sync. with your clock frequency.
Input supply to suit your circuitry.
H.V. ADJ. range between minus 10% and rated maximum voltage instead of zero to maximum.
Pre-set anode voltage between 2 kV and 20 kV with elimination of external H.V. ADJ.

ENVIRONMENTAL

Operating temperature: 0°C to 60°C (case)
Storage temperature: −55°C to +90°C
Case material: aluminum
Weight: approximately 1 pound

HDF and HF CRT focus power supplies 2.5 kV to 6 kV

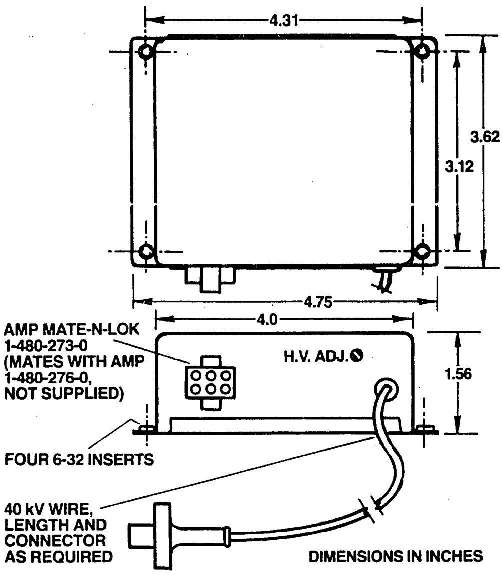
WITH DYNAMIC FOCUS AMPLIFIER

Model	Output Voltage
HDF3	**2.5 kV to 3 kV**
HDF4	**3 kV to 4 kV**
HDF5	**4 kV to 5 kV**
HDF6	**5 kV to 6 kV**

FOR SEPARATE FOCUS AMPLIFIER

Model	Output Voltage
HF3	**2.5 kV to 3 kV**
HF4	**3 kV to 4 kV**
HF5	**4 kV to 5 kV**
HF6	**5 kV to 6 kV**

These power supplies modulate focus voltage continuously for best spot size and clear resolution across the entire area of a CRT screen—corner-to-corner.


4.31
3.62
3.12
4.75
4.0
AMP MATE-N-LOK 1-480-273-0 (MATES WITH AMP 1-480-276-0, NOT SUPPLIED)
H.V. ADJ.
1.56
FOUR 6-32 INSERTS
40 kV WIRE, LENGTH AND CONNECTOR AS REQUIRED
DIMENSIONS IN INCHES

INPUT POWER

Input supply: 24 volts DC ±10%
Input current: 500 milliamperes
(other available inputs to 33 volts DC)

FOCUS VOLTAGE OUTPUT

Adjustable: see table for range
Output current: 300 microamperes
Line regulation: 0.03%
Load regulation: 0.03%
Dynamic load regulation: 5 volts/100μA
Ripple: 0.1% of voltage, peak-to-peak
Temperature coefficient: 200 ppm/°C

DYNAMIC FOCUS AMPLIFIER

Input voltage signal: 0 to 10 volts DC
Gain adjustment: 22 to 33
Phase delay: less than 1 microsecond
Modulation output: 300 volts DC, peak-to-peak
Full-power bandwidth: DC to 200 kHz

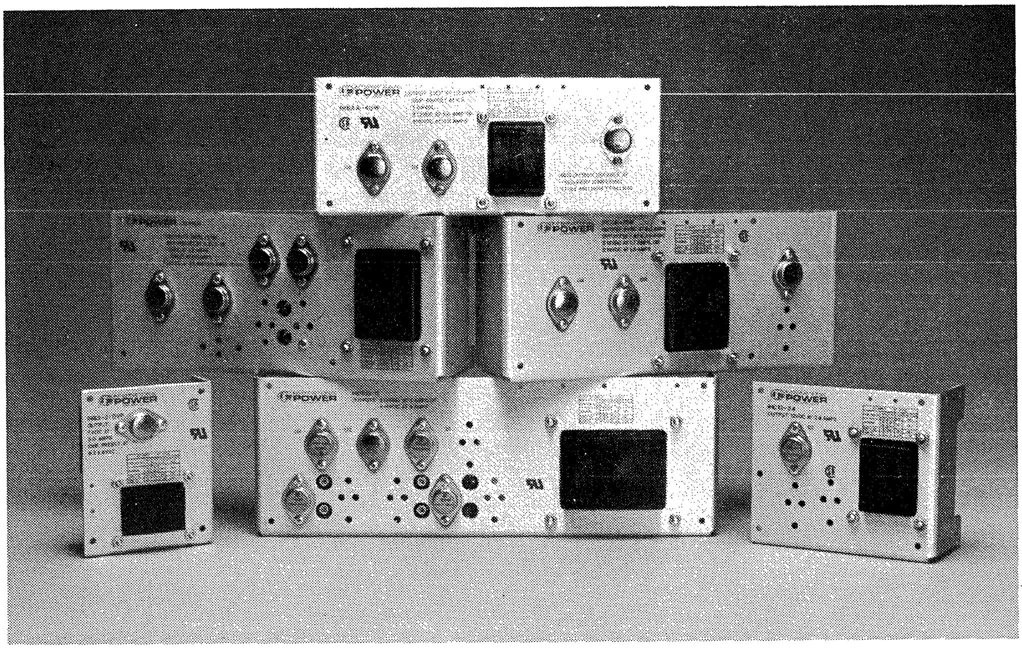
FOR SEPARATE AMPLIFIER

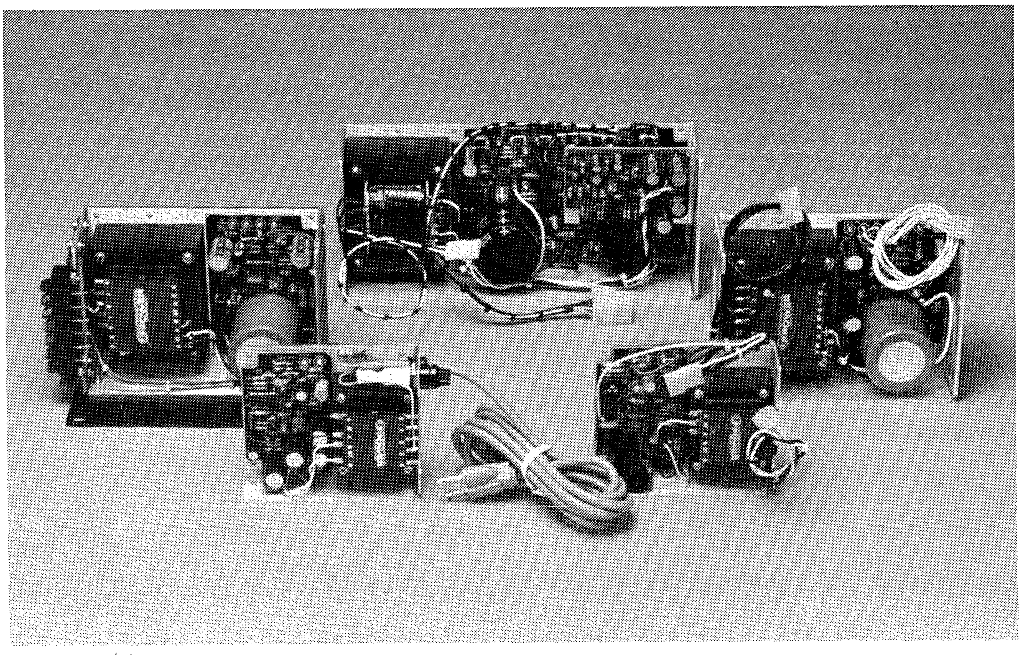
B+ voltage: 350 volts DC
B+ current: 4 milliamperes

ENVIRONMENTAL

Operating temperature: 0°C to 60°C
Storage temperature: −35°C to 90°C
Weight: approximately 1 pound

A Worldwide Standard of Reliability





INTERNATIONAL
POWER
DC POWER SUPPLIES

350 N. Lantana, Suite 710, Camarillo, CA 93010, (805) 987-7900

Description:

The International Power open frame series are a high reliability line of power supplies designed to operate over the wide range of A.C. power sources found worldwide. This feature simplifies your inventory and service consideration by allowing the use of one standard power supply regardless of destination.

These models are designed to meet many domestic and European regulatory agency requirements. If you plan to distribute your products worldwide, obtaining necessary agency approvals can be greatly simplified by specifying the International Power open frame series.

Features:

- VDE transformer construction
- 100/120/220/230-240 VAC input
- OVP on 5 volt outputs
- ±.05% regulation
- Remote sense on most outputs
- Industry standard case size
- Full rated to 50°C
- Foldback/current limit
- Two hour burn-in
- I.C. burned in to MIL-883 Level B
- Two-year warranty
- U.L. recognized - File #E84242
- C.S.A. Certified - File #LR52143
- Chassis notched for A.C. input
- Input accepts .110 x .032 fast-on or solder connection

Specifications:

A.C. Input:	100/120/220/230-240 VAC +10% −13% 47-63 Hz See chassis A.C. connection table for jumper and line fusing requirements. Derate output current 10% for 50 Hz operation. Tolerance for 230-240 volt operation is +15% −10%.
D.C. Output:	See voltage current rating chart. Adjustment range ±5% minimum.
Line Regulation:	±.05% for a 10% line change.
Load Regulation:	±.05% for a 50% load change.
Transient Response:	50 *u*seconds for 50% load change.
Output Ripple:	2 volt to 15 volt units: 5.0 mV PK-PK maximum. 24 volt to 250 volt units: .02% PK-PK maximum.
Short Circuit and Overload Protection:	Automatic current limit/foldback.
Overvoltage Protection:	Build-in on all 5 volt outputs. Set at 6.2 ± .4 volts. Other outputs use overvoltage protection modules.
Remote Sensing:	Provided on most models, see voltage/current rating chart. Open sense lead protection built-in.
Efficiency: (Typical)	5 volt unit: 45%. 12 and 15 volt units: 55%. 24 through 250 volt units: 60%.
Stability:	±.3% for 24-hour period after 1 hour warm up.
Temperature Rating:	0°C to 50°C full rated, derated linearly to 40% at 70°C.
Temperature Coefficient:	±.3% maximum.
Vibration:	Per MIL-STD-810C, Method 514, Procedure X.
Shock:	Per MIL-STD-810C, Method 514, Procedure V.

Value Added Services

International Power offers a variety of value added services for standard catalog models, examples of which are, but not limited to, installation of AC and DC harnesses, line cords, fuse holders, terminal blocks, PEM hardware, chassis modifications and output voltage/current modifications. This service is available for small quanitities as well as for production quantities. Please contact your local factory representative, distributor, or the factory direct for quotations and availability of services.

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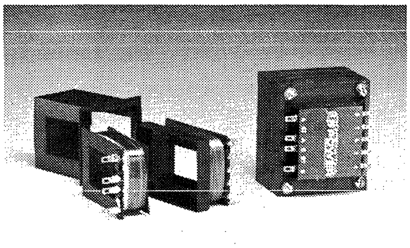

Transformers

International Power, open frame series transformers feature separate, fully enclosed, primary and secondary coils. Meets safety requirements of VDE, UL, CSA, BPO, IEC, CEE, and ECMA.

Summary of Regulatory Safety Agency Specifications

The following regulatory agency specifications have gained acceptance throughout the electronics industry as the most important to comply with when designing products for worldwide distribution. The International Power open frame series meets or exceeds the creepage distance, leakage current and dielectric withstand test requirements of these specifications.

UL **UNDERWRITERS LABORATORIES, INC.**

UL 1012 - Power Supplies

This specification covers the safety requirements for commercial and industrial power supplies.

UL 478 - Electronic Data Processing Units and Systems

This specification covers electrically operated machine units that, separately of assembles in systems, electronically accumulate, process and store data.

CSA **CANADIAN STANDARDS ASSOCIATION**

CSA 22.2, No. 143-1975 - Office Machines

This standard applies to office machines such as dictating machines, calculators, cash registers, duplicators, photocopiers, etc.

CSA 22.2, No. 154-1975 - Data Processing Equipment

This standard applies to equipment designed to prepare, store, process, transmit, or display data. All International Series power supplies are CSA certified.

VDE **VERBAND DEUTSCHER ELECTROTECHNIKER**

VDE 0730 Part 2P - Business Machines

This specification covers business machines used in office environments. Safety requirements are similar to IEC 380.

VDE 0804/3.77 - Telecommunications and Electronic Data Processing Equipment

This specification was the basis for IEC 435 and therefore contains similar safety requirements.

VDE 0806/11.81

This standard adopts IEC 380 as a German National Standard. It is essentially the same as IEC 380.

Please note the VDE certification is not mandatory for marketing products in Germany. However, equipment must be designed and built to meet the applicable VDE specifications. Equipment found not in compliance may be banned from sale in Germany.

BPO **BRITISH POST OFFICE TECHNICAL GUIDE No. 26**

Details the electrical protection requirements to which privately owned and maintained equipment must conform if supplied for attachment to post office maintained property.

ECMA **EUROPEAN COMPUTER MANUFACTURERS ASSOCIATION**

ECMA-57 - Safety Requirements for Data Processing Equipment

This standard applies to data processing equipment and associated electronic units, data preparation equipment and data terminal equipment. Safety requirements are essentially the same as IEC 435.

CEE **INTERNATIONAL COMMISSION ON RULES FOR THE APPROVAL OF ELECTRICAL EQUIPMENT**

CEE 10, Part 2P - Specification For Business Machines

This specification specifically covers office business machines. Safety requirements are similar to IEC 380 and VDE 0730 Part 2P.

IEC **INTERNATIONAL ELECTRO-TECHNICAL COMMISSION**

IEC 380 - Safety of Electrically Energized Office Machines

This specification is similar to IEC 435 but pertains specifically to office machines designed to be used in offices or similar locations. Such equipment as typewriters, duplicators and calculators are covered by IEC 380.

IEC 435 - Safety of Data Processing Equipment

This specification covers data processing equipment and associated electronic units, data preparation and data communication terminal equipment in office environments.

Voltage/Current Rating Chart

SINGLE OUTPUT MODELS			
MODEL	**VOLTAGE/ CURRENT**	**CASE SIZE**	**PRICE 10-24**
2 VOLTS			
IHB2-3	2V @ 3A*	B	$ 34.68
IHC2-6	2V @ 6A*	C	54.62
IHD2-12	2V @ 12A*	D	84.78
IHE2-18	2V @ 18A*	E	113.95
5 VOLTS			
IHA5-1.2/OVP	5V @ 1.2A**	A	26.50
IHA5-1.5/OVP	5V @ 1.5A*	B	27.88
IHB5-3/OVP	5V @ 3A*	B	32.77
IHC5-6/OVP	5V @ 6A*	C	54.62
IHN5-9/OVP	5V @ 9A*	N	74.59
IHD5-12/OVP	5V @ 12A*	D	84.78
IHE5-18/OVP	5V @ 18A*	E	113.95
IF5-25/OVP	5V @ 25A*	F	154.37
IG5-35/OVP	5V @ 35A*	F	194.28
ICP197	5V @ 50A*	F	229.42
12 VOLTS			
IHA15-0.5	12V @ 0.5A**	A	26.50
IHA15-0.9	12V @ 0.9A*	B	27.88
IHB12-1.7	12V @ 1.7A*	B	32.77
IHC12-3.4	12V @ 3.4A*	C	49.87
IHN12-5.1	12V @ 5.1A*	N	69.82
IHD12-6.8	12V @ 6.8A*	D	79.75
IHE12-10.2	12V @ 10.2A*	E	109.72
IF15-15	12V @ 16A*	F	154.37
15 VOLTS			
IHA15-0.5	15V @ 0.5A	A	26.50
IHA15-0.9	15V @ 0.9A*	B	27.88
IHB15-1.5	15V @ 1.5A*	B	32.77
IHC15-3	15V @ 3A*	C	49.87
IHN15-4.5	15V @ 4.5A*	N	69.82
IHD15-6	15V @ 6A*	D	79.75
IHE15-9	15V @ 9A*	E	109.72
IF15-15	15V @ 15A*	F	154.37

SINGLE OUTPUT MODELS			
MODEL	**VOLTAGE/ CURRENT**	**CASE SIZE**	**PRICE 10-24**
24 VOLTS			
IHA24-0.5	24V @ 0.5A	B	27.88
IHB24-1.2	24V @ 1.2A*	B	32.77
IHC24-2.4	24V @ 2.4A*	C	49.87
IHN24-3.6	24V @ 3.6A*	N	69.82
IHD24-4.8	24V @ 4.8A*	D	79.75
IHE24-7.2	24V @ 7.2A*	E	109.72
IF24-12	24V @ 12A*	F	154.37
28 VOLTS			
IHA24-0.5	28V @ 0.5A	B	27.88
IHB28-1	28V @ 1.0A*	B	32.77
IHC28-2	28V @ 2.0A*	C	49.87
IHN28-3	28V @ 3.0A*	N	69.82
IHD28-4	28V @ 4.0A*	D	79.75
IHE28-6	28V @ 6.0A*	E	109.72
IF24-12	28V @ 10A*	F	154.37
48 VOLTS			
IHB48-0.5	48V @ 0.5A	B	34.68
IHB48-0.5-105	48V @ .75A		36.95
IHC48-1	48V @ 1.0A	C	54.62
IHC48-1-105	48V @ 1.5A		56.95
IHD48-3	48V @ 3.0A*	D	84.78
IHE48-4	48V @ 4.0A*	E	109.72
IF48-8	48V @ 8.0A*	F	194.50
	**		
135-265 VOLTS			
IHB155-0.12	135-170V @ .12A	B	39.85
IHB200-0.12	175-210V @ .12A	B	39.85
IHB250-0.1	215-265V @ .10A	B	39.85

* Remote Sense Provided
**Not International Series

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INTERNATIONAL POWER
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Voltage/Current Rating Chart

DUAL OUTPUT MODELS,

MODEL	OUTPUT #1	OUTPUT #2	CASE SIZE	PRICE 10-24
± 5 VOLTS				
IHAA5-1.5/OVP	5V @ 1.5A	– 5V @ 1.5A	AA	49.87
IHBB5-3/OVP	5V @ 3A	– 5V @ 3A	BB	64.83
IHCC5-6/OVP	5V @ 6A*	– 5V @ 6A	CC	96.66
± 12 VOLTS				
IHAD12-0.4	12V @ 0.4A	– 12V @ 0.4A	B	36.80
± 15 VOLTS				
IHAD15-0.4	15V @ 0.4A	—15V @ 0.4A	B	36.80
± 12 TO 15 VOLTS				
IHAA15-0.8	12V @ 1A OR 15V @ 0.8A*	– 12V @ 1A OR – 15V @ 0.8A*	AA	42.75
IHBB15-1.5	12V @ 1.7A OR 15V @ 1.5A*	– 12V @ 1.7A OR – 15V @ 1.5A*	BB	54.62
IHCC15-3	12V @ 3.4A OR 15V @ 3.0A*	– 12V @ 3.4A OR – 15V @ 3.0A*	CC	87.87
IHDD15-5	12-15V @ 5A*	– 12-15V @ 5A*	E	129.68
± 18 TO 24 VOLTS				
IHAA24-0.6	18-20V @ 0.4A OR 24V @ 0.6A	– 18-20V @ 0.4A OR – 24V @ 0.6A	AA	42.75
IHBB24-1.2	18-20V @ 0.9A OR 24V @ 1.2A	– 18-20V @ 0.9A OR + 24V @ 1.2A	BB	54.62
IHCC24-2.4	18-20V @ 1.8A* OR 24V @ 2.4A*	– 18-20V @ 1.8A* OR – 24V @ 2.4A*	CC	87.87
5 VOLTS AND 12-15 VOLTS ISOLATED OUTPUTS				
IHAA512	5V @ 2A ‡	12-15V @ 0.5A	AA	49.87
IHBB512	5V @ 3A ‡*	12-15V @ 1.5A*	BB	59.80
IHCC512	5V @ 6A ‡*	12-15V @ 2.5A*	CC	94.52

*Remote Sense
‡ Over Voltage Protection Provided

Voltage/Current Rating Chart

TRIPLE OUTPUT MODELS

MODEL	OUTPUT #1	OUTPUT #2	OUTPUT #3	CASE SIZE	PRICE 10-24
IHTAA-16W	5V @ 2A ‡	12-15V @ 0.4A	– 12-15V @ 0.4A OR – 5V @ 0.4A	AA	54.86
IHBAA-40W	5V @ 3A* ‡	12V @ 1A OR * 15V @ 0.8A	– 12V @ 1A OR * – 15V @ 0.8A OR – 5V @ 0.4A	BAA	75.76
IHCAA-60W	5V @ 6A* ‡	12V-15V @ 1A	– 12V-15V @ 1A OR – 5V @ 0.4A	D	89.77
IHCBB-75W	5V @ 6A* ‡	12V @ 1.7A OR 15V @ 1.5A *	– 12V @ 1.7A OR – 15V @ 1.5A OR * – 5V @ 0.7A	CBB	99.70
IHBCC-512	5V @ 3A ‡	12V @ 3.4A OR 15V @ 3A	– 12V @ 3.4A OR – 15V @ 3A	CC	99.70
IHBCC-524	5V @ 3A	18-20V @ 1.8A OR 24V @ 2.4A	– 18-20V @ 1.8A OR – 24V @ 2.4A	CC	99.70
ICP131	5V @ 8A* ‡	12V @ 1.7A OR 15V @ 1.5A *	– 12V @ 1.7A OR – 15V @ 1.5A OR * – 5V @ 0.7A	131	119.65
IHDBB-105W	5V @ 12A* ‡	12V @ 1.7A OR 15V @ 1.5A *	– 12V @ 1.7A OR – 15V @ 1.5A OR * – 5V @ 0.7A	DBB	134.42
IHDCC-150W	5V @ 12A* ‡	12V @ 3.4A OR 15V @ 3A *	– 12V @ 3.4A OR – 15V @ 3A OR – 5V @ 0.7A *	DCC	154.37
IOVP-12					7.55
IOVP-24					14.20
IAR5-.6/OVP	The IAR5 will provide a – 5V regulated output from any – 7V to – 30V filtered D.C. source				10.91

OVP SELECTION GUIDE

MODEL	CASE SIZE	OVP MODULES REQUIRED
SINGLE OUTPUT	B,C,N,D	(1) OVP-12
	E, F	(1) OVP-24
DUAL OUTPUT	AA,BB,CC	(1) OVP-12 PROTECTS BOTH OUTPUTS. OVP BUILT-IN ON 5V OUTPUTS.
	E	(1) OVP-24 PROTECTS BOTH OUTPUTS.
TRIPLE OUTPUT	AA,BAA,D CBB,131 DBB	(1) OVP-12 PROTECTS BOTH 9V THRU 15V OUTPUTS. OVP BUILT-IN ON MAIN 5V OUTPUTS.
DISK DRIVE MODELS	N,BAA CBB, 131	(1) OVP-12 PROTECTS ANY OUTPUT NOT PROVIDED WITH BUILT-IN OVP

*Remote Sense
‡ Over Voltage Protection Provided

Voltage/Current Rating Chart

DISK DRIVES

MODEL	OUTPUT #1	OUTPUT #2	OUTPUT #3	OUTPUT #4	OUTPUT #5	CASE SIZE	PRICE 10-24
5¼" FLOPPY DISK DRIVES							
ICP340	5V @ 0.5A/ 0.7A PK‡*	12V @ 0.9A/ 1.8A PK				CP340	$ 44.88
ICP323	5V @ 3A ‡*	12V @ 4A				N	79.75
8" FLOPPY DISK DRIVES							
ICP205	5V @ 1A ‡	– 5V @ 0.5A ‡*	24V @ 1.5A/ 1.7A PK			BAA	75.76
ICP206	5V @ 2.5A ‡*	– 5V @ 0.5A ‡*	24V @ 3A/ 3.4A PK*			CBB	99.70
ICP162	5V @ 3A ‡*	– 5V @ 0.6A ‡*	24V @ 5A/ 6A PK*			131	129.67
RIGID-DISK DRIVES							
ICP510	5V @ 6A ‡	12V @ 2.5A/ 7.5A PK				CP510	79.56
ICP379	5V @ 6A ‡*	– 5V @ 1.2A or – 12V @ 1.2A	24V @ 3.5A/ 8A PK*			131	129.67
ICP384	5V @ 9A ‡*	– 5V @ 1.2A or – 12V @ 1.2A	24V @ 2A/ 8A PK*			131	129.67
ICP498	5V @ 6A ‡*	12V @ 5A/ 10A PK*	– 12V @ 0.5A or – 5V @ 0.25A			131	129.67
ICP503	5V @ 6A ‡	12V @ 1.2A	– 12V @ 0.8A	24V @ 2.5A/ 4A PK		CBB	129.67
ICP529	5V @ 11A ‡*	12V @ 0.25A	– 12V @ 0.25A	24V @ 5A/ 8A PK*	– 5V @ 0.25A	CP529	169.75

*Remote Sense
‡ Over Voltage Protection Provided

Outline and Mounting Drawings

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INTERNATIONAL
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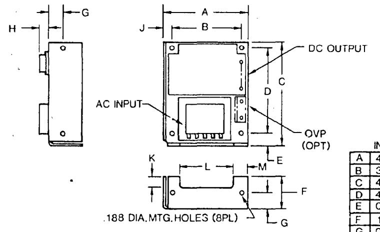
DC POWER SUPPLIES

WT. 2LBS



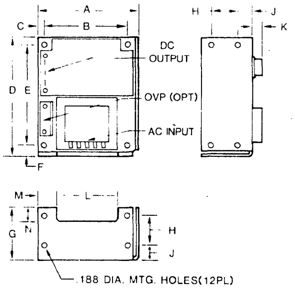
H
G
J
A
B
DC OUTPUT
C
D
AC INPUT
OVP (OPT)
E
K
L
M
F
G
.188 DIA.MTG.HOLES (8PL)

	INCH.	mm.
A	4.00	101.60
B	3.375	85.73
C	4.87	123.70
D	4.125	104.78
E	0.50	12.70
F	1.62	41.15
G	0.75	19.05
H	0.450	11.43
J	0.38	9.65
K	0.57	14.48
L	2.60	66.04
M	0.794	20.17

FUSE AT: 0.5/0.25 AMPS FOR 100-120/220-240 VAC

B Case

WT. 4LBS.



A
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DC OUTPUT
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OVP (OPT)
AC INPUT
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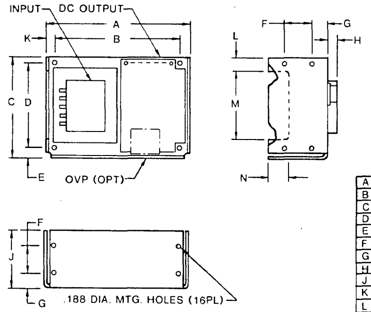
J
.188 DIA. MTG. HOLES(12PL)

	INCH.	mm.
A	4.87	123.70
B	4.125	104.78
C	0.25	6.35
D	5.62	142.75
E	4.875	123.83
F	0.50	12.70
G	2.50	63.50
H	1.250	31.75
J	0.75	19.05
K	0.450	11.43
L	2.85	72.39
M	1.025	26.04
N	0.665	16.89

FUSE AT: 1.0/0.5 AMPS FOR 100-120/220-240 VAC

C Case

WT. 6LBS.



INPUT
DC OUTPUT
A
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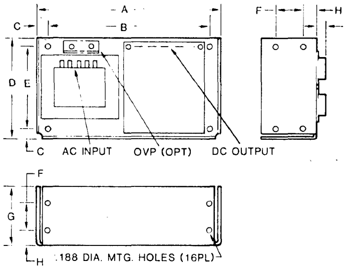
C
D
M
E
OVP (OPT)
N
F
J
G
.188 DIA. MTG. HOLES (16PL)

	INCH	mm.
A	7.00	177.80
B	6.250	158.75
C	4.87	123.70
D	4.125	104.78
E	0.50	12.70
F	1.250	31.75
G	0.75	19.05
H	0.450	11.43
J	2.75	69.85
K	0.38	6.35
L	0.640	16.26
M	3.345	84.96
N	1.00	25.40

FUSE AT: 2.0/1.0 AMPS FOR 100-120/220-240 VAC

N Case

WT. 7.5LBS.



A
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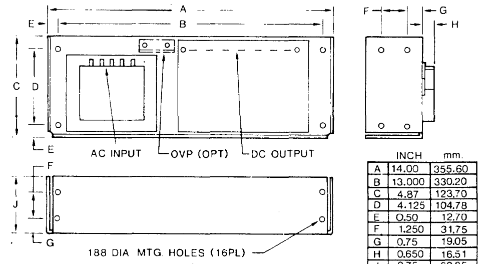
AC INPUT
OVP (OPT)
DC OUTPUT
F
G
H
.188 DIA. MTG. HOLES (16PL)

	INCH.	mm.
A	9.00	228.60
B	8.000	203.20
C	0.50	12.70
D	4.87	123.70
E	4.125	104.78
F	1.250	31.75
G	2.75	69.85
H	0.75	19.05
J	0.450	11.43

FUSE AT: 2.0/1.0 AMPS FOR 100-120/220-240 VAC

D Case

WT. 10LBS.



A
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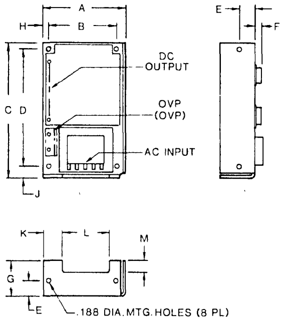
C
D
E
AC INPUT
OVP (OPT)
DC OUTPUT
F
J
G
188 DIA MTG. HOLES (16PL)

	INCH	mm.
A	14.00	355.60
B	13.000	330.20
C	4.87	123.70
D	4.125	104.78
E	0.50	12.70
F	1.250	31.75
G	0.75	19.05
H	0.650	16.51
J	2.75	69.85

FUSE AT: 3.0/1.5 AMPS FOR 100-120/220-240 VAC

E Case

WT 2LBS



A
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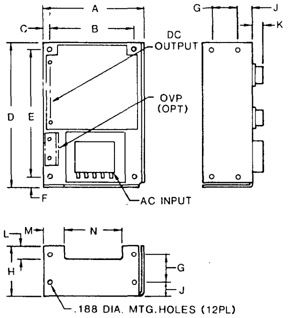
DC OUTPUT
C
D
OVP (OVP)
AC INPUT
J
K
L
M
G
E
.188 DIA.MTG.HOLES (8 PL)

	INCH	mm.
A	4.00	101.60
B	3.375	85.73
C	6.50	165.10
D	5.750	146.05
E	0.75	19.05
F	0.450	11.43
G	1.62	41.15
H	0.25	6.35
J	0.50	12.70
K	0.955	24.26
L	2.37	60.20
M	0.57	14.48

FUSE AT: 0.5/0.25 AMPS FOR 100-120/220-240 VAC

AA Case

WT. 4LBS



A
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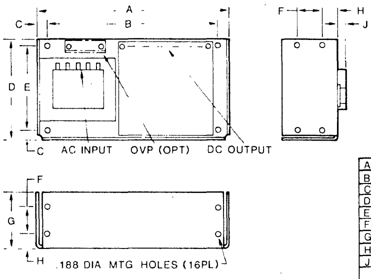
DC OUTPUT
OVP (OPT)
D
E
F
AC INPUT
L
M
N
H
G
J
.188 DIA. MTG.HOLES (12PL)

	INCH	mm.
A	4.87	123.70
B	4.125	104.78
C	0.25	6.35
D	7.00	177.80
E	6.250	158.75
F	0.50	12.70
G	1.250	31.75
H	2.50	63.50
J	0.75	19.05
K	0.450	11.43
L	0.665	16.89
M	1.025	26.03
N	2.85	72.39

FUSE AT: 1.0/0.5 AMPS FOR 100-120/220-240 VAC

BB Case

WT. 7LBS.



A
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D
E
C
AC INPUT
OVP (OPT)
DC OUTPUT
F
G
H
.188 DIA MTG HOLES (16PL)

	INCH.	mm.
A	9.38	238.25
B	8.375	212.73
C	0.50	12.70
D	4.87	123.70
E	4.125	104.78
F	1.250	31.75
G	2.75	69.85
H	0.75	19.05
J	0.450	11.43

FUSE AT: 2.0/1.0 AMPS FOR 100-120/220-240 VAC
HCC512: 3.0/1.5 AMPS FOR 100-120/220-240 VAC

CC Case

Outline and Mounting Drawings

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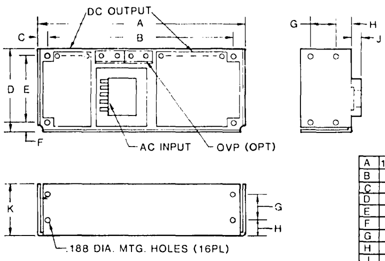
WT 5LBS


DC OUTPUT
A
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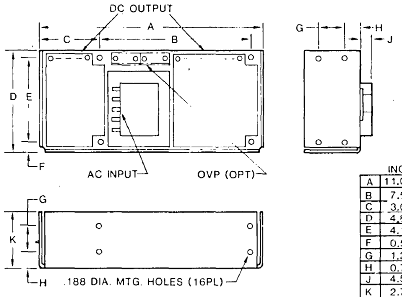
AC INPUT
OVP (OPT)
.188 DIA. MTG. HOLES (16PL)

	INCH.	mm.
A	10.25	260.35
B	9.250	234.95
C	0.50	12.70
D	4.00	101.60
E	3.375	85.73
F	0.37	9.40
G	1.250	31.75
H	0.75	19.05
J	0.450	11.43
K	2.50	63.50

FUSE AT: 1.0/0.5 AMPS FOR 100-120/220-240 VAC

BAA Case

WT. 8LBS.

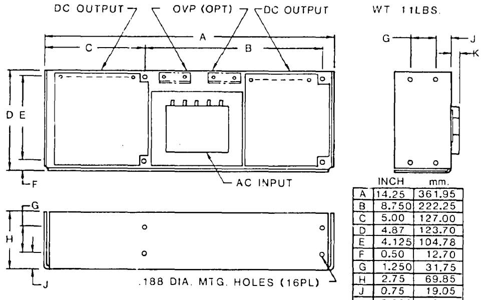

DC OUTPUT
A
B
C
D
E
F
G
H
J
K
AC INPUT
OVP (OPT)
H
.188 DIA. MTG. HOLES (16PL)

	INCH.	mm.
A	11.00	279.40
B	7.50	190.50
C	3.00	76.20
D	4.87	123.70
E	4.125	104.78
F	0.50	12.70
G	1.250	31.75
H	0.75	19.05
J	4.50	11.43
K	2.75	69.85

FUSE AT: 2.0/1.0 AMPS FOR 100-120/220-240 VAC

CBB Case

WT 11LBS

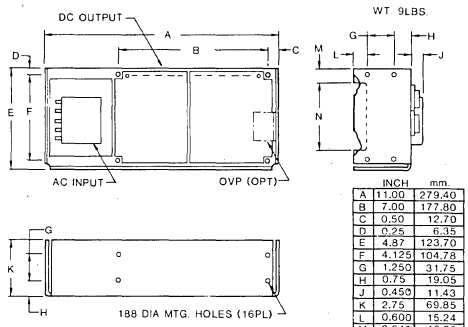

DC OUTPUT
OVP (OPT)
DC OUTPUT
A
B
C
D
E
F
G
H
J
K
AC INPUT
.188 DIA. MTG. HOLES (16PL)

	INCH	mm.
A	14.25	361.95
B	8.750	222.25
C	5.00	127.00
D	4.87	123.70
E	4.125	104.78
F	0.50	12.70
G	1.250	31.75
H	2.75	69.85
J	0.75	19.05
K	0.625	15.88

FUSE AT: 3.0/1.5 AMPS FOR 100-120/220-240 VAC

DBB Case

WT. 9LBS.

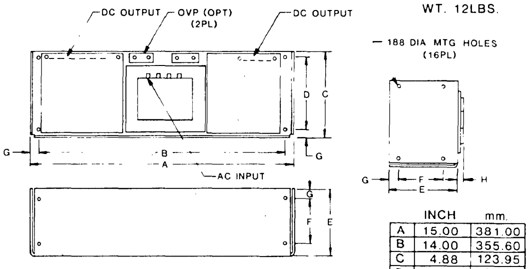

DC OUTPUT
A
B
C
D
E
F
G
H
J
K
L
M
N
AC INPUT
OVP (OPT)
188 DIA MTG. HOLES (16PL)

	INCH	mm.
A	11.00	279.40
B	7.00	177.80
C	0.50	12.70
D	0.25	6.35
E	4.87	123.70
F	4.125	104.78
G	1.250	31.75
H	0.75	19.05
J	0.450	11.43
K	2.75	69.85
L	0.600	15.24
M	0.640	16.26
N	3.345	84.96

FUSE AT: 3.0/1.5 AMPS FOR 100-120/220-240 VAC

131 Case

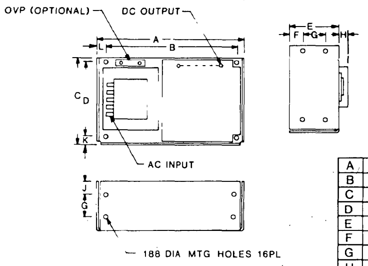
WT. 12LBS.


DC OUTPUT
OVP (OPT) (2PL)
DC OUTPUT
188 DIA MTG HOLES (16PL)
A
B
C
D
E
F
G
H
AC INPUT

	INCH	mm.
A	15.00	381.00
B	14.00	355.60
C	4.88	123.95
D	4.13	104.90
E	3.75	95.25
F	2.50	63.50
G	0.50	12.70
H	0.65	16.51

DCC Case

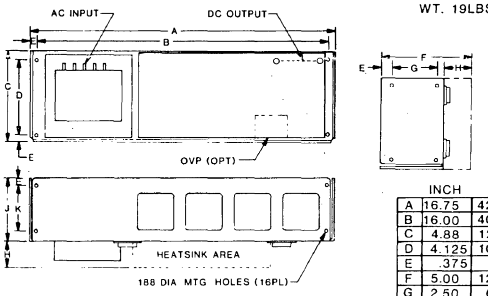
WT. 7.5LBS.


OVP (OPTIONAL)
DC OUTPUT
A
B
C
D
E
F
G
H
I
J
K
L
AC INPUT
188 DIA MTG HOLES 16PL

	INCH	mm.
A	8.25	209.55
B	7.50	190.50
C	4.87	123.70
D	4.125	104.78
E	2.75	69.85
F	.75	19.05
G	1.25	31.75
H	.50	12.70
J	.75	19.05
K	.500	12.70
L	350	8.89

CP-510 Case

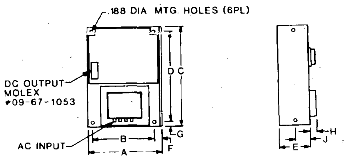
WT. 19LBS.


AC INPUT
DC OUTPUT
A
B
C
D
E
F
G
H
J
K
OVP (OPT)
HEATSINK AREA
188 DIA MTG HOLES (16PL)

	INCH	mm.
A	16.75	425.45
B	16.00	406.40
C	4.88	123.95
D	4.125	104.80
E	.375	9.53
F	5.00	127.00
G	2.50	63.50
H	1.50	38.10
J	3.50	88.90
K	2.50	63.50

F Case

WT. 2 LBS.

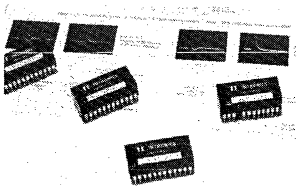

188 DIA MTG. HOLES (6PL)
DC OUTPUT MOLEX #09-67-1053
AC INPUT
A
B
C
D
E
F
G
H
J

	INCH	mm.
A	4.00	101.60
B	3.375	85.73
C	5.50	139.70
D	5.00	127.00
E	1.62	41.15
F	.375	9.53
G	:250	6.35
H	450	11.43
J	.750	19.05

CP-340 Case

Intronics-1 Watt to 100 Watt DC-DC Converters

1 Watt Low-Cost

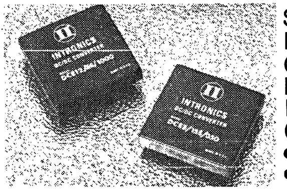


DCR (Regulated)
INPUT: 5, 12VDC
OUTPUT: 5, ±5, 12, ±12, 15, ±15
DCU (Unregulated)
INPUT: 5, 12VDC
OUTPUT: 5, ±12, ±15
24-Pin DIP Package

Individual Model Characteristics (Typical at +25°C)

Model	Input Voltage VDC	Output VDC @ mA	Model	Input Voltage VDC	Output VDC @ mA
DCR 5/5	5	5 @ 100	DCR 12/12-12	12	±12 @ 80
DCR 12/5	12	5 @ 100	DCR 5/15-15	5	±15 @ 65
DCR 5/12	5	12 @ 80	DCR 12/15-15	12	±15 @ 65
DCR 12/12	12	12 @ 80	DCU 5/5	5	5 @ 200
DCR 5/15	5	15 @ 65	DCU 12/5	12	5 @ 200
DCR 12/15	12	15 @ 65	DCU 5/12-12	5	±12 @ 80
DCR 5/5-5	5	±5 @ 100	DCU 5/15-15	5	±15 @ 65
DCR 5/12-12	5	±12 @ 80	DCU 12/15-15	12	±15 @ 65

5 Watt Low-Noise

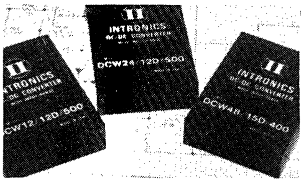


SINGLE
INPUT: 5, 12, 24, 28, 48VDC
OUTPUT: 5, 12, 15VDC
DUAL
INPUT: 5, 12, 24, 28, 48VDC
OUTPUT: ±12, ±15

- Small 2″ Square Package
- High 70% Efficiency

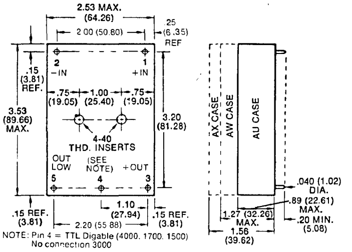
Model	Input Volt. VDC	Output VDC @ mA	Model	Input Volt. VDC	Output VDC @ mA
DCE 5/5S/1000A	5	5 @ 1A	DCE 48/5S/1000A	48	12 @ 1A
DCE 5/12S/500A	5	12 @ 500	DCE 48/12S/500A	48	12 @ 500
DCE 5/15S/350A	5	15 @ 350	DCE 48/15S/350A	48	15 @ 350
DCE 12/5S/1000A	12	5 @ 1A	DCE 5/12/150A	5	±12 @ 150
DCE 12/12S/500A	12	12 @ 500	DCE 5/15/150A	5	±15 @ 150
DCE 12/15S/350A	12	15 @ 350	DCE 12/12/150A	12	±12 @ 150
DCE 24/5S/1000A	24	5 @ 1A	DCE 12/15/150A	12	±15 @ 150
DCE 24/12S/500A	24	12 @ 500	DCE 24/12/150A	24	±12 @ 150
DCE 24/15S/350A	24	15 @ 350	DCE 24/15/150A	24	±15 @ 150
DCE 28/5S/1000A	28	5 @ 1A	DCE 28/12/150A	28	±12 @ 150
DCE 28/12S/500A	28	12 @ 500	DCE 28/15/150A	28	±15 @ 150
DCE 28/15S/350A	28	15 @ 350	DCE 48/12/150A	48	±12 @ 150
			DCE 48/15/150A	48	±15 @ 150

12-22 Watt Wide Input Range, Isolated



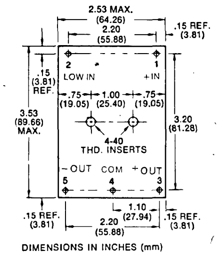
INPUT: 5, 12, 24, 48VDC
OUTPUT: ±12, ±15VDC

- Wide 2:1 Input Range
- No Heat Sink Required
- Low Output Ripple
- High Input/Output Isolation
- Short Circuit Protection


2.53 MAX.
(64.26)
2 00 (50.80)
.25
(6.35)
REF
.15
(3.81)
REF.
2
−IN
1
+IN
.75 (19.05)
1.00 (25.40)
.75 (19.05)
3.53
(89.66)
MAX.
3.20
(81.28)
4-40
THD. INSERTS
OUT LOW
(SEE NOTE)
+OUT
5
4
3
1.10
(27.94)
.15 REF.
(3.81)
2.20 (55 88)
.15 REF.
(3.81)
AX CASE
AW CASE
AU CASE
.040 (1.02)
DIA.
.89 (22.61)
MAX.
1.27 (32.26)
MAX.
.20 MIN.
(5.08)
1.56
(39.62)

NOTE: Pin 4 = TTL Digable (4000, 1700, 1500)
No connection 3000

Models: DCW 3000, 4000, 1500, 1700


2.53 MAX.
(64.26)
2.20
(55.88)
.15 REF.
(3.81)
.15
(3.81)
REF.
2
LOW IN
1
+IN
.75 (19.05)
1.00 (25.40)
.75 (19.05)
3.53
(89.66)
MAX.
3.20
(81.28)
4-40
THD. INSERTS
−OUT
COM
+OUT
5
4
3
1.10
(27.94)
.15 REF.
(3.81)
2.20
(55.88)
.15 REF.
(3.81)

DIMENSIONS IN INCHES (mm)

Models: DCW 330, 425, 400, 500

Specifications Typical at +25°C. After 15 minute warm-up unless otherwise noted.

Model DCWD	12/12D/500	12/15D/400	24/12D/500	24/15D/400	48/12D/500	48/15D/400	5/12/425	5/15/330
Input Voltage	9-18DC	9-18VDC	18-36VDC	18-36VDC	36-72VDC	36-72VDC	4.5-5.5 VDC	4.5-5.5VDC
Input Current (Nom. Line) No Load Full Load	200mA 1.67A	200mA 1.67A	100mA 830mA	100mA 830mA	50mA 420mA	50mA 420mA	480mA 3300mA	480mA 3300mA
Input/Output Isolation	10¹¹Ω‖120pF 300VDC						10¹¹Ω‖75pF 300VDC	
Output Voltage	±12VDC, 1%	±15VDC, 1%	±12VDC, 1%	±15VDC, 1%	±12VDC, 1%	±15VDC, 1%	±12VDC, ±2%	±15VDC, ±2%
Output Ripple	7mV rms (100mV p-p)						1.0mV rms	
Regulation Line Load vs. Temperature	0.1% max. 0.1% max. 0.05%/°C						0.02% max. 0.05% max. 0.02%/°C	
Temperature Range Operating, 100% Load Storage	−25°C to +71°C −25°C to +85°C						−25°C to +71°C −25°C to +85°C	
Case Size	AU						AU	AU

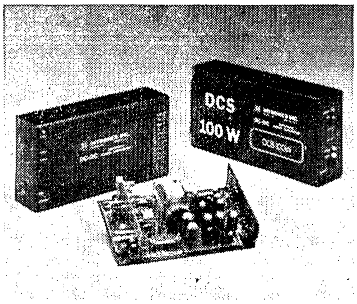
Models DCW	5VDC OUT @ 3000mA			5VDC OUT @ 4000mA			12VDC OUT @ 1700mA			15VDC OUT @ 1500mA		
	12/5/3000	24*/5/3000	48/5/3000	12/5/4000	24/5/4000	48/5/4000	12/12/1700	24/12/1700	48/12/1700	12/15/1500	24/15/1500	48/15/1500
Input Voltage	9 to 18VDC	18 to 36VDC	36 to 72VDC	9 to 18VDC	18 to 36VDC	36 to 72VDC	9 to 18VDC	18 to 36 VDC	36 to 72VDC	9 to 18VDC	18 to 36VDC	36 to 72VDC
Input Current (Nom. Line) No Load Full Load	125mA 1800mA	100mA 900mA	75mA 450mA	250mA 2500mA	130mA 1350mA	100mA 675mA	250mA 2500mA	130mA 1250mA	100mA 625mA	250mA 2500mA	130mA 1250mA	100mA 625mA
Input/Output Isolation	10¹⁰Ω‖100pF 300VDC			10¹⁰Ω‖250pF 300VDC			10¹⁰Ω‖470pF 300VDC			10¹⁰Ω‖540pF 300VDC		
Output Voltage	5VDC ±1%**			5VDC ±1%**			12VDC ±1%**			15VDC ±1%**		
Output Ripple	7.0mV rms			7.0mV rms			7.0mV rms			7.0mV rms		
Regulation Line Load vs. Temperature	.5% max. 1% max. 0.02%/°C			.5% max. 1% max. 0.02%/°C			.5% max. 1% max. 0.02%/°C			.5% max. 1% max. 0.02%/°C		
Temperature Range Operating, 100% Load Storage	−25°C to +71°C −25°C to +85°C			−25°C to +60°C −25°C to +85°C			−25°C to +60°C −25°C to +85°C			−25°C to +60°C −25°C to +85°C		
Case Height	AW			AX			AW			AW		

** For applications requiring closer preset accuracy, please consult factory.

intronics

INTRONICS, INCORPORATED, 57 CHAPEL STREET
NEWTON, MA 02158 • TEL.: (617) 964-4000 • TWX: 710-335-6835
TELEX 200095 INTL UR

30 to 100 Watt High Performance



- DISPLAY INDICATORS
- EXTERNAL DISABLE
- PROTECTION MODES
  - Input Polarity
  - Output OVP
  - Output Overcurrent
- EXTERNAL SYNC
- REMOTE SENSE
- ISOLATION
  - Input to Output: 1000VDC
  - Primary to Derived: 500VDC
- TEMPERATURE RATINGS:
  - Operation: −25°C to +85°C (Base Plate)
  - Storage: −40°C to +85°C
- EFFICIENCY:
  - 71% typical (depends on model)
  - Varies <3% over 2:1 input range
- REGULATION: Line/Load: 0.2%
- SIZE:
  - 30-Watt: 6.55″ x 4.22″ x 1.55″
  - 50-Watt: 8.35″ x 4.22″ x 2.06″
  - 100-Watt: 9.00″ x 4.50″ x 2.20″

ORDERING GUIDE DCS A-X/YY

A — Series (30, 50, 100)
X — Input Code
Y — Output Code

INPUT CODES

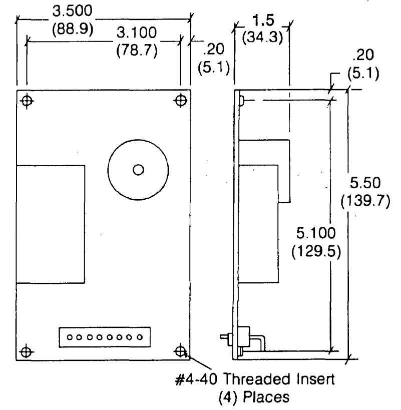
Code	Input Range
1	9-18VDC (except 100W)
2	18-36VDC
3	36-72VDC

	30-Watt				50-Watt				100-Watt			
Output Code	Output Voltage(s)	Nom.	Output Current(s) Min.	Max.	Output Voltage(s)	Nom.	Output Current(s) Min.	Max.	Output Voltage(s)	Nom.	Output Current(s) Min.	Max.
1	+ 5VDC	6A	0.6A	6A	+ 5VDC	10A	1A	10A	+ 5VDC	20A	2A	20A
2	+12VDC	2.5A	0.25A	2.5A	+12VDC	4A	0.4A	4A	+12VDC	8A	0.8A	8A
3	+15VDC	2A	0.2A	2A	+15VDC	3.3A	0.3A	3.3A	+15VDC	6.6A	0.67A	6.6A
4	+24VDC	1.25A	0.12A	1.25A	+24VDC	2A	0.2A	2A	+24VDC	4A	0.4A	4A
5	+28VDC	1A	0.1A	1A	+28VDC	1.8A	0.18A	1.8A	+28VDC	3.6A	0.36A	3.6A
6	+ 5VDC − 5VDC	4.8A 1.0A	0.48A 0.12A	6A 1.0A	+ 5VDC − 5VDC	8A 2A	0.8A 0.2A	10A 4A	+ 5VDC − 5VDC	16A 4A	1.6A 0.4A	20A 6A
7	+12VDC −12VDC	1.25A 1.0A	.125A .125A	2.0A 1.0A	+12VDC −12VDC	2A 2A	0.2A 0.2A	3.2A 3.2A	+12VDC −12VDC	4A 4A	0.4A 0.4A	5A 5A
8	+15VDC −15VDC	1A 1A	0.1A 0.1A	1.6A 1.0A	+15VDC −15VDC	1.7A 1.7A	0.17A 0.17A	2.7A 2.7A	+15VDC −15VDC	3.4A 3.4A	0.34A 0.34A	5A 5A
9	+18VDC −18VDC	0.8A 0.8A	0.08A 0.08A	1.38A 1.38A	+18VDC −18VDC	1.4A 1.4A	0.15A 0.15A	2.3A 2.3A	+18VDC −18VDC	2.8A 2.8A	0.3A 0.3A	4.6A 4.6A
10	+ 5VDC +12VDC	3A 1.2A	0.3A 0.12A	4.8A 1.6A	+ 5VDC +12VDC	5A 2A	0.5A 0.2A	8A 3A	+ 5VDC +12VDC	10A 4A	1A 0.4A	16A 6A
11	+ 5VDC +15VDC	3A 1A	0.3A 0.10A	4.8A 1.6A	+ 5VDC +15VDC	5A 1.7A	0.5A 0.17A	8A 2.8A	+ 5VDC +15VDC	10A 3.4A	1A 0.34A	16A 5.6A
12	+ 5VDC +24VDC	3A 0.6A	0.3A 0.06A	4.8A 0.8A	+ 5VDC +24VDC	5A 1A	0.5A 0.1A	8A 1.6A	+ 5VDC +24VDC	10A 2A	1A 0.2A	16A 3.2A
13	+ 5VDC +12VDC − 5VDC	3A 0.9A 0.6A	0.3A 0.09A 0.06A	4.8A 1.4A 1.2A	+ 5VDC +12VDC − 5VDC	5A 1.5A 1A	0.5A 0.15A 0.1A	8A 2.3A 1.5A	+ 5VDC +12VDC − 5VDC	10A 3A 2A	1A 0.3A 0.2A	16A 4.6A 3A
14	+ 5VDC +15VDC − 5VDC	3A 0.72A 0.6A	0.3A 0.07A 0.06A	4.8A 1.2A 1.2A	+ 5VDC +15VDC − 5VDC	5A 1.2A 1A	0.5A 0.12A 0.1A	8A 2A 1.5A	+ 5VDC +15VDC − 5VDC	10A 2.4A 2A	1A 0.24A 0.2A	16A 4A 3A
15	+ 5VDC +12VDC −12VDC	3A 0.6A 0.6A	0.3A 0.06A 0.06A	4.8A 1.0A 1.0A	+ 5VDC +12VDC −12VDC	5A 1A 1A	0.5A 0.1A 0.1A	8A 1.0A 1.0A	+ 5VDC +12VDC −12VDC	10A 2A 2A	1A 0.2A 0.2A	16A 3A 3A
16	+ 5VDC +15VDC −15VDC	3A 0.48A 0.48A	0.3A 0.05A 0.05A	4.8A 0.72A 0.72A	+ 5VDC +15VDC −15VDC	5A 0.8A 0.8A	0.5A 0.08A 0.08A	8A 1.0A 1.0A	+ 5VDC +15VDC −15VDC	10A 1.6A 1.6A	1A 0.16A 0.16A	16A 2.4A 2.4A
17	+ 5VDC +18VDC −18VDC	3A 0.42A 0.42A	0.3A 0.04A 0.04A	4.8A 0.6A 0.6A	+ 5VDC +18VDC −18VDC	5A 0.7A 0.7A	0.5A 0.07A 0.07A	8A 1A 1A	+ 5VDC +18VDC −18VDC	10A 1.4A 1.4A	1A 0.14A 0.14A	16A 2A 2A

40-Watt Low-Cost Isolated

ORDERING GUIDE DCC 40-A/X

A — Input Code
X — Output Code



INPUT CODES

Code	Input Range
1	10-35VDC
2	20-70VDC

Output Code	Output Voltage(s)	Output Current
1	5VDC	8.0A
2	12VDC	3.0A
3	15VDC	3.0A
4	±12VDC	1.3A
5	±15VDC	1.3A
6	5VDC ±12VDC	3.0A .5A
7	5VDC ±15VDC	3.0A .5A

Input Voltage Rated Operation	10-35VDC	20-70VDC
Input Current (Nom Line) No Load Full Load	200mA 2.2A	100mA 1.1A
Reflected Input Riple Current	200mA P-P	100mA P-P
Output Noise	10mV RMS 100mV P-P	
Line Regulation Load Regulation (10% to 100% Load): 5V Output Balanced Load on Dual Output Unbalanced Load on Dual Outputs Output vs. Temperature	.2% .2% .2% 10% .05%/°C	
Short Circuit Protection	Indefinite	
Temperature Range: Operating Storage	 0° to +70°C −25°C to +105°C	

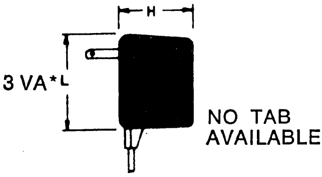
intronics

INTRONICS, INCORPORATED, 57 CHAPEL STREET
NEWTON, MA 02158 • TEL.: (617) 964-4000 • TWX: 710-335-6835
TELEX 200095 INTL UR

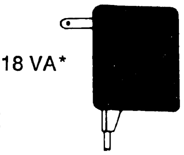
JEROME INDUSTRIES CORPORATION

CUSTOM DESIGN

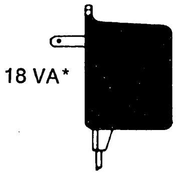
AVAILABLE SIZES IN DURABLE PLASTIC HOUSING


H
3 VA*
L
NO TAB
AVAILABLE

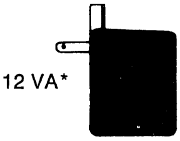
STYLE—E
1.94Lx1.82Wx1.45H



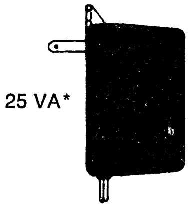
STYLE—B
2.18Lx2.06Wx1.71H



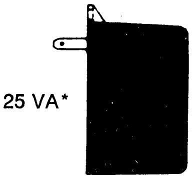
STYLE—BT
2.18Lx2.06Wx1.71H



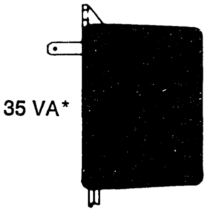
STYLE—D
2.18Lx2.06Wx1.71H



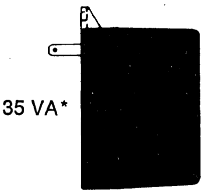
STYLE—H
3.12Lx2.35Wx1.92H



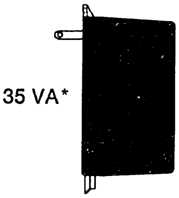
STYLE—J
3.12Lx2.35Wx1.92H



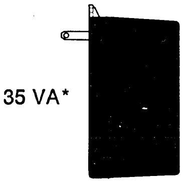
STYLE—F
3.25Lx2.72Wx2.25H



STYLE—G
3.25Lx2.72Wx2.25H



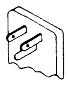
STYLE—K
4.75Lx3.00Wx2.75H



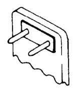
STYLE—M
4.75Lx3.00Wx2.75H

* Maximum Volt Ampere Rating for Transformers to meet U.L. Requirements. The Volt Ampere Capacity may be reduced from 20-25% for Power Supplies and some Battery Chargers.

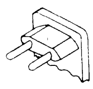
PLUG VARIATIONS FOR ALL HOUSINGS



GROUND PIN



EUROPEAN PRONGS



EUROPEAN PRONGS WITH TURRET

WE SPECIALIZE IN CUSTOM DESIGN

PLEASE SPECIFY THE FOLLOWING WHEN ORDERING

Choose Case Style

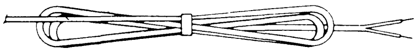
Style B — Style D — Style E — Style F — Style G, etc.

Electrical Requirements to Specify:

1. Input — Volts — Hz
2. Output — Volts A.C. — Amperes A.C.
   Volts D.C. — Amperes D.C.
3. Max. Ripple Voltage
4. Max. No Load Voltage
5. Regulation Requirements
6. Type and Length of Cord
7. Type of Cord Termination
8. Other Requirements including U.L. & C.S.A.

CORD AND PLUG SPECIFICATIONS FOR PLUG-IN ADAPTERS

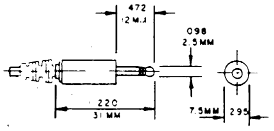
CORD



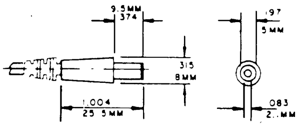
Standard Length . . . 6 Feet   Standard Color . . . Black

Available with the Following Standard Plug Styles:

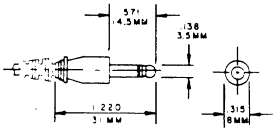
STYLE No. 1
22/2 CONDUCTOR


472
12 MM
098
2.5MM
1 220
31 MM
7.5MM
295

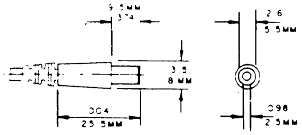
STYLE No. 4
22/2 CONDUCTOR


9.5MM
374
197
5MM
315
8MM
1.004
25 5MM
083
2.MM

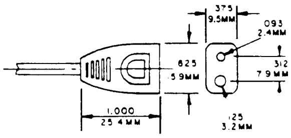
STYLE No. 2
22/2 CONDUCTOR


571
14.5MM
.138
3.5MM
1 220
31 MM
.315
8MM

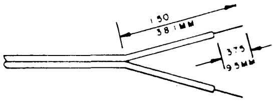
STYLE No. 5
22/2 CONDUCTOR


9 5MM
374
2 6
5 5MM
315
8 MM
004
25 5MM
098
2 5MM

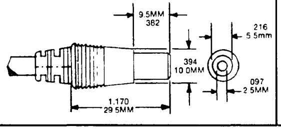
STYLE No. 3
SPT-1 18/2 CONDUCTOR


375
9.5MM
093
2.4MM
625
5 9MM
312
7 9MM
1.000
25 4MM
125
3.2MM

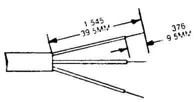
STYLE No. 6
22/2 CONDUCTOR


1 50
38 1MM
375
9 5MM

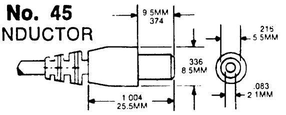
STYLE No. 7
SPT-1 18/2 CONDUCTOR


9.5MM
382
216
5.5mm
394
10 0MM
097
2 5MM
1.170
29 5MM

STYLE No. 8
PVC-22/3 CONDUCTOR


1 545
39 5MM
376
9 5MM

STYLE No. 45
22/2 CONDUCTOR


9 5MM
374
216
5 5MM
336
8 5MM
.083
2 1MM
1 004
25.5MM

Special Cord Sizes, and Plugs Available on Request

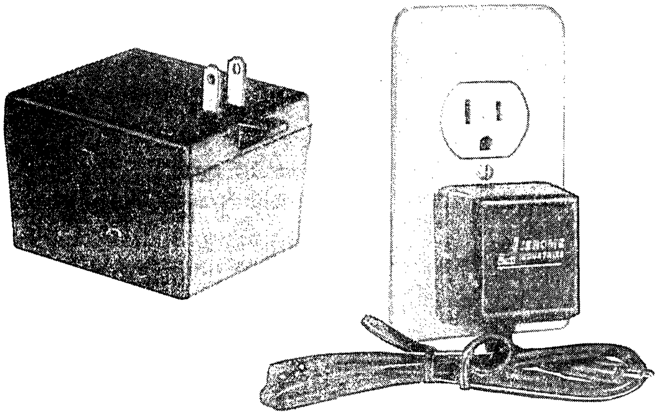
JEROME INDUSTRIES CORPORATION / 730E DIVISION STREET, ELIZABETH, NEW JERSEY 07201 / 201-353-5700 / TELEX 132001

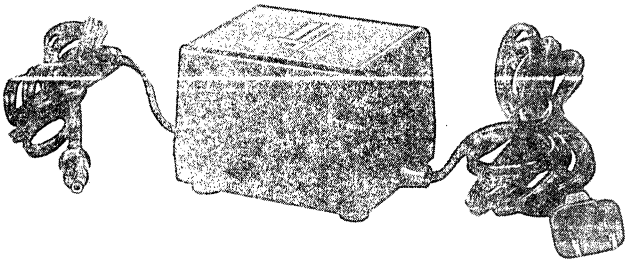
WALL PLUG-IN CONVERTER/ADAPTERS AND BATTERY CHARGERS

JEROME
INDUSTRIES
CORPORATION

POWER SOURCES — WALL PLUG-IN AND DESK TOP STYLE

APPLICATIONS—Computers, Modems, Microprocessor Controlled Systems, Telecommunications, Operational Amplifiers, Computer Peripherals, Test Equipment, Security Systems, Multiplexers, Medical Equipment





FEATURES

Available Electrical and Mechanical Features to Enhance the Appearance or Working Capability of Plug-In Adapters:

- Screw Terminals, Styles D, J, G and M.
- Cord & Plug assemblies to Customer Specs.
- On & Off Switch
- Single & Multiple Outputs Available
- Pilot Light
- Regulated Models are Short Circuit and Thermal Protected
- Others to Specific Customer Requirements

NOTED FEATURES FOR ALL PLUG-IN CONVERTER/ ADAPTERS

- All Units can be designed to U.L. & C.S.A. Requirements
- Molded Cases have dual tapered Surface for positive push-pull grip
- Case available in a variety of colors — to match the product they operate
- Your personal Hot Leaf stamped Logo or Trade Mark enhance the case appearance.

FOR INFORMATION PLEASE CONTACT
OUR CUSTOMER SERVICE DEPARTMENT
201-353-5700

ALL ITEMS CAN BE MADE TO U.L. SPECIFICATIONS 478, 1310, 506, 516, 544, 697, 1012, 1236, 1411 AND OTHERS. ALSO EQUIVALENT C.S.A. REQUIREMENTS

WALL PLUG-IN LINEAR REGULATED POWER SUPPLIES

MODEL #'s	OUTPUT	
	VDC	AMP
RK101	+ 5	1.4
RK102	+12	1.0
RK103	+24	0.5
RK301	+ 5 +12 −12	1.0 0.2 0.2
RK302	+ 5 − 5 +12	1.0 0.1 0.3
RK303	+ 5 +12 −12	0.6 0.2 0.2

STANDARD SPECIFICATIONS

- — Input Range 105-130VAC 60 HZ
- — Also available with input of 200-250 VAC 50 Hz
- — Output Line-Load Regulation 0.5%
- — Rated for Continuous Duty
- — 0° - 40°C Operating Ambient
- — Each Output Max 10 MV(RMS) Ripple
- — AC Dielectric strength 1500VRMS for One Minute Between Primary and Secondary Windings

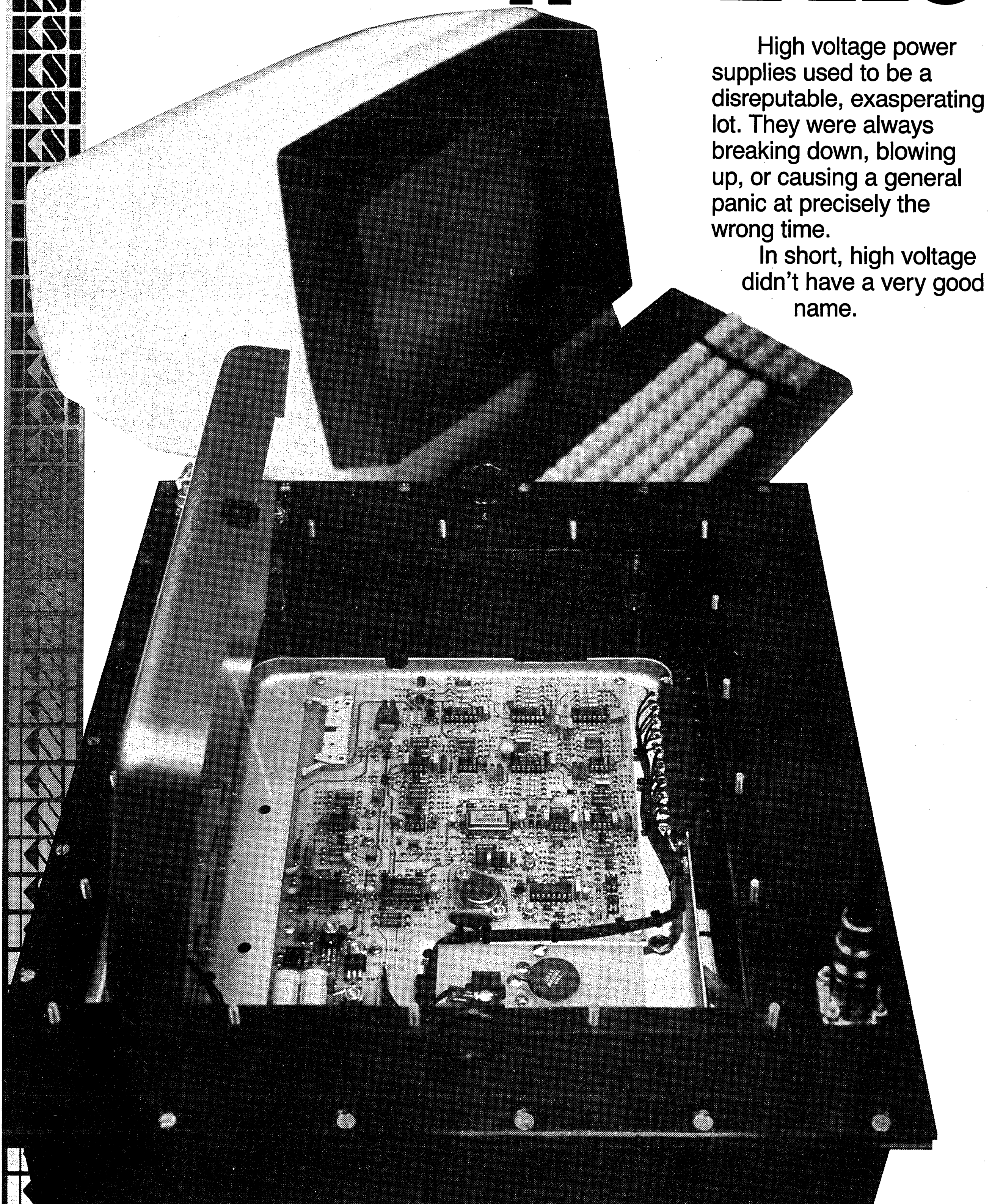
TYPICAL UL & CSA LISTED PLUG-IN POWER SUPPLIES

PART #	INPUT		RATED OUTPUT		NO LOAD	MAX. RIP-PLE	REMARKS	CSA LISTED
	VAC	HZ	VDC	IDC		MV		
PIDE-9A	120	60	9	0.1	12.5	150	—	Yes
PIDB-15	120	60	9	0.2	12	300	Thermal Fuse	Yes
PIDB-28	120	60	9	0.5	14.4	510	Thermal Fuse	Yes

TRANSFORMERS

PART #	INPUT		RATED OUTPUT		NO LOAD	REMARKS	CSA LISTED
	VAC	HZ	VAC	IAC			
PITB-125	120	60	10	0.75	13	Thermal Fuse	Yes
PITB-149	120	60	12	0.93	14.2	Thermal Fuse	No
PITB- 67	120	60	13.5	1.1	15 7	Current Fuse	Yes
PITB-126	120	60	18	0.25	20.3	Thermal Fuse	No

High Voltage Power Supplies: The



High voltage power supplies used to be a disreputable, exasperating lot. They were always breaking down, blowing up, or causing a general panic at precisely the wrong time.

In short, high voltage didn't have a very good name.

Inside Story.

Then along came a company called KSI. Remarkably, KSI brought common sense (and uncommon engineering) to the uncertain world of high voltage.

First, KSI invented the Arc Quencher™—an ingenious new design that makes high voltage power supplies short-circuit proof. And unlike other "fail-safe" systems, the Arc Quencher doesn't preserve itself at the expense of the load.

KSI then added double shielding, RFI filtering, isolated control power, and many other protective features.

Finally!!! High voltage power supplies were becoming reliable, upstanding citizens!

But KSI didn't stop here. High voltage power supplies were still notoriously behind the times. Who wanted to put an antique bucket of bolts into a highly advanced system?

So KSI went to work. It employed the latest vacuum-tube and control-circuit technology. It housed the components in compact tanks and modern control modules. And it used plug-in PCBs with LED indicators and test points.

To make matters even better, KSI taught its power supplies to speak ASCII with computers. Through fiber optics, computers precisely control each critical aspect of power-supply operation.

What's more, KSI is applying the same sensible engineering approach to high-frequency switchmode and resonant supplies.

And now for the happy ending: KSI custom designs high voltage *systems* for a whole range of applications, including:

- Ion implantation
- X-ray systems
- Lasers
- E-beam systems
- Ion deposition
- Ion milling.

To find out the latest developments in this exciting and continuing story, call or write: Kaiser Systems, Inc., 126 Sohier Road, Beverly, MA 01915. Phone (617) 922-9300. TWX: 887159. FAX: (617) 777-3340.

Typical Specifications

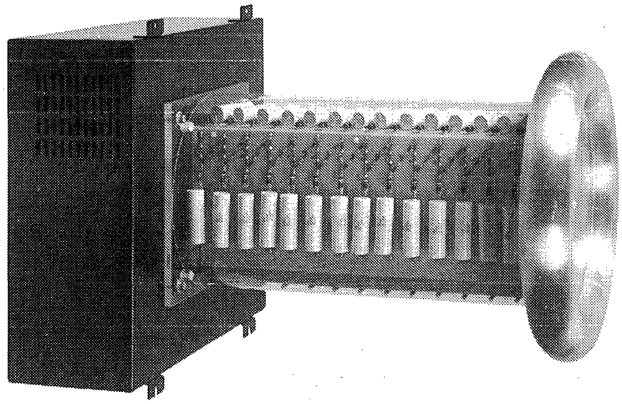
Description	Output Voltage	Reg.	Max. Current	Technology	Application
Multiple Output	Quad 0 to 10kV	.05%	4x 4mA	High-freq.	Beam optics
	0 to 10V 0 to 1.5kV 0 to 10kV	1% 1% 1%	300A 2.2A 40mA	High-freq. resonant	Deposition systems
D.C. Adjustable	+5 to +100kV	.01%	80mA	Output tube regulation	Ion implanters
Pulsed	+40 to +130kV	.1%	800mA		X-ray
Bipolar	−75, +75kV	.01%	200mA	High-freq. resonant	
Fixed voltage	25kV	1%	100mA		Lasers

We've given high voltage power supplies a good name...

KSI Kaiser Systems, Inc.

126 Sohier Road, Beverly, MA 01915 • Phone: (617) 922-9300

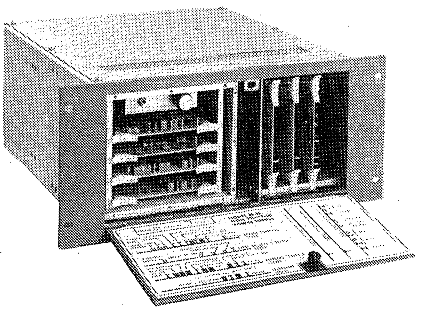
Short Circuit Proof High Voltage Power Supplies so reliable... they're boring!

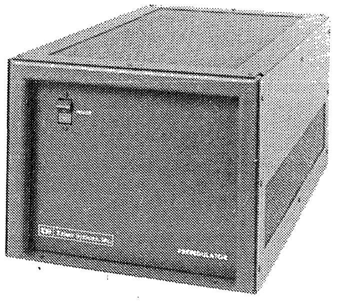


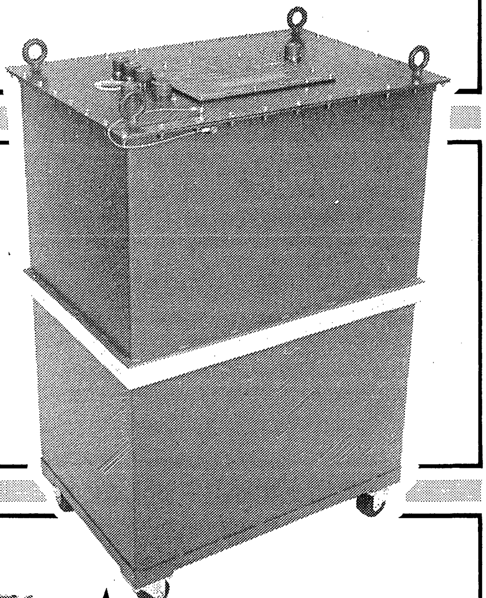
Such as . . .

Resonant Converter, Air Insulated.

Output 2 kW, adjustable 10 to 180 kV, 0.05% regulation, 0.3% ripple.



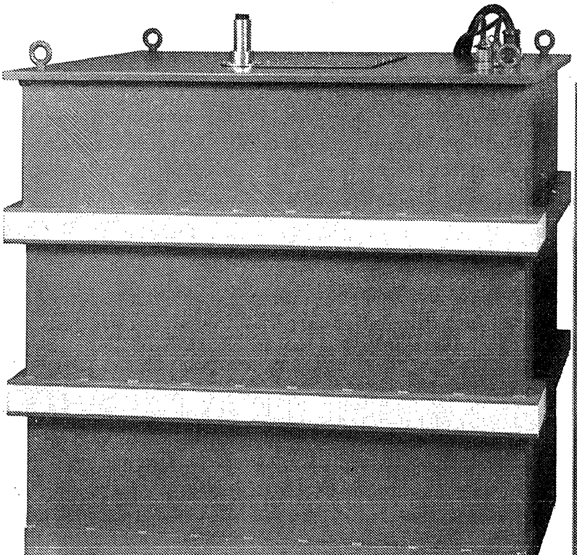


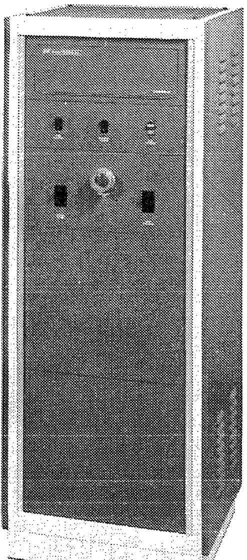


Or . . .

Series Pass Regulator.

Output 6.4 kW, adjustable 10 to 80 kV, 0.01% regulation, 0.01% ripple.





Or . . .

High Current Pulsed.

Output adjustable 40 to 130 kV, 0.1%, 1 A. 12 kW average. 2 sec max pulse width, rise and fall time <10 ms.

Kaiser Systems, Inc., 126 Sohier Road, Beverly, MA 01915 • Phone: (617) 922-9300 • TWX: 887159 • FAX: (617) 777-3340

High Voltage Power Supply Selection Guide

Selecting the right high voltage power supply for a specific application requires careful consideration of many parameters. The following table, which compares the performance characteristics of several types of high voltage supplies, will provide guidance in making the appropriate choice for your application.

Type	Unregulated	Input Regulated			Output Regulated
Technology	—	linear	switch mode	resonant converter	linear
Frequency	50 Hz to 400 Hz	50 Hz to 400 Hz	10 kHz to 50 kHz	10 kHz to 50 kHz	50 Hz to 400 Hz
Output Voltage (Max.)	to > 1 MV	to > 1 MV	to 500 kV	to 500 kV	to 150 kV
Power Level	any	any	to 3 kW	to 50 kW	200 W to 200 kW
Regulation Method	N/A	var. transf. SCR	pulse width modulation	freq., phase modulation	series pass element
Stored Energy*	high	high	low	low	lowest
Output Current Limit Δt	$\geq$ 10 ms	$\approx$ 10 ms	$\approx$ .1 ms	$\approx$ .5 ms	$<$ 1 μs
Transient Response	N/A	slow	medium	medium	very fast
EMI	very low	medium	high	medium	very low
Efficiency	$\approx$ 95%	$\approx$ 90%	$\approx$ 85%	$\approx$ 85%	75 to 90%
Parts Count	lowest	low	high	high	low
Size per Watt	large	large	small	small	large
Cost per Watt	low	medium–high	medium	medium	high
Insulation Medium	air, oil, SF6		air, oil, SF6, encapsulation		air, oil, SF6

*Stored energy at output due to output filter. Low filter requirements (higher ripple) reduce stored energy.

Choose your supplier as carefully as you choose your supplies. Ask yourself the following: are his designs modern, efficient, and reliable? Does he care as much about quality as you do? Will he deliver on time and to specifications?

Then call KSI.

We've given high voltage power supplies a good name...

KSI Kaiser Systems, Inc.

126 Sohier Road, Beverly, MA 01915 • Phone: (617) 922-9300

enclosures · capacitors · circuit boards · coils,
chokes, inductors · connectors, electronic · sockets/
terminals · crystals · oscillators · crystal filters
delay lines · panel hardware · displays · lamps/
lights · cooling equipment · filters · generators ·
multimeters · panel meters · oscilloscopes · gra
phic recorde nnections · microwave
components tors/
drives · power
supplies, ac · relays ·
solenoids · rs/trimmers
controls/rh rs ·
switches · s/en
coders · transformers · wire & cable · enclosures
capacitors · circuit boards · coils, chokes, induc
tors · connectors, electronic · sockets/terminals

EEM PRODUCT SELECTION GUIDES

Use the EEM Product Selection Guides. There are 34 Guides in this edition of EEM. See page 2 (A•2, B•2, C•2, D•2) of each volume to locate the Product Selection Guides that pertain to your needs.

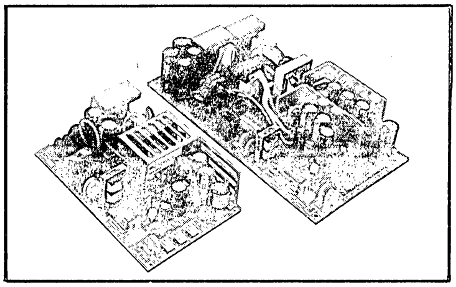
PRECISION SWITCHING POWER SUPPLIES
SELECTOR GUIDE

It tells you all you'll ever need to know to locate the exact switching power supply for most applications. It's complete with brief specs and prices. If you need to know more, just send for our comprehensive product data sheets.

MULTI-OUTPUT

KFD SERIES - MULTI OUTPUT 25, 40, 80 W.

The KFD-25E, 40E and 80E world-class power supplies have been engineered for full time duty at their maximum rated out-puts. They are designed to meet UL, CSA, and VDE safety requirements; and EMI emissions comply with FCC/VDE requirements.

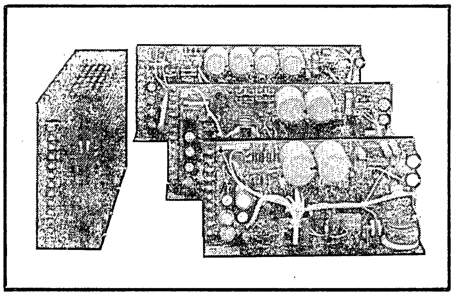


AC INPUT . . . 115/230 VAC (-20% to +15%)
Efficiency (Typical) . . . 70%

DIM.	KFD 25E	KFD40E	KFD80E
L	5.9	6.3	9
W	3.55	3.9	5
H	1.58	1.9	1.9

MODEL NUMBER	OUTPUT NO. 1 V(nom)/I(max)	OUTPUT NO. 2 V(nom)/I(max)	OUTPUT NO. 3 V(nom)/I(max)	OUTPUT NO. 4 V(nom)/I(max)	WATT
KFD 25E-01	+5V/3.5A	+12V/1A	−12V/0.5A		25W
KFD 25E-02	+5V/3.5A	+15V/1A	−15V/0.5A		
KFD40E-01	+5V/5A	+12V/2.5A	−12V/0.5A		40W
KFD40E-02	+5V/5A	+15V/2.5A	−15V/0.5A		
KFD40E-03	+5V/5A	+12V/2.5A	−5V/0.5A		
KFD40E-04	+5V/5A	+12V/2.5A	−48V/0.3A		
KFD80E-01	+5V/7A	+12V/4A	−12V/0.5A	−5V/0.5A	80W
KFD80E-02	+5V/7A	+15V/3A	−15V/0.5A	−5V/0.5A	
KFD80E-03	+5V/7A	+12/3A	−12V/0.5A	+24/0.5A	

Shaded area indicates post regulated outputs; no minimum load required.



AC INPUT...115/230VAC (−20% to +10%)
Efficiency (Typical)...75%

DIM.	KS 100	KS 130	KS 170	KS 200	SCB306
H	2.44	2.44	2.44	2.44	2.50
L	9.06	10.5	10.0	13.0	11.75
W	4.21	4.94	5.63	4.94	7.60

MODEL NUMBER	Output 1 V(nom)/ I(max)	Output 2 V(nom)/ I(max)	Output 3 V(nom)/ I(max)	Output 4 V(nom)/ I(max)	Output 5 V(nom)/ I(max)	Output 6 V(nom)/ I(max)	WATTS
KS 100-01	+5V/10A	+12V/1.5A	−12V/1.5A	−5V/.5A			100W
KS 100-02	+5V/10A	+15V/1.5A	−15V/1.5A	−5V/.5A			
KS 100-03	+5V/10A	+12V/1.5A	−12V/1.5A	+24V/1.5A			
KS 100-04	+5V/10A	+15V/1.5A	−15V/1.5A	+24V/1.5A			
KS 100-05	+5V/10A	+12V/1.5A*	+12V/1.5A*	+24V/1.5A			
KS 100-06	+5V/10A	+12V/1.5A*	−12V/1.5A	+12V/1.5A*			
KS 130-01	+5V/15A	+12V/4A	−12V/3A	−5V/0.5A			130W
KS 130-02	+5V/15A	+15V/4A	−15V/3A	−5V/0.5A			
KS 130-03	+5V/15A	+12V/4A	−12V/3A	+24V/2A			
KS 130-04	+5V/15A	+15V/4A	−15V/3A	+24V/2A			
KS 130-05	+5V/15A	+12V/4A*	+12V/3A*	+24V/2A			
KS 130-06	+5V/15A	+12V/4A*	−12V/3A	+12V/2A*			
KS 170-01	+5V/20A	+12V/4A	−12V/4A	+24V/4A			170W
KS 170-02	+5V/20A	+15V/4A	−15V/4A	+24V/4A			
KS 170-03	+5V/20A	+12V/4A	−12V/4A	−5V/0.5A			
KS 170-04	+5V/20A	+15V/4A	−15V/4A	−5V/0.5A			
KS 170-05	+5V/20A	+12V/4A*	+12V/4A*	+24V/4A			
KS 170-06	+5V/20A	+12V/4A*	−12V/4A	+12V/4A			
KS 200-01	+5V/25A	+12V/4A	−12V/4A	−5V/0.75A	+24V/4A		200W
KS 200-02	+5V/25A	+15V/4A	−15V/4A	−5V/0.75A	+24V/4A		
KS 200-03	+5V/25A	+12V/4A	−12V/4A	−24V/2A	+24V/4A		
SCB306-01	+5V/20A	+12V/4A	−12V/4A	+24V/4A	+15V/4A	−15V/4A	300W
SCB306-02	+5V/20A	+12V/4A	−12V/4A	−5V/1A	+24V/4A	−24V/4A	

Shaded outputs have separate returns.
* Can be paralleled for high-current applications

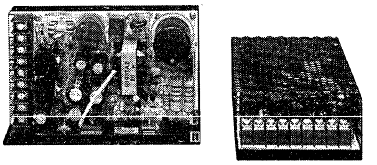
(Continued on next page)

(Multi-Output continued)

KFL SERIES – 4 OUTPUT. 15, 25, 40 W.

The KFL Series features independently regulated outputs and offers optimum size-to-power ratios. Available in both caged and open versions in 15, 25, and 40-watt models, these units provide ultra-reliable performance in the smallest possible space. Ideal for personal computers.
All models UL recognized.

MODEL NUMBER	OUTPUT NO. 1 V(nom)/I(max)	OUTPUT NO. 2 V(nom)/I(max)	OUTPUT NO. 3 V(nom)/I(max)	OUTPUT NO. 4 V(nom)/I(max)	WATT
KFL 15-01U	+5V/2A	−5V/0.5A	+12V/0.5A	−12V/0.5A	15W
KFL 15-02U	+5V/2A	−5V/0.5A	+15V/0.5A	−15V/0.5A	
KFL 25-01U	+5V/3.5A	−5V/0.5A	+12V/1.0A	−12V/0.5A	25W
KFL 25-02U	+5V/3.5A	−5V/0.5A	+15V/1.0A	−15V/0.5A	
KFL 40-01U	+5V/5A	−5V/0.5A	+12V/1.5A	−12V/0.5A	40W
KFL 40-02U	+5V/5A	−5V/0.5A	+15V/1.5A	−15V/0.5A	



AC INPUT...115VAC (−20% to +10%)
Efficiency (Typical)...60%

DIM.	KFL 15	KFL 25	KFL 40
L	5.5	6.3	7.1
W	3.9	3.9	3.9
H	1.8	1.9	2.0

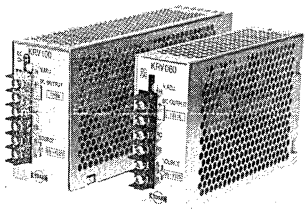
SINGLE OUTPUT

KRV SERIES—SINGLE OUTPUT, 60 & 100W.

The KRV Series features **100 kHz** switching speed instead of the usual 20 kHz, resulting in very small efficient packages and providing more wattage per cubic inch. These state-of-the-art power supplies are ideal for any application where space is at a premium.

MODEL NUMBER	Maximum Current Output at 50°C				
	5Vdc	12Vdc	15Vdc	24Vdc	Watt/
KRV 60**	12A	5A	4A	2.5A	60W
KRV 100**	20A	8A	6.5A	4A	100W

**Add voltage to complete model number. Contact factory for non-standard voltages.



AC INPUT...115 VAC/230 VAC (−25% +15%)
Efficiency (Typical)...75%

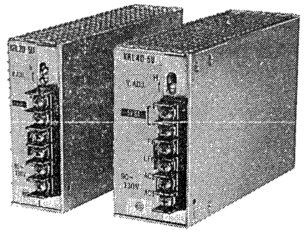
MODEL	H	L	W
KRV 60	3.94	6.65	1.69
KRV 100	3.94	8.74	2.09

KRL SERIES – SINGLE OUTPUT, 20 & 40 W.

The KRL Series is optimum for those applications requiring totally isolated outputs. A compact size and low price allows maximum flexibility in configuring your own multi-output system—often at a cost less than competitive multi-output units.

MODEL NUMBER	Maximum Current Output at 50°C				
	5Vdc	12Vdc	15Vdc	24Vdc	Watt/
KRL20**	4A	1.7A	1.3A	0.8A	20W
KRL40**	8A	3.3A	2.7A	1.7A	40W

**Add voltage to complete model number. Contact factory for non-standard voltages.



AC INPUT...115VAC (−20% to +10%)
Efficiency (Typical)...62%

MODEL	H	L	W
KRL 20	3.9	6.46	1.46
KRL 40	3.9	6.46	1.97

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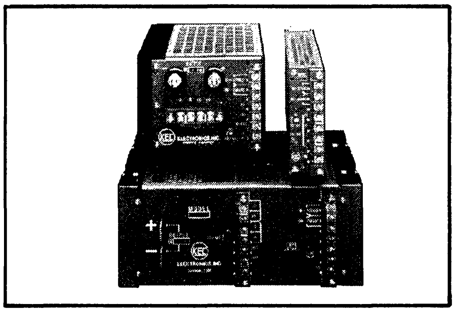
(Single Output continued)



AC INPUT...115/230VAC (−20% to +10%)
Efficiency (Typical)...73%

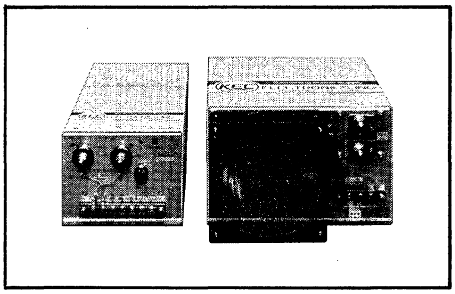
DIM.	SB-30	SB-55	SB-100	SB-150	SB-200	SB-300
W	1.30	1.93	3.44	5.25	5.25	9.45
H	3.94	3.94	3.94	3.94	3.94	3.94
L	7.88	7.88	7.88	7.88	7.88	7.88

SB MODULAR SERIES – SINGLE OUTPUT, FULLY ENCLOSED. 30-300 W.

Compact and cool operating, the SB series of modular power supplies are particularly well suited for a wide range of applications requiring a fully enclosed unit with a single output and high reliability. These rugged units feature overvoltage and overload protection as standard.

MODEL NUMBER	Max. Current Output at 50°C						
	5Vdc	12Vdc	15Vdc	20Vdc	24Vdc	48Vdc	Watt.
SB-30**	6.0A	2.5A	2.0A	1.5A	1.2A		30W
SB-55**	11A	4.5A	3.6A	2.75A	2.2A		55W
SB-100**	20A	8.0A	6.6A	5.0A	4.0A		100W
SB-150**	30A	12A	10A	7.5A	6.0A		150W
SB-200**	40A	16.6A	13.3A	10.0A	8.3A	4.1A	200W
SB-300**	60A	25.0A			12.5A	6.2A	300W

**Add voltage to complete model number. Contact factory for non-standard voltages.



AC INPUT...115 or 230VAC (−15% to +10%)
Efficiency (Typical)...SD Series: 80%, SE Series: 80%

DIM.	SD SERIES	SE SERIES
W	5.00	7.75
H	3.90	4.93
L	12.12	9.70

SD & SE HIGH POWER SERIES – SINGLE OUTPUT, MODULAR 375 & 750 W.

The SD and SE Series combine high power and space saving compactness. The units feature *as standard:* power fail indicator, remote start-up and shut-down, along with remote sensing and overvoltage protection.

SD SERIES

115VAC MODELS	SDI-5	SDI-12	SDI-24	SDI-28	SDI-48	Watt
230VAC MODELS	SD2-5	SD2-12	SD2-24	SD2-28	SD2-48	375W
NOM. VOLTAGE	5V	12V	24V	28V	48V	
MAX. CURRENT	75A	31A	16A	13A	8A	

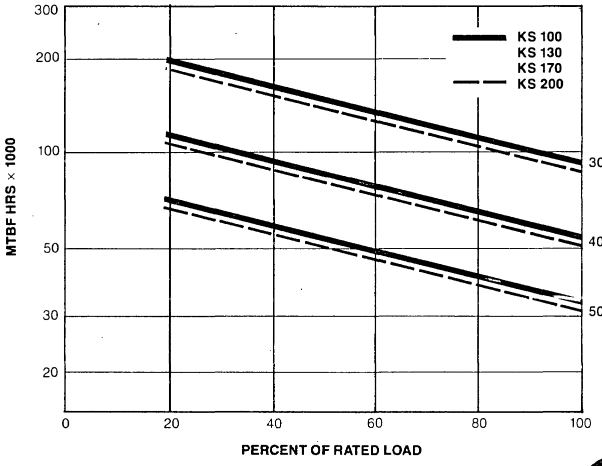
SE SERIES

115VAC MODELS	SEI-5	SEI-12	SEI-24	SEI-28	SEI-48	Watt
230VAC MODELS	SE2-5	SE2-12	SE2-24	SE2-28	SE2-48	750W
NOM. VOLTAGE	5V	12V	24V	28V	48V	
MAX. CURRENT	150A	64A	31A	27A	16A	

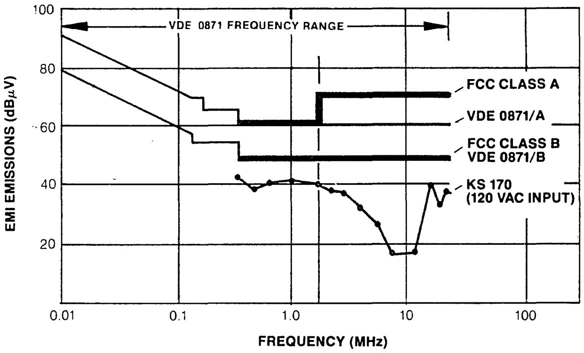
Dimensions are in inches. Model numbers, specifications and prices are subject to change.

KS SERIES, RELIABILITY AND FCC/EMI COMPLIANCE

MEAN TIME BETWEEN FAILURE



EMI SPECIFICATIONS—KS PERFORMANCE WITH OPTION F



OPTION F—Reduces conducted noise to comply with FCC and VDE levels A. Although the figure above indicates that the actual conducted noise is less than FCC level B, an external filter is recommended for compliance with FCC and VDE levels B. The recommended filter is a Stanford Applied Engineering Model CA-3, or equivalent.

KEC ELECTRONICS, INC.

20817 Western Avenue, Torrance, California 90501 • Phone (213) 320-3902 • TWX 910-349-6962

KELTEC FLORIDA Industrial Grade Power Supplies

• Switchers • Linears • DC to DC Converters • Off-line Switchers • Custom Designs • Standard Products • Total Power Supply Capability

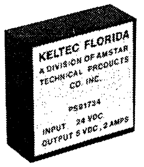
Keltec Industrial Operations offers an extensive line of standard products, as well as custom engineering and manufacturing capability, to a wide variety of power supply users. Keltec Industrial Operations' power supplies find wide application in industrial and government systems where high reliability, MTBF and product safety are essential. Extensive engineering resources are utilized to keep Keltec Industrial products on the leading-edge of power supply technology. Complete electrical and mechanical design service; modern manufacturing methods; complete production test capability and a fully staffed Quality Assurance department combine to provide highly-reliable, cost-efficient power supplies in large quantities in support of major industrial, commercial and government programs.

Standard DC to DC Converters.

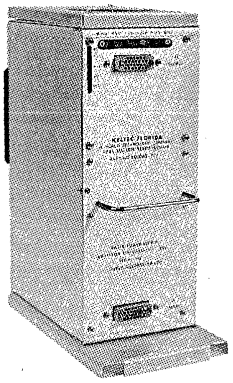
Point-of-load regulators for use in distributed systems.

Three Series Available:
1. Fixed Output 5V @ 2.5 to 4A.
2. Variable Output 5, 12, 15 or 24V.
3. Isolated +/−5, 12, 15 or 24V.

Input Voltage Range: 10 to 48 VDC.
Ripple and Noise: Less than 100mV p-p
Efficiency: 71 to 88%
Regulation:
  Line — 1mV/V (10 to 48VDC)
  Load — 0.3% Max. NL to FL.
Operating Temperature: Full ratings to 30°C.
  Linear derating to 70°C.

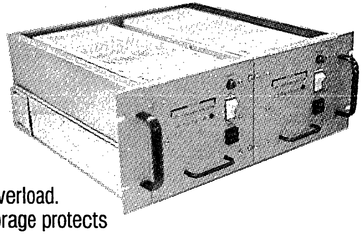


100,000 Hours MTBF Low Noise DC to DC Switcher



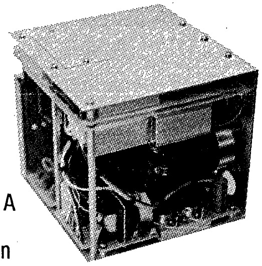
Low noise switching power supply with 5 outputs is used to power logic circuits in digital microwave radio links. Highly reliable with over 100,000 hours calculated MTBF.
Inputs: 20-28vdc and 42-56vdc.
Outputs: $\pm$5V @ 25A ± 0.5%
  $\mp$12V @ 3A ± 0.5%
  −15V @ 1.5A ± 1.0%
  −20V @ 1.5A ± 1.0%
Ripple: 50mv p-p max.
Protection: Adjustable current limiting.
  Automatic recovery on all outputs.
  Reverse polarity and overtemp. protection.
Operating Temp: −20° to +55°C.

Redundant Multi-Output AC to DC Switcher Provides 650 Watts!



Dual input range: 115V or 220V; 40 to 400Hz.
Outputs: +5V @ 50A
  ±15V @ 2A
  −5V @ 3A
Regulation: ±0.3%
Ripple: 100mV p-p max.
Fully protected with electronic overload. Automatic recovery. 30msec. storage protects against power failure. MTBF in excess of 50,000 hours per MIL-STD-2127D at 50°C ambient.
Operating temperature: −10° to +50°C.
Meets FCC20780 EMI requirements for Class A equipment.

Off-Line Switcher Has 5-Outputs



Off-Line AC to DC switcher with 5-outputs is used in air-traffic control systems world-wide.
Inputs: 115V and 220V; 40 to 400Hz.
Outputs: +5V @ 10A
  ± 15V @ 2A
  10V @ 6A
  12V @ 6A
Regulation: ±0.3%
Ripple: 100mv p-p. max.
Meets FCC20780EMI requirements for Class A equipment.
MTBF in excess of 50,000 hours calculated in accordance with MIL-STD-217D at 50° ambient.
10V and 12V outputs are fully adjustable over the range for panel light control.

Complete capabilities for any type of high reliability power supply. Contact Keltec Florida, Industrial Operations with your requirements.

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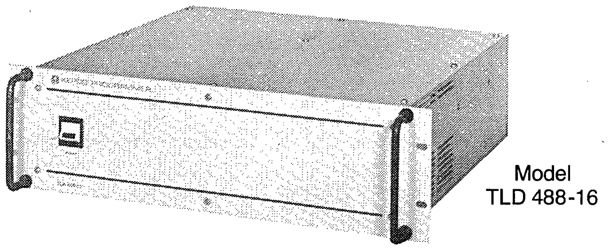
WORLD POWER™ OEM SWITCHING MODULES

Has all approvals
needed for world-
wide use...
single and
multi output.

Model
ERX

IEEE 488 COMPATIBLE PROGRAMMERS

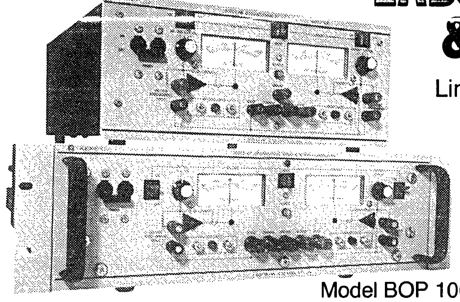


Model
TLD 488-16

POWER MANAGERS™ FOR LABORATORIES & SYSTEMS

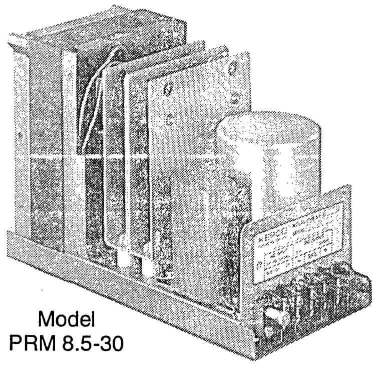
Model
BOP 50-4M-488-B

Linear programmable...
unipolar & bipolar...
conventional &
high speed...
low, medium, &
high voltage.



Model BOP 100-4M-488-D

OEM LINEAR & FERRORESONANT MODULES

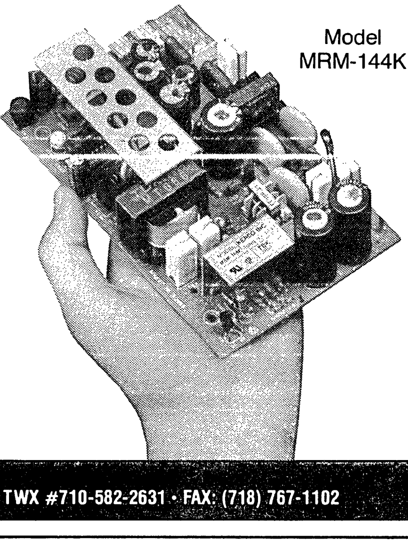


Model
PRM 8.5-30

DOMESTIC OEM SWITCHING MODULES

Single & multi-output...a-c to d-c
and d-c to d-c...PC Card,
L-chassis, and fully shielded.

Model
MRM-144K



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INDEX

SINGLE OUTPUT POWER SUPPLIES

VOLTS	AMPS	MODEL	PAGE
1.6-2.2	0-120(1)	RBX 02-120K	9
3.5-5.5	0-6.0(1)	RMK 05-S	9
3.5-5.5	0-6.0(1)	RMD 05-SA-12	10
3.5-5.5	0-10.0(1)	RMD 05-AA-12	10
3.5-5.5	0-10.0(1)	RMD 05-A-24	10
3.5-5.5	0-10.0(1)	RMD 05-A-48	10
3.5-5.5	0-10.0(1)	RMD 05-A-110	10
3.5-5.5	0-10.0(1)	RMX 05-A	9
3.5-5.5	0-26.0(1)	RMD 05-B-24	10
3.5-5.5	0-26.0(1)	RMD 05-B-48	10
3.5-5.5	0-26.0(1)	RMD 05-B-110	10
3.5-5.5	0-26.0(1)	RMX 05-B	9
3.5-5.5	0-30.0(1)	RMX 05-C	9
3.5-5.5	0-45(1)	RMX 05-N	9
3.5-5.5	0-50(1)	RMD 05-D-48	10
3.5-5.5	0-60(1)	RMD 05-D-110	10
3.5-5.5	0-60.0(1)	RMX 05-D	9
4.5-5.5	0-2.0(1)	MP 05-H	9
4.0-5.5	0-4.8(1)	ERX 5-6	5
5(2)	0-10(2)	PRM 5-10	14
4.0-5.5	0-9.6(1)	ERX 5-12	5
4.0-5.5	0-19.2(1)	ERX 5-24	5
4.0-5.5	0-120(1)	RBX 05-120K	9
0-6	0-5	ATE 6-5M	15
0-6	0-10	ATE 6-10M	15
0-6	0-10	JQE 6-10M	17
0-6	0-22	JQE 6-22M	17
0-6	0-25	ATE 6-25M	15
0-6	0-45	JQE 6-45M	17
0-6	0-50	ATE 6-50M	15
0-6	0-90	JQE 6-90M	17
0-6	0-100	ATE 6-100M	15
0-7	0-2	CC 7-2M	18
0-7	0-2	PAT 7-2	14
0-7	0-2	PCX 7-2MAT	18
0-7	0-5.5	PTR 7-5.5	14
8(2)	0-7(2)	PRM 8-7	14
8.5	0-30	PRM 8.5-30	14
6.3-9.9	0-3.3(1)	RMK 09-S	9
6.3-9.9	0-3.3(1)	RMD 09-SA-12	10
6.3-9.9	0-6.0(1)	RMD 09-AA-12	10
6.3-9.9	0-6.0(1)	RMD 09-A-24	10
6.3-9.9	0-6.0(1)	RMD 09-A-48	10
6.3-9.9	0-6.0(1)	RMX 09-A	9
6.3-9.9	0-15.0(1)	RMD 09-B-24	10
6.3-9.9	0-15.0(1)	RMD 09-B-48	10
6.3-9.9	0-15.0(1)	RMX 09-B	9
6.3-9.9	0-17.2(1)	RMX 09-C	9
6.3-9.9	0-25(1)	RMX 09-N	9
6.3-9.9	0-28(1)	RMD 09-D-48	10
6.3-9.9	0-32.0(1)	RMX 09-D	9
8.0-10.0	0-1.1(1)	MP 09-H	9
8.4-13.2	0-25(1)	RMK 12-S	9
8.4-13.2	0-2.5	RMD 12-SA-12	10
8.4-13.2	0-5.0(1)	RMD 12-AA-12	10
8.4-13.2	0-5.0(1)	RMD 12-A-24	10
8.4-13.2	0-5.0(1)	RMD 12-A-48	10
8.4-13.2	0-5.0(1)	RMX 12-A	9
8.4-13.2	0-12.0(1)	RMX 12-B	10
8.4-13.2	0-12.0(1)	RMD 12-B-24	10
8.4-13.2	0-12.0(1)	RMD 12-B-48	10
8.4-13.2	0-14.6(1)	RMX 12-C	9
8.4-13.2	0-19(1)	RMX 12-N	9
8.4-13.2	0-21(1)	RMD 12-D-48	10
8.4-13.2	0-27(1)	RMX 12-D	9
10.5-13.5	0-1.0(1)	MP 12-H	9
12(2)	0-5(2)	PRM 12-5	14
12	0-10	PRM 12-10	14
12	0-15	PRM 12-15	14
12	0-23	PRM 12-23	14
12	0-35	PRM 12-35	14
12	0-77	PRR 12-77M	18
10.5-16.5	0-2.0(1)	RMK 15-S	9
10.5-16.5	0-2.0(1)	RMD 15-SA-12	10
10.5-16.5	0-4.0(1)	RMD 15-AA-12	10
10.5-16.5	0-4.0(1)	RMD 15-A-24	10
10.5-16.5	0-4.0(1)	RMD 15-A-48	10
10.5-16.5	0-4.0(1)	RMD 15-A-110	10
10.5-16.5	0-4.0(1)	RMX 15-A	9
10.5-16.5	0-10.2(1)	RMD 15-B-24	10
10.5-16.5	0-10.2(1)	RMD 15-B-48	10
10.5-16.5	0-10.2(1)	RMD 15-B-110	10
10.5-16.5	0-10.2(1)	RMX 15-B	9
10.5-16.5	0-12.3(1)	RMX 15-C	9
10.5-16.5	0-15(1)	RMX 15-N	9
10.5-16.5	0-17(1)	RMD 15-D-48	10
10.5-16.5	0-23(1)	RMD 15-D-110	10
10.5-16.5	0-23.0(1)	RMX 15-D	9
10.8-13.2	0-2.5(3)	ERX 12-2.5	5
8.4-13.2	0-5(3)	ERX 12-5	5
8.4-13.2	0-10(3)	ERX 12-10	5
13.5-16.5	0-0.8	MP 15-H	9
0-15	0-1.5	CC 15-1.5M	18
0-15	0-1.5	PAT 15-1.5	14
0-15	0-1.5	PCX 15-1.5MAT	18
13.5-16.5	0-2(3)	ERX 15-2	5
10.5-16.5	0-4(3)	ERX 15-4	5
10.5-16.5	0-8(3)	ERX 15-8	5
0-15	0-3	ATE 15-3M	15
0-15	0-3.3	PTR 15-3.3	14
15(2)	0-4(2)	PRM 15-4	14
0-15	0-6	ATE 15-6M	15
0-15	0-6	JQE 15-6M	17
0-15	0-12	JQE 15-12M	17
0-15	0-15	ATE 15-15M	15
15	0-18	PRM 15-18	14
0-15	0-25	ATE 15-25M	15
0-15	0-25	JQE 15-25M	17
0-15	0-50	ATE 15-50M	15
0-15	0-50	JQE 15-50M	17
+20 to −20	+10 to −10	BOP 20-10M	16
+20 to −20	+20 to −20	BOP 20-20M	16
0-21	0-1	CC 21-1M	18
0-21	0-1	PAT 21-1	14
0-21	0-1	PCX 21-1MAT	18
0-21	0-2.5	PTR 21-2.5	14
21(2)	0-2.9(2)	PRM 21-2.9	14
16.8-26.4	0-1.3(1)	RMK 24-S	9
16.8-26.4	0-1.3(1)	RMD 24-SA-12	10
16.8-26.4	0-2.5(1)	RMD 24-AA-12	10
16.8-26.4	0-2.5(1)	RMD 24-A-24	10
16.8-26.4	0-2.5(1)	RMD 24-A-48	10
16.8-26.4	0-2.5(1)	RMD 24-A-110	10
16.8-26.4	0-2.5(1)	RMX 24-A	9
16.8-26.4	0-7.5(1)	RMD 24-B-24	10
16.8-26.4	0-7.5(1)	RMD 24-B-48	10
16.8-26.4	0-7.5(1)	RMD 24-B-110	10
16.8-26.4	0-7.5(1)	RMX 24-B	9
16.8-26.4	0-8.0(1)	RMX 24-C	9
16.8-26.4	0-9.5(1)	RMX 24-N	9
16.8-26.4	0-10.5(1)	RMD 24-D-48	10
16.8-26.4	0-16(1)	RMD 24-D-110	10
16.8-26.4	0-16(1)	RMX 24-D	9
19.0-26.5	0-25(1)	RBX 24-25K	9
21.6-26.4	0-1.3(3)	ERX 24-1.3	5

(1) +50°C current rating (2) Nominal output. Contains taps for two settings higher and two settings lower (3) +40°C current rating

KEPCO® THE POWER SUPPLIER™

SINGLE OUTPUT POWER SUPPLIES

INDEX

VOLTS	AMPS	MODEL	PAGE
16.8-26.4	0-2.5(3)	ERX 24-2.5	5
16.8-26.4	0-5(3)	ERX 24-5	5
24	0-5	PRM 24-5	14
24	0-8	PRM 24-8	14
24	0-12	PRM 24-12	14
24	0-20	PRM 24-20	14
24	0-42	PRR 24-42M	18
0-25	0-2	ATE 25-2M	15
0-25	0-4	ATE 25-4M	15
0-25	0-4	JQE 25-4M	17
0-25	0-10	ATE 25-10M	15
0-25	0-10	JQE 25-10M	17
0-25	0-20	JQE 25-20M	17
0-25	0-20	ATE 25-20M	15
0-25	0-40	ATE 25-40M	15
0-25	0-40	JQE 25-40M	17
26(2)	0-2.3(2)	PRM 26-2.3	14
28	0-7	PRM 28-7	14
28	0-10	PRM 28-10	14
28	0-17	PRM 28-17	14
28	0-36	PRR 28-36M	18
19.6-30.8	0-1.1(1)	RMD 28-SA-12	9
19.6-30.8	0-2.1(1)	RMD 28-A-24	9
19.6-30.8	0-2.1(1)	RMD 28-A-48	9
19.6-30.8	0-2.15(1)	RMD 28-AA-12	9
19.6-30.8	0-2.15(1)	RMX 28-A	8
19.6-30.8	0-6.4(1)	RMD 28-B-24	9
19.6-30.8	0-6.4(1)	RMD 28-B-48	9
19.6-30.8	0-6.4(1)	RMX 28-B	8
19.6-30.8	0-6.8(1)	RMX 28-C	8
19.6-30.8	0-8	RMX 18-N	8
19.6-30.8	0-9(1)	RMD 28-D-48	9
19.8-30.8	0-13.7(1)	RMX 28-D	8
0-36	0-1.5	ATE 36-1.5M	15
36(2)	0-1.7(2)	PRM 36-1.7	14
0-36	0-3	ATE 36-3M	15
0-36	0-3	JQE 36-3M	17
+36 to −36	+6 to −6	BOP 36-6M	16
+36 to −36	+12 to −12	BOP 36-12M	16
0-36	0-8	ATE 36-8M	15
0-36	0-8	JQE 36-8M	17
0-36	0-15	ATE 36-15M	15
0-36	0-15	JQE 36-15M	17
0-36	0-30	ATE 36-30M	15
0-36	0-30	JQE 36-30M	17
0-40	0-0.5	CC 40-0.5M	18
0-40	0-0.5	PAT 40-0.5	14
0-40	0-0.5	PCX 40-0.5MAT	18
0-40	0-1.4	PTR 40-1.4	14
48	0-6	PRM 48-6	14
48	0-10	PRM 48-10	14
48	0-22	PRR 48-22M	18
+50 to −50	+2 to −2	BOP 50-2M	16
+50 to −50	+4 to −4	BOP 50-4M	16
+50 to −50	+8 to −8	BOP 50-8M	16
0-55	0-1	ATE 55-1M	15
0-55	0-2	ATE 55-2M	15
0-55	0-2	JQE 55-2M	17
0-55	0-5	ATE 55-5M	15
0-55	0-5	JQE 55-5M	17
0-55	0-10	ATE 55-10M	15
0-55	0-10	JQE 55-10M	17
0-55	0-20	ATE 55-20M	15
0-55	0-20	JQE 55-20M	17
0-72	0-0.3	CC 72-0.3	18
0-72	0-0.3	PAT 72-0.3	14
0-72	0-0.3	PCX 72-0.3MAT	18
0-72	0-0.8	PTR 72-0.8	14
+72 to −72	+3 to −3	BOP 72-3M	16
+72 to −72	+6 to −6	BOP 72-6M	16
0-75	0-0.7	ATE 75-0.7M	15
0-75	0-1.5	ATE 75-1.5M	15
0-75	0-1.5	JQE 75-1.5M	17
0-75	0-3	ATE 75-3M	15
0-75	0-3	JQE 75-3M	17
0-75	0-8	ATE 75-8M	15
0-75	0-8	JQE 75-8M	17
0-75	0-15	ATE 75-15M	15
0-75	0-15	JQE 75-15M	17
0-100	0-0.2	CC 100-0.2	18
0-100	0-0.2	PAT 100-0.2	14
0-100	0-0.2	PCX 100-0.2MAT	18
0-100	0-0.5	ATE 100-0.5M	15
0-100	0-0.6	PTR 100-0.6	14
0-100	0-1	ATE 100-1M	15
0-100	0-1	JQE 100-1M	17
+100 to −100	+1 to −1	BOP 100-1M	16
+100 to −100	+2 to −2	BOP 100-2M	16
+100 to −100	+4 to −4	BOP 100-4M	16
0-100	0-2.5	ATE 100-2.5M	15
0-100	0-2.5	JQE 100-2.5M	17
0-100	0-5	ATE 100-5M	15
0-100	0-5	JQE 100-5M	17
0-100	0-10	ATE 100-10M	15
0-100	0-10	JQE 100-10M	17
120(2)	0-0.5(2)	PRM 120-0.5	14
120	0-1	PRM 120-1	14
120	0-1.5	PRM 120-1.5	14
120	0-2.4	PRM 120-2.4	14
0-150	0-0.3	ATE 150-0.3M	15
0-150	0-0.7	ATE 150-0.7M	15
0-150	0-1.5	ATE 150-1.5M	15
0-150	0-1.5	JQE 150-1.5M	17
0-150	0-3.5	ATE 150-3.5M	15
0-150	0-3.5	JQE 150-3.5M	17
0-150	0-7	ATE 150-7M	15
0-150	0-7	JQE 150-7M	17
0-200	0-0.01	NTC-200	18
240(2)	0-0.25(2)	PRM 240-0.25	14
0-325	0-0.4	HB 4AM	19
0-325	0-0.8	HB 8AM	19
0-325	0-0.8	ATE 325-0.8M	15
0-500	0-0.4	APH 500M	20
0-500	0-0.4	OPS 500B	21
+500 to −500	+0.08 to −0.08	BOP 500M	19
0-500	0-0.4	BHK 500-0.4M	20
0-525	0-0.5	HB 525M	19
0-1000	0-0.02	APH 1000M	20
0-1000	0-0.02	OPS 1000B	21
+1000 to −1000	+0.04 to −0.04	BOP 1000M	19
0-1000	0-0.2	BHK 1000-0.2M	20
0-2000	0-0.001	NTC-2000	18
0-2000	0-0.01	APH 2000M	20
0-2000	0-0.01	OPS 2000B	21
0-2000	0-0.1	BHK 2000-0.1M	20
0-3500	0-0.01	OPS 3500	21
0-5000	0-0.005	OPS 5000	21

(1) +50°C current rating (2) Nominal output. Contains taps for two settings higher and two settings lower (3) +40° current rating

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KEPCO® THE POWER SUPPLIER™

INDEX

MULTI OUTPUT POWER SUPPLIES

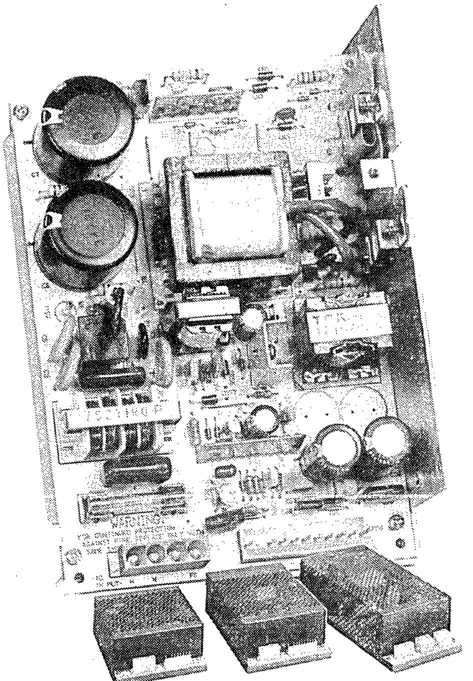
OUTPUT #1		OUTPUT #2		OUTPUT #3		OUTPUT #4		MODEL	PAGE
VOLTS	AMPS(1)	VOLTS	AMPS(1)	VOLTS	AMPS(1)	VOLTS	AMPS(1)		
+3.5-5.5	0-6	+12	0.4	−12	0-0.4			RMT 021-SA	9
+3.5-5.5	0-6	+15	0.4	−15	0-0.4			RMT 022-SA	9
+3.5-5.5	0-6	+12	0.4	− 5	0-0.4			RMT 023-SA	9
+3.5-5.5	0-6	+15	0.4	− 5	0-0.4			RMT 024-SA	9
+3.5-5.5	0-6	+12	0.4	−9	0-0.4			RMT 025-SA	9
+4.5-5.5	0-10	+12	0-1	−12	0-1			RDT 001-AA-24	9
+4.5-5.5	0-10	+15	0-1	−15	0-1			RDT 002-AA-24	9
+4.5-5.5	0-10	+12	0-1	−12	0-1			RDT 001-AA-48	9
+4.5-5.5	0-10	+15	0-1	−15	0-1			RDT 002-AA-48	9
+4.5-5.5	0-10	+12	0-1	−12	0-1			RMT 001-AA	9
+4.5-5.5	0-10	+15	0-1	−15	0-1			RMT 002-AA	9
+4.5-5.5	0-10	+12	0-1	− 5	0-1			RMT 003-AA	9
+4.5-5.5	0-10	+15	0-1	− 5	0-1			RMT 004-AA	9
+4.5-5.5	0-10	+12	0-1	− 9	0-1			RMT 005-AA	9
+4.5-5.5	0-20	12	0-2	12	0-2			RXT 051-C	9
+4.5-5.5	0-20	15	0-1.6	15	0-1.6			RXT 052-C	9
+4.5-5.5	0-20	12	0-2	5	0-5			RXT 053-C	9
+ 5	1.0-3.0	+12	0.0-0.3	−12	0.0-0.3			EMR 100K	7
+ 5	1.0-3.0	+12	0.4-2.0	−12	0.0-0.3			EMR 200K	7
+ 5	2.0-6.0	+12	0.2-1.0	−12	0.2-1.0			EMR 300K	7
+ 5	2.0-4.0	+12	0.1-0.5	−12	0.0-0.3	+24	0.2-1.0	EMR 400K	7
+ 5	2.0-5.0	+12	0.4-2.3	−12	0.0-0.3	+24	0.2-1.0	EMR 500K	7
+ 5	0.45-2.5	+12	0.3-2.0	−12	0.0-0.1			MRM 144K	6
+ 5	0.45-2.5	+12	0.3-2.0	−12	0.0-0.1			MRM 144KV	6
+ 5	0.45-2.5	+12	0.3-2.0	−12	0.0-0.1			MRM 146K	6
+ 5	0.75-3.0	−12	0.04-0.17	+24	0.0-2.2			MRM 147K/KB	6
+ 5	2.0-5.0	+12	0.5-1.8	+12	0.5-2.0	−12	0.25-0.5	MRM 174K/KF	6
+ 5	0.13-2.2	− 5	0.08-0.14	+24	0.0-1.3			MRM 183K	6
+ 5	2.0-6.0	+12	0.5-3.0	−12	0-1	− 5	0-0.5	MRM 250KV	6
+ 5	3.0-8.0	+12	0.5-3.0	−12	0-0.7	− 5	0-0.3	MRM 260KV	6
+ 5	3.0-15	+12	0.5-5.0	−12	0-0.7	− 5	0-0.3	MRM 270KV	6
+ 5	3.0-11	+12	0.5-5.0	+24	0.3-1.3	−12	0-0.5	MRM 280KV	6
+ 5	0-6	+12	0-1	−12	0-1	+24	0-0.2	EFX 050T-1	7
+ 5	0-6	+15	0-1	−15	0-1	+24	0-0.2	EFX 050T-2	7
+ 5	0-6	+12	0-1	−12	0-1	− 5	0-0.8	EFX 050T-3	7
+ 5	0-6	+15	0-1	−15	0-1	− 5	0-0.8	EFX 050T-4	7
+ 5	0-8	+12	0-2	−12	0-2	+24	0-0.5	EFX 100T-1	7
+ 5	0-8	+15	0-1.6	−15	0-1.6	+24	0-0.5	EFX 100T-2	7
+ 5	0-8	+12	0-2	−12	0-2	− 5	0-1.6	EFX 100T-3	7
+ 5	0-8	+15	0-1.6	−15	0-1.6	− 5	0-1.5	EFX 100T-4	7
+ 5	0-8	+12	0-3.5	−12	0-0.5	+24	0-0.5	EFX 100T-5	7
+ 5	0-8	+12	0-2.8	−12	0-0.5	+12	0-1.8	EFX 100T-6	7
+ 5	0-15	+12	0-2.5	−12	0-2.5	+24	0-1	EFX 150T-1	7
+ 5	0-15	+15	0-2	−15	0-2	+24	0-1	EFX 150T-2	7
+ 5	0-15	+12	0-2.5	−12	0-2.5	− 5	0-2	EFX 150T-3	7
+ 5	0-15	+15	0-2	−15	0-2	− 5	0-2	EFX 150T-4	7
+ 5	0-20	+12	0-4	−12	0-4	+24	0-1	EFX 210T-1	7
+ 5	0-20	+15	0-3	−15	0-3	+24	0-1	EFX 210T-2	7
+ 5	0-20	+12	0-4	−12	0-4	− 5	0-2	EFX 210T-3	7
+ 5	0-20	+15	0-3	−15	0-3	− 5	0-2	EFX 210T-4	7
0-6	0-5	0 to +20	0-1	0 to −20	0-1			MPS 620M	18
+12	0-0.5	−12	0-0.5					CMP 01-H	9
+12	0-0.5	− 5	0-0.5					CMP 03-H	9
+12	0-0.5	− 9	0-0.5					CMP 05-H	9
+12	0-12	12	0-12					PRM 2x12-12	14
+15	0-0.4	−15	0-0.4					CMP 02-H	9
+15	0-0.4	− 5	0-0.5					CMP 04-H	9
+15	0-10	15	0-10					PRM 2x15-10	14
+24	0-6	24	0-6					PRM 2x24-6	14
+60	0-2.5	60	0-2.5					PRM 2x60-2.5	14

KEPCO® THE POWER SUPPLIER™

KEPCO/TDK OEM SWITCHING MODULES

High Frequency, High Efficiency Power Supplies with Built-In Overvoltage Protector and Current Limiter

WORLD POWER™ ERX™ SINGLE OUTPUT



CA15 CA16 CA17

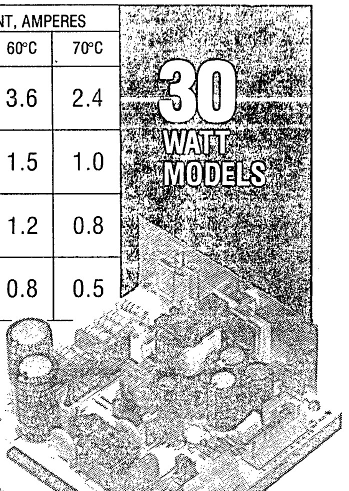
OPTIONAL STEEL ENCLOSURES

This series introduces a whole new generation of cost-effective switchers meeting the highest international safety and EMI standards at remarkably low prices. A built-in filter attenuates conducted EMI below FCC 20780, Class B, and VDE 0871. Optional enclosure reduces radiated EMI below VDE 0875/7.1, level N.

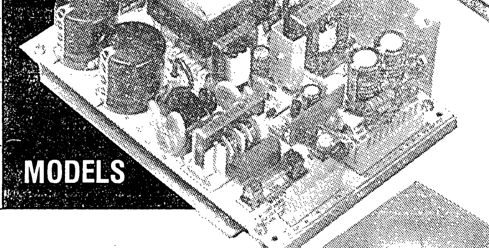
All models are "SELV" per the spacings and hi-pot requirements of VDE 0806 and IEC-380 (certified by TÜV Rheinland), and also meet the requirements of UL478 and CSA C22.2-154. The spacing, even with the larger transformer needed to meet these requirements, has been achieved through the use of two custom hybrid microcircuits. These also reduce the number of parts on the board, resulting in a clean, uncluttered layout, and greatly extended reliability.

The series consist of 12 models: 5V, 12V, 15V, and 24V models in three sizes, 30 Watts, 60 Watts, and 120 Watts. They provide well-stabilized, adjustable d-c outputs, protected by a current limiter and overvoltage protector, with remote error sensing available to compensate for the connecting wire's voltage loss.

MODEL	OUTPUT VOLTS	ADJUSTMENT RANGE	OUTPUT CURRENT, AMPERES			
			40°C	50°C	60°C	70°C
ERX 5-6	5	4.5-5.5	6	4.8	3.6	2.4
ERX 12-2.5	12	10.8-13.2	2.5	2.0	1.5	1.0
ERX 15-2	15	13.5-16.5	2.0	1.6	1.2	0.8
ERX 24-1.3	24	21.6-26.4	1.3	1.0	0.8	0.5

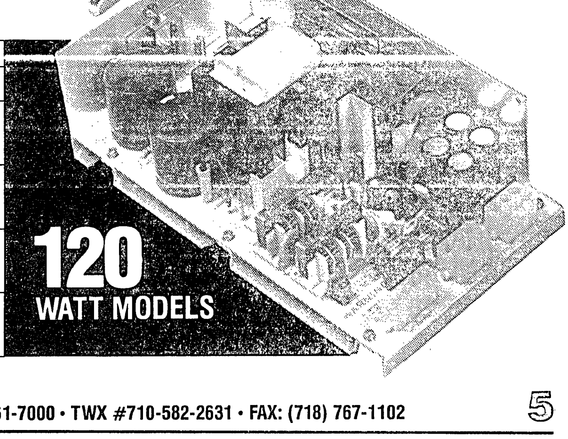


MODEL	OUTPUT VOLTS	ADJUSTMENT RANGE	OUTPUT CURRENT, AMPERES			
			40°C	50°C	60°C	70°C
ERX 5-12	5	4.0-5.5	12	9.6	7.2	4.8
ERX 12-5	12	8.4-13.2	5.0	4.0	3.0	2.0
ERX 15-4	15	10.5-16.5	4.0	3.2	2.4	1.6
ERX 24-2.5	24	16.8-26.4	2.5	2.0	1.5	1.0



This KEPCO product is backed by a firm **1-YEAR WARRANTY**

MODEL	OUTPUT VOLTS	ADJUSTMENT RANGE	OUTPUT CURRENT, AMPERES			
			40°C	50°C	60°C	70°C
ERX 5-24	5	4.0-5.5	24.0	19.2	14.4	9.6
ERX 12-10	12	8.4-13.2	10.0	8.0	6.0	4.0
ERX 15-8	15	10.5-16.5	8.0	6.4	4.8	3.2
ERX 24-5	24	16.8-26.4	5.0	4.0	3.0	2.0



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KEPCO® THE POWER SUPPLIER™

KEPCO/TDK OEM SWITCHING MODULES

High Frequency, High Efficiency Power Supplies with Built-In Overvoltage Protector and Current Limiter

MRM™ TRIPLE AND QUADRUPLE OUTPUT

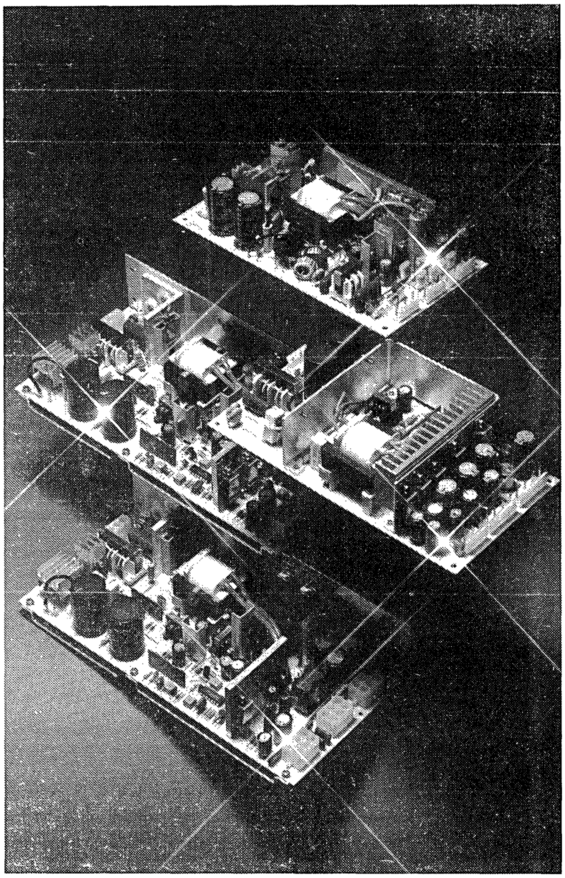
This series of printed-card style switching power supplies produce multiple outputs to meet, in various combinations, the logic, display, serial output, and disk drive needs of CRT terminals, microcomputers, and video games.

All members of the series have built-in filtering which meets FCC/VDE conducted EMI specs class B (except MRM 147K, Class A). All are UL recognized and CSA certified.

MRM 144KV, and the series' newest members, MRM 250KV, 260KV, 270KV, and 280KV, additionally meet the safety requirements of an SELV power supply per VDE 0806 and IEC 380. All have been certified by TÜV Rheinland.

MRM 250KV and MRM 260KV, both FET-based flyback converters, and MRM 270KV and 280KV, both FET-based forward converters, all operate over 100 KHz.

A special feature of the MRM 174K is a circuit to minimize transient disturbances on the + 12V output being used to power the video display. Such disturbances normally occur when other outputs undergo load change, as when a r/w head starts seeking. Also, the source frequency component of the ripple in the CRT's + 12V output is held below 4mV p-p to minimize interaction with the vertical rate of a CRT display.



MRM 144K, 144KV, 146K	40W
Output #1	+ 5V/0.45 to 2.5A (5.0 max)
Output #2	+12V/0.3 to 2.0A (2.5 max)
Output #3	−12V/0.0 to 0.1A (0.5 max)

MRM 147K	70W
Output #1	+ 5V/0.75 to 3.0A (6.6A peak)
Output #2	−12V/0.04 to 0.17A (0.37A peak)
Output #3	+24V/0.0 to 2.2A (3.3A peak)

MRM 174K	75W
Output #1	+ 5V/2.0 to 5.0A
Output #2	+12V/0.5 to 1.8A (2.8 peak)
Output #3	+12V/0.5 to 2.0A
Output #4	−12V/0.25 to 0.5A

MRM 183K	43W
Output #1	+ 5V/0.13 to 2.2A
Output #2	− 5V/0.08 to 0.14A
Output #3	+24V/0.0 to 1.3A (1.7A peak)

NEW

MRM 250KV	60W
Output #1	+5V/2.0 to 6.0A[(1)]
Output #2	+12V/0.5 to 3.0A[(1)]
Output #3	−12V/0.0 to 1.0A
Output #4	−5V/0.0 to 0.5A

MRM 260KV	80W
Output #1	+ 5V/3.0-8.0A
Output #2	+12V/0.5-3.0
Output #3	−12V/0-0.7A
Output #4	− 5V/0-0.3A

MRM 270KV	120W
Output #1	+ 5V/3.0-15A
Output #2	+12V/0.5-5.0A
Output #3	−12V/0-0.7A
Output #4	− 5V/0-0.3A

MRM 280KV	120W
Output #1	+ 5V/3.0-11A
Output #2	+12V/0.5-5.0A
Output #3	+24V/0.3-1.3A
Output #4	−12V/0-0.5A

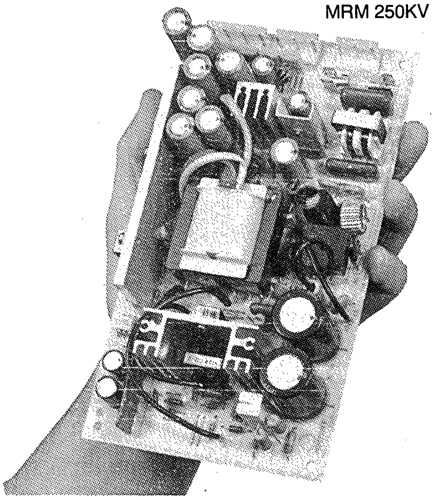
(1) Max current #1 and #2 is 8.0A

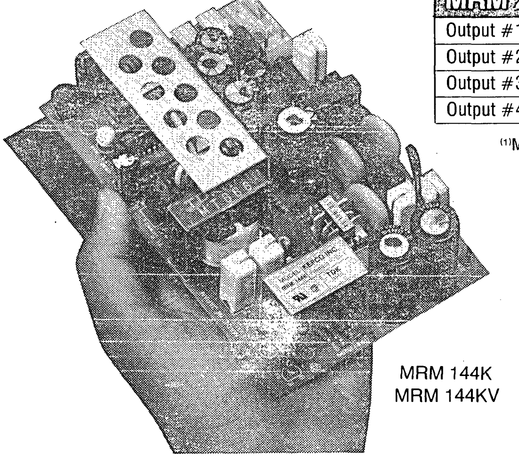
CSA CERTIFIED

UL RECOGNIZED

RHEINLAND

MRM 250KV





MRM 144K
MRM 144KV

1 This KEPCO product is backed by a firm **1-YEAR WARRANTY**

6

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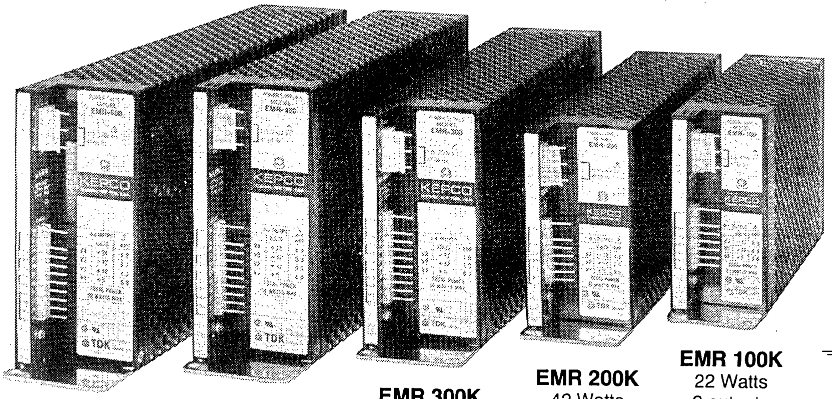
KEPCO® **THE POWER SUPPLIER**™

KEPCO/TDK OEM SWITCHING MODULES

High Frequency, High Efficiency Power Supplies with Built-In Overvoltage Protector and Current Limiter

EMR™ TRIPLE AND QUADRUPLE OUTPUT


EMR 500K
80 Watts
4 outputs

EMR 400K
53 Watts 4 outputs

EMR 300K
54 Watts
3 outputs

EMR 200K
42 Watts
3 outputs

EMR 100K
22 Watts
3 outputs

UL RECOGNIZED

CSA CERTIFIED

This KEPCO product is backed by a firm **1-YEAR WARRANTY**

These new high-quality multi-output fully enclosed and shielded power supplies are priced well below many competitive open frame designs. This is due to the computer-aided design of these units, and to the extensive use of proprietary TDK hybrid microcircuits, which dramatically reduce the parts population of the boards.

The five EMR models range from a 3-output 22-Watt model for logic circuits, through a 4-output 80-Watt model with sufficient 24V power to run an 8″ floppy disk drive.

EMR 100K (22W)	Output #1	+ 5V/1.0 to 3.0A
	Output #2	+12V/0.0 to 0.3A
	Output #3	−12V/0.0 to 0.3A

EMR 200K (42W)	Output #1	+ 5V/1.0 to 3.0A
	Output #2	+12V/0.4 to 2.0A
	Output #3	−12V/0.0 to 0.3A

EMR 300K (54W)	Output #1	+ 5V/2.0 to 6.0A
	Output #2	+12V/0.2 to 1.0A
	Output #3	−12V/0.2 to 1.0A

EMR 400K (53W)	Output #1	+ 5V/2.0 to 4.0A
	Output #2	+12V/0.1 to 0.5A
	Output #3	−12V/0.0 to 0.3A
	Output #4	+24V/0.2 to 1.0A

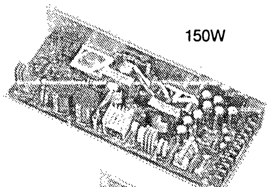
EMR 500K (80W)	Output #1	+ 5V/2.0 to 5.0A
	Output #2	+12V/0.4 to 2.3A
	Output #3	−12V/0.0 to 0.3A
	Output #4	+24V/0.2 to 1.0A

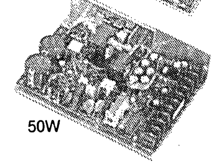
EFX™ QUADRUPLE OUTPUT

UL RECOGNIZED

CSA CERTIFIED

Four convenient sizes: 50 Watts, 100 Watts, 150 Watts and 210 Watts. Each available in a variety of popular volt-ampere combinations. Custom combinations are also available to your order.


150W


50W

SIZE	DIMENSIONS	NET WGT.	SHIP WGT.
50W	7.25″W x 5.00″D x 2.00″H	1.6 lbs.	3.0 lbs.
100W	9.50″W x 5.00″D x 2.00″H	2.4 lbs.	3.5 lbs.
150W	13.40″W x 5.00″D x 2.52″H	3.5 lbs.	4.5 lbs.
210W	15.00″W x 5.00″D x 2.52″H	4.8 lbs.	6.0 lbs.

50 WATTS

	AMPERES OUTPUT CURRENT AT 50°C					
MODEL	+5 VOLTS	−5 VOLTS	+12 (15) VOLTS	+12 VOLTS	−12 (15) VOLTS	+24 VOLTS
EFX 050T-1	6.0 Typ. 7.2 Max.	—	1.0 Typ. 1.5 Max.	—	1.0 Typ. 1.5 Max.	0.2 Typ. 0.3 Max.
EFX 050T-2	6.0 Typ. 7.2 Max.	—	(1.0 Typ.) (1.2 Max.)	—	(1.0 Typ.) (1.2 Max.)	0.2 Typ. 0.3 Max.
EFX 050T-3	6.0 Typ. 7.2 Max.	0.8 Typ. 1.2 Max.	1.0 Typ. 1.5 Max.	—	1.0 Typ. 1.5 Max.	—
EFX 050T-4	6.0 Typ. 7.2 Max.	0.8 Typ. 1.2 Max.	(1.0 Typ.) (1.2 Max.)	—	(1.0 Typ.) (1.2 Max.)	—
100 WATTS						
EFX 100T-1	8.0 Typ. 9.6 Max.	—	2.0 Typ. 3.0 Max.	—	2.0 Typ. 3.0 Max.	0.5 Typ. 0.75 Max.
EFX 100T-2	8.0 Typ. 9.6 Max.	—	(1.6 Typ.) (2.4 Max.)	—	(1.6 Typ.) (2.4 Max.)	0.5 Typ. 0.75 Max.
EFX 100T-3	8.0 Typ. 9.6 Max.	1.5 Typ. 2.25 Max.	2.0 Typ. 3.0 Max.	—	2.0 Typ. 3.0 Max.	—
EFX 100T-4	8.0 Typ. 9.6 Max.	1.5 Typ. 2.25 Max.	(1.6 Typ.) (2.4 Max.)	—	(1.6 Typ.) (2.4 Max.)	—
EFX 100T-5	8.0 Typ. 9.6 Max.	—	3.5 Typ. 5.0 Max.	—	0.5 Typ. 0.75 Max.	0.5 Typ. 0.75 Max.
EFX 100T-6	8.0 Typ. 9.6 Max.	—	2.8 Typ. 4.0 Max.	1.8 Typ. 2.7 Max.	0.5 Typ. 0.75 Max.	—
150 WATTS						
EFX 150T-1	15.0 Typ. 18.0 Max.	—	2.5 Typ. 3.75 Max.	—	2.5 Typ. 3.75 Max.	1.0 Typ. 1.5 Max.
EFX 150T-2	15.0 Typ. 18.0 Max.	—	(2.0 Typ.) (3.0 Max.)	—	(2.0 Typ.) (3.0 Max.)	1.0 Typ. 1.5 Max.
EFX 150T-3	15.0 Typ. 18.0 Max.	2.0 Typ. 3.0 Max.	2.5 Typ. 3.75 Max.	—	2.5 Typ. 3.75 Max.	—
EFX 150T-4	15.0 Typ. 18.0 Max.	2.0 Typ. 3.0 Max.	(2.0 Typ.) (3.0 Max.)	—	(2.0 Typ.) (3.0 Max.)	—
210 WATTS						
EFX 210T-1	20.0 Max.	—	4.0 Max.	—	4.0 Max.	1.0 Max.
EFX 210T-2	20.0 Max.	—	(3.0 Max.)	—	(3.0 Max.)	1.0 Max.
EFX 210T-3	20.0 Max.	2.0 Max.	4.0 Max.	—	4.0 Max.	—
EFX 210T-4	20.0 Max.	2.0 Max.	(3.0 Max.)	—	(3.0 Max.)	—

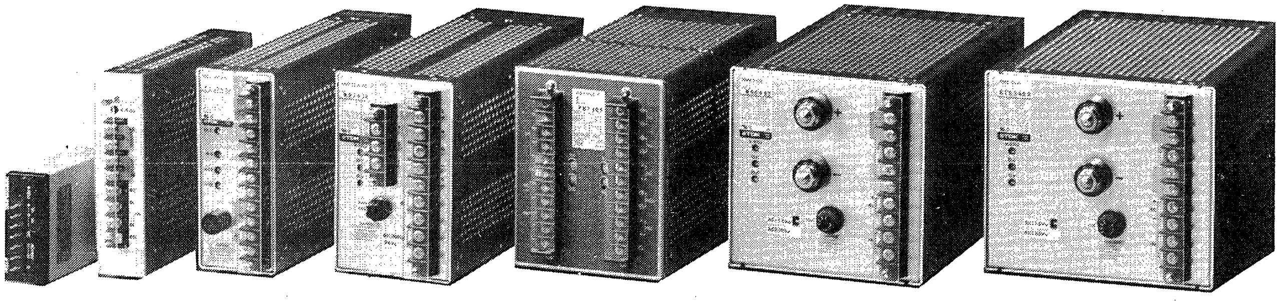
KEPCO, INC. • 131-38 SANFORD AVENUE, FLUSHING, NY 11352 USA • (718) 461-7000 • TWX #710-582-2631 • FAX: (718) 767-1102

KEPCO® THE POWER SUPPLIER™

OEM SWITCHING MODULES

High Frequency, High Efficiency Power Supplies with Built-In Overvoltage Protector and Current Limiter

R-Series enclosed and shielded heavy duty switchers offering control features essential for demanding industrial applications.



- **Overvoltage Sensor.** Turns off power transfer oscillator whenever the output voltage tries to exceed a safe threshold (adjustable in many single-output models).
- **Energy Storage.** Big input capacitors store enough energy to continue producing full output many milliseconds after you've pulled the plug (or the utility has).
- **Remote Error Sensing.** Allows Kepco's switchers to ignore the effect of load wire's resistance, up to 0.25V per lead.
- **Adjustable, Rectangular Type Current Limiting.** *Rectangular,* so you can drive loads like motors and capacitors, without their high initial turn-on surge causing your power supply to "lock out", the way foldback limiters tend to. *Adjustable* in many models, so you can tailor it to your load's requirements.
- **Soft Start.** A triac controlled limiter reduces the a-c input current at initial turn-on to safe limits.
- **Adjustable Outputs.** Typically −30% to +10% of nominal. If you place an adjustable resistor in series with the power supply's *plus* remote error sensing, you can even trim the voltage remotely!
- **Remote On-Off Programming.** Reduces the turn-on surge to zero (just turn the oscillator on and off with a simple switch, relay, or TTL logic signal).
- **Multiple Inputs.** A simple jumper (or plug) switches most models between 115 and 230V a-c. Most models have both a-c and d-c inputs (typically 290V d-c).

All Kepco/TDK switchers are machine assembled for economy, use TDK ferrite cores for cool operation, and have low parts counts for high reliability.

This KEPCO product is backed by a firm **5-YEAR WARRANTY**

CSA CERTIFIED

UL RECOGNIZED

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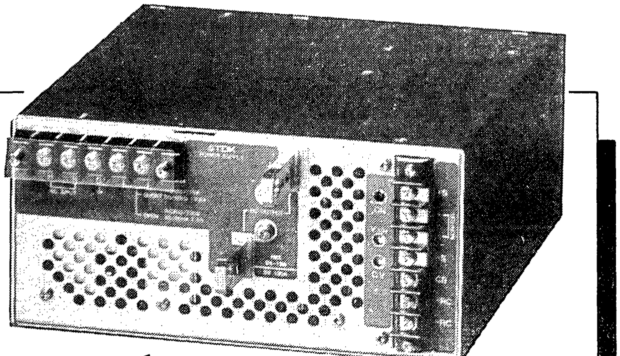

NEW

RBX™

KEPCO/TDK 600-Watt, 150KHz Switching Power Supply Series RBX

This brand new product of advanced Kepco/TDK technology squeezes more power into less space at a lower price than you'll find anywhere else today.

It's a highly efficient, FET-based switcher with a 150KHz oscillator operating a push-pull circuit.

It also gives you remote on/off, remote voltage control, remote error sensing, adjustable overvoltage protection, current limiting, an "output OK" LED, 115/230 selectable input, and a current balance circuit which lets you parallel three units and have them share the load.

240 and 600 Watt output, 115/230V selectable input

MODEL	RBX 02-120K	RBX 05-120K	RBX 24-25K
Volts	2V	5V	24V
Adjustment	1.6-2.2V	4.0-5.5V	19.0-26.5V
Amps	0-120A	0-120A	0-25A
OVP	2.6-2.8V	6.0-6.5V	27-27.5V
Current limit	125-145A	125-145A	26-30A

Size: 3.74" H x 7.87" W x 8.66" D **Wgt:** 9.25 lbs.

SINGLE OUTPUT A-C TO D-C VOLTAGE STABILIZERS

MP™

10 Watt output, 115V a-c input

MODEL	VOLTS	AMPS at 50°C
MP 05-H	4.5-5.5V	2.0
MP 09-H	8.0-10.0V	1.1
MP 12-H	10.8-13.2V	1.0
MP 15-H	13.5-16.5V	0.8

Size H: 1.18" H x 2.76" W x 3.75" D
Wgt: 9 ounces

RMK™

30 Watt output, 115V, a-c input

MODEL	VOLTS	AMPS at 50°C
RMK 05-S	3.5-5.5	6.0
RMK 09-S	6.3-9.9	3.3
RMK 12-S	8.4-13.2	2.5
RMK 15-S	10.5-16.5	2.0
RMK 24-S	16.8-26.4	1.3

Size S: 5.12" H x 1.38" W x 5.75" D
Wgt: 1.4 lbs.

RMX™

50 to 300 Watt output, 115/230V selectable input

MODEL	VOLTS	AMPS at 50°C
RMX 05-A	3.5-5.5	10.0
RMX 09-A	6.3-9.9	6.0
RMX 12-A	8.4-13.2	5.0
RMX 15-A	10.5-16.5	4.0
RMX 24-A	16.8-26.4	2.5
RMX 28-A	19.6-30.8	2.15

Size A: 5.12" H x 2.17" W x 7.52" D
Wgt: 3.1 lbs.

MODEL	VOLTS	AMPS at 50°C
RMX 05-B	3.5-5.5	26.0
RMX 09-B	6.3-9.9	15.0
RMX 12-B	8.4-13.2	12.0
RMX 15-B	10.5-16.5	10.2
RMX 24-B	16.8-26.4	7.5
RMX 28-B	19.6-30.8	6.4

Size B: 5.12" H x 3.27" W x 8.82" D
Wgt: 4.85 lbs.

MODEL	VOLTS	AMPS at 50°C
RMX 05-C	3.5-5.5	30.0
RMX 09-C	6.3-9.9	17.2
RMX 12-C	8.4-13.2	14.6
RMX 15-C	10.5-16.5	12.3
RMX 24-C	16.8-26.4	8.0
RMX 28-C	19.6-30.8	6.8

Size C: 5.12" H x 4.06" W x 8.82" D
Wgt: 5.25 lbs.

MODEL	VOLTS	AMPS at 50°C
RMX 05-N	3.5-5.5	45.0
RMX 09-N	6.3-9.9	25.0
RMX 12-N	8.4-13.2	19.0
RMX 15-N	10.5-16.5	15.0
RMX 24-N	16.8-26.4	9.5
RMX 28-N	19.6-30.8	8.0

Size N: 5.12" H x 5.24" W x 8.82" D
Wgt: 8.4 lbs.

MODEL	VOLTS	AMPS at 50°C
RMX 05-D	3.5-5.5	60.0
RMX 09-D	6.3-9.9	32.0
RMX 12-D	8.4-13.2	27.0
RMX 15-D	10.5-16.5	23.0
RMX 24-D	16.8-26.4	16.0
RMX 28-D	19.6-30.8	13.7

Size D: 5.12" H x 6.02" W x 8.82" D
Wgt: 9.0 lbs.

CSA CERTIFIED UL RECOGNIZED

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5-YEAR WARRANTY

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High Frequency, High Efficiency Power Supplies with Built-In Overvoltage Protector and Current Limiter

R-Series enclosed and shielded heavy duty switchers offering control features essential for demanding industrial applications.

SINGLE OUTPUT D-C TO D-C CONVERTERS

RMD™

30 to 300 Watt output,
12V, 24V, 48V & 110V d-c inputs

12V d-c input

MODEL	VOLTS	AMPS at 50°C
RMD 05-SA-12	3.5-5.5	6.0
RMD 09-SA-12	6.3-9.9	3.3
RMD 12-SA-12	8.4-13.2	2.5
RMD 15-SA-12	10.5-16.5	2.0
RMD 24-SA-12	16.8-26.4	1.3
RMD 28-SA-12	19.6-30.8	1.1

Size SA: 5.12″ H x 1.38″ W x 6.97″ D
Wgt: 1.8 lbs.

12V d-c input

MODEL	VOLTS	AMPS at 50°C
RMD 05-AA-12	3.5-5.5	10.0
RMD 09-AA-12	6.3-9.9	6.0
RMD 12-AA-12	8.4-13.2	5.0
RMD 15-AA-12	10.5-16.5	4.0
RMD 24-AA-12	16.8-26.4	2.5
RMD 28-AA-12	19.6-30.8	2.15

Size AA: 5.12″ H x 2.17″ W x 8.82″ D
Wgt: 3.3 lbs.

24V d-c input	48V d-c input	110V d-c input		
MODEL	MODEL	MODEL	VOLTS	AMPS at 50°C
RMD 05-A-24	RMD 05-A-48	RMD 05-A-110	3.5-5.5	10.0
RMD 09-A-24	RMD 09-A-48	——	6.3-9.9	6.0
RMD 12-A-24	RMD 12-A-48	——	8.4-13.2	5.0
RMD 15-A-24	RMD 15-A-48	RMD 15-A-110	10.5-16.5	4.0
RMD 24-A-24	RMD 24-A-48	RMD 24-A-110	16.8-26.4	2.5
RMD 28-A-24	RMD 28-A-48	——	19.6-30.8	2.1

Size A: 5.12″ H x 2.17″ W x 7.52″ D **Wgt:** 3.1 lbs.

24V d-c input	48V d-c input	110V d-c input		
MODEL	MODEL	MODEL	VOLTS	AMPS at 50°C
RMD 05-B-24	RMD 05-B-48	RMD 05-B-110	3.5-5.5	26.0
RMD 09-B-24	RMD 09-B-48	——	6.3-9.9	15.0
RMD 12-B-24	RMD 12-B-48	——	8.4-13.2	12.0
RMD 15-B-24	RMD 15-B-48	RMD 15-B-110	10.5-16.5	10.2
RMD 24-B-24	RMD 24-B-48	RMD 24-B-110	16.8-26.4	7.5
RMD 28-B-24	RMD 28-B-48	——	19.6-30.8	6.4

Size B: 5.12″ H x 3.27″ W x 8.82″ D **Wgt:** 4.85 lbs.

48V d-c input			110V d-c input		
MODEL	VOLTS	AMPS at 50°C	MODEL	VOLTS	AMPS at 50°C
RMD 05-D-48	3.5-5.5	50.0	RMD 05-D-110	3.5-5.5	60.0
RMD 09-D-48	6.3-9.9	28.0	——	—	—
RMD 12-D-48	8.4-13.2	21.0	——	—	—
RMD 15-D-48	10.5-16.5	17.0	RMD 15-D-110	10.5-16.5	23.0
RMD 24-D-48	16.8-26.4	10.5	RMD 24-D-110	16.8-26.4	16.0
RMD 28-D-48	19.6-30.8	9.0	——	—	—

Size D: 5.12″ H x 6.02″ W x 8.82″ D **Wgt:** 9.0 lbs.

MULTI OUTPUT A-C TO D-C VOLTAGE STABILIZERS

CMP™

10 Watt output, 115V a-c input
Size H: 1.18″ H x 2.76″ W x 3.75″D **Wgt:** 9 ounces

MODEL	OUTPUT #1 VOLTS	OUTPUT #1 AMPS	OUTPUT #2 VOLTS	OUTPUT #2 AMPS
CMP 01-H	+(10.8-13.2)	0.5A	−(10.8-13.2)	0.5A
CMP 02-H	+(13.5-16.5)	0.4A	−(13.5-16.5)	0.4A
CMP 03-H	+(10.8-13.2)	0.5A	−(4.5-5.5)	0.5A
CMP 04-H	+(13.5-16.5)	0.4A	−(4.5-5.5)	0.5A
CMP 05-H	+(10.8-13.2)	0.5A	−(8.1-9.9)	0.5A

50°C ratings.

RMT™

40 to 70 Watt output, 115V a-c input
Size SA: 5.12″ H x 1.38″ W x 6.97″ D **Wgt:** 1.8 lbs.

MODEL	PRINCIPAL OUTPUT #1 VOLTS	PRINCIPAL OUTPUT #1 AMPS	AUXILIARY OUTPUT #2 VOLTS	AUXILIARY OUTPUT #2 AMPS	AUXILIARY OUTPUT #3 VOLTS	AUXILIARY OUTPUT #3 AMPS
RMT 021-SA	+5	6	+12	0.4	−12	0.4
RMT 022-SA	+5	6	+15	0.4	−15	0.4
RMT 023-SA	+5	6	+12	0.4	− 5	0.4
RMT 024-SA	+5	6	+15	0.4	− 5	0.4
RMT 025-SA	+5	6	+12	0.4	− 9	0.4

50°C ratings. Input is 115V a-c only.

Size AA: 5.12″ H x 2.17″ W x 8.82″ D **Wgt:** 3.3 lbs.

RMT 001-AA(1)	+5	10	+12	1	−12	1
RMT 002-AA(1)	+5	10	+15	1	−15	1
RMT 003-AA(1)	+5	10	+12	1	− 5	1
RMT 004-AA(1)	+5	10	+15	1	− 5	1
RMT 005-AA(1)	+5	10	+12	1	− 9	1

(1) Std. input: 115V a-c, for 230V a-c input, add suffix "−230" to model number.
50°C ratings.

RXT™

150 Watt output, 115/230V a-c input
Size C: 5.12″ H x 4.06″ W x 8.82″ D **Wgt:** 6.4 lbs.

RXT 051-C	5	20	12	2.0	12	2.0
RXT 052-C	5	20	15	1.6	15	1.6
RXT 053-C	5	20	12	2.0	5	5.0

50°C ratings. Input is selectable 115/230V a-c.

MULTI OUTPUT D-C TO D-C CONVERTERS

RDT™

75 Watt output, 24V and 48V d-c input
Size AA: 5.12″ H x 2.17″ W x 8.82″ D **Wgt:** 3.3 lbs.

RDT 001-AA-24	+5	10	+12	1	−12	1
RDT 002-AA-24	+5	10	+15	1	−15	1
RDT 001-AA-48	+5	10	+12	1	−12	1
RDT 002-AA-48	+5	10	+15	1	−15	1

50°C ratings. Suffix "−24" input is 20-30V d-c. Suffix "−48" is 42-56V d-c.

CSA CERTIFIED

UL RECOGNIZED

This KEPCO product is backed by a firm
5-YEAR WARRANTY

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KEPCO® THE POWER SUPPLIER™

GENERAL SPECIFICATIONS AND FEATURES FOR SWITCHING POWER SUPPLIES

MODEL	INPUT Volts a-c	INPUT Volts d-c	EFFICIENCY Typical (%)	HOLDING TIME mSec.	SOFT START	REMOTE CONTROL	REMOTE ERROR SENSING Volts	RECOVERY CHARACTERISTICS mSec.	OVERVOLTAGE PROTECTION	CURRENT LIMIT	ISOLATION Input to Case KV a-c 1 min	ISOLATION Input to Output V d-c	ISOLATION Output to Case MΩ
SINGLE OUTPUT													
ERX	115/230	—	>70	>20	Yes	No	0.35	1	Fixed(1)	Rectangular Fixed	1.25 3.75	500	100
MP	115	—	>73	>7.5	No	No	NA	1	Zener Shunt	Rectangular Fixed	1.5	500	100
RBX	115/230	—	65-85	>30	Yes	Yes		300	Adjustable	Rectangular Adj.	2	500	50
RMD	—	12, 24, 48, 110	71-75	—	No	Yes	0.25(2)	1(3)	Adjustable	Rectangular Adj.	1.5	500	100
RMK	115	145	>73	>30	Yes	Yes	0.25	2	Fixed 120%	Rectangular Adj.	1.5	500	100
RMX	115/230	290	68-80	>30	Yes	Yes	0.25(2)	1	Adjustable	Rectangular Adj.	2.5	500	100
MULTI-OUTPUT													
CMP	115	—	>75	>7.5	No	No	NA	1	Zener Shunt	Rectangular Fixed	1.5	500	100
EFX	115/230	—	70-75	>20	Yes	No	NA	5	+5V fixed	Fixed 130%	2.5	500	100
EMR	115/230	—	66-78	>20	Yes	No	NA	2	+5V fixed	Rectangular Fixed(4)	1.5	500	100
MRM	115/230(5)	—	65-70	>16.8(6)	Yes	No	NA	—	+5V fixed(7)	Rectangular Fixed	1.5(8)	500	100
RMT-SA	115	145	>65	>20	Yes	No	NA	5	Fixed 120%(9)	5V: Adj.(10) Aux.: Fixed(11)	1.5	500	20
RMT-AA	115	145	>65	>20	Yes	Yes	0.25(3)	5	Fixed 120%(10)	5V: Adj.(10) Aux.: Fixed(10)	1.5	500	20
RMT-AA 230	230	290	>65	>20	Yes	Yes	0.25(3)	5	Fixed 120%(10)	5V: Adj.(10) Aux.: Fixed(10)	1.5	500	20
RXT	115/230	290	>75	>20	Yes	Yes	0.35	2	Fixed 120%(10)	5V: Adj.(10) Aux.: Fixed(10)	2.5	500	100
RDT	—	24, 48	>74	—	No	Yes	0.25	5	Fixed 120%(10)	5V: Adj.(10) Aux.: Fixed(10)	1.5	500	100

(1) OVP Settings:
5-Volt Models: 5.8~6.9V; 12-Volt Models: 13.7~15.7V;
15-Volt Models: 17.0~19.0V; 24-Volt Models: 27.0~30.5V.

(2) 0.35V/wire, Size C

(3) For Size A & AA; Size B is 2 mSec

(4) EMR 100K & EMR 200K: foldback

(5) MRM 146K & MRM 183K: 115V a-c only

(6) MRM 146K, 144K, & 144KV: 8.3 mSec

(7) MRM 260KV: +5V: adj. 5.7~7V; MRM 270KV & MRM 280KV: +5V: adj. 5.7~7V; +12V adj. 13.5~17V.

(8) MRM 144KV, MRM 250KV, MRM 260KV, MRM 270KV & MRM 280KV: 1.25/3.73

(9) For principal output only

(10) Rectangular characteristics

(11) Foldback characteristics

HOLDING TIME: The minimum time, in milliseconds, that the power supply will function, at full load, after loss of source power.

SOFT START: A surge limiting circuit is incorporated to limit the initial turn-on current. A separate logic-level on-off circuit is provided in many models for no-surge cycling. (See Remote Control).

REMOTE CONTROL: A TTL compatible logic level signal can be used to turn the power supply on and off. An internal pull-up resistor programs the power supply on in the absence of external signals. This can be used for sequencing and for no-surge cycling.

REMOTE ERROR SENSING: Separate terminals allow a 4-terminal connection between power supply and load. These connections can compensate for voltage drops in the connecting wires.

RECOVERY CHARACTERISTICS: The table lists the time for recovery to within 0.5% (or 0.05V) of the final output value following a step load change of either 50% to 100% or 100% to 50% of maximum (+50 °C) rated load.

OVERVOLTAGE PROTECTION: The tabulated overvoltage protector either shuts down the power supply at the O.V.P. voltage threshold or, in the case of the zener shunt-type, limits the maximum voltage.

CURRENT LIMIT: The rectangular shape of the current limit characteristic means these units may be connected in series or in parallel and may drive capacitive or non-linear loads without special precaution.

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KEPCO® THE POWER SUPPLIER™

STATIC SPECIFICATIONS FOR SWITCHING POWER SUPPLIES

MODEL			SOURCE EFFECT %	LOAD EFFECT % (10%–100%)	TEMPERATURE EFFECT % Coefficient per °C	TEMPERATURE EFFECT % Envelope 0–50 °C	COMBINED EFFECT % (For rated changes in source voltage, load current, and temperature)	TIME EFFECT (8-hour drift, with constant source voltage, load, and temperature)	OVERALL rms mV	RIPPLE AND NOISE		
										SOURCE COMPONENT p-p mV	SWITCHING COMPONENT p-p mV	SPIKE VOLTAGE to 10 MHz p-p mV
SINGLE OUTPUT												
ERX		Typ	0.6	0.6	—	1.0	2.2	0.1%	—	(1)	(2)	(3)
		Max	1.0	1.0	—	2.0	4.0	0.5%	—	(1)	(2)	(3)
MP		Typ	<0.1	<0.15	—	<1.0	<1.0	<0.02%	<7	<20	<50	—
		Max	0.2	0.3	—	1.5	1.5	0.1%	10	50	100	1% E_o + 50
RBX		Typ	<1.5	<1.0	<0.2	—	—	<0.1%	—	(4)	(4)	<150
		Max	<3.0	<2	<1.0	—	<2.7	<0.5%	—	(4)	(4)	<250
RMD		Typ	<0.4	<0.4	<0.01	<0.2	<1.0	<0.01%	<3	—	<50	—
		Max	0.8	0.8	0.05	0.6	2.2	0.05%	10	—	100	1% E_o + 50
RMK		Typ	<0.4	<0.4	<0.02	<0.6	<1.4	<0.02%	<7	<20	<30	<70
		Max	0.8	1.0	0.1	1.0	2.8	0.1%	10	50	70	1% E_o + 50
RMX		Typ	<0.3	<0.3	<0.02	<0.4	<1.0	<0.02%	<5	<10	<15	<50
		Max	0.6	0.6	0.1	0.8	2.0	0.1%	10	50	50	1% E_o + 50
MULTI-OUTPUT												
CMP	Outputs #1 and 2	Typ	<0.1	<0.15	—	<1.0	<1.0	<0.02%	<7	<20	<50	—
		Max	0.2	0.3	—	1.5	1.5	0.1%	10	50	100	1% E_0 +50
EFX	Output #1	Typ	<0.5	<0.5	—	<0.5	<1.0	<0.02%	—	<25	<50	—
		Max	1.0	1.0	—	1.0	3.0	0.1%	—	50	100	1% E_0 + 50
	Outputs #2, 3, 4	Typ	<0.5	<5.0	—	<0.5	<6.0	<0.02%	—	<25	<50	—
		Max	1.0	10.0	—	1.0	12.0	0.1%	—	50	100	1% E_0 + 50
EMR	+ 5V	Typ	—	—	—	—	—	—	—	—	<50	—
		Max	1.0-1.5	1.5-6	—	<3.0	< ±3.0	<0.5%	—	—	<100	2% E_0 + 50
	AUX	Typ	—	—	—	—	< ±5.0	—	—	—	<50	—
		Max	1.0-1.5	1.5-6	—	<3.0	< ±7.0	<0.5%	—	—	<200	2% E_0 + 50
MRM	+ 5V	Typ	<0.2-0.5	<0.1-2.5	—	<1.0-2.0	<2.0-3.0	<0.2%	—	—	—	—
		Max	<1.5	<1.5-3.0	—	<3.0	<3.0-5.0	<0.5%	—	<30	<5-100	<100-150
	AUX	Typ	<0.1-0.5	<0.5-3.0	—	≤1.0-3.0	<2.0-3.0	<0.2%	—	—	—	—
		Max	<1.5	<2.0-5.0	—	<3.0	<3.0-5.0	<0.5%	—	<4 ~ 150	<50-200	<500
RDT, all outputs		Typ	<0.4	<0.4	<0.02	<0.6	<1.4	<0.01%	<7	—	<30	—
		Max	0.8	1.0	0.1	1.0	2.8	0.05%	10	—	100	1% E_0 +50
RMT	Principal AA & SA & AA-Aux	Typ	<0.4	<0.4	<0.02	<0.6	<1.4	<0.01%	<7	<20	<30	—
		Max	0.8	1.0	0.1	1.0	2.8	0.05%	10	50	100	1% E_0 + 50
	Auxiliary SA-Size	Typ	<0.1	<0.1	<0.01	<0.4	<0.6	<0.01%	<4	<2	<2	—
		Max	0.2	0.2	0.05	0.6	1.0	0.05%	7	10	10	1% E_0 + 50
RXT, all outputs		Typ	<0.4	<0.4	<0.02	<0.4	<1.2	<0.02%	<5	<20	<30	—
		Max	0.8	1.0	0.1	0.8	2.6	0.1%	10	50	100	1% E_0 +50

(1) — 5-Volt models: 5 typ, 10 max.
12- and 15-Volt models: 20 typ, 40 max.
24-Volt models: 30 typ, 50 max.

(2) — 5-Volt models: 40 typ, 70 max.
12- and 15-Volt models: 40 typ, 80 max.
24-Volt models: 40 typ, 100 max.

(3) — 5-Volt models: 150
12- and 15-Volt models: 300
24-Volt models: 400

(4) Source and switching component combined, p-p: typ <25mV, max <100mV

KEPCO® THE POWER SUPPLIER™

KEPCO POWER ASSEMBLIES

The custom power supplies you design in an hour — and Kepco builds for you in just a few weeks!

You use our standard, off-the-shelf power supplies and accessories as components. You have over 150 single and multi-output switching power supplies to choose from, so you'll probably be able to put together most, if not all the *fixed* or trimmable Volt/Ampere combinations you need. (A glance at pages 5-10 will show you what we mean.) And if you need *programmable* outputs as part of your power assembly, we provide two groups of fully programmable series-pass linear power supplies in the 20-50 Watt range.

You can also include EMI filters, current sensing resistors, and a power fail detector. You'll have a front panel with circuit breaker, LEDs, digital voltage and current displays, voltage controls, and test points; and a back panel with a-c input and output connector, barrier strips, and an optional fan to cool off high-power Power Assemblies.

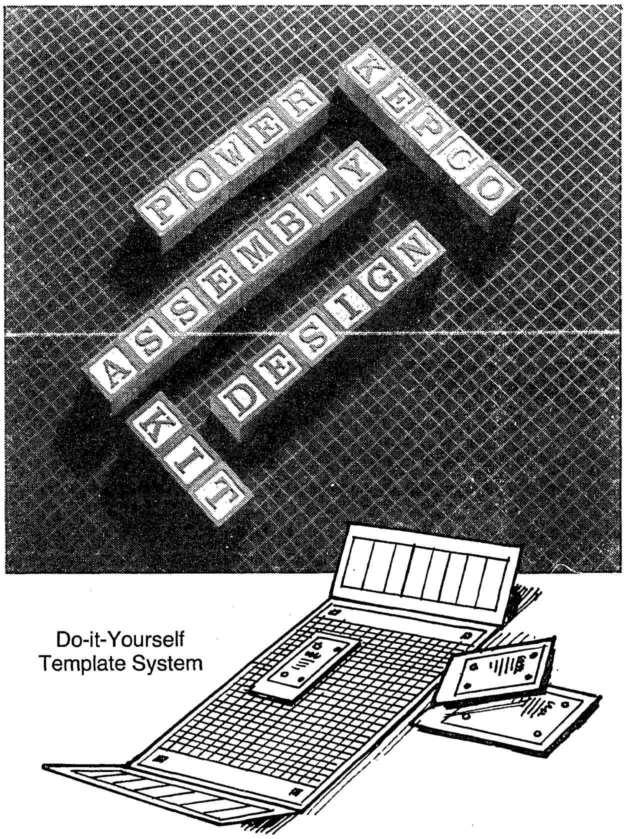
And the reason designing your Power Assembly will take you an hour or less is that we've put together a kit that makes it a snap.

It's called the Kepco Power Assembly Design Kit, and it contains:

— full scale Quick Design templates of virtually all the power supplies and accessories you can use.

— full scale Planning Grids representing the four special rack adapters we've designed especially to accommodate your Power Assemblies — 5-1/4″ and 7″ high, and 16″ and 21″ deep.

— complete and explicit instructions.



Do-it-Yourself Template System

All *you* do is choose the power supplies that provide the Volt/Ampere combinations you need, find the templates for those power supplies, and for whatever accessories you want, and fit them on a Planning Grid; choose your front and rear panel components from an illustrated list; and mark everything down. You have now designed a custom power supply!

You send us your design. We build your Power Assembly exactly the way you want it, wire it, test it, guarantee it — and send it to you.

KEPCO® THE POWER SUPPLIER™

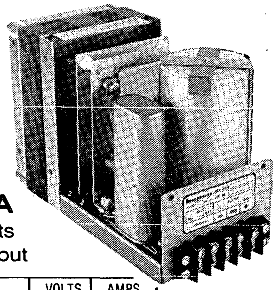
OEM MODULES

UL RECOGNIZED

This KEPCO product is backed by a firm
5-YEAR WARRANTY

FERRORESONANT VOLTAGE STABILIZERS

Enclosures available for Sizes A, AA and C



Size A
180 Watts
Fixed Output

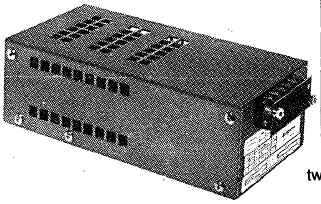
MODEL	VOLTS	AMPS
PRM 12-15	12.0	0-15
PRM 24-8	24.0	0-8
PRM 28-7	28.0	0-7
PRM 120-1.5	120.0	0-1.5

Size AA
280 Watts
Fixed Output

MODEL	VOLTS	AMPS
PRM 8.5-30	8.5	0-30
PRM 12-23	12	0-23
PRM 15-18	15	0-18
PRM 24-12	24	0-12
PRM 28-10	28	0-10
PRM 48-6	48	0-6
PRM 120-2.4	120	0-2.4

Size B
120 Watts
Fixed Output

MODEL	VOLTS	AMPS
PRM 12-10	12.0	0-10
PRM 24-5	24.0	0-5
PRM 120-1	120.0	0-1



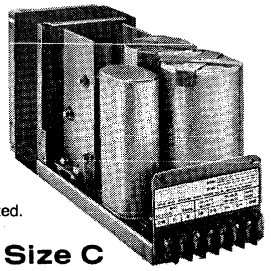
Size C
300 Watts
Dual Output

MODEL	VOLTS	AMPS
PRM 2x12-12	12.0	0-12
PRM 2x15-10	15.0	0-10
PRM 2x24-6	24.0	0-6
PRM 2x60-2.5	70.0	0-2.5

Two independent outputs identically rated.

INFLUENCE QUANTITY	OUTPUT EFFECT
SOURCE VOLTAGE: 100-130V a-c	± 1% E_0 max. (1) ± 1.5% E_0 max. (2)
LOAD CHANGE: 100% to 50% 100% to 25%	 < + 10% E_0 max (3) < + 20% E_0 max. (3)
TIME: 8-hour (drift)	< 1% E_0 max.
TEMPERATURE: Per °C	< 0.05% E_0 max.
RIPPLE and NOISE: rms	3 mV to 300 mV (3)

(1) At full load. (2) At no load. (3) Depends on model.



Size C
450 Watts Fixed Output

MODEL	VOLTS	AMPS
PRM 12-35	12.0	0-35
PRM 24-20	24.0	0-20
PRM 28-17	21.0	0-17
PRM 48-10	48.0	0-10

Size D
60 Watts
Selectable Output

MODEL	VOLTS	AMPS
PRM 5-10	5.0	0-10.0
PRM 8-7	8.0	0-7.0
PRM 12-5	12.0	0-5.0
PRM 15-4	15.0	0-4.0
PRM 21-2.9	21.0	0-2.9
PRM 26-2.3	26.0	0-2.3
PRM 36-1.7	36.0	0-1.7
PRM 120-0.50	120.0	0-0.50
PRM 240-0.25	240.0	0-0.25

The nominal output is listed. Taps for two settings higher and two settings lower.

Fixed output, heavy duty stabilizers for exceptional longevity under rugged conditions. PRM's offer high efficiency (50-75%) and excellent source isolation. For custom volt-ampere combinations, consult factory.

NOTE: The models listed are for operation on 115V a-c 60 Hz mains only (tolerance ± 3 Hz). For 50 Hz service areas separate models are available. These units have reduced ratings (approximately 20% less than the corresponding 60 Hz models).

DIMENSIONS:
Size A Models: (1) $6\frac{13}{16}$H x $4\frac{3}{4}$W x $10\frac{27}{32}$D.
Weight : 24 lbs.
Size AA Models: (1) $6\frac{13}{16}$H x $4\frac{3}{4}$W x $10\frac{29}{32}$D.
Weight: 24 lbs.
Size B Models: $3\frac{13}{32}$H x 5W x $13\frac{7}{8}$D.
Weight: 17 lbs.
Size C Models: (1) $6\frac{13}{16}$H x $4\frac{3}{4}$W x $15\frac{1}{8}$D.
Weight: 30 lbs (2)
Size D Models: $3\frac{13}{32}$H x 5W x $10\frac{7}{8}$D.
Weight: 11 lbs.

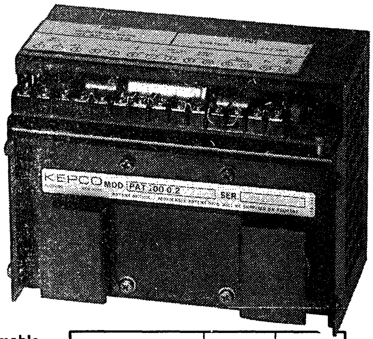
(1) Dimension, Models A and C are uncased modules
(2) Dual Output: 38 lbs. 450 Series: 40 lbs.

PRM™

LINEAR PROGRAMMABLE VOLTAGE / CURRENT STABILIZERS

PAT™

20 WATT PROGRAMMABLE VOLTAGE STABILIZER



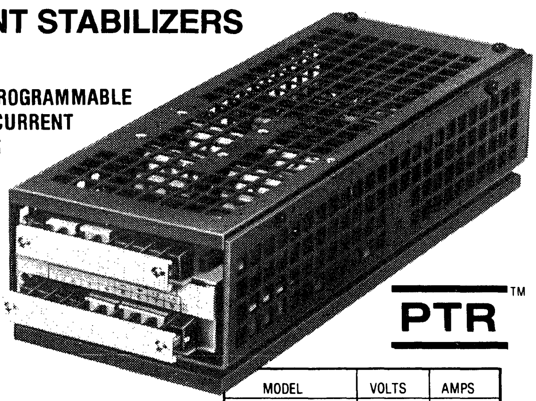
These operationally programmable power modules offer a single high-gain control channel for voltage or current stabilization, backed up by an adjustable overcurrent limiter. Programmable from IEEE-488 bus using a Kepco digital interface.

MODEL	VOLTS	AMPS
PAT 7-2	0-7	0-2
PAT 15-1.5	0-15	0-1.5
PAT 21-1	0-21	0-1
PAT 40-0.5	0-40	0-0.5
PAT 72-0.3	0-72	0-0.3
PAT 100-0.2	0-100	0-0.2

INFLUENCE QUANTITY		OUTPUT EFFECTS VOLTAGE MODE
SOURCE: 105-125/210-250V a-c		<0.0005%
LOAD: No load — full load		<0.005%
TIME: 8-hours (drift)		<0.01%
TEMPERATURE: Per°C		<0.01%
RIPPLE and NOISE:	rms	<0.1 mV
	p-p	<0.5 mV

DIMENSIONS: $3\frac{22}{32}$"H x $6\frac{7}{8}$"W x $4\frac{7}{8}$"D. **WEIGHT:** 6 lbs.

50 WATT PROGRAMMABLE VOLTAGE/CURRENT STABILIZER



PTR™

Programmable voltage/current stabilizer with automatic crossover and optional overvoltage protection, conventional speed design. Programmable from IEEE-488 bus using a Kepco digital interface.

MODEL	VOLTS	AMPS
PTR 7-5.5	0-7	0-5.5
PTR 15-3.3	0-15	0-3.3
PTR 21-2.5	0-21	0-2.5
PTR 40-1.4	0-40	0-1.4
PTR 72-0.8	0-72	0-0.8
PTR 100-0.6	0-100	0-0.6

INFLUENCE QUANTITY		OUTPUT EFFECTS VOLTAGE MODE	OUTPUT EFFECTS CURRENT MODE INTERNAL	EXTERNAL (1)
SOURCE: 105-125/210-250V a-c		<0.001%	<0.005%	<0.005%
LOAD: No load — full load		<0.005%	<3.0 mA	<0.01%
TIME: 8-hours (drift)		<0.01%	<0.05%	<0.02%
TEMPERATURE: Per°C		<0.01%	<0.05%	<0.02%
RIPPLE and NOISE:	rms	<0.1 mV	<0.5 mA	<0.5 mA
	p-p	<2.0 mV	<2.0 mA	<2.0 mA

(1) External current sensing and feedback to the voltage amplifier.

DIMENSIONS: $3\frac{17}{64}$"H x 5"W x $13\frac{27}{32}$"D (incl. barrier-strip). **WEIGHT:** 11 lbs.

KEPCO® THE POWER SUPPLIER™

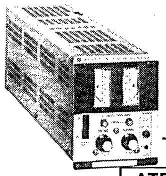
POWER MANAGERS™ for LABORATORY/SYSTEMS

ATE™ LINEAR PROGRAMMABLE POWER SUPPLIES FOR AUTOMATIC TEST EQUIPMENT SYSTEMS.

FEATURING:

- Full external control over both voltage and current with automatic crossover; separate voltmeter and ammeter for continuous output monitoring. Local control through 10-turn rheostats on front panel, remote through fixed gain power amplifier scaling from an input of 10 Volts to rated voltage. Digital input via IEEE 488 bus possible with a Kepco digital interface programmer.
- User selectable slow or fast mode of operation; slow mode is ideal for delivering constant voltage; in fast mode, the ATE can follow rapidly changing load voltages to deliver constant current, or follow high speed voltage or current programming.
- Two built-in, uncommitted amplifiers for scaling, summing, or other manipulation of programming signals. Both voltage and current control channels have full zeroing and calibration facilities for compatibility with Kepco's digital interfaces.
- Programmable/tracking overvoltage protection.

This KEPCO product is backed by a firm **5-YEAR WARRANTY**



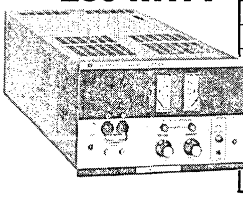
QUARTER-RACK 50 WATT

MODEL	VOLTS	AMPS
ATE 6-5M	0-6	0-5
ATE 15-3M	0-15	0-3
ATE 25-2M	0-25	0-2
ATE 36-1.5M	0-36	0-1.5
ATE 55-1M	0-55	0-1
ATE 75-0.7M	0-75	0-0.7
ATE 100-0.5M	0-100	0-0.5
ATE 150-0.3M	0-150	0-0.3

100 WATT

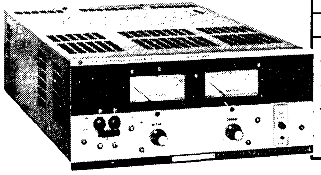
MODEL	VOLTS	AMPS
ATE 6-10M	0-6	0-10
ATE 15-6M	0-15	0-6
ATE 25-4M	0-25	0-4
ATE 36-3M	0-36	0-3
ATE 55-2M	0-55	0-2
ATE 75-1.5M	0-75	0-1.5
ATE 100-1M	0-100	0-1
ATE 150-0.7M	0-150	0-0.7

HALF-RACK 250 WATT



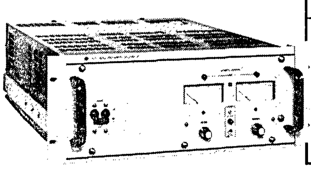
MODEL	VOLTS	AMPS
ATE 6-25M	0-6	0-25
ATE 15-15M	0-15	0-15
ATE 25-10M	0-25	0-10
ATE 36-8M	0-36	0-8
ATE 55-5M	0-55	0-5
ATE 75-3M	0-75	0-3
ATE 100-2.5M	0-100	0-2.5
ATE 150-1.5M	0-150	0-1.5
ATE 325-0.8M	0-325	0-0.8

THREE-QUARTER RACK 500 WATT



MODEL	VOLTS	AMPS
ATE 6-50M	0-6	0-50
ATE 15-25M	0-15	0-25
ATE 25-20M	0-25	0-20
ATE 36-15M	0-36	0-15
ATE 55-10M	0-55	0-10
ATE 75-8M	0-75	0-8
ATE 100-5M	0-100	0-5
ATE 150-3.5M	0-150	0-3.5

FULL-RACK 1000 WATT



MODEL	VOLTS	AMPS
ATE 6-100M	0-6	0-100
ATE 15-50M	0-15	0-50
ATE 25-40M	0-25	0-40
ATE 36-30M	0-36	0-30
ATE 55-20M	0-55	0-20
ATE 75-15M	0-75	0-15
ATE 100-10M	0-100	0-10
ATE 150-7M	0-150	0-7

STATIC STABILIZATION TABLE

INFLUENCE QUANTITY		OUTPUT EFFECTS VOLTAGE MODE Typ.	Max	OUTPUT EFFECTS CURRENT MODE Typ.	Max.	OFFSETS(3) ΔE_{io}	ΔI_{io}
SOURCE VOLTAGE (min.-max.):(1)		$<0.0005\%$ E_0 max.	0.001% E_0 max.	$<0.002\%$ I_0 max.	0.005% I_0 max.	<1 µV	<1 nA
LOAD (no load-full load):		$<0.001\%$ E_0 max.	0.002% E_0 max.	<0.5 mA(2)	1 mA(2)	<1 µV	<1 nA
TIME (8-hour drift):		$<0.005\%$ E_0 max.	0.01% E_0 max.	$<0.01\%$ I_0 max.	0.02% I_0 max.	<20 µV	<1 nA
TEMPERATURE, per °C:		$<0.005\%$ E_0 max.	0.01% E_0 max.	$<0.01\%$ I_0 max.	0.02% I_0 max.	<20 µV	<2 nA
RIPPLE and NOISE	rms:	<0.1 mV	0.3 mV	$<0.01\%$ I_0 max.	0.03% I_0 max.	—	—
(Slow Mode)	p-p:	<1 mV	3 mV	$<0.1\%$ I_0 max.	0.3% I_0 max.	—	—
RIPPLE and NOISE	rms:	<1 mV	3 mV	$<0.01\%$ I_0 max.	0.03% I_0 max.	—	—
(Fast Mode)	p-p:	<10 mV	30 mV	$<0.1\%$ I_0 max.	0.3% I_0 max.	—	—

(1) 105-125/210-250V a-c.

(2) In slow mode, the leakage current through the output capacitor adds approximately 0-6 mA to the current mode load effects.

(3) Uncommitted amplifier offsets.

DYNAMIC SPECIFICATIONS

OUTPUT VOLTAGE RATING	6V	15V	25V	36V	55V	75V	100V	150V
BANDWIDTH (−3db)(1)	53 KHz	21 KHz	13 KHz	9 KHz	6 KHz	4 KHz	3 KHz	2 KHz
PROGRAMMING TIME CONSTANT (µsec)(1)	3.0	7.5	12.5	18.0	27.5	37.5	50.0	75.0
REMOTE ERROR SENSING	0 to 0.5V/lead, both terminals							
OVP CONTROL	Local: trimmer-adjustable; remote: 0-10V signal (or may be set to track output voltage.							
VOLTAGE RECOVERY	For step load change between 10% and 100% I_0 maximum <50 µsec typ., <100 µsec max. to recover within 10 mV							

(1) In fast mode, operating into a resistive load.

DIMENSIONS:

50 Watt (Quarter-Rack):
$5\tfrac{7}{32}$"H x $4\tfrac{5}{32}$"W x $17\tfrac{1}{8}$"D(1) Weight: 17 lbs.
100 Watt (Quarter-Rack):
$5\tfrac{7}{32}$"H x $4\tfrac{5}{32}$"W x $17\tfrac{1}{8}$"D(1) Weight: 20 lbs.
250 Watt (Half-Rack):
$5\tfrac{7}{32}$"H x $8\tfrac{11}{32}$"W x $17\tfrac{9}{64}$"D(1) Weight: 43 lbs.
500 Watt (Three Quarter-Rack):
$5\tfrac{7}{32}$"H x $12\tfrac{17}{32}$"W x $17\tfrac{9}{64}$"D(1) Weight: 56 lbs.
1000 Watt (Full-Rack):(2)
$6\tfrac{31}{32}$"H x $16\tfrac{1}{2}$"W x $20\tfrac{1}{64}$"D(1) Weight: 103 lbs.

(1) Add $2\tfrac{1}{2}$" for connector protrusion.

(2) The full rack model is supplied with brackets for direct mounting in a standard 19-inch rack.

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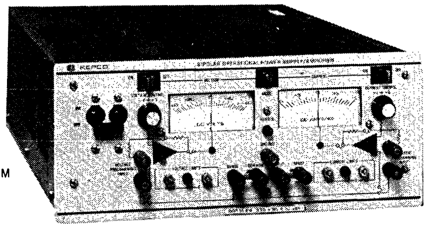
POWER MANAGERS™ for LABORATORY/SYSTEMS
4-QUADRANT VOLTAGE/CURRENT STABILIZERS

This KEPCO product is backed by a firm **5-YEAR WARRANTY**



BOP™

These low-voltage bipolar power supplies offer full, programmable control over both voltage and current with a mode selector. The power supply is bounded in all four quadrants by four fully adjustable, programmable boundary limits. The wide-band BOP offers two operational pre-amplifiers for scaling, summing and signal processing. Programmable from an IEEE-488 bus using optional interface board. (See page 23).

	MODEL	d-c OUTPUT RANGE E_0 max.	d-c OUTPUT RANGE I_0 max.	CLOSED LOOP GAIN VOLTAGE CHANNEL G_V (V/V)	CLOSED LOOP GAIN CURRENT CHANNEL G_I (A/V)	OUTPUT IMPEDANCE VOLTAGE MODE SERIES R	OUTPUT IMPEDANCE VOLTAGE MODE SERIES L	OUTPUT IMPEDANCE CURRENT MODE SHUNT R	OUTPUT IMPEDANCE CURRENT MODE SHUNT C
100 WATT	BOP 50-2M	± 50V	± 2A	5.0	0.2	0.5 mΩ	100μH	50 kΩ	0.05μF
	BOP 100-1M	±100V	± 1A	10.0	0.1	2.0 mΩ	200μH	100 kΩ	0.05μF

Size: $5\frac{7}{32}$"H x $12\frac{17}{32}$"W x $17\frac{9}{64}$"D **Weight:** 48 lbs.

200 WATT	BOP 20-10M	± 20V	±10A	2.0	1.0	40 μΩ	50μH	20 kΩ	0.1μF
	BOP 36-6M	± 36V	± 6A	3.6	0.6	120 μΩ	50μH	36 kΩ	0.1μF
	BOP 50-4M	± 50V	± 4A	5.0	0.4	0.25 mΩ	100μH	50 kΩ	0.05μF
	BOP 72-3M	± 72V	± 3A	7.2	0.3	0.48 mΩ	200μH	72 kΩ	0.05μF
	BOP 100-2M	±100V	± 2A	10.0	0.2	1.0 mΩ	200μH	100 kΩ	0.05μF

Size: $5\frac{7}{32}$"H x $12\frac{17}{32}$"W x $17\frac{9}{64}$"D **Weight:** 51 lbs.

400 WATT	BOP 20-20M	± 20V	±20A	2.0	2.0	20 μΩ	50μH	20 kΩ	0.2μF
	BOP 36-12M	± 36V	±12A	3.6	1.2	60 μΩ	50μH	36 kΩ	0.2μF
	BOP 50-8M	± 50V	± 8A	5.0	0.8	125 μΩ	100μH	50 kΩ	0.15μF
	BOP 72-6M	± 72V	± 6A	7.2	0.6	240 μΩ	200μH	72 kΩ	0.1μF
	BOP 100-4M	±100V	± 4A	10.0	0.4	500 μΩ	200μH	100 kΩ	0.1μF

Size: $5\frac{7}{32}$"H x $16\frac{15}{32}$"W x $20\frac{5}{64}$"D **Weight:** 90 lbs.

DYNAMIC SPECIFICATIONS

Parameter	Mode	BOP 20-10M	BOP 20-20M	BOP 36-6M	BOP 36-12M	BOP 50-2M	BOP 50-4M	BOP 50-8M	BOP 72-3M	BOP 72-6M	BOP 100-1M	BOP 100-2M	BOP 100-4M
Bandwidth	V	3.0 kHz	2.0 kHz	1.8 kHz	2.8 kHz	4.5 kHz	2.8 kHz	3.3 kHz	2.0 kHz	2.0 kHz	4.0 kHz	3.0 kHz	2.0 kHz
(d-c to f-3 db)	I	3.0 kHz	2.0 kHz	1.8 kHz	1.8 kHz	3.0 kHz	2.8 kHz	1.5 kHz	2.0 kHz	2.0 kHz	3.0 kHz	3.0 kHz	2.0 kHz
Programming	V	50 μsec	80 μsec	85 μsec	55 μsec	35 μsec	55 μsec	50 μsec	80 μsec	80 μsec	40 μsec	50 μsec	80 μsec
Time Constant	I	50 μsec	80 μsec	85 μsec	85 μsec	50 μsec	55 μsec	100 μsec	80 μsec	80 μsec	50 μsec	50 μsec	80 μsec
Large Signal	V	3.3 kHz	2.1 kHz	1.9 kHz	3.0 kHz	5.5 kHz	3.0 kHz	3.3 kHz	2.1 kHz	2.1 kHz	4.7 kHz	3.3 kHz	2.1 kHz
Freq. Response	I	3.1 kHz	2.1 kHz	1.9 kHz	1.9 kHz	3.1 kHz	3.0 kHz	1.5 kHz	2.1 kHz	2.1 kHz	3.5 kHz	3.3 kHz	2.1 kHz
Slewing Rate	V	0.4V/μsec	0.26V/μsec	0.4V/μsec	0.65V/μsec	1.7V/μsec	0.9V/μsec	1V/μsec	0.9V/μsec	0.9V/μsec	3V/μsec	2V/μsec	1.3V/μsec
	I	200 mA/μsec	260 mA/μsec	70 mA/μsec	140 mA/μsec	40 mA/μsec	75 mA/μsec	75 mA/μsec	40 mA/μsec	80 mA/μsec	22 mA/μsec	40 mA/μsec	50 mA/μsec
Recovery,	V	150 μsec	150 μsec	250 μsec	150 μsec	140 μsec	180 μsec	100 μsec	300 μsec	150 μsec	150 μsec	200 μsec	200 μsec
Step Load	I	30 μsec	50 μsec	30 μsec	30 μsec	30 μsec	30 μsec	50 μsec	30 μsec	50 μsec	40 μsec	30 μsec	50 μsec

STATIC SPECIFICATIONS

INFLUENCE QUANTITY		OUTPUT EFFECTS[2] VOLTAGE MODE TYP	OUTPUT EFFECTS[2] VOLTAGE MODE MAX	OUTPUT EFFECTS[2] CURRENT MODE TYP	OUTPUT EFFECTS[2] CURRENT MODE MAX	PREAMPLIFIER OFFSETS ΔE_{io}	PREAMPLIFIER OFFSETS ΔI_{io}	REFERENCE ±10V
SOURCE (min-max)[1]		<0.0005%	0.001%	<0.002%	0.005%	<5μV	<1nA	<0.0005%
LOAD (NL-FL):		<0.001%	0.002%	<0.5mA	1mA	—	—	<0.0005%
TIME (8-hour drift):		<0.005%	0.01%	<0.01%	0.02%	<20μV	<1nA	<0.005%
TEMP., per °C:		<0.005%	0.01%	<0.01%	0.02%	<20μV	<1nA	<0.005%
RIPPLE and NOISE:[3]	rms	<1mV	3mV	<0.01%	0.03%	—	—	—
	p-p[4]	<10mV	30mV	<0.1%	0.3%	—	—	—

[1] 105-125/210-250V a-c.

[2] Output effects, expressed as a percentage, are referred to the maximum rated output voltage or current.

[3] Measured with the common terminal grounded so that the common mode current does not flow through the load.

[4] Peak-to-peak ripple is measured over a 20 Hz to 10 MHz bandwidth.

KEPCO® THE POWER SUPPLIER™

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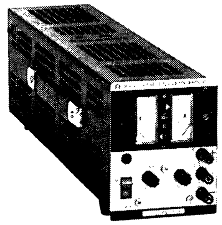
JQE™ GENERAL PURPOSE VOLTAGE STABILIZERS

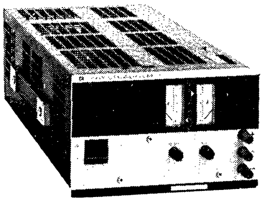
Systems-type, voltage stabilizers with current limiting, programmable from the IEEE bus using Kepco digital interfaces. JQE's voltage control channel has an I-C front end for maximum stability and minimum offset. The rated power is delivered under the realistic thermal environs of a system's cabinet with no derating. The 10-turn voltage control is standard. For units requiring overvoltage protection and/or high speed programming, see the ATE group.

QUARTER-RACK 100 WATT



MODEL	d-c OUTPUT RANGE VOLTS	d-c OUTPUT RANGE AMPS	OUTPUT IMPEDANCE VOLTAGE MODE SERIES R	OUTPUT IMPEDANCE VOLTAGE MODE SERIES L	OUTPUT IMPEDANCE CURRENT MODE(2) SHUNT R	OUTPUT IMPEDANCE CURRENT MODE(2) SHUNT C	MAX. INPUT AMPS at 125 V a-c
JQE 6-10M	0-6	0-10	30 μΩ	1 μH	50 kΩ	3 kμF	2.0
JQE 15-6M	0-15	0-6	125 μΩ	1 μH	84 kΩ	1 kμF	2.1
JQE 25-4M	0-25	0-4	300 μΩ	1 μH	125 kΩ	700 μF	2.2
JQE 36-3M	0-36	0-3	600 μΩ	1 μH	165 kΩ	400 μF	2.2
JQE 55-2M	0-55	0-2	1.4 mΩ	1 μH	250 kΩ	220 μF	2.3
JQE 75-1.5M	0-75	0-1.5	2.5 mΩ	1 μH	330 kΩ	160 μF	2.3
JQE 100-1M	0-100	0-1	5 mΩ	2 μH	500 kΩ	110 μF	2.1

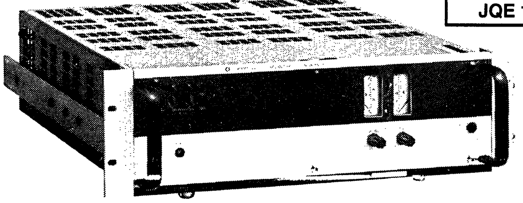
HALF-RACK 250/500 WATT



MODEL	d-c OUTPUT RANGE VOLTS	d-c OUTPUT RANGE AMPS	OUTPUT IMPEDANCE VOLTAGE MODE SERIES R	OUTPUT IMPEDANCE VOLTAGE MODE SERIES L	OUTPUT IMPEDANCE CURRENT MODE(2) SHUNT R	OUTPUT IMPEDANCE CURRENT MODE(2) SHUNT C	MAX. INPUT AMPS at 125 V a-c
JQE 6-22M	0-6	0-22	14 μΩ	0.5 μH	23 kΩ	5.8 kμF	4.2
JQE 6-45M	0-6	0-45	7 μΩ	0.5 μH	11 kΩ	8 kμF	9.0
JQE 15-12M	0-15	0-12	63 μΩ	0.5 μH	42 kΩ	2.7 kμF	4.0
JQE 15-25M	0-15	0-25	30 μΩ	0.5 μH	20 kΩ	4.5 kμF	8.4
JQE 25-10M	0-25	0-10	125 μΩ	0.5 μH	50 kΩ	2.4 kμF	5.3
JQE 25-20M	0-25	0-20	63 μΩ	0.5 μH	25 kΩ	4.3 kμF	10.5
JQE 36-8M	0-36	0-8	225 μΩ	0.5 μH	62.5 kΩ	1.4 kμF	6.0
JQE 36-15M	0-36	0-15	120 μΩ	0.5 μH	33 kΩ	3.6 kμF	9.5
JQE 55-5M	0-55	0-5	550 μΩ	1 μH	100 kΩ	850 μF	5.0
JQE 55-10M	0-55	0-10	275 μΩ	1 μH	50 kΩ	2.1 kμF	9.0
JQE 75-3M	0-75	0-3	1.25 mΩ	1 μH	165 kΩ	850 μF	4.0
JQE 75-8M	0-75	0-8	469 μΩ	1 μH	62.5 kΩ	1.2 kμF	10.0
JQE 100-2.5M	0-100	0-2.5	2 mΩ	1 μH	200 kΩ	600 μF	4.5
JQE 100-5M	0-100	0-5	1.25 mΩ	1 μH	100 kΩ	600 μF	8.4
JQE 150-1.5M	0-150	0-1.5	5 mΩ	2 μH	330 kΩ	440 μF	4.6
JQE 150-3.5M	0-150	0-3.5	2.2 mΩ	2 μH	140 kΩ	440 μF	8.7

This KEPCO product is backed by a firm
5-YEAR WARRANTY

FULL-RACK 1000 WATT



MODEL	d-c OUTPUT RANGE VOLTS	d-c OUTPUT RANGE AMPS	OUTPUT IMPEDANCE VOLTAGE MODE SERIES R	OUTPUT IMPEDANCE VOLTAGE MODE SERIES L	OUTPUT IMPEDANCE CURRENT MODE(2) SHUNT R	OUTPUT IMPEDANCE CURRENT MODE(2) SHUNT C	MAX. INPUT AMPS at 125 V a-c
JQE 6-90M	0-6	0-90	3.5 μΩ	0.5 μH	3.5 kΩ	17.6 kμF	15.7
JQE 15-50M	0-15	0-50	15 μΩ	0.5 μH	10 kΩ	12 kμF	16.6
JQE 25-40M	0-25	0-40	31 μΩ	0.5 μH	12.5 kΩ	14 kμF	21.0
JQE 36-30M	0-36	0-30	60 μΩ	0.5 μH	16 kΩ	11 kμF	19.0
JQE 55-20M	0-55	0-20	138 μΩ	1 μH	25 kΩ	7.3 kμF	18.0
JQE 75-15M	0-75	0-15	250μΩ	1 μH	33 kΩ	4.2 kμF	18.0
JQE 100-10M	0-100	0-10	0.62 mΩ	1 μH	50 kΩ	2.2 kμF	17.0
JQE 150-7M	0-150	0-7	1.1 mΩ	2 μH	72 kΩ	1 kμF	18.0

DIMENSIONS:

Quarter-Rack Models: $5\frac{7}{32}$"H x $4\frac{5}{32}$"W x $17\frac{3}{16}$D(1); Weight: 19 lbs.
Half-Rack Models: $5\frac{7}{32}$"H x $8\frac{11}{32}$"W x $7\frac{3}{8}$"D(1)
Weight: 250W–42 lbs 500W–56 lbs.
Full-Rack Models: $5\frac{7}{32}$"H x $16\frac{1}{2}$"W(2) x $17\frac{1}{64}$"D(1); Weight: 103 lbs.
(1) behind panel (2) with "ears" standard 19" panel width

INFLUENCE QUANTITY		OUTPUT EFFECTS VOLTAGE MODE	OUTPUT EFFECTS CURRENT MODE(1)	AMPLIFIER OFFSETS VOLTAGE ΔE_{io}	AMPLIFIER OFFSETS CURRENT ΔI_{io}	REFERENCE 6.2V ± 5%
SOURCE: 105-125/210-250V a-c		<0.0005%	<0.005%	<10 μV	<2 nA	0.0001%
LOAD: No load-full load		<0.005% or 0.2 mV(2)	<0.01%	<200 μV	<5 nA	—
TIME: 8-hours (drift)		<0.01% or 1 mV(2)	<0.02%	<20 μV	<2 nA	0.005%
TEMPERATURE: Per °C		<0.01%(4)	<0.02%(3)	<20 μV	<5 nA	0.005%
RIPPLE and NOISE:(4)	rms	<0.2 mV	<0.02% of I_o max.	—	—	—
	p-p(5)	<1.0 mV	<0.1% of I_o max.	—		—

(1) External current sensing, using the *voltage* amplifier. Effects are measured for a 1-volt current sensing voltage drop.
(2) Whichever is greater.
(3) Typical temperature effect coefficients are: 0.005% per °C voltage mode; 0.01% per °C externally sensed current mode.
(4) One terminal grounded or connected so that the common-mode current does not flow through the load or (in current-mode) through a sensing resistor.
(5) 20 Hz to 10 MHz.

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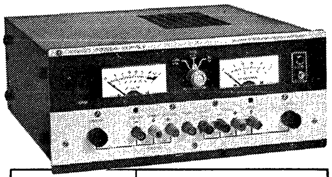
MPS 620M™

Multiple output voltage stabilizer with adjustable current limits. Model MPS 620M is the ideal bench power supply for the logic experimenter.



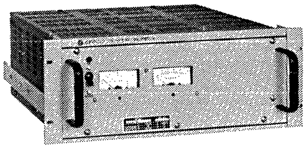
Output #1	0-6V, 0-5A
Output #2	0 to +20V, 0-1A
Output #3	0 to −20V, 0-1A

Outputs 2 and 3 are tracked. Output 1 is protected by an overvoltage crowbar.

DIMENSIONS:
$5\frac{7}{32}$"H x $12\frac{17}{32}$"W x $12\frac{7}{8}$"D.
WEIGHT: 29 lbs.

PRR™

Ferroresonant stabilized 1000W designs producing fixed voltages.

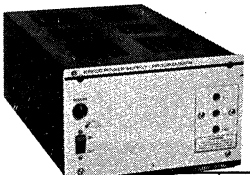


MODEL	VOLTS	AMPS
PRR 12-77M	12.0	0-77
PRR 24-42M	24.0	0-42
PRR 28-36M	28.0	0-36
PRR 48-22M	48.0	0-22

DIMENSIONS:
$6\frac{31}{32}$"H x 19"W x $13\frac{7}{16}$"D behind panel.
WEIGHT: 63 lbs.

NTC™

Low power shunt stabilized power supplies that can be used on their own as a fast-programmable voltage source, or serve as an interface for higher-powered operational power supplies. The NTC as an interface permits programming with the negative terminal common.



MODEL	VOLTS	AMPS
NTC-200	0-200	0-0.01
NTC 2000	0-2000	0-0.001

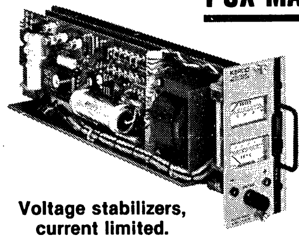
DIMENSIONS:
NTC–200: $5\frac{7}{32}$"H x $4\frac{5}{32}$"W x $17\frac{3}{16}$"D.
NTC–2000: $5\frac{7}{32}$"H x $8\frac{11}{32}$"W x $12\frac{7}{8}$"D.
WEIGHT: NTC–200: 11 lbs., NTC–2000: 21 lbs.

INFLUENCE QUANTITY		MPS OUTPUT EFFECTS 0 to 6V Output	MPS OUTPUT EFFECTS 0 to ±20V Output	PRR OUTPUT EFFECTS Typ.	PRR OUTPUT EFFECTS Max.	NTC(2) VOLTAGE AMPLIFIER OFFSETS ΔE_{io}	NTC(2) VOLTAGE AMPLIFIER OFFSETS ΔI_{io}	NTC(2) REFERENCE ±6.2V
SOURCE: 105–125/210–250V a-c		0.01%	0.01%	±0.5%	±1.0%	<100 μV	<10 nA	0.0005%
LOAD: No load—full load		0.01%	0.05%	(1)		<1 mV	<10 nA	—
TIME: 8-hour drift		0.01%	0.01%	<1%		<20 μV	<5 nA	0.005%
TEMPERATURE: Per °C		0.01%	0.01%	<0.05%		<20 μV	<5 nA	0.005%
RIPPLE and NOISE:	rms	0.1 mV	0.1 mV	—	50 mV	<0.01%	—	—
	p-p	1 mV	1 mV	—	—	<0.05%	—	—

(1) 100%-50% load change—voltage increase 3 ~ 6%; 100%-25% load change—voltage increase 5 ~ 10%

(2) The output effect can be calculated by the relationship: $\Delta E_o = \pm\Delta E_r (R_f/R_i) \pm\Delta E_{io} (1 + R_f/R_i) \pm\Delta I_{io} (R_f)$, where R_f is the built-in feedback resistance, and R_i is the external coupling resistance from the signal source or reference, E_r.

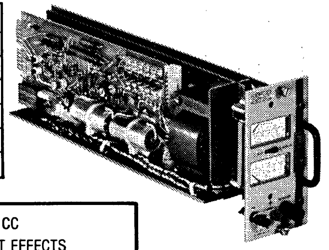
PCX-MAT™ PLUG-IN POWER SUPPLIES CC™



Voltage stabilizers, current limited. Programmable from IEEE-488 bus using Kepco digital interface.

MODEL	VOLTS	AMPS
PCX 7-2MAT	0-7	0-2
PCX 15-1.5MAT	0-15	0-1.5
PCX 21-1MAT	0-21	0-1
PCX 40-0.5MAT	0-40	0-0.5
PCX 72-0.3MAT	0-72	0-0.3
PCX 100-0.2MAT	0-100	0-0.2

MODEL	AMPS	VOLTS
CC 7-2M	0-2	0-7
CC 15-1.5M	0-1.5	0-15
CC 21-1M	0-1	0-21
CC 40-0.5M	0-0.5	0-40
CC 72-0.3M	0-0.3	0-72
CC 100-0.2M	0-0.2	0-100



Current stabilizer Programmable from IEEE-488 bus using Kepco digital interface.

INFLUENCE QUANTITY		PCX-MAT OUTPUT EFFECTS VOLTAGE MODE	PCX-MAT OUTPUT EFFECTS CURRENT MODE	CC OUTPUT EFFECTS CURRENT MODE
SOURCE: 105–125/210–250V a-c		<0.0005%	<0.005%	<0.0005%
LOAD: No load—full load		<0.005%	<0.01%	<0.005%
TIME: 8-hour (drift)		<0.01%	<0.02%	<0.02%
TEMPERATURE: Per °C		<0.01%	<0.02%	<0.01%
RIPPLE and NOISE:	rms	<0.1 mV	<0.02% of I_0 max.	<0.02% of selected scale
	p-p	<3 mV	<0.2% of I_0 max.	<0.1% of selected scale

This KEPCO product is backed by a firm 5-YEAR WARRANTY

DIMENSIONS: $5\frac{7}{32}$"H x $2\frac{25}{32}$"W x $14\frac{15}{16}$"D. (behind panel). **WEIGHT:** 8 lbs.

Note: Use optional cases CA-3, CA-4 or CA-5 for bench use, or plug-in style rack adapters RA-22-6A or RA-32. Consult factory for details of the mounting options.

KEPCO, INC. • 131-38 SANFORD AVENUE, FLUSHING, NY 11352 USA • (718) 461-7000 • TWX #710-582-2631 • FAX: (718) 767-1102

KEPCO® THE POWER SUPPLIER™

POWER MANAGERS™ for LABORATORY/SYSTEMS

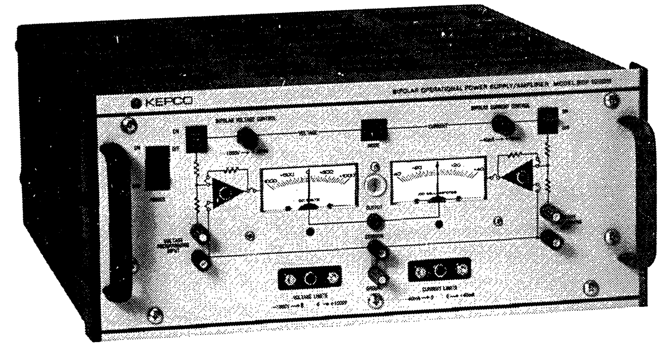
HIGH VOLTAGE MODELS

FOUR-QUADRANT VOLTAGE/CURRENT STABILIZERS

Programmable from IEEE-488 using one of the Kepco stand-alone digital interfaces.

BOP-HV, Bipolar High-voltage Operational Power Supplies, combine the capabilities of fast-programmable power supplies with a bi-directional output stage that can respond in either direction from zero and permits operation either as a sink or as a source. The BOP-HV are programmable from an IEEE-488 bus using one of the stand-alone Kepco digital interfaces.

This KEPCO product is backed by a firm **5-YEAR WARRANTY**



BOP-HV™

MODEL	VOLTS	AMPS
BOP 500M	+500 to −500	+0.08 to −0.08
BOP 1000M	+1000 to −1000	+0.04 to −0.04

DIMENSIONS: 6³¹⁄₃₂"H x 16½"W(1) x 17"D
(1) 19" with flanges.
WEIGHT: 65 lbs.

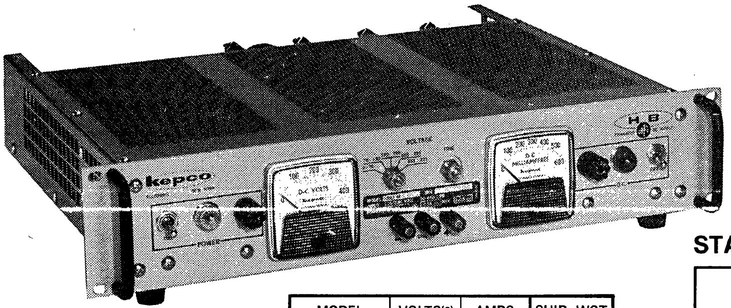
DYNAMIC SPECIFICATIONS

PARAMETER	MODE SWITCH	BOP 500M	BOP 1000M
BANDWIDTH (d-c to f_{-3dB})	Voltage	2 kHz	1 kHz
	Current	1.3 kHz	0.64 kHz
PROGRAMMING TIME CONSTANT	Voltage	75 µsec	150 µsec
	Current	125 µsec	250 µsec
LARGE SIGNAL FREQUENCY RESPONSE	Voltage	2 kHz	0.5 kHz
	Current	2 kHz	0.5 kHz
SLEWING RATE	Voltage	6V/µsec	3V/µsec
	Current	1 mA/µsec	0.13 mA/µsec
TRANSIENT RECOVERY (Step Load Change)	Voltage	100 µsec	100 µsec
	Current	125 µsec	250 µsec

STATIC SPECIFICATIONS

INFLUENCE QUANTITY		OUTPUT EFFECTS(2) VOLTAGE MODE	CURRENT MODE
SOURCE VOLTAGE (min.-max.):(1)		<0.0005%	<0.0005%
LOAD (No load—full load):		<0.0005%	<0.005%
TIME (8-hour drift):		<0.01%	<0.01%
TEMPERATURE, Per °C:		<0.01%	<0.01%
RIPPLE and NOISE:	rms	<10 mV	<25µA(3)
	p-p	<500 mV	<200µA(3)

(1) 105-125/210-250V a-c.
(2) Specifications are expressed as a *percent-of-setting* for the output range 10% to 100%. Below 10% output, the specification limit is the rated percentage of the 10% output setting.
(3) For frequency components in the bandwidth of the current stabilizer. Beyond cutoff, noise will appear as a voltage component equal to the rated voltage mode noise.



ADJUSTABLE VOLTAGE STABILIZERS

HB™

DIMENSIONS:
3¹⁵⁄₃₂"H x 19"W x 14⅞"D

MODEL	VOLTS(2)	AMPS	SHIP. WGT.
HB 4AM	0-325	0-0.4	35 lbs.
HB 8AM	0-325	0-0.8	41 lbs.
HB 525M	0-525	0-0.5	41 lbs.

This KEPCO product is backed by a firm **5-YEAR WARRANTY**

STATIC SPECIFICATIONS

INFLUENCE QUANTITY		OUTPUT EFFECTS VOLTAGE MODE	OUTPUT EFFECTS CURRENT MODE (1) (External Sensing)
SOURCE: 105-125/210-250V a-c		<0.01%	<0.01% at rated sample
LOAD: No load—full load		<0.01%	<0.01% at rated sample
TIME: 8 hours (drift)		<0.01%	<0.05%
TEMPERATURE: Per °C		<0.01%	<0.05% at rated sample
RIPPLE and NOISE:	rms	<1 mV	<0.01% of I_0 max
	p-p	<5 mV	<0.5% of I

(1) External current sensing, using the *voltage* amplifier. Effects are measured for a 1-volt current sensing voltage drop.
(2) 5 equal voltage steps.

KEPCO® THE POWER SUPPLIER™

POWER MANAGERS™ for LABORATORY/SYSTEMS HIGH VOLTAGE MODELS

PROGRAMMABLE (UP TO 1000 VOLTS) FROM IEEE-488 USING ONE OF THE KEPCO STAND-ALONE DIGITAL INTERFACES.

APH™ AUTOMATIC CROSSOVER CONVENTIONALLY FILTERED

High voltage laboratory power supplies offering continuously adjustable/programmable voltage and current in an automatic crossover configuration.

MODEL	VOLTS	AMPS
APH 500M	0-500	0-0.04
APH 1000M	0-1000	0-0.02
APH 2000M	0-2000	0-0.01

DIMENSIONS: 5 7/32"H x 12 17/32"W x 12 7/8"D
WEIGHT: 27 lbs.

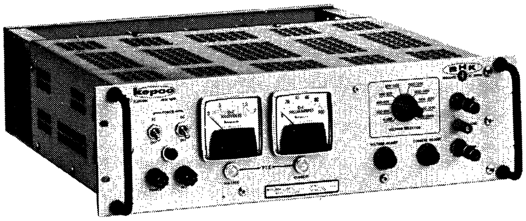
STATIC SPECIFICATIONS

INFLUENCE QUANTITY		OUTPUT EFFECTS VOLTAGE MODE (1)	CURRENT MODE (Internal Sensing)
SOURCE: 105–125V a-c		<0.001%	<0.005%
LOAD (No load—full load):		<0.005%	<0.01% of I_0 max.
TIME: 8-hour (drift)		<0.01%	<0.01% of I_0 max.
TEMPERATURE: Per °C		<0.01%	<0.01% of I_0 max.
RIPPLE and NOISE	rms	<2 mV	<40 μA
	p-p	<10 mV	<200 μA

(1) Specifications are expressed as a *percent-of-setting* for the output range 10% to 100%. Below 10% output, the specification limit is the rated percentage of the 10% output setting.

This KEPCO product is backed by a firm **5-YEAR WARRANTY**

BHK™ 200 WATT AUTOMATIC CROSSOVER CONVENTIONAL AND HIGH SPEED



Programmable (up to 1000V) from an IEEE-488 bus using one of the stand-alone Kepco digital interfaces. Programmable voltage and current stabilizer for high voltage arranged in an automatic crossover configuration. Provision is made for disconnecting the output capacitor for high speed programming.

MODEL	VOLTS	AMPS
BHK 500-0.4M	0-500	0-0.4
BHK 1000-0.2M	0-1000	0-0.2
BHK 2000-0.1M	0-2000	0-0.1

CONTROL/PROGRAMMING:
Output voltage is controlled from the panel by a combination of a 10-position decade switch and a 10-turn vernier control. This arrangement provides 0.005% resolution yet does not inhibit the ability to sweep program a BHK linearly through its entire range. External control can be exercised by a resistance (1000 ohms per volt) or by a control voltage, delivering 0 to +1 milliampere into the summing junction with respect to the plus (+) output/sense terminal. External signals can be substituted for, or summed with, the internal reference for additional control. BHK can be strapped for either conventional speed operation or for fast programming. In fast mode the output can be controlled at 0.5V per microsecond.

DIMENSIONS: 5 7/32"H x 19"W x 15 5/16"D (behind panel)

WEIGHT: 46 lbs.

STATIC SPECIFICATIONS

INFLUENCE QUANTITY		OUTPUT EFFECTS VOLTAGE MODE	CURRENT MODE (Internal Sensing)
SOURCE: 105-125/210-250V a-c		<0.005%	<100 μA
LOAD: No load—full load		<0.01%	<100 μA
TIME: 8 hours (drift)		<0.01%	<0.01%
TEMPERATURE: Per °C		<0.01%	<0.05% of I_0 max
RIPPLE and NOISE:	rms	<1 mV	<100 μA
(Slow Speed)	p-p	<10 mV	<1 mA
RIPPLE and NOISE:	rms	<50 mV	<500 μA
(High Speed)	p-p	<500 mV	<5 mA

KEPCO® THE POWER SUPPLIER™

POWER MANAGERS™ for LABORATORY/SYSTEMS HIGH VOLTAGE MODELS

This KEPCO product is backed by a firm
5-YEAR WARRANTY

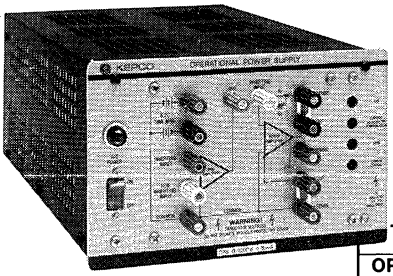
OPS™

group IXB

HIGH SPEED OPERATIONAL POWER SUPPLIES

PROGRAMMABLE (UP TO 1000 VOLTS) FROM IEEE-488 USING ONE OF THE KEPCO STAND-ALONE DIGITAL INTERFACES.

20 watt, high voltage stabilizer, equipped with an operational patch panel and featuring a capacitorless output for fast programming applications. Restricted to non-capacitive loads.



DIMENSIONS: $5\frac{7}{32}$"H x $8\frac{11}{32}$"W x $12\frac{7}{8}$"D

WEIGHT: 19 lbs.

MODEL	VOLTS	AMPS
OPS 500B	0-500	0.04
OPS 1000B	0-1000	0.02
OPS 2000B	0-2000	0.01

STATIC SPECIFICATIONS

INFLUENCE QUANTITY		UNCOMMITTED CONTROL CHANNEL OFFSET VOLTAGE ΔE_{io}	UNCOMMITTED CONTROL CHANNEL OFFSET CURRENT ΔI_{io}
SOURCE: 105-125V a-c		$<10\ \mu V$	<1 nA
LOAD (No load—full load):		$<10\ \mu V^{(3)}$	<1 nA
TIME: 8-hour (drift)		$<20\ \mu V$	<1 nA
TEMPERATURE: Per °C		$<20\ \mu V$	<0.5 nA
RIPPLE and NOISE	rms	$<0.01\%$ of E_0	
	p-p	$<0.1\%$ of E_0	

The output effect can be calculated by the relationship:
$\Delta E_o = \pm\Delta E_r(R_f/R_i) \pm\Delta E_{io}(1 + R_f/R_i) \pm\Delta I_{io}(R_f)$,
where R_f is the feedback resistor and R_i is the input resistor from the reference, E_r

DYNAMIC SPECIFICATIONS

PARAMETER	STABILIZATION MODE	OPS 500B	OPS 1000B	OPS 2000B
BANDWIDTH (d-c to f_{-3dB})	Voltage	800 Hz	400 Hz	200 Hz
	Current	320 Hz	160 Hz	80 Hz
PROGRAMMING TIME CONSTANT	Voltage(1)	200 μsec	400 μsec	800 μsec
	Current(2)	500 μsec	1 msec	2 msec
LARGE SIGNAL FREQUENCY RESPONSE	Voltage	320 Hz	160 Hz	80 Hz
SLEWING RATE	Voltage	>1V/μsec	>1V/μsec	>1V/μsec
TRANSIENT RECOVERY (Step Load Change)	Voltage	<100 μsec	<100 μsec	<100 μsec
	Current	500 μsec	1 msec	2 msec

(1) Calculated for a feedback resistance of 1000 ohms per volt of output and a feedback capacitance of 400 pF. The range of capacitance available internally is 400 pF to 3900 pF.

(2) Calculated for a load resistance equal to $E_O$max/$I_O$max and the tabulated value for equivalent output capacitance.

OPS™

group X

HIGH SPEED OPERATIONAL POWER SUPPLIES

A high speed, high voltage fast-programmable voltage source: Because of its capacitorless output design, OPS models function at design-speed only when used with resistive loads.

MODEL	VOLTS	AMPS
OPS 3500	0-3500	0-0.01
OPS 5000	0-5000	0-0.005

DIMENSIONS: $5\frac{7}{32}$"H x 19"W x $16\frac{31}{32}$"D

WEIGHT: 45 lbs.

STATIC SPECIFICATIONS

INFLUENCE QUANTITY		UNCOMMITTED CONTROL CHANNEL OFFSET VOLTAGE ΔE_{io}	UNCOMMITTED CONTROL CHANNEL OFFSET CURRENT ΔI_{io}	CURRENT CONTROL CHANNEL OUTPUT EFFECTS	REFERENCE ±6.2V ±5% NOMINAL
SOURCE VOLTAGE (min.-max.):(1)		$<10\ \mu V$	<1 nA	$<10\ \mu A$	$<0.0005\%$
LOAD (No load—full load):		$<10\ \mu V^{(2)}$	<1 nA	$<10\ \mu A$	—
TIME (8-hour drift):		$<20\ \mu V$	<1 nA	$<0.01\%$ of $I_{o\,max}$	$<0.005\%$
TEMPERATURE, Per °C:		$<20\ \mu V$	<0.5 nA	$<0.01\%$ of $I_{o\,max}$	$<0.005\%$
RIPPLE and NOISE:	rms	$<0.01\%$ of E_0		$<50\ \mu A$	—
	p-p	$<0.1\%$ of E_0		$<500\ \mu A$	—

(1) 105-125/210-250V a-c. Model OPS 5000: 60 Hz ± 3% only.

(2) E_{io} for load in current stabilization mode is ΔE_o/open-loop gain. ΔE_o is the compliance voltage change.

The output effect can be calculated by the relationship:

$$\Delta E_o = \pm\Delta E_r(R_f/R_i) \pm\Delta E_{io}(1 + R_f/R_i) \pm\Delta I_{io}(R_f),$$

where R_f is the feedback resistor and R_i is the input resistor from the reference, E_r.

DYNAMIC SPECIFICATIONS

	STABILIZATION MODE	OPS 3500	OPS 5000
BANDWIDTH (d-c to f_{-3dB})	Voltage	230 Hz	160 Hz
	Current	130 Hz	100 Hz
PROGRAMMING TIME CONSTANT	Voltage(1)	700 μsec	1 msec
	Current(2)	1.2 msec	1.6 msec
LARGE SIGNAL FREQUENCY RESPONSE	Voltage	135 Hz	100 Hz
SLEWING RATE	Voltage	>3V/μsec	>3V/μsec
TRANSIENT RECOVERY (Step Load Change)	Voltage	<100 μsec	<100 μsec
	Current	1.2 msec	1.6 msec

(1) Calculated for a feedback resistance of 1000 ohms per volt of output and a feedback capacitance of 200 pF. The range of capacitance available internally is 200 pF to 1900 pF.

(2) Calculated for a load resistance equal to E_{omax}/I_{omax} and the tabulated value for equivalent output capacitance.

KEPCO® DIGITAL PROGRAMMING INTERFACES

TLD 488-16 INTERACTIVE PROGRAMMER

FOR CONTROLLING UP TO 16 POWER SUPPLIES, USING CIIL COMMANDS

This new Kepco interface not only enables your computer or bus controller to give commands over the IEEE 488 bus to as many as 16 Kepco ATE or BOP power supplies; it also enables the power supplies to respond with appropriate flags if they are unable to carry out those commands.

The commands you can give are voltage setting with current limit, or current setting with voltage limit. The TLD 488-16 automatically translates the desired voltage or current settings into percentages of full scale.

A discrete fault (or status) monitor reports catastrophic failure either in the unit itself, or in the power supplies.

The TLD 488-16 consists of one single-board microcomputer which uses the 8088 CPU microprocessor, and as many as four plug-in boards. The "A" boards are for Kepco ATE power supplies: TL 488-1A controls one power supply, TL 488-2A controls two, and TA 488-4A controls four. TL 488-4B controls up to four Kepco bipolar BOP power supplies. All control circuits of the plug-in boards are optically isolated, to 500 Volts, from each other and from the digital interface circuit. The microcomputer board and all plug-in boards are standard Multibus(1) size.

TLD 488-16 recognizes these CIIL commands:

Function
Close
Set
Open
Reset
Confidence Test
Internal Self Test
Status

It recognizes this noun:
Direct Current Source

It recognizes these noun modifiers:

Voltage
Current
Voltage Limit
Current Limit

(the only allowable combinations of noun modifiers are "Voltage with Current Limit" and "Current with Voltage Limit")

It can receive from the power supplies under its control, and transmit to the host computer, these error messages:

Voltage Comparison Error
Current Comparison Error
Invalid Command
Voltage Out of Range
Relay Not Open(2)
Relay Not Closed(2)
Set Modifier Error
Current Out of Range
Device Not Present
Device Not Selected
Device Disconnected
Crowbarred
Overload

TLD 488-16 implements these interface functions on the IEEE 488 bus:

Source Handshake
Acceptor Handshake
Service Request
Talker
Listener
Device Clear

---

(1) Multibus™ is a trademark of the Intel Corporation

(2) Refers to optional relay TLR 25 or TLR 200

GENERAL SPECIFICATIONS

Ambient operating temperature range: 0 to +55°C Storage range: −20 to +75°C
Mounting: 19″ rack (Provisions for Jonathan 130-QD series slides)
A-C input: Selectable 115/230V a-c; 50~60 Hz
Input current: @ 115V a-c: 5A; @ 230V a-c: 2.5A
Aux. d.c. output: +5V at 10A
Dimensions: 5-7/32″ x 19″ x 16-3/16″ Weight: 8 lbs.
Color: Gray, Fed. Std. 26440

This KEPCO product is backed by a firm 5-YEAR WARRANTY

ISOLATION RELAYS TLR 25 AND TLR 200

These relays are interposed between the power supplies controlled by the TLD 488-16 and their loads. They are operated by the TLD 488 through a separate, discrete interface, and respond to the CIIL commands "open" and "close".

TLR 25 is rated at 25 Amps, TLR 200 at 200 Amps.

The relays mount behind the power supply. Adapter ADR 1 bolts on the back of full rack ATE models, and holds one TLR 200. Smaller ATE models mount on the 7″-high rack adapter. RA 41, which provides space behind the power supplies for the relays, using adapter ADR 4 which holds four TLR 25s.

PLUG-IN PROGRAM CARDS

(Standard Multibus Size)

The TLD 488-16 has provision for up to four plug-in cards, which can control the voltage and current function of up to four Kepco unipolar ATE or bipolar BOP power supplies.

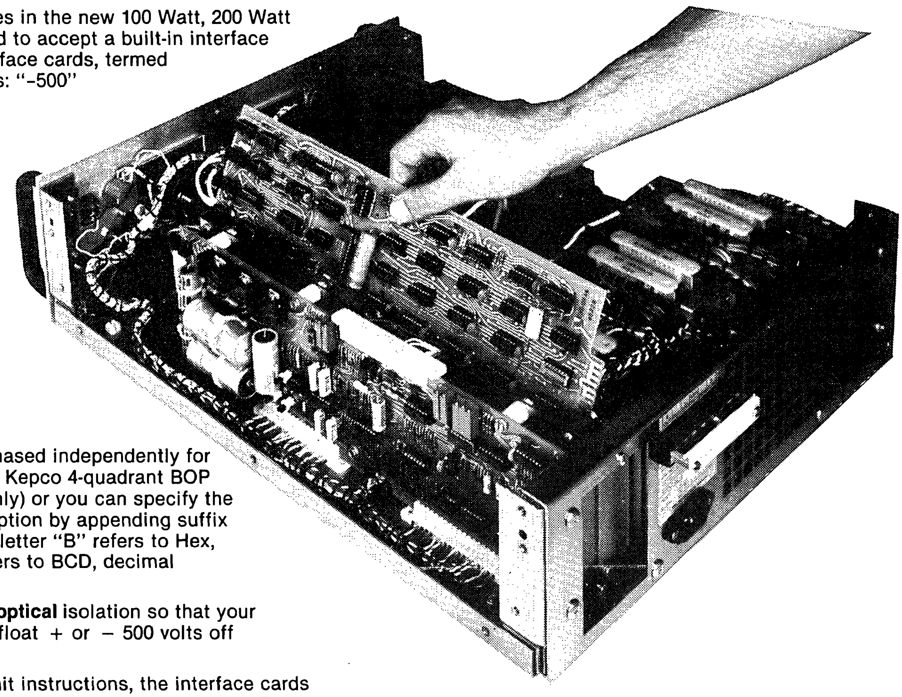
SPECIFICATIONS

MODEL	For ATE Models: TL 488-1A -2A -4A	For BOP Models: TL 488-4B
Number of isolated input/output ports	1 2 4	4
Analog outputs/port	Two channels.	
Analog output channels mode of Operation	Voltage and Current Limit or Current and Voltage Limit. Determined by noun modifiers within set command.	
Analog output voltage level	0 to + 10V for Volt. or Volt. limit channel 0 to + 1V for Curr. or Curr. limit channel.	0 to ± 10V for main or Curr. channel. 0 to + 10V for complementary Curr. or Volt. limit channel.
Analog output current level	0 to + 2mA per channel.	0 to ± 2mA for main channel. 0 to + 2mA for limit channel.
Output impedance	< 0.05 ohms.	
Output resolution	12 bit.	
Linearity error (0 to + 70 °C)	< ± ½ LSB.	
Adjustments (both channels)	Full scale calibration. Zero adjustment.	
Temp. coefficient (per degree C)	± 0.002% at full scale. ± 20μV at zero.	
Isolation between ports	500V d-c.	
Power supply ident. codes	Set with DIP switch for each port.	
Input signals accepted from the power supply	Supply absent flag. Voltage/current mode flag. Crowbar flag. Volt. out of limit (0.1% of full scale). Curr. out of limit (1.0% of full scale).	
Input digital commands	Via Multibus from TLA 488-16. All signals TTL compatible.	
Power requirements	+ 5V at 2A, via Multibus from TLA 488-16.	
Card, Physical characteristics	Width: 12''. Length 6.75''. Thickness: 0.5''. Weight: 20 ounces.	

This KEPCO product is backed by a firm 5-YEAR WARRANTY

KEPCO®

INTERNAL DIGITAL PROGRAMMING INTERFACES FOR THE BIPOLAR POWER SUPPLIES



Digital interface card mounts inside your BOP and provides either parallel data or IEEE-488 control.

The Kepco Bipolar power supplies in the new 100 Watt, 200 Watt and 400 Watt series are designed to accept a built-in interface card for digital control. The interface cards, termed "BIT", are available in two styles: "-500" for parallel data buses and "-488" for the popular instrumentation bus based on IEEE-488. In either style, the cards are available with either hexadecimal (12 bit) or decimal (3-BCD) format.

Each card is configured to control either the host BOP's voltage control channel or its current control channel as the user may select. There is an additional "limit channel" which can be addressed to control either voltage or current limits with 8 bit or 2-BCD resolution.

The interface cards can be purchased independently for field installation into an existing Kepco 4-quadrant BOP (100W, 200W, or 400W models only) or you can specify the interface as a factory-provided option by appending suffix -500B (or D) or -488 B (or D). The letter "B" refers to Hex, binary control; the letter "D" refers to BCD, decimal control.

The interface cards incorporate **optical** isolation so that your power supply can be allowed to float + or − 500 volts off digital ground.

In addition to the setting and limit instructions, the interface cards accept polarity (plus or minus) and range (10:1) instructions. The BIT-488 cards (IEEE-488) also implement the GPIB's remote enable and device clear interface functions.

An interconnecting cable is provided for field installation of the series BIT interface card into the host power supply. The interconnect cable from a BIT-488 interface to a GPIB is included when the digital interface is ordered. Model SNQ 488-2 (2 meters long).

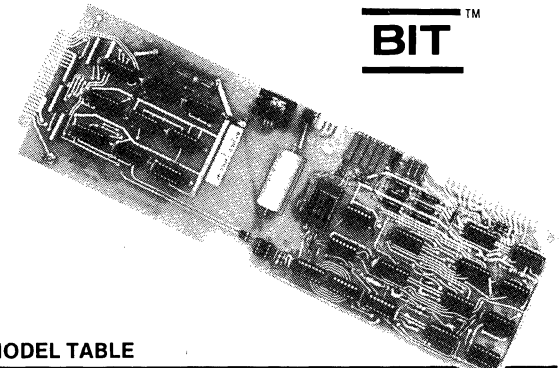
The BIT-500 parallel data interfaces require only a digital input connector model PC-12 which is supplied with the interface card.

Data Form (For IEEE-488 interfaces)
The digital interface looks for an instruction of the form CMMMLL (six ASCII encoded characters) where "C" is a 1-byte control character that specifies range and polarity while "MMM" are the 3 characters that specify the setting of the main control channel (voltage or current) in terms of percent of full scale. "LL" are the two control characters for the corresponding limit channel.

SPECIFICATIONS

OUTPUT VOLTAGE (Main Channel)	High Range	0 to ± 10V	
	Low Range	0 to ± 1.0V	
OUTPUT VOLTAGE (Limit Channel)		0 to + 10V	
OUTPUT CURRENT (Each Channel)		± 2.0 mA max	
OUTPUT IMPEDANCE		<0.05 ohms	
LINEARITY ERROR (0 to + 70°C)		± 1/2 LSB	
TEMPERATURE COEFFICIENT	Full Scale	± 35 PPM/°C max	
	Zero, High Range	± 20 μV/°C max	
	Zero, Low Range	± 10 μV/°C max	
LOGIC INPUT		TTL COMPATIBLE	
DATA TRANSFER FORMAT		Byte serial, BIT parallel (for BIT 488)	BIT parallel (for BIT 500)
INTERFACE FUNCTIONS IMPLEMENTED (for BIT 488 only)		AH1, L1 RL2, DC2	
SOURCE POWER		Supplied by Host Power Supply	

BIT™



MODEL TABLE

SUFFIX (1)	MODEL (2)	DATA FORMAT	RESOLUTION Principal Channel	RESOLUTION Limit Channel	INPUT
−488-B	BIT 488-B	ASCII/Hex	12 Bits (binary)	8 Bits (binary)	For IEEE-488 (GPIB) bus
−488-D	BIT 488-D	ASCII/Decimal	3-Digit (BCD)	2-Digit (BCD)	For IEEE-488 (GPIB) bus
−500-B	BIT 500-B	Hexadecimal	12 Bits (binary)	8 Bits (binary)	For parallel data transfer bus
−500-D	BIT 500-D	Decimal	3-Digit (BCD)	2-Digit (BCD)	For parallel data transfer bus

(1) Add to model No. of the BOP to specify a factory-installed interface.
(2) Use this designation when ordering separately for field installation.

KEPCO®

STAND ALONE DIGITAL INTERFACES FOR SINGLE OR MULTIPLE CHANNEL OPERATION

These digital programmers are designed for use with all Kepco operationally-programmable power supplies (high speed and conventionally filtered) and/or voltage-controlled instruments. They enable you to interface your d-c power supplies with the logic bus of a computer-controlled system.

The interface output is an isolated ±10 volt analog signal that makes a simple 2-wire connection to the programming terminals of Kepco ATE, BOP and other programmable power supplies.
Use the 2-channel version to control both voltage and current.

The two channels provided on each Model SN 488-B or SN 488-D plug-in card in the 4-card or 8-card housings are not isolated. Use them to control both voltage and current of the same power supply.

MODEL		SINGLE AND DUAL-CHANNEL PROGRAMMERS, ¼-RACK SIZE								PLUG-IN BOARDS FOR 4 CARD & 8-CARD HOUSINGS	
		SN488-121	SN488-122	SN488-031	SN488-032	SN500-121	SN500-122	SN500-031	SN500-032	SN 488-B	SN 488-D
NUMBER OF CHANNELS		1	2	1	2	1	2	1	2	2	2
INPUT DATA CODING FORMAT		Hex		Decimal		Hex		Decimal		Hex	Decimal
RESOLUTION		12 Bit		3 Digit		12 Bit		3 Digit		12 Bit	3 Digit
LINEARITY ERROR		± 1/2 LSB									
OUTPUT CURRENT		2 mA max.									
OUTPUT IMPEDANCE		<0.05 ohms									
OUTPUT VOLTAGE	High Range	± 10V									
	Low Range	± 1V									
LOGIC INPUT		TTL COMPATIBLE									
DIGITAL INPUT DATA TRANSFER FORMAT		Byte Serial, Bit Parallel				Bit Parallel				Byte Serial, Bit Parallel	
A-C INPUT	Voltage	105-125V/210-250V (selectable by switch)									
	Frequency	50-440 Hz									
	Power	≈12 VA								≈7 VA	
ISOLATION		1000V max. between digital input and analog input									

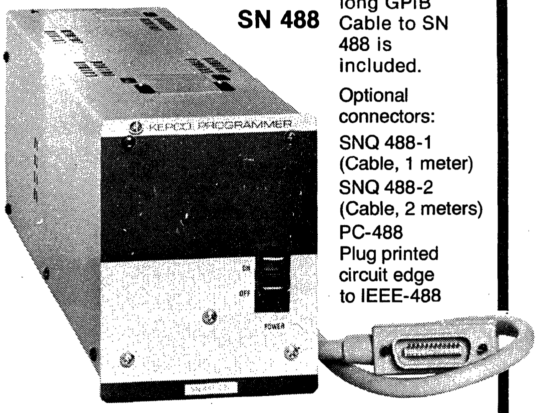
QUARTER-RACK STYLE PROGRAMMERS

Are available in either bit-parallel format or byte-serial format that is compatible with any IEEE-488 controller. You can buy single channel models or programmers with two independent, isolated channels.

SN 488

A 2-meter long GPIB Cable to SN 488 is included.

Optional connectors:
SNQ 488-1 (Cable, 1 meter)
SNQ 488-2 (Cable, 2 meters)
PC-488 Plug printed circuit edge to IEEE-488



DIMENSIONS: $5\frac{7}{32}$"H x $4\frac{5}{32}$"W x $17\frac{3}{16}$"D.
WEIGHT: 10 lbs.

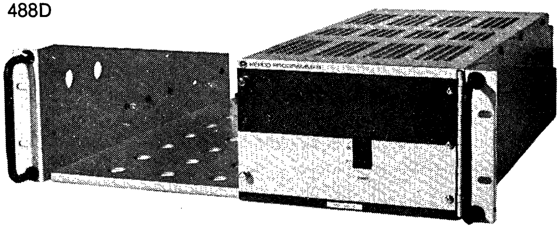
Applicable to Model SN 488-121,-122,-031-,032
and to Model SN 500-121,-122,-031,-032

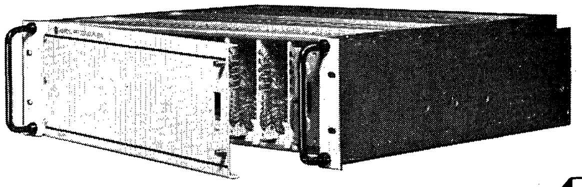
CARD-CAGE STYLE PROGRAMMERS FOR MULTIPLE UNIT SYSTEMS

HALF RACK SNR 488-4

Housing for 4 Dual-Channel Cards
SN 488B or SN 488D

DIMENSIONS:
$5\frac{7}{32}$"H x 19"W
x $17\frac{13}{16}$"D
WEIGHT: 17 lbs.





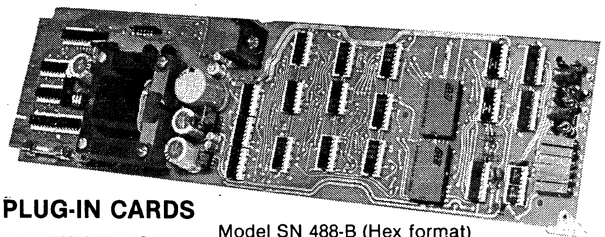
FULL RACK SNR 488-8

Housing for 8 Dual-Channel Cards
SN 488B or SN 488D

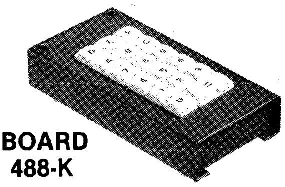
DIMENSIONS: $5\frac{7}{32}$"H x 19"W x 18"D **WEIGHT:** 23 lbs.

This KEPCO product is backed by a firm' 5-YEAR WARRANTY

ACCESSORIES FOR USE WITH SNR 488-4 AND SNR 488-8



PLUG-IN CARDS
FOR EITHER HOUSING Model SN 488-B (Hex format)
Model SN 488-D (BCD format)



KEYBOARD
SN 488-K

Hexadecimal keyboard for manually driving SNR 488-4 or SNR 488-8 *Weight:* 0.8 lbs.

CABLES (IEEE-488 INTERFACE)

SNC 488-1	(1 meter)
SNC 488-2	(2 meter
SNC 488-4	(4 meter)

KEYBOARD CABLES

SNP 488-1	(1 meter)
SNP 488-2	(2 meter)
SNP 488-4	(4 meter)

KEPCO, INC. • 131-38 SANFORD AVENUE, FLUSHING, NY 11352 USA • (718) 461-7000 • TWX #710-582-2631 • FAX: (718) 767-1102

KEPCO® HARDWARE

RACK ADAPTER PANELS

These models adapt Kepco (linear and ferroresonant modules) power supplies to the standard 19" wide equipment rack or cabinet.
Panel mounting holes are pre-drilled (standard E.I.A. pattern).
Finish: Light gray, color 26440, Fed. Std. 595.

MODEL	DESCRIPTION	USED FOR	DIMENSIONS HEIGHT inches	HEIGHT mm	WIDTH inches	WIDTH mm
RA 8-2	2 unit rack adapter	PRM size A and AA series or size C: Dual Output, Extra-Filtered and -450 series	$5\frac{7}{32}$	132.6	19	482.6
RA 9-3	3 unit rack adapter	PRM size A and AA series or size C: Dual Output, Extra-Filtered and -450 series	$6\frac{31}{32}$	177.0	19	482.6
RA 10-1	1 unit rack adapter	PRM size A and AA series	$5\frac{7}{32}$	132.6	19	482.6
RA 14-3	3 unit rack adapter	PRM size B-120 series or size D-60 series	$3\frac{15}{32}$	88.1	19	482.6
RA 15-1	1 unit rack adapter	PRM size B-120 series	$3\frac{15}{32}$	88.1	19	482.6
RA 16-4	4 unit rack adapter	PRM size B-120 series or size D-60 series	$5\frac{7}{32}$	132.6	19	482.6
RA 17-5	5 unit rack adapter	PRM size B-120 series or size D-60 series	$5\frac{7}{32}$	132.6	19	482.6
RA 18-1	1 unit rack adapter	PRM size C-180F series Extra-Filtered	$5\frac{7}{32}$	132.6	19	482.6
RA 26-1	1 unit rack adapter	PAT model	$3\frac{15}{32}$	88.1	19	482.6
RA 27-2	2 unit rack adapter	PAT models	$3\frac{15}{32}$	88.1	19	482.6
RA 28-4	4 unit rack adapter	PAT models	$6\frac{31}{32}$	177.0	19	482.6
RA 30-1	1 unit rack adapter	PRM size D-60 series	$3\frac{15}{32}$	88.1	19	482.6
RA 31-1	1 unit rack adapter	PRM size C-300 series Dual Output	$5\frac{7}{32}$	132.6	19	482.6
RA 33-3	3 unit rack adapter	PTR models	$3\frac{1}{82}$	132.6	19	482.6
RA 34-4	4 unit rack adapter	PTR models	$5\frac{1}{4}$	133.4	19	482.6
RA 35-1	1 unit rack adapter	PTR model	$3\frac{1}{2}$	88.9	19	482.6
RA 38-1	1 unit rack adapter	PRM size C-450 series	$5\frac{7}{32}$	132.6	19	482.6

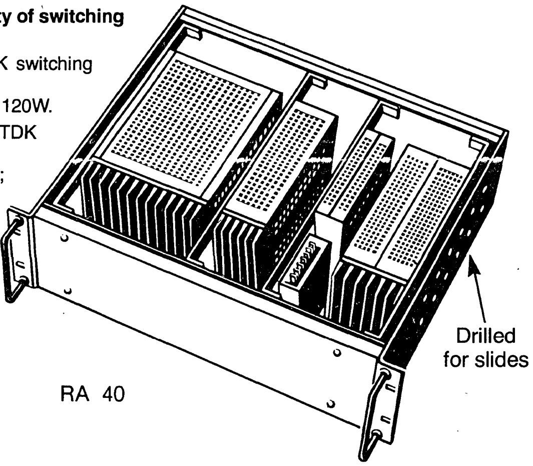
RACK MOUNTING SYSTEMS RA 39™ RA 40™ for switchers

The RA-39 and RA-40 rack mount systems are designed to allow you to combine a variety of switching Power Supply modules in a standard 19" equipment housing.

THE RA-39 SYSTEM: This system is designed for installation of the following KEPCO/TDK switching power units:
RMK-S; RMX-A,-B; RMD-SA,-AA,-A,-B; RMT-SA,-AA; RDT-AA; MP-H; CMP-H; ERX-30W, 60W, 120W.

THE RA-40 SYSTEM: This system is designed for installation of the following KEPCO/TDK switching power units:
RMK-S; RMX-A,-B,-C,-N,-D; RMD-SA,-AA,-A,-B,-D; RMT-SA,-AA; RXT-C; RDT-AA; MP-H; CMP-H; ERX-30W, 60W, 120W.

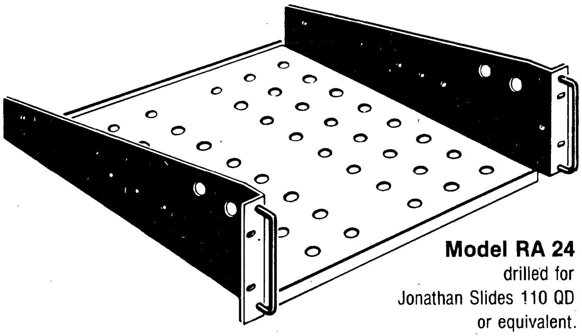
MODEL	DESCRIPTION	HEIGHT inches	HEIGHT mm	WIDTH inches	WIDTH mm	DEPTH inches	DEPTH mm	SHIP WGT LBS	SHIP WGT KG
RA 39	rack adapter	$3\frac{15}{32}$	88.1	19	482.6	$14\frac{29}{32}$	378.6	4	1.9
RA 40	rack adapter	$5\frac{7}{32}$	132.6	19	482.6	$14\frac{29}{32}$	378.6	5	2.3
RAB 39-40	for R-series	$\frac{3}{4}$	19.1	$\frac{3}{4}$	19.1	$12\frac{63}{64}$	329.8	1	0.5
RAB 39-40X	for ERX	1	25.4	$\frac{3}{4}$	19.1	$12\frac{63}{64}$	329.8	1	0.5
ADP 40H	use with RAB 39-40 to mount CMP & MP	$3\frac{15}{32}$	88.1	$2\frac{49}{64}$	70.2	$\frac{1}{16}$	1.6	1	0.5



KEPCO® RACK MOUNTING SYSTEMS

RA 24™ RA 37™

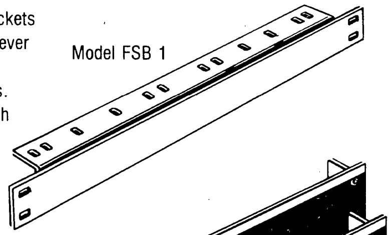
Model RA 24 mounts ATE, APH, BOP, JQE, MPS, OPS IXB, SN 488 and SN 500.
Model RA 37 mounts only ATE, SN 488, SN 500 and BOP ¾ Rack.



Model RA 24
drilled for
Jonathan Slides 110 QD
or equivalent.

Model FSB

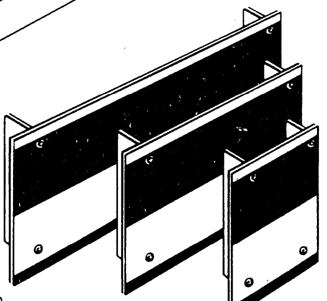
The filler support brackets should be used whenever the total load in an RA-24 exceeds 75 lbs. Mount directly beneath the lower front edge of the housing and fasten to the rack edge.



Model FSB 1

BLANK FILLER PANELS

are finished with a matching stripe on one side and solid gray on the other. Color 26440 per Fed. Std. 595.



Model RFP 24-3
Model RFP 37-3

Model RFP 24-2
Model RFP 37-2

Model RFP 24-1
Model RFP 37-1

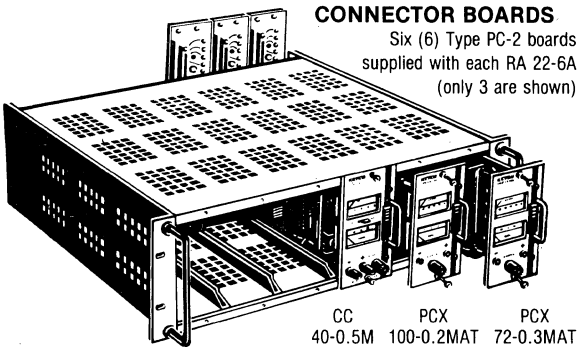
MODEL	DESCRIPTION	DIMENSIONS(1) H	DIMENSIONS(1) W
RA 24	Rack mount for (2) ½ or (4) ¼ rack models, 17⅞'' deep	5 7/32 132.6	19'' 482.6
RA 24B	Blank bottom for custom drilling	5 7/32 132.6	19'' 482.6
RA 37	Reinforced rack mount system, 20'' deep	5 7/32 132.6	19'' 482.6
RFP 24-1 **RFP 37-1**	¼ filler panel for RA 24 ¼ filler panel for RA 37	5 7/32 132.6	4 5/32 105.6
RFP 24-2 **RFP 37-2**	½ filler panel for RA 24 ½ filler panel for RA 37	5 7/32 132.6	8 11/32 211.9
RFP 24-3 **RFP 37-3**	¾ filler panel for RA 24 ¾ filler panel for RA 37	5 7/32 132.6	12 17/32 318.3
FSB 1	Filler support bracket	1 23/32 43.6	19'' 482.6
FSB 3	Filler support bracket	3 15/32 88.1	19'' 482.6
FSB 5	Filler support bracket	5 7/32 132.6	19'' 482.6

(1) Upper dimensions are in inches; lower dimensions in millimeters.

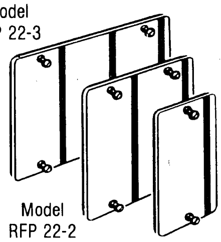
RA 22-6A™ RA 32™

The model RA-22-6A mounts Kepco Laboratory-type power supplies CC and PCX-MAT
The model RA-32 mounts, CC, PCX-MAT and any one ½ Rack or two ¼ rack size models.

PLUG-IN CONNECTOR BOARDS
Six (6) Type PC-2 boards supplied with each RA 22-6A (only 3 are shown)



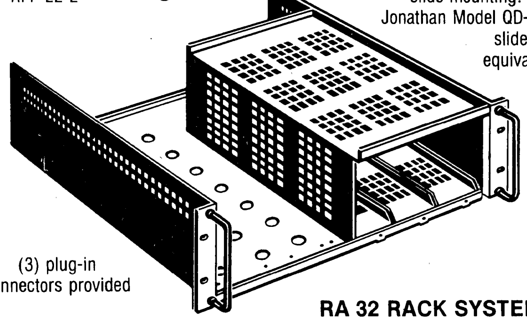
6-SLOT RACK HOUSING—MODEL RA 22-6A



FILLER PANELS

supplied without slide assembly and handle, may be used to fill unused slots in RA 22 6A, RA 32, CA 4 and CA 5.

NOTE: RA 32 is drilled for slide mounting. Use Jonathan Model QD-110 slides or equivalent



(3) plug-in connectors provided

RA 32 RACK SYSTEM
combines three plug-in slots of the RA 22-6A with a half-rack space from RA 24 to provide a convenient way of mixing models.

MODEL	DESCRIPTION	DIMENSIONS(2) H	DIMENSIONS(2) W	DIMENSIONS(2) D
RA 22-6A	Six-slot rack housing including (6) PC-2 connectors.	5 7/32 132.6	19 482.6	16¼ 412.8
RFP 22-1	Single filler panel	5 7/32 132.6	2 25/32 70.6	—
RFP 22-2	Double filler panel	5 7/32 132.6	5 9/16 141.2	—
RFP 22-3	Triple filler panel	5 7/32 132.6	8⅜ 212.7	—
RA 32	Rack adapter for (1) half-rack or (2) ¼-rack plus (3) ⅙-rack slots	5 7/32 132.6	19 482.6	19 482.6
PC 2	Edge-connector to barrier-strip interface	5 7/32 132.6	2 21/32 67.5	—
PC 8	Edge-connector to cable interface for CC and PCX-MAT	—	—	—

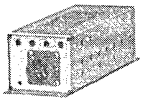
(2) Upper dimensions are in inches; lower dimensions in millimeters.

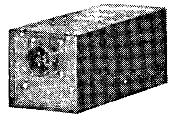
kgs electronics A GAR Enterprises Co.

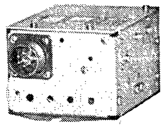
*Dept. EM • 2029 North Lincoln Avenue • Pasadena, California 91103 • Telephone **(818)** 798-0786*

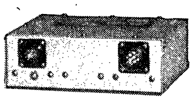
The KGS ELECTRONICS Model LT-SERIES are pulse width-modulated DC to DC converters that provide regulated power. These converters transform an unregulated 28 VDC to a regulated and adjustable DC output via a remote control potentiometer or DC voltage control. The models LT-25 and LT-2XXX-400 require 115 VAC, 400 Hz input for a DC output.

The Model LT-SERIES are used to control the light intensity of incandescent bulbs in aircraft instrument lighting when voltage control is required.


LT-50


LT-52A


LT-55


LT-352

MODEL LT-SERIES SPECIFICATIONS

Input Voltage:	28 VDC nominal, 20 to 40 VDC.
Output Voltage:	Adjustable with external rheostat or potentiometer and most models have DC voltage control
Regulation:	2% for line, 2% load and 2% temperature.
Output Ripple:	50 mVpp max.
Altitude:	55,000 ft.
Protection: (Overvoltage)	Output voltage is limited to approximately 125% of rating even though remote control rheostat opens or shorts, or internal failure occurs.
Temperature:	-55°C to +71°C (sufficient cooling required at +71°C ambient)
Protection: (Overload)	Input and output current pulse when overload exceeds approximately 125% of rating.

MODEL	OUTPUT (TOTAL)				INPUT CURR. at 28 VDC, at Full Load	EFFICIENCY % Typical at Full Load	SIZE (INCH) W x L x H	WEIGHT (LBS.)
	VOLT DC	AMPS	WATTS	RIPPLE				
BC-28	28±2 Adj.	2.5±0.5	70	25 mVpp	3.0 A	85	2.3 x 5.8 x 2.3	1.5
BC-328	28±2 Adj. (Three)	2.0±0.5	56	25 mVpp	7.2 A	83	6.7 x 6.5 x 2.35	3.6
CL-32	24	100 mADC 200 mADC	53	1 mVpp	4.8 A	85	1.56 x 4.0 x 3.05	0.75
LT-48	0 to 5	7.5	40	25 mVpp	1.7 A	75	2.03 x 5.03 x 1.63	0.80
LT-50	0 to 5	7.5	40	8 mVpp	1.7 A	75	2.3 x 6.9 x 2.0	1.2
LT-52A, 53	0 to 5	10.0	50	25 mVpp	2.5 A	73	2.3 x 5.8 x 2.3	1.5
LT-55( )	0 to 5	15	75	25 mVpp	3.6 A	75	3.43 x 5.1 x 2.6	1.2
LT-55(A)	0 to 5	15	75	25 mVpp	3.6 A	75	3.43 x 5.1 x 2.6	1.2
LT-55(D)	0 to 5	15	75	25 mVpp	3.6 A	75	3.43 x 5.1 x 2.6	1.2
LT-70, 73	0 to 12	5.8	70	25 mVpp	3.2 A	78	2.3 x 5.8 x 2.3	1.5
LT-71, 71A	14	8	112	50 mVpp	4.7 A	80	2.4 x 6.9 x 2.2	1.5
LT-100, 103	0 to 28	3.6	100	25 mVpp	4.2 A	84	2.3 x 5.8 x 2.3	1.5
LT-352	0 to 5 (Three)	28	150	25 mVpp	7.5 A	73	6.7 x 6.5 x 2.35	3.6
LT-370	0 to 12 (Three)	17	200	25 mVpp	9.2 A	78	6.7 x 6.5 x 2.35	3.6
LT-3100	0 to 28 (Three)	11	300	25 mVpp	12.8 A	84	6.7 x 6.5 x 2.35	3.6
LT-25	1 to 28	10	280	0.5 Vpp	2.9 A at 115 VAC, 400 Hz	84	4.0 x 7.0 x 4.0	6.0
LT-252-400	0 to 5	0 to 20	100	25 mVpp	1.6 A at 115 VAC, 400 Hz	54	6.7 x 6.5 x 2.35	3.6
LT-270-400	0 to 12	0 to 12	150	25 mVpp	2.0 A at 115 VAC, 400 Hz	65	6.7 x 6.5 x 2.35	3.6
LT-2100-400	0 to 28	0 to 7	200	25 mVpp	2.8 A at 115 VAC, 400 Hz	62	6.7 x 6.5 x 2.35	3.6

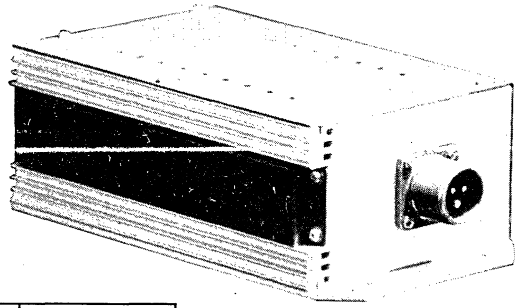
RM: typical at room ambient

DC TO DC POWER CONVERTER (UNREGULATED)

The KGS ELECTRONICS Model UC-SERIES are transistorized DC to DC converters that provide unregulated output power.

No mechanical rotating parts are used, thereby greatly increasing reliability and also eliminating periodic maintenance. Units have parallel capability for higher power if required.

The UC-SERIES allows operation of instruments and equipment requiring either 13.75 or 27.5 VDC.



MODEL UC-SERIES SPECIFICATIONS

Ripple:	Less than 100 mVpp
Regulation:	Output voltage varies proportional to the input voltage variation.
Efficiency:	90% plus
Temperature:	-55°C to +70°C
Weight:	3.4 pounds (1.5 Kg)
Altitude:	45,000 feet

MODEL	OUTPUT			INPUT CURRENT	SIZE (INCH)
	VOLT DC	AMPS	WATTS		
UC-14-28	27.5	10	275	23 amps at full load	4.5 x 8.3 x 2.8
UC-28-14	13.75	16	220	0.55 of output current	4.5 x 8.3 x 2.8

AC ADAPTER

I. DC OUTPUT

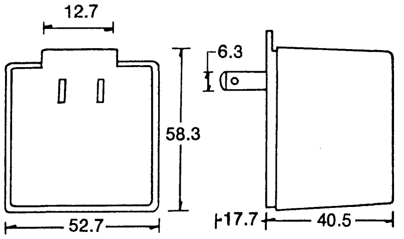
ALL MODELS ARE:
UL LISTED FILE No: E87297
CSA APPROVED FILE No: LR57562

MODEL NO.	INPUT VAC	INPUT HZ	OUTPUT VDC	OUTPUT MA	SIZE
AD—0450	120	60	4.5	500	41
AD—0630	120	60	6	300	41
0640	120	60	6	400	41
0650	120	60	6	500	41
0660	120	60	6	600	41
0670	120	60	6	700	41
0680	120	60	6	800	41
0690	120	60	6	900	48
061A	120	60	6	1000	48
AD—0730	120	60	7.5	300	41
0740	120	60	7.5	400	41
0750	120	60	7.5	500	41
AD—0780	120	60	7.5	800	48
0790	120	60	7.5	900	48
071A	120	60	7.5	1000	48
AD—0920	120	60	9	200	41
0930	120	60	9	300	41
0940	120	60	9	400	41
0950	120	60	9	500	41
0960	120	60	9	600	41
0970	120	60	9	700	48
0980	120	60	9	800	48
091A	120	60	9	1000	48
AD—1220	120	60	12	200	41
1230	120	60	12	300	41
1235	120	60	12	350	41
1240	120	60	12	400	41
1250	120	60	12	500	41
1260	120	60	12	600	48
1270	120	60	12	700	48
1280	120	60	12	800	48
AD—1515	120	60	15	150	41
1520	120	60	15	200	41
1525	120	60	15	250	41
1530	120	60	15	300	41
1535	120	60	15	350	41
1540	120	60	15	400	41
1550	120	60	15	500	48
1560	120	60	15	600	48

MODEL NO.	INPUT VAC	INPUT HZ	OUTPUT VDC	OUTPUT MA	SIZE
AD—1615	120	60	16	150	41
1620	120	60	16	200	41
1625	120	60	16	250	41
1630	120	60	16	300	41
1635	120	60	16	350	41
1645	120	60	16	450	48
1650	120	60	16	500	48
1655	120	60	16	550	48
AD—1815	120	60	18	150	41
1820	120	60	18	200	41
1825	120	60	18	250	41
1830	120	60	18	300	41
1835	120	60	18	350	48
1840	120	60	18	400	48
1845	120	60	18	450	48
1850	120	60	18	500	48
AD—2010	120	60	20	100	41
2015	120	60	20	150	41
2020	120	60	20	200	41
2025	120	60	20	250	41
2030	120	60	20	300	41
2035	120	60	20	350	48
2040	120	60	20	400	48
2045	120	60	20	450	48
AD—2230	120	60	22	300	48
2235	120	60	22	350	48
2240	120	60	22	400	48
AD—2410	120	60	24	100	41
2415	120	60	24	150	41
2420	120	60	24	200	41
2425	120	60	24	250	41
2430	120	60	24	300	48
2435	120	60	24	350	48

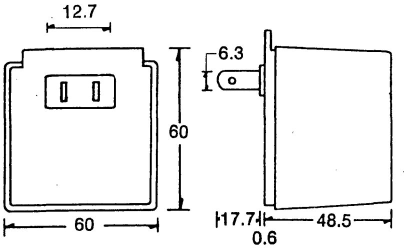
SIZE 41

Unit: mm



SIZE 48

Unit: mm



- * **Other non-standard outputs are available upon request.**
- * **All models available in 220-240 Volt/50 Hz to VDE, BS, SAA specifications.**
- * **All models are supplied with 6 ft., 22-24 AWG power cord and plug of your choice.**
- * **120/220/240 switchable models available upon request.**
- * **Private Label name plates available.**
- * **Custom Design to your own specifications.**

TRANS power

LZR ELECTRONICS, INC.
8174 Beechcraft Ave., Gaithersburg, MD 20879
Tel: (301) 921-9440
Telex: 71-3746453 (LZR INC USA) Telefax: (301) 6700436 D.D.D. (301) 9219733
ON WEST COAST CALL: **Pillar Industries Inc.** Tel: (818) 333-8803 TLX: 371 9700 (PLINC)

AC ADAPTER

II. AC OUTPUT

AD-41 SERIES
ALL MODELS ARE: UL LISTED FILE No: E87297
CSA APPROVED FILE No: LR57562

MODEL NO.	INPUT VAC	INPUT HZ	OUTPUT VAC	OUTPUT MA	SIZE
AA—0650	120	60	6	500	41
0660	120	60	6	600	41
0670	120	60	6	700	41
0680	120	60	6	800	41
061A	120	60	6	1000	41
AA—0753	120	60	7.5	530	41
0760	120	60	7.5	600	41
0770	120	60	7.5	700	41
0780	120	60	7.5	800	41
071A	120	60	7.5	1000	41
AA—0930	120	60	9	300	41
0940	120	60	9	400	41
0950	120	60	9	500	41
0960	120	60	9	600	41
0970	120	60	9	700	41
0980	120	60	9	800	41
091A	120	60	9	1000	41
AA—1230	120	60	12	300	41
1240	120	60	12	400	41
1250	120	60	12	500	41
1260	120	60	12	600	41

MODEL NO.	INPUT VAC	INPUT HZ	OUTPUT VAC	OUTPUT MA	SIZE
AA—1270	120	60	12	700	41
1280	120	60	12	800	41
1283	120	60	12	830	41
AA—1303	120	60	13.2	830	41
AA—1620	120	60	16	200	41
1630	120	60	16	300	41
1640	120	60	16	400	41
1650	120	60	16	500	41
1660	120	60	16	600	41
1663	120	60	16	630	41
AA—1830	120	60	18	300	41
1840	120	60	18	400	41
1850	120	60	18	500	41
1860	120	60	18	600	41
AA—2030	120	60	20	300	41
2040	120	60	20	400	41
2050	120	60	20	500	41
AA—2430	120	60	24	300	41
2440	120	60	24	400	41
2445	120	60	24	450	41

III. AD 57/66 SERIES AC ADAPTERS

INPUT: 120 VAC/60 Hz
AC OUTPUT

MODEL	INPUT	OUTPUT VAC	OUTPUT AMP	APPROVAL UL	APPROVAL CSA
AA121A	120/60Hz	12	1 A	√	
AA1212A	120/60Hz	12	1.2 A	√	
AA12167A	120/60Hz	12	1.67A	√	
AA122A	120/60Hz	12	2.0 A	√	
AA1233A	120/60Hz	12	3.3 A	√	
AA1215A	120/60Hz	12	1.25A	√	√
AA161A	120/60Hz	16	1.0 A	√	
AA1984A	120/60Hz	19	0.84A	√	
AA20125A	120/60Hz	20	1.25A	√	
AA2483A	120/60Hz	24	0.83A	√	
AA241A	120/60Hz	24	1.0 A	√	
AA2412A	120/60Hz	24	1.2 A	√	√
AA24166A	120/60Hz	24	1.66A	√	

IV. AD 57/66 SERIES AC ADAPTERS

ALL UNITS:
INPUT - 120 VAC/60 Hz
DC OUTPUT

MODEL	OUTPUT	APPROVAL UL	APPROVAL CSA
AD121A	12VDC 1Amp		
AD1212A	12VDC 1.2Amp	√	√
AD1480A	14VDC 0.8Amp	Pending	
AD1215A	12VDC 1.5Amp		
AD161A	16VDC 1.0Amp		
AD1880A	18VDC 800MA	√	
AD181A	18VDC 1.0Amp		
AD1812A	18VDC 1.2Amp		
AD2080A	20VDC 800MA		
AD201A	20VDC 1 Amp		
AD2450A	24VDC 0.5Amp	√	
AD2460A	24VDC 0.6Amp		

V. MULTI OUTPUT DESK TYPE REGULATED POWER SUPPLIES

UL/CSA APPROVED

MODEL NO.	INPUT (VAC/HZ)	OUTPUT VOLTAGE (VDC)	OUTPUT CURRENT (A)	REGULATION (%)	RIPPLE (mVp-p)	CASE DIMENSIONS LxWxD
LZ-591123	120/60	+5	0.9	5%	10	4.7 x 3 x 2.2 Inches
		−5	0.1	5%	10	
		12	0.3	5%	10	
LZ-581211	120/60	+5	0.8	3%	10	4.7 x 3 x 2.2
		+12	0.1	3%	10	
		−12	0.1	3%	10	
LZ-561222	120/60	+5	0.6	3%	10	4.7 x 3 x 2.2
		+12	0.2	3%	10	
		−12	0.2	3%	10	
LZ-51122525	120/60	+5	1.0	3%	10	4.7 x 3 x 2.2
		+12	0.25	3%	10	
		−12	0.25	3%	10	

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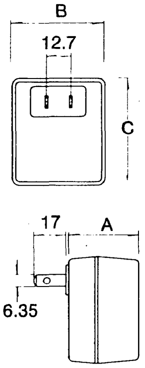
AC ADAPTER

VI. NI-CD BATTERY CHARGERS

E 82323

MODEL	INPUT VAC	INPUT HZ	INPUT W	NOMINAL CHARGE VDC	NOMINAL CHARGE mA	BATTERY SIZE	NO. OF CELLS	SIZE
CH-11350	120	60	3	1.5	350	D	1	2
CH-12350	120	60	3	3	350	D	2	2
†CH-13350	120	60	3	4.5	350	D	3	2
CH-14350	120	60	6	6	350	D	4	2
†CH-15350	120	60	6	7.5	350	D	5	3
CH-16350	120	60	6	9	350	D	6	3
†CH-18350	120	60	8	12	350	D	8	3
CH-21150	120	60	1.2	1.5	150	C	1	1
CH-22150	120	60	1.5	3	150	C	2	1
†CH-23150	120	60	3	4.5	150	C	3	2
CH-24150	120	60	3	6	150	C	4	2
†CH-25150	120	60	3	7.5	150	C	5	2
CH-26150	120	60	3	9	150	C	6	2
†CH-28150	120	60	3	12	150	C	3	2
CH-31045	120	60	1.2	1.5	45	AA	1	1
CH-32045	120	60	1.2	3	45	AA	2	1
†CH-33045	120	60	1.2	4.5	45	AA	3	1
CH-34045	120	60	1.2	6	45	AA	4	1
CH-36045	120	60	1.2	9	45	AA	6	1
†CH-38045	120	60	3	12	45	AA	8	2

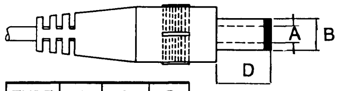
†: UL PENDING



SIZE	DIMENSIONS (MM) A	DIMENSIONS (MM) B	DIMENSIONS (MM) C
1	34.5	43.9	56.9
2	43.	50.1	64.1

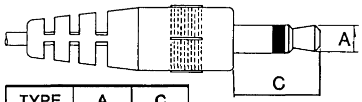
VII. CORD & PLUG ASSEMBLY

PL-1 DC POWER PLUG



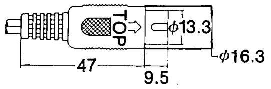
TYPE	A	B	D
1	φ2.1	φ5.5	9.6
2	φ2.1	φ5	9.6
3	φ2.5	φ5.5	11

PL-02 PHONE PLUG



TYPE	A	C
1	φ2.5	12.7
3	φ3.5	14

SD30 to SD80 DIN PLUG

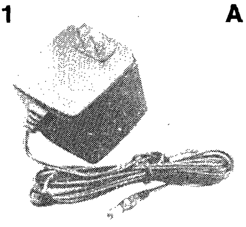


CHOOSE FROM 3-8 PINS

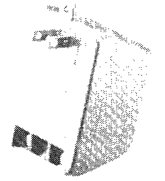
Other connectors of your choice can be molded at the end of the power cord.

VIII. ENCLOSURE TYPES

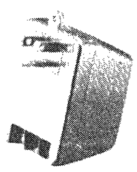
EI-41 A



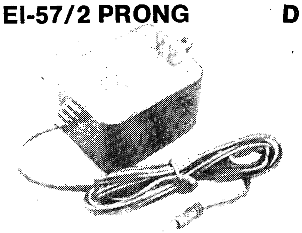
SCREW TERMINAL B



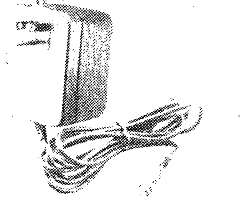
SCREW TERMINAL C



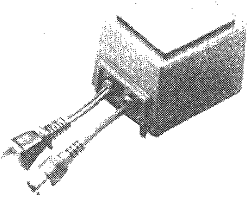
EI-57/2 PRONG D



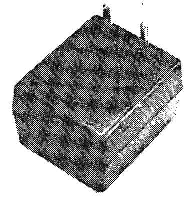
EI-57/3 PRONG E



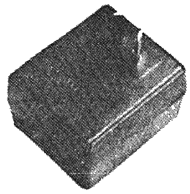
DESK TYPE F



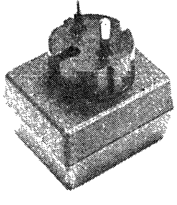
STD EUROPEAN G



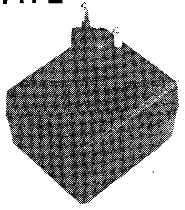
AUSTRALIAN TYPE H



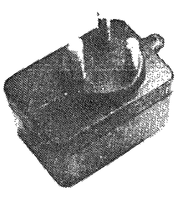
VDE TYPE I



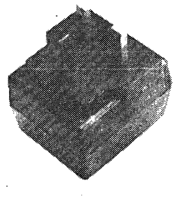
VDE TYPE J



SOUTH AFRICA K



U.K. L



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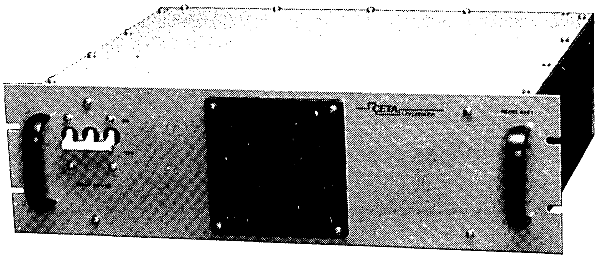
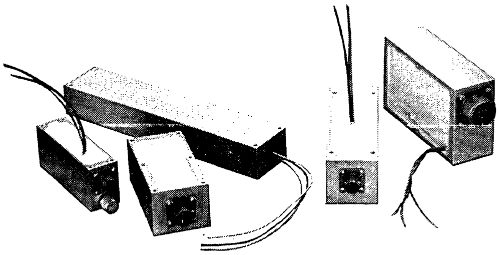
POWER



HIGH VOLTAGE

"SWITCHERS" up to 40 Kilovolts or up to 1500 watts. Featuring variable output with typical regulation of less than 1%. High density packaging techniques, getting high voltage into 10 watt/cubic inch. 90% efficiency units can be paralleled.

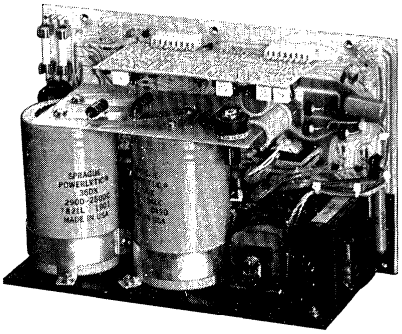


LOW VOLTAGE

Switchers and linear power supplies to meet the rigid demand for high efficiency in small packaging. Any number of outputs in combinations of regulated, unregulated, current limit, programmed or controlled are available.

INPUT/OUTPUT

Input configurations are available for the foreign and domestic, for EMI filtering, with undervoltage (brownout) protection and all the normal variations for frequency and voltage. Most any combination of single or multiple output. High voltage with low voltage to operate filaments, control circuits, etc., eliminating additional supplies.



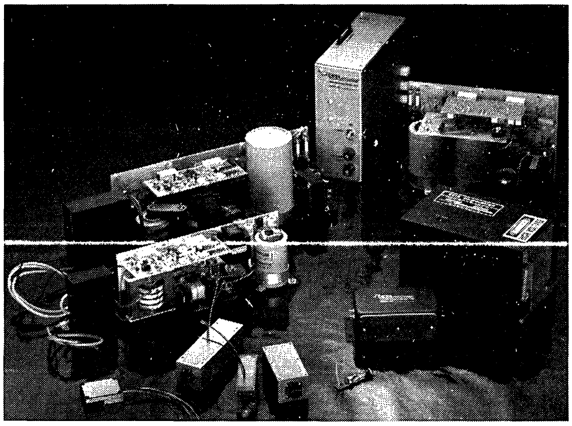
APPLICATIONS

- X-RAY
- LASERS
- TWT
- VIDEO
- MICROPROCESSORS
- DC to DC
- MICROWAVE
- INSTRUMENTATION
- POWER TUBE
- ELECTROSTATIC

LASERSONICS CAN BUILD IT . . . the custom designed power supply to fit your application that can't be found . . . except here.

Call or send us your specifications and we'll be glad to provide a quote.

COMING IN MID '86—4KW & 8KW POWER SUPPLIES!



LaserSonics

Cooper LaserSonics, Inc.

Power Supply Operation
177 N. Wolfe Rd., Sunnyvale, California 94086 (408) 732-9880 TWX 910-339-9201

eem

COMMONLY USED ELECTRICAL/ELECTRONIC ABBREVIATIONS AND ACRONYMS

A
AC alternating current
A/D analog to digital
ADC analog to digital converter
ADP automatic data processing
AF audio frequency
AFC automatic frequency control
ALGOL algorithmic language
AM amplitude modulation
AND a logical operator
AQL acceptable quality level
ASCII American national standard code for information interchange
AWG American wire gauge

B
BALUN balanced to unbalanced
BASIC beginners' all-purpose symbolic instruction
BCD binary-coded decimal
BNC baby "N" connector
BUS basic utility system

C
CAD computer aided design
CAM computer aided manufacture
CATV cable television or community antenna television
CERMET ceramic metal element
Comm. communications
CMOS complementary metal-oxide semiconductor
CPS characters per second
CPU central processing unit

D
D/A digital to analog
DAC digital to analog converter
DC direct current
DIAC bidirectional trigger diode
DIL dual in-line
DIN Deutsche Industrie Normenausschuss
DIP dual in-line package
DPM digital panel meter
DTL diode transistor logic

E
EDP electronic data processing
EBCDIC extended binary coded decimal interchange code
EEPROM electrically erasable PROM
EMC electromagnetic compatibility
EMI electromagnetic interference
EMP electromagnetic pulse
EPROM electrically programmable ROM
ESR equivalent series resistance

F
FEP fluorinated ethylene propylene Copolymar, 200° Teflon
FET field-effect transistor
FM frequency modulation
FORTRAN formula translator

G
GaAsFET gallium arsenide field effect transistor
GPIB general purpose interface bus

H
HF high frequency (3 to 30 MHz)
HIPOT test, measurement and diagnostic equipment
HLL high level language
HV high voltage
Hz Hertz

I
IC integrated circuit
IDC insulation displacement contact
IF intermediate frequency
IO input/output (devices)
IR insulation resistance (or) infrared

J
JFET junction field effect transistor
JMOS junction metal oxide semiconductor

K
kHz kilohertz (10^3 hertz)
KSR keyboard send receive

L
LC inductance capacitance
LCD liquid crystal display
LED light-emitting diode
LF low frequency (30 to 300 kHz)
LIF low insertion force
LNA low noise amplifier
LNB low noise band
LSI large scale integration
LVDT linear velocity displacement transformer

M
MASER microwave amplification by stimulated emission of radiation
MATV master antenna television
μF microforad
MHz megahertz
MIPS million instructions per second
MIB microcomputer interface board
MOS metal oxide semiconductor
MOSFET metal oxide semiconductor field effect transistor
MOSIGT metal-oxide semiconductor insulated-gate transistor
MOV metal oxide varistor
MPU microprocessor unit
MSI medium scale integration

N
NBS National Bureau of Standards
NEMP nuclear electromagnetic pulse
NIM nuclear instrumentation module
NOR not OR
NTC negative temperature coefficient

O
OCR optical character reader
OEM original equipment manufacturer
OR a logical operator

P
PC printed circuit
PCB printed circuit board
pF picofarad
PGA pin grid array
PIN positive-intrinsic-negative (transistor)
PLA programmable logic array
PLL phased lock loop
PPI plan position indicator
PROM programmable read only memory
PTC positive temperature coefficient
PUT programmable unijunction transistor

Q
QAM quadrature amplitude modulation
Q (meter) quality-factor meter

R
RAM random access memory
RC resistance-capacitance
RFI radio frequency interference
RMS root mean square
ROM read only memory
RF radio frequency
RFC radio-frequency choke
RFI radio-frequency interference
RTD resistance-temperature detector
RTL resistor transistor logic
RTV room temperature vulcanizing
RW read/write

S
SAS silicon asymmetrical switch
SBC single board (micro) computer
SBS silicon bilateral switch
SCR silicon-controlled rectifier
SCS silicon controlled switch
SDA source & detector assemblies
SIDAC bidirectional voltage-triggered switch
SIP single in-line package
SSI small scale integration
SSR solid state relay
STL Schottky transistor logic
SUS silicon unilateral switch

T
TC temperature coefficient
TCXO temperature compensated crystal oscillator
TFE tetrafluoride ethylene propylene Copolymer, 250° Teflon
TRIAC bidirectional AC switch
TTL transistor-transistor logic
TTY teletypewriter

U
UHF ultra high frequency (300 MHz to 3 GHz)
UJT silicon unijunction transistor
UL Underwriters Laboratory
UPS uninterruptible power supply

V
VAC volts (of) alternating current
VAR volt-ampere reactive
VCR video cassette recorder
VDC volts (of) direct current
VHF very high frequency
VHSIC very high speed integrated circuit
VLF very low frequency (3 to 30 kHz)
VLSI very large scale integration
VME virtual machine environment
VRM voice recognition module
VTVM vacuum tube volt meter
VU volume unit
VSWR voltage standing wave ratio

W
WPS word processing software

Y
YIG yttrium iron garnet

Z
ZIF zero insertion force

SWITCHING POWER SUPPLIES

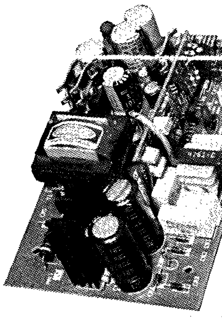
Microcomputer Power, Inc.

"LX" SERIES SWITCHING POWER SUPPLIES

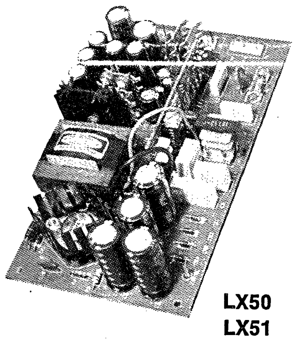
The new "LX" series are multi-output open frame switching power supplies. This completely CAD/CAE designed power supply series provides the OEM user with the state-of-the-art in packaging, reliability, and International Safety/EMI standards. Popular voltage/current outputs are provided to power micro based systems, floppy/hard disk drives, and industrial control.

"LX" SERIES ELECTRICAL SPECIFICATIONS

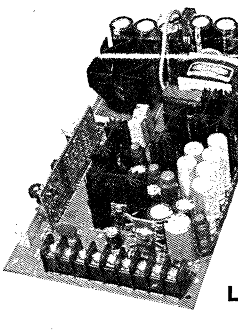
AC INPUT:	90 to 132 VAC or 180 to 264 VAC (user selectable), 47-63 Hz single phase.
AC INPUT SURGE CURRENT:	Internally limited by thermistor for maximum protection of input rectifiers.
DC OUTPUT:	See voltage/current charts.
OUTPUT POWER:	See voltage/current charts.
OUTPUT REGULATION:	See voltage/current charts for individual output regulation ratings. Line regulation measured over 90-132 VAC or 180-264 VAC line change. Load regulation measured by varying load current from 60% to either 20% or 100% of full rated load.
CROSS REGULATION:	See voltage/current charts for individual output regulation ratings. Cross regulation measured by varying the +5V main output from 75% to either 50% or 100% of full rated load and measuring the change on auxiliary outputs .
OVERVOLTAGE PROTECTION:	Provided on all +5 VDC outputs, will trigger at 5.8 to 7.0 VDC.
OVERLOAD PROTECTION:	Fully protected against overload and short circuit automatic recovery after removal of fault.
REVERSE VOLTAGE PROTECTION:	All outputs inherently protected from damage due to application of a reverse polarity across DC outputs.
NOISE AND RIPPLE:	0.3% RMS 1% maximum peak to peak 20 Hz to 20 MHz.
HOLD-UP TIME:	20 mS minimum at full load, nominal line.
POWER-FAIL SIGNAL:	Provided on LX125 and LX200 series only, TTL compatible signal goes low 10 mS max. before +5V main output drops 5% at 100% load condition. Signal goes high 20 mS min. after +5V ouput reaches 95%.
OVERSHOOT:	No overshoot at turn-on or turn-off.
MINIMUM LOAD:	Minimum load required on +5V main output for full load capability on auxiliary outputs: LX40 1A LX41 2A LX50 2A LX51 3A LX125 5A LX200 6A
TRANSIENT RESPONSE:	+5V output only, 500 μS 50% to 100% load change and recovery within 1% of initial voltage set point.
EFFICIENCY:	70% ±5% at full load, may vary with load distribution and model.
OPERATING TEMPERATURE RANGE:	0 deg. C to 70 deg. C ambient. Fully rated to 50 deg. C ambient, derate linearly to 50% of full rating at 70 deg. C ambient. Forced air cooling required above 50 deg. C ambient. Above 50 deg. C ambient it is important that cooling vs load profile is such that heat sinks do not operate above 90 deg. C.
TEMPERATURE COEFFICIENT:	+5 output ±.02%/deg. C typ., other outputs ±.05%/deg. C.
RELATIVE HUMIDITY RANGE:	Non-condensing, 20% to 80%.
ALTITUDE:	10,000 ft. max. operating, 30,000 ft. max. non-operating.
SHOCK AND VIBRATION:	The power supply shall withstand without degradation any reasonable shock and vibration found in the normal course of storage and operation, when properly packaged, handled, and installed. This includes transportation by a commercial carrier and operation in a non-mobile environment.
AC INPUT FUSING:	AC input line fuse provided. Internally protected.
LINE REGULATION:	(+5V ±.1%) (+12V, +15V ±.3%) (−12V, −15V ±.1%) (−5V ±.1%) (+24V ±.3%)
OUTPUT REGULATION:	(+5V ±1.5%) (+12V, +15V ±3%) (−12V, −15V ±1%) (−5V ±1%) (+24V ±5%)



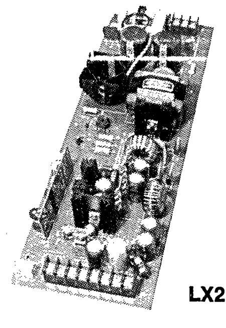
LX40
LX41



LX50
LX51



LX125



LX200

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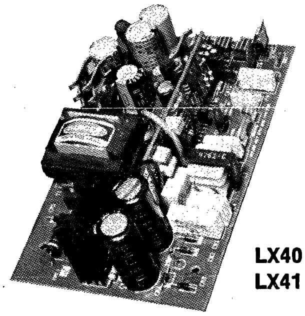
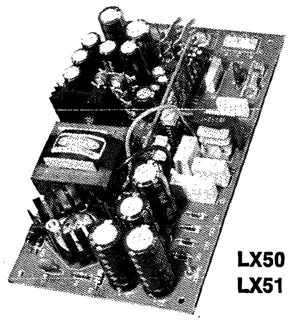
SWITCHING POWER SUPPLIES

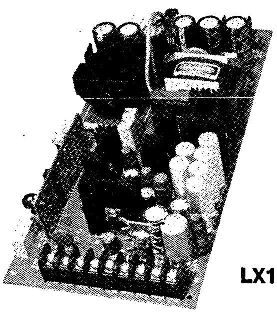
Microcomputer Power, Inc.



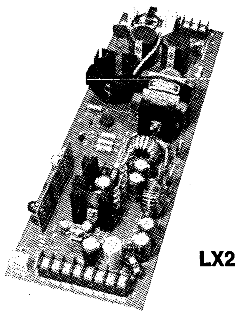
LX40
LX41



LX50
LX51



LX125



LX200

SELECTOR GUIDE — SWITCHING POWER SUPPLIES

MODEL	TOTAL POWER	OUTPUT #1	OUTPUT #2	OUTPUT #3	OUTPUT #4	PRICE (1-9)
LX40-01	40W	+5V @ 3A	+12V @ 2A	−12V @ .5A	N/A	$79.95
-02	40W	+5V @ 3A	+15V @ 2A	−15V @ .5A	N/A	$79.95
-03	40W	+5V @ 3A	+24V @ 2A	−12V @ .5A	N/A	$79.95
-04	40W	+5V @ 4A	+12V @ 2A	−12V @ .5A	N/A	$79.95
LX41-01	65W	+5V @ 6A	+12V @ 2.5A/4A pk	−12V @ .5A	N/A	$99.95
-02	65W	+5V @ 6A	+15V @ 2.5A/4A pk	−15V @ .5A	N/A	$99.95
-03	65W	+5V @ 6A	+24V @ 1.3A/2.6A pk	−15V @ .5A	N/A	$99.95
LX50-01	85W	+5V @ 6A	+12V @ 4A/5A pk	−12V @ .5A	−5V @ .5A	$114.95
-02	85W	+5V @ 6A	+12V @ 4A/5A pk	+12V @ 1.5A	−12V @ .5A	$114.95
-03	85W	+5V @ 6A	+15V @ 4A/5A pk	−15V @ .5A	−5V @ .5A	$114.95
-04	85W	+5V @ 6A	+24V @ 2.5A/3.5A pk	+12V @ .5A	−12V @ .5A	$114.95
LX51-01	100W	+5V @ 10A	+12V @ 4A/5A pk	−12V @ .5A	−5V @ .5A	$139.95
-02	100W	+5V @ 10A	+12V @ 4A/5A pk	+12V @ 1.5A	−12V @ .5A	$139.95
-03	100W	+5V @ 10A	+15V @ 4A/5A pk	−15V @ .5A	−5V @ .5A	$139.95
-04	100W	+5V @ 10A	+24V @ 2.5A/3.5A pk	+12V @ .5A	−12V @ .5A	$139.95
LX125-01	150W	+5V @ 15A	+12V @ 4A/6A pk	−12V @ 1.5A	−5V @ 1.5A	$189.95
-02	150W	+5V @ 15A	+12V @ 4A/6A pk	+12V @ 1.5A	−12V @ 1.5A	$189.95
-03	150W	+5V @ 15A	+24V @ 3A/4A pk	+12V @ 1.5A	−12V @ 1.5A	$189.95
LX200-01	250W	+5V @ 30A	+12V @ 5.3A/8A pk	+12V @ 1.5A	−12V @ 1.5A	$249.95
-02	250W	+5V @ 30A	+24V @ 3A/6A pk	+12V @ 1.5A	−12V @ 1.5A	$249.95

NOTES

A. Voltage level adjustable +5V ±10% min.
B. Dual sensed regulated output. +5V and +12V or +24V are sensed in combination to provide tighter regulation of +12V or +24V output. Initial setting of 5V output is ±1%.
C. Fully regulated output utilizing fixed, 3 terminal regulator.
D. Quasi-regulated output requires 20% min. load to meet regulation specs.

EMI SPECIFICATIONS

All "LX" series switching power supplies are equipped with internal line filtering which allows compliance to the conducted emission limits of FCC Docket 20870 Class B and VDE 0871 Class B.

150 KHz-450 KHz	<54 dBuV
450 KHz-30 MHz	<48 dBuV

OPTIONS CHASSIS: Optional angle chassis (kits) available for LX125 and LX200 series. These chassis allow right angle mounting of power supply circuit board.

Model No.	Chassis Part No.	Price (1-24)
LX125	C125 Chassis	$14.95
LX200	C200 Chassis	$17.95

INPUT/OUTPUT CONNECTORS: Connector kits available for LX40, LX41 and LX50, LX51 series. Kit provides all housings and pins.

Model No.	Connector Kit No.	Price (1-24)
LX40, LX41	CK40/41	$6.95
LX50, LX51	CK50/51	$7.95

SAFETY SPECIFICATIONS

All "LX" series switching power supplies meet or exceed the following safety standards.

LEAKAGE CURRENT:
- Line to ground (max). .75 MA

SAFETY SPACINGS:
- 8 mm minimum between primary and secondary
- 4 mm minimum between primary and ground circuit

DIELECTRIC WITHSTAND VOLTAGE (min):

Input to ground:	3750 VRMS
Input to outputs:	3750 VRMS
Output to ground:	700 VRMS

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SWITCHING POWER SUPPLIES

Microcomputer Power, Inc.

"LX" SERIES SWITCHING POWER SUPPLIES

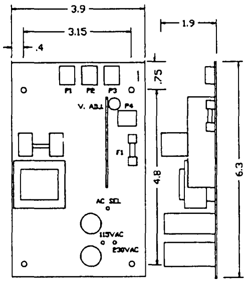
MOUNTING DRAWINGS AND DIMENSIONS SWITCHING POWER SUPPLIES

SPECIFICATIONS

LX40, LX41 SERIES

WT. .74 lbs

INPUT: P4
- 90-132/180-264 VAC 47-63 Hz
- For 90-132 VAC input connector AC SEL to 115 VAC. Fuse F1 at 1A
- For 180-264 VAC input connect AC SEL to 230 VAC. Fuse F1 at .5A
- Pin 1) AC neutral
- Pin 2) N/C
- Pin 3) AC line
- AC ground through .25" faston on PCB
- P4 mating housing—molex P/N 09-50-3031, molex pin P/N 08-50-0105



LX40, LX41

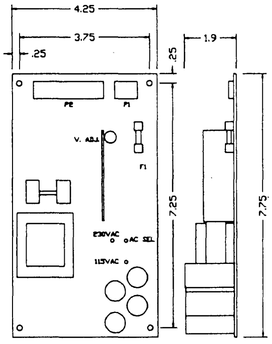
OUTPUT: P1, P2, P3
- Pin 1) +5V
- Pin 2) common
- Pin 3) +12V on −01/−04, +15V on −02, +24V on −03
- Pin 4) −12V on −01/03/04, −15V on −02
- P1, P2, P3 mating housing—molex P/N 22-01-1043, molex pin P/N 08-50-0114

LX50, LX51 SERIES

WT. 1.2 lbs

INPUT: P1
- 90-132/180-264 VAC 47-63 Hz
- For 90-132 VAC input connect AC SEL to 115 VAC. Fuse F1 at 2A
- For 180-264 VAC input connect AC SEL to 230 VAC. Fuse F1 at 1A
- Pin 1) AC ground
- Pin 2) N/C
- Pin 3) AC neutral
- Pin 4) N/C
- Pin 5) AC line
- P1 mating housing—molex P/N 26-03-4050, molex pin P/N 08-50-0189

OUTPUT: P2
- Pin 1) +5V
- Pin 2) N/C
- Pin 3) +5V
- Pin 4) N/C
- Pin 5) common
- Pin 6) N/C
- Pin 7) common
- Pin 8) N/C
- Pin 9) +12V on −01/02, +15V on −03, +24V on −04
- Pin 10) N/C
- Pin 11) −5V on −01/03, −12V on −02/04
- Pin 12) N/C
- Pin 13) −12V on −01, −15V on −03, +12V on −02/04
- P2 mating housing—molex P/N 26-03-4131, molex pin P/N 08-50-0189



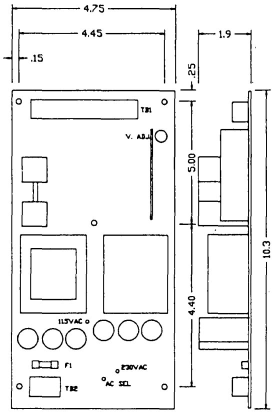
LX50, LX51

LX125 SERIES

WT. 1.9 lbs

INPUT: TB2
- 90-132/180-264 VAC 47-63 Hz
- For 90-132 VAC input connect AC SEL to 115 VAC. Fuse F1 at 5A
- For 180-264 VAC input connect AC SEL to 230 VAC. Fuse F1 at 2.5A
- Pin 1) AC line
- Pin 2) AC ground
- Pin 3) AC neutral
- TB2—.375 centers terminal block. 6-32 screws

OUTPUT: TB1
- Pin 1) power fail signal
- Pin 2) −5V on −01, −12V on −02/03
- Pin 3) −12V on −01, +12V on −02/03
- Pin 4) +12V on −01/02, +24V on −03
- Pin 5) common
- Pin 6) common
- Pin 7) common
- Pin 8) +5V
- Pin 9) +5V
- TB1—.375 centers terminal block. 6-32 screws



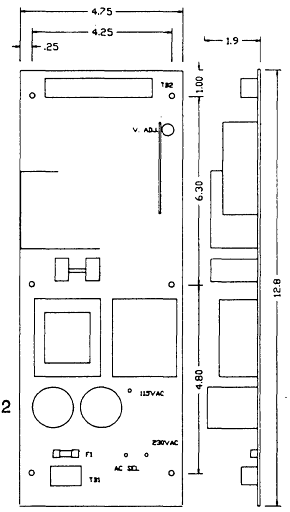
LX125

LX200 SERIES

WT. 2.4 lbs

INPUT: TB1
- 90-132/180-264 VAC 47-63 Hz
- For 90-132 VAC input connect AC SEL to 115 VAC. Fuse F1 at 6A
- For 180-264 VAC input connect AC SEL to 230 VAC. Fuse F1 at 3A
- Pin 1) AC neutral
- Pin 2) AC line
- Pin 3) AC ground
- TB1—.375 centers terminal block, 6-32 screws

OUTPUT: TB2
- Pin 1) −12V on −01/02
- Pin 2) +12V on −01/02
- Pin 3) +12V on −01, +24V on −02
- Pin 4) common
- Pin 5) common
- Pin 6) common
- Pin 7) +5V
- Pin 8) +5V
- TB2—.375 centers terminal block, 6-32 screws



LX200

FEATURES

- 20 models in 6 power ranges . . . 40 to 250 watts
- Multiple outputs up to 4 outputs
- UL recognized, CSA certified, VDE applied for
- Built-in line filter, meets FCC Class B and VDE 0871 Class B
- High efficiency flyback & forward converter designs
- CAD/CAE designed
- Dual AC input ranges, 90-132/180-264 VAC
- Short circuit protection
- Overvoltage protection
- 100% computer tested

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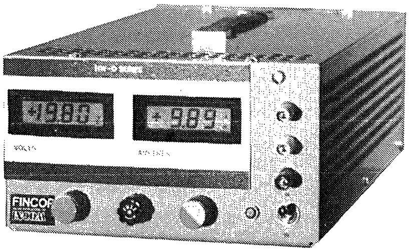
HWD Constant Voltage/Constant Current Supplies

FEATURES

- Digital Ammeter/Voltmeter
- Remotely Programmable
- Remote Sensing
- Series and Parallel Operation
- 500 μ Volts Ripple
- .01% Load Regulation
- .01% Line Regulation
- Separate Voltmeter and Ammeter
- Models to 200 Volts
- Half Rack Size or Bench Mounting



APPLICATION

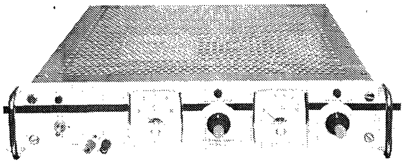
The HWD Series power supplies are designed to be used in the lab bench or for system application. The use of digital meters provides accurate readings of output voltage and current without the need of external DVM'S.

Model Number	Output		Regulation				Price
			Line %		Load %		
	Volts	Amps	CV	CC	CV	CC	
HWD 6-20A	0-6	0-20	0.01	0.1	0.01 or 1 mv	0.5	$825.
HWD 10-15A	0-10	0-15	0.01	0.1	0.01 or 1 mv	0.5	810.
HWD 20-10A	0-20	0-10	0.01	0.1	0.01 or 1 mv	0.5	810.
HWD 40-5A	0-40	0-5	0.01	0.1	0.01 or 1 mv	0.5	$810.
HWD 100-2A	0-100	0-2	0.01	0.1	0.01 or 1 mv	0.5	895.
HWD 200-1A	0-200	0-1	0.01	0.1	0.01 or 1 mv	0.5	975.

PR Constant Voltage/Current Silicon Supplies

FEATURES

- High Power — Small Size
- Remotely Programmable
- All Silicon Semiconductors
- Mode Lites
- Low Ripple
- .01% Regulation
- Constant Voltage/Constant Current
- Parallel Operation



APPLICATION

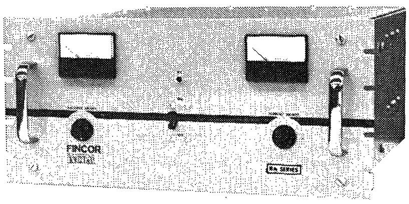
The PR Series find application in the laboratory and in systems where both versatility of operation and a high degree of regulation is required. Both 3½" 5 ¼" models are available. The voltage to current crossover point may be set anywhere within the limits of zero to full rated output voltage and zero to full rated output current.

Model Number	Output		Regulation				Panel Ht.	Price
			Line %		Load %			
	Volts	Amps	CV	CC	CV	CC		
PR 20-15A	0-20	0-15	0.01	0.01	0.01	0.25	3½"	$1475.
PR 40-10A	0-40	0-10	0.01	0.01	0.01	0.25	3½"	1435.
PR 60-7A	0-60	0-7	0.01	0.01	0.01	0.25	3½"	1530.
PR 125-3.2A	0-125	0-3.2	0.01	0.01	0.01	0.25	3½"	1745.
PR 20-25A	0-20	0-25	0.01	0.01	0.01	0.25	5¼"	1695.
PR 40-20A	0-40	0-20	0.01	0.01	0.01	0.25	5¼"	$1640.
PR 60-14A	0-60	0-14	0.01	0.01	0.01	0.25	5¼"	1750.
PR 125-6.5A	0-125	0-6.5	0.01	0.01	0.01	0.25	5¼"	1910.
PR 125-10A	0-125	0-10	0.01	0.01	0.01	0.25	5¼"	2625.

RA Constant Voltage Silicon Supplies

FEATURES

- High Power — Small Size
- Remotely Programmable
- Low Ripple
- Parallel Operation
- .01% Regulation
- All Silicon Semiconductors



APPLICATION

The RA Series are all silicon, relatively high in power, and tightly regulated. They find application in the laboratory and in systems where both versatility of operation and a high degree of regulation is required. Adjustable solid state current limiting provides load protection.

Model Number	Output		Regulation		Panel Ht.	Price
	Volts	Amps	Line %	Load %		
RA 20-15A	0-20	0-15	0.01	0.01	3½"	$1340.
RA 40-10A	0-40	0-10	0.01	0.01	3½"	1340
RA 60-7A	0-60	0-7	0.01	0.01	3½"	1340.
RA 125-3.2A	0-125	0-3.2	0.01	0.01	3½"	1365.
RA 20-25A	0-20	0-25	0.01	0.01	5½"	1525.
RA 40-20A	0-40	0-20	0.01	0.01	5½"	1475.
RA 60-14A	0-60	0-14	0.01	0.01	5½"	1525.
RA 125-6.5A	0-125	0-6.5	0.01	0.01	5½"	$1720.
RA 40-30A	0-40	0-30	0.01	0.01	7"	2020.
RA 60-20A	0-60	0-20	0.01	0.01	7"	2130.
RA 125-10A	0-125	0-10	0.01	0.01	7"	2395.
RA 40-50A	0-40	0-50	0.01	0.01	7"	3180.
RA 60-30A	0-60	0-30	0.01	0.01	7"	3280.
RA 250-10A	0-250	0-10	0.01	0.01	8¾"	4240.

Options include: meters, overvoltage, 10-turn potentiometers, and special input voltages.

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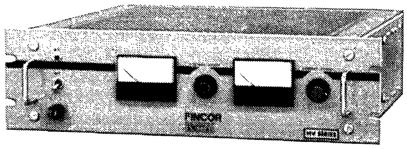
HV Constant High Voltage Supplies

FEATURES
- All Solid State
- Adjustable Current Limit
- < 1 Millivolt Ripple
- 10-Turn Voltage Adjustments
- Remote Programming
- Remote Sensing

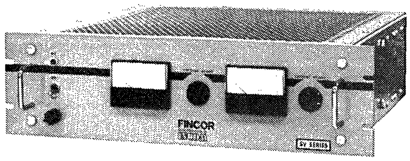


APPLICATION
The HV is a versatile series of constant voltage units adjustable from zero to full rated voltage. Adjustable solid state current limiting is a feature. Options provide for either systems or laboratory use. Crossover from constant voltage to current limiting is automatic solid state and noninterrupting. Units may be operated in parallel for increased current capacity.

Model Number	Output		Regulation		Size	Price
	Volts	Amps	Line %	Load %		
HV 350-1	0-350	1		0.01	3½ x 19 x 16½	$2225.
HV 350-2	0-350	2	0.005	0.01	5¼ x 19 x 16½	2650.
HV 350-3	0-350	3	0.005	0.01	7 x 19 x 16½	2970.
HV 350-5	0-350	5	0.005	0.01	7 x 19 x 16½	3390.

SV Constant High Voltage Power Supplies

FEATURES
- All Solid State
- Adjustable Current Limit
- 1 Millivolt Ripple
- 0.01% Regulation
- 10-Turn Voltage Adjustments
- Remote Programming
- Remote Sensing
- Meters

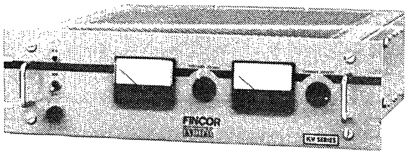


APPLICATION
The SV is a versatile series of constant voltage units adjustable from 0 to full rated voltage. Options provide either systems or laboratory use. Crossover from constant voltage to current limiting is automatic solid state and noninterrupting. Units may be operated in parallel for increased current capacity.

Model Number	Output		RMS Ripple	Regulation		Size	Price
	Volts	Amps		Line %	Load %		
SV 600-0.5	0-600	0-0.5	<3mv	0.01	0.01	3½ x 19 x 16½	$2600.
SV 600-1	0-600	0-1	<3mv	0.01	0.01	5¼ x 19 16½	3150.
SV 600-2	0-600	0-2	<3mv	0.01	0.01	7 x 19 x 16½	3950.

KV1000 High Voltage Power Supplies

FEATURES
- Output 100 to 1000 VDC
- Voltage Regulated 0.5%
- Current Regulated 0.5%
- Voltmeter and Ammeter
- Ripple 0.5% RMS



APPLICATION
The KV1000 Series of Power Supplies are constant voltage/constant current units with automatic crossover. Models are available with up to 2 ampere current capacity over the full voltage range. Options such as remote voltage and current programming, remote turn on and turn off make the unit a versatile piece of equipment for laboratory or manufacturing operations.

Model Number	Output		Regulation		Panel Height	Price
	Volts	Amps	Current %	Volts %		
KV 1000-0.5	100-1000	0-0.5	0.5	0.5	5¼″	$2545.
KV 1000-1	100-1000	0-1	0.5	0.5	7″	3150.
KV 1000-2	100-1000	0-2	0.5	0.5	10½″	5400.

MID-EASTERN INDUSTRIES, INC.

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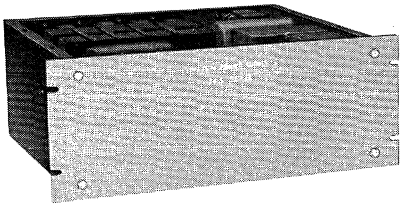
MS High Power System Component Power Supplies

FEATURES

- Most Complete Coverage
  Up to 600 Volts
  Up to 1200 Amperes
  139 Standard Models
- Low Cost
- All Solid State
- Extreme Reliability



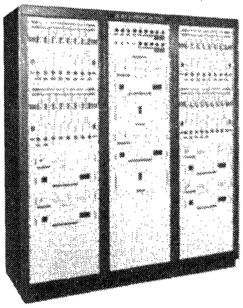
APPLICATION

Strictly designed for incorporation into systems, these supplies are considered as components. They are of exceptionally high reliability; yield the highest power at lowest cost; and provide complete coverage of all possible needs.

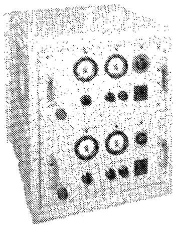
Model Number	Height in Inches	Model Number	Height in Inches	Model Number	Height in Inches	Model Number	Height in Inches	Model Number	Height in Inches	Model Number	Height in Inches
MS 9-600	48⅝	MS 20-30	5¼	MS 34-20	5¼	MS 65-10	5¼	MS 128-6	5¼	MS 350-1.5	5¼
MS 9-1200	67⅞	MS 20-45	8¾	MS 34-30	8¾	MS 65-15	8¾	MS 128-10	8¾	MS 350-3	8¾
		MS 20-80	12¼	MS 34-50	12¼	MS 65-25	12¼	MS 128-15	12¼	MS 350-5	12¼
MS 12-40	5¼	MS 20-120	17½	MS 34-75	17½	MS 65-35	17½	MS 128-24	17½	MS 350-7	17½
MS 12-60	8¾	MS 20-180	24	MS 34-125	24	MS 65-50	24	MS 128-35	24	MS 350-10	24
MS 12-100	12¼	MS 20-400	67⅞	MS 34-300	67⅞	MS 65-75	48⅝	MS 128-45	48⅝	MS 350-30	67⅞
MS 12-150	17½					MS 65-150	67⅞	MS 128-90	67⅞	MS 410-1.5	5¼
MS 12-225	24									MS 410-3	8¾
MS 12-400	67⅞									MS 410-5	12¼
		MS 25-25	5¼	MS 38-20	5¼	MS 77-10	5¼	MS 240-.75	3½	MS 410-7	17½
		MS 25-37	8¾	MS 38-30	8¾	MS 77-15	8¾	MS 240-3	5¼	MS 410-10	24
MS 13.5-40	5¼	MS 25-60	12¼	MS 38-50	12¼	MS 77-25	12¼	MS 240-5	8¾	MS 410-30	67⅞
MS 13.5-60	8¾	MS 25-90	17½	MS 38-75	17½	MS 77-35	17½	MS 240-7	12¼	MS 470-2	8¾
MS 13.5-100	12¼	MS 25-140	24	MS 38-125	24	MS 77-50	24	MS 240-10	17½	MS 470-3	12¼
MS 13.5-150	17½	MS 25-200	48⅝	MS 38-300	67⅞	MS 77-75	48⅝	MS 240-15	24	MS 470-5	17½
MS 13.5-225	24	MS 25-400	67⅞			MS 77-150	67⅞	MS 240-40	67⅞	MS 470-7	24
MS 13.5-400	67⅞									MS 470-10	48⅝
		MS 29-25	5¼	MS 46-15	5¼	MS 109-6	5¼	MS 273-.75	3½	MS 470-20	67⅞
MS 17-30	5¼	MS 29-37	8¾	MS 46-22	8¾	MS 109-10	8¾	MS 273-3	5¼	MS 545-2	8¾
MS 17-45	8¾	MS 29-60	12¼	MS-46-40	12¼	MS 109-15	12¼	MS 273-5	8¾	MS 545-3	12¼
MS 17-80	12¼	MS 29-90	17½	MS 46-60	17½	MS 109-24	17½	MS 273-7	12¼	MS 545-5	17½
MS 17-120	17½	MS 29-140	24	MS 46-90	24	MS-109-35	24	MS 273-10	17½	MS 545-7	24
MS 17-180	24	MS 29-200	48⅝	MS 46-120	48⅝	MS 109-45	48⅝	MS 273-15	24	MS 545-10	48⅝
MS 17-400	67⅞	MS 29-400	67⅞	MS 46-240	67⅞	MS 109-90	67⅞	MS 273-40	67⅞	MS 545-20	67⅞

NOTE: The digits of the Model Number indicate the output voltage and current in amps. Example: MS9-600 has an output of 9 volts, current of 600 amps. MS9-1200 has an output of 9 volts at 1200 amps. **Consult factory for prices.**

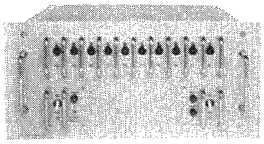
Custom Power Supplies and Systems



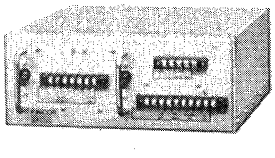
Double redundant regulated DC power distribution system for process industry. Features no break transfer and battery backup.



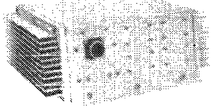
High power, 150 volt, constant current/constant voltage, shipboard-qualified power supply.



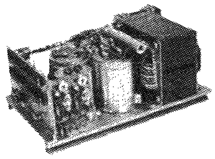
Regulated no-break, redundant 24-volt dc, 15-ampere, 10-channel power distribution system for television studios.



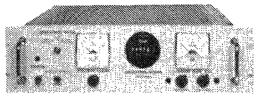
Uninterrruptable power supply, with internal battery charger, used for avionics instrumentation.



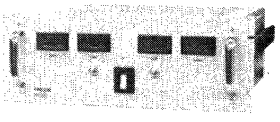
Mil Spec 4 output regulated power supply.



Regulated multi-output power supply for computer.



Automatic constant current battery charger with automatic range selection based on battery temperature and voltage level.

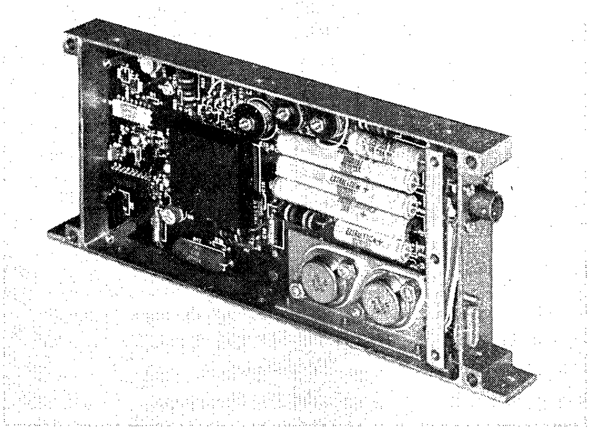


Two-channel linear regulated power supply for semi-conductor testing and burn-in.

NOTE: Not pictured are these special devices: (a) Power supply for CW lasers; (b) Redundant power systems for military telephone communications systems; (c) Xenon lamp power supplies; (d) True RMS regulated ac power supplies; and (e) High current dc power supply for automotive production line testing.

CUSTOM MILITARY POWER ELECTRONICS

Combining Switching Power Supplies with Custom Thick Film Hybrids

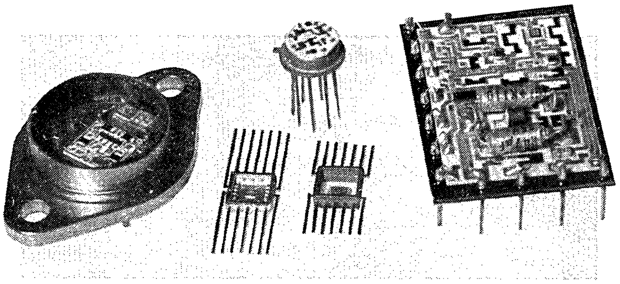


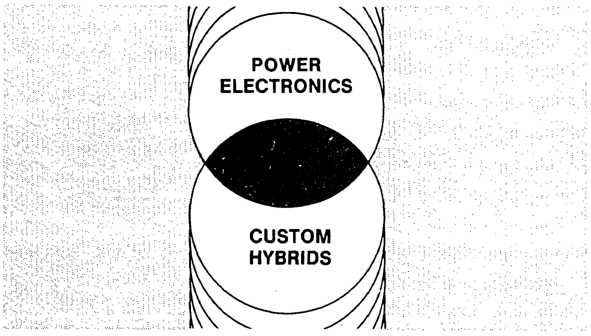
POWER ELECTRONICS

Power Electronics encompasses a wide spectrum of power supply products as well as areas such as servo and power amplifiers, motor drives and controls. Our servo amplifier and power operational amplifier products are widely used in many military systems. MDI's power supply technology incorporates the latest advances in high frequency switch mode techniques and emphasizes power FET devices. Our product capability includes:
■ AC to DC power supplies to 5 KVA with single and multiple outputs with power densities to 4W/in^3. ■ DC to DC converters to 2 KVA, operating frequencies to 400 KHz, power densities to 10W/in^3. ■ DC to AC supplies (static inverters) to 2 KVA, inputs 12 VDC to 350 VDC, outputs from 50 Hz to 1600 Hz.

CUSTOM HYBRIDS

Thick film hybrids offer many unique possibilities for miniaturized packaging of power electronic circuitry. Power supply control and monitoring circuitry are ideal areas for hybridization. Power hybrids allow MDI to break the "packaging barrier" for high power density applications. Low tooling and set up costs make hybrid technology economical for small production runs.





THE POWER OF SYNERGISM

Switching power supply technology for critical military and industrial applications is constantly pushing toward higher operating frequencies, smaller sizes and higher power densities. These technological trends make it inevitable that signal and power hybrids will form a key part of future state-of-the-art power electronic equipment. With our high technology power supply capability and custom hybrid facility, MDI is uniquely positioned to apply the best, appropriate packaging technology to our customer's diverse and challenging requirements.

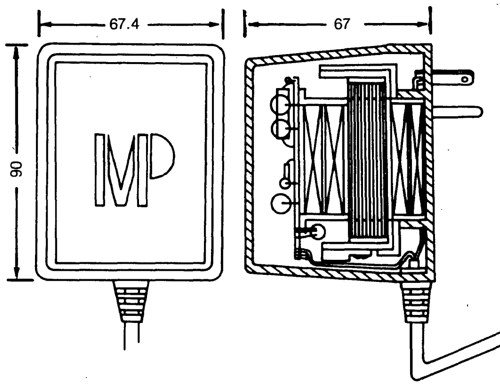
M.D.I. operates under a comprehensive Mil-I-45208 quality system. Our manufacturing capability includes a complete thick film hybrid microcircuit operation, temperature/vibration and environmental test facilities. Modular's extensive in-house capabilities allow us to offer a quick reaction capability for Mil-E-5400, Mil-E-16400, Mil-STD-883 and related requirements.

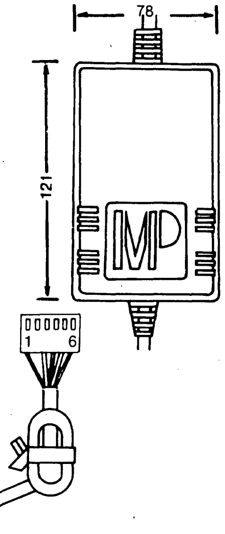
MODULAR DEVICES, INC.

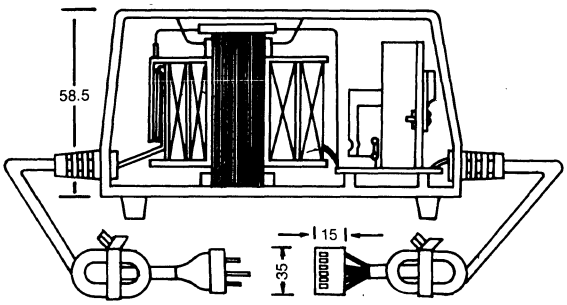
■ 50 ORVILLE DRIVE ■ AIRPORT INTERNATIONAL PLAZA ■ BOHEMIA, N.Y. 11716 ■ 516-567-9620 ■

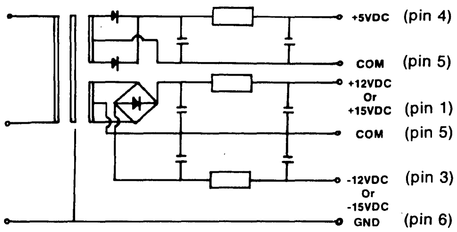
Multi Products International
218 Little Falls Rd., P.O. Box 238, Cedar Grove, NJ 07009
(201) 239-8183 • TELEX: 219289 • CABLE: MUPRINUSA-CEDG

POWER SUPPLIES









CATALOG NO.	INPUT	OUTPUT 1	OUTPUT 2	OUTPUT 3
T5121000/1*	120V RMS ± 10% 60 Hz	+5VDC 1amp	+12VDC 310ma	-12VDC 310ma
T5151000/1*		+5VDC 1amp	+15VDC 250ma	-15VDC 250ma
W512750/1**		+5VDC 750ma	+12VDC 80ma	-12VDC 80ma
T512750/1*		+5VDC 750ma	+12VDC 360ma	-12VDC 360ma
W515750/1**		+5VDC 750ma	+15VDC 64ma	-15VDC 64ma
T515750/1*		+5VDC 750ma	+15VDC 290ma	-15VDC 290ma
W512500/1**		+5VDC 500ma	+12VDC 130ma	-12VDC 130ma
T512500/1*		+5VDC 500ma	+12VDC 415ma	-12VDC 415ma
W515500/1**		+5VDC 500ma	+15VDC 105ma	-15VDC 105ma
T515500/1*		+5VDC 500ma	+15VDC 330ma	-15VDC 330ma

*UL and CSA Listed. **UL Listed.

FEATURES:

- Fully isolated outputs
- Overvoltage and overcurrent protected
- Plug-in convenience
- Multiple output to 12 watts
- Lightweight, tough impact resistant casing
- High efficiency
- One year warranty
- Short circuit protected
- Complies with FCC EMI regulations
- Regulated with low ripple
- Available with other output cords and connectors

BENEFITS:

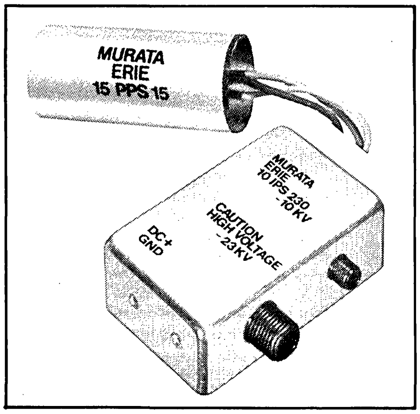
- Reduce size and weight of product
- Reduce design time for product
- Eliminate power supply heat and need for other cooling devices
- Eliminate hazardous voltages
- Provide a tamper-proof power source

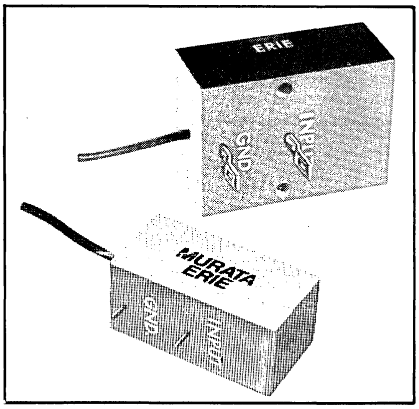
SPECIFICATIONS:

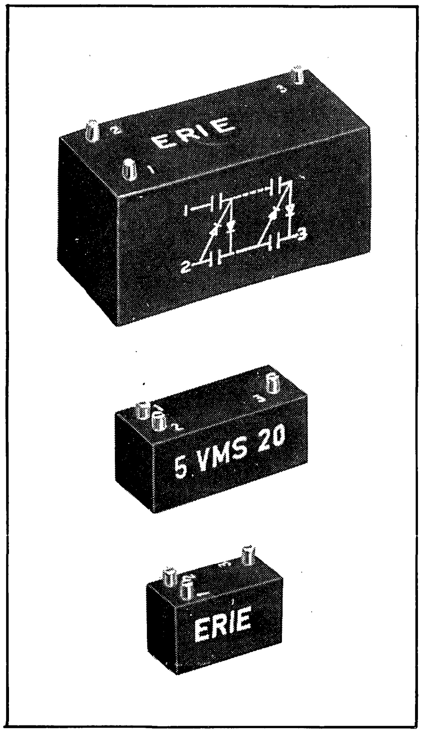
Input:	120V ± 10% 60 Hz
Regulation:	+5V 5% overall
Regulation:	+15V or +12V 5% overall
Regulation:	-15V or -12V 5% overall
Ripple:	50 MV P-P
Operating Temp:	0° C to +40° C
Storage Temp:	-55° C to 105° C
Operating Altitude:	15,000′

high voltage power supplies and multipliers

MURATA ERIE NORTH AMERICA, INC.







Custom Design

The design and fabrication of custom high voltage power supplies is a highly sophisticated specialty in which Murata Erie enjoys a high standard of excellence.

Miniaturization of power supplies is easily accomplished at Murata Erie through the use of its own miniature rectifiers, capacitors and specially designed series-bank capacitors. Industrial and military standards are met efficiently and economically, for high quality, low cost power supplies over a wide range of high voltage applications.

Murata Erie Sales Engineers are available at all times to discuss power supply requirements.

TYPICAL OPTIONAL FEATURES

- Positive or Negative Output Requirements
- Positive or Negative Input Requirements
- Multiple Outputs
- Isolated Output, with Separate Ground Return
- Inhibit Gate Input, to Turn Off the Power Supply
- Short-Circuit from Reverse Input Polarity
- Overvoltage Input Protection
- Output Current Limiting

Standard Designs

The MPS series of low cost miniature power supplies was originally designed for miniature CRT displays, but they have found a wide range of applications in the 1 KV to 5 KV range.

SPECIFICATIONS

Electrical

Input: See part number
Output Voltage: See part number
Output Current: To 100 μA
Load Regulation: <10%, 0 to full load
Ripple: <0.5% p-p, full load
Temp. Range: 0°C to 70°C (operating)

FEATURES

- PCB Mounting
- Miniature — Low Cost
- Ideal for many electro-optical applications

Mechanical

Size: .76″ x .76″ x 1.56″
Weight: <1.4 oz. (40 grams)
Terminations: PCB pins (input), 3″ lead (output)

Optional Features

— Negative input and/or output
— Isolated output (extra output ground PCB pin)
— Inhibit gate (extra PCB pin)

Multipliers

Murata Erie designs and manufactures a wide variety of custom designed high voltage multipliers. The units shown on this page are illustrative of the capabilities and expertise that Murata Erie can apply to meet your particular high voltage power supply specifications. Our application engineers will be happy to work with you to provide the best possible solution to your specific design and packaging application requirements.

FEATURES

- High Voltage Miniaturized Packaging
- Solder Post Terminations
- Positive or Negative Outputs Available
- Solid Encapsulation Eliminates Corona and Provides Environmental Protection

SPECIFICATIONS

Part Number	Max Input Voltage (p-p)	Max Output VDC ($I_L = 0$)	Dimensions (in Inches) L	W	H	Mtg. Centers (Inches)	Mtg. Pad Length (Inches)	Volume (Cubic Inches)
5VMS5	500	500	.75	.30	.40	1.13	1.48	.09
5VMS10	500	1000	.75	.30	.40	1.13	1.48	.09
5VMS15	500	1500	.75	.30	.40	1.13	1.48	.09
5VMS20	500	2000	.995	.395	.40	1.37	1.73	.15
15VMS15	1500	1500	1.00	.50	.50	1.37	1.73	.25
15VMS30	1500	3000	1.00	.50	.50	1.37	1.73	.25
15VMS45	1500	4500	1.00	.50	.50	1.37	1.73	.25
15VMS60	1500	6000	1.00	.50	.50	1.37	1.73	.25
15VMS75	1500	7500	1.125	.562	.515	1.49	1.85	.33
22VMS22	2200	2200	1.32	.69	.71	1.70	2.05	.65
22VMS44	2200	4400	1.32	.69	.71	1.70	2.05	.65
22VMS66	2200	6600	1.32	.69	.71	1.70	2.05	.65
22VMS88	2200	8800	1.32	.69	.71	1.70	2.05	.65
22VMS110	2200	11,000	1.55	.75	.75	1.91	2.28	.88
22VMS132	2200	13,200	1.32	.69	.71	1.70	2.05	.65

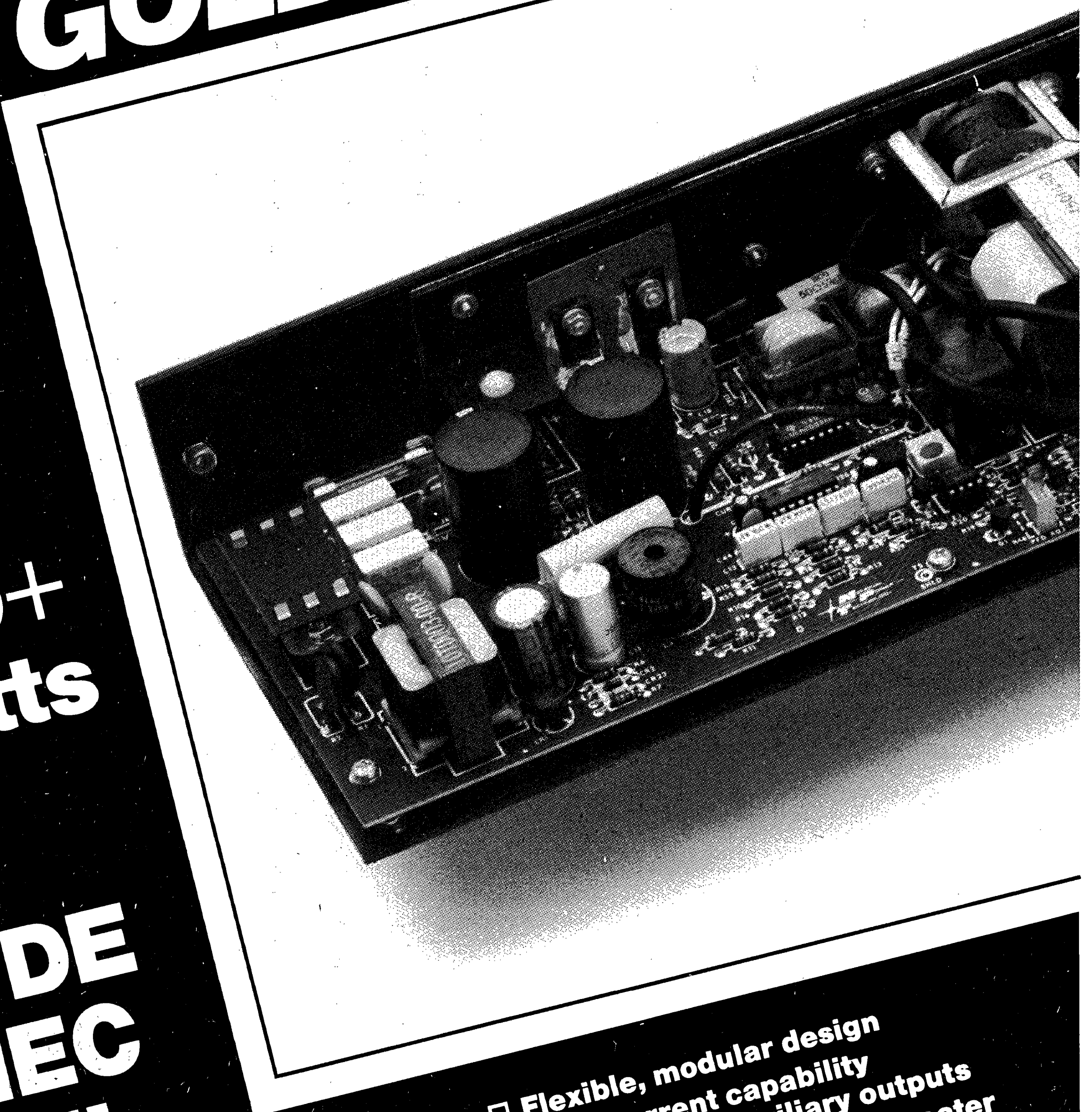
Temperature Range: −55°C to +85°C (Operating), −55°C to +125°C (Storage).
For use with frequencies over 30 KHz: add prefix "X" to the part number.
For negative output: add suffix "N" to the part number.

MURATA ERIE NORTH AMERICA, INC. 1148 Franklin Rd., S.E. Marietta, Georgia 30067 Tel: (404) 952-9777 Telex: 54-2329 TWX: 810-766-1531

NATIONAL POWER TECHNOLOGY

introduces the

GOLD STANDARD



100 to 600+ watts

VDE
IEC
UL
CSA
approved

- ☐ Flexible, modular design
- ☐ High-current capability on main and auxiliary outputs
- ☐ Smaller physical sizes: greater power density
- ☐ Optional power fail, thermal shutdown, cover
- ☐ Fast turnaround
- ☐ Lower cost

National Power's Gold Standard power supplies are designed to shorten your product development cycle. Since all models already have been approved to VDE, IEC, UL and CSA specifications, you don't have to waste precious time getting approvals.

All have high current capability—not just on the main +5 volt output, but also on at least one of the auxiliaries.

Modular construction gives you greater power density. Gold Standard power supplies deliver more power per cubic inch than the unit you're specifying now.

You get the kind of design flexibility that, before now, you could only get in a custom unit. Yet, even with all their capabilities, the price is low—about what you would expect to pay for an off-the-shelf switching power supply.

We know of no competing standard units that cover the power levels of our Gold Standard series. Nor do we know of any company offering supplies that have been approved to the international specifications at the power levels we offer. At any price.

The Gold Standard—a valuable commodity that's known the world over.

NATIONAL
POWER —
TECHNOLOGY

National Power Technology, Inc.
2111 Howell Avenue
Anaheim, California 92806 · USA
Telephone (714) 937-1301
TWX 910-591-1893

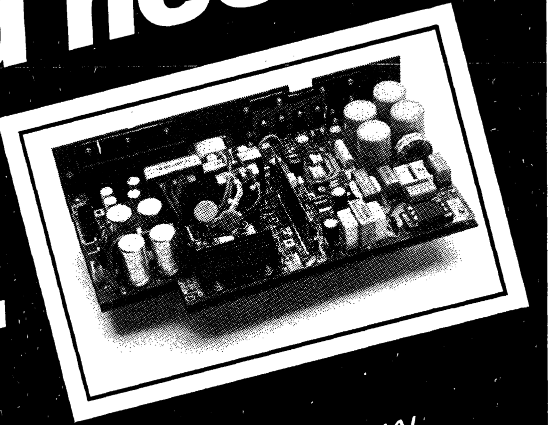
	---- MAXIMUM CURRENT AVAILABLE ----					
MODEL NO.	MAIN OUTPUT	AUX 1 AVG/PK	AUX 2	AUX 3	MAXIMUM OUTPUT POWER	OUTLINE DIMENSIONS (INCHES)
NQV100	5V @ 15A	5V @ 10/15A 12V @ 5/ 7A 15V @ 4/ 6A 24V @ 3/ 5A	5V @ 3A 12V @ 3A 15V @ 3A 24V @ 3A	5V @ 1.5A 12V @ 1.5A 15V @ 1.5A 24V @ 1.5A	**150 WATTS**	9.5 X 5.0 X 2.5
NQV200	5V @ 25A	5V @ 10/15A 12V @ 8/10A 15V @ 6/ 8A 24V @ 4/ 6A	5V @ 5A 12V @ 5A 15V @ 5A 24V @ 5A	5V @ 3A 12V @ 3A 15V @ 3A 24V @ 3A	**250 WATTS**	10.5 X 5.0 X 2.5
NQV300	5V @ 40A	5V @ 10/15A 12V @ 8/12A 15V @ 6/10A 24V @ 6/10A	5V @ 5A 12V @ 5A 15V @ 5A 24V @ 5A	5V @ 5A 12V @ 5A 15V @ 5A 24V @ 5A	**350 WATTS**	14.0 X 5.0 X 2.5
NQV400	5V @ 70A	5V @ 10/15A 12V @ 8/12A 15V @ 6/10A 24V @ 6/10A	5V @ 5A 12V @ 5A 15V @ 5A 24V @ 5A	5V @ 5A 12V @ 5A 15V @ 5A 24V @ 5A	**450 WATTS**	15.0 X 5.5 X 2.6
NQV500	5V @ 100A	5V @ 15/20A 12V @ 15/20A 15V @ 10/15A 24V @ 8/12A	5V @ 5A 12V @ 5A 15V @ 5A 24V @ 5A	5V @ 5A 12V @ 5A 15V @ 5A 24V @ 5A	**550 WATTS**	16.0 X 6.0 X 3.0
NQV600	5V @ 100A	5V @ 25/30A 12V @ 20/25A 15V @ 15/20A 24V @ 10/15A	5V @ 5A 12V @ 5A 15V @ 5A 24V @ 5A	5V @ 5A 12V @ 5A 15V @ 5A 24V @ 5A	**650 WATTS**	16.0 X 6.0 X 3.0

Note: Total power cannot exceed the supply's stated power maximum.
Auxiliary 2 current outputs also are capable of sustaining short periods of current surge, such as disk drive power-up.

Specifications

Input	90-132 VAC/ 180-264 VAC, 47-440 Hz
Output	See matrix, left
Line regulation	±0.2%, all outputs
Load regulation	±0.2% main output ±1% regulated AUX outputs ±5% quasi-regulated AUX outputs
Ripple and noise	1% point-to-point maximum, all outputs
Efficiency	75% typical
Operating temperature	50 degrees C at full rated load. Derate to 50% of rated output at 70 degrees C.
Temperature coefficient	0.02% per degree C
Overvoltage protection	OVP on main output is set at +125% (±5%). This protection is reset by recycling input power.
Overload protection	All regulated outputs are individually current-limited and short-circuit-protected. Recovery is automatic when load is reduced. Units are also protected by a maximum converter power limit.
Holdover storage	16 mSec. minimum; 20 mSec. typical from nominal line.
Remote sense	Remote sense on main output compensates for up to 0.5V in the load cable.
Overshoot	No voltage spikes on turn-on, turn-off or power fail.
Transient response	Recovery to within 1% of nominal output voltage within 500uSec. (50% load step for regulated outputs).

When you need a custom switcher...



NATIONAL POWER TECHNOLOGY

National Power Technology, Inc.
2111 Howell Avenue
Anaheim, California 92806 • USA
Telephone (714) 937-1301
TWX 910-591-1893

Call the company that knows the meaning of value-added.

We have the full-service expertise to design and build the switcher that meets your most critical requirements.

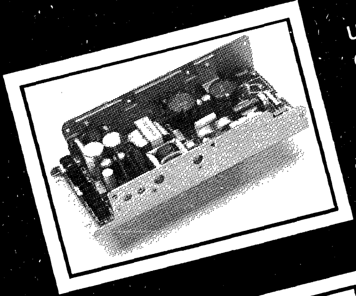
Our highly skilled engineering staff will thoroughly review your specification to ensure a reliable, cost-effective solution.

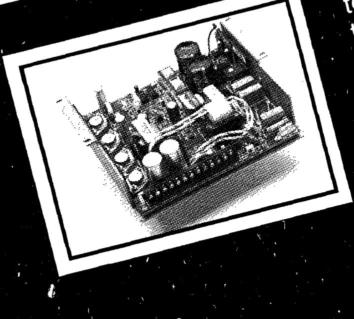
Manufacturing follows the latest, most up-to-date assembly techniques, with progressive workstations, state-of-the-art functional testing and 24-hour burn-in.

Quality is assured through multiple, on-line inspections and strict adherence to production test procedures developed from your specifications. All units are carefully burned in under controlled temperature and loads; then, they are re-tested prior to shipment. Our typical MTBF rates exceed the most demanding industry standards.

So call us. Your custom power supply will arrive as specified. On time. And within budget.

That's a commitment you can take to the bank.



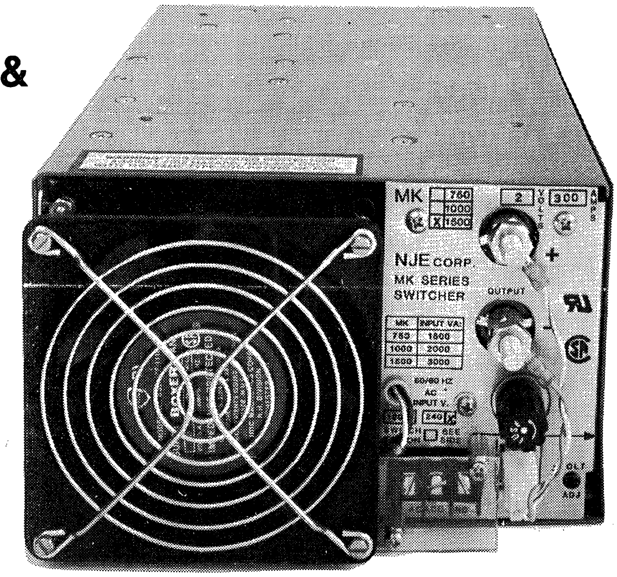


NJE

POWER SUPPLIES

750-1750W Single- and Multi-Output Switchers Guaranteed For 5 Years

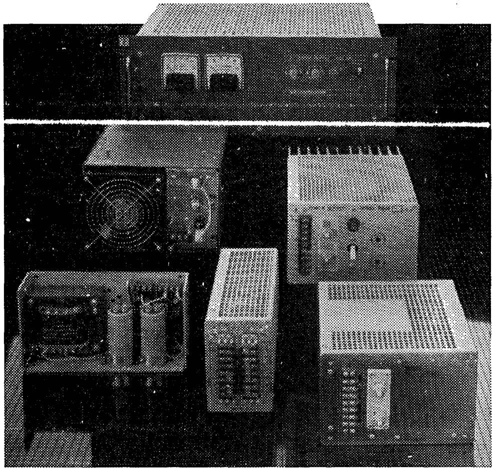
- CSA Certified & UL Recognized
- Full 5-Year Warranty
- Many Standard Models To Choose From
- Up To 85% Efficiency



- 100% Burn In With Power Cycling
- All Models In Industry-Standard Cases
- Highly-Reliable Ball Bearing Fans

Additional Features

- Inrush current limiting
- Expanded AC input range
- 0.2% line/load regulation
- OVP standard on all models
- Crowbar optional
- Remote inhibit
- Power failure signal
- 20 msec hold-up time
- Reverse voltage and overload protection
- Remote sensing; loss of sense protection
- Thermal protection; automatic restart
- Full rated to 50°C, operation to 70°C
- Designed to meet IEC & VDE safety specifications



When You Require Reliable Performance and Competitive Pricing, NJE Has The Power. The power to supply you with switchers, ferros and linears that are unsurpassed in the industry.

And NJE power supplies are backed by the most dedicated customer support team in the industry. We offer the power to deliver. To customize. To provide the product, service and technical support you need.

Contact NJE *today* for your copy of our latest catalog.

NJE **POWEReliability. Guaranteed.**

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Dayton, NJ 08810-0669 TWX 710-480-5674

PRECISION CURRENT & VOLTAGE SOURCES North Hills

PRECISION CURRENT SOURCES

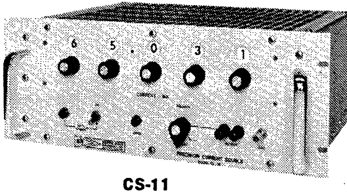
ACCURACIES TO 0.01% **STABILITIES TO 2 PPM**

APPLICATIONS:

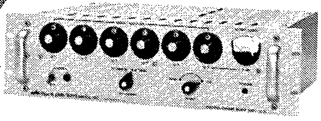
- Laboratory and Production Testing of Semiconductors, Gyros, Lamps, Meters, Thermistors, etc.
- Systems requiring a Precision Constant Current Setting such as X-ray Equipments, Electron Beam Welders, and Electron Beam Microscopes.

FEATURES:

- Digital In-Line Current Setting and Readout.
- 5 or 6 Decade Dividers for Setting to 1 Part in 100,000 or 1 Part in 1,000,000 of Full Scale.
- Uni- and Bi-Polar Models.
- Externally Programmable Models.
- External Modulation Capability.
- Automatic Protection Circuits.

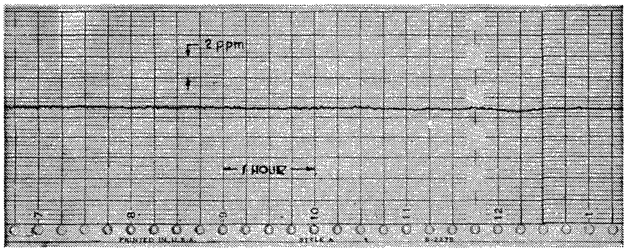


CS-11



CS-31

Model	Current Range (mA)	Compliance Range (V)	Accuracy (%)	Stability (ppm)
CS-11	0 - 100	100	0.015	10
CS-12	0 - 1000	12.5	0.015	10
CS-13	0-5000	25	0.03	10
CS-14	0 - 10,000	12.5	0.03	10
CS-31	0 - 2000	60	0.01	5
CS-32	0- 2000	100	0.01	5
CS-111	0 - 500	250	0.1	30
CS-120	0 - 10	2000	2.0	1000
CS-151	0 - ±10	± 10	0.01	2
CS-152	0 - ±150	± 25	0.01	2
CS-153	0 - ±150	±100	0.01	2



DIGITAL PRECISION CURRENT, VOLTAGE AND VOLTAGE/CURRENT SOURCES

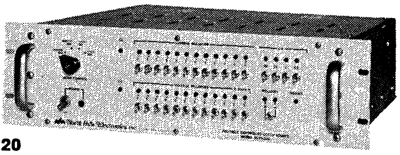
FOR COMPUTER-CONTROLLED AUTOMATIC TEST SYSTEMS

Output Selection:	4 digit BCD or 16 bit binary
Accuracy:	0.02% +½ LSB
Stability:	50 ppm
Regulation	
vs. line:	10 ppm
vs. load:	10 ppm
vs. temperature:	25 ppm/°C
Response Time:	100 μsec

CONSTANT VOLTAGE		
Model DVS-40	Full-Scale Volts	Max. Amps.
−010	10	2
−015	15	1.5
−020	20	1
−050	50	0.5
−075	75	0.3
−110	100	0.2

CONSTANT CURRENT		
Model	Full-Scale Amps.	Max. Volts
DCS-28—135	0.35	800
DCS-30—110	0.1	100
DCS-30—150	0.5	40
DCS-30—210	1	40
DCS-30—220	2	40
DCS-30—250	5	20
DCS-30—310	10	10

CONSTANT VOLTAGE/CURRENT		
Model	Full-Scale Volts	Full-Scale Amps.
DCVS-220	±100	±0.33
DCVS-222	±20	±2.0
DCVS-224	±40	±1.0



DCVS-220

PRECISION VOLTAGE/CURRENT SOURCES

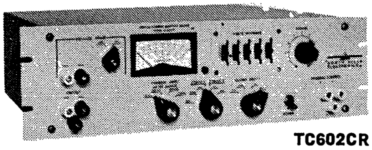
These highly stable and accurate precision sources can be operated in either constant voltage or constant current modes.

All models include such features as manual and remote programming, and output voltage regulation by either local or remote sensing.

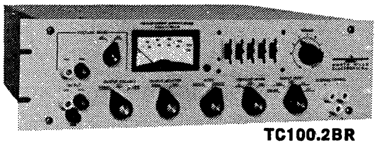
Voltage and current outputs are selected on decade switches whose markings form an in-line digital readout.

Model	Constant Voltage (V)	Constant Current (mA)	Accuracy (%)	Stability (ppm)	Decades
CVS-264	0 to ±100 @ 100 mA max.	0 to ±100 @ 100 V max.	0.1	25	5
TC-100.2 BR	0 to 100 @ 200 mA max.	0 to 100 @ 100 V max.	0.01	5	5 + vernier
TC-602 CR	0 to 60 @ 2 A max.	0 to 2000 @ 60 V max.	0.01	5	5 + vernier

Automatic protection limits output voltage and current to safe levels. No voltage or current overshoot occurs during turn-on or turn-off. A warning indicator alerts the operator if the actual output should differ from the dialed setting beyond the specified limits. Models TC-100.2BR and TC-602CR include a panel meter to monitor output current.



TC602CR



TC100.2BR

North Hills Electronics, INC.
1 ALEXANDER PLACE, GLEN COVE, NY 11542-3796 / TELEX: 46-6886 / TEL. (516) 671-5700

CUSTOM AC/DC POWER SUPPLIES
CONVERTERS, INVERTERS, CONTROLLERS

FROM WATTS TO MEGAWATTS

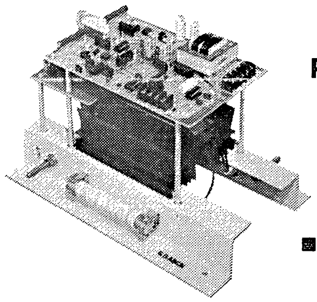
Products from NWL:

- AC/AC & AC/DC power supplies and controllers
- Silicon controlled rectifier (SCR) supplies
- High or low amperage and voltage
- Regulated: voltage, current and power
- Polarity reversing power supplies
- Transformers (oil, silicone, water-cooled, epoxy, dry)
- Reactors/chokes/filters

Products from
MEGATRAN ELECTRONIC POWER:

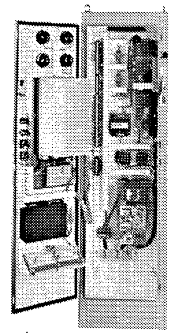
- Phase angle modular power controllers
- Phase angle firing circuits
- Voltage current regulators
- DC amplifiers (5 AMP + 25 AMP models)
- Current limiters
- Solid state alarm modules
- Diode stacks

TYPICAL OF THE RANGE OF NWL CAPABILITIES...

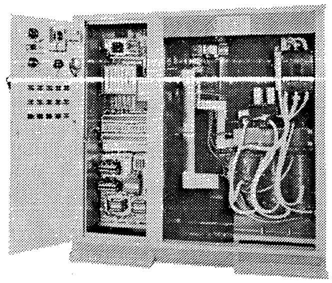


Phase Angle Modular Power Controllers

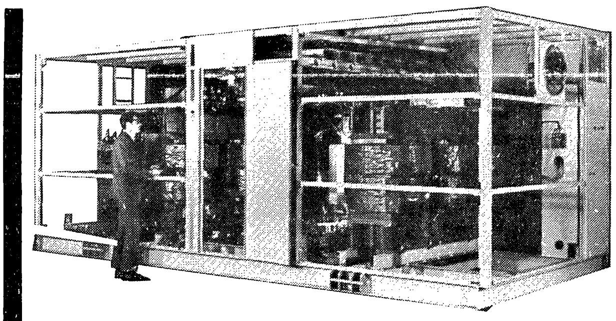
- AC line amperes: from 40 to 495
- "Linear" firing circuit
- RC network and MOV
- SCR's individually fused



Patented Microprocessor based SCR Controller with spark-rate logic for electrostatic precipitator application.



DC Power Supply for Super-conducting Magnets — 0-50 VDC @ 5000 Amps DC. Incorporates 12 pulse output, phase-angle controlled SCR's, L.C. Filter and programmable controller.



6.34 Megawatt Power Supply

- 20-ton unit for Compact Toroid Experiment (CTX)...entirely produced at NWL's facilities...from micro-electronics, to magnetics, to fabrication and assembly, to full-load testing

MANUFACTURING RANGE

Up to 200 KV
1 ma to 50,000 AMP
4 Hz to 50 kHz
1 VA to 6,000 KVA
Dry, Oil-Filled, Silicone Fluid-Filled, Water Cooled, and Epoxy Cast Units Available.

NWL also manufactures various types of power transformers, reactors, chokes. See our full page ad in the transformer section of EEM. Our engineers are available to assist you in selecting magnetic components to meet your application requirements.

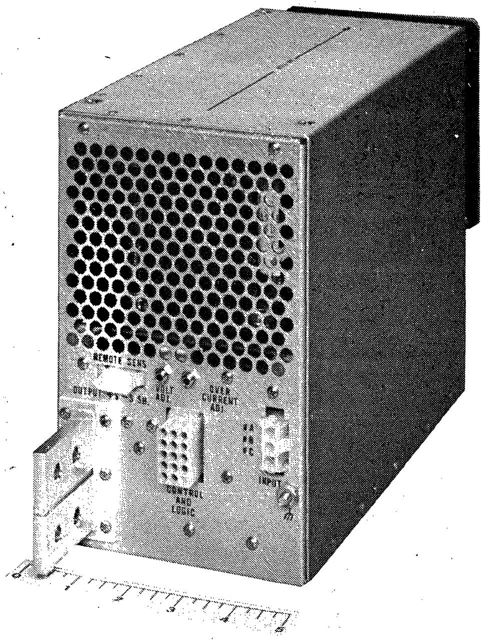
NWL TRANSFORMERS

Rising Sun Road, P.O. Box 358 • Bordentown, NJ 08505 • (609) 298-7300 • TWX: 510-685-3645

opt INDUSTRIES INC.
300 RED SCHOOL LANE, PHILLIPSBURG, NJ 08865 • (201) 454-2600 • TWX 510-235-2920

NEW DIMENSION IN 1500 watt OFF-LINE SWITCHING POWER SUPPLIES

SP-1500 SERIES



GENERAL INFORMATION

If you consider 3.75W/in³, ≥ 80% efficiency (5-50V Outputs), a weight of 14 pounds or less, an MTBF greater than 100,000 hours outstanding, then you owe it to yourself to investigate the quality and leading technology of the SP-1500 Series Power Supply.

While we at OPT's Power Conversion Systems Group (PCSG) believe these power supply units competitive on a dollar per watt basis (≤ $0.80/watt) — think about a 1500W unit in terms of ≤ 0.12 cents per reliable operating hour — that's real cost effectiveness.

At OPT/PCSG, we believe that reliability begins on the drawing board. Some of the things we do to achieve an MTBF in excess of 100,000 hours in a "commercial" power supply unit are:

- We use only ceramic packaged integrated circuits
- All power mesh FET's and rectifiers are TO-3 and DO-4/DO-5 packages — no plastic packaged devices
- All other components are carefully derated for their particular usage

We at OPT/PCSG also believe that QUALITY is CARING at every step of the manufacturing and testing of these units; therefore:

- Every unit is burned-in at 50°C ambient and simultaneously stress aged by input power cycling and load cycling for 8 hours
- Every specified functional parameter is 100% tested and recorded on our Acceptance Test Data Sheets — You, the Customer receive this data with every serialized unit. OPT/PCSG maintains these same data in our files
- These units are 100% manufactured and tested by skilled production personnel in our facilities in the U.S.A. — not overseas
- Continuous evaluation of purchased component quality is ably handled by our Material and Quality Assurance departments. We are always seeking ways to improve our products to better serve our valued customers

Here are some additional features of the SP-1500 Series Units:

- Line Regulation ≤ 0.1% • Load Regulation ≤ 0.2%
- Output Ripple/Noise ≤ 1% • Parallelable to Six (6) Units
- Overcurrent Protection (Please refer to Options)
- Adjustable Output Voltage • Adjustable Current Limit
- Overvoltage Protection (Please refer to Options)
- Overtemperature Protection Flag
- Three (3) Input Power Options (Please refer to Options)
- Meets all International Safety Agency Requirements
- Output Voltages of 2.0 to 50.0V DC Available (Refer to Options)
- Standard 5″ x 8″ x 10″ size (Less Fan)
- Redundant Parallelability (Discuss requirements with our Engineering Department for specific recommendations)
- These 1500 Watt units are switching at 100 kHz and exceed the efficiency of 200 kHz Bipolar units (Tpical efficiency — 5V/300A units ≥ 80%)

In addition to our 1500-Watt unit, OPT's Power Conversion System's Group offers the SP-750 Series — a 750-Watt output unit, with all of the input power options, output voltage ranges and all other features of the SP-1500.

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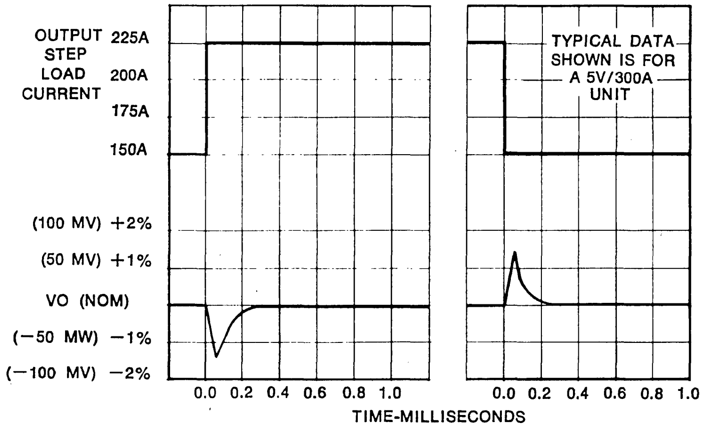
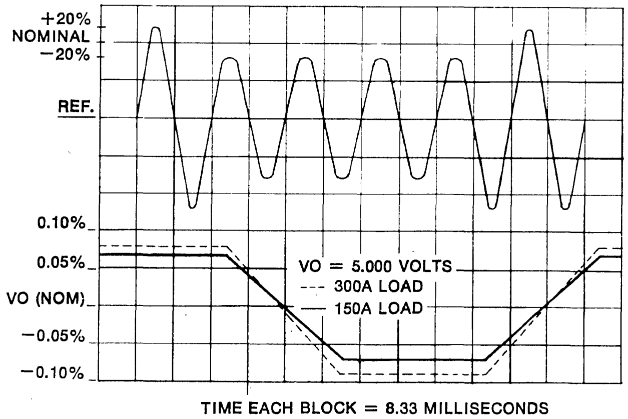
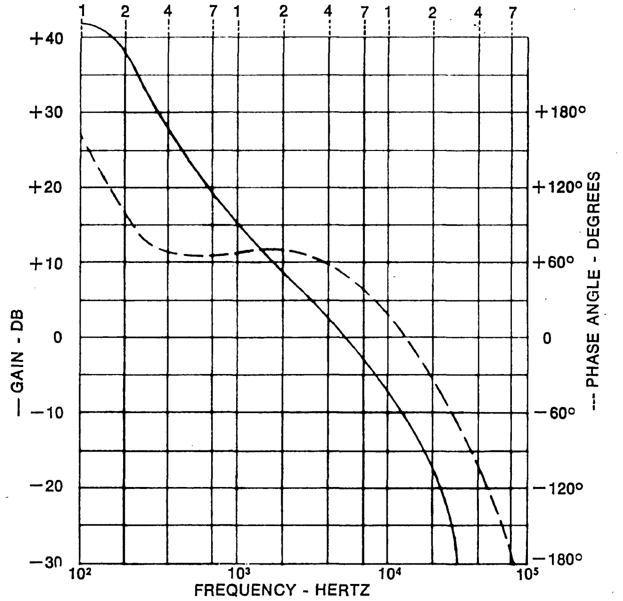


TYPICAL STEP LOAD RESPONSE CHARACTERISTICS



TYPICAL LINE TRANSIENT RESPONSE CHARACTERISTICS



TYPICAL OPEN LOOP CHARACTERISTICS

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SP-750/SP-1500 SERIES POWER SUPPLIES

COMMON CHARACTERISTICS

Output	Typical of 5V/300A Units	Typical of All Units
Output Voltage Range	4.5V to 5.5V	±10%
Output Current	300A	Zero to Rated I
Output Overcurrent Adj. Range	50A to 325A	10-100%
Output Ripple, Max. Rated Load Current	35mV P-P Max.	1% P-P
Output Voltage Regulation	±0.2% Max.	±0.2% Max
Hold-Up Time Standard	10 Msec	10 Msec
Float Battery Option Available (Contact Factory)	Optional	Optional
Overvoltage Protection (Automatic reset or latch available)	110-120%	110-120%
Short-Circuit Current (Constant current or foldback available)	—	—
Logic Inhibit (≤ 0.5V inhibits, ≥ 2.4V enables)	—	TTL Compatible
Remote Sense (Both output and return)	—	0.5V Max
Polarity (Isolation: ±500V DC to chassis)	—	Floating Output
Overtemperature Flag (Normally open)	—	Sinks 5 mA Max
Throughput Efficiency (Full load)	—	>80% (5V/300A)
Soft Start	—	Linear Ramp

INPUT

- Please see Product Availability Guide for Options Available
- Inrush Current: 30A Max
- Turn-on Time with Application of Primary Power: 1 Sec
- Turn-On Time with Logic Enable: 200 Msec

FEATURES

- Outputs Parallelable to six (6) units for increased current capacity
- Current Mode PWM control topology for wide bandwidth and excellent line and load response
- 100 kHz power FET "H" bridge topology for minimum power mesh component stress
- Input Transient voltage protection
- Redundant parallelability — Contact Factory with System Requirements

MECHANICAL

Size: 5"W x 8"H x 10"L
Weight: < 14 Pounds

SAFETY STANDARDS

(ALL UNITS)

- Designed to meet VDC/UL/CSA/FCC/IEC
- MTBF Commercial Version: > 100,000 Hours
- Available in Military Version

100KHZ OFF-LINE SWITCHMODE OPTIONS

SP-1500 SERIES

SP-15 AB XX
Input Power — 15
Options — AB
Output Voltage — XX

SP-750 SERIES

SP-7 AB XX
Input Power — 7
Options — AB
Output Voltage — XX

INPUT POWER

SP-1500 Series	Features	SP-750
15	3φ, 115V/208 Vrms AC, 47-440 Hz	7
16	1φ, 208V/230 Vrms AC, 47-440 Hz	8
17	260V/290V DC, Nominal Input	9
	Input Transient Range: 20 milliseconds to 392V DC 40 milliseconds to 357V DC continuous 205 to 325V DC	

OUTPUT VOLTAGE

XX		XX	
02	2 Volts DC	28	26-30 Volts DC
05	5 Volts DC	32	30-35 Volts DC
24	22-26 Volts DC	50	45-56 Volts DC

Please consult factory for other output voltage requirements.

NOTES:

1) SP-1500 Series limited to equal to or less than 1500 watts and 350 amperes output
2) The SP-750 Series limited to equal to or less than 750 watts and 175 amperes output
3) The SP-750 Series is packaged in the same size and mechanical configuration as the SP-1500 Series
4) Both the SP-750 and SP-1500 Series can be supplied with or without the Cooling Fan

OPTIONS:

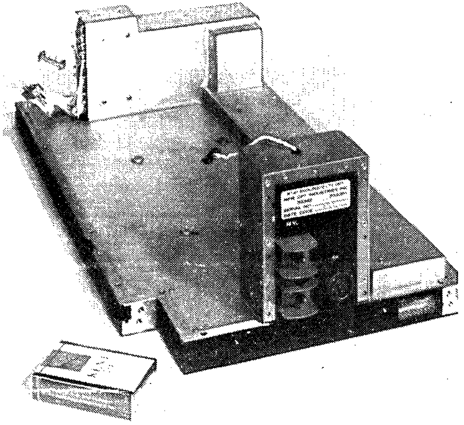
Please Note: All units include overtemperature flag with auto restart when O.T. condition clears and an output enable on the logic connector.

A0 — Units supplied with Cooling Fan as Standard
1 — Units supplied Less Cooling Fan (user supplies 60 CFM Air Flow)
B1 — Latching Overvoltage
2 — Auto Restart Overvoltage and Overcurrent Protection
3 — Latching Overvoltage Protection and Auto Restart Overcurrent Protection

Please consult factory for special option requirements.
OPT INDUSTRIES, Inc. reserves the right to make specification changes that in our judgment result in an improved performance parameter(s) and/or more cost effective, more reliable product.

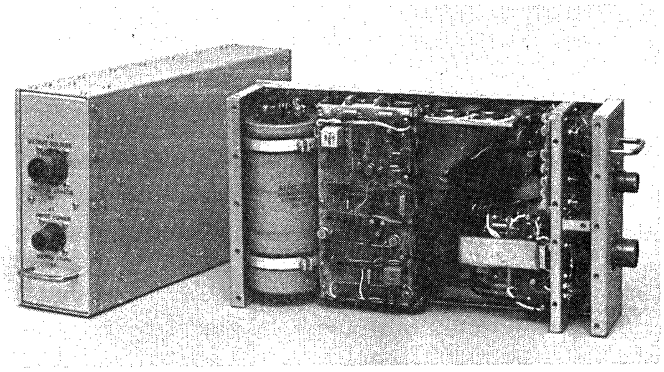
opt INDUSTRIES INC.
300 RED SCHOOL LANE, PHILLIPSBURG, NJ 08865 • (201) 454-2600 • TWX 510-235-2920

CUSTOM POWER SUPPLIES
Engineering and Manufacturing



- Commercial
- Military
- 20-100 kHz Switching
- DC to DC Converter
- Linear
- Ferroresonant
- MIL-E-5400R
- MIL-E-16400
- UL, VDE, CSA
- MIL-STD-461
- MIL-E-4158

Power densities 5W/in.^{3} have been achieved in multi-output power supplies employing power MOSFET technology switching at 100 kHz. We serve both the military and commercial market including the computer and medical electronics fields. Our high technology and quality standards are reflected by our strong participation in many advanced military programs, medical, as well as quality data processing main frame applications. For example:



- Rapport III Airborne Electronic Counter Measure (ECM) Multi-Output Power Supply
- Trident Submarine Missile Control System
- Navy Shipboard Missile Vertical Launch System (VLS)
- Computer and Processing Logic Power Supply
- Patient Connected Medical Electronics Equipment

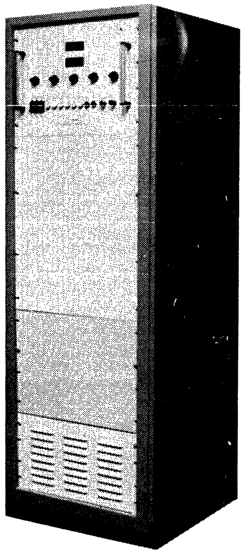
ORAM ELECTRONICS INC.

High Voltage Systems and Components

REGULATED HIGH VOLTAGE D. C. POWER SUPPLIES

STANDARD FEATURES:

- Digital panel meters
- Coarse and vernier voltage control
- Optional digital dialable controls with 1% accuracy
- Fast acting magnetic circuit breakers (fuse under 1KW)
- Adjustable overcurrent and over-voltage shut off
- Solid state regulating circuits (except for series regulating tube)
- Ripple: .01% RMS of full voltage
- Regulation: ±0.05% from no load to full load
- Line regulation: ±0.05% for ±10% line variations from nominal line voltage
- Stability: short term .02%, long term .05%
- Reversible polarity



OPTIONS:

- Current regulated instead of voltage regulated. Consult factory
- Load regulation to ±0.01% or ±0.001%
- Line regulation to ±0.01% or ±0.001%
- Combined voltage and current regulated output
- Emission current regulators for X-ray tubes — tomography supplies (cat scanners)
- Surge on operation
- Overcurrent roll off feature using a saturable reactor as the controlling element

Output Volt. Range (Volts)	Rated DC Current (MA)	Model Designa-tion	Input (60 Hz) Volts	φ	Control Cab. Size WxDxH	HV Ass'y Size WxDxH
0-3KV	100	DTR 3-100	105-125	1	22x18x19¼	A
	250	DTR 3-250	105-125	1	22x18x19¼	A
	400	DTR 3-400	105-125	1	22x18x22¾	A
	600	DTR 3-600	105-125	1	22x18x40	A
	1200	DTR 3-1.2A	190-230	1	22x18x72	A
	2500	DTR 3-2.5A	190-230	3	27x24x72	A
	5000	DTR 3-5A	190-230	3	33x24x72	A
0-5KV	60	DTR 5-6	105-125	1	22x18x19¾	A
	150	DTR 5-150	105-125	1	22x18x22¾	A
	200	DTR 5-200	105-125	1	22x18x22¾	A
	400	DTR 5-400	105-125	1	22x18x40	A
	800	DTR 5-800	190-230	3	22x24x72	A
	1500	DTR 5-1.5A	190-230	3	33x24x72	A
	3000	DTR 5-3A	190-230	3	33x24x72	A
	8000	DTR 5-8A	190-230	3	55x24x72	A
0-10KV	30	DTR 10-30	105-125	1	22x18x22¾	A
	80	DTR 10-80	105-125	1	22x18x33¼	A
	100	DTR 10-100	105-125	1	22x18x33¼	A
	200	DTR 10-200	190-230	1	22x18x72	A
	400	DTR 10-400	190-230	3	27x24x72	A
	800	DTR 10-800	190-230	3	27x24x72	A
	1500	DTR 10-1.5A	190-230	3	33x24x72	A
	4000	DTR 10-4A	190-230	3	71x24x72	A
0-15KV	20	DTR 15-20	105-125	1	22x18x22¾	A
	50	DTR 15-50	105-125	1	22x18x33¼	A
	80	DTR 15-80	105-125	1	22x18x40	A
	120	DTR 15-120	105-125	1	22x18x40	A
	240	DTR 15-240	190-230	1	22x24x72	A
	500	DTR 15-500	190-230	3	27x24x72	A
	1200	DTR 14-1.2A	100-230	3	22x24x72	A
	3000	DTR 15-3A	100-230	3	22x24x72	71x24x72
0-20KV	15	DTR 20-15	105-125	1	22x18x33¼	A
	40	DTR 20-40	105-125	1	22x18x40	A
	60	DTR 20-60	105-125	1	22x18x72	A
	100	DTR 20-100	190-230	1	22x24x72	A
	200	DTR 20-200	190-230	1	22x24x72	A
	400	DTR 20-400	190-230	3	22x24x72	240Dx37H
	800	DTR 20-800	190-230	3	33x24x72	22x28x36
	2000	DTR 20-2A	190-230	3	33x24x72	33x24x72⅜
0-24KV	12	DTR 24-12	105-125	1	22x18x40	A
	30	DTR 24-30	105-125	1	22x24x72	A
	50	DTR 24-50	105-125	1	22x24x72	A
	80	DTR 24-80	190-230	1	22x18x22¾	190Dx31H
	160	DTR 24-160	190-230	1	22x18x72	22x28x36
	300	DTR 24-300	190-230	3	22x24x72	22x28x36
	600	DTR 24-600	190-230	3	33x24x72	26x40x40
	1600	DTR 24-1.6A	190-230	3	66x24x72	30x42x42
0-30KV	10	DTR 30-10	105-125	1	22x18x40	A
	24	DTR 30-24	105-125	1	22x24x72	A
	40	DTR 30-40	105-125	1	22x24x72	A
	70	DTR 30-70	190-230	1	22x18x40	190Dx31H
	150	DTR 30-150	190-230	3	22x18x72	22x28x36
	250	DTR 30-250	190-230	3	22x24x72	22x28x36
	500	DTR 30-500	190-230	3	33x24x72	22x42x34
	1200	DTR 30-1.2A	190-230	3	66x24x72	26x50x40
0-50KV	6	DTR 50-6	105-125	1	22x18x72	190Dx31H
	15	DTR 50-15	105-125	1	22x24x72	190Dx31H
	25	DTR 50-25	105-125	1	22x24x72	190Dx31H
	40	DTR 40-40	190-230	1	22x24x72	240Dx38H
	80	DTR 50-80	190-230	1	22x24x72	240Dx38H
	150	DTR 50-150	190-230	3	33x24x72	240Dx38H
	300	DTR 50-300	190-230	3	33x24x72	36x40x50
	800	DTR 50-800	190-230	3	44x24x72	30x42x42
0-75KV	4	DTR 75-4	105-125	1	22x18x72	240Dx38H
	10	DTR 75-10	105-125	1	22x18x72	240Dx38H
	16	DTR 75-16	105-125	1	22x24x72	240Dx28H
	30	DTR 75-30	190-230	1	22x24x72	22x28x36
	60	DTR 75-60	190-230	1	22x24x72	22x34x42
	120	DTR 75-120	190-230	3	33x24x72	22x34x42
	240	DTR 75-240	190-230	3	33x24x72	26x40x50
	600	DTR 75-600	190-230	3	44x24x72	26x40x60

A — High Voltage Section is an integral part of Control Section.

Output Volt. Range (Volts)	Rated DC Current (MA)	Model Designa-tion	Input (60 Hz) Volts	φ	Control Cab. Size WxDxH	HV Ass'y Size WxDxH
0-100KV	3	DTR 100-3	105-125	1	22x18x72	22x28x36
	8	DTR 100-8	105-125	1	22x18x72	22x28x36
	12	DTR 100-12	105-125	1	22x24x72	22x28x36
	20	DTR 100-20	105-125	1	22x24x72	22x28x36
	40	DTR 100-40	190-230	1	22x24x72	22x42x34
	80	DTR 100-80	190-230	3	33x24x72	22x42x34
	160	DTR 100-160	190-230	3	44x24x72	26x50x40
	400	DTR 100-400	190-230	3	66x24x72	26x50x50
0-150KV	2.4	DTR 150-2.5	105-125	1	22x24x72	34x44x48
	6	DTR 150-6	105-125	1	22x24x72	34x44x48
	8	DTR 150-8	105-125	1	22x24x72	34x44x48
	15	DTR 150-15	190-230	1	22x24x72	34x54x48
	30	DTR 150-30	190-230	1	22x24x72	34x54x48
	60	DTR 150-60	190-230	3	33x24x72	36x60x50
	120	DTR 150-120	190-230	3	44x24x72	36x60x60
	300	DTR 150-300	190-230	3	66x24x72	36x60x60
0-200KV	2	DTR 200-2	105-125	1	22x24x72	34x44x48
	4	DTR 200-4	105-125	1	22x24x72	34x44x48
	6	DTR 200-6	105-125	1	22x24x72	34x44x48
	10	DTR 200-10	190-230	1	22x24x72	34x44x48
	20	DTR 200-20	190-230	1	22x24x72	34x44x48
	40	DTR 200-40	190-230	3	33x24x72	34x44x48
	80	DTR 200-80	190-230	3	33x24x72	34x54x48
	200	DTR 200-200	190-230	3	66x24x72	36x60x60
0-250KV	2	DTR 250-2	105-125	1	22x24x72	42x50x55
	3	DTR 250-3	105-125	1	22x24x72	42x50x55
	5	DTR 250-5	105-125	1	22x24x72	42x50x55
	8	DTR 250-8	105-125	1	22x24x72	42x50x55
	16	DTR 250-16	190-230	1	22x24x72	40x76x55
	30	DTR 250-30	190-230	1	33x24x72	40x76x55
	60	DTR 250-60	190-230	3	44x24x72	72x84x60
	160	DTR 250-160	190-230	3	66x24x72	96x84x72

ORAM
High Voltage

ORAM also manufactures the following: HIPOT Test Sets, AC/DC Megameters, Unregulated Power Supplies, TWT Test Sets, Dividers and Custom Systems to your specifications up to 250 KVA.

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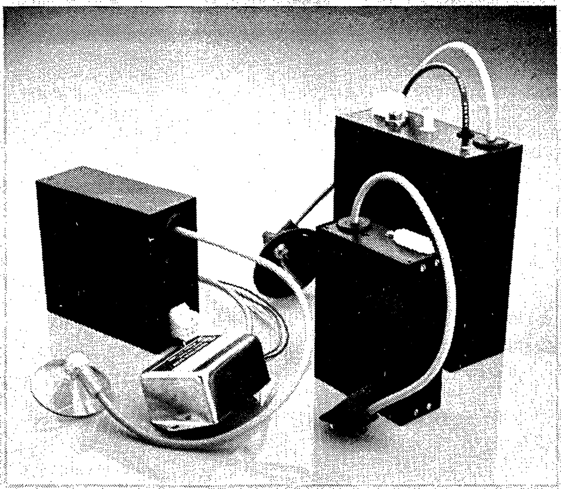
The New

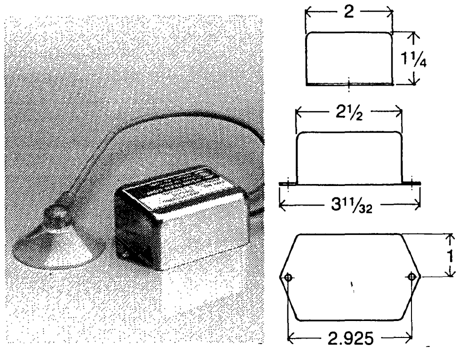
PENN-TRAN



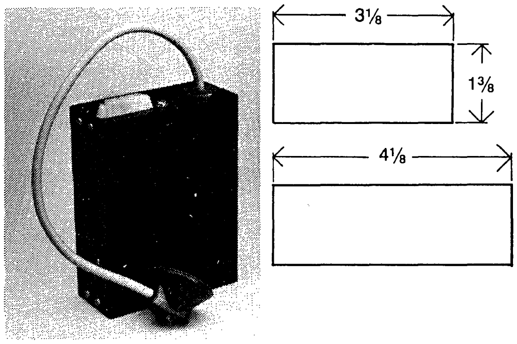
High Voltage Power Supplies

Engineers know us for quality and innovation in the design and manufacture of deflection components for CRT Displays and television cameras. High Voltage Power Supplies are part of the new Penn-Tran's team of deflection components, exactingly designed, manufactured and backed by our 39 years as a pioneer in the field.

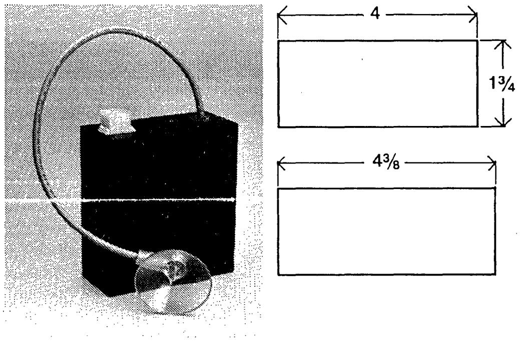
These samples of power supplies are suitable for multiple customer-specified applications, or we will design a prototype to suit your application. For the Penn-Tran systems approach, please see our high voltage power modules, saddle yokes, flybacks, and camera yokes in EEM Section 5600, and stator yokes in EEM Section 1800.



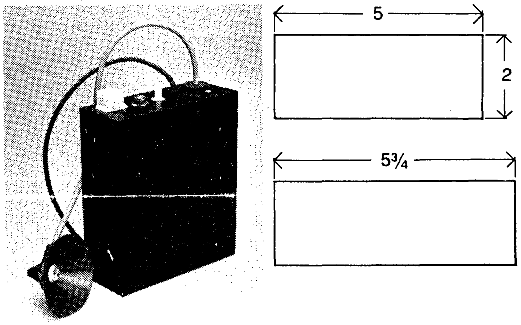
3 Watt -	B+	HV(KV)	SEC	SEC
HVS 1509	15	9.0	400	- 100
HVS 1512	15	12.0	400	- 100



10 Watt -	B+	HV(KV)	SEC	SEC	SEC
HVS 2610	26	10	400	- 100	
HVS 2617	26	17	1000	- 110	



20 Watt -	B+	HV(KV)	SEC	SEC	SEC
HVS 2818	28	18	1200	- 150	



30 Watt -	B+	HV(KV)	SEC(KV)	SEC	SEC
HVS 3625	36	25	(5.5-8.5)	(200-700)	- 200

PENN-TRAN

Penn-Tran Corporation, Route 144 North, P.O. Box 1321, Wingate, PA 16880
814-355-1521 Telex 706473

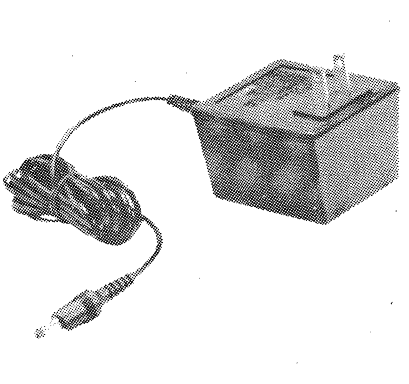
WALL PLUG-IN POWER SOURCES
AC-DC REGULATED OR UNREGULATED & AC-AC MODELS

UL-CSA UNREGULATED SERIES

INPUT: 120V 60Hz (ALL MODELS)

UL MODEL NUMBER	RATED OUTPUT VDC	RATED OUTPUT MADC	CSA
212A2212	3.0	150	*LISTED*
310A2210	3.0	200	*LISTED*
318A2213	3.0	600	*COMPLY*
416A2214	3.0	1000	*LISTED*
212A2143	3.3	300	*LISTED*
212A2220	4.5	150	*LISTED*
216A4222	4.5	350	*COMPLY*
318A4221	4.5	550	*LISTED*
416A2219	4.5	600	*LISTED*
820A2656	4.5	1500	*COMPLY*
825A2611	4.5	2000	*N/A*
212A2226	6.0	100	*LISTED*
310A2223	6.0	200	*LISTED*
318A2226	6.0	300	*LISTED*
318A4227	6.0	400	*LISTED*
416A2226	6.0	600	*LISTED*
420A4338	6.0	800	*LISTED*
820A4660	6.0	1200	*COMPLY*
825A2617	6.0	2000	*N/A*
521A4318	7.0	1200	*LISTED*
310A2223	7.5	100	*LISTED*
216A2134	7.5	200	*COMPLY*
420A2128	7.5	500	*LISTED*
212A2144	8.3	120	*LISTED*
318A4248	8.5	100	*LISTED*
212A2136	9.0	100	*LISTED*
318A2138	9.0	150	*LISTED*
216A4139	9.0	200	*LISTED*
420A2128	9.0	300	*LISTED*
416A4136	9.0	500	*LISTED*
820A4465	9.0	900	*COMPLY*
825A4620	9.0	1200	*N/A*
420A4246	10.0	500	*LISTED*
216A2045	12.0	100	*COMPLY*
318A2045	12.0	150	*LISTED*
318A4146	12.0	200	*LISTED*
416A2141	12.0	300	*LISTED*
420A4147	12.0	400	*LISTED*
420A4141	12.0	500	*LISTED*
820A4470	12.0	700	*COMPLY*
825A4425	12.0	900	*N/A*
521A4317	12.0	1000	*LISTED*
420A2249	14.0	350	*LISTED*
310A1941	18.0	50	*LISTED*
416A2045	18.0	100	*COMPLY*
420A4143	20.0	280	*LISTED*
318A4049	24.0	50	*LISTED*
811A4212	*	300	*LISTED*

*5 Switched Output Voltages: 3.0 - 4.5 - 6.0 - 7.5 - 9.0 VDC and Universal Output Plug



UL-CSA REGULATED SERIES

REGULATED TO LINE & LOAD CHANGES

UL MODEL NUMBER	RATED OUTPUT VDC	RATED OUTPUT REG	RATED OUTPUT MADC	CSA
420AR4301	3.0	0.5	400	*COMPLY*
416AR4242	4.5	0.5	400	*LISTED*
816AR4205	4.5	0.2	500	*COMPLY*
420AR4203	5.0	0.5	350	*COMPLY*
816AR4201	5.0	0.2	600	*COMPLY*
NEWAR4201	5.2	0.2	1000	*COMPLY*
420AR4204	6.0	0.5	300	*COMPLY*
420AR4207	6.0	0.5	400	*COMPLY*
816AR4202	6.0	0.2	500	*COMPLY*
420AR4008	7.5	0.5	600	*LISTED*
420AR4105	9.0	0.5	250	*COMPLY*
816AR4103	9.0	0.2	400	*COMPLY*
420AR4106	12.0	0.5	200	*COMPLY*
816AR4104	12.0	0.2	300	*COMPLY*
NEWAR4101	+12.0 −12.0	0.2 0.2	250 250	*COMPLY*
NEWAR4102	+15.0 −15.0	0.2 0.2	200 200	*COMPLY*

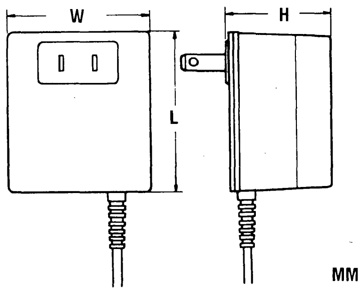
REG=TYPICAL OUTPUT DC VOLTAGE CHANGE AT 108V OR 132V INPUT LINE CONDITION

UL-CSA AC-AC SERIES CLASS II TRANSFORMERS

INPUT: 120V 60Hz (ALL MODELS)

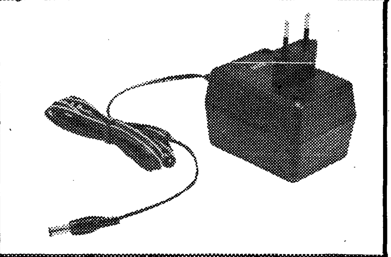
UL MODEL NUMBER	RATED OUTPUT VAC	RATED OUTPUT MA RMS	CSA
310A0001	2.5	500	*LISTED*
420A0003	9.0	800	*COMPLY*
825A0004	9.0	1700	*N/A*
420A0001	11.0	600	*LISTED*
310A0002	12.0	110	*COMPLY*
825A0001	12.0	1300	*N/A*
NEWA5701	12.0	2000	*N/A*
NEWA6601	12.0	3300	*N/A*
816A0001	14.0	500	*LISTED*
420A0002	14.0	770	*LISTED*
825A0005	15.0	1000	*N/A*
818A0001	17.0CT	500	*LISTED*
825A0002	18.0	880	*N/A*
NEWA6602	18.0	2200	*N/A*
420A0004	24.0	300	*COMPLY*
420A0005	24.0	450	*COMPLY*
825A0003	24.0	660	*N/A*
NEWA5702	24.0	1000	*N/A*
NEWA6603	24.0	1670	*N/A*

UL-CSA SERIES DIMENSIONS



MODEL SERIES	L	W	H
212A, 216A	53	36	38
310A, 316A	60	45	42
416A, 420A	61	55	41
816A	81	59	52
820A, 825A	82	60	48

EUROPEAN VDE SERIES



VDE UNREGULATED SERIES

INPUT: 220V 50Hz (ALL MODELS)

VDE MODEL NUMBER	RATED OUTPUT VDC	RATED OUTPUT MADC	VDE
416F4211	3.0	300	*COMPLY*
818F4311	3.0	1000	*COMPLY*
310F2102	3.5	200	*LISTED*
310F2104	4.5	200	*LISTED*
416F4212	4.5	300	*COMPLY*
818F4315	4.5	1000	*COMPLY*
310F4107	6.0	200	*LISTED*
416F4215	6.0	300	*COMPLY*
818F4225	6.0	400	*LISTED*
818F4217	6.0	800	*COMPLY*
416F4117	7.5	300	*COMPLY*
818F4119	7.5	700	*COMPLY*
416F4119	9.0	300	*COMPLY*
818F4120	9.0	500	*LISTED*
818F4121	9.0	600	*COMPLY*
416F4020	12.0	200	*COMPLY*
818F4124	12.0	500	*LISTED*

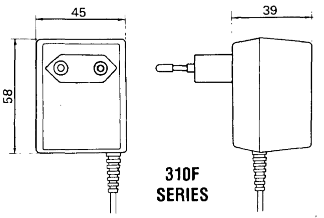
VDE REGULATED MODELS

VDE MODEL NUMBER	RATED OUTPUT VDC	RATED OUTPUT MADC	VDE
818FR4202	3.0	1000	*LISTED*
818FR4103	4.5	500	*LISTED*
818FR4104	6.0	400	*LISTED*
818FR4106	7.5	400	*LISTED*
818FR4107	9.0	300	*LISTED*
818FR4109	12.0	250	*LISTED*

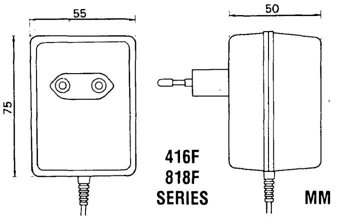
VDE AC-AC MODELS

VDE MODEL NUMBER	RATED OUTPUT VAC	RATED OUTPUT MA RMS	VDE
310F0001	4.5	300	*LISTED*
310F0002	6.0	250	*LISTED*
310F0006	9.5	150	*LISTED*
310F0007	12.0	100	*LISTED*

EUROPEAN SERIES DIMENSIONS



310F SERIES



416F 818F SERIES

PAN-MAGNETICS INTERNATIONAL, INC.

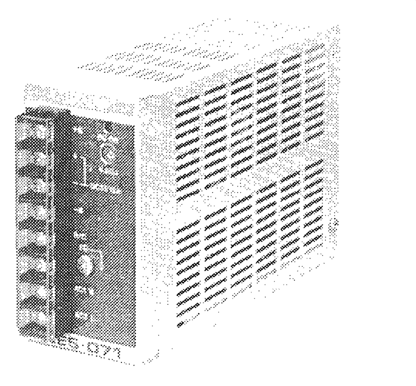
455-A CARSON PLAZA DRIVE, CARSON, CA 90746 • (213) 532-1790 • TELEX: 664759 (PAN-MAG CRSN)

TAMRADIO SWITCHING POWER SUPPLIES
COMPLY WITH UL-478, CSA, VDE, FCC PART 15 CLASS B & VDE NOISE REQUIREMENTS

NES — SINGLE OUTPUT SERIES

MODEL NUMBER	OUTPUT		MODEL SERIES
	VOLTS	AMPS	
NES-021	5	5	25W NES-020 SERIES
NES-022	12	2	
NES-023	15	1.6	
NES-024	24	1.0	
NES-051	5	10	50W NES-050 SERIES
NES-052	12	4	
NES-053	15	3.3	
NES-054	24	2	
NES-071	5	15	75W NES-070 SERIES
NES-072	12	6	
NES-073	15	5	
NES-074	24	3	
NES-101	5	20	100W NES-100 SERIES
NES-102	12	8	
NES-103	15	6.6	
NES-104	24	4	
NES-151	5	30	150W NES-150 SERIES
NES-152	12	12	
NES-153	15	10	
NES-154	24	6	

DIMENSIONS	INCHES / MM L	W	H
NES-020	4.53 115	1.42 36	3.98 101
NES-050	5.31 135	1.89 48	3.98 101
NES-070	7.28 185	2.01 51	3.98 101
NES-100	8.46 215	2.09 53	3.98 101
NES-150	8.46 215	2.99 76	3.98 101



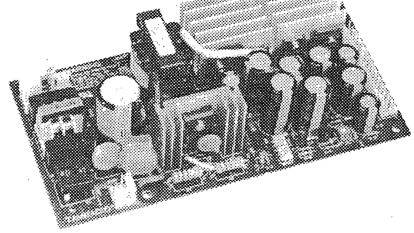
PERFORMANCE SPECIFICATIONS:

MODEL SERIES	NES-020	NES-050	NES-070	NES-100	NES-150
OUTPUT POWER	25W	50W	75W	100W	150W
Input Voltage	85-132VAC/170-264VAC				
Input Frequency	47-63Hz				
Line Regulation	0.5% MAX.		0.3% MAX.		
Load Regulation	1% MAX.		0.6% MAX.		
Overload Protection	Rectangular Current Limiting 120%				
Overvoltage Protection	Not Provided		Provided		
Remote Sense	Not Provided		Provided		
Remote On-Off	Not Provided		Provided		
Output Indicator	LED				
Operating Temperature	0 to +60°C				

NEM — MULTIPLE OUTPUT SERIES

MODEL NUMBER	OUTPUT 1		OUTPUT 2		OUTPUT 3		MODEL SERIES
	VOLTS	AMPS	VOLTS	AMPS	VOLTS	AMPS	
NEM-041	+5V	4A	+12V	1.4A	−12V	0.3A	40W NEM-040 SERIES
NEM-042	+5V	4A	+12V	1.4A	−5V	0.3A	
NEM-043	+5V	4A	+15V	1.1A	−5V	0.3A	
NEM-044	+5V	4A	+15V	1.1A	−15V	0.3A	
NEM-045	+5V	4A	+24V	0.7A	−12V	0.3A	
NEM-071	+5V	6A	+12V	2.8A	−12V	0.5A	70W NEM-070 SERIES
NEM-072	+5V	6A	+12V	2.8A	−5V	0.5A	
NEM-073	+5V	6A	+15V	2.2A	−15V	0.5A	
NEM-074	+5V	6A	+15V	2.2A	−5V	0.5A	
NEM-075	+5V	6A	+24V	1.4A	−12V	0.5A	
NEM-101	+5V	10A	+12V	3.6A	−12V	0.6A	100W NEM-100 SERIES
NEM-102	+5V	10A	+12V	3.6A	−5V	0.6A	
NEM-103	+5V	10A	+15V	2.8A	−15V	0.6A	
NEM-104	+5V	10A	+15V	2.8A	−5V	0.6A	
NEM-105	+5V	10A	+24V	1.8A	−12V	0.6A	
NEM-B41	+5V	3A	+12V	2A	−12V	0.2A	NEM-B40
NEM-B51	+5V	7.5A	+12V	1.3A (PEAK 2A)	−12V	0.2A	NEM-B50

	L	W	H
NEM-040	5.94 151	2.01 51	3.98 101
NEM-070	6.93 176	2.01 51	4.57 116
NEM-100	7.91 201	2.20 56	5.16 131
NEM-B40	6.30 160	1.97 50	3.94 100
NEM-B50	7.64 194	1.97 50	3.94 100



PERFORMANCE SPECIFICATIONS:

MODEL SERIES		NEM-040	NEM-070	NEM-100	NEM-B40	NEM-B50
OUTPUT POWER		40W	70W	100W	40W	50W
Input Voltage		85-132VAC 170-264VAC			95-135VAC 190-270VAC	105-135VAC
Input Frequency		47-63Hz				
Output Volt Tolerance	Output 1	±2%			±5%	±4%
	Output 2	±3%			±5%	±5%
	Output 3	±5%			±25%	+8.3% −25%
Line Regulation		1% MAX.				
Load Regulation (% Load Change)	Output 1	(30 - 100%) 2% MAX.			(20-100%) 3% MAX.	(25-100%) 2% MAX.
	Output 2	(0 - 100%) 2% MAX.			(25-100%) 4% MAX.	(15-100%) 2% MAX.
	Output 3	(0 - 100%) 2% MAX.			(10-100%) 8% MAX.	(0-100%) 2% MAX.
Rectangular Over Current Limiting		Provided			NOT FOR 12V OUTPUT	30 Sec. MAX.
Over Voltage Protection		Not Provided	Provided on +5V Output Only			

PAN-MAGNETICS INTERNATIONAL, INC.

455-A CARSON PLAZA DRIVE, CARSON, CA 90746 • (213) 532-1790 • TELEX: 664759 (PAN-MAG CRSN)

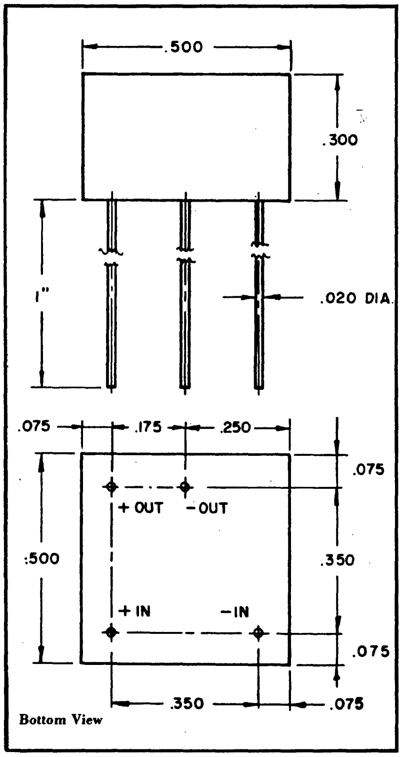
SERIES A

High Grade Industrial Ultra-Miniature DC-DC Converters

FEATURES:

- Up to 1.25 watt output at 70°C ambient
- Ultra-miniature size (0.3″ Height)
- 4 input voltage ranges 5,12,24 and 48V DC
- 100 megohm @ 500V DC isolation
- Input/output isolation
- Single and dual output
- No heat sink required

This series of unregulated DC-DC converters are produced in an ultra-miniature encapsulated package. 36 different models are available. The units feature single and dual outputs. They will operate over the temperature range of −25°C to +70°C. No heat sink is required.

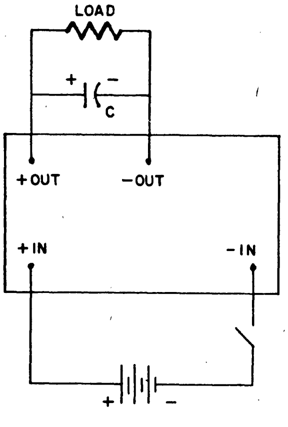


SERIES A - SINGLE OUTPUT

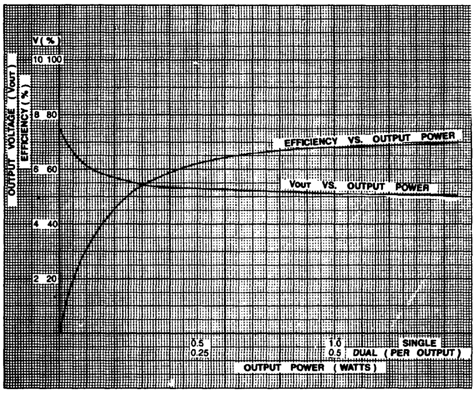
PICO PART NUMBER	INPUT VOLTAGE (V DC)	OUTPUT VOLTAGE (V DC)	MAX. LOAD CURRENT (mA)	MAX. OUTPUT POWER (watts)	EFF. @ FULL LOAD TYPICAL (%)	INPUT CURRENT FULL LOAD TYPICAL (mA)	OUTPUT VOLTAGE RIPPLE @ FULL LOAD * (Vp-p max)	NO LOAD CURRENT TYPICAL (mA)	FULL LOAD OUTPUT VOLTAGE TOLERANCE (V DC)	*** PRICE 1-9
5A5S	5	5	200	1	66	303	0.20	65	±0.25	34.95
5A12S	5	12	104	1.25	73	342	0.15	80	±0.4	34.95
5A15S	5	15	83	1.25	75	333	0.12	90	±0.4	34.95
5A24S	5	24	52	1.25	75	333	0.10	90	±0.5	34.95
5A48S	5	48	26	1.25	77	325	0.10	90	±0.7	34.95
12A5S	12	5	200	1	66	126	0.20	24	±0.25	34.95
12A12S	12	12	104	1.25	76	137	0.15	26	±0.4	34.95
12A15S	12	15	83	1.25	78	134	0.15	26	±0.4	34.95
12A24S	12	24	52	1.25	78	134	0.15	26	±0.5	34.95
12A48S	12	48	26	1.25	80	130	0.20	26	±0.7	34.95
24A5S	24	5	200	1	66	63	0.20	13	±0.25	34.95
24A12S	24	12	104	1.25	75	69	0.20	15	±0.4	34.95
24A15S	24	15	83	1.25	75	69	0.20	15	±0.4	34.95
24A24S	24	24	52	1.25	78	67	0.20	15	±0.5	34.95
24A48S	24	48	26	1.25	78	67	0.25	16	±0.7	34.95
48A5S	48	5	200	1	66	32	0.25	6	+0.25	37.50
48A12S	48	12	104	1.25	73	36	0.25	8	±0.4	37.50
48A24S	48	24	52	1.25	76	34	0.25	9	±0.5	37.50

* RIPPLE IS MEASURED WITH 10µF, 75 VOLT HIGH QUALITY TANTALUM CAPACITOR CONNECTED ACROSS THE OUTPUT.

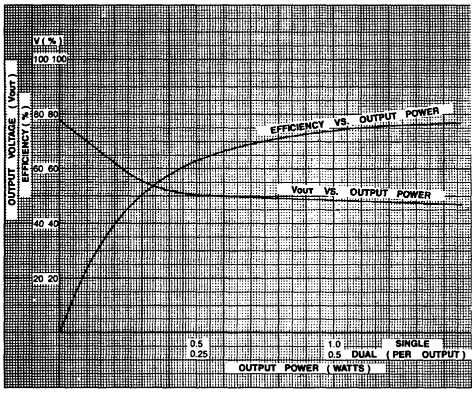
*** Discount Prices: 1-9 Net; 10-24 less 10%; 25-49 less 16%; 50-99 less 23%; 100-499 less 30%



SERIES A SINGLE & DUAL 12V-5V



SERIES A SINGLE & DUAL 5V-48V



453 N. MacQuesten Pkwy., Mt. Vernon, N.Y. 10552 • 914-699-5514 **PICO Electronics, Inc.**

TYPICAL CHARACTERISTICS:

Test conditions: 25°C ambient and input voltage at nominal value unless otherwise specified.

Input voltage range:
5V models 4 to 6.5V DC
12V models 9 to 15V DC
24V models 17 to 28V DC
48V models 25 to 50V DC

Line regulation: Output is directly proportional to the input.

Output voltage tolerance at full load:
5V models ± 0.25V
12V & 15V models ± 0.4V
24V models ± 0.5V
48V models ± 0.7V

Converter frequency: 20 – 40 KHz

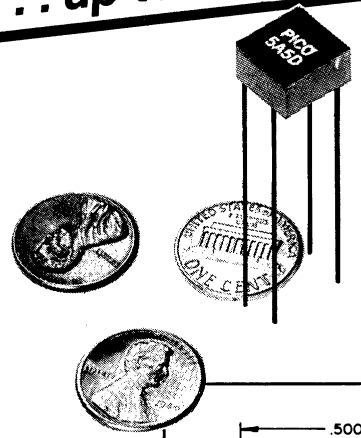
Output temperature coefficient:
0.05%/°C for 5V output.
0.04%/°C for 12 & 15V output.
0.02%/°C for 24 & 48V output.

Operating temperature: −25°C to +70°C ambient. No heat sink is required.

Storage temperature: −55°C to +125°C

Isolation: 100 megohms min. @ 500V DC

Low Profile .5″×.5″×.3″ Height!
. . . up to 1.25 Watts

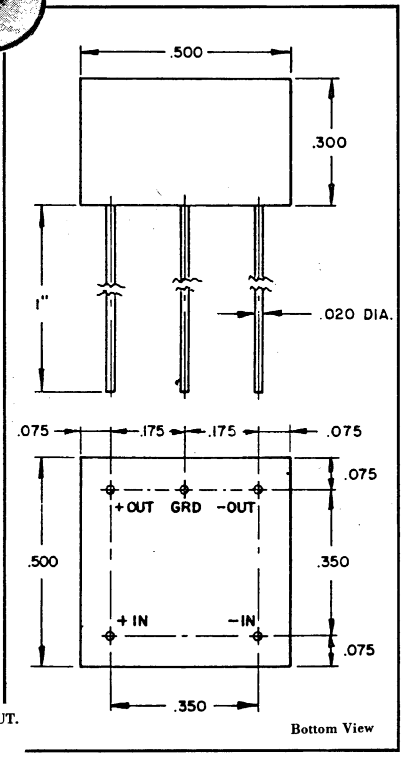


SERIES A - DUAL OUTPUT

PICO PART NUMBER	INPUT VOLTAGE (V DC)	DUAL OUTPUT VOLTAGE (V DC)	MAX. LOAD CURRENT PER OUTPUT (mA)	MAX. OUTPUT POWER PER OUTPUT (watts)	EFF. @ FULL LOAD TYPICAL (%)	INPUT CURRENT FULL LOAD TYPICAL (mA)	OUTPUT VOLTAGE RIPPLE @ FULL LOAD * (Vp-p max)	NO LOAD CURRENT TYPICAL (mA)	FULL LOAD OUTPUT VOLTAGE TOLERANCE (V DC)	*** PRICE 1-9
5A5D	5	±5	100	0.5	66	303	0.20	65	±0.25	39.50
5A12D	5	±12	52	0.625	73	342	0.15	80	±0.4	39.50
5A15D	5	±15	42	0.625	75	333	0.12	90	±0.4	39.50
5A24D	5	±24	26	0.625	75	333	0.10	90	±0.5	39.50
5A48D	5	±48	13	0.625	77	325	0.10	90	±0.7	39.50
12A5D	12	±5	100	0.5	66	126	0.20	24	±0.25	39.50
12A12D	12	±12	52	0.625	76	137	0.15	26	±0.4	39.50
12A15D	12	±15	42	0.625	78	134	0.15	26	±0.4	39.50
12A24D	12	±24	26	0.625	78	134	0.15	26	±0.5	39.50
12A48D	12	±48	13	0.625	80	130	0.20	26	±0.7	39.50
24A5D	24	±5	100	0.5	66	63	0.20	13	±0.25	39.50
24A12D	24	±12	52	0.625	75	69	0.20	15	±0.4	39.50
24A15D	24	±15	42	0.625	75	69	0.20	15	±0.4	39.50
24A24D	24	±24	26	0.625	78	67	0.20	15	±0.5	39.50
24A48D	24	±48	13	0.625	78	67	0.25	16	±0.7	39.50
48A5D	48	±5	100	0.5	66	32	0.25	6	±0.25	42.40
48A12D	48	±12	52	0.625	73	36	0.25	8	±0.4	42.40
48A24D	48	±24	26	0.625	76	34	0.25	9	±0.5	42.40

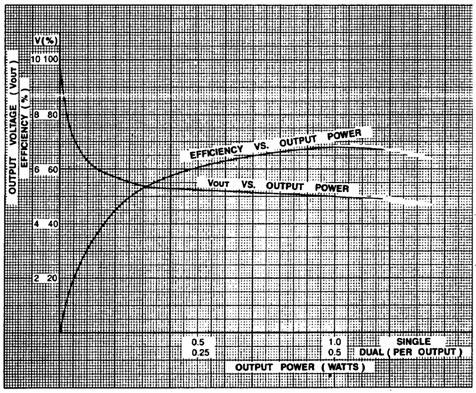
* RIPPLE IS MEASURED WITH 10 μF, 75 VOLT HIGH QUALITY TANTALUM CAPACITOR CONNECTED ACROSS EACH OUTPUT.

Ordering Instructions: No minimum. Net 30 days F.O.B. Mt. Vernon, New York.

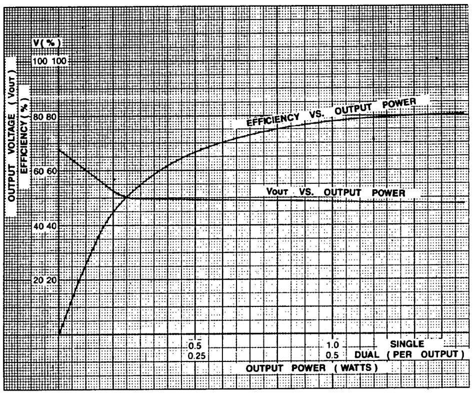


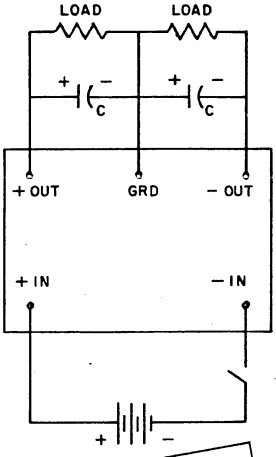
Bottom View

SERIES A SINGLE & DUAL 5V-5V



SERIES A SINGLE & DUAL 12V-48V

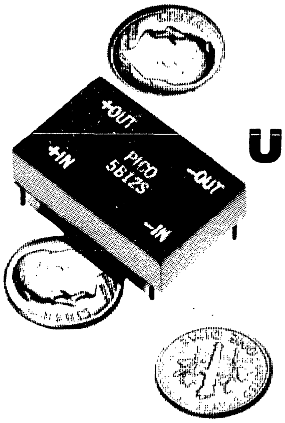




Delivery—stock to one week

*For immediate engineering assistance or to place an order—**Call Toll Free 800-431-1064*** • TWX 7105620113

SERIES B

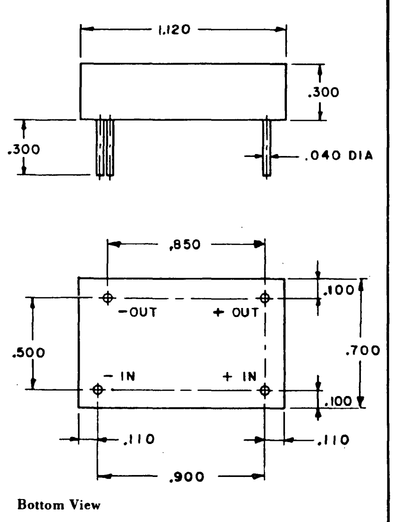


High Grade Industrial Ultra-Miniature DC-DC Converters

FEATURES:

- Up to 2.5 watts output power at 70°C ambient
- Ultra-miniature size (0.3″ Height)
- 4 input voltage ranges 5,12,24 and 48V DC
- 100 megohm @ 500V DC isolation
- Single and dual isolated outputs
- No heat sink required

This series of unregulated DC-DC converters comes in a miniaturized encapsulated package. 30 different models are available. The units feature single and isolated dual outputs. They will operate over the temperature range of −25°C to +70°C. No heat sink is required.



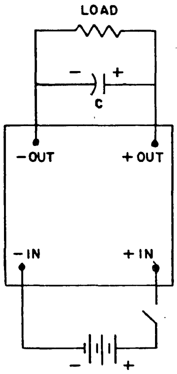
Bottom View

SERIES B - SINGLE OUTPUT

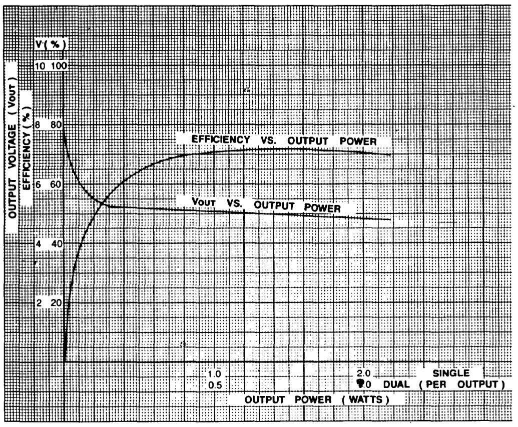
PICO PART NUMBER	INPUT VOLTAGE (V DC)	OUTPUT VOLTAGE (V DC)	MAX. LOAD CURRENT (mA)	MAX. OUTPUT POWER (watts)	EFF. @ FULL LOAD TYPICAL (%)	INPUT CURRENT FULL LOAD TYPICAL (mA)	OUTPUT VOLTAGE RIPPLE @ FULL LOAD * (Vp-p max)	NO LOAD CURRENT TYPICAL (mA)	FULL LOAD OUTPUT VOLTAGE TOLERANCE (V DC)	*** PRICE 1-9
5B5S	5	5	300	1.5	67	447	0.15	90	±0.25	34.95
5B12S	5	12	125	1.5	75	400	0.15	90	±0.4	34.95
5B15S	5	15	100	1.5	75	400	0.15	90	±0.4	34.95
5B24S	5	24	63	1.5	78	385	0.15	90	±0.5	34.95
12B5S	12	5	300	1.5	69	182	0.15	40	±0.25	34.95
12B12S	12	12	167	2.0	78	214	0.15	40	±0.4	34.95
12B15S	12	15	133	2.0	78	214	0.15	40	±0.4	34.95
12B24S	12	24	83	2.0	80	208	0.15	40	±0.5	34.95
24B5S	24	5	300	1.5	69	91	0.15	10	±0.25	34.95
24B12S	24	12	167	2.0	78	107	0.15	15	±0.4	34.95
24B15S	24	15	133	2.0	78	107	0.15	15	±0.4	34.95
24B24S	24	24	104	2.5	82	127	0.15	15	±0.5	34.95
48B5S	48	5	300	1.5	71	44	0.20	3.0	±0.25	37.50
48B12S	48	12	167	2.0	82	51	0.20	3.0	±0.4	37.50
48B24S	48	24	104	2.5	84	62	0.20	3.0	±0.5	37.50

*THE RIPPLE IS MEASURED WITH A 22 μF, 35 VOLT HIGH QUALITY TANTALUM CAPACITOR CONNECTED ACROSS EACH OUTPUT.

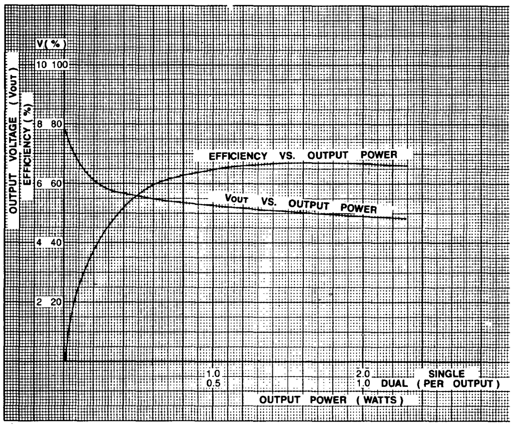
***Discount Prices: 1-9 Net; 10-24 less 10%; 25-49 less 16%; 50-99 less 23%; 100-499 less 30%



SERIES B SINGLE & DUAL 48V-5V



SERIES B SINGLE & DUAL 5V-5V



Delivery—
stock to one week

PICO Electronics, Inc.

453 N. MacQuesten Pkwy., Mt. Vernon, N.Y. 10552 • 914-699-5514 • TWX 7105620113

TYPICAL CHARACTERISTICS:

Test conditions: 25°C ambient and input voltage at nominal value unless otherwise specified.

Input voltage range: 5V models 4 to 6.5V DC
12V models 9 to 15V DC
24V models 17 to 28V DC
48V models 25 to 50V DC

Line regulation: Output is directly proportional to the input.

Output voltage tolerance at full load: 5V models ± 0.25V
12V & 15V models ± 0.4V
24V models ± 0.5V

Converter frequency: 20 to 40 KHz

Output temperature coefficient: 0.02%/°C

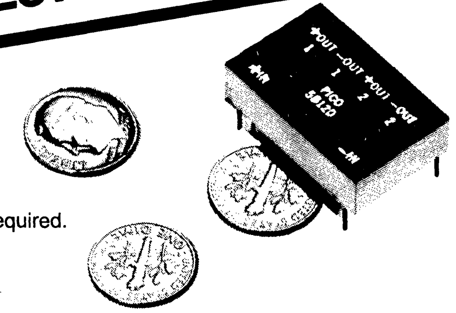
Operating temperature: −25°C to +70°C ambient. No heat sink is required.

Storage temperature: −55°C to +125°C

Isolation: 100 megohms min. @ 500V DC

Short circuit protection: Temporary

Low Profile 0.3" Height!

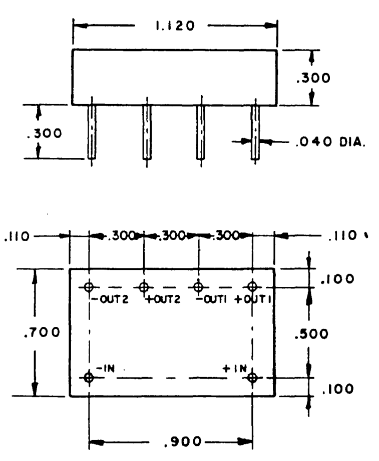


SERIES B- DUAL OUTPUT

PICO PART NUMBER	INPUT VOLTAGE (V DC)	DUAL OUTPUT VOLTAGE (V DC)	MAX. LOAD CURRENT PER OUTPUT (mA)	MAX. OUTPUT POWER PER OUTPUT (watts)	EFF. @ FULL LOAD TYPICAL (%)	INPUT CURRENT FULL LOAD TYPICAL (mA)	OUTPUT VOLTAGE RIPPLE @ FULL LOAD * (Vp-p max)	NO LOAD CURRENT TYPICAL (mA)	FULL LOAD OUTPUT VOLTAGE TOLERANCE (V DC)	*** PRICE 1-9
5B5D	5	5	150	0.75	68	441	0.15	90	±0.25	39.50
5B12D	5	12	62	0.75	76	394	0.15	90	±0.4	39.50
5B15D	5	15	50	0.75	78	384	0.15	90	±0.4	39.50
5B24D	5	24	31	0.75	80	375	0.15	90	±0.5	39.50
12B5D	12	5	150	0.75	71	176	0.15	40	±0.25	39.50
12B12D	12	12	83	1.0	81	205	0.15	40	±0.4	39.50
12B15D	12	15	66	1.0	81	205	0.15	40	±0.4	39.50
12B24D	12	24	41	1.0	83	200	0.15	40	±0.5	39.50
24B5D	24	5	150	0.75	71	88	0.15	10	±0.25	39.50
24B12D	24	12	83	1.0	80	104	0.15	15	±0.4	39.50
24B15D	24	15	66	1.0	81	102	0.15	15	±0.4	39.50
24B24D	24	24	52	1.25	82	127	0.15	15	±0.5	39.50
48B5D	48	5	150	0.75	71	44	0.20	3.0	±0.25	42.40
48B12D	48	12	83	1.0	82	51	0.20	3.0	±0.4	42.40
48B24D	48	24	52	1.25	84	62	0.20	3.0	±0.5	42.40

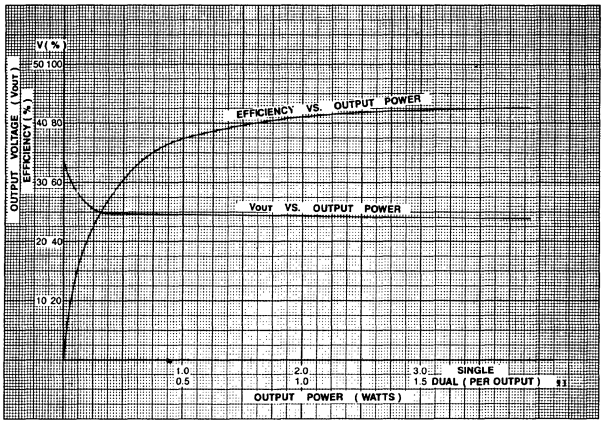
*THE RIPPLE IS MEASURED WITH A 22 μF, 35 VOLT HIGH QUALITY TANTALUM CAPACITOR CONNECTED ACROSS THE OUTPUT.

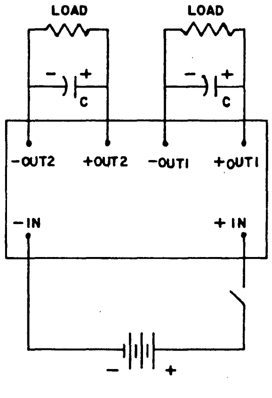
Ordering Instructions: No minimum. Net 30 days F.O.B. Mt. Vernon, New York.



Bottom View

SERIES B SINGLE & DUAL 24V-24V





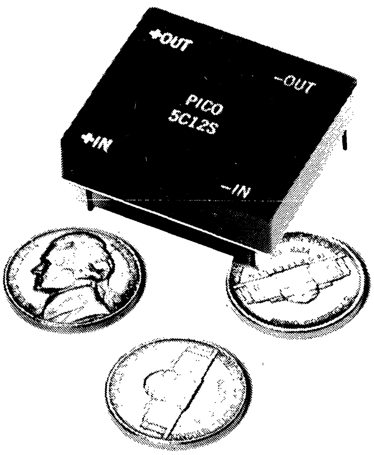
PICO
Electronics, Inc.

453 North Mac Questen Pkwy.
Mt. Vernon, New York 10552

914-699-5514 • TWX 7105620113

*For immediate engineering assistance or to place an order—**Call Toll Free 800-431-1064***

Delivery—
stock to one week



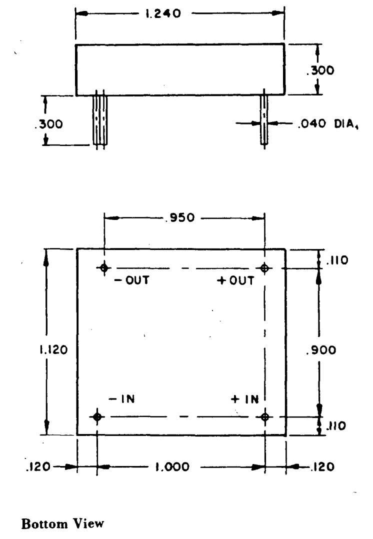
SERIES C

High Grade Industrial Miniature DC-DC Converters

FEATURES:

- Up to 4 watts output power at 70°C ambient
- Miniature-size (0.3″ Height)
- 4 input voltage ranges 5,12,24 and 48V DC
- 100 megohm @ 500V DC
- Single and dual isolated outputs
- No heat sink required

This series of unregulated DC-DC converters are produced in a miniaturized encapsulated package. 30 different models are available. The units feature single and isolated dual outputs. They will operate over the temperature range of −25°C to +70°C. No heat sink is required.

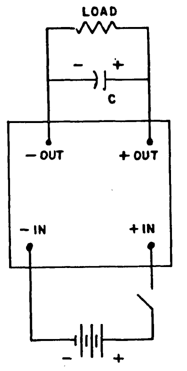


SERIES C - SINGLE OUTPUT

PICO PART NUMBER	INPUT VOLTAGE (V DC)	OUTPUT VOLTAGE (V DC)	MAX. LOAD CURRENT (mA)	MAX. OUTPUT POWER (watts)	EFF. @ FULL LOAD TYPICAL (%)	INPUT CURRENT FULL LOAD TYPICAL (mA)	OUTPUT VOLTAGE RIPPLE @ FULL LOAD * (Vp-p max)	NO LOAD CURRENT TYPICAL (mA)	FULL LOAD OUTPUT VOLTAGE TOLERANCE (V DC)	*** PRICE 1-9
5C5S	5	5	500	2.5	68	735	0.15	80	±0.25	39.50
5C12S	5	12	250	3.0	75	800	0.15	80	±0.4	39.50
5C15S	5	15	200	3.0	77	779	0.15	100	±0.4	39.50
5C24S	5	24	125	3.0	76	789	0.15	120	±0.5	39.50
12C5S	12	5	500	2.5	67	311	0.20	45	±0.25	39.50
12C12S	12	12	290	3.5	77	379	0.20	40	±0.4	39.50
12C15S	12	15	266	4.0	84	396	0.15	40	±0.4	39.50
12C24S	12	24	166	4.0	81	411	0.15	45	±0.5	39.50
24C5S	24	5	500	2.5	67	155	0.20	25	±0.25	39.50
24C12S	24	12	290	3.5	75	194	0.20	25	±0.4	39.50
24C15S	24	15	235	3.5	79	184	0.20	25	±0.4	39.50
24C24S	24	24	166	4.0	83	200	0.20	25	±0.5	39.50
48C5S	48	5	500	2.5	75	69	0.25	3	±0.25	42.40
48C12S	48	12	290	3.5	81	90	0.25	3	±0.4	42.40
48C24S	48	24	166	4.0	85	98	0.25	3	±0.5	42.40

*THE RIPPLE IS MEASURED WITH A 22 μF, 35 VOLT HIGH QUALITY TANTALUM CAPACITOR CONNECTED ACROSS THE OUTPUT.

*** Discount Prices: 1-9 Net; 10-24 less 10%; 25-49 less 16%; 50-99 less 23%; 100-499 less 30%



PICO

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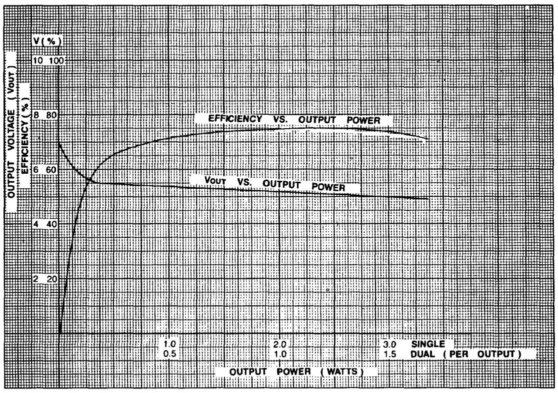
SERIES C SINGLE & DUAL 48V-5V



Delivery—
stock to one week

*For immediate engineering assistance or to place an order—**Call Toll Free 800-431-1064*** • TWX 7105620113

TYPICAL CHARACTERISTICS:

Test conditions: 25°C ambient and input voltage at nominal value unless otherwise specified.

Input voltage range: 5V models 4 to 6.5V DC
12V models 9 to 15V DC
24V models 17 to 28V DC
48V models 25 to 50V DC

Line regulation: Output is directly proportional to the input.

Output voltage tolerance at full load: 5V models ± 0.25V
12V & 15V models ± 0.4V
24V models ± 0.5V

Converter frequency: 20 to 40 KHz

Output temperature coefficient: 0.02%/°C

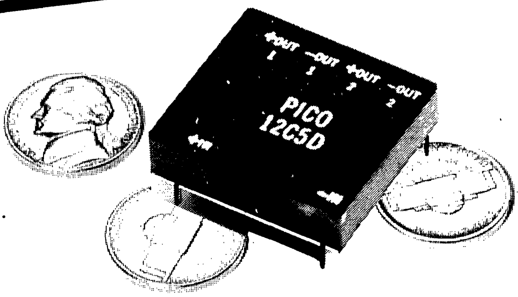
Operating temperature: −25°C to +70°C ambient. No heat sink is required.

Storage temperature: −55°C to +125°C

Isolation: 100 megohms min. @ 500V DC

Short circuit protection: Temporary

Low Profile 0.3" Height!

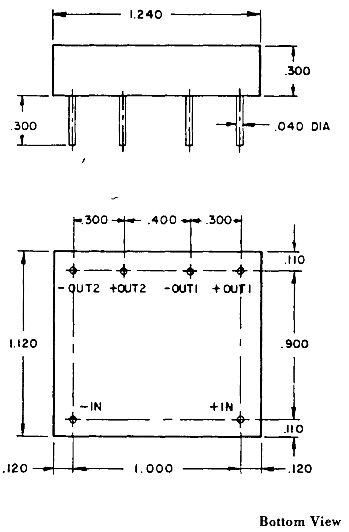


SERIES C - DUAL OUTPUT

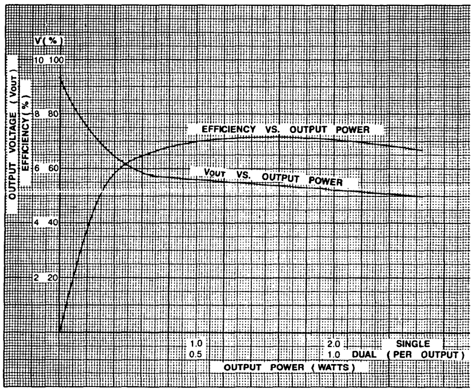
PICO PART NUMBER	INPUT VOLTAGE (V DC)	DUAL OUTPUT VOLTAGE ISOLATED (V DC)	MAX. LOAD CURRENT PER OUTPUT (mA)	MAX. OUTPUT POWER PER OUTPUT (watts)	EFF. @ FULL LOAD TYPICAL (%)	INPUT CURRENT FULL LOAD TYPICAL (mA)	OUTPUT VOLTAGE RIPPLE @ FULL LOAD * (Vp-p max)	NO LOAD CURRENT TYPICAL (mA)	FULL LOAD OUTPUT VOLTAGE TOLERANCE (V DC)	*** PRICE 1-9
5C5D	5	5	250	1.25	71	704	0.15	90	±0.25	45.00
5C12D	5	12	125	1.5	75	800	0.15	100	±0.4	45.00
5C15D	5	15	100	1.5	77	779	0.15	110	±0.4	45.00
5C24D	5	24	62	1.5	78	769	0.15	120	±0.5	45.00
12C5D	12	5	250	1.25	69	302	0.15	45	±0.25	45.00
12C12D	12	12	145	1.75	80	364	0.15	40	±0.4	45.00
12C15D	12	15	133	2.0	82	406	0.15	40	±0.4	45.00
12C24D	12	24	83	2.0	83	401	0.15	45	±0.5	45.00
24C5D	24	5	250	1.25	67	155	0.20	30	±0.25	45.00
24C12D	24	12	145	1.75	78	186	0.20	30	±0.4	45.00
24C15D	24	15	117	1.75	79	184	0.20	25	±0.4	45.00
24C24D	24	24	83	2.0	82	203	0.20	25	±0.5	45.00
48C5D	48	5	250	1.25	74	70	0.25	3	±0.25	48.25
48C12D	48	12	145	1.75	82	89	0.25	3	±0.4	48.25
48C24D	48	24	83	2.0	85	98	0.25	3	±0.5	48.25

*THE RIPPLE IS MEASURED WITH A 22 μF, 35 VOLT HIGH QUALITY TANTALUM CAPACITOR CONNECTED ACROSS EACH OUTPUT.

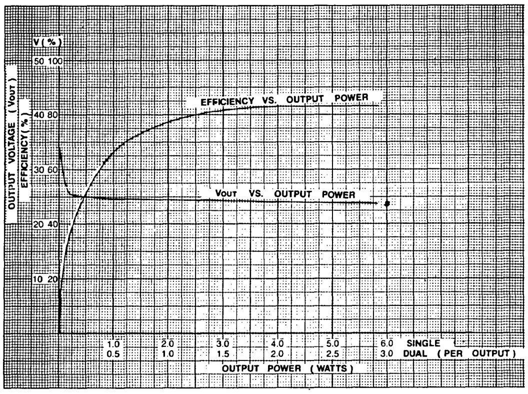
Ordering Instructions: No minimum. Net 30 days F.O.B. Mt. Vernon, New York.

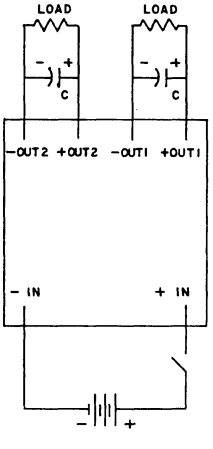


SERIES C SINGLE & DUAL 5V-5V



SERIES C SINGLE & DUAL 24V-24V





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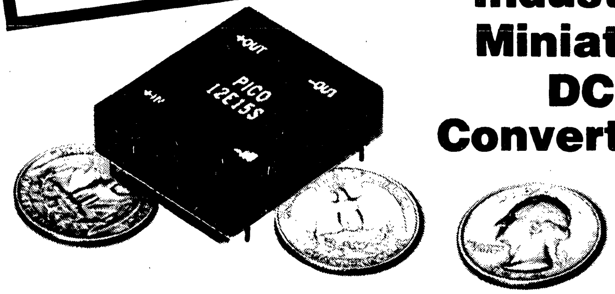
Low Profile . . . 0.4" Height



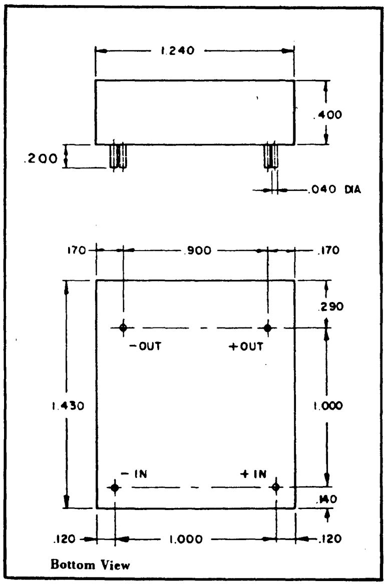
SERIES E

High Grade Industrial Miniature DC-DC Converters

FEATURES:

- Up to 7 watts output power at 70°C ambient
- 4 input voltage ranges 5,12,24 and 48V DC
- 100 megohm @ 500V DC isolation
- Single and dual isolated outputs
- No heat sink required
- Output filter included (No external capacitors required)

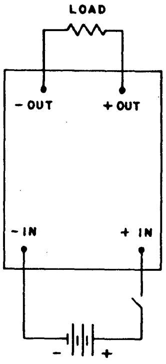
This series of unregulated DC-DC converters are produced in an ultra-miniature encapsulated package. 30 different models are available. The units feature single and isolated dual outputs. They will operate over the temperature range of −25°C to +70°C. No heat sink is required.



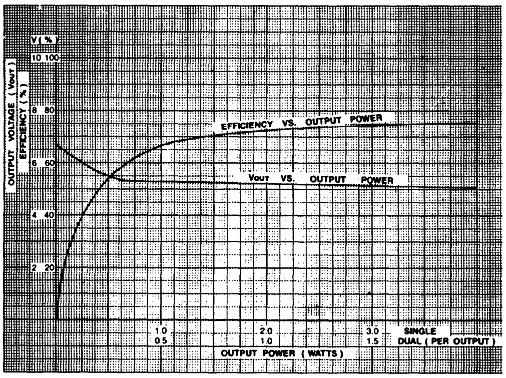
SERIES E - SINGLE OUTPUT

PICO PART NUMBER	INPUT VOLTAGE (V DC)	OUTPUT VOLTAGE (V DC)	MAX. LOAD CURRENT (mA)	MAX. OUTPUT POWER (watts)	EFF. @ FULL LOAD TYPICAL (%)	INPUT CURRENT FULL LOAD TYPICAL (mA)	OUTPUT VOLTAGE RIPPLE @ FULL LOAD (Vp-p max)	NO LOAD CURRENT TYPICAL (mA)	FULL LOAD OUTPUT VOLTAGE TOLERANCE (V DC)	*** PRICE 1-9
5E5S	5	5	800	4	68	1176	0.3	140	±0.25	65.00
5E12S	5	12	375	4.5	75	1200	0.15	200	±0.4	65.00
5E15S	5	15	300	4.5	78	1154	0.15	190	±0.4	65.00
5E24S	5	24	187	4.5	80	1125	0.15	190	±0.5	65.00
12E5S	12	5	800	4.0	73	456	0.3	40	±0.25	65.00
12E12S	12	12	541	6.5	82	660	0.25	45	±0.4	65.00
12E15S	12	15	433	6.5	83	652	0.25	40	±0.4	65.00
12E24S	12	24	281	6.75	86	654	0.25	40	±0.5	65.00
24E5S	24	5	800	4.0	69	241	0.3	22	±0.25	65.00
24E12S	24	12	541	6.5	81	334	0.25	22	±0.4	65.00
24E15S	24	15	400	6.5	82	330	0.25	22	±0.4	65.00
24E24S	24	24	291	7.0	88	331	0.25	17	±0.5	65.00
48E5S	48	5	800	4.0	75	111	0.3	4	±0.25	69.95
48E12S	48	12	541	6.5	84	161	0.3	4	±0.4	69.95
48E24S	48	24	291	7.0	89	164	0.3	4	±0.5	69.95

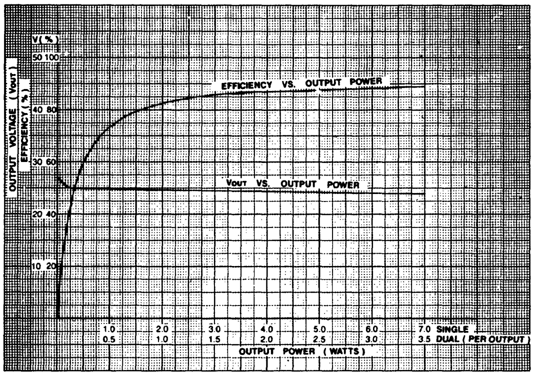
*** Discount Prices: 1-9 Net: 10-24 less 10%; 25-49 less 16%; 50-99 less 23%; 100-499 less 30%



SERIES E SINGLE & DUAL 48V-5V



SERIES E SINGLE & DUAL 48V-24V



Delivery— stock to one week

*For immediate engineering assistance or to place an order—**Call Toll Free 800-431-1064***

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TYPICAL CHARACTERISTICS:

Test conditions: 25°C ambient and input voltage at nominal value unless otherwise specified.

Input voltage range:
5V models 4 to 6.5V DC
12V models 9 to 15V DC
24V models 17 to 28V DC
48V models 25 to 50V DC

Line regulation: Output is directly proportional to the input.

Output voltage tolerance at full load:
5V models ± 0.25V
12V & 15V models ± 0.4V
24V models ± 0.5V

Converter frequency: 20 to 40 KHz

Output temperature coefficient: 0.02%/°C

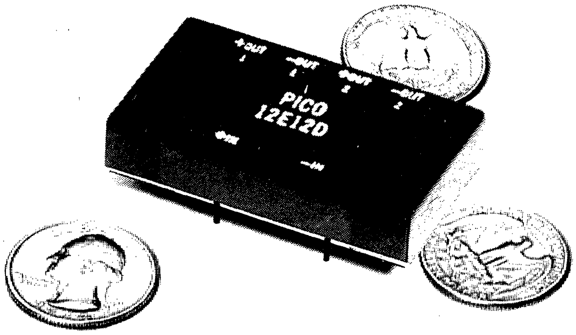
Operating temperature: −25°C to +70°C ambient. No heat sink required.

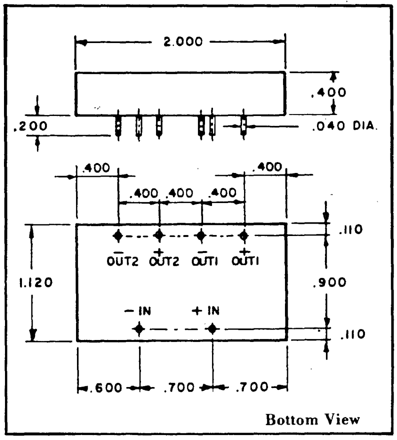
Storage temperature: −55°C to 125°C

Isolation: 100 megohms min. @ 500V DC

Short circuit protection: Temporary

NO EXTERNAL CAPACITORS REQUIRED

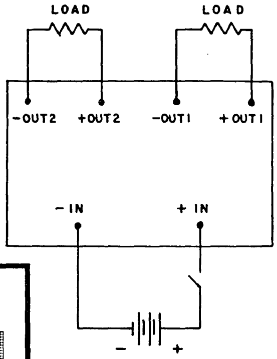




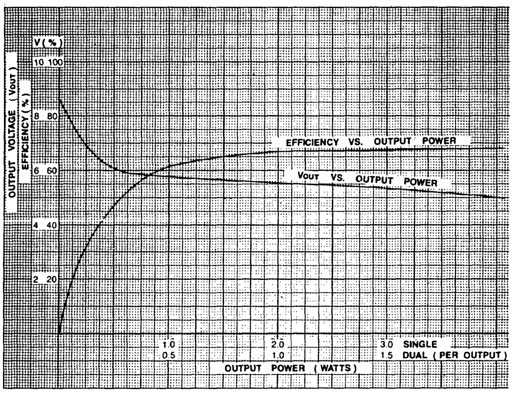
SERIES E - DUAL OUTPUT

PICO PART NUMBER	INPUT VOLTAGE (V DC)	DUAL OUTPUT VOLTAGE ISOLATED (V DC)	MAX. LOAD CURRENT PER OUTPUT (mA)	MAX. OUTPUT POWER PER OUTPUT (watts)	EFF. @ FULL LOAD TYPICAL (%)	INPUT CURRENT FULL LOAD TYPICAL (mA)	OUTPUT VOLTAGE RIPPLE @ FULL LOAD (Vp-p max)	NO LOAD CURRENT TYPICAL (mA)	FULL LOAD OUTPUT VOLTAGE TOLERANCE (V DC)	*** PRICE 1-9
5E5D	5	5	400	2.0	68	1176	0.3	140	±0.25	71.00
5E12D	5	12	187	2.25	77	1168	0.15	220	±0.4	71.00
5E15D	5	15	150	2.25	79	1139	0.15	200	±0.4	71.00
5E24D	5	24	93	2.25	80	1125	0.15	200	±0.5	71.00
12E5D	12	5	400	2.0	75	444	0.3	40	±0.25	71.00
12E12D	12	12	270	3.25	83	652	0.25	40	±0.4	71.00
12E15D	12	15	216	3.25	85	637	0.25	40	±0.4	71.00
12E24D	12	24	140	3.375	86	654	0.25	40	±0.5	71.00
24E5D	24	5	400	2.0	72	231	0.3	22	±0.25	71.00
24E12D	24	12	270	3.25	82	330	0.25	22	±0.4	71.00
24E15D	24	15	200	3.25	85	318	0.25	22	±0.4	71.00
24E24D	24	24	145	3.5	88	331	0.25	18	±0.5	71.00
48E5D	48	5	400	2.0	74	113	0.3	4	±0.25	75.95
48E12D	48	12	270	3.25	85	160	0.3	4	±0.4	75.95
48E24D	48	24	145	3.5	88	166	0.3	4	±0.5	75.95

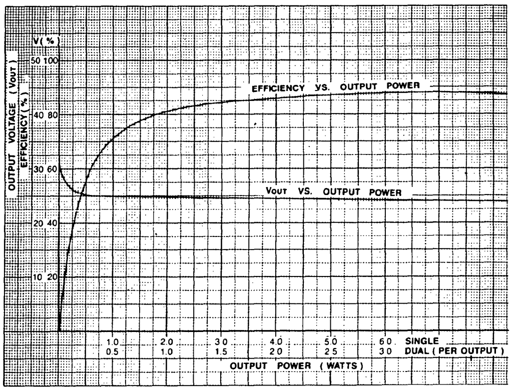
Ordering Instructions: No minimum. Net 30 days F.O.B. Mt. Vernon, New York.



SERIES E SINGLE & DUAL 5V-5V



SERIES E SINGLE & DUAL 24V-24V



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Delivery—stock to one week

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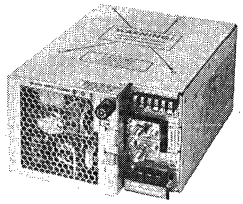
Pioneer Magnetics

The best in high power switching supplies

You can choose from two complete lines of medium and high power switching power supplies. First, the Dependables: Setting industry standards for reliability and performance. Second, the International Line: Designed to meet tough international noise and safety specs.

The Dependables



- Over 250,000 units in the field
- Demonstrated MTBF's as high as 115,000 hours
- UL recognized and CSA certified for data processing and office machines
- Exceptional dynamic load and line performance
- Full output rating at 50°C
- 60% to over 80% efficiency
- AC and DC input versions
- Optional volatile memory backup

The International Line

- Designed to meet FCC and VDE level B conducted and radiated noise specs. (150 KHz to 30 MHz)
- Approved to SELV level of IEC/VDE, UL and CSA safety standards
- Conservatively rated to provide full performance at maximum output
- Full output rating at 50°C
- 60% to over 80% efficient
- No main channel preload required to maintain secondary channel regulation
- Selectable input
- Optional battery backup

Specifications

AC Input

Dependables Dedicated Input:
92-138 VRMs, 184-264 VRMS
47-63 Hz, Single Phase. Line Dips to 70-140 VRMS

International Line Selectable Input:
90-135 VRMS or 180-264 VRMS
47-63 Hz, Single Phase. Line Dips to 75 or 140 VAC

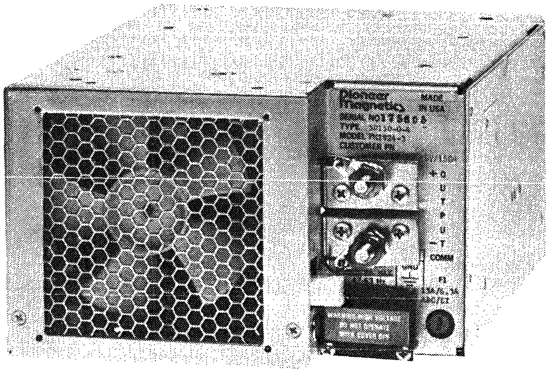
DC Input (Dependables Only)

22-34, 42-56 or 100-145 VDC

Total Error Band (Main Channel)

±2% including the following:

- Input line voltage variation over the specified range



THE INTERNATIONAL LINE

- Static loads from 0 to 100%
- Ripple and switching spikes
- Temperature stability over full operating range of 0 — 50°C
- Drift for 8 hr. period following initial warmup

Dynamic Load Response

Dependables: Dynamic load steps (1A/µsec slew rate) 25% on 5 VDC units; up to 90% on higher voltage units: Included in 2% error band above. International Line: 2% maximum excursion on 5 VDC units with 25% load step (1A/µsec slew rate) at nominal input line; up to 90% load step on higher voltage units.

Overvoltage Protection

Standard on primary channel and optional on secondary channels.

Other Standard Features

- Overload protection (foldback-type)
- Overtemperature protection
- Reverse voltage protection
- Remote Sense
- AC Input Fuse
- No turn-on or turn-off overshoot
- Operating temperature: 0° to 50°; derates to 80% of rated power at 71°C
- Storage temperature: −55°C to +85°C

Standard Options Include:

- Power Fail Signal
- Logic On/Off
- Crowbar
- Remote Programming/Margining
- Local Margin Check
- Output Tolerance Status
- Output Power Good Signal
- OV Secondary Channels

Special Options Include:

- Precision parallel load sharing module
- Automatic battery backup and charging
- EMI filtering for FCC and VDE requirements
- Custom options may be designed to your exact requirements.

Selection guide Single output power supplies

The Dependables

AC Input Model DC Input Model[4]	PM2496 PM2721	PM2497 PM2722	PM2500	PM2501	PM2502[3]
Maximum 5V Power (Watts)	300	750	1000	1500	2000
Output Voltage	Output Current	Output Current	Output Current	Output Current	Output Current
2	100A	200A	250A	325A	450A
3	60A	100A	—	—	450A
5	50A	100A	200A	300A	400A
	60A	120A	—	—	—
	—	150A	—	—	—
12	25A	60A	85A	125A	180A
15	25A	50A	70A	100A	150A
24	16A	33A	40A	60A	90A
28	13A	27A	36A	55A	80A
48	8A	16A	20A	32A	47A
Size, Inches (cm)	5 x 8 x 11 (12.7 x 20.3 x 27.9)				5 x 16 x 11 (12.7 x 40.6 x 27.9)
Weight, Pounds (kg)	16 (7.3)	18 (8.2)	20 (9.1)	20 (9.1)	35 (15.9)

The International Line

AC Input Model DC Input Model[4]	PM2920	PM2921	PM2922	PM2923	PM2924 PM3024	PM2925 PM3025	PM2926 PM3026
Maximum 5V Power (Watts)	250	350	500	625	750	850	1000
Output Voltage	Output Current	Output Current	Output Current	Output Current	Output Current	Output Current	Output Current
2	100A	125A	200A	—	—	—	—
3	60A	100A	150A	175A	200A	—	—
5	50A	70A	100A	125A	150A	170A	200A
12	21A	30A	42A	52A	60A	71A	85A
15	17A	25A	33A	42A	50A	57A	70A
24	10A	16A	21A	26A	33A	35A	40A
28	9A	13A	18A	22A	27A	30A	36A
48	5A	8A	10A	13A	16A	18A	20A
Size, Inches (cm)	5 x 8 x 11 (12.7 x 20.3 x 27.9)[7]						
Weight, Pounds (kg)	16 (7.3)						

Notes: [1] Other output voltage/current combinations are available.
[2] For 24 VDC input, check factory for output ratings.
[3] Requires 184-250 VRMS, 3-phase input.
[4] Consult factory for DC-input models of International line.

Multiple-output units

The Dependables

AC Input Model DC Input Model[9]		PM2675 PM2775	PM2676 PM2776	PM2677[1] PM2777	PM2678[1] PM2778	PM2680[1]
Maximum Total Output Power (Watts)[4]		375	600	750	850	To 1500W Consult Factory
Main Channel[2]	DC Voltages Available	2, 3, 12, 15, 24, 28, or 48 VDC				
	Max Power (Watts)[3]	250	500	600	750	875
	Max Current (Amps)	50	100	120	150	175
Channels 2, 3 & 4 Max Output Current[4] (Amps)	DC Voltages Available	2, 3, 5, 12, 15 VDC		24, 28 VDC		
	Low Current	6		3		
	Standard	12		6		
	High Current[5]	15		7.5		
Fifth Channel Output		Consult Factory				
Case Size, Inches (cm)		5 x 8 x 11 (12.7 x 20.3 x 27.9)[5]				
Weight, Pounds/(kg)		20/(9.1)[8]				

The International Line

AC Input Model DC Input Model[9]		PM2970	PM2971	PM2972	PM2973	PM2974	PM2975	PM2976
Maximum Total Output Power (Watts)[4]		250	375	500	625	750	850	1000
Main Channel[2]	DC Voltages Available	2, 3, 5, 12, 15, 24, 28, or 48 VDC						
	Max Power (Watts)[3]	200	300	400	500	600	750	750
	Max Current (Amps)	40A	60A	80A	100A	120A	150A	150
Channels 2, 3 & 4 Max Output Current[4] (Amps)	DC Voltages Available	2, 3, 12, 15, 24, 28 VDC				30, 48 VDC		
	Low Current	6A				3A		
	Standard	12A				6A		
	High Current[5]	15A				7.5A		
Fifth Channel Output		Consult Factory						
Case Size, Inches (cm)		5 x 8 x 11 (12.7 x 20.3 x 27.9)[7]						
Weight, Pounds/(kg)		18/(8.2)[8]						

NOTES:

[1] Brownout capability may be reduced for this model.
[2] Dependables multiple require 50W minimum load on main channel to maintain proper regulation on other channels. No minimum load required on International Line.
[3] For 2V and 3V channels, wattage is 60% of figure shown.
[4] Simultaneous channel output wattages may not exceed maximum supply rating.
[5] For higher current ratings (up to 30A), consult factory.
[6] For 24 VDC-input model ratings, consult factory.
[7] Models PM2975 and 2976 measure 5 x 8 x 12¾ inches. (12.7 x 20.3 x 32.4 cm). For multiple outputs, allow ¾ inch for clearance of molex connectors.
[8] Models PM2975 and PM2976 weigh 20 lb. (9.1 kg).
[9] Consult factory for DC-input model of International Line.

Pioneer Magnetics

The most powerful name in switching supplies.

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It is Pioneer Magnetic's policy to improve products as new techniques and components become available. We reserve the right to change specifications without prior notice.

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MINIGLOSSARIES
FORMULAS • CHARTS
PRODUCT SELECTION GUIDES
FORMS TECHNICAL
CODES INFORMATION

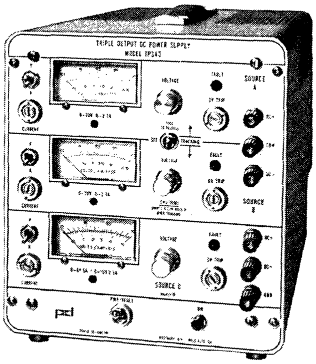
WHERE TO FIND THEM IN THE 85/86 EDITION OF EEM

Abbreviations/Acronyms .... **A**•1166, **B**•1012, **C**•1028, **D**•1016
ASCII Code .... **D**•1087
Batteries, Product Selection Guide .... **D**•1413
Batteries & Fuel Cells, Characteristics .... **D**•1430
Cabinets, Enclosures, Racks, & Chassis, Product Selection Guide .... **C**•1003
Capacitors, Basic Formulas .... **A**•1093
Capacitors, Miniglossary .... **A**•1066
Capacitors, Product Selection Guide .... **A**•1003
Circuit Boards (Printed) Product Selection Guide .... **C**•1099
Coils, Chokes, Inductors, Product Selection Guide .... **A**•1205
Conductors, Maximum Current Capacity of Copper & Aluminum .... **C**•1863
Connectors, Miniglossary .... **C**•1129
Connectors, Terminals, & Sockets, Product Selection Guide .... **C**•1105
Crystals, Oscillators, Crystal & Piezoelectric Filters, Product Selection Gude .... **A**•1309
Delay Lines, Product Selection Guide .... **A**•1459
Discrete Semiconductors, Product Selection Guide .... **A**•2067
Displays, Readouts, Lamps, & Lights, Product Selection Guide .... **B**•1015
EBCDIC Code .... **D**•1092
Encapsulation, Miniglossary .... **C**•1086
Fans, Blowers, Cooling Equipment, & Heat Exchangers, Product Selection Guide .. **C**•1623
Filters, Product Selection Guide .... **A**•1583
Instruments, Graphic Recording Product Selection Guide .... **D**•1401
Instruments, Panel Meters, Product Selection Guide .... **D**•1329
Instruments, Test & Measuring Product Selection Guide .... **D**•1175
Interconnection Systems, Product Selection Guide .... **C**•1699
Keyboards & Keypads, Product Selection Guide .... **B**•1705
Logofinder & Trademark Directories .... **B**•901
Microwave Components, Product Selection Guide .... **A**•1701
Military Qualified Products Lists .... **B**•1003
Motors, Drives, & Rotating Components, Product Selection Guide .... **B**•1129
Opto Semiconductors, Miniglossary .... **B**•1214
Oscilloscopes, Product Selection Guide .... **D**•1385
Panel Hardware, Product Selection Guide .... **C**•1589
Potentiometers, Trimmers, Controls, & Rheostats, Product Selection Guide .... **A**•1991
Power Supplies, Miniglossary .... **D**•1462
Power Supplies, AC, Product Selection Guide .... **D**•1877
Power Supplies, DC, Product Selection Guide .... **D**•1447
Protective Components (Fuses, Circuit Breakers, etc.), Product Selection Guide .... **B**•1225
Relay Contact Forms .... **B**•1317
Relays, Electromechanical, Miniglossary .... **B**•1308
Relays, Product Selection Guide .... **B**•1261
Resistor Color Codes .... **A**•1828
Resistors, Product Selection Guide .... **A**•1785
Servo Components, Miniglossary .... **D**•1985
Solenoids, Product Selection Guide .... **B**•1463
Switches, Product Selection Guide .... **B**•1477
Thermal Components, Product Selection Guide .... **B**•1741
Thermal Conductivity of Dielectrics at Room Temperature .... **B**•1744
Thyristors/High Power Diodes, Miniglossary .... **A**•2076
Transducers & Encoders, Product Selection Guide .... **B**•1777
Transformers, Product Selection Guide .... **A**•2099
Wire & Cable, Product Selection Guide .... **C**•1743
Wire Gauges—Diameter, Area, Copper Weight .... **C**•1844

POWER DESIGNS

LABORATORY POWER SOURCES

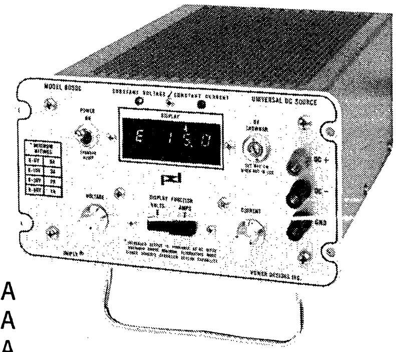
TRIPLE OUTPUT LABORATORY POWER SOURCES



- No derating. All outputs may be operated simultaneously at full capacity for a maximum of 100 W.
- Outputs are floating with respect to each other and chassis except for an internal connection between one negative terminal and one positive terminal of the A & B sources. The two A & B sources may be operated in series to provide twice the output voltage in any polarity with respect to chassis or left floating. The 0-6 VDC source may be operated in any polarity with respect to chassis or left floating.
- Independent adjustment of each output voltage utilizing 10-turn potentiometers with .05% resolution.
- Separate current limiting adjustment for each output.
- Ripple & Noise: Less than one millivolt P-P.
- Separately adjustable overvoltage crowbars on each output. Overvoltage crowbars on A & B outputs trip simultaneously if either one operates.
- Three taut band suspension dual range meters individually selectable for voltage or current of each source.
- A "FAULT" indicator lamp on each output signals overload, short circuit, crowbar trip or current limit operation.
- Automatic voltage tracking of the A & B sources to ±0.1% by means of a panel toggle switch. This switch is equipped with a locking lever to prevent accidental operation. Single potentiometer control of tracking outputs.
- Outputs may be shorted into each other in any polarity without damage.

PARAMETER	MODEL TP343A SOURCE A & B	MODEL TP340 SOURCE A & B	BOTH MODELS SOURCE C
INPUT	105-125, 58-440 Hz	105-125, 58-440 Hz	
OUTPUT	0-20V, 0-2.5A/0-25V, 0-1A	0-32V, 0-1A	0-6V, 0-5A/0-15V, 0-2.5A
LOAD REGULATION	0.01% + 1 mV per amp	0.01% + 1 mV	0.01% + 1 mV per amp
LINE REGULATION	0.01% + 0.5 mV	0.01% + 0.5 mV	0.01% + 0.5 mV
STABILITY	0.02% + 1 mV	0.02% + 1 mV	0.02% + 1 mV
RECOVERY TIME	100 μs	50 μs	100 μs
CURRENT LIMIT	2%-105% of rated current	2%-105% of rated current	2%-105% of rated current
TEMPERATURE	0-50°C	0-50°C	0-50°C
TEMP. COEFFICIENT	0.02% + 300 μV/°C	0.02% + 300 μV/°C	0.02% + 300 μV/°C
OV CROWBAR	Adj. 3-30V	Adj. 3-40V	Adj. 3-20V
TRACKING	0.1% + 10 mV by front panel switch	0.1% + 10 mV by front panel switch	
VOLTAGE CONTROLS	10 turn potentiometer	10 turn potentiometer	10 turn potentiometer
FAULT INDICATORS	Lamp indicates short circuit and overload	Lamp indicates short circuit and overload	Lamp indicates short circuit and overload
METERING	Dual range volt/ammeter	Dual range volt/ammeter	Dual range volt/ammeter

LABORATORY POWER SOURCES WITH DIGITAL PANEL METER



0-6V • 5A
0-15V • 3A
0-30V • 2A
0-60V • 1A

MODEL 6050C

Constant Current/Constant Voltage with automatic crossover. • Mode lights indicate operation characteristic • Uniply® Technique provides useful regulated output at reduced levels with line voltages as low as 85V. • Power supply provides increased output power at input line voltages above 105 VAC. • 3 Digit Display permits reading of output voltage with an accuracy of 0.1V + 1 digit or output current with an accuracy of 20 mA +1 digit and a resolution of 10 mA. • Panel adjustable crowbar protects load circuits against overvoltage conditions. • Ten-turn potentiometers for voltage and current control are provided for high resolution. • Positive or negative output polarity. • Front or rear access terminals. • Remote sensing and remote programming. • Ripple & Noise: 1 mV P-P to 10 MHz. • Regulation: .005% + 1 mV.

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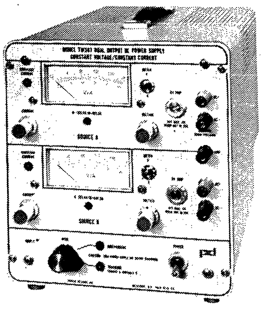
POWER DESIGNS

(PARTIAL LISTING — SEE CATALOG)

LABORATORY BENCH POWER SOURCES



0-16 VDC • 5A/
0-18 VDC • 3A
EACH SOURCE

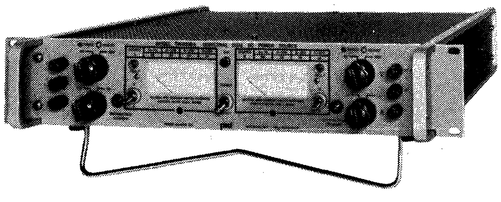
MODEL TW347

MODEL TW347

The model TW347 is a dual output, low noise, regulated DC power source designed for laboratory, engineering and electronic system applications. Each independent source in this general-purpose instrument can supply either a constant-voltage output with continuously adjustable current limiting, or a constant current output with continuously adjustable voltage compliance. The source will automatically transfer from voltage regulation to current regulation or vice versa at any predetermined operating point.

The two sources can be operated in series to provide 0-32V, 0-5A/0-36V, 0-3A either as a constant voltage or constant current source. Both outputs may be operated simultaneously at full capacity with no derating. Outputs may be shorted into each other in any polarity without damage.

Ripple and Noise: Less than two millivolts peak-to-peak.
Line Regulation (Current Mode): 1 mA.
Load Regulation (Current Mode): 0.2 mA.
Line and Load Regulation (Voltage Mode): 0.01% + 1 mV.



0-7V • 5A 0-25V • 2A
0-15V • 3A 0-60V • 1A
EACH SOURCE

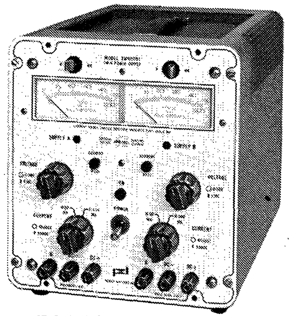
MODEL TW6050A

MODEL TW6050A

Model TW6050A is a dual voltage regulated DC power source. Each independent source replaces four conventional power supplies. It utilizes a regulator technique* trademarked Uniply® which provides operating features not obtainable with common dissipative type circuits and constant output power characteristics not available in SCR or switching regulator systems.

Power output capability increases with increasing AC line voltage. Up to 150% of rating is available at line voltages over 105 volts. Useful regulated output at reduced levels is available at line voltages as low as 85 volts.

Ripple and Noise: Less than one millivolt peak-to-peak.
Line and Load Regulation: 0.01% + 1 mV.



0-50 VDC • 0-500 MA
EACH SOURCE

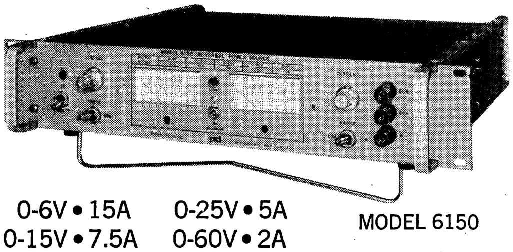
MODEL TW5005W

MODEL TW5005W

The model TW5005W is a dual constant current/constant voltage DC power source. Each source may be operated in either mode independently or combined in a series or paralled arrangement. Transfer from constant voltage to constant current or vice versa is automatic.

Each source has two (2) current ranges, 50 or 500 mA. Current adjustment and meter range are automatically transferred when the current range is switched. Independent adjustment of each voltage is provided, utilizing two 10 turn potentiometers with 15 mV resolution. Current output is controlled by means of two single turn dual range potentiometers.

Ripple and Noise: Less than one millivolt peak-to-peak.
Line and Load Regulation (Voltage Mode): .005% +1 mV.
Line and Load Regulation (Current Mode): Less than 300 VA.



0-6V • 15A 0-25V • 5A
0-15V • 7.5A 0-60V • 2A

MODEL 6150

MODEL 6150

Model 6150 is a voltage regulated DC power source that replaces four conventional power supplies. It utilizes a patented* regulator technique trademarked Uniply® which provides operating features not obtainable with common dissipative type circuits, and constant output power characteristics not available in SCR or switching regulator systems. Outputs are floating with respect to the chassis permitting positive or negative polarity. Remote sensing and remote programming capability are provided.

Ripple and Noise: Less than one millivolt peak-to-peak.
Line and Load Regulation: 0.01% + 1 Millivolt.

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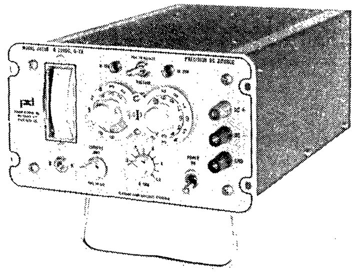
POWER DESIGNS

CALIBRATED POWER SOURCES

CALIBRATED, STABLE, LOW NOISE, HIGH RESOLUTION POWER SOURCES FOR PRECISION LABORATORY APPLICATIONS

LOW VOLTAGE

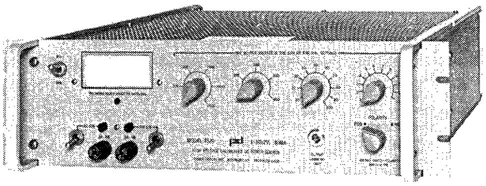


MODEL 2020B

- Two dual concentric switches (four decades) and a calibrated potentiometer provide digital readout to five significant figures • A toggle switch provides readout to six figures above 10 volts • Last-place potentiometer has 10 μV resolution • Source impedance is less than two milliohms at DC, less than 0.5 ohms at 1 MHz • Recovery times is less than 50 microseconds to return within a 20 millivolt band of the programmed voltage for an 80% load change • Front and rear access terminals.
- Better than 0.1% calibration accuracy • 10 PPM plus 100 μV stability for 8 hours • Temperature coefficient better than 10 PPM or 50 μV per °C • Self-restoring overload and short circuit protection with adjustable current limit control and flashing limit indicator • 100 μV maximum peak-to-peak ripple • Solid silver decade switch contacts • 100 hour minimum burn-in prior to calibration • Individual calibration data furnished with each unit • Provisions for remote sensing and remote resistance programming at 1000 Ω/volt • Voltage or current metering.

Model	Range Volts	Current Amps	Regulation Line/Load	Max. Ripple Pk to Pk	Stability	TC Per °C	Size	Special Features
2010	0-20	0-1.0	.0005% +100 μV	100 μV	.001% +100 μV/8 hrs.	.001% or 50 μV	8⅜ x 4¾ x 8²⁷⁄₃₂	4 decade readout with .1% accuracy. Continuous current limiting with panel pushbutton setting. Remote programmable 1000Ω/V.
2020B	0-20	0-2	.0005% +100 μV	100 μV	.001% +100 μV/8 hrs.	.001% or 50 μV	8⅜ x 4¾ x 11⁹⁄₁₆	Same
5020	0-20/50	0-2A/1A	.001% +100 μV	100 μV	.001% +100 μV/8 hrs.	.001% or 50 μV	8⅜ x 4¾ x 11⁹⁄₁₆	Same
C500	0-100	0-0.5	.001% +100 μV	250 μV	.001% +100 μV/8 hrs.	.001% or 50 μV	8⅜ x 4¾ x 11⁹⁄₁₆	Same

HIGH VOLTAGE



1570

- Calibrated control of the output voltage in thousand, hundred, ten volt steps, and a continuously adjustable potentiometer. Calibration accuracy is better than 0.25% of the dial settings above 250 volts, 1% or 100 millivolts below 250 volts.
- A dual scale volt/ammeter permits output voltage or current monitoring. A spring actuated toggle switch returns the meter function to volts avoiding damage in the event of current overload or short circuit condition.
- The unit functions in a stand-by mode through use of a high voltage on-off switch. A front panel lamp adjacent to the switch indicates when high voltage is in operation. A rear panel lamp also indicates when high voltage is on. This feature is incorporated for the safety of personnel especially when the unit is rack mounted.
- Fast acting electronic current limiting system permits continuous operation into an overload or short circuit with automatic restoration upon fault clearance.
- Polarity reversing switch on some models provides operation with either positive or negative output terminal at ground potential. An option is available for operation of the normally grounded terminal at potentials up to 500 VDC above the massis.

Model	Output Voltage	Output Current	Regulation Line/Load	Noise & Ripple
2K20	1-2012 VDC	0-20 MA	.001% +2 MV	1 MV PP
1570	1-3012 VDC	0-40 MA	.001% +2 MV	1 MV PP
1556B	10-6021 VDC	0-20 MA	.001% +2 MV	1 MV PP
1543A	10-10,021 VDC	0-10 MA	.001% +2 MV	5 MV PP
2K100 P/N*	500-2012 VDC	0-100 MA	.005%	5 MV PP
3K75 P/N*	10-3012 VDC	0-75 MA	.005%	5 MV PP

* Available in either negative or positive output polarity.

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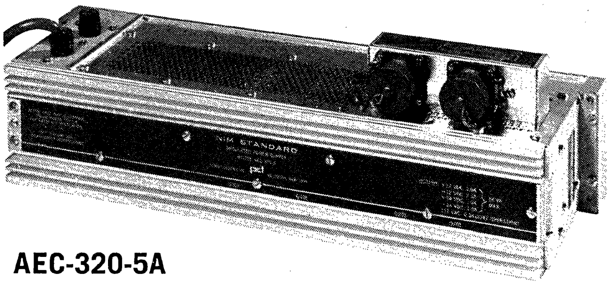
POWER DESIGNS

*NIM BIN POWER SOURCES

*Per TID-20893, Rv. 4, Dtd JULY 1974, "STD. NUCLEAR INSTRUMENT MODULES"



AEC-320-5A

The Model AEC-320-5A conforms to the requirements for a Type 1, Class A nuclear instrument modules bin power supply per TID-20893 (Rev. 4).

Plus... no power derating is necessary in this unit which can supply a full 96 va instead of the 72 va maximum rating of the specification.

Power input and output routing connectors permit interbin bussing of voltages not available in the power supply. An internal connector permits the field addition or removal of the routing connector assembly making it available as an option.

The Model AEC-320-5A provides four regulated outputs: ±12 VDC at two amperes each and ±24 VDC at 1 ampere each.

LOW VOLTAGE POWER SOURCES

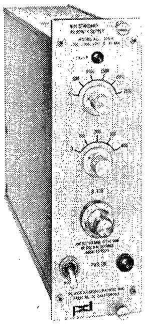
AEC-320-9

The Power Designs Model AEC-320-9 conforms or exceeds the requirements of a Type V-H Power Supply per TID-20893 (Rev. 4).

The equipment provides six regulated outputs: ±6 VDC at 10 amperes, current shared, ±12 VDC at 4 amperes, current shared (maximum 3 amperes from either source) and ±24 VDC at 2 amperes current shared (maximum 1.5 amperes from either source). 117 VAC at 0.5A is available when the supply is operated on 234 VAC, 50-65 Hz. The total power capacity is 150 VA with equally shared currents and 130 VA with unbalanced load currents. Built-in overvoltage crowbars are provided on the ±6 volt outputs.

Performance, stability and regulation are equal to that of a Type 1 Class A unit per TID-20893. Remote sensing provisions for the ±6 VDC sources are provided per Note 15 of NBS DW6 ND-522, Rev. 2. The unit is convection cooled. No fans or blowers are utilized.

HIGH VOLTAGE POWER SOURCES



MODEL AEC-5000B

MODEL AEC-315B

10-3000V/10 mA

The Model AEC-315B is a calibrated DC source designed for use with photomultipliers or solid state detectors requiring high stability, low noise and good regulation. It mounts in a standard 8¾" NIM Bin and occupies two module widths. It is supplied with an integral NEMA 3-wire line cord and does not use the Bin Power Supply.

Input: 103-129 VAC, 47-440 Hz, 65 watts

Calibration Accuracy: 0.25% of the dial settings from 500-3000 volts.

Resolution: 50 millivolts (10-turn vernier potentiometer with 100 volt range).

Noise and Ripple: 3 millivolts peak-to-peak to 15 MHz.

Regulation: .001 or 3 millivolts, whichever is greater, for line or load variations.

Stability: Drift is less than 100 PPM or 10 millivolts per hour whichever is greater.

0-3000V/1 mA 0-5000V/0.5 mA

The Model AEC-5000B is a continuously adjustable calibrated DC source designed for use with photo-multiplier tubes or high resolution solid state detectors where low noise and stability are prime considerations. The instrument occupies two module widths in a standard 8¾" NIM Bin and operates from the ±24 VDC sources provided by the Bin Power Supply. It has an output current capability of 1 mA up to 3 kV and 0.5 mA to 5 kV. Internal protection is provided against short circuits or arcing at the load.

Input: ±24 VDC. Input current at 1 mA output is 260 mA.

Regulation: Better than one ppm for input voltage variations and better than 10 ppm/100 μA load change.

Noise and Ripple: Less than one mV peak-to-peak to 50 MHz.

Calibration: 10-turn direct reading dial with an accuracy of better than 1% of maximum output voltage.

Stability: Output voltage drift is less than 50 ppm per hour and less than 200 ppm per day.

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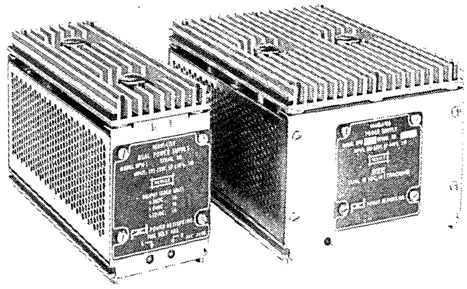
HIGH VOLTAGE POWER SOURCES



MODULAR HIGH VOLTAGE POWER SOURCES

The UPMD series are modular high voltage power sources of high stability and low noise designed for critical applications where remote panel adjustment of the output is required. It is ideal for such typical applications as: amplitude control of photomultiplier output, proportional detectors, focus conrol of cathode ray tubes, ion guns or electrostatic lenses.

Remote control of the output voltage is achieved by means of an external potentiometer operating at low potentials with respect to ground. Output voltage resolution is a function of this external control. An option is available for remote voltage control of the output at any desired input/output voltage ratio, making the UPMD series suitable for digital programming with an external digital/analog converter.

Proprietary overvoltage and arc protection circuits are incorporated to prevent damage to the supply or its load in the event of loss of output voltage control or an overvoltage condition.

High voltage transformers and high voltage components are vacuum encapsulated in readily replaceable epoxy modules.

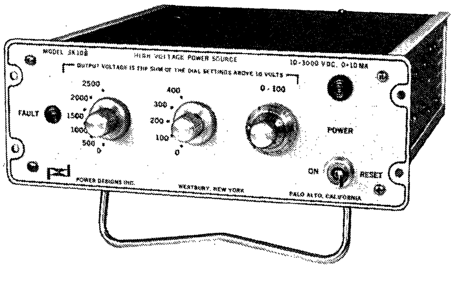
Model	* Output Polarity	Voltage Range	Output Current
UPMD-220N	Negative	10-2000 VDC	0-20 MA
UPMD-220P	Positive	10-2000 VDC	0-20 MA
UPMD-310N	Negative	10-3000 VDC	0-10 MA
UPMD-310P	Positive	10-3000 VDC	0-10 MA
UPMD-550N	Negative	10-5000 VDC	0-5 MA
UPMD-550P	Positive	10-5000 VDC	0-5 MA

* Corresponding output terminal connected to chassis. ** Subject to change without notice. FOB Westbury, N.Y.

OPTIONS 1. Remote voltage programming (specify ratio) 2. Isolation up to 250V above chassis

HIGH VOLTAGE CALIBRATED POWER SOURCE

MODEL 3K10B



10-3000 VDC • 0-10 mA

The Model 3K10B is a calibrated high voltage laboratory power source ideally suited for photomultiplier and similar applications requiring high stability low noise and superior regulation.

This all solid-state supply achieves high efficiency and usually compact construction through the use of high frequency switching technology.

The Model 3K10B incorporates proprietary overvoltage and arc protection circuitry which prevents damage to the supply and its load. In the event of an overvoltage condition or voltage transients generated by sustained arcing at the load the power supply will automatically shut off and a fault indicator will illuminate. Normal operation is restored by turning the power switch off, then on again.

An option is available which provides remote resistance or voltage programming over its entire range. It may also be programmed over a limited range around a preset voltage by an analog signal to provide automatic amplitude or drift compensation control for a photomultiplier tube system. The power supply may be operated in either positive or negative output polarity by means of a reversing switch. The output may be continuously shorted without damage to the power supply.

Two paralleled Safety High Voltage (SHV) BNC connectors provide dual output or meter monitoring at the rear panel. These connectors are National Bureau of Standards approved per DWG ND-545A.

High voltage transformers and critical circuit elements are environmentally isolated in vacuum encapsulated epoxy modules.

Model	Range Volts	Current Amps	Regulation Line/Load	Max. Ripple Pk to Pk	Stability	TC Per °C	Size	Special Features
3K10B	10-3000	0-0.01	.001% or 3 mV	3 mV	.005% +1V•8 hrs.	.005%	3 x 8½ x 11½	Calibrated readout to ¼%. Arc and short circuit proof.

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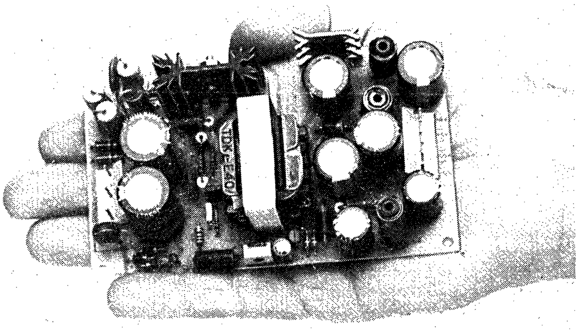
QUICK SELECTION CHARTS: SWITCHING POWER SUPPLIES

Power General manufactures a full line of low power, switch-mode power supplies. Over 140 standard off-the-shelf models are available for a wide variety of application requirements.
Single and multiple output units are available for power levels ranging from 25 to 150 watts. High efficiency, tight regulation, pulse load capability, small size, and designs meeting the requirements of international safety standards are among the high performance features offered.



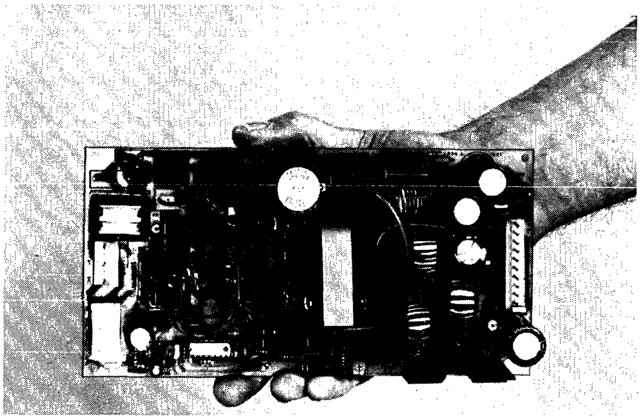
SINGLE OUTPUT MODELS							
MODEL NO.	**OUTPUT VOLT/TOL**	**OUTPUT CURRENT**	**MAX. OUTPUT POWER**	**EFFICIENCY**	**FORM FACTOR**	**PRICE**	**SEE PAGE**
125	5 VDC ±2%	5A	25W	80%	MODULE	$104.00	13
126	9 VDC ±2%	2.8A	25W	80%	MODULE	$104.00	13
127	12 VDC ±2%	2A	25W	80%	MODULE	$104.00	13
128	14 VDC ±2%	1.7A	25W	80%	MODULE	$104.00	13
1030-1A	5 VDC ADJ	6A	30W	80%	P.C. BOARD	$ 94.00	*
1030-1B	5 VDC ADJ	6A	30W	80%	OPEN FRAME	$104.00	*
1030-1C	5 VDC ADJ	6A	30W	80%	ENCLOSED	$114.00	*
1030-2A	12 VDC ADJ	2.5A	30W	80%	P.C. BOARD	$ 94.00	*
1030-2B	12 VDC ADJ	2.5A	30W	80%	OPEN FRAME	$104.00	*
1030-2C	12 VDC ADJ	2.5A	30W	80%	ENCLOSED	$114.00	*
1030-3A	15 VDC ADJ	2A	30W	80%	P.C. BOARD	$ 94.00	*
1030-3B	15 VDC ADJ	2A	30W	80%	OPEN FRAME	$104.00	*
1030-3C	15 VDC ADJ	2A	30W	80%	ENCLOSED	$114.00	*
1030-4A	24 VDC ADJ	1.2A	30W	80%	P.C. BOARD	$ 94.00	*
1030-4B	24 VDC ADJ	1.2A	30W	80%	OPEN FRAME	$104.00	*
1030-4C	24 VDC ADJ	1.2A	30W	80%	ENCLOSED	$114.00	*
1040-1	5 VDC ADJ	8A	40W	80%	P.C. BOARD	$ 64.00	17
1040-2	12 VDC ADJ	3A	40W	80%	P.C. BOARD	$ 64.00	17
1040-3	15 VDC ADJ	2.5A	40W	80%	P.C. BOARD	$ 64.00	17
1040-4	24 VDC ADJ	1.7A	40W	80%	P.C. BOARD	$ 64.00	17
1040-5	28 VDC ADJ	1.5A	40W	80%	P.C. BOARD	$ 64.00	17
1050-1	5 VDC ADJ	10A	50W	80%	P.C. BOARD	$109.00	*
1050-2	12 VDC ADJ	4A	50W	80%	P.C. BOARD	$109.00	*
1050-3	15 VDC ADJ	3.4A	50W	80%	P.C. BOARD	$109.00	*
1050-4	24 VDC ADJ	2A	50W	80%	P.C. BOARD	$109.00	*

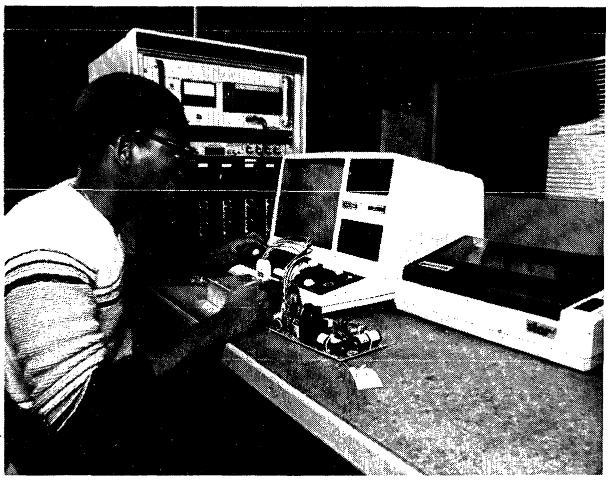
For detailed specifications, contact factory

	SINGLE OUTPUT MODELS							
	MODEL NO.	OUTPUT VOLT/TOL	OUTPUT CURRENT	MAX. OUTPUT POWER	EFFICIENCY	FORM FACTOR	PRICE	SEE PAGE
	1060-1A	5 VDC ADJ	12A	60W	80%	P.C. BOARD	$115.00	*
	1060-1B	5 VDC ADJ	12A	60W	80%	OPEN FRAME	$127.00	*
	1060-1C	5 VDC ADJ	12A	60W	80%	ENCLOSED	$137.00	*
	1060-2A	12 VDC ADJ	5A	60W	80%	P.C. BOARD	$115.00	*
	1060-2B	12 VDC ADJ	5A	60W	80%	OPEN FRAME	$127.00	*
	1060-2C	12 VDC ADJ	5A	60W	80%	ENCLOSED	$137.00	*
	1060-3A	15 VDC ADJ	4A	60W	80%	P.C. BOARD	$115.00	*
	1060-3B	15 VDC ADJ	4A	60W	80%	OPEN FRAME	$127.00	*
	1060-3C	15 VDC ADJ	4A	60W	80%	ENCLOSED	$137.00	*
	1060-4A	24 VDC ADJ	2.5A	60W	80%	P.C. BOARD	$115.00	*
	1060-4B	24 VDC ADJ	2.5A	60W	80%	OPEN FRAME	$127.00	*
	1060-4C	24 VDC ADJ	2.5A	60W	80%	ENCLOSED	$137.00	*
NEW	1075-1	5 VDC ADJ	15A	75W	70%	P.C. BOARD	$109.00	21
NEW	1075-2	12 VDC ADJ	6.5A	75W	70%	P.C. BOARD	$109.00	21
NEW	1075-3	15 VDC ADJ	5.25A	75W	70%	P.C. BOARD	$109.00	21
NEW	1075-4	24 VDC ADJ	3.33A	75W	70%	P.C. BOARD	$109.00	21
NEW	1150-1	2 VDC ADJ	30A	60W	67%	ENCLOSED	$149.00	25
NEW	1150-2	5 VDC ADJ	30A	150W	80%	ENCLOSED	$149.00	25
NEW	1150-3	12 VDC ADJ	14A	168W	83%	ENCLOSED	$149.00	25
NEW	1150-4	15 VDC ADJ	11A	165W	85%	ENCLOSED	$149.00	25
NEW	1150-5	24 VDC ADJ	7A	168W	86%	ENCLOSED	$149.00	25

	DUAL OUTPUT MODELS									
	MODEL NO.	OUTPUT NO. 1		OUTPUT NO. 2		MAX. OUTPUT POWER	EFFICIENCY	FORM FACTOR	PRICE	SEE PAGE
		VOLT/TOL	CURRENT	VOLT/TOL	CURRENT					
	225	+5 VDC ±2%	4A	−5 VDC ±5%	1A	25W	80%	MODULE	$109.00	13
	226	+12 VDC ±2%	1.8A	−12 VDC ±5%	1.8A	25W	80%	MODULE	$109.00	13
	227	+15 VDC ±2%	1.8A	−15 VDC ±5%	1.8A	25W	80%	MODULE	$109.00	13
	2050-1	+5 VDC ADJ	8A	−5 VDC (1)	2A	50W	75%	P.C. BOARD	$119.00	*
	2050-2	+12 VDC ADJ	3A	−12 VDC (1)	2A	50W	75%	P.C. BOARD	$119.00	*
	2050-3	+15 VDC ADJ	3A	−15 VDC (1)	2A	50W	75%	P.C. BOARD	$119.00	*
	2040-2A	+5 VDC ADJ	8A	−5 VDC ±3%	4A	60W	80%	P.C. BOARD	$125.00	*
	2040-2B	+5 VDC ADJ	8A	−5 VDC ±3%	4A	60W	80%	OPEN FRAME	$135.00	*
	2040-2C	+5 VDC ADJ	8A	−5 VDC ±3%	4A	60W	80%	ENCLOSED	$147.00	*
	2040-3A	+12 VDC ADJ	3A	−12 VDC ±3%	2A	60W	80%	P.C. BOARD	$125.00	*
	2040-3B	+12 VDC ADJ	3A	−12 VDC ±3%	2A	60W	80%	OPEN FRAME	$135.00	*
	2040-3C	+12 VDC ADJ	3A	−12 VDC ±3%	2A	60W	80%	ENCLOSED	$147.00	*
	2040-4A	+15 VDC ADJ	2A	−15 VDC ±3%	2A	60W	80%	P.C. BOARD	$125.00	*
	2040-4B	+15 VDC ADJ	2A	−15 VDC ±3%	2A	60W	80%	P.C. BOARD	$135.00	*
	2040-4C	+15 VDC ADJ	2A	−15 VDC ±3%	2A	60W	80%	P.C. BOARD	$147.00	*
	2060-1A	+5 VDC ADJ	6A	+24 VDC ±5%	0.5A (2.5A pk)	60W	80%	P.C. BOARD	$125.00	*
	2060-1B	+5 VDC ADJ	6A	+24 VDC ±5%	0.5A (2.5A pk)	60W	80%	OPEN FRAME	$135.00	*
	2060-1C	+5 VDC ADJ	6A	+24 VDC ±5%	0.5A (2.5A pk)	60W	80%	ENCLOSED	$147.00	*
	2060-2A	+5 VDC ADJ	8A	+12 VDC ±5%	1.6A (3.1A pk)	60W	80%	P.C. BOARD	$125.00	*
	2060-2B	+5 VDC ADJ	8A	+12 VDC ±5%	1.6A (3.1A pk)	60W	80%	OPEN FRAME	$135.00	*
	2060-2C	+5 VDC ADJ	8A	+12 VDC ±5%	1.6A (3.1A pk)	60W	80%	ENCLOSED	$147.00	*
	3050-7	+5 VDC ADJ	5A	+24 VDC ±5%	1.7A (2.5A pk)	60W	70%	P.C. BOARD	$119.00	*
	3050-8	+5 VDC ADJ	5A	+12 VDC ±5%	4A (6A pk)	60W	70%	P.C. BOARD	$119.00	*
	3050-9	+5 VDC ADJ	5A	+24 VDC ±5%	2.5A (3.5A pk)	60W	70%	P.C. BOARD	$119.00	*
NEW	2030-1	+5 VDC ADJ	2A (3A pk)	+12 VDC FXD	2A (3A pk)	30W	75%	P.C. BOARD	$ 59.00	27
NEW	2030-2	+5 VDC ADJ	2A (3A pk)	+15 VDC FXD	2A (3A pk)	30W	75%	P.C. BOARD	$ 59.00	27
NEW	2030-3	+5 VDC ADJ	2A (3A pk)	+24 VDC FXD	1A (2A pk)	30W	75%	P.C. BOARD	$ 59.00	27
NEW	2030-4	+5 VDC ADJ	2A (3A pk)	+24 VDC FXD	1A (2A pk)	30W	75%	P.C. BOARD	$ 64.00	27

For detailed specifications, contact factory.

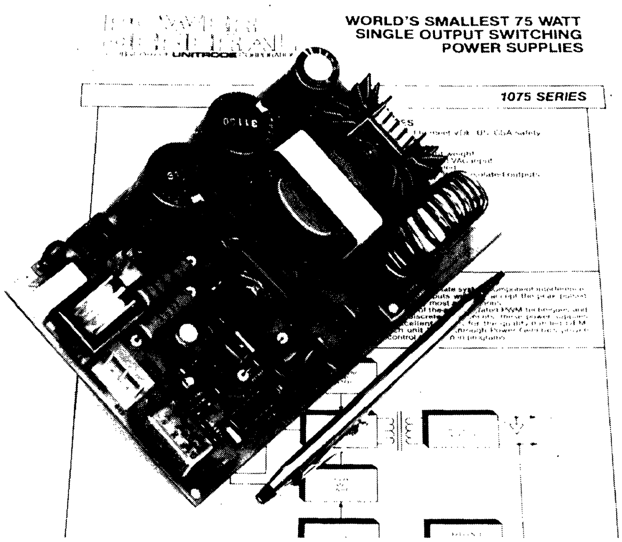


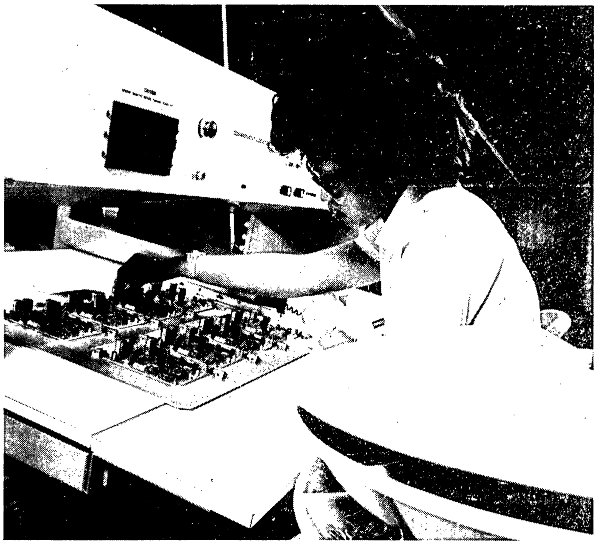


TRIPLE OUTPUT MODELS

	MODEL NO.	OUTPUT NO. 1		OUTPUT NO. 2		OUTPUT NO. 3		MAX. OUTPUT POWER	EFFICIENCY	FORM FACTOR	PRICE	SEE PAGE
		VOLT/TOL	CURRENT	VOLT/TOL	CURRENT	VOLT/TOL	CURRENT					
	325	+5 VDC ±2%	4A	+12 VDC ±4%	0.2A	−12 VDC ±4%	0.2A	25W	70%	MODULE	$109.00	13
	326	+5 VDC ±2%	4A	+15 VDC ±4%	0.2A	−15 VDC ±4%	0.2A	25W	70%	MODULE	$109.00	13
NEW	3030-1	+5 VDC ADJ	3A	+12 VDC ±5%	0.5A	−12 VDC ±5%	0.5A	30W	65%	P.C. BOARD	$ 69.00	31
NEW	3030-2	+5 VDC ADJ	3A	+15 VDC ±5%	0.5A	−15 VDC ±5%	0.5A	30W	65%	P.C. BOARD	$ 69.00	31
NEW	3045-1	+5 VDC ADJ	3A	+12 VDC ±5%	2A (5A pk)	−12 VDC ±5%	0.5A	40W	75%	P.C. BOARD	$ 69.00	17
NEW	3045-2	+5 VDC ADJ	3A	+12 VDC ±5%	2A (5A pk)	−12 VDC ±5%	0.5A	40W	75%	P.C. BOARD	$ 79.00	17
NEW	3045-3	+5 VDC ADJ	3A	+12 VDC ±5%	2A (5A pk)	− 5 VDC ±5%	0.5A	40W	75%	P.C. BOARD	$ 69.00	17
NEW	3045-4	+5 VDC ADJ	3A	+15 VDC ±5%	2A	−15 VDC ±5%	0.5A	40W	75%	P.C. BOARD	$ 69.00	27
NEW	3045-5	+5 VDC ADJ	3A	+24 VDC ±5%	1.0A (1.5A pk)	−12 VDC ±5%	0.5A	40W	75%	P.C. BOARD	$ 69.00	27
	3050-1	+5 VDC ADJ	6A	+12 VDC ±5%	1A	−12 VDC ±5%	1A	50W	70%	P.C. BOARD	$119.00	*
	3050-2	+5 VDC ADJ	6A	+15 VDC ±5%	1A	−15 VDC ±5%	1A	50W	70%	P.C. BOARD	$119.00	*
	3050-3	+5 VDC ADJ	6A	+12 VDC ±5%	2A (3A pk)	−12 VDC ±5%	2A	50W	70%	P.C. BOARD	$119.00	*
	3050-4	+5 VDC ADJ	6A	+15 VDC ±5%	2A (3A pk)	−15 VDC ±5%	2A	50W	70%	P.C. BOARD	$119.00	*
	3050-5	+5 VDC ADJ	6A	− 5 VDC ±5%	0.1A	+12 VDC ±5%	3A (5A pk)	50W	70%	P.C. BOARD	$119.00	*
	3050-6	+5 VDC ADJ	6A	+12 VDC ±5%	3A (5A pk)	−12 VDC ±5%	0.2A	50W	70%	P.C. BOARD	$119.00	*
NEW	3055-1	+5 VDC ADJ	6A	+12 VDC ±5%	1A	−12 VDC ±5%	1A	50W	70%	P.C. BOARD	$ 89.00	35
NEW	3055-2	+5 VDC ADJ	6A	+15 VDC ±5%	1A	−15 VDC ±5%	1A	50W	70%	P.C. BOARD	$ 89.00	35
NEW	3055-3	+5 VDC ADJ	6A	+12 VDC ±5%	3A (5A pk)	−12 VDC ±5%	0.5A	50W	70%	P.C. BOARD	$ 89.00	35
NEW	3055-4	+5 VDC ADJ	6A	+12 VDC ±5%	3A (5A pk)	− 5 VDC ±5%	1A	50W	70%	P.C. BOARD	$ 89.00	35
NEW	3055-5	+5 VDC ADJ	6A	+24 V ±5%	1.5A (3A pk)	−12 VDC ±5%	0.5A	50W	70%	P.C. BOARD	$ 89.00	49
NEW	3055-6	+5 VDC ADJ	6A	+12 V ±5%	3A (5A pk)	− 5 VDC ±5%	1.5A	50W	70%	P.C. BOARD	$ 89.00	49
NEW	4045-3	+5 VDC ADJ	6A	+12 VDC ±5%	1A	−12 VDC ±5%	1A	50W	70%	STD BUS BRD	$119.00	47
	4045-4	+5 VDC ADJ	6A	+15 VDC ±5%	1A	−15 VDC ±5%	1A	50W	70%	STD BUS BRD	$119.00	47
	3060-1	+5 VDC ADJ	6A	+12 VDC ±5%	3A (5A pk)	−12 VDC ±5%	1A	60W	70%	P.C. BOARD	$135.00	*
	3060-2	+5 VDC ADJ	6A	+15 VDC ±5%	3A (5A pk)	−15 VDC ±5%	1A	60W	70%	P.C. BOARD	$135.00	*
	3065-1	+5 VDC ADJ	8A	+12 VDC ±5%	0.1A	−12 VDC ±5%	0.1A	65W	70%	P.C. BOARD	$179.00	*
	3065-2	+5 VDC ADJ	8A	+15 VDC ±5%	0.1A	−15 VDC ±5%	0.1A	65W	70%	P.C. BOARD	$179.00	*
	3065-3	+5 VDC ADJ	6A	+12 VDC ADJ	0.1A	−12 VDC ±5%	0.1A	65W	70%	P.C. BOARD	$189.00	*
NEW	3075-1	+5 VDC ±5%	6A	+12 VDC ±5%	4A	−12 VDC ±6%	1A	75W	70%	P.C. BOARD	$104.00	39
NEW	3075-2	+5 VDC ±5%	6A	+12 VDC ±5%	4A	− 5 VDC ±6%	1A	75W	70%	P.C. BOARD	$104.00	39
NEW	3075-3	+5 VDC ±5%	6A	+24 VDC ±5%	2A	−12 VDC ±6%	1A	75W	70%	P.C. BOARD	$104.00	39
	3100-1	+5 VDC ADJ	15A	+12 VDC ±5%	1A	−12 VDC ±5%	1A	100W	65%	P.C. BOARD	$199.00	*
	3100-2	+5 VDC ADJ	15A	+15 VDC ±5%	1A	−15 VDC ±5%	1A	100W	65%	P.C. BOARD	$199.00	*
	3100-3	+5 VDC ADJ	10A	+12 VDC ±5%	3A	−12 VDC ±5%	1A	100W	65%	P.C. BOARD	$199.00	*
NEW	3110-1	5 VDC ADJ	12A	12 VDC ±5%	4A (6A pk)	12 VDC ±5%	1A	100W	70%	P.C. BOARD	$119.00	61
NEW	3110-2	5 VDC ADJ	12A	15 VDC ±5%	3A (5A pk)	15 VDC ±5%	3A	100W	70%	P.C. BOARD	$119.00	61
NEW	3110-3	5 VDC ADJ	12A	12 VDC ±5%	1.5A	12 VDC ±5%	1.5A	100W	70%	P.C. BOARD	$119.00	61
NEW	3110-4	5 VDC ADJ	12A	15 VDC ±5%	1.5A	15 VDC ±5%	1.5A	100W	70%	P.C. BOARD	$119.00	61
NEW	3110-5	5 VDC ADJ	12A	24 VDC ±5%	2A (3A pk)	12 VDC ±5%	1A	100W	70%	P.C. BOARD	$119.00	61

****For detailed specifications, contact factory***





	QUAD OUTPUT MODELS (PC BOARDS)												
	MODEL NO.	OUTPUT NO. 1		OUTPUT NO. 2		OUTPUT NO. 3		OUTPUT NO. 4		MAX. OUTPUT POWER	EFFI-CIENCY	PRICE	SEE PAGE
		VOLT/TOL	CURRENT	VOLT/TOL	CURRENT	VOLT/TOL	CURRENT	VOLT/TOL	CURRENT				
	4027-1	+5 VDC ADJ	4A	−2.5 to −15 VDC	0.1 to 0.5A	+15 VDC ±4%	0.5A	−15 VDC ±4%	0.5A	30W	70%	$135.00	*
	4027-2	+5 VDC ADJ	4A	−2.5 to −15 VDC	0.1 to 0.5A	+15 VDC ±4%	0.5A	−12 VDC ±4%	0.5A	30W	70%	$135.00	*
	4043-1	+5 VDC ADJ	3A	−5 VDC ±1%	0.3A	+12 VDC ±5%	2A	−12 VDC ±5%	0.3A	40W	75%	$ 69.00	*
	4040-1	+5 VDC ADJ	5A	+12 VDC ±5%	1A	−12 VDC ±5%	0.5A	+24 VDC ±6%	0.3A	50W	70%	$119.00	47
	4040-2	+5 VDC ADJ	5A	+15 VDC ±5%	1A	−15 VDC ±5%	0.5A	+24 VDC ±6%	0.3A	50W	70%	$119.00	47
	4045-1	+5 VDC ADJ	6A	−5 VDC ±4%	0.2A	±12 VDC ±5%	1A	−12 VDC ±5%	1A	50W	70%	$119.00	47
	4045-2	+5 VDC ADJ	6A	−5 VDC ±4%	0.2A	+15 VDC ±5%	1A	−15 VDC ±5%	1A	50W	70%	$119.00	47
	4050-1	+5 VDC ADJ	6A	−5 VDC ±5%	1A	+12 VDC ±5%	2A (3A pk)	−15 VDC ±5%	1A	60W	70%	$139.00	*
	4050-2	+5 VDC ADJ	6A	−5 VDC ±5%	1A	+15 VDC ±5%	2A (3A pk)	−15 VDC ±5%	1A	60W	70%	$139.00	*
	4070-1	+5 VDC ADJ	6A	−12 VDC ±5%	1A	+12 VDC ±5%	1A	+24 VDC ±5%	1.5A (3A pk)	70W	70%	$145.00	*
	4070-2	+5 VDC ADJ	6A	−15 VDC ±5%	1A	+15 VDC ±5%	1A	+24 VDC ±5%	1.5A (3A pk)	70W	70%	$145.00	*
NEW	4075-1	+5 VDC ±5%	6A	+12 VDC ±5%	2A	−12 VDC ±5%	1A	12 VDC (iso) ±5%	2A	75W	70%	$109.00	51
NEW	4075-2	+5 VDC ±5%	6A	+12 VDC ±5%	2A	−12 VDC ±5%	1A	5 VDC (iso) ±5%	2A	75W	70%	$109.00	51
NEW	4075-3	+5 VDC ±5%	6A	+12 VDC ±5%	2A	−12 VDC ±5%	2A	24 VDC (iso) ±5%	2A	75W	70%	$109.00	51
NEW	4075-4	+5 VDC ADJ	6A	+12 VDC ±5%	1A	−12 VDC ±5%	1A	12 VDC (iso) ±5%	3A (5A pk)	75W	70%	$109.00	51
NEW	4075-5	+5 VDC ADJ	6A	12 VDC (iso) ±5%	3A (5A pk)	−12 VDC ±5%	0.5A	−5 VDC ±5%	0.5A	75W	70%	$109.00	51
	4100-1	+5 VDC ADJ	10A	−5 VDC ±3%	10A	+12 VDC ±5%	1.5A	−12 VDC ±5%	1.5A	100W	70%	$169.00	55
	4100-2	+5 VDC ADJ	10A	−5 VDC ±3%	10A	+15 VDC ±5%	1.5A	−15 VDC ±5%	1.5A	100W	70%	$169.00	55
	4100-3	+5 VDC ADJ	10A	−5 VDC ±3%	10A	+12 VDC ±5%	3A	−12 VDC ±5%	3A	100W	70%	$169.00	55
	4100-4	+4 VDC ADJ	10A	−5 VDC ±3%	10A	+15 VDC ±5%	3A	−15 VDC ±5%	3A	100W	70%	$169.00	55
NEW	4110-1	+5 VDC ADJ	10A	+12 VDC ±5%	3A (5A pk)	−12 VDC ±5%	3A	12 VDC (iso) ±5%	3A	100W	70%	$139.00	61
NEW	4110-2	+5 VDC ADJ	10A	+12 VDC ±5%	3A (5A pk)	−12 VDC ±5%	3A	24 VDC (iso) ±5%	2A	100W	70%	$139.00	61
NEW	4110-3	+5 VDC ADJ	10A	+12 VDC ±5%	3A (5A pk)	−12 VDC ±5%	3A	15 VDC (iso) ±5%	3A	100W	70%	$139.00	61
NEW	4110-4	+5 VDC ADJ	10A	+12 VDC ±5%	3A (5A pk)	−12 VDC ±5%	3A	5 VDC (iso) ±5%	3A	100W	70%	$139.00	61
NEW	4110-5	+5 VDC ADJ	10A	12 VDC (iso) ±5%	3A (5A pk)	−12 VDC ±5%	0.5A	−5 VDC ±5%	0.25A	100W	70%	$139.00	61
NEW	4110-6	+5 VDC ADJ	10A	12 VDC ±5%	1.5A	−12 VDC ±5%	1A	12 VDC ±5%	5A	100W	70%	$139.00	61
NEW	4150-1	+5 VDC ADJ	15A	+12 VDC ±5%	3A	−12 VDC ±5%	1A	12 VDC (iso) ±5%	5A (8A pk)	150W	70%	$199.00	65
NEW	4150-2	+5 VDC ADJ	15A	+12 VDC ±5%	3A	−12 VDC ±5%	1A	24 VDC (iso) ±5%	3A (5A pk)	150W	70%	$199.00	65
NEW	4150-3	+1 VDC ADJ	15A	+12 VDC ±5%	1.5A	−12 VDC ±5%	1A	12 VDC (iso) ±5%	5A (8A pk)	150W	70%	$199.00	65
NEW	4150-4	+1 VDC ADJ	15A	+12 VDC (iso) ±5%	5A (8A pk)	− 5 VDC ±5%	1A	−12 VDC ±5%	1A	150W	70%	$199.00	65

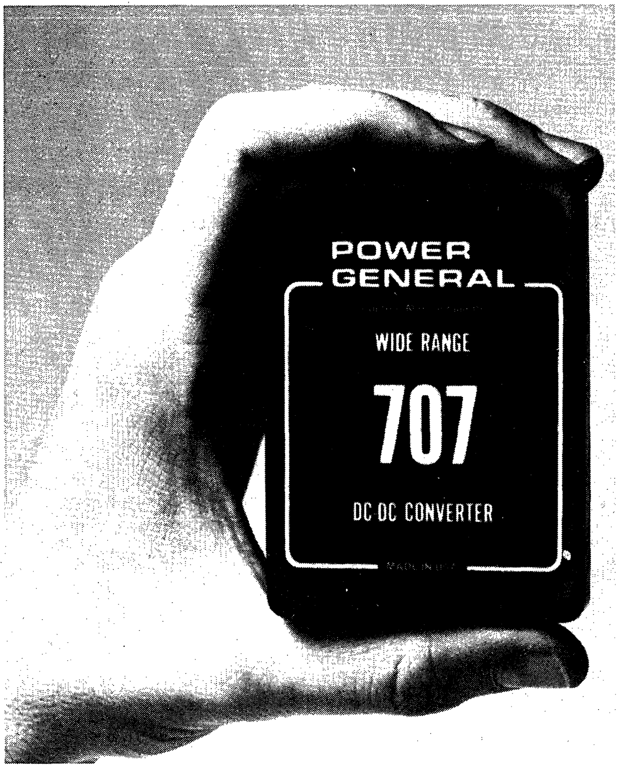
FIVE OUTPUT MODELS (PC BOARDS)														
MODEL NO.	OUTPUT NO. 1		OUTPUT NO. 2		OUTPUT NO. 3		OUTPUT NO. 4		OUTPUT NO. 5		MAX. OUTPUT POWER	EFFI-CIENCY	PRICE	SEE PAGE
	VOLT/TOL	CURRENT	VOLT/TOL	CURRENT	VOLT/TOL	CURRENT	VOLT/TOL	CURRENT	VOLT/TOL	CURRENT				
5001-1	+5 VDC ADJ	10A	−5 VDC ±3%	1A	+12 VDC ±5%	1.5A	−12 VDC ±5%	1.5A	12 to 30 VDC	0.4 to 1A	100W	70%	$169.00	55
5001-2	+5 VDC ADJ	10A	−5 VDC ±3%	1A	+15 VDC ±5%	1.5A	−15 VDC ±5%	1.5A	12 to 30 VDC	0.4 to 1A	100W	70%	$169.00	55
5001-3	+5 VDC ADJ	10A	−5 VDC ±3%	1A	+12 VDC ±5%	2A	−12 VDC ±5%	2A	12 to 30 VDC	0.4 to 1A	100W	70%	$169.00	55
5001-4	+5 VDC ADJ	10A	−5 VDC ±3%	1A	+15 VDC ±5%	2A	−15 VDC ±5%	2A	12 to 30 VDC	0.4 to 1A	100W	70%	$169.00	55
5110-1	+5 VDC ADJ	10A	−5 VDC ±3%	1A	+12 VDC ±5%	1A	−2.5 to −12 VDC	0.2 to 1A	24 VDC ±5%	2.5A (4A pk)	100W	70%	$169.00	55
5110-2	+5 VDC ADJ	10A	−5 VDC ±3%	1A	+15 VDC ±5%	1A	−2.5 to −15 VDC	0.2 to 1A	24 VDC ±5%	2.5A (4A pk)	100W	70%	$169.00	55
5110-3	+5 VDC ADJ	10A	−5 VDC ±3%	1A	+12 VDC ±5%	1A	−2 0 to −12 VDC	0.2 to 1A	12 VDC ±5%	3A (4A pk)	100W	70%	$139.00	55

For detailed specifications, contact factory

POWER GENERAL 152 WILL DRIVE, CANTON, MA 02021 TWX: 710-348-0200 TELEPHONE: (617) 828-6216

QUICK SELECTION: DC-DC CONVERTERS

Power General manufactures a broad line of DC-DC converters, many in industry standard packages. Over 180 different models are offered with features such as wide input ranges, high efficiency, 1 to 50 watts of output power, single or multiple outputs, input/output isolation, remote shutdown, and miniature size.



1 WATT SINGLE & DUAL OUTPUT				
MODEL NUMBER	INPUT VOLTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT	PRICE
401	5 VDC±10%	5 VDC±5%	100 mA	$34.00
402	5 VDC±10%	12 VDC±5%	80 mA	34.00
403	5 VDC±10%	15 VDC±5%	65 mA	34.00
404	12 VDC±10%	5 VDC±5%	100 mA	34.00
405	12 VDC±10%	12 VDC±5%	80 mA	34.00
406	12 VDC±10%	15 VDC±5%	65 mA	34.00
407	5 VDC±10%	±12 VDC±5%	±40 mA	38.00
408	5 VDC±10%	±15 VDC±5%	±33 mA	38.00
409	12 VDC±10%	±12 VDC±5%	±40 mA	38.00
410	12 VDC±10%	±15 VDC±5%	±33 mA	38.00
411	5 VDC±10%	±12 VDC±5%	±40 mA	38.00
412	5 VDC±10%	±15 VDC±5%	±33 mA	38.00
413	12 VDC±10%	±12 VDC±5%	±40 mA	38.00
414	12 VDC±10%	±15 VDC±5%	±33 mA	38.00
501	5 VDC±10%	5 VDC±5%	100 mA	39.00
502	5 VDC±10%	12 VDC±5%	80 mA	39.00
503	5 VDC±10%	15 VDC±5%	65 mA	39.00
504	5 VDC±10%	±12 VDC±5%	80 mA	46.00
505	5 VDC±10%	±15 VDC±5%	65 mA	46.00
506	12 VDC±10%	5 VDC±5%	100 mA	39.00
507	12 VDC±10%	12 VDC±5%	80 mA	39.00
508	12 VDC±10%	15 VDC±5%	65 mA	39.00
509	12 VDC±10%	±12 VDC±5%	80 mA	46.00
510	12 VDC±10%	±15 VDC±5%	65 mA	46.00

2 WATT SINGLE & DUAL OUTPUT				
MODEL NUMBER	INPUT VOLTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT	PRICE
421	5 VDC±10%	5 VDC±5%	250 mA	$42.00
422	5 VDC±10%	12 VDC±5%	160 mA	42.00
423	5 VDC±10%	15 VDC±5%	130 mA	42.00
424	12 VDC±10%	5 VDC±5%	250 mA	42.00
425	12 VDC±10%	12 VDC±5%	160 mA	42.00
426	12 VDC±10%	15 VDC±5%	130 mA	42.00
427	5 VDC±10%	±12 VDC±5%	±80 mA	46.50
428	5 VDC±10%	±15 VDC±5%	±65 mA	46.50
429	12 VDC±10%	±12 VDC±5%	±80 mA	46.50
430	12 VDC±10%	±15 VDC±5%	±65 mA	46.50
431	5 VDC±10%	±12 VDC±5%	±80 mA	46.50
432	5 VDC±10%	±15 VDC±5%	±65 mA	46.50
433	12 VDC±10%	±12 VDC±5%	±80 mA	46.50
434	12 VDC±10%	±15 VDC±5%	±65 mA	46.50
441	5 VDC±10%	5 VDC±5%	250 mA	44.00
442	5 VDC±10%	12 VDC±5%	160 mA	44.00
443	5 VDC±10%	15 VDC±5%	130 mA	44.00
444	12 VDC±10%	5 VDC±5%	250 mA	44.00
445	12 VDC±10%	12 VDC±5%	160 mA	44.00
446	12 VDC±10%	15 VDC±5%	130 mA	44.00
447	5 VDC±10%	±12 VDC±5%	±80 mA	48.50
448	5 VDC±10%	±15 VDC±5%	±65 mA	48.50
449	12 VDC±10%	±12 VDC±5%	±80 mA	48.50
450	12 VDC±10%	±15 VDC±5%	±65 mA	48.50

***NEW* 2 WATT SINGLE & DUAL OUTPUT**

MODEL NUMBER	INPUT VOLTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT	PRICE
461	5 VDC±10%	5 VDC±4%	250 mA	$52.00
462	5 VDC±10%	8 VDC±4%	250 mA	52.00
463	5 VDC±10%	12 VDC±4%	160 mA	52.00
464	5 VDC±10%	15 VDC±4%	130 mA	52.00
465	5 VDC±10%	24 VDC±4%	95 mA	52.00
466	12 VDC±16%	5 VDC±4%	250 mA	52.00
467	12 VDC±16%	8 VDC±4%	250 mA	52.00
468	12 VDC±16%	12 VDC±4%	160 mA	52.00
469	12 VDC±16%	15 VDC±4%	130 mA	52.00
470	12 VDC±16%	24 VDC±4%	95 mA	52.00
471	24 VDC±16%	5 VDC±4%	250 mA	52.00
472	24 VDC±16%	8 VDC±4%	250 mA	52.00
473	24 VDC±16%	12 VDC±4%	160 mA	52.00
474	24 VDC±16%	15 VDC±4%	130 mA	52.00
475	24 VDC±16%	24 VDC±4%	95 mA	52.00
476	28 VDC±14%	5 VDC±4%	250 mA	52.00
477	28 VDC±14%	8 VDC±4%	250 mA	52.00
478	28 VDC±14%	12 VDC±4%	160 mA	52.00
479	28 VDC±14%	15 VDC±4%	130 mA	52.00
480	28 VDC±14%	24 VDC±4%	95 mA	52.00
481	48 VDC−12/+16%	5 VDC±4%	250 mA	52.00
482	48 VDC−12/+16%	8 VDC±4%	250 mA	52.00
483	48 VDC−12/+16%	12 VDC±4%	160 mA	52.00
484	48 VDC−12/+16%	15 VDC±4%	130 mA	52.00
485	48 VDC−12/+16%	24 VDC±4%	95 mA	52.00
486	5 VDC±10%	±12 VDC±2%	±80 mA	56.00
487	5 VDC±10%	±15 VDC±2%	±65 mA	56.00
488	12 VDC±16%	±12 VDC±2%	±80 mA	56.00
489	12 VDC±16%	±15 VDC±2%	±65 mA	56.00
490	24 VDC±16%	±12 VDC±2%	±80 mA	56.00
491	24 VDC±16%	±15 VDC±2%	±65 mA	56.00
492	28 VDC±14%	±12 VDC±2%	±80 mA	56.00
493	28 VDC±14%	±15 VDC±2%	±65 mA	56.00
494	48 VDC−12/+16%	±12 VDC±2%	±80 mA	56.00
495	48 VDC−12/+16%	±15 VDC±2%	±65 mA	56.00

***NEW* 5 WATT SINGLE OUTPUT**

MODEL NUMBER	INPUT VOLTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT	PRICE
710	7 to 32 VDC	5 VDC±2%(adj)	1000 mA	$62.00

***NEW* 6 WATT DUAL OUTPUT**

MODEL NUMBER	INPUT VOLTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT	PRICE
623	5 VDC±10%	±12 VDC±5%	±250 mA	$69.00
624	5 VDC±10%	±15 VDC±5%	±250 mA	69.00
625	5 VDC±10%	±18 VDC±5%	±165 mA	69.00

***NEW* 9 TO 45 WATT SINGLE OUTPUT**

MODEL NUMBER	INPUT VOLTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT	PRICE
740	7.2 to 40 VDC	3 VDC±1%	3A	$ 88.00
741	8 to 40 VDC	5 VDC±1%	3A	$ 88.00
742	9 to 40 VDC	6 VDC±1%	3A	$ 88.00
743	16 to 40 VDC	12 VDC±1%	3A	$109.00
744	20 to 40 VDC	15 VDC±1%	3A	$109.00

5 WATT SINGLE & DUAL OUTPUT

MODEL NUMBER	INPUT VOLTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT	PRICE
801	5 VDC±10%	5 VDC±1%	1000 mA	$87.00
802	12 VDC±10%	5 VDC±1%	1000 mA	87.00
803	24 VDC±10%	5 VDC±1%	1000 mA	87.00
804	28 VDC±10%	5 VDC±1%	1000 mA	87.00
805	48 VDC±10%	5 VDC±1%	1000 mA	87.00
806	5 VDC±10%	9 VDC±1%	600 mA	87.00
807	12 VDC±10%	9 VDC±1%	600 mA	87.00
808	24 VDC±10%	9 VDC±1%	600 mA	87.00
809	28 VDC±10%	9 VDC±1%	600 mA	87.00
810	48 VDC±10%	9 VDC±1%	600 mA	87.00
811	5 VDC±10%	12 VDC±1%	470 mA	87.00
812	12 VDC±10%	12 VDC±1%	470 mA	87.00
813	24 VDC±10%	12 VDC±1%	470 mA	87.00
814	28 VDC±10%	12 VDC±1%	470 mA	87.00
815	48 VDC±10%	12 VDC±1%	470 mA	87.00
816	5 VDC±10%	15 VDC±1%	400 mA	87.00
817	12 VDC±10%	15 VDC±1%	400 mA	87.00
818	24 VDC±10%	15 VDC±1%	400 mA	87.00
819	28 VDC±10%	15 VDC±1%	400 mA	87.00
820	48 VDC±10%	15 VDC±1%	400 mA	87.00
821	5 VDC±10%	±12 VDC±1%	±230 mA	92.50
822	12 VDC±10%	±12 VDC±1%	±230 mA	92.50
823	24 VDC±10%	±12 VDC±1%	±230 mA	92.50
824	28 VDC±10%	±12 VDC±1%	±230 mA	92.50
825	48 VDC±10%	±12 VDC±1%	±230 mA	92.50
826	5 VDC±10%	±15 VDC±1%	±190 mA	92.50
827	12 VDC±10%	±15 VDC±1%	±190 mA	92.50
828	24 VDC±10%	±15 VDC±1%	±190 mA	92.50
829	28 VDC±10%	±15 VDC±1%	±190 mA	92.50
830	48 VDC±10%	±15 VDC±1%	±190 mA	92.50

10 WATT SINGLE & DUAL OUTPUT

MODEL NUMBER	INPUT VOLTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT	PRICE
901	5 VDC±10%	5 VDC±1%	2000 mA	$109.00
902	12 VDC±10%	5 VDC±1%	2000 mA	109.00
903	24 VDC±10%	5 VDC±1%	2000 mA	109.00
904	28 VDC±10%	5 VDC±1%	2000 mA	109.00
905	48 VDC±10%	5 VDC±1%	2000 mA	109.00
906	5 VDC±10%	9 VDC±1%	1200 mA	109.00
907	12 VDC±10%	9 VDC±1%	1200 mA	109.00
908	24 VDC±10%	9 VDC±1%	1200 mA	109.00
909	28 VDC±10%	9 VDC±1%	1200 mA	109.00
910	48 VDC±10%	9 VDC±1%	1200 mA	109.00
911	5 VDC±10%	12 VDC±1%	940 mA	109.00
912	12 VDC±10%	12 VDC±1%	940 mA	109.00
913	24 VDC±10%	12 VDC±1%	940 mA	109.00
914	28 VDC±10%	12 VDC±1%	940 mA	109.00
915	48 VDC±10%	12 VDC±1%	940 mA	109.00
916	5 VDC±10%	15 VDC±1%	800 mA	109.00
917	12 VDC±10%	15 VDC±1%	800 mA	109.00
918	24 VDC±10%	15 VDC±1%	800 mA	109.00
919	28 VDC±10%	15 VDC±1%	800 mA	109.00
920	48 VDC±10%	15 VDC±1%	800 mA	109.00
921	5 VDC±10%	±12 VDC±1%	±525 mA	114.50
922	12 VDC±10%	±12 VDC±1%	±525 mA	114.50
923	24 VDC±10%	±12 VDC±1%	±525 mA	114.50
924	28 VDC±10%	±12 VDC±1%	±525 mA	114.50
925	48 VDC±10%	±12 VDC±1%	±525 mA	114.50
926	5 VDC±10%	±15 VDC±1%	±410 mA	114.50
927	12 VDC±10%	±15 VDC±1%	±410 mA	114.50
928	24 VDC±10%	±15 VDC±1%	±410 mA	114.50
929	28 VDC±10%	±15 VDC±1%	±410 mA	114.50
930	48 VDC±10%	±15 VDC±1%	±410 mA	114.50

10 WATT TRIPLE OUTPUT				
MODEL NUMBER	INPUT VOLTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT	PRICE
931	5 VDC±10%	5VDC±1% ±15VDC±1%	1A ±165 mA	$124.00
932	12 VDC±10%	5VDC±1% ±15VDC±1%	1A ±165 mA	124.00
933	24 VDC±10%	5VDC±1% ±15VDC±1%	1A ±165 mA	124.00
934	28 VDC±10%	5VDC±1% ±15VDC±1%	1A ±165 mA	124.00
935	48 VDC±10%	5VDC±1% ±15VDC±1%	1A ±165 mA	124.00
936	5 VDC±10%	5VDC±1% ±12VDC±1%	1A ±200 mA	124.00
937	12 VDC±10%	5VDC±1% ±12VDC±1%	1A ±200 mA	124.00
938	24 VDC±10%	5VDC±1% ±12VDC±1%	1A ±200 mA	124.00
939	28 VDC±10%	5VDC±1% ±12VDC±1%	1A ±200 mA	124.00
940	48 VDC±10%	5VDC±1% ±12VDC±1%	1A ±200 mA	124.00
941	5 VDC±10%	5VDC±1% +12VDC±1% −5VDC±1%	1A 300 mA 100 mA	124.00
942	12 VDC±10%	5VDC±1% +12VDC±1% −5VDC±1%	1A 300 mA 100 mA	124.00
943	24 VDC±10%	5VDC±1% +12VDC±1% −5VDC±1%	1A 300 mA 100 mA	124.00
944	28 VDC±10%	5VDC±1% +12VDC±1% −5VDC±1%	1A 300 mA 100 mA	124.00
945	48 VDC±10%	5VDC±1% +12VDC±1% −5VDC±1%	1A 300 mA 100 mA	124.00

NEW 15 WATT ISOLATED SINGLE OUTPUT				
MODEL NUMBER	INPUT VOLTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT	PRICE
750	9 to 18 VDC	5 VDC ±1%	3A	$119.00
751	18 to 36 VDC	5 VDC ±1%	3A	119.00
752	36 to 72 VDC	5 VDC ±1%	3A	119.00
753	9 to 18 VDC	6 VDC ±1%	2.5A	119.00
754	18 to 36 VDC	6 VDC ±1%	2.5A	119.00
755	36 to 72 VDC	6 VDC ±1%	2.5A	119.00
756	9 to 18 VDC	12 VDC ±1%	1.25A	119.00
757	18 to 36 VDC	12 VDC ±1%	1.25A	119.00
758	36 to 72 VDC	12 VDC ±1%	1.25A	119.00
759	9 to 18 VDC	15 VDC ±1%	1A	119.00
760	18 to 36 VDC	15 VDC ±1%	1A	119.00
761	36 to 72 VDC	15 VDC ±1%	1A	119.00

NEW 15 WATT ISOLATED DUAL OUTPUT				
MODEL NUMBER	INPUT VOLTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT	PRICE
720	9 to 18 VDC	±12 VDC ±1%	1.25A	$169.00
721	18 to 36 VDC	±12 VDC ±1%	1.25A	169.00
722	36 to 72 VDC	±12 VDC ±1%	1.25A	169.00
723	9 to 18 VDC	±15 VDC ±1%	1A	169.00
724	18 to 36 VDC	±15 VDC ±1%	1A	169.00
725	36 to 72 VDC	±15 VDC ±1%	1A	169.00

25 WATT SINGLE OUTPUT				
MODEL NUMBER	INPUT VOLTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT	PRICE
711	20 to 72 VDC	5 VDC±1%	5A	$149.00
712	20 to 72 VDC	6 VDC±1%	4.5A	149.00
713	20 to 72 VDC	12 VDC±1%	2.5A	149.00
714	20 to 72 VDC	15 VDC±1%	2A	149.00

15 TO 50 WATT SINGLE OUTPUT				
MODEL NUMBER	INPUT VOLTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT	PRICE
700	9.5 to 40 VDC	3 VDC±1%	3A	$ 88.00
701	8 to 40 VDC	3 VDC±1%	5A	109.00
702	9.5 to 40 VDC	5 VDC±1%	3A	88.00
703	8 to 40 VDC	5 VDC±1%	5A	109.00
704	8 to 40 VDC	6 VDC±1%	4A	109.00
705	14 to 40 VDC	12 VDC±1%	2A	88.00
706	14 to 40 VDC	12 VDC±1%	4A	109.00
707	17 to 40 VDC	15 VDC±1%	1.5A	88.00
708	17 to 40 VDC	15 VDC±1%	3A	109.00

NEW 30 WATT TRIPLE OUTPUT				
MODEL NUMBER	INPUT VOLTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT	PRICE
730	9 to 18 VDC	5 VDC ±1% ±12 VDC ±1%	4A ±0.5A	$179.00
731	18 to 36 VDC	5 VDC ±1% ±12 VDC ±1%	4A ±0.5A	179.00
732	36 to 72 VDC	5 VDC ±1% ±12 VDC ±1%	4A ±0.5A	179.00
733	9 to 18 VDC	5 VDC ±1% ±15 VDC ±1%	4A ±0.4A	179.00
734	18 to 36 VDC	5 VDC ±1% ±15 VDC ±1%	4A ±0.4A	179.00
735	36 to 72 VDC	5 VDC ±1% ±15 VDC ±1%	4A ±0.4A	179.00
736	9 to 18 VDC	5 VDC ±1% ±12 VDC ±1% −5 VDC ±1%	4A ±0.5A 1A	179.00
737	18 to 36 VDC	5 VDC ±1% ±12 VDC ±1% −5 VDC ±1%	4A ±0.5A 1A	179.00

NEW 50 WATT OPEN FRAME TRIPLE OUTPUT				
MODEL NUMBER	INPUT VOLTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT	PRICE
DC50-1	12, 24, or 48 VDC (2:1 RANGE)	5 VDC 12 VDC 12 VDC	6A 1A 1A	$119.00
DC50-2	12, 24, or 48 VDC (2:1 RANGE)	5 VDC 15 VDC 15 VDC	6A 1A 1A	119.00
DC50-3	12, 24, or 48 VDC (2:1 RANGE)	5 VDC 12 VDC 12 VDC	6A 3A (5A Pk) 0.5A	119.00
DC50-4	12, 24, or 48 VDC (2:1 RANGE)	5 VDC 12 VDC 5 VDC	6A 3A (5A Pk) 1A	119.00

NEW 60 WATT OPEN FRAME SINGLE OUTPUT				
MODEL NUMBER	INPUT VOLTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT	PRICE
DC60-1A	9 to 18 VDC	5 VDC ADJ	10A	$119.00
DC60-1B	18 to 36 VDC	5 VDC ADJ	10A	119.00
DC60-1C	36 to 72 VDC	5 VDC ADJ	10A	119.00
DC60-2A	9 to 18 VDC	12 VDC ADJ	5A	119.00
DC60-2B	18 to 36 VDC	12 VDC ADJ	6A	119.00
DC60-2C	36 to 72 VDC	12 VDC ADJ	6A	119.00
DC60-3A	9 to 18 VDC	15 VDC ADJ	4A	119.00
DC60-3B	18 to 36 VDC	15 VDC ADJ	4.8A	119.00
DC60-3C	36 to 72 VDC	15 VDC ADJ	4.8A	119.00
DC60-4A	9 to 18 VDC	24 VDC ADJ	2.5A	119.00
DC60-4B	18 to 36 VDC	24 VDC ADJ	3A	119.00
DC60-4C	36 to 72 VDC	24 VDC ADJ	3A	119.00

POWER GENERAL 152 WILL DRIVE, CANTON, MA 02021 TWX: 710-348-0200 TELEPHONE: (617) 828-6216

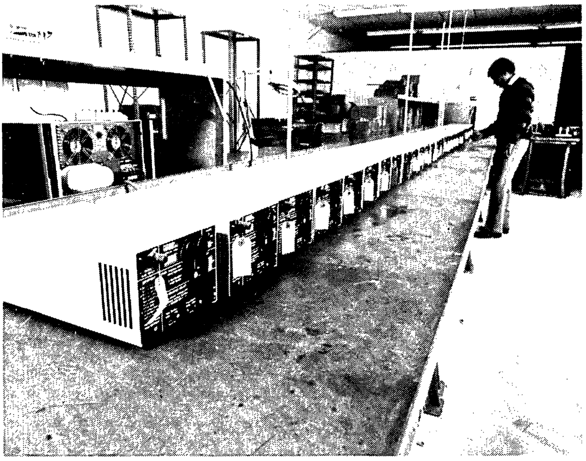
QUICK SELECTION: UNINTERRUPTIBLE POWER SUPPLIES

Uninterruptible power systems are used to protect computer based systems from faulty input power. Power General offers three low cost, high performance models.

Two units, the UPS-200 and UPS-420, offer output power levels of 200 and 420 watts respectively, with features such as 1.5 mS transfer time, visual and audible line failure alarms, input transient protection and compact desk-top styling.

The UPS-210 is an uninterruptible power supply subsystem, having all the features of the UPS-200 with the exclusion of an internal battery. All three units offer performance levels comparable to much more expensive units.

UPS-420
POWER GENERAL
UPS-210
POWER GENERAL



UNINTERRUPTIBLE POWER SYSTEMS									
MODEL NO.	MAXIMUM OUTPUT POWER	TRANSFER TIME MAXIMUM	OPERATING TIME @ FULL POWER	INPUT/OUTPUT VOLTAGE (Normal)	OUTPUT VOLTAGE (Inverter)	INTERNAL BATTERY	AUDIBLE POWER LOSS ALARM	SIZE H×W×D In mm	PRICE $
UPS-200	200W	1.5 mS	15 Min.	115 or 230 VAC 48 to 63 Hz	115 or 230V Square Wave 50 or 60 Hz±0.1%	12V 24 A-H	YES	6.9×7.3×13.25 150×186×337	$395.00
UPS-420	420W	1.5 mS	18 Min.	115 or 230 VAC 48 to 63 Hz	115 or 230V Square Wave 50 or 60 Hz ±0.1%	24V 24 A-H	YES	6.5×4.25×15.0 165.2×362.3 ×381.3	$595.00
UPS-210	200W	1.5 mS	Dependent on External Bat.	115 or 230 VAC 48 to 63 Hz	115 or 230V Square Wave 50 or 60 Hz ±0.1%	—	YES	5.9×7.3×6.0 150×186×153	$249.00

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"Innovators in Power Supply Technology"

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International Series
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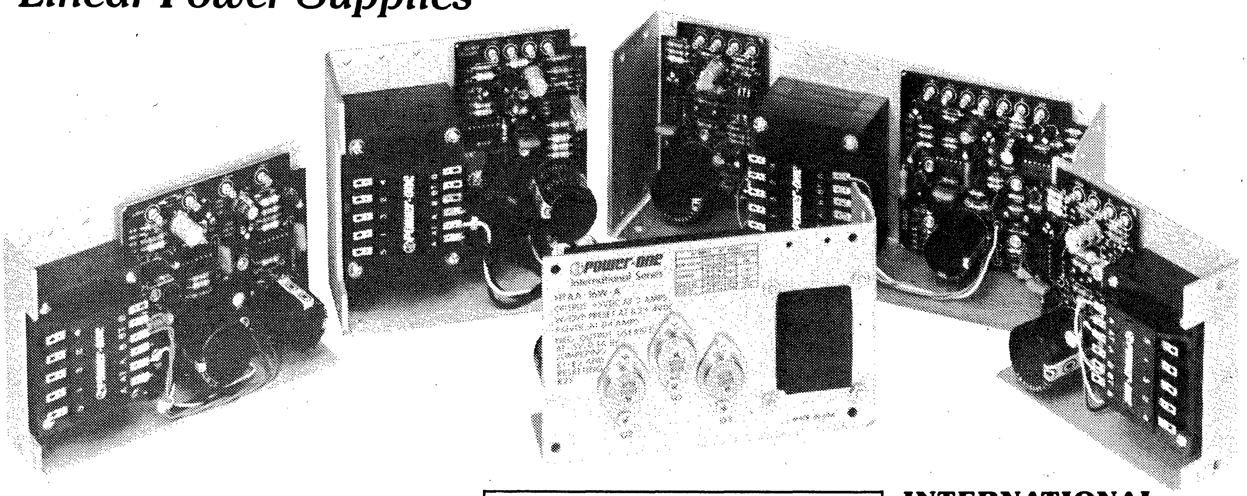
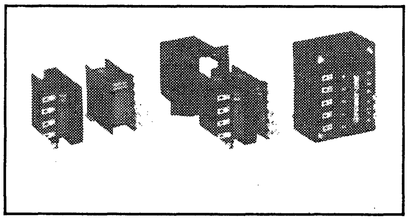
THE NEW WORLD STANDARD IN D.C. POWER SUPPLIES



FEATURES

- VDE TRANSFORMER CONSTRUCTION
- WORLDWIDE AC INPUT CAPABILITIES 100/120/220/230/240 VAC
- MEETS DOMESTIC AND FOREIGN SAFETY STANDARDS - UL, CSA, IEC, VDE, BPO, ECMA, CEE
- INDUSTRY STANDARD PACKAGES



INTERNATIONAL TRANSFORMER CONSTRUCTION

Power-One's patented International Series transformers feature separate, fully enclosed, primary and secondary coils. Meets safety requirements of VDE, UL, CSA, BPO, IEC, CEE, and ECMA.

DESCRIPTION

POWER-ONE's new International Series is the first and only high reliability D.C. power supply series designed for products sold throughout the world's major electronics markets.

The International Series can be used anywhere, for almost any application. It meets the most important safety requirements of UL, CSA, IEC, VDE, BPO, ECMA, and CEE. Also, each unit provides the AC input ranges needed for worldwide operation: 100, 120, 220, 230, and 240 volts, 47 to 63 Hz. This multi-range input capability reduces customer inventory and service requirements since only one standard off-the-shelf power supply is needed, regardless of the product's final destination. These are exclusive features of the International Series, and are not available on any competitive standard model.

In an effort to meet the world's toughest safety regulations, POWER-ONE achieved a technological breakthrough in power transformer design. Our new patented winding process features separate, fully enclosed primary and secondary windings. This unique construction complies with the most respected regulatory safety agency specifications, worldwide.

The end result is that product acceptance throughout the world is greatly simplified for domestic and foreign equipment manufacturers. The International Series power supplies comply with the major body of regulatory safety agencies responsible for product safety in virtually all of the major world markets. Its compatibility with world safety standards, combined with dramatically increased flexibility, results in far greater potential for international acceptance of your products.

MEETS SAFETY AGENCY REQUIREMENTS THROUGHOUT THE WORLD

Why compliance is so important!

For years electronic equipment manufacturers have found that safety requirements for most of the world's electronics markets are significantly different than those established in the USA by Underwriters Laboratories (UL). Also, there is little consistency in the requirements among the world's regulatory safety agencies. This has created almost impossible compliance problems for designers who are developing products for worldwide distribution.

Recognizing this dilemma, POWER-ONE initiated an extensive R&D program aimed at producing the first D.C. power supply line that truly meets the world's toughest safety requirements. The innovative new International Series—the solution to the difficult problem of gaining worldwide acceptance for your products.

SAFETY AGENCIES WORLDWIDE

The following regulatory agency specifications have gained industry-wide acceptance as the most important to comply with when designing products for the world's major electronics markets. The International Series meets or exceeds the leakage current, creepage distance, and dielectric withstand test requirements of these safety agency specifications:

UL 1012
UL 478
CSA 22.2 No. 143
CSA 22.2 No. 154
IEC 380 Class I
IEC 380 Class II
IEC 435 Class I
IEC 435 Class II
VDE 0730 Part 2P Class I
VDE 0730 Part 2P Class II
VDE 0804 Class I
VDE 0804 Class II
BPO Tech. Guide No. 26
ECMA-57 Class I
ECMA-57 Class II
CEE-10 Part 2P Class I
CEE-10 Part 2P Class II

INTERNATIONAL SERIES DESIGN STANDARDS:

Leakage Current, Line to Ground: 0.05mA Max.

Safety Spacings, Live Parts to Dead Metal: 9.0 mm

Dielectric Withstand Voltage,
Input to Ground: 3750 VAC
Input to Outputs: 3750 VAC
Outputs to Ground: 300 VDC

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POWER-ONE D.C. POWER SUPPLIES

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International Series

Linear Power Supplies

MEETS INTERNATIONAL SAFETY REQUIREMENTS THROUGHOUT THE WORLD

SPECIFICATIONS

AC Input:	100/120/220/240 VAC +10% −13%. 47-63 Hz. Tolerance for 230 VAC operation is +15%, −10%. Derate output current 10% for 50 Hz operation.
DC Output:	See Voltage/Current Rating Chart. Adjustment range ±5% minimum.
Line Regulation:	±.05% for a 10% line change.
Load Regulation:	±.05% for a 50% load change.
Output Ripple:	5V through 15V models: 5.0 mV PK-PK maximum; 24V and 28V models: 0.2% PK-PK maximum.
Transient Response:	50μ seconds for a 50% load change.
Short Circuit and Overload Protection:	Automatic current limit/foldback.
Overvoltage Protection:	Provided on 5V outputs where indicated. Set at 6.2V ±0.4V. Other outputs use optional overvoltage protectors OVP-12 and OVP-24.
Stability:	±0.3% for 24 hours after warm-up.
Temperature Rating:	0°C to 50°C full-rated, derated linearly to 40% at 70°C.
Temperature Coefficient:	.01%/°C typical, .03%/°C maximum.
Efficiency: (typical)	5V outputs: 45% 12V and 15V outputs: 55% 24V and 28V outputs: 60%
Vibration:	Per MIL-STD-810C, Method 514, Procedure X
Shock:	Per MIL-STD-810C, Method 516, Procedure V
EMI/RFI:	These linear power supplies have inherently low conducted and radiated noise levels. For most system applications they will meet the requirements of FCC Docket 20780 for Class A equipment and VDE 0871 for Class A equipment without additional noise filtering.

VOLTAGE/CURRENT RATING CHARTS

SINGLE OUTPUT MODELS

Model	Voltage/ Current	Case Size	Price (1–24)
2 VOLTS			
HB2-3-A	2V @ 3A	B	$ 34.95
HC2-6-A	2V @ 6A	C	54.95
HD2-12-A	2V @ 12A	D	84.95
HE2-18-A	2V @ 18A	E	119.95
5 VOLTS			
HA5-1.5/OVP-A*	5V @ 1.5A	B	$ 27.95
HB5-3/OVP-A*	5V @ 3A	B	32.95
HC5-6/OVP-A*	5V @ 6A	C	54.95
HN5-9/OVP-A*	5V @ 9A	N	74.95
HD5-12/OVP-A*	5V @ 12A	D	84.95
HE5-18/OVP-A*	5V @ 18A	E	119.95
F5-25/OVP-A*	5V @ 25A	F	154.95
G5-35/OVP-A*	5V @ 35A	F	194.95
CP197-A*	5V @ 50A	F	224.95
12 VOLTS			
HA15-0.9-A	12V @ 0.9A	B	$ 27.95
HB12-1.7-A	12V @ 1.7A	B	32.95
HC12-3.4-A	12V @ 3.4A	C	49.95
HN12-5.1-A	12V @ 5.1A	N	69.95
HD12-6.8-A	12V @ 6.8A	D	79.95
HE12-10.2-A	12V @ 10.2A	E	109.95
F15-15-A	12V @ 16A	F	154.95
15 VOLTS			
HA15-0.9-A	15V @ 0.9A	B	$ 27.95
HB15-1.5-A	15V @ 1.5A	B	32.95
HC15-3-A	15V @ 3A	C	49.95
HN15-4.5-A	15V @ 4.5A	N	69.95
HD15-6-A	15V @ 6A	D	79.95
HE15-9-A	15V @ 9A	E	109.95
F15-15-A	15V @ 15A	F	154.95
24 VOLTS			
HA24-0.5-A	24V @ 0.5A	B	$ 27.95
HB24-1.2-A	24V @ 1.2A	B	32.95
HC24-2.4-A	24V @ 2.4A	C	49.95
HN24-3.6-A	24V @ 3.6A	N	69.95
HD24-4.8-A	24V @ 4.8A	D	79.95
HE24-7.2-A	24V @ 7.2A	E	109.95
F24-12-A	24V @ 12.A	F	154.95
28 VOLTS			
HA24-0.5-A	28V @ 0.5A	B	$ 27.95
HB28-1-A	28V @ 1A	B	32.95
HC28-2-A	28V @ 2A	C	49.95
HN28-3-A	28V @ 3A	N	69.95
HD28-4-A	28V @ 4A	D	79.95
HE28-6-A	28V @ 6A	E	109.95
F24-12-A	28V @ 10A	F	154.95
48 VOLTS			
HB48-0.5-A	48V @ 0.5A	B	$ 34.95
HC48-1-A	48V @ 1A	C	54.95
HD48-3-A	48V @ 3A	D	84.95
HE48-4-A	48V @ 4A	E	119.95
180/200 VOLTS			
HB200-0.12-A	175-210V @ 0.12A	B	$ 39.95
250 VOLTS			
HB250-0.1-A	250V @ 0.1A	B	$ 39.95

*INCLUDES OVERVOLTAGE PROTECTION.

DUAL OUTPUT MODELS

Model	Output #1	Output #2	Case Size	Price (1–24)
±5 VOLTS				
HAA5-1.5/OVP-A	5V @ 1.5A*	−5V @1.5A*	AA	$ 49.95
HBB5-3/OVP-A	5V @ 3A*	−5V @3A*	BB	64.95
HCC5-6/OVP-A	5V @ 6A*	−5V @ 6A*	CC	96.95
±12 TO 15 VOLTS				
HAD12-0.4-A	12V @ 0.4A	−12V @ 0.4A	B	36.95
HAD15-0.4-A	15V @ 0.4A	−15V @ 0.4A	B	32.95
HAA15-0.8-A	12V @ 1A OR 15V @ 0.8A	−12V @ 1A OR −15V @ 0.8A OR −5V @ 0.4A	AA	42.95
HBB15-1.5-A	12V @ 1.7A OR 15V @ 1.5A	−12V @ 1.7A OR −15V @ 1.5A OR −5V @ 0.7A	BB	54.95
HCC15-3-A	12V @ 3.4A OR 15V @ 3A	−12V @ 3.4A OR −15V @ 3A	CC	87.95
HDD15-5-A	12V TO 15V@ 5A	(−) 12V TO 15V@5A	E	129.95
5 VOLTS AND 9 TO 15 VOLTS (Isolated Outputs)				
HAA512-A	5V @ 2A*	9 TO 15V @ 0.5A	AA	$ 49.95
HBB512-A	5V @ 3A*	9 TO 15V @ 1.25A	BB	59.95
HCC512-A	5V @ 6A*	9 TO 15V @ 2.5A	CC	94.95
±18 TO 24 VOLTS				
HAA24-0.6-A	18-20V @ 0.4A OR 24V @ 0.6A	(−)18-20V @ 0.4A OR −24V @ 0.6A	AA	42.95
HBB24-1.2-A	18-20V @ 0.9A OR 24V @ 1.2A	(−)18-20V @ 0.9A OR −24V @ 1.2A	BB	54.95
HCC24-2.4-A	18-20V @ 1.8A OR 24V @ 2.4A	(−)18-20V @ 1.8A OR −24V @ 2.4A	CC	87.95

TRIPLE OUTPUT MODELS

Model	Output #1	Output #2	Output #3	Case Size	Price (1–24)
HTAA-16W-A	5V @ 2A*	9 TO 15V @ 0.4A	(−)9 TO 15V @0.4A OR −5V @ 0.4A	AA	$ 54.95
HBAA-40W-A	5V @ 3A*	12V @ 1A OR 15V @ 0.8A	−12V @1A OR −15V @ 0.8A OR −5V @ 0.4A	BAA	75.95
HCAA-60W-A	5V @ 6A*	12 TO 15V @ 1A	(−)12 TO 15V @ 1A OR −5V @ 0.4A	D	89.95
HCBB-75W-A	5V @ 6A*	12V @ 1.7A OR 15V @ 1.5A	−12V @ 1.7A OR −15V @ 1.5A OR −5V @ 0.7A	CBB	99.95
CP131-A	5V @ 8A*	12V @ 1.7A OR 15V @ 1.5A	−12V @ 1.7A OR −15V @ 1.5A OR −5V @ 0.7A	131	119.95
HDBB-105W-A	5V @ 12A*	12V @ 1.7A OR 15V @ 1.5A	−12V @ 1.7A OR −15V @ 1.5A OR −5V @ 0.7A	DBB	134.95
HDCC-150W-A	5V @ 12A*	12V @ 3.4A OR 15V @ 3A	−12V @ 3.4A OR −15V @ 3A	DCC	154.95

DISK-DRIVE MODELS

Model	Output #1	Output #2	Output #3	Output #4	Output #5	Case Size	Price (1–24)
CP340-A	5V @ 0.5A/ 0.7A PK*	12V @ 0.9A/ 1.8A PK				CP340-A	$ 44.95
CP205-A	5V @ 1.A*	−5V @ 0.5A*	24V @ 1.5A/ 1.7A PK			BAA	75.95
CP510-A	5V @ 6A*	12V @ 2.5A/ 7.5A PK				CP510-A	79.95
CP323-A	5V @ 2A*					N	79.95
CP162-A	5V @ 3A*	−5V @ 0.6A*	24V @ 5A/6A PK			131	129.95
CP498-A	5V @ 6A*	12V @ 5A/ 10A PK	−12V @ 0.5A OR −5V @ 0.25A			131	129.95
CP379-A	5V @ 6A*	−5V @ 1.2A OR −12V @ 1.2A	24V @ 3.5A/ 8A PK			131	129.95
CP503-A	5V @ 6A*	12V @ 1.2A	−12V @ 0.8A	24V @ 2.5A/ 4APK		CBB	129.95
CP384-A	5V @ 9A*	−5V @ 1.2A OR −12V @ 1.2A	24V @ 2A/ 8A PK			131	129.95

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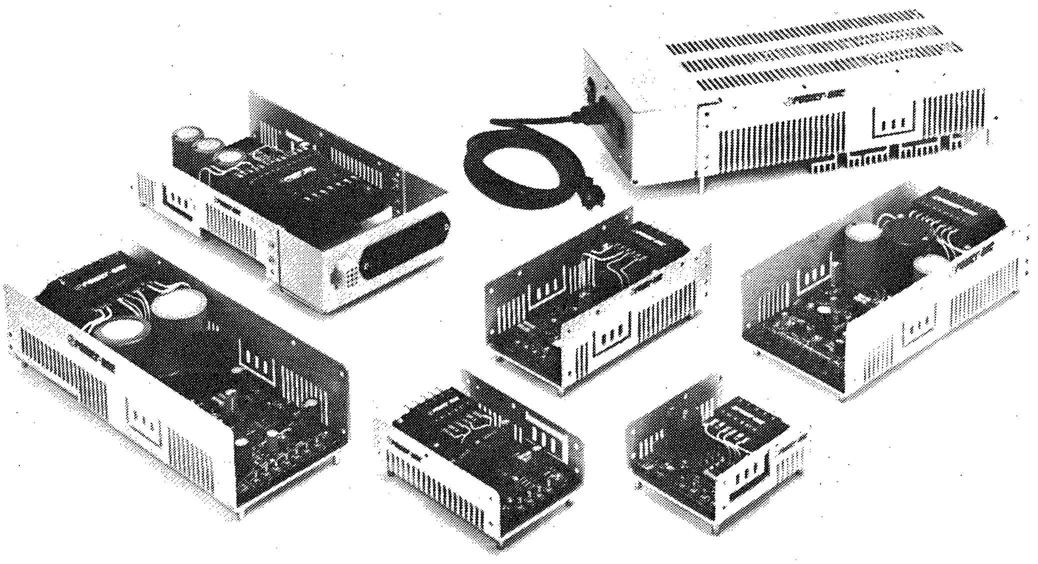
INTERNATIONAL FLEX-SERIES

A New Standard Approach to Your Custom Power Supply Requirements



Specify Your Exact Requirements Using POWER-ONE's New FLEX-Series Design Concept

- USER-SPECIFIED OUTPUT RATINGS AND OPTIONS
- 11 PRE-DESIGNED CASE SIZES... 10 TO 400 WATTS
- BUILT TO YOUR EXACT SPECIFICATIONS
- LOW DEVELOPMENT COST... FAST DELIVERY
- RELIABLE PRE-DESIGNED CIRCUITRY
- COST EFFECTIVE FOR LARGE AND SMALL QUANTITIES
- CAD SYSTEM DESIGNED
- WORLDWIDE SAFETY APPROVED TO UL, CSA, IEC, VDE STANDARDS

ECONOMY THROUGH STANDARDIZATION

The FLEX-Series was created with one goal in mind: to offer the industry, for the first time, a truly comprehensive set of standardized design tools for designing custom power supplies at the lowest possible cost and lead time. That goal has been achieved. In fact, the development of a FLEX-Series model is so economical that it has become the most cost-effective choice for both small and large-quantity custom requirements.

PROVEN TECHNOLOGY PLUS MAXIMUM VERSATILITY

The Series is based on a wide variety of pre-designed assemblies which can be used in their standard configurations or easily modified to meet more specific requirements. All FLEX-Series design work is done on Computer Aided Design (CAD) systems, using POWER-ONE's latest International Series technology and time-proven design concepts. The result has been unequalled quality and design flexibility.

A TOTAL PACKAGE CONCEPT

Unlike standardized approaches of the past, the FLEX-Series offers true technical and cost advantages since you receive *exactly* what you specify. You never pay extra for features you don't ask for and don't need. Also, there is no additional assembly labor required or extra parts for you to specify and purchase since FLEX-Series is a total package concept. There are no regulator modules to mount and heatsink, no additional wiring, no transformers or sheetmetal to buy, and no testing. The FLEX-Series total design concept provides a complete power supply package, built to your specifications, ready to install.

THOUSANDS OF STANDARD CONFIGURATIONS

Due to space limitations, these pages provide just a small sample of the wide choice of case sizes, features and options available. It is intended to serve only as a descriptive outline of the capabilities of the FLEX-Series. In practice, there are literally thousands of standard configurations possible. It is for this reason that we urge you to contact us with your requirements and allow us to propose our FLEX-Series approach. We think you'll be impressed.

TO RECEIVE YOUR QUOTATION

Simply call our Factory Applications Engineers with your electrical and mechanical requirements or send us your written specification. Be sure to include quantity information and your production delivery schedule.

First, we will determine the appropriate package size for the output power and options you require. We will then recommend the easiest, fastest, and most economical approach using our pre-designed FLEX-Series assemblies; if necessary, we will also prepare a preliminary design including any special features or modifications you specify.

Finally, your quotation will be quickly forwarded to you, including complete technical details, pricing and ordering information. It's that simple when you choose the FLEX-Series.

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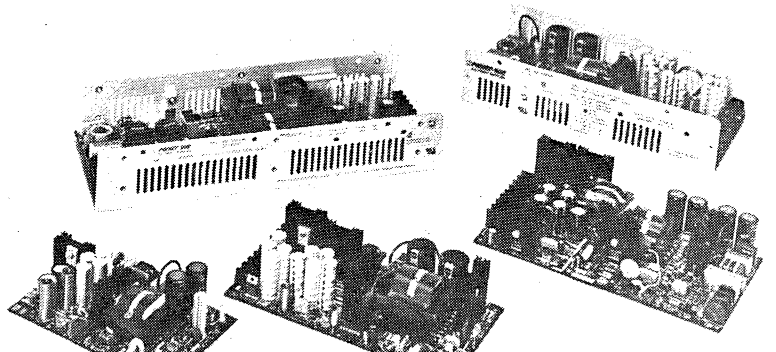
International Series
Switching Power Supplies

SINGLE AND MULTIPLE OUTPUT MODELS, WITH WORLDWIDE CAPABILITIES

FEATURES
- EFFICIENT, RELIABLE, ECONOMICAL
- 31 MODELS, 40 to 400 WATTS
- UP TO 5 TIGHTLY REGULATED OUTPUTS
- VDE CONSTRUCTION
- MEETS DOMESTIC AND INTERNATIONAL SAFETY:
  - 3750 VAC ISOLATION
  - VDE SAFETY SPACINGS
- MEETS DOMESTIC AND INTERNATIONAL EMI:
  - FCC DOCKET 20780, CLASS A
  - VDE 0871/6.78, CLASS A
- TUV CERTIFIED TO:
  - VDE 0804 IEC 380
  - VDE 0805 (Proposed) IEC 435
  - VDE 0806
- WORLDWIDE AC INPUT, 90-132/180-264 VAC, USER SELECTABLE
- POPULAR INDUSTRY STANDARD PACKAGES
- UL RECOGNIZED, CSA CERTIFIED
- FULL LOAD BURN-IN AND THERMAL CYCLING
- 2 YEAR WARRANTY



Description

Multioutput switchers designed for personal computers, disk-drives, intelligent terminals, word processors and other systems targeted for world wide distribution.

High capacity 5V outputs easily handle the increased demand of today's 5V-only logic, while tightly regulated auxiliary outputs provide the high surge current capability required by disk-drives and printers.

All models meet the world's toughest safety and EMI standards resulting in easier system approval and international marketing.

SPECIFICATIONS

AC Input	90-132 VAC or 180-264 VAC, user selectable. 47-63 HZ, single phase
DC Outputs:	See Voltage/Current Rating Charts.
Brown-Out Protection:	Regulation is maintained down to 90/180 VAC.
Hold-Up Time:	20 msec minimum at full rated load and nominal AC input voltage.
Efficiency:	Measured at full rated output power and nominal AC input voltage: 70% ± 5%
Regulation Characteristics:	See Voltage/Current Rating Charts. Line: Measured over a 90-132 VAC or 180-264 VAC line change. Load: Measured by varying the load current from 60% of full rated to either 20% or 100% of full rated.
Cross Regulation:	Cross regulation specifies the maximum voltage change when the +5V output load current is varied from 75% of full rated to either 50% or 100% of full rated.
Output Noise and Ripple:	0.3% RMS, 1% PK-PK maximum.
Transient Response:	Main 5V output only. Recovery Time: 500μsec typical for a 50-100% load change.
Output Overload Protection:	Fully protected against output overload and short circuit.
Overvoltage Protection:	Provided on +5V outputs.
Reverse Voltage Protection:	Fully protected from damage due to application of reverse polarity voltage across DC output terminals.
Input Protection:	AC input line fuse provided. Internally located.
Inrush Current:	Internally limited by thermistor.
Temperature Rating:	Operating: 0°C to +70°C. Storage: -55°C to +85°C
Temperature Coefficient:	±0.03%/°C typical, ±0.05%/°C maximum.
Vibration	Per Mil-Std-810C, Method 514, Procedure X, Catagory G-1.
Shock:	Per Mil-Std-810C, Method 516, Prodecure V.
Warranty:	2 years.

OPTIONS

Input/Output Connectors:	Barrier terminal blocks standard on all models. Consult factory for optional connector styles.
Safety Covers:	Available for most models
User Specified Outputs:	Output voltage and current ratings may be configured to user specified requirements. Consult factory for details.

VOLTAGE/CURRENT RATING CHARTS—MULTIPLE OUTPUT

SPL40 SERIES
40 WATTS CONTINUOUS
PRICE: $105.00 (1-24)

MODEL	VOLTAGE	CURRENT	INITIAL SETTING TOLERANCE	LINE REGULATION	LOAD REGULATION	CROSS REGULATION
SPL40 -4000	+5V	5A	ADJUSTABLE NOTE A	±0.1%	±1%	N/A
	+12V	0.5A	±4% NOTE B	±0.1%	±1%	N/A
	-12V	0.5A	±4% NOTE B	±0.1%	±1%	N/A
	-5V	0.5A	±4% NOTE B	±0.1%	±1%	N/A

SPL50 SERIES
50 WATTS CONTINUOUS, 60 WATTS PEAK
PRICE: $105.00 (1-24)

MODEL	VOLTAGE	CURRENT	INITIAL SETTING TOLERANCE	LINE REGULATION	LOAD REGULATION	CROSS REGULATION
SPL50 -3200	+5V	6A	ADJUSTABLE NOTE A	±0.1%	±1%	N/A
	+12V	2A/ 4A PK	±5% NOTE C	±0.3%	±3%	±5%
	−12V	0.5A	±5% NOTE C	±0.3%	±5%	±10%

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INTERNATIONAL SERIES SWITCHING POWER SUPPLIES MULTIPLE OUTPUT (CONTINUED)

SPL53 SERIES PRICE: $125.00 (1-24)
80 WATTS CONTINUOUS

MODEL	VOLTAGE	CURRENT	INITIAL SETTING TOLERANCE	LINE REGULATION	LOAD REGULATION	CROSS REGULATION
SPL53 -4000	+5V NOTE G	8A	ADJUSTABLE NOTE A	±0.1%	±1%	N/A
	+12V NOTE G	2.5A/ 5A PK	ADJUSTABLE NOTE D	±0.1%	±1%	N/A
	-12V	0.6A	±4% NOTE B	±0.1%	±1%	N/A
	-5V	0.6A	±4% NOTE B	±0.1%	±1%	N/A
SPL53 -4101	+5V	8A	ADJUSTABLE NOTE A	±0.1%	±1%	N/A
	+12V	1.2A	±4% NOTE B	±0.1%	±1%	N/A
	-12V	0.6A	±4% NOTE B	±0.1%	±1%	N/A
	+24V	1.5A/ 3A PK	±5% NOTE C	±0.3%	±5%	±5%
SPL53 -4102	+5V	8A	ADJUSTABLE NOTE A	±0.1%	±1%	N/A
	+12V	1.2A	±4% NOTE B	±0.1%	±1%	N/A
	+12V	2.5A/ 5A PK	±5% NOTE C	±0.3%	±5%	±5%
	-12V	0.6A	±4% NOTE B	±0.1%	±1%	N/A

MODEL	VOLTAGE	CURRENT	INITIAL SETTING TOLERANCE	LINE REGULATION	LOAD REGULATION	CROSS REGULATION
SPL53 -3200	+5V	8A	ADJUSTABLE NOTE A	±0.1%	±1%	N/A
	+12V	4A/ 6A PK	±5% NOTE C	±0.3%	±5%	±5%
	+24V	1.5A/ 2.5A PK	±5% NOTE C	±0.3%	±5%	±5%

SPL60 SERIES PRICE: $115.00 (1-24)
60 WATTS CONTINUOUS, 75 WATTS PEAK

MODEL	VOLTAGE	CURRENT	INITIAL SETTING TOLERANCE	LINE REGULATION	LOAD REGULATION	CROSS REGULATION
SPL60 -4100	+5V	6A	ADJUSTABLE NOTE A	±0.1%	±1%	N/A
	+12V	2A/ 4A PK	±5% NOTE C	±0.3%	±5%	±5%
	-12V	0.6A	±4% NOTE B	±0.1%	±1%	N/A
	-5V	0.6A	±4% NOTE B	±0.1%	±1%	N/A

SPL65 SERIES PRICE: $150.00 (1-24)
85 WATTS CONTINUOUS, 95 WATTS PEAK

MODEL	VOLTAGE	CURRENT	INITIAL SETTING TOLERANCE	LINE REGULATION	LOAD REGULATION	CROSS REGULATION
SPL65 -5000	+5V	8A	ADJUSTABLE NOTE A	±0.1%	±1%	N/A
	+12V	1.2A	±4% NOTE B	±0.1%	±1%	N/A
	-12V	1.2A	±4% NOTE B	±0.1%	±1%	N/A
	+24V	1.2A/ 1.5A PK	±4% NOTE B	±0.1%	±1%	N/A
	-5V	0.5A	±4% NOTE B	±0.1%	±1%	N/A

SPL100 SERIES PRICE: $156.00 (1-24)
100 WATTS CONTINUOUS, 125 WATTS PEAK

MODEL	VOLTAGE	CURRENT	INITIAL SETTING TOLERANCE	LINE REGULATION	LOAD REGULATION	CROSS REGULATION
SPL100 -4000	+5V	12A	ADJUSTABLE NOTE A	±0.1%	±1%	N/A
	+12V	4A/ 8A PK	ADJUSTABLE NOTE D	±0.1%	±1%	N/A
	-12V	0.60A	±4% NOTE B	±0.1%	±1%	N/A
	-5V	0.60A	±4% NOTE B	±0.1%	±1%	N/A

SPL130 SERIES PRICE: $198.00 (1-24)
130 WATTS CONTINUOUS, 150 WATTS PEAK

MODEL	VOLTAGE	CURRENT	INITIAL SETTING TOLERANCE	LINE REGULATION	LOAD REGULATION	CROSS REGULATION
SPL130 -4102P	+5V	20A NOTE E	ADJUSTABLE NOTE A	±0.1%	±1%	N/A
	+12V AUX 1	4A/ 6A PK	±5% NOTE C	±0.3%	±5%	±5%
	-12V	1.5A	±4% NOTE B	±0.1%	±1%	N/A
	-5V	1.5A	±4% NOTE B	±0.1%	±1%	N/A
SPL130 -4101P	+5V	20A NOTE E	ADJUSTABLE NOTE A	±0.1%	±1%	N/A
	+12V	1.5A	±4% NOTE B	±0.1%	±1%	N/A
	-12V	1.5A	±4% NOTE B	±0.1%	±1%	N/A
	+24V AUX 1	3A/ 4A PK	±5% NOTE C	±0.3%	±5%	±5%
SPL130 -4100P	+5V	20A NOTE E	ADJUSTABLE NOTE A	±0.1%	±1%	N/A
	+12V AUX 1	4A 6A PK	±5% NOTE C	±0.3%	±5%	±5%
	+12V	1.5A	±4% NOTE B	±0.1%	±1%	N/A
	-12V	1.5A	±4% NOTE B	±0.1%	±1%	N/A
SPL130 -4000*	+5V	22A	ADJUSTABLE NOTE A	±0.1%	±1%	N/A
	+12V	3A	ADJUSTABLE NOTE A	±0.1%	±1%	N/A
	-12V	1.5A	±4% NOTE B	±0.1%	±1%	N/A
	-5V	1.5A	±4% NOTE B	±0.1%	±1%	N/A

*120 WATTS CONTINUOUS, 135 WATTS PEAK

SPL200 SERIES PRICE: $270.00 (1-24)
200 WATTS CONTINUOUS, 250 WATTS PEAK

MODEL	VOLTAGE	CURRENT	INITIAL SETTING TOLERANCE	LINE REGULATION	LOAD REGULATION	CROSS REGULATION
SPL200 -4100P	+5V	35A NOTE F	ADJUSTABLE NOTE A	±0.1%	±1%	N/A
	+12V AUX 1	4A/ 8A PK	±5% NOTE C	±0.3%	±3%	±3%
	-12V	1.5A	±4% NOTE B	±0.1%	±1%	N/A
	-5V	1.5A	±4% NOTE B	±0.1%	±1%	N/A

NOTES
A. Voltage level adjustable from 4.75V to OVP trip point.
B. Fully regulated output, voltage fixed (3 terminal regulator).
C. Quasi-regulated output. 20% minimum load required to meet regulation specifications.
D. Fully regulated output, voltage adjustable ±5% minimum.
E. The sum of the +5V and AUX 1 load currents must not exceed 20A.
F. The sum of the +5V and AUX 1 load currents must not exceed 35A.
G. The combined output power of the +5V and +12V outputs is limited to 65W continuous. May be increased with forced air cooling.

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INTERNATIONAL SERIES SWITCHING POWER SUPPLIES MULTIPLE OUTPUT (CONTINUED)

SPL200 SERIES (CONTINUED) PRICE: $270.00 (1-24)
200 WATTS CONTINUOUS, 250 WATTS PEAK

MODEL	VOLTAGE	CURRENT	INITIAL SETTING TOLERANCE	LINE REGULATION	LOAD REGULATION	CROSS REGULATION
SPL200 -5200P	+5V	35A NOTE F	ADJUSTABLE NOTE A	±0.1%	±1%	N/A
	+12V AUX 1	4A/ 8A PK	±5% NOTE C	±0.3%	±3%	±3%
	-12V	1.5A	±4% NOTE B	±0.1%	±1%	N/A
	-5V	1.5A	±4% NOTE B	±0.1%	±1%	N/A
	+24V	4A/ 6A PK	±5% NOTE C	±0.3%	±5%	±5%

SPL200 -5100P	+5V	35A NOTE F	ADJUSTABLE NOTE A	±0.1%	±1%	N/A
	+12V AUX 1	4A/ 8A PK	±5% NOTE C	±0.3%	±5%	±3%
	+12V	1.5A	±4% NOTE B	±0.1%	±1%	N/A
	-12V	1.5A	±4% NOTE B	±0.1%	±1%	N/A
	-5V	1.5A	±4% NOTE B	±0.1%	±1%	N/A

SPL400 SERIES PRICE: $493.00 (1-24)
400 WATTS CONTINUOUS

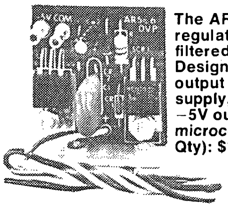
MODEL	VOLTAGE	CURRENT	INITIAL SETTING TOLERANCE	LINE REGULATION	LOAD REGULATION	CROSS REGULATION
SPL400 -5000	+5V	50A	ADJUSTABLE NOTE A	±0.1%	±1%	N/A
	+12V to 24V	10A	FULLY ADJUSTABLE	±0.1%	±1%	N/A
	+12V	3A	ADJUSTABLE NOTE D	±0.1%	±1%	N/A
	-12V	3A	ADJUSTABLE NOTE D	±0.1%	±1%	N/A
	-5V	6A	ADJUSTABLE NOTE D	±0.1%	±1%	N/A

MODEL	VOLTAGE	CURRENT	INITIAL SETTING TOLERANCE	LINE REGULATION	LOAD REGULATION	CROSS REGULATION
SPL400 -5200	+5V	50A	ADJUSTABLE NOTE A	±0.1%	±1%	N/A
	+12V to 24V	10A	FULLY ADJUSTABLE	±0.1%	±1%	N/A
	24V	10A	±5% NOTE C	±0.3%	±5%	±5%
	-12V	10A	±5% NOTE C	±0.3%	±5%	±5%
	-5V	6A	ADJUSTABLE NOTE D	±0.1%	±1%	N/A
SPL400 -5201	+5V	50A	ADJUSTABLE NOTE A	±0.1%	±1%	N/A
	+12V to 24V	10A	FULLY ADJUSTABLE	±0.1%	±1%	N/A
	+12V	10A	±5% NOTE C	±0.3%	±5%	±5%
	-12V	10A	±5% NOTE C	±0.3%	±5%	±5%
	-5V	6A	ADJUSTABLE NOTE D	±0.1%	±1%	N/A

SINGLE OUTPUT

MODEL	VOLTAGE	CURRENT	LINE REGULATION	LOAD REGULATION	PRICE (1-24)
5 VOLTS					
SPL40-1005	5V	8A	±0.2%	±1%	$ 95.00
SPL53-1005	5V	16A	±0.2%	±1%	$120.00
SPL130-1005	5V	26A	±0.1%	±1%	$170.00
SPL250-1005	5V	50A	±0.1%	±1%	$250.00
12-15 VOLTS					
SPL40-1012	12-15V	3.3A/2.7A	±0.2%	±1%	$ 95.00
SPL53-1012	12-15V	6.7A/5.3A	±0.2%	±1%	$120.00
SPL130-1012	12-15V	11A/9A	±0.1%	±1%	$170.00
SPL250-1012	12-15V	21A/17A	±0.1%	±1%	$250.00
24-28 VOLTS					
SPL40-1024	24-28V	1.6A/1.4A	±0.2%	±1%	$ 95.00
SPL53-1024	24-28V	3.3A/2.8A	±0.2%	±1%	$120.00
SPL130-1024	24-28V	5.5A/4.5A	±0.1%	±1%	$170.00
SPL250-1024	24-28V	10A/7A	±0.1%	±1%	$250.00

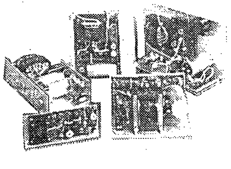
−5V Sub-Regulator Module



The AR5-0.6/OVP will provide a −5V regulated output from any −7V to −30V filtered DC source. Designed to be connected to the negative output of any multiple output power supply, the AR5-0.6/OVP will supply the −5V output required in many microcomputer applications. Price (Unit Qty): $10.95

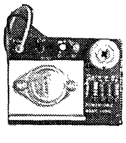
AR5-0.6/OVP

Custom Designs

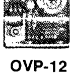


POWER-ONE is an experienced manufacturer of custom power supplies for high-quantity applications requiring special electrical and mechanical configurations. We excell at open frame multiple output designs, regulated or unregulated.

Overvoltage Protection



OVP-24



OVP-12

These optional Overvoltage Protection modules are available for use with any power supply NOT supplied with built-in OVP. Each is adjustable from 6.4V to 34V and should be used when maximum load protection is of prime Importance.

Mounting holes are provided on all power supplies to accommodate these modules, which mount within the specified outline dimensions of each supply.

OVP-12 For use on all models except E & F case sizes (when used on ±9V thru ±15V models, one OVP-12 protects both outputs): Price Unit Qty: $7.95

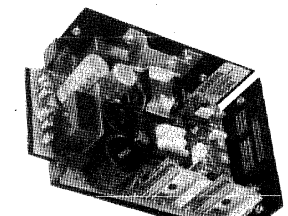
OVP-24 For use on E & F case models: Price Unit Qty: $14.95

Dimension Chart

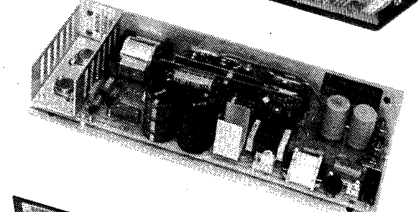
Case Size	Dimension Inches	Case Size	Dimension Inches	Case Size	Dimension Inches	Case Size	Dimension Inches
B	4.87 x 4.0 x 1.62	CBB	11.0 x 4.87 x 2.75	**SWITCHERS, MULTIPLE OUTPUT**		**SWITCHERS, SINGLE OUTPUT**	
C	5.62 x 4.87 x 2.5	DBB	14.25 x 4.87 x 2.75	SPL40	6.30 × 3.92 × 2.00	SPL40	5.75 × 3.92 × 2.20
N	7.0 x 4.87 x 2.75	DCC	15.0 x 4.88 x 3.75	SPL50	6.30 × 3.92 × 1.75	SPL53	8.25 × 4.25 × 2.20
D	9.0 x 4.87 x 2.75	131	11.0 x 4.87 x 2.75	SPL53	8.25 × 4.25 × 2.10	SPL130	8.90 × 5.00 × 2.45
E	14.0 x 4.87 x 2.75	CP340-A	5.5 x 4.0 x 1.62	SPL60	7.50 × 3.92 × 2.00	SPL250	12.00 × 4.94 × 2.45
F	16.75 x 4.87 x 5.0	CP510-A	8.25 x 4.87 x 2.75	SPL65	9.00 × 5.00 × 2.10		
AA	6.5 x 4.0 x 1.62	OVP-12	1.6 x 1.6 x 0.7	SPL100	9.00 × 4.75 × 2.10		
BB	7.0 x 4.87 x 2.5	OVP-24	2.8 x 2.0 x 0.9	SPL130	10.50 × 5.00 × 2.45		
CC	9.38 x 4.87 x 2.75	AR5-0.6/OVP	1.5 x 1.55 x 0.8	SPL200	13.00 × 5.00 × 2.45		
BAA	10.25 x 4.0 x 2.5			SPL400	14.50 × 5.00 × 2.85		

POWER PAC INC.

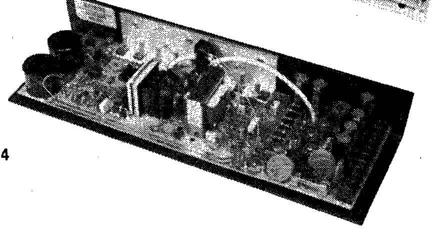
OPEN FRAME SWITCHING POWER SUPPLIES
ESP SINGLE OUTPUT
ESPT MULTIPLE OUTPUT



ESP3/4/5



ESP6/7



ESPT3/4

FEATURES:

- Highest efficiencies
- Latest high performance monolithic pulse width circuit design
- Open frame construction — convection cooled
- Dual input 115/230 VAC — 50/60 Hz
- Wide AC input ranges — brown out protection
- Up to 4 regulated outputs
- Choice of voltage and current on all outputs up to maximum rated power
- State of the art EMI filtering
- 24 hour burn in
- 5 year warranty

SPECIFICATIONS:

Input Voltage:	90/130 or 180/260 VAC 47/63 Hz. Jumper or barrier strip selectable.
Output Voltage/Current:	See rating in table.
Voltage Adjustment:	±5% or 0.5 VDC Minimum.
Regulation: (Single Output)	Line: ±0.1% for specified input range. Load: ±0.1% for 100% load change.
Regulation: (Multiple Output)	Line: ±0.2% for specified input range. Load: Output #1 (+5V): ±0.2% for 100% load change. Output #2 (−5V): ±5% for 100% load change; ±3% for cross regulation. Output #3 (+12V/+15V): ±0.2% for 100% load change. Output #4 (−12V/−15V): ±0.2% for 100% load change.
Ripple & Noise:	50 mV peak to peak maximum.
Efficiency:	70-80%.
Operating Temperature:	0°C to +70°C. Derate 2%/°C over 50°C.
Temperature Coefficient:	0.02%/°C over temperature range.
Storage Temperature:	−55°C to +85°C.
Transient Response:	300 μsec for 50% to 100% load change to recover within 1% of voltage set point. 500 μsec for a multiple output.
Overload Protection:	Automatic current limit.
Overvoltage Protection:	Standard on all models.
Soft Start:	Standard on all models.
In Rush Current Limit:	Standard on all models.
Remote Sense:	Standard on all models.
Hold-up:	16 msec minimum after loss of input voltage measured at full load and nominal input.
Overshoot:	No voltage spikes on turn-on, turn-off or power failure.
Remote Shutdown:	Single Output.
Minimum Load: (Multiple Output)	15% minimum loading required on Output #1 to maintain regulation on Outputs #2, 3 & 4.

SINGLE OUTPUT

ESP3 SERIES — 4⅞ x 4⅝ x 2 $75.00 **ESP4 SERIES — 6¼ x 4⅞ x 2⅜ $90.00**

Model	Voltage VDC ±5%	Current Amperes	Model	Voltage VDC ±5%	Current Amperes
ESP3-5	5	6	ESP4-5	5	10
ESP3-12	12	3	ESP4-12	12	5
ESP3-15	15	2.4	ESP4-15	15	4
ESP3-24	24	1.5	ESP4-24	24	2.5
ESP3-28	28	1.3	ESP4-28	28	2

ESP5 SERIES — 7¼ x 4⅞ x 2¾ $165.00 **ESP6 SERIES — 11 x 5 x 2¾ $230.00** **ESP7 SERIES — 14½ x 4⅞ x 2¾ $270.00**

Model	Volt. VDC ±5%	Curr. Amps.	Model	Volt. VDC ±5%	Curr. Amps.	Model	Volt. VDC ±5%	Curr. Amps.
ESP5-5	5	20	ESP6-5	5	40	ESP7-5	5	60
ESP5-12	12	10	ESP6-12	12	20	ESP7-12	12	30
ESP5-15	15	8	ESP6-15	15	18	ESP7-15	15	25
ESP5-24	24	5	ESP6-24	24	10	ESP7-24	24	16
ESP5-28	28	4	ESP6-28	28	8	ESP7-28	28	14

MULTIPLE OUTPUT

MAX. CONTINUOUS OUTPUT POWER — 100W SIZE — 10½ x 5 x 2½ $210.00

Model	Output #1	Output #2	Output #3	Output #4
ESPT3-12	+5V 15A	−5V 2.0A	+12V 1.2A	−12V 1.2A
ESPT3-15	+5V 15A	−5V 2.0A	+15V 0.8A	−15V 0.8A
ESPT3-XX	* 15A	* 2.0A	* 1.2A	* 1.2A

MAX. CONTINUOUS OUTPUT POWER — 200W SIZE — 15 x 5 x 2½ $310.00

ESPT4-12	+5V 25A	−5V 4.0A	+12V 4.0A	−12V 4.0A
ESPT4-15	+5V 25A	−5V 4.0A	+15V 3.2A	−15V 3.2A
ESPT4-XX	* 25A	* 4.0A	* 4.0A	* 4.0A

* Custom Units — Minimum Order 200 Units.

At no time must average power exceed the maximum continuous output power.

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POWER PAC INC.

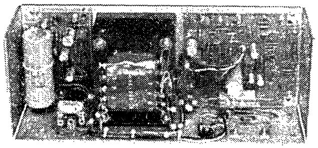
OPEN FRAME LINEAR DISK DRIVE POWER SUPPLIES EDD DISK DRIVE

FEATURES:

- Designed to power mosk disk memory systems Floppy disk — fixed disk — multiple drives
- 5¼ inch, 8 inch, fixed disk media 9 models — includes drive controller power
- Dual input 115/230 Volt — 50/60 Hz
- No 50 Hz derating
- Open frame construction Electrostatic shield
- Highest quality computer grade components 24-hour burn-in
- 5 year warranty
- UL recognized

SPECIFICATIONS:

Input Voltage:	105-125/210-250 VAC, 47-440 Hz
Output Voltage/Current:	See ratings in table.
Output Adj:	±5%
Regulation:	±0.15% line and load combined.
Ripple:	3 mV Peak to Peak
Transient Response:	50 μsec, full load to ½ load
Stability:	±.2% for 24 hrs. after ½ hr. warm-up
Temperature Coefficient:	Better than .025%/°C
Temperature Derating:	3%/°C above 50°C
Temperature — Operating:	0-70°C
Temperature — Storage:	−40° C to +85° C
Overload Protection:	All outputs protected by foldback type current limiting circuit. Automatic recovery upon removal of overload. Foldback is delayed on 24 volt output, to allow turn on surge normally encountered.
Overvoltage Protection:	OV Protection, factory set to trip from 5.8 to 7.0 VDC, is provided on both the plus and minus 5 volt outputs.
Shielding:	Electrostatic shield between primary and secondary of transformer
Cooling:	Convection cooled
Mechanical Dimensions:	For specific details of outline and mounting dimensions see PPI 82-06 Mechanical Data Handbook.
OPTION:	Perforated cover



EDD DISK DRIVE

Model	Output #1		Output #2		Output #3		Case	Size	Application	Price
	Volts	Amps	Volts	Amps	Volts	Amps				
EDD-08	5V	0.5A 1.7A Pk	+12V	1.2A 1.8 Pk	—		1DA	4 x 5½ x 1⅝	Floppy-Disk 5¼″ Media	$ 55
EDD-09	5V	2.0A	+12V	4.0A	—		8CC	7 x 4⅞ x 2¾	Floppy-Disk 5¼″ Media	87
EDD1	5V	1.0A	−5V	0.5A	+24V	1.5A 1.7A Pk	1BA	10¼ x 4 x 2½	Floppy-Disk 8″ Media	87
EDD2	5V	2.5A	−5V	0.5A	+24V	1.5A 1.7A Pk	3D	9 x 4⅞ x 2¾	Floppy-Disk 8″ Media	110
EDD3	5V	3.0A	−5V	0.5A	+24V	3.0A 3.4A Pk	6G	11 x 4⅞ x 2¾	Floppy-Disk 8″ Media	115
EDD4	5V	3.0A	−5V	0.6A	+24V	5.0A 6.0A Pk	6G	11 x 4⅞ x 2¾	Floppy-Disk 8″ Media	135
EDD5	5V	6.0A	−12V or − 5V	0.8A 0.8A	+24V	3.5A 5.5A Pk	6G	11 x 4⅞ x 2¾	Winchester Fixed Disk	135
EDD6	5V	9.0A	−12V or − 5V	0.8A 0.8A	+24V	0.7A 4.5A Pk	6G	11 x 4⅞ x 2¾	Winchester Fixed Disk	140
EDD7	5V	12.0A	−12V or − 5V	0.8A 0.8A	+24V	3.5A 5.5A Pk	4E	16¾ x 4⅞ x 4	Winchester Fixed Disk	175
EDD10	5V −5V	6.0A 0.5A	12V −12V	1.2A 1.0A	+24V	2.5A 6.0A Pk	9DD	14 x 4⅞ x 2¾	Winchester Fixed Disk	225

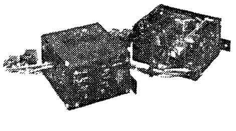
CUSTOM POWER SUPPLIES

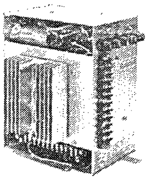
Power Pac is one of the leading manufacturers of OEM Custom Power Supplies.

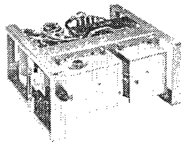
If our standard products do not fit your requirement, our experienced staff of engineers and designers are available to design to your exact requirement.

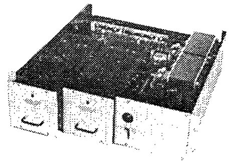
Our power supply applications vary from Medical Electronics, CRT Terminal, Disk Drive, Process Controls, Microprocessor, Main Frame Computers, Printers, Computer Peripheral, Recording Studio, Dental Electronics, Photo-typesetter, Word Processing to Industrial Control.

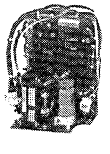
All supplies are designed to meet rigid quality and reliability requirements and are qualified to meet Underwriter Laboratories, Canadian Standards Association and European VDE Specifications.











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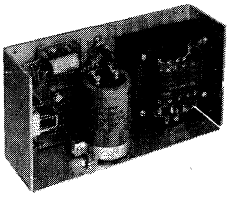
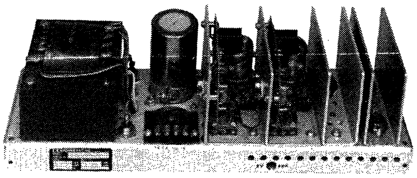
POWER PAC INC.

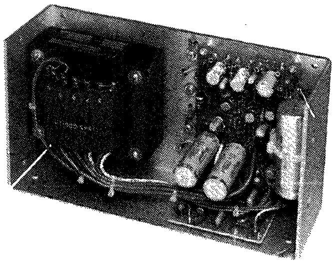
OPEN FRAME LINEAR EP SINGLE OUTPUT





FEATURES:

- Most popular universal power supply series
- Open frame construction — convection cooled
- Dual input 115/230 Volt — 50/60 Hz
- Electrostatic shield
- Highest quality computer grade components
- Built-in short circuit protection with automatic recovery
- Optional over-voltage protection
- 24 hour burn-in
- 5 year warranty
- UL recognized



SPECIFICATIONS:

Input Voltage:	105/125 or 210/250 VAC, 47/440 Hz
Output Voltage/Current:	See rating in table I. Current ratings are for 57/440 Hz. Derate 10% at 50 Hz
Output Adj. Range:	±5% or .5 VDC minimum
Regulation:	±0.15% Line & Load combined
Ripple:	1.5 mV RMS, 5 mV pk-pk max
Stability:	±0.1% for 8 hours after warm-up
Temperature Operating:	0°C to +71°C continuous
Temperature Derating:	Derate 2%/°C above 40°C
Temperature Coefficient:	Better than 0.03%/°C
Transient Response:	50 μsec for a 50% load change to recover within ±10 mV band
Cooling:	Convection cooled
Overload Protection:	Built-in foldback type current limit circuit to protect against overload and short circuit condition, with automatic recovery. Set to operate at 120 to 135% of full load current at 40°C.
Overvoltage Protection:	Built-in SCR crowbar set at 120-130% of nominal output. (120-140% on EP6A and EP1B)
Remote Sense:	Standard on size 2C and larger
Output Polarity:	Floating, either side may be grounded
Shielding:	Electrostatic shield between primary and secondary of transformer
Mechanical Dimension:	For specific details of outline and mounting dimensions see PPI 82-06 Mechanical Data Handbook.

EP SINGLE OUTPUT

Model	Voltage VDC ±5%	Current Amperes	Case	Price	
				No-OV	W-OV
EP1B SERIES — 4⅞ x 4 x 1⅝					
EP1B-5	5	3.0	1B	$ 32	$ 37
EP1B-6	6	3.0	1B	32	37
EP1B-12	12	1.7	1B	32	37
EP1B-15	15	1.5	1B	32	37
EP1B-24	24	1.2	1B	32	37
EP1B-28	28	1.0	1B	32	37
EP8CC SERIES — 7 x 4⅞ x 2¾					
EP8CC-5	5	9.0	8CC	$ 73	$ 80
EP8CC-6	6	8.5	8CC	73	80
EP8CC-12	12	5.1	8CC	73	80
EP8CC-15	15	4.5	8CC	73	80
EP8CC-24	24	3.3	8CC	73	80
EP8CC-28	28	3.0	8CC	73	80
EP9DD SERIES — 14 x 4⅞ x 2¾					
EP9DD-5	5	18	9DD	$121	$133
EP9DD-6	6	18	9DD	121	133
EP9DD-12	12	10.8	9DD	121	133
EP9DD-15	15	9.5	9DD	121	133
EP9DD-24	24	7.2	9DD	121	133
EP9DD-28	28	6.0	9DD	121	133
EP4EE SERIES — 16¾ x 4⅞ x 4⅞					
EP4EE-5	5	35	4EE	$200	$216
EP4EE-6	6	32	4EE	200	216
EP4EE-12	12	16	4EE	200	216
EP4EE-15	15	15	4EE	200	216
EP4EE-24	24	12	4EE	200	216
EP4EE-28	28	11	4EE	200	216

Model	Voltage VDC ±5%	Current Amperes	Case	Price	
				No-OV	W-OV
EP2C SERIES — 5⅝ x 4⅞ x 2½					
EP2C-5	5	6.0	2C	$ 56	$ 63
EP2C-6	6	6.0	2C	56	63
EP2C-12	12	3.4	2C	56	63
EP2C-15	15	3.0	2C	56	63
EP2C-24	24	2.4	2C	56	63
EP2C-28	28	2.0	2C	56	63
EP3D SERIES — 9 x 4⅞ x 2¾					
EP3D-5	5	12	3D	$ 96	$103
EP3D-6	6	12	3D	96	103
EP3D-12	12	6.8	3D	96	103
EP3D-15	15	6.0	3D	96	103
EP3D-24	24	5.0	3D	96	103
EP3D-28	28	4.4	3D	96	103
EP4E SERIES — 16¾ x 4⅞ x 4⅞					
EP4E-5	5	25	4E	$170	$184
EP4E-6	6	23	4E	170	184
EP4E-12	12	15	4E	170	184
EP4E-15	15	14	4E	170	184
EP4E-24	24	11	4E	170	184
EP4E-28	28	10	4E	170	184
EP5F SERIES — 16¾ x 10 x 4⅞					
EP5F-5	5	50	5F	$266	$290
EP5F-6	6	46	5F	266	290
EP5F-12	12	30	5F	266	290
EP5F-15	15	28	5F	266	290
EP5F-24	24	22	5F	266	290
EP5F-28	28	20	5F	266	290

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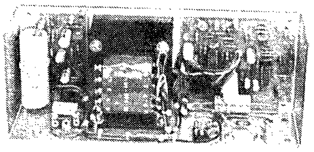
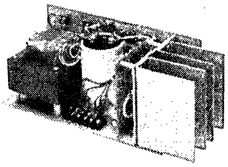
POWER PAC INC.

OPEN FRAME LINEAR
EPD DUAL
EPT/UPS TRIPLE OUTPUTS



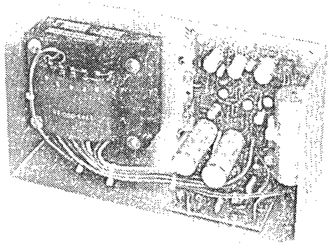


FEATURES:

- Most popular universal power supply series
- Open frame construction — convection cooled
- Dual input 115/230 Volt — 50/60 Hz
- Electrostatic shield
- Highest quality computer grade components
- Built-in short circuit protection with automatic recovery
- Optional over-voltage protection
- 24 hour burn-in
- 5 year warranty
- UL recognized

SPECIFICATIONS:

Input Voltage:	105/125 or 210/250 VAC, 47/440 Hz
Output Voltage/Current:	See rating in table I. Current ratings are for 57/440 Hz. Derate 10% at 50 Hz
Output Adj. Range:	±5% or .5 VDC minimum
Regulation:	±0.15% Line & Load combined
Ripple:	1.5 mV RMS, 5 mV pk-pk max
Stability:	±0.1% for 8 hours after warm-up
Temperature Operating:	0°C to +71°C continuous
Temperature Derating:	Derate 2%/°C above 40°C
Temperature Coefficient:	Better than 0.03%/°C
Transient Response:	50 μsec for a 50% load change to recover within ±10 mV band
Cooling:	Convection cooled
Overload Protection:	Built-in foldback type current limit circuit to protect against overload and short circuit condition, with automatic recovery. Set to operate at 120 to 135% of full load current at 40°C.
Overvoltage Protection:	Built-in SCR crowbar set at 120-130% of nominal output. (120-140% on EP6A and EP1B)
Remote Sense:	Standard on size 2C and larger
Output Polarity:	Floating, either side may be grounded
Shielding:	Electrostatic shield between primary and secondary of transformer
Mechanical Dimension:	For specific details of outline and mounting dimensions see PPI 82-06 Mechanical Data Handbook.



EPD DUAL OUTPUT

Model	Output #1		Output #2		Case	Size	Price	
	Volts	Amps	Volts	Amps			No-OV	W-OV
EPD1BB-5/9-15	5V	2.0A	−9 to −15V	0.5A	1BB	4¾ x 4 x 2¼	$ 52	$ 57
EPD1BB-12/15	12 to 15V	0.7A	−12 to −15V	0.7A	1BB	4¾ x 4 x 2¼	52	57
EPD7H-5	5V	3.0A	−5V	3.0A	7H	7 x 4⅞ x 2¾	70	75
EPD7H-6	6V	2.5A	−6V	2.5A	7H	7 x 4⅞ x 2¾	70	75
EPD7H-12	12V	1.7A	−12V	1.7A	7H	7 x 4⅞ x 2¾	70	75
EPD7H-15	15V	1.5A	−15V	1.5A	7H	7 x 4⅞ x 2¾	70	75
EPD7H-5/9-15	5V	3.0A	−9 to −15V	1.3A	7H	7 x 4⅞ x 2¾	70	75
EPD3D-5	5V	6.0A	−5V	6.0A	3D	9 x 4⅞ x 2¾	100	107
EPD3D-6	6V	5.0A	−6V	5.0A	3D	9 x 4⅞ x 2¾	100	107
EPD3D-12	12V	3.4A	−12V	3.4A	3D	9 x 4⅞ x 2¾	100	107
EPD3D-15	15V	3.0A	−15V	3.0A	3D	9 x 4⅞ x 2¾	100	107
EPD3D-5/9-15	5V	6.0A	−9 to −15V	2.5A	3D	9 x 4⅞ x 2¾	100	107
EPD9DD-12	12V	5.0A	−12V	5.0A	9DD	14 x 4⅞ x 2¾	130	140
EPD9DD-15	15V	5.0A	−15V	5.0A	9DD	14 x 4⅞ x 2¾	130	140
EPD4D-36	36V	4.0A	−36V	4.0A	4D	15 x 6⅛ x 5	205	220

EPT/UPS TRIPLE OUTPUT

Model	Output #1		Output #2		Output #3		Case	Size	Price	
	Volts	Amps	Volts	Amps	Volts	Amps			No-OV	W-OV
UPS 4	5V	1.0A	12V	0.25A	(−) 5-12V	0.25A	CA	4¾ x 3⅜ x 3⅜	$ —	$ 57
EPT1AA-12	5V	2.0A	12V	0.4A	−12V	0.4A	AA	6½ x 4 x 1⅝	60	72
EPT 1-24	5V	2.0A	24V	1.5A	−24V	1.5A	1BC	12 x 5⅞ x 5½	128	140
UPS 1	5V	3.0A	12V	0.6A	−12V or 5V	0.6A 0.4A	7H	7 x 4⅞ x 2¾	—	102
EPT5-12/15	5V	3.0A	12V or 15V	1.0A 0.8A	−12V or −15V or 5V	1.0A 0.8A 0.4A	1BA	10¼ x 4 x 2½	85	97
UPS 3	5V	3.0A	12V	1.2A	− 9V or 5V	1.5A 0.8A	3D	9 x 4⅞ x 2¾	—	114
EPT1-12	5V	3.0A	12V	1.5A	−12V	1.5A	3D	9 x 4⅞ x 2¾	105	117
EPT1-15	5V	3.0A	15V	1.3A	−15V	1.3A	3D	9 x 4⅞ x 2¾	105	117
EPT2-24	5V	3.0A	24V	3.0A	−24V	3.0A	2BC	12 x 6 x 6	200	220
EPT2-12	5V	6.0A	12V	1.7A	−12V	1.7A	6G	11 x 4⅞ x 2¾	128	140
EPT2-15	5V	6.0A	15V	1.5A	−15V	1.5A	6G	11 x 4⅞ x 2¾	128	140
EPT3-12	5V	6.0A	12V	3.0A	−12V	3.0A	4E	16¾ x 4⅞ x 4⅞	158	171
EPT3-15	5V	6.0A	15V	2.8A	−15V	2.8A	4E	16¾ x 4⅞ x 4⅞	158	171
UPS 2	5V	7.0A	12V	1.0A	− 9V or 5V	1.2A 0.75A	3D	9 x 4⅞ x 2¾	—	138
EPT9DD-12	5V	12.0A	12V	1.7A	−12V	1.7A	9DD	14 x 4⅞ x 2¾	150	162
EPT9DD-15	5V	12.0A	15V	1.5A	−15V	1.5A	9DD	14 x 4⅞ x 2¾	150	162
EPT4-12	5V	12.0A	12V	3.4A	−12V	3.4A	4E	16¾ x 4⅞ x 4⅞	188	208
EPT4-15	5V	12.0A	15V	3.0A	−15V	3.0A	4E	16¾ x 4⅞ x 4⅞	188	208
EPT6-12	5V	18.0A	12V	1.5A	−12V	1.5A	6BD	13 x 5 x 4¾	175	195

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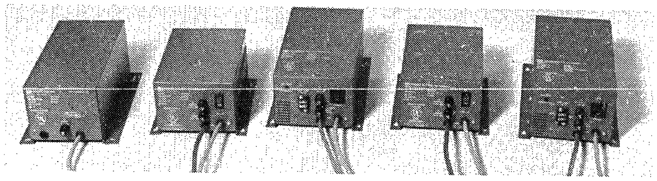
POWER PAC INC.

WALL MOUNT
BASIC AND CONSTANT VOLTAGE OUTPUT BATTERY BACK-UP AND BATTERY CHARGER



FEATURES:

- Most popular universal power sources
- Wall mount construction
- Convection cooled
- Highest quality computer grade components
- Short circuit protected
- Battery charger/back-up
- Highest efficiencies
- 24 hourn burn-in
- 10 year warranty
- UL 1012 listed
- CSA approved

SPECIFICATIONS:

Input Voltage: 117/234 VAC ±10% 60 Hz Fuse protected. Lighted on/off switch.

Regulation:	Basic DC models.	Constant Voltage models.
Line:	DC output is proportional to input line changes.	±1%
Load:	10% (20-100% load change)	5% (25-100% load change)
Ripple: (Line Frequency)	5% RMS	0.5% RMS

Efficiency: 80-90%

Operating Temperature: 0-50 C

Battery Back-Up: Battery Charger and Back-up System charges batteries at 1.5 amp maximum rate, monitors Line, DC Output and Battery voltages and will automatically switch in battery system when Line or DC Output voltage falls below specification. When fault is cleared, the Power Source will switch back to normal operation and charge batteries.

Transient Response: 50 ms for 50 to 100% load change for output to recover within rated voltage. (400 ms for constant voltage models).

Overload: 150 to 300% of rated output current for one second at turn on.

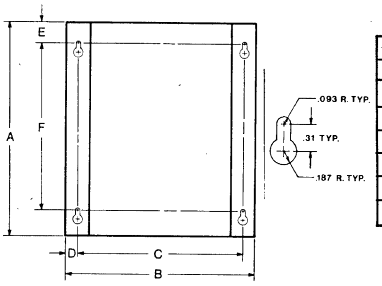
Overload Protection: Automatic current limit is inherent in constant voltage models restricting short circuit current to a safe value. Output returns to normal upon removal of overload. Basic DC output models are fuse protected.

Polarity: Isolation between primary and secondary. Positive or negative ground.

Input Connection: Standard 3-wire cord 6 ft. long. Right angle molded plug.

Output Connections: Barriers or cable.

Mounting: All models are designed for wall mounting or stand alone. All models available without cover for installation in key systems.



	KS3	KS5	KS7
	4¾″ high	5¾″ high	5¼″ high
A	9	12	12
B	7½	7½	10½
C	6¾	6¾	9¾
D	⅜	⅜	⅜
E	⅞	⅞	⅞
F	7	10	10

BASIC D.C. OUTPUT

MODEL	RATING		CASE	PRICE
KSA4-4	24 Volts DC	4.0 Amps	KS3	$170.00
KSA4-7	24 Volts DC	7.0 Amps	KS5	$265.00
KSA4-15	24 Volts DC	15.0 Amps	KS7	$340.00
KSA8-2	48 Volts DC	2.0 Amps	KS3	$170.00
KSA8-4	48 Volts DC	4.0 Amps	KS5	$265.00
KSA8-8	48 Volts DC	8.0 Amps	KS7	$340.00

BASIC DC OUTPUT WITH BATTERY BACK-UP & CONTROL CIRCUIT

KSB4-4	24 Volts DC	4.0 Amps	KS5	$230.00
KSB4-7	24 Volts DC	7.0 Amps	KS5	$325.00
KSB4-15	24 Volts DC	15.0 Amps	KS7	$400.00
KSB8-2	48 Volts DC	2.0 Amps	KS5	$230.00
KSB8-4	48 Volts DC	4.0 Amps	KS5	$325.00
KSB8-8	48 Volts DC	8.0 Amps	KS7	$400.00

CONSTANT DC OUTPUT

KSC4-4	24 Volts DC	4.0 Amps	KS3	$190.00
KSC4-7	24 Volts DC	7.0 Amps	KS5	$295.00
KSC4-15	24 Volts DC	15.0 Amps	KS7	$380.00
KSC8-2	48 Volts DC	2.0 Amps	KS3	$190.00
KSC8-4	48 Volts DC	4.0 Amps	KS5	$295.00
KSC8-8	48 Volts DC	8.0 Amps	KS7	$380.00

CONSTANT DC OUTPUT WITH BATTERY BACK-UP & CONTROL CIRCUIT

KSD4-4	24 Volts DC	4.0 Amps	KS5	$250.00
KSD4-7	24 Volts DC	7.0 Amps	KS5	$355.00
KSD4-15	24 Volts DC	15.0 Amps	KS7	$440.00
KSD8-2	48 Volts DC	2.0 Amps	KS5	$250.00
KSD8-4	48 Volts DC	4.0 Amps	KS5	$355.00
KSD8-8	48 Volts DC	8.0 Amps	KS7	$440.00

The following options are available on special order.

1. Multiple DC outputs
2. AC outputs
3. Non Standard DC outputs

Power Pac Inc. is a privately held company founded in 1971 and devoted solely to the design and manufacture of Power Sources. Our business philosophy is to produce a conservatively-designed, high-quality product at a competitive price.

In addition to our OEM product lines designed and manufactured for the Electronic Industry we have introduced a complete line of Power Sources to satisfy the Key/PBX Telephone System and Telephone Interconnected Industry. These Power Sources are UL 1012 approved for Telephone Interconnect and will meet the requirements of the FCC.

Basic DC Output models are used when the DC output voltage need not be regulated.

Constant Voltage models are used when the DC output voltage must be input line regulated and have a moderate degree of load regulation.

Higher degrees of Input line and Output load regulation may be obtained by including either Linear or Switching regulators. Consult factory for details.

Battery Charger circuits are available for all models and are designed to charge and control Back-up Battery systems. These circuits will charge at maximum rate of 1.5 amps and will maintain a trickle charge of approximately 0.5 amps. Other charge rates are available.

Included with the battery Charger is a Control Circuit that will automatically monitor the input line, the DC output voltage and the battery voltage. When the output voltage drops below a preset value due to low input line voltage or loss of input line voltage, the Control Circuit will automatically switch in the Back-Up Battery system and monitor battery voltage. When the battery voltage drops below a preset value the Control Circuit will shut the system off. When the input line voltage returns to a normal level the system will be turned on and the battery will be charged. This complete battery Back-up System is available as a separate model. Consult factory for details.

If our standard products do not fit your requirement, our experienced staff of engineers and designers are available to design to your exact requirement.

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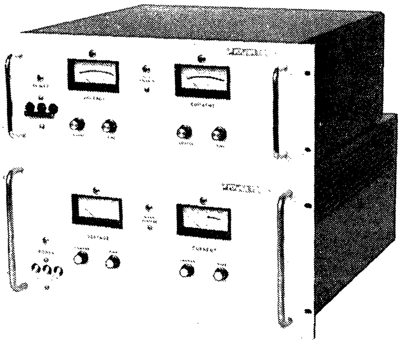
HIGH POWER SWITCHING REGULATED SUPPLIES to 5.0 kw

HIGH CURRENT-COMMERCIAL DC POWER SUPPLIES

SERIES 3500/SINGLE PHASE • SERIES 3600/THREE PHASE



FEATURES

- Lowest prices in industry
- Weighs only 45 lbs. (2.5 kw) or 75 lbs. (5.0 kw)
- Includes overvoltage protection
- 5 year warranty
- Variable voltage, constant current/constant voltage
- Fully programmable-local or remote

SERIES 3500

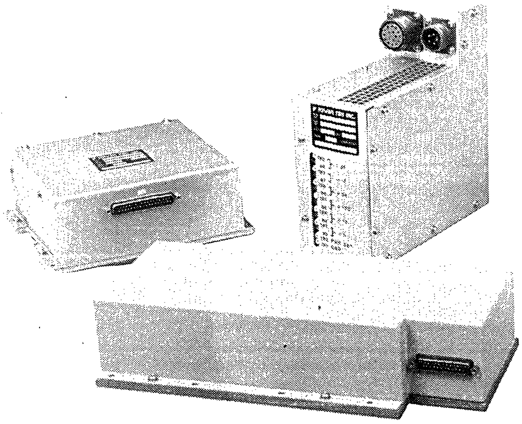
Model	Voltage (V)	Current (I)	Ripple (rms)	* Price ($)
75300	7.5	300	60mV	1695
10250	10	250	60mV	1695
20125	20	125	60mV	1695
4060	40	60	60mV	1695
6040	60	40	60mV	1695

*** Prices subject to change without notice**

SERIES 3600

Model	Voltage (V)	Current (I)	Ripple (rms)	* Price ($)
75300	7.5	300	30mV	1995
10250	10	250	35mV	1995
10500	10	500	35mV	2495
20125	20	125	30mV	1995
20250	20	250	20mV	2495
4060	40	60	15mV	1995
6040	60	40	25mV	1995

MIL-SPEC AND CUSTOM OEM



FEATURES

- Excellent reliability
- High efficiency, typically 80-85%
- High power density up to 10 watts per cubic inch
- Conduction or convection cooled
- Qualified to MIL-I-45208

Power Ten designs and manufactures a wide range of custom high power switching regulator and hybrid power supplies for military and commercial OEM end use. Since its inception in 1981, Power Ten has designed, developed, and delivered thousands of power supplies in both single and multi-output configurations and at output power levels of up to 5,000 watts. Many of these supplies are used in the most hostile of environments as experienced in airborne, shipboard and ground mobile applications.

POWER TEN INC.

486 Mercury Drive
Sunnyvale, California 94086
(408) 738-5959

Power Systems, Inc.

12 TOBEY ROAD, BLOOMFIELD, CT 06002 • (203) 243-0357
TWX #710 - 425 - 8778

Custom Designed Power Supplies

Feature: **Optimum Performance**
Systems Interface
Cost Effectiveness

Specifications

The custom designed supply provides the correct current ratings for each output voltage, at proper temperature ratings for your systems' cooling provisions. The final design is checked out under actual system operating conditions. The system designer may specify adjustment pots, in the desired location for the outputs that require this feature. Also, the custom supply can provide the exact amount of extra current for those optional "expansion" features.

Configuration Control

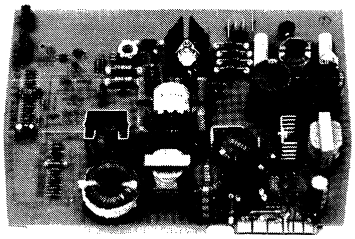
Form and fit are tailored to employ the available space in the most efficient way. We can use flat assemblies or rectangular modules, fully enclosed or open, match cabinet fittings, bend around corners and mount in any plane. It provides for functional human-engineering as well as aesthetic considerations.

Thermal Design Options

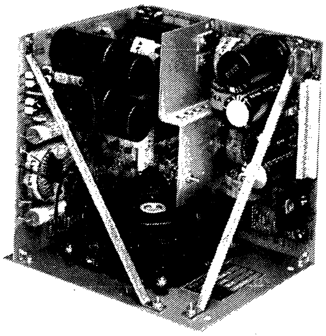
The custom supply can take maximum advantage of the cooling methods designed into the cabinet or housing. It can "sink" heat into sheet metal, or place fins in optimum convection areas. Often the supply includes a fan which ventilates the entire cabinet. 115 VAC for fans is available regardless of the input voltage used (115 or 230 VAC).

Input/Output Connections

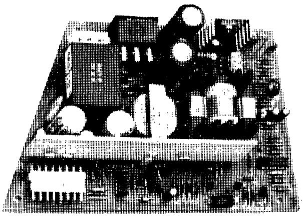
Custom designed power supplies allow the system designer to locate input and output connectors for minimum cabling and ease of assembly. Choices include plated-edge pcb or pin-type connectors, flying-lead cables, solder terminals or barrier-terminal blocks.



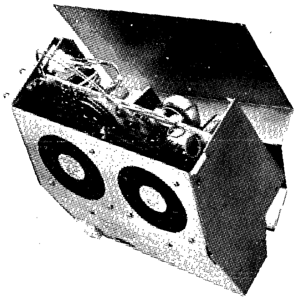
250 Watt Avg. 800 Watt Peak/
3 Output Printer Power Supply



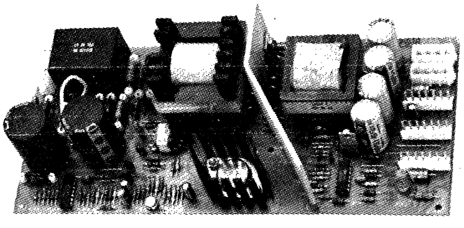
214 Watt/5 Output Ticketing Terminal



50 Watt/3 Output Terminal
Power Supply with Synch.



450 Watt/7 Output
High Speed Ticketing Terminal



150 Watt/3 Output with PFS
Multi-User Microcomputer

System Related Features

System interface logic of many types is a highly useful advantage that is easy to obtain in a custom design. Standard TTL logic may signal AC power failure, DC power failure, DC power good (one or all outputs), remote inhibit one or all outputs and remote turn-on or off. Choice of digital or analog functions to remote program an output voltage.

Example #1 Complete AC to DC power system with AC PWR Fail, DC PWR Good, Remote Sense, external inhibit and AC fan power.

Example #2 CRT terminal logic supply. To eliminate any interference with the display, we synchronize the switching frequency to the horizontal retrace.

Agency Approvals

PSI designs to meet applicable UL and CSA standards as well as FCC and VDE Safety and EMI/RFI standards. Cards listing Power Systems model numbers already approved by UL and CSA are available upon request. Several supplies have been approved by TUV Rhineland as being compliant with VDE and IEC Safety Standards.

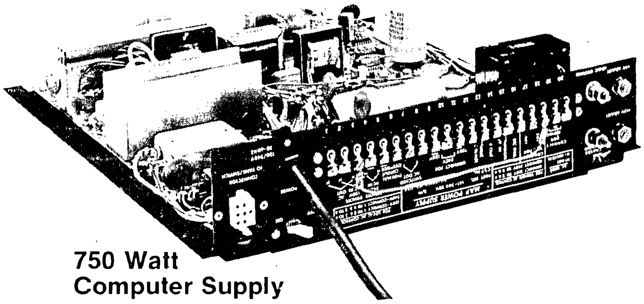
Cost Effectiveness

A higher-power rated "catalog" supply is often needed to compensate for current reduction by derating at higher temperatures. Prices often include unnecessary features. Front-end costs are generally required for a custom design program. When amortized over the total quantity for the product life, this becomes insignificant. The end result of a custom designed power supply is a form, fit and function that exactly matches the needs of the system, thereby optimizing system performance and cost.

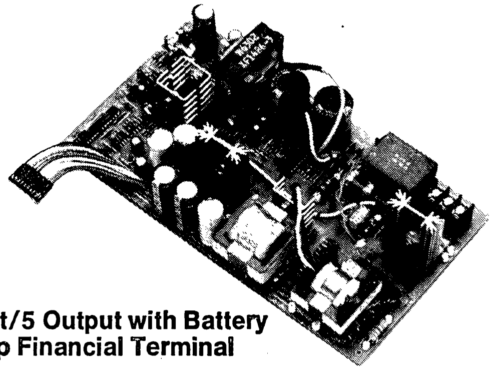
Our application engineers will be happy to assist in writing specifications, advising on configuration design or reviewing cost tradeoffs. Send for a free copy of "Guidelines for Custom Specifications" by contacting our offices or your nearest sales representative.

Power Systems, Inc.

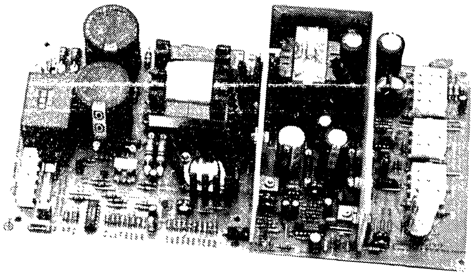
12 Tobey Road/Bloomfield, CT 06002
Area Code 203-243-0357 TWX #710-425-8778
FAX #203-242-1989



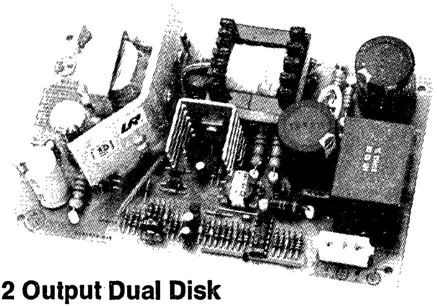
750 Watt Computer Supply



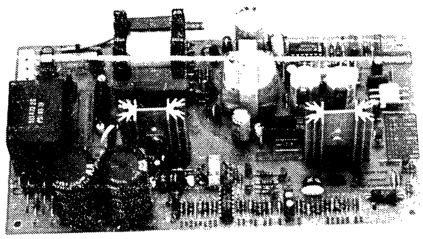
81 Watt/5 Output with Battery Backup Financial Terminal



170 Watt/3 Output IBM 3270 Compatible Controller



73 Watt/2 Output Dual Disk Power Supply

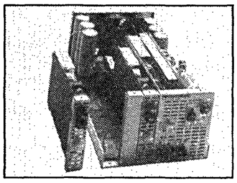


90 Watt/4 Output with Synch Terminal Power Supply

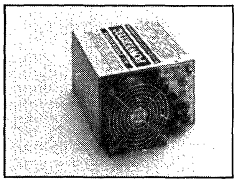
POWERTEC
The Power in DC Power Supplies

Table of Contents

Page No.

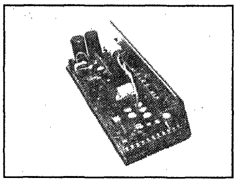


MultiMod™ – High Power Series of Multiple Output AC to DC Switching Power Supplies – 300 to 1200 Watts with Up to 7 Outputs – 2 to 48 Volts D•1783

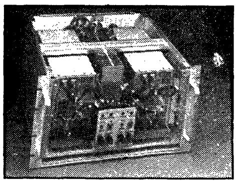


Super Switcher™ – High Power Single Output Box Switchers – 240 to 1800 Watts from 2 to 48 Volts – Over 100 Models Available D•1787

ValuSwitcher II – Application Notes D•1790



ValuSwitcher™ – Economical Series of Multiple Output AC to DC Switching Power Supplies – 44 Models from 50 to 400 Watts with Up to 6 Outputs – 2 to 48 Volts D•1793



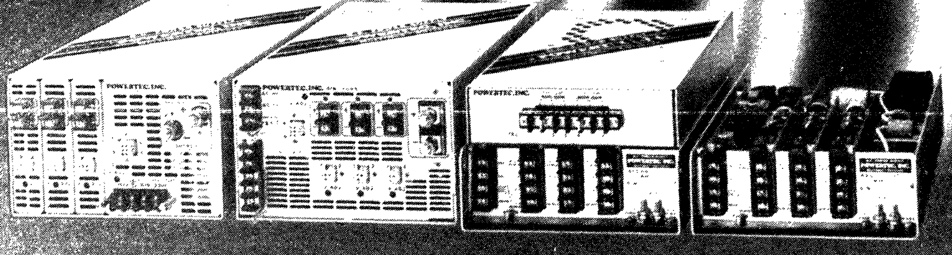
PowerSystems™ – Flexible Building Block Approach for Your Total System Requirements Using ValuSwitchers™, MultiMods™ and SuperSwitchers™ for: True Redundancy, or Up to 14 Outputs and 2400 Watts per System or Parallel Operations for High Current Requirements Up to 3400 Watts D•1797

POWERTEC
The Power in DC Power Supplies

Powertec, Inc., 20550 Nordhoff Street, Chatsworth, California 91311-6168 • (818) 882-0004 • TWX 910-494-2092

MultiMod™ Multiple Output Switching Power Supplies.

The Proven Custom Alternative.



300 to 1200 Watt Power Supplies With Up To 7 Outputs 2 to 48 VDC.

- Standard Off-The-Shelf Delivery
- VDE, IEC, CSA, UL Safety Specs
- FCC and VDE EMI Specs
- All Outputs Switching and Fully Isolated
- Field Selectable 115/230 VAC
- Efficiency Typically 75%
- Remote Sense
- Fully Regulated
- Extended Input Voltage Range: 90-132/165-265 VAC, 47-63 Hz
- Power Outputs at 50°C Derate Linearly to 50% at 70°C
- OVP with Crowbar & Inverter Shut-down
- Power Fail Signal
- Logic Inhibit
- Soft Start
- Brown Out of 85 or 160 VAC
- Reverse Voltage Protection
- 100% Burn-in
- Powertec's 19 Years of Proven Value

MultiModular Construction Using Standard Switching Plug-In Modules.

MultiMod™ is a new concept in multiple output modular switching power supplies providing an alternative to costly customs. It allows you to choose your voltage/current combinations from a large selection of standard switching power supplies and standard auxiliary output modules, and we do the rest.

The MultiMod switchers have 2 to 7 fully regulated outputs, which consist of one main output and 1 to 3 fully isolated plug-in output modules. These output modules are off-the-shelf standards which the designer can select as building blocks to provide his ideal voltage/current combinations. He is assured of dependable delivery of supplies which exactly match his unique requirements. And MultiMods operate with proven field reliability because they are put together with standard building blocks produced in high volume.

Main outputs use only pure switch mode design. All auxiliaries are also available as fully switching. Thus, the designer can be assured of maximum efficiency and minimum thermal stress. Post-linear regulated auxiliaries are also available.

Multiple outputs are available from 2 through 48 volts with modules rated from 12 to 1000 watts. Total output ratings available are 300, 400, 600, 850, 1000, and 1200 watts.

June 1985 (MM8)

POWERTEC
The Power in DC Power Supplies

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Selector Guide–Multiple Outputs

See ValuSwitcher™ Family (19 Series) For Other Multiple Output Switchers.

The MultiMod™ is a new concept in multiple output switching power supplies providing 2 to 7 outputs. A building block approach using a selection of flexible "power packages" and standard plug-in output modules provides voltage/current outputs tailored to your specific requirements. The power supply is delivered totally assembled and tested, using the output modules you have selected to meet your needs.

- Select the "power package" that meets your total output power requirements (300 to 1200 watts) by referring to the "Power Package Selector Guide."
- Select the output with the highest output power by referring to the "Main Output Selector Guide."
- Select lower power outputs (auxiliary plug-in modules) by referring to the "Auxiliary Module Selector Guides."
- Each power package accommodates one main output plus space for up to three one-space-wide auxiliary modules.
- Column Two of the "Main Output Selector Guide" indicates the quantity of one-space-wide auxiliary modules that may be used with the main output indicated.
- "Auxiliary Spaces Occupied" column of the "Auxiliary Module Selector Guide" indicates the quantity of spaces each auxiliary module occupies (1 to 3 spaces).

POWER PACKAGE SELECTOR GUIDE

Model Designation	Total Package Output Power^{1,2,3}	Max. Power^{1} 50°C		Max. No. Aux. Modules^{13}	Number of Outputs^{7}	Dimensions
		Main	Auxs^{4}			
6E	300^{5}	200^{5}	200^{5}	3	1 to 4	2.75" x 7.62" x 11.75"
6F	400	250	200	3	1 to 4	5" x 7.62" x 11.75"
6JA	600	384	250	3	1 to 6	5" x 8" x 11"
6JB	600	528	250	2	1 to 5	5" x 8" x 11"
6L	800	768	360	3	1 to 7	5" x 8" x 14.83"
6M	1000	768	360	3	1 to 7	5" x 8" x 14.83"
6MB	1200^{17}	1000	360	3	1 to 7	5" x 8" x 14.83"

MAIN OUTPUT SELECTOR GUIDE

Model No.	Auxiliary^{13} Spaces Available	Main Output Ratings				Load Regulation %	Ripple & Noise % P-P
		Volts^{16}	Amps^{1,2,3}				
			50°C	60°C	70°C		
6JA2-XXX-17	3	2	70	53	35	0.5	2.5
6JB2-XX-17	2	2	100	75	50	0.5	2.5
6L2-XXX-17	3	2	200	150	100	0.5	2.5
6M2-XXX-17	3	2	200	150	100	0.5	2.5
6E5-XXX-17	3	5	40^{5}	30^{5}	20^{5}	0.2	2.0
6F5-XXX-17	3	5	50	37	25	0.2	2.0
6JA5-XXX-17	3	5	60	45	30	0.2	1.0
6JB5-XX-17	2	5	90	68	45	0.2	1.0
6L5-XXX-17	3	5	150	113	75	0.2	1.0
6M5-XXX-17	3	5	150	113	75	0.2	1.0
6MB5-XXX-17	3	5	200^{17}	113	75	0.2	1.2
6JA12-XXX-17	3	12	28	21	14	0.2	1.0
6JB12-XX-17	2	12	42	32	21	0.2	1.0
6L12-XXX-17	3	12	62	47	31	0.2	1.0
6M12-XXX-17	3	12	62	47	31	0.2	1.0
6JA15-XXX-17	3	15	24	18	12	0.2	1.0
6JB15-XX-17	2	15	34	26	17	0.2	1.0
6L15-XXX-17	3	15	50	38	25	0.2	1.0
6M15-XXX-17	3	15	50	38	25	0.2	1.0
6JA24-XXX-17	3	24	16	12	8	0.2	1.0
6JB24-XX-17	2	24	22	17	11	0.2	1.0
6L24-XXX-17	3	24	32	24	16	0.2	1.0
6M24-XXX-17	3	24	32	24	16	0.2	1.0

AUXILIARY MODULES SELECTOR GUIDE— SINGLE OUTPUTS

Module Designation^{11}	Applicable Models^{12}	Output Ratings				Load Regulation %^{15}	Ripple & Noise % P-P	Aux. Spaces Occupied^{8}
		Volts^{16}	Amps^{1,2,3}					
			40°C	50°C	70°C			
F	6E, 6F	2	6	6	3.0	0.2	3.0	1
F	6J, 6L	2	10	10	5.0	0.2	2.5	1
F	6M	2	15	15	7.5	0.2	2.5	1
M	6J	2	45	45	23.0	0.2	2.5	Note 19
A	6E, 6F	5	6	6	3.0	0.2	2.0	1
A	6J, 6L	5	10	10	5.0	0.2	1.0	1
A	6M	5	15	15	7.5	0.2	1.0	1
B	6E, 6F	12	6	6	3.0	0.2	2.0	1
B	6J, 6L	12	10	10	5.0	0.2	1.0	1
B	6M	12	15	15	7.5	0.2	1.0	1
C	6E, 6F	15	6	6	3.0	0.2	2.0	1
C	6J, 6L	15	10	10	5.0	0.2	1.0	1
C	6M	15	15	15	7.5	0.2	1.0	1
D	6E, 6F	24	6	6	3.0	0.2	2.0	1
D	6J, 6L	24	5	5	2.5	0.2	1.0	1
D	6M	24	10	10	5.0	0.2	1.0	1
G	6E, 6F	48	3	3	1.5	0.2	2.0	1
G	6J, 6L, 6M	48	5	5	2.5	0.2	1.0	1

NOTE: 3.3 volts main outputs and auxiliary outputs are available upon request. Contact Factory.
For other notes and complete MultiMod specifications see MultiMod Brochure.

NOTES:

1. **Maximum continuous output power may not exceed the product of rated current and voltage (measured at the output terminals) specified in the Selector Guide at indicated temperatures.**
2. **Higher peak current ratings may be obtained. Contact Factory.**
3. **Maximum output power at 50°C of combined main and auxiliaries may not exceed the total package power indicated.**
4. **The combined power for all auxiliaries may not exceed power rating indicated.**
5. **Higher current and power ratings attainable with moving air (6E only).**
6. **"M" Auxiliary: Substitute "operating load current" for "rated max."**
7. **Number of outputs is determined by the output plug-in modules selected.**
8. **Numbers of spaces occupied by auxiliary module. Due to mechanical factors, 6JA and 6JB power packages are limited to no more than 2 "R" or "T" modules. Total number of outputs possible, including main, is therefore 6 and 5 outputs respectively.**
9. **Caution: Check supply to be sure of input voltage strapping, wiring or switch settings. Also see Note 18.**
10. **Class 1 Non-SELV: Meets European safety requirements except in cases where a system does not provide for grounding, or where the possibility exists that an operator (maintenance personnel excepted) can come into physical contact with the power supply or its load terminals.**
11. **The Designation only represents the voltage and current output specs provided (NOT THE LOCATION). Powertec must determine the location of the auxiliaries.**
12. **Model (Power Package) in which the auxiliary module specifications are applicable.**

June 1985 (MM8)

All specifications are subject to change without notice.

Powertec Series 6 Specifications

See SuperSwitcher™ Family (9 Series) For Single Output Switchers From 400 to 1800 Watts.

ORDER INFORMATION/SPECIFICATION
Model/Product Description—Options

Standard Options

6 J A 5-B B D-2 7 X-B C D P G 2 3 4 5-SXXXX

MultiMod™ Series Designation — 6
Package/Power — J
Additional Designation Indicated on some main outputs — A
Channel #1 Main Output Voltage 5V @ 60A — 5
Auxiliary Module[11] 12V @ 11A — B
Auxiliary Module[11] 12V @ 11A — B
Auxiliary Module[11] 24 V @ 8A — D

Custom Options & Modified Standards — SXXXX
5: Parallel Option (Contact Factory)
4: Factory Wired 230 VAC[9]
3: CSA Logo[14]
2: Reverse Fan: 6J, 6L, 6M
G: Power Good Option (6L & 6M only)
P: Ball-bearing Fan
D: Power Fail Option (all models)
C: Cover Option: Applicable to 6E only, standard on others.
B: EMI Filter– 6E, 6F, 6J meet FCC 20780 Class A. 6L and 6M (non-strappable 180-265 VAC input)[18] meet FCC 20780 Class B and VDE 0871 Class A.
X: Powertec assigned revision number when applicable.

7: INPUT VOLTAGES[9]

7. 90 to 132 VAC (47-63 Hz) and 180 to 264 VAC (47-63 Hz) field selectable: 6E, 6F, 6J, (6L, 6M)[18]

Note: For 400 Hz operation contact factory.

SAFETY SPECS (-2 or -3)

-2. Available all Models.
Meets UL 114, UL 478, UL 1012, CSA 22.2-143[14], CSA 22.2-154[14], plus the following: Class 1 Non-SELV: VDE 730[10], VDE 804[10], VDE 806[10], IEC 380[10], IEC 435[10].

Hipot–Input to Output:	**3500 VDC***	**1500 VDC****
Input to Case:	**2100 VDC***	**1500 VDC****
Output to Case:	**750 VDC***	**500 VDC****

Creepage/Clearance–Preliminary to Secondary: 3 mm
Primary to Case: 3 mm
Case Grounded, Insulation Resistance–10MΩ
Leakage–1mA (3mA with Option B @ 230 VAC)

-3.[19] Available all Models.
Meets all -2 specifications plus the following:
Class 1 SELV: VDE 730, VDE 804, VDE 806, IEC 380, IEC 435

	QUALIFICATION TYPE TEST	PRODUCTION TEST
Hipot–Input to Output:	**5300 VDC***	**1500 VDC****
Input to Case:	**2100 VDC***	**1500 VDC****
Output to Case:	**750 VDC***	**500 VDC****

Creepage/Clearance–Primary to Secondary: 8 mm
Primary to Case: 4 mm
Case Grounded, Insulation Resistance–10MΩ
Leakage–1mA (3mA with Option B @ 230 VAC)

***Qualification Type Test–May require disconnecting safety-agency-permitted components tied to case.**

****Production Test**

SAFETY and INPUT VOLTAGE (See "Order Information" above.)

AC INPUTS

Brown Out—Regulates through short term line dips to at least 85 or 160 VAC.

Inrush Current—Limited to 4X operating current to prevent nuisance tripping of protective circuit breakers and fuses.

Turn On Time—0.2 sec. max. for power up.

Undervoltage Inhibit—Protected against malfunction due to AC undervoltage operation.

DC OUTPUTS

Adjustments—(± % of nominal voltage.)
All Main Outputs: ±10%.
6J & 6M Auxiliaries; A, B, C, D, F, G: ±10%.
6J & 6M Auxiliaries; K, L, P, U, Y: +5%, −2%.
All 6E, 6F & "M" Auxiliaries: ±5%.

Line Regulation—6J, 6L, 6M: 5 mV or 0.1% over input range. 6E and 6F: ±0.2% over input range.

Load Regulation—10 mV or 0.2% at any load up to 100% of rated load with remote sense connected; 0.2 mV/amp with internal sense; auxiliary modules with internal sense are 3 mV/amp.

Dynamic Response–A step load change of ±25% of rated max.[6] will cause a max.deviation of 3%. Output will recover to within 0.1% of nominal in 400μ sec. typically.

Thermal Regulation—±0.02%/°C over operating range.

Ripple & Noise—See Selector Guide on page 2. Measured on 20 MHz scope via X1 probe having 4 inch maximum return lead.

Hold-up Time–Guaranteed at full load at 115 VAC or 230 VAC. Outputs remain within regulation following the last voltage peak for the times (msec.) indicated below:

HOLD-UP TIME vs. INPUT VOLTAGE

V_{in} Range	90-132 VAC		180-265 VAC		
VAC	90	115	180	208	230
6J, 6L, 6M HOLD-UP (msec.)	10	30	10	20	30
6E HOLD-UP (msec.)	—	20	—	—	20
6F HOLD-UP (msec.)	—	15	—	—	15

Efficiency—Exceeds 75% typically.

Loading vs. Temperature—100% rated load from 0 to 50°C. Derate linearly to 50% at 70°C.

Current Limiting—Foldback type, with automatic recovery upon removal of overload.

OVER VOLTAGE PROTECTION

OVP Inverter Shut-down (Standard)—All outputs: Initiates inverter shut-down and latches supply off. Trip point at output terminals are factory set within the following windows:

NOMINAL OUTPUT	2V	5V	12V	15V	24V	48V
TRIP WINDOW	2.8-3.2V	6.5-6.9V	14-16V	17-19V	27-29V	54-57V

Remove AC input for 30 sec. to restore operation.

OVP Crowbar–An SCR crowbar across the output terminals short circuits output to protect load against excessive voltage. 6E, 6F, 6L, 6M have crowbar on main outputs. 6E, 6F auxiliaries also have crowbar. All others have inverter shut-down.

REVERSE VOLTAGE PROTECTION

Main outputs protected up to rated load. Auxiliary outputs protected to 50% rated load.

REMOTE SENSE

Separate sense terminals will compensate for a cable drop of 0.5 VDC. (See Note 1.) Internal circuitry protects load if sense lines are opened or shorted.

Margining: Fixed internal resistors can be installed to permit adjustments up to ±10% for main power output. Contact factory regarding auxiliaries.

POWER FAIL SIGNAL

(Option)—Following the loss of AC input, a TTL compatible signal referenced to the negative terminal of the main output will change from high to low at least 2 msec. before the loss of output.

POWER GOOD SIGNAL (Standard Option of 6L and 6M)

(Option)—A TTL compatible signal referenced to the main negative output terminal will change from high to low if the output voltage deviates more than ± 4% from nominal.

LOGIC INHIBIT

6J, 6L, 6M: A TTL high signal referenced to the negative output terminal inhibits the output; a TTL low, or open input, enables the output.

6E, 6F: TTL low inhibits output.

Total Power Supply: Shut-down all outputs when main output is inhibited. Standard on all models.

Auxiliary Output: 6J, 6L, 6M: Shut-down control of individual outputs is standard.

WARRANTY—1 year

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13. Number of one-space-wide spaces available for auxiliary modules. Corresponds to "Auxiliary Spaces Occupied" column of the Auxiliary Module Selector Guide.

14. CSA logo added upon request. Powertec participates in the CSA certification program.

15. When maximum auxiliary power is being used as shown in the Power Package Selector Guide, the load on the main output must be the following minimum percentage of the "Total Package Output Power" rating at 50°C: (6E: 8%), (6F: 6.5%), (6J, 6L: 10%), (6M: 7.5%). Lacking the above, auxiliary output voltages will decrease. Less minimum power on the main is required with reduced auxiliary loads.

16. Other voltages available on special order.

17. 40°C ratings. Hold-up time is 70% of specification. Minimum low line input voltage is 5% higher than specified.

18. Unit cannot and should not be operated at any other input voltage other than 180 to 265 VAC when a "B" filter is provided internal to the supply. Add "4" option when ordering "B" filter.

19. Preliminary–Contact factory for details.

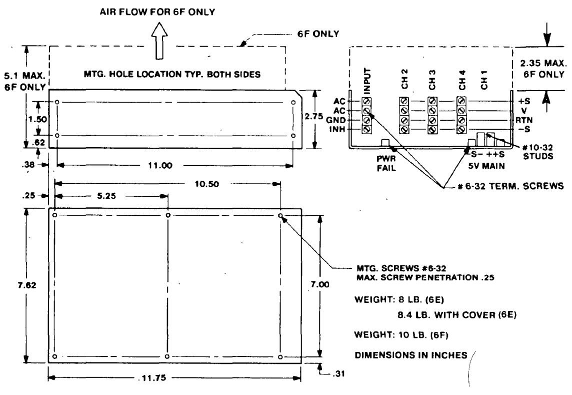
June 1985 (MM8)

Contact Factory to Obtain Powertec's Free Loose-Leaf Binder/Catalog to Which You May Add This and Other Product Brochures Which Are Published Monthly.

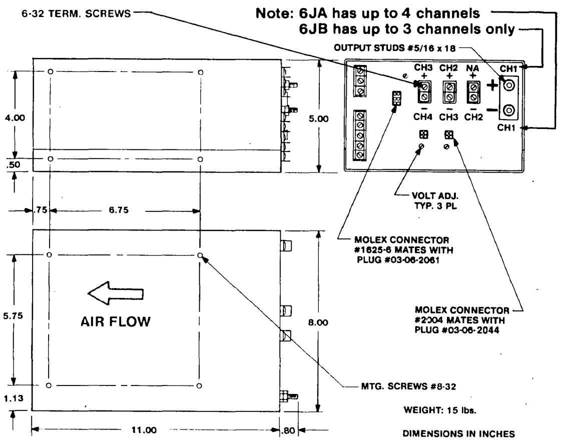
MultiMod Package Specifications

See SuperSwitcher™ Family (9 Series) For Single Output Switchers From 400 to 1680 Watts.
See ValuSwitcher™ Family (19 Series) For Other Multiple Output Switchers From 50 to 400 Watts.

MODEL 6E/6F

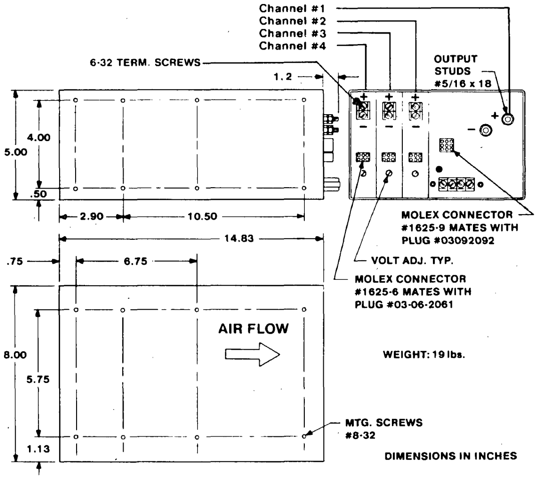

AIR FLOW FOR 6F ONLY
6F ONLY
5.1 MAX. 6F ONLY
MTG. HOLE LOCATION TYP. BOTH SIDES
1.50
.62
.38
11.00
2.75
AC
AC
GND
INH
INPUT
CH 2
CH 3
CH 4
CH 1
2.35 MAX. 6F ONLY
+S
V
RTN
-S
#10-32 STUDS
PWR FAIL
-S- ++S 5V MAIN
#6-32 TERM. SCREWS
10.50
.25
5.25
7.62
7.00
11.75
.31
MTG. SCREWS #6-32
MAX. SCREW PENETRATION .25
WEIGHT: 8 LB. (6E)
8.4 LB. WITH COVER (6E)
WEIGHT: 10 LB. (6F)
DIMENSIONS IN INCHES

MODEL 6JA/6JB


6-32 TERM. SCREWS
Note: 6JA has up to 4 channels
6JB has up to 3 channels only
OUTPUT STUDS #5/16 x 18
CH3 CH2 NA CH1
CH4 CH3 CH2
CH1
4.00
5.00
.50
.75
6.75
VOLT ADJ. TYP. 3 PL
MOLEX CONNECTOR #1625-6 MATES WITH PLUG #03-06-2061
AIR FLOW
5.75
8.00
MOLEX CONNECTOR #2004 MATES WITH PLUG #03-06-2044
MTG. SCREWS #8-32
1.13
11.00
.80
WEIGHT: 15 lbs.
DIMENSIONS IN INCHES

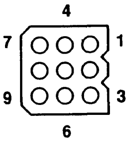
NOTE: The locations for the specified auxiliaries must be determined by Powertec.

MODEL 6L/6M


Channel #1
Channel #2
Channel #3
Channel #4
6-32 TERM. SCREWS
1.2
OUTPUT STUDS #5/16 x 18
4.00
5.00
.50
2.90
10.50
14.83
.75
6.75
MOLEX CONNECTOR #1625-9 MATES WITH PLUG #03092092
VOLT ADJ. TYP.
MOLEX CONNECTOR #1625-6 MATES WITH PLUG #03-06-2061
AIR FLOW
8.00
5.75
WEIGHT: 19 lbs.
MTG. SCREWS #8-32
1.13
DIMENSIONS IN INCHES

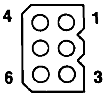
6L/6M MAIN

FUNCTION JACK (MOLEX) PIN-OUTS



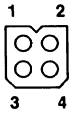
1. +Sense
2. Program
3. Program
4. −Sense
5. N/C
6. Inhibit
7. N/C
8. N/C
9. N/C

6J MAIN, 6L/6M AUXILIARIES



1. +Sense
2. Program
3. Program
4. −Sense
5. N/C
6. Inhibit

6J AUXILIARIES



1. +Sense
2. −Sense
3. Inhibit
4. N/C

Contact Factory to Obtain Powertec's Free Loose-Leaf Binder/Catalog to Which You May Add This and Other Product Brochures Which Are Published Monthly.

June 1985 (MM8)

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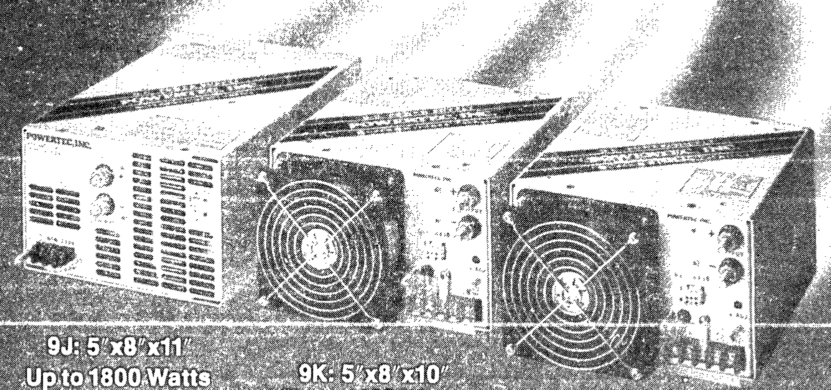
SuperSwitcher™
The Proven Industry Standard In Switching Power Supplies



9J: 5″x8″x11″
Up to 1800 Watts

9K: 5″x8″x10″
Up to 1100 Watts

9N: 5″x8″x10″
Up to 800 Watts

Single and Multiple Outputs
240 to 1800 Watts
2 to 48 VDC—124 Models

- Class I SELV Approved*: VDE 730, VDE 804, VDE 806
- Class I SELV Approved*: IEC 380, IEC 435
- CSA Certified*: CSA 22.2-143, CSA 22.2-154
- UL Recognized*: UL 114, UL 478, UL 1012
- FCC & VDE EMI Specs
- 115/230 Field Strappable
- All Outputs Switching
- Full Power Outputs at 50°C
- Automatic Thermal Shut-down Protection
- Remote Sense
- Fully Regulated and Fully Isolated Outputs
- Extended Input Voltage Range: 90-132 VAC & 165-265 VAC, 47-63 Hz
- Brown Out Below 85 or 160 VAC
- Efficiency Typically 75%
- OVP with Crowbar & Inverter Shut-down
- Input Power Fail Signal
- Inhibit—Logic High or Low
- Soft Start
- Reverse Voltage Protection
- 100% Dynamic Burn-in: AC cycled on & off, Full load to no load to short circuit cycling
- Standard Off-The-Shelf Delivery
- Powertec's 20 Years of Proven Value

VDE & IEC Approved to Class I SELV*
CSA Certified*
UL Recognized*

SuperSwitcher is a Powertec first, originally developed over twelve years ago. It is the most second-sourced high power switching power supply on the market. Today, we are delivering fourth generation product.

It's grown to a series consisting of more than 120 models, with both single and multiple outputs, ranging from 2 to 48 volts, and 240 to 1800 watts. Most models are the 5″ x 8″ x 10″ fan cooled box.

Reconfigured to meet the Safety Extra Low Voltage (SELV) requirements of the tough European safety specifications, the new 9N & 9K models are setting new standards of performance for high power switchers. The new designs offer 8mm spacing and 5300 VDC hipot capability. Add to this optional internal EMI filters to meet either FCC or VDE noise specifications in a 5″ x 8″ x 10″ package, and you can see how Powertec is leading the way. Need more power? Just give us 1″ and you can have the 9J, a real brute, dependably delivering up to 1800 watts in a 5″ x 8″ x 11″ package. With a host of standard features and standard options, of course.

Too good to be true? Not from Powertec. We deliver. We set the standard for others to copy. But then, that's what creating a standard is all about.

* Most Models

June 1985 (SS11)

POWERTEC
The Power in DC Power Supplies

Powertec, Inc., 20550 Nordhoff Street, Chatsworth, California 91311-6168 • (818) 882-0004 • TWX 910-494-2092

Selector Guide–Single Outputs

See MultiMod™ Family (Series 6) For Multiple Output Switchers To 1200 Watts.

MODEL NUMBER[2]	OUTPUT RATINGS[1]				LOAD REGULATION ±%	RIPPLE & NOISE % P-P
		MAX. AMPS @				
	VOLTS	50°C	60°C	70°C		
2 VOLT SINGLE OUTPUT						
9N2-120-27	2	120	90	60	0.5	2.5
9N2-160-27	2	160	120	80	0.5	2.5
9N2-200-27	2	200	150	100	0.5	2.5
9K2-300-27	2	300	225	150	0.5	2.5
9J2-400-23T[11]	2	400[11]	300[11]	200[11]	0.5	2.5
3.3 VOLT SINGLE OUTPUT						
9N3-120-27	3.3	120	90	60	0.3	1.5
9N3-160-27	3.3	160	120	80	0.3	1.5
9N3-200-27	3.3	200	150	100	0.3	1.5
9K3-270-27	3.3	270	200	135	0.3	1.5
9J3-400-23	3.3	400[11]	300[11]	200[11]	0.3	1.5
5 VOLT SINGLE OUTPUT						
9N5-90-27	5	90	68	45	0.2	1.0
9N5-120-27	5	120	90	60	0.2	1.0
9N5-150-27	5	150	113	75	0.2	1.0
9K5-200-27	5	200	150	100	0.2	1.0
9J5-300-23	5	300	225	150	0.2	1.0
9J5-360-23-T[16]	5	360 @ 40°C		180	0.2	1.2
12 VOLT SINGLE OUTPUT						
9N12-40-27	12	40	30	20	0.2	1.0
9N12-50-27	12	50	38	25	0.2	1.0
9N12-62-27	12	62	47	31	0.2	1.0
9K12-90-27	12	90	68	45	0.2	1.0
9J12-130-23	12	130	98	65	0.2	1.0

MODEL NUMBER	OUTPUT RATINGS[1]				LOAD REGULATION ±%	RIPPLE & NOISE % P-P
		MAX. AMPS @				
	VOLTS	50°C	60°C	70°C		
15 VOLT SINGLE OUTPUT						
9N15-32-27	15	32	24	16	0.2	1.0
9N15-40-27	15	40	30	20	0.2	1.0
9N15-50-27	15	50	38	25	0.2	1.0
9K15-70-27	15	70	53	35	0.2	1.0
9J15-105-23	15	105	79	53	0.2	1.0
24 VOLT SINGLE OUTPUT						
9N24-20-27	24	20	15	10	0.2	1.0
9N24-26-27	24	26	20	13	0.2	1.0
9N24-32-27	24	32	24	16	0.2	1.0
9K24-45-27	24	45	34	23	0.2	1.0
9J24-70-23	24	70	53	35	0.2	1.0
28 VOLT SINGLE OUTPUT						
9N28-17-27	28	17	13	9	0.2	1.0
9N28-22-27	28	22	17	11	0.2	1.0
9N28-28-27	28	28	21	14	0.2	1.0
9K28-38-27	28	38	29	19	0.2	1.0
9J28-60-23	28	60	45	30	0.2	1.0
48 VOLT SINGLE OUTPUT						
9N48-10-27	48	10	8	5	0.2	1.0
9N48-13-27	48	13	10	7	0.2	1.0
9N48-16-27	48	16	12	8	0.2	1.0
9K48-23-27	48	23	18	12	0.2	1.0
9J48-36-23	48	36	27	18	0.2	1.0

Other voltages may be available upon request.

ORDER INFORMATION/SPECIFICATION
Model/Product Description—Options

Standard Options[8,13]

9 N 5 - 1 5 0 - 3 7 X - J B D G A L V T M P W - 2 3 4 5 8 SXXXX

SuperSwitcher Designation
Package/Power
Output Voltage
Output Current

SAFETY SPECS (-1, -2 or -3)

-1. Available in the 9J, 9K and 9N
Meets UL 114, UL 478, UL 1012, CSA 22.2-143, CSA 22.2-154

	QUALIFICATION TYPE TEST[9]	PRODUCTION TEST
Hipot—Input to Output:	2100 VDC	1500 VDC
Input to Case:	2100 VDC	1500 VDC
Output to Case:	750 VDC	500 VDC

Creepage/Clearance—Primary to Secondary: 2.4 mm
Primary to Case: 2.4 mm
Case Grounded, Insulation Resistance—10MΩ
Leakage—1mA (3mA with Option B or F at 230 VAC)

-2. Available in the 9J, 9K and 9N
Meets all -1 specifications plus the following:
Class I non-SELV: VDE 730[4], VDE 804[4], VDE 806[4], IEC 380[4], IEC 435[4]

	QUALIFICATION TYPE TEST[9]	PRODUCTION TEST
Hipot—Input to Output:	3500 VDC	1500 VDC
Input to Case:	2100 VDC	1500 VDC
Output to Case:	750 VDC	500 VDC

Creepage/Clearance—Primary to Secondary: 3 mm
Primary to Case: 3 mm
Case Grounded, Insulation Resistance—10MΩ
Leakage—1mA (3mA with Option B or F at 230 VAC)

-3. **Available in the 9J[3], 9K and 9N**
Meets all -1 and -2 specifications plus the following:
Class I SELV: VDE 730, VDE 804, VDE 806, IEC 380, IEC 435

	QUALIFICATION TYPE TEST[9]	PRODUCTION TEST
Hipot—Input to Output:	5300 VDC	1500 VDC
Input to Case:	2100 VDC	1500 VDC
Output to Case:	750 VDC	500 VDC

Creepage/Clearance—Primary to Secondary: 8 mm
Primary to Case: 4 mm
Case Grounded, Insulation Resistance—10MΩ
Leakage—1mA (3mA with Option B or F at 230 VAC)

Custom Options and Modified Standard
8: 12 Pin Molex Connector (J1)[18]: 9J, 9K, 9N
5: Parallel Option[5]: 9J, 9K, 9N
4: Factory Wired 230 VAC: 9J, 9K, 9N
3: CSA Logo: 9J, 9K, 9N
2: Reverse Fan: 9J, 9K, 9N
W: Current Sharing[5]: 9K, 9N
P: Ball-bearing Fan: 9J, 9K, 9N
M: Margining: 9J[21], 9K, 9N
T: Multiple Studs: 9J, 9K, 9N (see package drawing)
V: Inhibit—Logic Low: 9J[21], 9K, 9N
L: Surge Current Limit: 9K, 9N (standard in 9J)
A: OVP Crowbar: 9J, 9K, 9N (see J option)
G: Output Good/Input Power Fail, Combination Option: 9J[21], 9K, 9N (see J option)
D: Input Power Fail: 9J[21], 9K, 9N (see J option)
B: EMI Filter (B or F):
  B. FCC 20780 Class A: 9J[6], 9K, 9N.
  F. VDE 0871 Class A and FCC 20780 Class A: 9K[6], 9N[6], (9J requires external filter).
J: Input Power Fail—Output Good—OVP Crowbar combined into a single option for the 9J[21], 9K and 9N models.

Note: VDE 0871 Class B or FCC 20780 Class B—all models require external filter.

Powertec assigned revision number when applicable.

INPUT VOLTAGES[12,20] (3 or 7)

3. 165 to 265 VAC (43-63 Hz)[7]: 9J[16], 9K, 9N
7. 90 to 132 VAC (47-63 Hz)[7] and 180 to 264 VAC (47-63 Hz)[7] field selectable: 9J (except 9J5-360[16]), 9K, 9N.

June 1985 (SS11)

NOTES: SuperSwitcher (Series 9) only.

1. Maximum output power may not exceed the product of rated current and voltage specified in the Selector Guide as measured at the output terminals.
2. Most readily available. Other models available on special order.
3. Preliminary, contact factory for details.
4. Class 1 non-SELV: Meets European safety requirements except in cases where a system does not provide for grounding, or where the possibility exists that an operator (maintenance personnel excepted) can come into physical contact with the power supply or its load terminals.
5. 9K or 9N: Current Sharing (W option) is accomplished by connecting J1 Molex-sense pins between supplies and separately connecting current sharing (CS) pins between supplies. 9J, 9K or 9N: Overload knee is factory set to 100% of rated load for parallel operation (5 option), no Molex connections required. Whenever the "5" option is ordered, the supply will

All specifications are subject to change without notice.

Powertec Series 9 Specifications

See ValuSwitcher™ Family (Series 19) for 50 to 400 Watt Multiple Output Switchers

INPUT VOLTAGE (See "Order Information/Specification"—Page 2.)

SAFETY (See "Order Information/Specification"—Page 2.)

AC INPUT

Brown Out–Regulates through short term line dips to at least 85 or 160 VAC.

Inrush Current–For units (9K, 9N) that have been off for 0.5 hour the maximum inrush current is less than 4x the operating current.

Surge Current Limit (Standard: 9J. Option: 9K, 9N)–Limits inrush current to the maximum steady state line current. See Options–Page 2.

Turn On Time–0.2 sec. max. for power up of standard unit. 1 sec. max. with surge current option.

Undervoltage Inhibit–Protected against malfunction due to AC undervoltage operation.

DC OUTPUT

Adjustment–Output adjustable ±10% of nominal voltage. Initial setting to ±1% of nominal voltage.

Line Regulation–5mV or 0.1% over input range.

Load Regulation–10mV or 0.2% at any load up to 100% of rated load with remote sense connected; less than 1% with internal sense.

Dynamic Response–A step load change of ±25% of rated max. will cause a max. deviation of 3%. Output will recover to within 0.1% of nominal in 400μ sec. typically.

Thermal Regulation–±0.02%/°C over operating range.

Ripple and Noise–1% or 50 mV, whichever is greater, P-P maximum measured on 20 MHz scope via X1 probe having 4 inch maximum return lead.

Hold-up Time–Fully loaded outputs remain within regulation for 30 msec. minimum following the last line voltage peak, measured from either 115 VAC or 230 VAC. Other typical values of hold-up are noted below:

HOLDUP TIME vs. INPUT VOLTAGE (except for models indicated in note 17)

V_{in} RANGE	90-132 VAC		165-265 VAC			
NOMINAL VAC	90	115	165	180	208	230
HOLDUP (msec.)	10	30	5	10	20	30

Efficiency–Exceeds 75% typically.

Loading vs. Temperature–100% rated load from 0-50°C. Derate linearly to 50% at 70°C.

Current Limiting–Foldback type, factory set at 105% to 125% of nominal, with automatic recovery (except for 2 volt outputs) upon removal of overload. Short circuit current limited to 10 to 50% (60% for 2V output) of rated load current. For parallel operation see Note 5 and Option 5–Page 2.

OVER VOLTAGE PROTECTION

OVP Inverter Shut-down (Standard)—Initiates inverter shut-down and latches supply off. Trip point at output terminals are factory set within the following windows:

NOMINAL OUTPUT	2V	3.3V	5V	12V	15V	24V	28V	48V
TRIP WINDOW	2.8-3.2V	4.5-5.0V	6.5-6.9V	14-16V	17-19V	27-29V	31-33V	54-57V

OVP Crowbar (Option)—An SCR crowbar across the output terminals short circuits output to protect load against excessive voltage. Remove AC input for 30 sec. to restore operation.

REVERSE VOLTAGE PROTECTION

Output protected up to rated load.

REMOTE SENSE

Separate sense terminals will compensate for a cable drop of 0.5 VDC. (See Note 1.) Internal circuitry protects load if sense lines are opened, shorted or reversed.

REMOTE OUTPUT PROGRAMMING

An external potentiometer, or resistors, or an external voltage source may be connected for remote control of output voltage. See Note 22.

MARGINING

(M Option)—Permits fixed step adjustment of output voltage by ± 10% minimum. See Note 22.

INHIBIT—LOGIC HIGH

(Standard)—A TTL high signal referenced to the negative output terminal inhibits the main DC output. A TTL low or open input enables the output. Input to J1-6.

INHIBIT—LOGIC LOW

(V Option)—A TTL low signal referenced to the negative output terminal inhibits the main DC output. A TTL high or open input enables the output. Input to J1-6.

EMI (See Standard Option "B" or "F"—Page 2.)

INPUT POWER FAIL SIGNAL

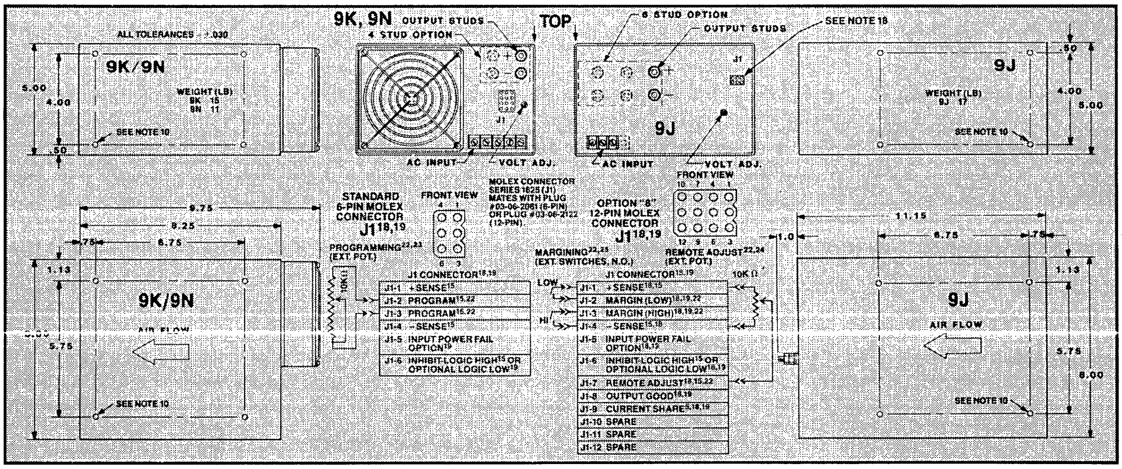
(D, G or J Option)—Following the loss of AC input, a TTL compatible signal referenced to the negative output terminal will change from high to low typically 5 msec. (but not less than 2 msec.) before the loss of output. Signal on J1-5.

OUTPUT GOOD SIGNAL

(G or J Option)—A TTL compatible signal referenced to the negative output terminal will change from high to low if the output voltage deviates more than ± 3 to 5% from nominal. Signal on J1-8.

WARRANTY—1 year.

June 1985 (SS11)


ALL TOLERANCES ± .030
9K, 9N
OUTPUT STUDS
4 STUD OPTION
TOP
6 STUD OPTION
OUTPUT STUDS
SEE NOTE 18
9K/9N
WEIGHT (LB)
9K 15
9N 11
SEE NOTE 10
5.00
4.00
.50
J1
AC INPUT
VOLT ADJ.
9J
AC INPUT
VOLT ADJ.
9J
WEIGHT (LB)
9J 17
SEE NOTE 10
.50
4.00
5.00
9.75
8.25
.75
6.75
STANDARD 6-PIN MOLEX CONNECTOR J1[18,19]
FRONT VIEW
4 1
6 3
MOLEX CONNECTOR SERIES 1625 (J1) MATES WITH PLUG #03-06-2061 (6-PIN) OR PLUG #03-06-2122 (12-PIN).
OPTION "8" 12-PIN MOLEX CONNECTOR J1[18,19]
FRONT VIEW
10 7 4 1
12 9 6 3
PROGRAMMING[22,23] (EXT. POT.)
10K Ω
J1 CONNECTOR[18,19]
J1-1 +SENSE[15]
J1-2 PROGRAM[15,22]
J1-3 PROGRAM[15,22]
J1-4 −SENSE[15]
J1-5 INPUT POWER FAIL OPTION[19]
J1-6 INHIBIT-LOGIC HIGH[15] OR OPTIONAL LOGIC LOW[19]
MARGINING[22,23] (EXT. SWITCHES, N.O.)
LOW
HI
REMOTE ADJUST[22,24] (EXT. POT.)
10K Ω
J1 CONNECTOR[18,19]
J1-1 +SENSE[18,15]
J1-2 MARGIN (LOW)[18,19,22]
J1-3 MARGIN (HIGH)[18,19,22]
J1-4 −SENSE[15,18]
J1-5 INPUT POWER FAIL OPTION[18,19]
J1-6 INHIBIT-LOGIC HIGH[15] OR OPTIONAL LOGIC LOW[18,19]
J1-7 REMOTE ADJUST[18,15,22]
J1-8 OUTPUT GOOD[18,19]
J1-9 CURRENT SHARE[5,18,19]
J1-10 SPARE
J1-11 SPARE
J1-12 SPARE
1.13
9K/9N
AIR FLOW
5.75
SEE NOTE 10
11.15
1.0
6.75
.75
1.13
9J
AIR FLOW
5.75
8.00
SEE NOTE 10

Notes–continued (SuperSwitcher only)

stay within regulation specification with up to 90% of maximum output current rating. 9J, 9K or 9N: Consult factory for complete specifications when paralleling. OVP Crowbar ("A" option) cannot be provided when either the "W" or "5" options are ordered.

6. **To be used with models that are operated with input voltages between 165-265 VAC only (47-63 Hz).**
7. **May operate to 400 Hz on special order.**
8. **Letters and numbers will be put in alphabetical/numerical order for marking and ordering purposes.**
9. **May require disconnecting safety-agency-permitted components tied to case.**
10. **Preferred mounting on 3 surfaces (bottom and two sides). Top mounting is also provided on 9K/9N models only. Use mtg. screws #8-32 UNC typ. max. penetration 0.200".**

Continued on next page

Contact Factory to Obtain Powertec's Free Loose-Leaf Binder/Catalog to Which You May Add This and Other Product Brochures Which Are Published Monthly.

Powertec ValuSwitcher II-Series 29-Application Notes

New 300-Watt Multi-Output Switcher Provides Unprecedented Flexibility And Utility

Unique current-mode design yields multiple floating outputs that can be paralleled with each other or with similar outputs on other supplies to increase power or for automatic true redundant-mode operation.

Although not the first multiple-output switcher with isolated outputs, the new Model 29D from Powertec is the first supply to combine isolation with automatic load sharing that permits the outputs to be wired in series or parallel. Moreover, the auxiliary outputs of this latest addition to Powertec's ValuSwitcher II series can be directly wired in parallel with other auxiliary outputs of the same voltage in the same power supply, or with all corresponding outputs in other Model 29D switchers.

The benefits that derive from this capability are limited only by the imagination of the user. For example, a small system can be shipped with one Model 29D and one or more added at a later date by the user as the system expands. This means the OEM no longer needs to bear the expense of a supply powerful enough to handle the load presented by a full-configured system when shipping a minimally-configured system. Furthermore, OEM's needing mid-power supplies with up to eight regulated outputs can often install two Model 29D switchers for less cost than a custom multiple-output supply.

Alternatively, a system can be supplied with two or more Series 29 supplies operating at less than their maximum ratings. In this redundant-mode operation, if one fails, the others carry the load. Additionally, Model 29D switchers can be provided with *built-in isolation diodes* for true redundant-mode operation.

At power levels in the kilowatt range, the value of this ability to form a redundant system is even greater. Redundant systems must protect against the loss of only one of its members. Thus, the maximum load that each supply must carry is equal to the total load multiplied by the reciprocal of one less than the number of supplies in the system. In a four-unit system, for example, the load carried by each supply will increase by one-third if one fails. This means that each can be safely operated at three-fourths of its maximum rating.

With convection cooling at 50°C, the Model 29D is rated at 200 watts. But with 200 linear feet per minute of forced air cooling, the rating increases by 50 percent to 300 watts. Four Model 29D switchers in parallel, therefore, have an installed capacity of 1200 watts and/or can form a 1 of 4 redundant system able to support a 900 watt load. By comparison, in a 2-unit system of equal power, each supply would have to

Continued

Notes—continued (SuperSwitcher only)

11. **Ratings with an input voltage of 180 VAC. 165 VAC requires 10% derating.**
12. **Caution: Check supply to be sure of proper input voltage strapping, wiring, or switch settings.**
13. **Standard options—Availability varies based upon combination desired.**
14. **Order as separate option (see Note 5).**
15. **Standard feature automatically included in this configuration.**
16. **Same as 9J5-300 with the following additionally specified differences:**
    Input Voltage—180 to 265 VAC
    Ripple and Noise—50mV
    Derate output current linearly from 40°C to 70°C.
    See Note 17 also.
17. **Holdup Time: 9J models specified to operate with 115 VAC (-X7) = 28 msec. min. @ 115 VAC input. 9J models specified by Powertec to have max. power rating of over 1700 watts = 27 msec. @ 115 VAC input (115 VAC input models), or @ 230 VAC (230 VAC input models).**
18. **The 12-pin Molex connector (J1) should be ordered/used whenever possible as it is the most available/popular model. Include an "8" in the model number to obtain this configuration. The 12-pin Molex (Option "8") will automatically be provided when features/options are ordered which are not available on the 6-pin (J1) configuration.**
19. **Optional functions noted by each connector pin may not be provided unless specifically indicated in the model number when ordering. However, Powertec reserves the right to include options beyond which are ordered. Powertec, at its option may provide both the 6-pin and 12-pin Molex connectors on units shipped regardless of model number ordered.**
20. **Power line source impedance should be less than 0.04 ohms.**
21. **This option is available. However, contact factory to determine whether a combination of required options may be accommodated.**
22. **Only one function (Margining, Program, or Remote Adjust may be used. The other two functions must be left open (no wire connections). Resistor values shown are typical for a 5-volt supply and are subject to change. Please contact factory for other supply voltages.**
23. **To use Programming, set ext. pot. to maximum resistance, then adjust output voltage level to approximately +10% of nominal. Set output level to nominal via ext. pot. Output can now be varied via this pot. The leads to the pot. should be twisted.**
24. **To use the Remote Adjust, adjust ext. pot. to approximately midpoint resistance until output level is at nominal. Use pot. to remotely adjust output ±from nominal. Leads to pot. should be twisted.**
25. **To use Margining, connect external N.O. switches as shown. When the "Low" switch is closed, the output level will shift approx. 10% lower than nominal. The "Hi" switch closure will cause a +10% shift in output level. Only one switch should be closed at any time. Both switches should be open for normal operation. Leads to switches should be twisted.**

June 1985 (SS11)

POWERTEC

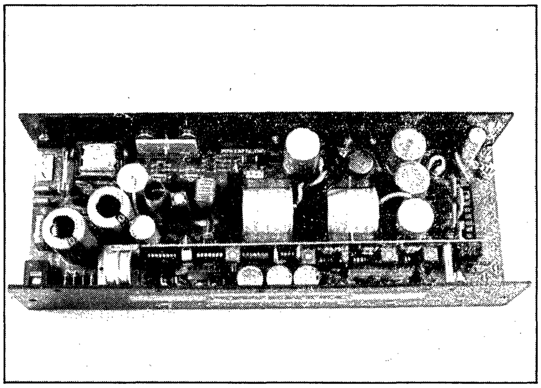
The Power in DC Power Supplies

Powertec, Inc., 20550 Nordhoff Street, Chatsworth, California 91311-6168 • (818) 882-0004 • TWX 910-494-2092

Powertec ValuSwitcher II-Series 29-Application Notes

carry the full 900 watt load if the other failed and thus the pair would represent a rated capacity of 1800 watts. Even if the dollar-per-watt cost did not increase as power increased, the cost of an 1800 watt system (with two supplies) would be significantly more than that of a 1200 watt system (with 4 Model 29D's).

Installing additional Model 29D switchers in a system or replacing units in the field has been greatly simplified by the use of quick-disconnect connectors for all leads but the main output which, because of the high current involved, requires stud terminals. The auxiliary outputs are provided through a jack that mates with a standard AMP Model 207396-1 connector. All of the sensing and control input and output signals are provided through an on-board jack that mates with a standard AMP Model 499933-6, 26-pin ribbon cable connector. Even the AC input-power connections are made through a standard three-conductor jack, which mates with a Molex Model 09-50-3051 connector. However, barrier strips for the AC input and auxiliary outputs can be provided on special order for those customers preferring screw terminals.



These connectors significantly simplify installation and eliminate the time that would be wasted manually attaching leads to a terminal strip. Over the course of a day, this will substantially reduce the cost of electrical testing during incoming inspection and integration into the end product/system.

The operating flexibility of the Model 29D extends to its output configuration as well. The main output and three of the auxiliary outputs are fully regulated and maintain their voltage to within ±0.2% for variations in line and/or load. With each output fully regulated, there are no cross-regulation problems to worry about. As a multiple-output unit, the supply might be configured to provide a 5-volt main output combined with three auxiliary outputs providing any combination of 5, 12, 15 or 24 volts. To improve efficiency, when tight regulation is not required (e,g., motors, solenoids, relays, etc.), a fifth output is provided, quasi regulated to ±2.5%.

An interesting feature of the Model 29D is its active preload circuit. The active preload option insures that the auxiliary outputs will operate within spec. when the main output is lightly loaded. Unlike conventional preloads, however, this one automatically disconnects when the main load current rises above the minimum threshold level. This means that power is not unnecessarily wasted in the preload circuit.

The main output can deliver up to 200 watts with forced-air cooling, and 150 watts with convection cooling at 50°C. The maximum power that can be provided by each of the regulated auxiliaries is a function of the output voltage and the maximum permissible regulator current. One auxiliary output can supply up to 5 amps with the other two supplying 3 amps each. The semi-regulated fifth output can provide 12 volts at 6 amps continuous and 9 amps peak, or 24 volts at 4 amps continuous and 7 amps peak. All of these individual output ratings are, however, limited by the supply's overall power rating.

Each output, being fully isolated and floating, can be used as a source of either positive or negative voltage. This means that a single supply can serve, for example, as either a source of ±5 and ±12 volts or 5 volts at a higher current level and two independent, isolated sources of 12 volts. As a result, the number of mid-range power-supply models an OEM must carry in inventory can be drastically reduced.

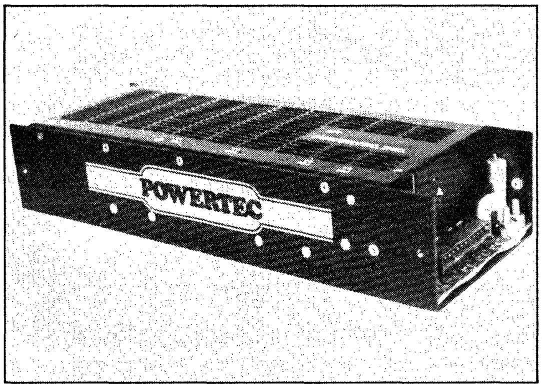
Provisions have also been made to derive another regulated output from the semi-regulated fifth output. Since this sixth output option is a derivative of the fifth, its polarity tracks the polarity of the fifth output. Also, since the sixth output is post regulated, its output voltage must be 2.5 volts lower than that of the fifth.

Overvoltage protection on the main output is provided via automatic inverter shutdown. A crowbar option is also available. Crowbar protection is standard on each of the regulated auxiliary outputs. Foldback current limiting protects against short circuits and overcurrent conditions on all the regulated outputs. The fifth output is electronically

Continued on next page

Powertec ValuSwitcher II-Series 29-Application Notes

current limited. All outputs are also protected against reverse polarity. The supply is automatically latched off when chassis heatsink temperature exceeds 90°C. Recovery will occur with return to safe temperature levels and upon recycling of the AC input. An interesting feature of the Model 29D is that an impending thermal shutdown is signaled by the "Input Power Fail" output typically 8 milliseconds before it occurs.



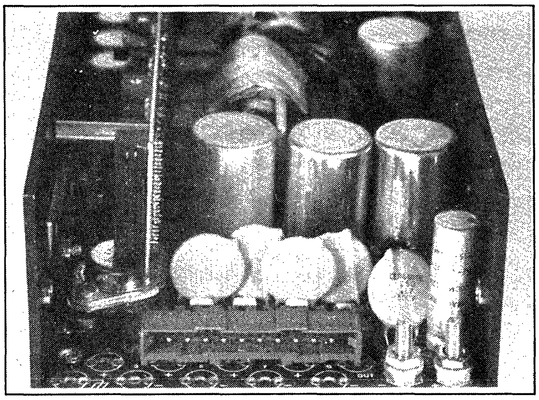
In its standard configuration, the Model 29D provides its users with an abundance of performance features. For example, each of the regulated outputs is equipped with independent remote sensing. An inhibit input for the main output is provided that allows a remote source to turn the entire supply on and off. Moreover, each auxiliary output can be independently inhibited through the application of the appropriate logic signal, facilitating sequenced turn-on and turn-off. Also, the main output has a TTL-compatible output which signals a voltage deviation of ±5% from the nominal. Each regulated auxiliary output is provided with an opto-isolated output which trips if that DC output is lost. This feature is particularly useful for true redundant-mode (with optional isolation diodes) operation, as it makes the user aware that a supply has failed even though the power system is still operating successfully. An "Input Power Fail" TTL- compatible output is also provided that signals the loss of the input AC. This signal appears typically 8 milliseconds before the outputs drop out. For users who do not need all of these features, a simplified version of the Model 29D providing basic power supply operation will soon be offered.

All versions of the Model 29D operate on both 90 to 132 volt or 180 to 264 volt, 50 or 60 Hz AC. Unlike most open-frame supplies, however, which involve jumpers or changing connections, the Model 29D can be configured for either input through the simple flip of a switch.

Considerable attention has been paid to the safety standards of various regulatory agencies. As a result, the Model 29D meets all VDE 0806 Class 1 SELV (safety extra low voltage) requirements. The supply can also meet the special requirements of the U.K. as specified in BT Guide 26 (formerly the requirements of the British Post Office). An optional EMI filter is provided to meet conducted EMI requirements of FCC Rule 15J (Docket 20780) and VDE 0871 Class A.

The same thought that went into the electrical design of the Model 29D also went into the mechanical design. A linear layout places the input and output at opposite ends of the supply. For users needing the input and output at the same end of the supply, a standard three-pin recessed power AC socket can be provided at the output end of the board.

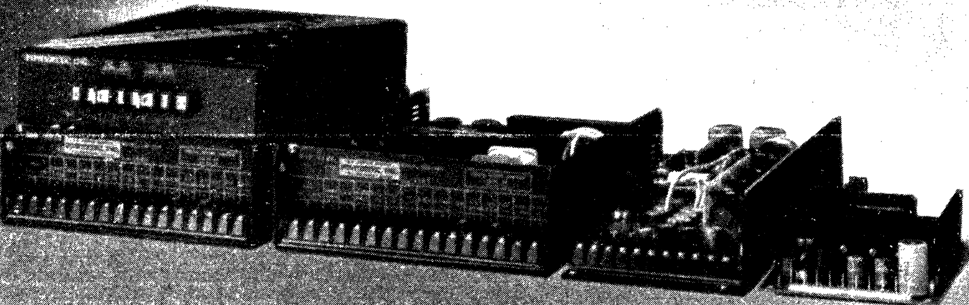
The Model 29D measures 5" wide x 13.75" long x 2.88" high. This is the same width and just one-quarter inch more length than the standard Powertec 150-watt switcher footprint. Also, the mounting holes in the Model 29D are compatible with the standard 150-watt mounting holes. A cover with built-in captive nuts that simplifies the mounting of a cooling fan is available as an option.



POWERTEC
The Power in DC Power Supplies

Powertec, Inc., 20550 Nordhoff Street, Chatsworth, California 91311-6168 • (818) 882-0004 • TWX 910-494-2092

ValuSwitchers™ The Proven Value in Open Frame Multiple Output Switching Power Supplies.



44 Multiple Output Models 50 to 400 Watts

- VDE, IEC, CSA, UL Safety Specs
- FCC & VDE EMI Option
- Fully Regulated All Outputs
  OR
- Fully Regulated Main Output and Semi-regulated Auxiliaries up to 4 Outputs
- Field Strappable 115/230 VAC
- Extended Input Voltage Range: 90-132/180-264 VAC, 47-440 Hz
- Brown-out Below 85 or 170 VAC
- OVP with Crowbar and Inverter Shutdown
- Remote Sense
- Reverse Voltage Protection
- Soft-start Circuit
- Power Fail Signal Option
- Inhibit
- Hold-up Exceeds 20 ms
- Cover Option
- 100% Burn-in
- Powertec's 19 Years of Proven Value

Quality, Reliability, Performance at an Economical Price.

The ValuSwitcher family is Powertec's economical series of switching power supplies, both open frame and enclosed. ValuSwitchers are designed for low and medium power applications (50-400 watts). They are an extension of the SuperSwitcher™ family (400-1700 watts) introduced over ten years ago and the MultiMod™ multiple output switcher family (300-1000 watts).

Designated Series 19, ValuSwitchers offer a fully regulated main output and a choice of fully regulated or semi-regulated auxiliary outputs. OVP is standard on the main output, optional on the others. Additional options include a power fail signal, EMI filter and cover.

Common mode input filtering, logic inhibit, AC undervoltage inhibit and remote sense are all standard features.

Reliability, quality, and performance which have long characterized SuperSwitchers are also hallmarks of the ValuSwitchers. And at a price that offers the best DC power supply value in the industry.

June 1985 (VS10)

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Selector Guide-Multiple Outputs-Series 19

See MultiMod™ Family (Series 6) For Other Multiple Output Switchers To 1200 Watts.

ORDER INFORMATION
Model/Product Description, Definitions

Standard Options

19C - A00 - ABCDE - SXXXX

Series
Case Size
Output Voltage Combinations
A. 5, 12, 12, 5
B. 5, 12, 12, 24
C. 5, 15, 15, 5
D. 5, 15, 15, 24
E. 5, 12, 12, 12
G. 8, 16, 16, 24
S. Others to 5 outputs.

Custom Options
E: Factory Wired for 230 VAC Input
D: Power Fail—Option
C: Case or Cover[15]—Option
B: EMI Filter—Option
A: OVP on Auxiliary Outputs—Option
0: Regulation
0—Full[7] regulation on main output; Semi[6]-regulated on all others
1—Full[7] regulation on all outputs

MODEL NUMBER	OUTPUT RATINGS (CONVECTION COOLED)[4]					LOAD REGULATION (PERCENTAGE)		Initial Output Voltage Tolerance (Adj.)[8](±%)[9]	
	TOTAL POWER[1,2,3,4]	VOLTS/AMPS[1,12] @50°C[3]							
		#1 (MAIN)	#2	#3	#4	#1 (MAIN)	#2-4	#1 (MAIN)	#2-4
TRIPLE OUTPUTS—Use quad output models. Outputs may be deleted from quad output models for volume requirments.									
Quad Output		**5**	**12**	**12**	**12**	**Volts(DC)**			
19C-EO1	150	+5V/25A	+12V/4A[18]	−12V/4A	+12V/4A[18]	±0.2	±0.2	Adj.	Adj.
6E5-BBB-17[5]	300	±5V/40A	±12V/6A	±12V/6A	±12V/6A	±0.2	±0.2	Adj.	Adj.
19E-E00	350	+5V/40A	+12V/6A	−12V/6A	+12V/6A	±0.2	±2.5	Adj.	±5
6F5-BBB-17[5]	400	±5V/50A	±12V/61	±12V/6A	±12V/6A	±0.2	±0.2	Adj.	Adj.
19F-E00	400	+5V/50A	+12V/6A	−12V/6A	+12V/6A	±0.2	±2.5	Adj.	Adj.
Quad Output		**5**	**12**	**12**	**5**	**Volts(DC)**			
19C-A01	150	+5V/25A	+12VP4A	−12V/4A	−5V/4A	±0.2	±0.2	Adj.	Adj.
6E5-BBA-17[5]	300	±5V/40A	±12V/6A	±12V/6A	±5V/6A	±0.2	±0.2	Adj.	Adj.
19E-A00	350	+5V/40A	+12V/6A	−12V/6A	−5V/4A	±0.2	±2.5	Adj.	±5
6F5-BBA-17[5]	400	±5V/50A	±12V/6A	±12V/6A	±5V/6A	±0.2	±0.2	Adj.	Adj.
19F-A00	400	+5V/50A	+12V/6A	−12V/6A	−5V/4A	±0.2	±2.5	Adj.	±5
Quad Output		**5**	**12**	**12**	**24**	**Volts(DC)**			
19C-B01	150	+5V/25A	+12V/4A	−12V/4A	+24V/2A	±0.2	±0.2	Adj.	Adj.
6E5-BBD-17[5]	300	±5V/40A	±12V/6A	±12V/6A	±24V/6A	±0.2	±0.2	Adj.	Adj.
19E-B00	350	+5V/40A	+12V/6A	−12V/6A	+24V/2 & 6A[17]	±0.2	±2.5	Adj.	±5
6F5-BBD-17[5]	400	±5V/50A	±12V/6A	±12V/6A	±24V/6A	±0.2	±0.2	Adj.	Adj.
19F-B00	400	+5V/50A	+12V/6A	−12V/6A	+24V/2 & 6A[17]	±0.2	±2.5	Adj.	±5
Quad Output		**5**	**15**	**15**	**5**	**Volts(DC)**			
6E5-CCA-17[5]	300	±5V/40A	±15V/6A	±15V/6A	±5V/6A	±0.2	±0.2	Adj.	Adj.
6F5-CCA-17[5]	400	±5V/50A	±15V/6A	±15V/6A	±5V/6A	±0.2	±0.2	Adj.	Adj.
19F-C00	400	+5V/50A	+15V/6A	−15V/6A	−5V/4A	±0.2	±2.5	Adj.	±5
Quad Output		**5**	**15**	**15**	**24**	**Volts(DC)**			
6E5-CCA-17[5]	300	±5V/40A	±15V/6A	±15V/6A	±24V/6A	±0.2	±0.2	Adj.	Adj.
19E-D00	350	+5V/40A	+15V/6A	−15V/6A	+24V/2 & 6A[17]	±0.2	±2.5	Adj.	±5
6F5-CCD-17[5]	400	±5V/50A	±15V/6A	±15V/6A	±24V/6A	±0.2	±0.2	Adj.	Adj.
19F-D00	400	+5V/50A	+15V/6A	−15V/6A	+24V/2 & 6A[17]	±0.2	±2.5	Adj.	±5
Quad Output		**8**	**16**	**16**	**24**	**Volts(DC)**			
19E-G00	350	+8V/40A	+16V/6A	−16V/6A	+24V/2 & 6A[17]	±0.2	±2.5	Adj.	±5
19F-G00	400	+8V/45A	+16V/6A	−16V/6A	+24V/2 & 6A[17]	±0.2	±2.5	Adj.	±5

Selector Guide-Multiple Outputs-Series 29

(Partial Listing)

MODEL NUMBER	OUTPUT RATINGS (Preliminary)[j]						LOAD REGULATION (Percentage)		
	TOTAL POWER (Watts) See Note b	VOLTS/AMPS							
		#1 (Main) Note b	#2	#3	#4	#5	#1 (Main)	#2-4	#5
29D5-B2A-371-F	200/300	5V/30A/40A	12V/5A (7A PK)	12V/3A (4A PK)	5V/3A (4A PK)	12V/6A (9A PK)	±0.2	±0.2	±2.5
29D5-A2A-371-F	200/300	5V/30A/40A	12V/5A (7A PK)	12V/3A (4A PK)	5V/3A (4A PK)	24V/4A (7A PK)	±0.2	±0.2	±2.5
29D5-C2A-371-F	200/300	5V/30A/40A	12V/5A (7A PK)	12V/3A (4A PK)	12V/3A (4A PK)	12V/6A (9A PK)	±0.2	±0.2	±2.5
29D5-E2A-371-F	200/300	5V/30A/40A	12V/5A (7A PK)	12V/3A (4A PK)	12V/3A (4A PK)	5V/6A (9A PK)	±0.2	±0.2	±2.5
29D5-D2A-371-F	200/300	5V/30A/40A	12V/5A (7A PK)	12V/3A (4A PK)	12V/3A (4A PK)	24V/4A (7A PK)	±0.2	±0.2	±2.5
29D5-J2A-371-F	200/300	5V/30A/40A	15V/5A (7A PK)	15V/3A (4A PK)	15V/3A (4A PK)	24V/4A (7A PK)	±0.2	±0.2	±2.5

NOTES: Series 29 Only.

a. Meets safety specs: UL114, UL478, UL1012, CSA 22.2-143, CSA 22.2-154, Class 1 SELV: VDE 730, VDE 804, VDE 806, IEC 380, IEC 435. Creepage/ Clearance–Primary to Secondary: 8mm, Primary to Case: 4mm. Case grounded, Insulation Resistance – 10MΩ. Leakage – 1mA (3mA with Option F at 230 VAC). BT (formerly BPO) Guide 26 is also available (contact factory).
b. Lowest ratings are 50°C ambient max., convection cooled ratings. Higher ratings are 50°C ambient max. with 200 linear feet/minute air cooling.
c. Use model 29D5-A2A-371F (first choice) or 29D5-C2A-371-F (second choice) wherever possible. These models have the best availability and prices.
d. All outputs are fully isolated and floating.
e. Outputs #1, #2, #3 and #4 are fully regulated[7]. Output 5 is semi-regulated[6].
f. Output #1 may be paralleled with output #1 of another 29D[l].
g. Output #5 may be paralleled with output #5 of another 29D[l].
h. Outputs #2, #3, and #4 may be paralleled with each other in any combination within the same supply or between another 29D supply[l].
i. Output #1[m], #2, #3 and #4 are current mode and they will current share when paralleled as connected per f, g or h above.
j. Contact factory for complete specifications and application notes.
k. See series 19 DC Output specifications on following page.
l. Assumes output voltages are the same.
m. Applies when all used outputs of both supplies are connected to the same loads.

June 1985 (VS10)

All specifications are subject to change without notice.

Powertec Series 19 Specifications

See SuperSwitcher™ Family (Series 9) For Single Output Switchers From 400 To 1700 Watts.

AC INPUT

Nominal—115/230 VAC, field selectable,[14] 47 to 440 Hz.[16]

Operating range—90-132 or 180-264 VAC.

Brown-out—Below 85 or 170 VAC.

Inrush current—For units that have been off for 0.5 hour, the maximum thermistor-limited inrush current is less than: 15 amps peak for the 19A, 35 amps peak for the 19C, and 50 amps peak for the 19E.

Undervoltage inhibit—Protected against malfunction due to AC undervoltage operation.

DC OUTPUTS

Adjustments—Only the fully[7] regulated outputs (VDC) are adjustable up to ±5% (except the 19A auxiliaries which are nonadjustable).

Initial tolerance, auxiliaries—Tolerance of all semi[6]-regulated outputs and all 19A fully[7] regulated auxiliary outputs is ±5% of nominal with all outputs at 50% load and main output set at 5.0 VDC.

Line regulation—±0.2% over an input range of 90-132/180-264 VAC at 100% of rated load.

Load regulation—All outputs will operate from no-load to full-load. However, proper operation of the auxiliaries requires that the main output be loaded to at least 10% of its 50°C rating. Regulation is measured statically between 20% and 100% of the 50°C rated output. For this measurement, all semi[6]-regulated outputs not under test should have 20%[19] loads. Fully[7] regulated auxiliaries need not be loaded.

	Main Output			Auxiliary Output			
	19A	19C	19E/F 6E/F	19A	19C	19E/19F	6E/6F
FULL[7]	±0.3%	±0.2%	±0.2%	±1.0%	±0.2%	N.A.	±0.2%
SEMI[6]	±0.3%	±0.2%	±0.2%	±2.5%	±2.5%	±2.5%	N.A.

Dynamic response—A step load change of ±25% of rated maximum will cause a regulated output to deviate no more than 2%, with recovery to 0.5% in less than 400μ sec.

Efficiency—Typically exceeds 75%.

Thermal regulation—±0.02%/°C, fully regulated outputs. ±0.05%/°C, semi-regulated outputs.

Cross regulation—Measured with the output under test loaded at 20% of rated max. while the load on any other output is varied from 50% to 100% of rated max.

	Main (Varying auxiliary)	Auxiliary (Varying main)	Auxiliary (Varying auxiliary)
FULL[7]	±0.1%	±0.1%	±0.1%
SEMI[6]	±0.5%	±2.5%	±0.5%

Ripple and Noise—Any output, 0.5% max. RMS ripple. Typically 1.0% P-P measured with a 20MHz scope via X1 probe, having 4″ max. return lead.

Hold-up time—Fully loaded outputs will remain within regulation for 20 msec. minimum from the last nominal line voltage peak.

OVER VOLTAGE PROTECTION

Main output—Both crowbar OVP and inverter shutdown OVP standard on all models except 19A.

Auxiliary outputs—Inverter shutdown standard on all models. OVP crowbar (Option A): All fully regulated auxiliary outputs except 19A. Standard on 6E/6F auxiliaries. Remove AC input for 30 sec. to restore operation.

Range—OVP ranges are factory fixed as follows:[13]

5 VDC: 5.5-6.9 VDC
8 VDC: 9.5-10.9 VDC
12 VDC: 13-16 VDC
15 VDC: 16-20 VDC
24 VDC: 25-29 VDC
24 VDC: 31-32 VDC (19E, 19F only)

REVERSE VOLTAGE PROTECTION

Semi-regulated—Protected to rated current.

Fully regulated—Main output protected to rated current. All others protected to 1 amp continuously or full rated current momentarily.

LOADING vs. TEMPERATURE

Convection cooling—100% rated loads from 0°C to 50°C. Derate linearly to 50% at 70°C.

Forced air cooling—100% rated loads at 70°C with 400 LFM air directed along unit (excluding 6F & 19F).

REMOTE SENSING

Standard on +5 VDC output and 6E/6F auxiliaries. Can accommodate 0.25 VDC cable-drop. Open sense protection is provided. (Not available on 19A.)

CURRENT LIMITING

Main output and fully regulated auxiliary outputs are protected against overload and short circuits by fold-back current limiting. Semi-regulated auxiliaries are protected against continuous shorts.

POWER FAIL

Option D: A TTL compatible logic low signal will occur at least 2 ms before the loss of output following the loss of AC input.

LOGIC INHIBIT

All outputs will be shut off by the application of a TTL compatible logic low signal to the inhibit terminal.

SAFETY

Meets the test specifications listed below. UL submittals are automatic for standard units; check with factory for current status on any model. Powertec has been granted self-certification status by CSA. CSA logo available upon request.

UL 114, UL 478, UL 1012
CSA 22.2-143, CSA 22.2-154
IEC 380[10] IEC 435[10]
VDE 730[10] VDE 804[10] VDE 0806[10]

Hipot—3500 VDC Input to Output; 2100 VDC Input to Case; 750 VDC Output to Case for qualification test. For production test, 1500 VDC, 1500 VDC and 500 VDC respectively.

Creepage/Clearance—3mm primary to secondary. 4mm primary to case.

Leakage—Less than 1 mA input to case.

Grounding—Case ground terminal provided.

Insulation—Exceeds 10 MΩ at 500 VDC.

EMI

Option B allows these units to meet the conducted EMI requirements of FCC Rule 15J (Docket 20780) and VDE 0871 as shown.

	19A	19C	*19E/19F/6E/6F
FCC	Class A	Class B	Class B
VDE	—	Class A	Class A

*Preliminary

WARRANTY—1 year

NOTES: Series 19 only.

1. Maximum continuous output power may not exceed the product of rated current and voltage specified in the Selector Guide at indicated temperatures as measured at the output terminals.
2. Max. total power of all outputs combined.
3. Above 50°C, current and power ratings derate linearly to 50% at 70°C.
4. Higher current and power ratings attainable with moving air. Consult Factory. (Excludes 6F and 19F models.)
5. Outputs for 6E and 6F are floating (i.e., outputs may be wired for either plus or minus).
6. Semi-regulated outputs. "Semi" have less circuitry in order to improve cost. Load regulation is sufficient for many requirements.
7. Fully regulated outputs. "Full" have additional circuitry to assure better regulation than the semi-regulated outputs.
8. Output voltage adjustable to ±5% of specified nominal.
9. Output voltage non-adjustable. Initial voltage within ±% tolerance indicated.
10. Class 1 non-SELV: Meets European safety requirements except in cases where a system does not provide for grounding, or where the possibility exists that an operator (maintenance personnel excepted) can come into physical contact with the power supply or its load terminals.
11. Must be connected (wired) to the load in parallel.
12. Higher peak current ratings may be obtained. Contact Factory.
13. Trip occurs within the applicable range.
14. Units shipped are strapped for 115 VAC input. Customer may change for use at 230 VAC.
15. Cover standard with 6F and 19F, optional on all others.
16. 6F and 19F operate at 47-63 Hz only, except on special order.
17. Line/load regulation, ripple and noise typically double at the higher current rating indicated.
18. To increase output current: Outputs No. 2 and No. 4 may be paralleled. Contact Factory for details.
19. Outputs will operate at lower load conditions with degraded regulation.

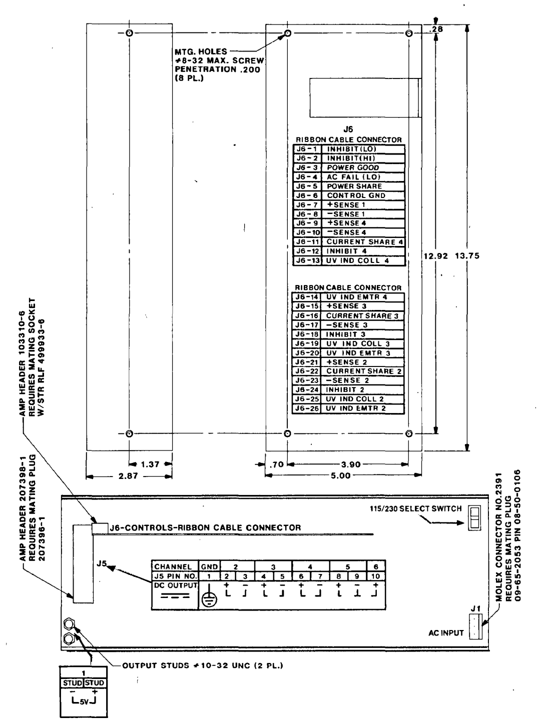
June 1985 (VS10)

Contact Factory to Obtain Powertec's Free Loose-Leaf Binder/Catalog to Which You May Add This and Other Product Brochures Which Are Published Monthly.

Outline and Mounting Dimensions

29D

All Tolerances ±0.030 inches


MTG. HOLES
#8-32 MAX. SCREW
PENETRATION .200
(8 PL.)
.28
12.92 13.75
1.37
2.87
.70
3.90
5.00
AMP HEADER 103310-6
REQUIRES MATING SOCKET
W/STR RLF 499933-6
AMP HEADER 207398-1
REQUIRES MATING PLUG
207396-1
J6-CONTROLS-RIBBON CABLE CONNECTOR
115/230 SELECT SWITCH
J5
MOLEX CONNECTOR NO.2391
REQUIRES MATING PLUG
09-65-2053 PIN 08-50-0106
J1
AC INPUT
OUTPUT STUDS #10-32 UNC (2 PL.)
1
STUD STUD
− +
5V

J6
RIBBON CABLE CONNECTOR

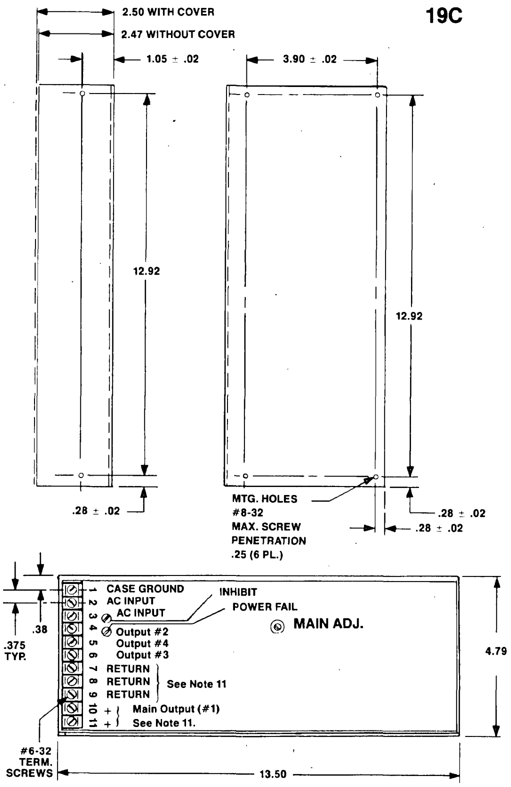
J6-1	INHIBIT (LO)
J6-2	INHIBIT (HI)
J6-3	POWER GOOD
J6-4	AC FAIL (LO)
J6-5	POWER SHARE
J6-6	CONTROL GND
J6-7	+SENSE 1
J6-8	−SENSE 1
J6-9	+SENSE 4
J6-10	−SENSE 4
J6-11	CURRENT SHARE 4
J6-12	INHIBIT 4
J6-13	UV IND COLL 4

RIBBON CABLE CONNECTOR

J6-14	UV IND EMTR 4
J6-15	+SENSE 3
J6-16	CURRENT SHARE 3
J6-17	−SENSE 3
J6-18	INHIBIT 3
J6-19	UV IND COLL 3
J6-20	UV IND EMTR 3
J6-21	+SENSE 2
J6-22	CURRENT SHARE 2
J6-23	−SENSE 2
J6-24	INHIBIT 2
J6-25	UV IND COLL 2
J6-26	UV IND EMTR 2

CHANNEL	GND	2		3		4		5		6
J5 PIN NO.	1	2	3	4	5	6	7	8	9	10
DC OUTPUT	⏚	+	−	+	−	+	−	+	−	+

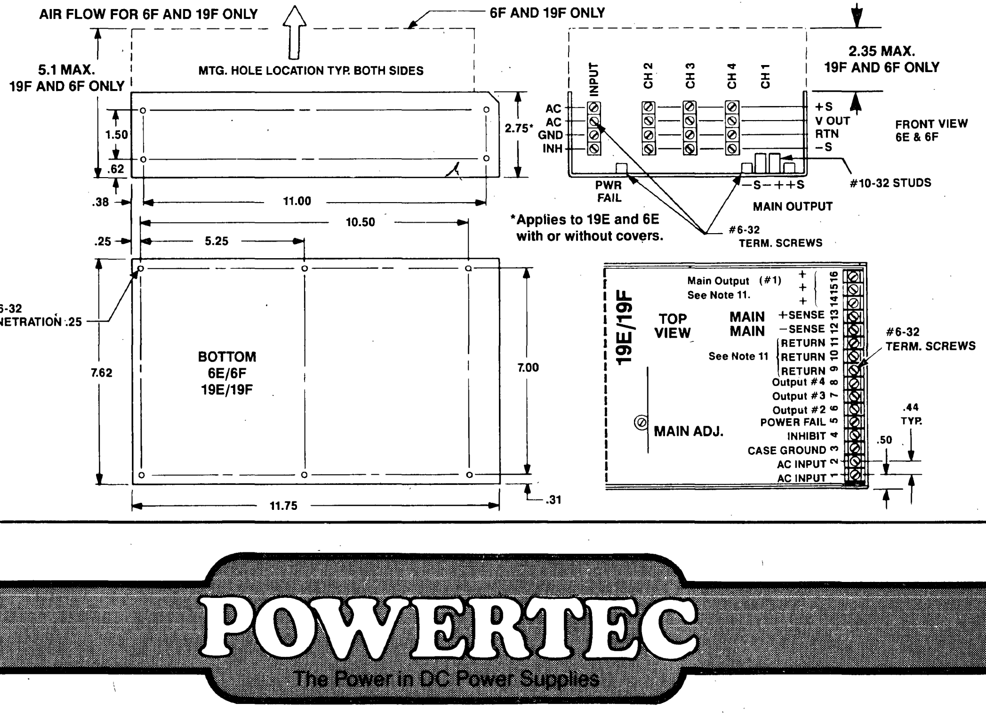
19C


2.50 WITH COVER
2.47 WITHOUT COVER
1.05 ± .02
3.90 ± .02
12.92
12.92
.28 ± .02
MTG. HOLES
#8-32
MAX. SCREW
PENETRATION
.25 (6 PL.)
.28 ± .02
.28 ± .02
.38
.375
TYP.
1 CASE GROUND
2 AC INPUT
3 AC INPUT
4 Output #2
5 Output #4
6 Output #3
7 RETURN
8 RETURN
9 RETURN
See Note 11
10 +
11 +
Main Output (#1)
See Note 11.
INHIBIT
POWER FAIL
MAIN ADJ.
4.79
#6-32
TERM.
SCREWS
13.50

WEIGHT
19C: 4.3 lbs.
*19C: 4.7 lbs.
*WITH COVER

Contact Factory to Obtain Powertec's Free Loose-Leaf Binder/Catalog to Which You May Add This and Other Product Brochures Which Are Published Monthly.

6E/6F
19E/19F


AIR FLOW FOR 6F AND 19F ONLY
6F AND 19F ONLY
5.1 MAX.
19F AND 6F ONLY
MTG. HOLE LOCATION TYP. BOTH SIDES
1.50
.62
2.75*
.38
11.00
10.50
.25
5.25
INPUT
CH 2
CH 3
CH 4
CH 1
AC
AC
GND
INH
+S
V OUT
RTN
−S
2.35 MAX.
19F AND 6F ONLY
FRONT VIEW
6E & 6F
PWR
FAIL
−S− ++S
MAIN OUTPUT
#10-32 STUDS
#6-32
TERM. SCREWS
MTG. SCREWS #6-32
MAX. SCREW PENETRATION .25
7.62
BOTTOM
6E/6F
19E/19F
7.00
.31
11.75
19E/19F
TOP
VIEW
Main Output (#1)
See Note 11.
MAIN +SENSE
MAIN −SENSE
RETURN
See Note 11 RETURN
RETURN
Output #4
Output #3
Output #2
POWER FAIL
INHIBIT
CASE GROUND
AC INPUT
AC INPUT
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
MAIN ADJ.
#6-32
TERM. SCREWS
.44
TYP.
.50

*Applies to 19E and 6E with or without covers.

WEIGHT
19E: 5.9 lbs.
**19E: 6.3 lbs.
**19F: 7.9 lbs.
6E: 8 lbs.
**6E: 8.4 lbs.
**6F: 10 lbs.
**WITH COVER

June 1985 (VS10)

POWERTEC
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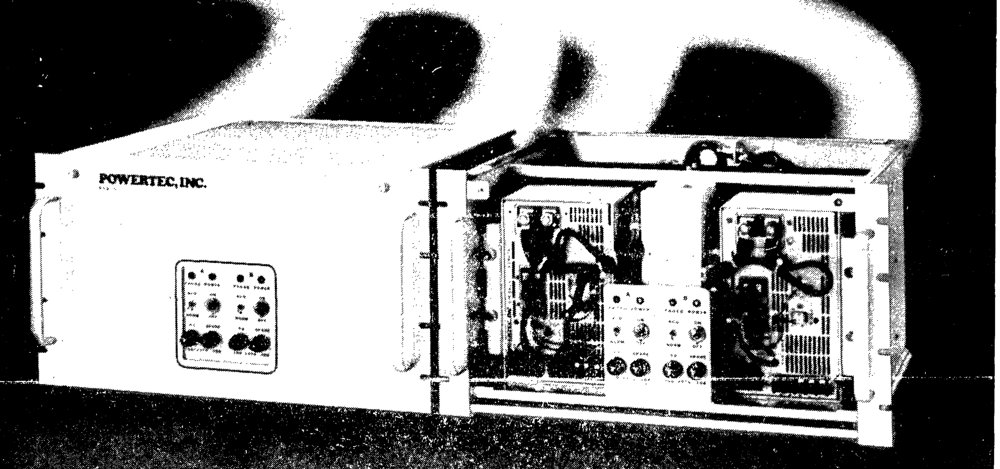
PowerSystems™ by Powertec
The Proven Solution to Your Total System Power Requirements.



Single and Multiple Outputs 300 to 3400 Watts with up to 14 Outputs Using Standard Switching Power Supplies

- True redundancy with isolation diodes for fault protection
- Parallel operation for high power requirements
- VDE, IEC, CSA, UL Safety Specs
- FCC and VDE EMI Specs
- Field Selectable 115/230 VAC
- Standard 19" rack for convenience
- Easy power supply installation via hinged-door and "quick-connect" mounting hardware
- Convenient hook-up via standard power cord and AMP FASTON™-type connectors
- Safe "on line" repair/replacement capabilities in redundant system
- Alarm circuitry for power good and power fail
- 100% Burn-in of Power Supplies
- Brown Out of 85 or 160 VAC
- Separate, electrically isolated outputs
- Powertec's 19 Years of Proven Value
- All the proven performance features and specifications of the SuperSwitcher,™ MultiMod™ and ValuSwitcher™ Power Supply Families.

November, 1984 (PS2)

Quality, Reliability, Performance and Value Tailored to your System Requirements

PowerSystems™ by Powertec is a highly flexible building block approach for your total system requirements using standard Powertec power supplies from our three families of switchers:

- ValuSwitcher™—44 multiple output models from 50 to 400 Watts with up to 5 outputs—2 to 48 volts.
- MultiMod™—300 to 1000 watt multiple output power supplies with up to 7 outputs—2 to 48 volts.
- SuperSwitcher™—240 to 1700 watt single output power supplies from 2 to 48 volts—over 100 models available.

Powertec is capable of providing the following type of systems:

- True redundancy for 1 to 7 outputs to achieve maximum system reliability (not simply parallel operation).
- Up to 14 outputs and 2400 watts per system.
- Parallel operation for high current requirement on one or more voltages up to 3400 watts.

With PowerSystems,™ individual outputs can be configured to your needs. And all this in a standard 19" rack mount or custom package that will meet UL, CSA, BT (formerly BPO) on some models, or VDE safety standards as required. PowerSystems™ by Powertec—deliver your total system power requirements.

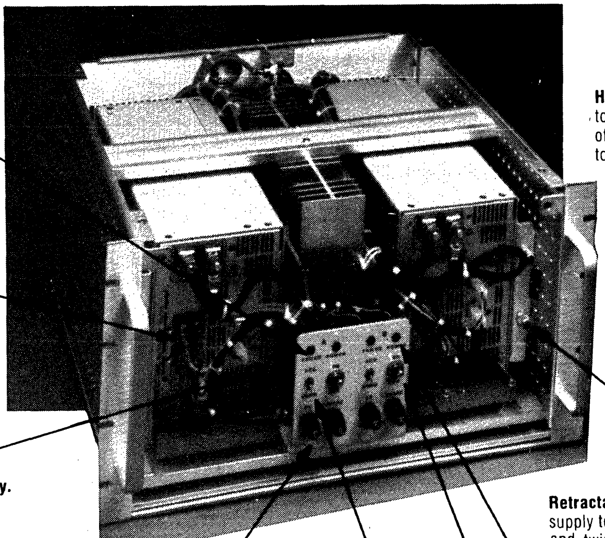
POWERTEC

The Power in DC Power Supplies

Powertec, Inc., 20550 Nordhoff Street, Chatsworth, California 91311-6168 • (818) 882-0004 • TWX 910-494-2092

Powertec PS4001 Features

PowerSystems™—PS4001 consists of two MultiMod™ power supplies configured in parallel redundant mode with current sharing. Parallel redundancy raises the level of system reliability by combining "mirrored" regulated outputs from each of two power supplies via isolation diodes. A detect signal reports and identifies a failed supply. The mechanical/electrical layout and con-



Individual Power Supply Failure Alarm LED Indicator. Lamp turns on upon detection of an undervoltage condition from any output of each supply.

Hinged Drop-Down Front Door has easy-to-read wiring layout silk screened on inside of door showing connections with references to color-coded wires. (Not shown.)

AMP FASTON™-Type Connectors and color-coded wire on auxiliary DC outputs and AC inputs of each power supply—minimizes time to replace faulty unit.

6JB5-BB-27B MultiMod™ Power Supply.

Retractable Captive Screws secure each power supply to the PowerSystems'™ rack. A simple press-in-and-twist action permits fast power supply removal and installation.

Thermal Protection. Each power supply within the system has thermal cutoff protection to prevent damage to the power supply in the event of any condition that results in excessively high temperature within the system.

Individual Power Supply Alarm Cutoff Switch permits deactivation of Power Fail Alarm signal.

Individual Power Supply On/Off LED (Lamp) Indicator. Lamp informs operator that AC input to each supply is present or absent.

Fuses on Front Panel. Each supply (A & B) has "AC" hot input fused. Spare fuse and fuse holder for both supplies permits AC return to be fused in order to meet European safety standards. On domestic models, spare fuse holders are used simply to contain spare fuses.

Individual Power Supply On/Off Switch on Front Panel. Separate AC input to each supply can be switched off via easy access on/off switch on Front Panel, thus keeping service personnel from coming into contact with "hot" AC input.

SPECIFICATIONS FOR PS4001

AC INPUT

47-63 Hz (47-400 Hz available as a special).

MODEL[3]	VOLTAGE	
	NOMINAL	RANGE
PS4001/PS4005	115/230	90-132/180-264 FIELD STRAPPABLE[1]
PS4002/PS4006	220	180-242
PS4004/PS4008	240	204-264

Brown Out—Regulates through short term line dips to at least 85 VAC or 160 VAC.

Inrush Current—Limited to 8X peak operating line current to prevent nuisance tripping of protective circuit breakers and fuses.

Turn-on Time—0.2 sec. max. for power-up.

Undervoltage Inhibit—Protected against malfunction due to AC undervoltage operation.

DC OUTPUTS PS4001, PS4002, PS4003 (Others[3])

Regulation & Output Specifications—

OUTPUT	SYSTEM OUTPUT RATING*					REGULATION		
	VOLTS	VO. ADJ.	AMPS			SYSTEM TOLERANCE**	POWER SUPPLIES	
			50°C	60°C	70°C		LINE	LOAD
#1	+ 5.0	±10%	80	60	40	±2.5%	1%	0.2%
#2	+12.0	± 5%	8	6	4	± 3%	1%	0.2%
#3	−12.0	± 5%	8	6	4	± 3%	1%	0.2%

*Total power from system outputs cannot exceed 550 watts. Individual power supplies are 600 watts each.

**Tolerance envelope limits include line, load, temperature, ripple and switching noise. Instrumentation having 20 mHz bandwidth is to be used for this measurement. The loads may be in all combinations. Initial output voltage adjustment better than ±1% of the above readings at room temperature and full load.

System Transient Response—All redundant or non-redundant outputs are to remain within 2% of the initial output specified for a step change (1A/μ sec.) at any output of 20% of load current at any load between 8 to 70 amps on the 5 volt output and between 1 to 8 amps on the ±12 volt outputs both at 50°C.

Thermal Regulation—±0.02/°C over operating range.

System Ripple and Noise—For all valid static conditions of line and load, the output ripple and noise shall be 20 mV RMS maximum between +5V output and DC return and between DC return and chassis with a 100 ohm ½ watt resistor between chassis and DC return. For the ±12V output the ripple and noise shall be less than 40 mV RMS. Instrumentation for measurement purposes shall be HP3400A True RMS voltmeter or equivalent.

Hold-up Time—Following the last line voltage peak with system under full load.

V_{in} NOMINAL	117		220			
V_{in} ACTUAL	90	115	165	180	208	230
HOLD-UP (msec.)	10	30	5	10	20	30

System Efficiency—Typically exceeds 65% including redundant diode losses.

Current Limiting—

OUTPUT	MAX. CURRENT (AMPS) FOLDBACK KNEE	MAX. SHORT CIRCUIT
+ 5.0V	100	45
+12.0V	13	6
−12.0V	13	6

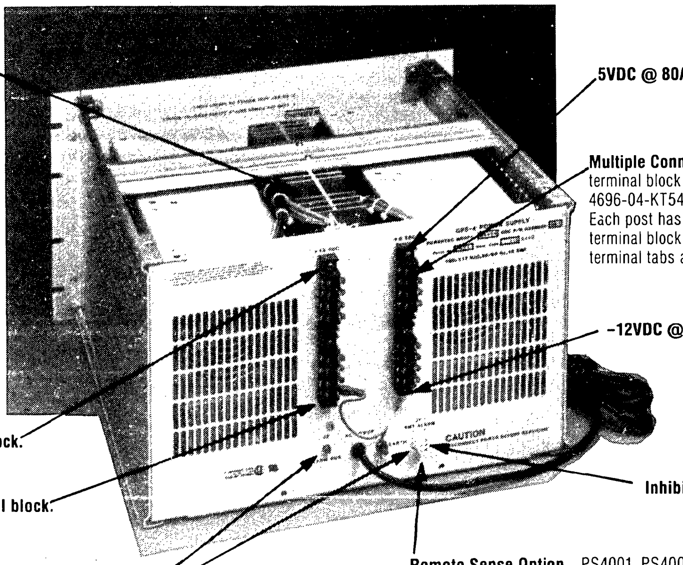
Automatic recovery upon removal of overload. Outputs can sustain indefinite overload or dead short without damage. Also, power supply system is capable of with standing a short from one output to another without damage.

November, 1984 (PS2)

All specifications are subject to change without notice.

and Specifications

struction of the system avoids down time and minimizes time and effort required to replace a defective unit. Independent AC on/off switches for each supply allow for replacement of faulty unit while functional supply continues to support system operation.



Heatsink Mounted Diodes "or" outputs from two MultiMod™ power supplies to achieve parallel redundant operation with current sharing. Diodes are a must in order to isolate each supply's output from its "mirror" output on the other supply. Without the diode isolation, a shorted output capacitor or an OVP crowbar condition on any one of either supply's outputs would cripple system operation. Diodes thus insure that non-malfunctioning outputs continue to power the system reliably despite the presence of faulty output. Rack can be designed without diodes if isolation is not a requirement.

5VDC @ 80A output terminal block.

Multiple Connection Terminal Block. Each terminal block (Beau 73704-7311-7312 or Kulka 4696-04-KT547-KT548) consists of 4 posts. Each post has 4 FASTONS™ for a total of 16 per terminal block (AMP FASTON™-type male terminal tabs are .250"w x .032"t (typically)).

−12VDC @ 8A output terminal block.

12VDC @ 8A output terminal block.

Common terminal block.

Inhibit Option. Allows for sequencing.

Remote Sense Option. PS4001, PS4002, PS4004 have local sense connected at output terminal blocks. Remote sense is available as an option for other system configurations. Consult factory.

DC Power Fail and Alarm. J2 (mates with .08" diameter pin) provides a logic + 5 VDC output signal upon detection of any output 20% or more below the nominal output voltage. J1 (Molex receptacle No. 1261-6 mates with Molex No. 03-09-2061), pins 1-3 provide a relay switch closure for supply A and pins 4-6 for supply B, depending on which is out of tolerance.

Guide/Mating Mounting Pins (2) on the rear panel of each power supply makes installation and mounting of each supply a snap. Mounting hardware and mounting effort are kept to a minimum. (Not shown.)

Current Sharing—5 Volt (Main) Output—System must draw 16 amperes or above on the 5 volt system output for each individual supply to current share within ± 20% of nominal. ± 12 Volt (Auxiliary) Outputs—System must draw 2 amperes or above on each of these system outputs for each individual auxiliary to current share within ± 50% of nominal.

Note: $I\ \text{Nominal} = \frac{I_A + I_B}{2}$

Where I_A and I_B is the current drawn from each individual supply.

ADDITIONAL SPECIFICATIONS

Individual Power Supply Load Regulation, Dynamic Response, Ripple and Noise, Overvoltage Protection, etc. (See specific power supply family brochures.)

ADDITIONAL OPTIONS

Remote Sense, Power Fail, Power Good, Logic Inhibit, etc. (See specific power supply family brochures.)

SAFETY

PS4001/PS4005^{3} (U.S. and Canadian version)

Meets UL 114, UL 478, UL 1012, CSA 22.2-143, CSA 22.2-154

Hipot—Input to Output: 2100 VDC
Input to Case: 2100 VDC
Output to Case: 700 VDC

Creepage/Clearance—Primary to Secondary: 2.4 mm
Primary to Case: 2.4 mm

Case Grounded, Insulation Resistance—10MΩ

Leakage—1mA

PS4002/PS4006^{3} (European version)

Meets all above specifications plus the following:

Class I non-SELV: VDE 730^{2}, VDE 804^{2}, VDE 806^{2}, IEC 380^{2}, IEC 435^{2}

Hipot—Input to Output: 3500 VDC
Input to Case: 2100 VDC
Output to Case: 700 VDC

Creepage/Clearance—Primary to Secondary: 3 mm
Primary to Case: 3 mm

Case Grounded, Insulation Resistance—10MΩ

Leakage—1mA

PS4004/PS4008^{3} (United Kingdom version)

Meets BT (formerly BPO) Guide 26

Hipot—Input to Output: 2200 VDC
Input to Case: 2200 VDC

Creepage/Clearance—Primary to Secondary: 3 mm
Primary to Case: 3 mm

Case Grounded, Insulation Resistance—100MΩ

EMI PERFORMANCE (All Models)

FCC 20780 Class B VDE 0871 Class A

DIMENSIONS—19" x 10.47" x 15.125"
(excludes handles & terminals).

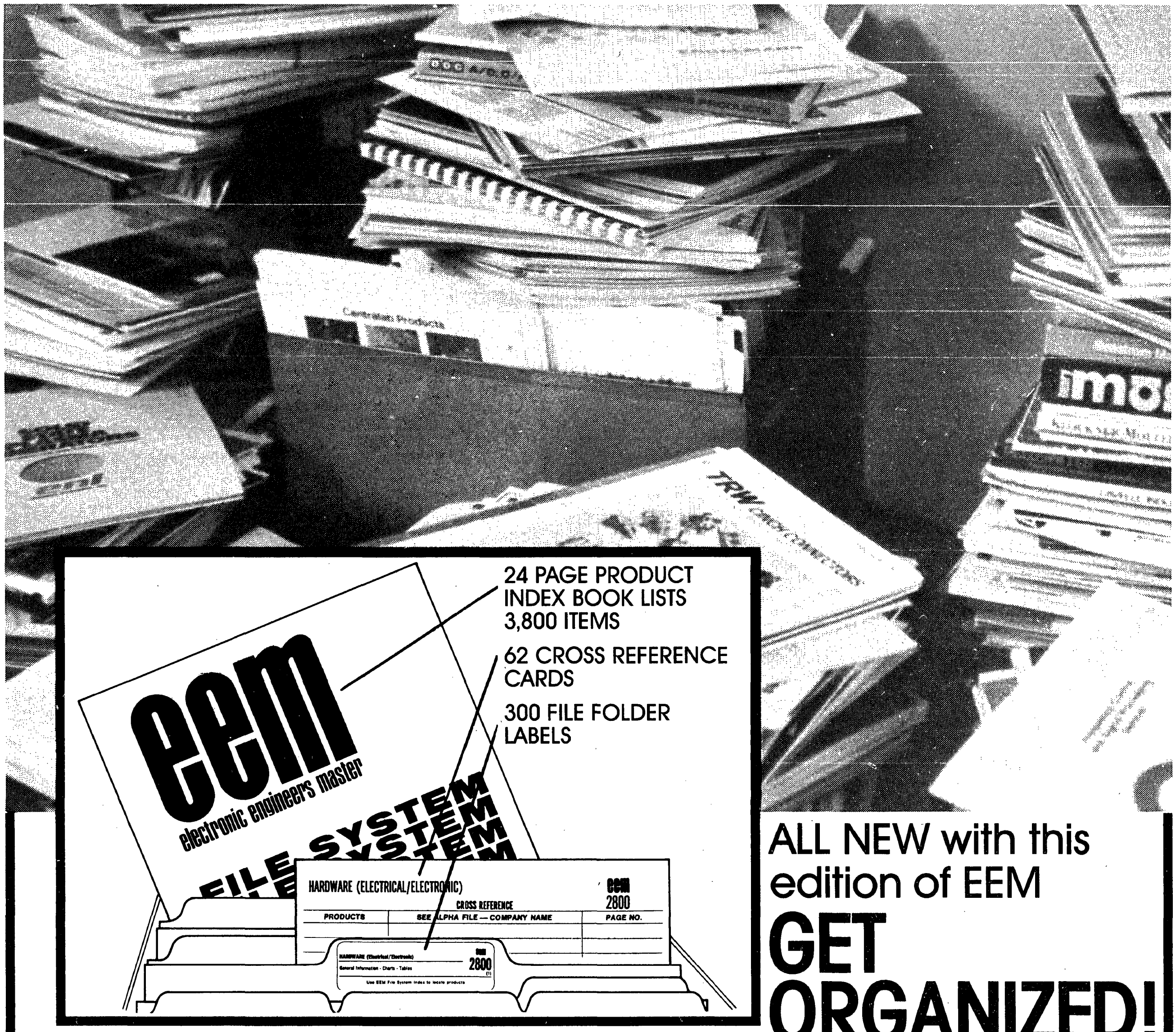
WEIGHT—55 lbs. **WARRANTY**—1 year

NOTES:

1. **Individual power supplies are field strappable. Standard 115V three-prong plug provided on line cord.**
2. **Class I non-SELV: Meets European safety requirements except in cases where a system does not provide for grounding, or where the possibility exists that an operator (maintenance personnel excepted) can come into physical contact with the power supply or its load terminals.**
3. **PS4005, PS4006, and PS4008 provide 4 outputs: −5V @ 55A, + 12V @ 9A, −12V @ 9A, + 5V @ 9A. Contact factory for additional specifications.**

November, 1984 (PS2)

Contact Factory to Obtain Powertec's Free Loose-Leaf Binder/Catalog to Which You May Add This and Other Product Brochures Which Are Published Monthly.



24 PAGE PRODUCT INDEX BOOK LISTS 3,800 ITEMS
62 CROSS REFERENCE CARDS
300 FILE FOLDER LABELS
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electronic engineers master
FILE SYSTEM
HARDWARE (ELECTRICAL/ELECTRONIC)
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TRW

ALL NEW with this edition of EEM

GET ORGANIZED!

Are your catalog files organized? Can you find any given catalog in a matter of seconds? If your answer is "Yes," you probably already have the EEM File System. But, if you said "No," you really ought to look into this simple system. It will save hours of time and tons of aggravation.

The EEM File System was invented over twenty-five years ago to help people who specify, buy, or work with electronic products and equipment. It is upgraded on a constant basis to reflect the current state of the art. It's easy to use and easy to customize to your particular needs.

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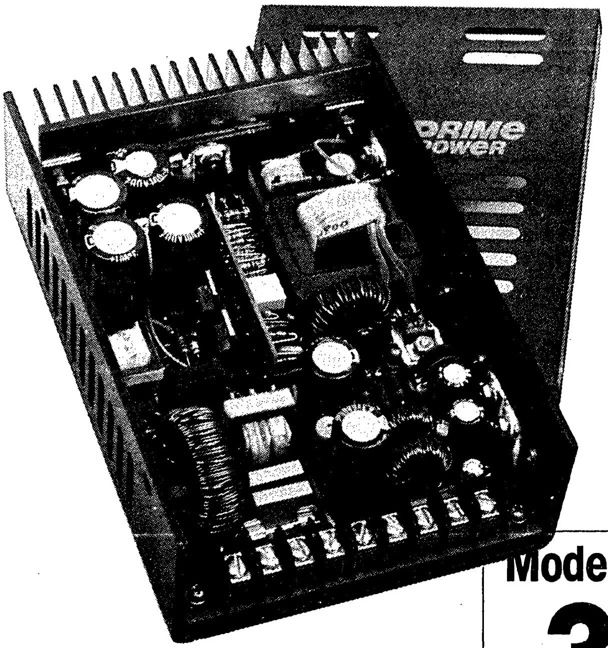
645 stewart ave., garden city, ny 11530

Dependable Switchers

PRIME POWER

A PRIME TECHNOLOGY COMPANY



Small. Quiet. Dependable. Because they are from PRIME POWER, the "precision people."

These reliable switchers provide more power per cubic inch in a completely enclosed power supply that is built to precision instrument standards. Noise and ripple are extremely low (see N&R column in table below) as it is limited by differential and common mode line filters.

- 168 Hour Burn-in
- Single/Triple/Quad Outputs
- 70% Typical Efficiency
- No 50/60 Hz Magnetics
- UL approved
- Built to meet VDE, FCC, CSA and RFI requirements
- 2 Year Warranty
- Soft Start
- Fused
- Surge Guard
- RFI Filters
- Brown-Out Protection
- Reverse Voltage Protection
- Sense Leads on Single Output Models
- Barrier Strip or Connector for Input/Output

Also available:

- Open frame models.
- 200-W to 1000-W models.
- DC-DC converters.
- Custom built units

Model PP30 30 WATTS				Model PP60 60 WATTS				Model PP120 120 WATTS			
Model	**Volts**	**Amps**	**N&R***	**Model**	**Volts**	**Amps**	**N&R***	**Model**	**Volts**	**Amps**	**N&R***
03011	5	6	15	05011	5	12	20	10011	5	20	25
03031	12-15	2	30	05031	12-15	4	30	10031	12-15	8	35
03041	24-28	1	45	05041	24-28	2	45	10041	24-28	4	50
03051	43-53	.5	60	05051	43-53	1.2	60	10051	43-53	2.4	70
03061	5 ±12	3 .5 ea	20 5 ea	05061	5 ±12	6 .5 ea	20 5 ea	10061	5 ±12	10 1.2 ea	20 5 ea
03071	5 ±15	3 .5 ea	20 5 ea	05071	5 ±15	6 .5 ea	20 5 ea	10071	5 ±15	10 1.2 ea	20 5 ea
								10081	5 ±12 +12	6 1, .5 4/6*	20 5 ea 50
								10091	5 ±12 +24	6 1, .5 2/3†	20 5 ea 50

*Noise and ripple mVP-P(max.)

†Continuous Current/Peak Current

Size (in.): 5.45 × 3.20 × 1.56 5.94 × 4.05 × 1.56 6.94 × 4.67 × 2.06

PRIME POWER, INC.
P. O. Box 185, North Branford, Connecticut 06471
TWX 710-452-3092

CALL 203 481-5721

EEM PRODUCT SELECTION GUIDES

Use the EEM Product Selection Guides. There are 34 Guides in this edition of EEM. See page 2 (A•2, B•2, C•2, D•2) of each volume to locate the Product Selection Guides that pertain to your needs.

enclosures · capacitors · circuit boards · coils,
chokes, inductors · connectors, electronic · sockets/
terminals · crystals · oscillators · crystal filters
delay lines · panel hardware · displays · lamps/
lights · cooling equipment · filters · generators ·
multimeters · panel meters · oscilloscopes · gra
phic recorde[illegible]nnections · microwave
components [illegible]otors/
drives · batteries · power supplies, dc · power
supplies, ac · [illegible] · relays ·
solenoids · resistors · potentiometers/trimmers
controls/rheostats · discrete semiconductors ·
switches · keyboards/keypads · transducers/en
coders · transformers · wire & cable · enclosures
capacitors · circuit boards · coils, chokes, induc
tors · connectors, electronic · sockets,/terminals

QUALIDYNE SYSTEMS, INC.

3055 Del Sol Blvd., San Diego, CA 92154 (619) 575-4400

CAPABILITIES

QSI began operation in 1976 with production delivery of power supplies in 1977. On December 15, 1983, QSI officially became a subsidiary of Unitech Inc., a British company with 26 divisions and annual sales in excess of 200 million dollars. QSI, in power levels of 500 watts and above, ranks in the top three in terms of annual sales, and currently employs 285 people. Standard, and the more common modified standard product configurations for specific customer applications, are commonplace.

In addition to QSI, Unitech has three power supply divisions in Europe — Coutant Electronics Ltd., Weir Electronics and APT Inc. Each division has its own market niche, and cross license agreements exist between QSI and Coutant, and one is in effect between QSI and Weir. Coutant manufactures, sells and services QSI products in Europe, and we do likewise in the United States. We have found this arrangement to be a valuable service with our larger customers who have manufacturing capability in Europe and are in need of manufacturing and service support overseas.

We have recently moved into our new 56,000 square foot manufacturing and office facility located in San Diego. In addition, two QSI facilities located in Mexico occupy approximately 40,000 square feet, where our sub-assembly manufacturing and sheet metal fabrication is accomplished.

In the area of quality, all circuit boards are tested on a Wayne Kerr bed of nails auto tester, and all transistors are individually tested and graded prior to going to the assembly line. Upon completion of assembly, the power supplies are fully tested and burned in for a period of 48 hours. After burn-in the units are given a final test on an Autotest Co. Model 3000 auto tester, and a copy of the test report is shipped with the unit.

APPLICATION GUIDE

15-400 WATTS QCP SERIES

- High volume, 1000 pieces and above
- Low cost
- Price sensitive
- Typical open frame construction
- Refer to page **D**•1804 for details

50-300 WATTS ML SERIES

- Low volume typical
- Quality and reliability
- Enclosed frame construction
- Modular flexibility
- No main channel loading (independent outputs)
- Configuration capability
- Refer to page **D**•1805 for details

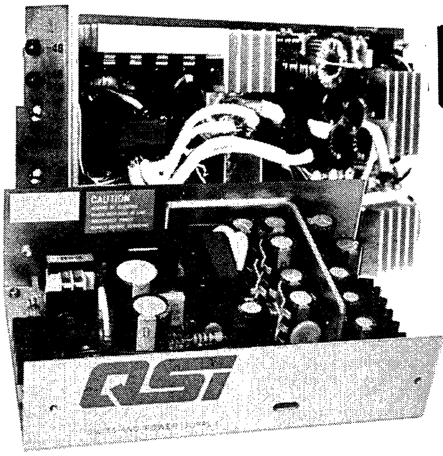
100-300 WATTS

- Quality and reliability
- Ideal for microprocessor systems, disk drives, displays, memory cards and input devices
- Cost effective
- Fully regulated and semi-regulated outputs
- Refer to pages **D**•1806, **D**•1807 for details

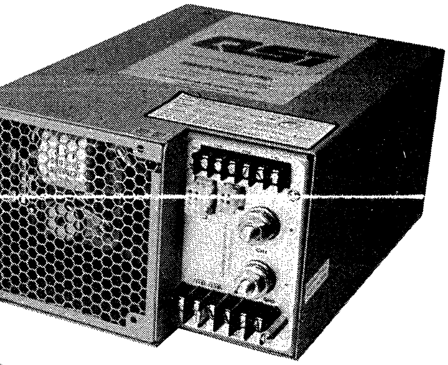
500-1800 WATTS 5x8x11, 5x8x13 SLOT SUPPLIES

- Quality and reliability
- UL, CSA, VDE, IEC safety specifications
- Cost effective
- Computer, CAD/CAM process control, ATE, medical electronics and communications applications
- Refer to page **D**•1809 for details

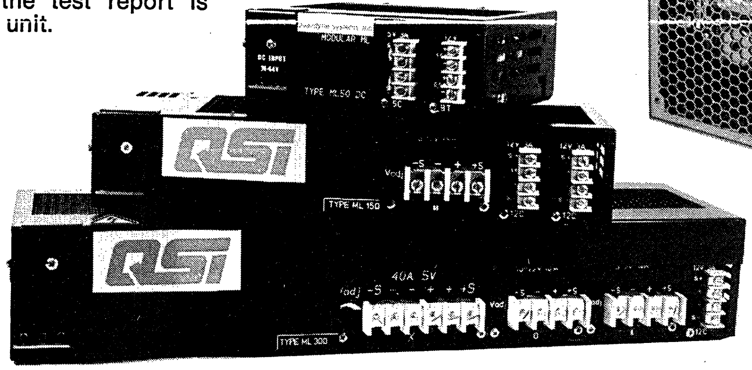
100-300 WATT SERIES
MODELS 3019B AND
2329B Shown



QCP SERIES
50 WATT SUPPLY
& 260 WATT SUPPLY Shown



500-1800 WATT
PRODUCT FAMILY

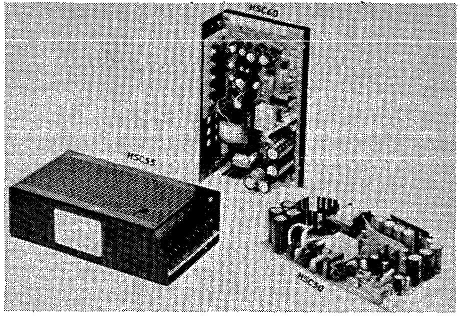


50-300 WATT
ML SERIES
MODELS ML50/150/300

QUALIDYNE SYSTEMS, INC.

3055 Del Sol Blvd., San Diego, CA 92154 (619) 575-4400

SWTCHING POWER SUPPLIES, 15 to 400 WATT OUTPUT, CUSTOM CAPABILITIES



Qualidyne "QCP" Series switching power supplies are available in single and multiple output configurations in power ratings from 15 to 400 Watts. Single or strappable AC input or DC input from 12 Vdc to 250 Vdc is available. The table below serves as a guideline regarding our capabilities. Since these are custom products, each application is tailored electrically and mechanically to the specific application. Each unit is completely tested with a minimum 24 hour burn-in at full load and operating temperature. All units have built in EMI filters and comply with UL standards and meet all European and VDE specifications as required.

AC INPUT/DC OUTPUT SWITCHING POWER SUPPLIES

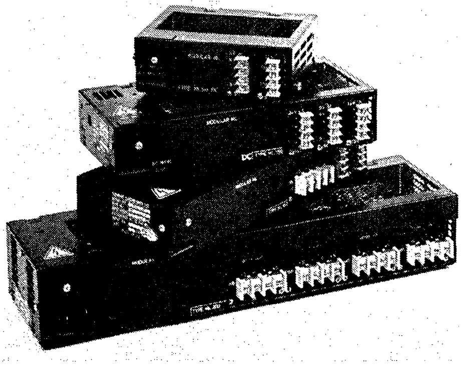
Model	Input — Vac*		Output — Vdc @ Amperes						Max. Watts
	47-440 Hz		Main +5	Aux. #1 −5	Aux. #2 +12	Aux. #3 −12	Aux. #4 +12	Aux. #5 +24	
QCP30-10	90-135†	170-265	6.0						30.0
QCP30-20	90-135†	170-265	3.0	3.0					30.0
QCP30-21	90-135†	170-265	3.0		1.2				30.0
QCP40-32	90-130	180-260	4.0		3.0	1.0			40.0
QCP40-40	90-130	180-260	4.0	1.0	3.0	1.0			42.0
QCP40-42	90-130	180-260	4.0	1.0	3.0	1.0			45.0
QCP40-43	90-130	180-260	5.0		3.0	1.0	1.0		45.0
QCP50-30	90-130	180-260	6.0		2.0	1.0			50.0
QCP50-31	90-130	180-260	6.0	1.0	2.0				50.0
QCP50-44	90-130	180-260	6.0		2.0	1.0			50.0
QCP55-30	90-130	180-260	6.0	0.5	2.5	1.0			55.0
QCP55-40	90-130	180-260	6.0		2.5	1.0			55.0
QCP55-44	90-130	180-260	6.0		2.5	1.0	1.2		55.0
QCP55-47	90-130	180-260	6.0		2.5	1.0		1.5	55.0
QCP60-30	90-130	180-260	6.0		3.0	1.0			60.0
QCP60-40	90-130	180-260	6.0	0.5	3.0	1.0			60.0
QCP60-44	90-130	180-260	6.0		3.0	1.0	1.2		60.0
QCP60-47	90-130	180-260	6.0		3.0	1.0		1.5	60.0
QCP75-30	90-130	180-260	8.0		3.0	1.0			75.0
QCP75-40	90-130	180-260	8.0	1.0	3.0	1.0			75.0
QCP75-42	90-130	180-260	8.0		3.0	1.0		2.5	75.0
QCP75-50	90-130	180-260	8.0	1.0	3.0	1.0	2.0		75.0
QCP75-51	90-130	180-260	8.0	1.0	3.0	1.0		2.5	75.0
QCP80-32	90-130	180-260	10.0			3.0		3.0	80.0
QCP80-33	90-130	180-260	10.0		4.0			3.0	80.0
QCP80-41	90-130	180-260	10.0		4.0	1.0	3.0		80.0
QCP80-42	90-130	180-260	10.0		4.0	1.0		3.0	80.0
QCP125-30	90-130	180-260	12.5		4.0	1.0			125.0
QCP125-34	90-130	180-260	15.0				+15V	−15V	125.0
							4.0	1.0	125.0
QCP125-40	90-130	180-260	12.5		4.0	1.0	3.5		125.0
QCP125-46	90-130	180-260	12.5	1.0	4.0	1.0			125.0
QCP200-30	90-130	180-260	30.0	4.0	4.0				200.0
QCP200-40	90-130	180-260	30.0	2.0	4.0	2.0			200.0
QCP200-50	90-130	180-260	30.0	4.0	4.0	2.0		2.0	200.0
QCP200-51	90-130	180-260	30.0	4.0	5.0	2.0	2.0		200.0
QCP300-40	90-130	180-260	40.0	6.0	5.0	3.0			300.0
QCP300-41	90-130	180-260	40.0		5.0	5.0		3.0	300.0
QCP300-42	90-130	180-260	40.0	6.0	5.0			5.0	300.0
QCP300-50	90-130	180-260	40.0	5.0	5.0	2.0	5.0		300.0
QCP400-30	90-130	180-260	50.0		6.0	6.0			400.0
QCP400-40	90-130	180-260	50.0	5.0	6.0	6.0			400.0
QCP400-50	90-130	180-260	50.0	5.0	6.0	3.0		3.0	400.0
QCP400-51	90-130	180-260	50.0		6.0	6.0		5.0	400.0

* All the above models are available with DC Inputs at 12, 24, 48, 60, 125, 250 Volts. † 47-63 Hz only.

QUALIDYNE SYSTEMS, INC.

3055 Del Sol Blvd., San Diego, CA 92154 (619) 575-4400

SWITCHING POWER SUPPLIES • ML SERIES



FEATURES

- High Reliability • Flexibility • No main channel load reqd. All outputs independent
- Operate to zero load
- Any number of configurations — up to six outputs
- AC and DC input
- Prototype service — stock to 2 weeks including custom designs • B.T. approval
- Designed for UL, CSA, VDE, BS

The Qualidyne ML Series provides a modular approach to power supply selection and allows the designer to choose from a wide variety of output modules to build the needed power supply with either AC or DC input. Call for complete details.

STANDARD MODELS

Model Number			Max. Power Watts	O/P 1	O/P 2	O/P 3	O/P 4	O/P 5	O/P 6	Mechanical Sizes (In.)		
115/230 A.C.	48 V.D.C.	24 V.D.C.								H	W	L
ML 100C1	ML 100C1DCH	ML 100C1DCL	116	5V-20A	2V-10A					2.36	5.2	11.61
ML 150C2	ML 150C2DCH	ML 150C2DCL	150	12/15V-10A	5V-10A					2.36	5.2	11.61
ML 150C3	ML 150C3DCH	ML 150C3DCL	150	12/15V-10A	12/15V-4A					2.36	5.2	11.61
ML 150C4	ML 150C4DCH	ML 150C4DCL	150	5V-20A	12V-3A					2.36	5.2	11.61
ML 150C6	ML 150C6DCH	ML 150C6DCL	150	5V-20A	24V-3A	5V-3A				2.36	5.2	11.61
ML 150D3	ML 150D3DCH	ML 150D3DCL	150	5V-20A	24V-4A†	12V-3A	12V-3A			2.36	5.2	12.8
ML 150D5	ML 150D5DCH	ML 150D5DCL	150	5V-20A	24V-3A	12V-3A	12V-1.5A*	5V-0.5A		2.36	5.2	12.8
ML 150E1	ML 150E1DCH	ML 150E1DCL	150	5V-20A	24V-3A	12V-3A	12V-3A	5V-1A		2.36	5.2	13.98
ML 200F1	—	—	200	5V-40A						3.15	5.2	11.02
ML 200F2	—	—	224	24/28V-10A						3.15	5.2	11.02
ML 250H1	—	—	240	5V-40A	24V-3A					3.15	5.2	13.39
ML 300L1	—	—	260	5V-20A	5V-10A	12/15V-4A	12/15V-4A			3.15	5.2	13.39
ML 300G1	—	—	300	12/15V-10A	12/15V-10A					3.15	5.2	12.2
ML 300H3	—	—	300	5V-40A	12/15V-10A					3.15	5.2	13.39
ML 300J3	—	—	300	5V-20A	12/15V-10A	12/15V-10A				3.15	5.2	14.57
ML 300J4	—	—	300	5V-40A	12/15V-10A	5V-3A				3.15	5.2	14.59
ML 300K1	—	—	300	5V-40A	12/15V-10A	12/15V-4A				3.15	5.2	15.75
ML 300K2	—	—	300	5V-20A	12/15V-10A	12/15V-10A	24V-4A†			3.15	5.2	15.75
ML 300K3	—	—	300	5V-40A	24V-4A†	12/15V-4A	5V-3A			3.15	5.2	15.75
ML 300K5	—	—	300	5V-40A	24V-8A†	12V-3A	12V-1.5A*	5V-0.5A		3.15	5.2	15.75
ML 300L3	—	—	300	5V-20A	24V-8A†	12V-3A	12V-3A	12V-3A	5V-3A	3.15	5.2	16.93
ML 300M1	—	—	300	5V-40A	24V-8A†	12/15V-4A	12/15V-4A			3.15	5.2	18.11

* These outputs have a reduced spec. on line and load reg.
† These outputs provide double peak load currents.

INPUT SPECIFICATIONS

Parameter	AC Input	DC Input	
Input Voltage	90-132, 180-264 Vac	High: 38-64 Vdc	Low: 18-32 Vdc
Input Frequency	47-440 Hertz	—	—
Output Power	100-300 Watts	50-150 Watts	50-150 Watts
Hold up (mSec.)	20 (105-198 Vac)	—	—
Inrush current	<18A peak	<20A w/module	<40A w/module
Operating Temperature*	0-70°C in free air	(Derate above 50°C: 2.5%/°C)	
Storage Temperature	−30 +85°C	−30 +85°C	−30 +85°C
RFI		VDE 0871 Class A	
Safety	VDE0804, IEC 380, BS5850, Meets UL & CSA Req.		
Input fuse	Yes	Yes	Yes
Operating Frequency	75 Hz (Nom.)	75 Hz (Nom.)	75 Hz (Nom.)
Start-up time	<0.5 Sec.	<0.5 Sec.	<0.5 Sec.
Efficiency	70-85% depending on configuration	>65% incl. inrush module w/5V output on 150W units	
Psophometric noise filtering	—	>63% (50W unit)	>58% (50W unit)
Thermal Protection	Yes	Std. (150W units), Opt. (50W units)	

* Case temp. must not exceed +70°C.

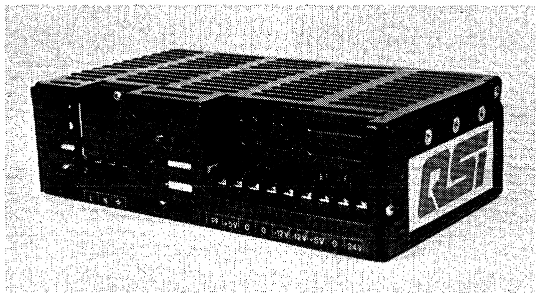
OUTPUT SPECIFICATIONS

Parameter	Switching		Linear
Output Voltage	2-28V	5-36V	5-30V
Adjustment	Pot.	Pre-set	Fixed
Max. O/P deviation	5%	5%	2%
O/P setting	+50 mV	+3%	+50 mV
Temp. Coeff.	0.02%/°C	0.1%/°C	0.02%/°C
Off load Voltage	As set	As set	As set
Line reg. (−15% +10%)	0.05%	1.0%	0.05%
Load reg. (0-100%)	0.1%	0.5% (10-100%) 1.5% (0-100%)	0.5% 0.1%
Ripple	50 mV	0.1% pk-pk	0.2%
Spike	50 mV pk-pk	—	50 mV +0.5% pk
Transient response	—	—	25 μSec
50-100% load chng.	500 μSec	500 μSec	50 μSec
Overcurrent prot.	Constant	—	Foldback
Overvoltage prot.	—	—	Optional
Nondissip. crowbar	5V std (oth opt)	Optional	—
Surge cap. (10 sec. @ 25%)	—	8A and 16A	—
Remote sense (0.25V/line)	Std.	—	only

QUALIDYNE SYSTEMS, INC.

3055 Del Sol Blvd., San Diego, CA 92154 (619) 575-4400

SWITCHING POWER SUPPLIES • 100 WATTS to 150 WATTS



FEATURES

- 1-5 Outputs
- 110/220 V Input
- 100 Watts convection cooled, 150 Watts air cooled
- Typically 80 efficient
- International safety/RFI standards (IEC, VDE, UL)
- Fully regulated and semi-regulated outputs available
- 24 hour full load burn-in
- Approved by British Telecom (Technical guides TG 2 & TG 26)
- UL Recognized

VOLTAGE AND MAXIMUM CONTINUOUS CURRENT RATING

Model	Output 1	Output 2	Output 3	Output 4	Output 5	Mechanical Sizes (in.)		
						H	W	L
MULTIPLE OUTPUTS								
1527-3F-000	+5V 12A	+12V 5A	−12V 2A	−5V 1A	+24V 2A	2.36	4.53	8.27
1527-3F-001*	+5V 12A	+15.6V 4A	−15.6V 1.5A	−5V 0.5A	+24V 2A	2.36	4.53	8.27
1527-3F-002*	+5V 12A	+12V 5A	−12V 2A	−5V 1A	+12V 2A	2.36	4.53	8.27
1527-3F-003	+5V 12A	+12V 5A	−12V 2A	−5V 1A	+75V .8A	2.36	4.53	8.27
1527-3F-004	+5V 12A	+12V 5A	−12V 2A	−5V 1A	+50V 1A	2.36	4.53	8.27
1527-3F-005**	+5V 12A	24V 3A	−12V 2A	−5V 1A	N/A	2.36	4.53	8.27
SINGLE OUTPUTS								
1027B-3F-000	5V 20A					2.36	4.53	8.27
1027B-3F-001	12V 8A					2.36	4.53	8.27
1027B-3F-002	24V 4.2A					2.36	4.53	8.27
1027B-3F-003	50V 2A					2.36	4.53	8.27

NOTE: Other combinations of voltages are available for volume applications to special order.

Initial setting accuracy	±2%	±2%	±5%	±5%	±0.5%	
Load at which outputs are set	6A	2.5A	1.0A	0.5A	1A	

* Please note that specifications refer to base unit.
Outputs 2, 3, and 5 are designed to provide surge currents.
** 4 outputs only.

SPECIFICATIONS

Input

AC 45 to 450 Hz 180-264V and 90-132V. Selected by linking two internal terminals.

Inrush current limiting circuitry limits input current peaks on switch on to less than 50 Amperes under worst case conditions.

Outputs

The following performance specifications are based upon operation over a temperature range of 0°C to 50°C.

Operation at temperatures up to 70°C is permissible but output derates linearly to half the stated maximums over the 50°C to 70°C range.

Maximum Output Power. The 1527 is capable of supplying up to 100W if convection cooled and up to 150W if forced air cooled.

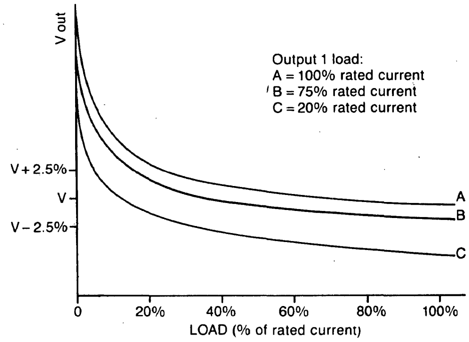
Output hold up at 100W. Input AC 50 Hz 125V or 235V > 1 cycle (switch-off occurring at zero crossing.)
Input AC 50 Hz 115V or 230V > ½ cycle (switch-off occurring at zero crossing).

Overvoltage Protection. This is a latch circuit and is fitted to Output 1. It is set at 6.2V ±10% and after tripping may be reset by disconnecting the AC input for 10 seconds.

PERFORMANCE SPECIFICATION

		Output 1	Output 2	Output 3	Output 4	Output 5
Line regulation ±10% line voltage change		±0.2%	±0.4%	±0.4%	±0.5%	±0.1%
Load regulation 60% ±40% load change		±1.5%	±2.5%	±2.5%	±1.0%	±0.25%
Cross regulation (OP1 75 ±25%, all outputs 50% load)		N/A	±2.5%	±2.5%	±0.5%	±0.2%
Maximum temperature coefficient/°C		±0.02%	±0.05%	±0.05%	±0.05%	±0.02%
Short circuit protection		current limit	current limit	current limit	current limit	current limit
Overvoltage protection		6.2V ±10%	–	–	–	–
Regulation		fully regulated	semi-regulated	semi-regulated	fully regulated	fully regulated
Output noise (pk-pk)* 100W output, nominal input	(a) AC input	10 mV	25 mV	25 mV	5 mV	5 mV
	(b) Switching	25 mV	60 mV	60 mV	25 mV	50 mV
	(c) Spikes	50 mV	120 mV	120 mV	100 mV	120 mV

* Please note that specifications refer to base unit. Outputs 2, 3 and 5 are designed to provide surge currents.

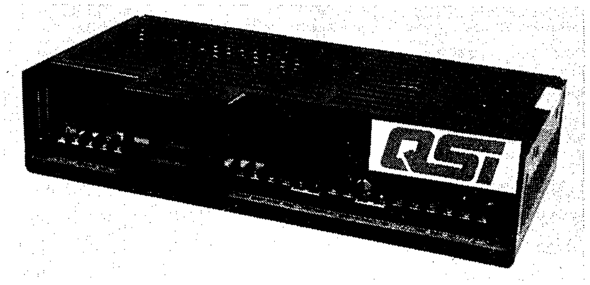


TYPICAL REGULATION CHARACTERISTICS OUTPUT 2 & 3

QUALIDYNE SYSTEMS, INC.

3055 Del Sol Blvd., San Diego, CA 92154 (619) 575-4400

SWITCHING POWER SUPPLIES • 180 WATTS to 300 WATTS



FEATURES

- 1-5 Outputs
- 110/220 V Input or 48 VDC (Model 3519 only)
- 180 Watts to 300 Watts convection or air cooled
- Typically 80 efficient
- International safety/RFI standards (IEC, VDE, UL)
- Fully regulated and semi-regulated outputs available
- 24 hour full load burn-in
- Approved by British Telecom (Technical guides TG 2 & TG 26)
- UL Recognized ®

VOLTAGE AND MAXIMUM CONTINUOUS CURRENT RATING

Model	Max. Power Watts	Output 1	Output 2	Output 3	Output 4	Output 5	Mechanical Dimensions (in.)		
							H	W	L
FOR MAIN AND SECONDARY OUTPUTS									
1530B-3F-000*	180	+5.1V 20A	+12V 6A	−12V 6A	−5V 1A	+24V 3A, 5Apk	2.83	4.80	10.50
2329B-3F-000	200	+5V 30A	12-24V 6A	12V 6A			2.56	5.90	11.81
2429B-3F-000	200	+5V 30A	12-24V 6A	12V 6A	+24V 3A, 5Apk		2.56	5.90	11.81
2429B-3F-000	200	+5V 25A	+12V 6A	−12V 6A	−5V1A		2.56	5.90	11.81
FOR SINGLE OUTPUTS									
3019B-3-000	300	5V 60A					2.56	5.90	11.81
3019E-3-000	300	12/15V 25A					2.56	5.90	11.81
3019J-3-000	300	24V 12A					2.56	5.90	11.81
3019P-3-000	300	50V 6A					2.56	5.90	11.81
FOR MULTIPLE OUTPUTS									
3419B-3-005	300	5V 40A	12V 6A	12V 6A	12-15V 6A		2.56	7.48	11.81
3419B-3-006	300	5V 40A	12V 6A	12V 6A	12-15V 6A		2.56	7.48	11.81
3519B-3-000	300	5V 40A	24V 6A	12-15V 6A	12-15V 6A	5-15V 3A	2.56	7.48	11.81
3519B-3-001	300	5V 40A	12V 6A	12-15V 6A	12-15V 6A	5-15V 3A	2.56	7.48	11.81
3519B-5-000	300	5V 40A	24V 6A	12-15V 6A	12-15V 6A	5-15V 3A	2.56	7.48	11.81
3519B-5-001	300	5V 40A	12V 6A	12-15V 6A	12-15V 6A	5-15V 3A	2.56	7.48	11.81

* Other combinations available.

SPECIFICATIONS

Input

AC 45 to 450 Hz 180-264V and 90-132V. Selected by linking two internal terminals.

Inrush current limiting circuitry limits input current peaks on switch on to less than 50 Amperes under worst case conditions.

Outputs

The following performance specifications are based upon operation over a temperature range of 0°C to 50°C.

Operation at temperatures up to 70°C is permissible but output derates linearly to half the stated maximums over the 50°C to 70°C range.

Maximum Output Power. 180 to 300 watts depending on product selected.

Output hold up. Input AC 50 Hz 125V or 235V > 1 cycle (switch-off occurring at zero crossing.)
Input AC 50 Hz 115V or 230V > ½ cycle (switch-off occurring at zero crossing).

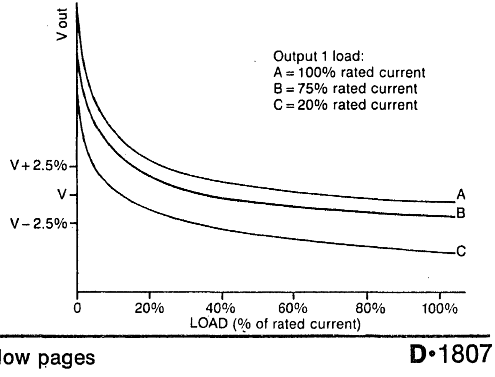
Overvoltage Protection. This is a latch circuit and is fitted to Output 1. It is set at 6.2V ±10% and after tripping may be reset by disconnecting the AC input for 10 seconds.

PERFORMANCE SPECIFICATION

		Output 1	Output 2	Output 3	Output 4	Output 5
Line regulation ±15% line voltage change		±0.2%	±0.4%	±0.4%	±0.5%	±0.1%
Load regulation 60% ±40% load change*		±1.5%	±2.5%	±2.5%	±1.0%	0.25%
Cross regulation (OP1 75 ±25%, all outputs 50% load)		N/A	±3.0%	±3.0%	±0.5%	±0.2%
Maximum temperature coefficient/°C		±0.02%	±0.05%	±0.05%	±0.05%	±0.02%
Short circuit protection		current limit	current limit	current limit	current limit	current limit
Overvoltage protection		6.2V ±10%	—	—	—	—
Regulation*		fully regulated	semi regulated	semi regulated	fully regulated	fully regulated
Output noise (pk-pk) nominal input	(a) Mains	10 mV	10 mV	25 mV	5 mV	5 mV
	(b) Switching	25 mV	60 mV	60 mV	25 mV	50 mV
	(c) Spikes	50 mV	120 mV	120 mV	100 mV	120 mV

* Model 3519B has 1% load regulation and all fully regulated outputs.

TYPICAL REGULATION CHARACTERISTICS OUTPUT 2 & 3



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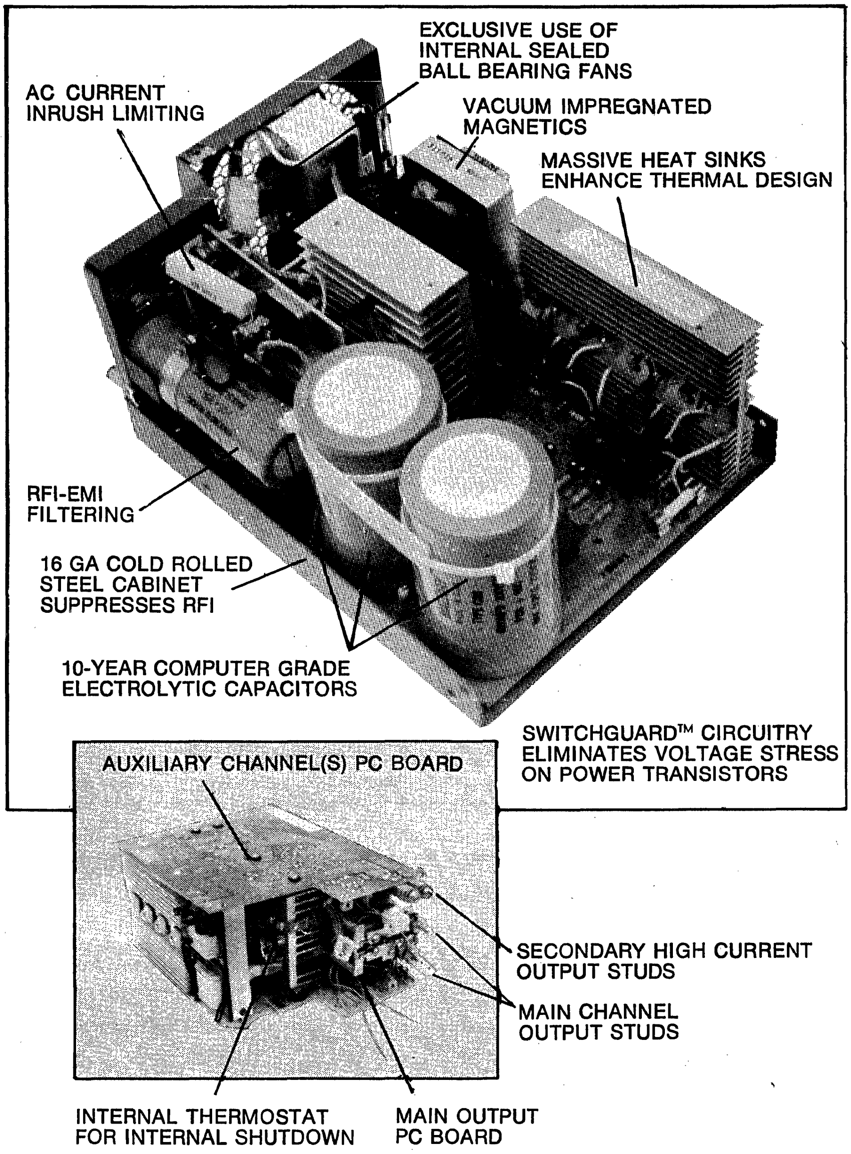
EXCLUSIVE USE OF INTERNAL SEALED BALL BEARING FANS
AC CURRENT INRUSH LIMITING
VACUUM IMPREGNATED MAGNETICS
MASSIVE HEAT SINKS ENHANCE THERMAL DESIGN
RFI-EMI FILTERING
16 GA COLD ROLLED STEEL CABINET SUPPRESSES RFI
10-YEAR COMPUTER GRADE ELECTROLYTIC CAPACITORS
SWITCHGUARD™ CIRCUITRY ELIMINATES VOLTAGE STRESS ON POWER TRANSISTORS
AUXILIARY CHANNEL(S) PC BOARD
SECONDARY HIGH CURRENT OUTPUT STUDS
MAIN CHANNEL OUTPUT STUDS
INTERNAL THERMOSTAT FOR INTERNAL SHUTDOWN
MAIN OUTPUT PC BOARD

POWER FOR PERFORMANCE

STANDARD FEATURES

- Overvoltage protection
- Overcurrent protection
- Overtemperature protection
- EMI — RFI noise filtering
- FCC 20780 Class A
- Remote sense
- Single through 6 output models available
- Input voltages available:
  1 = 115 VAC 50/60 Hz
  2 = 208 VAC 50/60 Hz
  3 = 115/208 VAC 50/60 Hz
  4 = 24 VDC
  5 = 48 VDC
  6 = 125 VDC
  7 = 125 VDC/115 VAC
  8 = 250 VDC/208 VAC
  9 = 208 VAC 3 Phase
- Designed to meet the critical safety agency approvals UL478, CSA22.2 No. 154, IEC435, VDE 0875, IEC 380, VDE 0806
- U.L. file no. E64604
- TUV File No. 855062
- CSA file no. LR45803C
- Board level test on Wayne-Kerr
- UTS 3000 computerized final test with printout for each supply
- Standard general inspection requirements to MIL STD-454G
- Inspection to MIL-I-45208A
- High power switching regulated secondary channels available
- Incoming/receiving inspection of all active devices — 100% testing and matching of power diodes and power transistors
- Exclusive use of ball bearing fans on all products
- 48 hour burn-in at 50°C at 100% load with temperature and AC input cycling
- MTBF 50,000 hours
- Inrush current limited
- 30 millisecond holdover storage
- One year warranty

Switchguard™ — a patented modification of the classic "H" or full-bridge inverter circuit. The design forces series transistors to turn off at the same time thereby eliminating failure due to voltage stress.

COMPUTERIZED FINAL ELECTRICAL TEST OF ALL PRODUCTION SUPPLIES

MICROPROCESSOR BASED BOARD LEVEL SUB-ASSEMBLY TEST

QSI QUALIDYNE SYSTEMS, INC.

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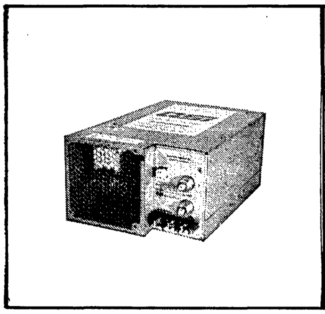
SWITCHING POWER SUPPLIES • 500 WATTS to 1800 WATTS



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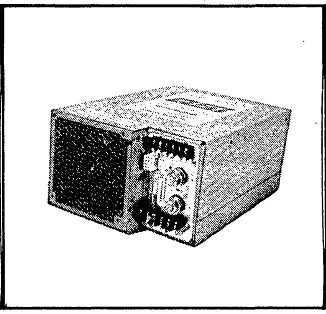

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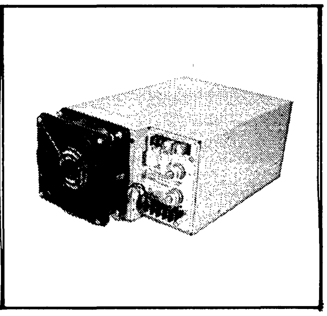


9311C-2F-002

The Qualidyne power supplies listed on this page are all highly efficient switching types for computer related equipment, from 500 to 1800 Watts with single or multiple (up to 5) outputs in many combinations. There are three basic styles and a variety of models within each style.

The models shown here have the same basic case dimensions. In the 9000 series family, an additional cooling fan is used which adds 2" to the case length. The tables illustrate the breadth of line available. In the tables the figures for the channels indicate the available range (5V/6A to 24V/6A).

Most models feature dual AC input (115/208). Some are designed for DC input and the higher power units are either 115 or 208 Vac input. All Qualidyne power supplies are UL listed and meet all other safety standards (CSA, VDE, IEC, etc.) Efficiency varies with load and cooling method.

The "X" in the model numbers indicates an option or voltage to be specified. The options are: A = Inhibit Active Hi; B = Inhibit Active Lo; C = Overvoltage crowbar; D = Enable Active Hi; E = Enable Active Lo; F = AC Power Fail; G = DC Power Good; H = 47-440 Hz; J = Current Monitor; M = Provision for system margin test; V = Electronic Preload.

Model/ Series	Nominal Input			Output Volts/Amps					Options*										Cooling		Total Power Watts	Nom. Dimen. L"xH"xW"
	Vac	Vac	Vdc	Chan. 1	Chan. 2	Chan. 3	Chan. 4	Chan. 5	A	B	C	D	E	F	G	H	J	M	Conv.	Fan		
5010X-3-XXX	115	208		Single: 2/100 to 48/10					X	X	X	X	X	X	X	X	X	X	X		500	11.0x5.0x8.0
5310X-3-XXX	115	208		5/80	12/8-15/15	5/6-24/6			X	X	X	X	X	X	X	X	X	X	X		500	11.0x5.0x8.0
5410X-3-XXX	115	208		5/80	12/6-15/8	12/6-15/8	5/8-24/4		X	X	X	X	X	X	X	X	X	X	X		500	11.0x5.0x8.0
5510X-3-XXX	115	208		5/80	12/6-15/8	12/6-15/8	12/6-24/4	5/4-15/4	X	X	X	X	X	X	X	X	X	X	X		500	11.0x5.0x8.0
6010X-4-XXX			24	Single: 2/200 to 48/15					X	X	X	X	X		X		X	X	X		750	11.0x5.0x8.0
60101-5-XXX			48	Single: 2/200 to 48/15					X	X	X	X	X		X		X	X	X		750	11.0x5.0x8.0
6010X-6-XXX			125	Single: 2/200 to 48/15					X	X	X	X	X		X		X	X	X		750	11.0x5.0x8.0
6010X-3-XXX	115	208		Single: 2/200 to 48/17					X	X	X	X	X	X	X	X	X	X	X		750	11.0x5.0x8.0
8310X-4-XXX			24	5/120	3/15-15/8	5/5-24/5			X	X	X	X	X		X		X	X	X		750	11.0x5.0x8.0
8310X-5-XXX			48	5/120	3/15-15/8	5/5-24/5			X	X	X	X	X		X		X	X	X		750	11.0x5.0x8.0
8310X-6-XXX			125	5/120	3/15-15/8	5/5-24/5			X	X	X	X	X		X		X	X	X		750	11.0x5.0x8.0
8410X-4-XXX			24	5/120	5/15-15/8	12/5-24/5	5/4-15/4		X	X	X	X	X		X		X	X	X		750	11.0x5.0x8.0
8410X-5-XXX			48	5/120					X	X	X	X	X		X		X	X	X		750	11.0x5.0x8.0
8410X-6-XXX			125	5/120					X	X	X	X	X				X	X	X		750	11.0x5.0x8.0
8210X-3-XXX	115	208		5/120	5/25-24/16				X	X	X	X	X	X	X	X	X	X	X		825	11.0x5.0x8.0
8310X-3-XXX	115	208		5/120	5/13-15/20	5/5-24/8			X	X	X	X	X	X	X	X	X	X	X		825	11.0x5.0x8.0
8410X-3-XXX	115	208		5/120	5/13-15/10	12/5-24/6	5/3-15/6		X	X	X	X	X	X	X	X	X	X	X		825	11.0x5.0x8.0
8510X-3-XXX	115	208		5/120	12/13-15/10	12/6-24/6	12/6-24/6	5/4-24/3	X	X	X	X	X	X	X	X	X	X	X		825	11.0x5.0x8.0
8010X-3-XXX	115	208		Single: 2/250 to 48/20					X	X	X	X	X	X	X	X	X	X	X		1000	11.0x5.0x8.0
Either 115 or 208																						
9311X-2X-XXX		208		5/150	12/13-15/10	12/13-24/6			X	X	X	X	X	X	X	X	X	X		X	1150	13.0x5.0x8.0
9411X-2X-XXX		208		5/150	12/13-15/10	12/13-24/6	12/5-24/3		X	X	X	X	X	X	X	X	X	X		X	1150	13.0x5.0x8.0
9411X-2X-XXX	Custom	208		5/150-5/200	2/30-5/50	12/4-15/4	5/3-24/2.5		X	X	X	X	X	X	X	X	X	X		X	1150	13.0x5.0x8.0
9511X-2X-XXX		208		5/150	12/13-15/10	12/10-24/6	12/6-24/6	5/4-15/3	X	X	X	X	X	X	X	X	X	X		X	1150	13.0x5.0x8.0
9010X-2X-XXX		208		Single: 2/300 to 48/35					X	X	X	X	X	X	X	X	X	X	X		1500	11.0x5.0x8.0
9011X-2X-XXX		208		Single: 2/300 to 48/40					X	X	X	X	X	X	X	X	X	X		X	1800	13.0x5.0x8.0

RIFA

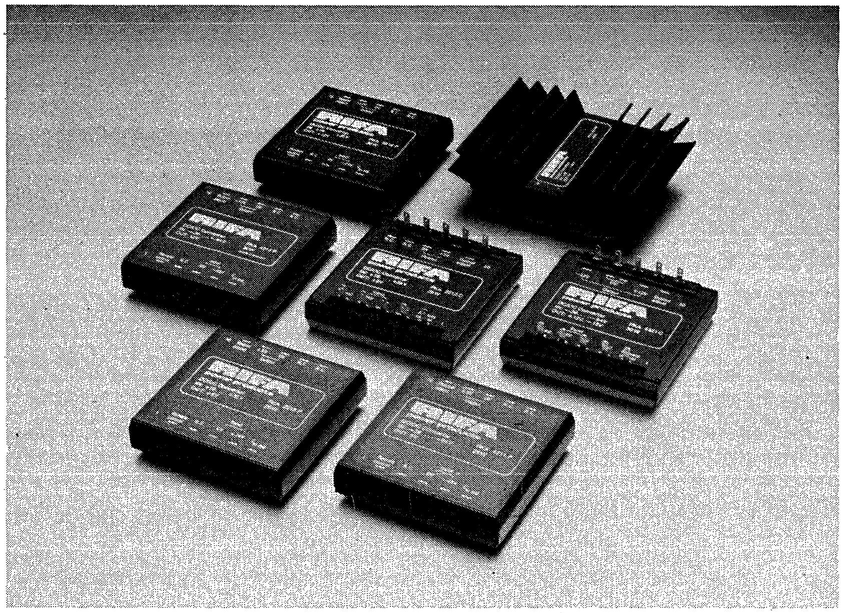
power products **PKA**

DC/DC converters 25—40W

Single, Dual and Triple outputs

- **Switching frequency: 300kHz**
- **Short circuit proof**
- **MTBF at T_{amb} = 45°C: >200 years**
- **No extra components**
- **No extra cooling**
- **Parallelable**
- **PC-card or chassis mountable**
- **Extremely compact: 25W—0.25W/cm^3 (4.1W/in^3), 30W—0.3W/cm^3 (4.9W/in^3)**
- **Extremely light-weight: 100—160 gr. (3.53—5.64 ozs.)**
- **Input voltage ratings: + 24V (19—35V) −48V (−39... −64V)**
- **Low RFI and noise**
- **Transient protected**
- **Input sense with shutdown command at undervoltage**
- **Output adjustable: ±10%**
- **Remote control**
- **Soft start**
- **Very high efficiency: 79—85%**
- **No derating of output power —45° C to +85° C**

The PKA series DC/DC converters are modular miniaturized standard components designed for economic Industrial/Professional applications in central and decentralized power supply systems. Their completeness and particular mechanical features of dimensions and weight make the PKA series suitable also for high power density PC-card applications. The very high MTBF-figure makes the converters useful for parallel operations in great numbers, while maintaining a good system MTBF-figure. 300kHz PWM-switching technology, and sophisticated mechanical design including thickfilm technology, custom designed IC:s and extremely minimized magnetics, give the RIFA converters unique electrical and mechanical features.



Product Program

In:	+ 24V DC (19—35V)	P_{out}	Type
Out:	+5V/5A	25W	PKA 2212
	+12V/2,5A	30W	PKA 2314
	+5V ±12V/3.8A, ±0.25A	25W	PKA 2231
	+5V ±15V/3.2A, ±0.32A	25W	PKA 2232
In:	**−48V DC (−39...−64V)**	**P_{out}**	**Type**
Out:	+ 5V alt. −5V/5A	25W	PKA 4211
	+ 5V alt. −5V/8A	40W	PKA 4411
	+ 12V alt. −12V/2.5A	30W	PKA 4313
	±12V/±1.25A alt. —24V/1.25A	30W	PKA 4321
	+5V ±12V/3.8A, ±0.25A	25W	PKA 4231
	+5V ±15V/3.2A, ±0.32A	25W	PKA 4232
All types available in PC card or Chassis versions.			

Absolute Maximum Ratings

V_i	Input voltage	+ 40V DC alt. −65V DC
T_{op}	Operating ambient temperature	−45 to + 85°C
$T_{stg.}$	Storage temperature	−55 to + 125°C
T_C	Case temperature	+ 115°C
I_O	Output current	Internally limited
W_{tr}	Transient input energy, $T_{amb.}$ = 25°C	1.3Ws

RIFA Inc.

Greenwich Office Park 3, Greenwich, CT 06830 / (203) 625-7300 / TWX 710-579-2970

RIFA

PKA

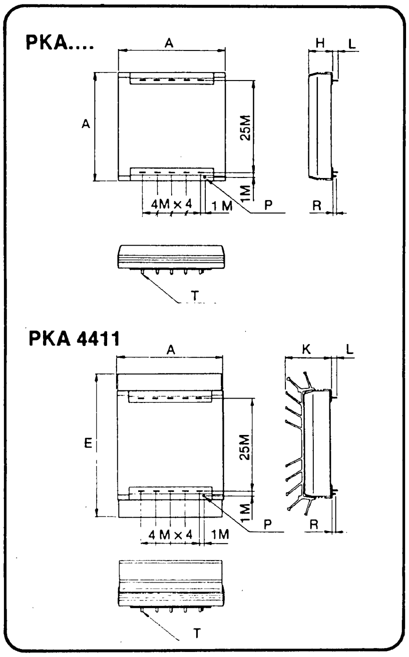
power products

Environmental Tests according to IEC 68

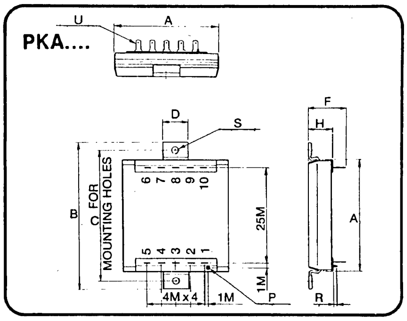
Test method		Reference	Test conditions	
F_c	Vibration (Sinusoidal)	IEC 68-2-6 F_c	Frequency	10—500 Hz
			Displacement amplitude	0.75 mm (0.03 in.)
			Acceleration amplitude	100 m/s^2 (327.9 ft/s^2) ≈ 10.2 g
			Number of cycles	10 in each axis
E_a	Mechanical shock (Half-sinusoidal)	IEC 68-2-27 E_a	Peak acceleration	2000 m/s^2 (6557.4 ft/s^2) ≈ 204 g
			Shock duration	3 ms
E_b	Bump (Half-sinusoidal)	IEC 68-2-29 E_b	Peak acceleration	400 m/s^2 (1311.5 ft/s^2) ≈ 40.8 g
			Bump duration	6 ms
			Number of bumps	1.000 in 6 directions

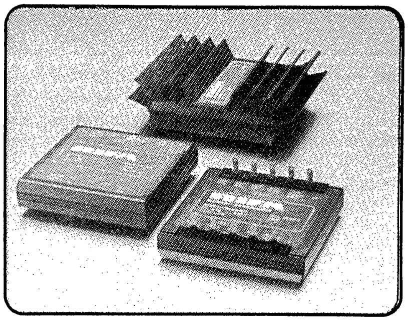
Mechanical Data (Dimensions given as max. values unless otherwise stated.)

PC-card versions



Chassis version





	Millimeters	Inches		Millimeters	Inches
A	76	2.99	**K**	34	1.39
B	100	3.94	**L**	3.4	0.14
C	88±0.3	3.46±0.02	**M**	2.54	0.1
D	19	0.75	**P**	Ø1.8	Ø0.07
E	101.6	4.00	**R**	2.6	0.1
F	27.3	1.07	**S**	Ø4.6±0.2	Ø0.18±0.01
G	19.8	0.78	**T**	1.3×0.5	0.05×0.02
H*	17.8	0.70	**U**	2.8×0.5	0.11×0.02

* For PKA 4411C replace H with G.

Ordering Information:

PKA.... P PC-Card version
PKA.... C Chassis version

Package:
Blue anodized self-cooled aluminium chassis with snap-on cover. Chassis version includes blue anodized snap-on adapter and flat contacts according to DIN 46244.

Weight:
PC-Card version 100 grams (3.53 ozs.), PKA 4411 (40W) 160 grams (5.64 ozs.) Chassis version 155 grams (5.47 ozs.).

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RO ASSOCIATES

AC to DC Switchers

- MTBF'S TO 126,000 HOURS
- 90/110/240 VAC INPUTS AVAILABLE
- ST SERIES MEETS MIL-STD-810C
- 18 YEARS EXPERIENCE IN SWITCHING POWER SUPPLIES
- OVER 200,000 SWITCHERS DELIVERED

SINGLE OUTPUTS

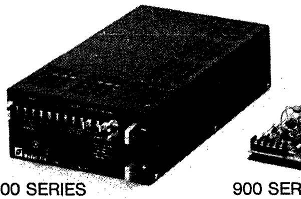
Volts DC	Amps	Model	Price
1.5-6V	5	105	$135.00
5.0	1	ET-13	87.00
	5	105	135.00
	10	210	299.00
	25	925	199.00
	25	325	320.00
	25	325ST	480.00
	35	UC-35	275.00
	100	710	595.00
	120	712	650.00
6.0	5	105	135.00
	20	325C	320.00
	20	325STC	480.00
	100	710C	650.00
6–12	3	108	135.00
6–28	1.5	106	135.00
12	3	108	135.00
	10	940	199.00
12–15	2.5	107	135.00
	4	250	315.00
	10	350	320.00
	10	350ST	480.00
	40	750	595.00
15	8	950	199.00
16–23	1.5	106	135.00
24	5	951	199.00
24–28	1.5	106	135.00
	2	251	315.00
	5	351	320.00
	5	351ST	480.00
	20	751	595.00
30	5	351	320.00
	20	751	595.00
250	.030	ET-19	95.00

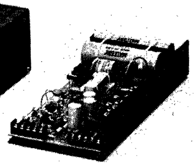
DUAL OUTPUTS

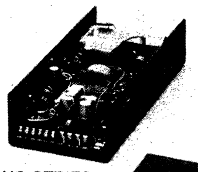
Volts DC	Amps	Model	Price
±12	±.200	ET-21	$ 87.00
±12	±3.0	903	225.00
±12	±3.0	303	395.00
±12	±3.0	303ST	592.50
±12–±15	±.750	115	135.00
±15	±.200	ET-24	87.00
±15	±2.5	902	225.00
±15	±3.0	302	395.00
±15	±3.0	302ST	592.50

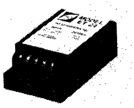
MULTI OUTPUTS

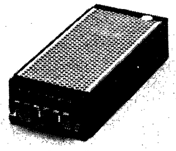
Output 1	Output 2	Output 3	Output 4	Output 5	Model	Price
5V @ .6A	+12V @ .1A	−12V @ .1A	—	—	ET-31	$108.00
5V @ .5A	+15V @ .1A	−15V @ .1A	—	—	ET-32	108.00
5V @ 5A	+12V @ .4A	−12V @ .4A	—	—	213C	395.00
5V @ 5A	+15V @ .4A	−15V @ .4A	—	—	213	395.00
5V @ 10A	12V @ 2A	—	—	—	314	375.00
5V @ 10A	12V @ 2A	—	—	—	314ST	562.50
5V @ 8A	12V @ 3A	—	—	—	315	375.00
5V @ 8A	12V @ 3A	—	—	—	315ST	562.50
5V @ 12A	12V @ 1A	—	—	—	316	375.00
5V @ 12A	12V @ 1A	—	—	—	316ST	562.50
5V @ 10A	+12V @ 1A	−12V @ 1A	—	—	312	395.00
5V @ 10A	+12V @ 1A	−12V @ 1A	—	—	312ST	592.50
5V @ 10A	+15V @ 1A	−15V @ 1A	—	—	313	395.00
5V @ 10A	+15V @ 1A	−15V @ 1A	—	—	313ST	592.50
5V @ 15A	+12V @ 1.0A	−12V @ 1.0A	−5V @ .5A	—	910	225.00
5V @ 15A	+15V @ .8A	−15V @ .8A	−5V @ .5A	—	910	225.00
5V @ 20A	+12V @ 3A	−12V @ 1A	−5V @ .5A	—	UC-10	325.00
5V @ 20A	+15V @ 2.5A	−15V @ 1A	−5V @ .5A	—	UC-10	325.00
5V @ 15A	+(12-15)V @ 2A	−(12-15)V @ 1A	+12V @ 4.0A	—	UC-22	325.00
5V @ 15A	+(12-15)V @ 2A	−(12-15)V @ 1A	+24V @ 2.0A	—	UC-24	325.00
5V @ 10A	+(12-15)V @ 2A	−(12-15)V @ 1A	−5V @ .5A	—	910X	250.00
5V @ 10A	+(12-15)V @ 1A	−(12-15)V @ 2A	−5V @ .5A	—	910V	250.00
5V @ 50A	+(12-15)V @ 10A	−(12-15)V @ 10A	—	—	713	750.00
5V @ 50A	+12V @ 12A	−(12 − 15)V @ 8A	—	—	722	750.00
5V @ 50A	+24V @ 4A	+(12-15)V @ 6A	−(12-15)V @ 6A	—	724	750.00

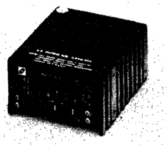

700 SERIES

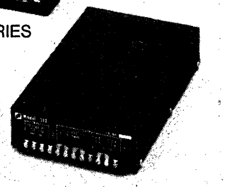

900 SERIES


UC SERIES


ET SERIES


100 SERIES


200 and 2000 SERIES


300 and 300ST SERIES

CONSULT FACTORY FOR MIL-SPEC UL/VDE/FCC APPROVALS

RO ASSOCIATES, INCORPORATED
246 CASPIAN DRIVE, SUNNYVALE, CA 94086 / (408) 744-1450 TWX 910-339-9304

RO ASSOCIATES

DC to DC Converters

Series 1100

FEATURES

- HIGH EFFICIENCY SECONDARIES
- LOW PROFILE (2.7" HIGH)
- UP TO 5 OUTPUTS IN ONE PACKAGE
- OUTPUT SURGE CAPABILITY FOR DISK DRIVES
- WIDE INPUT RANGE

Series CX

FEATURES

- LOW PROFILE 0.38 INCH HIGH CASE
- HIGH EFFICIENCY
- SIX-SIDED CONTINUOUS SHIELDING
- RFI INPUT FILTER
- DUAL TRACKING OUTPUTS
- LOW NOISE (INPUT AND OUTPUT)
- INPUT/OUTPUT ISOLATION

SINGLES

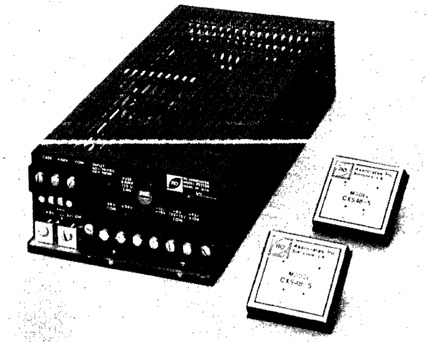
Input	Volts DC	Amps	Model	Price
48VDC	5	1	CXS48-5	$ 98.
48VDC	5	10	2105	395.
48VDC	5	40	1140	340.
48VDC	12	.5	CXS48-12	98.
48VDC	15	.4	CXS48-15	98.

DUALS

Input	Volts DC	MA	Model	Price
5VDC	±12	±185	CXD5-12	$110.
5VDC	±15	±150	CXD5-15	110.
12VDC	±12	±250	CXD12-12	110.
12VDC	±15	±200	CXD12-15	110.
24VDC	±12	±250	CXD24-12	110.
24VDC	±15	±200	CXD24-15	110.
48VDC	±12	±250	CXD48-12	110.
48VDC	±15	±200	CXD48-15	110.

MULTI OUTPUTS

Input	Output 1	Output 2	Output 3	Output 4	Output 5	Model	Price
40-70VDC	5V @ 20A	+12V @ 4.0A	−12V @ 4.0A	-5V @ 0.5A	—	1110	$395.00
40-70VDC	5V @ 20A	+15V @ 3.0A	−15V @ 3.0A	-5V @ 0.5A	—	1110	395.00
40-70VDC	5V @ 20A	+12V @ 4.0A	+12V @ 3.0A	-12V @ 2.0A	-5V @ 0.5A	1112	395.00
40-70VDC	5V @ 20A	+12V @ 4.0A	+15V @ 2.5A	-15V @ 1.5A	-5V @ 0.5A	1112	395.00
40-70VDC	5V @ 20A	+24V @ 2.0A	+12V @ 3.0A	-12V @ 2.0A	-5V @ 0.5A	1124	395.00
40-70VDC	5V @ 20A	+24V @ 2.0A	+15V @ 2.5A	-15V @ 1.5A	-5V @ 0.5A	1124	395.00



1100 SERIES CX SERIES

Call or Write for complete catalog

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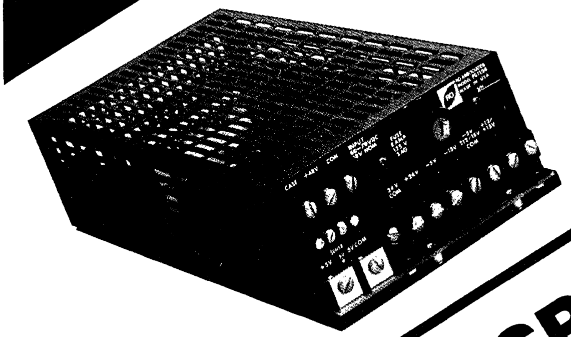
See what's "NEW FOR '85" on next page

NEW FOR '85

DC-DC

1100 SERIES (48 VDC INPUT)

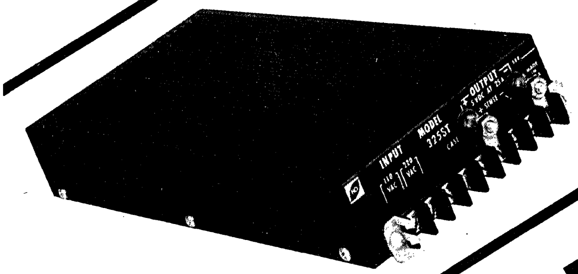
a. 200 WATTS—UP TO 5 OUTPUTS
b. LOW PROFILE 2.7" HIGH
c. HIGH EFFICIENCY SECONDARIES
d. OUTPUT SURGE CAPABILITY



MIL-SPEC.

300ST SERIES

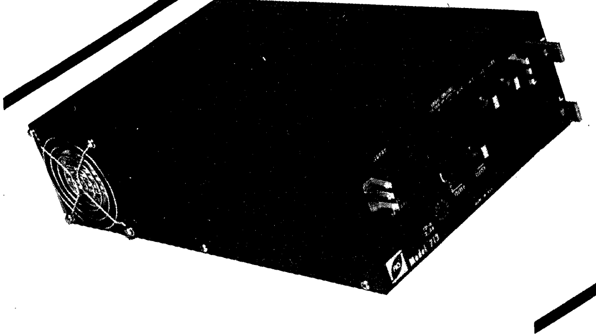
a. MEETS MIL 810C (ENVIRONMENTAL)
b. MEETS MIL 1399 (VOLTAGE TRANSIENTS)
c. MEETS MIL 461A (CONDUCTED EMI)
d. MEETS MIL 901C (HIGH SHOCK)



HIGH POWER MULTI-OUTPUT

700 SERIES (550 WATTS)

a. LOW PROFILE 3.4" HIGH
b. HIGH EFFICIENCY SECONDARIES
c. OUTPUT SURGE CAPABILITIES
d. ADJUSTABLE SECONDARIES



RO

RO ASSOCIATES, INCORPORATED
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COMMONLY USED ELECTRICAL/ELECTRONIC ABBREVIATIONS AND ACRONYMS

A
AC alternating current
A/D analog to digital
ADC analog to digital converter
ADP automatic data processing
AF audio frequency
AFC automatic frequency control
ALGOL algorithmic language
AM amplitude modulation
AND a logical operator
AQL acceptable quality level
ASCII American national standard code for information interchange
AWG American wire gauge

B
BALUN balanced to unbalanced
BASIC beginners' all-purpose symbolic instruction
BCD binary-coded decimal
BNC baby "N" connector
BUS basic utility system

C
CAD computer aided design
CAM computer aided manufacture
CATV cable television or community antenna television
CERMET ceramic metal element
Comm. communications
CMOS complementary metal-oxide semiconductor
CPS characters per second
CPU central processing unit

D
D/A digital to analog
DAC digital to analog converter
DC direct current
DIAC bidirectional trigger diode
DIL dual in-line
DIN Deutsche Industrie Normenausschuss
DIP dual in-line package
DPM digital panel meter
DTL diode transistor logic

E
EDP electronic data processing
EBCDIC extended binary coded decimal interchange code
EEPROM electrically erasable PROM
EMC electromagnetic compatibility
EMI electromagnetic interference
EMP electromagnetic pulse
EPROM electrically programmable ROM
ESR equivalent series resistance

F
FEP fluorinated ethylene propylene Copolymar, 200° Teflon
FET field-effect transistor
FM frequency modulation
FORTRAN formula translator

G
GaAsFET gallium arsenide field effect transistor
GPIB general purpose interface bus

H
HF high frequency (3 to 30 MHz)
HIPOT test, measurement and diagnostic equipment
HLL high level language
HV high voltage
Hz Hertz

I
IC integrated circuit
IDC insulation displacement contact
IF intermediate frequency
IO input/output (devices)
IR insulation resistance (or) infrared

J
JFET junction field effect transistor
JMOS junction metal oxide semiconductor

K
kHz kilohertz (10^3 hertz)
KSR keyboard send receive

L
LC inductance capacitance
LCD liquid crystal display
LED light-emitting diode
LF low frequency (30 to 300 kHz)
LIF low insertion force
LNA low noise amplifier
LNB low noise band
LSI large scale integration
LVDT linear velocity displacement transformer

M
MASER microwave amplification by stimulated emission of radiation
MATV master antenna television
μF microforad
MHz megahertz
MIPS million instructions per second
MIB microcomputer interface board
MOS metal oxide semiconductor
MOSFET metal oxide semiconductor field effect transistor
MOSIGT metal-oxide semiconductor insulated-gate transistor
MOV metal oxide varistor
MPU microprocessor unit
MSI medium scale integration

N
NBS National Bureau of Standards
NEMP nuclear electromagnetic pulse
NIM nuclear instrumentation module
NOR not OR
NTC negative temperature coefficient

O
OCR optical character reader
OEM original equipment manufacturer
OR a logical operator

P
PC printed circuit
PCB printed circuit board
pF picofarad
PGA pin grid array
PIN positive-intrinsic-negative ~~(transistor)~~ (Diode)
PLA programmable logic array
PLL phased lock loop
PPI plan position indicator
PROM programmable read only memory
PTC positive temperature coefficient
PUT programmable unijunction transistor

Q
QAM quadrature amplitude modulation
Q (meter) quality-factor meter

R
RAM random access memory
RC resistance-capacitance
RFI radio frequency interference
RMS root mean square
ROM read only memory
RF radio frequency
RFC radio-frequency choke
RFI radio-frequency interference
RTD resistance-temperature detector
RTL resistor transistor logic
RTV room temperature vulcanizing
RW read/write

S
SAS silicon asymmetrical switch
SBC single board (micro) computer
SBS silicon bilateral switch
SCR silicon-controlled rectifier
SCS silicon controlled switch
SDA source & detector assemblies
SIDAC bidirectional voltage-triggered switch
SIP single in-line package
SSI small scale integration
SSR solid state relay
STL Schottky transistor logic
SUS silicon unilateral switch

T
TC temperature coefficient
TCXO temperature compensated crystal oscillator
TFE tetrafluoride ethylene propylene Copolymer, 250° Teflon
TRIAC bidirectional AC switch
TTL transistor-transistor logic
TTY teletypewriter

U
UHF ultra high frequency (300 MHz to 3 GHz)
UJT silicon unijunction transistor
UL Underwriters Laboratory
UPS uninterruptible power supply

V
VAC volts (of) alternating current
VAR volt-ampere reactive
VCR video cassette recorder
VDC volts (of) direct current
VHF very high frequency
VHSIC very high speed integrated circuit
VLF very low frequency (3 to 30 kHz)
VLSI very large scale integration
VME virtual machine environment
VRM voice recognition module
VTVM vacuum tube volt meter
VU volume unit
VSWR voltage standing wave ratio

W
WPS word processing software

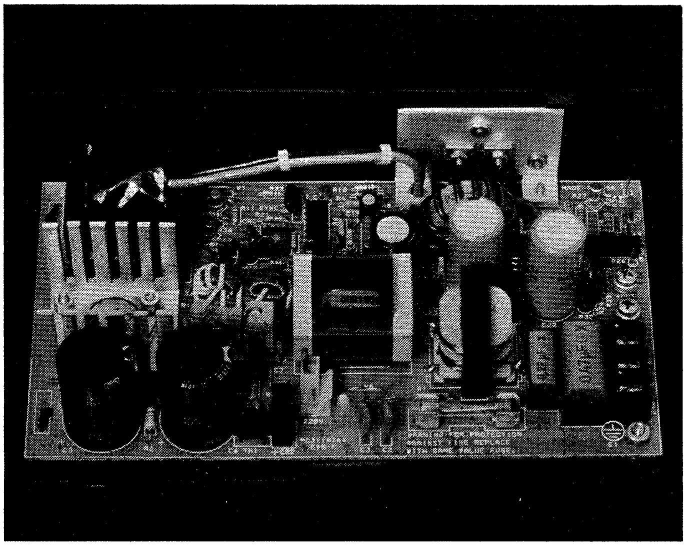
Y
YIG yttrium iron garnet

Z
ZIF zero insertion force

RTE POWER/MATE

EVS SERIES 50 TO 384 WATT - SINGLE OUTPUT

Switching Regulated Power Supply



- **Recognized under IEC 380 safety standards**
- **Meets VDE 0806 safety design standards**
- **Complies with UL 478 and CSA C22.2 154**
- **Input filter conforms to VDE 0871/6.78 and FCC 20780 Part 15, Subpart J**

The EVS family of single output switchers incorporates the latest in switching technology to offer low cost, high-performance solutions to your power supply. These efficient, light weight units are available in 5, 12, 15 and 24 VDC versions. Units are designed and qualified to meet all of the latest required regulatory specifications used throughout the world.

FEATURES

- User selectable 115/230 VAC dual input
- Overvoltage protection
- Overload protection
- Short circuit protection
- AC transient suppression
- Logic inhibit on many models
- Remote or local sensing on most models
- Covers available for all models

SPECIFICATIONS

Parameter	Conditions	Limits
AC Input	47-63 Hz. (consult factory for 400 Hz)	90-132/180-250 VAC (user selectable)
DC Output	See Ordering Information Chart	
DC Output Adjustment		±10%
Line Regulation	Within specified AC limits	±0.5%
Load Regulation	No load to full load	±0.5%*
Noise and Ripple	DC - 50 MHz	75 mV peak-to-peak maximum
Hold-up Time	Based upon nominal input voltage and full load	20 ms
Transient Response	50 to 100% load change	2% in 1.0 ms
Efficiency	According to output voltage	70 - 80%
Remote/Local Sensing (Series EVS-F, G, H, J)	Provision included for improved overall regulation	
Overload Protection		Built-in fold back limiting
Short Circuit Protection	Automatic electronic circuit	Preset Value
Overvoltage Protection	Built-in, fixed	

*EVS-E: Load Regulation 10 to 100%. No load to full ± 3%.

Parameter	Conditions	Limits
Overshoot	No voltage spikes on turn-on, turn-off or power failure	
Input Surge Current	Peak (cold start)	20A (115 VAC) 40A (220 VAC)
Logic Inhibit Function (Series EVS-F, G, H, J)	Referenced to (−) negative sense terminal	4.5 to 5.5V
Polarity	Either positive, negative, floating	Up to 300 VDC
Soft Start	Provides input current limiting at turn-on	
Parallel Operation	Consult factory	
Long Term Stability	For 8 hrs. after 20 min. warm-up	0.1%
Ambient Operating Temperature	Continuous Duty Full rating Derate linearly to 50% of full rating at +71°C	0°C to +71°C 0°C to +50°C
Storage Temperature		−20°C to 85°C
Quality Control	According to MIL-I-45208	

RTE POWER/MATE
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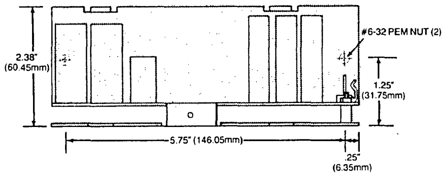
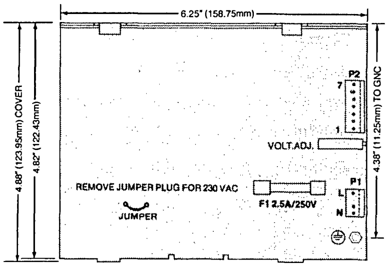
RTEPOWER/MATE

ORDERING INFORMATION Output Voltages/Maximum Rated Load Current

Standard Model	Output V nom I max*	Max Con't Output Power
EVS-E SERIES		
EVS-5E	5V @ 10A	50W
EVS-12E	12V @ 5A	60W
EVS-15E	15V @ 4A	60W
EVS-24E	24V @ 2.5A	60W

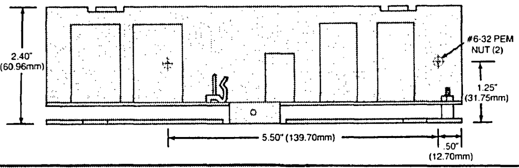
Weight: 1 lb., 6 oz.

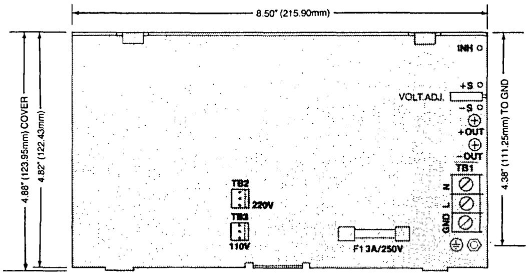

2.38"
(60.45mm)
#6-32 PEM NUT (2)
1.25"
(31.75mm)
5.75" (146.05mm)
.25"
(6.35mm)


6.25" (158.75mm)
4.88" (123.95mm) COVER
4.82" (122.43mm)
4.38" (111.25mm) TO GNC
P2
7
1
VOLT.ADJ.
REMOVE JUMPER PLUG FOR 230 VAC
JUMPER
P1
L
N
F1 2.5A/250V

EVS-F SERIES		
EVS-5F	5V @ 20A	100W
EVS-12F	12V @ 10A	120W
EVS-15F	15V @ 8A	120W
EVS-24F	24V @ 5A	120W

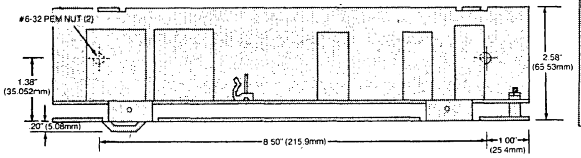
Weight: 2 lbs.

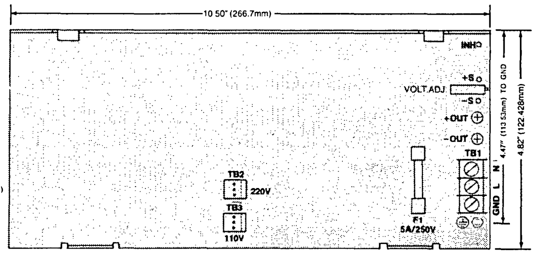

2.40"
(60.96mm)
#6-32 PEM NUT (2)
1.25"
(31.75mm)
5.50" (139.70mm)
.50"
(12.70mm)


8.50" (215.90mm)
4.88" (123.95mm) COVER
4.82" (122.43mm)
4.38" (111.25mm) TO GND
INH
+S
VOLT.ADJ.
-S
+OUT
-OUT
TB1
N
L
GND
TB2
220V
TB3
110V
F1 3A/250V

EVS-G SERIES		
EVS-5G	5V @ 30A	150W
EVS-12G	12V @ 15A	180W
EVS-15G	15V @ 12A	180W
EVS-24G	24V @ 7.5A	180W

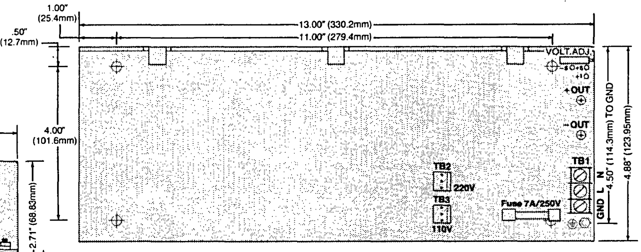
Weight: 2 lbs., 14 oz.

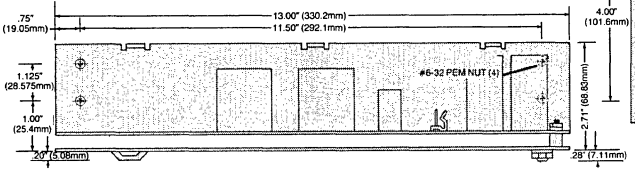

#6-32 PEM NUT (2)
1.38"
(35.052mm)
.20" (5.08mm)
2.58"
(65.53mm)
8.50" (215.9mm)
1.00"
(25.4mm)


10.50" (266.7mm)
INH
+S
VOLT.ADJ.
-S
+OUT
-OUT
TB1
N
L
GND
4.47" (113.53mm) TO GND
4.82" (122.428mm)
TB2
220V
TB3
110V
F1
5A/250V

EVS-H SERIES		
EVS-5H	5V @ 45A	225W
EVS-12H	12V @ 22A	264W
EVS-15H	15V @ 18A	270W
EVS-24H	24V @ 12A	288W

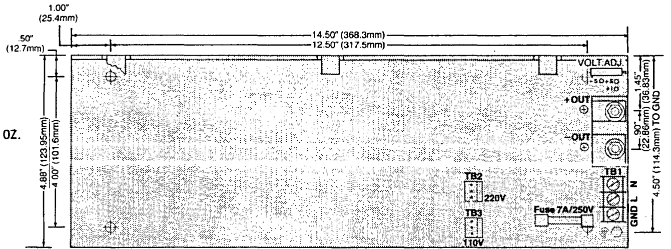
Weight: 4 lbs., 2 oz.


1.00"
(25.4mm)
.50"
(12.7mm)
13.00" (330.2mm)
11.00" (279.4mm)
4.00"
(101.6mm)
VOLT.ADJ.
+S
-S
+OUT
-OUT
TB1
N
L
GND
4.50" (114.3mm) TO GND
4.88" (123.95mm)
TB2
220V
TB3
110V
Fuse 7A/250V


.75"
(19.05mm)
13.00" (330.2mm)
11.50" (292.1mm)
1.125"
(28.575mm)
1.00"
(25.4mm)
.20" (5.08mm)
#6-32 PEM NUT (4)
2.71" (68.83mm)
.28" (7.11mm)

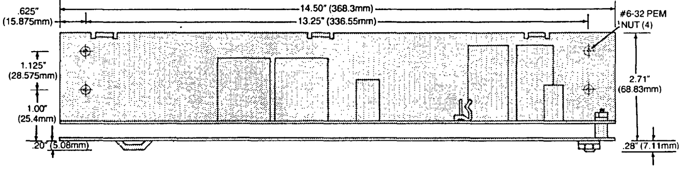
EVS-J SERIES		
EVS-5J	5V @ 60A	300W
EVS-12J	12V @ 30A	360W
EVS-15J	15V @ 25A	375W
EVS-24J	24V @ 16A	384W

Weight: 4 lbs., 6 oz.


1.00"
(25.4mm)
.50"
(12.7mm)
14.50" (368.3mm)
12.50" (317.5mm)
4.88" (123.95mm)
4.00" (101.6mm)
VOLT.ADJ.
+S
-S
+OUT
-OUT
TB1
N
L
GND
1.45"
(36.83mm)
.90"
(22.86mm)
4.50" (114.3mm) TO GND
TB2
220V
TB3
110V
Fuse 7A/250V

***Maximum current rating at +50°C.**

⌖ Mounting Holes


.625"
(15.875mm)
14.50" (368.3mm)
13.25" (336.55mm)
#6-32 PEM NUT (4)
1.125"
(28.575mm)
1.00"
(25.4mm)
.20" (5.08mm)
2.71"
(68.83mm)
.28" (7.11mm)

RTEPOWER/MATE

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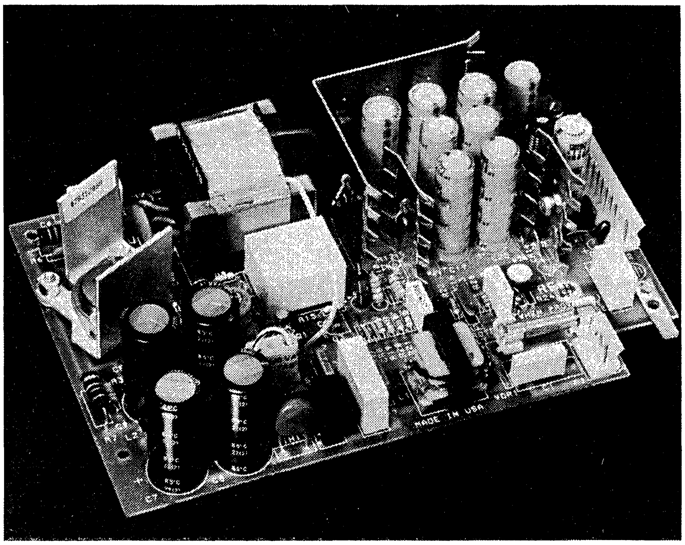
RTE POWER/MATE

EVD SERIES 50/65 WATT - TRIPLE AND QUAD OUTPUT

Switching Regulated Power Supply



- **Input filter conforms to VDE 0871/6.78 and FCC 20780 Part 15, Subpart J**
- **Meets UL 478 and CSA C22.2 154**
- **Meets VDE 0806 and IEC 380 safety design**

The Power/Mate EVD-50 and EVD-65 Series are multiple output switching regulated power supplies. providing up to three or four DC outputs.

Designed for CRT applications, the EVD-50 and EVD-65 Series can also provide a variety of voltages and currents to power microprocessors, floppy and hard disks, electronic and electromechanical systems.

The EVD-50 and EVD-65 Series feature EMI filtering which meets the latest specifications for FCC and VDE compliance. In addition, the supplies' electrical and mechanical designs conform to UL, CSA, VDE and IEC safety standards.

FEATURES

- Short circuit protection
- Overload protection
- 20 ms hold-up time
- 115/230 VAC user selectable
- Input surge current protected
- Voltage transient suppressor on input
- Brownout protection
- Overvoltage protection
- One year warranty

SPECIFICATIONS

Parameter	Conditions	Limits
AC Input	47-63 Hz (consult factory for 400 Hz)	90-132/180-250 VAC (user selectable)
Input Frequency		47-63 Hz.
DC Output Voltages	See Ordering Information Chart	
Overall Regulation (EVD-50 only)	Output 1 and 2 Output 3 and 4	±3% ±5% (see note 2)
Line Regulation	All Outputs	±1.0%
Load Regulation	Output 1 Output 2 Output 3	±1.0% ±3% (see Fig. 1) ±3%
Cross Regulation	Output 1 varied 50%-100% Output 2 (see Fig. 1) Output 3	 ±2.5% max ±3.5% max
Centering (see note 3)	Output 1 (Adjustable) Output 2 Output 3 Output 4	±5% Maximum ±3% Typical
Load Range*	 Output 1 Output 2 Output 3 Output 4	EVD-50 EVD-65 1-6A 1-6A 0.4-2.5A 0.2-1.25A 0 -0.6A 0 -1A 0 -0.6A —
Noise and Ripple	All Outputs (DC-20 MHz Bandwidth)	1% Maximum 0.5% Typical

*See ordering chart for output 1 and 2 for combination current ratings.

Parameter	Conditions	Limits
Hold-up Time	Based upon nominal input voltage and maximum output power.	20 ms
Efficiency	Rated at maximum continuous power and nominal input line	65% typical
Overvoltage Protection Threshold	Output 1	6.25V ±0.75V
Adjustability	Output 1 (with minimum load)	4.75V to OVP trip point
Input Surge Current	Peak (cold start)	20A, 115 VAC 40A, 230 VAC
Leakage Current to ground	All	0.75 mA maximum
MTBF	Per MIL-HDBK-217C	40,000 hours
Temperature Coefficients of Outputs	All Outputs	0.05%/°C typical
Ambient Operating Temperature (see note 4)	Continuous duty (with forced air, eg. 75 CFM Full rating (convection cooled) Derate linearly to 50% at +71°C	0°C to +71°C 0°C to +50°C
Storage Temperature		−20°C to +85°C

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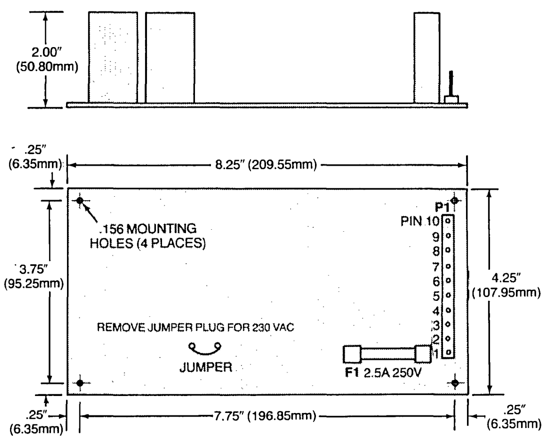
ORDERING INFORMATION **Output Voltages/Maximum Rated Load Chart**

EVD-50				
Max. Watts 65W	Output 1 V nom I max*	Output 2 V nom I max*	Output 3 V nom I max*	Output 4 V nom I max*
Standard Model				
EVD-50-4001	+5V @ 6A	+12V @ 2.5A	−12V @ 0.6A	−5V @ 0.6A
EVD-50-4002	+5V @ 6A	+24V @ 1.25A	+12V @ 0.6A	−12V @ 0.6A

The combination of currents on Outputs 1 and 2 should not exceed 8.0A



2.00"
(50.80mm)
.25"
(6.35mm)
8.25" (209.55mm)
.156 MOUNTING
HOLES (4 PLACES)
P1
PIN 10
9
8
7
6
5
4
3
2
1
3.75"
(95.25mm)
4.25"
(107.95mm)
REMOVE JUMPER PLUG FOR 230 VAC
JUMPER
F1 2.5A 250V
.25"
(6.35mm)
7.75" (196.85mm)
.25"
(6.35mm)

EVD-50

Weight: 1 lb., 8 oz.

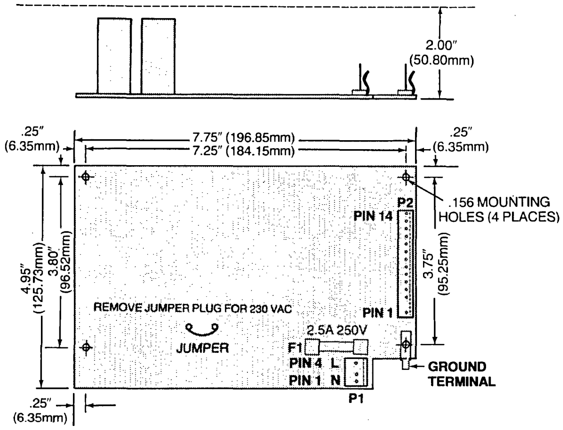
P 1 PIN TERMINALS

AC Neutral (N)	Pin 1
AC Hot (L)	Pin 2
Chassis Ground	Pin 3
Output 4	Pin 4
Output 3	Pin 5
Output 2	Pin 6
Common	Pin 7, 8
Output 1	Pin 9, 10

P 1 MATING CONNECTOR AMP, INC.
Part #87025-7 (Housing)
Part #87116-3 (Key)
Part #87027-1 (Pins)

EVD-65			
Max. Watts 65W	Output 1 V nom I max*	Output 2 V nom I max*	Output 3 V nom I max*
Standard Model			
EVD-65-3001	+5V @ 6A	+12V @ 2.0A	−12V @ 1.0A
EVD-65-3002	+5V @ 6A	+15V @ 2.0A	−15V @ 1.0A

The combination of currents on Outputs 1 and 2 should not exceed 8.0A



2.00"
(50.80mm)
.25"
(6.35mm)
7.75" (196.85mm)
7.25" (184.15mm)
.25"
(6.35mm)
.156 MOUNTING
HOLES (4 PLACES)
P2
PIN 14
4.95"
(125.73mm)
3.80"
(96.52mm)
3.75"
(95.25mm)
REMOVE JUMPER PLUG FOR 230 VAC
PIN 1
2.5A 250V
JUMPER
F1
PIN 4 L
PIN 1 N
GROUND
TERMINAL
P1
.25"
(6.35mm)

EVD-65

Weight: 1 lb., 4 oz.

P 1 CONNECTOR

AC Hot (L)	Pin 4
AC Neutral (N)	Pin 1, 2

P 1 MATING CONNECTOR
Molex Type 2391,
Part #09-65-1041

P 2 MATING CONNECTOR
Molex Type 2391,
Part #09-65-1141

P 2 CONNECTOR

Output 1	Pin 12, 13, 14
Common	Pin 1, 7, 8, 9, 10, 11
Output 2	Pin 5, 6
Output 3	Pin 3, 4

NOTE: Pin 3 of P1 Connector and Pin 2 of P2 Connector omitted for polarizing purposes.

***Maximum current rating at +50°C.**
Note: Custom models available. Consult factory

NOTES:

1. Maximum specified current can not be drawn from all outputs simultaneously. At no time should average current-times-output voltage exceed the maximum rated output power. Above this point, output voltages and currents will be automatically reduced on all outputs.
2. Overall regulation includes the contribution of load regulation over stated load range, line regulation from minimum to maximum input voltage, and manufacturing tolerance. To maintain all outputs in regulation, Output 1 and Output 2 must be, at rated minimum load current or greater.
3. All outputs set at 50% of rated load.
4. Forced air cooling must be provided to insure that the power semiconductors do not exceed +110°C when the ambient air temperature exceeds +50°C and full power is required.

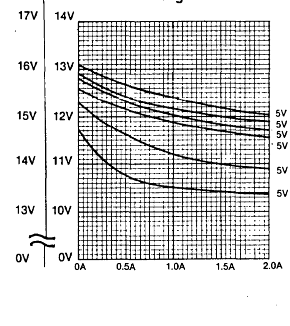


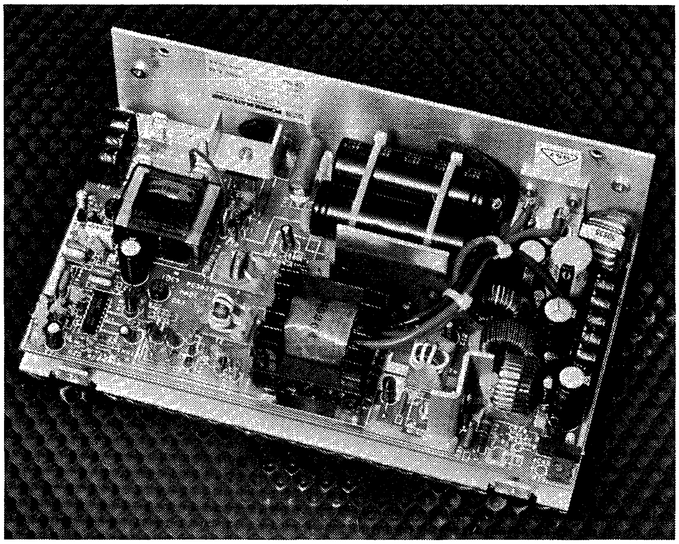
Figure 1

RTE POWER/MATE

EVD / EVQ SERIES

130 / 165 / 180 WATT - TRIPLE AND QUAD OUTPUT

Switching Regulated Power Supply



- **Listed under VDE 0806 and IEC 380 Safety Standards**
- **Conforms to VDE 0871/7.78 level B with optional EMI/RFI Corcom filter 3EP1 or 3EP7 (or equivalent)**
- **UL Recognized component**

With up to four outputs, Power/Mate's EVD and EVQ Series of open frame switching power supplies can deliver up to 180 watts of continuous power.

Unmatched in quality and performance, the EVD and EVQ Series are ideally suited for computer terminals, floppy disks, Winchester disks and printer applications requiring pulsed loads, along with a host of electromechanical applications.

Power/Mate's computer-aided design capability permits the user to "customize" his outputs for a wide variety of voltage and current requirements within the total output power specified.

FEATURES

- Less than one-third the size of linears
- Dual AC inputs standard
- Brownout protection
- OVP standard on primary output
- Overload protection
- Short circuit protection on all outputs
- Input surge current protection (soft start)
- 20 ms hold-up time
- Open frame construction
- Convection cooled
- One year warranty
- FR4 Glass epoxy printed circuit board
- AC transient suppressor, inhibit and cover

SPECIFICATIONS

Parameter	Conditions	Limits
AC Input	47-440 Hz	90-132/180-250 VAC (user selectable)
DC Output Voltages	See Ordering Information Chart	
Input Line Regulation (see note 3)	All outputs 90-132/ 180-250 VAC	±0.2% max
Load Regulation (see note 4)	+5V output 20% to 100% max rated load All other outputs 20% to 100% max rated load	±0.2% max (EVQ-180, ±1%) ±3% max
Centering (initial setting) on Auxiliary Outputs (see note 2)	All outputs 50% max rated load, +5V adjusted to 5.00V	±5% max ±3% typical
Cross Regulation (see note 5)	+5V output/Change any other outputs from 50% to 100% max rated load Any other output/Change +5V output from 50% to 100% max rated load Change some other output from 20% to 100% max rated load	±1% max ±3.5% max ±1% max
Noise and Ripple	Any output peak to peak (DC-20 MHz	2% max 40 mV max RMS

Parameter	Conditions	Limits
Hold-up Time	Based upon nominal input voltage and maximum output power	20 ms min
Efficiency	Rated at maximum continuous power and nominal line input	75% typical
Overvoltage Protection Threshold	+5V output	6.25V ±0.75V
Ambient Operating Temperature (see note 6)	Continuous duty (with forced air, eg. 75 cfm Full rating (convection cooled) Derate linearly to 50% of full rating at +70°C	0°C to +70°C 0°C to +50°C
Storage Temperature		−20°C to +85°C
Mean Time Between Failure	Per MIL-HDBK-217C	40,000 hrs
DC Output Adjustability	+5V output	4.5V to OVP trip point
Input Surge Current	Peak (cold start)	30 Amps peak @ 115V (nom) 60 Amps peak @ 220V (nom)
Temperature Coefficients of Outputs	+5V output All other outputs	0.04%/°C typical 0.05%/°C typical

RTE POWER/MATE

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RTE POWER/MATE

ORDERING INFORMATION DC Output Voltages/Maximum Rated Load Currents

EVD-130

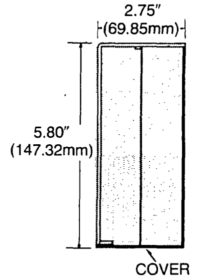
Max. Watts 130W	Output 1 V nom I max*	Output 2 V nom I max*	Output 3 V nom I max*	Output 4 V nom I max*
Standard Model				
EVD-130-3001	+5V @ 15A	+12V @ 2A	−12V @ 2A	—
EVD-130-3002	+5V @ 15A	+15V @ 2A	−15V @ 2A	—
EVD-130-4001	+5V @ 11A	+12V @ 2A	−12V @ 2A	−5V @ 2A
EVD-130-4002	+5V @ 11A	+15V @ 2A	−15V @ 2A	−5V @ 2A
EVD-130-4003	+5V @ 11A	+12V @ 2A	−12V @ 2A	+24V @ 2A
EVD-130-4004	+5V @ 11A	+15V @ 2A	−15V @ 2A	+24V @ 2A
EVD-130-4011	+5V @ 11A	+12V @ 2A	−12V @ 2A	+12V @ 2A

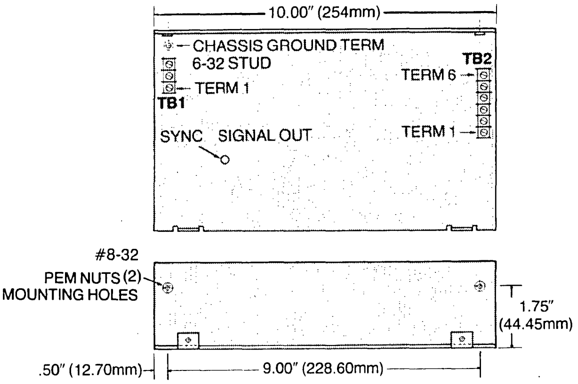
EVD-165

Max. Watts 165W	Output 1 V nom I max*	Output 2 V nom I max*	Output 3 V nom I max*	Output 4 V nom I max*
Standard Model				
EVD-165-3001	+5V @ 15A	+12V @ 6A	−12V @ 2A	—
EVD-165-3002	+5V @ 15A	+15V @ 6A	−15V @ 2A	—
EVD-165-4001	+5V @ 11A	+12V @ 6A	−12V @ 2A	−5V @ 2A
EVD-165-4002	+5V @ 11A	+15V @ 6A	−15V @ 2A	−5V @ 2A
EVD-165-4003	+5V @ 11A	+12V @ 6A	−12V @ 2A	+24V @ 2A
EVD-165-4004	+5V @ 11A	+15V @ 6A	−15V @ 2A	+24V @ 2A
EVD-165-4011	+5V @ 11A	+12V @ 6A	−12V @ 2A	+12V @ 2A
EVD-165-4012	+5V @ 11A	+12V @ 1A	−12V @ .5A	+24V @ 5A

EVD-130
EVD-165

Weight: 3 lbs., 4 oz.


2.75"
(69.85mm)
5.80"
(147.32mm)
COVER


10.00" (254mm)
CHASSIS GROUND TERM
6-32 STUD
TERM 1
TB1
TB2
TERM 6
TERM 1
SYNC SIGNAL OUT
#8-32
PEM NUTS (2)
MOUNTING HOLES
1.75"
(44.45mm)
.50" (12.70mm)
9.00" (228.60mm)

TB1 INPUT TERMINAL BLOCK

Term 1	AC
Term 2	AC
Term 3	Ground

TB2 OUTPUT TERMINAL BLOCK

Term 1	Output 3	Term 4	Return
Term 2	Output 2	Term 5	Return
Term 3	Output 4	Term 6	Output 1

NOTE: Overall dimensions with cover 5.84" (148.33mm) x 10.12" (257.04mm) x 2.75" (69.85mm)
Chassis Ground #6-32 Permanut

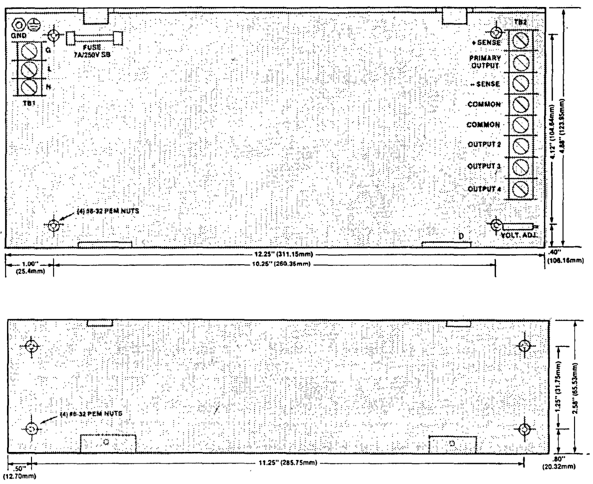
EVQ-180

Max. Watts 180W	Output 1 V nom I max*	Output 2 V nom I max*	Output 3 V nom I max*	Output 4 V nom I max*
Standard Model				
EVQ-180-3001	+5V @ 25A	+12V @ 4A	−12V @ 4A	—
EVQ-180-3002	+5V @ 25A	+15V @ 4A	−15V @ 4A	—
EVQ-180-4001	+5V @ 20A	+12V @ 4A	−12V @ 4A	−5V @ 1.5A
EVQ-180-4002	+5V @ 20A	+15V @ 4A	−15V @ 4A	−5V @ 1.5A
EVQ-180-4003	+5V @ 20A	+12V @ 4A	−12V @ 4A	+24V @ 2.0A
EVQ-180-4004	+5V @ 20A	+15V @ 4A	−15V @ 4A	+24V @ 2.0A
EVQ-180-4011	+5V @ 20A	+12V @ 4A	−12V @ 4A	+12V @ 2.0A

***Maximum current rating at +50°C.**

EVQ-180

Weight: 5 lbs.


GND
G
L
N
TB1
FUSE
7A/250V SB
TB2
+SENSE
PRIMARY OUTPUT
−SENSE
COMMON
COMMON
OUTPUT 2
OUTPUT 3
OUTPUT 4
(4) #8-32 PEM NUTS
D
VOLT. ADJ.
4.12" (104.64mm)
4.88" (123.95mm)
12.25" (311.15mm)
10.25" (260.35mm)
1.00" (25.4mm)
.40" (106.16mm)
(4) #8-32 PEM NUTS
1.25" (31.75mm)
2.58" (65.53mm)
.50" (12.70mm)
11.25" (285.75mm)
.80" (20.32mm)

Note: Custom models available. Consult factory

NOTES:

1. Output 1 must be loaded to 20% of total output power to maintain proper regulation of other outputs (supply will not be damaged by a no-load condition on Output 1).
2. Each output is loaded to 50% of rated current (not to exceed total output power specifications) and nominal input line voltage. Sensed output is adjusted for currect output voltage. Remaining outputs will fall within the desired tolerance.
3. All outputs are loaded to obtain maximum total output power. Input AC voltage is varied from minimum to maximum. The change in output voltage at any output is the line regulation for that channel.
4. All outputs except load being measured are set to 50% of load current (observe maximum load rating). Output to be measured is adjusted from 20% to 100% of rating and variation in regulation is noted. Minimum loading of 50% is for testing purposes only.
5. All outputs except one, are set to 20% of rated load, while remaining output is varied from 50% to 100% of rated load.
6. An adequate external heat sink must be provided to insure that the unit's power semiconductors do not exceed 110°C when the environmental temperature is 50°C. Derate maximum power rating by 10% when used with cover.

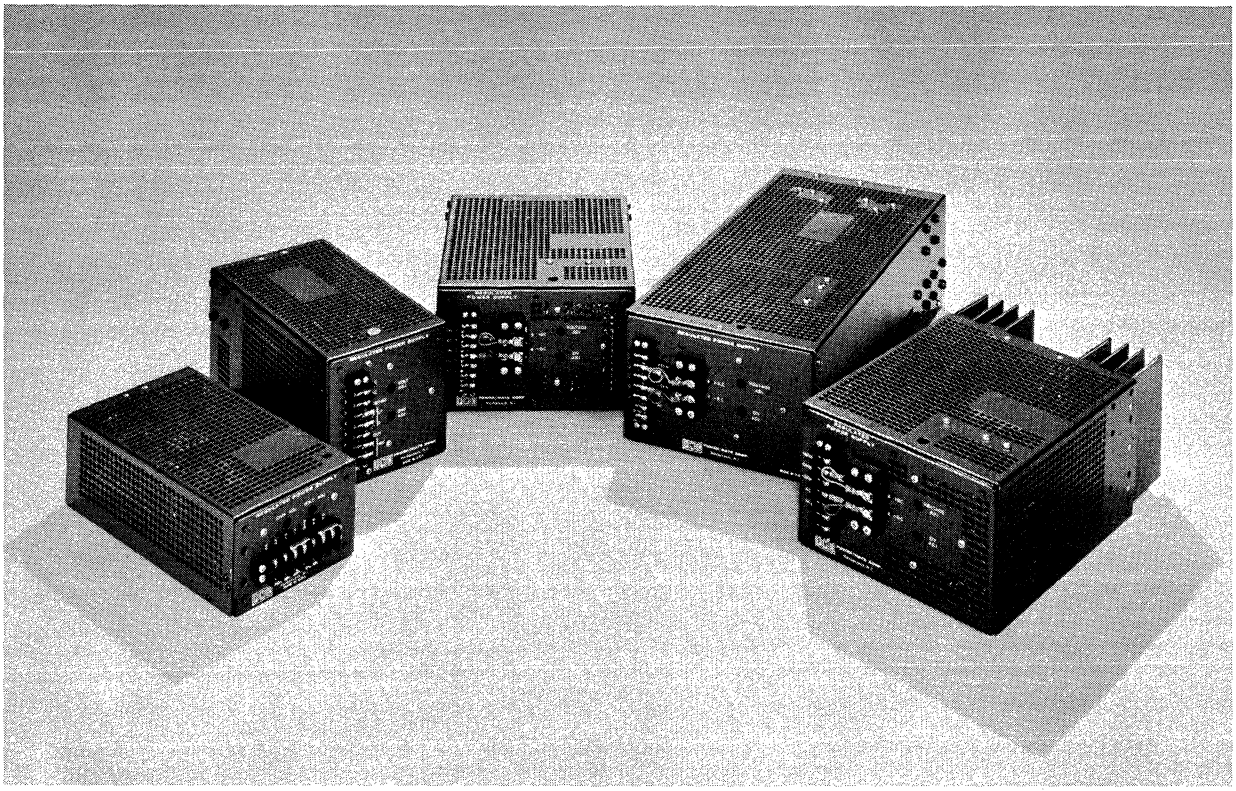
RTE POWER/MATE

514 South River Street, Hackensack, NJ 07601 • (201) 440-3100 TWX (710) 990-5023

RTEPOWER/MATE

PXS SERIES SINGLE OUTPUT

Modular Linear Power Supplies



- **UL and CSA recognized up to 24 volts**
- **Meets EMI requirements of MIL-STD-461A**

The PXS series modular power supplies are the ultimate in linear regulated design and construction. These units are setting operating life records that may take decades for switching technology to reach. The series is conservatively rated to operate at a fraction of their full power for enhanced component life. Dozens of quality control checks throughout production and pre-testing of components enhance life expectancy.

FEATURES

- 48 different models in six standard case sizes
- 0.075% +1mV regulation
- Less than 5mV ripple peak-to-peak
- OVP standard on all supplies to 48VDC
- MTBF well in excess of 100,000 hours
- Computer-grade capacitors used throughout
- Integrated circuit regulators
- IC's and transistors are thermally shocked and pre-tested
- Standard 5¼" rack mountable
- One year warranty, fully transferrable

RTEPOWER/MATE
514 South River Street, Hackensack, NJ 07601 • (201) 440-3100 TWX (710) 990-5023

RTE POWER/MATE

SPECIFICATIONS

Parameter	Conditions	Limits
AC Input	47-63 Hz For 50 Hz operation, derate current ratings 10%	105-132 VAC 187-242 VAC*
DC Output	See ordering information chart	
Line Regulation	105-132 VAC	0.075% +1mV
Load Regulation	No load to full load	0.075% +1mV
Ripple	Output terminal ungrounded Output terminal grounded	< 1.5mV RMS 5mV peak-to-peak
Remote/Local Sensing	Provision included for improved overall regulation	
Remote/Local Voltage Adjust	Remotely adjusted with external resistor or internally adjusted	±5%
Polarity	Either positive, negative, floating	Up to 300 VDC
Overshoot	No voltage overshoot on turn-on, turn-off or power fail	
Temperature Coefficient		Better than 0.01%/°C
Ambient Operating Temperature	Continuous duty	−20°C to +71°C
Temperature Derating	Full current derate linearly to 60% at +71°C	−20°C to +40°C
Storage Temperature		−55°C to +85°C
Overvoltage Protection	Built-in on models up to 48VDC	Adjustable
Short Circuit Protection	Automatic electronic circuit	Preset value, approximately 20% maximum I
Input/Output Connections	Heavy duty screw-type barrier terminals	
Controls	Screwdriver adjustment	Specified ranges
Quality Control	According to MIL-I-45208	
Power Transistors	Hermetically sealed	
Circuit Boards	Epoxy glass, approved to UL 94	

*Available. Consult Factory.

RTE POWER/MATE

514 South River Street, Hackensack, NJ 07601 • (201) 440-3100 TWX (710) 990-5023

RTE POWER/MATE

ORDERING INFORMATION

PXS 'B' CASE

Weight: 6 lbs.

Model	Adj. Voltage Range	Max. Amps. 40°C
+PXS-B-5V	5 ± 5%	5.8
+PXS-B-12V	12 ± 5%	3.8
+PXS-B-15V	15 ± 5%	3.2
+PXS-B-24V	24 ± 5%	2.1
• PXS-B-48V	48 ± 5%	1.1
• PXS-B-100	100 ± 5%	0.46
• PXS-B-120	120 ± 5%	0.40
• PXS-B-150	150 ± 5%	0.32

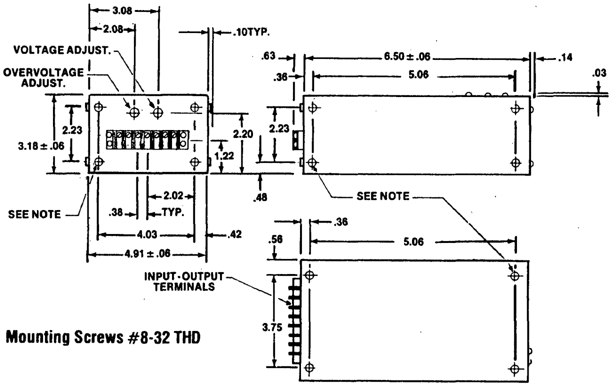
PXS 'C' CASE

Weight: 8 lbs.

Model	Adj. Voltage Range	Max. Amps. 40°C
+PXS-C-5V	5 ± 5%	9.0
+PXS-C-12V	12 ± 5%	6.5
+PXS-C-15V	15 ± 5%	6.0
+PXS-C-24V	24 ± 5%	3.6
PXS-C-48V	48 ± 5%	1.8
PXS-C-100	100 ± 5%	0.65
PXS-C-120	120 ± 5%	0.55
PXS-C-150	150 ± 5%	0.42

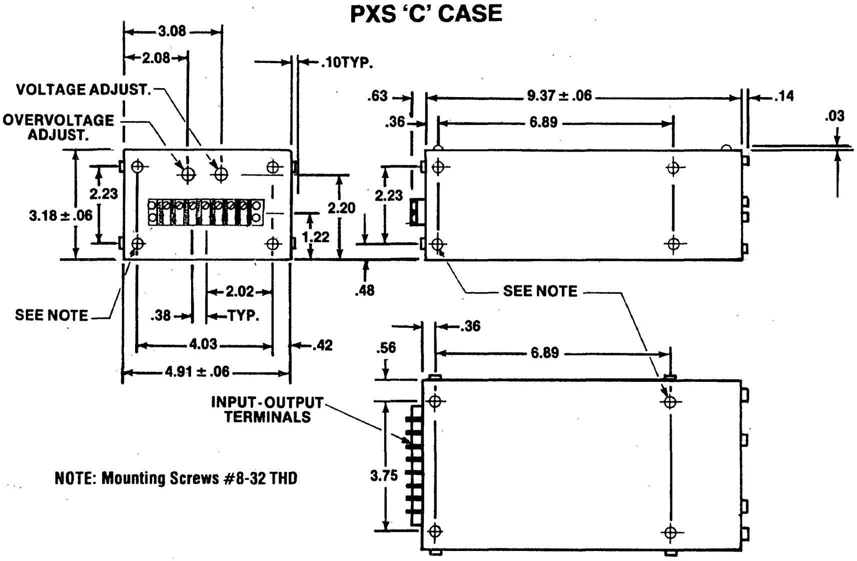
+ UL SP
* UL
• SP

PXS 'B' CASE


3.08
2.08
.10TYP.
VOLTAGE ADJUST.
OVERVOLTAGE ADJUST.
2.23
3.18 ± .06
2.20
1.22
SEE NOTE
.38
2.02
TYP.
4.03
.42
4.91 ± .06
.63
6.50 ± .06
.14
.36
5.06
.03
2.23
.48
SEE NOTE
.36
.56
5.06
INPUT-OUTPUT TERMINALS
3.75

NOTE: Mounting Screws #8-32 THD

PXS 'C' CASE


3.08
2.08
.10TYP.
VOLTAGE ADJUST.
OVERVOLTAGE ADJUST.
2.23
3.18 ± .06
2.20
1.22
SEE NOTE
.38
2.02
TYP.
4.03
.42
4.91 ± .06
.63
9.37 ± .06
.14
.36
6.89
.03
2.23
.48
SEE NOTE
.36
.56
6.89
INPUT-OUTPUT TERMINALS
3.75

NOTE: Mounting Screws #8-32 THD

RTE POWER/MATE

ORDERING INFORMATION

PXS 'CC' CASE

Weight: 14 lbs.

Model	Adj. Voltage Range	Max. Amps. 40°C
+PXS-CC-5V	5 ± 5%	16.0
+PXS-CC-12V	12 ± 5%	10.5
+PXS-CC-15V	15 ± 5%	9.5
+PXS-CC-24V	24 ± 5%	6.8
• PXS-CC-48V	48 ± 5%	3.7
• PXS-CC-100	100 ± 5%	1.8
• PXS-CC-120	120 ± 5%	1.5
• PXS-CC-150	150 ± 5%	1.2

PXS 'D' CASE

Weight: 20 lbs.

Model	Adj. Voltage Range	Max. Amps. 40°C
+PXS-D-5V	5 ± 5%	27.5
+PXS-D-12V	12 ± 5%	16.0
+PXS-D-15V	15 ± 5%	14.0
+PXS-D-24V	24 ± 5%	10.0
PXS-D-48V	48 ± 5%	5.2
PXS-D-100	100 ± 5%	2.5
PXS-D-120	120 ± 5%	2.0
PXS-D-150	150 ± 5%	1.5

PXS 'E' CASE

Weight: 25 lbs.

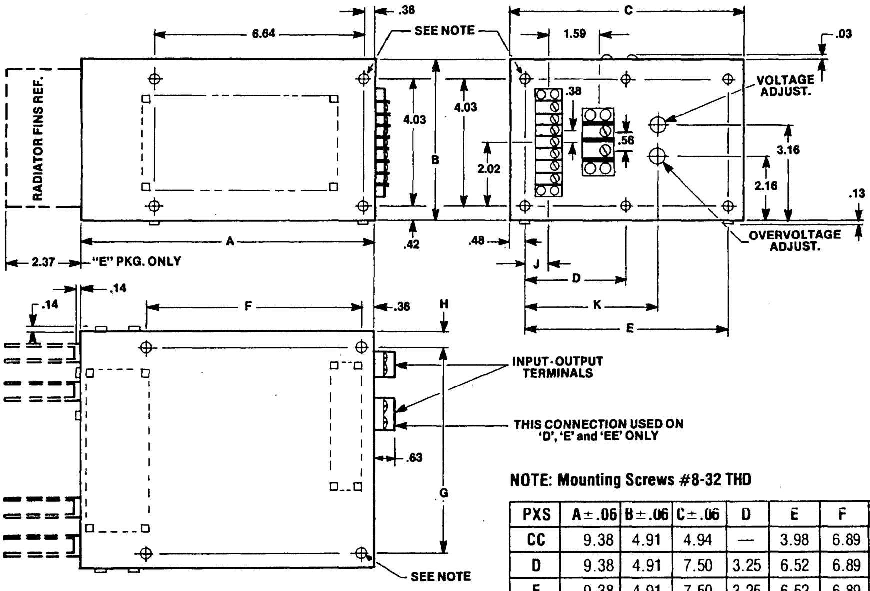
Model	Adj. Voltage Range	Max. Amps. 40°C
+PXS-E-5V	5 ± 5%	35.0
+PXS-E-12V	12 ± 5%	21.0
+PXS-E-15V	15 ± 5%	19.0
+PXS-E-24V	24 ± 5%	13.0
PXS-E-48V	48 ± 5%	6.7
PXS-E-100	100 ± 5%	3.5
PXS-E-120	120 ± 5%	2.5
PXS-E-150	150 ± 5%	2.3

PXS 'EE' CASE

Weight: 38 lbs.

Model	Adj. Voltage Range	Max. Amps. 40°C
+PXS-EE-5V	5 ± 5%	45.0
+PXS-EE-12V	12 ± 5%	32.0
+PXS-EE-15V	15 ± 5%	28.0
+PXS-EE-24V	24 ± 5%	19.0
• PXS-EE-48V	48 ± 5%	10.0
• PXS-EE-100	100 ± 5%	5.0
• PXS-EE-120	120 ± 5%	4.0
• PXS-EE-150	150 ± 5%	3.0

+ UL CSA
* UL
• CSA



.36
6.64
SEE NOTE
C
1.59
.03
VOLTAGE ADJUST.
RADIATOR FINS REF.
4.03
4.03
B
2.02
.38
.56
3.16
2.16
.13
.42
.48
A
OVERVOLTAGE ADJUST.
2.37
"E" PKG. ONLY
J
D
K
E
.14
.14
F
.36
H
INPUT-OUTPUT TERMINALS
THIS CONNECTION USED ON 'D', 'E' and 'EE' ONLY
.63
G
SEE NOTE

NOTE: Mounting Screws #8-32 THD

PXS	A±.06	B±.06	C±.06	D	E	F	G	H	J	K
CC	9.38	4.91	4.94	—	3.98	6.89	4.06	.44	.73	2.11
D	9.38	4.91	7.50	3.25	6.52	6.89	6.56	.48	.73	4.20
E	9.38	4.91	7.50	3.25	6.52	6.89	6.56	.48	.73	4.20
EE	16.50	4.91	7.50	—	—	12.38	6.56	.48	.36	4.20

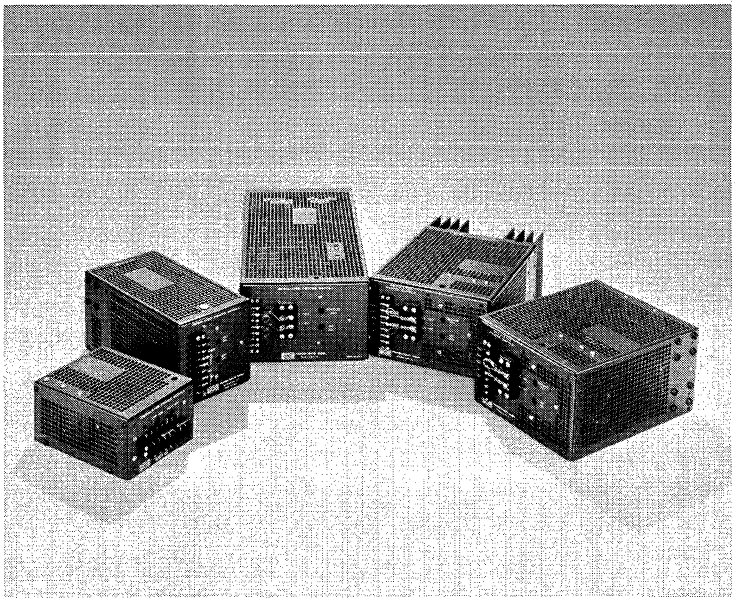
RTE POWER/MATE

514 South River Street, Hackensack, NJ 07601 • (201) 440-3100 TWX (710) 990-5023

RTE POWER/MATE

SUPER-UNI SERIES MULTIPLE OUTPUT

Variable Rated Power Supplies



- **UL and CSA recognized**
- **Meets RFI requirements of MIL-STD-461A**

Super/Uni is a unique variable rated power supply that provides different output voltages to solve all your power problems. It has a range of DC output voltages from 0 to 30 volts and currents from 0 to 36 amperes. These units are compact, yet rugged, with an MTBF rating of 100,000 hours. And Super/Uni's are reliable, short circuit proof, and provide you with power when the going gets hot (up to 71°C without external cooling).

FEATURES

- Wide range of DC voltages and currents
- MTBF rating of 100,000 hours
- Less than 5mV ripple peak-to-peak
- OVP standard on all supplies
- 0.05% +1mV regulation
- One year warranty, fully transferrable

SPECIFICATIONS

Parameter	Conditions	Limits
AC Input	47-63 Hz Derate output current 10% for 50 Hz operation	105-132 VAC 187-242 VAC
DC Output Voltage	See chart	
Output Current	See chart	
Output Voltage Range	Set in overlapping ranges by means of internal taps	
Line Regulation	105-132 VAC	0.05% +1mV
Load Regulation	No load to full load	0.05% +1mV
Ripple	With either positive or negative output terminal grounded	<1.0mV RMS 5mV peak-to-peak
Remote Sensing	Provision for improved regulation	
Remote/Local Voltage Adjust	Remotely adjusted with external resistor or internally adjusted	±5% V out
Polarity	Either positive, negative, or floating	Up to 300 VDC

Parameter	Conditions	Limits
Overshoot	No voltage overshoot on turn-on, turn-off or power fail	
Temperature Coefficient		Better than 0.01%/°C
Ambient Operating Temperature	Continuous duty	−20°C to +71°C
Temperature Derating	Full current Derate linearly to 60% at +71°C	−20°C to +40°C
Storage Temperature		−55°C to +85°C
Overvoltage Protection	Built-in	Adjustable
Overload/Short Circuit Protection	Solid State	Preset value, instantaneous recovery, and automatic reset
Input/Outout Connections	Heavy duty screw-type barrier terminals	

RTE POWER/MATE
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RTE POWER/MATE

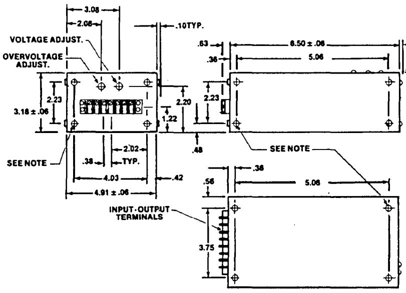
ORDERING INFORMATION

SUPER/UNI-30BV Wt. 6 lbs.

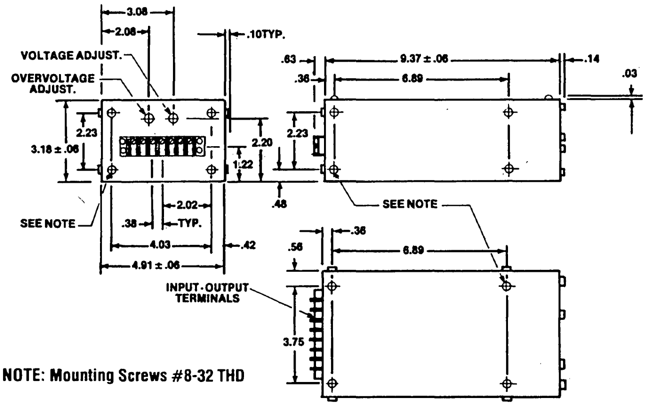
	Output voltage											
	3	5	6	8	10	12	15	18	20	24	28	30
Current Output	4.0	4.0	4.0	3.7	3.5	3.3	3.2	2.8	2.7	2.1	1.8	1.8

SUPER/UNI-30CV Wt. 8 lbs.

	Output voltage											
	3	5	6	8	10	12	15	18	20	24	28	30
Current Output	6.5	6.5	6.5	5.8	5.6	5.3	5.0	4.5	4.2	3.6	3.0	3.0


3.08
2.06
.10TYP.
VOLTAGE ADJUST.
OVERVOLTAGE ADJUST.
.63
.36
6.50 ± .06
5.06
.14
.03
2.23
3.18 ± .06
2.20
1.22
2.23
.48
SEE NOTE
SEE NOTE
.38
2.02
TYP.
4.03
4.91 ± .06
.42
.56
.36
5.06
INPUT-OUTPUT TERMINALS
3.75

NOTE: Mounting Screws #8-32 THD


3.08
2.06
.10TYP.
VOLTAGE ADJUST.
OVERVOLTAGE ADJUST.
.63
.36
9.37 ± .06
6.89
.14
.03
2.23
3.18 ± .06
2.20
1.22
2.23
.48
SEE NOTE
SEE NOTE
.38
2.02
TYP.
4.03
4.91 ± .06
.42
.56
.36
6.89
INPUT-OUTPUT TERMINALS
3.75

NOTE: Mounting Screws #8-32 THD

SUPER/UNI-30CCV Wt. 14 lbs.

	Output voltage											
	3	5	6	8	10	12	15	18	20	24	28	30
Current Output	13.0	12.5	12.0	11.7	11.0	10.5	9.5	8.0	7.7	6.8	6.0	5.5

SUPER/UNI-30EV Wt. 25 lbs.

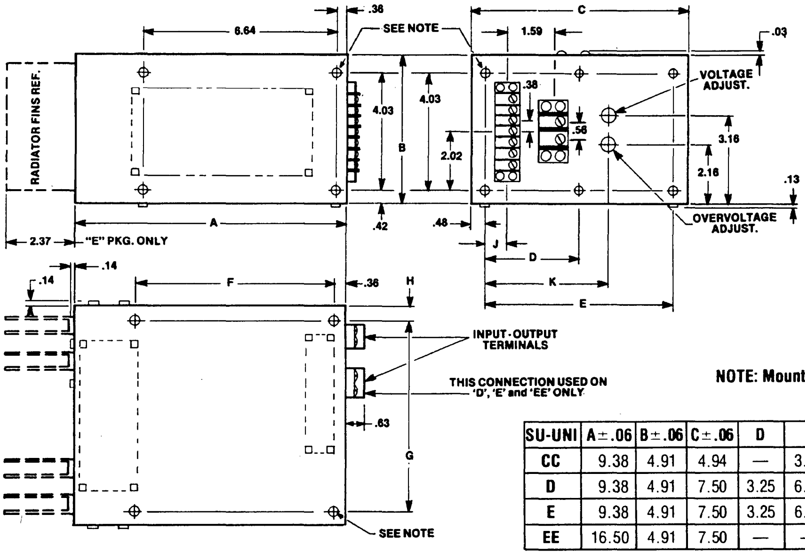
	Output voltage											
	3	5	6	8	10	12	15	18	20	24	28	30
Current Output	25.0	24.0	23.0	22.0	21.0	20.0	19.0	16.0	15.0	13.0	11.0	10.0

SUPER/UNI-30DV Wt. 22 lbs.

	Output voltage											
	3	5	6	8	10	12	15	18	20	24	28	30
Current Output	18.0	17.5	17.0	16.5	16.0	15.0	14.0	12.5	11.5	10.0	9.0	8.0

SUPER/UNI-30EEV Wt. 38 lbs.

	Output voltage											
	3	5	6	8	10	12	15	18	20	24	28	30
Current Output	36.0	34.0	33.0	32.0	30.0	29.0	28.0	24.0	22.0	19.0	17.0	16.0


6.64
.36
SEE NOTE
C
1.59
.03
RADIATOR FINS REF.
.38
VOLTAGE ADJUST.
4.03
4.03
B
2.02
.56
3.16
2.16
.13
OVERVOLTAGE ADJUST.
A
.42
.48
J
D
K
E
2.37
"E" PKG. ONLY
.14
.14
F
.36
H
INPUT-OUTPUT TERMINALS
THIS CONNECTION USED ON 'D', 'E' and 'EE' ONLY
.63
G
SEE NOTE

NOTE: Mounting Screws #8-32 THD

SU-UNI	A±.06	B±.06	C±.06	D	E	F	G	H	J	K
CC	9.38	4.91	4.94	—	3.98	6.89	4.06	.44	.73	2.11
D	9.38	4.91	7.50	3.25	6.52	6.89	6.56	.48	.73	4.20
E	9.38	4.91	7.50	3.25	6.52	6.89	6.56	.48	.73	4.20
EE	16.50	4.91	7.50	—	—	12.38	6.56	.48	.36	4.20

MINIGLOSSARIES
FORMULAS • CHARTS
PRODUCT SELECTION GUIDES
FORMS
CODES

TECHNICAL INFORMATION

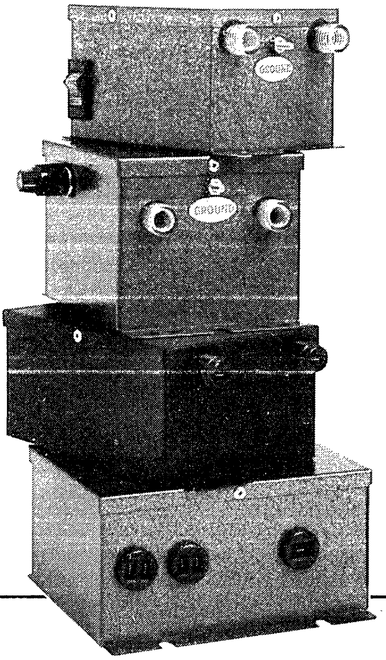
WHERE TO FIND THEM IN THE 85/86 EDITION OF EEM

Abbreviations/Acronyms **A**•1166, **B**•1012, **C**•1028, **D**•1016
ASCII Code **D**•1087
Batteries, Product Selection Guide **D**•1413
Batteries & Fuel Cells, Characteristics **D**•1430
Cabinets, Enclosures, Racks, & Chassis, Product Selection Guide **C**•1003
Capacitors, Basic Formulas **A**•1093
Capacitors, Miniglossary **A**•1066
Capacitors, Product Selection Guide **A**•1003
Circuit Boards (Printed) Product Selection Guide **C**•1099
Coils, Chokes, Inductors, Product Selection Guide **A**•1205
Conductors, Maximum Current Capacity of Copper & Aluminum **C**•1863
Connectors, Miniglossary **C**•1129
Connectors, Terminals, & Sockets, Product Selection Guide **C**•1105
Crystals, Oscillators, Crystal & Piezoelectric Filters, Product Selection Gude **A**•1309
Delay Lines, Product Selection Guide **A**•1459
Discrete Semiconductors, Product Selection Guide **A**•2067
Displays, Readouts, Lamps, & Lights, Product Selection Guide **B**•1015
EBCDIC Code **D**•1092
Encapsulation, Miniglossary **C**•1086
Fans, Blowers, Cooling Equipment, & Heat Exchangers, Product Selection Guide **C**•1623
Filters, Product Selection Guide **A**•1583
Instruments, Graphic Recording Product Selection Guide **D**•1401
Instruments, Panel Meters, Product Selection Guide **D**•1329
Instruments, Test & Measuring Product Selection Guide **D**•1175
Interconnection Systems, Product Selection Guide **C**•1699
Keyboards & Keypads, Product Selection Guide **B**•1705
Logofinder & Trademark Directories **B**•901
Microwave Components, Product Selection Guide **A**•1701
Military Qualified Products Lists **B**•1003
Motors, Drives, & Rotating Components, Product Selection Guide **B**•1129
Opto Semiconductors, Miniglossary **B**•1214
Oscilloscopes, Product Selection Guide **D**•1385
Panel Hardware, Product Selection Guide **C**•1589
Potentiometers, Trimmers, Controls, & Rheostats, Product Selection Guide **A**•1991
Power Supplies, Miniglossary **D**•1462
Power Supplies, AC, Product Selection Guide **D**•1877
Power Supplies, DC, Product Selection Guide **D**•1447
Protective Components (Fuses, Circuit Breakers, etc.), Product Selection Guide **B**•1225
Relay Contact Forms **B**•1317
Relays, Electromechanical, Miniglossary **B**•1308
Relays, Product Selection Guide **B**•1261
Resistor Color Codes **A**•1828
Resistors, Product Selection Guide **A**•1785
Servo Components, Miniglossary **D**•1985
Solenoids, Product Selection Guide **B**•1463
Switches, Product Selection Guide **B**•1477
Thermal Components, Product Selection Guide **B**•1741
Thermal Conductivity of Dielectrics at Room Temperature **B**•1744
Thyristors/High Power Diodes, Miniglossary **A**•2076
Transducers & Encoders, Product Selection Guide **B**•1777
Transformers, Product Selection Guide **A**•2099
Wire & Cable, Product Selection Guide **C**•1743
Wire Gauges—Diameter, Area, Copper Weight **C**•1844

THE MOST RELIABLE POWER SUPPLIES FOR
HIGH VOLTAGE DC POWER

- Delivery from stock
- Standard or custom design
- Regulated, short circuit and arc protected
- All units available — 120/220, 50/60 Hz
- Special input voltages available

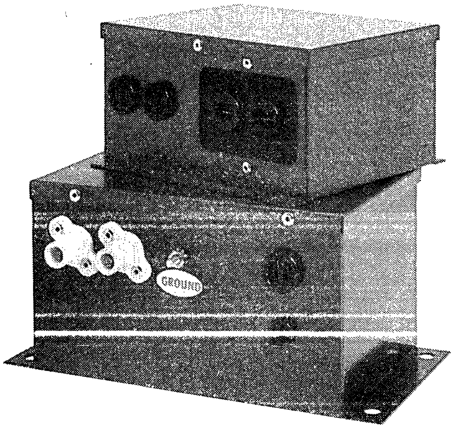
S&H manufactures a wide range of High Voltage Power Supplies, both in stock and custom designs. Our Application Engineers can work with your special requirements and match them to either a cataloged unit or they will be pleased to quote to your exact specifications.



SINGLE OUTPUT VOLTAGE

MODEL NUMBER	INPUT VOLTAGE	OUTPUT VOLTAGE	POWER OUTPUT
DC-1205	120V/60 Hz	5000 VDC	20 VA
DC-1206	120V/60 Hz	6000 VDC	20 VA
DC-1207	120V/60 Hz	7000 VDC	20 VA
DC-1208	120V/60 Hz	8000 VDC	20 VA
DC-1209	120V/60 Hz	9000 VDC	20 VA
DC-12010	120V/60 Hz	10,000 VDC	20 VA
DC-12012	120V/60 Hz	12,000 VDC	20 VA
DC-12014	120V/60 Hz	14,000 VDC	20 VA
DC-12016	120V/60 Hz	16,000 VDC	20 VA
DC-12018	120V/60 Hz	18,000 VDC	20 VA

Units are also available for 230 and/or 50 Hz. The output of above models is isolated. Either output terminal may be grounded for positive or negative applications.



DUAL OUTPUT VOLTAGE

MODEL NUMBER	PRIMARY INPUT	POLARITY	OUTPUT VOLTAGE
DC-1205/9	120V/60 Hz	Positive	9000/5000
DCN-1205/9	120V/60 Hz	Negative	9000/5000
DC-1205/10	120V/60 Hz	Positive	9500/5000
DCN-1205/10	120V/60 Hz	Negative	9500/5000
DC-1205/11	120V/60 Hz	Positive	10,500/5000
DCN-1205/11	120V/60 Hz	Negative	10,500/5000

Above units also available for 230V and/or 50 Hz.

All S&H power sources utilized epoxy molded ferroresonant transformers and are therefore line and load regulated.

Ideal for use in precipitators, microfiche copiers, plain paper copiers and many other electrostatic charge and discharge applications.

SEE OUR OTHER PAGE IN SECTION 4100 PAGE D•1984

S&H INDUSTRIES, INC.

119 GLEN COVE DRIVE • GLEN HEAD, NEW YORK 11545 • (516) 671-5600

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digi-power

Digi-power has all the power you'll ever need in OEM power supplies

(Custom or standard)

Select from a complete line of compact power supplies, 50 to 500 watts. Each unit is burned-in for a full 12 hours at 100% rated load before final testing and packaging for shipment. Reliability is assured with a one year warranty. Digi-power has the size you need for your microprocessor, mini-computer Winchester-type modules or peripheral equipment.

Units are available open-frame or enclosed to meet your specific requirements. Standard or optional features include brown-out protection, short circuit protection, power-fail option, over-temperature protection, and OVP for all outputs. Each Digi-power component is EMI filtered and constructed of tested and proven quality materials. All units deliver up to 80% efficiency. UL recognized.

Custom designs are available for OEM customers requiring special electrical, mechanical or physical parameters. A staff of service personnel and off-the-shelf replacement parts can be readily accessed should the need arise. Call or write for informative booklet and specification sheets.

Single/Dual Output Supplies

OUTPUT TERMINAL SINGLE	I,J A
DS 150-105	5V @ 30A
112	12V @ 12A
115	15V @ 10A
124	24V @ 6A
128	28V @ 5A
148	48V @ 3A

TERMINAL OUTPUT SINGLE	I,J A
DU 250-105	5V @ 40A
112	12V @ 20A
115	15V @ 16A
124	24V @ 10A
128	28V @ 9A
148	48V @ 5A

OUTPUT TERMINAL DUAL	D AUX. B	I,J A
DS 150-201	+12V @ 4A	+5V @ 30A
202	-28V @ 3A	+28V @ 3A
203	-5V @ 1A	+5V @ 24A
204	-12V @ 4A	+12V @ 8A
207	-5V @ 5A	5V @ 25A
208	24V @ 1.5A	12V @ 10A
209	-18V @ 3A	18V @ 3A
211	-15V @ 3A	15V @ 3A

OUTPUT TERMINAL DUAL	D AUX. B	I,J A
DU 250-201	+12V @ 4A	+5V @ 40A
202	-28V @ 4A	+28V @ 4A
203	-5V @ 5A	-5V @ 40A
204	-12V @ 4A	+12V @ 15A

Triple Output Supplies

OUTPUT TERMINAL TRIPLE	D AUX. B	E AUX. C	I,J A
DS 150-301	12V @ 4A	-12V @ 1A	5V @ 24A
302	12V @ 3A	-12V @ 3A	5V @ 24A
304	15V @ 3A	-15V @ 3A	5V @ 24A
310	+12V @ 5A	-5V @ 2A	5V @ 15A
315	28V @ 2.5A	-5V @ 2A	5V @ 15A
316	16.5V @ 3A	-16.5V @ 3A	5V @ 24A
321	12V @ 3A	+24V @ 3A	5V @ 20A
322	-28V @ 2.5A	-5V @ 2A	5V @ 15A

TERMINAL OUTPUT-TRIPLE	D AUX. B	E AUX. C	I,J A
DU 250-301	12V @ 5A	-12V @ 5A	+5V @ 40A
303	15V @ 4A	-15V @ 4A	+5V @ 40A
310	12V @ 5A	-5V @ 5A	+5V @ 40A

Four or More Output Supplies

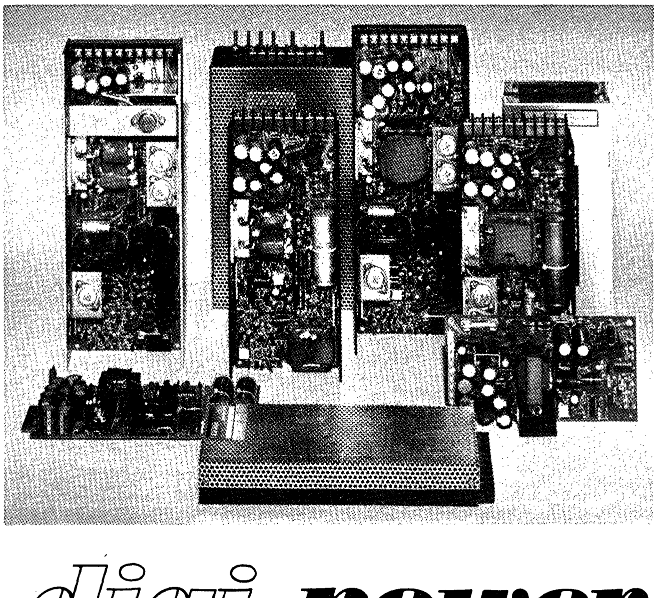
OUTPUT TERMINAL OUTPUT	D AUX. B	E AUX. C	F AUX. D	G,H COM.	I,J A
DS 160-401	+12V @ 4A	-12V @ 4A	-5V @ 1A		+5V @ 25A
403	+12V @ 4A	-12V @ 3A	+15V @ 2A		+5V @ 25A
404	+12V @ 4A	-12V @3A	+24V @ 4A		+5V @ 25A
405	+15V @ 4A	-15V @ 4A	-5V @ 1A		+5V @ 25A
406	+15V @ 4A	-15V @ 3A	+12V @ 2A		+5V @ 25A
408	+15V @ 4A	-15V @ 3A	+24V @ 4A		+5V @ 25A
409	+15V @ 1A	+15V @ 1A	+28V @ 2A		+5V @ 10A

OUTPUT TERMINAL OUTPUT	D AUX. B	E AUX. C	F AUX. D	G,H COM.	I,J A
DU 260-401	+12V @ 4A	-12V @ 4A	-5V @ 1A		+5V @ 40A
403	+12V @ 4A	-12V @ 4A	+15V @ 2A		+5V @ 40A
404	+12V @ 4A	-12V @ 4A	+24V @ 4A		+5V @ 40A
405	+15V @ 4A	-15V @ 4A	-5V @ 1A		+5V @ 40A
406	+15V @ 4A	-15V @ 4A	+12V @ 2A		+5V @ 40A
408	+15V @ 4A	-15V @ 4A	+24V @ 4A		+5V @ 40A

	OUTPUT CONFIGURATION							
MODEL	A	B	C	D	E	F	G,H	I,J
HU200-401	P.F.	P.F. RET.	-5V @ 1A	RET.	-12V @ 4A	+12V @ 4A	RET.	+5V @ 25A
402	P.F.	P.F. RET	-12V @ 2A	RET.	-12V @ 3A	+12V @ 4A	RET.	+5V @ 25A
403	P.F.	P.F. RET.	+15V @ 2A	RET.	-12V @ 3A	+12V @ 4A	RET.	+5V @ 25A
404	P.F.	P.F. RET.	+24V @ 4A	RET.	-12V @ 3A	+12V @ 4A	RET.	+5V @ 25A
405	P.F.	P.F. RET.	-5V @ 1A	RET.	-15V @ 4A	+15V @ 4A	RET	+5V @ 25A
406	P.F.	P.F. RET.	+12V @ 2A	RET.	-15V @ 3A	+15V @ 4A	RET.	+5V @ 25A
407	P.F.	P.F. RET.	+15V @ 2A	RET.	-15V @ 3A	+15V @ 4A	RET.	+5V @ 25A
408	P.F.	P.F. RET.	-15V @ 1.5A	RET.	-15V @ 3A	+15V @ 4A	RET.	+5V @ 25A

Floppy/Winchester Drive Supplies

OUTPUT NUMBER. OUTPUT TERMINAL	AUX. A I,J	AUX. B F	AUX. C E	AUX. D C	AUX. F B
DS150-206	+5V @ -18A	-12V @ 5A			
HU200-217	+5V @ 10A	+24V @ 6A*			
325	-5V @ 10A	+24V @ 6A*	-5V @ 1A		
326	-5V @ 30A	+12V @ 5A**	-12V @ 3A		
329	+5V @ 7A	+24V @ 8A*	-12V @ 6A		
334	+5V @ 10A	+24V @ 6A*	-12V @ 4A		
335	+5V @ 10A	+12V @ 4.5A*	-12V @ 4A	+24V @ 6A*	
412	+5V @ 10A	-5V @ 2.5A	-12V @ 4A	+24V @ 6A	
SP523	+5V @ 35A	+12V @ 5A**	-12V @ 3A	+24V @ 6A	



Electrical Specifications

AC Input: 90-132/180-264 VAC at 47-63 Hz

Line Regulation: 0.1% for a 15% AC input change

Load Regulation: A) Main output +0.2% for a 10-100% load change
B) Auxiliaries with post regulation +0.5% for a 10-100% load change
C) Auxiliaries without post regulation typical +5% for a 20-100% load change

Stability: 0.05% for 24 hours after warm up

Output Ripple: 100 mv for +5 volts. other outputs 1% maximum

Remote Sense: Standard on most models

Temperature Rating: Operating 0°C to 50°C. derate linearly to 50% at 70°C

Short Circuit and Overload Protection: Self restoring current limiting (foldback type)

Overvoltage Protection: OVP is standard on all outputs

Efficiency: 65% minimum

Input Surge: Cold start. 115VAC 10A max.. 230VAC 20A max.

Holdup Time: 10 m.s. minimum

Options: Power Fail. Battery Charger. Battery Backup. Clock Circuitry. Remote Shutoff

digi-power

686 E. Gish Road, San Jose, CA 95112
(408) 288-5600, TWX 910-338-0579

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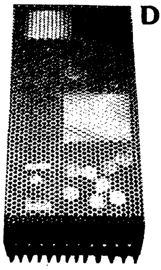
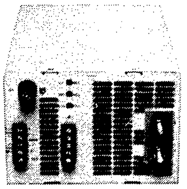
Providing all the power you need...

Digital Power Corporation has announced an agreement with SECOINSA of Spain, an electronics and computer manufacturer, to become a part of that company. SECOINSA is a member of the Instituto Nacional de Industria (INI), industrial group which holds shares in 83 of Spains leading companies and whose annual sales exceed 15 billion dollars. SECOINSA, which was established in 1975, booked 60 million dollars in sales in 1984.

SECOINSA/DIGI-POWER, as Digital Power will now be known, will continue to offer you the highest quality power supplies and the latest state-of-the-art technology.

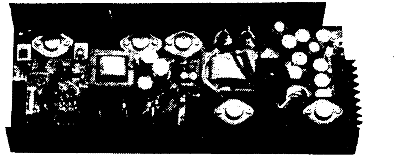


DC/DH 150-300



DS 500-100

HH/HC 300/310-400



RELIABILITY

Digi-power uses only quality part in the construction of their Power Supplies. All units undergo a thorough preliminary electrical test followed by 12 hours minimum burn-in at 100% rated load. Only after successfully passing burn-in, uninterrupted, is a unit final tested and packaged for shipment.

DC/DH 150-300

This model meets FCC Class A on conducted noise. UL approved. It is designed to meet CSA 22.2 Elect. bulletin 1402. Consult factory for models with agency approvals.

Parameters	Conditions	Limits
Output Power	—	150 Watts
Output Voltages	—	±5V to ±48V
Output Current	—	See table
Number of Outputs	—	3
Input Voltages	110/220 VAC, user selectable	±17%
Input Frequency	—	47-440 Hz
Input Surge Current	Cold start	25A max
Hold Up Time	Nominal AC input, full load	16 msec min
Line Regulation	Over entire voltage range, for all outputs	±0.1%
Load Regulation	V1—10-100% max rated load	±0.2%
	V2, V3—60% ±40% max rated load change (V1 load rated at 50%)	±3.0%
Cross Regulation	V1—change V2 or V3 load 20-100%	±0.2%
	V2, V3—change V1 load 50-100%	±5.0%
Ripple and Noise	DC to 30 MHz ±5V	100 MV PK-PK
	All other outputs	1% max PK-PK
Efficiency	AC low line, full power	70% min
Overvoltage Protection	All outputs	140% of rated voltage
Current Limit	Power out	120%
Overshoot	All outputs	+5.0% max
Response Time	V1 returns to within 1.0% of nominal for a 50% load step change	500 μsec
Temp Range	Operating; Derated linearly to 50% rated load	0—70°C
	Storage	—20°C—85°C

Parameters	Conditions	Limits
Cooling	—	40 CFM
Voltage adjustment	V1 only. All other outputs tracking	±5.0%
Output Polarity	V1 positive V2, V3, positive or negative V1, V2, V3, common return	
Withstand Voltage	3 sec) between/1 min) input to	1750 VAC
Output or Input	to	1500 VAC
Isolation	Between output to	500 VDC
Remote Sense	Compensates for 250 MV drop in load harness. V1 only	
Dimensions:	11.25 x 5.0 x 1.75	

Output Number	V1	V2	V3	Return	AC Hot	AC Neut	
Output Term.	9, 10	4	5	7, 8	1	2	3
Model **DC150-301**	5V@24A	12V@4A	—12V@3A	—	—	—	—
DC150-303	5V@24A	15V@3A	—15V@3A	—	—	—	—
DC150-309	5V@5A	12V@5A	—12V@5A	—	—	—	—
DC150-317	5V@30A	12V@4A	—5V@3A	—	—	—	—
DC150-321	5V@20A	12V@3A	24V@3A	—	—	—	—
DC150-332	5V@12A	—12V@3A	—5V@4A	—	—	—	—

Consult factory for other voltages and current requirements.

HH/HC 300/310-400

This model is designed to meet UL 1012.

Parameters	Conditions	Limits
Output Power	—	300 Watts
Output Voltages	—	±5V to ±48V
Output Current	—	See table
No. of Outputs	—	1 to 4
Input Voltages	110/220 VAC, user selectable	±17%
Input Frequency	—	47 to 440 Hz
Input Surge Current	Cold start	25A max
Hold Up Time	Nominal AC input, full load	16 Msec min
Line Regulation	Over entire voltage range, for all outputs	±0.1%
Load Regulation	V1—10 to 100% max rated load	±0.2%
	V2 to 4—60% ±40% max rated load change (V1 loaded at 50%)	±3.0%
Cross Regulation	V1—Change V2, V3, V4 load 20 to 100%	±0.2%
	V2, V3, V4—Change V1 load 50 to 100%	±5.0%
Ripple and Noise	DC to 30 MHz +5V	100 MV P-PK
	All other outputs	1% max PK-PK
Efficiency	AC low line, full power	70% min
Overvoltage Protection	+5V output	5.25V ±0.75V
Current Limit	Power out	120%
Overshoot	All outputs	+5.0% max
Response Time	V1 returns to within 1.0% of nominal for a 50% load step change	500 μsec
Temp Range	Operating, derate linearly to 50% max rated load	0 to 70°C
	Storage	—20°C to 85°C

Parameters	Conditions	Limits
Cooling	—	40 CFM
Voltage Adjustment	V1 only. All other outputs tracking	±5.0%
Output Polarity	V1—Positive V2, V3, V4—Positive or Negative V1 to V4—Common Return	
Power Fail	TTL compatible/high state	3.7 to 5.0 VDC
	low state	0 to 0.4 VDC
	Source Current	400 μa
	Sink current	10 mA
Remote Sense	Compensates for 250 MV drop in load harness. V1 only	
Withstand Voltage	3 sec) between input to	1750 VAC
	1 min) output or input to	1500 VAC
Isolation	Between output to	500 VDC
Dimensions:	14.0 x 5.5 x 2.5	

Output Number	V1	V2	V3	V4	P.F.	PFRET	Return
Output Terminal	10,11,12	3	5	6	1	2	4,7,8,9
Model **HH/HC 300-401**	5V@40A	12V@4A	—12V@4A	—5V@4A	—	—	—
HH-HC 300-414	5V@40A	12V@4A	12V@4A	24V@4A	—	—	—

Consult factory for other voltage and current requirements.
Options: Power Fail/Post Regulated Outputs.

DS 500-100

Parameters		Limits
Output Power	—	500 Watts
Output Voltage	—	+5.0V
Output Current	—	100A max
Input Voltages	110/220 VAC	±17%
Input Frequency	—	47 to 440 Hz
Input Surge Current	Cold start	25A max
Hold Up Time	Full load, nominal AC input	16 Msec
Line Regulation	Over entire voltage range	±0.2%
Load Regulation	10 to 100% max rated output	±0.2%
Ripple and Noise	DC to 30 MHz	50 MV PK-PK
Efficiency	Low line: full power	Min 70%
Overvoltage Protection	—	6.25V ±0.75V
Current Limit	Power out	120%
Overshoot	All outputs	+5.0% max
Response Time	+5 returns to within 1.0% for a 25% step load	400 μsec

Parameters		Limits
Overshoot	10 to 100% max rated load	+5.0%
Temp Range	Operating, derate linearly to 50% max load at 70%	0 to 70°C
	Storage	—20C to 85°C
Voltage Adjustment	—	±5.0%
Withstand Voltage	3 sec) between input—	1750 VAC
	1 min) to output or input to	1500 VAC
	Between output to	500 VDC
Remote Sense	Compensates for drop in load harness	250 mv
Remote Shutoff	Short J2-3 to return. Resets with removal of short.	
P.F. & P.F.	TTL compatible/high state	3.7—5.0 VDC
	low state	0.0—0.4 VDC
	Source	400 μa
	Sink	10 ma
Dimensions:	11.35 x 7.15 x 5.0	

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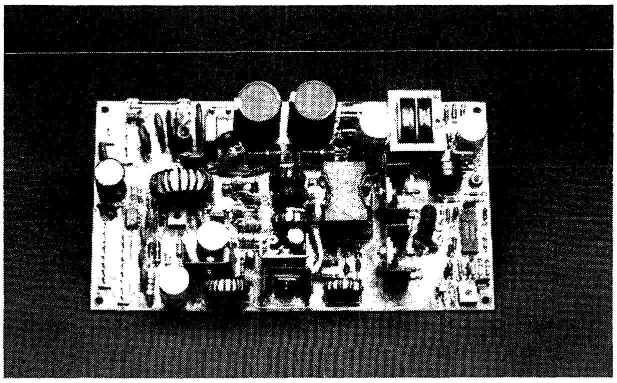
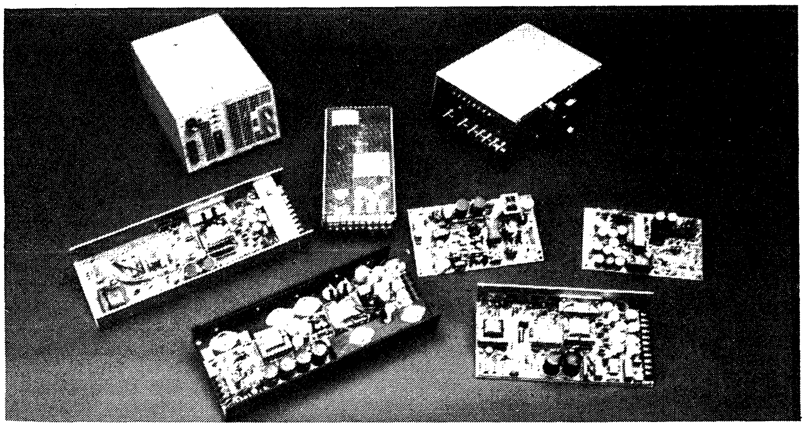


Digi-Power announces its MOSFET switchers —

Select from a complete line of compact power supplies, 50 to 500 watts. Our new line of power supplies makes use of MOSFET circuitry, making these power supplies small in size, light in weight, cooler in operation and lower in noise levels than traditional bi-polar switchers.



Digi-Power open frame/ closed frame models.

Units are available open frame or enclosed to meet your specific requirements. In addition, custom designs are available for OEM customers requiring special electrical, mechanical or physical parameters.

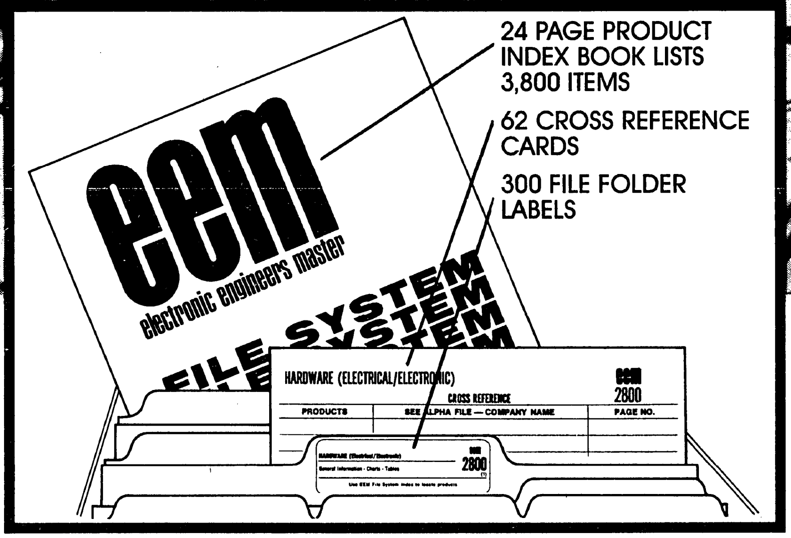
Current prices for other models may be obtained from customer service department. Call for further information.

Models	1 - 24	25 - 49	50 - 99	100 - 249	250 - 499	500 - 999
DU 50-ALL	$140.00	$134.00	$126.25	$114.00	$103.00	$ 93.00
DH 65	170.00	151.00	135.00	122.00	109.50	99.50
DC 150-100	245.00	227.00	212.00	201.00	192.00	184.00*
DC 150-200	262.50	240.00	222.00	210.00	201.00	191.00
DC 150-300	262.50	240.00	222.00	210.00	201.00	191.00
DC 160-400	262.50	240.00	222.00	210.00	201.00	191.00
DC 161-ALL	293.00	270.00	253.00	236.00	222.00	214.00*
DC 261-ALL	325.00	302.00	281.00	264.00	253.00	245.00*
DL 130	230.00	214.00	200.00	189.00	180.00	171.00
DL 300-ALL	375.00	350.00	325.00	305.00	290.00	278.00
DL 400-ALL	500.00	465.00	432.00	406.00	385.00	370.00*
DH 250-ALL	305.00	280.00	265.00	253.00	242.50	237.00
DH 260-400*	305.00	280.00	265.00	253.00	242.50	237.00
HH-200-ALL	325.00	302.00	281.00	264.00	253.00	245.00
HH 210-ALL*	345.00	321.00	299.00	281.00	270.00	260.00
HH 310-ALL	400.00	372.00	348.00	327.00	310.00	298.00
HH 300-ALL	375.00	350.00	325.00	305.00	290.00	278.00
DS 500-100	600.00	560.00	520.00	490.00	465.00	445.00
New MOSFET Models						
MXF 100	170.00	151.00	135.00	122.00	109.50	99.50
MXF 130	200.00	181.50	165.50	150.00	135.00	122.00
MXF 150	230.00	214.00	200.00	189.00	180.00	171.00
MXF 200	285.00	258.50	235.50	215.00	195.00	176.50

WARRANTY

Digital Power products are warranted for 1 year from the date of shipment against defects in material and workmanship. Digi-power will repair or replace any product that proves to be defective during the warranty period unless damage was due to improper installation, physical damage or operation outside specified limits.

Digital Power reserves the right to modify without notice any product without incurring any obligation to modify products previously sold.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ALL NEW with this edition of EEM

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Are your catalog files organized? Can you find any given catalog in a matter of seconds? If your answer is "Yes," you probably already have the EEM File System. But, if you said "No," you really ought to look into this simple system. It will save hours of time and tons of aggravation.

The EEM File System was invented over twenty-five years ago to help people who specify, buy, or work with electronic products and equipment. It is upgraded on a constant basis to reflect the current state of the art. It's easy to use and easy to customize to your particular needs.

You say you want to file catalogs by type of product? That's easy to do with The System. But, what are you going to do when there are multiple products in one catalog? Take Mallory for example. There are all kinds of products in the Mallory Short Form Catalog. With the EEM File System all you do is file the catalog under "M" for Mallory and refer to it on all of the cross reference cards that apply.

There are thousands of EEM File Systems in everyday use in engineering and procurement offices all over the world. Shouldn't you be using this proven system?

The EEM File System is shipped in one neat package. The package contains everything you need to set up your very own filing system. Best of all, it's easy to get and very affordable. Send a check or money order for $25.00 and EEM will pay the postage and sales tax. If you must use a purchase order, please add $5.00 for postage and handling. An invoice will accompany your System.

Don't waste any more time. Get organized now!

EEM FILE SYSTEM,
645 stewart ave., garden city, ny 11530

OEM Switching Power Supplies

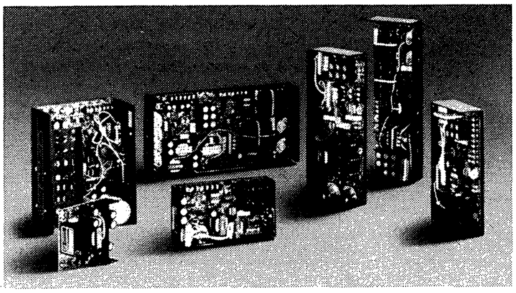
Features
- Dual Range AC input
- UL recognized; CSA certified
- Compliance to FCC 20780/Class A and VDE 0871/A for conducted noise. (Compliance to Class B on 7M45, 7M70, 7M100 and 7M150 models)
- VDE 0806/IEC 380 safety standards (7M and 5K)
- Two year warranty
- 24-hour burn-in
- 65% to 80% efficiency
- Output status LED indicator
- Overvoltage protection
- Overload protection
- Enable/inhibit function
- Reverse polarity protection
- Convection cooled

Specifications

The following is a brief summary of specifications. Comprehensive specifications for each model are included in the full product line catalog.
- Input 90-132/180-264 VAC, 47-63 Hz
- Input carry-over 16ms minimum
- Ripple and noise from 50m Vp-p typical
- 0 to 40°C full rated load. (0 to 50°C on 7M45, 7M70, 7M100 and 7M150). Derate linearly to 50% load at 70°C
- Efficiency ranges from 65% to 80% dependent on model number
- Line regulation from 0.15%
- Load regulation from 0.15%
- Transient response from 500μs for a 50% to 100% load change with a maximum deviation of 4% of V_{out}.
- Turn-on time 100ms maximum
- Power fail option

Single output ratings

Voltage	Current	Model
5V	7.0A	5A5A
	12.0A	5B5A
	20.0A	5C5A
	35.0A	5E5A
	50.0A	5F5A
	65.0A	5G5A
	100.0A	5K5A
12V	3.3A	5A12A
	5.6A	5B12A
	8.3A	5C12A
	14.5A	5E12A
	21.0A	5F12A
	27.0A	5G12A
	41.0A	5K12A
15V	2.6A	5A15A
	4.5A	5B15A
	6.8A	5C15A
	11.8A	5E15A
	17.0A	5F15A
	22.0A	5G15A
	34.0A	5K15A
24V	1.6A	5A24A
	2.9A	5B24A
	4.5A	5C24A
	7.9A	5E24A
	11.0A	5F24A
	15.0A	5G24A
	22.0A	5K24A



Dimensions and weights:

Case	5A	5B	5C	5E	5F	5G	5K	5AX	7M40/ 7M45	5BX	7M70	5CX	7M100	7M150	5EX	7M200	5FX	5GX
Height	4.75	4.87	4.87	4.87	4.87	4.87	7.50	4.75	3.9	4.87	4.25	4.87	4.75	5.00	4.87	5.50	6.00	7.50
Width	5.00	6.50	8.50	10.50	13.50	15.00	15.00	6.10	6.3	8.00	8.25	11.00	10.3	10.50	15.00	11.50	15.00	15.00
Depth	2.10	1.75	2.00	2.25	2.25	2.37	3.00	2.10	1.90	1.75	1.90	2.00	2.00	2.50	2.25	2.75	2.25	2.50
MTG SDS	1	4	4	4	4	4	4	1	1	4	1	4	1	2	4	2	4	4
Weight	0.80	1.65	2.81	3.86	4.57	6.05	8.50	1.00	1.25	1.88	1.50	3.55	2.25	3.40	5.22	3.75	6.12	8.55

Multiple Output Ratings

1st Output		2nd Output		3rd Output		4th Output		5th Output		Max. Power	Model
Voltage	Current	Voltage	Current	Voltage	Current	Voltage	Current	Voltage	Current		
+5V	2.5A	+12V	2A	−12V	0.2A	—	—	—	—	40W	7M40
+5V	2.5A	+12V	2A	−12V	0.1A	−5V	0.1A	—	—	40W	7M40-01
+5V	4.0A	+12V	0.5A	−12V	0.5A	−5V	0.5A	+15V	1.0A	40W	5AXMPA
+5V	5.0A	+12V	2.0A	−12V	0.5A	—	—	—	—	45W	7M45
+5V	7.0A	+12V	1.5A	−12V	0.5A	−5V	0.25A	—	—	60W	5BXMPA
+5V	7.0A	+15V	1.0A	−15V	1.0A	—	—	—	—	65W	5BX515TA
+5V	8.0A	+12V	4.0A	−12V	0.6A	−5V	0.5A	—	—	70W	7M70
+5V	6.0A	+12V	2A/4A	+12V	1.4A	−12V	0.6A	—	—	70W	7M70-01
+5V	10.0A	+12V	2.0A	−12V	1.0A	−5V	1.0A	—	—	90W	5CXMPA
+5V	10.0A	+15V	2.0A	−15V	1.0A	—	—	—	—	95W	5CX515TA
+5V	10.0A	+12V	1.4A	+12V	4.0A	−12V	2.0A	Power Fail*		100W	7M100
+5V	10.0A	+12V	1.4A	−12V	2.0A	+24V	2/4A	Power Fail*		100W	7M100-01
+5V	15.0A	+12V	4.0A	−12V	2.0A	+24V	2A/3.75A	Power Fail*		150W	7M150
+5V	15.0A	+12V	4.0A	+12V	4A/7A	−12V	2A	Power Fail*		150W	7M150-01
+5V	20.0A	+12V	3.0A	−12V	2.0A	−5V	1.0A	—	—	165W	5EXMPA
+5V	20.0A	+12V	4A/7.5APk	−12V	4.0A	+24V	3.2A/6APk	−5V	0.7A	200W	7M200
+5V	20.0A	+15V	3.2A/6A	−15V	3.2A	+24V	3.2A/6A	−5V	0.7A	200W	7M200-01
+5V	20.0A	+12V	4A/7A	+12V	4A/8A	−12V	4A	−5V	0.7A	200W	7M200-02
+5V	30.0A	+12V	5.0A	−12V	3.0A	−5V	2.0A	+24V	3.2A	250W	5FXMPA
+5V	45.0A	+12V	7.0A	−12V	5.0A	−5V	2.0A	+24V	3.2A	325W	5GXMPA

*Additional −5V output is available if Power Fail is not required.

For applications information,
dial direct toll free
(800) 423-5569
In California, call collect (818) 998-6811
Specifications subject to change without notice.

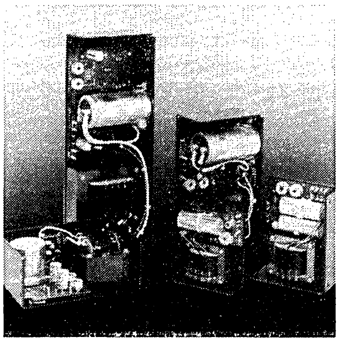
Sierracin/Power Systems
20500 Plummer Street, Chatsworth, California 91311
Telephone (818) 998-9873

OEM Linear Power Supplies

Features
- Dual range AC input
- Overvoltage protection
- Foldback current limiting
- Remote sense—most models
- Two year warranty
- UL recognized

Specifications
The following is a brief summary of specifications. Comprehensive specifications for each model are included in the full product line catalog.
- Input 105-125/210-250 VAC, 47-440 Hz.
- Line regulation 0.15% typical.
- Load regulation 0.15% typical
- Ripple 3mVp-p typical, 10mVp-p maximum.
- 0 to 40°C full rated load. Derate linearly to 50% load at 70°C ambient temperature.
- Dimensions on back page.

OEM III Power Supplies



Single output ratings

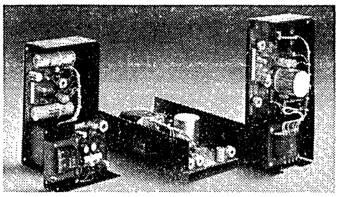
Voltage	Current	Model
5 Volts	3.0A	3B5
	6.0A	3C5
	9.0A	3CC5
	12.0A	3D5
	18.0A	3DD5
12 Volts	1.7A	3B12
	3.4A	3C12
	5.1A	3CC12
	7.0A	3D12
	10.0A	3DD12
15 Volts	1.5A	3B15
	3.0A	3C15
	4.5A	3CC15
	6.0A	3D15
	9.0A	3DD15
24 Volts	1.2A	3B24
	2.4A	3C24
	3.6A	3CC24
	4.8A	3D24
	7.0A	3DD24

Multiple output ratings

1st Output		2nd Output		3rd Output		Model
Voltage	Current	Voltage	Current	Voltage	Current	
+12V	1.0A	−12V	1.0A	–	–	2BB12D
12V	1.6A	12V	1.6A	–	–	3K12D
12V	3.2A	12V	3.2A	–	–	3L12D
+15V	0.8A	−15V	0.8A	–	–	2BB15D
15V	1.5A	15V	1.5A	–	–	3K15D
15V	3.0A	15V	3.0A	–	–	3L15D
5V	3.0A	12V	0.5A	12V	0.5A	2CC512T
5V	3.0A	+12V	1.0A	−12V	1.0A	3KX512T
5V	7.0A	12V	1.0A	12V	1.0A	2D512T
5V	8.0A	+12V	1.7A	−12V	1.7A	2P512T
5V	15.0A	+12V	3.4A	−12V	3.4A	2Q512T
5V	3.0A	15V	0.5A	15V	0.5A	2CC515TA
5V	7.0A	15V	1.0A	15V	1.0A	2D515TA
5V	8.0A	+15V	1.5A	−15V	1.5A	2P515T
5V	15.0A	+15V	3.0A	−15V	3.0A	2Q515T

Shading indicates output includes OVP

Floppy Disk Supplies

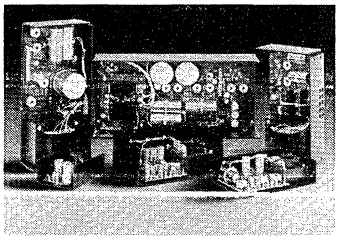


Output ratings

1st Output		2nd Output		3rd Output		4th Output*		Model
Voltage	Current	Voltage	Current	Voltage	Current	Voltage	Current	
+5V	0.5A Avg 0.7A PK	+12V	0.9A Avg 1.8A PK	–	–	–	–	2BXFD
5V	1.4A	+12V	1.8A Avg 3.2A PK	–	–	–	–	2BBXFD
+5V	2.2A	− 5V	0.2A	+24V	1.2A Avg 3.0A PK	+8V	2.0A	2DFD
5V	3.0A	5V	0.6A	24V	4.0A	–	–	2PFD
+5V	6.0A	−12V	1.0A	24V	4.0A	–	–	2QXFD

Shading indicates output includes OVP *Unregulated Output

Microprocessor Supplies



Output ratings

1st Output		2nd Output		3rd Output		4th Output		Model
Voltage	Current	Voltage	Current	Voltage	Current	Voltage	Current	
5V	2.0A	9-15V or 5V	0.5A 0.35A	–	–	–	–	2BBMPD
5V	2.0A	9-15V	0.25A	9-15V or 5V	0.25A 0.25A	–	–	2BBMP
5V	3.0A	12V	0.6A	9-12V or 5V	0.6A 0.38A	–	–	2CCMP
5V	7.0A	12V	1.0A	9V or 5V	1.2A 0.75A	–	–	2DMP
5V	8.0A	+12V	1.7A	−12V	1.0A	5V	0.6A	2PMP
5V	15.0A	+12V	3.4A	−12V	1.7A	5V	1.0A	2QMP

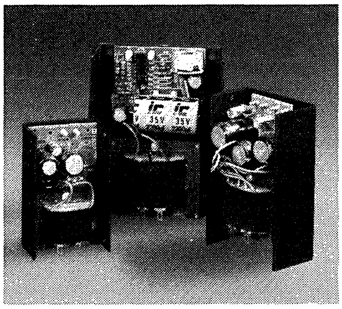
Shading indicates output includes OVP

For applications information,
dial direct toll free
(800) 423-5569
In California, call collect (818) 998-6811
Specifications subject to change without notice.

Sierracin/Power Systems
20500 Plummer Street, Chatsworth, California 91311
Telephone (818) 998-9873

Micro-Reg Low Power Supplies

Features
- Smallest open frame construction available
- Overvoltage protection
- Monolithic voltage regulation
- Single, dual and triple outputs
- Economical replacement for encapsulated supplies
- Two year warranty
- UL recognized
- Overcurrent protection



Specifications
The following is a brief summary of specifications. Comprehensive specifications for each model are included in the full product line catalog.
- Input 105-125 VAC, 47-440 Hz.
- Line regulation for 1C single output models 0.15% for a low-high line change. All others 0.5%.
- Load regulation for 1C single output models 0.15% for a 0 to 100% load change. All others 0.5%.
- Ripple 3mVp-p typical, 10mVp-p maximum on 1C single output models. 10mVp-p typical, 50mVp-p maximum on all others.
- 0° to 40°C full rated load. Derate linearly to 50% load at 70°C ambient temperature.

Single output ratings

Voltage	Current	Model
5V	0.5A	1A5
5V	1.1A	1B5
5V	2.2A	1C5
12V	0.25A	1A12
12V	0.6A	1B12
12V	1.2A	1C12
15V	0.2A	1A15
15V	0.5A	1B15
15V	1.0A	1C15
24V	0.5A	1C24

Shading indicates output includes OVP

Multiple output ratings

1st Output		2nd Output		3rd Output		Model
Voltage	Current	Voltage	Current	Voltage	Current	
+12V	0.13A	−12V	0.13A	–	–	1A12D
+12V	0.30A	−12V	0.30A	–	–	1B12D
+12V	0.60A	−12V	0.60A	–	–	1C12D
+15V	0.10A	−15V	0.10A	–	–	1A15D
+15V	0.25A	−15V	0.25A	–	–	1B15D
+15V	0.50A	−15V	0.50A	–	–	1C15D
+ 5V	0.25A	+12V	0.06A	−12V	0.06A	1A512T
+ 5V	0.50A	+12V	0.13A	−12V	0.13A	1B512T
+ 5V	1.00A	+12V	0.25A	−12V	0.25A	1C512T
+ 5V	0.25A	+15V	0.05A	−15V	0.05A	1A515T
+ 5V	0.50A	+15V	0.13A	−15V	0.13A	1B515T
+ 5V	1.00A	+15V	0.25A	−15V	0.25A	1C515T
+ 5V	1.00A	+12V	0.25A	− 5V	0.40A	1CMP

Shading indicates output includes OVP

S-100 Bus Power Supplies

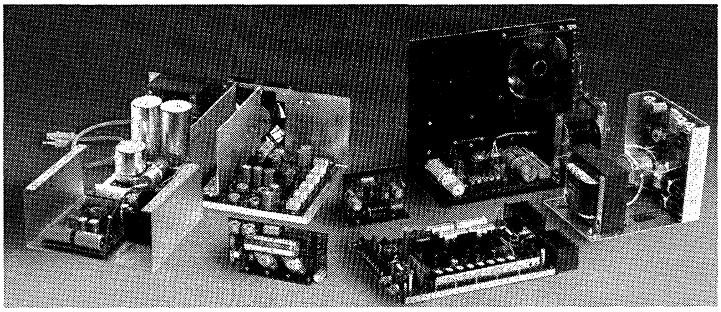
Features:
- Standard units provide 128W and 288W output power
- Dual range AC input
- Unregulated supplies for "on-board" regulators

Specifications
- Input 115/230 VAC ±10%, 47-440 Hz.
- Outputs below 20A are fused.

Output ratings

Model	Output 1 +8V @	Output 2 +16V @	Output 3 −16V @
2D-S100	8A	2.0A	2.0A
2F-S100	20A	4.0A	4.0A

Custom Power Supplies



Sierracin is presently supplying open frame custom power supplies in high volume to a large number of customers for application in floppy disk drives, CRT terminals, electronic games, computers, etc. Contact Sierracin for a quotation on custom power supplies for your specific requirements.

Outline Dimensions and Weights

The table describes overall outline dimension of the power supply envelope. Detailed dimension and mounting patterns are included in the full product line catalog.

	1A	1B	1C	2BB	2BX	2CC	2D	2P	2Q	2QX	3B	3C	3CC	3D	3DD	3K	3KX	3L	2DS	2FS
Height:	1.80	2.20	3.20	4.00	4.00	4.87	4.87	4.87	6.25	6.25	4.00	4.87	4.87	4.87	4.87	4.00	4.00	4.87	4.87	4.87
Width:	2.80	3.50	4.00	6.50	5.50	7.00	9.00	11.00	13.50	10.50	4.87	5.62	7.00	9.00	14.00	7.88	10.25	9.38	9.00	11.25
Depth																				
Overall:	1.48	1.68	2.07	1.93	1.93	3.20	3.20	3.13	4.00	3.25	2.07	2.95	3.20	3.20	3.20	2.95	2.95	3.20	3.20	4.12
Chassis:	1.10	1.35	1.65	1.62	1.62	2.75	2.75	2.75	3.37	2.87	1.62	2.50	2.75	2.75	2.75	2.50	2.50	2.75	2.75	3.75
Mtg Sides:	3	3	3	3	2	4	4	4	3	3	3	3	4	4	4	4	4	4	4	2
Weight:	0.50	0.90	1.55	2.15	1.95	4.25	7.20	7.85	11.3	9.4	1.9	4.0	4.25	7.75	10.2	4.1	4.25	7.35	7.55	12.2

NOTE: All dimensions are in inches and are ± 0.030 inches.

For applications information,
dial direct toll free
(800) 423-5569
In California, call collect (213) 998-6811
Specifications subject to change without notice.

Sierracin/Power Systems
20500 Plummer Street, Chatsworth, California 91311
Telephone (818) 998-9873

EEM PRODUCT SELECTION GUIDES

**Use the EEM Product Selection Guides.
There are 34 Guides in this edition of EEM.
See page 2 (A•2, B•2, C•2, D•2) of each
volume to locate the Product Selection Guides
that pertain to your needs.**

150 Watt Switcher

A UNIT OF GENERAL SIGNAL
SOLA
1717 BUSSE ROAD, ELK GROVE VILLAGE, IL 60007
Phone: 312/439-2800 Telex 28-0538

Features

- Single, triple and quad outputs
- Three board levels—PC board only, open frame and enclosed
- Construction Flexibility
- Remote Sensing
- Soft Start
- UL/CSA Recognized
- Overcurrent Protection
- Overvoltage Protection

Electrical Characteristics

Input Voltage: 120/240 VAC RMS
Input Voltage Range: 90-137 VAC
180-257 VAC
Input Frequency: 50-400 Hz.
Soft Start: 500 mSec. maximum to full output.
Maximum Input Current: 4. Amp @ 120 VAC
2.5 Amp @ 240 VAC
(External fuse)
Regulation: 0.25 - 0.5%; unit dependent
Hold-Up Time: 10 mSec @ 100 VAC input
(full load)
Output Power: 150 Watts

Environmental Characteristics

Storage Temperature: −30 to +105 degrees C.
Operating Temperature: 0 to 40 degrees C.: full output.
40 to 85 degrees C.: derate linearly to 0 watts.

Electrical Specifications
(Single Output Series)

Initial Set Accuracy: ±1%
Adjustability: ±5%
Line Regulation: 0.25%
Load Regulation: 0.25%
Ripple (p-p): 50 mV. max.
Transient Response: 500 μSec - 25% to 100% load.
Maximum Overshoot: 2% - 50% to 100% load.
Overload Protection: 110% of load rating.

Catalog Number**	Output Volts/Amps	Maximum Amp Rating
86-05-325	+5.0/25	28
86-12-312	+12.0/12.5	15
86-13-310	+13.8/10	11
86-15-310	+15.0/10	12.5
86-24-262	+24.0/6.25	8

**For Open Frame add (−1) to catalog number.
For Board Level add (−2) to catalog number.

Electrical Specifications Triple and Quad Output Series

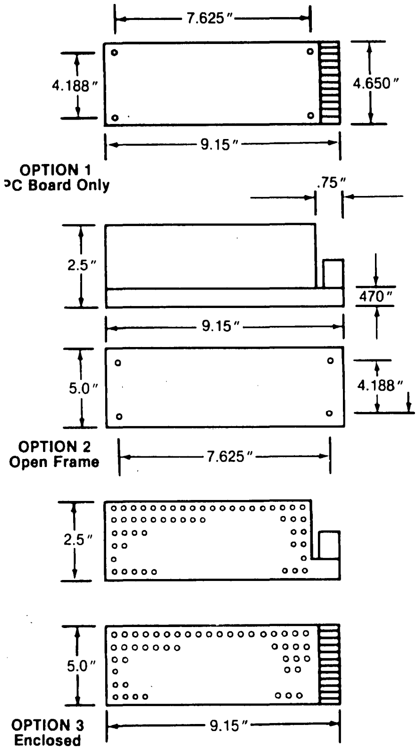
	Triple Output Series			Quad Output Series			
	Primary	Aux. A	Aux. B	Primary	Aux. A	Aux. B	Aux. C
Voltage:	5.0	12 to 15	−5 to −15	5.0	5 to 18	5 to 18	12-24
Initial Set Accuracy:	1%	5%	5%	1%	5%	5%	5%
Adjustable:	±5%	No	No	±5%	No	No	No
Line Reg. (Maximum):	.25%	.5%	.5%	.25%	1%	1%	1%
Load Reg. (Maximum):	.25%	1%	1%	.25%	1%	1%	1%
Max. Rated Current:	20A	4A	4A	20A	1.5A	1.5A	1.5A
Max. Current Limit:	115%	2*	2*	115%	2*	2*	2*
Ripple (p-p) mV.:	50	50	50	50	20	20	20
Transient Response (uS):	500	500	500	500	50	50	50
Efficiency:		65%			65%		
Overshoot:	2%	2%	2%	2%	2%	2%	2%

*Two times current output.

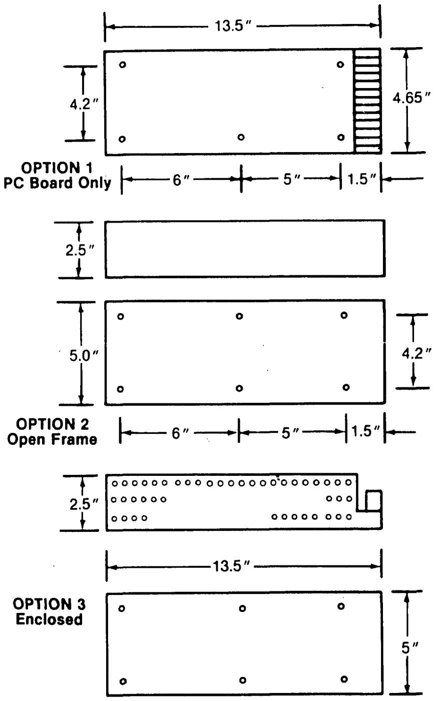
GS
SOLA
1717 BUSSE ROAD, ELK GROVE VILLAGE, IL 60007
Phone: 312/439-2800 Telex 28-0538

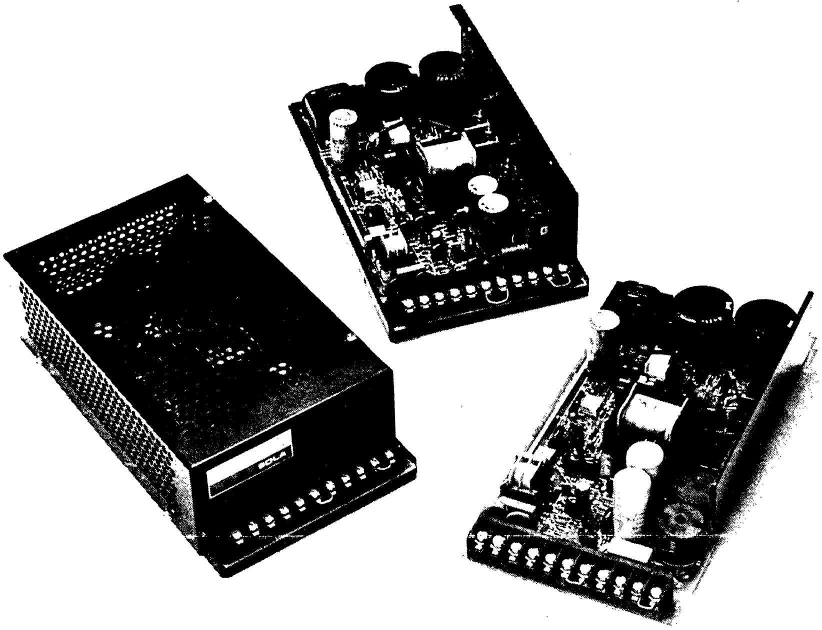
Dimensions

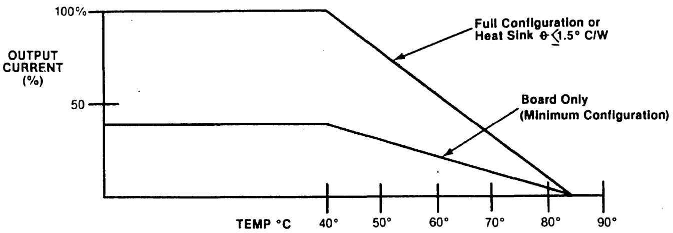
SINGLE OUTPUT


7.625″
4.188″
4.650″
9.15″
OPTION 1
PC Board Only
.75″
2.5″
.470″
9.15″
5.0″
4.188″
OPTION 2
Open Frame
7.625″
2.5″
5.0″
OPTION 3
Enclosed
9.15″

TRIPLE AND QUAD OUTPUT


13.5″
4.2″
4.65″
OPTION 1
PC Board Only
6″
5″
1.5″
2.5″
5.0″
4.2″
OPTION 2
Open Frame
6″
5″
1.5″
2.5″
13.5″
OPTION 3
Enclosed
5″




100%
OUTPUT CURRENT (%)
50
Full Configuration or Heat Sink θ ≤ 1.5° C/W
Board Only (Minimum Configuration)
TEMP °C
40°
50°
60°
70°
80°
90°

Standard Voltages— Triple Output Series (Volt/Amps)

Catalog Number**	Primary (adj)	Aux A	Aux B	Aux C
86-83-3320	5/20	12/2	−12/2	
86-85-3320	5/20	15/2	−15/2	
86-84-3320	5/20	12/2	− 5/3	
86-86-3320	5/20	15/2	− 5/3	
86-83-3310	5/10	12/4	−12/4	
86-85-3310	5/10	15/4	−15/4	

Standard Voltages— Quad Output Series (Volts/Amps)

Catalog Number**	Primary (adj)	Aux A	Aux B	Aux C
86-87-4320	5/20	12/1	−12/1	24/1
86-87-4310	5/10	12/1	−12/1	24/3
86-84-4320	5/20	12/1.5	−12/1.5	−5/1.5
86-88-4320	5/20	15/1	−15/1	24/1
86-86-4320	5/20	15/1.5	−15/1.5	−5/1.5

**For Open Frame add (−1) to catalog number. For Board Level add (−2) to catalog number.

SPELLMAN High Voltage Electronics Corporation

HIGH VOLTAGE POWER SUPPLIES

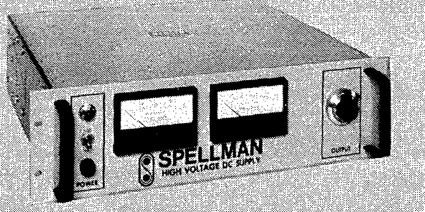
- Voltages as high as 475 KV
- Models from low to high power (0 to 30 KW)
- Rack and modular configurations
- Standard, custom and OEM designs
- Highly regulated and economy versions
- Designs for laboratory, production or military applications
- Protection against shorts, overload, and arcing
- Low ripple

TYPICAL APPLICATIONS:

- **HV devices** . . . CRT's, lasers, photomultipliers, X-ray tubes, capacitor chargers
- **HV instrumentation** . . . ionization chambers, electron beam accelerators, SEM's
- **Production processing** . . . X-ray lithography, ion implantation, electrostatics
- Medical x-ray imaging
- Nuclear magnetic resonance

SPELLMAN'S EXPERIENCE IN HV DESIGN MAKES THE DIFFERENCE

For over 42 years SPELLMAN has been a leader in high voltage technology as a **specialist** in supplying high voltage power sources for a wide variety of applications. The **RHP** models use SPELLMAN's proprietary new series resonant technology. This highly efficient design allows switching rates of over 20 KHz. At the same time it avoids spikes and RFI problems previously associated with switching and pulse width modulated supplies. The **RHR/UHR/RHSR** models utilize a solid state RF high voltage circuit that feeds to an RF oscillator circuit operating at 35-40 KHz.



STANDARD HV RACK POWER SUPPLIES

SUMMARY OF SPECIFICATIONS

INPUT: 105-125 VAC, 50-60 Hz (optional 100V or 220 VAC, 50-60 Hz); RHP: 208 VAC ±10%, 3ϕ, 50-60 Hz; (Others available on request).

OUTPUT: continuously adjustable, current limited to 110% of rated load.

PROTECTION: overload, short circuit and arc.

FEATURES: contact factory for complete details on available options for each model and to receive a full line catalog.

SPECIFICATION	UHR	RHP	RHR	RHSR	CRT30/40 (anode)	(focus)
MAXIMUM OUTPUT:						
Voltage (KV)	400	200	400	60	40	6.5**
Wattage (W)	500	3-30 KW	500	60	120	.3
MINIMUM OUTPUT VOLTAGE: (KV)	40	3	5	5	5	0
REGULATION:						
0 to full load (%)	±0.1	0.02	0.01 +1V	0.001	0.01 +1V	1
±10% line change (%)	±0.1	0.01	0.01 +1V	±.001	±.01 +1V	±0.01
RIPPLE: (RMS) (%)	0.1	0.1 (x)	0.02 +2V*	0.001	0.02 +2V	0.1 (.05 no load)
STABILITY:						
per hour (%)	0.2	0.02	0.02 +2V	0.005	0.02 +2V	
per 8 hours (%)	—	0.05	0.05 +5V	0.01	0.05 +5V	
TEMPERATURE:						
Coefficient/°C (%)	0.2	0.01	0.02 +2V	0.005	0.02% +2V	
Operating (°C)	0-50	0-50	−20 to +55	0-50	0-50	

* 0.1% at or over 100 KV
(x) lower ripple available
** Other voltages available — consult factory (1-30 KV @ .3-10 watts)

A MODEL FOR EVERY APPLICATION

	CUSTOM	MOST APPLICABLE MODEL (a) UHR	RHP	RHR	RHSR	CRT
General high quality lab	●		●	●	●	
CRT:						
General				●		
High resolution					●	
Production testing	●	●		●		●
Scanning electron microscope	●			●	●	
Mass spectrometer	●				●	
Ionization chamber				●		
Electron beam guns	●	●	●	●		
High power (welding, cutting)	●		●			
Capacitor charging	●	●	●	●		
Ion Implantation:	●		●	●		
Predeposition	●		●			
X-ray:						
Lab and Industrial	●		●	●		
Medical Imaging	●		●(b)			
Lithography	●		●(b)			
Photomultiplier		●		●	●	
Laser: High power (pulsed & CW)	●	●	●(b)	●		
Image Intensifier	●	●		●		
TWT and Klystron	●		●(b)			
Magnet and NMR	●					
Electrostatics:						
Production (flocking, spraying)	●	●				
Production:						
CRT test				●		●
Plasma etching			●			
Corona test		●		●		
Hi Pot Insulation Testing		●		●		

FOOTNOTES
(a) Depending upon the specific application, other models may be more suitable; see the individual specifications or consult the factory.
(b) Consult factory for (RHPX) special product designs

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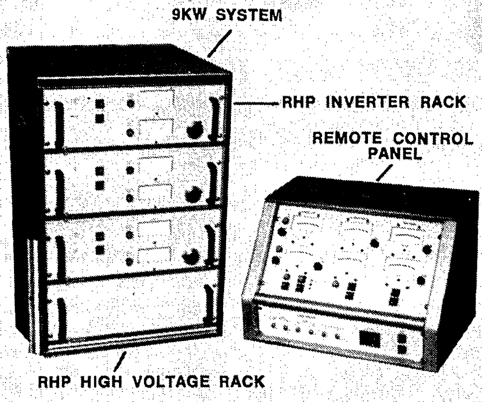
Standard HV RACK power supplies

continued from previous page

Refer to the charts below to select appropriate models. If specifications do not meet exact requirements consult factory. Custom designs available upon request.



RACK MOUNTED POWER SUPPLY MODELS

RHP Series High wattage without large size (due to a uniquely efficient design technique), digital metering and IEEE bus available; can be paralled for up to 9 KW, 15 KW and 30 KW.

RHR Series A general purpose unit for a variety of uses with a reasonable compromise between power, regulation, stability, ripple, size and price.

RHSR Series For demanding applications featuring exceptional regulation and stability with very low ripple; remote voltage and resistance programming and monitoring is standard.

UHR Series Most economical unit with satisfactory performance for many uses such as production test.

CRT 30/40 Designed specifically for testing CRT's; provides variable anode and focus voltages; remote voltage and resistance control with monitoring of both voltage and current.

RHR SERIES

POLARITY		FIXED (a)			REVERSIBLE	
Max. Output Voltage (KV)	Max. Output Current (mA)	(c) Rack Height In (mm)	Model Number	Net Weight Lbs (kg)	Model Number	Net Weight Lbs (kg)
5	2	5¼ (133)	RHR5*10	25 (12)	——	——
	6	5¼ (133)	RHR5*30	30 (14)	RHR5PN30	25 (12)
	10	5¼ (133)	RHR5*50	30 (14)	RHR5PN50	30 (14)
	20	5¼ (133)	RHR5*100	55 (25)	RHR5PN100	60 (27)
10	1	5¼ (133)	RHR10*10	25 (12)	——	——
	3	5¼ (133)	RHR10*30	30 (14)	RHR10PN30	25 (12)
	6	5¼ (133)	RHR10*60	30 (14)	RHR10PN60	30 (14)
	10	5¼ (133)	RHR10*100	30 (14)	RHR10PN100	30 (14)
	20	10½ (267)	RHR10*200	55 (25)	RHR10PN200	60 (27)
15	0.67	5¼ (133)	RHR15*10	25 (12)	——	——
	2	5¼ (133)	RHR15*30	25 (12)	RHR15PN30	25 (12)
	4	5¼ (133)	RHR15*60	30 (14)	RHR15PN60	30 (14)
	8	5¼ (133)	RHR15*120	30 (14)	RHR15PN120	30 (14)
	15	10½ (267)	RHR15*225	55 (25)	RHR15PN225	60 (27)
20	0.5	5¼ (133)	RHR20*10	25 (12)	——	——
	1.5	5¼ (133)	RHR20*30	25 (12)	RHR20PN30	25 (12)
	3	5¼ (133)	RHR20*60	30 (14)	RHR20PN60	30 (14)
	6	5¼ (133)	RHR20*120	30 (14)	RHR20PN120	30 (14)
	12	10½ (267)	RHR20*240	55 (25)	RHR20PN240	60 (27)
30	0.33	5¼ (133)	RHR30*10	25 (12)	——	——
	1	5¼ (133)	RHR30*30	25 (12)	RHR30PN30	25 (12)
	2	5¼ (133)	RHR30*60	30 (14)	RHR30PN60	30 (14)
	4	5¼ (133)	RHR30*120	30 (14)	RHR30PN120	30 (14)
	5	5¼ (133)	RHR30*150	50 (23)	RHR30PN150	55 (25)
	8	10½ (267)	RHR30*240	55 (25)	RHR30PN240	60 (27)
40	0.75	5¼ (133)	RHR40*30	40 (18)	RHR40PN30	40 (18)
	1.5	5¼ (133)	RHR40*60	40 (18)	RHR40PN60	40 (18)
	3	5¼ (133)	RHR40*120	40 (18)	RHR40PN120	40 (18)
	6	10½ (267)	RHR40*240	60 (27)	RHR40PN240	60 (27)
50	0.5	5¼ (133)	RHR50*25	40 (18)	RHR50PN25	52 (24)
	1	5¼ (133)	RHR50*50	40 (18)	RHR50PN50	52 (24)
	3	5¼ (133)	RHR50*150	55 (25)	RHR50PN150	70 (32)
	5	10½ (267)	RHR50*250	60 (27)	RHR50PN250	75 (34)
60	0.5	5¼ (133)	RHR60*30	40 (18)	RHR60PN30	52 (24)
	1	5¼ (133)	RHR60*60	40 (18)	RHR60PN60	52 (24)
	2	5¼ (133)	RHR60*120	40 (18)	RHR60PN120	52 (24)
	4	10½ (267)	RHR60*240	60 (27)	RHR60PN240	75 (34)
80	1	8¾ (222)	RHR80*80	52 (24)	RHR80PN80	52 (24)
	3	10½ (267)	RHR80*240	72 (33)	RHR80PN240	75 (34)
100	1	8¾ (222)	RHR100*100	52 (24)	RHR100PN100	52 (24)
	1.5	8¾ (222)	RHR100*150	69 (31)	RHR100PN150	70 (32)
	2	10½ (267)	RHR100*200	72 (33)	RHR100PN200	75 (34)
150 (b)	1	34 (864)	RHR150*150	125 (57)	Consult	Consult
	2	40 (1016)	RHR150*300	145 (66)	Factory	Factory
200 (b)	0.5	34 (864)	RHR200*100	150 (68)	Consult	Consult
	1	34 (864)	RHR200*200	170 (77)	Factory	Factory
300 (b)	0.5	48 (1220)	RHR300*150	175 (80)	Consult	Consult
	1	60 (1554)	RHR300*300	200 (91)	Factory	Factory
400 (b)	0.5	48 (1220)	RHR400*200	225 (102)	Consult	Consult
	1	60 (1554)	RHR400*400	225 (102)	Factory	Factory

RHSR SERIES (REVERSIBLE POLARITY)*

Output Voltage (KV)	Max. Output Current (mA)	Rack (c) Height In (mm)	Model (a) Number	Net Weight Lbs (kg)
0-5	10	5¼ (133)	RHSR5PN50	30 (14)
0-10	6	5¼ (133)	RHSR10PN60	30 (14)
0-15	4	5¼ (133)	RHSR15PN60	30 (14)
0-20	3	5¼ (133)	RHSR20PN60	30 (14)
0-25	2.4	5¼ (133)	RHSR25PN60	30 (14)
0-30	2	5¼ (133)	RHSR30PN60	30 (14)
0-40	1.5	8¾ (222)	RHSR40PN60	52 (24)
0-50	1	8¾ (222)	RHSR50*50	52 (24)
0-60	1	8¾ (222)	RHSR60*60	52 (24)

* Fixed polarity also available — consult factory.

RHP 3 KW SERIES (FIXED POLARITY[a])

0-3	1000	14 (356)	RHP3*3	144 (65)
0-6	500	14 (356)	RHP6*3	144 (65)
0-10	300	14 (356)	RHP10*3	144 (65)
0-15	200	14 (356)	RHP15*3	144 (65)
0-20	150	14 (356)	RHP20*3	144 (65)
0-30	100	14 (356)	RHP30*3	144 (65)
0-40	75	14 (356)	RHP40*3	144 (65)
0-50	60	14 (356)	RHP50*3	144 (65)
0-60	50	14 (356)	RHP60*3	144 (65)
0-80	40	15¾ (445)	RHP80*3	150 (68)
0-100	30	15¾ (445)	RHP100*3	150 (68)
0-120(b)	25	22 (559)	RHP120*3	140 (63)
0-150(b)	20	22 (559)	RHP150*3	140 (63)
0-170(b)	17	27 (686)	RHP170*3	155 (70)
0-180(b)	16	27 (686)	RHP180*3	155 (70)
0-200(b)	15	27 (686)	RHP200*3	155 (70)

Consult factory for reversible models & availability of 6 KW, 9 KW, & higher.

UHR SERIES (FIXED POLARITY[a])

0-40	0.75	5¼ (133)	UHR40*30	40 (18)
	1.5	5¼ (133)	UHR40*60	40 (18)
	3	5¼ (133)	UHR40*120	40 (18)
0-60	0.5	5¼ (133)	UHR60*30	40 (18)
	1	5¼ (133)	UHR60*60	40 (18)
	2	5¼ (133)	UHR60*120	40 (18)
0-100	1	8¾ (222)	UHR100*100	52 (24)
0-150(b)	1	34 (864)	UHR150*150	125 (57)
0-200(b)	0.75	34 (1016)	UHR200*150	150 (68)
0-300(b)	0.5	48 (1220)	UHR300*150	175 (80)
0-400(b)	0.25	48 (1220)	UHR400*100	225 (102)

CRT SERIES (d)

0-30	4	5¼ (133)	CRT30	25 (11)
0-40	3	5¼ (133)	CRT40	25 (11)

FOOTNOTES

(a) (*) Specify "P" (positive) or "N" (negative) in place of (*).

(b) High voltage output is an air insulated toroid terminated stack.

(c) 19 inches wide (rack) x 16½ inches deep, except 18½ inches deep for units 150 KV and larger.

(d) Also includes FOCUS voltage output 0-6.5 KV, 50 μA

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SPELLMAN High Voltage Electronics Corporation

STANDARD HV MODULAR POWER SUPPLIES

SUMMARY OF SPECIFICATIONS

OUTPUT: Variable from near zero to rated voltage using an input control voltage, potentiometer or input voltage.

SPECIFICATION	MODEL WRM	RM	UM	LRD	RV	LCM	RIM30
INPUT: (nominal VDC ±10%)	+28	+28	+24	2-12	+28	±12 to ±31	+24 VDC or 115/230 VAC
MAXIMUM OUTPUT: (KV) (WATT)	30 30	30 9	30 1.5	500V 3	20 10	30 10	30 1.0
REGULATION: 0-full load (%) ±10% line (%)	0.05 ±0.01	1%/W 0.01	15%/W ~ line	5% (b)	0.05 0.005	0.05 0.2	1.0 .5
RIPPLE: (%)	0.01 PTP/W	0.1 RMS/W	0.1 RMS	1 (c) PTP	0.05 (c) PTP	0.2V	0.3 PTP
OPERATING TEMP: (°C)	0-60	0-60	0-60	0-60	0-60	0-60	0-60
AUXILIARY OUTPUTS:	—	—	—	—	+600V to +800V (a) (d)	+1400 VDC focus & grid (opt) (d)	(G1) 100-400 (G2) 0-2000 (G3) 0-12KV (G4) 3KV
PROGRAMMABLE: (Voltage & Resistance)	•	•			•		•
ADJUSTABLE: (Control by input or pot.)	•	•	•	•	•	•	•
PROTECTION: All Models Have: short circuit, reverse input polarity, arc-over and overload protection.							

(a) Proportional to anode (main) voltage with +600V ±5% with anode at 12 KV and +800V ±5% with anode at 16 KV; 1 mA secondary output current, 3% regulation 0-1 mA, 1% peak ripple at 1 mA. (b) one half to full load (c) at full load (d) tracks anode

OUTPUT VOLTAGE (+KV)	MAXIMUM OUTPUT CURRENT (mA)	AUXILIARY OUTPUT	MODEL NUMBER	CASE SIZE*
RV Series for Mil Spec				
0-16	0.5	+600V to 800V, 1 mA	RV16P8/F	E
0-20	0.5			E
RIM 30 Series for Image Intensifiers				
30	1 µA	(G1) 100-210V (G2) 0-2000V (G3) 0-12,000V (G4) 3 KV	RIM30X	7⅞″ L x 5¾″ D x 2½″ W

LCM Series for CRT's

OUTPUT VOLTAGE (+KV)	MAXIMUM OUTPUT CURRENT mA	MODEL NUMBER	CASE SIZE*	AUXILIARY OUTPUT FOCUS	G1
2-3.5	5-2.8	LCM3.5	B	±1000V	±1000
3.5-5	2.8-2	LCM5	B	±1000V	±1000
5-7.5	2-1.3	LCM7.5	B	±1000V	±1000
7.5-10	1.3-1	LCM10	B	±1000V	±1000
10-14	1-0.7	LCM14	B	±1000V	±1000
14-18	0.7-0.55	LCM18	B	±1000V	±1000
18-22	0.55-0.45	LCM22	B	±1000V	±1000
22-30	0.45-0.33	LCM30	I	±1000V	±1000

Note:
* (a) Specify "P" (positive) or "N" for (negative) in place of (*)

OUTPUT VOLTAGE (KV)	MAXIMUM OUTPUT CURRENT (mA)	MODEL NUMBER (a)	CASE SIZE*
UM Series			
0-1	1000 µA	UMI*1000D	C
0-1.5	1000 µA	UM1.5*1500D	C
0-3	500 µA	UM3*1500D	C
0-6	250 µA	UM6*1500D	C
0-9	150 µA	UM9*1500D	C
0-12	100 µA	UM12*1500D	C
0-15	75 µA	UM15*1500D	D
0-18	60 µA	UM18*1500D	D
0-24	50 µA	UM24*1500D	F
0-30	50 µA	UM30*1500D	H
LRD Series (Reversible)			
80-500V	6 mA	LRD.5PN3000D	A

*Consult factory for case size letter representation.

A MODEL FOR EVERY APPLICATION

	(a) WRM	(a) RM	UM	LRD	RV	LCM	RIM30
CRT:							
General	•		•	•		•	
MIL, Airborne					•		
Low Cost						•	
Photomultipliers	•	•	•	•		•	
Image Intensifiers	•						•
Electron Beam			•				
Scintillation Counters			•				
Geiger tubes				•			
Control grid bias		•	•			•	
Ion sources	•						
Scanning electron microscopes	•		•			•	
Electrostatics			•				
Lasers	•	•					

(a) Consult factory for FWRM and FRM models which provide for narrow range output.

MODULAR SUPPLY MODELS

Output Voltage (KV)	Maximum Output Current (mA)	Model Number (a)	Case Size*	Model Number (a)	Case Size (see chart)
WRM Series				**RM Series**	
0-1.5	1.0	WRM1.5*1500D	F	RM1.5*1500D	D
0-1.5	2.0	WRM1.5*3000D	F	RM1.5*3000D	D
0-1.5	4.0	WRM1.5*6000D	F	RM1.5*6000D	D
0-1.5	6.0	WRM1.5*10KD	F	RM1.5*10KD	D
0-1.5	10.0	WRM1.5*15KD	H	——	—
0-3	0.5	WRM3*1500D	F	RM3*1500D	D
0-3	1.0	WRM3*3000D	F	RM3*3000D	D
0-3	2.0	WRM3*6000D	F	RM3*6000D	D
0-3	3.0	WRM3*10KD	F	RM3*10KD	D
0-3	10.0	WRM3*30KD	H	——	—
0-6	0.25	WRM6*1500D	F	RM6*1500D	D
0-6	0.5	WRM6*3000D	F	RM6*3000D	D
0-6	1.0	WRM6*6000D	F	RM6*6000D	D
0-6	1.5	WRM6*10KD	F	RM6*10KD	D
0-6	5.0	WRM6*30KD	H	——	—
0-9	0.15	WRM9*1500D	F	RM9*1500D	D
0-9	0.3	WRM9*3000D	F	RM9*3000D	D
0-9	0.6	WRM9*6000D	F	RM9*6000D	D
0-9	1.0	WRM9*10KD	F	RM9*10KD	D
0-9	3.3	WRM9*30KD	H	——	—
0-12	0.15	WRM12*1500D	F	RM12*1500D	D
0-12	0.3	WRM12*3000D	F	RM12*3000D	D
0-12	0.6	WRM12*6000D	F	RM12*6000D	D
0-12	0.8	WRM12*10KD	F	RM12*10KD	D
0-12	2.5	WRM12*30KD	H	——	—
0-15	0.1	WRM15*1500D	F	RM15*1500D	F
0-15	0.2	WRM15*3000D	F	RM15*3000D	F
0-15	0.4	WRM15*6000D	F	RM15*6000D	F
0-15	0.6	WRM15*10KD	F	RM15*10KD	F
0-15	2.0	WRM15*30KD	H	——	—
0-18	0.08	WRM18*1500D	E	RM18*1500D	E
0-18	0.16	WRM18*3000D	E	RM18*3000D	E
0-18	0.3	WRM18*6000D	E	RM18*6000D	E
0-18	0.5	WRM18*10KD	E	RM18*10KD	E
0-18	1.6	WRM18*30KD	E	——	—
0-20	0.07	WRM20*1500D	H	RM20*1500D	F
0-20	0.15	WRM20*3000D	H	RM20*3000D	F
0-20	0.3	WRM20*6000D	H	RM20*6000D	F
0-20	0.5	WRM20*10KD	H	RM20*10KD	F
0-20	1.5	WRM20*30KD	H	——	—
0-24	0.06	WRM24*1500D	H	RM24*1500D	F
0-24	0.12	WRM24*3000D	H	RM24*3000D	F
0-24	0.24	WRM24*6000D	H	RM24*6000D	F
0-24	0.4	WRM24*10KD	H	RM24*10KD	F
0-24	1.25	WRM24*30KD	H	——	—
0-30	0.15	WRM30*1500D	H	RM30*1500D	F
0-30	0.1	WRM30*3000D	H	RM30*3000D	F
0-30	0.2	WRM30*6000D	H	RM30*6000D	F
0-30	0.3	WRM30*10KD	H	RM30*10KD	F
0-30	1.0	WRM30*30KD	H	——	—

(a) specify "p" (positive) or "n" (negative)

SPELLMAN HIGH VOLTAGE ELECTRONICS CORPORATION • 7 Fairchild Avenue, Plainview, New York 11803 • 516/349-8686 • TWX 510-221-2155

COMMONLY USED ELECTRICAL/ELECTRONIC ABBREVIATIONS AND ACRONYMS

A
AC alternating current
A/D analog to digital
ADC analog to digital converter
ADP automatic data processing
AF audio frequency
AFC automatic frequency control
ALGOL algorithmic language
AM amplitude modulation
AND a logical operator
AQL acceptable quality level
ASCII American national standard code for information interchange
AWG American wire gauge

B
BALUN balanced to unbalanced
BASIC beginners' all-purpose symbolic instruction
BCD binary-coded decimal
BNC baby "N" connector
BUS basic utility system

C
CAD computer aided design
CAM computer aided manufacture
CATV cable television or community antenna television
CERMET ceramic metal element
Comm. communications
CMOS complementary metal-oxide semiconductor
CPS characters per second
CPU central processing unit

D
D/A digital to analog
DAC digital to analog converter
DC direct current
DIAC bidirectional trigger diode
DIL dual in-line
DIN Deutsche Industrie Normenausschuss
DIP dual in-line package
DPM digital panel meter
DTL diode transistor logic

E
EDP electronic data processing
EBCDIC extended binary coded decimal interchange code
EEPROM electrically erasable PROM
EMC electromagnetic compatibility
EMI electromagnetic interference
EMP electromagnetic pulse
EPROM electrically programmable ROM
ESR equivalent series resistance

F
FEP fluorinated ethylene propylene Copolymar, 200° Teflon
FET field-effect transistor
FM frequency modulation
FORTRAN formula translator

G
GaAsFET gallium arsenide field effect transistor
GPIB general purpose interface bus

H
HF high frequency (3 to 30 MHz)
HIPOT test, measurement and diagnostic equipment
HLL high level language
HV high voltage
Hz Hertz

I
IC integrated circuit
IDC insulation displacement contact
IF intermediate frequency
IO input/output (devices)
IR insulation resistance (or) infrared

J
JFET junction field effect transistor
JMOS junction metal oxide semiconductor

K
kHz kilohertz (10^3 hertz)
KSR keyboard send receive

L
LC inductance capacitance
LCD liquid crystal display
LED light-emitting diode
LF low frequency (30 to 300 kHz)
LIF low insertion force
LNA low noise amplifier
LNB low noise band
LSI large scale integration
LVDT linear velocity displacement transformer

M
MASER microwave amplification by stimulated emission of radiation
MATV master antenna television
μF microforad
MHz megahertz
MIPS million instructions per second
MIB microcomputer interface board
MOS metal oxide semiconductor
MOSFET metal oxide semiconductor field effect transistor
MOSIGT metal-oxide semiconductor insulated-gate transistor
MOV metal oxide varistor
MPU microprocessor unit
MSI medium scale integration

N
NBS National Bureau of Standards
NEMP nuclear electromagnetic pulse
NIM nuclear instrumentation module
NOR not OR
NTC negative temperature coefficient

O
OCR optical character reader
OEM original equipment manufacturer
OR a logical operator

P
PC printed circuit
PCB printed circuit board
pF picofarad
PGA pin grid array
PIN positive-intrinsic-negative (transistor)
PLA programmable logic array
PLL phased lock loop
PPI plan position indicator
PROM programmable read only memory
PTC positive temperature coefficient
PUT programmable unijunction transistor

Q
QAM quadrature amplitude modulation
Q (meter) quality-factor meter

R
RAM random access memory
RC resistance-capacitance
RFI radio frequency interference
RMS root mean square
ROM read only memory
RF radio frequency
RFC radio-frequency choke
RFI radio-frequency interference
RTD resistance-temperature detector
RTL resistor transistor logic
RTV room temperature vulcanizing
RW read/write

S
SAS silicon asymmetrical switch
SBC single board (micro) computer
SBS silicon bilateral switch
SCR silicon-controlled rectifier
SCS silicon controlled switch
SDA source & detector assemblies
SIDAC bidirectional voltage-triggered switch
SIP single in-line package
SSI small scale integration
SSR solid state relay
STL Schottky transistor logic
SUS silicon unilateral switch

T
TC temperature coefficient
TCXO temperature compensated crystal oscillator
TFE tetrafluoride ethylene propylene Copolymer, 250° Teflon
TRIAC bidirectional AC switch
TTL transistor-transistor logic
TTY teletypewriter

U
UHF ultra high frequency (300 MHz to 3 GHz)
UJT silicon unijunction transistor
UL Underwriters Laboratory
UPS uninterruptible power supply

V
VAC volts (of) alternating current
VAR volt-ampere reactive
VCR video cassette recorder
VDC volts (of) direct current
VHF very high frequency
VHSIC very high speed integrated circuit
VLF very low frequency (3 to 30 kHz)
VLSI very large scale integration
VME virtual machine environment
VRM voice recognition module
VTVM vacuum tube volt meter
VU volume unit
VSWR voltage standing wave ratio

W
WPS word processing software

Y
YIG yttrium iron garnet

Z
ZIF zero insertion force

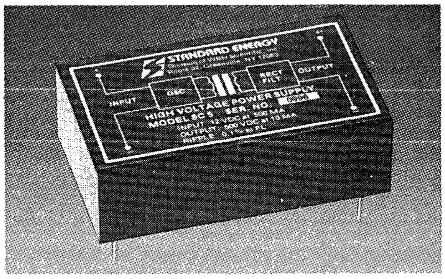
STANDARD ENERGY

Division of WBH Scientific, Inc.
GREENVILLE, NEW YORK 12083 • (518) 966-4197 • TLX: 754180

Standard Energy's SC Series are a line of compact high voltage DC to DC converters (size: 2.5″ x 1.5″ x 0.8″) which offer 5 watts of output power in only 2.8 cubic inches. Voltages available range from 100 to 3kvdc. The output is directly proportional to the input, starting as low as 2 volts and will not be destroyed by inputs as high as 18 vdc. Each SC supply has an internal bleeder on the output for safety. The output ripple of each supply is kept below 0.1% at full power.

The SC Series are very easy to use. The two output high voltage leads are floating and are fully isolated from the two input leads. This permits either plus or minus polarity output.

Output proportional to Input, 5 Watts, Five Models: SC1: 100v @ 50ma, SC5: 500v @ 10ma, SC15: 1500v @ 3.3ma, SC30: 3000v @ 1.6ma.


STANDARD ENERGY
INPUT
OSC
RECT FILT
OUTPUT
HIGH VOLTAGE POWER SUPPLY

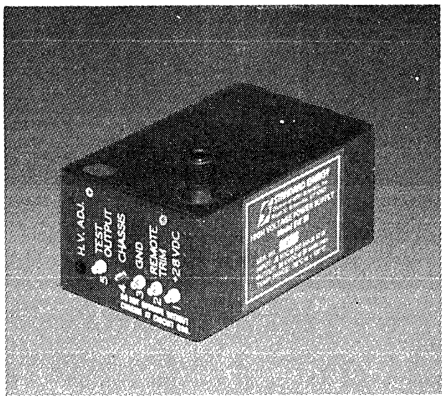
The SW Series precision switching high voltage power supplies are highly efficient DC to DC converters for applications requiring a regulated source of high voltage such as a 20kv CRT display. Since these models use state of art switching circuitry, as opposed to older linear design, the input current into the supply is greatly reduced. This has a profound effect on the reliability of the unit, and since the power dissipation is low, operation at ambient temperatures to 100°C are possible.

The output voltage is adjustable over a 5 to 1 range via an external control voltage or resistance to ground. The output may also be adjusted via a 10 turn potentiometer located in the unit. This varies the output over a 3 to 1 range.

All SW power supplies are fully encapsulated in RTV and shielded in a black anodized aluminum case. As the high voltage transformer is encapsulated in a low loss high temperature epoxy, this serves to raise the MTBF considerably.

All SW Series supplies are guaranteed against defects in workmanship and materials for 5 years and each unit is fully burned in and tested prior to shipment for 24 hrs. at 100°C at full load.

High Efficiency Switching Power Supply, Model SW20: 20kv, SW30: 30kv, Airborne CRT Supplies, Input Current: 500ma @ 10w, Military Specifications.


H.V. ADJ.
TEST OUTPUT
CHASSIS
GND
REMOTE TRIM
+28 VDC

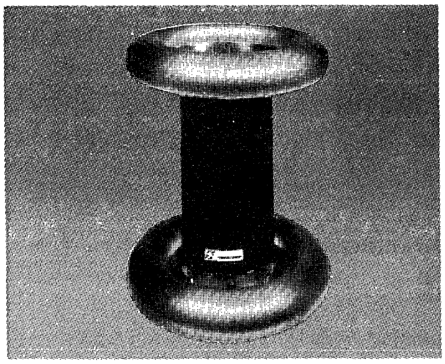
The Standard Energy SD-100 precision high voltage divider is an easy way of measuring voltages up to 100kv with complete safety.

The SD-100 is ruggedly constructed of a fire retardant material (not lucite) as a safety feature and will not crack if dropped. It contains multiple rare earth oxide resistors which provide extremely low temperature coefficients and high stability. This unit does not contain any oil which could leak out and damage other equipment.

Two anti corona torroids are used as the input and ground, and if needed, two or more SD-100 dividers may be stacked to measure voltages over 100kv. The output impedances of 1 Megohm and 100 kohm provide a 1000: 1 and 10,000: 1 division ratio respectively.

With a weight of less than 7 lbs. the SD-100 is very portable and easy to use.

100kv Resistive Divider, 0.1% Accuracy, Low TC: 15ppm/°C, High Stability.



The model SF Series power supplies provide up to 15 watts of high voltage power in a package of just 6.4 cubic inches. The SF Series units are extremely versatile since they allow the user to float the high voltage output up to 5kvdc above the input line. These power supplies are ideal for photomultiplier, CRT and other electro-optical applications.

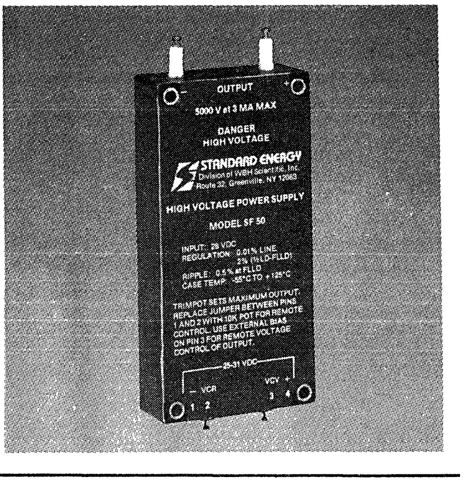
The outputs available range from 100vdc to 10kvdc, all at 15 watts.

The output is adjustable over the specified voltage range by 3 methods. A 10 turn screwdriver adjust pot on the top surface of the unit sets the maximum output voltage. Remote control of this voltage is also possible with an external trim resistor between pins 2 and ground, or by an external voltage between pin 3 and ground.

A 2% load regulation is provided for half to full load variations. Output ripple is 1% max at full output power.

Each unit is fully encapsulated in RTV and packaged in an anodized aluminum case which provides electrostatic shielding. Calculated MTBF is 70,000 hours at 71°C.

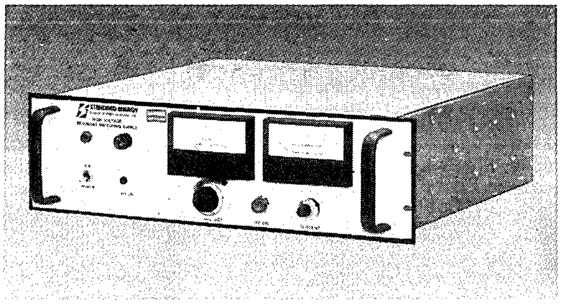
Floating High Voltage Output, 15 Watts, 6 Models: SF3: 300v @ 50ma, SF6: 600v @ 25ma, SF12: 1250v @ 12ma, SF25: 2500v @ 6ma, SF50: 5000v @ 3ma, SF100: 10,000v @ 1.5ma.


OUTPUT
5000 V at 3 MA MAX
DANGER
HIGH VOLTAGE
STANDARD ENERGY
Division of WBH Scientific, Inc.
Route 32, Greenville, NY 12083
HIGH VOLTAGE POWER SUPPLY
MODEL SF 50
INPUT: 28 VDC
REGULATION: 0.01% LINE 2% (½LD-FLLD)
RIPPLE: 0.5% at FLLD
CASE TEMP: -55°C TO +125°C
TRIMPOT SETS MAXIMUM OUTPUT. REPLACE JUMPER BETWEEN PINS 1 AND 2 WITH 10K POT FOR REMOTE CONTROL. USE EXTERNAL BIAS ON PIN 3 FOR REMOTE VOLTAGE CONTROL OF OUTPUT.
23-31 VDC
– VCR
VCV +
1 2
3 4

STANDARD ENERGY

Division of WBH Scientific, Inc.

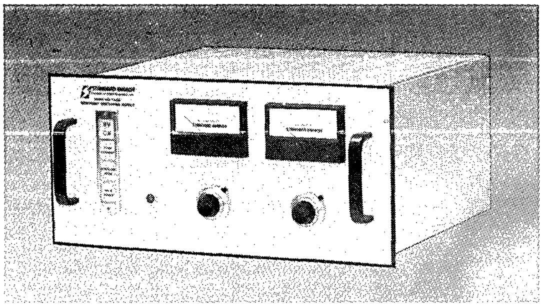
GREENVILLE, NEW YORK 12083 • (518) 966-4197 • TLX: 754180



The HVS series of power supplies are a new design of low cost off the line resonant switchers capable of delivering 250 watts for applications requiring a regulated source of high voltage. The HVS line is compact, reliable and unique. All switching is done at an inaudible rate (f > 25KH$_Z$) so there are no unpleasant buzzing or whistling noises as in other resonant designs. This is a user safety feature. The HVS series operate with a fixed frequency mode.

Both the voltage and current can be adjusted by front panel 10 turn potentiometers, and in addition can also be remotely programmed by either an external resistance or voltage. As an extra feature all HVS supplies contain adjustable OVP and OCP circuitry. The HVS series will easily withstand the continuous vacuum arcing that occurs in ion beam work.

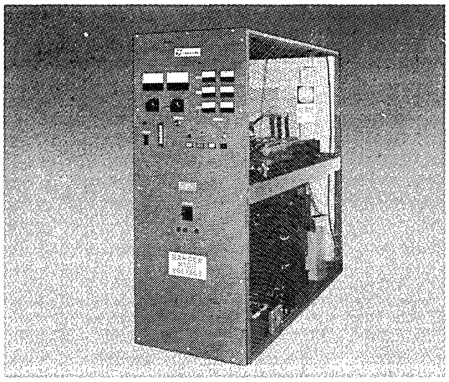
Resonant Switching Supply, Models HVS-5: 5Kv @ 50ma, HVS-10: 10Kv @ 25ma, HVS-25: 25Kv @ 10ma, HVS-50: 50Kv @ 5ma, 250 Watts, Low Cost.



Standard Energy's VHP series of very high power resonant switching supplies offer complete flexibility rarely found in any high voltage power source. To enable the user the option of selecting various output voltages, currents, and polarities, the entire supply is composed of two sections: the power drive section and the output section. The main advantage of the VHP series supplies is that the output section may be easily interchanged with one another to provide a negative output, or even a higher voltage output.

The VHP series provides regulation to 0.01%, transient response as fast as 1 ms, and output ripple down to 0.05%. Both output voltage and current are adjustable via front panel potentiometers with automatic crossover feature standard. Output monitors which may be used to drive a chart recorder or feed information to an A to D converter are standard. The power supply may also be programmed via an external voltage. Both overvoltage and overcurrent shutdown levels may be remotely controlled.

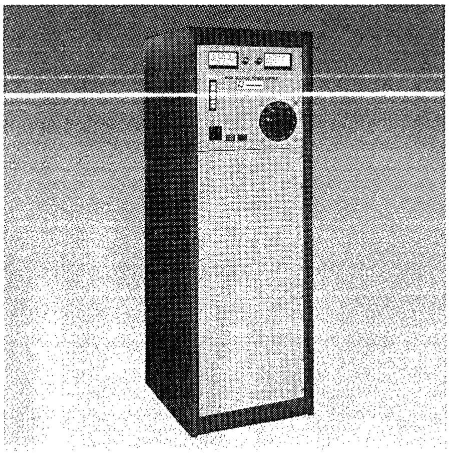
Very High Power Switching Supply, Outputs to 200KVdc @ 3000 Watts, Efficiency to 90%, Low Stored Energy.



Standard Energy SCR power supplies offer high power, high efficiency, and smallest size per watt....at low cost. They are rugged, dependable, and versatile. This design is capable of high regulation, and moderately low ripple.

Each SCR power supply can be remotely programmed over the entire voltage or current range by an external signal. Both the voltage and current are displayed on 3½″ panel meters. In addition, all control circuitry is transient protected against output arcing. The SCR series can be used in all vacuum arcing equipment.

SCR Regulated Supply, Power up to 100kw, Low Cost/Watt, High Efficiency.



Standard Energy series tube power supplies offer high quality, dependability, and reasonable price for all R&D laboratory work. They are of proven design and versatile enough to suit any application.

In this design, a series pass tube regulates the output voltage and is capable of extremely fast transient response (100μs) and low output ripple with low stored energy. In the event of an overcurrent condition, the series tube stops current flow within 100μs thereby protecting any delicate output load.

Each ST power supply can be remotely controlled via a voltage program signal. Both voltage and current monitors are provided which give a signal proportional to the output being examined. In all ST supplies 3½″ voltage and current meters are standard. Also a supply status indicator is provided on the front panel which indicates the output condition at all times.

Series Tube Supply, Power up to 10kw, Fast Response, Low Ripple.

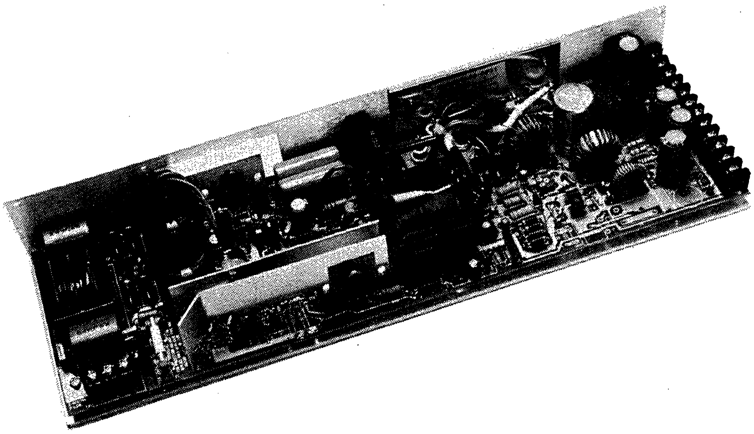
Summit® Electronics, Inc.
A subsidiary of Basler Electric Company, Highland, Illinois
855 East Collins Boulevard • Richardson, Texas 75081
(214) 231-1456 or Toll Free (800) 645-2074

Switching Power Supplies

Standard 50-400 Watt
Custom 40-2000 Watt

FEATURES

- Up to five outputs.
- Choice of Voltage and current on all outputs up to maximum wattage total
- Brownout protection
- OVP standard on primary output
- Overload protection
- Short circuit protection
- Reverse polarity protection
- Soft start
- Built to UL, CSA and VDE safety standards
- Built to VDE and FCC EMI standards
- Convenient 2-surface mounting
- Convection cooled
- Advanced EMI filtering



New SX400 Switching Power Supply

Fit, Form & Function to Boschert Models

MODEL NUMBER	+5V	−5V	+12V	−12V	+15V	−15V	+24V	+12V	L	W	H	TOTAL POWER	PRICE 100 PC.
SX 50-3601	6A	.7A	2.5A	.7A	—	—	—	—	7.75	4.25	2.00	60W	$ 75.00
SX 50-3602	6A	—	2.5A	.7A	—	—	1A	—	7.75	4.25	2.00	60W	$ 75.00
SX 50-3603	6A	—	2.5A	.7A	—	—	—	2A	7.75	4.25	2.00	60W	$ 75.00
SX 50-3604	6A	.7A	—	—	2.5A	.7A	—	—	7.75	4.25	2.00	60W	$ 75.00
SX 60-3601	6A	.7A	2.5A	.7A	—	—	—	—	7.75	4.25	2.00	70W	$ 80.00
SX 60-3602	6A	—	2.5A	.7A	—	—	1A	2A	7.75	4.25	2.00	70W	$ 80.00
SX 60-3603	6A	—	2.5A	.7A	—	—	—	2A	7.75	4.25	2.00	70W	$ 80.00
SX 60-3604	6A	.7A	—	—	2.5A	.7A	—	—	7.75	4.25	2.00	70W	$ 80.00
SX 65-3020	6A	.7A	3A	1A	—	—	1A	1A	9.45	5.00	2.00	85W	$ 92.00
SX 65-3032	6A	.7A	—	—	3A	1A	1A	—	9.45	5.00	2.00	85W	$ 92.00
SX100-3601	10A	.7A	3A	1A	—	—	—	—	10.50	5.00	2.00	100W	$125.00
SX100-3601	10A	—	3A	1A	—	—	2A	—	10.50	5.00	2.00	100W	$125.00
SX100-3601	10A	.7A	—	—	3A	1A	—	—	10.50	5.00	2.00	100W	$125.00
SX125-3601	15A	.7A	3A	1A	—	—	—	—	10.50	5.00	2.50	125W	$138.00
SX125-3602	15A	—	3A	1A	—	—	2A	—	10.50	5.00	2.50	125W	$138.00
SX125-3603	15A	—	3A	1A	—	—	—	4A	10.50	5.00	2.50	125W	$138.00
SX125-3604	15A	.7A	—	—	3A	1A	—	—	10.50	5.00	2.50	125W	$138.00
SX130-3001	20A	.7A	5A	.7A	—	—	—	—	—	—	—	150W	$179.00
SX130-3002	20A	—	5A	.7A	—	—	2A	—	—	—	—	150W	$179.00
SX130-3003	20A	—	5A	2A	—	—	2A	—	—	—	—	150W	$179.00
SX130-3004	20A	—	5A	.7A	—	—	—	1.5A	—	—	—	150W	$179.00
SX200-3501	35A	4A	4A	4A	—	—	—	—	—	—	—	200W	$245.00
SX200-3504	35A	—	4A	4A	—	—	4A	—	—	—	—	200W	$245.00
SS400-3015	50A	4A	10A	10A	—	—	4A	—	—	—	—	400W	$424.00
SS400-3026	50A	4A	—	—	10A	10A	4A	—	—	—	—	400W	$424.00
SX400-3015	50A	4A	10A	10A	—	—	4A	—	—	—	—	400W	$450.00
SX400-3026	50A	4A	—	—	10A	10A	4A	—	—	—	—	400W	$450.00

Summit® Electronics, Inc.
A subsidiary of Basler Electric Company. Highland, Illinois
(214) 231-1456 or Toll Free (800) 645-2074

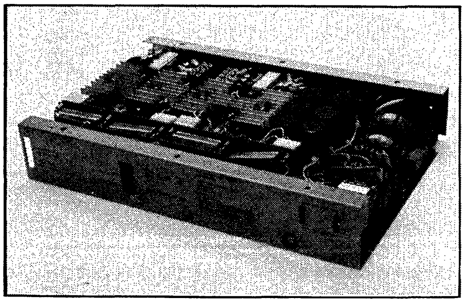
Switching Power Supplies

Standard 50-400 Watt
Custom 40-2000 Watt

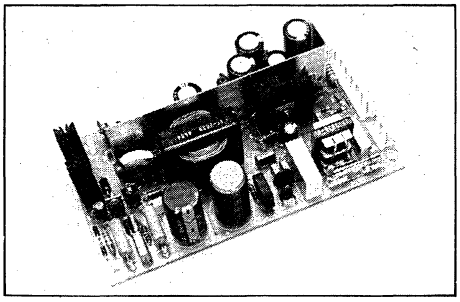
SPECIFICIATIONS

• **Input Voltage**	90-132VAC/180-264VAC
• **Input Frequency**	47-440Hz
• **Output**	See Table
• **Line Regulation**	0.2% all outputs
• **Load Regulation**	2% main output ±5% auxiliary outputs
• **Ripple & Noise**	1% P-P maximum, all outputs
• **Efficiency**	75% typical
• **Operating Temperature**	0.50°C at full rated load. Derate to 50% of rated load at 70°C
• **Overload Protection**	All outputs are individually current limited and short circuit protected. Recovery is automatic when load is reduced.
• **Overvoltage Protection**	OVP on main circuit is set between 6-6.5V. This protection is reset by recycling input power.
• **Holdover Storage**	16mSEC minimum, 20 mSEC typical
• **Remote Sense** (Optional)	Remote sense on main output compensates for up to 0.5V in the load cable.
• **Power Fail** (Optional)	A TTL signal (low) appears within 5mSEC at full load to warn of output voltage drop below minimum operating level.
• **Remote Inhibit** (Optional)	Power supply can be remotely programmed by an application of TTL signal (high).

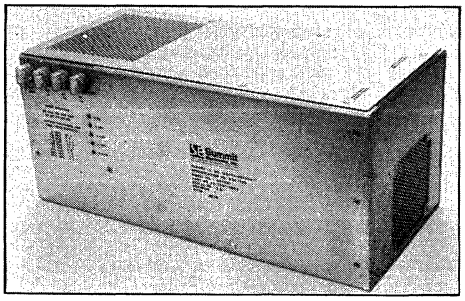
A FULL PRODUCT RANGE



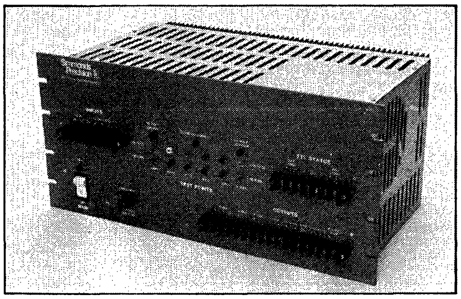
Computers
CS 69
2 Outputs 1000W
11.5 x 17.75 x 3.25



Commercial
SX 50
4 Outputs 60W
7.75 x 4.5 x 2



Military
CS 97
9 Outputs 750W
9 x 8.5 x 20



Battery Back-Up
CS 142
6 Outputs 400W
8 x 19 x 10.5

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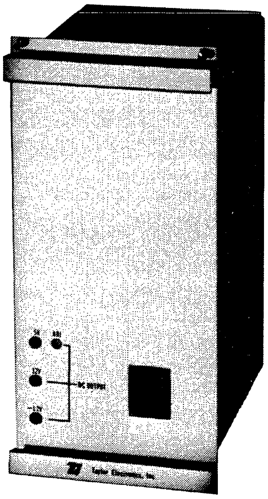
TAYLOR ELECTRONICS, INC.

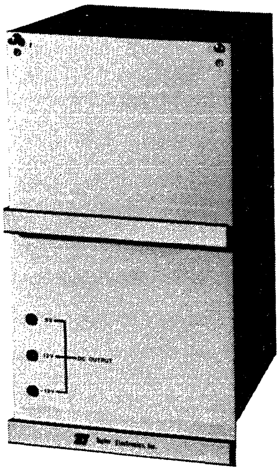
HIGH PERFORMANCE SWITCHING POWER SUPPLIES

EUROMATE™ MODELS FOR VME BUS APPLICATIONS

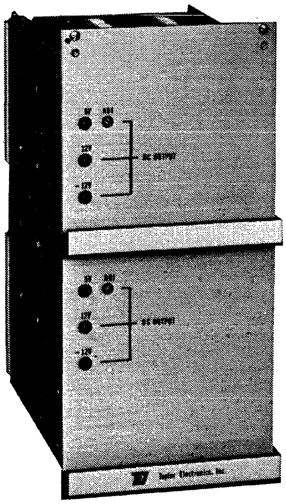
EUROMATE™ MODELS FOR GENERAL BUS APPLICATIONS



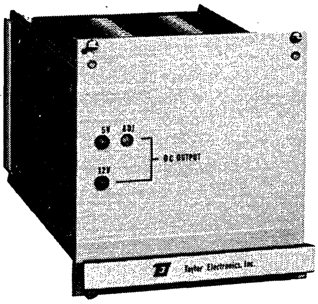
VME 911



VME 910



EM 200



EM 75

SELECTION GUIDE

The chart at right was designed to help you select the standard EuroMate model which will meet the needs of your application. If you require specifications which differ from those listed, contact our factory. We can meet special requirements by modifying existing models or by designing a custom unit for your application.

MODEL	SIZE	POWER	OUTPUT VOLTAGE			
			STANDARD		OPTIONAL	
			Number of Voltages	Voltages	Number of Voltages	Voltage Range
VME 911	6U/24E	400 W	Three	+5, +12, −12 VDC	One to four	−36 to +36 VDC
VME 910	6U/28E	250 W	Three	+5, +12, −12 VDC	One to five	−36 to +36 VDC
EM 200	6U/24E	200 W	Six	+5, +5, +12, +12, −12, −12 VDC	One to six	−36 to +36 VDC
EM 75	3U/24E	75 W	Three	+5, +12, -12 VDC	One to three	+5 to +36 VDC

SPECIFICATIONS The following specifications are applicable to all standard EuroMate models.

ELECTRICAL
Input voltage range: 90 to 130; 180 to 260 VAC. Jumper selected.
Input frequency: 47 to 63 Hz.
Input filtering: Meets FCC 20780, VDE 0871/6.78 Curve B, and VDE 0875 conducted and radiation specifications.
Efficiency: 70 to 85%
Voltage regulation: 5V outputs, 0.2%. Other outputs, 3%.
Current limit: Foldback on all outputs.
Output noise: 5V ports, 75 mV max. 12V ports, 100 mV max. Other ports 1% of output.

Output voltage overshoot: Less than 5% for 50% load step from I_{max}.
Reverse voltage: Diode protected on all outputs.
Holdup time: 20 msec min at 90 VAC input.
Isolation: Input to chassis-
3750 VAC RMS—VME911
1500 VAC RMS—VME910, EM200, EM75
Input to output-
3750 VAC RMS—VME911
1500 VAC RMS—VME910, EM200, EM75
Output to chassis-
500 VAC RMS all models
Total input lines capacitance to chassis: 6500 pF max.

ENVIRONMENTAL
Operating temperature: 0 to 70°C ambient.
Storage temperature: −55 to 85°C.
Humidity: 0 to 95%, non-condensing.

MECHANICAL
Output connectors: DIN 41612 or user specified.
Package outline: Conforms to DIN 41494 and IEC 48 D, section 12.

MODEL NUMBER	VME 911	VME 910	EM 200	EM 75
OUTPUT VOLTAGE				
Standard	5 VDC @ 50A 12 VDC @ 8 A −12 VDC @ 4 A	5 VDC @ 30 A 12 VDC @ 3 A −12 VDC @ 1 A	5 VDC @ 25 A 5 VDC @ 15 A 12 VDC @ 1.5 A 12 VDC @ 1.5 A −12 VDC @ 1.5 A −12 VDC @ 1.5 A	5 VDC @ 5 A 12 VDC @ 3 A -12 VDC @ 1.5 A
Optional	24 VDC @ 4 A	5 to 24 VDC at port #1 12 to 24 VDC at port #2 −12 to −24 VDC at port #3 15 to 36 VDC at port #4 −15 to −36 VDC at port #5	5 to 24 VDC at port #1 12 to 24 VDC at port #2 −12 to −24 VDC at port #3 5 to 24 VDC at port #4 12 to 36 VDC at port #5 −12 to −36 VDC at port #6	5 to 24 VDC at port #1 12 to 24 VDC at port # 2 24 to 36 VDC at port #3
OVP	5 VDC: 5.4 to 5.8 VDC	5 VDC: 5.4 to 5.6 VDC 12 VDC: 13.6 to 15 VDC 12 VDC: −13.6 to −15 VDC	5 VDC @ 25 A: 5.6 to 5.8 VDC 5 VDC @ 15 A: 5.6 to 5.8 VDC	5 VDC: 5.4 to 5.8 VDC
Power	400 W	250 W	200 W	75 W
Thermal shut-off	$T_t = 85°C$	$T_t = 85°C$	N/A	N/A
Input power fail monitor	Open collector. 6 msec reaction time.	Open collector. 6 msec reaction time.	Open collector. 6 msec reaction time.	N/A
Output voltage fail monitor	N/A	N/A	Open collector.	N/A
Minimum load requirement	No minimum load required	No minimum load required	5 VDC @ 3.5 A	5 VDC @ 1 A
Package Size[2]	6U/24E	6U/28E	6U/24E	3U/24E

NOTES:
1. Specifications listed are for standard EuroMate models. If your require specifications which differ from those listed, contact our factory. We can meet your special requirements by modifying existing models—or by designing a custom unit for your application.
2. System dimensions: 1E = 0.20 inches (5.08 mm); 1U k= 1.75 inches (44.45 mm).

Taylor Electronics, Inc. 401 West Orion Street Tempe, Arizona 85283 Telephone (602) 838-4523

DC TO DC CONVERTERS

TDK®

TDK CORPORATION OF AMERICA 4711 West Golf Road, Suite 300, Skokie, Illinois 60076, U.S.A. Phone: (312) 679-8200 CHICAGO SALES OFFICE (312) 679-8200 LOS ANGELES SALES OFFICE (213) 539-6631 SAN FRANCISCO SALES OFFICE (408) 943-9325 NEW YORK SALES OFFICE (516) 625-0100 INDIANAPOLIS SALES OFFICE (317) 872-0370 DETROIT BRANCH (313) 353-9393 ALABAMA BRANCH (205) 539-4551 **TDK CORPORATION** Tokyo, Japan

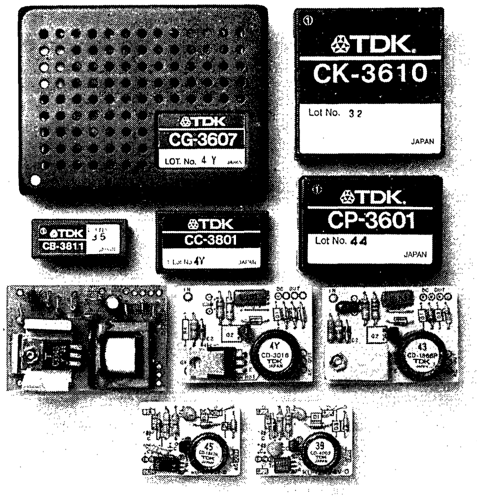
An on-board DC to DC converter is useful in simplifying the main power supply of electronic equipment by providing precisely the required voltage at each location.

Features

1) TDK's high performance magnetic materials and original circuit technology.
2) Compact and lightweight construction.
3) Highly efficient operation.
4) Outstanding reliability.
5) Printed circuit board used (except CH series).

Applications

Computers and peripheral equipment, industrial robots, electronic measuring instruments, automotive electronic equipment, other electronic devices.



Electrical specifications vs. Part No.

Type	Output power (W)	Input-output insulation	Input (V)	Output (V) +12	+15	−17	−15	−12	−9	−5	5	6	9	12	15	±12	±15
CB Series	0.3	No insulation	+4 to +7							3810							
			+3 to +7	3801	3802		3812	3811									
CC Series	0.25	No insulation	5±5%	3801	3802		3853	3852		3851							
CP Series	1.5	Insulation (CP-36, CP-46)	5±10%								3601		3604	3607	3610	4601	4604
			12±10%								3602		3605	3608	3611	4602	4605
			24±10%								3603		3606	3609	3612	4603	4606
		No insulation (Others)	+4.5 to +12.0			3807	3805	3803	3801							4801	4803
			+10.8 to +28.8			3808	3806	3804					3802			4802	4804
CK Series	3	Insulation	5±10%								3601			3607	3610		
			12±10%								3602			3608	3611		
			24±10%								3603			3609	3612		
CG Series	6	Insulation	5±10%								3601	3613		3607	3610		
CH Series	10	Insulation	5±10%								3601			3607	3610		
CD-Series for driving fluorescent display	Up to 6W	No insulation	5±10%	Products are made in accordance with fluorescent displays.													

Type	Dimensions (mm)	Terminals (mm)
CB Series	30.5×13.3×12.2	⌀0.6±0.1×4
CC Series	35.5×20.0×6.55	⌀0.5±0.1×4
CP Series	45.0×30.5×16.5	⌀1.0±0.1×5
CK Series	47.0×47.0×14.5	⌀1.0±0.1×5
CG Series	78.0×60.0×19.0	⌀1.0±0.1×5
CH Series	98×70×32	AMP#110×7
CD Series	32×24×8.5&10 43×31×15 & 18 51×34×20	⌀0.6×4

Please refer TDK catalogue.

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"MIL-QUAL" MODULAR POWER SUPPLIES

These Advanced, High Reliability, Modular Power Supplies are economical, proven alternatives to expensive custom builts.

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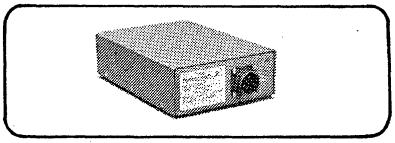
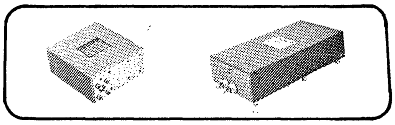
"MIL-QUAL" TRIPLE OUTPUT SWITCHERS... Field Repairable Or Sealed Models



AC Source Models TVC: 105 to 125 VAC
DC Source Models TYC: 21 to 30 VDC

The efficiency and size advantages of a switcher...the desirable output of a linear...plus high density packaging! These Technipower "Mil-Qual" Triple Output Swtichers come in fully sealed models to meet Mil-901 for severe shock and extreme environment use; and in field repairable models for harsh environment, moderate shock applications! Included are a Mil-type connector input/output and a special EMI/RFI filtering circuit. MTBF is rated at more than 100,000 hours, and full power is provided at max, operating temperatures — no derating. These high efficiency (80%) switchers also feature Mil-704A transient protection; have a 47-430Hz input range; are conductively cooled; and exhibit a power range to 300W. They are designed to meet reliability guide lines for NAV/MAT P-4855, and are ideal for military ground-base and airborne uses, surface and submarine naval systems, aerospace and space optics. Numerous industrial applications can be found wherever harsh environment and/or rugged conditions exist, e.g. for oil well exploration; mining; rail systems; mobile communications; and rugged terrain construction. 5 year warranty.

HIGH EFFICIENCY, HIGH DENSITY MODULAR SWITCHERS



Fully encapsulated, partially encapsulated or open frame, these switching power supplies are designed for high thermal application. With as low as 0.1% overall source/load effects, 0.1% PARD and 500 microsec recovery.

VC-80 Series
AC-DC Converters. Partially encapsulated, 2.8 to 125 VDC — to 450 Watts output. 110,000 hours MTBF @ 80°C base.

HF-80/HFC-80 Series
AC-DC, DC-DC stabilized. Partially encapsulated, 2.8 to 250 VDC, to 375 Watts. 70,000 hours MTBF @ 80°C base.

YC-95 Series
Ruggedized DC-DC Converters. Hermetically sealed, 2.8 to 125 VDC, to 450 Watts. 110,000 hours MTBF @ 95°C base.

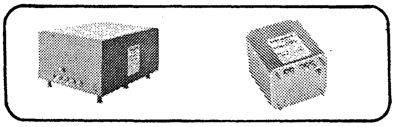
CD-95/CDC-95 Series
Stabilized DC-DC Converters. Encapsulated. 2.8 to 250 VDC, to 275 Watts. 60,000 hours MTBF @ 95°C base.

CL/CLC Series
AC-DC, DC-DC, open frame stabilized converters. 3 to 32 VDC, to 256 Watts. 50,000 hours MTBF.

SCR-80 Series
Stabilized AC-DC phase control. High current. Partially encapsulated. 5 to 160 VDC, to 2000 Watts.

RA-80 Series
Special circuit AC-DC. Programmable from zero. Partially encapsulated. 0 to 160 VDC, to 1000 Watts.

HARSH ENVIRONMENT "MIL-QUAL" LINEAR SUPPLIES



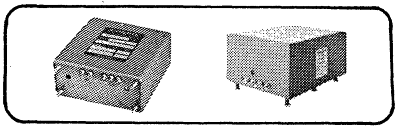
Ultra high reliability for military and industrial harsh environments. These fully encapsulated AC-DC supplies are designed for use in extreme MIL environments. Source/load effects are as low as 0.05% with 1mV rms PARD and 50 Microsec. recovery.

PM-95 Series
Stabilized AC-DC modules. Fully encapsulated. 3 to 325 VDC, to 800 Watts. 80,000 hours MTBF, @ 95°C base.

DPM-95, TDPM-95 Series
Stabilized, AC-DC, dual output, tracking and non-tracking. 12 to 15 VDC, to 150 Watts. 50,000 hours MTBF, @ 95°C base.

F-115, FD-115 Series
Stabilized, AC-DC modules, 3 to 325 VDC, to 500 Watts. 50,000 MTBF, @ 115°C base.

"MIL-SPEC" LINEAR SUPPLIES



For industrial, military and commercial use. The partially encapsulated AC-DC stabilizers are designed for moderate environments. They have 0.05% load effect, 1mV rms PARD and generally have 50 microsecond recovery.

PL-80 Series
Lower cost, high density, stabilized AC-DC modules. 3 to 152 VDC, to 75 Watts, 120,000 hours MTBF, @ 80°C base.

P-80 Series
Fully encapsulated, series stabilized DC modules. 3 to 325 VDC, to 800 Watts. 100,000 hours MTBF, @ 80°C base.

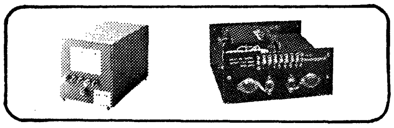
MC-65 Series
Series stabilized, DC-DC modules. Up to 30% more current. 3 to 152 VDC, to 750 Watts, 1,000,000 hours MTBF, 65°C base.

DP-80, TDP-80 Series
Tracking and non-tracking, AC-DC, dual output. 6 to 150 VDC, to 10 Watts. 50,000 hours MTBF, @ 80°C base.

NP-80 Series
Non-stabilized, low cost. 3 to 1000 VDC, to 975 Watts. 250,000 hours MTBF, @ 80°C base.

FRP-80 Types — Ferroresonant
Low cost, regulated, AC-DC, modular. 5.0 to 550 VDC, up to 950 Watts. MTBF - 250,000 hours @ 80°C base.

SINE-WAVE INVERTERS



For military and industrial applications. Open frame and partially encapsulated with 70% efficiency, 5% rms max. source ripple and less than 100 rms recovery.

IN Series
24/28 DVC, 115/220 VAC, 5-/60 or 400 HZ. 50-100VA.

NAC/NACD Series
Stabilized DC-AC, 24/28 VDC, 115 VAC rms, 60/400 Hz output, to 500 VA.

CUSTOM CAPABILITIES FOR MODULE RACK MOUNTS AVAILABLE.

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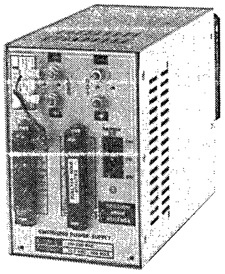
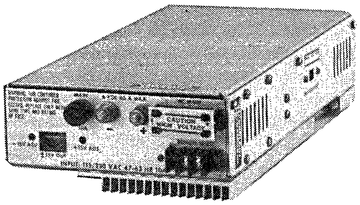
Technology Dynamics specializes in custom commercial switching power supplies and DC-DC converters in the range of 50W to 2000W. No NRE charge is imposed on orders above $250,000. Delivery of prototype in 8-10 weeks.



DUAL INPUT UNIT
MODEL **TDI-184**

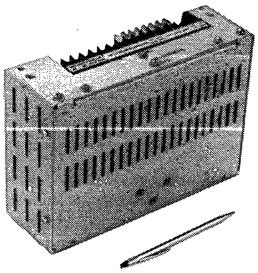


CUSTOM 400W SWITCHING P.S.
TDI-194

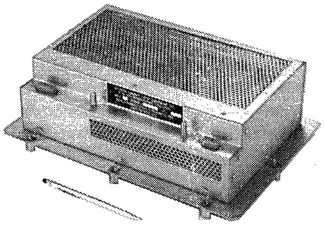
CUSTOM MILITARY POWER SUPPLIES

Full range capacity for military designs for ground support, airborne and shipboard applications. Quality control setup to MIL-I-45208 — proven performance with very low NRE charges.

Full compliance to the NAVMAT P4855-1 Reliability report.



CUSTOM MILITARY AIRBORN DC-DC CONVERTER
TDI-189



CUSTOM MULTI-OUTPUT AIRBORN P.S.
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YOUR SPECIAL IS OUR SPECIALTY!

- Militarized Commercial Designs
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- DC-DC Converter with High DC Input
- Switching Power Supplies with Battery Backup
- Battery Chargers
- Airborn Power Supplies

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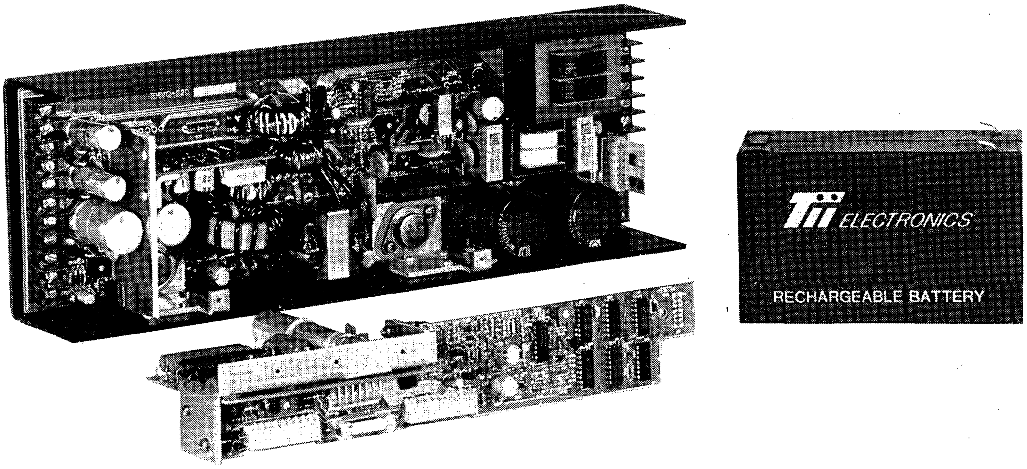

EHVQ™ 220, BATTERY BACK UP BOARD AND BATTERY PACK

POWER SUPPLIES DESIGNED AS INTELLIGENTLY AS YOUR COMPUTER

EHVQ POWER SUPPLY

- 115/230 VAC INPUT
- DESIGNED TO MEET FCC VDE UL CSA
- INDUSTRY STANDARD CASES
- FULL POWER AT 50°C
- OVERVOLTAGE PROTECTION ON MAIN OUTPUT
- REMOTE ON/OFF
- 1 YEAR WARRANTY
- AVAILABLE WITH OPTIONAL BATTERY BACKUP
- ALL OUTPUTS ISOLATED AND FULLY FLOATING
- OPTIONAL COVER
- BUILT IN LINE FILTER
- SOFT START

BATTERY BACKUP OPTION

- FIELD UPGRADEABLE (PLUG IN PC BOARD)
- TTL STATUS SIGNALS
- JUMPER SELECTIBLE SHUTDOWN MODES
- ON-BOARD, FLOAT-TYPE BATTERY CHARGER

Our EHVQ™ line of high-quality, compact switches offer new flexibility in the design of fault-tolerant systems. The optional battery backup now allows you to implement reliable DC power without the size/cost penalty associated with traditional battery backup systems. Battery backup is field upgradeable. It plugs into your system's EHVQ™ power supply as easily as adding more memory. The EHVQ™ line is designed to retain it's form factor when the battery backup is added.

The battery backup board contains the battery charger, soft transition logic, and all communications logic. TTL compatible status signals indicate AC low, battery low and battery charged conditions. During an AC power failure, automatic shutdown logic allows system shutdown to occur after a timeout, after the battery gets to a low state or controlled by the system, via the "Shutdown Inhibit" input. The unit automatically restarts after AC power is restored. A "Return from Power Fail" status signal can be used by the system to vector to the appropriate restart procedure.

Transition from AC power to battery power is done with novel "Soft Transition" logic (patent pending). This allows power sharing between the battery and AC line even under the most severe brownout conditions.

Call or write TII Electronics for more information. Our application engineers are ready to answer any questions you may have about optional battery backup. EHVQ Designer's Kits are available from stock. They contain everything you need to test the EHVQ with optional battery backup.

HELPING YOU BEFORE YOUR CHIPS ARE DOWN.™

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1375 Akron Street, Copiague, New York 11726 516-789-5000

EHVQ™ SWITCHING POWER SUPPLIES WITH OPTIONAL BATTERY BACKUP

ELECTRICAL SPECIFICATIONS

INPUT: 85-140 /170-280 VAC
50-60 HZ

LINE REGULATION: .2% Fully Regulated Outputs
2% Semi Regulated Outputs

LOAD REGULATION: .2% Fully Regulated Outputs
±5% Semi Regulated Outputs

CROSS REGULATION: ±5% Semi Regulated Outputs
Main Output Change 50% to 100% of Rated load

CENTERING: ±3% Semi Regulated Outputs

RIPPLE & NOISE: 50 mV PP Max Main Output and Fully Regulated Outputs
1% Nominal Semi Regulated Outputs

170 WATT MODELS 2.6" x 5" x 13.4"

EHVQ-170	MAIN	AUX 1*	AUX 2	AUX 3
2	5V, 15A	12V, 4A SR	12V, 4A SR	
3	5V, 15A	12V, 6A SR	12V, 1A FR	
4	5V, 15A	12V, 4A SR	12V, 4A SR	5V, 1A FR
5	5V, 15A	12V, 6A SR	12V, 1A FR	5V, 1A FR
6	5V, 15A	12V, 6A SR	12V, 1A FR	12V, 1A FR
7	5V, 15A	12V, 4A SR	15V, 1A FR	15V, 1A FR
8	5V, 15A	24V, 4A SR	12V, 1A FR	12V, 1A FR

220 WATT MODELS 2.6" x 5" x 15.0"

EHVQ-220	MAIN	AUX 1*	AUX 2	AUX 3
1	5V, 44A			
2	5V, 25A	12V, 6A SR	12V, 4A SR	
3	5V, 25A	12V, 6A SR	12V, 4A FR	
4	5V, 25A	12V, 6A SR	12V, 4A FR	12V, 1A FR
5	5V, 25A	12V, 4A SR	15V, 4A FR	15V, 1A FR
6	5V, 25A	12V, 6A SR	12V, 4A SR	5V, 1A FR
7	5V, 25A	12V, 6A SR	12V, 4A FR	5V, 1A FR
8	5V, 25A	24V, 4A SR	12V, 4A SR	12V, 1A FR
9	5V, 25A	24V, 4A SR	12V, 4A FR	12V, 1A FR
10	5V, 25A	12V, 6A SR	12V, 4A SR	12V, 1A FR
11	5V, 25A	12V, 4A FR	12V, 4A FR	
12	5V, 25A	15V, 4A FR	15V, 4A FR	

360 WATT MODELS 2.6" x 6.5" x 15.0"

EHVQ-360	MAIN	AUX 1*	AUX 2	AUX 3
1	5V, 76A			
2	5V, 45A	Δ 12V, 10A SR	12V, 5A SR	
3	5V, 45A	Δ 12V, 10A SR	12V, 5A SR	
4	5V, 45A	Δ 12V, 10A SR	12V, 5A FR	12V, 1A FR
5	5V, 45A	12V, 5A SR	15V, 5A FR	15V, 1A FR
6	5V, 45A	Δ 12V, 10A SR	12V, 5A FR	5V, 1A FR
7	5V, 45A	Δ 12V, 10A SR	12V, 5A FR	5V, 1A FR
8	5V, 45A	24V, 6A SR	12V, 5A SR	12V, 1A FR
9	5V, 45A	24V, 6A SR	12V, 5A FR	12V, 1A FR
10	5V, 45A	Δ 12V, 10A SR	12V, 5A SR	12V, 1A FR
11	5V, 45A	12V, 5A FR	12V, 5A FR	24V, 2A SR
12	5V, 45A	15V, 5A FR	15V, 5A FR	24V, 2A SR

SR - Semi-Regulated Output FR - Fully Regulated Output

All models total power current limited. Currents shown represent maximum continuous current available per output, AUX 1* capable of supplying additional 4A surge current.

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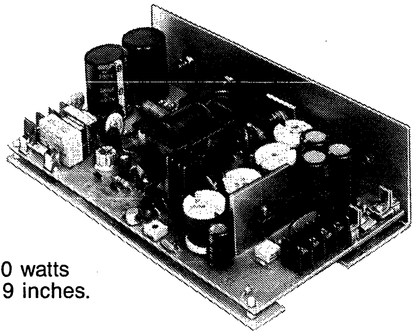
MULTI-OUTPUT SWITCHERS
THE NEW WORLD STANDARD SERIES


220 watts
in 9 inches.

INNOVATIVE DESIGN

As a pioneer in the development of switching power supplies, Todd Products has led the way in the application of innovative design and advanced technology to shrink size and improve reliability. Result: The New World Standard Series and The Cost-Effective Space Saver Series.

SURFACE MOUNT TECHNOLOGY

By reducing component count and using chip components mounted on the underside of the board, Todd engineers have achieved a breakthrough in switcher design, reliability and performance.

The size of the New World Standard Series is the smallest in the industry. Reduced component count, use of chip components, and direct connections of the chip components to the board rather than relying on interconnects greatly improves reliability. Performance is considerably improved with components positioned on the board where they function efficiently rather than where they fit.

CUSTOM APPLICATIONS

Todd engineers will modify standard power supplies, and custom design switchers to meet your specific requirements.

FEATURES:

- Advanced Surface Mount Technology Reduces Size, Increases Reliability
- Clean, Simple Design With Low Component Count Gives High MTBF.
- High Peak Current Output Holds ±5% Total Regulation Band for Proper Hard Disk & Tape Operation
- Meets International Safety Standards UL 478, CSA 22.2, IEC 435, VDE 0806, Class 1, SELV
- Built-in RFI Filter Meets FCC Part 15, Subpart J RFI
- Optimized design for application with computer-based systems utilizing logic, memory, disk, tape and communications
- Proprietary Current Fed VERI-DRIVE PLUS Design Increases Inverter Efficiency
- Proprietary DYNA-FLUX Output Filter Improves Filter Operation Also Helps to Reduce Size

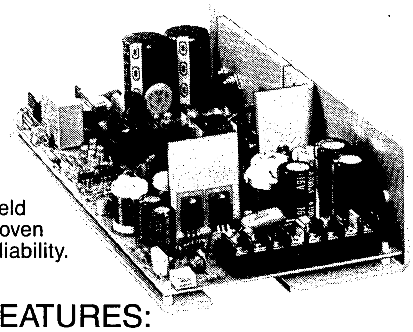
	MAIN* +5V	DISK/TAPE*	AUX #1	AUX #2
160 WATT Size: 9″x5″x2.5″				
MDT-163-0512R	25A	+12V @ 4/9A pk	12V @ 1.5A	
MDT-163-0512S	20A	+12V @ 4/9A pk	12V @ 4A	
MDT-163-2412R	20A	+24V @ 3/6A pk	12V @ 1.5A	
MDT-163-2412S	20A	+24V @ 3/6A pk	24V @ 4A	
MDT-163-1224R	25A	+12V @ 4/9A pk	24V @ 1.5A	
MDT-163-1224S	20A	+12V @ 4/9A pk	24V @ 2A	
MDT-163-1205R	25A	+12V @ 4/9A pk	5V @ 1.5A	
MDT-164-1212R	25A	+12V @ 4/9A pk	+12V @ 1A	−12V @ 1A
MDT-164-2412R	20A	+24V @ 3/6A pk	+12V @ 1A	−12V @ 1A
220 WATT++ Size: 9″x5″x2.5″				
MDT-223-0512R	30A	+12V @ 6/10A pk	12V @ 2.5A	
MDT-223-0512S	25A	+12V @ 6/10A pk	12V @ 6A	
MDT-223-2412R	25A	+24V @ 4/8A pk	12V @ 2.5A	
MDT-223-2412S	25A	+24V @ 4/8A pk	12V @ 6A	
MDT-223-1224R	30A	+12V @ 6/10A pk	24V @ 2A	
MDT-223-1224S	25A	+12V @ 6/10A pk	24V @ 3A	
MDT-223-1205R	30A	+12V @ 6/10A pk	5V @ 2.5A	
MDT-224-1212R	30A	+12V @ 6/10A pk	+12V @ 1.5A	−12V @ 1.5A
MDT-224-2412R	25A	+24V @ 4/8A pk	+12V @ 1.5A	−12V @ 1.5A
300 WATT++ Size: 11.5″x5″x2.5″				
MDT-303-0512S	45A	+12V @ 8/16A pk	12V @ 5A	
MDT-303-2412S	40A	+24V @ 4/10A pk	12V @ 5A	
MDT-304-1212R	40A	+12V @ 8/16A pk	12V @ 4A	12V @ 2.5A
MDT-304-2412R	40A	+24V @ 4/10A pk	12V @ 4A	12V @ 2.5A
MDT-304-2405R	40A	+24V @ 4/10A pk	12V @ 4A	5V @ 2.5A
MDT-304-1205R	45A	+12V @ 8/16A pk	12V @ 4A	5V @ 2.5A
MDT-304-1242R	35A	+12V @ 5/10A pk	24V @ 4A	12V @ 2.5A
MDT-304-1224R	40A	+12V @ 8/16A pk	12V @ 3A	24V @ 2A
400 WATT++ Size: 11.5″x5″x2.5″				
MDT-403-0512S	60A	+12V @10/16A pk	12V @ 6A	
MDT-403-2412S	55A	+24V @ 5/10A pk	12V @ 6A	
MDT-404-1212R	55A	+12V @10/16A pk	12V @ 6A	12V @ 2.5A
MDT-404-2412R	55A	+24V @ 5/10A pk	12V @ 4A	12V @ 2.5A
MDT-404-2405R	55A	+24V @ 5/10A pk	12V @ 5A	5V @ 2.5A
MDT-404-1205R	55A	+12V @10/16A pk	12V @ 6A	5V @ 2.5A
MDT-404-1242R	50A	+12V @ 5/10A pk	24V @ 5A	12V @ 2.5A
MDT-404-1224R	55A	+12V @10/16A pk	12V @ 4A	24V @ 2A

++30 CFM required to achieve full ratings.
*Maximum combined currents not to exceed main output current.

Todd Products Corporation, 50 Emjay Boulevard, Brentwood, NY 11717 • (516) 231-3366 • TWX 510-227-4905

Todd

MULTI-OUTPUT SWITCHERS
COST-EFFECTIVE SPACE SAVER SERIES



Field proven reliability.

FEATURES:

- Field Proven Reliability and Performance
- Built-in RFI Filter
- Meets UL and CSA standards. Select Models meet IEC 435 and VDE 0806, Class 1, ELV
- Tightly Regulated Auxiliary Outputs
- Remote Sense on +5V Output
- Proprietary Current Fed VERI-DRIVE PLUS Design Increases Inverter Efficiency
- Self-Biasing Design Eliminates 60Hz Magnetics and Reduces Magnetic Fields
- Soft Start Limits Inrush Current
- Current Limit Protection on all Outputs.
- Designed for applications with computer-based systems utilizing logic, memory, disk, tape and communications

	MAIN +5V	DISK/TAPE	AUX #1 +12V	AUX #2 −12V	AUX #3
100 WATTS Size: 9.5″x5″x2.5″					
MOS-100-0512	15A		3A	2A	−5V @ 1A
MRV-100-0512	15A		1A	1A	5V @ 1A
MRV-100-2412	15A		1A	1A	24V @ 1A
130 WATTS Size: 9.5″x5″x2.5″ Meets IEC 435 and VDE 0806					
MOV-130-1212	15A	+12V @ 2.5A/5A pk	1.5A	1.5A	
MOV-130-2412	15A	+24V @ 2.5A/5A pk	1.5A	1.5A	
150 WATTS Size: 10.5″x5″x2.5″					
MOS-150-0512	20A		4A	3A	−5V @ 1A
MOS-150-1212	20A	+12V @ 3A/6A pk	1.5A	1A	−5V @ 1A
MOS-150-2412	20A	+24V @ 3A/6A pk	1.5A	1A	−5V @ 1A
200 WATTS Size: 13″x5″x2.5″					
MOX-200-1212	25A	+12V @ 4A/8A pk	4A	4A	−5V @ 1A
MOX-200-2412	25A	+24V @ 4A/8A pk	4A	4A	−5V @ 1A
300 WATTS++ Size: 11.5″x5″x2.5″ Meets IEC 435 and VDE 0806					
MOR-304-0512	45A		1.5A	1.5A	5V @ 1.5A
MOR-304-1212	45A		1.5A	1.5A	12V @ 1.5A
MOR-304-2412	45A		1.5A	1.5A	24V @ 1.5A
400 WATTS++ Size: 15″x5″x2.5″					
MOX-400-1212	50A	+12V @ 5A/8A pk	10A	10A	−5V @ 4A
MOX-400-2412	50A	+24V @ 5A/8A pk	10A	10A	−5V @ 4A

++60 CFM of moving air required to achieve full ratings.

HIGH PERFORMANCE SINGLE OUTPUT SWITCHERS

FEATURES

- Field Proven Reliability and Performance
- Meets UL and CSA Standards
- SFG Series Meets IEC 435, VDE 0806 Class I, ELV Safety Standards
- Full Ratings to 50° C.
- Dual AC Input Except Where Noted
- Remote Sense
- Small Size
- Power Factor Correction
- Fully Protected for Overvoltage and Overcurrent
- Built-in RFI filter

***1000 WATTS** Size: 4.94 x 7.88 x 10.69

MODEL	VOLTAGE	CURRENT
SW5-200	5V	200A

***900 WATTS** Size: 4.94 x 7.88 x 10.69

MODEL	VOLTAGE	CURRENT
SW5-150S	5V	150A
SW12-75S	12V	75A
SW24-38S	24V	38A
SW28-33S	28V	33A
SW48-20S	48V	20A

720 WATTS++ Size: 3.25 x 6 x 12

MODEL	VOLTAGE	CURRENT
SFG-24-30	24V	30A
SFG-48-15	48V	15A

***625 WATTS** Size: 5 x 8 x 10

MODEL	VOLTAGE	CURRENT
SOX-5-125	5V	125A
SOX-12-52	12V	52A
SOX-24-26	24V	26A
SOX-28-23	28V	23A
SOX-48-13	48V	13A

360 WATTS Size: 4.86 x 5.13 x 9.12

MODEL	VOLTAGE	CURRENT
SW5-60	5V	60A
SW12-30	12V	30A
SW24-15	24V	15A
SW28-13	28V	13A
SW48-7.5	48V	7.5A

180 WATTS Size: 3.11 x 4.85 x 8.5

MODEL	VOLTAGE	CURRENT
SW5-30	5V	30A
SW12-15	12V	15A
SW24-7.5	24V	7.5A
SW28-6.5	28V	6.5A
SW48-4	48V	4.0A

120 WATTS Size: 1.93 x 4.63 x 9.5

MODEL	VOLTAGE	CURRENT
SW5-20	5V	20A
SW12-10	12V	10A
SW24-5	24V	5A
SW28-4.5	28V	4.5A
SW48-2.5	48V	2.5A

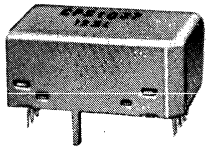
++105 CFM forced air required to achieve maximum ratings.
*Specify suffix 'A1' for 115VAC input or 'A2' for 230VAC. Units have built-in fan.

Todd Products Corporation, 50 Emjay Boulevard, Brentwood, NY 11717 ◦ (516) 231-3366 ◦ TWX 510-227-4905

TOKO AMERICA

POWER SUPPLIES
CONVERTERS/

DC/DC CONVERTERS



LOW COST CPS SERIES OF DC/DC CONVERTERS FOR VACUUM FLUORESCENT DISPLAYS, RS232 INTERFACES AND OTHER USES. FULLY SHIELDED FOR LOW RADIATED NOISE.

Use	Input (V)	Output 1 : (V/mA)	Output 2 : (V/mA)	AC Out : (Vrms)/(mA)	Output (mW)	Form	Type No
Fl. lamp Driver: DC 1ch output AC 1ch output	4.5~5.5	+24 ±2.4/1~3.5		3.4 ±0.4/10~14	150		CPS2027
	4.5~5.5	−29 ±2.9/6~20		1.8 ±0.27/117~143	930		1118
	5.05~4.95	−7 ±0.7/23.4		1.4 ±0.14/140	395		1058
	9~16	−24 ±2.4/0.5~1.5		3.7 ±1.0/10.8~13.2	102		1063
	9~16	−22 ±2.2/1.0~5.5		1.3 ±0.4/47~58	232		1061
	9~16	−19 ±1.9/10~40		3 ±0.6/40~80	1000		1001B
	9~16	−24 ±3/5.6~32		2.4 ±0.55 - 0.45/67~86	1050		1052B
1ch +V Output	4~6	+30 ±3/5~10			330		1079
	4.2~6.6	+12 ±1.2/40			528		1077
	4.5~8	+10 ±1/30~100			1100		1076
	4.75~5.25	+15 ±0.75/1~5			79		1117
	4.9~5.1	+37 ±5.5 - 1.8/1~2			85		1098B
	6~10	+34 ±3.4/1~5			187		1092
	8~11	+40 ±/25~30			1200		1121
	8~16	+24 ±2.4/4~20			530		2004C
	9~16	+50 ±5/5			275		1074A
	9~16	+35 ±1.75/8~20			735		1129
Fl. lamp Driver: DC 2 ch AC 1ch	4.5~5.5	−31 ±3.1/7~23	−25 ±2.5/1	2.3 ±0.3 - 0.4/67~83	1027		1102
	4.5~5.5	−47 ±4.7/1	−40±4/3~11	6.8 ±0.8/70~86	1180		1091
	4.5~5.5	−47 ±4.7~3/11	−40 ±4/1	6.8 ±0.8/70~86	1200		1103
	8~14	−21 ±2.1/0~7	−27.3 ±2.8/1.4~3	3.5 ±0.35/20~25	348		1051B
	9~16	−24 ±2.4/1~3	−30 ±3/1.5~4.5	5.5 ±1 - 1.5/14.8~18.2	346		1069
	9~16	−20 ±2/5~20	−24 ±2.4/3~6	3.4 ±0.8/10~14	658		1049
	9~16	−35 ±3.5/3~9	−30 ±3/2~7	3.8 ±0.95/50~60	850		1078
	9~16	−10 ±0.8/12~35	−22 ±3/3~13	2.4 ±0.75/40~65	910		1023B
	9~16	−10 ±0.8/12~35	−22 ±3/3~13	3 ±0.75/40~65	950	L	1033A
1ch −V Output	4~5.6	−5 ±0.6/5~20			120		1089
	4.5~5.5	−5 ±0.5/25~50			275		1064
	4.5~5.5	−45 ±4/3~10			480		1097
	4.5~5.5	−10 ±0.5/20~60			600		1012B
	7~16	−5 ±0.5/1~50			250		1053
	9~16	−14 ±1.4/20~80			1200		1116
	9~16	−23.5 ±2.4/15~51			1200		1067A

SWITCHING POWER SUPPLIES

PT SERIES—TRIPLE OUTPUT POWER SUPPLIES (UL478 RECOGNITION)
PS SERIES—SINGLE OUTPUT POWER SUPPLIES; +5, 12, 15, 24 VOLTS DC

GENERAL SPECIFICATIONS

Operating Temperature		0~+60°C (Also refer to derating curve)	
Storage Temperature		−20~+75°C	
Operating Humidity		30~85% RH (without dew condensation)	
Storage Humidity		30~85% RH (without dew condensation)	
DIELECTRIC STRENGTH AND INSULATION RESISTANCE			
Dielectric Strength		1500V AC 1 min between input/output, and input to frame	At 25°C 60% RH
Insulation Resistance		Over 100M Ω at 500V DC (Output to Frame)	
VIBRATION AND SHOCK TEST (AT NON-OPERATNG CONDITION)			
Vibration	5~10 Hz	Amplitude, 10mm (1 hr in each of 3 orientations)	
	10~55 Hz	20 (1 hr in each of 3 orientations)	
Impact	Impact	20G (X3 in each of 3 orientations)	
	Time	11 ±5 ms	

PT SERIES

PT15 (15W)		PT30 (30W)		PT50 (50W)		
PT15-01	PT15-02	PT30-01	PT30-02	PT50-01	PT50-02	PT50-03
+ 5V• 2A +12V•0.3A −12V•0.2A	+ 5V• 2A +12V•0.3A −12V•0.2A	+ 5V• 3A +12V• 1A −12V•0.3A	+ 5V• 3A +12V• 1A −12V•0.3A	+ 5V•5A +12V•1A −12V•1A	+ 5V•5A +12V•1A −12V•1A	+ 5V• 6A +12V•7.2A −12V•0.3A
16	16	30.6	30.6	4	49	48

PT75 (75W)				PT100 (100W)	
PT75-01	PT75-02	PT75-03	PT75-04	PT100-01	PT100-02
+ 5V•10A +12V• 1A −12V• 1A	+ 5V•10A +12V• 1A −12V• 1A	+ 5V• 12A +12V•0.5A −12V•0.5A	+ 5V• 9A +12V• 2A −12V•0.5A	+ 5• 12A +12• 3A −12•0.5A	+ 5V• 12A +12V• 3A −12•0.5A
74	74	72	75	102	102

- 15 & 30W available in open frame, closed frame or PWB.
- 50, 75 & 100W available in open frame or closed frame.

PS SERIES

Output Power (W)	Type Name	Output Voltage and Current			
		5V	12V	15V	24V
10	PS10	2.0A	0.9A	0.7A	0.5A
15	PS15	3.0A	1.3A	1.0A	0.7A
30	PS30	5.5A	2.5A	2.0A	1.3A
50	PS50	10.0A	4.2A	3.4A	2.1A
100	PS100	20.0A	8.3A	6.6A	4.2A

- LED indicator
- ±10% adjustable output voltage
- 10, 15, 30 Watt versions available in PWB, open frame, or closed frame.
- 50, 75 & 100W available in open frame or closed frame.

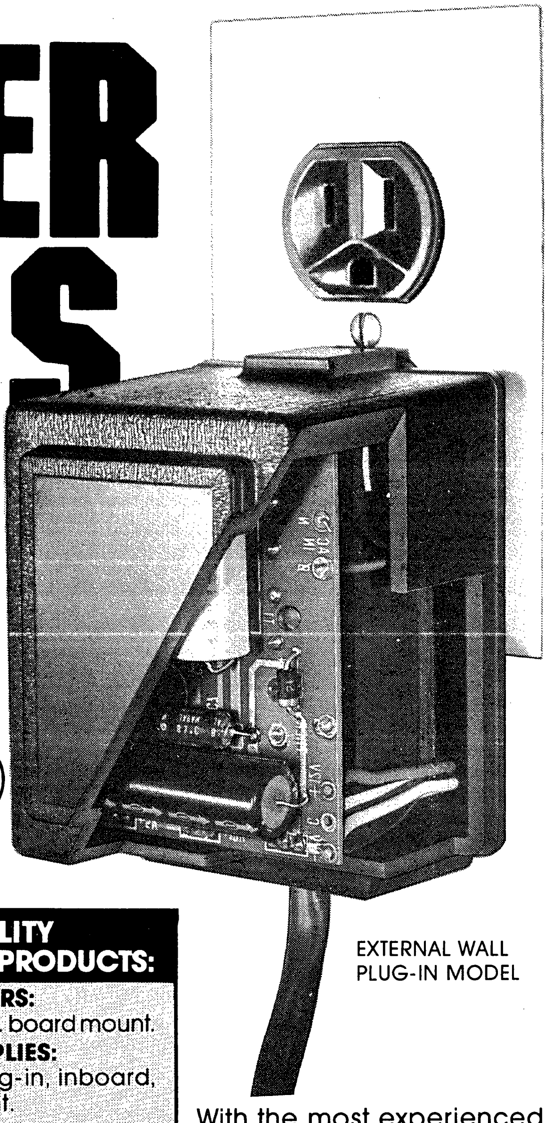
Toko America, Inc. Corporate Offices / 1250 Feehanville Drive / Mount Prospect, IL 60056 / Tel. 312-297-0070 / Telex 72-4372 / FAX 312-297-8063
California Office / 10050 N. Wolfe Rd. / SW3-361 / Cupertino, CA 95014 / Tel. 408-996-7575 / FAX 408-996-7280
New York Office / 6 Corporate Park Drive / Suite 307 / White Plains, NY 10604 / Tel. 914-694-5618 / FAX 914-694-6280

DC POWER SUPPLIES

outboard, regulated multiple output power supplies for ...

microprocessor based computers, terminals, modems, printers and telecommunications equipment.

- **REDUCES HEAT**
- **REDUCES SIZE**
- **REDUCES COST**
- **ELIMINATES EMI**
- **EASY ACCESS SERVICE**
- **UL LISTING**



EXTERNAL WALL PLUG-IN MODEL

SPECIFICATIONS:

- INPUT: 103VAC to 129 VAC @ 60 Hz.
- OUTPUT:
  - + 5 VDC @ 750 M.A., 2.0% load regulation
  - +12 VDC @ 150 M.A., 0.1% load regulation
  - −12 VDC @ 150 M.A., 0.1% load regulation
- UL 1310 LISTED: Wall plug-in models.
- Meets CSA requirements (desk-top models).
- Line regulation: .2%.
- Operating temperature: 0°-40°C.
- Short circuit protected.

OPTIONS:

- 220 VAC, 50 Hz input.
- Permanent mounting tab.
- Shielded and/or drain output cable.

OTHER HIGH QUALITY TEC UL/CSA LISTED PRODUCTS:

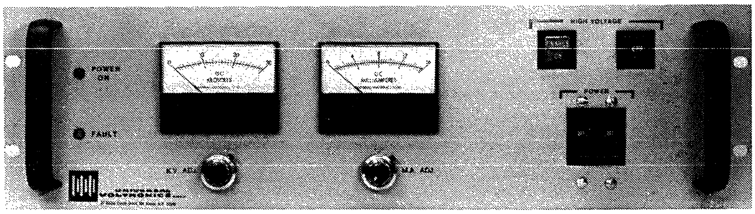
- **AC-AC TRANSFORMERS:** Direct wall plug-in, P.C. board mount.
- **AC-DC POWER SUPPLIES:** Outboard, direct plug-in, inboard, P.C.B., chassis mount.
- **BATTERY CHARGERS:** Lead acid, nickel cadmium, fast rate, trickle, direct wall plug-in, inboard.
- **REGULATED POWER SUPPLIES:** (linear, switcher) Close regulation for micro-processor based equipment, direct wall plug-in, P.C.B., inboard mounted.
- **P.C. BOARD ASSEMBLY:** High-volume, wave soldered, point to point, manual or automatic stuffing.

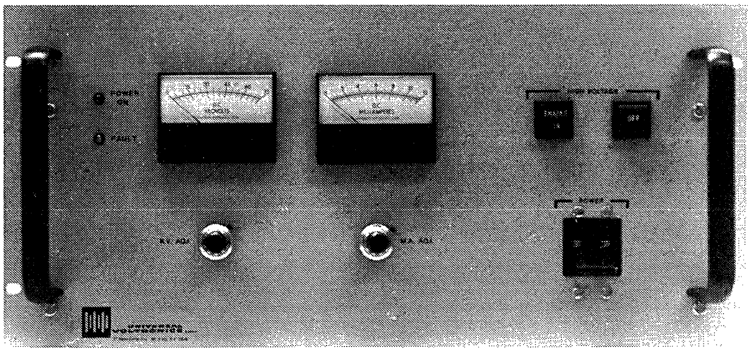
With the most experienced Engineering, Manufacturing and Marketing Team in our industry, Transformation Electronics Corp. can handle any low voltage power product or assembly requirement you have. TEC can engineer and obtain UL LISTING for power supplies in the U.S., build it here, or tool and manufacture in their Taiwan or Haiti manufacturing facilities.

TEC

TRANSFORMATION ELECTRONICS CORP.
170 Wilbur Place, Bohemia, New York 11716 (516) 563-1117
TWX: 510-222-0972

UVC DELIVERS THE NEXT GENERATION OF HIGH VOLTAGE SWITCHING SUPPLIES — NOW!





Output Voltage (KV)	Output Current (MA)	Package	Model Number
0-5	50	1	BRC-5-50*
	100	1	BRC-5-100*
	200	2	BRC-5-200*
0-10	25	1	BRC-10-25*
	50	1	BRC-10-50*
	100	2	BRC-10-100*
0-20	12.5	1	BRC-20-12.5*
	25	1	BRC-20-25*
	50	2	BRC-20-50*
0-30	8	1	BRC-30-8*
	16	1	BRC-30-8*
	30	2	BRC-30-30*
0-50	5	1	BRC-50-5*
	10	1	BRC-50-10*
	20	2	BRC-50-20*
0-75	3	1	BRC-75-3*
	6	1	BRC-75-6*
	12	2	BRC-75-12*
0-100	2.5	1	BRC-100-2.5*
	5	3	BRC-100-5
	10	3	BRC-100-10*
0-150	1.5	1	BRC-150-1.5
		3	BRC-150-3
		3	BRC-150-6

Specifications

Input: 105-125 Volts rms; 50-60 Hz, single phase.

Output: Adjustable, 0 to full rated voltage.
Rated current may be drawn at any voltage setting.

Voltage Regulation: ±0.05% for line changes 105 to 125 volts.
±0.05% for no load to full load changes.*

Current Regulation: Line, ±0.5% for line changes 105 to 125 volts; load, better than 100 microamperes for load changes over a voltage compliance range of 10% to 100%.

Ripple: 0.5% of rated voltage at full load.

Stability: 0.02% per hour, 0.05% for 8 hours.
Typical after 30 min. warm-up.

Temperature: 0.01% per degree centigrade typical.

Polarity: Fixed, positive or negative, specify at time of order.

* For voltage between 25% and 100% of rated output.

Features

- **Controls: Front Panel**

On-off circuit breaker and power On light
HV ON pushbutton and light
HV OFF pushbutton
Voltage Control — 10 turn pot, locking type, 0.1% resolution
Current Control — 10 turn pot, locking type, 0.1% resolution
Meters — Single range kV and MA meters — 2% full scale accuracy

- **Packaging:**

Package 1 — 5¼H x 19W x 17D.

Package 2 — 8¾H x 19W x 18D.

Package 3 — Controls — 5¼H x 19W x 17D.
High Voltage Assembly — 15"OD x 22"H (oil insulated).

UVC IS THE INDUSTRY LEADER IN HIGH VOLTAGE POWER CONVERSION

- **TWT, CFA, Klystron, Gyrotron, and Magnetron Systems**

Available to customer's specification, pulsed or CW, including cathode, collector, helix, grid and heater outputs as required.

- **Precision Regulation**

Precisely regulated performance is available on all models featuring low ripple, fast response and high stability for exacting applications for X-ray, spectroscopy, computerized tomography, electron microscopes, ion bombardment experiments, particle separators and precise semiconductor industry manufacturing systems.

- **Custom Design**

Our expertise in the field of high voltage design is unexcelled. Consult with our Engineering staff for the solution to your most demanding high voltage power supply, Modulator or Isolation Transformer in output voltages to 500kV and up to 10 megawatt output power.

- **12-Month Warranty**

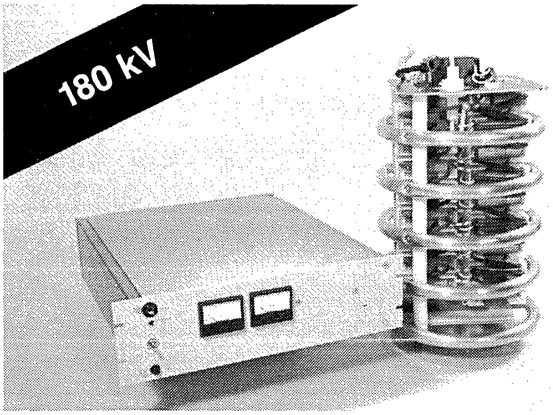
A one year factory backed and field supported warranty policy accompanies each shipment.

Write or call

UNIVERSAL VOLTRONICS CORPORATION
27 Radio Circle Drive, Mount Kisco, NY 10549
Phone: (914) 241-1300 ■ TWX: 710-571-2142

High Voltage/High Power Power Supplies from Varian

Over 35 years old, Varian Canada is a subsidiary of Varian Associates, Inc. (a Fortune 500 company) of Palo Alto, California. Varian Canada has established its leadership in specialized custom power supply technology for radar and communications markets worldwide.



Standard and Custom Designs

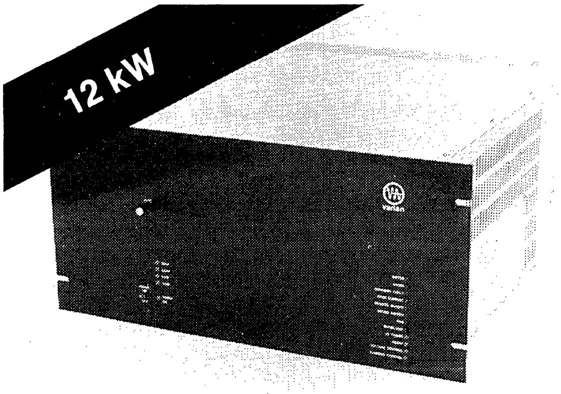
From the initial use of Varian power supplies in advanced transmitter systems, Varian has developed a substantial number of specialized power supplies to meet stringent performance specifications. Our major customers include:

Western Electric
AT&T
Collins Radio (Rockwell)
Northern Telecom
GTE
Lenkurt
Raytheon
Ford Aerospace
RCA
COMSAT
Telesat Canada
Teleglobe Canada
British Aerospace

The scope of our products and potential applications are shown in Figure 1. These products have demonstrated high voltage output, extremely tight regulation, high MTBF, MIL Spec conformance and rugged environmental test to meet military and commercial requirements. The expertise acquired from these programs enables Varian to proclaim proficiency in high power DC generation.

Varian Commitment to Quality and Dependability

Varian Canada products have met the tough environmental specifications of U.S. Government and NATO military requirements. This experience has given strong emphasis to strict engineering standards, performance and quality. The Varian facility is equipped to work to DND 1015 which is equivalent to MIL-Q-9858 and NATO AQAP-1.



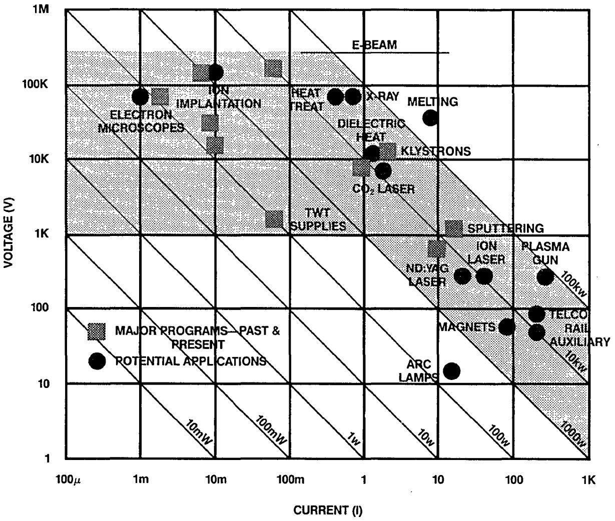

Varian Canada Power Supply Capabilities

Figure I

Every power supply is subjected to a thorough test before and after burn-in. All test results are recorded for trend analysis and future reference. Burn-ins are conducted in ovens with temperature cycling. Only those units operating to specified values during the burn-in are accepted for final testing.

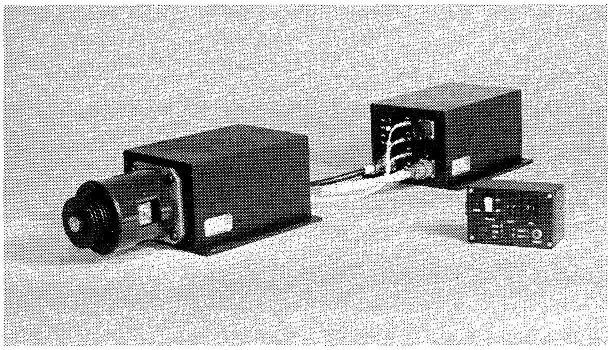
varian

Dedicated Varian Service

Varian offers quick turnaround service on all products sold. Serviceability is a major consideration in new product design and support. The close association between our service and design groups ensures that quality is engineered into every product.

Varian Product Capabilities

The following product descriptions are only a sample of Varian's design and manufacturing capabilities. Call the factory for more details on custom designs.



VPW 2882 Series Modulators/ Power Supplies

This series of products is designed for use with Varian Canada's Extended Interaction Klystrons. The unit provides both the D.C. and pulsed power to run the klystron. These products are suitable for ground and airborne applications.

Outputs:

Cathode to body (variable)	−18,000 to −23,000 V	800 mA peak

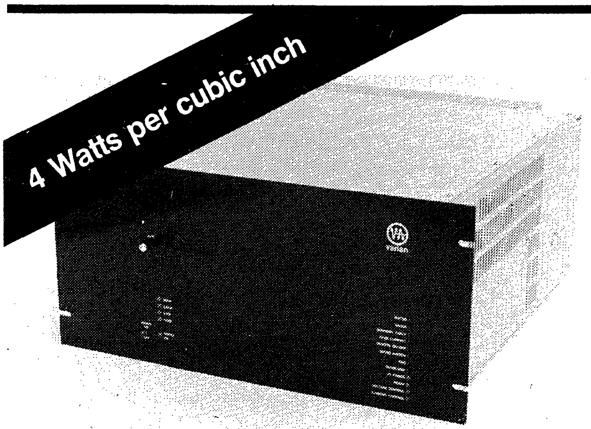
Other outputs compatible with full range of EIKs.

Inputs:

28V DC or 406 VAC, 3 phase

Features:

- Variable PRFs from 10 to 40 kHz
- Variable duty cycle from .001 to .01
- Rise/fall times from 2 nsec
- Variable pulse widths: 20 nsec to 2000 nsec
- Protection circuits for EIK and power supply
- TTL compatible external controls for: PRF triggering and pulse width selection
- Optional TTL compatible outputs for control and synchronization
- Compact size and weight



VPW 2870 High Power Switching Series

This power supply is designed to address applications requiring several kW of power with widely varying load characteristics, e.g. sputtering, or diverse other loads such as magnets and electron tubes.

Typical Outputs (Sputtering Application):

12kW	0 to 30A	0 to 1400V
6kW	0 to 15A	0 to 1400V

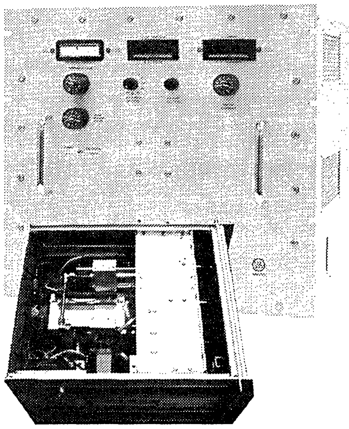
Inputs:

3-phase input power with minor tap changing to cover the international mains 200/208/380/415/$480V_{L\text{-}L}$ ±10%, 50/60 Hz

Features:

- Wide power control range (1% to 100%)
- Conventional 19" rack mount
- Small size (17.5"W x 8.75"H x 22"D)
- High packaging density (4W/cu.in.)
- Insensitive to load arcing—Arc control options available
- Water cooled (air cooled optional)
- Available with constant voltage, constant current, or constant power control
- Remote control

Varian Product Capabilities



VPW 2872 Precision High Voltage Series

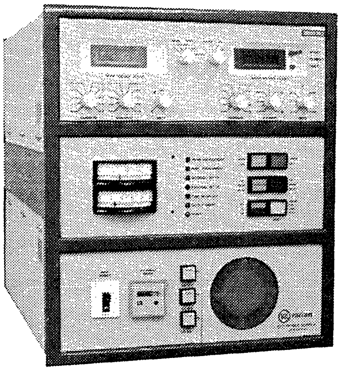
This power supply is designed to provide stable, ultra low noise high voltage. Applications include electron beam lithography, semiconductor processing equipment, electron microscopy, and other electron guns.

Typical Outputs:

			Reg.(%)	Ripple(%)
Beam	0 to 50,000 Volts	0 to 2mA	20 ppm	20 ppm_{p-p}
Grid	0 to 2,000 Volts	0 to 100μA	0.1	50mV_{p-p}
Filament	0.5 to 10.0 Volts	0.5 to 5A	0.1	5mV_{p-p}

Inputs:
110/220 Volts, 50/60 Hz

Features:
- High reliability open-air design
- Computer interface for control and monitoring
- Constant grid bias voltage or constant emission (load) current modes
- Very low noise (20 ppm)
- Voltage highly stable with respect to time (5 ppm/15 min)
- Voltage highly stable with respect to temperature (25 ppm/°C)
- Low energy storage and comprehensive protection systems
- Convection cooled
- Easily serviceable



VPW 2834 Lab Series

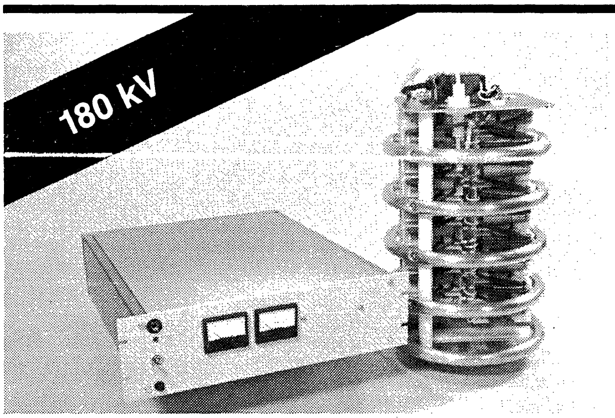
This power supply is designed to provide input power for the Varian Canada line of Extended Interaction Klystrons in laboratory applications.

Typical Outputs:

			Reg.(%)	Ripple(%)
Beam (adjustable)	0-10,000 Volts	0-200	—	mV_{p-p}
		mA	0.2	100
Anode	0-10,000 Volts	10 mA	0.2	100
Filament	6.3 Volts	1.5 A	5.0	100

Inputs:
110/220 Volts, 50/60 Hz

Features:
- Full monitoring through front panel digital and analog meters
- Comprehensive tube and power supply protection features
- Extremely well regulated HV outputs
- Forced air cooled
- Very low output ripple—0.001% typical



180kV 5mA Accelerator Supplies

This high voltage power supply is designed for the acceleration of charged particle beams in ion implantation systems.

Typical Outputs:

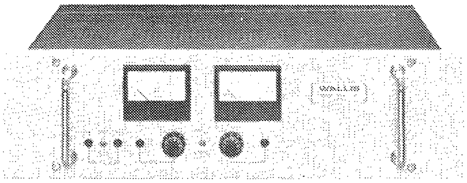
		Reg.(%)	Ripple(%)
0 to 180,000 volts	0 to 5mA	0.2	0.5

Inputs:
110 Volts AC, 50/60 Hz

Features:
- Stability of 0.1% over 8 hours
- Remote control and monitoring capabilities
- Linearity of 0.1% over entire output range
- Over current protection

Wallis Power Supplies from Varian

To complement our custom designs, Varian Canada also distributes a line of standard power supplies from Wallis Electronics Limited of Great Britain. These power supplies are used in a broad spectrum of OEM and lab applications. For a complete list of available Wallis products, call Varian Canada.



'VCS' Series

The VCS Series offers to meet the demand for voltage and current stabilized supplies with reversible output polarity.

In the 'limit' mode, automatic changeover from constant voltage to constant current operation is decided electronically. The value of the load and the setting of the voltage and current controls dictate this changeover point.

In the 'trip' mode, the current control acts as a variable current trip.

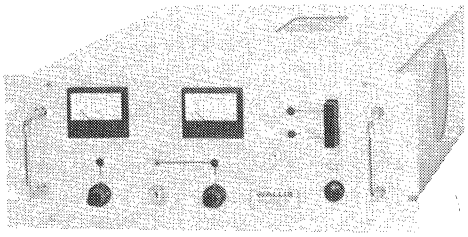
These power supplies are available with remote control circuitry via a 15 pin socket mounted on the rear panel.

TYPICAL SPECIFICATIONS:

Load Regulation:
250 ppm in voltage mode

Line Regulation:
0.02% for ± 10% input change

Ripple:
0.1% p-p at full output using cable supplied



'OL' Series

The 'OL' Series is a family of high power switched mode power supplies. The output ranges from 1 kV to 60 kV at 0.5 kW power. The high switching frequency (20 KHz) allows for smaller output capacitors resulting in a lower stored energy content. This design enjoys inherent safety advantages over line frequency operated high voltage supplies.

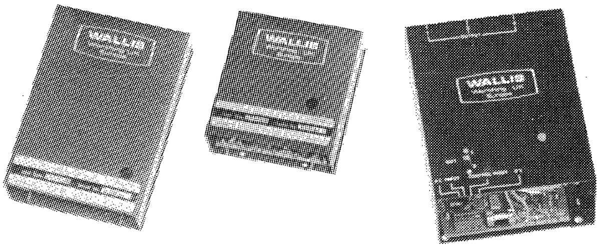
All units offer both stabilized voltage and stabilized current control with automatic changeover from constant voltage to constant current. Trip mode can be selected by front panel switch.

TYPICAL SPECIFICATIONS:

Load Regulation:
Voltage 0.1% 10% to full load current
Current 0.1% 10% to full voltage

Line Regulation:
0.1% change for ± 10% input change

Voltage Ripple:
0.5% p-p at full load current (low ripple options available)



'L' and 'M' Series

The 'L' and 'M' Series 24 V input DC/DC converters are modular in design. They are available with outputs from 5 kV to 30 kV. The 'L' range has a ripple of 500 ppm, while the more precise 'M' Series has a ripple of 50 ppm.

Over 100 different variations of these basic modules have been manufactured to commercial and military specifications in quantities ranging from 10 to 1000. They are particularly well suited to CRT applications.

For More Information

For more information on Varian power supplies, call Varian Canada Microwave Division or any Electron Device Group sales organization worldwide.

varian

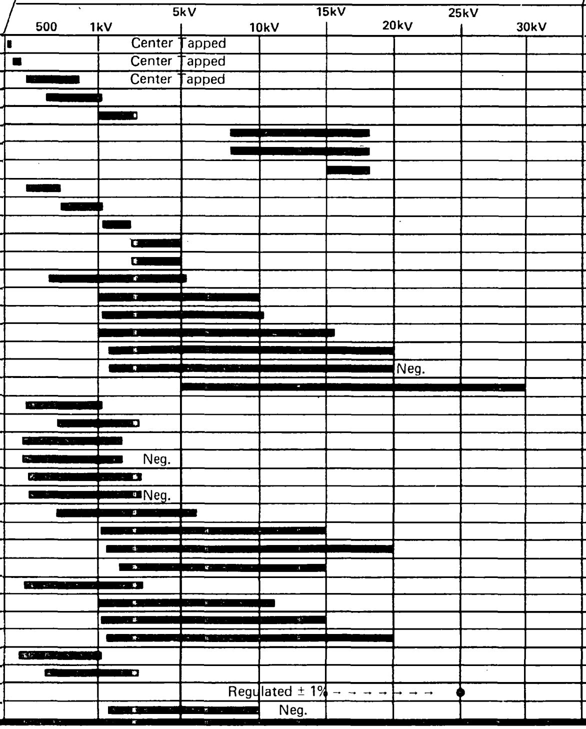
Varian Canada Microwave Division
45 River Drive
Georgetown, Ontario
Canada L7G 2J4
Telephone: (416) 877-0161
Telex: 069-7502 TWX 610-492-2641

VENUS SCIENTIFIC, INC.

Miniature High Voltage Power Supplies

Standard Products "Quick" Selection Chart   Standard Products Performance Characteristics

MODEL NO.	Output Proportional to Input	Floating Bias Supply	Multiple Output	Low Power Battery Operated	PMT	CRT	Focus	Dynamic Focus	Switching Penetration	X-Ray Microscope	High Alt. Version	Volume in Cubic Inches	Output Voltage Range	-55° to +71°C Full Rating (-55° to +85°C Reduced Rating) Max. current rating	0° to 55°C
C-½T	√	√	√									3	Center Tapped	*	32mA
C-2T	√	√	√									3	Center Tapped	*	8mA
C-8T	√	√	√				√					3	Center Tapped	*	2mA
C-15	√	√			√		√					3		*	1mA
C-30	√	√			√		√					3		*	500uA
CS-18						√			√			180		*	200uA
CS-18/DF			√			√	√	√	√			382		*	500uA
DF-18			√			√	√	√				314		*	500uA
F-6		√					√					7		16mA	*
F-12		√			√		√					7		8mA	*
F-25		√			√		√					7		4mA	*
F-50		√				√	√					7		2mA	*
F-50A		√				√	√				√	7		2mA	*
G-6						√	√				√	15		500uA	*
G-10						√					√	15		500uA	*
G-12						√					√	15		500uA	*
H-16F			√			√	√				√	31		500uA	*
H-20						√				√	√	31		500uA	*
H-20N						√				√	√	31	Neg.	500uA	*
H-30						√				√	√	44		300uA	*
K-15(Z)	√	√			√		√				(√)	2		1mA	*
K-30(Z)	√	√			√		√				(√)	2		500uA	*
LR-2					√							33		*	10mA
LR-2N					√							33	Neg.	*	10mA
LR-3					√							33		*	6.6mA
LR-3N					√							33	Neg.	*	6.6mA
LR-6						√	√					33		— —	3.3mA
LR-15			√			√	√					33		— —	1.3mA
LR-20			√			√	√					33		— —	1mA
LU-15	√		√			√	√					27		*	300uA
MG-3					√		√					7		1mA	*
MG-12						√						7		500uA	*
MR-15			√			√	√					33		— —	1.3mA
MR-20			√			√	√					33		— —	1mA
Q-15(Z)	√	√		√	√		√				(√)	3		400uA	*
Q-30(Z)	√	√		√	√		√				(√)	3		200uA	*
SM-25			√			√	√	√				97	Regulated ± 1%	*	1.2mA
ST-10N	√			√								7	Neg.	10uA	*



Above current ratings proportional to output voltage when units are operated at less than rated output voltage. *NOTE: Contact Factory

Most of Venus' power supplies can be obtained "off-the-shelf" from a large stock of inventory. This allows the unique advantage of selecting a power supply proven through previous years of field testing in numerous applications. The benefits of selecting from inventory include immediate delivery, no non-recurring engineering and demonstrated quality at a reasonable price. A custom design service is also available where unique and exacting requirements are not compatible with existing standard products. Venus can supply custom designed units in both prototype and production quantities for both Military and Commercial applications. Please contact the Venus Engineering Sales Department for further details in formulating a cost effective design to suit your specific requirements.

VENUS™
SCIENTIFIC, INC.

399 Smith Street   Farmingdale, N.Y. 11735   (516) 293-4100   TWX: 510-224-6492

DC POWER SUPPLIES

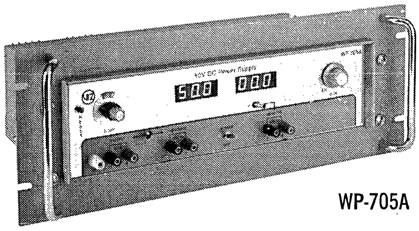
The VIZ family of fully regulated DC Power Supplies has been designed to give Laboratory type performance. The nine supplies are ideally suited for use in servicing a wide variety of electronic equipment, as well as having production testing, circuit design and educational applications.

Each supply has voltage continuously variable by 0.1V, and current limiting to a milliamp.

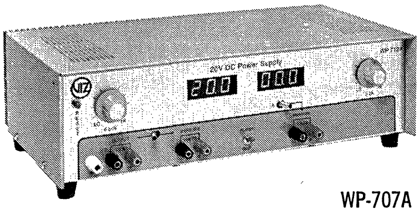
Both voltage and current can be monitored simultaneously on the two digital panel meters provided on the Single Output Supplies. On the Dual (WP-707A, WP-713A) and Triple (WP-708A, WP-714A) Supplies the two digital panel meters can be switched to monitor voltage and/or current of either output. The two outputs can be externally connected in series. Each Triple Supply has a fixed 5V @ 4A output.

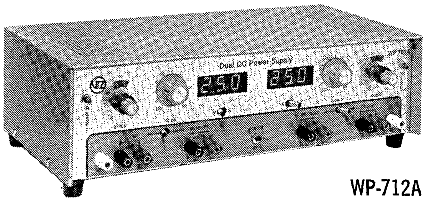
Each Supply is also a dual DC digital voltmeter. Separate inputs on the front panel allow the measurement of two independent DC voltages from 0 to 99.9V.

	WP-705A	WP-706A WP-707A	WP-708A	WP-709A	WP-711A	WP-712A WP-713A	WP-714A
Output Voltage (DC)	0-50	0-25	0-20 & 5	5 or 13 ±1.5	0-40	0-20	0-20 & 5
Output Current (DC)	0-2	0-4 0-2	0-2 & 4	0-7.5	0-1	0-2 0-1	0-.75 & 4
Regulation Load %	.075	.075	.075	.10	.075	.075	.075
Regulation Line %	.05	.05	.05	.05	.05	.05	.05
Ripple	5mV (P-P)	5mV (P-P)	5mV (P-P)	15mV (P-P)	5mV (P-P)	5mV (P-P)	5mV (P-P)
Overshoot	NO	NO	NO	NO	NO	NO	NO
Output vs Temperature	.01%/°C	.01%/°C	.01%/°C	.05%/°C	.01%/°C	.01%/°C	.01%/°C
Output Impedance	1 OHM	1 OHM	<2 OHMS	2 OHMS	1 OHM	1 OHM	1 OHM
Load Protection	CURRENT LIMITING & SHUTDOWN WITH RESET						
Input Impedance	5M	5M	5M	5M	5M	5M	5M
Panel Meter	3 Digit LED & LED Overload Indicator						
Isolated Outputs	1	1 2	3	1	1	1 2	3
Size	4" X 15" X 95" (10 X 38 X 24 cm)						
Weight (lbs) (cm)	14 6.4	14&15 6.4&6.8	16.5 7.5	17 7.7	10 4.5	10&11 4.5&5	12 5.6
AC Power Required	110/120 60Hz—220/240 50Hz						
Prices	$349	$355 (WP-706) $449 (WP-707)	$499	$359	$279	$285 (WP-712) $359 (WP-713)	$399


WP-705A

The RM-100A Rack Mount ($45) is available on all VIZ DC Power Supplies.


WP-707A


WP-712A

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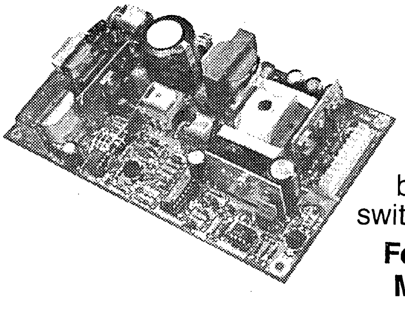
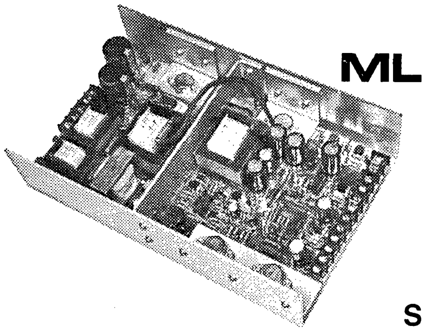
VOLTEX
Power Supplies
compact, competitive and powerful.



SERIES
VLX-50

45 watt
multi output
board mountable
switch mode supply.
For Terminal and Microprocessor applications.

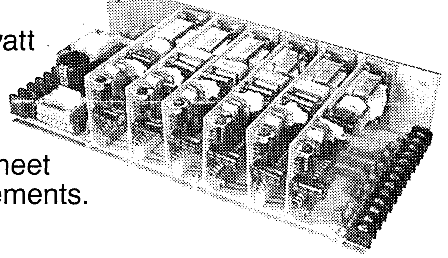


SERIES
MLX-200

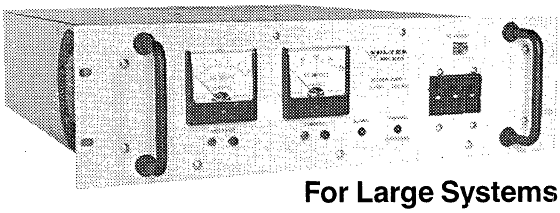
200 watt
multi output
open frame
switch mode
supply.
For Medium Size Systems.

MMX-500

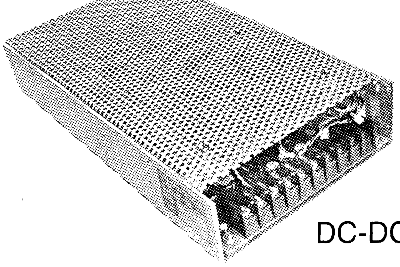
50 and 100 watt
plug-in modules
assembled on
multi-output
main chassis to meet
most system requirements.



SERIES **RHX**
Rack Mounted 1 and 2 KW Switching.



For Large Systems.



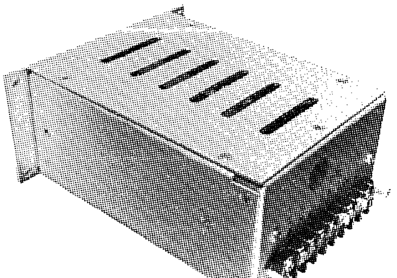
SERIES
DMX

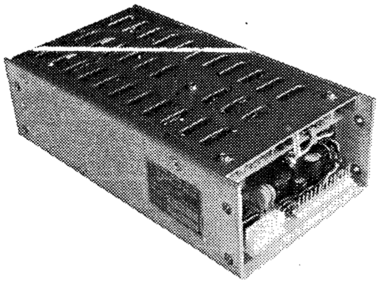
DC-DC converters

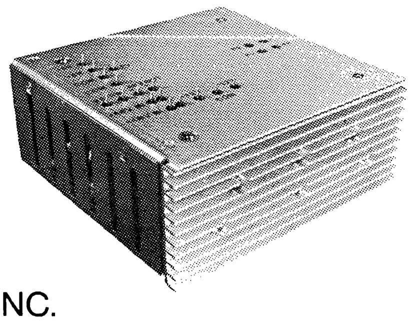
150 watt
multi output
DC-DC converters

Custom Designed Power Supplies for OEM applications

Switching Supplies **Linear Systems** **Ferroresonant Units** **SCR Regulators** **DC-AC Inverters**







VOLTEX CO., INC.
3460 Great Neck Road, North Amityville, New York 11701
(516) 842-2772

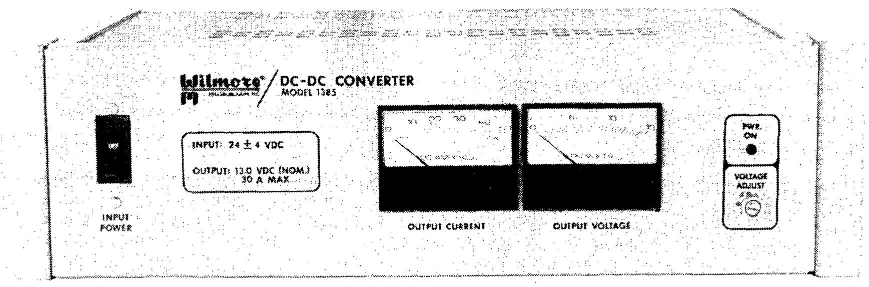
MINIGLOSSARIES
FORMULAS • CHARTS
PRODUCT SELECTION GUIDES
FORMS
CODES

TECHNICAL INFORMATION

WHERE TO FIND THEM IN THE 85/86 EDITION OF EEM

Abbreviations/Acronyms .... **A**•1166, **B**•1012, **C**•1028, **D**•1016
ASCII Code .... **D**•1087
Batteries, Product Selection Guide .... **D**•1413
Batteries & Fuel Cells, Characteristics .... **D**•1430
Cabinets, Enclosures, Racks, & Chassis, Product Selection Guide .... **C**•1003
Capacitors, Basic Formulas .... **A**•1093
Capacitors, Miniglossary .... **A**•1066
Capacitors, Product Selection Guide .... **A**•1003
Circuit Boards (Printed) Product Selection Guide .... **C**•1099
Coils, Chokes, Inductors, Product Selection Guide .... **A**•1205
Conductors, Maximum Current Capacity of Copper & Aluminum .... **C**•1863
Connectors, Miniglossary .... **C**•1129
Connectors, Terminals, & Sockets, Product Selection Guide .... **C**•1105
Crystals, Oscillators, Crystal & Piezoelectric Filters, Product Selection Gude .... **A**•1309
Delay Lines, Product Selection Guide .... **A**•1459
Discrete Semiconductors, Product Selection Guide .... **A**•2067
Displays, Readouts, Lamps, & Lights, Product Selection Guide .... **B**•1015
EBCDIC Code .... **D**•1092
Encapsulation, Miniglossary .... **C**•1086
Fans, Blowers, Cooling Equipment, & Heat Exchangers, Product Selection Guide .... **C**•1623
Filters, Product Selection Guide .... **A**•1583
Instruments, Graphic Recording Product Selection Guide .... **D**•1401
Instruments, Panel Meters, Product Selection Guide .... **D**•1329
Instruments, Test & Measuring Product Selection Guide .... **D**•1175
Interconnection Systems, Product Selection Guide .... **C**•1699
Keyboards & Keypads, Product Selection Guide .... **B**•1705
Logofinder & Trademark Directories .... **B**•901
Microwave Components, Product Selection Guide .... **A**•1701
Military Qualified Products Lists .... **B**•1003
Motors, Drives, & Rotating Components, Product Selection Guide .... **B**•1129
Opto Semiconductors, Miniglossary .... **B**•1214
Oscilloscopes, Product Selection Guide .... **D**•1385
Panel Hardware, Product Selection Guide .... **C**•1589
Potentiometers, Trimmers, Controls, & Rheostats, Product Selection Guide .... **A**•1991
Power Supplies, Miniglossary .... **D**•1462
Power Supplies, AC, Product Selection Guide .... **D**•1877
Power Supplies, DC, Product Selection Guide .... **D**•1447
Protective Components (Fuses, Circuit Breakers, etc.), Product Selection Guide .... **B**•1225
Relay Contact Forms .... **B**•1317
Relays, Electromechanical, Miniglossary .... **B**•1308
Relays, Product Selection Guide .... **B**•1261
Resistor Color Codes .... **A**•1828
Resistors, Product Selection Guide .... **A**•1785
Servo Components, Miniglossary .... **D**•1985
Solenoids, Product Selection Guide .... **B**•1463
Switches, Product Selection Guide .... **B**•1477
Thermal Components, Product Selection Guide .... **B**•1741
Thermal Conductivity of Dielectrics at Room Temperature .... **B**•1744
Thyristors/High Power Diodes, Miniglossary .... **A**•2076
Transducers & Encoders, Product Selection Guide .... **B**•1777
Transformers, Product Selection Guide .... **A**•2099
Wire & Cable, Product Selection Guide .... **C**•1743
Wire Gauges—Diameter, Area, Copper Weight .... **C**•1844

DC-to-DC Power Converters



Wilmore®
ELECTRONICS CO., INC.

SERIES 1385

SERIES 1385 RACK-MOUNTED DC-to-DC POWER CONVERTERS

- **80% - 90% EFFICIENCIES**
- **INPUT/OUTPUT ISOLATION**
- **LOW OUTPUT RIPPLE**
- **-30°C TO 65°C OPERATING RANGE, CONVECTION COOLED**

The Series 1385 converters provide an isolated, regulated, adjustable dc output from station batteries or other widely fluctuating dc sources to reliably power telecommunications equipment, supervisory control systems, and other sensitive electronic loads. Although capable of providing up to 420 watts of continuous output power, these converters typically require only 5 watts of no-load input power and exhibit correspondingly high light-load efficiencies, making them uniquely suited for applications in which periods of "standby" or light-load service are encountered.

Front-Panel Controls and Indicators

A combination circuit breaker and ON/OFF switch is provided for the input power. A light-emitting diode indicates "DC Output Present." A voltmeter and ammeter display the DC output, and a screwdriver-slotted potentiometer shaft with locking nut is provided to adjust the output voltage level.

Size and Weight

All converters measure 5¼" high by 17" wide by 12" deep and are designed for 19" rack mounting. All units weigh less than 18 pounds.

Standard Options

Series 1385 converters are available with several standard options, including paralleling diodes for redundant applications, under- and over-voltage alarm contact closure, and remote sensing of output voltage. In addition, many other nonstandard input/output voltage combinations are available. Contact our sales department for details.

Model Number	Input Voltage Range (Vdc)	Settable Output Voltage Range (Vdc)	Output Current (Adc)
1385-24-13-15	20-29	12-14	0-15
1385-24-13-30			0-30
1385-24-24-7.5		22-26	0- 7.5
1385-24-24-15			0-15
1385-24-48-4		44-52	0-4
1385-24-48-8			0-8
1385-48-13-15	40-58	12-14	0-15
1385-48-13-30			0-30
1385-48-24-7.5		22-26	0- 7.5
1385-48-24-15			0-15
1385-48-48-4		44-52	0-4
1385-48-48-8			0-8
1385-48-125-1.5		115-135	0- 1.5
1385-48-125-3			0-3
1385-125-13-15	105-140	12-14	0-15
1385-125-13-30			0-30
1385-125-24-7.5		22-26	0- 7.5
1385-125-24-15			0-15
1385-125-48-4		44-52	0-4
1385-125-48-8			0-8
1385-125-125-1.5		115-135	0- 1.5
1385-125-125-3			0-3
1385-250-13-15	210-280	12-14	0-15
1385-250-24-7.5		22-26	0- 7.5
1385-250-48-4		44-52	0-4
1385-250-125-1.5		115-135	0- 1.5

OTHER RACK-MOUNTED DC-to-DC CONVERTERS

In addition to the Series 1385, Wilmore manufactures many other standard and custom, single- and multiple-output rack-mounted DC-to-DC converters, some of which are briefly described below. Each series is isolated, regulated, and highly efficient, and each is designed and manufactured in accordance with Wilmore's traditional emphasis on conservative electrical ratings and long product life.

The **Series 1240** converters are single-output units with standard output voltages of 24, 28, 30, 48 and 125 Vdc and standard input voltages of 48, 125 and 250 Vdc. These rugged converters are available at both 300-watt and 600-watt power levels. They are extensively used to power equipment within public utilities. Request bulletin 4011 for more information.

The **Series 1265** converters provide an adjustable 13 Vdc output at 30 amperes maximum load current, with standard input voltages of 24 Vdc and 48 Vdc. These converters weigh less than 15 pounds and feature an extremely wide ambient operating temperature range of -30°C to 71°C with convection cooling and no derating of output power. The Series 1265 is widely used in the communications industry to power sensitive radio transceivers and auxiliary base station equipment. Request bulletin 5061 for more information.

The **Series 1295** converters are similar to the Series 1265 except that the rated output power is 150 watts and additional output voltages of 24, 28, 36, 48 and 125 Vdc are available. Request bulletin 6061 for more information.

The **Series 1366** converters are modular, rack-mounted dual- or triple-output dc-to-dc converters. The independent outputs have a maximum output power of approximately 100 watts each and can be assembled in essentially any combination of the following standard outputs: 5 Vdc at 20 amperes, 12 Vdc at 6 amperes, and 15 Vdc at 6 amperes. Standard input voltages are 48 Vdc and 125 Vdc. Request bulletin 3051 for more information.

See Our Pages In Section 4050
DC-to-AC INVERTERS
UNINTERRUPTIBLE
POWER SYSTEMS

WILMORE ELECTRONICS CO., INC.

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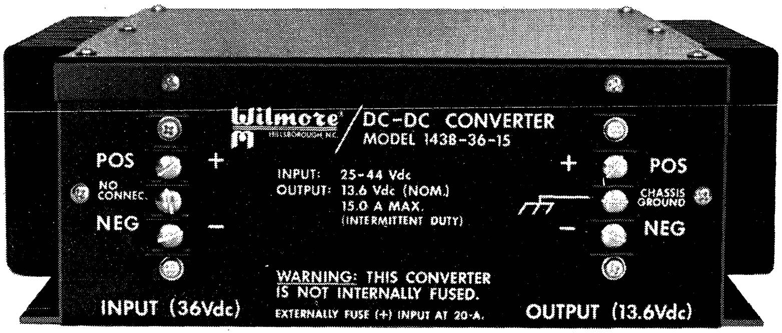
Railroad and Mobile-Radio DC-to-DC Converters



SERIES 1438

Wilmore®
ELECTRONICS CO., INC.

RELIABLE 13 VDC OR 26 VDC FROM VIRTUALLY ANY VEHICLE

- **HIGHLY EFFICIENT OPERATION**
- **-30°C TO 60°C OPERATING RANGE**
- **ELECTRICALLY/MECHANICALLY RUGGED FOR MOBILE APPLICATIONS**

These dc-to-dc converters are designed to power standard mobile communications equipment from vehicular electrical systems with output voltages other than 13-Vdc negative ground. Typical applications include 24, 36, 48, and 72-V lift trucks, positive-ground trucks, 24-V heavy duty construction vehicles, and 36-V and 72-V diesel and electric rail vehicles.

Series 1416 24-volt to 13-volt Converters
With output current ratings of 15, 25 and 35 amperes, the three models within this series provide a regulated 13.5 Vdc from 24-volt vehicular battery systems. Designed to meet military shock and vibration specifications, the Series 1416 converters are lightweight, highly efficient, and extremely rugged.

Series 1360 Mobile-Radio Converters
These rugged unregulated converters include Models 1360 and 1380 (13-Vdc polarity converters), Models 1365 and 1395 (24-Vdc to 13-Vdc converters) and Models 1424 and 1442 (12-Vdc to 24-Vdc converters). They are small, lightweight, and quiet, with typical efficiencies exceeding 85%.

Series 1340 Regulated/Isolated Converters
The Series 1340 can be used with 12, 24, 36, and 48-Vdc vehicular battery systems to provide voltage regulation and electrical isolation for 13-Vdc and 24-Vdc mobile communications equipment.

See Our Pages In Section 4050
DC-to-AC INVERTERS
UNINTERRUPTIBLE
POWER SYSTEMS

Model 1411 Wide Input Range Converter
Designed to power mobile-radio equipment on lift trucks, the Model 1411 has an input voltage range of 20 to 56 Vdc. This extremely wide input range, along with other features including electrical isolation and output voltage regulation, allows the user to specify one model for an entire fleet of lift trucks despite the presence of more than one vehicular battery voltage.

Series 1438 Railroad/LRV Converters
Communications equipment on diesel and electric rail vehicles is subject to an extremely harsh electrical and mechanical environment. The Series 1438 converters are designed to handle the constant mechanical stresses and will operate through input transients of up to 3000 Vdc in amplitude and 90 watt-seconds of energy content. Electrically isolated and well regulated, these converters are available with input voltages of 36 and 72 Vdc, with maximum output load currents of 5, 10 and 15 amperes.

MOBILE-RADIO DC-TO-DC CONVERTERS

Model Number	Input Voltage Range (Vdc)	Nominal Output Voltage[1] (Vdc)	Output Current[2] (Adc)	Isolated/ Polarity-Reversing	Dimensions (h" x w" x d")	Efficiency[3] (Typical)
1416-15	21-32	13.5	0-15	No	3.9 x 9.1 x 10.5	80%
1416-25			0-25			
1416-35			0-35			
1380	10-16	13.0	0-10	Polarity-Reversing	2.5 x 7.3 x 9.8	80%
1360			0-15			
1395	20-32		0-10	No		
1365			0-15			
1442	10-16	26.0	0-10			
1424			0-15			
1340-13-13-6	11-15	13.0	0-6	Isolated	3.9 x 5.5 x 7.1	72%
1340-13-26-3		26.0	0-3			
1340-26-13-6	22-30	13.0	0-6			
1340-26-26-3		26.0	0-3			
1340-36-13-6	30-42	13.0	0-6			
1340-48-13-6	40-56					
1411	20-56	13.0	0-4	Isolated	3.9 x 5.5 x 7.1	74%

RAILROAD/LRV DC-TO-DC CONVERTERS

Model Number	Input Voltage Range (Vdc)	Nominal Output Voltage (Vdc)	Output Current[2] (Adc)	Dimensions (h" x w" x d")	Weight (Pounds)	Input-Transient Withstand Capability	
						Voltage	Energy
1438-36-5	25-44	13.6	0-5	3.7 x 9.0 x 11.8	5.0	3000 Vdc	90 Joules
1438-72-5	58-86						
1438-36-10	25-44		0-10	3.7 x 11.4 x 11.8	5.5		
1438-72-10	58-86						
1438-36-15	25-44		0-15		7.0		
1438-72-15	58-86						

1. Models 1380, 1360, 1395, 1365, 1442, and 1424 provide output voltages directly proportional to input voltage. All other models provide regulated output voltages.
2. All maximum current ratings assume an intermittent demand on a 20% duty cycle except for Models 1340, 1411, and 1438. Models 1340 and 1411 are continuous current ratings, and Model 1438 ratings assume a 25% duty cycle per AAR specifications.
3. These are typical minimum efficiencies from one-half to full load.

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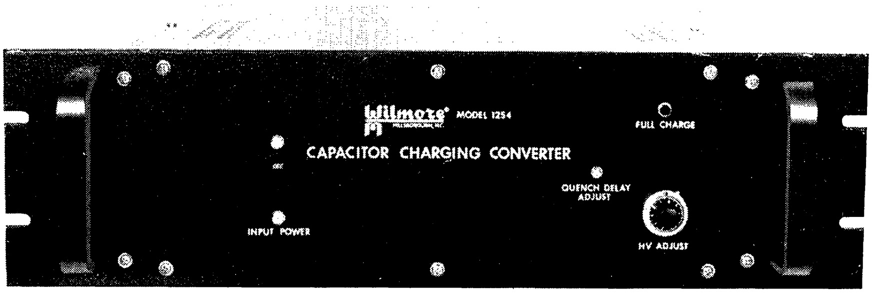
Power Supplies for Pulsed Lasers



Wilmore®
ELECTRONICS CO., INC.

SERIES 1254

ENERGY DELIVERY RATES UP TO 1200 JOULES/SECOND

- **AC- AND DC-INPUT MODELS**
- **± 0.25% OUTPUT VOLTAGE REPEATABILITY**
- **MIL-SPEC UNITS AND CUSTOM PACKAGING AVAILABLE**

Series 1254 capacitor-charging converters utilize a unique constant-power charging technique that allows them to charge any size capacitor at any pulse repetition rate within their energy-delivery-rate capacity. In addition to this series, Wilmore manufactures smaller, lighter and higher efficiency units on a custom-designed basis for industrial, military, and aerospace applications.

Model Number	Input Voltage	Energy Delivery Rate (Joules/sec*)	Maximum Output Voltage (Vdc)	Efficiency (Typical)	Dimensions (h"xw"xd")	Approximate Weight (Pounds)
1254-28-150	20 Vdc-32 Vdc (28 Vdc nominal)	150	User Specified - up to + 2500 Vdc (some units are available with negative output voltages) *Note: Energy delivery rates are maximum rates specified at the maximum output voltage. At one-half maximum voltage, the energy delivery rate will be reduced to approximately 70-75% of its maximum.	75%	5¼ x 19 x 17	12
1254-28-300		300			5¼ x 19 x 17	14
1254-28-450		450			5¼ x 19 x 21	20
1254-28-600		600			5¼ x 19 x 21	23
1254-115-300	115 Vac 50/60 Hz Single Phase (400 Hz optional)	300		85%	5¼ x 19 x 17	12
1254-115-600		600			5¼ x 19 x 21	20
1254-120/208-600	120/208 Vac 50/60 Hz Three Phase Wye (400 Hz optional)	600			5¼ x 19 x 17	20
1254-120/208-1200		1200			5¼ x 19 x 21	35

Custom-designed/OEM Power Supplies

FULLY INTEGRATED ELECTRICAL, MECHANICAL, AND THERMAL DESIGNS

- **INDUSTRIAL, MILITARY, AND AEROSPACE**
- **FAST TURNAROUND ON PROTOTYPES**
- **QUANTITY PRODUCTION CAPABILITY**
- **AC-to-AC, AC-to-DC, DC-to-AC, DC-to-DC DESIGNS**

Because user's needs tend to be highly individualized, a substantial portion of Wilmore's production involves custom-designed power conversion equipment rather than standard products. Our engineering charges for custom units are modest, and our urnaround times are exceedingly short. OEM's and system designers can cut costs without compromising quality with a custom power converter that is integrated in numerous ways to the overall electrical, mechanical, and thermal planning of a product.

Wilmore's involvements in designing and manufacturing custom power supplies in production quantities include a myriad of products, each with its own set of special electrical, mechanical, and thermal concerns. The following example categories are cited to illustrate the considerable range of Wilmore's custom engineering and production capabilities.

Sub-Modular and Encapsulated Supplies for PC-Board Mounting.
Wilmore is currently manufacturing ac-input and dc-input power supplies with single and multiple outputs that are designed to be mounted directly to printed circuit boards by plug-in sockets or direct soldering. These power supplies feature compact size and very wide operating temperature ranges with no output-power derating.

PC-Card Multiple-Output Switching Power Supplies
Designed to provide multiple dc outputs in a compact mounting configuration, these units operate from dc or ac power sources to power microprocessor-based equipment in utility-station environments. They can deliver up to 40 watts of power in a single pc-card, edge-connector configuration.

High-Efficiency DC-to-DC Converters
Wilmore specializes in the custom design of truly state-of-the-art dc-to-dc converters for military, aerospace, or particularly demanding industrial applications. We manufacture single- and multiple-output units in the power range from milliwatts to a kilowatt, with emphasis on reliability, efficiency, and cost-effectiveness.

Open-Frame and Enclosed Switching Power Supplies
Many power supply manufacturers have recently jumped on the "switcher" bandwagon, but Wilmore has been designing and manufacturing switching power supplies for more than 15 years. Virtually every power supply that we have designed and manufactured is a transistor-switching power supply. If you have some challenging requirements regarding efficiency, size, weight, reliability, or other performance criteria, our engineers would like to hear from you.

See Our Pages In Section 4050
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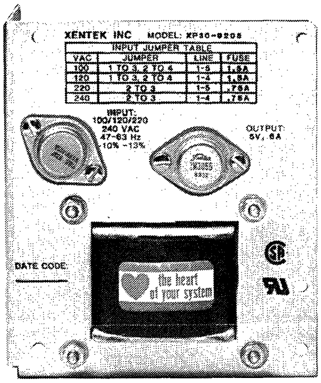
Xentek

Power Supplies

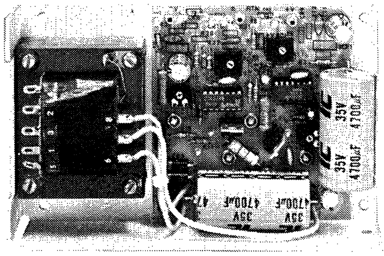
International Series

- Single, dual, triple outputs to 120 watts
- 100, 120, 220, 240 VAC + 10-13% 47-440 Hz input
- ±0.1% load and line regulation
- 5MV ripple on 5V, 12V, 15V; 50MV on 24V
- 0-50°C operation, derate 2% per °C to 70°C
- O.V.P. standard on all 5V outputs
- U.L. recognized and CSA certified
- Designed to meet safety standards of VDE, IEC, CEE, ECMA and BPO


XENTEK INC MODEL: XP30-9205
INPUT JUMPER TABLE
INPUT: 100/120/220 240 VAC 47-63 Hz 10% -13%
OUTPUT: 5V, 6A
DATE CODE
the heart of your system

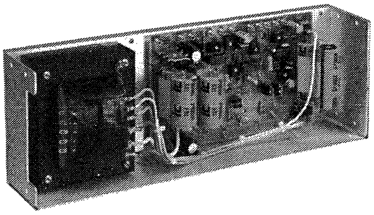
Single Output

Model	Output	L × W × H (in.)	Price (1-9)
XP15-9005	5V* 3A	4.87 × 4 × 2.30	$ 32.95
XP15-9012	12V 1.7A	4.87 × 4 × 2.30	32.95
XP15-9015	15V 1.5A	4.87 × 4 × 2.30	32.95
XP15-9024	24V 1.2A	4.87 × 4 × 2.30	32.95
XP20-9105	5V* 4A	4.87 × 4 × 2.68	43.95
XP20-9112	12V 2.4A	4.87 × 4 × 2.68	43.95
XP20-9115	15V 2.1A	4.87 × 4 × 2.68	43.95
XP20-9124	24V 1.4A	4.87 × 4 × 2.68	43.95
XP30-9205	5V* 6A	5.62 × 4.87 × 3	54.95
XP30-9212	12V 3.4A	5.62 × 4.87 × 3	49.95
XP30-9215	15V 3A	5.62 × 4.87 × 3	49.95
XP30-9224	24V 2.4A	5.62 × 4.87 × 3	49.95
XP45-9305	5V* 9A	7 × 4.87 × 3.3	$ 74.95
XP45-9312	12V 5.1A	7 × 4.87 × 3.3	69.95
XP45-9315	15V 4.5A	7 × 4.87 × 3.3	69.95
XP45-9324	24V 3.6A	7 × 4.87 × 3.3	69.95
XP60-9405	5V* 12A	9 × 4.87 × 3.3	84.95
XP60-9412	12V 6.8A	9 × 4.87 × 3.3	79.95
XP60-9415	15V 6A	9 × 4.87 × 3.3	79.95
XP60-9424	24V 4.8A	9 × 4.87 × 3.3	79.95
XP90-9505	5V* 18A	14 × 4.87 × 3.45	119.95
XP90-9512	12V 10.2A	14 × 4.87 × 3.45	109.95
XP90-9515	15V 9A	14 × 4.87 × 3.45	109.95
XP90-9524	24V 7.2A	14 × 4.87 × 3.45	109.95



Dual Outputs

Model	Output #1	Output #2	L × W × H (in.)	Price (1-9)
XPD20-9601	±12/15V, 1.0/.8A Each		6.5 × 4 × 2.25	$ 42.95
XPD20-9605	5V, 2A*	.9 to 15V, .5A	6.5 × 4 × 2.3	49.95
XPD30-9602	±12/15V, 1.7/1.5A Each		7 × 4.87 × 3	54.95
XPD30-9606	5V, 3A*	9 to 15V, 1.25A	7 × 4.87 × 3	59.95
XPD60-9603	±12/15V, 3.4/3A Each		9.38 × 4.87 × 3.35	87.95
XPD60-9607	5V, 6A*	9 to 15V, 2.5A	9.38 × 4.87 × 3.35	94.95
XPD120-9604	±12/15V, 5A Each		14 × 4.87 × 3.45	129.95



Triple Outputs

Model	Output #1	Output #2	Output #3	L × W × H (in.)	Price (1-9)
XPT20-9701	5V, 2A*	+9 to 15V, 0.4A	−9 to 15V, .4A	6.5 × 4 × 2.3	$ 54.95
XPT40-9702	5V, 3A*	±12/15V, 1.0/0.8A Each		10.25 × 4 × 3.05	75.95
XPT60-9703	5V, 6A*	+12 to 15V, 1A	−12 to 15V, 1A	9 × 4.87 × 3.3	89.95
XPT75-9704	5V, 6A*	±12/15V, 1.7/1.5A Each		11 × 4.87 × 3.3	99.95
XPT90-9705	5V, 8A*	±12/15V, 1.7/1.5A Each		11 × 4.87 × 3.5	119.95
XPT120-9706	5V, 12A*	±12/15V, 1.7/1.5A Each		14.25 × 4.87 × 3.45	134.95

*Includes OVP standard

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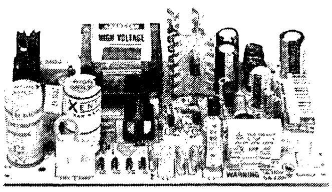
Power Supplies

Xentek

XSW Series—Switching power supplies

- Dual, triple, quad outputs from 40-150 watts
- 90-130/180-260 VAC inputs 50/60 Hz
- Over voltage and short circuit protected
- 0-50°C non-derated operation
- Comply with FCC Part 15 Subpart, Class B
- Meet UL and CSA safety requirements

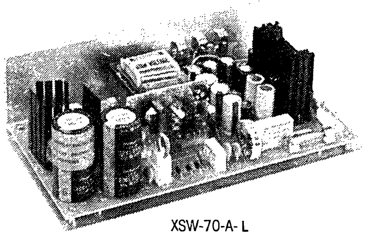
The heart of your system

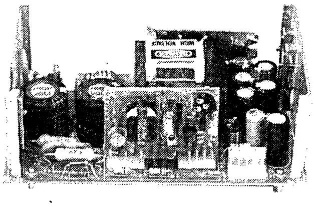

XSW-40-512

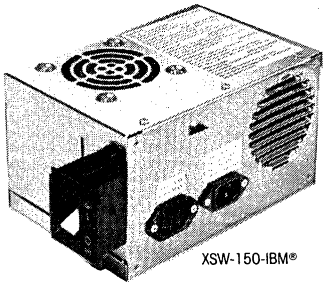
Model	Output #1			Output #2			Output #3			Output #4			L x W x H in.	Price (1-9)
XSW40-512-X X = E, C	5V		2.5A	+12V		2A	−12V		0.1A				6.3 × 3.9 × 2	$ 59.00 (−C)
		I_{MIN}	I_{MAX}		I_{MIN}	I_{MAX}		I_{MIN}	I_{MAX}		I_{MIN}	I_{MAX}		
XSW70- A-X	5V	2A	6A	12V	0.5A	2.5A	−5V*	0A	.6A	−12V*	0A	.6A	8.25 × 4.3 × 2.5	85.00
X = E, L, B	5V	2A	6A	24V	0.3A	1.25A	+12V*	0A	.6A	−12V*	0A	.6A		(−C)
C C	5V	2A	6A	12V	0.5A	2.5A	+24V*	0A	.6A	−12V*	0A	.6A		
D	5V	2A	6A	12V	0.3A	2A	+12V*	0A	1.5A	−12V*	0A	.6A		
E-C	5V	1A	5A	12V	0.5A	2A	+12V	0.5A	1.5A	−12V	0A	.25A	7.75 × 4.25 × 2.25	
XSW74- F-C	5V	2A	7A	12V	0.3A	1.5A	+12V	0A	1.5A	−12V	0A	.25A	8.5 × 4.5 × 2.5	
XSW75-512 Card only	+5V		5A	12V	6A	4.5A Surge							6 × 3.5 × 2	79.00 (−C)
XSW150-A-X	5V	2A	15A	+12V	1A	5A	−12V*	0A	.7A	−5V*	0A	.7A	10.5 × 5 × 2.5	149.00
X = E, L B	5V	2A	15A	+12V	0.4A	4A	−12V*	0A	.7A	+24V	1A	4A		(−L)
C	5V	2A	15A	+12V	0.8A	4A	−12V*	0A	.7A	+12V*	0.5A	1.5A		
D	5V	2A	15A	+12V	1A	3A	−12V	0.5A	2A	−5V*	0A	.7A		
XSW150-IBM® Enclosed only	5V		15A	12V 9A surge		4.5A	−5V		0.5A	−12V		0.5A	9.5 × 5.9 × 5.75	159.00

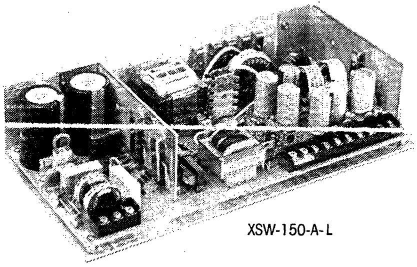
*Output with linear post regulator

X = Enclosed
X = Card
X = L Bracket


XSW-70-A- L


XSW-75-512


XSW-150-IBM®


XSW-150-A- L

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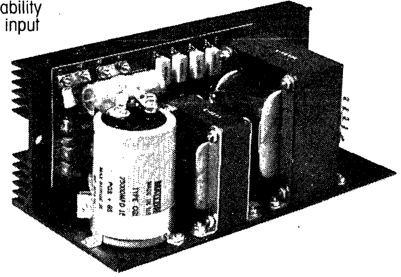
Xentek Power Supplies

XE Series—Premium grade single output

- Nine models from 15-375W
- 0-55°C operation without derating
- ±0.1% load and line regulation
- ±0.1% ripple and stability
- 115/230V 50/60 Hz input
- large aluminum heat sinks on XE30 and larger
- shielded transformer and remote sensing standard

Options: built-in, adjustable OVP; high performance (0.01% regulation, ripple and stability); multiple or wide range inputs.



The heart of your system

Standard features for all Xentek supplies on this page: computer grade components ■ cermet adjustment pots ■ varnish impregnated transformers with 180°C magnet wire ■ 15-turn voltage adjustment pots ■ metal sealed or ceramic ICs with 168 hour burn-in ■ foldback current limiting ■ short circuit and reverse voltage protection ■ black anodized all aluminum chassis ■ 100% inspection

Output Current (amps at nominal voltage)

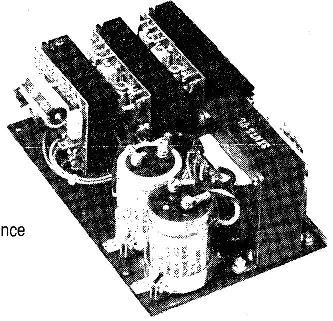
DASH NO.	-3	-5	-7	-9	-12	-15	-18	-24	-28				Price
MODEL/VDC	2-4	5-6	7'8	9-10	11-13	14-16	17-19	20-25	26-33	L×W×H (in.)			(1-9)
XE 15	3	3	2.4	2	1.7	1.5	1.2	1.0	.6	4.50	4.00	2.75	$ 40
XE 20	4	4	3	2.9	2.4	2.1	1.8	1.2	.9	4.50	4.00	3.06	47
XE 30	6	6	4.8	4.6	4	3.3	2.6	2	1.7	5.75	4.38	3.50	69
XE 60	12	12	9.6	9.2	8	6.6	5.2	4	3.4	6.25	5.25	4.88	99
XE 90	18	18	12.9	12	10.2	8.4	7.4	5	4.2	8.50	5.50	4.88	125
XE 120	25	25	17.3	14	12.1	10.3	8.7	6.5	5.6	12.00	5.62	4.88	159
XE 180	36	36	25.5	21	18.1	14.7	12.5	9.3	8	9.62	8.50	4.88	199
XE 240	50	50	34.6	28	24.2	20.6	17.4	13	11.2	11.94	9.25	4.88	249
XE 375	75	75	52	42	36	31	26	19.5	16.8	14.75	12.00	4.88	399

OVP option $8 (1-9) on most outputs under 90W.

XM Series—Premium grade multiple output

- Dual, triple and quadruple outputs to 180W
- 16 standard models listed here, plus:
- Thousands of tailored combinations—send for complete catalog
- 0-55°C operation without derating (0-40°C on XM20, XM25)
- ±0.1% regulation, ripple, stability
- 115/230V inputs, shielded transformer, remote sensing all standard

Options: built-in adjustable OVP; high performance output; multiple or wide range inputs; dual tracking on XM15 or XM20.



Standard Models

Model	Output #1	Output #2	Output #3	L×W×H (in.)			Price (1-9)
XM-15-12/15	±12/15V, 0.8/0.75A each			4.50	4.00	2.75	$ 59
XM15-510	±5V, 1.5A	−9-12V, 10.0-0.8A		4.50	4.00	2.75	59
XM20-12/15	±12/15V, 1.0/0.9A each			4.50	4.00	3.06	65
XM20-510	+5V, 2A	−9-12V, 1.3-1.0A					65
XM25-510/512	5V, 4A	12/15V, 1.0/0.8A		6.50	4.38	2.38	76
3XM75S	5V, 4A	±12V, 4A each		10.50	6.25	3.62	189
3XM120-12/15	5V, 12A*	±12/15V, 4/3.3A each		12.00	7.00	4.88	239
3XM140-12/15	5V, 20A*	±12/15V, 2.4/2.1A each		14.62	5.75	5.00	284
3XM180-12/15	5V, 25A*	±12/15V, 4/3.3A each		15.00	7.00	5.38	289
4XM180S	5V, 25A*	±12V, 2.4A each; #4: 5V, 3A		12.00	8.50	4.88	299

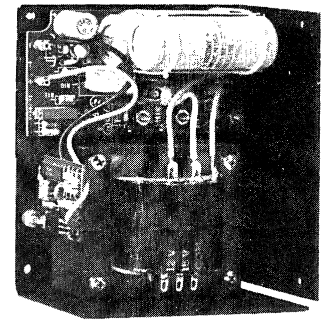
*Includes OVP standard

Note: Select 12V (-12) or 15V (-15) operation on models marked -12/15.

XP Series—Ideal choice for OEM, systems. Single outputs to 90W.

- Any output voltage from 2-32Vdc (2-250V on XP20, XP30)
- ±0.1% load and line regulation
- ±0.1% ripple and stability
- 0-40°C operation, derate 2%/°C to 71°C
- 115V 50/60Hz input

Options: Adjustable OVP; XPX, XS versions with 115/230V input; remote sensing; multiple and wide range inputs; shielded transformer



Output Current (amps at nominal voltage)

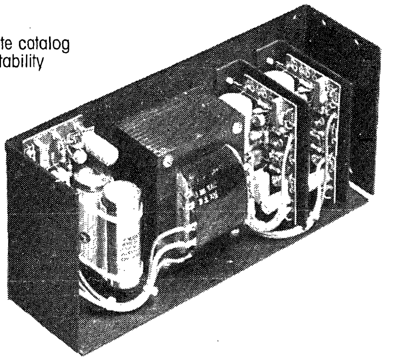
Dash No.	-3	-5	-9	-12	-24	-28	L×W×H (in.)			Price
Model/VDC	2-4	5-6	7-10	11-16	17-24	25-32				(1-9)
XP15	3	3	2	1.8	1.0	.6	4.87	4.00	1.97	$ 39.50
XP20	4	4	2.9	2.4	1.2	.9	4.87	4.00	2.28	46.00
XP30	6	6	4	3	2.3	1.2	5.62	4.88	2.95	59.00
XP45	9	9	6.1	4.8	3.6	1.8	7.00	4.88	3.38	81.00
XP60	12	12	8.2	6.5	5	2.6	9.00	4.88	3.38	94.00
XP90	18	18	12	10	6.7	6.0	14.00	4.88	3.38	129.00
XS40	5	5	3.8	3.5	2	1.6	5.62	4.88	3.00	69.00

	High voltage versions				
VDC	48	75-100	120-180	200-250	Price (1-9)
XP20HV	.6A	.3A	.15A	.1A	$59
XP30HV	1.2A	.6A	.3A	.2A	85

2X, 3X, XPD, XPT Series—Multiple outputs for OEM, systems

- Dual and triple outputs to 120W
- Thousands for tailored combinations—send for complete catalog
- ±0.1% regulation, ripple and stability
- 115V 50/60 Hz input
- 0-40°C without derating
- Packages to replace existing supplies

Options: adjustable OVPs, 115/230V inputs; remote sensing; multiple and wide range inputs, shielded transformer



Standard Models

Model	Output #1	Output #2	Output #3	L×W×H (in.)			Price (1-9)
XPD30-12	±12-15V, 1.8-1.5A each			7.87	4.00	2.70	$ 69.00
XPD30-512	5V, 3A	12-15V, 1.8-1.5A		7.87	4.00	2.70	69.00
2X45S	5V, 6A	12-15V, 1.8-1.5A		8.00	4.88	3.25	99.00
XPD60-12	±12-15V, 3A each			9.38	4.88	3.25	104.00
XPD60-512	5V, 6A	12-15V, 3A		9.38	4.88	3.25	104.00
XPD120S	±12-15V, 6.6-6.0A each			15.00	4.88	4.06	164.00
3X30S	5V, 3A	±12-15V, 0.8-0.75A each		9.50	4.25	2.62	89.00
3X45S	5V, 3A	±12-15V, 1.8-1.5A each		9.00	4.12	3.25	99.00
3X50S	5V, 6A	±12-15V, 0.8-0.75A each		9.25	4.88	3.25	105.00
3X55S	5V, 6A	12-15V, 1.8-1.5V	12-15V, 0.8-0.75A	10.00	4.88	3.25	109.00
XPT60S	5V, 6A	±12-15V, 1.8-1.5A each		11.00	4.88	3.38	109.00
XPT75S	5V, 9A	±12-15V, 1.8-1.5A each		11.00	4.88	3.70	129.00
XPT90S	5V, 12A	±12-15V, 1.8-1.5A each		14.25	4.88	3.38	139.00
XPT120S	5V, 12A	±12-15V, 3A each		15.00	4.88	4.06	165.00

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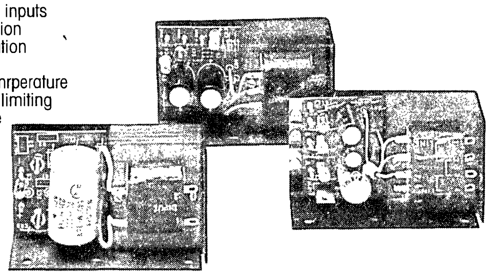
Power Supplies Isolation Transformers

Xentek

XI Series—Fixed output, **IC** regulated

- Single, dual, triple outputs to 30W
- Fixed voltage outputs within 5% of nominal
- 105-125V, 50/60Hz inputs
- ±0.5% load regulation
- ±0.25% line regulation
- 0.1% ripple
- 0-40°C operating temrperature
- Thermal and current limiting

Options: Output voltage adjustment (X17 and XDI14, std on XTI30); OVP; shielded transformer



X17 Single Output

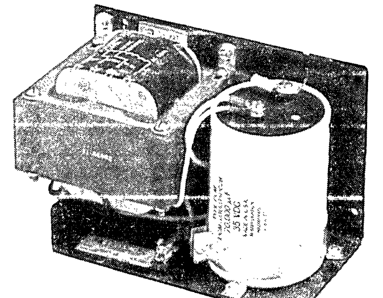
VDC	5	6	8	12	15	18	24	L×W×H (in.)			Price (1-9)
A	1.2	1.1	1.0	.8	.7	.5	.3	4.0	2.38	1.69	$24.95

Model	Output #1	Output #2	Output #3	L×W×H (in.)			Price (1-9)
XDI8-5	±5V, 0.5A each			4.00	2.38	1.69	$34.95
XDI8-12/15	±12/15V, 0.4/0.34A each			4.00	2.38	1.69	34.95
XDI9-5	+5V, 1.2A	−5V, 0.1A		4.00	2.38	1.69	37.00
XDI9-12/15	+12/15V, 0.8/0.7A	−12/15V, 0.1A		4.00	2.38	1.69	37.00
XDI9-512	+5V, 1.2A	−12V, 0.1A		4.00	2.38	1.69	37.00
XDI14-12/15	+12/15V, 0.8/0.7A each			4.87	4.00	1.97	39.95
XDI14-512	5V, 1.2 A	12V, 0.8A		4.87	4.00	1.97	39.95
XDI20-5	+5V, 2A	−5V, 1.0A		4.87	4.00	1.97	54.95
XDI20-12/15	+12/15V, 1.2/1.0A	−12/15A, 0.6/0.5A		4.87	4.00	1.97	54.95
XTI5-12/15	+5V, 0.5A	±12/15V, 0.125/0.1A each		3.50	2.20	1.60	39.95
XTI8-12/15	+5V, 0.75A	±12/15V, 0.2/0.15A each		4.00	2.38	1.69	42.95
XTI15-12/15	+5V, 1.2A	±12/15V, 0.25/2A each		4.87	4.00	1.97	49.95
XTI20-12/15	+5V, 2A	±12/15V, 0.4/35A each		4.87	4.00	1.97	54.95
XTI30-12/15	+5V, 3A	±12/15V, 0.4/35A each		7.00	4.50	3.00	74.95

XU Series—Unregulated dc to 500W

- Three input taps for ±10% voltage adjustment
- 3% rms max ripple at full load
- 0-50° C operating temperature
- Ideal for on-board regulator applications

Optional models: S-100 bus and ferroresonant versions available



Output Current (amps at nominal voltage)

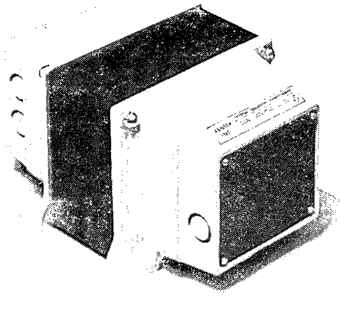
Dash No (VDC) Model	−7	−12	−16	−20	−24*	−48*	−120*	−250	L×W×H (in.)			Price (1-9)
15XU	1.8	1.2	.9	.75	.6	.3	.12	.05	4.62	2.62	2.09	$ 28.50
30XU	3	2.4	1.8	1.5	1.2	.6	.25	.1	5.88	3.19	2.62	36.00
60XU	6	4.8	3.6	3	2.4	1.2	.5	.2	6.25	3.69	3.00	57.00
100XU	10	7	7	5	3.5	1.8			7.12	4.00	3.25	65.00
200XU	20	15	12.5	10	7.5	4			8.10	5.00	3.88	89.00
500XU					20	10			9.00	5.62	4.62	149.00

*consult factory for pricing

EIT Series—Extreme Isolation Transformers

- Greatly attenuates unwanted power line noise
- Less than 0.1 femtofarad effective interwinding capacitance (-3 models)
- 115/230V strapping on input and output, 50/60 Hz. (1 KVA & up)
- ±3% load regulation

Options: multiple input voltages; line cord and duplex receptacle; three phase operation



Selection Guide

Model No.	Rating (KVA)	Input Voltage (V AC)	Output Voltage (V AC)	Output Current AMPS	Effective Interwinding Capacitance (Pico Farads)	Common Mode Rejection	Price (1-9)
EIT5203	.25	115	115	2.17A	.005	130db	$175.00
EIT5204	.50	115	115	4.34A	.005	130db	205.00
EIT5205	.75	115	115	6.52A	.005	130db	235.00
EIT1.0-20	1	115/230	115/230	9/4.5A	.001	140db	299.00
EIT1.0-30	1	115/230	115/230	9/4.5A	.0001	160db	367.00
EIT2.5-20	2.5	115/230	115/230	20/10A	.001	140db	417.00
EIT2.5-30	2.5	115/230	115/230	20/10A	.0001	160db	538.00
EIT5.0-20	115/230	115/230	115/230	39/19.5A	.001	140db	612.00
EIT5.0-30	115/230	115/230	115/230	39/19.5A	.0001	160db	732.00

Dimensions & Weights

Dimensions (Inches/mm) Model No.	Size H	W	L	Mounting WM	WM	Weight (Lbs.)
EIT5203	5.6	4.4	5.44	3.5	2.75	12
EIT5204	5.6	4.4	6.19	3.5	3.50	17
EIT5205	5.6	4.4	7.44	3.5	4.75	23
EIT1.0	6.5/165	8.5/216	9.75/248	7.25/184	3.50/89	38
EIT2.5	6.5/165	8.5/216	11.5/292	7.25/184	5.25/133	57
EIT5.0	6.5/165	8.5/216	14.5/368	7.25/184	8.25/210	92

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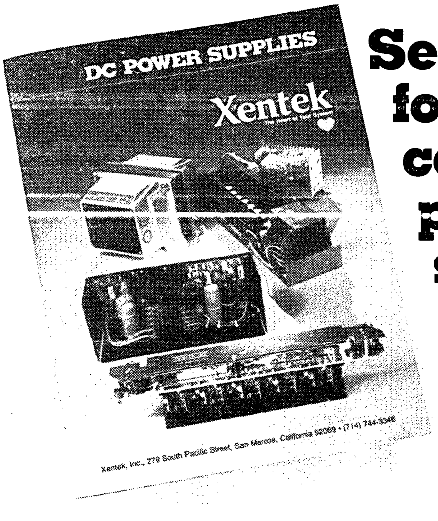

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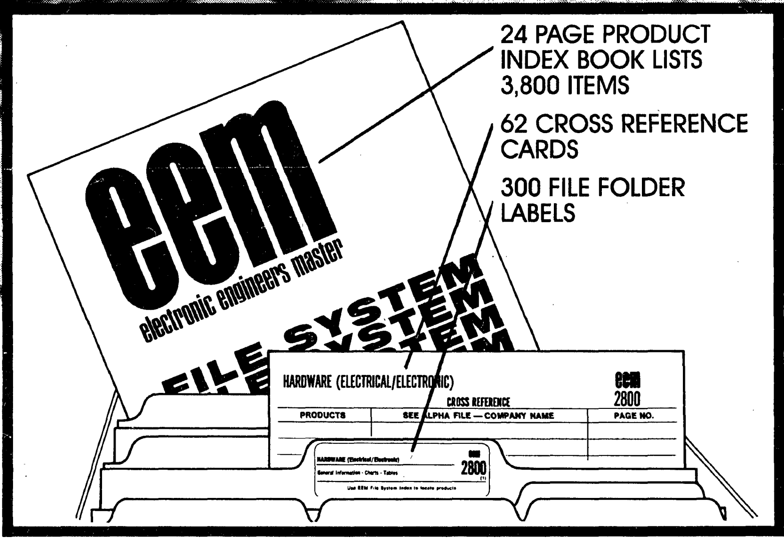
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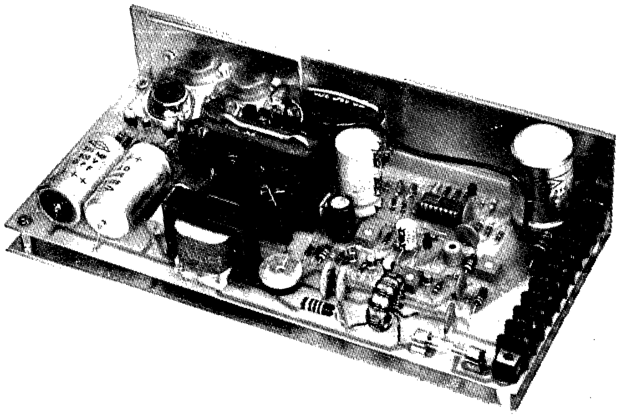

SPECIFICATIONS

- Input: 90-132/180-264 VAC 47-63 Hz
- Holdup Time: 16 msec min.
- Ripple and Noise: 2% pk-pk max.
  40 mV RMS max.
- Temperature Range: 0 to 70°C
- Regulation: 1%
- Current Limiting: 110-125% of Rated Current
- EMI Filtering

SINGLE OUTPUT

Model	SO 100	SO 175	SO 300
DC Volts/Watts	100W	175W	300W
5	20A	35A	60A
12	8.3A	14.5A	25A
15	6.8A	11.8A	20A
24	4.5A	7.9A	12.5A

MULTIPLE OUTPUT

Model	Case	1st Output	2nd Output	3rd Output	4th Output
MO 100	B	5V @ 10A	+12V @ 2A	—12V @ 1A	−5V @ 1A
MO 175	C	5V @ 20A	+12V @ 3A	−12V @ 2A	−5V @ 1A

DIMENSIONS

Case	H	L	W
A	2.5	8.5	5
B	2.5	10.5	5
C	3.0	15.0	5

All dimensions in inches.

OPTIONS

- Output Status LED Indicators
- Over Voltage Protection
- Enable/Inhibit Function
- Covers
- User Tailored Output Voltage
- Remote Sensing

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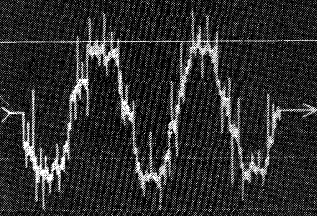

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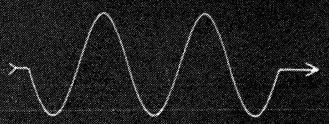

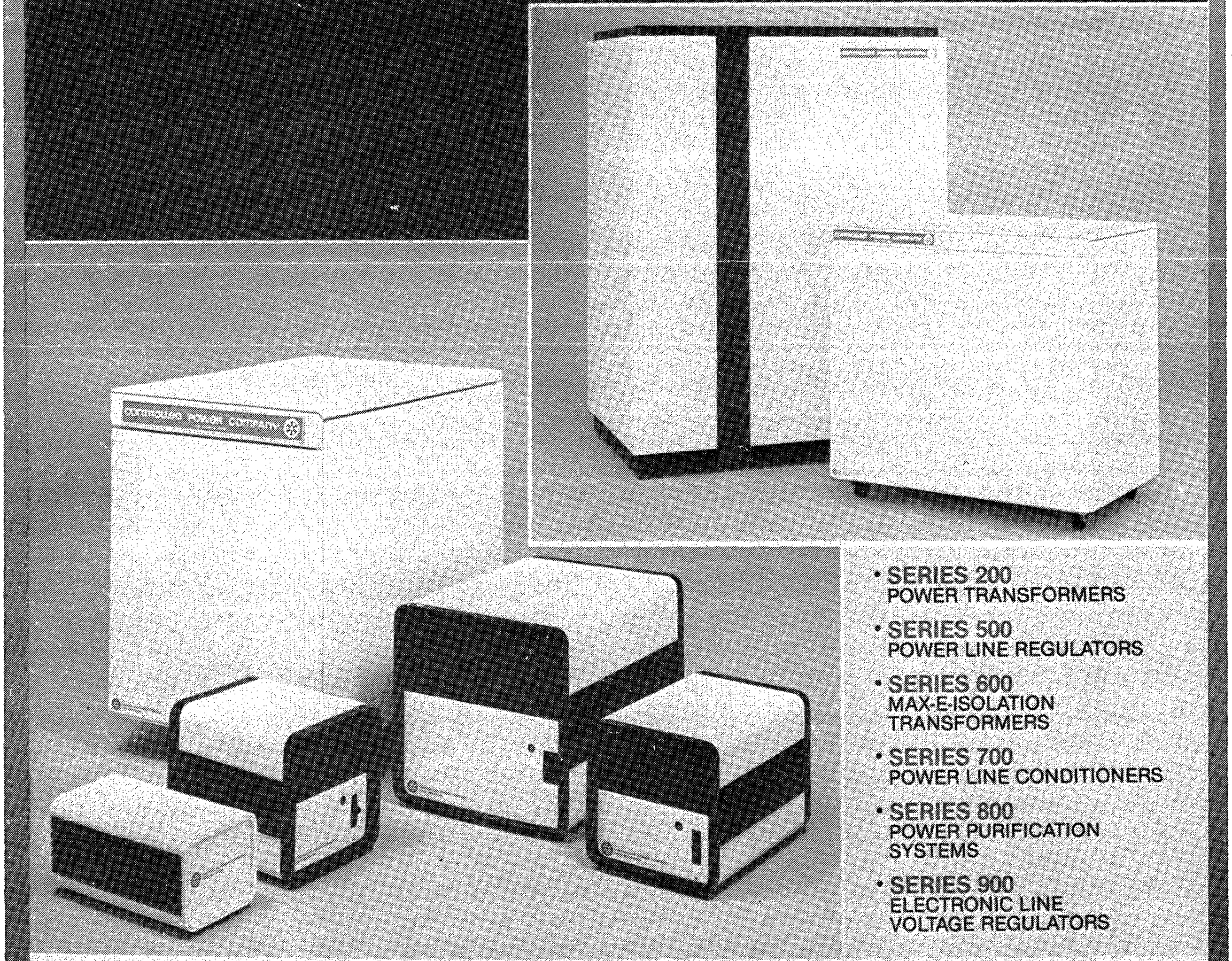

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LINE REGULATORS/CONDITIONERS

Manufacturer	EEM Page No.	Model/ Series	Power Rating	Output Frequency (Hz)	Phase			Under/ Over Voltage Protection	Surge Protection
					Single	Two	Three		
Behlman Engineering	D•1898	LCL	100 VA - 54 KVA		●		●	●	●
	D•1898	LCH	100 VA - 54 KVA		●		●	●	●
	D•1900	STD	0 - 130 VAC	45 Hz - 10 KHz	●	●	●	●	●
	D•1904	UPS	100 VA - 20 KVA		●		●	●	●
Controlled Power	D•1911	500	120/240	60	●		●	●	
	D•1913	700	120/240	60	●		●		
	D•1914	800	120/240	60	●		●	●	
	D•1915	900	25 KVA to 150 KVA	60	○		○	○	
Displex	D•1917	LC	105-125 VAC	50, 60	●			●	●
Elgar	D•1920	6000/ 3000/ 5000	115/220/240	47 - 63				●	
		RLC	120		●			●	
Hipotronics	D•1934	Peschel		50, 60	●		●	●	
Hitran	D•1937	SFR	120/240/480	60	●		●	●	●
Pulizzi Engineering	D•1956	PC874	90 - 270 VAC	47 - 63	●			●	●
	D•1956	PC115	90 - 270 VAC	47 - 63	●			●	●
	D•1957	PC230	90 - 270 VAC	47 - 63	●				
	D•1957	PC881	120/208 VAC	47 - 63	●				
	D•1957	TPC115	180/270, 90/132 VAC	47 - 63	●				
RTE Deltec	D•1959		150 VA - 60 KVA	50, 60	●		●	●	
SL Waber	D•1963							●	
Shape Magnetronics	D•1960	CLT	70 - 250 KVA	60	●			●	●
	D•1961	ZLT	7.5 - 75 KVA	50, 60	●		●	●	●
Sola	D•1964- D•1967	UPS	120/220/240	50, 60	●			●	●
Superior Electric	D•1968	Stabiline	120/240	60	●			●	●
Triad-Utrad	D•1970		120/240	50, 60	●		●	●	

eem selection guide power supplies, ac-4050

UPS SYSTEMS

Manufacturer	EEM Page No.	Model/ Series	Output Range (VA)	Output Frequency (Hz)	Phase		
					Single	Two	Three
Abacus Controls	D•1882		1 - 30 KVA	50, 60, 400	●		●
Advance Conversion Devices	D•1886	UPS	36 - 1500	60	●		●
ATR Electronics	D•1889	UPS	0 - 1000				
Behlman Engineering	D•1904	UPS	0.1 - 20 KVA	50, 60	●		●
	D•1904	UPS	100 VA - 20 KVA	60	●		●
Displex	D•1917	SU	1 - 2.5 KVA	50, 60	●		
Elgar	D•1918	UPS	0.5 - 45 KVA	50, 60	●		●
Energy Ltd.	D•1923	BA	100 - 1800	50, 60	●		
General Power Systems	D•1929	On-Line	500 - 35 KVA	50, 60	●		●
	D•1929	Standby	100 - 2000	50, 60	●		
Hitran	D•1936	UPS	1 - 45 KVA	50, 60	●		●
ICS/Electro-Pac	D•1933	M95	200 - 2 KVA	60	●		
	D•1933	UP	3 KVA - 20 KVA		●		
Nova Electric	D•1946	Taurus	125 VA - 37.5 KVA	50, 60	●		●
Pacific Power Source	D•1949	G/UG	2 - 90 KVA	50, 60, 400	●		●
RTE Deltec	D•1959	UPS	500 VA - 50 KVA	50, 60	●		●
Sola	D•1964		400 - 700	50, 60	●		
Triad-Utrad	D•1971	KU	95 - 130	60	●		
UPSystems	D•1973	UPS	2.5 - 150 KVA		●		●
Wilmore Electronics	D•1975	1406/09	50 - 1000	50, 60	●		
Xylog	D•1976	MPS/SSG	800 - 1500	60	●		

FREQUENCY CONVERTERS

Abacus Controls	D•1880		0.5 - 30 KVA	50, 60, 400	●		●
Advance Conversion Devices	D•1887		36 - 5000	400, 60 - 400	●		●
Avionic Instruments	D•1890- D•1893*	4A1000-3000	1000, 2000, 3000	50, 60	●		
Avtel/Unitron	D•1896*		0.4 - 120 KVA	50, 60, 400	●		●
Behlman Engineering	D•1900	STD	100 VA - 27 KVA	45 KHz - 10 KHz	●	●	●
California Instruments	D•1907		100 VA - 36 KVA	20 Hz - 20 KHz	●		●
CML Macarr	D•1909	ST	500 - 4000	50, 60, 400	●		
	D•1909	TT	750 - 12,000	50, 60, 400			●
	D•1908	NAS	500 - 1000	45 Hz - 10 KHz	●		
	D•1908	TAS	500 - 3000	45 Hz - 10 KHz			●
Diego Power	D•1916	2021	1 KVA, 2 KVA	47 - 500	●		
	D•1916	3023	3 KVA	47 - 500			●
	D•1916	6023	6 KVA	50, 60, 400			●
Displex	D•1917	FC	1 KVA	50, 60, 400	●		
Elgar	D•1921		120 - 6000	45 - 5000	●	●	●
John Franek	D•1924- D•1926		12 - 72 KVA	50, 60, 400 (47 - 500 Variable)	●		●
Georator	D•1930		0.15 KVA - 25 KVA	50, 60, 400, plus specials	●		●
Industrial Test/Powertron	D•1939		80 VA - 12 KVA	45 Hz - 10 KHz	●	●	●
KGS Electronics	D•1943	SPC	150, 1000, 2250, 500	400	●		●
Nova Electric	D•1946	Nova	125 VA - 37.5 KVA	50, 60, 400	●		●
Pacific Power Source	D•1949*		250 VA - 300 KVA	50, 60, 400	●		●
Powermark	D•1955		200 VA - 10 KVA	50, 60, 400	●		

STATIC INVERTERS

Abacus Controls	D•1881		0.5 - 30 KVA	50, 60, 400	●		●
Abbott Transistor	D•1884		5 - 240	50, 60, 400, 800	●		
Advance Conversion Devices	D•1886*		36 VA - 50 KVA	60	●		●
Astrosystems	D•1888	AS100-T	6.5				●
ATR Electronics	D•1889		50 - 5000	50, 60	●		
Avionic Instruments	D•1890- D•1893*		50 VA - 9.5 KVA	50, 60, 400	●		●
ICS/Electro-Pac	D•1933	UP	3 KVA - 20 KVA		●		
KGS Electronics	D•1942	SPS	200 - 1000	50, 60	●		
	D•1943	SPC	50 - 750	400	●		
Ocean Marine	D•1947		115, 230, 115/230 VAC	50, 60, 400	●		
Powermark	D•1955	Z	200 VA - 2 KVA	50, 60	●		
	D•1955	X	2 KVA - 10 KVA	400	●		
Wilmore Electronics	D•1974		45 - 500	50, 60	●		

* Mil. Spec.

EEM PRODUCT SELECTION GUIDES

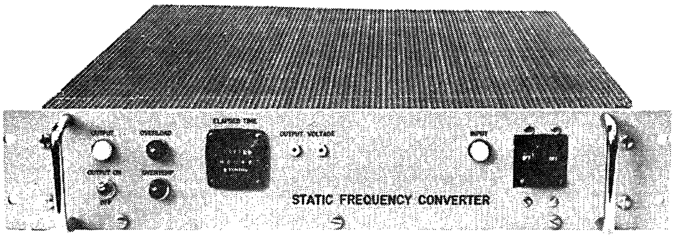
Use the EEM Product Selection Guides. There are 34 Guides in this edition of EEM. See page 2 (A•2, B•2, C•2, D•2) of each volume to locate the Product Selection Guides that pertain to your needs.

abacus controls inc.

89 READINGTON ROAD
SOMERVILLE, NJ 08876
(201) 526-6010
Telex 888186

• POWER FREQUENCY CONVERTERS
• SOLID-STATE INVERTERS
• UPS APPLICATIONS

- **Digital Sinewave Generator**
- **77% Efficiency**
- **Low Cost**
- **Light Weight**
- **Proven Reliability**
- **Switching Power Transistors**
- **Useable as AC Power Supply**
  - **Motor Controller**
  - **Power Oscillator**
  - **Power Converter**
  - **Lab AC Source**



Model 152-1 (60Hz to 400Hz)

FREQUENCY CONVERTERS
50-60-400 Hz

Input Voltage: 115V AC, ±10%, single-phase for units 2000VA and below. 208V AC, ±10%, three-phase for units above 2000VA. 220V AC, ±10%, 50Hz is a no charge option. Other inputs available on a custom basis.

Input Frequency: 47 to 65Hz. 380 to 420Hz input is a no charge option.

Output Voltage: Adjustable 100 to 130 volts. Voltage adjust is internal for fixed frequency models, on the front panel for adjustable frequency models. (Other ranges available, consult factory.)

Voltage Regulation: Less than ±2% for combined no load to full load change and rated input voltage change.

Load Power Factor: 0.7 lead to 0.7 lag. Continuous zero lead to zero lag at full rated output without damage.

Output Waveshape: Sinewave less than 4% THD, 3% max any single frequency. (Less than 1% on custom basis.)

Protective Circuits: All models are equipped with automatic overload protection, including short circuit. Automatic reset upon overload removal. Circuit breaker on the input and fuse on the output. Automatic shutdown for input overvoltage, undervoltage.

Meters: Output voltmeter ammeter, and frequency meter offered as options.

Output Frequency: Rated output frequency for each model is shown on chart. For adjustable frequency models, adjustment is on the front panel. Internal frequency adjust is a no charge option.

Frequency Stability: Oscillator included in the unit base price. Fixed frequency oscillators are crystal controlled with a stability of ±0.05%. Adjustable oscillators are RC controlled and have a stability of ±0.25%.

Efficiency: Between 70 to 80 percent (typical 75%). At least 70% from 40% of full load to full load.

Peak Output Current: 150% of full rated current is available for three-cycles. Unit is set to current limit at 120% after three cycles.

SINGLE PHASE — 50/60 Hz

Model	Output Power (VA)	Output Frequency	Dimensions (Inches)			Wt. (Lbs.)
			H	W	D	
152-3	500	50	3½	19	20	50
152-4	500	60	3½	19	20	50
152-5	500	45-65	3½	19	20	50
113-3	1000	50	8¾	19	20	70
113-4	1000	60	8¾	19	20	70
113-5	1000	45-65	8¾	19	20	70
223-3	2000	50	12¼	19	20	130
223-4	2000	60	12¼	19	20	130
223-5	2000	45-65	12¼	19	20	130
243-3	4000	50	21	19	20	240
243-4	4000	60	21	19	20	240
243-5	4000	45-65	21	19	20	240
263-3	6000	50	51	22	30	630
263-4	6000	60	51	22	30	630
263-5	6000	45-65	51	22	30	630
214-3	10000	50	63	22	30	775
214-4	10000	60	63	22	30	775
214-5	10000	45-65	63	22	30	775
2153-3	15000	50	63	22	30	1000
2153-4	15000	60	63	22	30	1000
2153-5	15000	45-65	63	22	30	1000
234-3	30000	50	63	44	30	2250
234-4	30000	60	63	44	30	2250
234-5	30000	45-65	63	44	30	2250

THREE PHASE — 50/60 Hz

Model	Output Power (VA)	Output Frequency	Dimensions (Inches)			Wt. (Lbs.)
			H	W	D	
117-3	1000	50	8¾	19	20	75
117-4	1000	60	8¾	19	20	75
117-5	1000	45-65	8¾	19	20	75
118-3	1600	50	12¼	19	20	110
118-4	1600	60	12¼	19	20	110
118-5	1600	45-65	12¼	19	20	110
238-3	3000	50	17½	19	20	170
238-4	3000	60	17½	19	20	170
238-5	3000	45-65	17½	19	20	170
268-3	6000	50	51	22	30	630
268-4	6000	60	51	22	30	630
268-5	6000	45-65	51	22	30	630
288-3	8000	50	63	22	30	680
288-4	8000	60	63	22	30	680
288-5	8000	45-65	63	22	30	680
219-3	10000	50	63	22	30	730
219-4	10000	60	63	22	30	730
219-5	10000	45-65	63	22	30	730
2158-3	15000	50	63	22	30	1000
2158-4	15000	60	63	22	30	1000
2158-5	15000	45-65	63	22	30	1000
239-3	30000	50	63	44	30	2250
239-4	30000	60	63	44	30	2250
239-5	30000	45-65	63	44	30	2250

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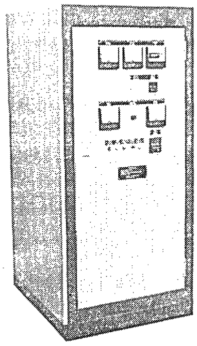
FREQUENCY CONVERTERS

SINGLE PHASE — 400 Hz

Model	Output Power (VA)	Output Frequency	Dimensions (Inches)			Wt. (Lbs.)
			H	W	D	
152-1	500	400	3½	19	20	35
152-2	500	350-450	3½	19	20	35
162-1	600	400	3½	19	20	40
162-2	600	350-450	3½	19	20	40
113-1	1000	400	8¾	19	20	70
113-2	1000	350-450	8¾	19	20	70
223-1	2000	400	12¼	19	20	130
223-2	2000	350-450	12¼	19	20	130
233-1	3000	400	21	19	20	180
233-2	3000	350-450	21	19	20	180
243-1	4000	400	21	19	20	210
243-2	4000	350-450	21	19	20	210
263-1	6000	400	51	22	30	550
263-2	6000	350-450	51	22	30	550
283-1	8000	400	63	22	30	680
283-2	8000	350-450	63	22	30	680
214-1	10000	400	63	22	30	775
214-2	10000	350-450	63	22	30	775
224-1	20000	400	63	44	30	1400
224-2	20000	350-450	63	44	30	1400

THREE PHASE — 400 Hz

Model	Output Power (VA)	Output Frequency	Dimensions (Inches)			Wt. (Lbs.)
			H	W	D	
117-1	1000	400	8¾	19	20	70
117-2	1000	350-450	8¾	19	20	70
118-1	2000	400	8¾	19	20	90
118-2	2000	350-450	8¾	19	20	90
218-1	1600	400	12¼	19	20	95
218-2	1600	350-450	12¼	19	20	95
228-1	2500	400	12¼	19	20	140
228-2	2500	350-450	12¼	19	20	140
238-1	3500	400	17½	19	20	180
238-2	3500	350-450	17½	19	20	180
268-1	6000	400	51	22	30	590
268-2	6000	350-450	51	22	30	590
278-1	7500	400	51	22	30	680
278-2	7500	350-450	51	22	30	680
219-1	10000	400	63	22	30	750
219-2	10000	350-450	63	22	30	750
2158-1	15000	400	63	22	30	1000
2158-2	15000	350-450	63	22	30	1000
239-1	30000	400	63	44	30	2100
239-2	30000	350-450	63	44	30	2100



Model 414-4-200 10KVA

STATIC INVERTERS
DC TO 50-60-400 Hz

- **85% Efficiency**
- **Low Cost**
- **Light Weight**
- **Proven Reliability**

Input Voltage: 100 to 140V DC. Other input voltage ranges, 28V DC, 48V DC, 60V DC and 200V DC Sunverter.

Output Voltage: Set for 117V. Internal adjustment from 110V to 120V. 220V AC for 50Hz models.

Voltage Regulation: Less than 2% for single phase units, less than 5% for three phase units, for combined load and input voltage changes.

Output Waveshape: Sinewave less than 4% THD, 3% max any single frequency. (Less than 1% on custom basis.)

Protective Circuits: All models are equipped with automatic overload protection, including short circuit. Automatic reset upon overload removal. Circuit breaker on the input and fuse on the output. Automatic shutdown for input overvoltage, undervoltage.

STATIC INVERTERS

SINGLE PHASE

Model	Output Power (VA)	Output Frequency	Dimensions (Inches)			Wt. (Lbs.)
			H	W	D	
452-1	500	400	3½	19	20	40
452-3	500	50	3½	19	20	45
452-4	500	60	3½	19	20	45
413-1	1000	400	8¾	19	20	60
413-3	1000	50	8¾	19	20	65
413-4	1000	60	8¾	19	20	65
423-1	2000	400	12¼	19	20	90
423-3	2000	50	12¼	19	20	110
423-4	2000	60	12¼	19	20	110
433-1	3000	400	12¼	19	20	140
433-3	3000	50	12¼	19	20	160
433-4	3000	60	12¼	19	20	155
443-1	4000	400	22¾	19	20	170
443-3	4000	50	22¾	19	20	220
443-4	4000	60	22¾	19	20	210
463-1	6000	400	63	24	30	350
463-3	6000	50	63	24	30	400
463-4	6000	60	63	24	30	390
483-1	8000	400	63	24	30	400
483-3	8000	50	63	24	30	440
483-4	8000	60	63	24	30	430
414-1	10000	400	63	24	30	470
414-3	10000	50	63	24	30	540
414-4	10000	60	63	24	30	510
424-1	20000	400	63	48	30	969
424-3	20000	50	63	48	30	1080
424-4	20000	60	63	48	30	1020

THREE PHASE

Model	Output Power (VA)	Output Frequency	Dimensions (Inches)			Wt. (Lbs.)
			H	W	D	
417-1	1000	400	8¾	19	20	60
417-3	1000	50	8¾	19	20	70
417-4	1000	60	8¾	19	20	70
418-1	1600	400	12¼	19	20	90
418-3	1600	50	12¼	19	20	100
418-4	1600	60	12¼	19	20	100
428-1	2500	400	12¼	19	20	130
428-3	2500	50	12¼	19	20	150
428-4	2500	60	12¼	19	20	140
438-1	3500	400	17½	19	20	160
438-3	3500	50	17½	19	20	180
438-4	3500	60	17½	19	20	170
468-1	6000	400	63	24	30	350
468-3	6000	50	63	24	30	400
468-4	6000	60	63	24	30	390
488-1	8000	400	63	24	30	395
488-3	8000	50	63	24	30	475
488-4	8000	60	63	24	30	430
419-1	10000	400	63	24	30	470
419-3	10000	50	63	24	30	540
419-4	10000	60	63	24	30	520
429-1	20000	400	63	48	30	990
429-3	20000	50	63	48	30	1090
429-4	20000	60	63	48	30	1090
439-1	30000	400	63	48	30	1310
439-3	30000	50	63	48	30	1490
439-4	30000	60	63	48	30	1490

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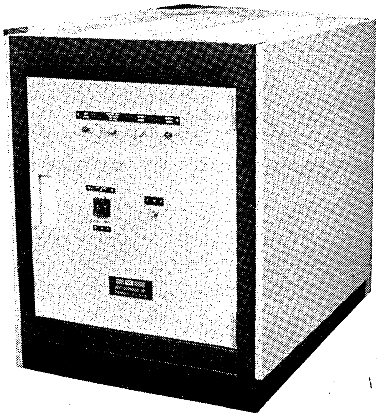
UNINTERRUPTIBLE POWER SUPPLIES
Single Phase and Three Phase
50, 60, and 400 HZ



- **Uninterruptible AC Power**
- **Quiet Operation — No Ferroresonant Devices**
- **Dual Mode Operation**
- **High Efficiency For Low Heat Generation**
- **"Bumpless Transfer" From Utility to Battery Operation**
- **Protection From Line Transients**
- **Electrically Isolated Integral Battery Charges**

Input Voltage: 115V AC ±10% single phase for single phase units. 208V AC ±10% three phase for three phase units. 220V AC for 50 Hz units. Other inputs available on a custom basis. Consult factory.

Input Frequency: 48 to 52Hz, 57 to 63Hz, or 380 to 420Hz depending on output.

Input and Output Terminations: Rear panel terminal blocks for 50Hz and 60-Hz models. MS3102A circular connectors on 400Hz models.

Output Voltage: Internally adjustable. Any standard power line voltage available. Three phase units are supplied in either wye or delta configurations.

Voltage Regulation: ±2% for single phase equipment and ±5% for three phase units.

Peak Output Current: 150% of full rated current is available for three cycles. Unit is set to current limit at 110% after three cycles.

Frequency Stability: Oscillator included in the unit base price. Fixed frequency oscillators are crystal controlled with a stability of ±0.05%. Adjustable oscillators are RC controlled and have a stability of ±0.25% (See option for phase-lock.)

Load Power Factor: 0.7 lead to 0.7 lag. Continuous zero lead to zero lag at full rated load without damage.

Output Waveshape: Sinewave, less than 4% THD, 3% max any single frequency. (Less than 1% on custom basis.)

Duty Cycle: Continuous duty at full rated output.

Efficiency: Between 75 to 80 percent (typical 80%). At least 75% from 40% of load to full load.

Battery Charger: Operates in a constant current mode until the battery achieves float voltage, then automatic transfer to a constant voltage mode. The output is well filtered to minimize battery heating.

Float Voltage: The float voltage set point is adjustable.

Ambient Temperature Range: Operating 0 to 40°C. Nonoperating −20 to +85°C.

Method of Operation: The load operates from the UPS System. Should a power failure occur, the inverter will continue to operate from the battery bank. There is no transfer time since the load normally is connected to the inverter.

Transfer Time: Standard electro mechanical by-pass transfer time is two cycles nominal. Static switch optional with 4msec transfer time.

SINGLE PHASE UPS

Model	Output Power (VA)	Output Frequency	Dimensions (Inches) H	W	D	Wt. (Lbs.)
523-1	2000	400	30	22	30	160
523-3	2000	50	30	22	30	180
523-4	2000	60	30	22	30	180
543-1	4000	400	30	22	30	230
543-3	4000	50	30	22	30	260
543-4	4000	60	30	22	30	260
563-1	6000	400	63	22	30	590
563-3	6000	50	63	22	30	605
563-4	6000	60	63	22	30	605
583-3	8000	50	63	22	30	700
583-4	8000	60	63	22	30	700
514-1	10000	400	63	22	30	825
514-3	10000	50	63	22	30	900
514-4	10000	60	63	22	30	850
524-1	20000	400	63	44	30	1600
524-3	20000	50	63	44	30	1600
524-4	20000	60	63	44	30	1600

THREE PHASE UPS

Model	Output Power (VA)	Output Frequency	Dimensions (Inches) H	W	D	Wt. (Lbs.)
618-1	1600	400	30	22	30	100
618-3	1600	50	30	22	30	130
618-4	1600	60	30	22	30	125
638-1	3000	400	30	22	30	160
638-3	3000	50	30	22	30	185
638-4	3000	60	30	22	30	180
668-1	6000	400	63	22	30	605
668-3	6000	50	63	22	30	605
668-4	6000	60	63	22	30	605
688-1	8000	400	63	22	30	650
688-3	8000	50	63	22	30	650
688-4	8000	60	63	22	30	650
619-1	10000	400	63	22	30	690
619-3	10000	50	63	22	30	760
619-4	10000	60	63	22	30	760
6158-4	15000	60	63	22	30	1110
639-4	30000	60	63	44	30	2260

MINIGLOSSARY
POWER SUPPLIES

Ambient reference: Refers to the temperature of the still air surrounding the power supply

Case reference: One of the specs that make up the nominal rating. The temperature of the case with the temperature of the surrounding still air at a stated temperature (usually 25°C).

Crowbar circuit: Protects the load. A protective circuit that applies a short circuit across the output immediately upon overload. (See overvoltage).

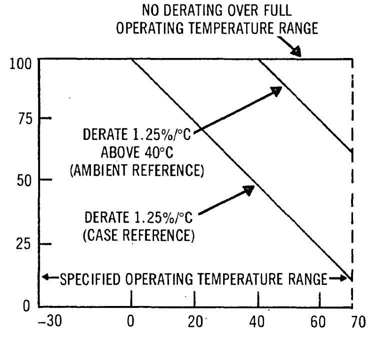


Fig. 1. Power output derating can be referred to ambient or case.

Derating: The degree output is reduced as temperature increases. Usually referenced to ambient case temperature and shown on a graph.

Efficiency: Ratio of the output power to the required input power. Usually expressed as a percentage given nominal environmental temperature.

EMI/RFI: Interference electronic circuitry caused by energy from electromechanical or radio frequency power supplies.

Foldback: Built-in protective circuits that automatically reduce the output voltage and/or current to very low levels in the event of an overload.

Holdover (Holdup): The interval that rated output will continue after input ceases. Usually milliseconds.

Input reflected current: The peak-to-peak alternating current generated by switching transients in DC/DC converters. Should not exceed 1%.

Inrush current limiting: Built-in circuits that monitor high currents through the rectifiers to the capacitors at turn ON. Circuit is usually inhibited as capacitors attain full charge.

Nominal rating: The spec value of the supply at stated conditions of input, output, and temperature.

Overshoot: A transient voltage change occurring during turn ON or OFF or during an abrupt load change.

Overvoltage (Overload) protection: Built-in circuits that protect the load or the supply by shutting it down or providing foldback.

Recovery: The time interval between the termination of an overload and restoration to normal operations.

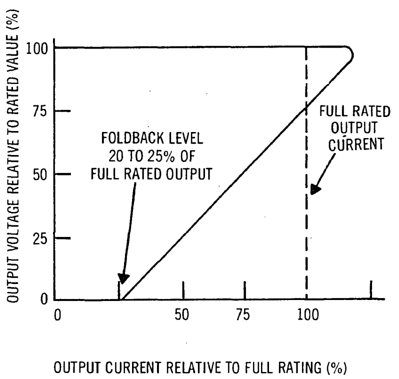


Fig. 2. Current foldback limiting self-resets with removal of fault.

Response: The time interval between a stated step change in input voltage or load current and return of output to normal operating conditions.

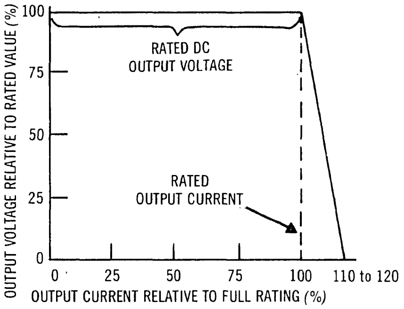


Fig. 3. Current limiting restrictions output current to a valve somewhat greater than full rated output; it resets when fault is removed.

Sensing: Regulation techniques that monitor output voltage and/or current. *Local sensing* refers to the output terminals. *Remote sensing* allows a feedback from the load circuit to the power supply.

Soft start: Allows the supply to start from zero current and/or voltage over a stated period of time during start up to prevent voltage overshoots and current imbalances.

Switchers: Power supplies using switching techniques to achieve high efficiency regulation. These techniques can have attendant EMI/RFI problems.

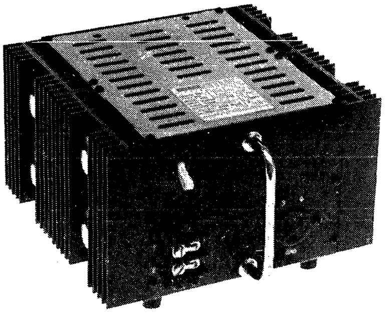
Tracking: The maintaining of fixed ratios between multiple outlets despite variations in line, load or temperature. Particularly important in supplies with symetrical (+)(−) outputs.

Transient protection: Circuitry designed to protect the supply from high amplitude line transients. Generally expressed in terms of peak voltage and maximum transient time duration.

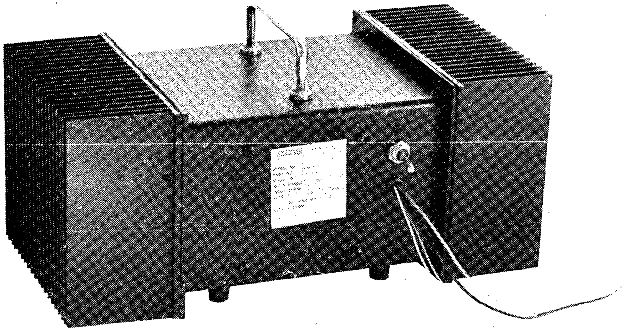
abbott
INDUSTRIAL POWER SUPPLIES

Sine Wave Inverters

MODELS
KN-PN
LN-TN



Standard Models: KN, PN, LN, TN
Cases K2, F2, J2



Salt Spray Models: KS, PS, LS, TS
Case G-2

Severe environment models are fully enclosed in an anodized aluminum case. Specifically designed to provide trouble-free operation in a salt spray environment such as marine navigation, offshore platforms as well as corrosive industrial applications. Flying leads are provided to simplify installation.

11 to 54 VDC Input
30 to 320 VA Output

- A wide range of standard models.
- 50 Hz or 60 Hz output.
- Surge current capabilities up to 3 times rated output power.
- Exceptional reliability. Typical MTBF: 90,586 hours for model LN8
- High efficiency provided by sine wave. Conserves power.
- Saves motors by reducing overheating.
- Low distortion. 2% typical.
- Salt spray package.
- Compact. Lightweight.
- Switchable 115 VAC 60 Hz/230 VAC 50 Hz.
- Wide temperature range: −20°C to +55°C ambient operation.
- Special models available.
- 2-year warranty.
- Prices as low as $250 (OEM QTY).

11 to 15 VDC Input

Output Power (VA)	Case	Weight (Lbs.)	Single Output 115 VAC 60 Hz	Single Output 220 VAC 50 Hz	Switchable Output 115V 60 Hz/220V 50 Hz
30	K2	16	KN3T-115-60	KN3T-220-50	KN3T-50/60
30	G2	27	KS3R-115-60	KS3R-220-50	NA
60	F2	18	KN6T-115-60	KN6T-220-50	KN6T-50/60
60	G2	27	KS6R-115-60	KS6R-220-50	NA
120	J2	30	KN12T-115-60	KN12T-220-50	KN12T-50/60

29 to 38 VDC Input

Output Power (VA)	Case	Weight (Lbs.)	Single Output 115 VAC 60 Hz	Single Output 220 VAC 50 Hz	Switchable Output 115V 60 Hz/220V 50 Hz
80	K2	16	LN8T-115-60	LN8T-220-50	LN8T-50/60
80	G2	27	LS8R-115-60	LS8R-220-50	NA
160	F2	18	LN16T-115-60	LN16T-220-50	LN16T-50/60
160	G2	27	LS16R-115-60	LS16R-220-50	NA
320	J2	30	LN32T-115-60	LN32T-220-50	LN32T-50/60

22 to 30 VDC Input

Output Power (VA)	Case	Weight (Lbs.)	Single Output 115 VAC 60 Hz	Single Output 220 VAC 50 Hz	Switchable Output 115V 60 Hz/220V 50 Hz
60	K2	16	PN6T-115-60	PN6T-220-50	PN6T-50/60
60	G2	27	PS6R-115-60	PS6R-220-50	NA
120	F2	18	PN12T-115-60	PN12T-220-50	PN12T-50/60
120	G2	27	PS12R-115-60	PS12R-220-50	NA
240	J2	30	PN24T-115-60	PN24T-220-50	PN24T-50/60

42 to 54 VDC Input

Output Power (VA)	Case	Weight (Lbs.)	Single Output 115 VAC 60 Hz	Single Output 220 VAC 50 Hz	Switchable Output 115V 60 Hz/220V 50 Hz
80	K2	16	TN8T-115-60	TN8T-220-50	TN8T-50/60
80	G2	27	TS8R-115-60	TS8R-220-50	NA
160	F2	18	TN16T-115-60	TN16T-220-50	TN16T-50/60
160	G2	27	TS16R-115-60	TS16R-220-50	NA
320	J2	30	TN32T-115-60	TN32T-220-50	TN32T-50/60

ABBOTT TRANSISTOR LABORATORIES, INC.

Industrial Products Div. Western Offices: 8203 Vineland Ave., Sun Valley, CA 91352 (818) 504-0644. Telex: 75-2972.
Eastern: 520 Main St., Fort Lee, NJ 07024 (201) 461-4411. Telex: 13-5332
Southwest: 710 Kindred Lane, Richardson, TX 75080 (214) 437-0697 • W. Canada: (604) 986-1286

abbott
INDUSTRIAL POWER SUPPLIES

Sine Wave Inverters

MODELS
KN-PN
LN-TN

SPECIFICATIONS

INPUT VOLTAGE RANGE:
KN, KS: 11 to 15 VDC
PN, PS: 22 to 30 VDC
LN, LS: 29 to 38 VDC
TN. TS: 42 to 54 VDC

OUTPUT VOLTAGE: 115 or 220 VAC ±2% at full load and nominal input voltage.

OUTPUT FREQUENCY: 50 Hz or 60 Hz.

LINE REGULATION: 3% for specified input voltage range with load constant.

LOAD REGULATION: 3% for load change of half load to full load with line constant; 6% for change of no load to full load.

WAVE FORM: Sine wave with 2% typical, 5% maximum distortion.

POWER FACTOR: Fully rated output VA, from unity to 0.7 power factor lagging or leading.

EFFICIENCY: At full load with nominal input voltage
40% minimum on KN, KS
50% minimum on PN, PS
58% minimum on LN, LS
60% minimum on TN, TS

OPERATING TEMPERATURE RANGE: (KN, PN, LN and TN): 4°F to +131°F (−20°C to +55°C) ambient air temperature. Humidity 0 to 90% (non condensing) at 25°C.

OPERATING TEMPERATURE RANGE: (KS, PS, LS and TS): 4°F to +131°F (−20°C to +55°C) ambient air temperature. G2 case is submersible (10 feet, 2 minutes).

INPUT TRANSIENT PROTECTION: 45 VDC for 0.1 second transient deviation and recovery (for change of 50%) of rated (load).

ALTITUDE: 10,000 feet above sea level (KN, PN, LN, TN) 50,000 feet above sea level (KS, PS, LS, TS).

PROTECTIVE FEATURES

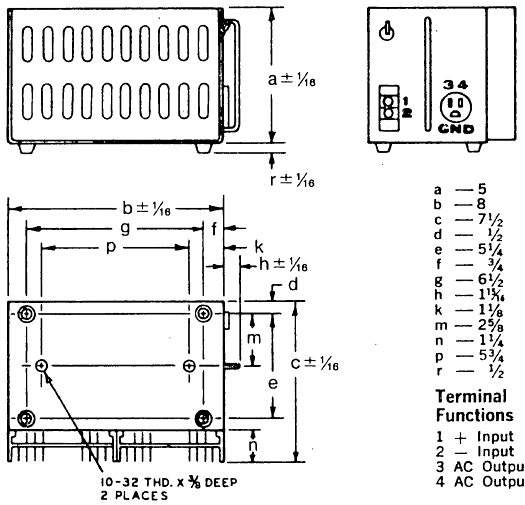
OVERLOAD PROTECTION: Magnetic type circuit breaker. Reverse polarity protection.

HIGH RELIABILITY

Model LN8T-115-60: MTBF 90,586 hours at 25°C ambient, ground benign environment per MIL-HDBK-217C. Model TN8T-115-60: MTBF 74,733 hours at 50° ambient.

2-YEAR WARRANTY/ALL MODELS.

Case K2 Dimensions in inches.

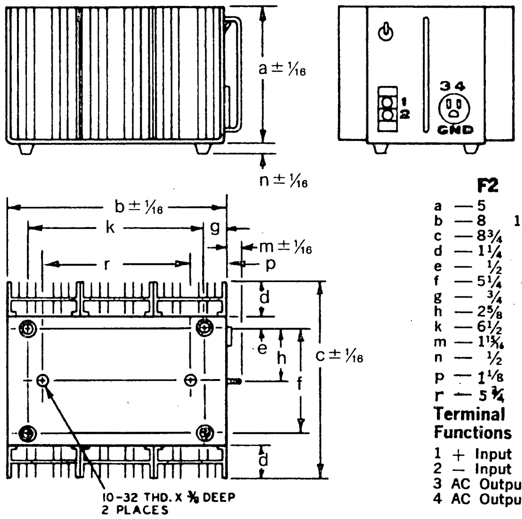


10-32 THD. X ⅜ DEEP
2 PLACES

a	5
b	8
c	7½
d	½
e	5¼
f	¾
g	6½
h	1 15/16
k	1⅛
m	2⅝
n	1¼
p	5¾
r	½

Terminal Functions
1 + Input
2 − Input
3 AC Output
4 AC Output

Cases F2, J2 Dimensions in inches.

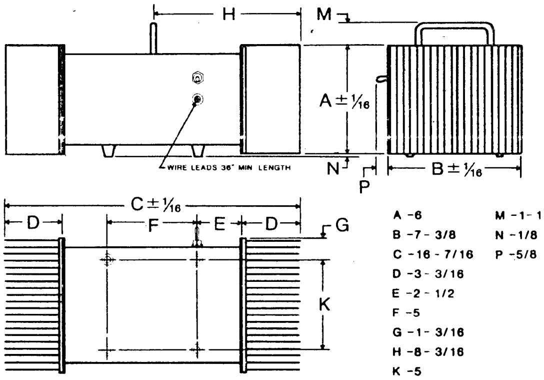


10-32 THD. X ⅜ DEEP
2 PLACES

	F2	J2
a	5	6½
b	8	12
c	8¾	9¾
d	1¼	2⅛
e	½	⅜
f	5¼	4¾
g	¾	1¼
h	2⅝	2⅜
k	6½	9½
m	1 15/16	1 15/16
n	½	½
p	1⅛	1¼
r	5¾	9½

Terminal Functions
1 + Input
2 − Input
3 AC Output
4 AC Output

Case G2 Dimensions in inches.



WIRE LEADS 36" MIN LENGTH

A	-6
B	-7- 3/8
C	-16 - 7/16
D	-3- 3/16
E	-2 - 1/2
F	-5
G	-1- 3/16
H	-8- 3/16
K	-5
M	-1- 1/4
N	-1/8
P	-5/8

WIRE FUNCTIONS	
RED	+ INPUT
BLACK	− INPUT
WHITE	AC OUTPUT
BROWN	AC OUTPUT

Note: Dimensional tolerances are all ±1/16".

ABBOTT TRANSISTOR LABORATORIES, INC.

Industrial Products Div. Western Offices: 8203 Vineland Ave., Sun Valley, CA 91352 (818) 504-0644. Telex: 75-2972.
Eastern: 520 Main St., Fort Lee, NJ 07024 (201) 461-4411. Telex: 13-5332
Southwest: 710 Kindred Lane, Richardson, TX 75080 (214) 437-0697 • W. Canada: (604) 986-1286

ACDCo *Power* WHERE *you need it!*

Inverters-Uninterruptible Power Systems -Battery Chargers-Frequency Changers-Power Supplies

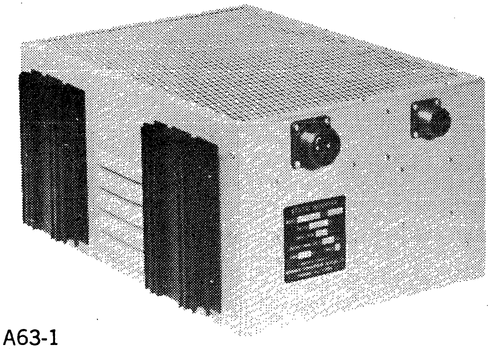
ACDCo Power Equipment is designed to meet high reliability and performance standards providing maximum life with minimum maintenance to protect all system circuits that require dependable, high quality power.

PRODUCT

Inverters, Power — DC to AC Output: Fixed-base, portable, mobile and marine.

Uninterruptible AC Power Systems: 36 VA to 5 KVA.

Frequency Converters — AC to AC: 50/60 Hz, 60/50 Hz, 50/400 Hz and 60/400 Hz.



A63-1
1 KVA INVERTER

TYPICAL SPECIFICATIONS

Input: ±15% from nominal.

Output: Sine wave, 120 Volts RMS, 60 Hz.

Voltage Regulation: 2% over full input and load range.

Frequency Regulation: 1% over full input and load range.

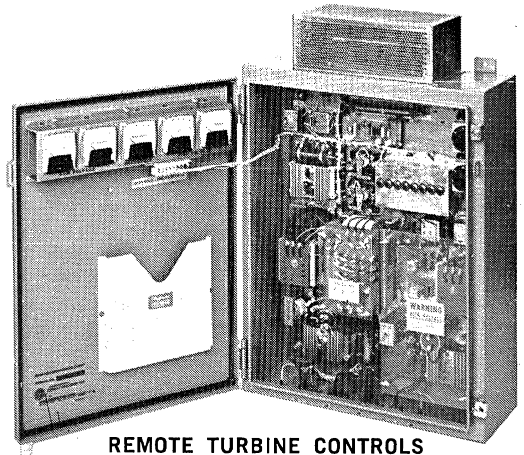
Power Factor: .9 Lead to .8 Lag.

Efficiency: Over 80% at nominal input.

Distortion: Less than 5%.

Overload: Within specifications for ONE MINUTE at 140% load.

Overload Protection: No damage from short to open circuit, reversal of input, or input voltage to 140% nominal.



REMOTE TURBINE CONTROLS FOR THE ALASKAN PIPELINE

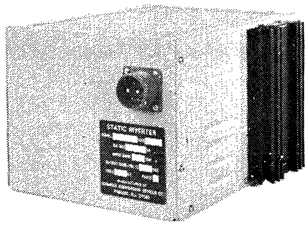
DESIGN FEATURES

Ruggedized construction, no moving parts, completely solid state, easy servicing — sides fold down, plug-in transistors and I/C's on Printed Circuit Boards, all P/C boards plug-in removable.

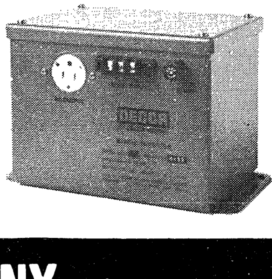
STATIC INVERTER MODELS

Rating	12VDC	24VDC	32VDC	48VDC	120VDC
36VA	A12-1	A13-1	A19-1	A14-1	A16-1
72VA	A22-1	A23-1	A29-1	A24-1	A26-1
125VA	A32-1	A33-1	A39-1	A34-1	A36-1
250VA	A42-1	A43-1	A49-1	A44-1	A46-1
500VA	A52-1	A53-1	A59-1	A54-1	A56-1
1000VA		A63-1	A69-1	A64-1	A66-1
1750VA		A63-2		A64-2	A66-2
2500VA		A73-1		A74-1	A76-1
3750VA				A74-2	A76-2
5000VA				A84-1	A86-1

Three Phase Models Available up to 15KVA



A43-1
250VA INVERTER



A12-1
36VA INVERTER

ACDCo. inverters are used in one of the roughest of Marine Environments on the U.S. Coast Guard's Rescue Life Boats to power their Navigation and Communication equipment.

ACDCo. has versions of power equipment available to meet military specifications.

ACDCo. static inverters are used by major Public Utility companies throughout the United States.

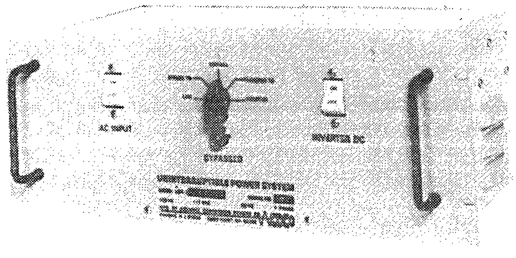
ADVANCE CONVERSION DEVICES COMPANY ACDCo

274 SOUTH SALEM STREET, RANDOLPH, NJ 07869 Phone (201) 989-0095

ACDCo Power WHEN you need it!

Protect Against Costly Power Interruptions

ACDCo Uninterruptible Power Systems protect critical circuits for computer peripherals, process controls, telephone switch boards, high risk medical or experimental procedures and all systems requiring dependable emergency power when normal AC is lost.



U34-1

Typical UPS Model U34-1 is used to power a critical liquid hydrogen temperature control system at a major government research nuclear reactor.

UNINTERRUPTIBLE POWER SYSTEMS

Your margin of safety to insure continuous high quality power even in the event of any utility line or generator power fluctuation or failure. ACDCo's UPS systems are designed to provide full output capacity even under "brownout" conditions where voltage reductions as severe as 15% are encountered. The reserve (battery back-up) for power outages is not diminished by extended operation in brownout conditions.

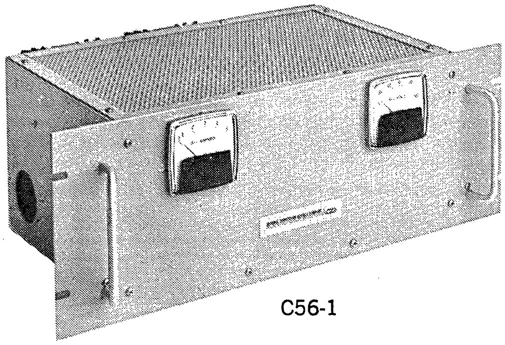
The use of power transistors rather than SCR's in the inverter greatly reduces the susceptibility to transients which can be present on power lines due to faults, switchovers, lightning and other factors. These transients usually cause the problems that the UPS was intended to protect. If the inverter can malfunction as a result of the transient, then the expected protection is absent when it is most needed.

DESIGN FEATURES

- **Ruggedized construction**
- **Easy servicing**
- **Plug-in Transistors and I/C's**
- **Removable P/C Boards**
- **Optimized design to provide maximum value for the procurement dollar**

VA Rating	36VA	72VA	125VA	250VA	500VA	1KVA	1.75KVA	2.5KVA	3.75KVA	5KVA
Model No.	U14-1 U13-1	U24-1 U23-1	U34-1	U44-1	U54-1	U64-1	U64-2	U74-1 U76-1	U74-2 U76-2	U84-1 U86-1

Three phase models also available from 100VA to 1500VA.
Typical specifications relate to those of static inverters.

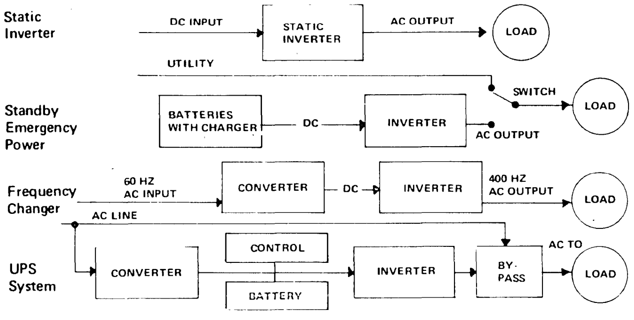


C56-1

SPECIAL POWER SYSTEMS BULLETIN

Ask for our power systems outline discussion in which ACDCo answers many outstanding questions of systems configuration.

ACDCo POWER SYSTEMS FUNCTIONAL DIAGRAMS


Static Inverter
DC INPUT
STATIC INVERTER
AC OUTPUT
LOAD
UTILITY
SWITCH
LOAD
Standby Emergency Power
BATTERIES WITH CHARGER
DC
INVERTER
AC OUTPUT
Frequency Changer
60 HZ AC INPUT
CONVERTER
DC
INVERTER
400 HZ AC OUTPUT
LOAD
AC LINE
AC TO
UPS System
CONTROL
CONVERTER
INVERTER
BY-PASS
LOAD
BATTERY

AC TO AC FREQUENCY CONVERTERS

Available in eight power sizes from 36VA to 5000VA plus three phase up to 15 KVA. Power frequencies changed from: 50 to 60 Hz, 60 to 50 Hz, 50 to 400 Hz, and 60 to 400 Hz.

Options available for laboratory applications include metering, front panel controls, etc.

WIND DRIVEN SYSTEMS

ACDCo designs and manufactures the electronic control, regulation, and power subsystems for "modern" power conversion from this "ancient" energy source.

A SUBSIDIARY OF TRANSISTOR DEVICES, INC.

ADVANCE CONVERSION DEVICES COMPANY

274 SOUTH SALEM STREET, RANDOLPH, NJ 07869 Phone (201) 989-0095

ACDCo

asi PROGRAMMABLE AC POWER SOURCES

- **Designed for Critical Mil Spec ATE**
- **Microprocessor Controlled**
- **High Efficiency Autotransformer Design**
- **MATE Compatible IEEE-488 Bus**

Astrosystems' new series of programmable AC supplies provides precision AC power, programmable in amplitude and phase. Featuring built-in microprocessor control, these completely solid-state power sources are capable of driving high-power loads. A unique switching autotransformer design eliminates the need for high power drive amplifiers, resulting in low power dissipation and reduced size and weight.

NEW!

7.5 KVA Three-Phase Output Programmable High Power AC Inverter

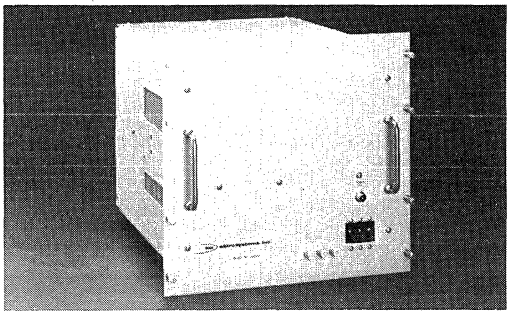
- **Programmable in Voltage and Frequency**
- **High Efficiency/Small Size**
- **AC or DC Input**

Astrosystems' Programmable High Power AC Inverter (Programmable High Power Three-Phase Supply) is a solid-state power source which converts AC or DC input power to an accurate, controllable source of three-phase AC power programmable in both frequency and amplitude. Featuring built-in microprocessor control, this completely solid-state power source is capable of driving high power loads, including motor startup.

MATE COMPATIBLE IEEE-488 BUS

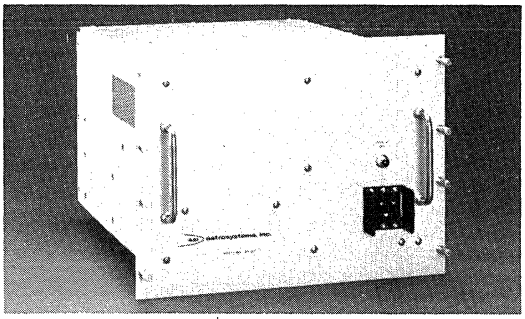
The output is programmable in amplitude and current limit via a GPIB bus. Programming is accomplished using the latest version of CIIL language. Overall control is exercised with a built-in Test Module Adapter (TMA) incorporating an 8088 processor. The processor also controls extensive Built-in Test (BIT) capabilities.

A5500-T Two Phase AC Power Supply



Output Power—Two independent AC power outputs; 4.5 amps each
Output Voltage—Programmable in 0.5 volt steps from 0 to 115 volts
Output Phase—Programmable in 1.5 degree steps from 0 to 360 degrees
Programming—MATE compatible IEEE 488 bus using CIIL language

A2100-T Three Phase Power Supply



Output Voltage—100-130 volts RMS per phase in 2 volt steps
Output Power—6.5 KVA maximum
Protection—Complete protection for short circuits. Voltage limiting to 110% of programmed value and current limiting to 110% of maximum power rating.
Programming—MATE compatible IEEE 488 bus using CIIL language.

Custom/Standard Supplies

The power supplies described are typical of those designed and produced by Astrosystems. Modular design and plug-in circuitry facilitate special designs. Our engineering department will customize these units to your exact requirements. Send us your specs or call the toll free number below.

asi astrosystems, inc.
6 Nevada Drive • Lake Success, N.Y. 11042
516/328-1600 TWX: 510-223-0411

CALL TOLL-FREE
1-800-645-8454

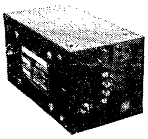
MANUFACTURERS OF QUALITY PRODUCTS SINCE 1931

ATR ELECTRONICS, INC.

SUBSIDIARY: DIGITAL CONTROLS, INC.

INVERTERS 50-60 Hz

12V, 24V, 48V, 110V
50 VA to 5000 VA
24, 110, 220 VAC

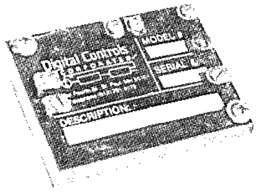


Automatic overloads and voltage protection power MOS! Sq. and sinewave high frequency synthesized or unsynthesized waveforms.

Will operate VCR, TV, Stereo, Computer & Portable Telescope equipment, in your remote location.

Order by the input voltage and power requirements.

8813



OPTO ISOLATED, MULTI FUNCTION, INDUSTRIAL PROGRAMMABLE TIMERS.

Power MOS Opto Isolated Output SSR'S.

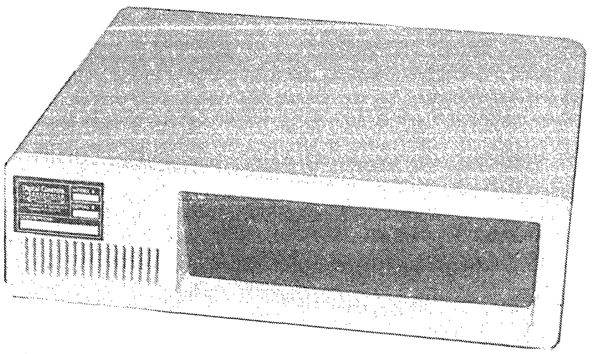
TOUGH!

Call to discuss your application.

Replacement Vibrators for all your former applications. Now non-mechanical, solid state construction.

One year limited warranties on all products. We will repair or replace any unit delivered to our location.

CALL FOR DETAILS

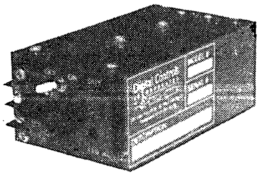


THE "NEW" ATR ELECTRONICS INC. INTEGRATED FAMILY OF PRODUCTS. THE SAME HIGH QUALITY AND DEPENDABILITY WITH STATE OF THE ART SOLID STATE CONSTRUCTION.

UPS SYSTEMS
Design for Personal Computers and Instruments to 1000 VA

FULL PROTECTION—INCLUDES BATTERIES. ALSO AVAILABLE FOR DC BACK-UP.

HBC 8000

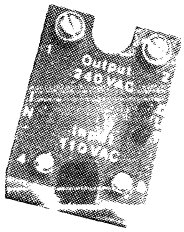


HIGH EFFICIENCY • HIGH POWER BATTERY CHARGERS AND POWER SUPPLIES USE POWER MOS 200 KHz — 400 KHz SMPS TECH.

110/220 VAC • 20 to 80 Amp • From 12 — 110 VDC AUTOMATIC! RUGGED!

8851

SOLID STATE RELAY



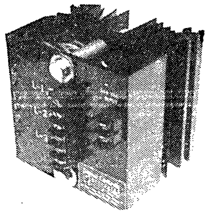
SSR'S INDICATE BOTH INPUT SIGNAL AND OUTPUT CURRENT!

8, 20, 30, 40 Amp
Up to 240 VAC

Power MOS versions with Solid State Circuit Breakers.

8830

3 PHASE SOLID STATE CONTACTORS.



Have Indicating Signal Input and Current Sensed Indicator Outputs!

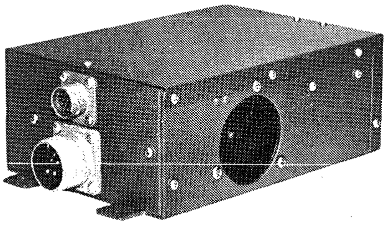
110/220 VAC

ATR ELECTRONICS, INC. • 280 E. LAFAYETTE RD. • ST. PAUL, MN 55107 • 612/222-3791

OUT OF STATE CALL 1-800-533-5542 All states (except Minnesota) phone: 1-800-533-5542.

Avionic Instruments, Inc.

Avionic Instruments Inc.
943 East Hazelwood Avenue
Rahway, New Jersey 07065
Telephone: (201) 388-3500
Cable Address: Reainta, Rahway
Telex: 844-413 Reaintl Rway
RCA 247034 REA UR



Lightweight 50, 60, 400 Hz Static Inverters and Frequency Converters for Aerospace, Military, Industry

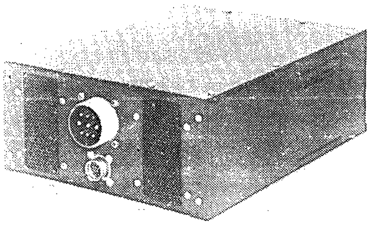
- *Ultra lightweight—10 lbs. per 1000VA*
- *Designed for dynamic non-sinusoidal loads*
- *Reliable and rugged*
- *Meets military standards for severe, hostile environments*
- *Custom design capability*
- *Non-standard frequencies and voltages*
- *UPS and mobile systems*
- *Call Avionic for all your inverter and converter needs: Telephone: (201) 388-3500*

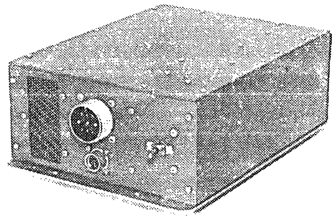
AVIONIC INSTRUMENTS INC. (AI^2) Power Processing series features a patented, advanced power processing technique that virtually eliminates the limitations inherent in traditional power conversion designs.

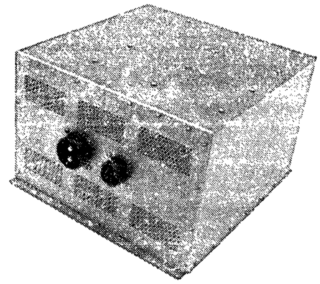
These advanced designs include a high frequency (40KHz) DC to DC converter/regulator and a two-state (bridge) inverter regulator. The sinusoidal output voltage is achieved from the bridge section through use of a spectrum controlled modulation system utilizing advanced field effect transistor switching circuitry. Heavy, baseband magnetic components are eliminated and result in an extremely lightweight, efficient and highly reliable inverter design.

Each section of these advanced designs utilizes a patented, current controlled, closed loop system which is inherently stable and which provides excellent steady state and dynamic response characteristics evidenced by no output voltage excursions outside the regulation band—under any conditions of load application and removal—including non-linear loads such as half-wave rectifiers. Protection circuitry includes built-in overvoltage and out-of-frequency shutdown features as well as 200 percent of rated current under short circuit conditions.

Avionic's modular design allows interconnection of units for increased power output and for multiphase systems. Reliable custom designed units for non-standard frequencies and voltages are made easy by the basic Avionics two-stage conversion design. Call us for your special needs.







General Performance Specifications

(Consult factory for exact data on specific models)

Input Voltage
Static Inverters:
28VDC ± 10V.
Frequency Converters:
115/200VAC ± 20V, 400Hz.

Output Power
50VA to 9kVA.

Output Voltage
115VAC RMS ± 1%, single phase units.
26VAC RMS ± 2V.
115/200VAC wye RMS ± 1%, three phase units.
200 microsecond response time.

Output Frequency
50/60/400Hz ± 0.5% for all conditions of line, load, and temperature.

Waveshape
Sinewave 0.5% THD, typical.
Less than 0.1VDC component per MIL STD 704C.

Efficiency
80% typical at rated output.

Overload
110% rated output for 2 hours.
150% load current for 5 minutes, nominal conditions per TSO-C73.

Short Circuit Current
200% for five minutes.

Power Factor
0.7 lead to 0.7 lag.
Not damaged by any power factor.

Protection
Cannot be damaged by any short circuit.
Input under/over voltage.
Output overvoltage.
Output under/over frequency.
Thermal overheat.
Reverse polarity.
Fault light indicator.

Environmental
RTCA DO-160A for severe, hostile environments.

Qualifications
FAA TSO-C73.
AS-8023 Proposed.
RTCA DO-160A
Cat.F2B/RTY/EXXXFXXZAZZ.

EMI
IAW MIL STD-461A(4).
RTCA DO-160A Cat. Z for conducted, radiated and susceptibility.

Temperature Range
−55°C to +71°C, operating.
−65°C to +85°C, storage and shipment.

Altitude
55,000 feet, operating.

Vibration
10g's; 5Hz–2000Hz.

Humidity
95%, 10 days; 71°C.

Explosion
DO-160A Cat. E.

Salt Spray
DO-160A Cat. S.

Sand and Dust
DO-160A Cat. D.

Fungus
DO-160A Cat. F.

Shock
15g's; all axes.

Quality Assurance
IAW MIL-Q-9858A
FAA TSO-C73

APPLICATIONS

Radio/Communications
RPVs and Drones
Robots
Stability Augmentation
Space Shuttle Systems
Surveillance Equipment
SATCOM Terminals
Shelters
Shipboard Communication
Autopilots
Appliances
Business Equipment
CRT Displays
Computers/Tactical
Environmental Systems
Fire Control Systems
Flight Test Equipment
Aircraft
Vans and Jeeps
Security Systems
TV Systems
Trainers/Simulators
Telemetry
UPS
Underwater Systems
X-Ray Systems
Guidance & Gyros
Lasers
Laboratory Equipment
MEDEVAC/EMS
Microwave Relay
OMEGA/VLF
Radars
Night Vision Devices
Hospitals

Avionic Instruments, Inc.

Avionic Instruments Inc., 943 East Hazelwood Avenue, Rahway, New Jersey 07065
Telephone: (201) 388-3500, Cable Address: Reainta, Rahway, Telex: 844-413 Reaintl Rway, RCA 247034 REA UR

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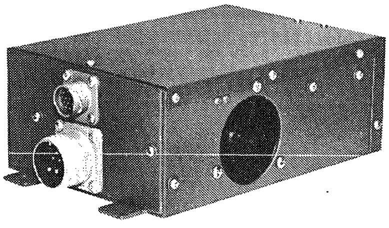
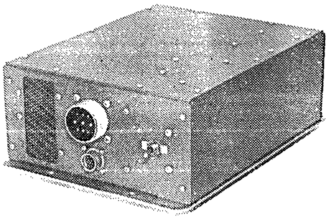
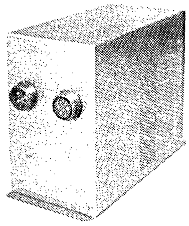
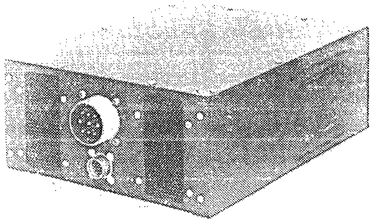


Static Inverters and Frequency Converters: Lightweight, high efficiency, rugged and reliable

	Model	Output		Input	Dimensions	Weight
28 VDC to 400 Hz Single Phase Static Inverters	1A50-1B	50VA	115/26 VAC	2.5 ADC	7.0″ × 5.0″ × 2.75″	4.0 lbs.
	1A125-1B	125VA	115/26 VAC	5.6 ADC	7.0″ × 5.0″ × 2.75″	4.3 lbs.
	1B250-1B,D,F	250VA	115/26 VAC	11.0 ADC	7.0″ × 5.0″ × 2.75″	4.5 lbs.
	1B350-1B	350VA	115/26 VAC	16.4 ADC	7.0″ × 5.0″ × 2.75″	4.8 lbs.
	1B800-1G	800VA	115/26 VAC	36.0 ADC	12.0″ × 8.5″ × 4.0″	13.5 lbs.
	1B-1000-1G	1000VA	115/26 VAC	46.0 ADC	12.0″ × 8.5″ × 4.0″	13.5 lbs.
	PL-500-1A	500VA	115/26 VAC	22.0 ADC	Multiple Unit Systems	9.0 lbs.
	PL-500-1B	500VA	115/26 VAC	22.0 ADC		9.0 lbs.
	PL-1600-1A	1600VA	115/26 VAC	72.0 ADC		27.0 lbs.
	PL-2000-1A	2000VA	115/26 VAC	42.0 ADC		27.0 lbs.
	PL-3000-1A	3000VA	115/26 VAC	138.0 ADC		40.5 lbs.
	PL-4000-1A	4000VA	115/26 VAC	184.0 ADC		54.0 lbs.
28 VDC to 400 Hz Three Phase Static Inverters	3PH-150-1A	150VA	115/200 VAC	7.5 ADC	Multiple Unit Systems	13.0 lbs.
	3PH-375-1A	375VA	115/200 VAC	16.8 ADC		14.0 lbs.
	3PH-1500-1A	1500VA	115/200 VAC	66.0 ADC		29.0 lbs.
	3PH-4800-1A	4800VA	115/200 VAC	216.0 ADC		83.0 lbs.
	3PH-6000-1A	6000VA	115/200 VAC	276.0 ADC		84.0 lbs.
	3PH-9000-1A	9000VA	115/200 VAC	414.0 ADC		126.0 lbs.
	1A750-1A	750VA	115/200 VAC	33.0 ADC	12.5″ × 5.8″ × 9.0″	17.5 lbs.
	1A1050-1A	1050VA	115/200 VAC	49.2 ADC	12.5″ × 5.8″ × 9.0″	18.3 lbs.
	1A2400-1A	2400VA	115/200 VAC	108.0 ADC	16.0″ × 13.9″ × 9.3″	49.0 lbs.
	1A-3000-1A	3000VA	115/200 VAC	138.0 ADC	16.0″ × 13.9″ × 9.3″	49.0 lbs.
28 VDC to 60 Hz Single Phase Static Inverters	2A-50-1B	50VA	115 VAC	2.5 ADC	7.0″ × 5.0″ × 2.8″	3.9 lbs.
	2A-125-1B	125VA	115 VAC	5.6 ADC	7.0″ × 5.0″ × 2.8″	4.3 lbs.
	2A-250-1B,C	250VA	115 VAC	11.0 ADC	7.0″ × 5.0″ × 2.8″	4.5 lbs.
	2A-350-1B	350VA	115 VAC	16.4 ADC	7.0″ × 5.0″ × 2.8″	4.75 lbs.
	2A1000-1G	1000VA	115 VAC	45.0 ADC	12.0″ × 8.5″ × 4.0″	12.5 lbs.
	PL-1400-2A	1400VA	115 VAC	65.6 ADC	Multiple Unit Systems	19.0 lbs.
	PL-4000-2A	4000VA	115 VAC	180.0 ADC		51.0 lbs.
	SR-100-2A	100VA	230 VAC	5.0 ADC		9.0 lbs.
	SR-250-2A	250VA	230 VAC	11.2 ADC		9.5 lbs.
	SR-500-2A	500VA	230 VAC	22.0 ADC		9.0 lbs.
	SR-700-2A	700VA	230 VAC	32.8 ADC		9.5 lbs.
	SR-2000-2A	2000VA	230 VAC	90.0 ADC		26.0 lbs.
	SP-1000-2A	1000VA	230 VAC	44.0 ADC		18.0 lbs.
	SP-4000-2A	4000VA	230 VAC	180.0 ADC		52.0 lbs.
	SP-6000-2A	6000VA	230 VAC	270.0 ADC		77.0 lbs.
Consult factory for exact specifications	SP-8000-2A	8000VA	230 VAC	360.0 ADC		104.0 lbs.
	2A500-1A	500VA	115 VAC	22.4 ADC	12.5″ × 5.8″ × 9.0″	13.0 lbs.
	2A2000-1A	2000VA	115 VAC	90.0 ADC	16.0″ × 13.9″ × 9.3″	36.0 lbs.
	2A-3000-1A	3000VA	115 VAC	135.0 ADC	16.0″ × 13.9″ × 9.3″	49.0 lbs.







	Model	Output		Input	Dimensions	Weight
28 VDC to 60 Hz Three Phase Static Inverters	3PH-150-2A	150VA	115/200 VAC	7.5 ADC	Multiple Unit Systems	13.0 lbs.
	3PH-375-2A	375VA	115/200 VAC	16.8 ADC		14.0 lbs.
	3PH-1500-2A	1500VA	115/200 VAC	66.0 ADC		29.0 lbs.
	3PH-2100-2A	2100VA	115/200 VAC	98.4 ADC		30.0 lbs.
	3PH-6000-2A	6000VA	115/200 VAC	270.0 ADC		78.0 lbs.
	3PH-9000-2A	9000VA	115/200 VAC	405.0 ADC		116.0 lbs.
	2A-750-1A	750VA	115/200 VAC	33.5 ADC	12.5"×5.8"×9.0"	17.5 lbs.
	2A-1050-1A	1050VA	115/200 VAC	46.9 ADC	12.5"×5.8"×9.0"	8.3 lbs.
	2A-3000-1B	3000VA	115/200 VAC	135.0 ADC	16.0"×13.9"×9.3"	49.0 lbs.
28 VDC to 50 Hz Single Phase Static Inverters	3A-50-1B	50VA	115 VAC	2.5 ADC	7.0"×5.0"×2.8"	3.9 lbs.
	3A-125-1B	125VA	115 VAC	5.6 ADC	7.0"×5.0"×2.8"	4.3 lbs.
	3A-250-1B	250VA	115 VAC	11.0 ADC	7.0"×5.0"×2.8"	4.5 lbs.
	3A-350-1B	350VA	115 VAC	16.4 ADC	7.0"×5.0"×2.8"	4.75 lbs.
	3A-1000-1G	1000VA	115 VAC	45.0 ADC	12.0"×8.5"×4.0"	12.5 lbs.
	PL-500-3A	500VA	115 VAC	22.0 ADC	Multiple Unit Systems	9.0 lbs.
	PL-1400-3A	1400VA	115 VAC	65.6 ADC		19.0 lbs.
	PL-2000-3A	2000VA	115 VAC	90.0 ADC		26.0 lbs.
	PL-3000-3A	3000VA	115 VAC	135.0 ADC		39.0 lbs.
	PL-4000-3A	4000VA	115 VAC	180.0 ADC		52.0 lbs.
	SR-100-3A	100VA	230 VAC	5.0 ADC		8.0 lbs.
	SR-250-3A	250VA	230 VAC	11.2 ADC		8.5 lbs.
	SR-2000-3A	2000VA	230 VAC	90.0 ADC		26.0 lbs.
	SP-1000-3A	1000VA	230 VAC	44.0 ADC		18.0 lbs.
	SP-4000-3A	4000VA	230 VAC	180.0 ADC		52.0 lbs.
	SP-6000-3A	6000VA	230 VAC	270.0 ADC		77.0 lbs.
	SP-8000-3A	8000VA	230 VAC	360.0 ADC		104.0 lbs.
	3A-500-1A	500VA	230 VAC	22.4 ADC	12.5"×5.8"×9.0"	13.0 lbs.
	3A-700-1A	700VA	230 VAC	31.3 ADC	12.5"×5.8"×9.0"	13.5 lbs.
	3A-1000-1D	1000VA	230 VAC	45.0 ADC	16.0"×13.9"×9.3"	36.0 lbs.
	3A-2000-1A	2000VA	230 VAC	90.0 ADC	16.0"×13.9"×9.3"	36.0 lbs.
28 VDC to 50 Hz Three Phase Static Inverters	3PH-150-3A	150VA	230/397 VAC	7.5 ADC	Multiple Unit Systems	16.0 lbs.
	3PH-375-3A	375VA	230/397 VAC	16.8 ADC		19.0 lbs.
	3PH-750-3A	750VA	230/397 VAC	33.0 ADC		26.0 lbs.
	3PH-1050-3A	1050VA	230/397 VAC	49.2 ADC		30.0 lbs.
	3PH-1500-3A	1500VA	230/397 VAC	66.0 ADC		28.0 lbs.
	3PH-2100-3A	2100VA	230/397 VAC	98.4 ADC		30.0 lbs.
	3PH-3000-3A	3000VA	230/397 VAC	135.0 ADC		72.0 lbs.
	3PH-6000-3A	6000VA	230/397 VAC	270.0 ADC		76.0 lbs.
	3PH-9000-3A	9000VA	230/397 VAC	405.0 ADC		190.0 lbs.
400 Hz Three Phase to 60 Hz Frequency Converters	4A-2000-1B	2000VA	115 VAC	20.5 AAC	16.0"×13.9"×9.3"	40.0 lbs.
	4A-3000-1B	3000VA	115 VAC	30.7 AAC	16.0"×13.9"×9.3"	55.0 lbs.
	4A-1000-1H	1000VA	115 VAC	10.24 AAC	12.0"×8.5"×4.1"	15.5 lbs.
	4A-1000-1HC	1000VA	115 VAC	10.24 AAC	12.0"×8.5"×4.1"	15.5 lbs.
	4A-3000-1C	3000VA	115/200 VAC	30.7 AAC	16.0"×13.9"×9.3"	55.0 lbs.
400 Hz Three Phase to 50 Hz Frequency Converters	4A-1000-1C	1000VA	230 VAC	10.24 AAC	16.0"×13.9"×9.3"	40.0 lbs.
	4A-2000-1A	2000VA	230 VAC	20.5 AAC	16.0"×13.9"×9.3"	40.0 lbs.
	4A-3000-1A	3000VA	115 VAC	30.7 AAC	16.0"×13.9"×9.3"	55.0 lbs.
	4A-1000-1G	1000VA	115 VAC	10.24 AAC	12.0"×8.5"×4.1"	15.5 lbs.
	4A-1000-1GC	1000VA	115 VAC	10.24 AAC	12.5"×8.5"×4.1"	15.5 lbs.

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cem

COMMONLY USED ELECTRICAL/ELECTRONIC ABBREVIATIONS AND ACRONYMS

A
AC alternating current
A/D analog to digital
ADC analog to digital converter
ADP automatic data processing
AF audio frequency
AFC automatic frequency control
ALGOL algorithmic language
AM amplitude modulation
AND a logical operator
AQL acceptable quality level
ASCII American national standard code for information interchange
AWG American wire gauge

B
BALUN balanced to unbalanced
BASIC beginners' all-purpose symbolic instruction
BCD binary-coded decimal
BNC baby "N" connector
BUS basic utility system

C
CAD computer aided design
CAM computer aided manufacture
CATV cable television or community antenna television
CERMET ceramic metal element
Comm. communications
CMOS complementary metal-oxide semiconductor
CPS characters per second
CPU central processing unit

D
D/A digital to analog
DAC digital to analog converter
DC direct current
DIAC bidirectional trigger diode
DIL dual in-line
DIN Deutsche Industrie Normenausschuss
DIP dual in-line package
DPM digital panel meter
DTL diode transistor logic

E
EDP electronic data processing
EBCDIC extended binary coded decimal interchange code
EEPROM electrically erasable PROM
EMC electromagnetic compatibility
EMI electromagnetic interference
EMP electromagnetic pulse
EPROM electrically programmable ROM
ESR equivalent series resistance

F
FEP fluorinated ethylene propylene Copolymar, 200° Teflon
FET field-effect transistor
FM frequency modulation
FORTRAN formula translator

G
GaAsFET gallium arsenide field effect transistor
GPIB general purpose interface bus

H
HF high frequency (3 to 30 MHz)
HIPOT test, measurement and diagnostic equipment
HLL high level language
HV high voltage
Hz Hertz

I
IC integrated circuit
IDC insulation displacement contact
IF intermediate frequency
IO input/output (devices)
IR insulation resistance (or) infrared

J
JFET junction field effect transistor
JMOS junction metal oxide semiconductor

K
kHz kilohertz (10^3 hertz)
KSR keyboard send receive

L
LC inductance capacitance
LCD liquid crystal display
LED light-emitting diode
LF low frequency (30 to 300 kHz)
LIF low insertion force
LNA low noise amplifier
LNB low noise band
LSI large scale integration
LVDT linear velocity displacement transformer

M
MASER microwave amplification by stimulated emission of radiation
MATV master antenna television
µF microforad
MHz megahertz
MIPS million instructions per second
MIB microcomputer interface board
MOS metal oxide semiconductor
MOSFET metal oxide semiconductor field effect transistor
MOSIGT metal-oxide semiconductor insulated-gate transistor
MOV metal oxide varistor
MPU microprocessor unit
MSI medium scale integration

N
NBS National Bureau of Standards
NEMP nuclear electromagnetic pulse
NIM nuclear instrumentation module
NOR not OR
NTC negative temperature coefficient

O
OCR optical character reader
OEM original equipment manufacturer
OR a logical operator

P
PC printed circuit
PCB printed circuit board
pF picofarad
PGA pin grid array
PIN positive-intrinsic-negative (transistor)
PLA programmable logic array
PLL phased lock loop
PPI plan position indicator
PROM programmable read only memory
PTC positive temperature coefficient
PUT programmable unijunction transistor

Q
QAM quadrature amplitude modulation
Q (meter) quality-factor meter

R
RAM random access memory
RC resistance-capacitance
RFI radio frequency interference
RMS root mean square
ROM read only memory
RF radio frequency
RFC radio-frequency choke
RFI radio-frequency interference
RTD resistance-temperature detector
RTL resistor transistor logic
RTV room temperature vulcanizing
RW read/write

S
SAS silicon asymmetrical switch
SBC single board (micro) computer
SBS silicon bilateral switch
SCR silicon-controlled rectifier
SCS silicon controlled switch
SDA source & detector assemblies
SIDAC bidirectional voltage-triggered switch
SIP single in-line package
SSI small scale integration
SSR solid state relay
STL Schottky transistor logic
SUS silicon unilateral switch

T
TC temperature coefficient
TCXO temperature compensated crystal oscillator
TFE tetrafluoride ethylene propylene Copolymer, 250° Teflon
TRIAC bidirectional AC switch
TTL transistor-transistor logic
TTY teletypewriter

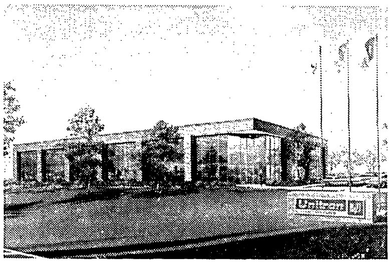
U
UHF ultra high frequency (300 MHz to 3 GHz)
UJT silicon unijunction transistor
UL Underwriters Laboratory
UPS uninterruptible power supply

V
VAC volts (of) alternating current
VAR volt-ampere reactive
VCR video cassette recorder
VDC volts (of) direct current
VHF very high frequency
VHSIC very high speed integrated circuit
VLF very low frequency (3 to 30 kHz)
VLSI very large scale integration
VME virtual machine environment
VRM voice recognition module
VTVM vacuum tube volt meter
VU volume unit
VSWR voltage standing wave ratio

W
WPS word processing software

Y
YIG yttrium iron garnet

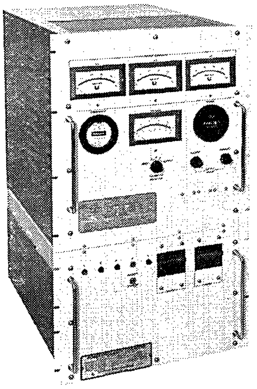
Z
ZIF zero insertion force

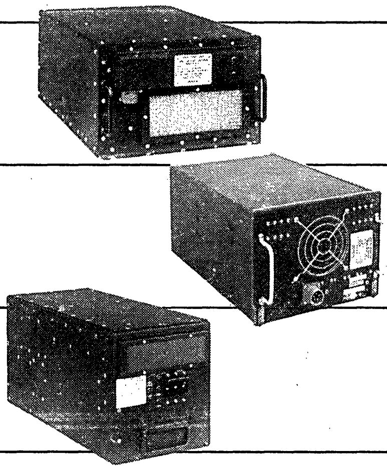


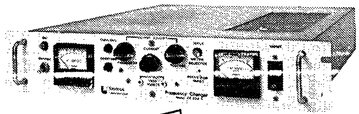
25 Years of Service

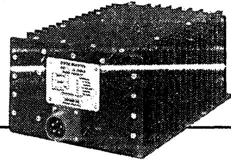
25 Years of Experience.

Beginning in 1960, Unitron, Incorporated has concentrated on the design and development of solid state static power conversion equipment. As a result, Unitron is able to produce equipment of high reliability and superior performance within practical economic limits. This single point concentration has resulted in Unitron's becoming the supplier of the largest variety of products to both the defense aerospace and industrial markets. With the world-wide desire to conserve natural resources Unitron has expanded its product line to include 400 Hz converters that operate from 50 Hz or 60 Hz sources. This expansion includes a series of new ultra-lightweight high efficiency units. We invite your inquiries.









NOW AVAILABLE!
New ultra-lightweight highly efficient units. Selectable output voltage and frequency. Parallelable for high power applications.

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AVTEL

FREQUENCY CONVERTERS
400 to 8000 VA SINE WAVE
400 Hz to 60* Hz

Unitron

GENERAL SPECIFICATIONS

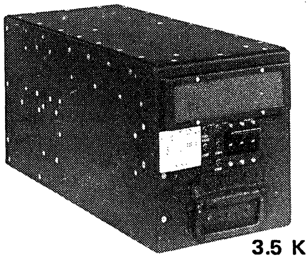
POWER RATING	INPUT		OUTPUT	
	PHASE	VOLTAGE	PHASE	VOLTAGE
400 VA	3φ	115/200 VRMS	1φ	115 VRMS
750 VA	3φ	115/200 VRMS	1φ	115 VRMS
*2000 VA	3φ	115/200 VRMS	1φ	115 VRMS
*3000 VA	3φ	115/200 VRMS	1φ	115 VRMS
3500 VA	3φ	115/200 VRMS	1φ	115 VRMS
8000 VA	3φ	115/200 VRMS	1φ	115 VRMS

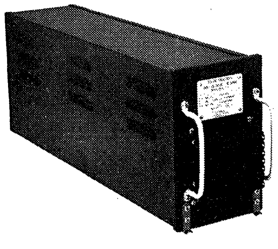
*Also available in 50 Hz output

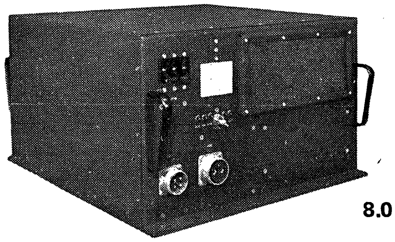
UNITRON IS THE LEADING MFG. OF 400 TO 60 Hz FREQUENCY CONVERTERS, WITH **EXPERIENCE EXCEEDING 18,000,000 HOURS OF FIELD OPERATION** IN AIRBORNE ■ SHIPBOARD ■ TRANSPORTABLE SHELTERS & GROUND POWER ENVIRONMENTS.

FEATURES:

- ■ **MIL SPECIFICATIONS (Standard power)**
- ■ **FEDERAL & NATIONAL STOCK LISTINGS**
- ■ **LIGHT WEIGHT**
- ■ **LOW DISTORTION**
- ■ **PRECISE FREQUENCY**
- ■ **FULLY PROTECTED**
- ■ **SINE WAVE OUTPUT**
- ■ **HIGH EFFICIENCY**
- ■ **LOW AUDIO NOISE**
- ■ **SELF-COOLED**
- ■ **LONG MAINTENANCE FREE OPERATION**
- ■ **6000 + NOW IN AIRBORNE OPERATION**
- ■ **HIGH RELIABILITY**
- ■ **LOW COST**


3.5 KVA


400 VA


8.0 KVA

APPLICATIONS: AIRBORNE ■ COMPUTERS ■ VIDEO SYS. ■ TELETYPE ■ CONVENIENCE ITEMS ■ MOVIE PROJECTOR ■ RECORDERS ■ TRASH COMPACTORS ■ TEST EQUIPMENT ■ DATA ACQUISITION ■ ETC. ■ **SHIPBOARD ■ GROUND & AIR TRANSPORTABLE SHELTERS ■ FLYING LABORATORIES ■ MEDICAL EVACUATION ■** THERMAL BLANKETS ■ EKG'S ■ BREATHING APPARATUS ■ LIFE SUPPORT ■

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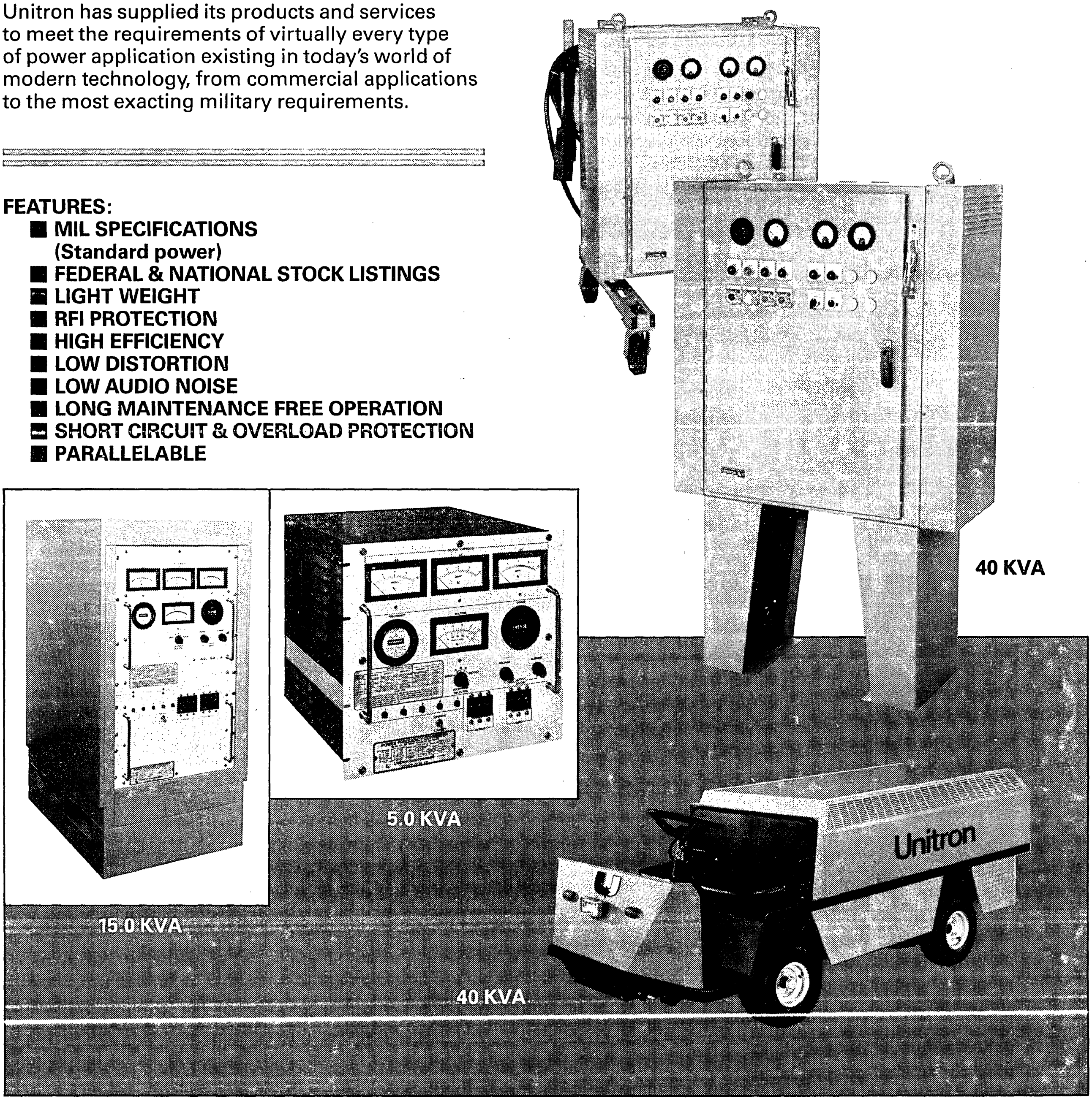
AVTEL

FREQUENCY CONVERTERS
500 VA to 160 KVA SINE WAVE
50/60 Hz to 400 Hz

Unitron

Unitron has supplied its products and services to meet the requirements of virtually every type of power application existing in today's world of modern technology, from commercial applications to the most exacting military requirements.

FEATURES:
- MIL SPECIFICATIONS (Standard power)
- FEDERAL & NATIONAL STOCK LISTINGS
- LIGHT WEIGHT
- RFI PROTECTION
- HIGH EFFICIENCY
- LOW DISTORTION
- LOW AUDIO NOISE
- LONG MAINTENANCE FREE OPERATION
- SHORT CIRCUIT & OVERLOAD PROTECTION
- PARALLELABLE



40 KVA

15.0 KVA

5.0 KVA

40 KVA

APPLICATIONS:
SHIPBOARD ■ SHELTERS ■ GROUND SUPPORT ■ SIMULATORS ■ AVIONICS TEST & REPAIR ■ LABORTORIES ■ HANGARS ■ Wherever precision power is required.

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BEHLMAN Engineering

AC POWER

From computer controlled AC Power Sources for test labs through back-up power in the computer room, to simple line conditioning systems, Behlman Engineering covers the entire spectrum of AC power requirements.

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Behlman Engineering's instrument quality AC power sources greatly enhance your testing capabilities and effectiveness for complex computer controlled, or simple manual tests. These efficient linear sources are widely used in ATE systems, laboratories, production lines, test facilities, quality control and many other applications.

- Manual or computer control
- 45 Hz to 10,000 Hz
- 100 VA to 54 KVA power ratings
- 1, 2, and 3 phase outputs
- Measurements of outputs independent of programmed values, including diagnostics
- IEEE-488 (Talker/Listener) interface
- ATE applications
- Military testing
- MATE and CSS programs

TURNKEY ATE SYSTEMS

A variety of standard and specialized ATE systems by Behlman Engineering meet new and demanding requirements. All systems provide straightforward and cost effective time saving solutions to problems.

- AC motor drive test systems
- DC power supply test systems
- Tachometer test workstations
- PC and mini computer based designs
- Menu prompting
- Complete turnkey operation

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A full range of line conditioning products, with several technologies to choose from, protect sensitive electronic equipment from all types of line anomalies. Whether used to protect PC's or entire facilities, Behlman's line conditioners span a wide range of applications. For high precision applications the LCL Series combines superior performance, pure sine wave output, and complete input and output transformer isolation. The LCH Series combines high efficiency and performance with low cost for a general range of conditioned power applications.

LCL Series

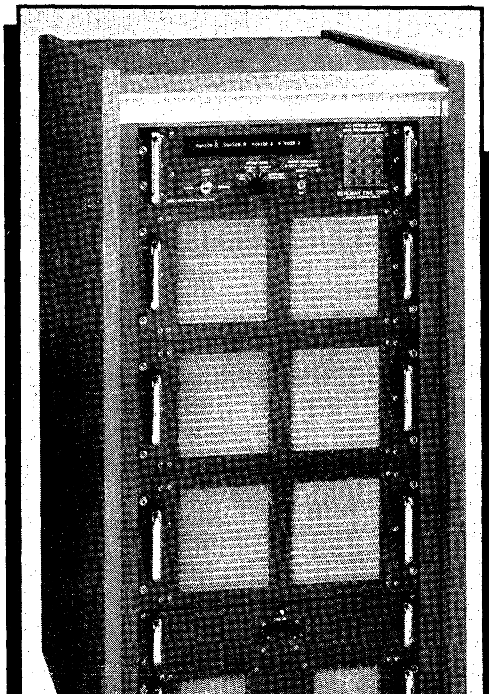
- Tempest and low EMI/RFI applications
- High noise rejection/suppression
- Fast response time for output regulation
- 100 VA to 54 KVA, 1 and 3 phase
- Up to 300% overload transient capability
- Pure sine wave

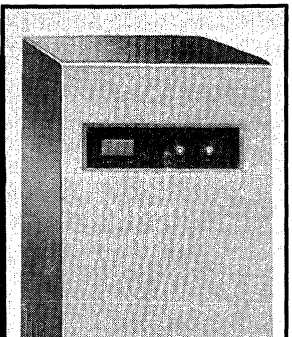
LCH Series

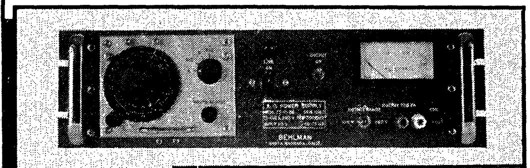
- High efficiency and low cost
- Compact and light weight
- Fast acting regulation
- 100 VA to 54 KVA, 1 and 3 phase
- 200 - 300% transient overload capability

UPS

Behlman UPS' continuously guard against power failure while also protecting sensitive electronic equipment from line anomalies. The range of applications spans from the office to advanced space and military programs. The Behlman UPS Series is







. . . For Every Application

best suited for sensitive applications requiring the finest in AC power. Types of applications include Tempest, instrumentation, security, communications, and Automatic Test Equipment. The UPS H Series provides high efficiency and low cost for most general office, computer system and industrial applications.

UPS Series
- Low EMI/RFI
- Input and output transformer isolation
- Purest sine wave power available
- 100 VA to 20 KVA, 1 and 3 phase
- Up to 300% transient overload capability

UPS H Series
- High efficiency, low cost
- High quality sine wave output
- High noise rejection/suppression
- Small, light weight
- 100 VA to 54 KVA, 1 and 3 phase
- 200 - 300% transient overload capability

CUSTOM SYSTEMS AND ACCESSORIES

As the innovative leader in the AC power industry since 1968, Behlman Engineering provides an ever expanding line of unique, yet practical power accessories. Behlman can rapidly develop custom systems and accessories that meet your special needs.

- AC power analyzers
- Smart AC power distribution
- Redundant and load sharing accessories
- Support software
- Special ATE systems

GENERAL PURPOSE AC POWER

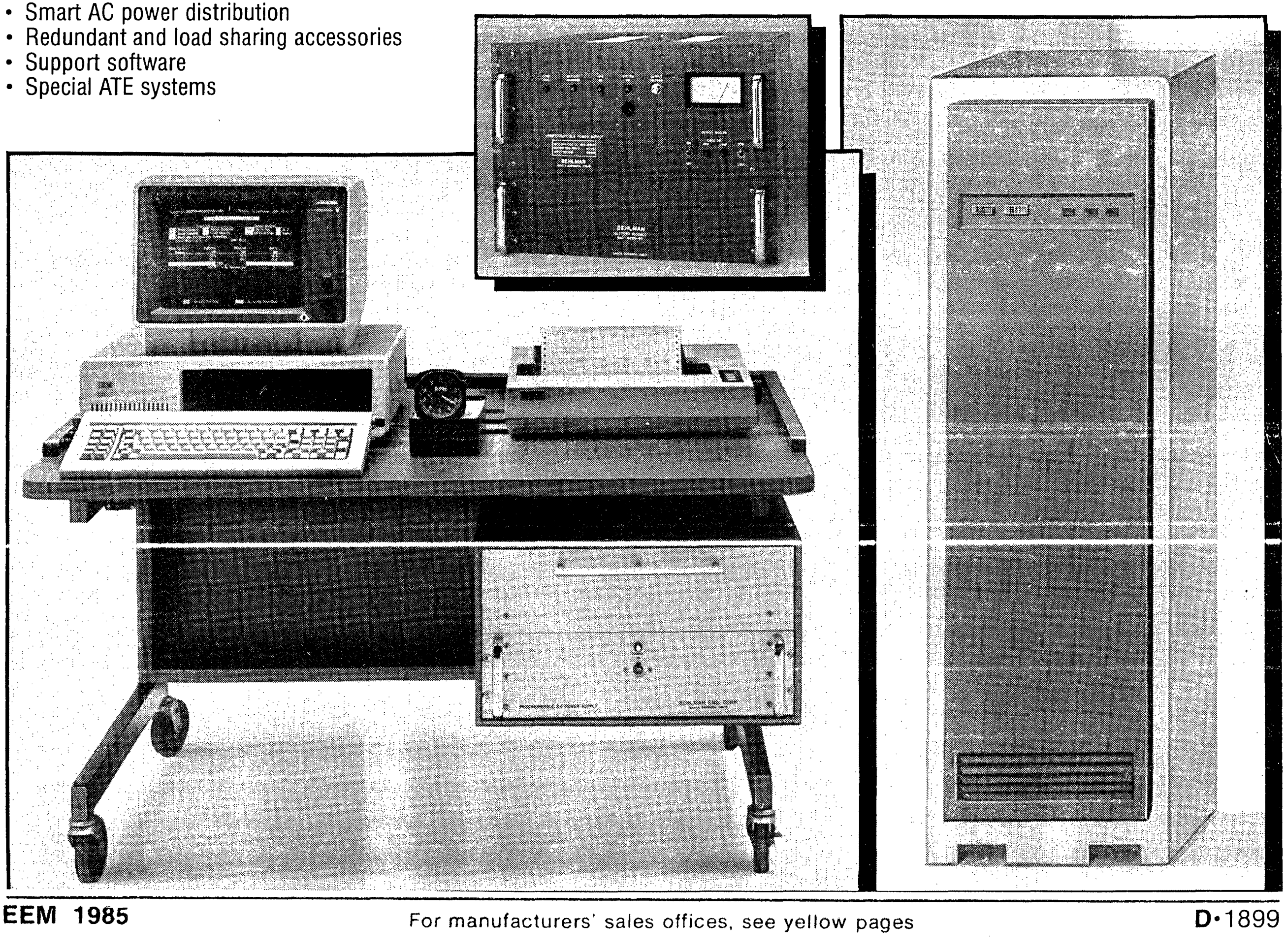
Behlman's General Purpose AC power systems provide economical, high quality sine wave power for a wide range of technical requirements such as military, industrial and marine. These cost effective products include Frequency changers, AC to AC sources and DC to AC inverters. All combine high efficiency with very low EMI/RFI.

- AC to AC sources
- Frequency changers
- DC to AC inverters
- 100 VA to 54 KVA, 1,2, and 3 phase
- Ruggedized and flight line models available
- Remote control options
- High efficiency, small size and weight

For more information, see the following pages or call collect.

BEHLMAN
Engineering
Electronic Energy Conversion Sources & Systems

(805) 684-8311
1142 Mark Avenue • Carpinteria, CA 93013

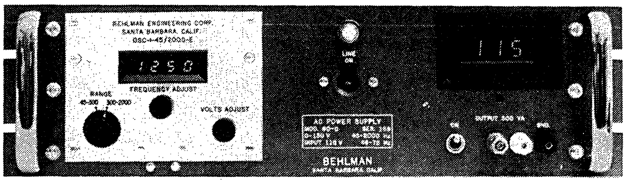


BEHLMAN Engineering

AC POWER

STD SERIES

AC POWER SOURCES



WIDE RANGE OF APPLICATIONS

- Motor Generator Replacements
- Power Supply Testing
- Relay Testing
- Avionics and Missile Test Systems
- General Laboratory Support
- Motor Testing
- Transformer Testing
- Military Test Systems
- Automatic Test Equipment
- Acceptance Testing
- Airborne, Marine, Ground Support

FEATURES

- Negligible EMI/RFI
- Smaller, lighter — saves rack space
- Tight regulation, low distortion
- Up to 18,000 VA per phase
- Overload protection with automatic recovery
- 45 Hz - 10 KHz fixed or variable output frequency
- Complete input/output transformer isolation
- 0-10 VDC, BCD, Straight Binary programming
- External sync
- 1% tc 0.001% frequency accuracies
- Up to 300% overload transient capability

DESCRIPTION

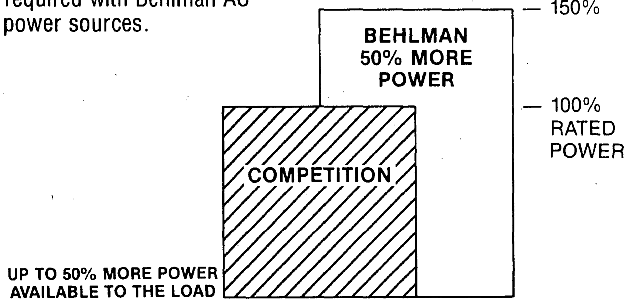
The Behlman STD Series of AC Power Sources are uniquely efficient linear power amplifiers driven by plug-in oscillators. Fixed and variable frequency oscillators, with frequency accuracies to 0.001% and 0.1% respectively, are available in a wide variety of standard models. The STD Series is best suited for manual and limited computer control applications requiring reliable, precision AC Power.

Both input and output are transformer coupled providing complete isolation for safety purposes and immunity from line noise. The output can be left floating or one side can be grounded. Complete overload, short circuit and fault protection is provided by a combination of an instantaneous, automatic-recovery electronic protector plus a fast acting main circuit breaker.

MORE COST EFFECTIVE

Unlike competitive power sources, Behlman AC Power sources are capable of providing continuous FULL-RATED volt-ampere output even under worst case conditions: zero power factor loads either leading or lagging, 10% low line, and output voltage at 77% of maximum. Continuous operation at 150% of rating is possible with unity power factor loads, maximum output voltage, nominal input voltage, middle 60% frequency range, and 25°C ambient.

Furthermore, many AC power sources require derating to half power in the 5 KHz to 10 KHz range. This derating is never required with Behlman AC power sources.



STD SERIES GENERAL SPECIFICATIONS*

INPUT

VOLTAGE: 115/230 VAC ±10% single phase on models through 1500 VA output. Three phase inputs available.
120/208 or 230 VAC ±10% three phase on models over 1500 VA output and up through 18000 output.
460 VAC ±10% three phase on models over 18000 VA output.

FREQUENCY: 48-72Hz (400Hz available).

Various input voltage, frequency and power options are available, many at no extra charge.

EFFICIENCY: 50-65% depending on operating conditions.

OUTPUT

VOLTAGE: 0-130 for single phase and 0-130 line to neutral for two or three phase models. Other ranges or combinations of ranges available.

FREQUENCY: 45-10,000Hz: See Selection Guide for frequency range of specific models.

LOAD REGULATION: ±0.5% No load to full load. Adjustable through zero for specific loads.

LINE REGULATION: ±0.1% for ±10% line change.

DISTORTION: 0.5% maximum harmonic distortion at frequency extremes. Less at mid-band.

RATED POWER OUTPUT: Obtainable from 100-130 volts out, down to 10% low line.

MAXIMUM CONTINUOUS RATED POWER: Up to 150% of nominal rating available depending on operating conditions.

MAXIMUM CONTINUOUS CURRENT: Up to 120% of nominal rating available depending on operating conditions.

PEAK SHORT TERM CURRENTS: 200% to 300% of rating depending on model and operating conditions.

POWER FACTOR: 100% of VA rating available into any power factor load (unity to zero, leading or lagging).

OVERLOAD PROTECTION: Electronic overload and short circuit protection with automatic instantaneous recovery when overload is removed.

FAULT PROTECTION: Fast-acting, main circuit breaker.

GENERAL

METERING: Output voltmeter. Digital readout optional.

AMPLIFIER DRIVE: 0-9.2 volts RMS. 15K ohms input impedance.

OPERATING TEMPERATURE: 0° to 55°C.

FRONT PANEL COLOR: Light grey, black engraved lettering.

*All specifications described are based on unity power factor loads and are subject to change without notice.

1142 Mark Avenue
Carpinteria, California 93013

Call Collect:
(805) 684-8311

STD SERIES PRICE LIST AND MODEL SELECTION

Use model number corresponding to output power level and number of phases desired. Add letter corresponding to desired frequency range. For example 3-10-D (three phase, 300 VA, 45-10,000 Hz). All units are in rack mounting enclosure except as noted below. Cabinet enclosed versions for any of these units are available.

Output Power		Max. Amperes (Per Phase) (0-130 V.)	Model Number	Output Frequency Range (Hz)				Weight (lbs) A&B Models	Dimensions
Maximum	Rated			150-2000	150-10,000	45-2000	45-10,000		
SINGLE PHASE				A	B	C	D		
150 VA	100 VA	1.2	10-	$ 1,075	$ 1,450	$ 1,125	$ 1,525	26	5¼"Hx15"Dx19"W
375 VA	250 VA	3.0	25-	1,425	1,925	1,500	2,025	38	5¼"Hx15"Dx19"W
525 VA	350 VA	4.2	35-	1,650	2,225	1,750	2,350	50	5¼"Hx15"Dx19"W
750 VA	500 VA	6.0	50-	1,900	2,575	2,000	2,700	60	5¼"Hx19"Dx19"W
1,125 VA	750 VA	9.0	75-	2,500	3,375	2,625	3,550	65	5¼"Hx19"Dx19"W
1,500 VA	1,000 VA	12.0	100-	2,850	3,850	3,000	4,050	85	8¾"Hx19"Dx19"W
2,250 VA	1,500 VA	18.0	150-	3,550	4,800	3,750	5,050	120	14"Hx19"Dx19"W
3,000 VA	2,000 VA	24.0	200-	4,475	6,025	4,750	6,350	145	14"Hx19"Dx19"W
4,500 VA	3,000 VA	36.0	300-	5,550	7,500	5,850	7,900	180	21"Hx19"Dx19"W
7,500 VA	5,000 VA	48.0	500-	9,250	12,500	9,750	13,175	280	31½"Hx22"Dx19"W
9,000 VA	6,000 VA	72.0	600-	11,125	15,000	11,700	15,800	290	31½"Hx22"Dx19"W
13,500 VA	9,000 VA*	108.0	900-	16,675	22,525	17,550	23,700	390	42"Hx22"Dx19"W
18,000 VA	12,000 VA	144.0	1200-	22,250	30,025	23,400	31,600	570	57¾"Hx22"Dx19"W
27,000 VA	18,000 VA*	216.0	1800-	33,350	45,025	31,500	47,400	780	42"Hx22"Dx19"W (2) ea.
THREE PHASE-Y				A	B	C	D		
450 VA	300 VA	1.2	3-10-	$ 2,625	$ 3,550	$ 2,775	$ 3,750	42	5¼"Hx19"Dx19"W
1,125 VA	750 VA	3.0	3-25-	3,550	4,800	3,750	5,050	72	7"Hx19"Dx19"W
1,575 VA	1,050 VA	4.2	3-35-	4,000	5,375	4,200	5,670	110	8¾"Hx22"Dx19"W
2,250 VA	1,500 VA	6.0	3-50-	4,975	6,725	5,250	7,075	145	14"Hx19"Dx19"W
3,375 VA	2,250 VA	9.0	3-75-	6,950	9,325	7,325	9,875	165	14"Hx19"Dx19"W
4,500 VA	3,000 VA	12.0	3-100-	8,850	11,550	9,000	12,150	200	21"Hx19"Dx19"W
6,750 VA	4,500 VA	18.0	3-150-	10,250	13,850	10,800	14,575	280	28"Hx19"Dx19"W
9,000 VA	6,000 VA	24.0	3-200-	11,400	15,400	12,000	16,200	325	29¾"Hx19"Dx19"W
13,500 VA	9,000 VA*	36.0	3-300-	17,100	23,075	18,000	24,300	390	42"Hx22"Dx19"W
18,000 VA	12,000 VA	48.0	3-400-	21,375	28,850	22,500	30,375	625	64¾"Hx22"Dx19"W
27,000 VA	18,000 VA*	72.0	3-600-	32,050	43,275	33,750	45,550	780	42"Hx22"Dx19"W (2) ea.
40,500 VA	27,000 VA*	108.0	3-900-	48,100	64,925	50,625	68,350	1170	42"Hx22"Dx19"W (3) ea.
54,000 VA	36,000 VA	144.0	3-1200-	64,125	85,575	67,500	91,125	1680	57¾"Hx22"Dx19"W (3) ea.
81,000 VA	54,000 VA*	216.0	3-1800-	96,176	129,850	101,250	136,675	2340	42"Hx22"Dx19"W (6) ea.

*Available only as a cabinet enclosed unit. Price does not include cabinet which will vary depending upon type and cabinet manufacturer desired. **TWO PHASE — PLEASE CONSULT FACTORY**

PLUG-IN OSCILLATORS

The OSC Series oscillators are designed to plug into the front panel of Behlman Engineering AC Power Supplies. They are available in a wide variety of flexed and variable frequency outputs. Single, two and three phase models provide suitable drive signals for multi-phase supplies. These oscillators readily synchronize with external signals.

FIXED FREQUENCY		BASE MODEL CODE	FREQUENCY ACCURACY					
			1%	0.5%	0.25%	0.1%	0.01%	0.001%
			E	F	G	H	J	K
Single Phase	Fixed	OSC-1-XXX-	$145	$175	$195	$225	$380	$515
	Dual Fixed	OSC-1-XXX-XXX-	$260	$315	$350	$405	$685	$925
TWO PHASE — PLEASE CONSULT FACTORY								
Three Phase	Fixed	OSC-3-XXX-	$235	$265	$285	$315	$450	$585
	Dual Fixed	OSC-3-XXX-XXX-	$425	$475	$515	$570	$810	$1055

VARIABLE FREQUENCY MODEL NUMBER	FREQUENCY ACCURACY			
	1%	0.5%	0.25%	0.1%
Single Phase	E	F	G	H
OSC-1-380/420-	$325	$370	$410	$485
OSC-1-350/450-	$350	$395	$430	---
OSC-1-300/500-	$375	$410	$450	---
OSC-1-44/66-	$375	$410	$450	---
OSC-1-44/66-320/480-	$440	$475	$515	---
OSC-1-45/2000-	$460	---	---	---
OSC-1-150/2000-	$450	---	---	---
OSC-1-45/10000-	$510	---	---	---
OSC-1-150/10000-	$490	---	---	---

Two and three phase, add approximately 26% and 36%.

For digital LED frequency readout in place of the circular dial, add $150.00 to the variable frequency model prices and designate with OSCD in place of OSC in the model number.

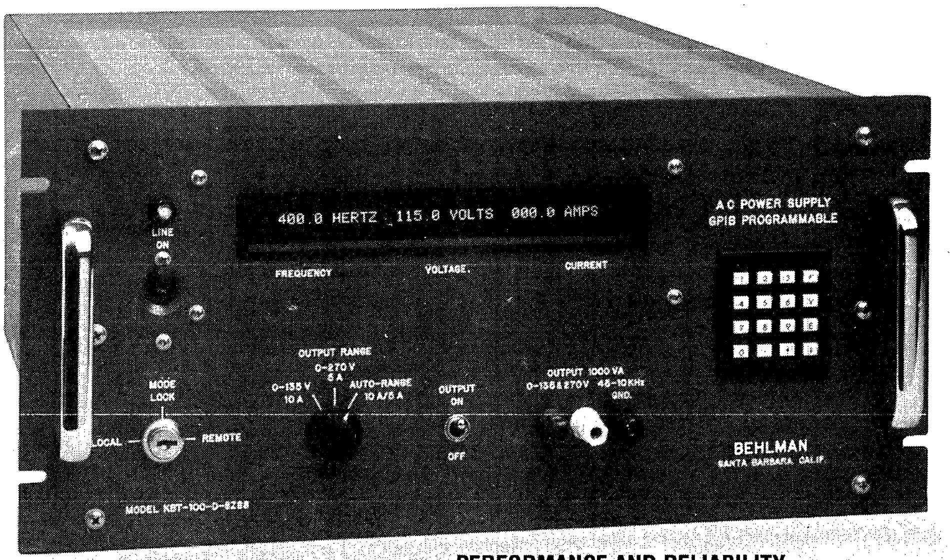
EXTERNAL SYNC ONE, TWO & THREE PHASES	CODE NUMBER SN	PRICE $55.00
EXTERNAL INPUT (PLUG-IN)	**MODEL NUMBER**	**PRICE PER PHASE**
Single Phase	EIP-1	$75.00
Two Phase	EIP-2	$85.00
Three Phase	EIP-3	$95.00

BEHLMAN
Engineering

AC POWER

KB SERIES

AC POWER SOURCES


400.0 HERTZ 115.0 VOLTS 000.0 AMPS
A C POWER SUPPLY
GPIB PROGRAMMABLE
LINE
ON
FREQUENCY
VOLTAGE
CURRENT
OUTPUT RANGE
0-270 V
5 A
0-135 V
10 A
AUTO-RANGE
10 A/5 A
MODE
LOCK
LOCAL
REMOTE
OUTPUT
ON
OFF
OUTPUT 1000 VA
0-135&270V 45-10KHz
GND.
BEHLMAN
SANTA BARBARA, CALIF.
MODEL KBT-100-D-8Z88

PROGRAMMABILITY

- Output Voltage
- Output Frequency
- Output phase to phase angle on multi-phase models
- Current Limit
- Local or Remote Control
- IEEE-488 (Talker/Listener) Interface
- CIIL, Atlas, ADA Languages

OUTPUT MEASUREMENTS

- RMS Voltage
- RMS Current
- True Power (Watts)
- Power Factor
- Frequency

FEATURES

- Up to 300% overload transient capability
- Reduces ATE system complexity
- Microcomputer based crystal referenced, synthesized sinewave
- Reduces support equipment
- Very low EMI/RFI
- Smaller, lighter — saves rack space
- Complete input and output transformer isolation

APPLICATIONS

- MIL-STD 704 Testing
- MATE & CSS Programs
- EMI/RFI Test Systems
- Aerospace Systems Testing
- Power Supply Testing
- Acceptance Testing
- Motor Testing

WIDE RANGE OF MODELS

- 45 Hz to 10,000 Hz
- 100 VA to 54 KVA Power Ratings
- 1, 2, & 3 Phase Outputs

PERFORMANCE AND RELIABILITY

- Level I Diagnostics
  - — Confidence Tests
  - — Automatic Fault Detection
  - — Built-In Test (BIT)
- Level II Diagnostics
  - — Continuous Spec. Verification
  - — Confidence Tests
  - — Enhanced Automatic Fault Detection
  - — Enhanced Built-In Test (BIT)

MATCHLESS FEATURES

In one price competitive package, Behlman Engineering has advanced the state of the art in AC power with the KB Series. KB Series AC Power Sources provide truly independent, simultaneous output measurements while tests are in progress. This makes testing easier because expensive external voltmeters, ammeters, frequency counters or power meters are eliminated.

Programming is accomplished by the front panel keyboard or a host computer and allows for incrementing and decrementing of the output values with user definable resolution. On command, measurements are reported on a front panel, forty character, alphanumeric, fluorescent display and/or a variety of optional host interfaces such as IEEE-488, RS-232, and others. Confidence Tests are carried out by Built-In Test (BIT) circuits that report via the display and/or host interface.

The KB Series delivers more power in the smallest, lightest package available, saving valuable rack space. As with the STD Series on the preceding page, the KB Series is capable of providing 150% of its rated power.

Behlman AC Power Sources greatly enhance testing capabilities and effectiveness for complex computer controlled, or simple manual tests.

1142 Mark Avenue
Carpinteria, California 93013

Call Collect:
(805) 684-8311

KB SERIES PRICE LIST AND MODEL SELECTION

Use model number corresponding to output power level and number of phases desired. Add letter corresponding to desired frequency range. For example, KBT 3-10-D (three phase, 100 VA per phase and 45-10,000 Hz). All units are in rack mounting enclosure except as noted below. Cabinet enclosed versions for any of these units are available.

Output Power		Max. Amperes (Per Phase)	Base Model	Output Frequency Range (Hz)				Weight	
Maximum	Rated	(0-130 V.)	Number	150-2000	150-10,000	45-2000	45-10,000	(lbs.) A&B Models	Dimensions
SINGLE PHASE				**A**	**B**	**C**	**D**		
150 VA	100 VA	1.2	KBT-10-	$ 3,075	$ 3,475	$ 3,125	$ 3,550	26	5.25"Hx19"Dx19"W
375 VA	250 VA	3.0	KBT-25-	3,450	3,975	3,525	4,075	38	5.25"Hx19"Dx19"W
525 VA	350 VA	4.2	KBT-35-	3,675	4,275	3,775	4,400	50	5.25"Hx19"Dx19"W
750 VA	500 VA	6.0	KBT-50-	3,950	4,650	4,050	4,775	60	7.0"Hx19"Dx19"W
1,125 VA	750 VA	9.0	KBT-75-	4,575	5,475	4,700	5,675	65	7.0"Hx19"Dx19"W
1,500 VA	1,000 VA	12.0	KBT-100-	4,950	5,975	5,100	6,200	85	8.75"Hx22"Dx19"W
2,250 VA	1,500 VA	18.0	KBT-150-	5,675	6,975	5,875	7,250	120	14"Hx19"Dx19"W
3,000 VA	2,000 VA	24.0	KBT-200-	6,650	8,275	6,875	8,600	145	14"Hx19"Dx19"W
4,500 VA	3,000 VA	36.0	KBT-300-	7,775	9,825	8,075	10,250	180	21"Hx19"Dx19"W
7,500 VA	5,000 VA	60.0	KBT-500-	11,650	15,075	12,175	15,775	280	31.5"Hx22"Dx19"W
9,000 VA	6,000 VA	72.0	KBT-600-	13,625	17,700	14,225	18,525	290	31.5"Hx22"Dx19"W
13,500 VA	9,000 VA*	108.0	KBT-900-	19,450	25,600	20,375	26,825	390	42"Hx22"Dx19"W
18,000 VA	12,000 VA	144.0	KBT-1200-	25,950	34,150	27,175	35,775	570	57.75"Hx22"Dx19"W
27,000 VA	18,000 VA*	216.0	KBT-1800-	38,900	51,200	40,750	53,650	780	42"Hx22"Dx19"W (2) ea.
TWO PHASE — PLEASE CONSULT FACTORY									
THREE PHASE-Y				**A**	**B**	**C**	**D**		
450 VA	300 VA	1.2	KBT3-10-	5,075	6,050	5,225	6,275	42	5.25"Hx22"Dx19"W
750 VA	500 VA	2.0	KBT3-17-	5,650	6,800	5,850	7,025	65	7"Hx22"Dx19"W
1,125 VA	750 VA	3.0	KBT3-25-	6,050	7,400	6,275	7,675	72	7"Hx22"Dx19"W
1,575 VA	1,050 VA	4.2	KBT3-35-	6,550	8,025	6,750	8,350	110	8.75"Hx22"Dx19"W
2,250 VA	1,500 VA	6.0	KBT3-50-	7,600	9,475	7,875	9,850	145	14"Hx19"Dx19"W
3,375 VA	2,250 VA	9.0	KBT3-75-	9,725	12,325	10,125	12,850	165	14"Hx19"Dx19"W
4,500 VA	3,000 VA	12.0	KBT3-100-	11,425	14,650	11,925	15,300	200	21"Hx19"Dx19"W
6,750 VA	4,500 VA	18.0	KBT3-150-	13,275	17,125	13,850	17,925	280	28"Hx19"Dx19"W
9,000 VA	6,000 VA	24.0	KBT3-200-	14,500	18,800	15,150	19,650	325	35"Hx19"Dx19"W
13,500 VA	9,000 VA*	36.0	KBT3-300-	20,625	27,050	21,600	28,375	390	42"Hx22"Dx19"W
18,000 VA	12,000 VA	48.0	KBT3-400-	25,235	33,250	26,425	34,900	625	64.75"Hx22"Dx19"W
27,000 VA	18,000 VA*	72.0	KBT3-600-	36,700	48,775	38,525	51,200	780	42"Hx22"Dx19"W (2) ea.
40,500 VA	27,000 VA*	108.0	KBT3-900-	55,050	73,175	57,800	76,800	1170	42"Hx22"Dx19"W (3) ea.
54,000 VA	36,000 VA	144.0	KBT3-1200-	73,400	97,550	77,050	102,400	1680	57.75"Hx22"Dx19"W (3) ea.
81,000 VA	54,000 VA*	216.0	KBT3-1800-	110,100	146,325	115,575	153,600	2340	42"Hx22"Dx19"W (6) ea.

*Available only as a cabinet enclosed unit.

GENERAL SPECIFICATIONS*

*All specifications are based on unity power factor loads and are subject to change without notice.

INPUT

VOLTAGE: 115/230 VAC ±10% single phase on models through 1500 VA output. Three phase inputs available.
120/208 or 230 VAC ±10% three phase on models over 1500 VA output and up through 18000 output.
460 VAC ±10% three phase on models over 18000 VA output.

FREQUENCY: 48-72Hz (400Hz available).
Various input voltage, frequency and power options are available, many at no extra charge.

EFFICIENCY: 50-65% depending on operating conditions.

OUTPUT

VOLTAGE: Single phase: 0-135 and 0-270 with autorange change at 135 volts.
Two or three phase: 0-135 line to neutral. (0-270 with autorange change at 135 volts is optional.)

FREQUENCY: 45-10,000Hz; See Selection Guide for frequency range of specific models.

LOAD REGULATION: ±0.2%, no load to full load.

LINE REGULATION: ±0.1% for ±10% line change.

DISTORTION: Less than 1% total harmonic distortion.

RATED POWER OUTPUT: Obtainable from 100-135 volts out and 200-270 volts out, down to 10% low line.

MAXIMUM RATED POWER: Up to 150% of nominal rating available depending on operating conditions.

POWER FACTOR: 100% VA rating available into any power factor load (unity to zero, leading or lagging).

OVERLOAD PROTECTION: Electronic overload and short circuit protection with automatic instantaneous recovery when overload is removed.

OVER VOLTAGE PROTECTION (OVP): Continuously tracking within 5% of operating value.

FAULT PROTECTION: Fast-acting, main circuit breaker.

OUTPUT SENSING: Optional individual remote sensing for each phase. Various output voltage, frequency and power options available.

WAVEFORM GENERATION

OSCILLATOR TYPE: Microcomputer based, crystal referenced, synthesized sinewave.

FREQUENCY ACCURACY: ±0.001%

MEASUREMENT

VOLTAGE RMS
Accuracy: ±1.0% at Full Scale, ±1LSD
Units of Measure: Volts

CURRENT RMS
Accuracy: ±0.5% of Full Scale, ±1LSD
Units of Measure: Amperes

FREQUENCY
Accuracy: ±0.01%, ±1LSD
Units of Measure: Hertz

PHASE ANGLE CONTROL (Optional)
Accuracy: ±1 Degree, ±1LSD
Units of Measure: Degrees

POWER (Optional)
Accuracy: ±3.0%, ±1LSD
Units of Measure: Volt Amperes

FRONT PANEL DISPLAY/CONTROL

DISPLAY TYPE: 40 character, alphanumeric, blue vacuum fluorescent.

PROGRAMMING MEDIA: 16 key (single-phase models) or 20 key (multi-phase models) alphanumeric keypad.

OUTPUT CONTROL: ON/OFF Toggle Switch or remote control of output to external terminals (Confidence relay used with MATE and CSS type applications.)

MASTER POWER: ON/OFF Circuit Breaker for line power input control.

OUTPUT RANGE: Low, high, autorange.

GENERAL

OPERATING TEMPERATURE: 0° to 50° Celsius.

FRONT PANEL: Light grey, with black engraved lettering.

OPTIONAL HOST INTERFACES

IEEE-488 (GPIB), 1978	Parallel BCD
RS-232C	0-10 VDC
Parallel Binary	

A front panel LOCAL/REMOTE keylock switch is included with the host interface.

PROGRAMMING ACCURACY

VOLTAGE AMPLITUDE: 0.2% of full scale.

FREQUENCY: ±0.001% of programmed value.

PHASE ANGLE: ±1.0 degree through 360 degrees (multi-phase models).

CURRENT LIMIT (Optional): 1% to 120% of maximum rated output current.

PROGRAMMING RESOLUTION

VOLTAGE AMPLITUDE: 0.1 Volt

FREQUENCY: 0.1 Hertz

PHASE ANGLE: 1.0 Degree (multi-phase models)

CURRENT LIMIT (Optional): 0.1 Ampere

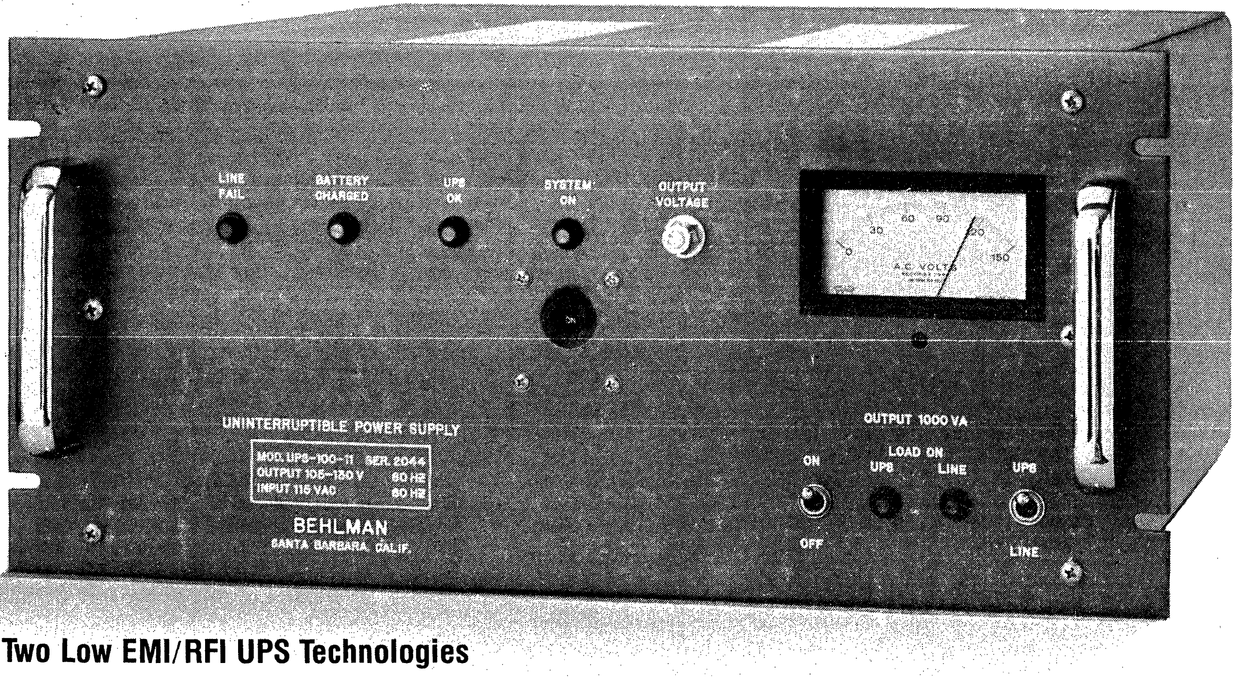
PROGRAMMING LANGUAGES

HIGH LEVEL LANGUAGE COMPATIBILITY: Direct use with Control Intermediate Interface Language (CIIL), Atlas, Ada, and most standard programming languages.

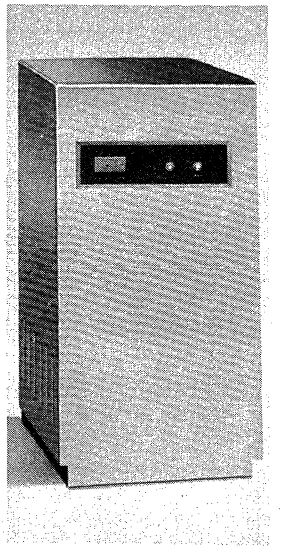
BEHLMAN
Engineering

AC POWER

UNINTERRUPTIBLE POWER SYSTEMS



Now, Two Low EMI/RFI UPS Technologies



UPS SERIES

- Negligible EMI/RFI
- Rugged design and high reliability
- Continuous on-line duty
- Complete input and output transformer isolation
- Linear power amplifiers provide pure sine wave
- Cleanest output available
- High noise rejection/suppression
- Up to 300% overload transient capability

UPS H SERIES

- High efficiency, low cost
- High quality sine wave output
- High noise rejection/suppression
- Small and light weight
- Continuous on-line duty
- Very low distortion
- Tight line and load regulation

Behlman's battery backed UPS' continuously guard against power interruption while protecting sensitive electronic equipment from adverse line disturbances. The range of applications span from the office to advanced space and military programs. When normal power is available, Behlman UPS' condition the power, eliminating line anomalies. If a complete failure of the line occurs or line anomalies exceed tolerable limits, operation is automatically switched to a battery supply allowing the UPS to maintain an uninterrupted output of high quality AC power.

All Behlman UPS' include a battery charger, solid state bypass switch and power line failure alarm provisions. Battery banks can be furnished for relay rack mounting or to a customer's specific requirements.

UPS SERIES

Behlman's UPS Series is ideally suited for sensitive applications requiring the finest in AC power. Types of applications include Tempest, instrumentation, security, communications, and Automatic Test Equipment. This series uses linear amplifier designs. Such amplifiers inherently do not generate EMI or RFI either conducted or radiated. An additional benefit is low distortion (under 1.0%), and tight line and load regulation. The UPS Series provides an output of superb quality that is unmatched by any other UPS manufactured today. Other designs such as Pulse Width Modulation switchers cannot achieve the purity of output nor low EMI/RFI levels.

UPS H SERIES

The UPS H Series provides high efficiency and low cost for general office and computer applications. Linear and switcher techniques are combined in a completely new concept by Behlman Engineering. No other UPS design combines high efficiency, clean sine wave output, and extremely low level EMI/RFI. All of these extra features are added to a top quality UPS with pricing as competitive as other manufacturers' economy models. Please consult the factory for more information on the UPS H Series.

1142 Mark Avenue
Carpinteria, California 93013

Call Collect:
(805) 684-8311

UPS SERIES MODEL INFORMATION

1. To develop a complete model number, use the model number of this table (example UPS-10-) followed by the dash number for the Input/Output combination desired. Example: UPS-10-11 is a 100 VA unit with single phase, 115 VAC, 60 Hz input and output.
2. All models listed are rack mount type.
3. Battery packs listed are only suggestions for 15 minutes back-up using Gel-Cel batteries except where noted. See Price List for complete battery selection guide or contact factory for selection assistance.
4. External battery models are available.

MODEL[1]	TOTAL POWER OUTPUT	CURRENT OUTPUT PER PHASE (AMPERES)	WEIGHT (lbs)	DIMENSIONS[2] (in) (Not Including External Batteries)	RECOMMENDED BATTERY PACK[3] (Gel Cell)
SINGLE PHASE MODELS					
UPS-10-	100 VA, 1Ø	1	65	5.25Hx19Dx19W	Internal (60 min)[4]
UPS-25-	250 VA, 1Ø	2.5	70	5.25Hx19Dx19W	Internal (20 min)[4]
UPS-35-	350 VA, 1Ø	3.5	85	7Hx19Dx19W	Internal (15 min)[4]
UPS-50-	500 VA, 1Ø	5.0	65	5.25Hx19Dx19W	BAT 6020-20
UPS-75-	750 VA, 1Ø	7.5	70	5.25Hx19Dx19W	BAT 6020-20
UPS-100-	1.0 KVA, 1Ø	10	100	8.75Hx22Dx19W	BAT 6040-05
UPS-150-	1.5 KVA, 1Ø	15	160	14Hx19Dx19W	BAT 6040-05
UPS-200-	2.0 KVA, 1Ø	20	175	14Hx19Dx19W	2 ea BAT 6040-05
UPS-300-	3.0 KVA, 1Ø	30	225	22.75Hx22Dx19W	2 ea BAT 6040-05
UPS-500-	5.0 KVA, 1Ø	42	310	28Hx22Dx19W	3 ea BAT 6040-05
UPS-750-	7.5 KVA, 1Ø	63	395	33.25Hx22Dx19W	4 ea BAT 6040-05
THREE PHASE MODELS					
UPS3-100-	3.0 KVA, 3Ø	10	260	33.25Hx22Dx19W	2 ea BAT 6040-05
UPS3-150-	5.0 KVA, 3Ø	15	385	33.25Hx22Dx19W	3 ea BAT 6040-05
UPS3-200-	7.5 KVA, 3Ø	21	405	36.75Hx22Dx19W	4 ea BAT 6040-05
UPS3-300-	10 KVA, 3Ø	30	520	45.5Hx22Dx19W	5 ea BAT 6040-05
UPS3-500-	15 KVA, 3Ø	42	790	68.25Hx22Dx19W	8 ea BAT 6040-05
UPS3-600-	20 KVA, 3Ø	60	1040	2 ea 45.5Hx22Dx19W	10 ea BAT 6040-05
		Lower three phase units available; contact factory.			

INPUT/OUTPUT COMBINATIONS AVAILABLE

	INPUT			OUTPUT		
Dash No.	Voltage	Phase	Frequency	Voltage	Phase	Frequency
11	115 VAC	1	60	115 VAC	1	60
12	230 VAC	1	60	230 VAC	1	60
13	220/230 VAC	1	50	220/230 VAC	1	50
15	100 VAC	1	50	100 VAC	1	50
31	120/208 VAC	3	60	120/208 VAC	3	60
32	230 VAC	3	60	230 VAC	3	60
33	460 VAC	3	60	460 VAC	3	60
34	220/380 VAC	3	50	220/380 VAC	3	50
35	380 VAC	3	50	380 VAC	3	50
36	120/208 VAC	3	60	120 VAC	1	60
37	120/208 VAC	3	60	230 VAC	1	60
38	230 VAC	3	60	115 VAC	1	60
39	230 VAC	3	60	230 VAC	1	60
40	460 VAC	3	60	115 VAC	1	60
41	460 VAC	3	60	230 VAC	1	60
42	220/380 VAC	3	50	220/380 VAC	1	50
43	380 VAC	3	50	220/230 VAC	1	50

GENERAL SPECIFICATIONS

INPUT

Voltage: See Selection Guide
Voltage Range: ±10%
Frequency: See Selection Guide
Frequency Range: ±3 Hz
Power Factor (worst case): 0.8 lagging

OUTPUT

Voltage: See Selection Guide
Voltage Regulation: ±1% line and load
Voltage Adjustment: ±10% (i.e. 105-130 volts on 115 volt model)
Frequency: See Selection Guide
Frequency Accuracy (Freerunning): ±0.1% (0.01% and 0.001% available)
Frequency Stability (Freerunning): ±0.01% (short term), ±0.1% (long term)
Line Synchronization: Capture range ±3 Hz at a 1 Hz per second slew rate
Waveform: Sinewave
Distortion: 1% maximum total harmonic distortion
Load Power Factor Range: Unity to zero, leading or lagging
Overload Rating: 125% for 10 minutes, 150% for 30 seconds, 200% for 1 second

MISCELLANEOUS

Controls: System "On-Off" circuit breaker, Output Voltage Adjustment, Manual Bypass Switch "UPS-Line," Output to load "On-Off"
Indicators: Line Failure, Battery Charged, UPS OK, System On, Load On UPS, Load On Line
Contact Closure Outputs: Line Failure, UPS Off, Low Battery; Single Pole, Normally Open, and optional Load on line and Load on UPS
Meter: Output Voltage
Static Transfer Switch: 4ms transfer to bypass line for inverter failure or overload, automatic re-transfer to inverter after removal of overload
Manual Bypass Switch: Front Panel Control for transfer of load to bypass line during UPS maintenance or checkout
Battery Chargers: Designed for rapid recharge. Rate and current depend on battery selection.
Operating Temperature: 0°C to 40°C
Operating Humidity: 0 to 95% relative humidity; non-condensing
MTBF: 20,000 hours minimum; 100,000 hours for AC output failure including static transfer switch
MTTR: 30 minutes

MINIGLOSSARIES
FORMULAS • CHARTS
PRODUCT SELECTION GUIDES
FORMS
CODES

TECHNICAL INFORMATION

WHERE TO FIND THEM IN THE 85/86 EDITION OF EEM

Abbreviations/Acronyms ... **A**•1166, **B**•1012, **C**•1028, **D**•1016
ASCII Code ... **D**•1087
Batteries, Product Selection Guide ... **D**•1413
Batteries & Fuel Cells, Characteristics ... **D**•1430
Cabinets, Enclosures, Racks, & Chassis, Product Selection Guide ... **C**•1003
Capacitors, Basic Formulas ... **A**•1093
Capacitors, Miniglossary ... **A**•1066
Capacitors, Product Selection Guide ... **A**•1003
Circuit Boards (Printed) Product Selection Guide ... **C**•1099
Coils, Chokes, Inductors, Product Selection Guide ... **A**•1205
Conductors, Maximum Current Capacity of Copper & Aluminum ... **C**•1863
Connectors, Miniglossary ... **C**•1129
Connectors, Terminals, & Sockets, Product Selection Guide ... **C**•1105
Crystals, Oscillators, Crystal & Piezoelectric Filters, Product Selection Gude ... **A**•1309
Delay Lines, Product Selection Guide ... **A**•1459
Discrete Semiconductors, Product Selection Guide ... **A**•2067
Displays, Readouts, Lamps, & Lights, Product Selection Guide ... **B**•1015
EBCDIC Code ... **D**•1092
Encapsulation, Miniglossary ... **C**•1086
Fans, Blowers, Cooling Equipment, & Heat Exchangers, Product Selection Guide ... **C**•1623
Filters, Product Selection Guide ... **A**•1583
Instruments, Graphic Recording Product Selection Guide ... **D**•1401
Instruments, Panel Meters, Product Selection Guide ... **D**•1329
Instruments, Test & Measuring Product Selection Guide ... **D**•1175
Interconnection Systems, Product Selection Guide ... **C**•1699
Keyboards & Keypads, Product Selection Guide ... **B**•1705
Logofinder & Trademark Directories ... **B**•901
Microwave Components, Product Selection Guide ... **A**•1701
Military Qualified Products Lists ... **B**•1003
Motors, Drives, & Rotating Components, Product Selection Guide ... **B**•1129
Opto Semiconductors, Miniglossary ... **B**•1214
Oscilloscopes, Product Selection Guide ... **D**•1385
Panel Hardware, Product Selection Guide ... **C**•1589
Potentiometers, Trimmers, Controls, & Rheostats, Product Selection Guide ... **A**•1991
Power Supplies, Miniglossary ... **D**•1462
Power Supplies, AC, Product Selection Guide ... **D**•1877
Power Supplies, DC, Product Selection Guide ... **D**•1447
Protective Components (Fuses, Circuit Breakers, etc.), Product Selection Guide ... **B**•1225
Relay Contact Forms ... **B**•1317
Relays, Electromechanical, Miniglossary ... **B**•1308
Relays, Product Selection Guide ... **B**•1261
Resistor Color Codes ... **A**•1828
Resistors, Product Selection Guide ... **A**•1785
Servo Components, Miniglossary ... **D**•1985
Solenoids, Product Selection Guide ... **B**•1463
Switches, Product Selection Guide ... **B**•1477
Thermal Components, Product Selection Guide ... **B**•1741
Thermal Conductivity of Dielectrics at Room Temperature ... **B**•1744
Thyristors/High Power Diodes, Miniglossary ... **A**•2076
Transducers & Encoders, Product Selection Guide ... **B**•1777
Transformers, Product Selection Guide ... **A**•2099
Wire & Cable, Product Selection Guide ... **C**•1743
Wire Gauges—Diameter, Area, Copper Weight ... **C**•1844

TESTING POWER.

Precision control of the AC power in your testing application.

Total control of amplitude, frequency, phase-angle, and current is at your fingertips. California Instruments manufactures power sources ranging from simple frequency converters to laboratory instruments to complex ATE systems. Applications include:

- Avionics Testing
- Frequency Conversion
- Instrument Calibration
- DC Power Supply Testing
- Ground Power Simulation
- Position Sensor (LVDT/RVDT, Synchros, etc.) Testing
- Circuit Breaker, Fuse, etc. Testing
- Military Electronics Testing
- Gyro Testing—Microsyn and Wheel Supplies

The innovative modular building-block approach provides you with the flexibility to configure systems tailored to your application.

The California Instruments Invertron® AC Power Sources and associated oscillators feature:

- Power Ratings—100 VA to 36,000 VA
- Multi-Phase Power Configurations
- Adjustable Voltages—to 270 V RMS
- Adjustable Frequency—20 Hz to 20 kHz
- Sine- or Square-Wave Output
- Adjustable Phase-Angle—0.01° Increments
- Current Sources—1 Amp to 200 Amps
- Mate IEEE-488 Interface with CIIL or our own Abbreviated Plain English (APE) Language

With over twenty years of experience, California Instruments is unmatched in the precision AC power field. Our applications engineering staff has the expertise to help with your requirement. Get precision testing power into your application. Call or write today for assistance and a complete catalog.

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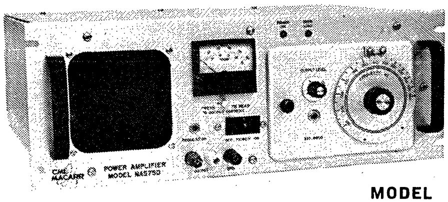
CML MACARR®™

POWER SUPPORT EQUIPMENT

SOLID STATE
WIDE BAND AC POWER SUPPLIES—45-10KHz
Single Phase and Three Phase

NAS series 500VA to 1KVA

Single Phase



MODEL
NAS 750-1

Model	Output Power VA	Input Power	Dimensions H x W x D	Shipping Weight
NAS-500	500	115/230 1φ 47-63 Hz	7 x 19 x 17	114 lbs.
NAS-750	750	115/230 1φ 47-63 Hz	7 x 19 x 19	125 lbs.
NAS-1000	1000	208/230 3φ 47-63 Hz	12¼ x 19 x 19	150 lbs.

TAS series 500VA to 3KVA

Three Phase

MODEL	OUTPUT POWER VA	INPUT POWER	DIMENSIONS H x W x D	SHIPPING WEIGHT
TAS-500	500	115/230 3φ 47-63 Hz	8¾ x 19 x 19	160 lbs.
TAS-1500	1500	208/230 3φ 47-63 Hz	14 x 19 x 19	205 lbs.
TAS-2000	2000	208/230 3φ 47-63 Hz	14 x 19 x 19	225 lbs.
TAS-3000	3000	208/230 3φ 47-63 Hz	20 x 19 x 19	290 lbs.

Plug-In Oscillators

Frequency	1φ*	3φ	Frequency Stability			
			.25	.1	.01	.001
400	SSG14	SSG34	A	B	—	—
400	STG14	STG34	—	—	E	G
50	SSG11	SSG31	A	B	—	—
50	STG11	STG31	—	—	E	G
60	SSG12	SSG32	A	B	—	—
60	STG12	STG32	—	—	E	G
45-70	SSG13	SSG33	A	C	—	—
350-450	SSG15	SSG35	A	C	—	—
300-2 kHz	SSG16	SSG36	A	C	—	—
45-6 kHz	SSG17	SSG37	A	C	—	—
45-10 kHz	SSG10	SSG30	A	C	—	—
External Signal Adapter (0-5V)	SA2T	N/A	—	—	—	—

* All 1φ oscillators have 600 ohm jack receptacle for external oscillators.

C—Available on special order.

- Plug-In Oscillators
- Low Harmonic Distortion
- Outputs 0-65, 0-130, 260V available
- Minimum Package Sizes 500 VA in 7″ high standard rack space
- Response time 50 microseconds
- Frequency stability .25% to .001%

Specifications

OUTPUT CONFIGURATION: Single phase two wire isolated. Three phase four wire. WYE with taps for Delta loads.

OUTPUT VOLTAGE: Single phase units, model NAS 500 standard; (-1) 0-130V with full power @ 105-130V. Optional; (-2) 0-65/0-130/0-260V with full power @ 55-65V/105-130V/210-260V respectively. Includes automatic range voltmeter, current meter and range indicator lights. All other models 0-130/0-260V with full power 105-130V/210-260V. All Three Phase units — 105-130V/185-225V line to line WYE or Delta loads.

PROTECTION: Current overload

LOAD POWER FACTOR: .7 lead or lag.

HARMONIC DISTORTION: Less than .5%, 45-10 KHz @ full load. Less than 1% with plug-in oscillator. Less than 2% for 3φ units.

REGULATION: ±.25% with ±10% input line variation ±1.0% NF-FL.

OUTPUT PHASE SEPARATION: 120 ±1° for fixed frequency models as well as 350-450 Hz models. 120 ±2° for 45-70 and 300-2,000 Hz models. 120 ±3° for 45-6,000 Hz models.

NOISE LEVEL: 70 db below rated output.

OPERATING TEMPERATURE: −20°C to +40°C.

TEMPERATURE STABILITY: Voltage .05% per degree C typical. Frequency .05% per degree C typical.

METERS: Models 500 VA and up include panel mounted output voltmeters.

CONTROLS: Output voltage and frequency controls mounted on plug-in oscillator panels where required.

CONSTRUCTION: Standard 19″ rack mount with full dust covers. Bench adapters (-C) or chassis slides (-S) available at extra cost. Add suffix to Model Number. Rear or side supports required.

FINISH: Front panels finished in ivory paint with black marking. Chassis surfaces are protected by irridite.

MODIFICATIONS AVAILABLE ON SPECIAL ORDER

Single Phase and Two Phase Output

Standard 3 phase power supplies may be used to provide a 2 phase output at ⅔ of rated power. An internal selector switch internally provides either 90 degrees or 120 degrees phase separation for 2 or 3 phases respectively. Three 1 phase units may be operated as a 2 phase or 3 phase system.

CML MACARR®™

POWER SUPPORT EQUIPMENT

MARINE ELECTRIC RPD INC.
CML MACARR DIVISION
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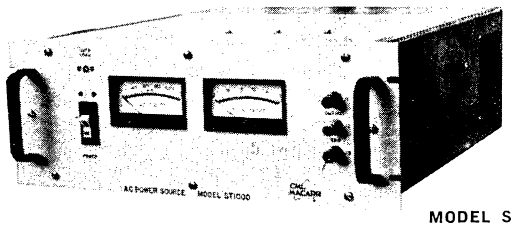
SYNAMP® solid state frequency converters synthesized sine wave NOW IN STOCK!!

single phase 50-60-400 Hz

ST series 500VA to 2000VA



MODEL ST-1000

Model	Output Power VA	Output Amps Max.	*Input	Dimensions H x W x D	Shipping Weight
ST500	500	4.76	115/230 1φ 47-63 Hz	5¼ x 19 x 21	103 lbs.
ST1000	1000	9.52	115/230 1φ 47-63 Hz	7 x 19 x 21	115 lbs.
ST2000	2000	19.04	208/230 3φ 47-63 Hz	8¾ x 19 x 21	216 lbs.

*400 Hz input available on special order.
**47-63 Hz available on special order.

three phase 50-60-400 Hz

TT series 1500VA to 6000VA

Model	Output Power VA	Output Max. Amps	*Input	Dimensions H x W x D	Shipping Weight
TT1500	1500	4.76	208/230 3φ 47-63 Hz	10½ x 19 x 20	230 lbs.
TT3000	3000	9.52	208/230 3φ **57-63 Hz	14 x 19 x 20	300 lbs.
TT6000	6000	19.04	208/230 3φ **57-63 Hz	17 x 19 x 20	375 lbs.

*400 Hz input available on special order.
**47-63 Hz available on special order.

Ordering Information

To specify give model number and option code number as shown below. For example: 500VA single phase 45-66 Hz. Model ST500-01

Frequency	Code	Mode
45-66 Hz	-01	variable
320-460 Hz	-02	variable
50 Hz	-50	fixed
60 Hz	-60	fixed
400 Hz	-41	fixed

- High Efficiency 75% Typical
- Rack Mount Construction
- Versatility — may be used as a Frequency Converter or Precision AC Power Source
- Output Voltage Range: 105-130V/210-260V
- Output Frequency Range: 45-460 Hz at Full Rated Output
- Modular Power Transistor Assemblies

Specifications

OUTPUT CONFIGURATION: Single phase — two wire isolated. Three phase — four wire WYE with floating neutral and taps for delta load.

INPUT CONFIGURATION: 115/230 ±10% 1φ 47-63 Hz all models thru 1KVA, others 208/230 ±10% 3φ 47-63 Hz. Special voltages available at slight extra cost.

OUTPUT VOLTAGE: Single phase, 105-130V/210-260V @ full power. Three phase, 105-130V/185-225V line to line, or line to neutral @ full power. Preset 117V 1φ line-neutral.

VOLTAGE ADJUSTMENT: Single phase units, internally adjustable. Optional, front panel mounted (add -P) to model number. Three phase units, standard front panel mounted.

PHASE DISPLACEMENTS: Three phase units ±3° with balanced load.

LOAD POWER FACTOR: .8 lead or .7 lag at rated output.

EFFICIENCY: 75% typical.

FREQUENCY STABILITY: .25% standard, options to .001%.

RESPONSE TIME: Less than 200 milliseconds at 60 Hz and 100 milliseconds at 400 Hz.

HARMONIC DISTORTION: 3% maximum at full load; 4% at N.L.

AMBIENT TEMPERATURE: −20°C to +50°C.

TEMPERATURE STABILITY: Voltage .03% per degree C typical. Frequency .05% per degree C typical.

CONTROLS AND METERS: All models 500VA and up include panel voltmeter and ammeter. Variable frequency models have front panel mounted frequency control dial.

VOLTAGE REGULATION: ±1% with ±10% line, ±1% NL-FL.

PROTECTION: Input line circuit breaker. Current limit on output. Output circuit breaker available at extra cost.

TERMINATIONS: Output on front and rear. Input on rear mounted barrier strip.

CONSTRUCTION: Standard 19″ rack mount with full dust covers. Bench adaptors (-C) or chassis slides (-S) available at extra cost. Add suffix to Model Number. Rear or side supports required.

FINISH: Front panels finished in ivory paint with black marking. Chassis surfaces are protected by irridite.

ANNOUNCEMENT **CONTACT US ON OUR NEW LINE OF DC-AC INVERTERS UP TO 500VA**

CML MACARR®™
POWER SUPPORT EQUIPMENT

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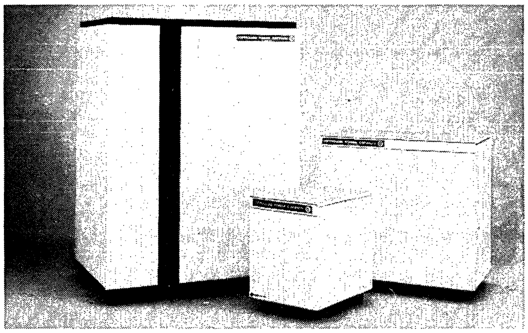
SERIES 200 POWER TRANSFORMERS



GENERAL

Controlled Power has established an enviable reputation by offering the highest quality products. The quality is reflected in the design, material, workmanship and ultimately in the performance of the products.

Series 200 includes: Single phase, double wound, **Power Transformers;** 600V, 2 KVA-1000 KVA.
Three phase, double wound, **Power Transformers;** 600V, 3 KVA-1000 KVA.
Single phase **Auto Transformers;** 600V, 3 KVA-50 KVA.
Three phase **Auto Transformers;** 600V, 3 KVA-1000 KVA.
Three phase **Controlled Power Testing Transformer** with combined standard auto winding and a multitapped auxiliary winding; 600V, 5 KVA-50 KVA.
Single phase, double wound **Power Transformers**; 5000V, 10 KVA-333 KVA.
Three phase, double wound **Power Transformers**; 5000V, 10 KVA-750 KVA.
All of these transformers are 60 Hertz and utilize Class H insulation. 50 Hertz units available.
Complete specifications available from factory. Ask for Bulletin 200-80A.

The quality features listed below exemplify the quality found in Controlled Power Systems:

- Heavy gauge sheet steel or aluminum enclosures.
- Enclosure is phosphated (sheet steel) and finished with a baked on enamel.
- Drip-proof construction with baffled openings for ventilation.
- Enclosure, core, shield and coil assembly are visibly grounded.
- Floor or wall mounting for industrial units through 50 KVA without accessory brackets (industrial enclosures).
- Commercial units attractively styled and color co-ordinated for computer room application or office placement are available.
- Dry Nitrogen Annealed electric steel cores retain the high magnetic properties after shearing and forming operations through the Controlled Power Annealing Process.
- Higher efficiency and power factor results from stress relieving the steel and restoring the electrical grade silicon steel magnetic characteristics.
- Quiet operation on all systems.

ENCLOSURES

Phosphatized sheet metal cabinets are completely rust proof and corrosion resistant. Baked on enamel ensures long life.
Formed and flanged from extra heavy gauge steel or aluminum.
Removable or hinged panels for excellent accessability.
Thermally designed vented openings offer optimum cooling for long life.
Solid top covering shields units from foreign matter and liquids entry.
Commercial enclosure suitable for computer room or office environment available.
Prominent non-corrosive diagrammatic data nameplate attached.

TRANSFORMER TAPS

Taps are added to the high voltage or low voltage windings of transformers to compensate for changing voltage conditions at the input transformer. They are rated at a fixed percentage of the nominal input. The correct way to check for the best tap to be used is to ascertain the present incoming voltage and also check the output voltage of the secondary with the load connected to see if it is within one or two percent of the desired output voltage. Frequently voltage is correct when first installed but when other loads are added, voltage to or from the transformer drops. This will require a change of taps to compensate for this drop.

ELECTRICAL AND MECHANICAL ASSEMBLY

Extra strong and flexible core and coil support materials used for bracing result in high mechanical strength to withstand surges.
Terminal connections marked and easily accessible through removable panels.
10 KV BIL certifications for 600 Volt Class, High BIL ratings available.

CORE AND COIL CONSTRUCTION

Computer assisted design for optimum results. Windings are in tight, even layers keeping core losses and noise to a minimum.
Silicon grain-oriented low magnetostriction steel is precisely cut, interleaved, formed, rigidly clamped and firmly bonded.
Completed steel cores retain the high magnetic properties after shearing and blanking operations through the Controlled Power Dry Nitrogen Annealing Process. Higher efficiency and power factor results from stress relieving the steel and restoring the electrical grade silicon steel magnetic characteristics.
Coil insulating blocks create tunnel cooling effect increasing safety factor against overloads and excessive temperature rise.
Low losses through use of optimum conductor to core loss ratios.
Electrical silicon steel offers high efficiency, long life and complete reliability.
Temperature and noise levels equal to or below NEMA, CSA, U.L., and ASA standards.
Insulators are selected for best thermal properties and high dielectric strength.

SHIELDING

Single shielded transformers are available in most of the sizes listed below.

CALL OR WRITE FACTORY FOR COMPLETE DETAILED BROCHURE OF OUR POWER TRANSFORMERS

SOUND LEVELS

Controlled Power's quiet performance transformers start with quality steel. By using an electrical grade steel having a high rating of withstanding magnetostriction vibrations caused by magnetic force fields and proper varnish impregnation, quiet operation is insured.
Further minimization of any transmitted pulsation is reduced by rigid mechanical bracing. By utilizing grades of insulation that allow forming tighter, smaller coils with closer air gaps the sound level is lowered.

SINGLE PHASE DOUBLE WOUND POWER TRANSFORMERS 600V CLASS 2 KVA-500 KVA	2 KVA THRU 5 KVA — SINGLE PHASE POWER TRANSFORMERS — 600V CLASS 7.5 KVA THRU 25 KVA — SINGLE PHASE POWER TRANSFORMERS — 600V CLASS 37.5 KVA THRU 100 KVA — SINGLE PHASE POWER TRANSFORMERS — 600V CLASS 167 KVA THRU 500 KVA — SINGLE PHASE POWER TRANSFORMERS — 600V CLASS
THREE PHASE DOUBLE WOUND POWER TRANSFORMERS 600 VOLT CLASS 3 KVA-1000 KVA	3 KVA THRU 15 KVA — THREE PHASE POWER TRANSFORMERS — 600V CLASS 30 KVA THRU 1125 KVA — THREE PHASE POWER TRANSFORMERS — 600V CLASS 150 KVA THRU 450 KVA — THREE PHASE POWER TRANSFOMERS — 600V CLASS 500 KVA THRU 1000 KVA — THREE PHASE POWER TRANSFORMERS — 600V CLASS
AUTO TRANSFORMERS SINGLE & THREE PHASE 600 VOLT CLASS 3 KVA-1000 KVA	3 KVA THRU 50 KVA — SINGLE PHASE AUTO TRANSFORMERS — 600V CLASS 3 KVA THRU 1000 KVA — THREE PHASE AUTO TRANSFORMERS — 600V CLASS 5 KVA THRU 50 KVA — TESTING THREE PHASE AUTO TRANSFORMERS
SINGLE PHASE DOUBLE WOUND POWER TRANSFORMERS 5000 VOLT CLASS 10 KVA-333 KVA	10 KVA THRU 37.5 KVA — SINGLE PHASE POWER TRANSFORMERS — 5 KV CLASS 50 KVA THRU 150 KVA — SINGLE PHASE POWER TRANSFORMERS — 5 KV CLASS 167 KVA THRU 333 KVA — SINGLE PHASE POWER TRANSFORMERS — 5 KV CLASS
THREE PHASE DOUBLE WOUND POWER TRANSFORMERS 5000 VOLT CLASS 10 KVA-750 KVA	10 KVA THRU 45 KVA — THREE PHASE POWER TRANSFORMERS — 5 KV CLASS 75 KVA THRU 225 KVA — THREE PHASE POWER TRANSFORMERS — 5 KV CLASS 300 KVA THRU 750 KVA — THREE PHASE POWER TRANSFORMERS — 5 KV CLASS

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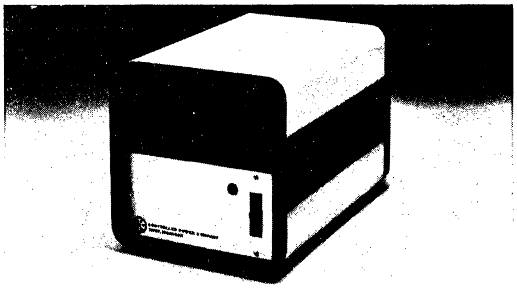

SERIES 500
POWER LINE REGULATOR

GENERAL

The Series 500 Power Line Regulator is a light weight, efficient, distortion free method of regulating line voltage. It utilizes a tapped auto-transformer with either triacs or inverse-parallel silicon controlled rectifiers to automatically change taps and regulate the output voltage. It is an excellent low cost method of correcting for high or low line voltage conditions automatically. An auto-transformer does not isolate the incoming from outgoing lines, and does not eliminate noise or transients.

APPLICATIONS

The Series 500 utilizes an auto-transformer. Hence, it does not isolate the incoming and outgoing lines. This unit should be applied where brownouts or surges are the main power line problem. It does not protect agaist noise, transients, or distortions.

FEATURES AND BENEFITS

Lower Cost: The Series 500 Power Line Regulator is one of the lowest cost methods of regulating line voltage. This is especially true in the larger KVA sizes.

Efficient: Because the Series 500 is an autotransformer regulator with a limited regulating range, it is one of the most efficient means of regulating line voltage. Efficiency in the order of 98% and higher can be expected.

Fast Response: The Series 500 Line Voltage Regulator will respond to line voltage changes within one cycle of the operating frequency.

Low Distortion: The Series 500 Line Voltage Regulator will add less than 1.0% distortion to the incoming waveform.

Wide Input Frequency Range: The Series 500 operates over a wide input frequency range (+5%, −5%) which enables it to supply constant voltage to the load even with a fluctuating input frequency.

SPECIFICATIONS

Line Voltage Regulation: The output of the Series 500 is held constant ±5% of the nominal with input voltage variation of +10%, −20%. (±3% available)

Input Voltage Range: Input voltage may vary from +10% to −20% from nominal and still maintain regulation specifications.

Efficiency: Efficiency in the order of 98% or better can be expected.

Operating Temperature: The normal operating temperature range is 0°C to 40°C.

Output Distortion: Adds less than 1.0% total harmonic distortion to the input waveform.

Response Time: 1 cycle maximum.

Load Regulation: Less than ±2% from no load to full load.

SINGLE PHASE — 60 HERTZ

Power Rating V.A.*	(1) Nominal Input Voltage and Plug Type x	Input Voltage Range	(2) Output Voltage and Receptacle	(2) No. of Standard Outputs	(3) Weight Pounds	(4) Basic Model Number	Power Rating V.A.*	(1) Nominal Input Voltage and Plug Type x	Input Voltage Range	(2) Output Voltage and Receptacle	(2) No. of Standard Outputs	(3) Weight Pounds	(4) Basic Model Number
1000	120V, 5-15P	95-132	120V 5-20R	4	61	5AAX-1K-5	8000	240 H.W.	192-264	240 H.W.	0	165	5CCX-8K-5
1500	120V, 5-20P	95-132	120V 5-20R	4	66	5AAX-1.5K-5	10,000	208 H.W.	165-228	208 H.W.	0	176	5BBX-10K-5
2000	120V, 5-30P	95-132	120V 5-20R	4	68	5AAX-2K-5	10,000	240 H.W.	192-264	240 H.W.	0	176	5CCX-10K-5
2500	120V, 5-30P	95-132	120V 5-20R	4	70	5AAX-2.5K-5	15,000	208 H.W.	165-228	208 H.W.	0	195	5BBX-15K-5
3000	208 H.W.	166-228	208 H.W.	0	74	5BBX-3K-5	15,000	240 H.W.	192-264	240 H.W.	0	195	5CCX-15K-5
3000	240 H.W.	192-264	240 H.W.	0	74	5CCX-3K-5	20,000	208 H.W.	165-228	208 H.W.	0	230	5BBX-20K-5
5000	208 H.W.	165-228	208 H.W.	0	78	5BBX-5K-5	20,000	240 H.W.	192-264	240 H.W.	0	230	5CCX-20K-5
5000	240 H.W.	192-264	240 H.W.	0	78	5CCX-5K-5	25,000	208 H.W.	165-228	208 H.W.	0	250	5BBX-25K-5
8000	208 H.W.	185-228	208 H.W.	0	165	5BBX-8K-5	25,000	240 H.W.	192-264	240 H.W.	0	250	5CCX-25K-5

All transformers above are 60 Hertz and utilize Class H Insulation. 50 Hertz models available on request.

(1) Commercial Enclosures have plugs noted with 8 ft. cord and circuit breaker input. Inputs are hard wired. H.W. denotes hard wiring.

(2) Commercial Enclosures have receptacles noted. When applicable, they are circuit breaker protected. Outputs are hard wired.

(3) Shipping weights are approximate. Actual weights may be higher due to packing and crating.

* Other KVA sizes, input and output voltages are available on request.

- Open type systems are available for OEM utilization.

THREE PHASE — 60 HERTZ

Power Rating V.A.*	(1) Nominal Input Voltage	(2) Input Voltage Range	Output Voltage	(3) Weight Founds	(4) Basic Model + Number	Power Rating V.A.*	(1) Nominal Input Voltage	(2) Input Voltage Range	Output Voltage	(3) Weight Pounds	(4) Basic Model + Number
9 KVA	600	480-660	600 Hard Wired	245	8EEX-9K-5	50 KVA	240	192-264	240 Hard Wired	650	8CCX-50K-5
9 KVA	480	384-528	480y/277 Hard Wired	245	8DDX-9K-5	50 KVA	208	166-228	208y/120 Hard Wired	650	8BBX-50K-5
9 KVA	240	192-264	240 Hard Wired	245	8CCX-9K-5	75 KVA	600	480-660	600 Hard Wired	950	8EEX-75K-5
9 KVA	208	166-228	208y/120 Hard Wired	245	8BBX-9K-5	75 KVA	480	384-528	480y/277 Hard Wired	950	8DDX-75K-5
15 KVA	600	480-660	600 Hard Wired	375	8EEX-15K-5	75 KVA	240	192-264	240 Hard Wired	1250	8CCX-75K-5
15 KVA	480	384-528	480y/277 Hard Wired	375	8DDX-15K-5	75 KVA	208	166-228	208y/120 Hard Wired	1250	8BBX-75K-5
15 KVA	240	192-264	240 Hard Wired	375	8CCX-15K-5	112.5 KVA	600	480-660	600 Hard Wired	1450	8EEX-112K-5
15 KVA	208	166-228	208y/120 Hard Wired	375	8BBX-15K-5	112.5 KVA	480	384-528	480y/277 Hard Wired	1450	8DDX-112K-5
25 KVA	600	480-660	600 Hard Wired	450	8EEX-25K-5	112.5 KVA	240	192-264	240 Hard Wired	1450	8CCX-112K-5
25 KVA	480	384-528	480y/277 Hard Wired	450	8DDX-25K-5	112.5 KVA	208	166-228	208y/120 Hard Wired	1450	8BBX-112K-5
25 KVA	240	192-264	240 Hard Wired	450	8CCX-25K-5	150 KVA	600	480-660	600 Hard Wired	1700	8EEX-150K-5
25 KVA	208	166-228	208y/120 Hard Wired	450	8BBX-25K-5	150 KVA	480	384-528	480y/277 Hard Wired	1700	8DDX-150K-5
50 KVA	600	480-660	600 Hard Wired	650	8EEX-50K-5	150 KVA	240	192-264	240 Hard Wired	1700	8CCX-150K-5
50 KVA	480	384-528	480y/277 Hard Wired	650	8DDX-50K-5	150 KVA	208	166-228	208y/120 Hard Wired	1700	8BBX-150K-5

All transformers above are 60 Hertz and utilize Class H Insulation. 50 Hertz models available on request.

(1) All units have a hard wired input. Other voltages available on request.

(2) Commercial Enclosures have receptacles noted. When applicable they are circuit breaker protected. Outputs are hard wired.

(3) Shipping weights are approximate. Actual weights may be higher due to packing and crating.

* Other KVA sizes, input and output voltages are available on request.

- Open type systems are available for OEM utilization.

CONTROLLED POWER COMPANY

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SERIES 600 MAX-E-ISOLATION TRANSFORMER

CONTROLLED POWER COMPANY
TROY, MICHIGAN

GENERAL

The Series 600 Max-E-Isolation Transformers are used to protect sensitive equipment from power line noise and transients. There are common disturbances on the line caused by lighting, motor starting-stopping, utility network switching, and general electrical noise which will adversely affect sensitive electronic equipment. The Series 600 Max-E-Isolation Transformer utilizes a unique method of shielding which provides low capacitive coupling between input and output circuits. The Series 600 does not have the capability of regulating long duration changes of input voltage.

FEATURES AND BENEFITS

Lowest Cost: The Series 600 Max-E-Isolation Transformer is one of the lowest cost methods of protecting sensitive electronic equipment from line noise and transients.

Efficient: The Series 600 Max-E-Isolation Transformer is a highly efficient means of isolating the line and attenuating noise and transients. Efficiencies of better than 95% can be expected.

Multiple Shielding: A unique method of shielding and isolation of the primary and secondary is responsible for the excellent attenuation of both Common Mode Noise and Transverse Noise.

Common-Mode Noise Attenuation: The Series 600 Max-E-Isolation Transformer has a Common Mode Noise Attenuation of 140 db.

Transverse-Mode Noise Attenuation: 3 db down at 600 Hertz, 40 db per decade to well below 50 db with resistive loads.

SPECIFICATIONS

Line Voltage Regulation: No regulating means incorporated. Output voltage will vary with input voltage.

Load Regulation: ±2% No load to full load.

Efficiency: 95% minimum.

Operating Temperature: 0°C to 40°C.

Distortion: 0.1% total harmonic distortion.

Operating Frequency: 47-53 Hertz for 50 Hertz Models. 57-63 Hertz for 60 Hertz Models.

SINGLE PHASE — 60 HERTZ

Power Rating V.A.*	(1) Nominal Input Voltage and Plug Type	(2) Output Voltage and Receptacle	(2) No. of Standard Outputs	(3) Weight Pounds	MODEL NUMBER Basic Model + Number
125	120V, 5-15P	120V 5-20R	2	18	5AAX-125-6
250	120V, 5-15P	120V 5-20R	2	21	5AAX-250-6
500	120V, 5-15P	120V 5-20R	4	26	5AAX-500-6
750	120V, 5-15P	120V 5-20R	4	36	5AAX-750-6
1000	120V, 5-15P	120V 5-20R	4	46	5AAX-1K-6
1500	120V, 5-20P	120V 5-20R	4	68	5AAX-1.5K-6
2000	120V, 5-30P	120V 5-20R	4	72	5AAX-2K-6
2500	120V, 5-30P	120V 5-20R	4	83	5AAX-2.5K-6
3000	208/240 6-30P	120V 5-20R 240V H.W.	4	85	5MGX-3K-6
5000	208/240 6-30P	120V 5-20R 240V H.W.	4	125	5MGX-5K-6
8000	208/240 H.W.	120V 5-20R 240V H.W.	4	160	5MGX-8K-6
10,000	208/240 H.W.	120V 5-20R 240V H.W.	4	200	5MGX-10K-6
15,000	208/240 H.W.	120V 5-20R 240V H.W.	4	275	5MGX-15K-6
20,000	208/240 H.W.	120V 5-20R 240V H.W.	4	340	5MGX-20K-6
25,000	208/240 H.W.	120V 5-20R 240V H.W.	4	450	5MGX-25K-6

THREE PHASE — 60 HERTZ

Power Rating V.A.*	(1) Nominal Input Voltage	(2) Output Voltage and Receptacle	No. of Standard Outputs	(3) Weight Pounds	MODEL NUMBER Basic Model + Number	Power Rating V.A.*	(1) Nominal Input Voltage	(2) Output Voltage and Receptacle	No. of Standard Outputs	(3) Weight Pounds	MODEL NUMBER Basic Model + Number
3 KVA	240	208y/120 H.W. +5-20R	4	120	8CLX-3K-6	112 KVA	600	208y/120 H.W. +5-20R	4	1300	8ELX-112K-6
3 KVA	208	208y/120 H.W. +5-20R	4	120	8BLX-3K-6	112 KVA	480	208y/120 H.W. +5-20R	4	1300	8DLX-112K-6
6 KVA	240	208y/120 H.W. +5-20R	4	210	8CLX-6K-6	112 KVA	240	208y/120 H.W. +5-20R	4	1300	8CLX-112K-6
6 KVA	208	208y/120 H.W. +5-20R	4	210	8BLX-6K-6	112 KVA	208	208y/120 H.W. +5-20R	4	1300	8BLX-112K-6
9 KVA	600	208y/120 H.W. +5-20R	4	260	8ELX-9K-6	150 KVA	600	208y/120 H.W. +5-20R	4	1500	8ELX-150K-6
9 KVA	480	208y/120 H.W. +5-20R	4	260	8DLX-9K-6	150 KVA	480	208y/120 H.W. +5-20R	4	1500	8DLX-150K-6
9 KVA	240	208y/120 H.W. +5-20R	4	260	8CLX-9K-6	150 KVA	240	208y/120 H.W. +5-20R	4	1500	8CLX-150K-6
9 KVA	208	208y/120 H.W. +5-20R	4	260	8BLX-9K-6	150 KVA	208	208y/120 H.W. +5-20R	4	1500	8BLX-150K-6
15 KVA	600	208y/120 H.W. +5-20R	4	360	6ELX-15K-6	225 KVA	600	208y/120 H.W.	0	1850	8ELX-225K-6
15 KVA	480	208y/120 H.W. +5-20R	4	360	8DLX-15K-6	225 KVA	480	208y/120 H.W.	0	1850	8DLX-225K-6
15 KVA	240	208y/120 H.W. +5-20R	4	360	8CLX-15K-6	225 KVA	240	208y/120 H.W.	0	1850	8CLX-225K-6
15 KVA	208	208y/120 H.W. +5-20R	4	360	8BLX-15K-6	225 KVA	208	208y/120 H.W.	0	1850	8BLX-225K-6
30 KVA	600	208y/120 H.W. +5-20R	4	540	8ELX-30K-6	300 KVA	600	208y/120 H.W.	0	2500	8ELX-300K-6
30 KVA	480	208y/120 H.W. +5-20R	4	540	8DLX-30K-6	300 KVA	480	208y/120 H.W.	0	2500	8DLX-300K-6
30 KVA	240	208y/120 H.W. +5-20R	4	540	8CLX-30K-6	300 KVA	240	208y/120 H.W.	0	2500	8CLX-300K-6
30 KVA	208	208y/120 H.W. +5-20R	4	540	8BLX-30K-6	300 KVA	208	208y/120 H.W.	0	2500	8BLX-300K-6
45 KVA	600	208y/120 H.W. +5-20R	4	750	8ELX-45K-6	450 KVA	600	208y/120 H.W.	0	3200	8ELX-450K-6
45 KVA	480	208y/120 H.W. +5-20R	4	750	8DLX-45K-6	450 KVA	480	208y/120 H.W.	0	3200	8DLX-450K-6
45 KVA	240	208y/120 H.W. +5-20R	4	750	8CLX-45K-6	450 KVA	240	208y/120 H.W.	0	3200	8CLX-450K-6
45 KVA	208	208y/120 H.W. +5-20R	4	750	8BLX-45K-6	450 KVA	208	208y/120 H.W.	0	3200	8BLX-450K-6
75 KVA	600	208y/120 H.W. +5-20R	4	950	8ELX-75K-6	500 KVA	600	208y/120 H.W.	0	3500	8ELX-500K-6
75 KVA	480	208y/120 H.W. +5-20R	4	950	8DLX-75K-6	500 KVA	480	208y/120 H.W.	0	3500	8DLX-500K-6
75 KVA	240	208y/120 H.W. +5-20R	4	950	8CLX-75K-6	500 KVA	240	208y/120 H.W.	0	3500	8CLX-500K-6
75 KVA	208	208y/120 H.W. +5-20R	4	950	8BLX-75K-6	500 KVA	208	208y/120 H.W.	0	3500	8BLX-500K-6

All transformers above are 60 Hertz and utilize Class H Insulation. 50 Hertz models available on request.

(1) Commercial Enclosures have plugs noted with 8 ft. cord and circuit breaker input. Inputs are hard wired. Other inputs and outputs available on request.

* Other KVA sizes, input and output voltages are available on request.

(2) Commercial Enclosures have receptacles noted. When applicable they are circuit breaker protected. Outputs are hard wired.

(3) Shipping weights are approximate. Actual weights may be higher due to packing and crating.

- Open type systems are available for OEM utilization.

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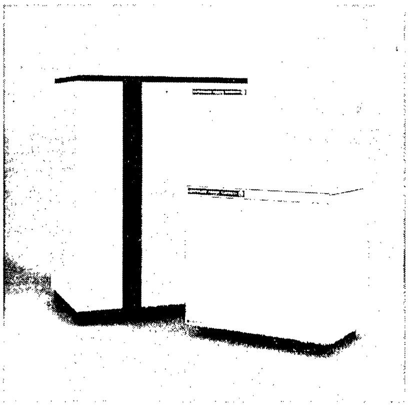


SERIES 700 POWER LINE CONDITIONER

GENERAL

The Series 700 Power Line Regulator and Conditioner combine the characteristics of the Series 500 and Series 600. The Series 700 will regulate the input voltage in the event of line voltage brownouts or surges in addition to having Max-E-Isolation capability to protect the load from line voltage noise and transients. The unit should be applied where line voltage sags, surges, noise or transients are a problem.

APPLICATIONS

The Series 700 Power Line Conditioner should be applied where isolation, regulation, noise and transients are the predominant power line problem. The units does not correct for power line outages or distortion.

FEATURES AND BENEFITS

Wide Input Range: The input voltage range of the Series 700 Power Line Conditioner is +10%, −20%. With input voltage covering this range, the output voltage is held to a very narrow band.
Narrow Output Regulation Band: The output is held to within ±5%. (±3% available)
Multiple Shielding: A unique method of multiple shielding and isolation of the primary and secondary is responsible for the excellent attenuation of both Common-Mode Noise and Transverse-Mode Noise.

Excellent Response Time: The Series 700 Power Line Conditioner has a response time of 1 cycle or less to input voltage change beyond the threshold voltage band.
High Efficiency. Overall efficiency of 95% or better can be expected.
Low Output Impedance: Output impedance ranging from 2% to 5% (depending on size of unit.)
Common-Mode Noise Attenuation: The Series 700 Power Line Conditioner has a Common-Mode Noise Attenuation of 140 db.
Transverse-Mode Noise Attenuation: The Transverse-Mode Noise Attenuation of the Series 700 is 3 db down at 600 Hertz; 40 db down per decade to well below 50 db with resistive load.
Low-Audible Noise Level: All Series 700 Power Line Conditioners are vacuum impregnated with a special epoxy resin to deliver the lowest possible sound level.

SPECIFICATIONS

Input Voltage Range: +10%, −20% of Nominal Input.

Line Voltage Regulation: The output of the Series 700 is held constant ±5% of nominal with input voltage variation of +10%, −20%, (±3% Regulation available)
Load Regulation: Less than ±2% from no load to full load.

Response Time: Typically 1 cycle for 100% correction.

Impedance: 2% to 5% depending on size of unit.

Efficiency: 95% minimum.

Operating Temperature: 0°C to 40°C.

Operating Frequency: 47-53 Hertz (50 Hertz Models). 57-63 Hertz (60 Hertz Models).
Transverse-Mode Noise Attenuation: 3 db down at 600 Hertz; 40 db per decade to well below 50 db with resistive load.
Common-Mode Noise Attenuation: 140 db.

Output Distortion: No spikes; adds less than 1.0% total harmonic distortion.

Audible Noise: 40 db to 50 db depending on size.

Overvoltage Protection: Automatically turns off if output exceeds +10% of nominal. (On units with company provided circuit breaker input and where shut off option is selected).

SINGLE PHASE — 60 HERTZ

Power Rating V.A.*	(1) Nominal Input Voltage and Plug Type	Input Voltage Range	(2) Output Voltage and Receptacle	(2) No. of Standard Outputs	(3) Weight Pounds	MODEL NUMBER + Basic Model + Number	Power Rating V.A.*	(1) Nominal Input Voltage and Plug Type	Input Voltage Range	(2) Output Voltage and Receptacle	(2) No. of Standard Outputs	(3) Weight Pounds	MODEL NUMBER + Basic Model + Number
1000	120V, 5-15P	95-132	120V 5-20R	4	54	5AAX-1K-7	8000	240 H.W.	192-264	240/120 H.W.	4	246	5CGX-8K-7
1500	120V, 5-20P	95-132	120V 5-20R	4	92	5AAX-1.5K-7	10,000	208 H.W.	165-228	208 H.W.	0	300	5BBX-10K-7
2000	120V, 5-30P	95-132	120V 5-20R	4	98	5AAX-2K-7	10,000	240 H.W.	192-264	240/120 H.W.	4	300	5CGX-10K-7
2500	120V, 5-50P	95-132	120V 5-20R	4	112	5AAX-2.5K-7	15,000	208 H.W.	165-228	208 H.W.	0	370	5BBX-15K-7
3000	208 H.W.	165-228	208 H.W.	0	115	5BBX-3K-7	15,000	240 H.W.	192-264	240/120 H.W.	4	370	5CGX-15K-7
3000	240 H.W.	192-264	240/120 H.W.	4	115	5CGX-3K-7	20,000	208 H.W.	165-228	208 H.W.	0	450	5BBX-20K-7
5000	208 H.W.	165-228	208 H.W.	0	169	5CCX-5K-7	20,000	240 H.W.	192-264	240/120 H.W.	4	450	5CGX-20K-7
5000	240 H.W.	192-264	240/120 H.W.	4	169	5CGX-5K-7	25,000	208 H.W.	165-228	208 H.W.	0	600	5BBX-25K-7
8000	208 H.W.	165-228	208 H.W.	0	246	5BBK-8K-7	25,000	240 H.W.	192-264	240/120 H.W.	4	600	5CGX-25K-7

THREE PHASE — 60 HERTZ

Power Rating V.A.*	(1) Nom. Input Volt.	Input Voltage Range	(2) Output Voltage and Receptacle	(2) No. of Standard Outputs	(3) Wt. Lbs.	MODEL NO. (4) Basic Model + Number	Power Rating V.A.*	(1) Nom. Input Volt.	Input Voltage Range	(2) Output Voltage and Receptacle	(2) No. of Standard Outputs	(3) Wt. Lbs.	MODEL NO. (4) Basic Model + Number
3 KVA	240	192-264	208y/120 H.W. +5-20R	4	220	8CLX-3K-7	45 KVA	600	480-660	208y/120 H.W. +5-20R	4	1180	8ELX-45K-7
3 KVA	208	166-228	208y/120 H.W. +5-20R	4	220	8BLX-3K-7	45 KVA	480	384-528	208y/120 H.W. +5-20R	4	1180	8DLX-45K-7
6 KVA	240	192-264	208y/120 H.W. +5-20R	4	300	8CLX-6K-7	45 KVA	240	192-264	208y/120 H.W. +5-20R	4	1180	8CLX-45K-7
6 KVA	208	166-228	208y/120 H.W. +5-20R	4	300	8BLX-6K-7	45 KVA	208	166-228	208y/120 H.W. +5-20R	4	1180	8BLX-45K-7
9 KVA	600	480-660	208y/120 H.W. +5-20R	4	410	8ELX-9K-7	75 KVA	600	480-660	208y/120 H.W.	0	1720	8ELX-75K-7
9 KVA	480	384-528	208y/120 H.W. +5-20R	4	410	8DLX-9K-7	75 KVA	480	384-528	208y/120 H.W.	0	1720	8DLX-75K-7
9 KVA	240	192-264	208y/120 H.W. +5-20R	4	410	8CLX-9K-7	75 KVA	240	192-264	208y/120 H.W.	0	2020	8CLX-75K-7
9 KVA	208	166-228	208y/120 H.W. +5-20R	4	410	8BLX-9K-7	75 KVA	208	166-228	208y/120 H.W.	0	2020	8BLX-75K-7
15 KVA	600	480-660	208y/120 H.W. +5-20R	4	620	8ELX-15K-7	112.5 KVA	600	480-660	208y/120 H.W.	0	2450	8ELX-112K-7
15 KVA	480	348-528	208y/120 H.W. +5-20R	4	620	8DLX-15K-7	112.5 KVA	480	384-528	208y/120 H.W.	0	2450	8DLX-112K-7
15 KVA	240	192-264	208y/120 H.W. +5-20R	4	620	8CLX-15K-7	112.5 KVA	240	192-264	208y/120 H.W.	0	2450	8CLX-112K-7
15 KVA	208	166-228	208y/120 H.W. +5-20R	4	620	8BLX-15K-7	112.5 KVA	208	166-228	208y/120 H.W.	0	2450	8BLX-112K-7
30 KVA	600	480-660	208y/120 H.W. +5-20R	4	850	8ELX-30K-7	150 KVA	600	480-660	208y/120 H.W.	0	3100	8ELX-150K-7
30 KVA	480	384-528	208y/120 H.W. +5-20R	4	850	8DLX-30K-7	150 KVA	480	384-528	208y/120 H.W.	0	3100	8DLX-150K-7
30 KVA	240	192-264	208y/120 H.W. +5-20R	4	850	8CLX-30K-7	150 KVA	240	192-264	208y/120 H.W.	0	3100	8CLX-150K-7
30 KVA	208	166-228	208y/120 H.W. +5-20R	4	850	8BLX-30K-7	150 KVA	208	166-228	208y/120 H.W.	0	3100	8BLX-150K-7

All transformers above are 60 Hertz and utilize Class H Insulation. 50 Hertz models available on request.

(1) Commercial Enclosures have plugs noted with 8 ft. cord and circuit breaker input. H.W. denotes hard wiring.

* Other KVA sizes, Input and Output voltages are available on request.

(2) Commercial Enclosures have receptacles noted. When applicable, they are circuit breaker protected. Outputs are nard wired.

(3) Shipping weights are approximate. Actual weights may be higher due to packing and crating.

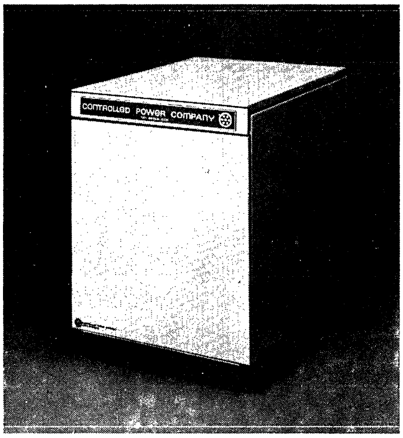
- Open type systems are available for OEM utilization.

CONTROLLED POWER COMPANY

1955 STEPHENSON HWY., TROY, MI 48083, (313) 528-3700, TWX: 810-232-3401

CALL TOLL FREE
1-800-521-4792

SERIES 800 POWER PURIFICATION SYSTEMS



FEATURES AND BENEFITS

Regulation Bandwidth: One of the major benefits of a Power Purification System is its ability to regulate the output voltage to within −3%, +3% with an input variation of −20% to +10% and even wider depending on the load of the system.

Regulation and Isolation: The Power Purification System combines the common mode noise rejection capabilities of a multi-shielded transformer with a voltage regulating capability. In addition to rejecting common mode noise it virtually eliminates transverse noise and distortion coming in on the power line. The unique capability of the Power Purifier to eliminate almost any power malady is what makes it an essential addition to power sensitive electronic equipment.

Unique "Ride Through" Capability: The output of the Power Purifier does not go to zero with the loss of input power for a ¼ cycle (4 msec), a ½ cycle (8 msec) or even for a complete cycle (16.6 msec. — depending on load). The voltage from the Power Purifier is generated essentially by a circuit operating as a powerful oscillator with energy stored in the unit. For this reason, the output is much more immune to the input than other regulating systems.

Voltage Transformation: The Series 800 Power Purification System, in addition to conditioning, regulating, and purifying power, can also be used to step voltage up or down.

Transformation of Square Wave to Sine Wave: The output of the Series 800 Power Purification System is a near perfect sine wave even when the supply voltage is a square wave. A battery supplied power, chopped into a square wave, is converted into an excellent sine wave by the Power Purifier.

Rugged Static Magnetic Circuit: The Power Purifier is a ruggedly constructed static magnetic device which will deliver many years of reliable operation because it is virtually impossible to abuse electrically. It is circuit breaker protected against internal shorts, and cannot be damaged by electrical shorts in the load.

Voltage Recovery: The output voltage returns to 95% of nominal level within 2 cycles and to 100% within 3 cycles when going from no load to full load or visa-versa. Recovery from partial load changes is correct in a shorter period of time.

SPECIFICATIONS

Line Regulation: The output voltage will maintain itself constant to within ±3% with input voltage variations of +10% to −20%.

Load Regulation: The output voltage will maintain itself to within ±0.5% with output loads variations of 0 to 100%.

Frequency Variations: A 1% change in line frequency from the nominal design frequency changes output voltage approximately 1.5% in the same direction as the frequency change.

Efficiency: Full load efficiency is in the order of 90% for standard input and output voltage levels.

Operating Temperature: Power Purifiers are designed to operate within specifications in an ambient temperature range from −20°C to +50°C.

Effect of Load Power Factor: The regulation specifications stated above is for unity power factor. Regulation will improve with a leading power factor and become wide with a lagging power factor.

Distortion: On Harmonically Neutralized Systems harmonic content is 3% or less.

SINGLE PHASE — 60 HERTZ

Power Rating V.A.*	(1) Nominal Input Voltage and Plug Type X	Input Volt. Range	(2) Output Volt. and Receptacle	(2) No. of Stand. Outputs	Input V.A.	Audible Noise Level	(3) Wt. Lbs.	(4)(5) Basic Model + Number
60	120V, 5-15P	95-130	120V 5-20R	2	80	45db	12	5AAX-60-8
120	120V, 5-15P	95-130	120V 5-20R	2	160	45db	18	5AAX-120-8
200	120V, 5-15P	95-130	120V 5-20R	4	265	45db	25	5AAX-200-8
250	120V, 5-15P	95-130	120V 5-20R	4	295	45db	28	5AAX-250-8
500	120V, 5-15P	95-130	120V 5-20R	4	590	45db	58	5AAX-500-8
750	120V, 5-15P	95-130	120V 5-20R	4	880	45db	68	5AAX-750-8
1000	120V, 5-15P	95-130	120V 5-20R	4	1250	45db	83	5AAX-1K-8
1500	120V, 5-20P	95-130	120V 5-20R	4	1760	45db	110	5AAX-1.5K-8
2000	120V, 5-30P	95-130	120V 5-20R	4	2350	45db	125	5AAX-2K-8
2500	120V, 5-30P	95-130	120V 5-20R	4	2770	50db	163	5AAX-2.5K-8
3000	208/240 6-30P	165-225 (208 tap) 190-260 (240 tap)	120V 5-20R 240V Hard Wire	4	3330	50db	180	5MGX-3K-8

Power Rating V.A.*	(1) Nominal Input Voltage and Plug Type X	Input Voltage Range	(2) Output Voltage and Receptacle	(2) No. of Stand. Outputs	Input V.A.	Audible Noise Level	(3) Wt. Lbs.	(4)(5) Basic Model + Number
5000	208/240 6-50P	165-225 (208 tap) 190-260 (240 tap)	120V 5-20R 240V Hard Wire	4	5550	55db	336	5MGX-5K-8
8000	208/240 H.W.	165-225 (208 tap) 190-260 (240 tap)	120V 5-20R 240V Hard Wire	4	8880	55db	460	5MGX-8K-8
10,000	208/240 H.W.	165-225 (208 tap) 190-260 (240 tap)	120V 5-20R 240V Hard Wire	4	11,100	60db	536	5MGX-10K-8
15,000	208/240 H.W.	165-225 (208 tap) 190-260 (240 tap)	120V 5-20R 240V Hard Wire	4	16,600	60db	920	5MGX-15K-8
20,000	208/240 H.W.	165-225 (208 tap) 190-260 (240 tap)	120V 5-20R 240V Hard Wire	4	22,200	60db	1100	5MGX-20K-8
25,000	208/240 H.W.	165-225 (208 tap) 190-260 (240 tap)	120V 5-20R 240V Hard Wire	4	27,700	60db	1425	5MGX-25K-8

(1) Commercial enclosures have plugs noted with 8 ft. cord and circuit breaker or fused input. Industrial and Panel Mount enclosures do not have plug, or circuit breaker or fused input. Inputs are hard wired. Dual input voltages of 240/480 available (input range 190-260 x 380-520). Other Inputs and Outputs available on request.

(2) Commercial enclosures have receptacles noted. When applicable, they are circuit breaker protected. Industrial and Panel Mount enclosures do not have receptacles. Outputs are hard wired.

(3) Panel Mount enclosures up to 3 KVA can be wall mounted.

(4) For Commercial Cabinet model number consult factory.

(5) For Industrial or Panel Mount Cabinet model number consult factory.

+ When ordering specify basic model number plus either the Commercial Cabinet model number or the Industrial Cabinet model number.

* Other KVA sizes, input and output voltages are available on request.

° Open type and uncompensated power purification systems are available for OEM utilization.

THREE PHASE — 60 HERTZ

Power Rating V.A.	(1) Nom. Input Volt.	Input Voltage Range	(2) Output Voltage and Receptacle	No. of Stand. Outputs	Input V.A.	Audible Noise Level	(3) Wt. Lbs.	(4) Basic Model + Number
3 KVA	600	480-660	208/120 Hard Wired	0	3.5 KVA	45db	255	8ELX-3K-8
3 KVA	480	384-528	208y/120 H.W.	0	3.5 KVA	45db	255	8DLX-3K-8
3 KVA	240	192-264	208y/120 H.W.	0	3.5 KVA	45db	255	8CLX-3K-8
3 KVA	208	166-228	208y/120 H.W.	0	3.5 KVA	45db	255	8BLX-3K-8
6 KVA	600	480-660	208/120 Hard Wired	0	7.1 KVA	50db	480	8ELX-6K-8
6 KVA	480	384-528	208y/120 H.W.	0	7.1 KVA	50db	480	8DLX-6K-8
6 KVA	240	192-264	208y/120 H.W.	0	7.1 KVA	50db	480	8CLX-6K-8
6 KVA	208	166-228	208y/120 H.W.	0	7.1 KVA	50db	480	8BLX-6K-8
7.5 KVA	600	480-660	208/120 Hard Wired	0	8.3 KVA	50db	550	8ELX-7.5K-8
7.5 KVA	480	384-528	208y/120 H.W.	0	8.3 KVA	50db	550	8DLX-7.5K-8
7.5 KVA	240	192-264	208y/120 H.W.	0	8.3 KVA	50db	550	8CLX-7.5K-8
7.5 KVA	208	166-228	208y/120 H.W.	0	8.3 KVA	50db	550	8BLX-7.5K-8
9 KVA	600	480-660	208/120 Hard Wired	0	10 KVA	55db	630	8ELX-9K-8
9 KVA	480	348-528	208y/120 H.W.	0	10 KVA	55db	630	8DLX-9K-8

Power Rating V.A.	(1) Nom. Input Volt.	Input Voltage Range	(2) Output Voltage and Receptacle	No. of Stand. Outputs	Input V.A.	Audible Noise Level	(3) Wt. Lbs.	(4) Basic Model + Number
9 KVA	240	192-264	208y/120 H.W.	0	10 KVA	55db	630	8CLX-9K-8
9 KVA	208	166-228	208y/120 H.W.	0	10 KVA	55db	630	8BLX-9K-8
15 KVA	600	480-660	208/120 Hard Wired	0	16.6 KVA	55db	1160	8ELX-15K-8
15 KVA	480	384-528	208y/120 H.W.	0	16.6 KVA	55db	1160	8DLX-15K-8
15 KVA	240	192-264	208y/120 H.W.	0	16.6 KVA	55db	1160	8CLX-15K-8
15 KVA	208	166-228	208y/120 H.W.	0	16.6 KVA	55db	1160	8BLX-15K-8
24 KVA	600	480-660	208/120 Hard Wired	0	26.6 KVA	60db	1860	8ELX-24K-8
24 KVA	480	384-528	208y/120 H.W.	0	26.6 KVA	60db	1860	8DLX-24K-8
24 KVA	240	192-264	208y/120 H.W.	0	26.6 KVA	60db	1860	8CLX-24K-8
24 KVA	208	166-228	208y/120 H.W.	0	26.6 KVA	60db	1860	8BLX-24K-8
30 KVA	600	480-660	208/120 Hard Wired	0	33.3 KVA	65db	2000	8ELX-30K-8
30 KVA	480	384-528	208y/120 H.W.	0	33.3 KVA	65db	2000	8DLX-30K-8
30 KVA	240	192-264	208y/120 H.W.	0	33.3 KVA	65db	2000	8CLX-30K-8
30 KVA	208	166-228	208y/120 H.W.	0	33.3 KVA	65db	2000	8BLX-30K-8

(1) All units have a hard wired input.

(2) Commercial enclosures have no receptacles. Industrial enclosures do not have receptacles. Outputs are hard wired.

(3) Industrial enclosures are not circuit breaker protected.

(4) For Commercial or Industrial Cabinet model number consult factory.

+ When ordering specify basic model number plus either the commercial cabinet model number or the industrial model number.

NOTE: With unbalanced loads, there is a phase shift with a Series 800 Power Purification System that can result in poor voltage regulation. If unbalanced loading is expected, use a Series 700 or Series 900 regulator.

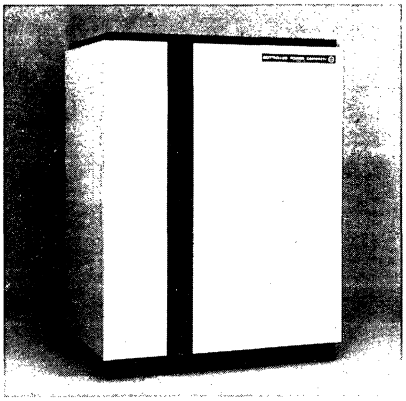
+ Open Type and Uncompensated Type of Power Purification Systems are available for OEM utilization.

CONTROLLED POWER COMPANY

1955 STEPHENSON HWY., TROY, MI 48083, (313) 528-3700, TWX: 810-232-3401

CALL TOLL FREE
1-800-521-4792

SERIES 900 ELECTRONIC LINE VOLTAGE REGULATORS



GENERAL

The Series 900 Electronic Line Voltage Regulator delivers the most accurate regulated line voltage available to industry.

The Series 900 when used with a Series 600 Max-E-Isolation Transformer will allow sensitive electronic equipment to operate with poorly regulated and noisy power lines.

Series 900 Electronic Line Voltage Regulators provide solutions to electrical power — or disturbance problems. They are available in single phase models, 60 Hertz with output power ratings from 25 KVA to 150 KVA. The three phase models are 60 Hertz with output ratings from 1.5 KVA to 500 KVA.

All units are hard wired to terminals at both input and output and all units utilize Class H insulation. Complete specifications are available from the factory. Ask for Bulletin 900-80A.

FEATURES AND BENEFITS

Adjustable Output: The output voltage is adjustable over a range of ±10% from nominal with an internal potentiometer.

Remote Sensing: The voltage to be regulated can be sensed at the load to automatically compensate for line and wire losses to the load.

Excellent Load Regulation: Output voltage is regulated to within ±0.5%.

Wide Input Voltage Range: The output is regulated to within ±1% with input voltage excursion of +10% to −20% from nominal on small sizes and ±10% on larger sizes.

Filtered Output: The output of the Series 900 is filtered to free the waveform of noise and excessive harmonic content.

No Moving Parts: The Series 900 is electronically and magnetically regulated. There are no moving parts and virtually no preventative maintenance required.

Fast Response: Response starts immediately and is complete in 5 cycles (under worst case conditions).

Enclosures: Available in either industrial, commercial (computer type).

Wide Range Of Types Available: The Series 900 Electronic Line Voltage Regulator is available in single phase and three phase configurations and in 50 Hertz or 60 Hertz models. In addition a wide range of KVA sizes are available.

SPECIFICATIONS

Input Voltage: See sizing charts on subsequent pages.

Output Voltage: See sizing charts on subsequent pages.

Regulation: ±1% for any combination of line variation, load variation, thermal drift, and warm-up.

Remote Sensing: Remote sensing available to compensate for series drop to the load.

Frequency Range: 57 to 63 Hertz on 60 Hertz Models. 48 to 52 Hertz on 50 Hertz Models.

Output Voltage Adjustment Range: +10%, −10% Adjustable with internally located potentiometer.

Response Time: Starts immediately and complete within 5 cycles under worst case conditions.

Efficiency: 95% Typical.

Power Factor: Approximately 95% at full load.

Harmonic Content: See sizing chart.

SINGLE PHASE — 60 HERTZ — 25 KVA TO 150 KVA

Output Power Rating V.A.	(1) Nom. Input and Output Volt.	(2) Input Voltage Range	Output Voltage Adjust-ability	Max. Har-monic Content	(3) Wt. Lbs.	MODEL NUMBER (4)(5)(6) Model + Number	Output Power Rating V.A.	(1) Nom. Input and Output Volt.	(2) Input Voltage Range	Output Voltage Adjust-ability	Max. Har-monic Content	(3) Wt. Lbs.	MODEL NUMBER (4)(5)(6) Model + Number
25 KVA	120	+10%, −20%	108-132	5%	830	3AAX-25K-9	75 KVA	120	±10%	108-132	9%	2700	3AAX-75K-9
25 KVA	208	+10%, −20%	187-228	5%	830	3BBX-25K-9	75 KVA	208	±10%	187-228	9%	2700	3BBX-75K-9
25 KVA	240	+10%, −20%	216-264	5%	830	3CCX-25K-9	75 KVA	240	±10%	216-264	9%	2700	3CCX-75K-9
25 KVA	480	+10%, −20%	432-528	5%	830	3DDX-25K-9	75 KVA	480	±10%	432-528	9%	2700	3DDX-75K-9
25 KVA	600	+10%, −20%	540-660	5%	830	3EEX-25K-9	75 KVA	600	±10%	540-660	9%	2700	3EEX-75K-9
37.5 KVA	120	±10%	108-132	8%	940	3AAX-37.5K-9	100 KVA	120	±10%	108-132	9%	3200	3AAX-100K-9
37.5 KVA	208	±10%	187-228	8%	940	3BBX-37.5K-9	100 KVA	208	±10%	187-228	9%	3200	3BBX-100K-9
37.5 KVA	240	±10%	216-264	8%	940	3CCX-37.5K-9	100 KVA	240	±10%	216-264	9%	3200	3CCX-100K-9
37.5 KVA	480	±10%	432-528	8%	940	3DDX-37.5K-9	100 KVA	480	±10%	432-528	9%	3200	3DDX-100K-9
37.5 KVA	600	±10%	540-660	8%	940	3EEX-37.5K-9	100 KVA	600	±10%	540-660	9%	3200	3EEK-100K-9
50 KVA	120	±10%	108-132	9%	1800	3AAX-50K-9	150 KVA	120	±10%	108-132	9%	3700	3AAX-150K-9
50 KVA	208	±10%	187-228	9%	1800	3BBX-50K-9	150 KVA	208	±10%	187-228	9%	3700	3BBX-150K-9
50 KVA	240	±10%	216-264	9%	1800	3CCX-50K-9	150 KVA	240	±10%	216-264	9%	3700	3CCX-150K-9
50 KVA	480	±10%	432-528	9%	1800	3DDX-50K-9	150 KVA	480	±10%	432-528	9%	3700	3DDX-150K-9
50 KVA	600	±10%	540-660	9%	1800	3EEX-50K-9	150 KVA	600	±10%	540-660	9%	3700	3EEX-150K-9

THREE PHASE — 60 HERTZ — 1.5 KVA TO 75 KVA

Output Rating V.A.	(1) Nominal Input and Output Voltage	(2) Input Voltage Range	Output Voltage Adjust-ability (Line-to Neutral)	Maxi-mum Har-monic Content	(3) Wt. Lbs.	MODEL NUMBER Basic Model + Number	Output Rating V.A.	(1) Nominal Input and Output Voltage	(2) Input Voltage Range	Output Voltage Adjust-ability (Line-to Neutral)	Maxi-mum Har-monic Content	(3) Wt. Lbs.	MODEL NUMBER Basic Model + Number
1.5 KVA	208/120Y	−10%, +20%	108-132	5%	180	3LLX-1.5K-9	45 KVA	600/347Y	−10%, +20%	312-381	5%	1700	3EEX-45K-9
3 KVA	208/120Y		108-132	5%	370	3LLX-3K.9	75 KVA	208/120Y		108-132	5%	2200	3LLX-75K-9
6 KVA	208/120Y		108-132	5%	370	3LLX-6K-9	75 KVA	480/277Y		250-304	5%	2200	3NNX-75K-9
6 KVA	480/277Y		250-304	5%	370	3NNX-6K-9	75 KVA	600/347Y		312-381	5%	2200	3EEK-75K-9
6 KVA	600/347Y		312-381	5%	370	3EEX-6K-9	112.5 KVA	208/120Y		108-132	5%	2900	3LLX-112K-9
9 KVA	208/120Y		108-132	5%	430	3LLX-9K-9	112.5 KVA	480/277Y		250-304	9%	2900	3NNX-112K-9
9 KVA	480/277Y		250-304	5%	430	3NNX-9K-9	112.5 KVA	600/347Y		312-381	9%	2900	3EEX-112K-9
9 KVA	600/347Y		312-381	5%	430	3EEX-9K-9	150 KVA	208/120Y		108-132	9%	5000	3LLX-150K-9
15 KVA	208/120Y		108-132	5%	600	3LLX-15K-9	150 KVA	480/277Y		250-304	9%	5000	3NNX-150K-9
15 KVA	480/277Y		250-304	5%	600	3NNX-15K-9	150 KVA	600/347Y		312-381	9%	5000	3EEX-150K-9
15 KVA	600/347Y		312-381	5%	600	3EEX-15K-9	225 KVA	208/120Y		108-132	9%	8000	3LLX-225K-9
22.5 KVA	208/120Y		108-132	5%	750	3LLX-22K-9	225 KVA	480/277Y		250-304	9%	8000	3NNX-225K-9
22.5 KVA	480/277Y		250-304	5%	750	3NNX-22K-9	225 KVA	600/347Y		312-381	9%	9200	3EEX-225K-9
22.5 KVA	600/347Y		312-381	5%	750	3EEK-22K-9	300 KVA	208/120Y		108-132	9%	9200	3LLX-300K-9
30 KVA	208/120Y		108-132	5%	900	3LLX-30K-9	300 KVA	480/277Y	±10%	250-304	9%	9200	3NNX-300K-9
30 KVA	480/277Y		250-304	5%	900	3NNX-30K-9	300 KVA	600/347Y		312-381	9%	9200	3EEX-300K-9
30 KVA	600/347Y		312-381	5%	900	3EEX-30K-9	500 KVA	208/120Y		108-132	9%	Consult	3LLX-500K-9
45 KVA	208/120Y		108-132	5%	1700	3LLX-45K-9	500 KVA	480/277Y		250-304	9%	Factory	3NNX-500K-9
45 KVA	480/277Y		250-304	5%	1700	3NNX-45K-9	500 KVA	600/347Y		312-381	9%		3EEX-500K-9

All regulators listed above are 60 Hertz and utilize Class H insulation. 50 Hertz units are available on request.

(1) All units are hard wired to terminals at both the input and output.

(2) The input voltage range is based on the output voltage setting. The output voltage is adjustable ±10% of the rated nominal output by means of an internal potentiometer.

(3) Shipping weights are approximate. Actual weights may be higher due to packing, crating or design.

DIEGO POWER

A California Corporation

Eastgate Industrial Center
5350 Eastgate Mall
San Diego, CA 92121
(619) 587-1925

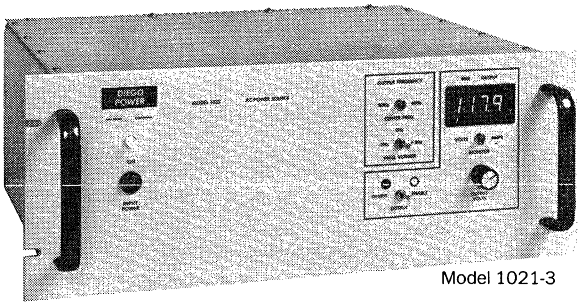
New Power Source Technology Reduces Cost and Weight—Improves Performance

COMPARE 1000 VA

Adjustable frequency **47–63Hz**
Adjustable output **0 to 260 volts**
Full current at low voltages
Light weight: **54 lbs**
80% Efficient
Short circuit and **overload protected**

$1895
without readout

$2140
with readout



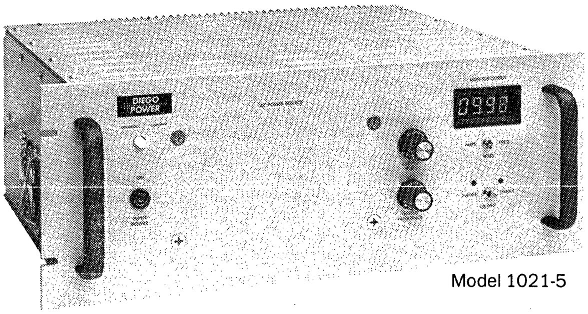
Model 1021-3

COMPARE 1000 VA

Adjustable frequency **47 to 500Hz**
Less than **200 μS response time**
Peak current: **2 times RMS rating**
Operates with **any power factor**
Smooth overload recovery characteristics
80% Efficient
Light weight: **56 lbs.**

$2765
Complete with Readout
(No add-on oscillators, etc.)

IEEE 488
and other busses available



Model 1021-5

Avoid a Jam

Ask for a FREE APPLICATIONS BULLETIN which discusses the following facts (and more):

☐ Some 1KVA sources hit their max peak current limits with a 400VA load (electronic equipment as load)!
☐ An "average" responding DVM can misread your "RMS" current requirement by 2:1 (in wrong direction).
☐ Poor power factor often (or usually) has nothing to do with reactive loads.
☐ Some sources can oscillate with Variacs® or transformers connected.

Ask about High Peak Current Option H (3.5x RMS Rating)

OTHER TYPICAL VALUES IN SOURCES

1KVA	Single Phase	400Hz	Model 1021-4	$2,435*
2KVA	Single Phase	47-63Hz	Model 2021-3	$4,290*
2KVA	Single Phase	47-500Hz	Model 2021-5	$5,540*
2KVA	Single Phase	400Hz	Model 2021-4	$4,880*
3KVA	Three Phase	50Hz	Model 3023-1	$6,985*
3KVA	Three Phase	400Hz	Model 3023-4	$7,995*
3KVA	Three Phase	47-500Hz	Model 3023-5	$9,295*
6KVA	Three Phase	50Hz	Model 6023-1	$12,370*
6KVA	Three Phase	60Hz	Model 6023-2	$12,370*
6KVA	Three Phase	400Hz	Model 6023-4	$15,110*

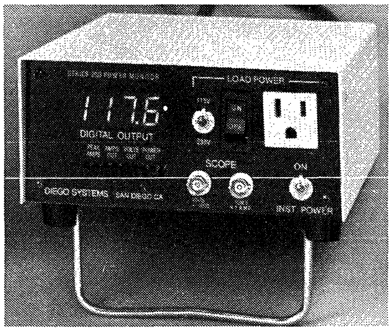
*Prices include cables. System cabinets available.

AC-DC Power Monitors.

Measures AC & DC	**Applications**
Complex waveforms	50 Hz equipment
RMS voltage	60 Hz equipment
RMS current	Airborne equip.
Peak current	DC (with ripple)
True power	Inverter in/out

1500W, (3000W on 230V)	Model 343	$695
4000W, (8000W on 230V)	Model 353	$795

Other models available



Many Testing Applications

Motors
Generators
Shop equipment
Communications equip.
Household appliances
Computer products
Switching power supplies

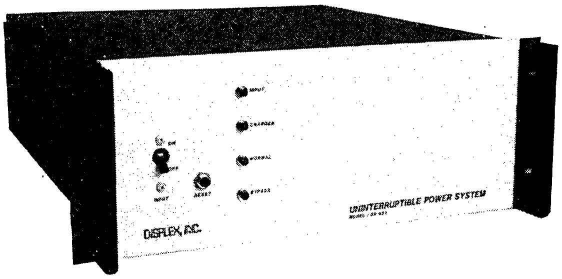
Lighting fixtures
Pumps
Transformers
Gyros
Office equipment

Prices subject to change without notice

HIGH-POWER AC SOURCES AND LINE CONDITIONERS

UNINTERRUPTIBLE AC POWER SOURCES

Model No.	kVA	Input	Output
PSU-7401	1.0	115V, 60 Hz	115V, 60 Hz
PSU-7402	1.0	230V, 50 Hz	230V, 50 Hz
PSU-7403	2.5	115V, 60 Hz	115V, 60 Hz
PSU-7404	2.5	230V, 50 Hz	230V, 50 Hz



FEATURES:

- Feed-through, full-time power conditioning.
- Low-distortion sine wave output.
- Electronic bypass switch for fail-safe operation.
- For −0.5 to +0.5 power factor loads.
- Short-circuit proof.
- Built-in battery bank.
- Light-weight, compact, efficient, high reliability.

REGULATING AC LINE CONDITIONERS

Model No.	kVA	Input	Output
PLR-5108	1.0	88-130V	105-125V
PLR-5116	2.0	88-130V	105-125V
PLR-5124	3.0	88-130V	105-125V
PLR-5204	1.0	170-250V	200-240V
PLR-5208	2.0	170-250V	200-240V

FEATURES:

- Reliable and efficient.
- Light-weight.
- Advanced short-circuit proof design.
- High overload capacity.
- Effective spike and lightning protection.
- Built-in voltage and load current meters.

LINE CONDITIONERS/FILTERS

Model No.	kVA	Nom. Voltage
PLC-3104	0.5	115
PLC-3108	1.0	115
PLC-3116	2.0	115
PLC-3124	3.0	115
PLC-3202	0.5	230
PLC-3204	1.0	230
PLC-3208	2.0	230
PLC-3212	3.0	230

FEATURES:

- Output Isolation.
- Excellent common and normal mode noise reduction.
- Built-in spike and lightning protection.

HIGH-POWER FREQUENCY CHANGERS

Model No.	kVA	Input	Output
PFC-8501	1.0	115V, 60 Hz	230V, 50 Hz
PFC-8502	1.0	230V, 50 Hz	115V, 60 Hz
PFC-8503	1.0	115V, 60 Hz	115V, 400 Hz
PFC-8504	1.0	230V, 50 Hz	115V, 400 Hz

FEATURES:

- Low-distortion sine wave output.
- Short-circuit proof.
- Variable frequency and output capability.
- DC Input versions available.
- Light-weight, compact, high reliability.

HIGH-POWER PROGRAMMABLE SOURCES

Model No.	kVA	Input	Output Voltage Span	Freq. Range
PPS-8701	1.0	115V, 60 Hz	±160V	0 to 60
PPS-8702	1.0	230V, 50 Hz	±160V	0 to 60

FEATURES:

- External analog programming input standard.
- Arbitrary programming input waveshape.
- Digital programming input version available.
- Advanced design with bi-directional output capability for either.

DISPLEX, INC.
A SUBSIDIARY OF NORTH HILLS ELECTRONICS INC.

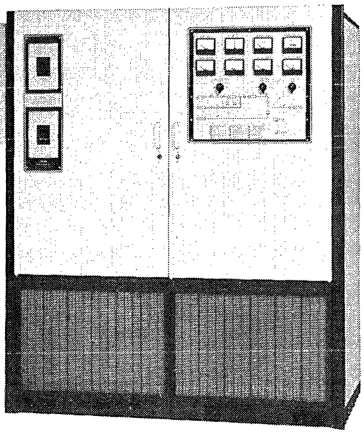
1 ALEXANDER PLACE, GLEN COVE, NEW YORK 11542-3796
TELEPHONE: (516) 671-4400 • TELEX: 46-6886 (NORTHILLS CI)

ELGAR

UNINTERRUPTIBLE POWER SYSTEMS

9250 Brown Deer Road • San Diego, CA 92121
Phone: (619) 450-0085 • Telex: 211063 ELSD UR

UNINTERRUPTIBLE POWER SYSTEMS

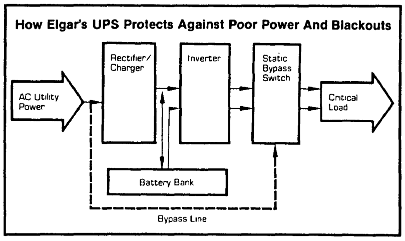


Elgar's all solid-state Uninterruptible Power Systems (UPS) combine a battery charger, battery bank, solid-state inverter and bypass switch to provide clean, continuous power to critical loads. The battery charger converts AC line power to DC. Normally, this DC power simultaneously float-charges the battery bank and powers the inverter. Upon loss of input AC, the inverter continues to furnish the critical load with uninterruptible AC power by drawing its energy from the battery bank. Since the battery bank is always connected to the inverter as well as to the battery charger, there is no switchover time. AC output frequency from the Uninterruptible Power Source is phase-locked to the input AC or bypass input AC, under normal conditions. When there is no input AC or bypass input AC, the output frequency is automatically determined by the stable internal oscillator.

In the unlikely event of a component failure within the Uninterruptible Power System, the bypass switch will be activated and the critical load will automatically transfer to the input AC line or bypass input AC. Elgar UPS rated 1.0, and 50KVA come equipped with a solid-state bypass switch (SBS) that can make the transfer with less than 1ms interruption.

Elgar UPS are designed to accept DC input power (derived from a nominally 125 or 130VDC rectifier system or from a battery bank with a final discharge voltage of 105VDC) and convert it to tightly regulated, single-phase AC power.

Elgar UPS are designed for a useful life of 15 to 20 years. Mathematical analysis and operating history indicate the anticipated mean-time between failures (MTBF) will be about 100,000 hours, depending upon the model and features selected. With appropriate interface of the bypass switch (electromechanical or static) with the load, an MTBF in excess of 180,000 hours for the output load bus can be expected.

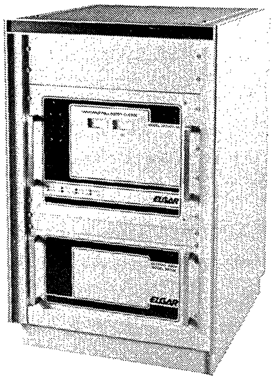


NEW "B" SERIES UPS

Elgar's new "B" series of UPS now provides lighter weight, reduced size, higher efficiency and better dynamic characteristics at a lower price. The improved performance characteristics of the "B" series units stems from a change in UPS inverter technology. Elgar's proven quasi type inverter designs have been replaced in the "B" series units with pulse width modulation (PWM) inverter technology. The technology was gained through Elgar's experience in providing (PWM) inverters and UPS to the nuclear power generation industry.

The "B" series units now incorporate standard operational and alarm features which were formerly offered only as options. The automatic forward transfer of static switches feature is a standard on all units thereby allowing the UPS to start loads that demand abnormally high in-rush currents.

Available in sizes from 1KVA single phase to 50KVA three phase.



MICRO UPS

Elgar offers a new line of power protection products especially designed for personal and small business computers.

Elgar's Power Control Systems (PSC) provide basic protection from most common line disturbances. Its compact design provides for fingertip control for all peripherals. It is modestly priced and is available for loads up to 1200 VA.

Elgar's Standby Power Systems, the SPS and SPR (pictured) provide even greater protection from common power line problems. In addition, both provide battery backup that takes over instantly when power is lost completely when blackouts hit. The reserve battery systems will run your computer long enough for you to shut your system down safely and in an orderly manner.

Elgar's SPS product line is offered in 500 and 1000 VA sinewave output. The SPR is offered in 350 VA squarewave output.

Elgar's family of power protection equipment for small computers is designed to be modular as progressively greater levels of power protection are required.

ELGAR

STANDARD UPS MODELS

9250 Brown Deer Road • San Diego, CA 92121
Phone: (619) 450-0085 • Telex: 211063 ELSD UR

UPS GENERAL SPECIFICATIONS

EXCLUSIVE 2 YEAR WARRANTY

Voltage Regulations: ± 2%
Instantaneous Transient (100% load change):
Single phase models:
± 15% overall
Three phase models:
± 10% overall
Frequency Stability: ± 0.25%
Continuous Power:
Rated KVA at 0.8 to 1.0 P.F.
Load Power Factor: 0.7 lag to unity
Harmonic Distortion: 5% THD maximum

Overload Rating:
5KVA and above:
125% for 20 minutes
150% for 10 seconds
Efficiency at Full Load;
1.0 and 3.0 KVA: 75% minimum
5KVA to 15 KVA: 80% minimum
25KVA and above: 82% minimum
STANDARD INSTRUMENTS:
DC Voltmeter, AC Voltmeter
Output AC Ammeter — 5KVA and above

STANDARD INDICATORS:
Input Power On
Low DC
Bypass Switch Position
Fuse(s) Open — 5KVA and above
Battery Operation
Overtemperature — 5KVA and above
Overload
CONSTRUCTION:
In accordance with applicable NEMA standards and the National Electric Code (NEC).
ENVIRONMENT:
Operating Temperature: 0 to 50° C
Humidity: to 95%

SINGLE PHASE SYSTEMS, 1-3 KVA

Model	Output Rating	Inverter Input Current at Cut Off End Point of Discharge Voltage (1)	Dimensions in./mm — H×W×D	Approx. Weight lbs./kg.
60Hz, 115VAC INPUT & OUTPUT MODELS				
UPS-102-1B	1000VA	16.5A @ 63.0V	8.75/222×19/483×20/508	100/45.5
UPS-302-1B	3000VA	47.7A @ 63.0V	14/356×19/483×19/483	225/102
50Hz, 230VAC INPUT & OUTPUT MODELS				
UPS-1025-1B	1000VA	18.4A @ 63.0V	8.75/222×19/483×20/508	125/56.7
UPS-3025-1B	3000VA	47.7A @ 63.0V	24.5/622×19/483×20/508	330/149.7

SINGLE PHASE UPS, 5-25 KVA

Model	Input/Output Frequency, Hz	Output Rating	Standard Input Voltage/ Config. (2) (4)	Standard Output Voltage (4)	Nominal Battery Bus VDC	Inverter Input Range VDC	Inverter Input Current	Dimensions in./mm — H×W×D	Approx. Weight lbs./kg.
UPS-502-1T	60	5KVA	208 1ϕ	208 1ϕ/120 1ϕ	120	105-145	48A	40/1020x24/610x29/738	750/450
UPS-103-1T	60	10KVA	120/208 3ϕ	208 1ϕ/120 1ϕ	120	105-145	94A	40x1020x36/915x29/738	1100/650
UPS-153-1B	60	15KVA	120/208 3ϕ	120 1ϕ	120	105-145	143A	72.5/1842×55/1397×19/483	2300/1045
UPS-253-1B	60	25KVA	120/208	120 1ϕ	240	210	107A	78/1981×66/1676×307/780	2800/1270

Internal SBS (Static Bypass Switch) is a standard feature on all models.

THREE PHASE UPS WITH BUILT-IN STATIC BYPASS SWITCHES

Model	Input/Output Frequency, Hz	Output Rating	Standard Input/Output Voltage (4)	Nominal Battery Bus VDC	Inverter Input Range VDC	Inverter Input Current at Cut Off	Dimensions in./mm — H×W×D	Approx. Weight lbs./kg.
UPS-103-3B	60	10KVA	120/208	120	105-145	96A	72.5/1842×55/1397×19/483	2000/909
UPS-153-3B	60	15KVA	120/208	120	105-145	143A	76.5/1943×55/1397×26/660	2250/1023
UPS-253-3B	60	25KVA	120/208	240	210-285	110A	78/1981×66/1676×30.7/780	2800/1270
UPS-373-3B	60	37.5KVA	120/208	240	210-285	163A	78/1981×66/1676×30.7/780	3700/1680
UPS-503-3B	60	50KVA	120/208	240	210-285	217A	78/1981×66/1676×30.7/780	4300/1950
UPS-1035-3B	50	10KVA	230/400	120	105-145	96A	72.5/1842×55/1397×19/483	2240/1018
UPS-1535-3B	50	15KVA	230/400	120	105-145	143A	76.5/1943×55/1397×26/660	2500/1136
UPS-2535-3B	50	25KVA	240/415	240	210-285	110A	78/1981×66/1676×30.7/780	3700/1680
UPS-3735-3B	50	37.5KVA	240/415	240	210-285	163A	78/1981×66/1676×30.7/780	4300/1950

(1) Based upon full inverter output load at 0.8 p.f.
(2) Input taps provided on 50Hz units for nominally 220 or 240.
(3) Breaks into two sections (Charger & Inverter) for shipment.
(4) Many optional input and output voltages are available at additional cost.

OPTIONAL FEATURES INCLUDE:

Additional Annunciation, Float Equalize Switch and/or Timer, Maintenance Bypass Switch, Narrow Frequency Sync Window, Slow Slew Circuit, and Remote Status Panels. Consult factory for details.

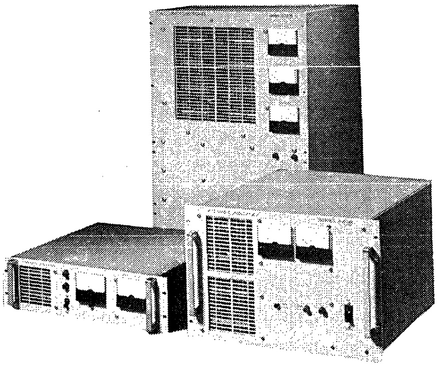
FREQUENCY CONVERSION WITH AN ELGAR UPS

An Elgar AC Power Source is suitable for more frequency conversion requirements. For 10KVA and above (where neither variable frequency nor voltage is required), a UPS may be ordered for 60Hz input to 60Hz output or vice versa.

ELGAR

ULTRA PRECISION AC LINE CONDITIONERS

9250 Brown Deer Road • San Diego, CA 92121
Phone: (619) 450-0085 • Telex: 211063 ELSD UR



Elgar's Ultra Precision AC Line Conditioners provide precise, clean AC power to critical loads by eliminating high-speed AC line and load transients and distortion as well as providing precise regulation. These versatile instruments have response times 5,000 times faster than the fastest conventional AC line regulators and line isolation of 70 to 100 dB, far superior to mere isolation transformers. All Elgar AC line conditioners are designed for continuous operation and are contained in rack-mount enclosures. Front panel controls include meters to monitor input and output voltages and output load current, an overload indicator and an input circuit breaker.

Users of voltage-sensitive equipment need isolation from high-speed AC line transients. These transients can cause erratic operation, component failures, and a reduction in equipment life. In sensitive instrumentation and data processing equipment, high-speed line transients often are the cause of erroneous information.

Elgar AC Line Conditioners are the best, most reliable solution to these problems.

GENERAL SPECIFICATIONS

INPUT / OUTPUT ISOLATION: 100 dB (60 Hz)

OUTPUT DISTORTION: 0.2% max for up to 10% input harmonic distortion

LINE REGULATION: ± 0.025% for ± 10% input AC line variation

LOAD REGULATION: ± 0.025% for no load/full load full current into unity to zero lagging or leading load.

REDUCES 500V 10μ SEC TRANSIENTS BY 1000:1

SUPPLIES PEAK CURRENTS 3.5 TIMES RMS RATING

TEMPERATURE COEFFICIENT: 0.005% per °C

PEAK AMPLITUDE STABILITY: ± 0.01% (cycle to cycle)

AMPLITUDE DRIFT: ± 0.05% 24 hrs constant line, load and temperature

IMPULSE SETTLING TIME: less than 20μsec

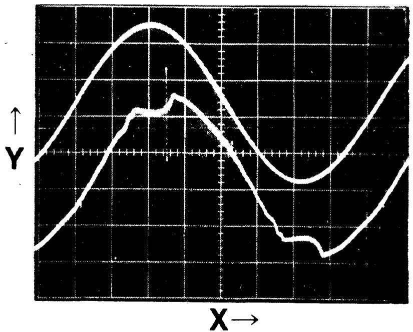
AMBIENT TEMPERATURE: 0 to +55°C operating, −20 to +85°C storage

OVERLOAD INDICATION: Front panel lamp lights when rated output current is exceeded

OVERLOAD PROTECTION: Continuous overload actuates front panel circuit breaker

METERING: Reads: input voltage, output voltage, & output current

COOLING: Forced Air



Y=75 volts/cm **X=2 millisec/cm**

The lower trace shows a very distorted input AC line waveform with a 75 volt peak spike riding on it. The upper trace shows the output of the Elgar AC Line Conditioner which is perfectly clean and shows no trace of the AC input anomalies.

STANDARD MODELS

	OUTPUT				INPUT
	POWER, VA		Voltage	FREQ	Voltage
MODEL	Cont.	Peak	VRMS	HZ	Range[1]
6006B	1000	5000	115	57-63	94-138
6226B	1000	5000	220	57-63	180-260
6246B	1000	5000	240	57-63	200-280
6005B	1000	5000	115	47-53	95-135
6225B	1000	5000	220	47-53	180-260
6245B	1000	5000	240	47-53	200-280
3006B	3000	15000	115	57-63	95-135[2]
3226B	3000	15000	220	57-63	180-260
3246B	3000	15000	240	57-63	200-280

	OUTPUT				INPUT
	POWER, VA		Voltage	FREQ	Voltage
MODEL	Cont.	Peak	VRMS	HZ	Range[1]
3005B	3000	15000	115	47-53	95-135[2]
3225B	3000	15000	220	47-53	180-260
3245B	3000	15000	240	47-53	200-280
5006B	5000	25000	115	57-63	95-135[2]
5226B	5000	25000	220	57-63	180-260
5246B	5000	25000	240	57-63	200-280
5005B	5000	25000	115	47-53	95-135[2]
5225B	5000	25000	220	47-53	180-260
5245B	5000	25000	240	47-53	200-280

NOTES:

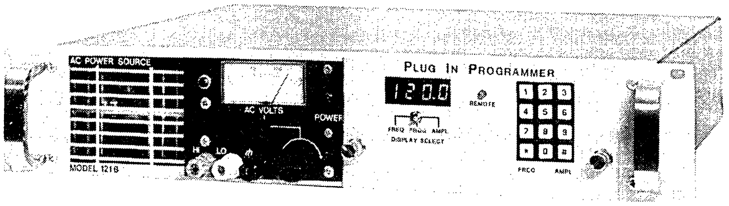
1. Input voltage ranges selected by 3 position tap switch
   94-116, 103-127, 112-138V for 94-138V range
   80-100, 90-110, 100-120V for 80-120V range
   180-220, 198-212, 216-268V for 180-260V range
   198-242, 216-264, 234-286V for 200-280V range
2. 115V output with 230V input available. Add −230 to model number, e.g., 3006B-230

MODEL	SIZE—Inches/mm			WEIGHT
	Height	Width	Depth	Lbs./Kg.
SERIES 6000B	5.25/133	19/483	16/406	65/30
SERIES 3000B	12.25/311	19/483	20/508	175/80
SERIES 5000B	24.5/622	19/483	20.2/513	375/170

ELGAR

AC POWER SOURCES

9250 Brown Deer Road • San Diego, CA 92121
Phone: (619) 450-0085 • Telex: 211063 ELSD UR



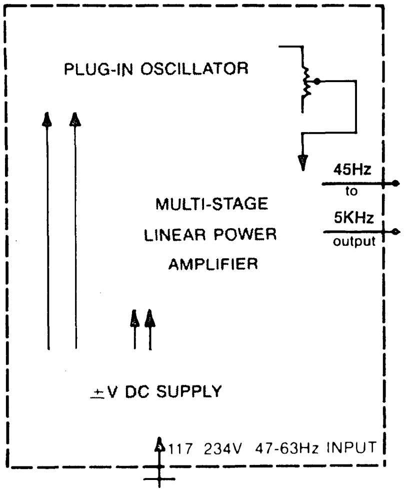
Elgar has long been the industry leader in producing solid-state Frequency Converters (AC Power Sources) for a variety of applications. These include laboratories, receiving inspection, production testing, computer-controlled automatic test systems, and facilities which require variable voltage, fixed or variable frequencies independent of power line and load variations.

Think of an Elgar AC power source as a high-power linear amplifier driven by a precision oscillator. Actually, the basic power amplifier consists of a ± DC supply and a multi-stage amplifier with a multiple-tap power output transformer. Output frequency is established by a plug-in oscillator.

Although frequently classed as instruments, Elgar power sources are actually power systems. They can deliver a variety of voltages and frequencies at the output, and the phase angles of the oscillators can be controlled, enabling the user to interconnect the output of two or more power sources into 2-phase and either Delta or Wye, 3-phase configurations.

Because of the relative ease of control of the output frequency, amplitude and phase angle, Elgar power sources can be externally programmed by a computer or other digital commands via an Elgar Plug-In Programmer (PIP) Oscillator. This enables avionics and other system designers to automatically "exercise" their end products under simulated power conditions.

Since the many possible output variations are achieved either by a plug-in device or by external interconnection, Elgar power sources can serve many needs without fear of obsolescence.



GENERAL SPECIFICATIONS

Input: 115 or 230VAC, 47-63Hz single-phase, standard for all models through 1500VA; 230/400V or 120/208V 3-phase for 1751B, 3001, 1753B.
Output Voltage Ranges: 0-32, 0-130, 0-260
Output Frequency Range: 45-5,000 Hz
Load Power Factor: ± 0.7 at full VA
Output Harmonic Distortion: 0.6% THD worst case
Line Regulation:
± 0.25% at full load vs. ± 10% change of input line voltage.
Load Regulation:
± 1% from no load to full load over full frequency range and ± 10% input range. Adjustable to better than 0.1% for specific load conditions. Fixed frequency systems always less than ± 0.25%.
Response Time: Less than 50 μsec.

STANDARD MODELS

SINGLE PHASE		TWO PHASE		THREE PHASE			
MODEL	RATING VA	MODEL	RATING VA	MODEL	RATING VA	MODEL	RATING VA
121B	120	240-2	240	153B	150	2000-3D	2000
251B	250	500-2	500	240-3D	240	2250-3	2250
501B	500	1000-2	1000	360-3	360	3000-3	3000
751B	750	1500-2	1500	503A	500	3603B	3600
1001B	1000	2000-2	2000	500-3D	500	5250-3	5250
1751B	1750	3500-2	3500	750-3	750	9000-3	9000
2000-1	2000	6000-2	6000	1000-3D	1000	10500-3	10500
3001	3000			1500-3	1500	18000-3	18000
6000-1	6000			1753B	1750	27000-3	27000
9000-1	9000					36000-3	36000

Note: D is an open delta configuration.

Noise Level: 70db below full output. Includes plug-in oscillator.
Gain Stability:
± 0.25% for 24 hours at constant line, load and temperature.

Temperature Range:
Operating, − 20° to +50°C;
Storage, − 40° to +80°C.

STANDARD AMPLIFIER MAIN FRAME DATA

MODEL	OUTPUT POWER VA	Height In./mm.	Width In./mm.	Depth In./mm.	Weight Lbs./kg.
121B	120	3.5/89	19/482	15/381	45/20
251B	250	5.25/133	19/482	16/406	49/22
501B	500	7/178	19/482	19/482	100/46
751B	750	7/178	19/482	19/482	115/52
1001B	1.000	12.25/311	19/482	19/482	210/96
1751B	1750	14/356	19/482	19/482	230/105
3001	3000	17.5/445	19/482	22/560	310/141
153B	150	5.25/133	19/482	16.5/419	70/32
503A	500	8.75/220	19/482	19/482	115/52
1753B	1750	14/256	19/482	19/482	230/105

COMPACT "C" SERIES MODELS

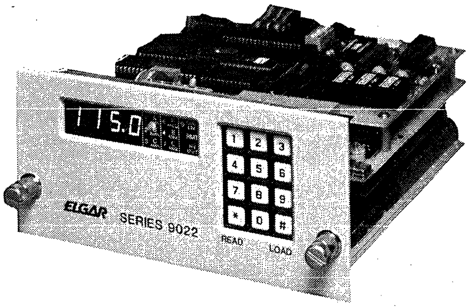
Elgar's "C" series provides lighter weight, reduced size and higher efficiency than the standard line. While available only with a single range output (0-125V) due to the transformerless approach employed, an optional auto-transformer is available to provide 250V output ranges. Frequency range 15Hz to 10KHz without auto-transformer.

MODEL	OUTPUT POWER VA	Height In./mm.	Width In./mm.	Depth In./mm.	Weight Lbs./kg.
501C	500	5.25/133	19/482	16/406	46/21
1001C	1000	8.75/222	19/482	20/508	76/35
1503C	1500	8.75/222	19/482	20/508	110/45

ELGAR

OSCILLATORS FOR AC POWER SOURCES

9250 Brown Deer Road • San Diego, CA 92121
Phone: (619) 450-0085 • Telex: 211063 ELSD UR



FREQUENCY GENERATION TECHNIQUES

The output frequency of the power source is determined by the plug-in oscillator which develops the low distortion sine wave to the power amplifier. A variety of interchangeable versions are available, including 45Hz to 10KHz, narrow range variable or fixed frequencies.

Depending on the accuracy of frequency control desired, either of two methods of frequency generation is utilized. One method employs a modified phase shift oscillator.

This technique is used in both the continuously variable and fixed frequency plug-ins since it requires only a change of resistance to produce a change in frequency. External sync capability is a standard option to this group of oscillators and the external sync signal can be sine or square wave, fundamental or odd order harmonics. The other method uses a crystal for precision fixed frequency. By utilizing these two methods of frequency generation, Elgar offers over 50 standard manual and programmable plug-in oscillators.

PROGRAMMABLE OSCILLATORS

Plug-In-Programmable oscillators (PIPs) which provide the interface between a computer and any Elgar AC Power Source System are available to enable programming of every function controllable in an AC Source including frequency, voltage amplitude, and phase angle in multi-phase systems.

Elgar's PIPs are microprocessor controlled and offer more power options than ever before. Our latest PIP provides programmable current limiting and is CIIL compatible to meet Air Force MATE/TMA specifications.

Elgar's Atlas Based Language Extension (ABLE) makes programming simple via IEEE-488 (GPIB). Most PIP models provide key pad and LED read-out for convenient local control. And with Elgar's PIP, rack space is cut to a bare minimum since it is designed as a plug-in component for our AC Power Sources.

PLUG-IN OSCILLATOR MODULES AVAILABLE FOR USE WITH ALL ELGAR AC POWER SOURCES

VARIABLE FREQUENCY				
Type	Model	Frequency Range (Hz)	Calibration Accuracy	Frequency Temp. Coeff.
Synthesized Decade Dial	40*SD-XXX	15-9999**	±0.001%	3 PPM/0°
Continuous Dial	43AV	300-500	±0.25%	±0.02%/°C
	46*V	45-70	±0.25%	±0.02%/°C
	464*V	45-70 & 340-450	±0.25%	±0.02%/°C
FIXED FREQUENCY				
R.C. Phase Shift	Any fixed frequency in the range of 15Hz to 10KHz at 1Hz increments. Examples:			
	45*-.1	50Hz	±0.1%	±0.015%/°C
	46*-.1	60Hz	±0.1%	±0.015%/°C
	44*-.1	400Hz	±0.1%	±0.015%/°C
Crystal Control	Any fixed frequency available in the range of 15Hz to 9999Hz; from 15.00Hz to 99.99Hz in 0.01Hz increments; 100.0Hz to 999.9Hz in 0.1Hz increments; 100Hz to 9999Hz in 1Hz increments. Examples:			
	40*SP-50-XXX	50Hz	±0.001%	3PPM/0°
	40*SP-60-XXX	60Hz	±0.001%	3PPM/0°
	40*SP-400-XXX	400Hz	±0.001%	3PPM/0°

*Indicates number of phases with 1, 2 or 3 available. 2 phase has a 90° ± 1° phase angle while 3 phase has 120° ± 1° phase angle. Example: 401SD-001, single phase.

**Normally restricted to 45-5000Hz.

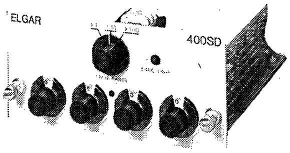
COMPLETION OF THE 400SD OR 400SP MODEL NUMBER "THREE DIGIT OPTIONS CODE"

400SD- 1 1 1

MODEL 400SD OR 400SP

0 - No external programming
1 - External resistance programming 0 to 13K ohm for 0 to full scale
2 - External voltage programming 0 to 10VDC for 0 to full scale
3 - External voltage programming 0 to 13VDC for 9 to 130V output
4 - External voltage programming 0 to 26VDC for 0 to 260V output
5 - External 10Kohm pot

1 - 0 to 130V output of power source
2 - 0 to 260V output of power source
3 - 0 to 32V output of power source
4 - 0 to 65V output of power source
5 - Frequency range of 400SD extended to 15Hz to 10KHz
6 - Frequency range 15Hz to 5KHz
7 - Frequency range 45Hz to 10KHz



0 - No remote sense with servo control
1 - 1 Phase remote sense with servo control
2 - 2 Phase remote sense with servo control
3 - 3 Phase remote sense with servo control
4 - 3 Phase open DELTA
5 - 3 Phase open DELTA remote sense with servo contro

Special purpose programmable oscillators such as Elgar's TG-704A are also available to simulate transients and line distortion as well.

Available with BCD inputs or per the IEEE standard interface bus, Elgar's PIPs enable the use of Elgar AC Power Sources with the most advanced Automatic Test Equipment.

ENERGY LTD
4714 Upshur Street • Bladensburg, MD 20710 • (301) 699-1144 • Telex 62837736

UNINTERRUPTIBLE POWER SYSTEMS

FEATURES

- 100VA-1800VA (LARGER MODELS UPON REQUEST)
- HIGH INRUSH CAPACITY — DESIGNED TO HANDLE DISC DRIVE START UP
- MODULAR IN DESIGN
- ALL SOLID STATE
- PURE SINE WAVE (LINEAR DESIGN)
- COMPLETE METER AND UNIT STATUS PANEL
- AUTO VOLTAGE REGULATION
- PORTABLE (DUE TO MODULAR DESIGN OF LARGER MODELS)
- SWITCHABLE FOR INDUCTANCE OR RESISTIVE LOADS
- BATTERY EXTENSION UNITS AVAILABLE
- 208V OUTPUT AVAILABLE
- LOW IN COST
- VERY QUIET OPERATION (NO FERRORESONANT COMPONENTS)
- COMPLETE WITH BATTERIES

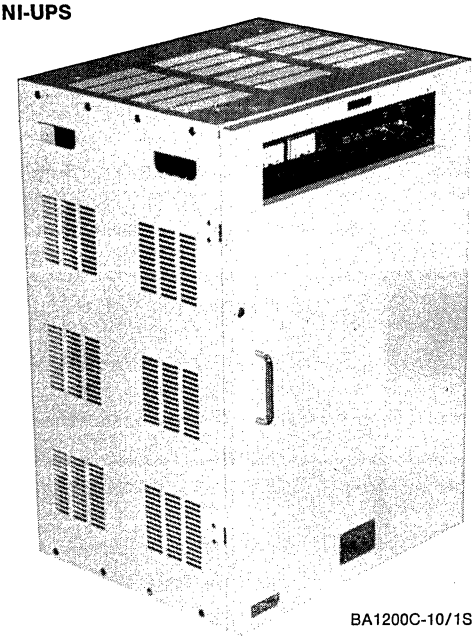
OPERATION

This system keeps the storage batteries fully charged at all times by a constant voltage charger as long as the commercial power source is present. The incoming AC signal is rectified and passed into the inverter. The inverter supplies the AC output (synchronized to the commercial power source at all times) of the load through the electronic static switch. In the event of commercial power source interruption, the DC signal which has been supplied to the input of the inverter from the commercial power source through the rectifier, is stopped. Instantly, the solid state static switch is opened to supply the DC signal from the batteries to the input of the inverter, thus continuing the supply of output power. At the same time, the buzzer sounds to announce the service interruption.

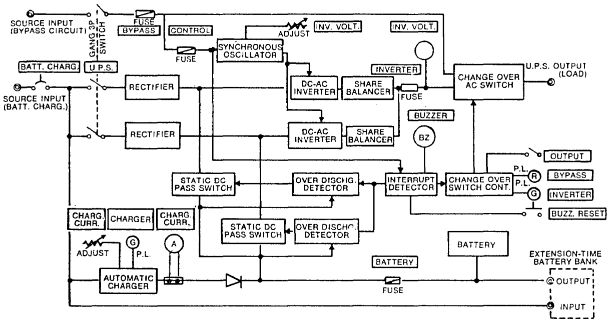
As the commercial power outage continues, battery voltage will decrease. To prevent damage to the battery unit due to over discharge, a discharge protecter will disconnect the unit at a predetermined level. At this time AC output will cease. If more back-up time is required, battery extension units are available. They are self-contained and sized for each unit and extension time desired. Upon return of commercial power, the AC output of the inverter will start to synchronize with the incoming signal. When synchronized (within 2 seconds) the unit will disconnect the batteries and return to normal operation. In the meantime, the automatic constant voltage charger immediately starts replenishing the electric power to the discharged batteries. Within twelve hours, the batteries restore to 80% of total capacity. Within the next twelve hours, the batteries restore to 100% capacity.

If an abnormality occurs, such as failure of the output of the inverter for more than 4/1000 seconds (1/4 Hz), the power to be supplied to the load is changed instantly to the commercial power source (within 1/4 Hz) so that the power is now supplied directly from the commercial power source to the load. The sine wave is unaffected.

MINI-UPS



BA1200C-10/1S (1200VA)


SOURCE INPUT (BYPASS CIRCUIT)
GANG UP SWITCH
FUSE
BYPASS
CONTROL
ADJUST
INV. VOLT.
INV. VOLT.
FUSE
SYNCHRONOUS OSCILLATOR
BATT. CHARG.
U.P.S.
SOURCE INPUT (BATT. CHARG.)
RECTIFIER
INVERTER
DC-AC INVERTER
SHARE BALANCER
FUSE
CHANGE OVER AC SWITCH
U.P.S. OUTPUT (LOAD)
BUZZER
RECTIFIER
DC-AC INVERTER
SHARE BALANCER
BZ
OUTPUT
P.L.
BYPASS
STATIC DC PASS SWITCH
OVER DISCHG. DETECTOR
INTERRUPT DETECTOR
CHANGE OVER SWITCH CONT.
P.L.
INVERTER
BUZZ. RESET
CHARG. CURR.
CHARGER
CHARG. CURR.
STATIC DC PASS SWITCH
OVER DISCHG. DETECTOR
ADJUST
P.L.
A
BATTERY
BATTERY
EXTENSION-TIME BATTERY BANK
AUTOMATIC CHARGER
FUSE
OUTPUT
INPUT

If the equipment demands high inrush start-up current, this system has the ability to sense the drop in output voltage and instantly (within 1/4 Hz) transfers to by-pass circuit. Upon sensing normal voltage levels, it will switch back to the inverter.

SPECIFICATIONS

	Model of UPS	BA 600C-10/1S	BA 1200C-10/1S	BA 1800C-10/1S
	Output Capacity	600 VA	1200 VA	1800 VA
	Back up time	more than 10 min.	more than 10 min.	more than 10 min.
	Transfer time	no interruption	no interruption	no interruption
	Dimensions	21"H x 21"W x 17"D	32"H x 21"W x 17"D	47"H x 21"W x 17"D
	Weight	180 lbs.	306 lbs.	409 lbs.
Battery Charger	Operation	Continuous	Continuous	Continuous
	Rated Source Input	100V/115V AC 1φ	100V/115V AC 1φ	100V/115V AC 1φ
	Input Fluctuation	Rated Volts ±15% max.	Rated Volts ±15% max.	Rated Volts ±15% max.
	Input Frequency	50 Hz/ 60 Hz	50 Hz/ 60 Hz	50 Hz/ 60 Hz
	Rated Output Volts	110.4V DC	110.4V DC	110.4V DC
	Output Fluctuation	96V ~ 112V DC	96V ~ 112V DC	96V ~ 112V DC
	Charge Current	0 ~ 1.0A DC	0 ~ 1.0A DC	0 ~ 1.0A DC
	Current Limiter	Automatic Control	Automatic Control	Automatic Control
Rectifier	Rated Source Input	115V AC	115V AC	115V AC
	Input Fluctuation	Rated Volts ±15% max.	Rated Volts ±15% max.	Rated Volts ±15% max.
	Input Frequency	50 Hz/60 Hz	50 Hz/60 Hz	50 Hz/60 Hz
	Output Regulation	90V ~ 110V DC	90V ~ 110V DC	90V ~ 110V DC
	Output Current	0 ~ 10A DC	0 ~ 20A DC (2 units)	0 ~ 30A DC (3 units)
	Current Limiter	Protection by Fuse	Protection by Fuse	Protection by Fuse
DC-AC Inverter	Cooling	Fan Forced	Fan Forced	Fan Forced
	Rated Input Voltage	DC 96V	DC 96V	DC 96V
	Input Fluctuation	DC 90V ~ 115V	DC 90V ~ 115V	DC 90V ~ 115V
	Current Input	10A DC max.	20A DC max. (2 units)	30A DC max. (3 units)
	Output Power	600VA AC 1φ	1200 VA AC 1φ	1800 VA AC 1φ
	Rated Voltage Output	115V/230V AC	115V/230V AC	115V/230V AC
	Output Regulation Volts	±5% AC max.	±5% AC max.	±5% AC max.
	Output Freq. Stability	Sync. to Comm. Power	Sync. to Comm. Power	Sync. to Comm. Power
	Output Distortion	10% max. (Sine wave)	10% max. (Sine wave)	10% max. (Sine wave)

50, 60, 400 Hz

John Franek Company, Inc.

FREQUENCY CHANGERS POWER CONDITIONERS

Performance Specifications

These modular systems make it possible to configure a system from 12 to 72 kVA by simply adding modules (depending on cabinet size). And you can choose between a fixed system (user specified at any frequency from 45 to 500 Hz) or a variable system that delivers from 45 to 500 Hz at the turn of a dial. Variable systems also have fixed settings at 50, 60 and 400 Hz. For 3-phase units the performance listed is per phase.

Input Types:

A. 120/208 VAC ±10%, 47–67Hz, 3 ϕ Wye
B. 240 VAC ±10%, 47–63Hz, 3 ϕ Delta
C. 220/308 VAC ±10%, 3 ϕ Wye
D. 460 VAC ±10%, 3 ϕ Delta

Output Frequency: Fixed or Variable models
Fixed: User specified from 45–500 Hz.
Variable: 45–500 Hz variable mode plus fixed mode settings at 50, 60 and 400 Hz.

Output Voltage: Single-phase, 0 to 130 VAC. Three-phase, 0 to 225 VAC, line-to-line. An auto-transformer is used for other ranges.

Output Distortion: 3% max THD for non-linear loads; 1.5% typical for linear loads.

Line Regulation: ±1% max for ±15% line change. Up to ±30% line range is optional.

Load Regulation: ±1% max for 100% load change.

Load Imbalance: Zero to 100%. Each phase is totally independent.

Response Time: Corrects for 100% load changes in less than 0.5 millisecond. (< ¼ cycle at 400 Hz.)

Power Factor: Zero to unity P.F. inductive or capacitive at 100% rated current. Unit is stable into any type load.

Output Protection: Overload and short circuit.

Efficiency: 85–90%.

Output Isolation: Output floating from chassis, neutral may be grounded if desired.

Ride Through: Sustains rated output voltage at full power with a 16 millisecond line interruption.

Operating Temp Range: 0°C to +55°C

Output Power: (See individual model listing on following pages)
100% of rating at 0°C to 55°C
120% of rating at 0°C to 45°C
150% for 10 seconds

12 kVA

This switching power source delivers a full 12 kVA with a typical efficiency of 85–90%. And it can be used right in the workplace due to cool, quiet operation and light weight single cabinet construction (caster mounted for easy mobility). Models can be selected to operate at fixed or variable frequency from 45 to 500 Hz. Variable models include fixed setting at 50, 60 and 400 Hz.

Dimensions: 29″W x 34″D x 59″H

Weight: 750 lbs.

SINGLE PHASE

USER SELECTABLE OUTPUTS

MODEL #	FREQ.	120 VAC (AMPS)	240 VAC (AMPS)
1031-AVR1	VARIABLE	**96**	—
1031-AFR1	FIXED	**96**	—
1031-AVT1	VARIABLE	**96**	**46**
1031-AFT1	FIXED	**96**	**46**

THREE PHASE

USER SELECTABLE OUTPUTS (AMPS PER LEG)

MODEL #	FREQ.	120/208 WYE	230 VAC DELTA	120 VAC DELTA	240 VAC DELTA	220/380 WYE	480 VAC DELTA
3031-AVR3	VARIABLE	**32**	**32**	**32**	—	—	—
3031-AFR3	FIXED	**32**	**32**	**32**	—	—	—
3031-AVT2	VARIABLE	**32**	**32**	**32**	**27**	**16**	**14**
3031-AFT2	FIXED	**32**	**32**	**32**	**27**	**16**	**14**
3031-AVT3	VARIABLE	**32**	**32**	**55**			
3031-AFT3	FIXED	**32**	**32**	**55**			

John Franek Company, Inc.

Ask for John Franek
P.O. Box 1172
Santa Ana, CA 92711
(714) 832-0290

Toll-Free outside CA
800-854-9420
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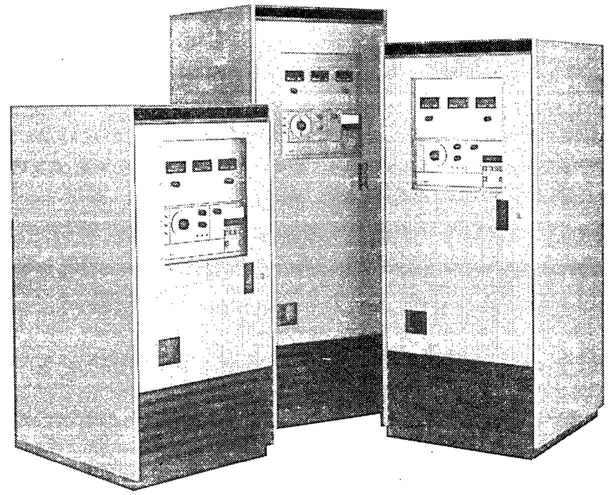
800-468-6808



John Franek Company, Inc.

FREQUENCY CHANGERS POWER CONDITIONERS

24 kVA

This switching power source delivers a full 24 kVA with a typical efficiency of 85–90%. And it can be used right in the workplace due to cool, quiet operation and light weight single cabinet construction (caster mounted for easy mobility). Models can be selected to operate at fixed or variable frequency from 45 to 500 Hz. Variable models include fixed setting at 50, 60 and 400 Hz.

Dimensions: 29″W x 34″D x 59″H **Weight:** 750 lbs.

SINGLE PHASE

USER SELECTABLE OUTPUTS

MODEL #	FREQ.	120 VAC (AMPS)	240 VAC (AMPS)
1061-AVR1	VARIABLE	**192**	—
1061-AFR1	FIXED	**192**	—
1061-AVT1	VARIABLE	**192**	**96**
1061-AFT1	FIXED	**192**	**96**

(AMPS PER LEG)

THREE PHASE

MODEL #	FREQ.	120/208 WYE	230 VAC DELTA	120 VAC DELTA	240 VAC DELTA	220/380 WYE	480 VAC DELTA
3061-AVR3	VARIABLE	**64**	**64**	**64**	—	—	—
3061-AFR3	FIXED	**64**	**64**	**64**	—	—	—
3061-AVT2	VARIABLE	**64**	**64**	**64**	**54**	**32**	**28**
3061-AFT2	FIXED	**64**	**64**	**64**	**54**	**32**	**28**
3061-AVT3	VARIABLE	**64**	**64**	**110**	—	—	—
3061-AFT3	FIXED	**64**	**64**	**110**	—	—	—

◄ **Performance specification listed on previous page**

36 kVA

This switching power source delivers a full 36 kVA with a typical efficiency of 85–90%. And it can be used right in the workplace due to cool, quiet operation and light weight single cabinet construction (caster mounted for easy mobility). Models can be selected to operate at fixed or variable frequency from 45 to 500 Hz. Variable models include fixed setting at 50, 60 and 400 Hz.

Dimensions: 29″W x 34″D x 72″H **Weight:** 875 lbs.

SINGLE PHASE

USER SELECTABLE OUTPUTS

MODEL #	FREQ.	120 VAC (AMPS)	240 VAC (AMPS)
1091-AVR1	VARIABLE	**279**	—
1091-AFR1	FIXED	**279**	—
1091-AVT1*	VARIABLE	**279**	**140**
1091-AFT1*	FIXED	**279**	**140**

(AMPS PER LEG)

THREE PHASE

MODEL #	FREQ.	120/208 WYE	230 VAC DELTA	120 VAC DELTA	240 VAC DELTA	220/380 WYE	480 VAC DELTA
3091-AVR3	VARIABLE	**96**	**96**	**96**	—	—	—
3091-AFR3	FIXED	**96**	**96**	**96**	—	—	—
3091-AVT2*	VARIABLE	**96**	**96**	**96**	**81**	**48**	**40**
3091-AFT2*	FIXED	**96**	**96**	**96**	**81**	**48**	**40**
3091-AFT3*	VARIABLE	**96**	**96**	**166**	—	—	—
3091-AFT3*	FIXED	**96**	**96**	**166**	—	—	—

*Indicated models utilize an external output auto-transformer mounted in its own enclosure. All others are single cabinet systems.

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800-468-6808

50, 60, 400 Hz

John Franek Company, Inc.

FREQUENCY CHANGERS • POWER CONDITIONERS

48 kVA

This switching power source delivers a full 48 kVA with a typical efficiency of 85–90%. And it can be used right in the workplace due to cool, quiet operation and light weight single cabinet construction (caster mounted for easy mobility). Models can be selected to operate at fixed or variable frequency from 45 to 500 Hz. Variable models include fixed setting at 50, 60 and 400 Hz.

Dimensions: 29″W x 34″D x 72″H

Weight: 875 lbs.

SINGLE PHASE

USER SELECTABLE OUTPUTS

MODEL #	FREQ.	120 VAC (AMPS)	240 VAC (AMPS)
1121-AVR1	VARIABLE	**380**	—
1121-AFR1	FIXED	**380**	—
1121-AVT1*	VARIABLE	**380**	**190**
1121-AFT1*	FIXED	**380**	**190**

THREE PHASE

USER SELECTABLE OUTPUTS (AMPS PER LEG)

MODEL #	FREQ.	120/208 WYE	230 VAC DELTA	120 VAC DELTA	240 VAC DELTA	220/380 WYE	480 VAC DELTA
3121-AVR3	VARIABLE	**128**	**128**	**128**	—	—	—
3121-AFR3	FIXED	**128**	**128**	**128**	—	—	—
3121-AVT2*	VARIABLE	**128**	**128**	**128**	**108**	**64**	**54**
3121-AFT2*	FIXED	**128**	**128**	**128**	**108**	**64**	**54**
3121-AVT3*	VARIABLE	**128**	**128**	**221**	—	—	—
3121-AFT3*	FIXED	**128**	**128**	**221**	—	—	—

◄ Performance specification listed on previous spread

72kVA and above

This switching power source delivers a full 72 kVA with a typical efficiency of 85–90%. And it can be used right in the workplace due to cool, quiet operation and light weight single cabinet construction (caster mounted for easy mobility). Models can be selected to operate at fixed or variable frequency from 45 to 500 Hz. Variable models include fixed setting at 50, 60 and 400 Hz. Units may be paralleled for operation above 75 kVA.

Dimensions: 29″W x 34″D x 78″H

Weight: 975 lbs.

SINGLE PHASE

USER SELECTABLE OUTPUTS

MODEL #	FREQ.	120 VAC (AMPS)	240 VAC (AMPS)
1181-AVR1	VARIABLE	**576**	—
1181-AFR1	FIXED	**576**	—
1181-AVT1*	VARIABLE	**576**	**288**
1181-AFT1*	FIXED	**576**	**288**

THREE PHASE

USER SELECTABLE OUTPUTS (AMPS PER LEG)

MODEL #	FREQ.	120/208 WYE	230 VAC DELTA	120 VAC DELTA	240 VAC DELTA	220/380 WYE	480 VAC DELTA
3181-AVR3	VARIABLE	**192**	**192**	**192**	—	—	—
3181-AFR3	FIXED	**192**	**192**	**192**	—	—	—
3181-AVT2*	VARIABLE	**192**	**192**	**192**	**162**	**96**	**81**
3181-AFT2*	FIXED	**192**	**192**	**192**	**162**	**96**	**81**
3181-AVT3*	VARIABLE	**192**	**192**	**332**	—	—	—
3181-AFT3*	FIXED	**192**	**192**	**332**	—	—	—

*Indicated models utilize an external output autotransformer mounted in its own enclosure. All others are single cabinet systems.

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800-468-6808

John Franek Company, Inc.

1 to 6 kVA FREQUENCY CHANGERS

- 50 Hz Product Testing
- Foreign Power: 50–60 Hz Conversion
- 400 Hz Military Power
- Frequency Stabilization 50, 60 and 400 Hz

Model	Output	Description	
1011-3	1 kVA	47–63 Hz	single-phase w/out readout
1021-3	1 kVA	47–63 Hz	single-phase with readout
1021-4	1 kVA	400 Hz	single-phase with readout
1021-5	1 kVA	47-500 Hz	single-phase with readout
2021-3	2 kVA	47-63 Hz	1-phase (2 chassis system)
2021-4	2 kVA	400 Hz	1-phase (2 chassis system)
2021-5	2 kVA	47-500 Hz	1-phase (2 chassis system)
3023-1	3 kVA	50 Hz	3-phase (3 chassis system)
3023-2	3 kVA	60 Hz	3-phase (3 chassis system)
3023-4	3 kVA	400 Hz	3-phase (3 chassis system)
6023-1	6 kVA	50 Hz	3-phase (6 chassis system)
6023-2	6 kVA	60 Hz	3-phase (6 chassis system)
6023-4	6 kVA	400 Hz	3-phase (6 chassis system)

Specifications and prices subject to change without notice.

Advanced switching technology enhances efficiency, allows compact packaging and dramatically reduces cost. Important features include soft-start, overload and short-circuit protection, fast response time, output isolation, optional volt and current meter (true RMS) and option IEEE interface. Prices start at a low

$1895.00 1 kVA Model 1011-3

Specifications

Input: 115 or 230 VAC ±10% 45 to 440 Hz

Output: See model listing at left

Efficiency: >80% at full load

Distortion: <2% line and load

Power Factor: .7 lead to .7 lag

Response Time: <2ms with 50% load change

Regulation: ±2% line and load

Frequency Stability and Accuracy: ±0.25%

Operating Temp Range: −10°C to +50°C

Storage Temp Range: −40°C to +75°C

Mechanical: 19″W x 7″H x 15″D; 50 lbs. (single chassis system)

John Franek Company, Inc.

Ask for John Franek
P.O. Box 1172
Santa Ana, CA 92711
(714) 832-0290

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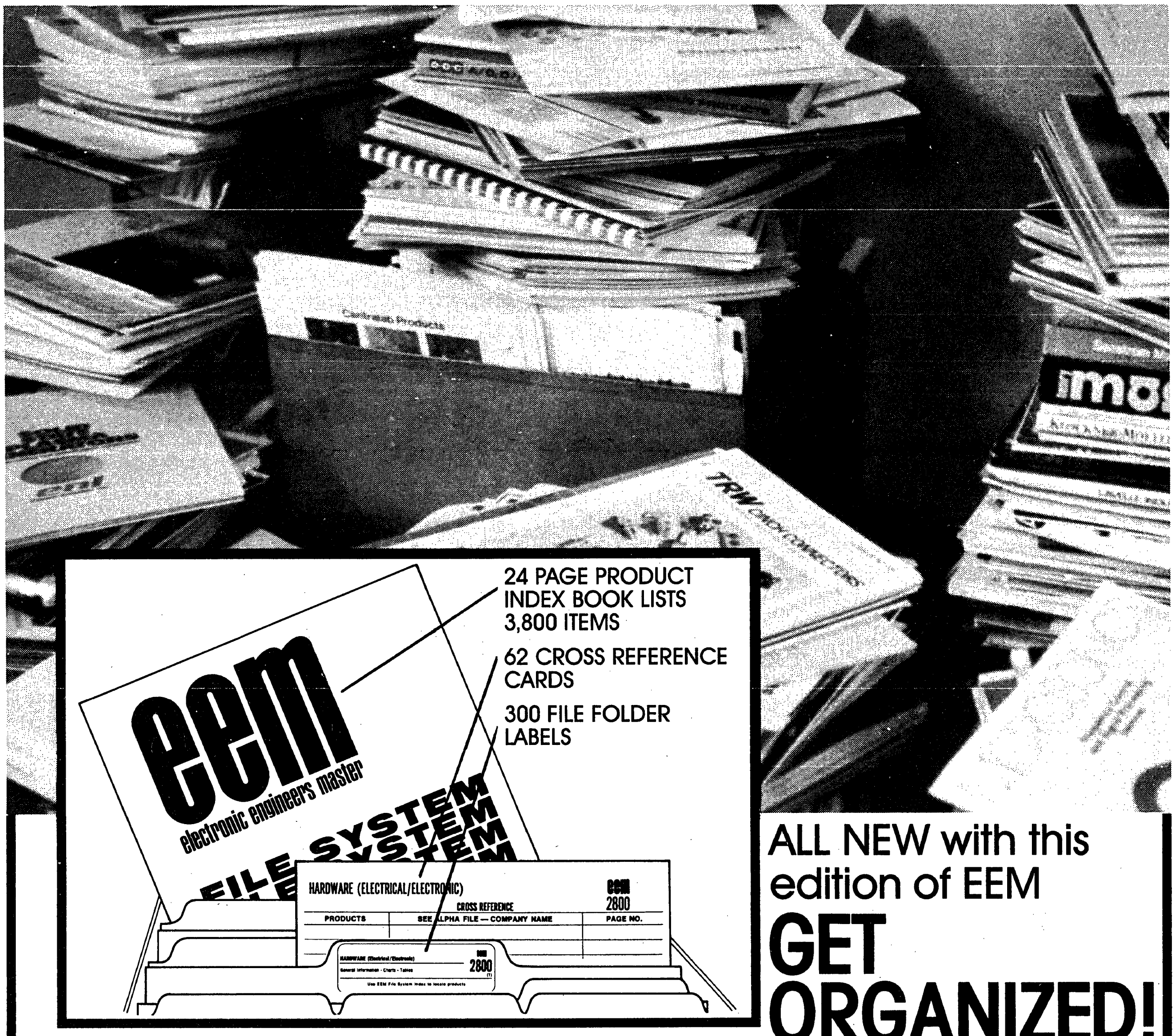
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- 2ms transition speed, fastest in the industry, provides fail safe standby power.
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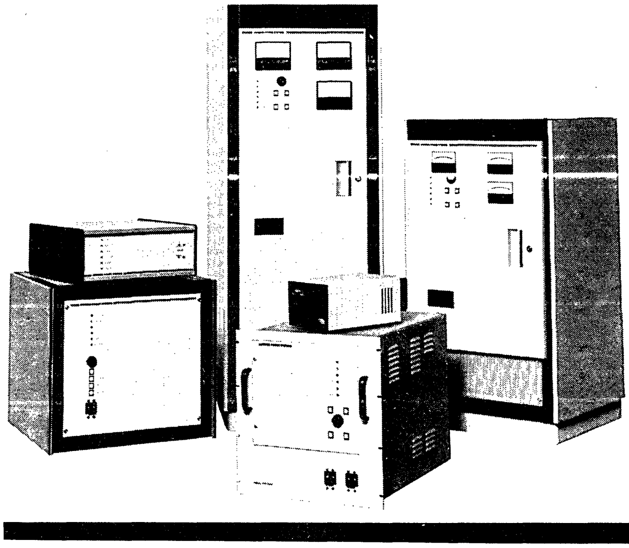
For personal and small business computers, telecommunications, security systems, financial services, critical life support systems and fault tolerant processors, GPS has uninterruptible power supplies (UPS) with reliability by design. Simple to install with virtually no "hands on" operation required, General Power System's UPS eliminate worry about your computer data. And since GPS has the broadest line of standard products plus customization available for OEMs, you can be sure that we have *your* UPS.



Current Product Offering

On-Line	Models	Description
500VA	4 models	50 and 60 Hz; 115 and 230 VAC; single phase; 15 min. battery time.
1KVA	6 models	50 and 60 Hz; 120, 208, 220, 230 VAC; single phase; 18 min. battery time.
2KVA	6 models	50 and 60 Hz; 120, 208, 220, 230 VAC; single phase; 18 min. battery time.
3KVA	6 models	50 and 60 Hz; 120, 208, 220, 230 VAC; single phase; 16 min. battery time.
5KVA	11 models	50 and 60 Hz; 120, 208, 220, 230, 240, 277 VAC; single and three phase; 12 min. battery time.
10KVA	11 models	50 and 60 Hz; 120, 208, 220, 230, 240, 277 VAC; single and three phase.*
15KVA	7 models	50 and 60 Hz; 120, 127, 230, 240, 277 VAC; three phase.*
20KVA	7 models	50 and 60 Hz; 120, 127, 230, 240, 277 VAC; three phase.*
25KVA	7 models	50 and 60 Hz; 120, 127, 230, 240, 277 VAC; three phase.*
35KVA	7 models	50 and 60 Hz; 120, 127, 230, 240, 277 VAC; three phase.*

*External battery option available.

Standby	Models	Description
100VA	4 models	50 and 60 Hz; 115 and 230 VAC; 9 min. battery time.
200VA	4 models	50 and 60 Hz; 115 and 230 VAC; 16 min. battery time.
300VA	4 models	50 and 60 Hz; 115 and 230 VAC; 18 min. battery time.
500VA	4 models	50 and 60 Hz; 115 and 230 VAC; 10 min. battery time.
1000VA	4 models	50 and 60 Hz; 115 and 230 VAC; 15 min. battery time.
2000VA	4 models	50 and 60 Hz; 115 and 230 VAC; 8 min. battery time.

GENERAL POWER SYSTEMS
A Division of ALS Corporation

1400-D North Baxter Street, Anaheim, California 92806–1201
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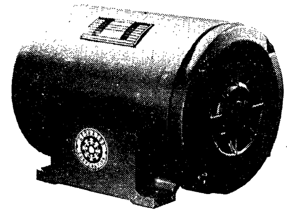
NOBRUSH® FREQUENCY
GEORATOR T.M. CORPORATION

PERMANENT MAGNET GENERATOR DESIGN

"NoBrush" Motor Generators and Frequency Converters are efficient, compact, dependable, quiet running units for powering all types of electronic systems and electrical equipment. The heart of each "NoBrush" power system is a "NoBrush" permanent magnet generator which features a cast aluminum rotor designed to give superior voltage stability. • A typical "NoBrush" generator is mounted with a high quality induction or synduction motor within a single aluminum alloy shell. • Oversize lubricated for life ball bearings, coupled with the absence of brushes, commutators or slip rings, insure long-term maintenance-free operation. • Georator brushless permanent magnet generators are noted for their compact construction, ruggedness, ability to withstand short circuits, and excellent wave form. • All Georator power systems whether utilized for frequency conversion or basic power requirements, provide true "line isolation and stabilization" for protecting sensitive electronic systems from momentary power interruptions, switching transients, brown outs, or voltage spikes.

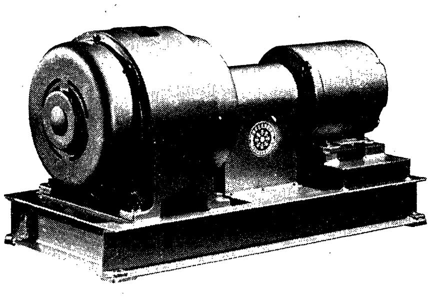


60 TO 60 Hz LINE ISOLATOR SERIES 30 UNIT SHELL

This small isolator stabilizer Motor-Generator offers full line isolation for small power requirements up to 1 KVA. Permanent magnet field generator coupled with the high inertia of the rotating system assures maximum electrical isolation between line and load. The rugged unit shell construction gives long, maintenance-free operation.

Model No.	KVA Rating	Phase In/Out	Output Voltage	Input Voltage	Dimensions H"/L"/Weight
30-194	0.5	3/1	115/230	230/460	14.8"/16.1"/120 lbs.
30-198	0.5	1/1	115/230	115/230	14.8"/16.1"/120 lbs.
30-195	1.0	3/3	120/208	230/460	14.8"/16.1"/130 lbs.
30-199	1.0	1/3	120/208	115/230	14.8"/16.1"/130 lbs.

These 60 to 60 Hz brushless generators, including those in the next column are designed to accept long term input variation of up to ±15% from nominal with no change in output. Inertia stabilization allows these units to absorb input line transients of as much as 30% for as long as 500 milliseconds with less than 1% change in output.



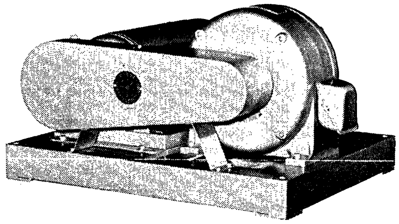
60 TO 60 Hz ISOLATOR STABILIZER SERIES 37 IN LINE

Larger Motor Generators in ratings up to 125 KVA are also available to provide full line isolation and distortion free power to protect electronic equipment from power line excursions and momentary power loss.

Model No.	KVA Rating	Phase In/Out	Output Voltage	Input Voltage	Dimensions H"/L"/Weight
37-015	1.5	3/1	115/230	220/440	18.3"/34.0"/300 lbs.
37-118	1.5	1/1	115/230	230	18.3"/34.0"/315 lbs.
37-130	2.5	3/3	120/208	220/440	18.3"/34.0"/215 lbs.
37-133	2.5	1/3	120/208	230	18.3"/34.0"/400 lbs.
37-070	2.5	3/1	115/230	220/440	18.3"/34.0"/335 lbs.
37-134	2.5	1/1	115/230	230	18.3"/34.0"/400 lbs.
37-123	5.0	3/3	120/208	220/440	18.3"/38.0"/410 lbs.
37-227	6.25	3/1	120/240	220/440	26.0"/48.0"/650 lbs.
37-312	6.25	3/3	120/208	220/440	33.0"/48.0"/650 lbs.
37-285	12.5	3/1	120/240	230/460	29.0"/62.0"/910 lbs.
37-135	12.5	3/3	120/208	230/460	29.0"/62.0"/910 lbs.
37-136	18.75	3/3	120/240	230/460	37.5"/70.0"/1300 lbs.
37-137	18.75	3/1	120/208	230/460	29.0"/63.0"/1000 lbs.
37-138	25	3/3	120/240	230/460	37.5"/72.0"/1550 lbs.
37-139	25	3/1	120/208	230/460	29.0"/65.0"/1230 lbs.
37-278	37.5	3/3	120/208	230/460	30.8"/65.5"/1550 lbs.
37-327	50	3/3	120/208	230/460	30.8"/66.5"/1595 lbs.
37-XXX	75	3/3	120/208	230/460	49.0"/80.1"/2350 lbs.
37-317	100	3/3	120/208	460	49.0"/80.1"/2550 lbs.

PERMANENT MAGNET FEATURES:

- ☐ *Line Isolation and Stabilization*
- ☐ *Stable Output Voltage*
- ☐ *High Overload Capacity*
- ☐ *Withstands Short Circuits*
- ☐ *Extremely Low R. F. Noise*
- ☐ *Minimum Maintenance*
- ☐ *Lightweight*
- ☐ *Low Audible Noise*
- ☐ *Cool Operation*
- ☐ *Operates in Adverse Environments*



50 TO 60 Hz and 60 TO 50 Hz FREQUENCY CONVERTERS

These ruggedly built, belt driven, motor-generator sets are mounted on a sturdy steel frame base. Units in the 0.5 to 5 KVA power range are designed around the highly efficient NoBrush Permanent Magnet Generator. Units in the 6.25 to 125 KVA power range have brushless rotating rectifier type generators with voltage regulators, to provide ±1% output voltage regulation, and voltage adjustment of ±10%. These motor-generators provide frequency conversion, basic power, and superior line isolation and stabilization for exported and imported electrical and electronic equipment. Other voltages available upon request.

50 to 60 Hz

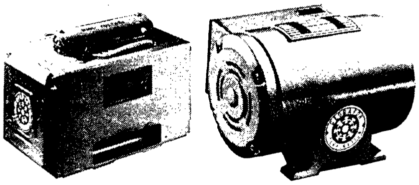
Model No.	KVA Rating	Phase In/Out	Voltage Output	Approx. Wt. lbs.
37-097	0.5	1/1	115/230	230
37-044	1.5	1/1	115/230	400
37-151	2.5	3/1	115/230	420
37-177	6.25	3/1	115/230	650
37-144	12.5	3/3	120/208	1,050
37-218	12.5	3/1	115/230	1,050
37-272	18.75	3/1	115/230	1,250
37-334	25.0	3/3	120/208	1,600
37-311	37.5	3/3	120/208	1,600

60 to 50 Mz

Model No.	KVA Rating	Phase In/Out	Voltage Output	Approx. Wt. lbs.
37-105	0.5	1/1	115/230	230
37-102	1.5	1/1	115/230	400
37-111	1.5	3/1	115/230	400
37-095	2.5	3/1	115/230	440
37-210	6.25	3/1	115/230	750
37-284	6.25	3/3	220/380	650
37-186	12.5	3/1	115/230	1,220
37-180	12.5	3/3	220/380	1,000
37-283	18.75	3/1	115/230	1,560
37-192	25.0	3/1	115/230	1,580
37-164	25.0	3/3	220/380	1,580
37-306	31.3	3/3	220/380	1,485
37-276	37.5	3/3	220/380	1,700
37-298	50.0	3/3	220/380	1,810
37-301	50.0	3/1	115/230	2,315
37-335	75.0	3/3	220/380	3,708
37-288	100.0	3/3	220/380	3,337

CONVERTERS & GENERATORS

The simplest, most rugged, most dependable power source.

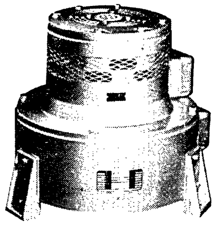


60 TO 400 Hz FREQUENCY CONVERTERS SERIES 30 UNIT SHELL

A highly compact, brushless, Motor Generator Set for conversion of 50 or 60 Hz power to 400 Hz or higher frequencies. Generator and Motor Rotors are pressed on a common shaft, with shielded ball bearing at ends of shaft, all contained within an aluminum alloy shell.

Model No.	KVA Rating	Phase In/Out	Output Voltages Full Load *	Input Voltage **	Dimensions H"/L"/Weight
30-021	0.15	1/1	115/200	115/230	8"/11"/40 lbs.
30-001	0.25	1/1	115	115/230	8"/11"/43 lbs.
30-004	0.25	1/3	115/200	115/230	8"/11"/43 lbs.
30-002	0.5	1/1	115	115/230	8"/11"/51 lbs.
30-005	0.5	1/3	115/200	115/230	8"/11"/51 lbs.
30-016	0.5	3/3	115/200	208-220/440	8"/11"/51 lbs.
30-006	0.75	3/3	115/200	208-220/440	8"/11"/51 lbs.
30-003	1.0	1/1	115	115/230	12¼"/15¼"/118 lbs.
30-025	1.0	1/3	115/200	115/230	12¼"/15¼"/107 lbs.
30-007	2.0	1/3	115/200	115/230	12¼"/15¼"/137 lbs.
30-020	2.0	3/3	115/200	208-220/440	12¼"/15¼"/121 lbs.
30-029	2.5	3/3	115/200	208-220/440	12¼"/15¼"/153 lbs.

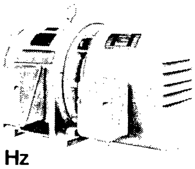
- ☐ Other Generator Outputs Available: 120, 180, 280, 360, and 840 Hz
- ☐ Other Standard and Non-Standard Voltages.
- ☐ Exact 400 Hz Output.
- ☐ DC Outputs at Low or High Voltage.



60 to 400 Hz FREQUENCY CONVERTER SERIES 33 VERTICAL

High quality induction motor is close coupled to a "NOBRUSH" generator providing a very compact high power to weight and size ratio. Available variations include: 50 Hz input; multiple standard and non-standard AC output voltages; Dual AC and DC outputs; and militarized construction.

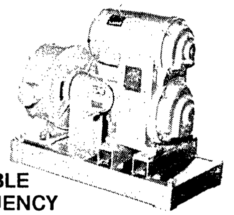
MODEL NO.	KVA RATING	PHASE IN/OUT	OUTPUT VOLTAGES FULL LOAD	DIMENSIONS DIAMETER"/H"/Lbs.
33-001	2.5	3/3	115/200	16.8"/18.3"/173
33-002	3.5	3/1	115	16.8"/18.3"/178
33-003	5.0	3/1	115	16.8"/18.3"/273
33-004	5.0	3/3	115/200	16.8"/18.3"/250
33-005	7.5	3/3	115/200	16.8"/19.5"/259
33-006	10.0	3/3	115/200	16.8"/19.5"/280
33-103	10.0	3/1	115	20.6"/21.8"/405
33-124	12.5	3/3	115/200	20.6"/21.6"/410
33-102	15.0	3/3	115/200	20.6"/24.2"/485
33-154	20.0	3/3	115/200	20.6"/26.6"/431
30-120	25.0	3/3	115/200	23.0"/26.5"/1213



EXACT 400 Hz FREQUENCY CONVERTERS SYNCHRONOUS DRIVEN SERIES 35 IN LINE

60 Hz to exact 400 Hz frequency conversion. Low rotational speed (1200 RPM) provides long life and minimum audible noise (65db). High/low AC and DC outputs available.

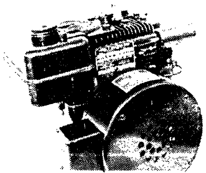
MODEL NO.	KVA RATING	PHASE IN/OUT	OUTPUT VOLTAGE FULL LOAD	OUTPUT FREQUENCY EXACT	DIMENSIONS H"/L"/WEIGHT
35-001	2.5	3/1	115	400 Hz	16.5/26/470 Lbs.
35-003	3.0	3/3	115/200	400 Hz	16.5/26/472 Lbs.
35-002	5.0	3/1	115	400 Hz	16.5/30/620 Lbs.
35-004	5.0	3/3	115/200	400 Hz	16.5/28/586 Lbs.
35-005	10.0	3/3	115/200	400 Hz	16.5/30/665 Lbs.



VARIABLE FREQUENCY CONVERTERS SERIES 32

Available both in standard designs and to customer specifications—in ratings from 0.5 to 15 KVA. Variacs supplied with unit for voltage adjustment. Other frequency variations available.

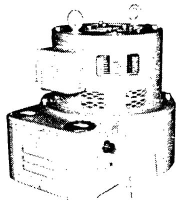
MODEL NO.	KVA RATING	PHASE OUT	VARIABLE FREQUENCY	OUTPUT VOLTAGE
32-037	2.5	1	45-65 Hz	100-140/180-240
32-040	5	3	45-65 Hz	105-125/183-217
32-002	1	3	380-420 Hz	105-125/183-217
32-022	1	1	380-420 Hz	105/127
32-016	5	3	380-420 Hz	105-125/183-127
32-038	5	1	380-420 Hz	100-140/180-240
32-035	10	3	380-420 Hz	105-125/183-217
32-043	15	3	380-420 Hz	105-125/183-217



LIGHTWEIGHT 400 Hz ENGINE-GENERATORS

Lightweight 400 Hz permanent magnet engine-generators are available with 1Ø, or 3Ø, or DC, or dual AC/DC outputs. Applications include: geophysical, navigation, and communication systems; also fish conservation.

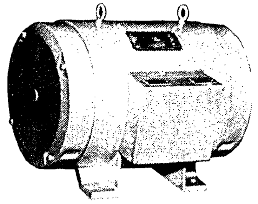
MODEL NO.	KVA RATING	DC/PHASE OUT	OUTPUT VOLTAGE	WEIGHT
31-001	0.5	1Ø AC	115/230	43
31-002	0.5	DC/1Ø AC	115/230	44
31-008	0.75	3Ø AC	115/200	50
31-014	0.5	DC	250/500	44



VOLTAGE REGULATED 60 TO 400 Hz FREQUENCY CONVERTERS

This new, Series 39, Regulated, Vertical Frequency Converter combines the "No-Brush" permanent magnet generator together with control windings and simplified sensing electronics, to provide both the traditional "Brushless" rugged design and a closely regulated 400 Hz power system. Voltage regulation is ±1.5% no load to full load, 0.8 to 1.0 power factor, with a voltage adjustment feature of ±5%.

MODEL NO.	KVA RATING	VOLTAGE OUTPUT	VOLTAGE REGULATION	PHASE IN/OUT
39-001	5	120/208	±1.5%	3/3
39-002	5	115/230	±1.5%	3/1
39-004	6.5	120/208	±1.5%	3/3



60 TO 180 Hz, 360 Hz, 840 Hz FREQUENCY CONVERTERS FOR HIGH FREQUENCY TOOLS, MOTORS, AND LIGHTING

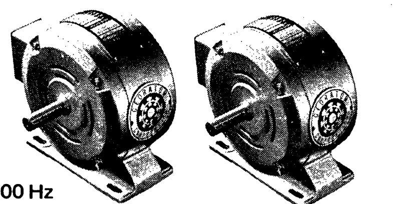
These frequency converters are available for powering high frequency metal-working tools, wood-working tools, motors, and lighting systems. The highly dependable, minimum maintenance, PERMANENT MAGNET BRUSHLESS DESIGNS are available in many ratings up to: 5 KVA for 180 Hz applications; 10 KVA for 360 Hz applications; and 30 KVA for 840 Hz applications.

GEORATOR T.M.
CORPORATION
Makers of NOBRUSH®
power systems
9617 Center Street • P.O. Box 70
Manassas, Virginia 22110
Telephone (703) 368-2101

GEORATOR T.M. CORPORATION PERMANENT MAGNET ALTERNATORS

FEATURES:

- ☐ High Efficiency
- ☐ Excellent Wave Form
- ☐ Stable Output Voltage
- ☐ Short Circuit Immunity
- ☐ High Overload Capacity
- ☐ Essentially "0" RF Noise
- ☐ Brushless
- ☐ Compact Design
- ☐ Cool Operation



400 Hz ALTERNATORS PERMANENT MAGNET

The original, revolutionary, "NoBrush" generator. Permanent magnets yield stability, reproducibility, ruggedness and virtually zero R.F. noise. Available in large variety of ratings, frequencies and voltages. Supplementary windings with rectifiers available for D.C. output.

400 Hz ALTERNATORS

Model No.	KVA Rating	Phase Out	Speed RPM	Dimensions H"/L"/Weight
36-001	0.25	1	3428	8¼"/4 1/16"/17 lbs.
36-003	0.5	1	3428	8¼"/4 1/16"/22 lbs.
36-030	0.5	3	3428	8¼"/4 1/16"/21½ lbs.
36-006	1.0	1	1714	12 3/16"/4 9/16"/35½ lbs.
36-007	1.0	3	1714	13 3/16"/4 9/16"/35½ lbs.
36-008	2.0	3	1714	13 3/16"/4 9/16"/45 lbs.
36-009	2.5	1	1714	17¼"/6¾"/105 lbs.
36-010	5.0	1	1714	17¼"/6¾"/137 lbs.
36-011	5.0	3	1714	17¼"/6¾"/103½ lbs.
36-012	7.5	3	1714	17¼"/6¾"/120 lbs.
36-013	10.0	3	1714	17¼"/6¾"/135 lbs.
36-151	15.0	3	1714	25"/11.2"/310 lbs.
36-152	25.0	3	1714	25.3"/17"/730 lbs.

☐ Alternator Frequencies Available Include: 50, 60, 120, 180, 240, 300, 360, 420, 840 and 1000 Hz.

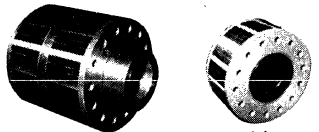
☐ Units are Available with:
- Standard and Non-Standard AC Voltages.
- Multiple DC Outputs/Low Voltage taps.
- Special Housings for Flange Mountings.
- Double Shafts.
- Militarized Construction.

60 Hz ALTERNATORS 50 Hz ALTERNATORS PERMANENT MAGNET

These industrial type generators provide output voltage stability within ±1% for constant load and constant driving speed (from cold to hot and ambient temperatures of −20° F to 130° F).

MODEL NO.	KVA RATING	PHASE OUT	OUTPUT VOLTAGE NOMINAL	FREQUENCY Hz	SPEED RPM	DIMENSIONS H"L"/WEIGHT
36-138	0.5	1	115/230	60	1800	12/10.3/90 lbs.
36-103	1.0	3	120/208	60	1800	12/10.3/90 lbs.
36-021	1.5	1	115/230	60	1800	14/19/185 lbs.
36-149	2.5	3	120/208	60	1800	14/19/185 lbs.
36-135	2.5	1	115/230	60	1800	14/19/200 lbs.
36-006	5.0	3	120/208	60	1800	14/19/200 lbs.
36-154	10.0	3	120	60	3600	18/25/753 lbs.

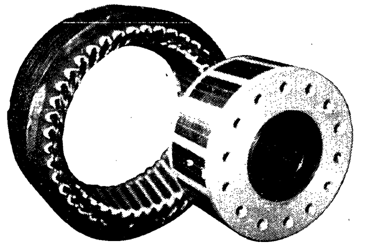
☐ Units are available with 50 Hz output.



APPLICATIONS:

Permanent Magnet Brushless Alternators are available in frequencies up to 1,000 Hz and in power ratings from 150 VA to 25 KVA. Wherever a rugged, continuous duty, industrial type, long life generator is required for:

- Special industrial applications 120 Hz, 180 Hz, 360 Hz.
- High frequency power up to 1,000 Hz.
- Low frequency power 60 Hz, 50 Hz or lower.
- Variable frequency....
- Electrical power source in hazardous locations.
- Military 400 Hz electronic equipment.
- Source of multiple AC outputs for rectification to DC power.
- Power static exciter—voltage regulators of large engine generators.
- Pilot excitation and field flashing of large generators.
- Tachometer feedback for large rotating apparatus.
- Lighting Systems.
- Electric brake excitation.
- Power for process control equipment in hazardous environments.
- Special vehicular applications.
- As computer peripheral rotating power supply providing basic power, line isolation, ride through, and multiple outputs.



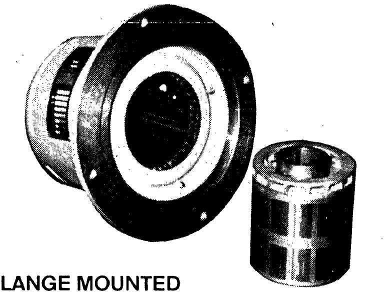
ROTORS AND STATORS

Separate permanent magnet rotors and stators are available for a wide range of OEM applications engineered to fit customer shaft or shaft extensions. From speeds as low as 720 RPM to 12,000 RPM in selected ratings. In power ratings from 50 VA to 25 KVA.

TOTALLY ENCLOSED AND EXPLOSION PROOF

Totally enclosed and explosion proof designs are available in selected ratings. Some typical units are:

MODEL NO.	KVA RATING	PHASE OUT	VOLTAGE OUT	FREQUENCY/ RPM	DESCRIPTION
36-168	1.5	1	120	60 Hz/1800	Totally enclosed.
36-173	1.5	1	115/230	60 Hz/1800	Explosion Proof.



FLANGE MOUNTED ROTORS AND STATORS

Cast aluminum alloy housings to fit on customer stub shaft.

SPECIAL PM DESIGNS

Examples of special 2 bearing units of unique industrial application-

MODEL NO.	RATING	PHASE OUT	VOLTAGE OUT	DESCRIPTION
36-094	165 watts	DC	5, 12, 24, 48 VDC	Multiple DC outputs for computer peripheral.
36-169	2.5 KVA	1Ø	240 VAC	1000 Hz, 4286 RPM Unique Industrial Application.
36-167	3.0 KVA	3Ø	115/200 VAC	200 Hz, 3000 RPM Vehicular application.

GEORATOR T.M.
CORPORATION

Makers of NOBRUSH® power systems

P.O. Box 70
9617 Center Street
Manassas, Virginia 22110
Telephone (703) 368-2101

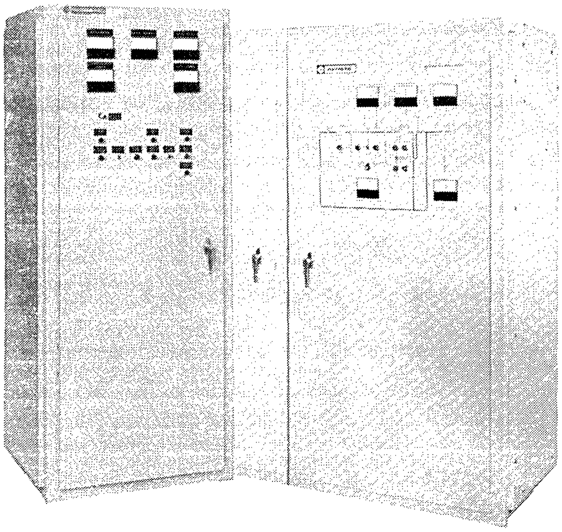
TELEX 892-431

ICS INC. ELECTRO-PAC® DIVISION

UPS

Uninterruptible Power Systems Inverters, Static Switches

ELECTRO-PAC Series E power systems are reliable, state-of-the-art designs providing true uninterruptible AC power for critical control and communication applications. The systems consist of four components: a highly regulated battery charger, a storage battery bank, SCR sine wave inverter and a fast acting static power switch. The Series E output provides an AC voltage which is clean, highly regulated and frequency controlled. The critical load is protected from momentary overloads or short circuits. Battery back-up time is specified by the application's needs.



STANDARD FEATURES

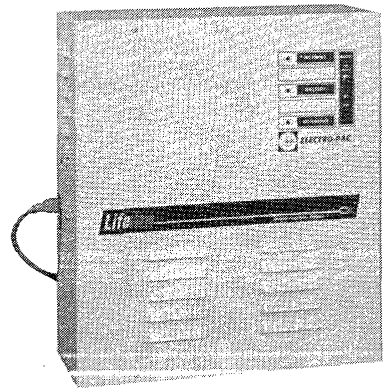
- *Fast response.*
- *Solid state integrated control circuits.*
- *Standard capacities 3 to 20 KVA.*
- *Regulation ±2%.*
- *80% inverter efficiency.*
- *Will start and run from 0 to full load.*
- *Soft-start charger circuitry.*
- *Overload and short circuit protected.*
- *High quality meters.*
- *Input circuit breakers.*
- *Five operation indicator lights.*
- *Three alarm contacts.*
- *Front accessibility for service.*
- *Convection cooling.*
- *Class H insulation on magnetics.*

SPECIFICATIONS: UPS, INVERTERS

U.S. Patents 3,229,111 & 3,991,319

OUTPUT				INPUT		Approx. Weight (Lbs.)	Size (Inches) H x W x D	UPS Model Number
Power Rating	Voltage AC*	Current Full Load	Battery Voltage**	Line Voltage	Phase			
3.0 KVA	120	25 AMPS	120	120	1	750	51 X 27 X 30	UP3.0E120-1-1-CDLTW
5.0 KVA	120	42 AMPS	120	240	1	1,400	75 X 36 X 30	UP5.0E120-3-1-CDLTW
7.5 KVA	120	63 AMPS	120	240	1	1,750	75 X 36 X 30	UP7.5E120-3-1-CDLTW
10 KVA	120	83 AMPS	120	240	3	2,150	75 X 48 X 30	UP10.0E120-5-1-CDLTW
15 KVA	120	125 AMPS	120	240	3	2,900	75 X 66 X 30	UP15.0E120-5-1-CDLTW
20 KVA	120	167 AMPS	120	480	3	3,500	75 X 66 X 30	UP20.0E120-6-1-CDLTW

**All models also available with 240 Volt output. **Battery back-up time specified by customer.*

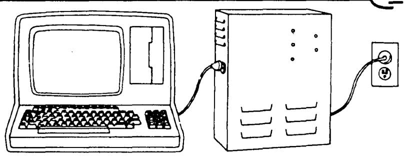


Lifeline™ UPS

True UPS protection!

The LIFELINE™ UPS provides economical true uninterruptible AC power, isolating critical computer based circuits from outages and "glitches." LIFELINE powers microprocessor based systems such as P.C.'s, communications, electronic cash registers, security systems, etc.

There is no transfer time. When a deviation is sensed, the computer load is automatically protected, without interruption. No lost information.



STANDARD FEATURES

- *Instant response. No power break.*
- *Up to 90% efficiency.*
- *Capacities from 200VA to 2KVA.*
- *Maintenance-Free internal battery.*
- *Operates from standard office outlets.**
- *Illuminated status indicators.*
- *Input Voltage: 120 VAC, +10%, −15%, 60 Hz.*
- *Output Voltage: 120 VAC, ±3%, 60 Hz.*
- *Output Receptacle: Duplex NEMA 5-15R.**

Through 1KVA. Others hard wired or NEMA 6-15R

SPECIFICATIONS: LIFELINE™ UPS

OUTPUT					INPUT		Approx. Weight (Lbs.)	Size (Inches) H x W x D	UPS Model Number
Power Rating	Voltage AC	Current Full Load	Battery Back-Up Time*	Battery Voltage	Line Voltage	Phase			
200 VA	120	1.6	7 Min.	12	120	1	55	20 X 16 X 6.5	M95-200
600 VA	120	5.0	13	48	120	1	140	24 X 20 X 10.5	M95-600
1.0 KVA	120	8.4	7	48	120	1	140	12 X 17 X 21	M95-1000
1.5 KVA	120	12.5	13	48	120	1	150	12 X 17 X 21	M95-1500
2.0 KVA	120	16.7	13	48	120	1	170	12 X 17 X 21	M95-2000

**At full load. Extended battery times available.*

Specifications subject to change without notice.

ICS/ELECTRO-PAC DIVISION 520 Interstate Road * Addison, Illinois 60101 * 312/543-6200 * TWX: 910-991-5945

Hipotronics

Automatic Voltage Regulators

THREE PHASE INPUT VOLTAGE RANGE: +9%, -14% OF NOMINAL

INPUT: 240 Volts, 220 Volts, 208 Volts

AMPS	KVA	MODEL	CABINET	CORRECTION RATE *	WEIGHT lbs. (kg)
40	17	A240-40Y	A	10	300 (136)
60	25	A240-60Y	A	10	300 (136)
100	42	A240-100Y	A	10	350 (159)
150	62	A240-150Y	B	10	550 (249)
200	83	A240-200Y	B	10	650 (295)
300	125	A240-300Y	B	10	700 (318)
400	166	A240-400Y	C	10	850 (386)
500	208	A240-500Y	C	10	950 (431)
600	249	A240-600Y	C	10	1000 (454)
700	291	A240-700Y	C	10	1150 (522)
800	333	A240-800Y	D	10	1200 (544)

INPUT: 415 Volts, 380 Volts

AMPS	KVA	MODEL	CABINET	CORRECTION RATE *	WEIGHT lbs. (kg)
40	29	A415-40Y	A	15	400 (181)
60	43	A415-60Y	A	15	440 (200)
100	72	A415-100Y	B	15	620 (281)
150	108	A415-150Y	B	15	800 (363)
200	144	A415-200Y	C	15	880 (399)
300	216	A415-300Y	C	15	1000 (454)
400	288	A415-400Y	C	15	1040 (472)
500	359	A415-500Y	C	15	1200 (544)
600	431	A415-600Y	D	15	1270 (576)
700	503	A415-700Y	D	15	1550 (703)
800	575	A415-800Y	E	15	1750 (794)

INPUT: 480 Volts

AMPS	KVA	MODEL	CABINET	CORRECTION RATE *	WEIGHT lbs. (kg)
40	33	A480-40Y	A	20	450 (204)
60	50	A480-60Y	A	20	500 (227)
100	83	A480-100Y	B	20	700 (318)
150	125	A480-150Y	B	20	950 (431)
200	166	A480-200Y	C	20	1000 (454)
300	249	A480-300Y	C	20	1200 (544)
400	333	A480-400Y	D	20	1350 (612)
500	416	A480-500Y	D	20	1400 (635)
600	499	A480-600Y	D	20	1550 (703)
700	582	A480-700Y	E	20	1900 (862)
800	665	A480-800Y	E	20	2000 (907)

THREE PHASE INPUT VOLTAGE RANGE: ± 20% OF NOMINAL

INPUT: 240 Volts, 220 Volts, 208 Volts

AMPS	KVA	MODEL	CABINET	CORRECTION RATE *	WEIGHT lbs. (kg)
40	17	D240-40Y	A	10	375 (170)
60	25	D240-60Y	A	10	400 (181)
100	42	D240-100Y	B	10	450 (204)
150	62	D240-150Y	B	10	700 (317)
200	83	D240-200Y	C	10	760 (345)
300	125	D240-300Y	C	10	820 (372)
400	166	D240-400Y	D	10	1000 (454)
500	208	D240-500Y	D	10	1180 (535)
600	249	D240-600Y	D	10	1450 (658)
700	291	D240-700Y	E	10	1730 (785)
800	333	D240-800Y	E	10	1800 (816)

INPUT: 415 Volts, 380 Volts

AMPS	KVA	MODEL	CABINET	CORRECTION RATE *	WEIGHT lbs. (kg)
40	29	D415-40Y	A	15	475 (215)
60	43	D415-60Y	A	15	550 (249)
100	72	D415-100Y	B	15	700 (318)
150	108	D415-150Y	B	15	900 (408)
200	144	D415-200Y	C	15	1000 (454)
300	216	D415-300Y	C	15	1150 (522)
400	288	D415-400Y	D	15	1450 (658)
500	359	D415-500Y	D	15	1600 (726)
600	431	D415-600Y	E	15	1900 (862)
700	503	D415-700Y	E	15	2200 (998)
800	575	D415-800Y	E	15	2500 (1134)

INPUT: 480 Volts

AMPS	KVA	MODEL	CABINET	CORRECTION RATE *	WEIGHT lbs. (kg)
40	33	D480-40Y	A	20	500 (227)
60	50	D480-60Y	A	20	600 (272)
100	83	D480-100Y	B	20	800 (363)
150	125	D480-150Y	B	20	1000 (454)
200	166	D480-200Y	C	20	1140 (517)
300	249	D480-300Y	C	20	1300 (590)
400	333	D480-400Y	D	20	1650 (748)
500	416	D480-500Y	D	20	1800 (816)
600	499	D480-600Y	E	20	2700 (1225)
700	582	D480-700Y	E	20	2950 (1338)
800	665	D480-800Y	E	20	3800 (1724)

*Approx. volts per second

Sizes and weights are subject to change. If sizes and weights are critical, request drawing from factory.

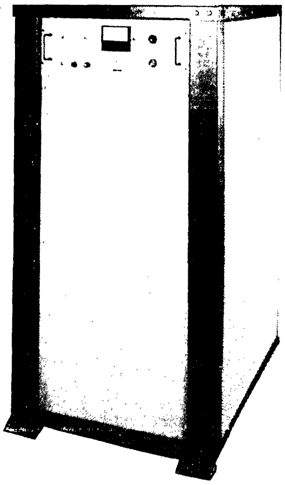
Hipotronics Inc. ■ P.O. Drawer A, Route 22, Brewster, New York ■ Phone (914) 279-8091 ■ Twx: 710-574-2420 HIPO BRWS NY

Hipotronics

Automatic Voltage Regulators

CABINET

CABINET DIMENSIONS			
CABINET	WIDTH in (mm)	DEPTH in (mm)	HEIGHT in (mm)
A	30″ (762)	25″ (635)	30″ (762)
B	30″ (762)	25″ (635)	52″ (1320)
C	30″ (762)	25″ (635)	72″ (1829)
D	30″ (762)	42″ (1067)	72″ (1829)
E	36″ (914)	48″ (1219)	76″ (1930)



PESCHEL AUTOMATIC VOLTAGE REGULATOR™

- 99% EFFICIENT
- NO WAVEFORM DISTORTION
- VERY LOW INTERNAL IMPEDANCE
- NO PHASE SHIFT
- NO EFFECT ON POWER FACTOR
- UP TO 20 VOLTS PER SECOND CORRECTION RATE
- TEMPERATURE RANGE -10°C to +50°C
- OUTPUT ACCURACY ±1% ADJUSTABLE TO ±5%
- VOLTMETER WITH EXPANDED SCALE
- DRY TYPE, CONVECTION COOLED

The Peschel Automatic Voltage Regulator is a 50/60 Hz., wye connected, dry-type, convection cooled, ac line voltage regulator. It is designed to maintain line voltage to within ±1% of nominal, with an input voltage variation of +9/-14% or ±20%, due to line and/or load changes. The PAVR introduces no harmful waveform distortion, has a very low internal impedance, causes no phase shift, is insensitive to load power factor, has no effect on system power factor, and is approx. 99% efficient.

The PAVR is neither an impedance changing nor a ferroresonant device and uses no SCRs. It is an electro-mechanical device using electro-magnetic transformer action to regulate. Its high efficiency and reliability make it the best solution to today's voltage problems.

ONE PHASE INPUT VOLTAGE RANGE: +9%, -14% OF NOMINAL

INPUT: 240 Volts, 220 Volts

AMPS	KVA	MODEL	CABINET	CORRECTION RATE*	WEIGHT lbs. (kg)
50	12	A240-50	A	9	275 (125)
100	24	A240-100	B	9	300 (136)
150	36	A240-150	B	9	350 (159)
200	48	A240-200	B	9	380 (172)
300	72	A240-300	B	9	510 (231)
400	96	A240-400	B	9	580 (263)
500	120	A240-500	C	9	620 (281)
600	144	A240-600	C	9	750 (340)
700	168	A240-700	C	9	900 (408)

INPUT: 480 Volts

AMPS	KVA	MODEL	CABINET	CORRECTION RATE *	WEIGHT lbs. (kg)
50	24	A480-50	A	18	350 (159)
100	48	A480-100	A	18	450 (204)
150	72	A480-150	A	18	600 (272)
200	96	A480-200	B	18	750 (340)
300	144	A480-300	B	18	850 (386)
400	192	A480-400	B	18	1050 (476)
500	240	A480-500	C	18	1200 (544)
600	288	A480-600	C	18	1300 (590)
700	336	A480-700	C	18	1500 (680)

ONE PHASE INPUT VOLTAGE RANGE: ±20% OF NOMINAL

INPUT: 240 Volts, 220 Volts

AMPS	KVA	MODEL	CABINET	CORRECTION RATE *	WEIGHT lbs. (kg)
50	12	D240-50	A	15	330 (150)
100	24	D240-100	B	15	350 (159)
150	36	D240-150	B	15	400 (181)
200	48	D240-200	B	15	475 (215)
300	72	D240-300	B	15	650 (295)
400	96	D240-400	C	15	800 (363)
500	120	D240-500	C	15	825 (374)
600	144	D240-600	C	15	1000 (454)
700	168	D240-700	C	15	1200 (544)

INPUT: 480 Volts

AMPS	KVA	MODEL	CABINET	CORRECTION RATE *	WEIGHT lbs. (kg)
50	24	D480-50	A	25	450 (204)
100	48	D480-100	B	25	575 (261)
150	72	D480-150	B	25	800 (363)
200	96	D480-200	C	25	925 (420)
300	144	D480-300	C	25	1000 (454)
400	192	D480-400	C	25	1450 (658)
500	240	D480-500	C	25	1590 (721)
600	288	D480-600	C	25	1700 (771)
700	336	D480-700	C	25	1900 (862)

*Approx. volts per second

Sizes and weights are subject to change. If sizes and weights are critical, request drawing from factory.

Hipotronics Inc. ■ P.O. Drawer A, Route 22, Brewster, New York ■ Phone (914) 279-8091 ■ Twx: 710-574-2420 HIPO BRWS NY

HITRAN

Division of AGEX

Key source for reliable magnetic components, power supplies and control systems for over 40 years.

500VA TO 150KVA LINE CONDITIONED POWER SYSTEMS

Also see our catalog pages under TRANSFORMERS and DC POWER SOURCES.

UPS SERIES — UNINTERRUPTIBLE POWER SYSTEMS

The ultimate in line conditioning equipment. The Hitran UPS Series provides low distortion, sinusoidal, computer grade, voltage regulated power under all line conditions. The UPS Series is designed to eliminate more than 99% of common power line problems — power outages, line interruptions, brownouts and short term transients. It protects the load against line disturbances resulting from switching in the transmission system, clearing of line faults, starting of motor loads and even lightning strikes. The associated battery bank is sized to provide continuous power during line interruptions for the period required for an orderly shutdown of computer or process control systems.

Standard Features

- Online System Design - No switchover time in the event of power interruption.
- Easy Maintenance - Subassemblies are modular for rapid trouble shooting or replacement.
- High Efficiency - Total system efficiency ranges from 72% to 80% depending on KVA size. Inverter efficiency - 80% to 89%.
- Auto Electro-mechanical Bypass Switch with Manual Override - Standard on all models.
- Static Bypass Switch (SBS) - Operates automatically within ¼ cycle. Equipped with Automatic Retransfer and Manual Override. Optional on 1KVA & 2.5 KVA single phase models.
- Double Isolation - Doubly isolated from input line via input isolation transformer and output ferroresonant transformer.
- Battery Protection - Automatic current limit circuit in the battery charger for built-in protection. Low battery shutdown disconnects battery from load after extended AC line failure.
- Operating Temperature - 0 to 50°C.

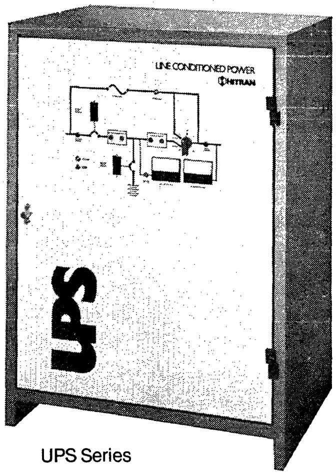
Electrical Specifications

Input

- Input Voltage Range - ±10% of nominal
- Input Frequency range - ±5% of nominal
- Power Factor - 0.8 lagging, nominal.

Output

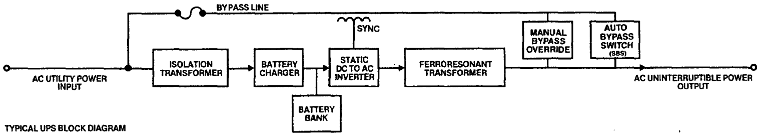
- Output Harmonic Distortion - Less than 5% total harmonic distortion and less than 3% of any single harmonic.
- Output Voltage Regulation - Dynamic: ±10% with recovery to ±3% in 50ms as a result of step load changes or AC line failure. Static: ±3% for the combined effects of line, load and temperature.
- Output Frequency Stability - ±0.25%
- Output Frequency Regulation - ±1.0% when not in synchronization with input frequency. (Units are automatically synchronized to input frequency when within range of nominal ±1Hz.)
- Output Power - Provides full output KVA for load power factors from 0.8 lagging to unity. (HITRAN's UPS will operate with such highly reactive loads as high isolation transformers.)
- Overload Capacity - 125% for 20 minutes. 140% for 10 minutes. (The Bypass Feature automatically transfers to bypass line if an overload causes an inverter output reduction.)



UPS Series

Battery Packs

- Battery Types - The UPS is compatible with any type of battery of proper voltage and capacity. Hitran offers a complete selection of Lead-Calcium, wet and gel-cell battery packs specifically designed for UPS applications. Other battery types available.
- Reserve Time - Standard packs available with reserve time from 10 to 120 minutes. Longer times available.



TYPICAL UPS BLOCK DIAGRAM

	UPS		60Hz UPS INPUT (1)		60Hz UPS OUTPUT (3)		INVERTER INPUT		DIMENSIONS (5) (Inches)			WEIGHT
	OUTPUT KVA	PART NO.	VOLTAGE	CURRENT(2)	VOLTAGE	CURRENT	VOLTS DC NOMINAL	CURRENT DC MAXIMUM (@ VDC MIN.)	H	W	D	APPROX. (lbs.)
SINGLE PHASE INPUT	1	BA0206-00	120 (1φ)	20	120 (1φ)	8.3	48Vdc	29Adc	52	38	24	450
		BA0206-03	208 (1φ)	12	208 (1φ)	4.8	48Vdc	29Adc	52	38	24	450
		BA0206-04(4)	120/240 (1φ)	10	120/240 (1φ)	4.2	48Vdc	29Adc	52	38	24	450
	2.5	BA0207-00	120 (1φ)	41	120 (1φ)	21	48Vdc	73Adc	52	38	24	675
		BA0207-03	208 (1φ)	24	208 (1φ)	12	48Vdc	73Adc	52	38	24	675
		BA0207-04(4)	120/240 (1φ)	21	120/240 (1φ)	11	48Vdc	73Adc	52	38	24	675
	5	BA0208-00	120 (1φ)	90	120 (1φ)	42	120Vdc	55Adc	62	42	24	1250
		BA0208-02	208 (1φ)	52	208 (1φ)	24	120Vdc	55Adc	62	42	24	1250
		BA0208-01(4)	120/240 (1φ)	45	120/240 (1φ)	21	120Vdc	55Adc	62	42	24	1250
	7.5	BA0209-00	120 (1φ)	130	120 (1φ)	63	120Vdc	84Adc	62	42	24	1450
		BA0209-02	208 (1φ)	75	208 (1φ)	36	120Vdc	84Adc	62	42	24	1450
		BA0209-01(4)	120/240 (1φ)	65	120/240 (1φ)	32	120Vdc	84Adc	62	42	24	1450
	10	BA0237-02	208 (1φ)	101	208 (1φ)	48	120Vdc	112Adc	62	42	24	1750
		BA0237-01(4)	120/240 (1φ)	87	120/240 (1φ)	42	120Vdc	112Adc	62	42	24	1750
	15	BA0238-02	208 (1φ)	150	208 (1φ)	72	180Vdc	112Adc	80	58	30	2100
		BA0238-01(4)	120/240 (1φ)	130	120/240 (1φ)	63	180Vdc	112Adc	80	58	30	2100
THREE PHASE INPUT	5	BA0250-00	208-240/480 (3φ)	30-26/13	120 (1φ)	42	120Vdc	55Adc	62	42	24	1250
	7.5	BA0251-00	208-240/480 (3φ)	45-39/19	120 (1φ)	63	120Vdc	84Adc	62	42	24	1450
	10	BA0252-00	208-240/480 (3φ)	60-52/26	120 (1φ)	83	120Vdc	112Adc	62	42	24	1750
	15	BA0253-00	208-240/480 (3φ)	89-77/39	120 (1φ)	125	180Vdc	112Adc	80	58	30	2100
	20	BA0254-00	208-240/480 (3φ)	117-101/51	120 (1φ)	167	180Vdc	149Adc	80	58	30	2600

(1) 50Hz units and special voltages available. Consult factory.
(2) Worst case - Discharged batteries, at full load and at low input line voltage.
(3) All Outputs are Single Phase, ± 1% of nominal.
(4) Units can operate as 120/240V split-phase 3-wire systems or 240V-1φ 2-wire systems
(5) Dimensions listed are not to be used for construction purposes.

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HITRAN

Division of AGEX

Key source for reliable magnetic components, power supplies and control systems for over 40 years.

500VA TO 150KVA LINE CONDITIONED POWER SYSTEMS

Also see our catalog pages under TRANSFORMERS and DC POWER SOURCES.

SFR SERIES — SINUSOIDAL FERRORESONANT REGULATOR

The SFR provides low distortion, sinusoidal, computer grade power. It provides a high degree of electrical noise rejection as well as output voltage regulation. Designed to eliminate power line problems caused by brownouts, short term transients and electrical noise, the SFR protects against switching disturbances, clearing of line faults, starting of motor loads and lightning strikes.

Standard Features

- Computer grade sinusoidal output - less than 5% harmonic distortion.
- Electrical noise rejection - Common Mode: greater than 120dB, 1 KHz to 1MHz. - Transverse Mode: greater than 60dB, 10KHz to 1MHz.
- Wide input voltage range - +10%, −20% of nominal input
- Tightly regulated output - ±1% of nominal output voltage.
- Input to Output Coupling Capacitance - Less than 0.005pF.
- Operating Temperature - 0-50°C.

Electrical Specifications

Input

- Nominal Standard Voltages - 1ϕ: 120, 208, 240, 480 (+10, −20%) 3ϕ: 208Δ, 240Δ, 480Δ (+10, −20%)
- Frequency - 60Hz or 50Hz ±2Hz.

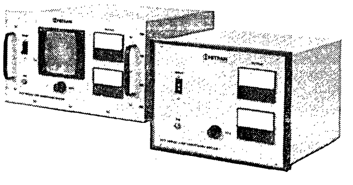
Output

- 1ϕ - 120/240-277V ±1%
- 3ϕ - 208Y/120V ±1%
- 3ϕ - 480Y/277V ±1%
- Frequency - Same as Input.
- Regulation - Static: ±1%; Dynamic: ±4% with recovery to ±1% in 50ms.
- Load PF - 0.8 lagging
- Overload Recovery - Automatic within 50ms.
- Ride Through - Continuous power during line outages lasting as long as 25ms (1.5 cycles).
- Protection - Self current limiting
- Efficiency - Greater than 90%

Complete Line Conditioner Systems

The SFR Series is also available as a Complete Line Conditioner System. It includes all the standard features listed plus the following accessories:

- *Output Ammeter and Voltmeter*
- *Input Circuit Breaker*
- *Input Power "ON" Indicating Light*
- *Output Fusing and Receptacles*
- *Input Receptacles or Line Cord*
- *19-inch Rack Mount or Free-Standing Desk Top Assembly*



SFR Series - Rack Mount and Desk Top Complete Systems.

SFR SERIES–SINGLE PHASE	60 Hz • 600V CLASS • 220°C INSULATION CLASS • NEMA I ENCLOSURE					
	KVA	DIMENSIONS IN INCHES* H	W	D	APPROX. WT. LBS.	TYPE MOUNTING
	0.5	22	18	17	75	Floor/Wall
	1	22	18	17	100	Floor/Wall
	2	22	18	17	160	Floor/Wall
	3	33	24	20	225	Floor (W)
	5	33	24	20	350	Floor (W)
	7.5	33	24	20	490	Floor (W)
	10	39	30	20	600	Floor (W)
	15	39	30	20	815	Floor
	20	43	36	26	1070	Floor

(W) Wall mounting brackets available.

SFR SERIES–THREE PHASE	60 Hz • 600V CLASS • 220°C INSULATION CLASS • NEMA I ENCLOSURE					
	KVA	DIMENSIONS IN INCHES* H	W	D	APPROX. WT. LBS.	TYPE MOUNTING
	3	20	30	20	250	Floor
	6	26	36	26	445	Floor
	9	26	36	26	575	Floor
	15	32	45	28	970	Floor
	22.5	32	45	28	1300	Floor
	30	40	53	32	1690	Floor
	45	40	53	32	2325	Floor
	60	60	65	40	2975	Floor

UIS SERIES — ULTIMATE ISOLATION SYSTEM

The UIS effectively eliminates common-mode and transverse-mode power line noise in transformer applications for computers, programmable controllers and sensitive instruments.

Standard Features

- High degree of electrical noise rejection,- Common-mode: greater than 140dB, 1KHz to 1Mhz; Transverse-mode: greater than 60db, 10KHz to 1MHz.
- Input to output capacitance coupling - 0.001pF
- DC insulation resistance - 10,000MΩ
- Dielectric strength - 4000Vac min.
- Operating Temperature - 0-50°C
- Efficiency - 97% min. at full load.
- Line Cord & Output Receptacles - Standard on 120V single phase models up through 2.4KVA.

Electrical Specifications

	KVA	INPUT (V)	Hz	OUTPUT (V)
1ϕ	0.5-2.4	120	50/60	120
	2.5	120/208-240	50/60	120/240
	5-20	120/208-240 or-480	60	120/240
3ϕ	3	208Y/120	60	208Y/120
	7.5	208Δ or 240Δ	60	208Y/120
	15 & 22.5	208Δ, 240Δ, or 480Δ	60	208Y/120
	30-150	208-240/480Δ	60	208Y/120 or 480Y/277

LINE CONDITIONED POWER
HITRAN
UIS
LINE CONDITIONED POWER
HITRAN
UIS

UIS Series

UIS SERIES–SINGLE PHASE	50/60Hz • 600V CLASS • 220°C INSULATION CLASS • NEMA I ENCLOSURE					
	KVA	DIMENSIONS IN INCHES* H	W	D	APPROX. WT. LBS.	TYPE MOUNTING
	0.5	4.9	7.2	9.5	25	Floor/Wall
	1.0	6.8	8.5	10.2	40	Floor/Wall
	2.4	6.8	8.5	12.8	60	Floor/Wall
	2.5	6.8	8.5	12.8	60	Floor/Wall
	5.0	6.8	8.5	14.8	90	Floor/Wall
	7.5	6.8	8.5	18.5	145	Floor/Wall
	10.0	15.0	12.0	27.0	235	Floor/Wall
	15.0	15.0	12.0	29.0	280	Floor/Wall
	20.0	15.0	12.0	31.0	355	Floor/Wall

UIS SERIES–THREE PHASE	60Hz • 600V CLASS • 220°C INSULATION CLASS • NEMA I ENCLOSURE					
	KVA	DIMENSIONS IN INCHES* H	W	D	APPROX. WT. LBS.	TYPE MOUNTING
	3.0	9.2	39.0	10.2	140	Floor
	7.5	9.2	39.0	12.2	205	Floor
	15.0	9.2	39.0	14.8	300	Floor
	22.5	9.2	39.0	18.5	470	Floor
	30.0	16.4	52.0	27.0	825	Floor
	45.0	16.4	52.0	29.0	1000	Floor
	60.0	16.4	52.0	31.0	1200	Floor
	75.0	48.0	48.0	32.0	1600	Floor
	100.0	48.0	48.0	32.0	1900	Floor
	130.0	60.0	54.0	40.0	2400	Floor
	150.0	60.0	54.0	40.0	2700	Floor

*Dimensions listed are not to be used for construction purposes.

Route 31, RD 5-65 • Flemington, New Jersey 08822 • 201-782-5525 • Telex: 833701/AGEX/FLEM

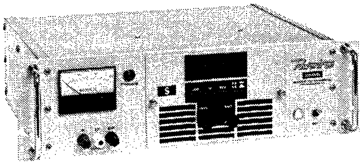
Powertron

0-36 KVA AC POWER SOURCES

The Powertron AC Power Supplies provide stable, low distortion, AC power at frequencies within the audio frequency spectrum. These highly reliable and versatile power sources find wide application in calibration and test stations, motor drives, gyro wheel supplies, laboratory use, military component testing, and operating foreign equipment. These supplies may be used whenever it is necessary to provide AC power at a frequency not available from the power lines. The various supplies feature all solid state construction, wide operating frequency range, low distortion, and a wide variety of output voltages and impedances. The units are designed to be used in modular form so that a single unit can provide single phase output, and two or three units may be used to provide two phase or three phase outputs respectively.

AMPLIFIER SPECIFICATIONS

(Series 250S, Illustrated)



Output Circuit: Single phase, isolated (Ground terminal is provided for optional grounding of output.)

Output Power: 250 VA

Load Power Factor: .7 Lead through .7 Lag for full power output. Useable to .2 at reduced power.

Output Voltage Range: 0-130 V RMS (An output connector provided at the rear of the unit may readily be reconnected to provide optimum power output at other voltages. Ranges available are 0-260 V, 0-190 V, 0-130 V, 0-90 V, 0-75 V, 0-67 V, 0-60 V, 0-38 V, and 0-17 V.

Output Frequency Range: 45 Hz to 10,000 Hz for full power out. 20 Hz to 20,000 Hz at reduced power.

Output Distortion: 0.1% mid band.

Load Regulation: Factory set to ±0.5% mid band (A control is provided for zero regulation over most of frequency range.)

Line Regulation: ±0.1% for ±5% line change.

Transient Response: 50 Microseconds.

Hum Level: 80 db approx. below rated output voltage.

Thermal Overload Protection: Output transistors protected by thermal cutout circuit.

Short Circuit Protection: Output may be shorted indefinitely without damage to unit.

External Amplifier Input: An input connector is provided at the rear of the unit when it is desired to drive the amplifier from an external source. Model XA-1 plug-in module is required for this mode of operation.

External Sync. Input: An input connector is provided at the rear when it is desired to synchronize the plug-in oscillator with an external frequency source.

Convenience Outlets: Two convenience outlets controlled by the power switch are provided at the rear of the unit. These permit single control operation of one or two additional amplifiers when 2ϕ or 3ϕ outputs are required. When not used for this purpose, the outlets may also be used to turn on auxilliary equipment which is mounted in the same test console.

Meter: A voltmeter with range of 0-150 V RMS is provided to monitor the output voltage.

Input Power: 115 V or 230 V, 50-60 Hz (400 Hz input available).

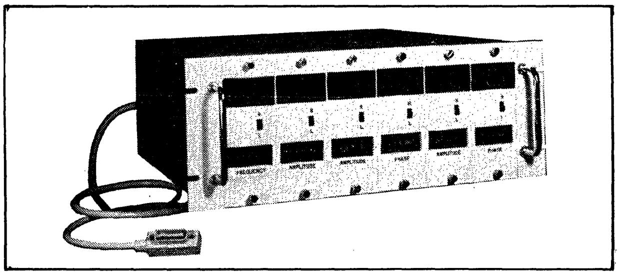
Ambient Temperature Range: 0°C to 55°C.

Dimensions: 5¼ x 19″ Rack Panel x 14″ Deep.

Weight: 75 Lbs. Approx.

MODEL 5700 BCD, IEEE BUS PROGRAMMER

The AC Power Programmer 5700 is used in conjunction with the various AC power amplifiers to provide precisely controlled frequency, amplitude, and phase angle displacement. The programmer includes the capability for 3 modes of control, by front panel BCD thumbwheel switches, by remote BCD signals, or by remote IEEE-488 GPIB. The modular construction of the programmer allows the user to purchase only the modules required for the application, and to expand the system as required. Thus, a single-phase application would require only a frequency module, and an amplitude module, a two-phase application requires a frequency module, two amplitude modules, and a phase shift module, and a three-phase system requires the full compliment of frequency module, three amplitude modules, and two phase shift modules. Remote programming is also optional and expandable in that separate modular plug-ins are available for remote BCD, or IEEE operation.



The digital techniques employed in the frequency and phase modules of the programmer insure precise control of these functions. The amplitude modules provide servo loop control of the respective output amplifiers insuring precise amplitude stability and control. Local or remote programming for each function is selected by a front panel switch. Remote programming status is displayed on LED indicators of the respective control modules.

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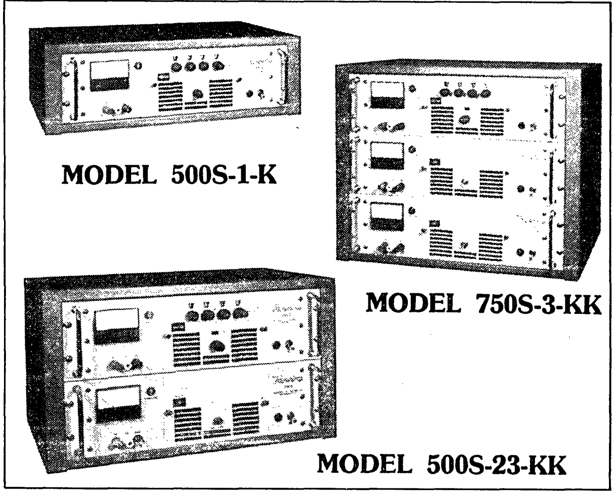
Powertron 0-36 KVA AC POWER SOURCES

SPECIFYING YOUR REQUIREMENTS

The order designations listed below are for convenience of specifying the components required for various power supply configurations. To select an appropriate unit for your requirements first determine which category, 1-phase, 2-phase, or 3-phase, is most suitable to your intended load. Then use the ordering designation adjacent to the required output power within that category. For the complete ordering designation replace the asterisk with the ordering code letters of the plug-in oscillator.

The available full power output voltage ranges are specified for each configuration. The cable set is normally supplied for the range listed in bold type. If a different range is required, it should be specified when ordering. The available power line voltages are also listed below. The units are normally supplied wired for the voltage listed in bold type. If a different power line voltage connection is required, it should be specified when ordering.



1φ POWER SUPPLIES (for use with single phase loads)

Ordering Designation	Total Output Power	Components	Output Voltage Ranges	Input Voltage
80S-1-*	80 VA	1 Model 80S, CA1 plug set	17, 30, 38, 60, 67, 75, 90, **130**, 190, 260	1 phase **115**, 230
250S-1-*	250 VA	1 Model 250S, CA1 plug set		
350S-1-*	350 VA	1 Model 350S, CA1 plug set		
500S-1-*	500 VA	1 Model 500S, CA1 plug set		
1000S-1-*	1 KVA	1 Model 1000S, CA11 plug set	65, 76, **130**, 140, 150, 260, 300	3 phase line to line 190, **208**, 225, 380, 450
1500S-1-*	1.5 KVA	1 Model 1500S, CA11 plug set		
2000S-1-*	2 KVA	1 Model 2000S, CA11 plug set		
3000S-1-*	3 KVA	1 Model 3000S, CA11 plug set		
4000S-1-*	4 KVA	2 Model 2000S†, CA12 cable set	**130**, 150, 260, 280, 300	
6000S-1-*	6 KVA	2 Model 3000S†, CA12 cable set		

† 1 XA plug-in

2φ-3φ (Open Delta) POWER SUPPLIES (for use with 2φ loads and 3φ, 3 wire delta loads. Derate to 80% of rated power for delta loads)

Ordering Designation	Total Output Power	Components	Output Voltage Ranges	Input Voltage
160S-23-*	160 VA	2 Model 80S†, CA23 cable set	17, 30, 38, 60, 67, 75, 90, **130**, 190, 260	1 phase **115**, 230
500S-23-*	500 VA	2 Model 250S†, CA23 cable set		
700S-23-*	700 VA	2 Model 350S†, CA23 cable set		
1000S-23-*	1 KVA	2 Model 500S†, CA23 cable set		
2000S-23-*	2 KVA	2 Model 1000S†, CA232 cable set	65, 76, **130**, 140, 150, 260, 300	3 phase line to line 190, **208**, 225, 380, 450
3000S-23-*	3 KVA	2 Model 1500S†, CA232 cable set		
4000S-23-*	4 KVA	2 Model 2000S†, CA232 cable set		
6000S-23-*	6 KVA	2 Model 3000S†, CA232 cable set		
8000S-23-*	8 KVA	4 Model 2000S‡, CA234 cable set	**130**, 150, 260, 280, 300, 600	

† 1 XA or XA-1 plug-in ‡ 3 XA plug-in

3φ Wye-Delta POWER SUPPLIES (for use with 3φ, 4 wire wye loads, or 3φ, 3 wire delta loads. Also suitable for 2φ loads at ⅔ output power)

Ordering Designation	Total Output Power	Components	Output Voltage Ranges (line to neutral)	Input Voltage
240S-3-*	240 VA	3 Model 80S†, CA3 cable set	17, 30, 38, 60, 67, 75, 90 **130**, 190, 260	1 phase **115**, 230
750S-3-*	750 VA	3 Model 250S†, CA3 cable set		
1000S-3-*	1 KVA	3 Model 350S†, CA3 cable set		
1500S-3-*	1.5 KVA	3 Model 500S†, CA3 cable set		
3000S-3-*	3 KVA	3 Model 1000S†, CA31 cable set	65, 76, **130**, 140, 150, 260, 300	3 phase line to line 190, **208**, 225, 380, 450
4500S-3-*	4.5 KVA	3 Model 1500S†, CA31 cable set		
6000S-3-*	6 KVA	3 Model 2000S†, CA31 cable set		
9000S-3-*	9 KVA	3 Model 3000S†, CA31 cable set		
12000S-3-*	12 KVA	6 Model 2000S‡, CA36 cable set	**130**, 150, 260, 280, 300, 600	

† 3 XA plug-in ‡ 6 XA plug-in

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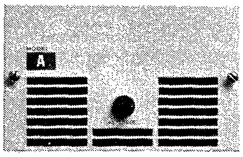
Powertron 0-36 KVA AC POWER SOURCES

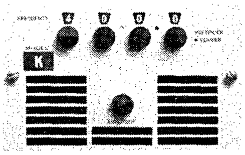
STANDARD PLUG-IN OSCILLATORS

These oscillators provide the input signal for the Powertron AC power supplies. Front panel controls include frequency, amplitude, and phase angle where applicable. They all feature external synchronization capability.

SINGLE PHASE



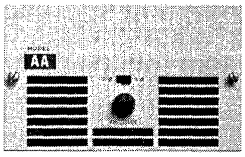
MODEL A



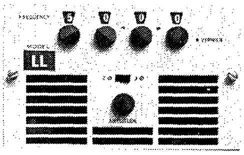
MODEL K

Model	Frequency Type	Frequency Range (Hz)	Accuracy	Distortion
A	Fixed	400	0.1%	0.1%
B	Fixed	60	0.1%	0.1%
C	Fixed	specify	0.1%	0.1%
E	Crystal	specify	0.001%	0.1%
F	2 Fixed	specify	0.1%	0.1%
K	Variable	10-10K	1.0%	0.2%
L	Variable	10-100	1.0%	0.2%
M	Variable	100-1K	1.0%	0.2%
N	Variable	350-450	0.25%	0.1%
P	Variable	300-500	0.25%	0.1%
Q	Variable	1K-10K	1.0%	0.2%
LM	Variable	10-1K	1.0%	0.2%
MQ	Variable	100-10K	1.0%	0.2%

TWO PHASE/THREE PHASE



MODEL AA



MODEL LL

Model	Frequency Type	Frequency Range (Hz)	Accuracy	Distortion
AA	Fixed	400	0.1%	0.25%
BB	Fixed	60	0.1%	0.25%
CC	Fixed	specify	0.1%	0.25%
EE	Crystal	specify	0.001%	0.25%
FF	2 Fixed	specify	0.1%	0.25%
KK	Variable	10-10K	1.0%	0.35%
LL	Variable	10-100	1.0%	0.35%
MM	Variable	100-1K	1.0%	0.35%
NN	Variable	350-450	0.25%	0.25%
PP	Variable	300-500	0.25%	0.25%
QQ	Variable	1K-10K	1.0%	0.35%
LLMM	Variable	10-1K	1.0%	0.35%
MMQQ	Variable	100-10K	1.0%	0.35%

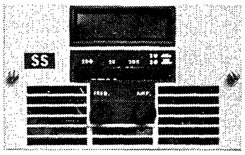
CONTINUOUSLY VARIABLE PLUG-IN OSCILLATORS WITH BUILT IN FREQUENCY COUNTER

FEATURES:

10 turn adjustment of frequency in 3 ranges:
20 Hz — 200 Hz
200 Hz — 2 KHz
2 KHz — 19.99 KHz
10 turn adjustment of amplitude from front panel, or programmable sub-boards.

SPECIFICATIONS:

Frequency Range: 20 Hz — 19.99 KHz
Distortion: 0.5% Maximum
Single ϕ Model Number: "S"
Poly ϕ Model Number: "SS"



MODEL SS

IDENTIFYING PLUG-IN OSCILLATORS:

500S - 23 - SS

Powertron Model Number
Wiring Designation
Required Oscillator

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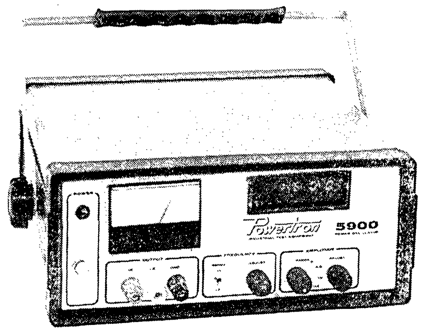
Powertron

0-36 KVA AC POWER SOURCES

MODEL 5900



The Model 5900 is a high power general purpose audio generator.

The circuit consists of a low distortion oscillator, a driver amplifier, and a bipolar class AB1 power amplifier with an output transformer.

The output transformer has three taps to allow utilization of the full power over a wide range of voltages.

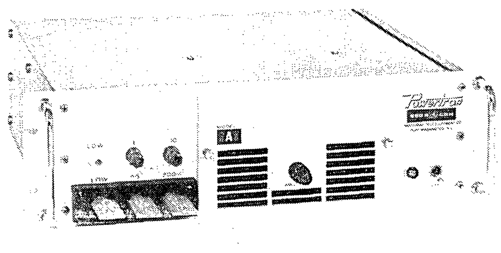
A frequency counter and output voltmeter are built in.

Electronic overload protection is provided that limits the power into a short circuit to a safe value.

SPECIFICATIONS

Output:	Low Range	0 to 8.5 V @ 8.2 A
	Middle range	0 to 38 V @ 1.8 A
	High range	0 to 130 V @ .53 A
Power:	Max.	70 VA
	Continuous	50 VA
Frequency:	Low range	45 to 2 KHz
	High range	2 K to 19.99 KHz
	Also available with fixed frequency output.	
Distortion		0.3% typ.
Power requirements		120 V 50 to 400 Hz
Dimensions (inches)		12¼ x 5¼ x 12½
Weight		23 lbs.

CONSTANT CURRENT AC SUPPLIES



In addition to constant voltage amplifiers a full line of constant current amplifiers is available. The inherent ability of these amplifiers to maintain a preset current through a load whose impedance may vary makes them ideally suited to the testing of ammeters, wattmeters, relays, circuit breakers, current transformers, and other current sensitive devices. These amplifiers may be driven by the plug-in oscillators. All amplifiers are protected for open load circuit conditions.

SPECIFICATIONS

Output Frequency: Determined by plug-in oscillator.

Current Regulation: ±1% for loads ranging from short circuit to maximum rate load impedance for the respective amplifier.

Output Distortion: Less than 1%

Constant current amplifiers may be used with similar outputs in parallel when it is desired to increase the current capacity. Constant current supplies may also be used for 3ϕ wye connected load applications. As the standard output transformers may not always provide the optimum current range and compliance voltage, special output transformers may be supplied to meet user requirements.

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K.G.S. electronics, inc.

kgs electronics A GAR Enterprises Co.

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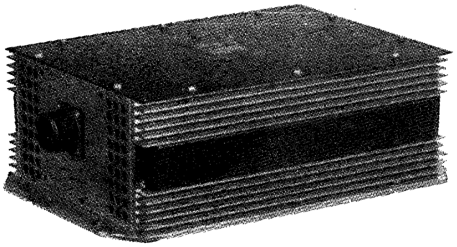
60 Hz/50 Hz STATIC INVERTER



These inverters are particularly applicable as a source of 60 Hz power for the operation of Projectors, Tape Records, TV systems. Typewriters, on aircraft that have a 28 volt DC electrical system. For applications requiring greater power the inverters can be paralleled for higher output.

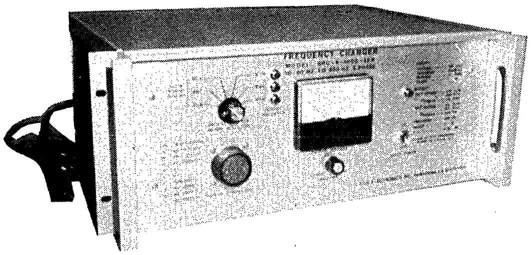
The inverters available in various voltages, frequency and power are listed in the table below.

GENERAL SPECIFICATIONS

Input voltage:	1. 28 VDC ± 2 Volts, 14 VDC for SPS-316 2. Withstands 88 Volt Transient for 1 millisecond
Power Factor:	0.8 to 1.0
Amplitude Distortion:	Less than 7%
Wave Form:	Sine form except SPS-1308, SPH-1006
Phase:	Single
Short-Circuit:	Withstand for 1 minute or longer
Temperature:	-65°F to +160°F (-55°C to +70°C)
Altitude:	45,000 ft.

MODEL	OUTPUT				INPUT		WEIGHT LBS. (KG)	SIZE (INCH) W x L x H
	VOLTAGE	POWER VA	WAVESHAPE	FREQ. Hz	VOLTS	AMPS		
SPS-206	115 VAC	200	SINE	60 ± 1	28 VDC	10.5 DC	14.5 (6.6 Kg)	7 3/4 x 12 x 4
SPS-306	115 VAC	300	SINE	60 ± 1	28 VDC	15.8 DC	18.0 (8.2 Kg)	7 3/4 x 12 x 4
SPS-306B	115 VAC	375	SINE	60 ± 1	28 VDC	18.5 DC	18.0 (8.2 Kg)	7 3/4 x 12 x 4
SPS-305	115 VAC	270	SINE	50 ± 1	28 VDC	15.8 DC	18.0 (8.2 Kg)	7 3/4 x 12 x 4
SPS-3052	230 VAC	270	SINE	50 ± 1	28 VDC	15.8 DC	18.0 (8.2 Kg)	7 3/4 x 12 x 4
SPS-316	115 VAC	300	SINE	60 ± 1	14 VDC	32.0 DC	18.0 (8.2 Kg)	7 3/4 x 12 x 4
SPS-750	115 VAC	750	CLIPPED SINE	60 ± 1	28 VDC	33.0 DC	21.0 (9.55 Kg)	7 3/4 x 13 1/4 x 4
SPS-1007	115 VAC	1000	CLIPPED SINE	60 ± 1	28 VDC	43.0 DC	7 (3.18 Kg)	6 x 10 x 13
SPS-1307	115 VAC	1000	CLIPPED SINE	60 ± 1	28 VDC	53.0 DC	24.5 (11.12 Kg)	7 3/4 x 13 1/4 x 4
SPS-1308	115 VAC	1000	QUASI-SQUARE	60 ± 1	115/200, 3 ph, 400 Hz		12 (5.5 Kg)	7 3/4 x 13 1/4 x 4
SPH-1006	115 VAC	1000	QUASI-SQUARE	60 ± 1	115/200, 3 ph, 400 Hz		7 (3.18 Kg)	6 x 10 x 3

FREQUENCY CHANGER
MODEL SPC-6-( ) SERIES
50 to 60 Hz to 400 Hz

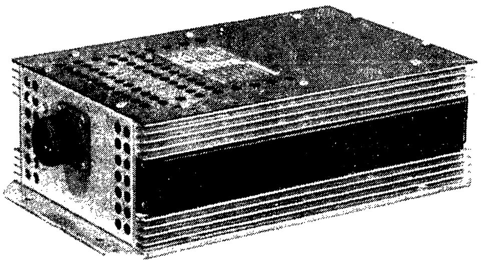


KGS ELECTRONICS' solid state frequency changer converts 115 VAC 50 to 60 Hz to 115 VAC 400 Hz sine wave power. These frequency changers are suitable for use on test benches or labs to check radars, compasses, gyros, synchros, fuel flow gauges, etc. SPC-6-750 is single phase output. SPC-6-1000-3Ø is three (3) phase output. Output is monitored via analog meter and is adjustable from 105 to 126 VAC line to neutral. Amplitude distortion is typically 2%.
For SPC-2250-3pH the input is 3 phase 47 to 440 Hz and the output is 3 phase WYE 400 Hz fixed voltage and frequency.

MODEL	INPUT	OUTPUT/OUTPUT VA	OUTPUT FREQUENCY	SIZE (INCH) W x L x H	WEIGHT (LBS.)
SPC-6-750	115 VAC 50 to 60 Hz	115 VAC/750 VA, 26 VAC/150 VA	400 Hz	19 x 13 x 7	30
SPC-6-750A	115 VAC 50 to 60 Hz	115 VAC/250 VA, 26 VAC/500 VA	400 Hz	19 x 13 x 7	30
SPC-6-1000-3pH	115 VAC 50 to 60 Hz	120/208 L-L/1000 VA	400 Hz	19 x 13 x 7	36
SPC-2250-3pH	115/200 or 230/400 Hz 47 to 440 Hz	120/208 WYE/2250 VA	400 Hz	19 x 17 x 10 1/2	71

K.G.S.
electronics, inc.

kgs electronics A GAR Enterprises Co.
Dept. EM • 2029 North Lincoln Avenue • Pasadena, California 91103 • Telephone ***(818)*** *798-0786*



TSO'D 400 Hz STATIC INVERTER

The KGS ELECTRONICS's static inverter utilizes solid state circuitry to convert 28 VDC to 115 VAC, 400 Hz sine wave power. Design features include sine to sine or square to sine wave power conversion permitting lightweight and reliable operation.

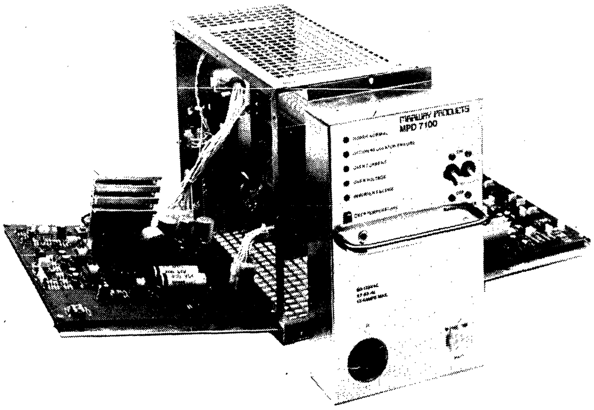
GENERAL SPECIFICATIONS

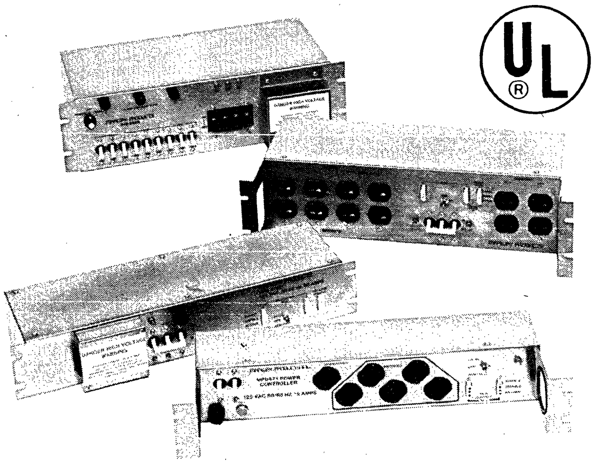
Input Voltage:	20 to 32 VDC
Output Voltage:	115 VAC and/or 26 VAC
Phase/Waveform:	Single/Sine Wave
Frequency:	400 Hz ± 1%
Ampl. Distortion:	Less than 7% (3% typical)
Power Factor:	0.8 to -0.95
Input Overvoltage:	Operate up to 37 VDC input while supplying full rated VA output power. Output voltage under this condition is 115 VAC +5%, -7%
Input Transient Protection:	Withstands transients of 88 volts lasting 1 millisecond on the 28 VDC input line
Overload & Short-Circuit Protection:	Withstands without damage or degradation load exceeding 150% of rated output to an output dead short. Inverter delivers rated output on removal of above condition
Altitude:	45,000 ft.
Temperature:	-64°F to +160°F (-55°C to +71°C)
Humidity:	Tested to greater than 95% for 10 days, temperature was cycled between 75°F to 160°F
Environmental:	Meets RTCA Paper DO-160 Env. Cat.D2BR

SPC-SERIES SPECIFICATIONS

MODEL	OUTPUT VOLTAGE VAC/VAC	OUTPUT POWER VA 115/26	INPUT CURRENT ADC	EFFICIENCY PERCENT TYPICAL	POWER CONVERSION	WEIGHT LBS. (KG.)	SIZE (INCH) W x L x H
SPC-5( )	115/26	50/30	2.6	67 to 72	PWM to SINE	3.0 (1.3)	4.1 x 6.5 x 2.7
SPC-10( )	115/26	100/60	4.8	75 to 78	PWM to SINE	5.2 (2.4)	4.5 x 8.3 x 3.5
SPC-30( )	115/26	300/75	16	70	SINE to SINE	8.1 (3.7)	6.0 x 11.0 x 3.2
SPC-30(A)	115/26	300/75	16	70	SINE to SINE	7.6 (3.5)	6.0 x 11.0 x 3.2
SPC-30(B)	115/26	300/75	16	70	SINE to SINE	8.1 (3.7)	6.0 x 11.0 x 3.2
SPC-38( )	115/26	375/75	16	83	PWM to SINE	8.0 (3.6)	6.0 x 11.0 x 3.2
SPC-38(A)	115/26	375/75	16	83	PWM to SINE	8.0 (3.6)	6.0 x 11.0 x 3.2
SPC-38(B)	115/26	375/75	16	84	PWM to SINE	8.0 (3.6)	6.0 x 11.0 x 3.2
SPC-38(T)	115/26	375/75	16	80	PWM to SINE	8.0 (3.6)	6.0 x 11.0 x 3.2
SPC-60( )	115/26	600/125	31	70	SINE to SINE	14.0 (6.4)	7.7 x 12.0 x 4.0
SPC-60(A)	115/26	600/125	31	70	SINE to SINE	14.0 (6.4)	7.7 x 12.0 x 4.0
SPC-60(B)	208/240	600/600	31	70	SINE to SINE	14.0 (6.4)	7.7 x 12.0 x 4.0
SPC-75( )	115/26/5	750/150/30	32	83	PWM to SINE	14.0 (6.4)	8.0 x 12.0 x 4.0
SPC-75(B)	115/26/5	750/150/30	32	83	PWM to SINE	14.0 (6.4)	8.0 x 12.0 x 4.0

MARWAY PRODUCTS INC.™





DC Power Supplies for DEC Computers From The Industries Leading Manufacturer of DEC® Compatible Power Products

MPS 7100 (VAX) SWITCHING POWER SUPPLY

- High Reliability Via All Solid State Circuitry With Reduced Component Count
- Low Common And Differential Mode Output Noise
- Over Voltage Shutdown And Current Foldback To Protect Logic Cards
- Status And Fault Display For Ease Of System Trouble Shooting
- Modular Sub-Assemblies For Ease Of Field Maintenance
- Industry Standard Components For Ease Of Repair
- Complete Documentation Package
- 5 V DC @ 100 Amps

MPR 744 Switching Regulator

- Pulse Width Modulation With Constant Operating Frequency To Eliminate Audible Noise
- Overvoltage Crowbar To Protect Logic Cards
- Foldback Current Limiting
- Over Temperature Shutdown
- Standard Components For Ease Of Repair
- 5 V DC @ 32 Amps

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Digital Equipment Corporation

MARWAY Reserves The Right To Make Specification Changes Without Notice. Consult The Factory For Current Information.

DEC Compatible AC Power Controllers For All Types Of DEC Computer Installations

MPD 861

- Three Models
  - **MPD 861 C** For 120 V AC @ 24 Amps
  - **MPD 861 B** For 240 V AC @ 16 Amps
  - **MPD 861 A** For 240 V AC / 120 V AC
- 12 Receptacles

MPD 869

- Two Models
  - **MPD 869D** For 208 V AC @ 72 Amps
  - **MPD 869E** For 416 V AC @ 36 Amps
- 18 Receptacles

MPD 871

- Two Models
  - **MPD 871 A** For 120 V AC @ 12 Amps
  - **MPD 871 B** For 416 V AC @ 12 Amps
- Six Receptacles

MPD 872

- Three Models
  - **MPD 872D** For 120 V AC @ 24 Amps
  - **MPD 872C** For 240 V AC @ 16 Amps
  - **MPD 872E** For 240 V AC / 120 V AC @ 24 Amps
- 10 Receptacles

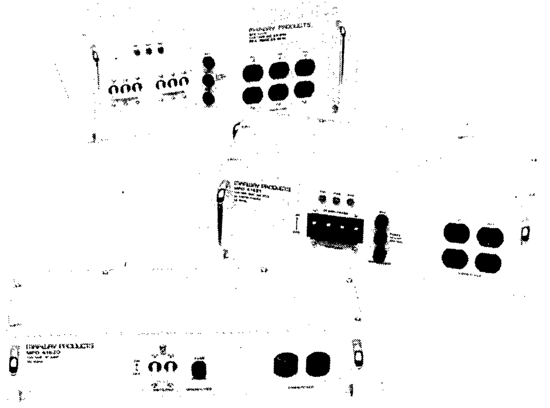
MPD 874

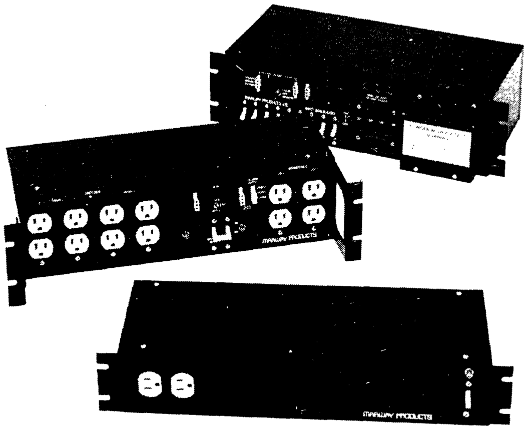
- Three Models
  - **MPD 874A** For 120 V AC @ 12 Amps
  - **MPD 874D** For 120 V AC @ 24 Amps
  - **MPD 874B** For 240 V AC @ 16 Amps

MARWAY PRODUCTS INC.™

POWER PRODUCTS FOR COMPUTERS

311 No. Clara St. Santa Ana, Ca. 92703 (714) 973-1800





Front Panel Mount AC Power Distributor Units For Instrumentation, Test Equipment, Etc.

Featuring:

- Optional Remote Control/Shutdown Panel
- Sturdy Rack Panel Construction With Handles And Painted Front Panel
- Standard 3½", 5¼", 7" & 8⅞" Panel Heights
- Single And Multiple Phase Electrical Configurations With Up To 150 Amp Capacity
- Optional Remote Control Via Safe Low Voltage Switch Closure
- High Performance T Section EMI Filter For Noise Free Operation
- Fast, Accurate Magnetic Circuit Breakers For Overload Protection
- High Energy Transient Suppression To Protect Valuable Equipment
- **Custom Configurations Available**

MARWAY Reserves The Right To Make Specification Changes Without Notice. Consult The Factory For Current Information.

P.D.U.

(Power Distribution Units)

Distribution Of Popular Line Voltages

120 V AC

- **MPD 117A**
  -15 Amp Service
  -8 Outlets
- **MPD 110**
  -15 Amp Service
  -10 Outlets
  -Rack Mount
- **MPD 115**
  -30 Amp Service
  -12 Outlets
  -Rack Mount

240 V AC

- **MPD 220**
  -15 Amp Service
  -8 Outlets
- **MPD 230**
  -20 Amp Service
  -12 Outlets

240 / 120 V AC 4 WIRE

- **MPD 2010**
  -30 Amp Service
  -8 Outlets
- **MPD 872E**
  -30 Amp Service
  -10 Outlets
- **MPD 861A**
  -30 Amp Service
  -12 Outlets

208 / 120 V AC 5 WIRE

- **MPD 208A**
  -90 Amp Service
  -18 Outlets

416 / 240 V AC 5 WIRE

- **MPD 416A**
  -60 Amp Service
  -18 Outlets

Marway Power Distribution Units Include Features Such As:

- High Performance EMI Filtering
- Transient Supression
- Remote Control
- Overvoltage Protection
- **Custom Configurations Available**

MARWAY PRODUCTS INC.™

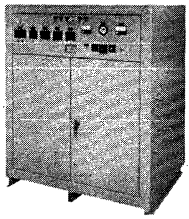
POWER PRODUCTS FOR COMPUTERS

311 No. Clara St. Santa Ana, Ca. 92703 (714) 973-1800

ELECTRIC MANUFACTURING CO.
263 HILLSIDE AVENUE
NUTLEY, NEW JERSEY 07110
(201) 661-3434 TELEX 219077

TAURUS™ by Nova

INVERTERS • UNINTERRUPTIBLE POWER SYSTEMS • FREQUENCY CHANGERS



15KVAUPS

TAURUS™ Uninterruptible Power Systems are designed to supply interrupted, conditioned, transient-free power to computers, process control equipment, emergency lighting and communications systems.

Single and Three Phase Systems are available at all standard voltages and at 60 Hz. and 50 Hz.

1φ SYSTEMS		3φ SYSTEMS	
KVA	**Model No.**	**KVA**	**Model No.**
1KVA	11-1K60	5KVA	11- 5K-3/6
2KVA	11-2K60	7.5KVA	11-7.5K-3/6
3KVA	11-3K60	10KVA	11-10K-3/6
5KVA	11-5K60	15KVA	11-15K-3/6
7.5KVA	11-7.5K60	20KVA	11-20K-3/6
10KVA	11-10K60	30KVA	11-30K-3/6
15KVA	11-15K60	37.5KVA	11-37.5K-3/6
		50KVA	11-50K-3/6

Systems are available with solid state (one-quarter cycle) transfer switches or electro-mechanical switches.

Many options are available.

Nova TAURUS™ systems are backed by nationwide service.

For more information call or write for catalog.

1φ Sine Wave INVERTERS 3φ
50 Hz. 60 Hz. 400 Hz.
OVER 50 MODELS

Nova solid state INVERTERS are designed for commercial applications requiring high quality, durable equipment for continuous operation at 100% of rating. INVERTERS are available from 125VA to 50KVA.

Nova INVERTERS are available with a wide range of input voltages from 12VDC - 750VDC.

All common output voltages are available at 50 Hz., 60 Hz., or 400 Hz.

Nova INVERTERS are currently in use in communications (telephone, TV and microwave), automotive testing, utilities, the petroleum industry, aircraft, the steel industry and in rapid transit.

Call us or our local representative for catalog information.

1φ FREQUENCY CHANGERS 3φ
50 Hz. 60 Hz. 400 Hz.
OVER 50 MODELS

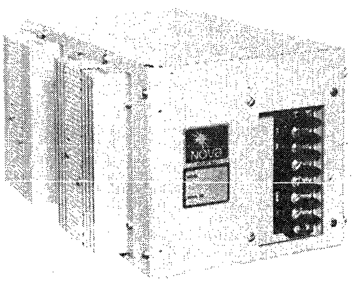
Nova solid state FREQUENCY CHANGERS are designed for continuous operation at rated power. They are available from 125VA to 50KVA.

They operate from any input frequency between 48-440 Hz. and produce a regulated sine wave with a stability of ±0.5% (±0.05% optional).

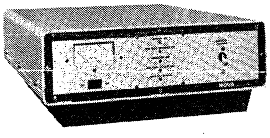
All common input voltages (input and output, single and three phase) are available.

These devices are used in computer systems testing, aircraft, the petroleum industry and in communications.

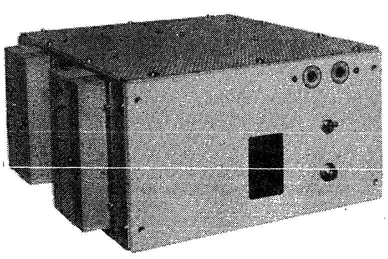
Call us or your local representative for catalog information.



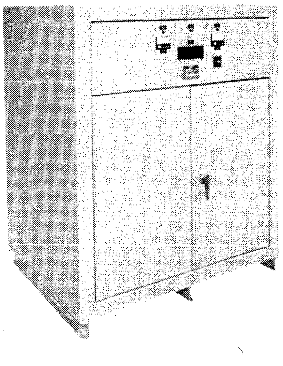
500VA Inverter



1KVA



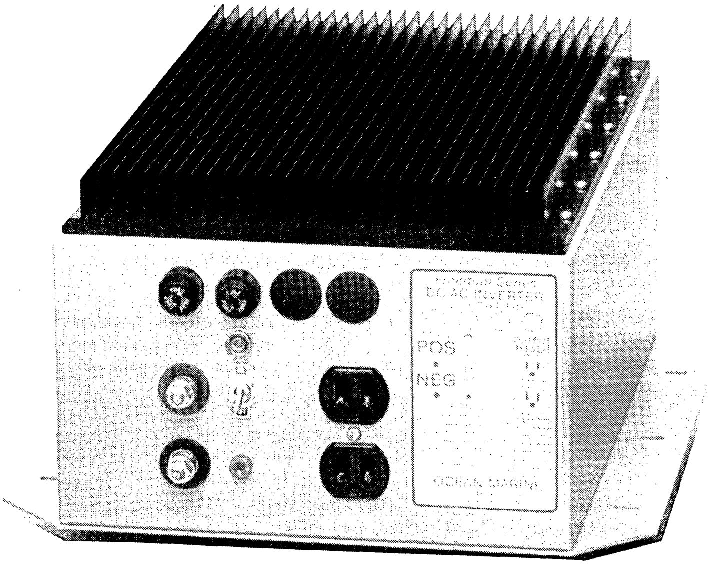
250VA Frequency Changer



20KVA Frequency Changer

DC to AC FREEDOM INVERTERS

50 HZ, 60 HZ or 400 HZ Output, 500 to 5000 Watts



High efficiency, excellent voltage and frequency regulation, plus four step approximated sinewave output make these solid state inverters ideal for most electronic, instrument, appliance, motor and lighting loads.

SPECIFICATIONS: INPUT POWER

DC Voltage: 12, 24, 28, 32 and 48 Vdc

DC Current: Operating—Proportional to load. Standby—Approximately 3-4% of max. input. Optional Standby—0.1 Amp with Load Demand turn-on option.

Input Connection: Isolated positive and negative 1/4" brass studs.

Input Protection: Type 3AG fused input.

OUTPUT POWER

AC Voltage: Choice of 110 Vac, 220 Vac or 110/220 Vac.

Output Connection: Isolated Duplex Outlet 110 Vac, 220 Vac or 110/220 Vac type.

Voltage Regulation: ±2% no load to full load, and over specified input battery voltage range.

Frequency Regulation: Crystal controlled to ±0.1%.

Waveform: Step approximated sinewave, four steps.

Overload Protection: Automatic current limiting protects against shorts and overloads.

Overtemperature Cutout: Internal thermal shutoff at 140°F.

Undervoltage Cutout: Shuts unit off if input battery voltage falls below 70% of nominal.

Output On/Off Control: On/Off toggle switch with pilot light. "Remote" jack for On/Off using +12 Vdc battery voltage thru remote contact or switch.

INPUT POWER FROM:

- Battery
- DC generator
- Solar panels

REGULATED AC OUTPUT FOR:

- 60 Hz portable power
- 50 Hz foreign power/test
- 400 Hz military power/test

MODEL NO.	INPUT Vdc	MAXIMUM INPUT Idc AMP	OUTPUT Vac	OUTPUT Hz FREQ.	RATED OUTPUT WATTS	PEAK OUTPUT WATTS	WT. LBS.
512	12	60	115, 230 & 115/230	50, 60 & 400	500	750	35
812	12	80			800	1200	38
1212	12	120			1200	1800	50
1224	24	60			1200	1800	50
2024	24	100			2000	3000	62
2032	32	80			2000	3000	62
2424	24	120			2400	3600	81
4848	48	120			4800	7200	112

MISCELLANEOUS

Efficiency: 80-90% depending on load.

Mounting: Any position, vertical preferred for convection cooling.

Size/Weight: 10"x14"x7.5", 35 to 62 lbs. for 500 to 2000 Watts. 9"x13"x39", 81 lbs./2400 Watts, 112 lbs./4800 Watts.

OCEAN MARINE INSTRUMENTS

629 TERMINAL WAY #15, COSTA MESA, CA 92627 • 714/548-9569

enclosures · capacitors · circuit boards · coils,
chokes, inductors · connectors, electronic · sockets/
terminals · crystals · oscillators · crystal filters
delay lines · panel hardware · displays · lamps/
lights · cooling equipment · filters · generators ·
multimeters · panel meters · oscilloscopes · gra
phic recorde nections · microwave
components tors/
drives · batteries · power supplies, dc · power
supplies, ac · relays ·
solenoids · resistors · potentiometers/trimmers
controls/rheostats · discrete semiconductors ·
switches · keyboards/keypads · transducers/en

EEM PRODUCT SELECTION GUIDES

Use the EEM Product Selection Guides. There are 34 Guides in this edition of EEM. See page 2 (A•2, B•2, C•2, D•2) of each volume to locate the Product Selection Guides that pertain to your needs.

coders · transformers · wire & cable · enclosures
capacitors · circuit boards · coils, chokes, induc
tors · connectors, electronic · sockets/terminals

Quality Solid-State Linear AC POWER

PACIFIC
POWER SOURCE CORP.

300KVA to 250VA

AC POWER CONVERSION

Pacific's power conversion equipment is specifically recommended as an AC power converter for generation of 50, 60, and 400 Hz power. The converted power is extremely pure, very highly regulated and virtually immune to load induced cross-talk. Typical applications are generation of U.S. and Non-U.S. power forms for facilities power. This equipment is designed for long term unattended use. It is highly reliable and easy to maintain through module exchange by relatively untrained personnel.

LINE CONDITIONER/NOISE ELIMINATOR/UPS

Pacific's AC Power Sources are also used as line conditioners due to their excellent noise rejection properties. While most line conditioners can only reject a small amount of line disturbances, you can expect to eliminate virtually all line disturbances effecting the most sensitive loads. These systems provide clean, highly regulated power, free of load induced transients because they are designed to respond to any step load change in 50 microseconds, usually less.

Adding an UPS support cabinet to the AC power source ensures that your most critical load will be immune to all power line disturbances, including complete loss of line for extended periods.

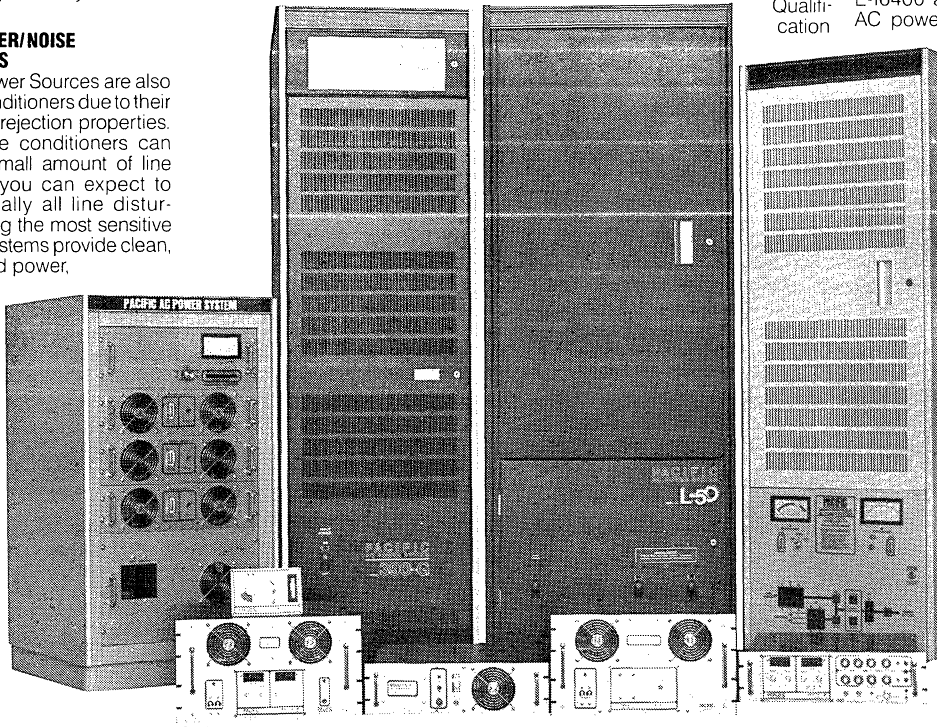
TEST POWER/PRODUCTION BURN-IN

Applications requiring multi-functional AC power at both fixed and variable frequency are ideal for this family of power equipment. Pacific's equipment is designed for use as a broad band linear AC power source; applications requiring highly reliable operation over virtually all power frequencies (and even below 47 Hz and above 500 Hz) are standard on most of Pacific's equipment.

Production testing and burn-in of equipment for shipment abroad is a common application for AC power systems from Pacific. Qualification testing of electronic equipment demands an AC power source with quality and reliability. Quality Solid-State Linear AC Power is standard with *all* Pacific AC power equipment.

PROGRAM POWER & TRANSIENT SIMULATION

When used in conjunction with the MODEL 8037 Transient Generator, Pacific's systems serve as an excellent device for simulation of envelop power transients in accordance with MIL-STD-704, MIL-STD-1399 or MIL-E-16400 and similar standards for AC power equipment. The equipment is usable with any external wave - form generator to produce power with simulated harmonic distortion.



GENERAL PERFORMANCE SPECIFICATIONS

- Power Forms: Virtually all input and output AC power forms are available on most systems.
- Load Power Factor: No load power factor restrictions, leading or lagging.
- Regulation: Line (0.1% max. for 10% change), Load (0.25% at the sense point).
- Load Transient Response: 50 μs max. (Typ. 30μs).
- Output Distortion: 0.75% THD (Typ. 0.5%).
- Output Isolation: Fully isolated from input and frame ground.
- Output Protection: Integral electronic current limiting with auto-recovery.
- 1Ø/3Ø Operation: Some models are user selectable by key locking switch.
- Failure Isolation System: Failed devices are auto-disconnected without output voltage waveform disturbances.
- System Efficiency: 85% Large Systems, 60%-71% Small Systems.
- Parallelable: Systems are parallelable and serve as building blocks for high power level systems; most are user parallelable by your electrical personnel.

FOR MODEL SELECTIONS, TURN TO THE NEXT 4 PAGES ▶▶▶

800-854-2433
In CA, Call 800-472-8465; Corporate Office: 714-898-2691
Ask for an Applications Engineer or your Local Rep. Office
PACIFIC POWER SOURCE CORP.; 15122 Bolsa Chica St.; Huntington Beach. CA 92649

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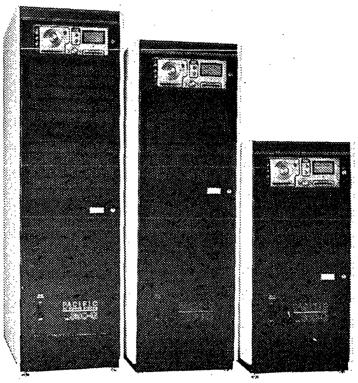
G-SERIES
Multi-Function AC Power Sources 6-90 KVA



Model 390-G Model 360-G Model 330-G

APPLICATIONS

- **AC Frequency Changer**
- **Facility Power**
- **Program Power & Transient Simulation**
- **Line Conditioner / Noise Eliminator / UPS**
- **Variable Frequency Test Source**

CONTROL CHARACTERISTICS:
"**H**" Type Systems — Fixed frequency 1ø or 3ø switch selectable operation. Output frequency — specified by the user within the range of 47-1000 Hz. Accuracy ±0.1% ±0.5 Hz. Stability ±0.1%

"**C**" Type Systems — Variable frequency 1ø or 3ø switch convertible operation.

1 continuous variable range of 47-500 Hz. dial accuracy ±1% stability 0.25%. 3 pushbutton selection preset frequencies of 50, 60, 400 Hz. Accuracy ±0.1% ±0.5 Hz. Stability ±0.1%. NOTE: Pushbutton switches are equipped with a lockout feature to prevent accidental changes. External input — one per phase, fully isolated. Allows system to operate as 3 independent amplifiers (3 phase mode).

Standard Models are complete systems ready for use, including cabinets, oscillators, input circuit breakers and output contactors

MODEL	OUTPUT POWER (KVA)	1 PHASE OUTPUT			3 PHASE OUTPUT			CABINETS	
		VOLTS (RMS)	AMPS (RMS)	AMPS (PEAK)	VOLTS (RMS)	AMPS/LEG (RMS)	AMPS/LEG (PEAK)		
330-G ☐ ☐	6	120	48	144	120/208 WYE or 208 DELTA	16	48	1 ea. 330-G	FIXED AND/OR VARIABLE FREQUENCY 1 PHASE/ 3 PHASE USER SWITCH CONVERTIBLE MODELS
360-G ☐ ☐	12	120	96	288	120/208 WYE or 208 DELTA	32	96	1 ea. 360-G	
390-G ☐ ☐	18	120	144	432	120/208 WYE or 208 DELTA	48	144	1 ea. 390-G	
3120-G ☐ ☐	24	120	192	576	120/208 WYE or 208 DELTA	64	192	2 ea. 360-G	
3150-G ☐ ☐	30	120	240	720	120/208 WYE or 208 DELTA	80	240	2 ea. 390-G	
3180-G ☐ ☐	36	120	288	864	120/208 WYE or 208 DELTA	96	288	2 ea. 390-G	
3210-G ☐ ☐	42	120	336	1008	120/208 WYE or 208 DELTA	112	336	3 ea. 390-G	
3240-G ☐ ☐	48	120	384	1152	120/208 WYE or 208 DELTA	128	384	3 ea. 390-G	
3270-G ☐ ☐	54	120	432	1296	120/208 WYE or 208 DELTA	144	432	3 ea. 390-G	
3360-G ☐ ☐	72	—	—	—	120/208 WYE or 208 DELTA	176	528	4 ea. 390-G	
3450-G ☐ ☐	90	—	—	—	120/208 WYE or 208 DELTA	208	624	5 ea. 390-G	

→SECONDARY OUTPUT TRANSFORMER: Indicate "**T**" for 0-250 (L-N) or leave blank for 0-125V (L-N).

→CONTROL CHARACTERISTICS: Indicate either "**H**" or "**C**"

UG-SERIES UPS OPERATION: Each cabinet has provisions for UPS operation. Only adapters, external batteries and battery charger are required. Ask for form "**U**" input.

FEATURES

- **Parallelable** by user for up to 90 KVA output
- **Easy Installation** locate anywhere, just connect input service
- **Fast Response** 50 µs to full step load changes
- **No Load P.F. Restrictions** output will drive any P.F. leading or lagging full power to ±0.7 P.F. loads
- **High Peak Current** up to 300%
- **Fail Safe Circuits** patented auto-disconnect & current limiting with auto-recovery
- **Use & Service Training** by factory specialists
- **Field Proven** linear technology in wide spread use for over 10 years
- **1ø / 3ø Switch Selectable Output** by user and key lockable
- **Tamper Proof Doors** with front filtered air intake
- **Front Access** for convenient maintenance & module exchange

Ordering Information for G-Series & UG-Series

1. Select the basic model from the chart above. Consider your your control needs ("**H**" models for precision fixed frequency operation — "**C**" models for variable frequency; and both allow selectable 1ø - 3ø control). If "**H**" model is chosen, specify ouytput frequency.
2. Specify input service to the unit, e.g. Volts line to neutral for 3ø WYE, Volts line to line for 3ø DELTA, and frequency.
3. If secondary output is desired, add Suffix "**T**" to model number, and specify secondary output voltage form.

PACIFIC
POWER SOURCE CORP.

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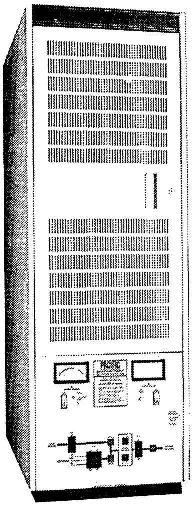
POWER SOURCE CORP.



MODEL 140-UG
DIMENSIONS: 71"H x 23"W
34.5"D
WEIGHT: 900 lbs.

140-UG SERIES

Complete Single Cabinet Self Contained UPS 2-6 KVA

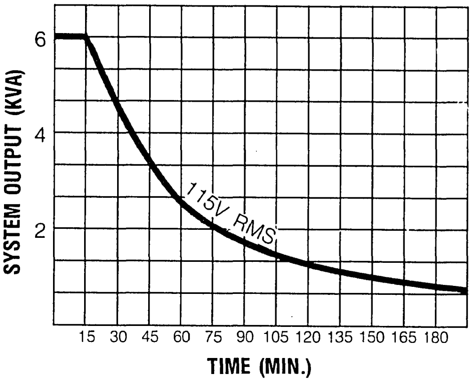
The 140-UG series is a self contained single cabinet UPS for low power (2-6 KVA) single phase applications. These units are especially designed for the most sensitive computer and EDP loads. Output frequency is fixed at user specified value 50-400 Hz.

METERS & INDICATORS

- OUTPUT BATTERY VOLTAGE
- OUTPUT AC VOLTAGE
- BATTERY CHARGER CURRENT
- OUTPUT CURRENT
- INPUT POWER "ON" LAMP
- OUTPUT POWER "ON" LAMP
- BATTERY DISCHARGE LAMP
- UPS OPERATION LAMP
- OVERLOAD LAMP

BATTERY OPERATION TIME

38 A.H. Maintenance Free, Rechargeable 12VDC Gell Cell Battery

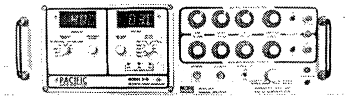


Transient Generator Model 8037

A most useful extension to any PACIFIC AC power source is the Model 8037 transient signal generator. The Model 8037 variable frequency, transient generator is capable of simultaneously simulating both AC line voltage and frequency transient excursions. These excursions are capable of simulating the various transient envelopes of MIL-STD-1399, MIL-E-16400 and MIL-STD-704A.

FEATURES

- Precision digital sine wave formation, single or three phase
- Separate time base controls for voltage and frequency excursions
- Plus or minus transients capability
- 20Hz to 2KHz frequency range - full range manual adjustments of transient magnitude, rise time, duration, fall time, and execution
- Precision monitor output for external charting of transients
- Analog programmable frequency and/or voltage excursions



MODEL 8037
DIMENSIONS: 5¼" H x 19" W x 17"D
Rack Mountable

L-Series

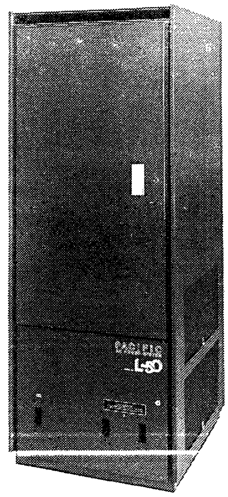
Solid State AC Power Systems 25-250 KVA

PACIFIC'S "L" SERIES equipment is the latest generation of solid state AC power converters. It is superior to motor-generator sets, and other types of solid state units because of its great versatility, economy and reliability. The basic "L" series unit is the 3240-L.

As a frequency changer the user is assured that the output is always precisely regulated in frequency, voltage and waveform purity, regardless of variations in input power or load currents.

As a line transient eliminator, the "L" Series equipment is much superior to isolation transformers, since it not only eliminates common mode noise, but line spikes of as much as 100% of line voltage of several millisecond duration.

Multiple cabinets can be paralleled for higher capacity. Standard units can be combined up to 5 cabinets for 250 KVA capacity. Higher capacity systems can be assembled, if desired, by the use of special drivers and junction equipment.



MODEL 3240-L
50KVA AC Power Source
DIMENSIONS: 78"H x 27"W x 30"D
WEIGHT: 1600

STANDARD MODELS

Each of the following listed models are complete systems ready for use.

3-PHASE WYE SYSTEMS

OUTPUT RATINGS					
	POWER	VOLTS	CURRENT PER LEG		NO. OF
MODEL	(KVA)	RMS	AMPS RMS	AMPS PEAK	CABS.
3120-L	25	120/208Y	64	160	1
3180-L	36	120/208Y	96	240	1
3240-L	50	120/208Y	128	320	1
3360-L	75	120/208Y	192	480	2
3480-L	100	120/208Y	256	640	2
3720-L	150	120/208Y	384	960	3
3960-L	200	120/208Y	512	1280	4
31200-L	250	120/208Y	640	1600	5

SINGLE PHASE SYSTEMS

OUTPUT RATINGS					
	POWER	VOLTS	CURRENT PER LEG		NO. OF
MODEL	(KVA)	RMS	AMPS RMS	AMPS PEAK	CABS.
1120-L	25	120	192	480	1
1180-L	36	120	288	720	1
1240-L	50	120	384	960	1
1360-L	75	120	576	1440	2
1480-L	100	120	768	1920	2
1720-L	150	120	1152	2880	3
1960-L	200	120	1536	3840	4
11200-L	250	120	1920	4800	5

800-854-2433

In CA, Call 800-472-8465; Corporate Office: 714-898-2691
Ask for an Applications Engineer or your Local Rep. Office
PACIFIC POWER SOURCE CORP.; 15122 Bolsa Chica St.; Huntington Beach, CA 92649

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K-SERIES
Bench Top Rack Mount Multi-Function AC Power Sources 250 VA-4.5KVA

STANDARD MODELS

Model	Output Power	Output Current (Amps RMS)	Voltage (Volts RMS)	Case	Weight (lbs)
		SINGLE PHASE MODELS			
103K-☐ R	250VA	2	0-125	A	30
103K-☐ T	250VA	2/1	0-125/0-250	A	35
105K-☐ R	500VA	4	0-125	A	40
105K-☐ T	500VA	4/2	0-125/0-250	A	48
108K-☐ R	750VA	6	0-125	A	54
108K-☐ T	750VA	6/3	0-125/0-250	A	65
110K-☐ R	1KVA	8	0-125	B	80
110K-☐ T	1KVA	8/4	0-125/0-250	B	95
112K-☐ R	1.25KVA	10	0-125	B	92
112K-☐ T	1.25KVA	10/5	0-125/0-250	B	107
115K-☐ R	1.5KVA	12	0-125	B	105
115K-☐ T	1.5KVA	12/6	0-125/0-250	B	125
		THREE PHASE DELTA MODELS			
205K-☐ R	430VA	2	0-125	A	40
210K-☐ R	860VA	4	0-125	B	80
210K-☐ T	860VA	4/2	0-125/0-250	B	95
215K-☐ R	1.3KVA	6	0-125	B	105
215K-☐ T	1.3KVA	6/3	0-125/0-250	B	125
220K-☐ R	1.7KVA	8	0-125	B (2)	160
220K-☐ T	1.7KVA	8/4	0-125/0-250	B (2)	190
225K-☐ R	2.2KVA	10	0-125	B (2)	184
225K-☐ T	2.2KVA	10/5	0-125/0-250	B (2)	214
230K-☐ R	2.6KVA	12	0-125	B (2)	210
230K-☐ T	2.6KVA	12/6	0-125/0-250	B (2)	250
		THREE PHASE WYE MODELS			
305K-☐ R	500VA	2	0-125	A	44
308K-☐ R	750VA	2	0-125	A	55
315K-☐ R	1.5KVA	4	0-125	B	115
323K-☐ R	2.25KVA	6	0-125	A (3)	165
323K-☐ T	2.25KVA	6/3	0-125/0-250	A (3)	195
330K-☐ R	3KVA	8	0-125	B (3)	240
330K-☐ T	3KVA	8/4	0-125/0-250	B (3)	285
338K-☐ R	3.75KVA	10	0-125	B (3)	325
338K-☐ T	3.75KVA	10/5	0-125/0-250	B (3)	325
345K-☐ R	4.5KVA	12	0-125	B (3)	315
345K-☐ T	4.5KVA	12/6	0-125/0-250	B (3)	375

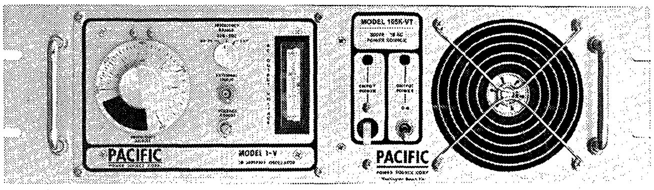
↳ Fill in box with OSCILLATOR type desired: V,F,D, or X

↳ CASE DIMENSIONS:
Case Size A — 5¼"H x 19"W x 19"D
Case Size B — 10½"H x 19"W x 19"D

The "K" series family — covers the power range 250 to 4500 VA single and three phase, in light-weight one-man-portable units. A variety of plug-in signal generators are available for adaptation to either laboratory variable, or fixed parameter OEM application.

FEATURES:
- Lightweight one-man-portable systems
- 1ø or 3ø capability
- Precision AC Power
- Direct coupled output

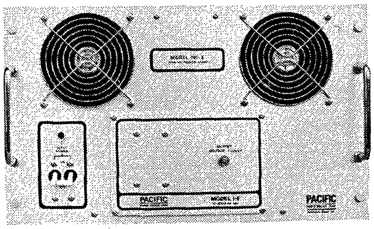
APPLICATIONS:
- Variable frequency test source
- O.E.M.
- Motor control
- Local AC source



Model 105K-VT
SIZE: 10.5"H x 19"W x 19"D

PLUG-IN OSCILLATORS
See Next Page ▶▶▶

E-SERIES Standalone or Parallelable 1ø or 3ø AC Power Source 1-9KVA



Model 110-E
DIMENSIONS: 10.5"H x 19"W x 19"D
WEIGHT: 80 lbs

Models 110E- ∇ R
110E- ∇ T

↳ Fill in triangle with K-SERIES type OSCILLATOR or "E" type standard fixed frequency plug-in: V, F, D, X, or E.

FEATURES:
- Parallelable for up to 3KVA 1ø or 3ø
- Variable output voltage
  110E- ∇ R = 0-125 VAC
  110E- ∇ T = 0-125/0-250VAC
- High surge and peak current capability
- Bench top or rack mountable
- Overload protected
- Precision sine wave output
- External input (optional)
- Operates from normal 115VAC wall outlet
- Output is full isolated and either leg may be grounded
- Lightweight/Portable

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OSCILLATOR SELECTION for K and E SERIES

The K and E Series Systems are available with a variety of interchangeable oscillator plug-ins listed below.

Oscillator	Output Form	Frequency Range	Frequency Stability per °C %	Amplitude Stability per °C %	Voltmeter Accuracy	Frequency Accuracy	Frequency Meter (counter) Accuracy
*1-D (Digital)	1 Phase Variable	20-2000 Hz	0.01	0.01	1.0% ±1 digit	Pre-set Fixed ±0.25%	1.0% ±1 digit
*3-D (Digital)	3 Phase Variable	20-2000 Hz	0.01	0.01	1.0% ±1 digit	Pre-set Fixed ±0.25%	1.0% ±1 digit
1-V (Analog)	1 Phase Variable	45-75 Hz 300-500 Hz	0.01	0.003	3%	±1.0% of Dial	not supplied
3-V (Analog)	3 Phase Variable	47-500 Hz	0.01	0.01	3%	±1.0% of Dial	not supplied
1-F (Fixed)	1 Phase Fixed	User Specified 20-2000 Hz	0.01	0.003	3%	User Specified ±0.25%	not supplied
3-F (Fixed)	3 Phase Fixed	User Specified 47-500 Hz	0.01	0.01	3%	User Specified ±0.25%	not supplied
1-E (Low Cost) (E-Series only)	1 Phase Fixed	User Specified 47-500 Hz	0.01	0.1	not supplied	User Specified ±0.25%	not supplied
1-X (External)	Ext. Input 1 Phase	NOTE: The "X" suffix adapter allows any power source to be used as a wideband linear amplifier. Gain = 25 Bandwidth = 20-2000 Hz full power; Input Impedance = 50 ohms					

*The 1-D and 3-D are supplied with pre-set fixed frequencies of 50, 60 and 400 Hz. Two variable ranges of 20-200 and 200-2000 Hz are also provided.

— COMING IN 1985 —

Pacific's New Energy Efficient 1 KVA AC Power Source

High efficiency - small size (21" D x 5¼" H x 19" W)
No power factor restrictions - 50 microsecond response
switch selectable single or three phase output
parallelable up to 3KVA - fixed and variable frequency
crystal controlled digital oscillator
IEEE-488 GPIB BUS option

Call one of our Application Engineers for full details

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COMMONLY USED ELECTRICAL/ELECTRONIC ABBREVIATIONS AND ACRONYMS

A
AC alternating current
A/D analog to digital
ADC analog to digital converter
ADP automatic data processing
AF audio frequency
AFC automatic frequency control
ALGOL algorithmic language
AM amplitude modulation
AND a logical operator
AQL acceptable quality level
ASCII American national standard code for information interchange
AWG American wire gauge

B
BALUN balanced to unbalanced
BASIC beginners' all-purpose symbolic instruction
BCD binary-coded decimal
BNC baby "N" connector
BUS basic utility system

C
CAD computer aided design
CAM computer aided manufacture
CATV cable television or community antenna television
CERMET ceramic metal element
Comm. communications
CMOS complementary metal-oxide semiconductor
CPS characters per second
CPU central processing unit

D
D/A digital to analog
DAC digital to analog converter
DC direct current
DIAC bidirectional trigger diode
DIL dual in-line
DIN Deutsche Industrie Normenausschuss
DIP dual in-line package
DPM digital panel meter
DTL diode transistor logic

E
EDP electronic data processing
EBCDIC extended binary coded decimal interchange code
EEPROM electrically erasable PROM
EMC electromagnetic compatibility
EMI electromagnetic interference
EMP electromagnetic pulse
EPROM electrically programmable ROM
ESR equivalent series resistance

F
FEP fluorinated ethylene propylene Copolymar, 200° Teflon
FET field-effect transistor
FM frequency modulation
FORTRAN formula translator

G
GaAsFET gallium arsenide field effect transistor
GPIB general purpose interface bus

H
HF high frequency (3 to 30 MHz)
HIPOT test, measurement and diagnostic equipment
HLL high level language
HV high voltage
Hz Hertz

I
IC integrated circuit
IDC insulation displacement contact
IF intermediate frequency
IO input/output (devices)
IR insulation resistance (or) infrared

J
JFET junction field effect transistor
JMOS junction metal oxide semiconductor

K
kHz kilohertz (10^3 hertz)
KSR keyboard send receive

L
LC inductance capacitance
LCD liquid crystal display
LED light-emitting diode
LF low frequency (30 to 300 kHz)
LIF low insertion force
LNA low noise amplifier
LNB low noise band
LSI large scale integration
LVDT linear velocity displacement transformer

M
MASER microwave amplification by stimulated emission of radiation
MATV master antenna television
μF microforad
MHz megahertz
MIPS million instructions per second
MIB microcomputer interface board
MOS metal oxide semiconductor
MOSFET metal oxide semiconductor field effect transistor
MOSIGT metal-oxide semiconductor insulated-gate transistor
MOV metal oxide varistor
MPU microprocessor unit
MSI medium scale integration

N
NBS National Bureau of Standards
NEMP nuclear electromagnetic pulse
NIM nuclear instrumentation module
NOR not OR
NTC negative temperature coefficient

O
OCR optical character reader
OEM original equipment manufacturer
OR a logical operator

P
PC printed circuit
PCB printed circuit board
pF picofarad
PGA pin grid array
PIN positive-intrinsic-negative (transistor)
PLA programmable logic array
PLL phased lock loop
PPI plan position indicator
PROM programmable read only memory
PTC positive temperature coefficient
PUT programmable unijunction transistor

Q
QAM quadrature amplitude modulation
Q (meter) quality-factor meter

R
RAM random access memory
RC resistance-capacitance
RFI radio frequency interference
RMS root mean square
ROM read only memory
RF radio frequency
RFC radio-frequency choke
RFI radio-frequency interference
RTD resistance-temperature detector
RTL resistor transistor logic
RTV room temperature vulcanizing
RW read/write

S
SAS silicon asymmetrical switch
SBC single board (micro) computer
SBS silicon bilateral switch
SCR silicon-controlled rectifier
SCS silicon controlled switch
SDA source & detector assemblies
SIDAC bidirectional voltage-triggered switch
SIP single in-line package
SSI small scale integration
SSR solid state relay
STL Schottky transistor logic
SUS silicon unilateral switch

T
TC temperature coefficient
TCXO temperature compensated crystal oscillator
TFE tetrafluoride ethylene propylene Copolymer, 250° Teflon
TRIAC bidirectional AC switch
TTL transistor-transistor logic
TTY teletypewriter

U
UHF ultra high frequency (300 MHz to 3 GHz)
UJT silicon unijunction transistor
UL Underwriters Laboratory
UPS uninterruptible power supply

V
VAC volts (of) alternating current
VAR volt-ampere reactive
VCR video cassette recorder
VDC volts (of) direct current
VHF very high frequency
VHSIC very high speed integrated circuit
VLF very low frequency (3 to 30 kHz)
VLSI very large scale integration
VME virtual machine environment
VRM voice recognition module
VTVM vacuum tube volt meter
VU volume unit
VSWR voltage standing wave ratio

W
WPS word processing software

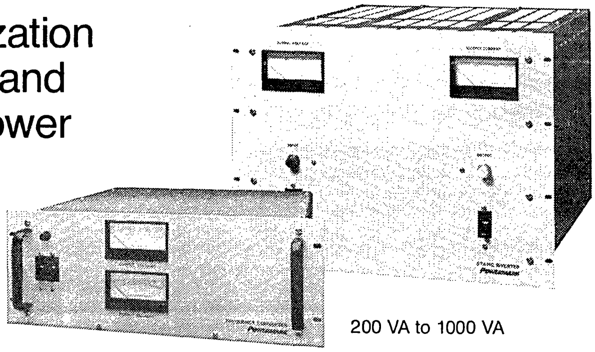
Y
YIG yttrium iron garnet

Z
ZIF zero insertion force

POWERMARK
DIVISION OF TOPAZ
SQUARE D COMPANY

Inverters and Converters

For voltage regulation, frequency stabilization and frequency conversion of AC power; and for efficient, reliable conversion of DC power into sinusoidal AC power.



200 VA to 1000 VA

Inverters

Powermark Series Z Inverters (200 VA to 2 kVA) provide reliable conversion of DC power into highly regulated sinusoidal AC power. They feature ferroresonant transformer simplicity, high reliability, excellent isolation, current limiting capability and very good waveform shaping.

Series X Inverters (2 kVA to 10 kVA) use *pulse-width modulation* technology and harmonic-suppressing transformer filters to provide excellent output regulation.

Frequency Converters

Powermark Series Z Frequency Converters (200 VA to 2 kVA) are used to change available frequency to regulated outputs of 50 Hz, 60 Hz or 400 Hz. They offer the same operational advantages as the Series Z Inverters.

Series X Frequency Converters (2 kVA to 10 kVA) are used to convert available frequency to regulated output voltages of 50 Hz or 60 Hz. These converters offer the same operating features as the Series X Inverters.

Specifications

Input Protection:
High and low voltage reverse polarity protection.

Static Regulation:
Line regulation ±1% maximum for line variations between low line and high line at half load.
Load regulation ±2% maximum for load variations between no load and full load at nominal line.

Frequency Stability:
Series Z, ±0.5% of fixed frequency (±0.01% optional); Series X, ±0.5% of fixed frequency (±0.05% optional).

Output Protection:
Overload and short-circuit protection.

Total Harmonic Distortion:
Less than 5% at full load and nominal line.

Operating Temperature:
Series Z, −10°C to +55°C;
Series X, 0°C to +55°C

External Phase and Frequency Synchronization:
Optional for Series X.

Recovery Time:
50 milliseconds for 20% load change for Series X; 100 milliseconds for 50% load change for Series Z.

Input Frequency Ranges:
Series Z, 45 to 65 Hz
Series X, 48 to 420 Hz

Inverters

Power Rating	Product Series	Input Voltage	Output Frequency	Output Voltage	Size Code	Approx. Weight lb/kg
200 VA	Z	12/24, 28, 48 or 125*	50 Hz	115/230 VAC	A	45/21
400 VA	Z	12/24, 28, 48 or 125*	50 Hz	115/230 VAC	A	70/32
800 VA	Z	12/24, 28, 48 or 125*	50 Hz	115/230 VAC	A	100/46
1,600 VA	Z	12/24 or 28*	50 Hz	115/230 VAC	C	195/89
2,000 VA	X	48 or 125*	50 Hz	115 or 230 VAC*	G	190/87
4,000 VA	X	48 or 125*	50 Hz	115 or 230 VAC*	H	270/123
8,000 VA	X	125 or 250*	50 Hz	115 or 230 VAC*	I	710/323
250 VA	Z	12/24, 28, 48 or 125*	60 Hz	115 VAC	A	45/21
500 VA	Z	12/24, 28, 48 or 125*	60 Hz	115 VAC	A	70/32
1,000 VA	Z	12/24, 28, 48 or 125* (250)	60 Hz	115 or 115/230 VAC*	A(B)	100/46
2,000 VA	Z	12/24 or 28*	60 Hz	115 or 115/230 VAC*	C	195/89
2,500 VA	X	48 or 125*	60 Hz	115 or 230 VAC*	G	190/87
5,000 VA	X	48 or 125*	60 Hz	115 or 230 VAC*	H	270/123
10,000 VA	X	125 or 250*	60 Hz	115 or 230 VAC*	I	710/323
250 VA	Z	12/24 or 28*	400 Hz	115 VAC	A	30/14
500 VA	Z	12/24 or 28*	400 Hz	115 VAC	A	45/21
1,000 VA	Z	12/24 or 28*	400 Hz	115 VAC	A	55/25
2,000 VA	Z	12/24 or 28*	400 Hz	115 VAC	C	110/50

*Specify with order

Sizes

Size Code	Height in./cm	Width in./cm	Depth in./cm
A	7/18	19/48	13/33
B	7/18	19/48	18.5/47
C	14/36	19/48	13/33
D	14/36	19/48	18.5/47

Size Code	Height in./cm	Width in./cm	Depth in./cm
E	21/54	19/48	13/33
G	14/36	19/48	21/53
H	21/53	19/48	21/53
I	62/157	23.3/59	31/79

Frequency Converters

Power Rating	Product Series	Input Voltage	Output Frequency	Output Voltage	Size Code	Approx. Weight lb/kg
200 VA	Z	115	50 Hz	115/230 VAC	A	50/23
200 VA	Z	230	50 Hz	115/230 VAC	A	65/30
400 VA	Z	115	50 Hz	115/230 VAC	B	80/37
400 VA	Z	230	50 Hz	115/230 VAC	B	90/41
800 VA	Z	115	50 Hz	115/230 VAC	B	115/53
800 VA	Z	230	50 Hz	115/230 VAC	B	140/64
1,600 VA	Z	115	50 Hz	115/230 VAC	D	225/103
1,600 VA	Z	230	50 Hz	115/230 VAC	D	275/125
2,000 VA	X	115, 208, 230 or 240*†	50 Hz	115 or 230 VAC*	G	245/112
4,000 VA	X	208, 230 or 240*†	50 Hz	115 or 230 VAC*	H	330/150
8,000 VA	X	115, 208, 230 or 240*†	50 Hz	115 or 230 VAC*	I	860/391
250 VA	Z	115	60 Hz	115 VAC	A	50/23
250 VA	Z	230	60 Hz	115 VAC	A	65/30
500 VA	Z	115	60 Hz	115 VAC	B	80/37
500 VA	Z	230	60 Hz	115 VAC	B	90/40
1,000 VA	Z	115	60 Hz	115 or 115/230 VAC*	B	115/53
1,000 VA	Z	230	60 Hz	115 or 115/230 VAC*	B	140/64
2,000 VA	Z	115	60 Hz	115 or 115/230 VAC*	D	225/103
2,000 VA	Z	230	60 Hz	115 or 115/230 VAC*	D	275/125
2,500 VA	X	115, 208, 230 or 240*†	60 Hz	115 or 230 VAC*	G	245/112
5,000 VA	X	208, 230 or 240*†	60 Hz	115 or 230 VAC*	H	330/150
10,000 VA	X	115, 208, 230 or 240*†	60 Hz	115 or 230 VAC*	I	860/391
250 VA	Z	115	400 Hz	115 VAC	A	35/16
250 VA	Z	230	400 Hz	115 VAC	A	50/23
500 VA	Z	115	400 Hz	115 VAC	B	55/25
500 VA	Z	230	400 Hz	115 VAC	B	70/32
1,000 VA	Z	115	400 Hz	115 VAC	B	70/32
1,000 VA	Z	230	400 Hz	115 VAC	B	95/44
2,000 VA	Z	115	400 Hz	115 VAC	D	140/64
2,000 VA	Z	230	400 Hz	115 VAC	D	190/87

*Specify with order
†All three-phase inputs are 208Y/120 VAC or 240 coils VAC

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Z-LINE™ power controllers

GENERAL SPECIFICATIONS COMMON TO ALL Z-LINE POWER CONTROLLERS

SPIKE, NOISE, AND SURGE PROTECTION

TRANSIENT VOLTAGE SPIKE PROTECTION
Multi stage voltage clamping devices have been incorporated for maximum transient protection. 150 V A.C. RMS clamping. Transient peak current, 6500 A (8×20 ms). Transient energy to 80 joules.

SAFETY PROTECTION
UL recognized components.

OVERLOAD CIRCUIT BREAKER PROTECTION
Precision electromagnetic breaker provides manual switching and opens automatically under overload conditions.

RUGGED, 16 GA. STEEL CONSTRUCTION
Zinc Plated with black silkscreening.

EMI/RFI FILTER

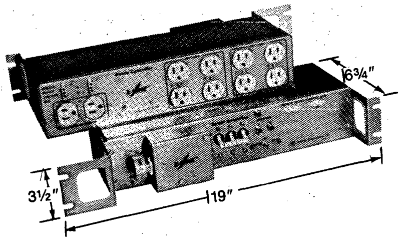
TYPICAL INSERTION LOSS				
.15 M Hz	.20 M Hz	.50 M Hz	10 M Hz	20 M Hz
15dB	20dB	30dB	55dB	55dB

EMERGENCY SHUTDOWN PROTECTION
Allows easy interfacing with your mechanical, electronic or thermo-switching devices thru the 2 remote power control bus connectors.

DEC is a trademark of Digital Equipment Corporation

PC 874

POWER CONTROLLER AND LINE CONDITIONER DEC® COMPATIBLE



EMI/RFI TRIPLE NOISE 30 Amp, PROTECTION
Both common mode and differential mode, plus high frequency ground isolation.

PILOT LIGHTS
Power to controller
Power to switched 1 outlets
Power to switched 2 outlets

TIME DELAY, POWER UP PROTECTION
Time delay, approximately 4 seconds between switched outlets 1 and switched outlets 2, provides sequential power up through the 8 switched outlets (optional).

REMOTE POWER CONTROL BUS
4 bussed remote I/O connectors allows for multiple interfacing with your mechanical, electronic or thermo-switching protective controls for emergency shutdown.

RACK MOUNTED
Designed to fit standard 19″ wide IEC STD. Rack. Maximum height only 3½″.

10 OUTLETS
8 outlets switched 2 outlets unswitched always "on" for convenient AC power requirements.

POWER CABLE, HEAVY DUTY PROTECTION
15 ft. long.

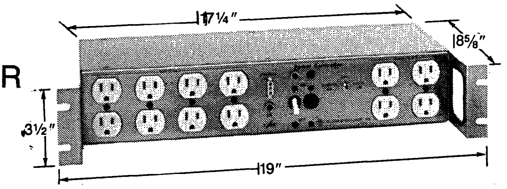
UNIQUE UNIVERSAL MOUNTING
Flush or recessed 1¾″. Control panel on front or back. Receptables on front or back. Cable access on right or left. All of these options are yours without special hardware or custom design cost. You just assemble the mounting brackets to fit your specifications.

PC 115

POWER CONTROLLER AND LINE CONDITIONER

EMI/RFI FILTER
20 Amp, Dual Protection:
Common mode, line to ground.
Differential mode, line to line.

ON/OFF SWITCH PROTECTION
Local and remote control options



PILOT LIGHTS
Power to controller switched circuits on.

12 OUTLETS
8 outlets switched
4 outlets, unswitched, always "on" for added convenience

POWER CORD
Heavy duty, 9 ft. long.

RACK MOUNTED
Designed to fit standard 19″ wide IEC STD. Rack, maximum height only 3½″, depth 8⅝″. Front panel recessed 2½″, with convenient side cut outs for cable routing.

MODEL NUMBER	PC 874				PC 115		PC 125			
	PC 874 A*	PC 874 B*	PC 874 D***	PC 874 E	PC 115 A	PC 115 B	PC 125 A	PC 125 B	PC 125 D	PC 125 E
A.C. VOLTAGE INPUT	90/135	180/270	90/135	180/270	90/132	180/270	90/135	180/270	90/135	180/270
HERTZ	47-63	47-63	47-63	47-63	47-63	47-63	47-63	47-63	47-63	47-63
POLE/WIRE	3/2-G	3/2-G	3/2-G	3/2-G	3/2-G	3/2-G	3/2-G	3/2-G	3/2-G	3/2-G
CURRENT	12 AMP	12 AMP	24 AMP	24 AMP	12 AMP	12 AMP	12 AMP	12 AMP	24 AMP	24 AMP
FULL LOAD	1440 VA	2880 VA	2880 VA	5760 VA	1440 VA	2880 VA	1440 VA	2880 VA	2880 VA	5760 VA
CIRCUIT BREAKER	DUAL 20	DUAL 20	20/20/30	20/20/30	20 AMP	20 AMP	20 AMP	20 AMP	30 AMP	30 AMP
FILTER EMI & RFI	20 AMP	20 AMP	30 AMP	30 AMP	20 AMP	20 AMP	20 AMP	20 AMP	30 AMP	30 AMP
OPERATING TEMPERATURE	0 to 60° C	0 to 60° C	0 to 60° C	0 to 60° C	0 to 60° C	0 to 60° C	0 to 60° C	0 to 60° C	0 to 60° C	0 to 60° C
STORAGE TEMPERATURE	−40 to +70° C	−40 to +70° C	−40 to +70° C	−40 to +70° C	−40 to +71° C	−40 to +71° C	−40 to +70° C	−40 to +70° C	−40 to +70° C	−40 to +70° C
ALTITUDE—MAXIMUM	10,000 ft.	10,000 ft.	10,000 ft.	10,000 ft.	10,000 ft.	10,000 ft.	10,000 ft.	10,000 ft.	10,000 ft.	10,000 ft.
RELATIVE HUMIDITY	95% MAX	95% MAX	95% MAX	95% MAX	95% MAX	95% MAX	95% MAX	95% MAX	95% MAX	95% MAX
WEIGHT	15 lbs.	15 lbs.	18 lbs.	18 lbs.	13 lbs.	13 lbs.	12 lbs.	12 lbs.	16 lbs.	16 lbs.
POWER CABLE	14/3	14/3	12/3	12/3	14/3	14/3	14/3	14/3	10/3	10/3
INPUT CONNECTORS—NEMA	5-15P	**	L5-30P	**	5-15P	**	5-15P	**	L5-30P	**
MATING CONNECTORS—NEMA	5-15R	6-15R	L5-30R	L6-30R	5-15R	6-15R	5-15R	6-15R	L5-30R	L6-30R
OUTLETS—NEMA	5-15R	6-15R	5-20R	6-20R	5-15R	6-15R	5-15R	6-15R	5-20R	6-20R

*Add "TD" after model number for time delay option. ***UL LISTED **Not provided—must be specified by client.

PULIZZI ENGINEERING INC.

3260 S. Susan Street, Santa Ana, CA 92704-6865 (714) 540-4229

Contact factory with your special requirements for a custom design and quote to meet your specific needs. . . .

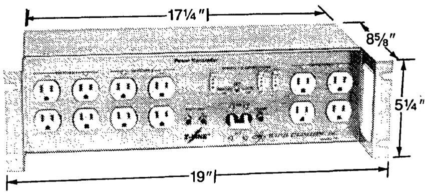
Z-LINE™

PC 230

POWER CONTROLLER & LINE CONDITIONER DEC® COMPATIBLE

EMI/RFI FILTER
30 Amp Dual Protection:
Common mode, line to ground.
Differential mode, line to line.

PILOT LIGHTS
Power to controller
Power to swtiched 1 outlets
Power to switched 2 outlets



TIME DELAY, POWER UP PROTECTION
Time delay, approximately 4 seconds between switched outlets 1 and switched outlets 2, provides sequential power up through the 8 switched outlets.

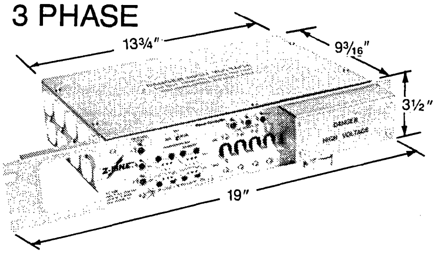
REMOTE POWER CONTROL PROTECTION
3 bussed remote I/O connectors allows for multiple interfacing with your mechanical, electronic or thermo-switching protective controls for emergency shutdown.

RACK MOUNTED
Designed to fit standard 19″ wide IEC STD. Rack, 5¼″ high, 8⅝″ deep, front panel, recessed 2½″, with convenient side cut outs for cable routing.

12 OUTLETS
8 outlets, switched
(time delay, standard)
4 outlets, unswitched, always "on" for convenient AC power requirements.

PC 881

POWER CONTROLLER AND LINE CONDITIONER 3 PHASE



CHASSIS
Only 3.5″ in height, the smallest 19″ rack mount 3-phase power controller and line conditioner currently available on the market.

EMI/RFI FILTER
30 Amp. TRIPLE NOISE PROTECTION. Both common mode and diffential mode, plus high frequency ground isolation.

PILOT LIGHTS
3 lights to indicate "power on" to system. 3 additional lights to indicate "switched power on" to all phases (X, Y, Z)

SEQUENCED POWER REMOTE BUS CONNECTORS
4 filtered connectors provide sequential power up. Also for multiple interfacing with your mechanical, electronic or thermo-switching devices.

10 OUTLETS
Located on the left side panel. 3 switch receptacles alloted per phase as well as one utility outlet.

RACK MOUNTED
Designed to fit standard 19″ rack. Maximum height only 3½″.

TPC 115-8

POWER CONTROLLER AND LINE CONDITIONER INDUSTRY COMPATIBLE THIN LINE

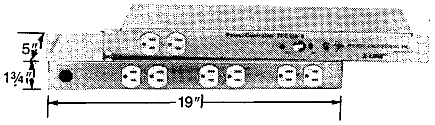
EMI/RFI FILTER
30 Amp Dual Protection:
Common mode, line to ground.
Differential mode, line to line.

POWER CORD
Heavy duty 6 ft. long

PILOT LIGHT
Power to Controller switched on.

8 RECEPTACLE OUTLETS
Grounded, NEMA 5-15R, 6 mounted on the rear for easy access to other instruments in the cabinet, additional outlets on the front panel.

RACK MOUNTED
Designed to fit standard 19″ wide IEC STD. Rack only 1¾″ high, 5″ deep.



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MODEL NUMBER	PC 230			PC 881	TPC 115-8		
	PC 230 A	PC 230B	PC 230 C	PC 881 A	TPC 115-8A	TPC 115-8B	TPC 115-8C
A.C. VOLTAGE INPUT	125/250	180/270	90/135	120/208	90/132 VAC	180/270 VAC	90/132 VAC
HERTZ	47-63	47-63	47-63	47-63	47-63	47-63	47-63
POLE/WIRE	4/2-G	3/2-G	3/2-G	3/4-G	3/2-G	3/2-G	3/2-G
CURRENT	24 AMP	12 AMP	24 AMP	24 AMP	12 AMP	12 AMP	24 AMP
FULL LOAD	2880 VA	2880 VA	2880 VA	8640 VA	2880 VA	1440 VA	2880 VA
CIRCUIT BREAKER	DUAL 20 AMP	DUAL 20 AMP	DUAL 20 AMP	4 POLE, 30 AMP	20 AMP	20 AMP	DUAL 20 AMP
FILTER EMI & RFI	30 AMP	30 AMP	30 AMP	30 AMP/3 PHASE	20 AMP	20 AMP	30 AMP
OPERATING TEMPERATURE	0 to 60° C	0 to 60° C	0 to 60° C	+5° to +50° C	0 to 60° C	0 to 60° C	0 to 60° C
STORAGE TEMPERATURE	−40 to +71° C	−40 to +71° C	−40 to +71° C	−40 to +66° C	−40 to +71° C	−40 to +71° C	−40 to +71° C
ALTITUDE—MAXIMUM	10,000 ft.	10,000 ft.	10,000 ft.	30,000 ft.	10,000 ft.	10,000 ft.	10,000 ft.
RELATIVE HUMIDITY	95% MAX	95% MAX	95% MAX	90% MAX	95% MAX	95% MAX	95% MAX
WEIGHT	18 lbs.	18 lbs.	18 lbs.	20 lbs.	7 lbs.	7 lbs.	8 lbs.
POWER CABLE	10/4	10/3	10/3	10/5	14/3	14/3	10/3
INPUT CONNECTORS—NEMA	L14-30P	**	L5-30P	L21-30P	5-15P	**	L5-30P
MATING CONNECTORS—NEMA	L14-30R	L6-20R	L5-30R	L21-30R	5-15R	6-15R	L5-30R
OUTLETS—NEMA	5-15R	5-20R	5-15R	5-15R	5-15R	6-15R	5-15R

**Not provided—must be specified by client.

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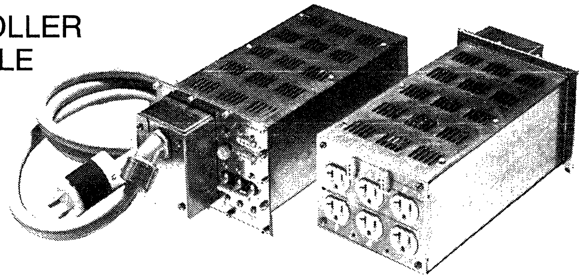
Z-LINE™ power controllers

PC 877

POWER CONTROLLER DEC® COMPATIBLE



POWER PROTECTION
The "Z-LINE™" DEC® Compatible PC 877 is available in both a domestic (Model PC 877D) and a European style (Model PC 877B). Both PC 877 models are single phase controllers with EMI/RFI filtering on the input as well as containing a separate filter for the remote I/O connectors on the front panel. Transient Voltage Spike and Surge Suppression has been incorporated for optimum protection.

For all other features please refer to the general specifications, page 1.

PC 877B and PC 877D are used in shielded cabinets (DEC series H9640) in conjunction with the DEC H9544-SJ bulk head assembly which is equivalent to the Pulizzi Engineering, Inc. Part number PE 9544-SJ.

POWER CONTROL BUS
All models use three pin, female mate-n-lok connectors.
Mating Plug, AMP #1-480305-0
Contact, AMP #60620-1

MECHANICAL
6 9/16 × 11 1/16 × 5 5/16″
Weight—15 lbs. MAX

EMI/RFI FILTER TRIPLE NOISE PROTECTION
Both common mode and differential mode, plus high frequency ground isolation.

REMOTE POWER CONTROL BUS
4 CONNECTORS
2 on the Control Panel - Filtered
2 on the Receptable Panel

UL RECOGNIZED COMPONENTS

RACK MOUNTED
(WITH USE OF PE9544SJ)
Designed to fit standard 19″ wide RETMA rails. Maximum height only 6″

MODEL NUMBER	PC 877 A	PC 877 B	PC 877 D	PC 877 E
A.C. VOLTAGE INPUT	90-132	189-264	90-132	189/264 VAC
HERTZ	47-63	47-63	47-63	47-63
CURRENT	12 AMP	12 AMP	24 AMP	24 AMP
FULL LOAD	1440 VA	2880 VA	2880 VA	5760 VA
OUTLETS—NEMA	5-20R 6 TOTAL (4 SWITCHED/ 2 UNSWITCHED)	6-20R 6 TOTAL (4 SWITCHED 2 UNSWITCHED)	5-20R 6 TOTAL (4 SWITCHED) 2 UNSWITCHED	6-20R
POWER CABLE	12/3	12/3	10/3	12/3
INPUT POWER PLUG—NEMA	5-15P	**	L5-30P	**

**Not provided—must be specified by client.

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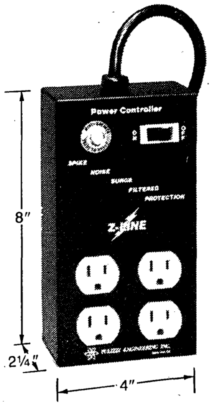
PC 115-4

POWER CONTROLLER



TRANSIENT VOLTAGE SURGE SUPPRESSOR PROTECTS AGAINST:

NOISE
Unwanted electrical signals caused by anything from lightning to:
☐ CB & Ham transmission
☐ Automobile ignition
☐ Electrical storms

SPIKE
Voltage signals that are very brief and very large.
☐ Lightning
☐ ON/OFF action of electrical motors
☐ Utility company load switching

SURGE
Sudden current or voltage changes in a circuit
☐ Utility peak period load switching
☐ Voltage regulation failure
☐ Machinery ON/OFF

POWER PROTECTION
DIFFERENTIAL MODE: LINE TO LINE.
COMMON MODE: LINE TO GROUND AND NEUTRAL TO GROUND.
THE "Z-LINE" LPC 115-4 helps to protect your sensitive equipment from spikes, surges, electromagnetic (EMI) and Radio Frequency (RFI) interference. Please note that all power lines (HOT, NEUTRAL AND GROUND) MUST be protected. If not, you are leaving your equipment wide open for additional problems and damage. "Real" EMI/RFI filter in a surge suppressor will further increase the protection and performance. Only "Z-LINE" can provide the protection, service, and quality you not only need but deserve.

EMI/RFI NOISE PROTECTION
Dual Filter protection:
Common Mode, Line to ground.
Differential Mode, Line to line.

TRANSIENT VOLTAGE SPIKE PROTECTION
Symmetrically bidirectional, Maximum continuous RMS VOLTAGE 150 VAC. Transient peak current 6500AMPS (8×20 μsec.). Transient energy, 80 joules (10/1000 μsec.). Clamping response time less than 50 nanoseconds.

CUSTOM DESIGNED SPECIALS
Hospital Grade, heavy duty, 20 AMP @ 125V., 10 AMP @ 250 V.
Contact factory with your special requirements for a custom design and quote to meet your specific needs...

CIRCUIT BREAKER PROTECTION
15 AMPS, resettable

ON/OFF SWITCH with LIGHT

12 AMPS, 125V AC, 60 HZ,
1500 Watts

6 FOOT, 14/3, POWER CORD
with plug, NEMA 5-15P

UL 62J9 LISTED **TRANSIENT VOLTAGE SURGE SUPPRESSOR—1449**

PULIZZI ENGINEERING INC.
3260 S. Susan Street, Santa Ana, CA 92704-6865 (714) 540-4229
Contact factory with your special requirements for a custom design and quote to meet your specific needs...

AC POWER LINE CONDITIONING EQUIPMENT

RTE DELTEC technology brings you AC Power Line Conditioning products that keep your computer or other critical equipment running smoothly throughout a wide variety of power-line disturbances. Our products will always keep you in power because we keep our design simple. We use the minimum number of conservatively rated parts. The results of this simple logic are MTBFs from 50,000 hours to over 100,000 hours, depending on the product you select to solve your specific power problem.

Uninterruptible Power Systems

Single and Three Phase, 500VA to 45KVA, 50 and 60Hz

RTE DELTEC UPS provide complete protection against blackouts, brownouts, spikes, surges and sags, in short, any disturbance in your power line. From our tiny, silent 500VA MICRO-UPS to our 45KVA UL Listed Series 6000 with Digital Information System, we have the right UPS for your specific needs. All standard 60Hz models are available with stock to 3-week delivery; 50Hz models are stock to 6 weeks.

Super Isolation Transformers

Single and Three Phase, 250VA to 15KVA, 50/60Hz

RTE DELTEC's Super Isolation Transformers (SITs) provide a low-cost solution to the most common power-line problem, noise. Surveys of power quality indicate up to 88% of the disturbances are noise. RTE DELTEC's SITs eliminate common-mode noise and greatly reduce transverse-mode noise. All standard models are in stock, and come with a 5-Year warranty.

AC Line Conditioners

Single and Three Phase, 150VA to 60KVA, 50 and 60Hz

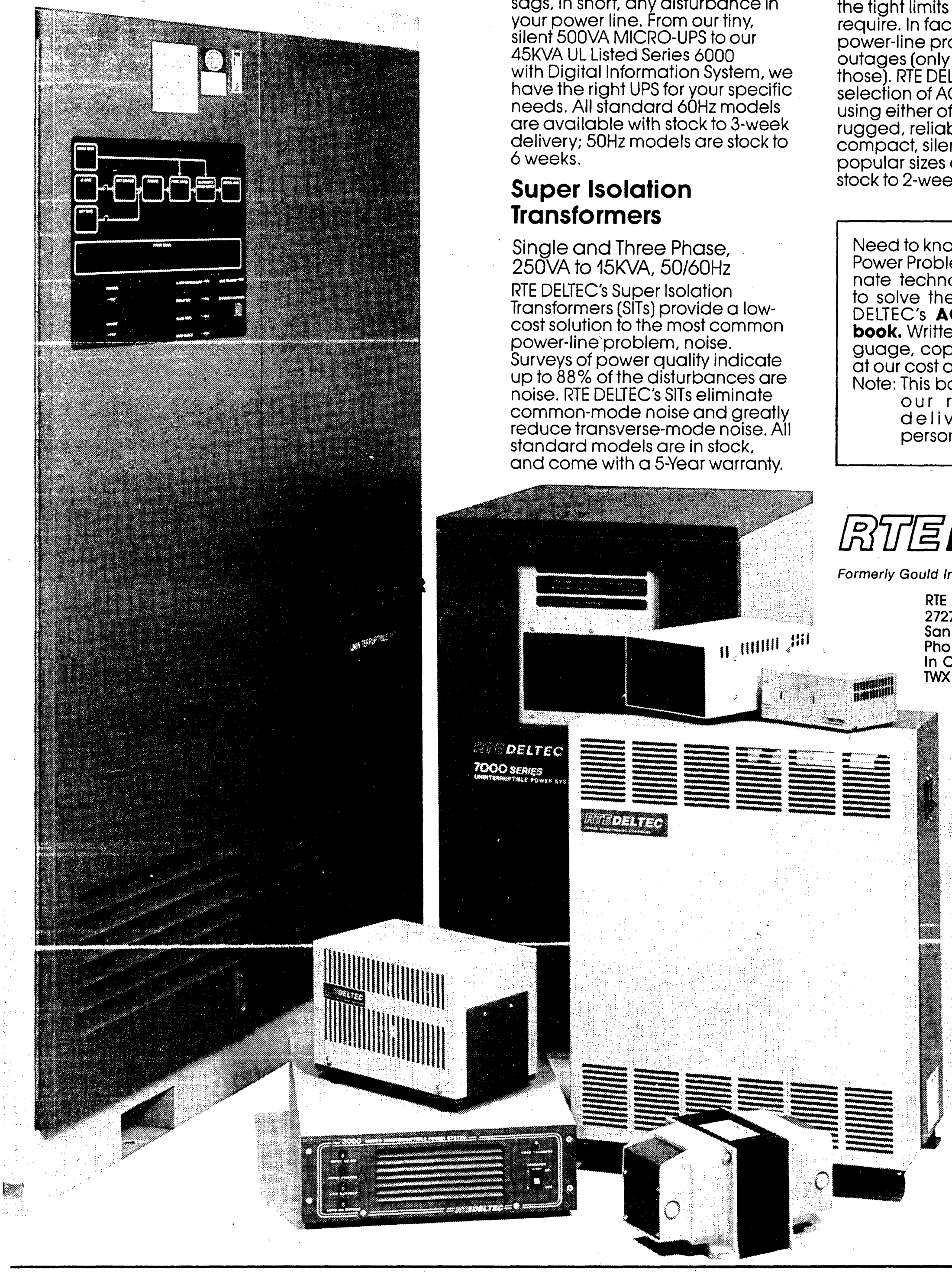
RTE DELTEC AC Line Conditioners eliminate power line noise and regulate AC line voltage to within the tight limits modern computers require. In fact, they solve all power-line problems except outages (only an UPS will handle those). RTE DELTEC has a complete selection of AC Line Conditioners using either of two technologies: rugged, reliable Ferroresonant, or compact, silent Electronic. All popular sizes are available with stock to 2-week delivery.

Need to know more about AC Power Problems and the alternate technologies available to solve them? Send for RTE DELTEC's **AC Power Handbook.** Written in layman's language, copies are available at our cost of $4.00 each.
Note: This book is yours FREE if our representative delivers it to you personally.

RTE DELTEC

Formerly Gould Inc., Power Conversion Division

RTE DELTEC CORPORATION
2727 Kurtz Street
San Diego, CA 92110 U.S.A.
Phone (800) 854-2658.
In California (619) 291-4211.
TWX (910) 335-1241.

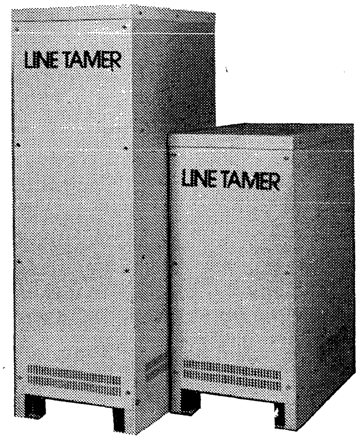


LINE TAMER I.M. Power Conditioners

Z-Phase Line Tamers™

The Z-Phase Line Tamer™ is the first and only non-oscillating three-phase, three-wire ferroresonant transformer, bringing the low cost and high performance of Line Tamers™ to larger applications where oscillation between the three phases and unbalanced line-to-line voltage causes typical ferroresonant power conditioners to operate improperly.

This Z-Phase Line Tamer™ automatically balances unbalanced loads by sharing the load among all three phases instead of only two, as in the typical three-phase design. It also permits the mixing of single-phase and three-phase loads.



Three-Phase

KVA	CATALOG NUMBER	VOLTAGE INPUT +10%, 20%	VOLTAGE OUTPUT ±3%	APPROXIMATE DIMENSIONS SHIPPING WEIGHT	H"	W"	D"
7.5	ZLT-7500-HGO	208	208Y/120	460	40	19	21.75
7.5	ZLT-7500-HEO	208	240Y/138	460	40	19	21.75
7.5	ZLT-7500-HFO	208	480Y/277	460	40	19	21.75
7.5	ZLT-7500-EGO	240	208Y/120	460	40	19	21.75
7.5	ZLT-7500-EEO	240	240Y/138	460	40	19	21.75
7.5	ZLT-7500-EFO	240	480Y/277	460	40	19	21.75
7.5	ZLT-7500-FGO	480	208Y/120	460	40	19	21.75
7.5	ZLT-7500-FEO	480	240Y/138	460	40	19	21.75
7.5	ZLT-7500-FFO	480	480Y/277	460	40	19	21.75
10	ZLT-1001-HGR	208	208Y/120	650	44	21.25	32.25
10	ZLT-1001-HER	208	240Y/138	650	44	21.25	32.25
10	ZLT-1001-HFR	208	480Y/277	650	44	21.25	32.25
10	ZLT-1001-EGR	240	208Y/120	650	44	21.25	32.25
10	ZLT-1001-EER	240	240Y/138	650	44	21.25	32.25
10	ZLT-1001-EFR	240	480Y/277	650	44	21.25	32.25
10	ZLT-1001-FGR	480	208Y/120	650	44	21.25	32.25
10	ZLT-1001-FER	480	240Y/138	650	44	21.25	32.25
10	ZLT-1001-FFR	480	480Y/277	650	44	21.25	32.25
15	ZLT-1501-HGR	208	208Y/120	740	44	21.25	32.25
15	ZLT-1501-HER	208	240Y/138	740	44	21.25	32.25
15	ZLT-1501-HFR	208	480Y/277	740	44	21.25	32.25
15	ZLT-1501-EGR	240	208Y/120	740	44	21.25	32.25
15	ZLT-1501-EER	240	240Y/138	740	44	21.25	32.25
15	ZLT-1501-EFR	240	480Y/277	740	44	21.25	32.25
15	ZLT-1501-FGR	480	208Y/120	740	44	21.25	32.25
15	ZLT-1501-FER	480	240Y/138	740	44	21.25	32.25
15	ZLT-1501-FFR	480	480Y/277	740	44	21.25	32.25
22.5	ZLT-2251-HGP	208	208Y/120	860	64	21.25	32.25
22.5	ZLT-2251-HEP	208	240Y/138	860	64	21.25	32.25
22.5	ZLT-2251-HFP	208	480Y/277	860	64	21.25	32.25
22.5	ZLT-2251-EGP	240	208Y/120	860	64	21.25	32.25
22.5	ZLT-2251-EEP	240	240Y/138	860	64	21.25	32.25
22.5	ZLT-2251-EFP	240	480Y/277	860	64	21.25	32.25
22.5	ZLT-2251-FGP	480	208Y/120	860	64	21.25	32.25
22.5	ZLT-2251-FEP	480	240Y/138	860	64	21.25	32.25
22.5	ZLT-2251-FFP	480	480Y/277	860	64	21.25	32.25
30	ZLT-3001-HGP	208	208Y/120	1225	64	21.25	32.25
30	ZLT-3001-HEP	208	240Y/138	1225	64	21.25	32.25
30	ZLT-3001-HFP	208	480Y/277	1225	64	21.25	32.25
30	ZLT-3001-EGP	240	208Y/120	1225	64	21.25	32.25

Three-Phase

KVA	CATALOG NUMBER	VOLTAGE INPUT +10%, 20%	VOLTAGE OUTPUT ±3%	APPROXIMATE DIMENSIONS SHIPPING WEIGHT	H"	W"	D"
30	ZLT-3001-EEP	240	240Y/138	1225	64	21.25	32.25
30	ZLT-3001-EFP	240	480Y/277	1225	64	21.25	32.25
30	ZLT-3001-FGP	480	208Y/120	1225	64	21.25	32.25
30	ZLT-3001-FEP	480	240Y/138	1225	64	21.25	32.25
30	ZLT-3001-FFP	480	480Y/277	1225	64	21.25	32.25
37.5	ZLT-3751-HGP	208	208Y/120	1360	64	21.25	32.25
37.5	ZLT-3751-HEP	208	240Y/138	1360	64	21.25	32.25
37.5	ZLT-3751-HFP	208	480Y/277	1360	64	21.25	32.25
37.5	ZLT-3751-EGP	240	208Y/120	1360	64	21.25	32.25
37.5	ZLT-3751-EEP	240	240Y/138	1360	64	21.25	32.25
37.5	ZLT-3751-EFP	240	480Y/277	1360	64	21.25	32.25
37.5	ZLT-3751-FGP	480	208Y/120	1360	64	21.25	32.25
37.5	ZLT-3751-FEP	480	240Y/138	1360	64	21.25	32.25
37.5	ZLT-3751-FFP	480	480Y/277	1360	64	21.25	32.25
45	ZLT-4501-HGP	208	208Y/120	1575	64	21.25	32.25
45	ZLT-4501-HEP	208	240Y/138	1575	64	21.25	32.25
45	ZLT-4501-HFP	208	480Y/277	1575	64	21.25	32.25
45	ZLT-4501-EGP	240	208Y/120	1575	64	21.25	32.25
45	ZLT-4501-EEP	240	240Y/138	1575	64	21.25	32.25
45	ZLT-4501-EFP	240	480Y/277	1575	64	21.25	32.25
45	ZLT-4501-FGP	480	208Y/120	1575	64	21.25	32.25
45	ZLT-4501-FEP	480	240Y/138	1575	64	21.25	32.25
45	ZLT-4501-FFP	480	480Y/277	1575	64	21.25	32.25
60	ZLT-6001-HGT	208	208Y/120	1980	78	30	42
60	ZLT-6001-HET	208	240Y/138	1980	78	30	42
60	ZLT-6001-HFT	208	480Y/277	1980	78	30	42
60	ZLT-6001-EGT	240	208Y/120	1980	78	30	42
60	ZLT-6001-EET	240	240Y/138	1980	78	30	42
60	ZLT-6001-EFT	240	480Y/277	1980	78	30	42
60	ZLT-6001-FGT	480	208Y/120	1980	78	30	42
60	ZLT-6001-FET	480	240Y/138	1980	78	30	42
60	ZLT-6001-FFT	480	480Y/277	1980	78	30	42
75	ZLT-7501-HGT	208	208Y/120	2280	78	30	42
75	ZLT-7501-HET	208	240Y/138	2280	78	30	42
75	ZLT-7501-HFT	208	480Y/277	2280	78	30	42
75	ZLT-7501-EGT	240	208Y/120	2280	78	30	42
75	ZLT-7501-EET	240	240Y/138	2280	78	30	42
75	ZLT-7501-EFT	240	480Y/277	2280	78	30	42
75	ZLT-7501-FGT	480	208Y/120	2280	78	30	42
75	ZLT-7501-FET	480	240Y/138	2280	78	30	42
75	ZLT-7501-FFT	480	480Y/277	2280	78	30	42

Z-Phase Line Tamer™ Specifications

VA RATINGS: 7.5 kVA to 75 kVA.

INPUT/OUTPUT: all common three-phase AC voltages.

FREQUENCY: 60 Hz Standard; 50 Hz available.

VOLTAGE REGULATION:

Line-to-Line:

A. ±5% over a regulating range of +10%, −20% with load unbalance up to ±30% of the average of the total load.

B. ±7% over a regulating range of +10%, −20% with load unbalance up to ±75% of the average of the total load.

Average of total load is calculated by dividing total line amps by 3. This figure should then be used as the reference to determine acceptable load unbalances.

Line-to-Neutral:

±3% over a regulating range of +10%, −20%.

ISOLATION: complete isolation from power line. .001pf capacitance between windings.

COMMON MODE NOISE REJECTION: better than 120 dB.

TRANSVERSE MODE NOISE REJECTION: better than 60 dB.

VOLTAGE SPIKE ATTENUATION: 250:1.

HARMONICS: typically 5%.

LINE INTERRUPTIONS: output will be maintained with line interruptions of up to 3 milliseconds.

RESPONSE TIME: instantaneous. Complete within 25 milliseconds (1.5 cycles).

EFFICIENCY: up to 92%.

OPERATING TEMPERATURE: −40°C to +40°C.

SHORT-CIRCUIT PROTECTION: output voltage drops to zero, output current is limited to 200% of rated value. No transformer damage will occur.

FREQUENCY VARIATIONS: a 1% change in line frequency produces less than a 1.1% change in output voltage.

ENCLOSURES: all meet or exceed NEMA specifications.

MAINTENANCE: minimal. Cooling fans are only moving parts.

WARRANTY: one year from date of shipment.

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901 DuPage Avenue Lombard, Illinois 60148 Telephone: 1 312/620-8394 TWX: 910-991-2352

Products of Shape Magnetronics

Computer Line Tamers™

Computer Line Tamer™ ferroresonant power conditioners are engineered to meet the super isolation and tight regulation requirements for today's computers, as well as other sensitive, computer- and microprocessor-controlled systems, from PABX to typesetters.

The Personal Computer Line Tamer™ brings these same benefits to micros, at a very economical cost.

Computer Line Tamer™ Specifications

VA RATINGS: 70 VA to 75 kVA.

UL/CSA LISTING: most sizes to 7.5 kVA. UL File Number E62765; CSA File Number LR54339.

INPUT/OUTPUT: all common single-phase AC voltages.

FREQUENCY: 50 Hz or 60 Hz as selected.

REGULATION: ±3% for input range of +10%, −20% of nominal voltage.

ISOLATION: complete isolation from power line. Less than 2pf of effective capacitance.

COMMON MODE NOISE REJECTION: better than 120 dB.

TRANSVERSE MODE NOISE REJECTION: better than 60 dB.

VOLTAGE SPIKE ATTENUATION: 250:1.

HARMONICS: 70 VA-7.5 kVA, approximately 3% full load; 10 kVA and up, approximately 5% full load.

AUDIBLE NOISE: minimized for office and computer room environments.

LINE INTERRUPTIONS: full output voltage maintenance for 3 milliseconds.

RESPONSE TIME: instantaneous. Complete within 25 milliseconds (1.5 cycles).

EFFICIENCY: up to 92%.

OPERATING TEMPERATURE: −40°C to +40°C.

SHORT-CIRCUIT PROTECTION: output voltage drops to zero, output current is limited to 200% of rated value. No transformer damage will occur.

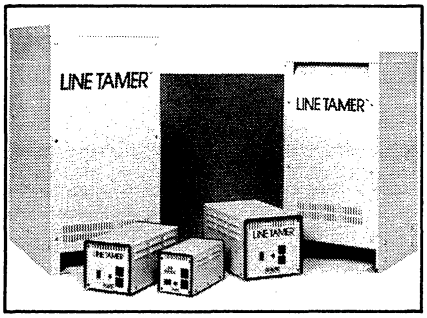
FREQUENCY VARIATIONS: a 1% change in line frequency produces less than a 1.1% change in output voltage.

ENCLOSURES: all meet or exceed NEMA specifications.

MAINTENANCE: none. No moving parts.

WARRANTY: one year from date of shipment.

INDICATORS: portable CLT: On/Off switch, output power light.



60 Hz Single-Phase, Wall or Floor Mount, Hard-Wired

VA	CATALOG NUMBER	VOLTAGE		APPROXIMATE DIMENSIONS			
		INPUT +10%, −20%	OUTPUT ±3%	SHIPPING WEIGHT	H"	W"	D"
140	CLT-0140-AAB	120	120	14	5.5	3.5	8.5
250	CLT-0250-BAB	120/240	120	21	6	4.5	10
500	CLT-0500-CBB	120/208/240	120/240	34	6.5	6.5	12.5
500	CLT-0500-DBB	240/480	120/240	34	6.5	6.5	12.5
750	CLT-0750-CBB	120/208/240	120/240	40	6.5	6.5	13.5
750	CLT-0750-DBB	240/480	120/240	40	6.5	6.5	13.5
1,000	CLT-1000-CBB	120/208/240	120/240	50	6.5	6.5	14.5
1,000	CLT-1000-DBB	240/480	120/240	50	6.5	6.5	14.5
1,500	CLT-1500-CBB	120/208/240	120/240	77	9.5	10	17.5
1,500	CLT-1500-DBB	240/480	120/240	77	9.5	10	17.5
2,000	CLT-2000-CBB	120/208/240	120/240	92	9.5	10	18
2,000	CLT-2000-DBB	240/480	120/240	92	9.5	10	18
2,500	CLT-2500-CBB	120/208/240	120/240	107	9.5	10	18.5
2,500	CLT-2500-DBB	240/480	120/240	107	9.5	10	18.5
3,000	CLT-3000-CBB	120/208/240	120/240	137	9.5	10	20
3,000	CLT-3000-DBB	240/480	120/240	137	9.5	10	20
4,000	CLT-4000-CBB	120/208/240	120/240	159	9.5	10	22
4,000	CLT-4000-DBB	240/480	120/240	159	9.5	10	22
5,000	CLT-5000-CBB*	120/208/240	120/240	233	10	26	18.5
5,000	CLT-5000-DBB*	240/480	120/240	233	10	26	18.5
5,000	CLT-5000-CSW	120/208/240	120/208/240	233	14	14.5	26.75
5,000	CLT-5000-DSW	208/240	120/208/240	233	14	14.5	26.75
7,500	CLT-7500-CBB*	120/208/240	120/240	379	10	26	22
7,500	CLT-7500-DBB*	240/480	120/240	379	10	26	22
7,500	CLT-7500-CSW	120/208/240	120/208/240	379	14	14.5	28.25
7,500	CLT-7500-DSW	240/480	120/208/240	379	14	14.5	28.25
10,000	CLT-1001-CSW	120/208/240	120/208/240	590	14	14.5	29.25
10,000	CLT-1001-DSW	240/480	120/208/240	590	14	14.5	29.25

*Consists of two parallel mounted enclosures.
Weights listed are approximate totals for both enclosures.

60 Hz Single-Phase, Portable Plug-In

VA	CATALOG NUMBER	VOLTAGE		APPROXIMATE DIMENSIONS			
		INPUT +10%, −20%	OUTPUT ±3%	SHIPPING WEIGHT	H"	W"	D"
70	CLT-0070-AAA	120	120	15	7	6	12.5
140	CLT-0140-AAA	120	120	18	7	6	12.5
250	CLT-0250-AAA	120	120	24	7	6	12.5
500	CLT-0500-AAA	120	120	43	8.5	8.5	17.5
750	CLT-0750-AAA	120	120	52	8.5	8.5	17.5
1,000	CLT-1000-AAA	120	120	61	8.5	8.5	17.5
1,500	CLT-1500-AAA*	120	120	93	11	11	19
2,000	CLT-2000-AAA*	120	120	110	11	11	19
2,000	CLT-2000-AAE**	120	120	110	11	11	19

*Requires customer supplied NEMA Type L5-30R Receptacle
**CSA only

60 Hz Single-Phase, Floor Mount

KVA	CATALOG NUMBER	VOLTAGE		APPROXIMATE DIMENSIONS			
		INPUT +10%, −20%	OUTPUT ±3%	SHIPPING WEIGHT	H"	W"	D"
5	CLT-5000-CSO	120/208/240	120/208/240	315	40	19	21.75
5	CLT-5000-DSO	240/480	120/208/240	315	40	19	21.75
7.5	CLT-7500-CSO	120/208/240	120/208/240	420	40	19	21.75
7.5	CLT-7500-DSO	240/480	120/208/240	420	40	19	21.75
10	CLT-1001-CSO	120/208/240	120/208/240	590	40	19	21.75
10	CLT-1001-DSO	240/480	120/208/240	590	40	19	21.75
12.5	CLT-1251-CSO	120/208/240	120/208/240	635	40	19	21.75
12.5	CLT-1251-DSO	240/480	120/208/240	635	40	19	21.75
15	CLT-1501-CSO	120/208/240	120/208/240	680	40	19	21.75
15	CLT-1501-DSO	240/480	120/208/240	680	40	19	21.75
20	CLT-2001-CSR	120/208/240	120/208/240	930	44	21.25	32.25
20	CLT-2001-DSR	240/480	120/208/240	930	44	21.25	32.25
25	CLT-2501-CSR	120/208/240	120/208/240	1080	44	21.25	32.25
25	CLT-2501-DSR	240/480	120/208/240	1080	44	21.25	32.25
30	CLT-3001-CSR	120/208/240	120/208/240	1250	44	21.25	32.25
30	CLT-3001-DSR	240/480	120/208/240	1250	44	21.25	32.25
37.5	CLT-3751-CSP	120/208/240	120/208/240	1660	64	21.25	32.25
37.5	CLT-3751-DSP	240/480	120/208/240	1660	64	21.25	32.25
45	CLT-4501-CSP	120/208/240	120/208/240	1920	64	21.25	32.25
45	CLT-4501-DSP	240/480	120/208/240	1920	64	21.25	32.25
50	CLT-5001-CSP	120/208/240	120/208/240	1920	64	21.25	32.25
50	CLT-5001-DSP	240/480	120/208/240	1920	64	21.25	32.25
60	CLT-6001-CST	120/208/240	120/208/240	2500	44	43	32.25
60	CLT-6001-DST	240/480	120/208/240	2500	44	43	32.25
75	CLT-7501-CST	120/208/240	120/208/240	3320	64	43	32.25
75	CLT-7501-DST	240/480	240/480	3320	64	43	32.25

50 Hz units also available in most sizes. Please consult factory.

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Ferrite and Toroidal Transformers

Small, lightweight toroids, pot cores, flybacks, linear actuators, main switching transformers and other ferrite devices for high frequency applications, including switching power supplies.

Power Transformers

Input & Output Voltage: Up to 6000 volts
Capacity: Up to 250 kVA
Construction: Open frame
Applications: Power supplies, line isolation and voltage step-up or step-down

Constant Voltage Transformers

Capacity: 15 VA to 25 kVA
Input Range: Up to ±20%
Line Regulation: ±1%
Frequency: 50, 60 or 50/60 Hz
Applications: Regulated DC power supplies and equipment generally insensitive to harmonics

Mercury-Vapor Ballasts

Capacity: 200 watts to 25 kVA
Input Range: ±10%
Output Voltages: Up to 6000 volts
Line Regulation: ±2% of lamp wattage
Frequency: 50, 60 or 50/60 Hz
Applications: UV curing systems and film and fiche reproduction equipment

...and we can supply custom-designed transformers and magnetic-electronic devices to meet virtually any requirement.

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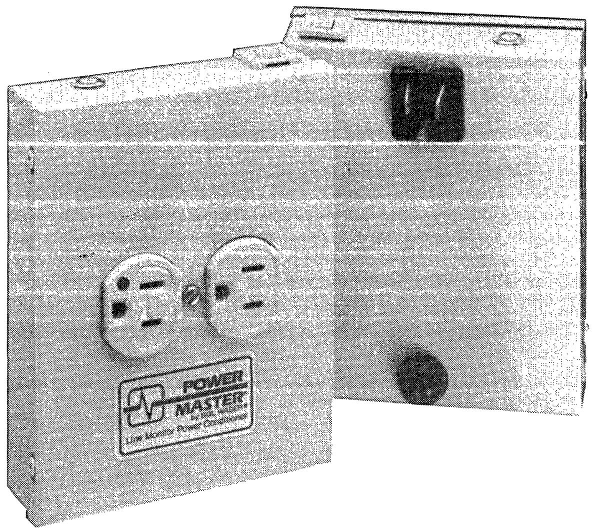
MINIGLOSSARIES
FORMULAS • CHARTS
PRODUCT SELECTION GUIDES
FORMS TECHNICAL
CODES INFORMATION

WHERE TO FIND THEM IN THE 85/86 EDITION OF EEM

Abbreviations/Acronyms **A**•1166, **B**•1012, **C**•1028, **D**•1016
ASCII Code **D**•1087
Batteries, Product Selection Guide **D**•1413
Batteries & Fuel Cells, Characteristics **D**•1430
Cabinets, Enclosures, Racks, & Chassis, Product Selection Guide **C**•1003
Capacitors, Basic Formulas **A**•1093
Capacitors, Miniglossary **A**•1066
Capacitors, Product Selection Guide **A**•1003
Circuit Boards (Printed) Product Selection Guide **C**•1099
Coils, Chokes, Inductors, Product Selection Guide **A**•1205
Conductors, Maximum Current Capacity of Copper & Aluminum **C**•1863
Connectors, Miniglossary **C**•1129
Connectors, Terminals, & Sockets, Product Selection Guide **C**•1105
Crystals, Oscillators, Crystal & Piezoelectric Filters, Product Selection Gude **A**•1309
Delay Lines, Product Selection Guide **A**•1459
Discrete Semiconductors, Product Selection Guide **A**•2067
Displays, Readouts, Lamps, & Lights, Product Selection Guide **B**•1015
EBCDIC Code **D**•1092
Encapsulation, Miniglossary **C**•1086
Fans, Blowers, Cooling Equipment, & Heat Exchangers, Product Selection Guide **C**•1623
Filters, Product Selection Guide **A**•1583
Instruments, Graphic Recording Product Selection Guide **D**•1401
Instruments, Panel Meters, Product Selection Guide **D**•1329
Instruments, Test & Measuring Product Selection Guide **D**•1175
Interconnection Systems, Product Selection Guide **C**•1699
Keyboards & Keypads, Product Selection Guide **B**•1705
Logofinder & Trademark Directories **B**•901
Microwave Components, Product Selection Guide **A**•1701
Military Qualified Products Lists **B**•1003
Motors, Drives, & Rotating Components, Product Selection Guide **B**•1129
Opto Semiconductors, Miniglossary **B**•1214
Oscilloscopes, Product Selection Guide **D**•1385
Panel Hardware, Product Selection Guide **C**•1589
Potentiometers, Trimmers, Controls, & Rheostats, Product Selection Guide **A**•1991
Power Supplies, Miniglossary **D**•1462
Power Supplies, AC, Product Selection Guide **D**•1877
Power Supplies, DC, Product Selection Guide **D**•1447
Protective Components (Fuses, Circuit Breakers, etc.), Product Selection Guide **B**•1225
Relay Contact Forms **B**•1317
Relays, Electromechanical, Miniglossary **B**•1308
Relays, Product Selection Guide **B**•1261
Resistor Color Codes **A**•1828
Resistors, Product Selection Guide **A**•1785
Servo Components, Miniglossary **D**•1985
Solenoids, Product Selection Guide **B**•1463
Switches, Product Selection Guide **B**•1477
Thermal Components, Product Selection Guide **B**•1741
Thermal Conductivity of Dielectrics at Room Temperature **B**•1744
Thyristors/High Power Diodes, Miniglossary **A**•2076
Transducers & Encoders, Product Selection Guide **B**•1777
Transformers, Product Selection Guide **A**•2099
Wire & Cable, Product Selection Guide **C**•1743
Wire Gauges—Diameter, Area, Copper Weight **C**•1844

AVOID EQUIPMENT FAILURE!



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Sola Mini UPS

A UNIT OF GENERAL SIGNAL
SOLA
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Phone: 312/439-2800 Telex 28-0538

True UPS:

The Mini UPS is always between the AC line and the critical load.

Inverter Design:

Multiple pulse width modulation with switching transistors.

Complete Brownout and Noise Protection:

The rectifier charger powers the inverter at all times; line noise and transients are isolated from the load. The AC line never directly powers the load.

Regulated Output:

The Mini UPS output voltage is regulated to ± 3% when operating from the AC line as well as when operating from the internal battery.

Sine Wave Output:

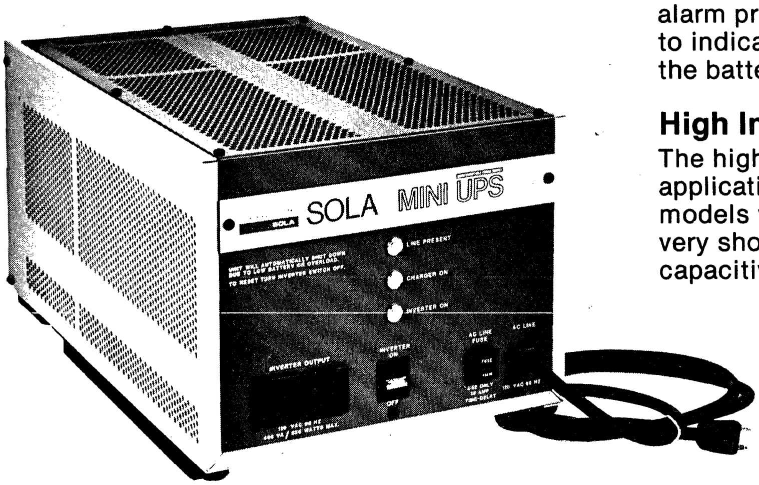
The output waveshape is a sine wave with less than 3% of any single harmonic and less than 5% total harmonic distortion (THD).

Overload Capability:

The Mini UPS is designed to handle load starting surges and fault clearing by providing 125% overload for 30 seconds, 150% overload for one second and 200% into a short circuit with two automatic restrikes before shutdown.

Maintenance Free Battery:

A long life, maintenance free, sealed lead acid battery is built into the unit to provide uninterrupted inverter operation (without a switching relay) when the AC line fails.



Battery Backup:

If the Mini UPS is operated at less than full load the battery backup time will be extended. If operated at full laod and additional backup time is needed, add on battery packs are available. See Table 4.

Battery Protection:

Automatic shut-off circuitry disconnects the battery during prolonged power outages to prevent battery damage. Upon return of the AC input, the battery is automatically recharged (without operator action) to 95% of capacity in less than 10 times the discharge time.

Controls and Indicators

The front panel on/off switch controls the inverter but does not affect charger operation to insure that the battery is always fully charged. The inverter "on" lamp, "charger on" lamp and "line present" lamp provide quick visual status indications.

Compact Design:

The compact design, input line cord and output receptacle permit simplified installation without the need of rewiring or remodeling. Whether installed with the initial equipment or added later, installation is as simple as plugging in a radio.

Deluxe Models:

The deluxe models (Table 2) incorporate automatic inverter restart and a battery supplying power alarm circuit. The automatic inverter restart allows the inverter to restart once AC input power is restored after a shutdown due to a discharged battery. The battery supplying power alarm provides an isolated set of relay contacts to indicate that the inverter is being powered by the battery as in the case of an AC line failure.

High Inrush Models:

The high inrush models (Table 3) are available for applications requiring large inrush currents. These models will supply up to 6 times rated current for very short durations, as when powering a capacitive input load, such as a power supply.

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Specifications

Electrical Specifications:

Input Voltage:	See table, 1Ø, + 10, − 15%
Input Frequency:	50 Hz or 60Hz, ± 10%
Input Protection:	Line fuse, EMI filtering and rectifier current limiting
Output Voltage:	See table, 1Ø
Output Regulation:	± 3% steady state
Output Frequency:	50Hz or 60Hz, ± 0.01%
Output Waveshape:	Sine wave, 3% maximum single harmonic, 5% total harmonic distortion
Output Overload:	125% for 30 seconds 150% for 1 second 200% shortcircuit
Output Protection:	Automatic shutdown after 2 restrikes

Table 1: Mini UPS Standard Models

Catalog Number	Output Power (At 0.8 Pf)	Input/ Output Frequency	Input/ Output Voltage	Battery Back-Up Time	Approx. Weight	Cooling
26-00-50400-3001	400 VA	60 Hz	120	20 min.	100 lbs.	Conv.
26-29-50600-3000	600 VA	50 Hz	220/240	20 min.	135 lbs.	Fan
UL 56-01-10001-7500	750 VA	SEE BELOW				

Table 2: Deluxe Mini UPS Systems

Catalog Number	Output Power (At 0.8 Pf)	Input/ Output Frequency	Input Output Voltage	Battery Back-Up Time	Approx. Weight	Cooling
26-00-50400-3101	400 VA	60 Hz	120	20 min.	100 lbs.	Conv.
26-29-50600-3100	600 VA	50 Hz	220/240	12 min.	135 lbs.	Fan
UL 56-01-10001-7500	750 VA	60 Hz	120	10 min.	120 lbs.	Fan

Table 3: High Inrush Current Models

Catalog Number	Output Power (At 0.8 Pf)	Input/ Output Frequency	Input/ Output Voltage	Battery Back-Up Time	Approx. Weight	Cooling
26-29-50600-3700	600 VA	50 Hz	220/240	12 min.	135 lbs.	Fan
26-00-50750-3700	750 VA	60 Hz	120	10 min.	120 lbs.	Fan

Table 4: Add-On Battery Packs

Catalog Number	Input Power	Dimensions (Inches) (HxWxD)	Approx. Wt.	Total Reserve Operating Time (2) 400 VA Model	600 VA Model	750 VA Model
911-01-00012-0001	120V (1) (60 Hz)	10.5x12.0x20.5	120 lbs.	110 min.	60 min.	50 min.
911-03-00012-0002	None	8.0x12.0x20.0	80 lbs.	110 min.	60 min.	50 min.
911-03-00028-0002	None	9.5x12.5x25.5	145 lbs.	250 min.	150 min.	120 min.

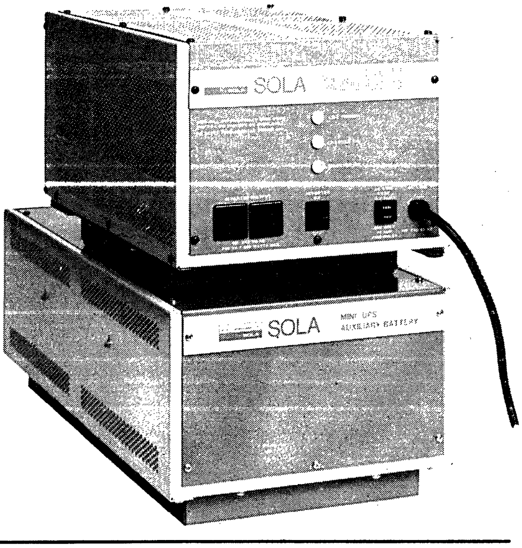
(1) This unit is equipped with an internal battery charger, which offers a shorter recharging time.
(2) Total reserve operating time (including the Mini UPS internal battery) at full load output. Operation at less than full load will greatly extend the reserve time.

Mechanical Specifications:

Input Line Cord:	For 120 VAC Models, 6 ft. with NEMA 5-15 P plug type For 220 & 240 VAC models, 6 ft. with NEMA 6-15 P plug type
Output Receptacle:	For 120VAC models, NEMA 5-15R duplex receptacle For 220 & 240VAC models, NEMA 6-15 R duplex receptacle
Controls & Indicators:	On-Off Switch Amber "Inverter On" Lamp Amber "Charger On" Lamp Amber "Line Present" Lamp Input Fuse Inverter Enable Switch (Screwdriver operated)
Dimensions: (inches)	10.5 H x 12.0 W x 19.0 D

Environmental Specifications

Operating Temperature:	0°C to 40°C
Operating Humidity:	0% to 95% (without condensation)
Operating Altitude:	0 to 5000 ft. (above 5000 ft. consult factory)
Storage Temperature:	0° to 65°C



Sola Standby Power Source

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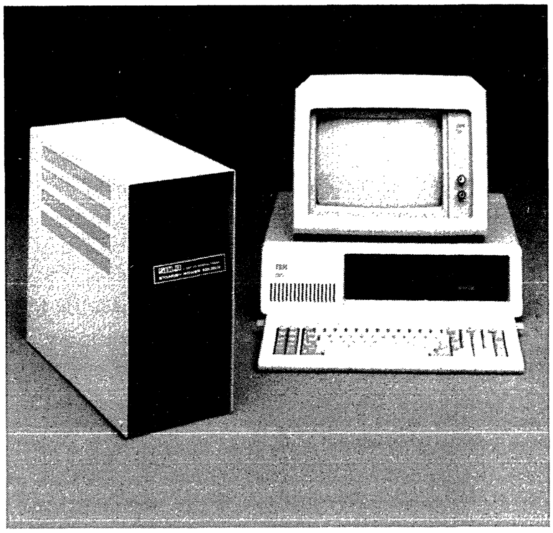
The Sola S.P.S. is an economical standby power source, designed to protect personal, micro, and mini-computers from AC line disturbances and failures. It provides clean, regulated AC power to your critical load when the commercial AC line fails or drops 15% below nominal. The unit contains a sealed, maintenance-free battery that will operate the inverter until the AC returns, or until you complete your computer activity. When the AC is present, it supplies filtered power to the load and maintains the battery in a charged condition.



Electrical Specifications

Input

- 120 VAC, +10%, −15%, 60Hz ±10%
- 220/240 VAC +10%, −15%, 50Hz ±10%

Output

- 120 VAC, ±3%, 60Hz ±1%
- 220/240 VAC ±3%, 50Hz ±1%
- Sine wave, less than 5% T.H.D.
- 130% overload for 3 seconds
- Current limited inverter for short circuit protection
- Line to inverter transfer, 4 to 10 milliseconds at −15% of nominal voltage
- inverter to line retransfer, 2 to 4 milliseconds at −10% of nominal voltage
- Noise attenuation at 10kHz and above, 40 db minimum at 100kHz

Mechanical Specification

- 0°C to 40°C operating temperature
- 0% to 95%, without condensation, operating humidity
- 0 to 8000 ft. operating altitude
- 6 foot power cord with NEMA 5-15P plug for 60Hz, European or British standard for 50Hz
- NEMA 5-15R duplex receptacle for 60Hz, European or British standard for 50Hz
- 15″ high, 7″ wide, 18.5″ deep cabinet
- Maintenance-free, sealed, lead acid battery
- Alarm relay, dry Form C contacts through a ¼″ phone jack

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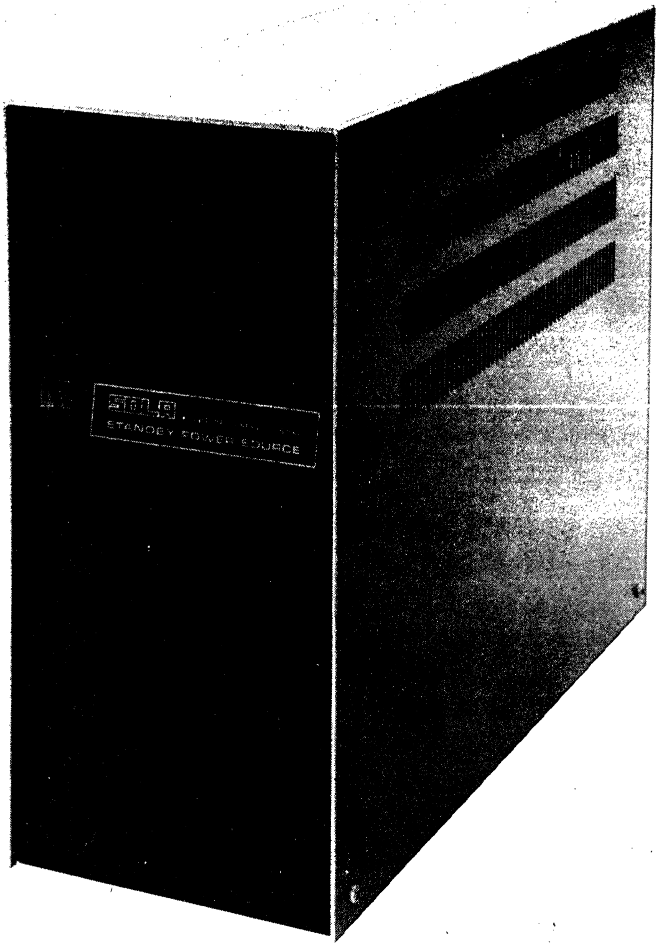
Phone: 312/439-2800 Telex 28-0538

The Sola SPS Offers The Ultimate In Standby Power Protection, With All Of These Features:

- Noise and transient protection when the AC line is present.
- Fast response, ¼ to ½ cycle, when the AC line fails.
- Inverter overcurrent protection, even into a short circuit.
- Simplified installation and operation, just plug it in and turn it on.
- Compact, lightweight design, with hands off operation, including maintenance free battery.
- Relay contact and audible alarm for user annunciation of AC line failure.
- UL listed.



Model Table

Model	Output Power (VA)	Input/Output Voltage (VAC)	Input/Output Frequency (Hz)	Typical Reserve Time (Minutes) ½ Load	¾ Load	Full Load	Net Weight (Lbs.)
SPS-400 A	400	120	60	30	20	12	65
SPS-400 B *	400	220/240[1]	50	30	20	12	67
SPS-400 C * *	400	220/240[1]	50	30	20	12	67
SPS-800 A	800	120	60	30	20	12	87
SPS-800 B *	800	220/240[1]	50	30	20	12	89
SPS-800 C * *	800	220/240[1]	50	30	20	12	89

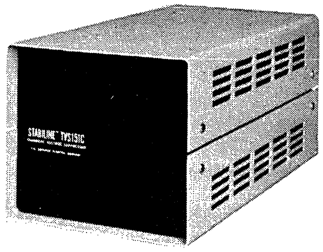
*Equipped with British type plug and outlet. **Equipped with European type plug and outlet.

[1] 50Hz unit shipped set for 240 VAC. Instructions included for 220 VAC operation.

STABILINE® AUTOMATIC VOLTAGE CONTROLS

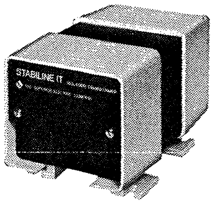
STABILINE® Computer Regulators

Maintain properly conditioned voltage to computers and other voltage critical equipment. Simple cord and plug connection to voltage source; two grounded receptacles for connecting equipment. Provide output of 120 volts rms ±3%, 60 Hz over an input range of 95 to 130 volts rms. Also provide 60dB minimum common-mode noise rejection to help prevent computer errors, loss of information and other noise related problems.



STABILINE® Transient Voltage Suppressors

Suppress momentary voltage spikes on power lines to prevent damage to sensitive equipment. Used to protect medical equipment, computers, word processors, electronic instrumentation, microprocessor based equipment, communications equipment, industrial controls and similar apparatus. Benefits include virtually instantaneous response time, transient reduction of 40dB (100 to 1) per frequency decade above 5kHz, efficiency of 99% at full resistive load and regulation less than 1%. Will attenuate in the same manner regardless of where on the sine-wave or in which direction the transient is applied and do not rely on an absolute magnitude before attenuation occurs. Available in 120 and 240 volt models in ratings from 15 to 60 amperes maximum load current.



SVR Series STABILINE® Automatic Voltage Regulators

Highly efficient, extremely fast solid-state automatic voltage regulators. Very light in weight when compared with many units of similar kVA ratings. Features include virtually zero waveform distortion, very low internal impedance, negligible phase shift, insensitivity to load power factor and virtually no effect on system power factor. Efficiency is 95 percent at 60 hertz. Models in the SVR Series are available from 0.75 to 4kVA.

STABILINE® Transient Suppressors/Voltage Regulators

In addition to correcting for high or low voltage from power sources, units attenuate transverse-mode (line-to-line) noise and transients. Transient voltage attenuation of 40dB from 5 to 50 kHz. Provide the all-around protection needed by computers, business machines, word processors, microprocessor-based equipment and other voltage sensing devices to reduce or eliminate disruptions, data errors, loss of information and equipment failure. Types SVRS88101C and SVRS88102C are also available with cord/plug sets.

STABILINE® Isolation Transformers

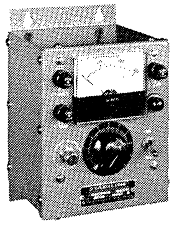
Multi-shielded, ultra-isolation transformers exhibiting low capacitance between primary and secondary windings. Ideal for isolating sensitive equipment and attenuating common mode noise voltage generated by power consuming sources. Common mode noise attenuation is 126dB. Available in four models from 0.5kVA to 5kVA.

Electro Mechanical STABILINE® Automatic Voltage Regulators

Utilize solid-state control circuits, motor-driven POWERSTAT Variable Transformers and buck-boost transformers to regulate line voltage. Widely used in industrial applications or where constant output voltage is required with zero waveform distortion. EMT Series types are offered with ratings from 2.3 to 118kVA; EMS Series in ratings from 25 to 300kVA. The speed of response of EMT and EMS Series units is slower than for some types of automatic voltage regulators, but is sufficiently fast for the majority of applications.

Instantaneous Electronic STABILINE® Automatic Voltage Regulators

Highly accurate, fast-correcting units featuring solid-state circuitry. No vacuum tubes, motors, blowers or relays are used. Benefits include very high accuracy, fast response, low distortion, high efficiency (up to 95 percent) and wide operating frequency range. Models are available in ratings from 0.5 to 15kVA.



STABILINE® Full Range Regulator Controllers

Designed for use with any motor-driven POWERSTAT® Variable Transformer to provide full range regulation of a-c voltage, a-c current or d-c voltage. Output voltage will remain within a 2-volt band when used with 120 volt units and a 4-volt band when used with 240 volt models. Output current can be maintained within ±1% of maximum current setting with user supplied current transformer and Superior Electric transformer T6340. Type FR501BDC and user supplied d-c power will provide regulated d-c voltage.

THE SUPERIOR ELECTRIC COMPANY

1000 Middle Street / Bristol, Connecticut 06010 / Telephone: (203)582-9561

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EEM PRODUCT SELECTION GUIDES

Use the EEM Product Selection Guides.
There are 34 Guides in this edition of EEM.
See page 2 (A•2, B•2, C•2, D•2) of each
volume to locate the Product Selection Guides
that pertain to your needs.

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Regulated Power Conditioners

Linestar™ portable and hard wire regulated power conditioners suppress transients and protect against overloading.

Portable Models

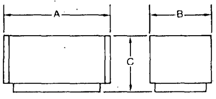
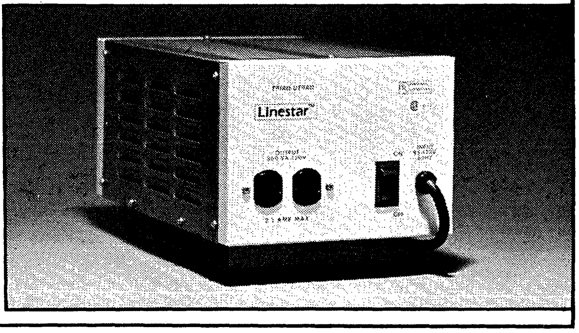


Figure 1



Portable Models, 60 Hertz, Single Phase

Output VA Rating	Catalog Number	Input Voltage Range	Nominal Output Voltage	Approx. Unit Wt. (lbs.)	Figure Code	Dimensions (Inches) A (Length)	B (Width)	C (Height)
70	K6-0400	95-130	120	11	1	$12\frac{5}{8}$	$4\frac{5}{8}$	$7\frac{5}{8}$
140	K6-0600	95-130	120	15½	1	$12\frac{5}{8}$	$4\frac{5}{8}$	$7\frac{5}{8}$
250	K6-0700	95-130	120	20	1	$12\frac{5}{8}$	$4\frac{5}{8}$	$7\frac{5}{8}$
300	K6-0800* •	95-130	120	30	1	$16\frac{1}{8}$	$9\frac{1}{4}$	$8\frac{3}{8}$
500	K6-0900* •	95-130	120	40	1	$16\frac{1}{8}$	$9\frac{1}{4}$	$8\frac{3}{8}$
750	K6-1000* •	95-130	120	49	1	$16\frac{1}{8}$	$9\frac{1}{4}$	$8\frac{3}{8}$
1000	K6-1100* •	95-130	120	59	1	$16\frac{1}{8}$	$9\frac{1}{4}$	$8\frac{3}{8}$
1500	K6-1200	95-130	120	80	1	$16\frac{1}{8}$	$11\frac{1}{2}$	$10\frac{3}{4}$
2000	K6-1300*☐	95-130	120	101	1	$16\frac{1}{8}$	$11\frac{1}{2}$	$10\frac{3}{4}$

*UL LISTED •CSA APPROVED ☐ INPUT PLUG IS A NEMA TYPE L5-30P

Hard Wire Models

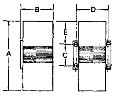


Figure 2

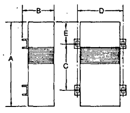


Figure 3

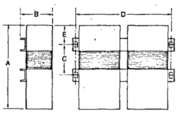


Figure 4

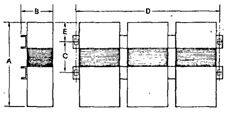
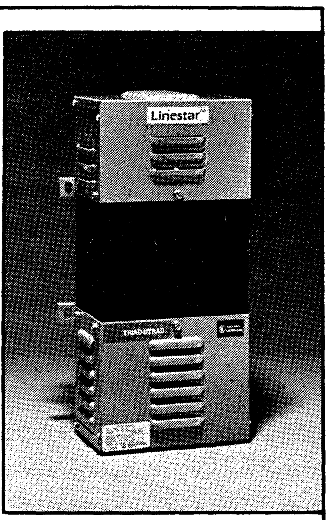


Figure 5



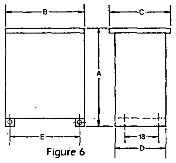


Figure 6

Hard Wire Models, 60 Hertz, Single Phase

Output VA Rating	Catalog Number	Input Voltage Range	Nominal Output Voltage	Approx. Unit Wt. (lbs.)	Figure Code	Dimensions (Inches) A (Length)	B (Depth)	C	D (Width)	E	Mounting Slots
30	K0-0200	95-130	120	8.5	2	$6\frac{11}{16}$	5	3	$3\frac{1}{2}$	$1\frac{27}{32}$	$\frac{7}{32}$ x $\frac{3}{4}$
60	K0-0300	95-130	120	10	2	$7\frac{3}{8}$	5	3	$3\frac{1}{2}$	$2\frac{3}{16}$	$\frac{7}{32}$ x $\frac{3}{4}$
60	K0-0320	190-260, 380-520	120	10	2	$7\frac{3}{8}$	5	3	$3\frac{1}{2}$	$2\frac{3}{16}$	$\frac{7}{32}$ x $\frac{3}{4}$
120	K0-0510	95-130, 190-260	120	14	2	$8\frac{3}{4}$	5	3	$3\frac{1}{2}$	$2\frac{7}{8}$	$\frac{7}{32}$ x $\frac{3}{4}$
120	K0-0520	190-260, 380-520	120	14	2	$8\frac{3}{4}$	5	3	$3\frac{1}{2}$	$2\frac{7}{8}$	$\frac{7}{32}$ x $\frac{3}{4}$
140	K6-0610	95-130,190-260	120	14	2	$8\frac{3}{4}$	5	3	$3\frac{1}{2}$	$2\frac{7}{8}$	$\frac{7}{32}$ x $\frac{3}{4}$
140	K6-0620	190-260 380-520	120	14	2	$8\frac{3}{4}$	5	3	$3\frac{1}{2}$	$2\frac{7}{8}$	$\frac{7}{32}$ x $\frac{3}{4}$
300	K6-0810*	95-130, 190-260	120	28	2	$12\frac{1}{4}$	$8\frac{3}{8}$	$5\frac{5}{8}$	$8\frac{1}{8}$	5	$\frac{3}{8}$ x $\frac{13}{16}$
500	K6-0910*	95-130, 190-260	120	37	2	13	$8\frac{3}{8}$	$5\frac{5}{8}$	$8\frac{1}{8}$	5	$\frac{3}{8}$ x $\frac{13}{16}$
500	K6-0922*	190-260, 380-520	120 x 240	37	2	13	$8\frac{3}{8}$	$5\frac{5}{8}$	$8\frac{1}{8}$	5	$\frac{3}{8}$ x $\frac{13}{16}$
500	K6-0937*	95-130, 175-235, 190-260	120 x 208	47	2	$15\frac{1}{4}$	$8\frac{3}{8}$	$5\frac{5}{8}$	$8\frac{1}{8}$	5	$\frac{3}{8}$ x $\frac{13}{16}$
750	K6-1032*	95-130, 175-235, 190-260	120 x 240	47	2	$15\frac{1}{4}$	$8\frac{3}{8}$	$5\frac{5}{8}$	$8\frac{1}{8}$	5	$\frac{3}{8}$ x $\frac{13}{16}$
1000	K6-1122*	190-260, 380-520	120 x 240	59	2	$16\frac{1}{4}$	$8\frac{3}{8}$	$5\frac{5}{8}$	$8\frac{1}{8}$	5	$\frac{3}{8}$ x $\frac{13}{16}$
1000	K6-1132*	95-130, 175-235, 190-260	120 x 240	59	2	$16\frac{1}{4}$	$8\frac{3}{8}$	$5\frac{5}{8}$	$8\frac{1}{8}$	5	$\frac{3}{8}$ x $\frac{13}{16}$
1000	K6-1137*	95-130, 175-235, 190-260	120 x 208	59	2	$16\frac{1}{4}$	$8\frac{3}{8}$	$5\frac{5}{8}$	$8\frac{1}{8}$	5	$\frac{3}{8}$ x $\frac{13}{16}$
1500	K6-1232*	95-130, 175-235, 190-260	120 x 240	78	3	$18\frac{1}{4}$	$8\frac{3}{8}$	$6\frac{5}{8}$	$8\frac{5}{8}$	5	$\frac{13}{32}$ x $\frac{5}{8}$
2000	K6-1322*	190-260, 380-520	120 x 240	101	3	19	$9\frac{3}{4}$	$3\frac{3}{4}$	$11\frac{3}{4}$	5	$\frac{7}{16}$ x $\frac{11}{16}$
2000	K6-1332*	95-130, 190-260, 175-235	120 x 240	101	3	19	$9\frac{3}{4}$	$3\frac{3}{4}$	$11\frac{3}{4}$	5	$\frac{7}{16}$ x $\frac{11}{16}$
2000	K6-1337*	95-130, 175-235, 190-260	120 x 208	101	3	19	$9\frac{3}{4}$	$3\frac{3}{4}$	$11\frac{3}{4}$	5	$\frac{7}{16}$ x $\frac{11}{16}$
2500	K6-1422*	190-260,380-520	120 x 240	120	3	$19\frac{7}{8}$	$9\frac{3}{4}$	$4\frac{5}{8}$	$11\frac{3}{4}$	5	$\frac{7}{16}$ x $\frac{11}{16}$
2500	K6-1432*	95-130, 175-235, 190-260	120 x 240	120	3	$19\frac{7}{8}$	$9\frac{3}{4}$	$4\frac{5}{8}$	$11\frac{3}{4}$	5	$\frac{7}{16}$ x $\frac{11}{16}$
3000	K6-1522*	190-260, 380-520	120 x 240	130	3	$20\frac{5}{8}$	$9\frac{3}{4}$	$5\frac{3}{8}$	$11\frac{3}{4}$	5	$\frac{7}{16}$ x $\frac{11}{16}$
3000	K6-1532*	95-130, 175-235, 190-260	120 x 240	130	3	$20\frac{5}{8}$	$9\frac{3}{4}$	$5\frac{3}{8}$	$11\frac{3}{4}$	5	$\frac{7}{16}$ x $\frac{11}{16}$
3000	K6-1537*	95-130, 175-235, 190-260	120 x 208	130	3	$20\frac{5}{8}$	$9\frac{3}{4}$	$5\frac{3}{8}$	$11\frac{3}{4}$	5	$\frac{7}{16}$ x $\frac{11}{16}$
3750	K6-1622*	190-260, 380-520	120 x 240	158	3	$21\frac{7}{8}$	$9\frac{3}{4}$	$6\frac{5}{8}$	$11\frac{3}{4}$	5	$\frac{7}{16}$ x $\frac{11}{16}$
3750	K6-1632*	95-130, 175-235, 190-260	120 x 240	158	3	$21\frac{7}{8}$	$9\frac{3}{4}$	$6\frac{5}{8}$	$11\frac{3}{4}$	5	$\frac{7}{16}$ x $\frac{11}{16}$
5000	K6-1722*	190-260, 380-520	120 x 240	265	4	$19\frac{7}{8}$	$9\frac{3}{4}$	$4\frac{5}{8}$	$24\frac{3}{4}$	5	$\frac{7}{16}$ x $\frac{11}{16}$
5000	K6-1732*	95-130, 175-235, 190-260	120 x 240	265	4	$19\frac{7}{8}$	$9\frac{3}{4}$	$4\frac{5}{8}$	$24\frac{3}{4}$	5	$\frac{7}{16}$ x $\frac{11}{16}$
7500	K6-1822*	190-260, 380-520	120 x 240	325	4	$21\frac{7}{8}$	$9\frac{3}{4}$	$6\frac{7}{16}$	$24\frac{3}{4}$	5	$\frac{7}{16}$ x $\frac{11}{16}$
9000	K6-1922*	190-260, 380-520	120 x 240	430	5	$20\frac{5}{8}$	$9\frac{3}{4}$	$5\frac{3}{8}$	37	5	$\frac{7}{16}$ x $\frac{11}{16}$
11000	K6-2022*	190-260, 380-520	120 x 240	480	5	$21\frac{7}{8}$	$9\frac{3}{4}$	$6\frac{5}{8}$	37	5	$\frac{7}{16}$ x $\frac{11}{16}$
15000	K6-2176†	175-235, 190-260 380-520	120 x 208 x 240	708	6	51	26	27	22	$22\frac{7}{8}$	$\frac{9}{16}$
20000	K6-2276†	175-235, 190-260 380-520	120 x 208 x 240	853	6	51	26	27	22	$22\frac{7}{8}$	$\frac{9}{16}$
25000	K6-2376†	175-235, 190-260 380-520	120 x 208 x 240	997	6	51	26	27	22	$22\frac{7}{8}$	$\frac{9}{16}$
30000	K6-2476†	175-235, 190-260 380-520	120 x 208 x 240	1142	6	51	26	27	22	$22\frac{7}{8}$	$\frac{9}{16}$

*UL LISTED †Eight (8) week lead time.

Hard Wire Models, 60 Hertz, Three Phase

Output VA Rating	Catalog Number	Input Voltage Rating	Secondary Volts	Approx. Unit Wt. (lbs.)	Figure Code	Dimensions (Inches) A (Length)	B (Depth)	C	D (Width)	Mounting Slots
15000	K8-2100†	120/208Y	120/208Y	708	6	51	26	27	$22\frac{7}{8}$	$\frac{9}{16}$
15000	K8-2110†	277/480Y	120/208Y	708	6	51	26	27	$22\frac{7}{8}$	$\frac{9}{16}$
15000	K8-2140†	240 Δ	120/208Y	708	6	51	26	27	$22\frac{7}{8}$	$\frac{9}{16}$
15000	K8-2150†	480 Δ	120/208Y	708	6	51	26	27	$22\frac{7}{8}$	$\frac{9}{16}$
20000	K8-2200†	120/208Y	120/208Y	853	6	51	26	27	$22\frac{7}{8}$	$\frac{9}{16}$
20000	K8-2210†	277/480Y	120/208Y	853	6	51	26	27	$22\frac{7}{8}$	$\frac{9}{16}$
20000	K8-2240†	240 Δ	120/208Y	853	6	51	26	27	$22\frac{7}{8}$	$\frac{9}{16}$
20000	K8-2250†	480 Δ	120/208Y	853	6	51	26	27	$22\frac{7}{8}$	$\frac{9}{16}$
25000	K8-2300†	120/208Y	120/208Y	997	6	51	26	27	$22\frac{7}{8}$	$\frac{9}{16}$
25000	K8-2310†	277/480Y	120/208Y	997	6	51	26	27	$22\frac{7}{8}$	$\frac{9}{16}$
25000	K8-2340†	240 Δ	120/208Y	997	6	51	26	27	$22\frac{7}{8}$	$\frac{9}{16}$
25000	K8-2350†	480 Δ	120/208Y	997	6	51	26	27	$22\frac{7}{8}$	$\frac{9}{16}$
30000	K8-2400†	120/208Y	120/208Y	1142	6	51	26	27	$22\frac{7}{8}$	$\frac{9}{16}$
30000	K8-2410†	277/480Y	120/208Y	1142	6	51	26	27	$22\frac{7}{8}$	$\frac{9}{16}$
30000	K8-2440†	240 Δ	120/208Y	1142	6	51	26	27	$22\frac{7}{8}$	$\frac{9}{16}$
30000	K8-2450†	480 Δ	120/208Y	1142	6	51	26	27	$22\frac{7}{8}$	$\frac{9}{16}$

†Eight (8) week lead time.

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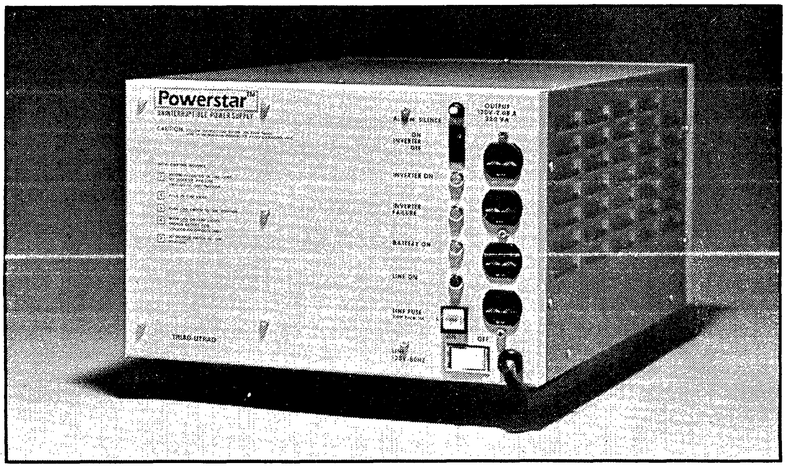
Uninterruptible Power Supply

Powerstar™—Lighter, Cooler UPS Units

The Powerstar uninterruptible power supply from Triad ensures continuous power supply for computers, word processors and a wide range of microprocessor-based controls and equipment. And in the event of power failure or lowered voltage, the Powerstar uninterruptible power supply can save you time and money...with battery back-up time to prevent loss of entries or memory...so your operator can re-enter the job on file.

For unsurpassed quality in an uninterruptible power supply, compare the Powerstar models with any other.



60 Hertz

Catalog Number	VA Rating	Approx. Unit Wt. (lbs.)
KU-411	250 VA	145
KU-611	500 VA	155
KU-811	750 VA	160
KU-1011	1000 VA	170

General Specifications

Input frequency—60 Hz ±3 Hz.

Input Voltage—120 VAC (95—130) 1 Ø.

Input Protection—Line fuse, EMI filtering and rectifier current limiting.

Output Voltage—120 VAC, 1 Ø at nominal frequency and resistive load.

Line and Load Regulation—±3% battery operation, ±1% normal operation.

Output Frequency—60 Hz ±0.5% battery operation.

Output Waveshape—Sinewave, total harmonic distortion 3% at full load max.

Output Overload Capability—150% inverter shutdown, starts restrikes.

Output Protection—Automatic shutdown after three restrikes, inverter shut off and reset provision—alarm.

Operating Temperature—0—40°C.

Type of Operation—Continuous (no interruption).

Bypass Static Switch—maximum 4 milliseconds reverse transfer time.

Power Factor Load—0.8 leading to 0.8 lagging.

Input Linecord—For 120 VAC models, 6 ft. with NEMA 5-15 plug type.

Output Receptacle—For 120 VAC models, NEMA 5-15R duplex receptacle.

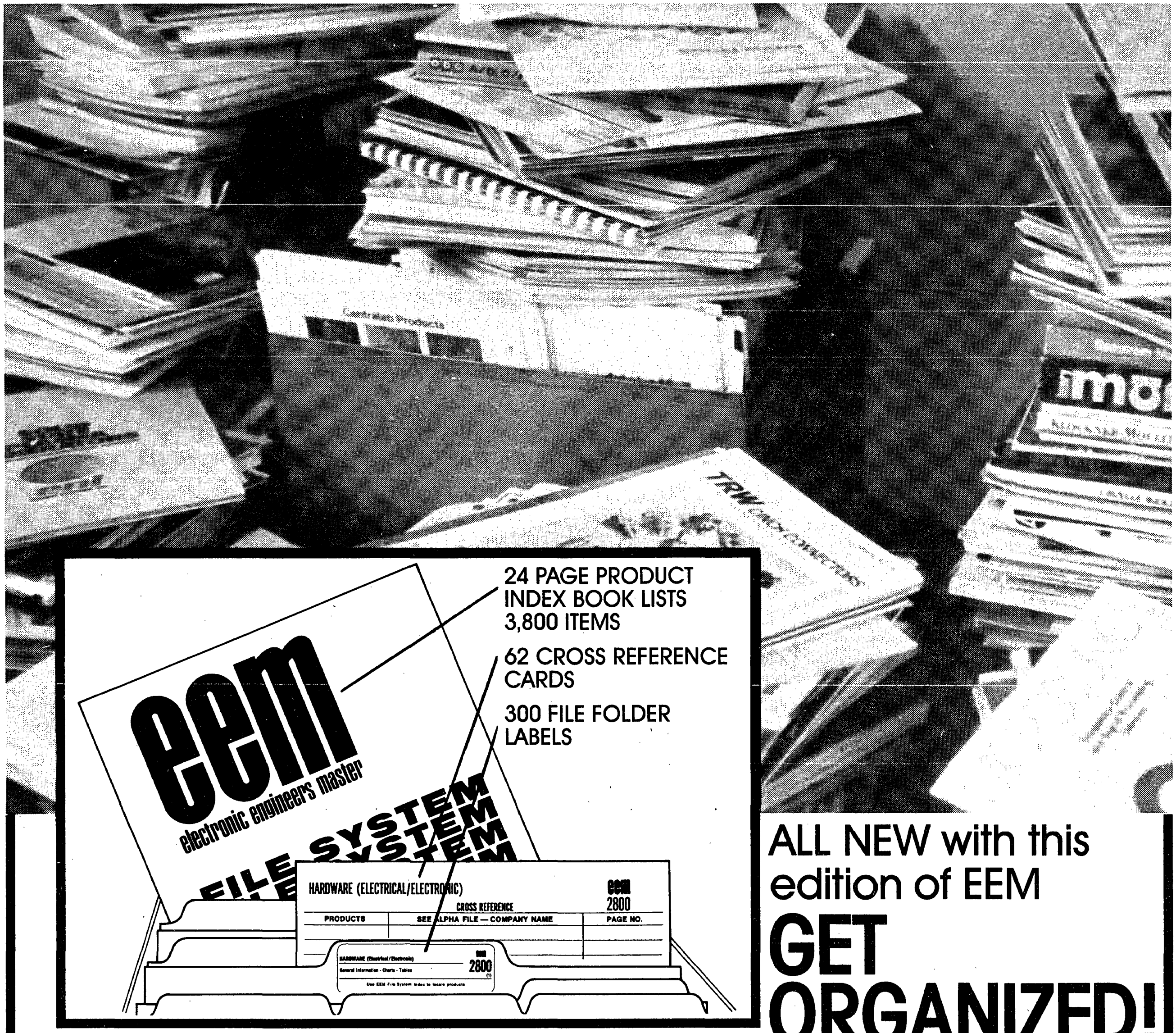
Lamp Designations—"Line On," "Inverter On," "Inverter Failure," "Battery On."

Battery Back-Up Time—

250 VA	45 min.
500 VA	30 min.
750 VA	15 min.
1000 VA	7 min.

Battery Back-Up—If the UPS is operated at less than full load, the battery back-up time will be extended. If operated at full load and additional back-up time is needed, add-on battery packs are available.

Dimensions—$20\frac{1}{4}$" deep, 15" wide, $11\frac{1}{8}$" high.


24 PAGE PRODUCT INDEX BOOK LISTS 3,800 ITEMS
62 CROSS REFERENCE CARDS
300 FILE FOLDER LABELS
eem
electronic engineers master
FILE SYSTEM
HARDWARE (ELECTRICAL/ELECTRONIC)
CROSS REFERENCE
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PRODUCTS
SEE ALPHA FILE — COMPANY NAME
PAGE NO.
TRW

ALL NEW with this edition of EEM

GET ORGANIZED!

Are your catalog files organized? Can you find any given catalog in a matter of seconds? If your answer is "Yes," you probably already have the EEM File System. But, if you said "No," you really ought to look into this simple system. It will save hours of time and tons of aggravation.

The EEM File System was invented over twenty-five years ago to help people who specify, buy, or work with electronic products and equipment. It is upgraded on a constant basis to reflect the current state of the art. It's easy to use and easy to customize to your particular needs.

You say you want to file catalogs by type of product? That's easy to do with The System. But, what are you going to do when there are multiple products in one catalog? Take Mallory for example. There are all kinds of products in the Mallory Short Form Catalog. With the EEM File System all you do is file the catalog under "M" for Mallory and refer to it on all of the cross reference cards that apply.

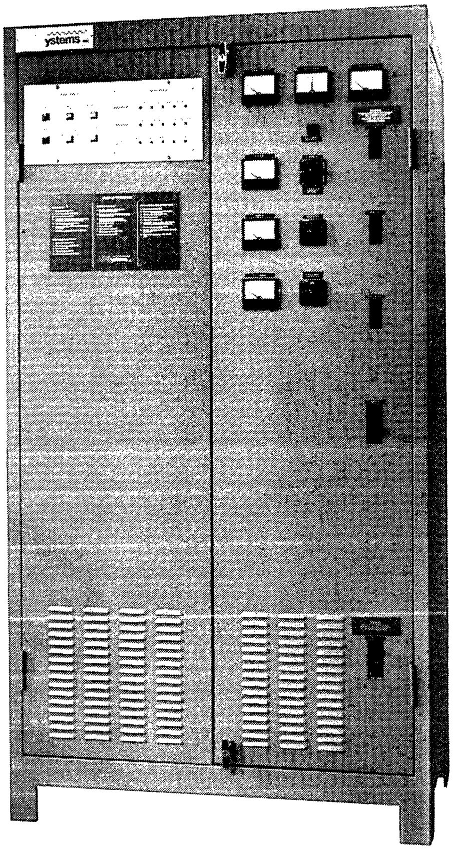
There are thousands of EEM File Systems in everyday use in engineering and procurement offices all over the world. Shouldn't you be using this proven system?

The EEM File System is shipped in one neat package. The package contains everything you need to set up your very own filing system. Best of all, it's easy to get and very affordable. Send a check or money order for $25.00 and EEM will pay the postage and sales tax. If you must use a purchase order, please add $5.00 for postage and handling. An invoice will accompany your System.

Don't waste any more time. Get organized now!

EEM FILE SYSTEM,
645 stewart ave., garden city, ny 11530

static Uninterruptible Power Supply systems



- **SOLID STATE**
- **FULLY AUTOMATIC**
- **ULTRA-RELIABLE**
- **ULTRA-EFFICIENT**

SYSTEM FEATURES

EFFICIENT

85% average efficiency (AC to AC) as manufactured by UPSystems is a major money saver over the life of the UPS.

COOL RUNNING

High efficiency produces less heat so less air conditioning is required, which reduces power consumption.

LIGHTWEIGHT, SMALL, QUIET

Especially important for installation in computer rooms or other small areas.

RELIABLE

Average time before any part fails — 30,000 hours. Most repairs accomplished in less than one hour.

POWER TRANSFER

Upon utility power failure, the power flow is transferred to batteries (zero time) uninterrupted.

SYSTEMS SPECIFICATIONS

	UNITS	SINGLE PHASE				THREE PHASE							
Continuous Rating	k VA	2.5	5.0	7.5	10	15	30	37.5	50	75	100	125	150
Inverter Overload Rating (15 Minutes)	k VA	3.1	6.3	9.4	13	18.8	38	46.8	63	93.7	125	156	187
Short Circuit Current Rating	Amperes	32	64	95	128	63	125	155	209	312	416	520	624
Charger Output	VDC	120	120	120	120	120	240	240	240	240	240	240	240
Battery Current (Full Load)	Amperes	5	5	10	10	30	30	30	40	60	80	90	115
Conversion Efficiency	% AC-AC	85	85	85	85	85.5	87.3	87.3	87.3	87.5	88.4	88.4	88.9
Heat Dissipation	KBTU/HR	1.2	2.4	3.6	4.8	6.9	11.9	14	19.6	29	35.8	44.7	51.1
Accoustical Noise (Max @ 5 Feet)	dBA	60	60	60	60	60	60	60	65	66	67	68	70
Dimensions Ht, Wdth, Dpt	Inches	60x21x25		78x25x34		85x44x28			85x 44x 33	85x66x33			85x 66x 33
Weight	Lbs.	550	660	1000	1320	1760	2200	2400	2700	3075	3300	3600	4000

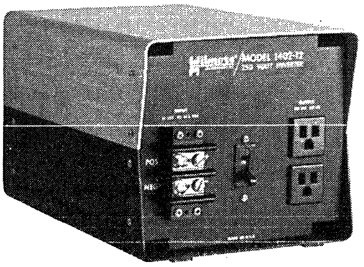
Consult Factory for Intermediate Sizes from 0.65 thru 150 k VA and 50 Hz Freq.

UPSystems INC.

7801 E. Compton Blvd., Paramount, CA 90723
Phone: 213/634-0621 • 1-800-824-0165 • TWX: 910-346-78

DC-to-AC Inverters

MODEL 1404


MODEL 1402

Wilmore®
ELECTRONICS CO., INC.

45 TO 1000 WATTS OF AC POWER FROM DC POWER SOURCES

- **HIGHLY EFFICIENT**
- **FREQUENCY STABLE**
- **CONSERVATIVELY RATED**
- **MECHANICALLY RUGGED**

Wilmore manufactures solid-state transistor-switching dc-to-ac inverters to power ac loads of up to 1000 volt-amperes from a dc power source. These inverters are characterized by conservative electrical and thermal design, and a great deal of attention has been paid to mechanical layout and structural integrity to ensure trouble-free operation in harsh electrical and mechanical environments. Users can choose between inverters with three different ac-output-voltage waveshapes to more closely match the inverter to the user's load requirements.

Many loads can be adequately powered with a square-wave output. Most small motors, lighting loads, heating and other resistive loads, and some electronic equipment are compatible with this waveshape. Inverters which provide a square-wave output are generally simpler in design and more efficient in operation than those which provide a more refined waveshape. Our Model 1124A and Model 1172 are square-wave inverters featuring high efficiencies and a clean output waveshape. In addition, the Model 1172 is a modular inverter, and two can be easily paralleled in the field using an optional paralleling cable set. The Model 1172 also provides a 2:1 output power surge capability for powering loads with high inrush current.

Some electronic instruments, small computers, chart recorders, and audio and video tape recording equipment require a more refined waveshape than a square-wave. Our Model 1057 and Series 1400 inverters provide a three-level-step waveshape having peak and rms voltages that approximate those of a pure sine wave while maintaining operating efficiencies comparable to square-wave inverters. This waveshape is intended to ensure compatibility with sensitive electronic equipment for which sine-wave power would normally be specified. The Model 1057 inverters provide a regulated output voltage, and the Series 1400 inverters feature a 2:1 output power surge capability. For rare instances where true sine-wave power is required, our Model 1081 provides a closely regulated, low-distortion sinusoidal output with excellent frequency stability.

Model Number	Output Power[1] (Volt-Amps)	Nominal Input Voltage (Vdc)	Nominal Output Voltage (Vac)	Output Frequency (Hz)	Dimensions (h" x w" x d")	Weight (Pounds)	Efficiency (Typical)
SQUARE-WAVE OUTPUT							
1124A-12	45	12	115	60	4 x 5¼ x 6⅝	6	70%
1124A-24		24					75%
1172-12-115-60	500	12	115	60	7 x 8½ x 11½	30	80%
1172-12-230-50			230	50			
1172-24-115-60		24	115	60			85%
1172-24-230-50			230	50			
1172-32-115-60		32	115	60			85%
1172-32-230-50			230	50			
THREE-LEVEL-STEP-WAVE OUTPUT							
1401-12-115-60	50	12	115	60	4¼ x 5¼ x 7	6	60%
1401-12-230-50			230	50			
1401-24-115-60		24	115	60			65%
1401-24-230-50			230	50			
1401-48-115-60		48	115	60			65%
1401-48-230-50			230	50			
1402-12-115-60	250	12	115	60	7¾ x 9 x 12	31	80%
1402-12-230-50			230	50			
1402-24-115-60		24	115	60			85%
1402-24-230-50			230	50			
1402-48-115-60		48	115	60			85%
1402-48-230-50			230	50			
1057-12-115-60	300	12	115	60	8¼ x 11 x 8¾	25	80%
1057-12-230-50			230	50			
1057-24-115-60		24	115	60			85%
1057-24-230-50			230	50			
1057-28-115-60		28	115	60			85%
1057-28-230-50			230	50			
1057-32-115-60		32	115	60			85%
1057-32-230-50			230	50			
1403-12-115-60	500	12	115	60	8¾x12½x11	44	80%
1403-12-230-50			230	50			
1403-24-115-60		24	115	60			85%
1403-24-230-50			230	50			
1403-48-115-60		48	115	60			85%
1403-48-230-50			230	50			
1404-24-115-60	1000	24	115	60	8¾x12½x11	47	85%
1404-24-230-50			230	50			
1404-48-115-60		48	115	60			85%
1404-48-230-50			230	50			
SINE-WAVE OUTPUT							
1081-12	500	12	115	60	6¾x19x20½	95	70% (at Full Load)
1081-48		48				65	
1081-125		125				65	

1. All models except Model 1124A, Model 1057, and Model 1081 have a 2:1 output power surge capability.

See Our Pages in Section 4000
DC-to-DC CONVERTERS
PULSED LASER POWER SUPPLIES

WILMORE ELECTRONICS CO., INC.

P.O. Box 1329, Hillsborough, N.C. 27278 • Telephone: (919) 732-9351 • Telex: 292617 WLMR UR

Uninterruptible Power Systems

MODEL 1409

MODEL 1406

Wilmore®
ELECTRONICS CO., INC.

RELIABLE PROTECTION AGAINST AC POWER FAILURE

- **POWER RATINGS TO 1000 WATTS**
- **HIGHLY EFFICIENT FOR LONGER BACKUP TIMES**
- **FREQUENCY-STABLE INVERTER**
- **2:1 POWER SURGE CAPABILITY**

Serious problems may result when commercial ac power is unexpectedly interrupted to sensitive loads such as point-of-sale terminals, PABX and communications equipment, small computers, or security systems. Wilmore's point-of-use uninterruptible power systems protect these critical loads from severe brownouts and loss of commercial power.

There are two general approaches to the design of an uninterruptible power system (UPS). One method processes commercial power through a battery charger, batteries, and a dc-to-ac inverter, always powering the user's equipment from the UPS's internal inverter. The other method is to power the user's equipment from the inverter only upon failure of commercial power. The first method is inherently more expensive initially and is more costly to operate; it requires both the battery charger and inverter to be sized to the user's full power requirement and all of the output power must undergo ac-to-dc rectification followed by dc-to-ac inversion. Wilmore UPS's use the second method, making them less expensive to purchase and allowing very low operating costs with much higher system efficiencies. Each UPS on this page (except the four Model 1252-SQ types) incorporates an inverter which provides Wilmore's unique three-level-step approximation to a sine wave for powering virtually any load within its output-power rating. In addition, each UPS (except the Model 1252-ST and Model 1406 types) provides a 2:1 output power surge capability for powering loads with high inrush current.

See Our Pages in Section 4000
DC-to-DC CONVERTERS
PULSED LASER POWER SUPPLIES

Automatic Transfer

Interruption of commercial power causes Wilmore Uninterruptible Power Systems to switch to internal operation in a few milliseconds. The Series 1252 UPS transfers in approximately 25 milliseconds and the Series 1400 UPS switches in approximately 15 milliseconds. Upon restoration of normal ac power, the UPS switches back to supplying the load directly from the commercial line and the internal battery charger begins to recharge the battery.

Batteries

Standby power for the system is provided by external batteries which are maintained at full charge by the built-in battery charger. Backup time is determined by the rating of the battery bank employed by the customer. Units are available for either 12- or 24- Vdc batteries. Batteries are not supplied with Wilmore's UPS units.

Battery Charger

The battery charger, supplied as an integral part of each Wilmore UPS, is a precision current-limited charger which float charges the battery at a pre-established level whenever commercial AC power is present and the charging current demand by the battery does not exceed the current-limit level. The float-charge voltage is factory adjusted to 13.65 Vdc for 12-volt batteries and 27.3 Vdc for 24-volt batteries. The maximum charging current level for each model is given in the table below.

Protection

All models are protected against output overloads and against accidental reversal of the dc input-voltage polarity. An under-voltage sensing circuit helps protect the batteries from possible damage resulting from excessive discharging.

Availability

All models are normally shipped from stock in the 115-Vac 60-Hz versions. Allow two weeks delivery for 230-Vac 50-Hz models. Contact our sales department for information about other standard features and custom-designed units.

Model Number	Output Power[1] (Volt-Amps)	Battery Input Voltage (Vdc)	Battery Charger Current (Adc max)	Nominal Output Voltage (Vac)	Frequency (Hz)	Dimensions (h" x w" x d")	Weight (Pounds)
SERIES 1252 (19" rack mountable)							
1252-ST-250-115-60-12	250	12	3	115	60	5¼ x 17 x 14	43
1252-ST-250-230-50-12				230	50		
1252-ST-250-115-60-24		24	2	115	60		
1252-ST-250-230-50-24				230	50		
1252-SQ-500-115-60-12	500	12	3	115	60		46
1252-SQ-500-230-50-12				230	50		
1252-SQ-500-115-60-24		24	2	115	60		
1252-SQ-500-230-50-24				230	50		
SERIES 1400							
1406-12-115-60	50	12	3	115	60	7 x 8½ x 11½	15
1406-12-230-50				230	50		
1406-24-115-60		24	2	115	60		
1406-24-230-50				230	50		
1407-12-115-60	250	12	3	115	60	8¾ x 12¾ x 11	42
1407-12-230-50				230	50		
1407-24-115-60		24	2	115	60		
1407-24-230-50				230	50		
1408-12-115-60	500	12	6	115	60	9 x 12¾ x 16	56
1408-12-230-50				230	50		
1408-24-115-60		24	3	115	60		
1408-24-230-50				230	50		
1409-24-115-60	1000	24	3	115	60	9 x 12¾ x 16	60
1409-24-230-50				230	50		

1. All models except Model 1252-ST and Model 1406 have a 2:1 output power surge capability.

WILMORE ELECTRONICS CO., INC.

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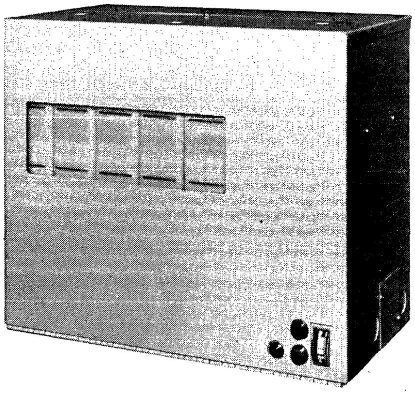
Xylog

M/POWER SYSTEMS

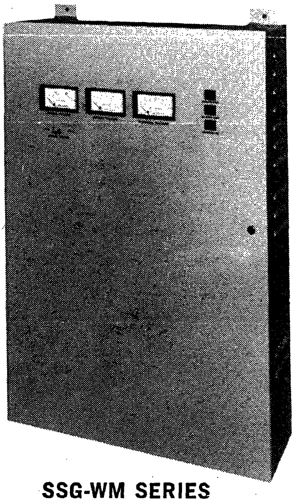
DON'T MISS A BEAT WITH XYLOG CORPORATION UPS OR SPS SYSTEMS



MPS SERIES

- Output Frequency: 60 Hz ±.1%
- Protection: Overload Protection
- Voltage Regulation: 5% Max
- Recharge Time: 12 Hrs.

Model	Battery Type	Output Watts 60HZ AC	Time	Size (LxHxD)	Wgt. (lbs.)
MPA200 VANC	Nickel-Cadmium	200	1½ hrs.	30"x12"x8"	155
MPA400 VANC	Nickel-Cadmium	400	1½ hrs.	30"x12"x8"	160
MPA600 VANC	Nickel-Cadmium	600	1½ hrs.	40"x14"x8"	170
MPA200 VALA	Lead-Acid	200	1½ hrs.	30"x12"x8"	145
MPA400 VALA	Lead-Acid	400	1½ hrs.	30"x12"x8"	150
MPA600 VALA	Lead-Acid	600	1½ hrs.	40"x14"x8"	165



SSG-WM SERIES

SUPERVISORY PANEL INCLUDING:

- AC Voltmeter
- DC Ammeter
- DC Voltmeter
- AC Line Test Lamp
- Inverter On Lamp
- High Charge Lamp

Model	Battery Type	Output VA	Time	Size
SSG-WM-800VA	Lead-Acid	800	1½ hrs.	32⅜"x42"x10⅜"
SSG-WM-1.0KVA	Lead-Acid	1.0K	1½ hrs.	32⅜"x42"x10⅜"
SSG-WM-1.3KVA	Lead-Acid	1.3K	1½ hrs.	32⅜"x42"x10⅜"
SSG-WM-1.5KVA	Lead-Acid	1.5K	1½ hrs.	32⅜"x42"x10⅜"

DESIGN AND OPERATIONAL FEATURES

INPUT—Wide selection of AC 60 Hz voltages.

OUTPUT—60 Hz voltage of essentially utility grade regulated over full load and battery voltage range.

VOLTAGE REGULATION—±10% 10-100% load .8 to 1.0 Power Factor.

FREQUENCY REGULATION—1%.

COMPUTER LOGIC CONTROL—Programmed at the factory, the computer logic cards control the battery charger, monitor line voltage and battery voltage, control inverter and regulate the system in normal and emergency mode.

SURGE CURRENT LIMITING—Limits current drawn by charger during recharge period to maximum safe value.

OVERLOAD PROTECTION—Internal circuitry and specially selected thermal and magnetic tripping devices protect the charger, inverter and batteries from overloads and short circuits.

RESTORATION DELAY—Maintains inverter "on" for approximately 8 seconds after normal power is restored. Insures stable voltage to load. Reduces surge on line power circuits during unstable interval when utility is attempting to come on line and start heavy equipment.

SHORT CIRCUIT PROTECTION—Circuitry allows inverter to start full incandescent loads with attendant high starting current, without hesitation. Automatically protects the inverter against load shorts or overloads.

CONSERVATIVE RATING—All Standby Solid State Generators are conservatively rated to allow for minor errors in load calculation or connection.

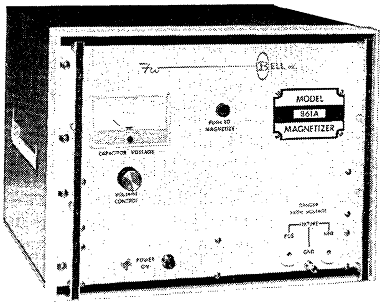
PERMANENT INVERTER CONNECTION—The inverter is permanently connected to the battery. It is energized at all times to insure maximum reliability and minimum start-up time.

Xylog Corporation DEPT. EM, 150 TILLMAN ST., WESTWOOD, NJ 07675 / TELEPHONE (201) 664-7997

Magnet Processing Equipment

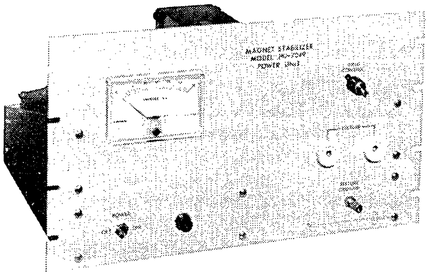
Magnetizers • Stabilizers • Fixtures

Magnetizers



Bell magnetizers are capacitive discharge power units designed to supply a current pulse to a magnetizing fixture coil. The energy level is variable and accurately repeatable. Internal logic makes it impossible to fire the magnetizer until the capacitor-stored energy reaches the preset level.

Stabilizers

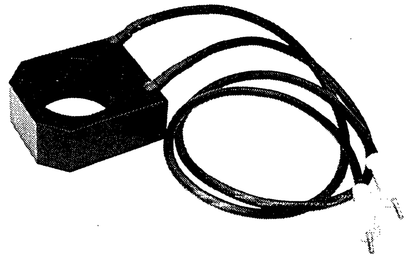


Bell stabilizers are phase-fired SCR power units designed to supply the demagnetizing current to a fixture coil. The magnitude of the current is variable, repeatable and may be controlled automatically for field stabilization purposes. The unit will supply enough current to a properly designed coil and fixture to stabilize most modern magnetic materials.

FEATURES

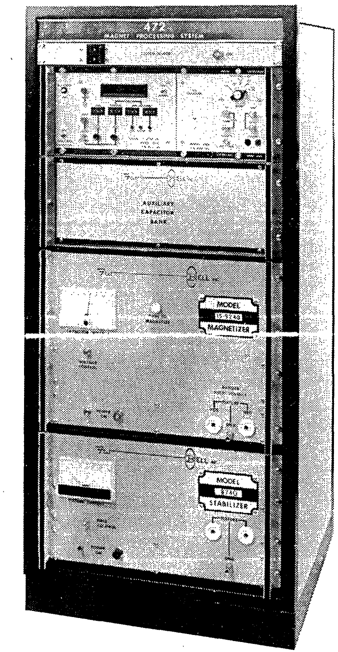
- **Solid-State**
The entirely solid-state units are designed for long life and high reliability
- **Low-Voltage Magnetizer**
The magnetizer operates at high capacity and low voltage for personal safety and long equipment life
- **Manual or Automatic Operation**
Magnetizer and stabilizer units are usually manually operated. However, they may be integrated into automatic systems through the use of optional equipment available from F.W. Bell

Fixtures



Bell fixtures are designed to apply the proper pulsed magnetic field to the magnet or magnet assembly. The fixtures provide the field shape and direction to accommodate the specific magnet configuration and magnetization direction. Special fixtures that simulate specific magnetic circuits are available. F.W. Bell supplies fixture design assistance.

Model 470 Magnet Processing System



Designed to be used with a large variety of fixtures, standard or special, for the purpose of magnetizing and stabilizing magnets or magnet assemblies to a desired flux density level. In addition to processing the magnet, the system checks for proper final value. Processing proceeds automatically in the sequence of magnetize, test for saturation, stabilize, and test for final value. If the saturation test indicates "Below" the cycle will terminate, skipping the regular stabilize sequence. Manual operation is also possible, permitting magnetizing and stabilizing to be initiated individually by panel buttons.

F.W. BELL
An Allegheny International Company

6120 Hanging Moss Rd., Orlando, FL 32807
Phone: 305-678-6900 TWX: 810-853-3115

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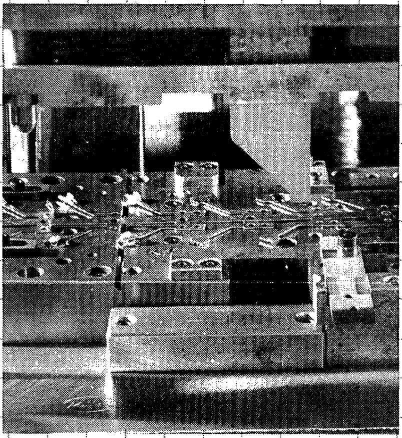
Specialty Controls Packaging In Action

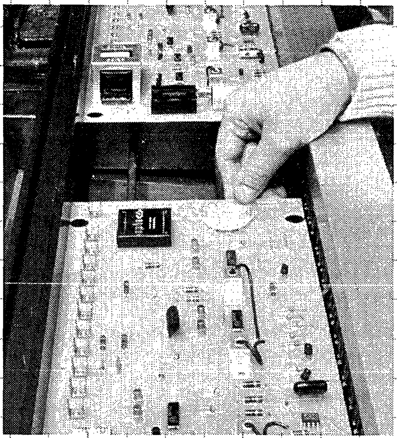
Whether you want hundreds or thousands of control assemblies, **CURTIS CAN HELP.** We carefully review your prints, parameters, environments, and other specifications. Then we offer an out-of-the-ordinary approach to cost-effective controls manufacturing. Give us a call, today . . . we'll show you profitable results.

Total Control Package

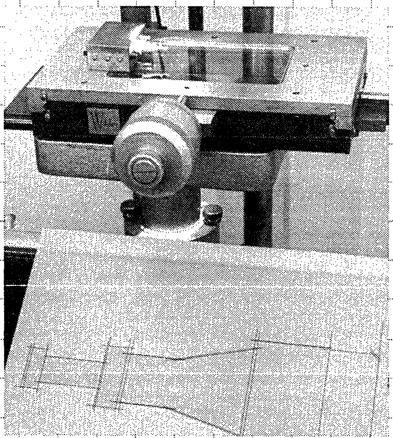
Fabricating Capability ... Within the Machine Shop of the World

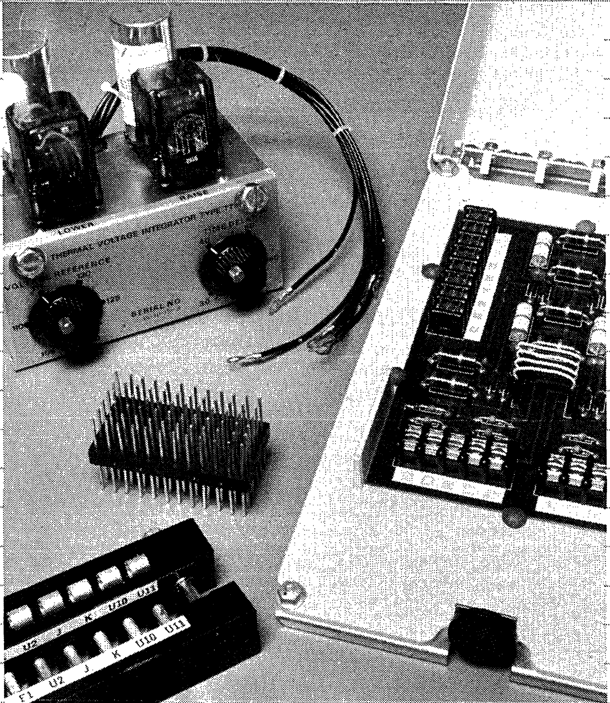


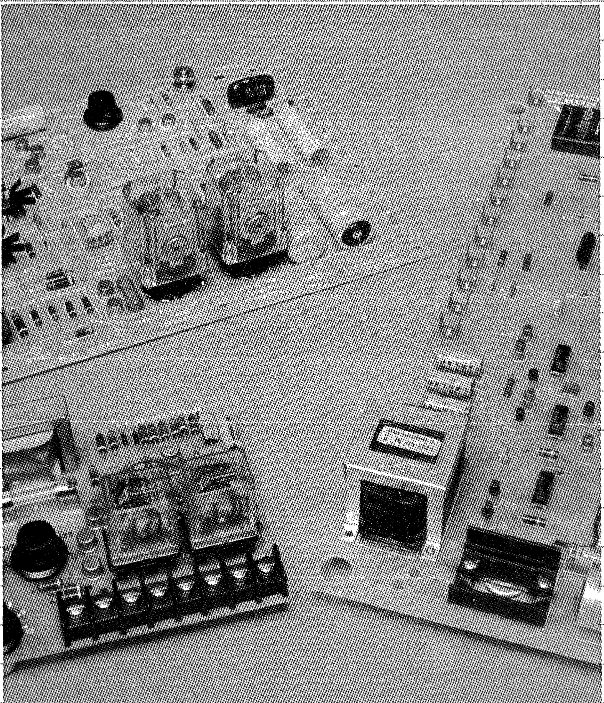
Assembly Operations Minimize Labor Content, Maximize Reliability ...



TOTAL QUALITY ASSURANCE







CURTIS INDUSTRIES, INC.®

8000 W. Tower Avenue, Milwaukee, Wisconsin 53223
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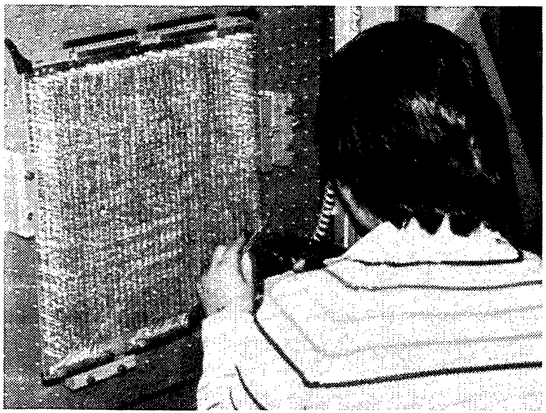
"We Build Confidence!"

DATAWRAP

. . . FOR WIREWRAPPING ASSEMBLY SERVICE

WE HAVE ALL THE TOOLS AND PEOPLE TO DO THE JOB RIGHT . . .

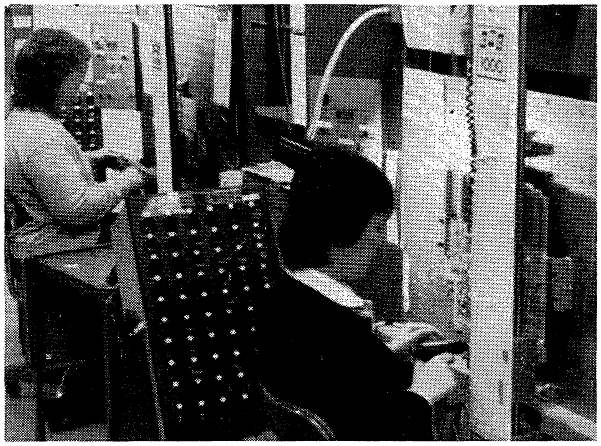


Our computer-controlled system is the culmination of 5 years of design and development SPECIFICALLY FOR WIREWRAP. Our semi-automatic wire-wrap stations are micro-computer controlled satellite systems, receiving their commands from a PDP-11 master computer. And our on-line wirelist generation and analysis program is the most advanced in the industry.

Prototypes
★★★★★ Are Our Specialty ★★★★★

- OUR GIANT DATAWRAP-4000 MACHINE–will accommodate wire-wrap panels up to 6½ feet long.
- OUR IN-HOUSE ENGINEERS–can handle special problems; such as input from schematics.
- WE DO EVERYTHING IN-HOUSE–from data processing, wire cutting, stripping and twisting, to design and development of new equipment.
- FOR YOU, OUR CUSTOMER–this means fast, efficient, trouble-free service, customized as required.

★ Most Modern Equipment
★ Fast Turn-Around
★ Customized Service
★ Convenient Location
★ Free Wirelist Storage
★ Special Pickup and Delivery Available



CALL US TODAY
FOR MORE INFORMATION
(617) 938-8911

DATAWRAP inc.

13 Henshaw Street
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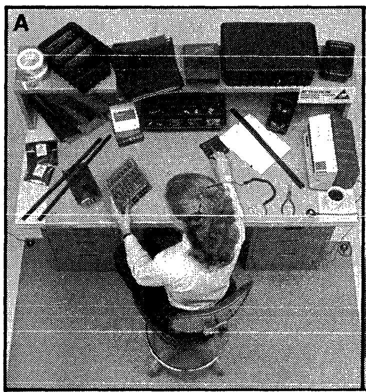
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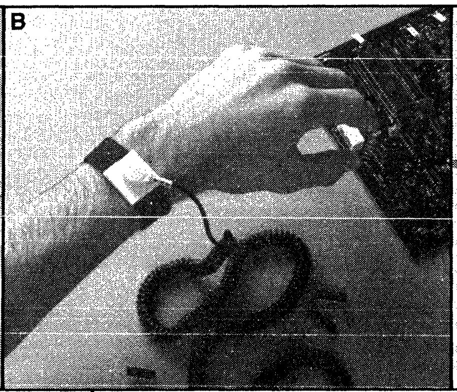
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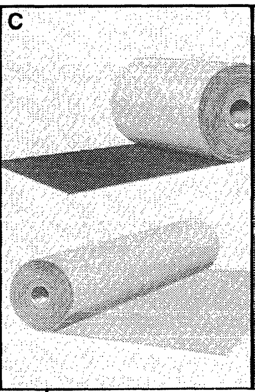
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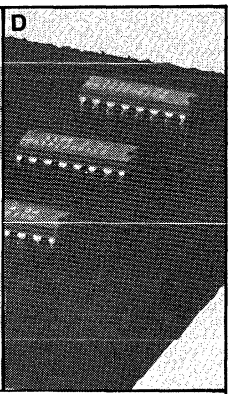
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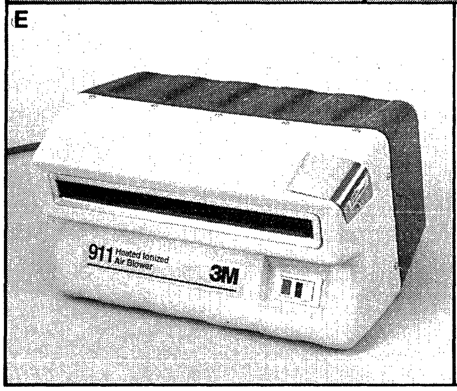
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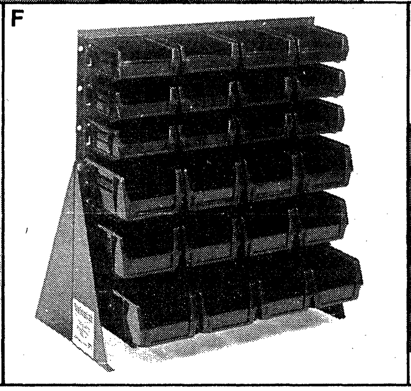
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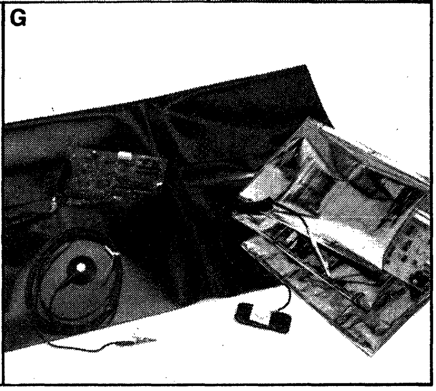
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Rule#1 Handle all static-sensitive components at a static-safeguarded work area.

A. Safeguard Work Station Kit provides the materials needed to create a static-safe work area. The kit adapts easily to most production operations, including fabrication, assembly, storage, kitting and testing areas. Kit includes:

1. **Conductive Floor Mat** with ground cord, available in 5 colors.
2. **Conductive Table Pad,** available in 5 colors.
3. **Conductive Charge-Guard® Wrist Strap.**
4. **Conductive Ground Cord** that connects table top to floor mat and completes grounding system.
5. **3M Model 911 Ionized Air Blower.**

B. Charge-Guard® Wrist Strap dissipates static charge found on personnel – before static damages sensitive devices. The wrist strap features a new band made of stainless steel fibers woven with an elastic nylon. The result is a highly conductive, corrosion-resistant elastic band that gently and comfortably conforms to the wrist for reliable contact to ground. Comes with a one megohm resistor.

To order, please specify wrist strap model number and size.

Model	Description	Wrist Size
2066	5′ coil cord	Small, up to 6½″ circ. (camel) Large, over 6½″ circ. (navy blue)
2067	4′ straight cord	Small, up to 6½″ circ. (camel) Large, over 6½″ circ. (navy blue)
2071	10′ coil cord	Small, up to 6½″ circ. (camel) Large, over 6½″ circ. (navy blue)

C. 8200 Series Table and Floor Runners drain static charge from personnel and ground conductive objects. Available in 40 ft. rolls and 5 colors.

Model 8230 Series Table Runner includes 2′ x 40′ runner, two 15′ ground cords, two female snap fasteners and ten swivel connectors to terminate wrist straps. Model 8220 Series Floor Runner includes 4′ x 40′ runner, two female snap fasteners and two 15 ft. ground cords. **New Charge-Guard® Static Protective Hard Laminate.** Now available in 3 colors. For workstation table surfaces.

D. VELOSTAT® Non-corrosive, Conductive Foam provides physical and static protection for sensitive components. Keeps leads at equal potential when inserted in the foam and shunted. Improved formula eliminates corrosive chlorides and sulfides even under elevated temperatures and humidities over a long period.

Type 2900 low density and 2910 high density; thickness: ⅛″, ¼″, ⅜″, ½″, ¾″, 1″. Sold in 24″ x 36″ sheets. ⅛″ and ¼″ available in 2 ft. x 50 ft. rolls.

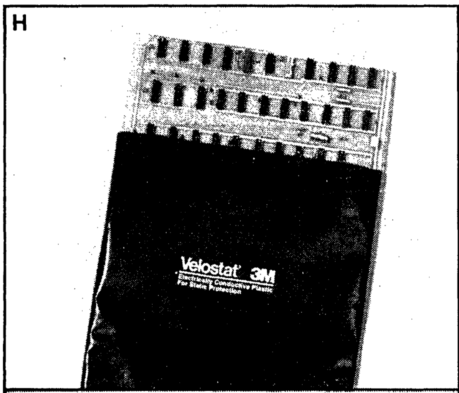
E. Model 911 Heated Ionized Air Blower creates a highly efficient, but low velocity supply of ionized air to evenly blanket a 2′ x 4′ work surface. The ionized air neutralizes static charge on non-conductors such as tape, polyester clothing and polystyrene cups. The Model 911 is purchased, but its static neutralizer element, Model 220, is leased annually.

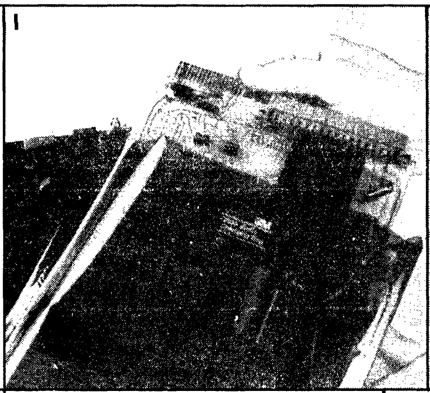
F. VELOSTAT® Conductive Parts Bins and Assembly Stands create an organized, grounded system for assembly. The bins are designed with a hopper front for easy access and identification. They are held by a convenient bench-top rack. The bins are made of conductive plastic, they will never rust or corrode. You can customize the arrangement of parts bins on the assembly stand to meet the needs of each assembly station.

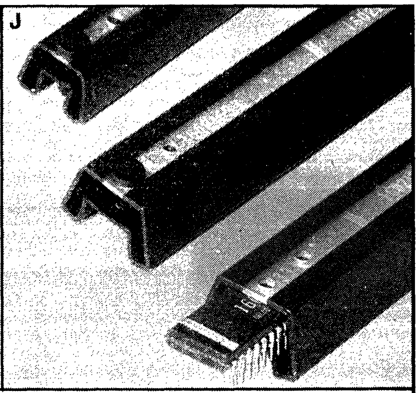
Model	Description	Size
4018	STAND	17⅝″ x 18″
4451	BIN	3″ x 3½″ x 1½″
4452	BIN	4″ x 3½″ x 2½″
4453	BIN	6″ x 3⅜″ x 2½″
4454	BIN	9″ x 4⅜″ x 4⅜″
4455	BIN	8″ x 8¾″ x 6⅜″
4456	BIN	11⅞″ x 6⅝″ x 6⅜″
4457	BIN	11⅞″ x 14¾″ x 6⅜″

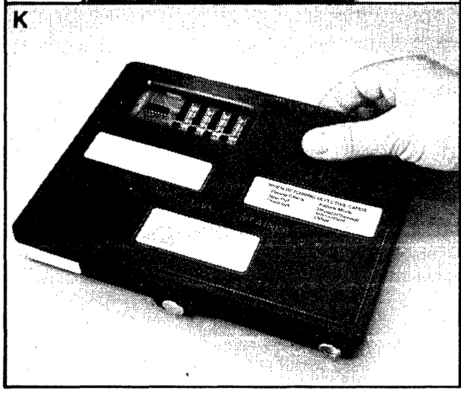
G. VELOSTAT® Conductive 8012 Portable Field Service Kit protects equipment from static damage during field repair. Included is 10 mil. film working surface, ground cord and Charge-Guard Wrist Strap.

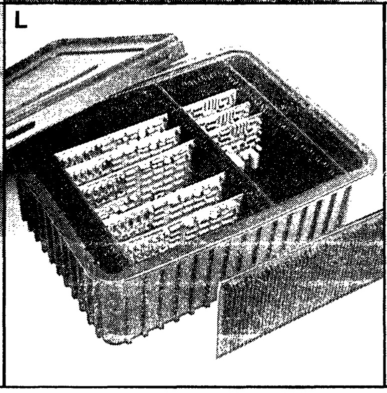
3M

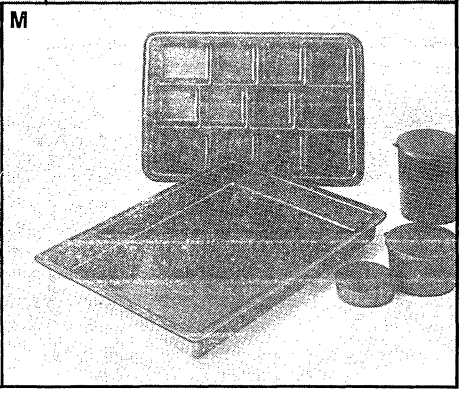












Rule#2 Transport all static-sensitive components in static-shielding containers or packages.

H. VELOSTAT® Opaque Electrically Conductive Bags, made of VELOSTAT Conductive Film, provide shielding from static by safely enveloping sensitive devices and boards in a humidity-independent Faraday cage. The bags' effectiveness is unaffected by humidity, age and many chemicals. Available in many sizes. Also manufactured to your specifications. All VELOSTAT Bags are heat-sealable.

I. 3M Transparent Static-Shielding Bags with identification printed on them, feature high-strength metallic-coated polyester film creating an electrostatic shield. The polyester is laminated to a heat-sealable, anti-static polyethylene inner layer that prevents static charge generation inside the bag. Custom manufactured sizes available. Standard sizes (in inches) for 3M Transparent Static-Shielding Bags and VELOSTAT Electrically Conductive Bags above.

Transparent Static-Shielding Bag Sizes

3″ x 5″	8″ x 10″	15″ x 18″
4″ x 4″	8″ x 12″	18″ x 18″*
4″ x 6″	10″ x 12″	4″ x 24″*
5″ x 8″	10″ x 14″	10″ x 24″*
5″ x 10″	11″ x 15″	4″ x 26″*
6″ x 8″	12″ x 16″	10″ x 26″*
6″ x 10″	12″ x 18″	4″ x 30″*
8″ x 8″	14″ x 18″	10″ x 30″*

*Special order for VELOSTAT

J. Static-Shielding Coextruded Shipping Tubes provide protection from internal and external static fields. Standard sizes for 300 mil. 400 mil and 600 mil. dual in-line packages. Lengths up to 25 inches. Custom sizes and configurations on request. Tubes feature viewing windows and pinholes..Specify pins or plugs with order.

K. Custom Containers and Packages are created to fit your product requirements. Provide physical and static protection. All custom specifications are accepted on a quotation basis. Our capabilities include: design engineering, injection-molding, vacuum-forming, die-cutting, corrogated fabrication, film lamination and film converting.

L. VELOSTAT® Adjustable Electrically Conductive Tote Boxes combine conductivity with rigidity. These totes are injection-molded for strength with a hard formula of VELOSTAT Electrically Conductive material.

Unlike ordinary plastic, VELOSTAT totes are truly conductive and shield static-sensitive parts from static charges that could blow or degrade them.

Adjustable dividers allow you to customize tote boxes to hold several differently sized P.C. boards.

Adjustable dividers complement models 4432, 4435 and 4438. Slip-in dividers and covers are available for all models.

Tote Box Dimensions (Inside)

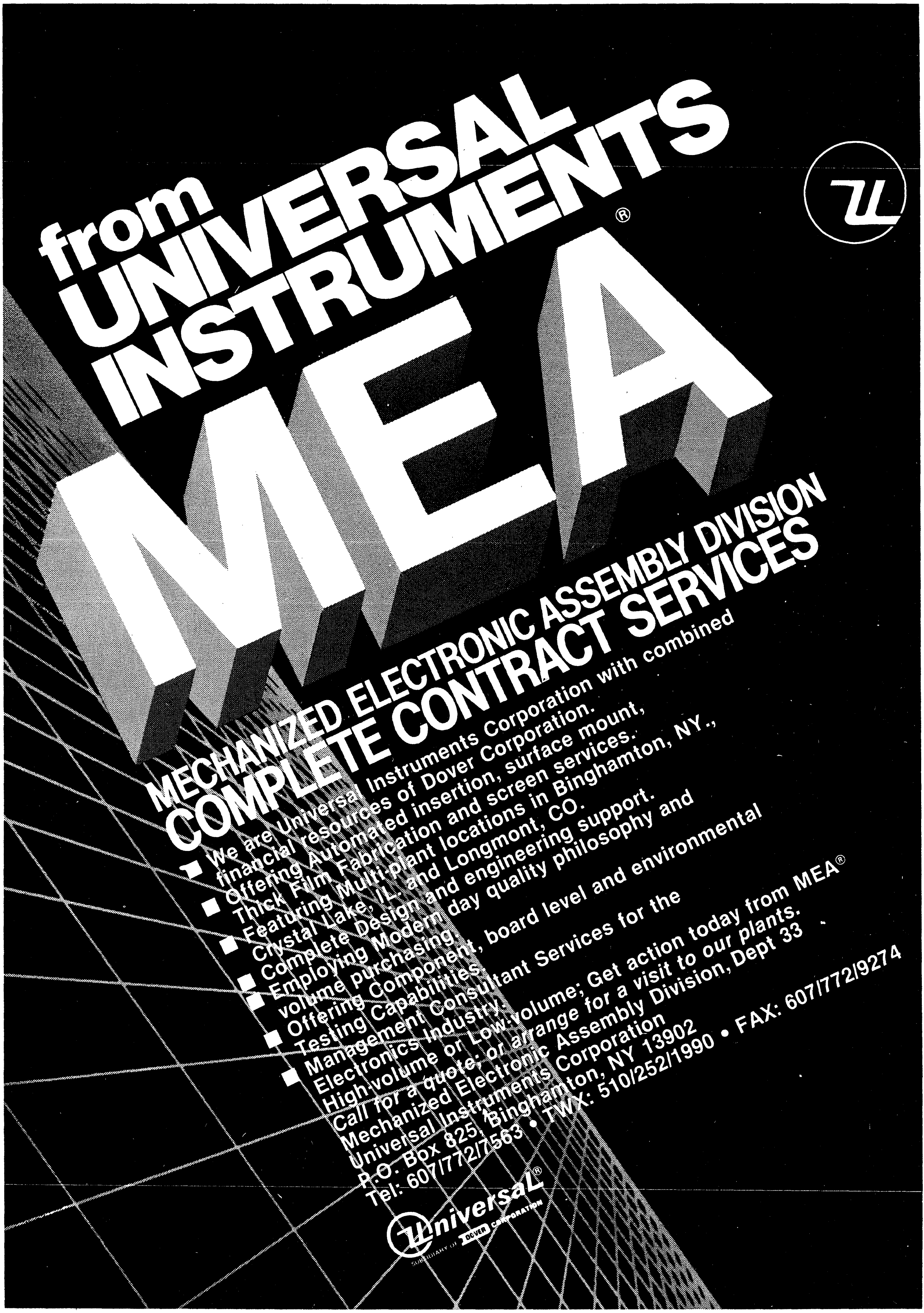
4415	9 3/16″ x 6 9/16″ x 4½″
4423	14⅞″ x 9¼″ x 3″
4425	14⅞″ x 9¼″ x 4½″
4428	14⅞″ x 9¼″ x 7½″
4432	20⅜″ x 15⅛″ x 11½″
4435	20⅜″ x 15⅛″ x 4½″
4438	20⅜″ x 15⅛″ x 7½″

M. VELOSTAT® Trays and Containers, made of VELOSTAT Electrically Conductive Plastic, are ideal for static-safe storage, kitting and shipping. Models 4010-20 and 4061 are available in a variety of shapes and sizes.

FOR MORE INFORMATION WRITE:
Static Control Systems Division/3M,
2111 W. Braker Lane, Bldg. 501,
P.O. Box 2963, Austin, TX 78769-2963.
OR CALL TOLL-FREE: 1-800-328-1368.

Total control of the static in your business **3M Hears You...**

3M



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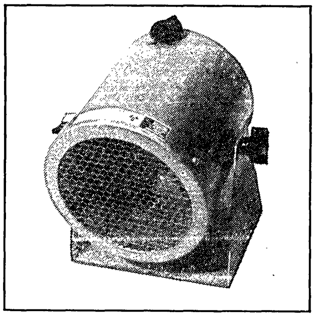
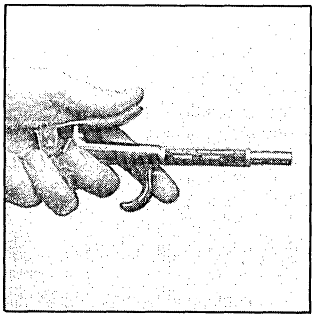
NRD Static CONTROL Products

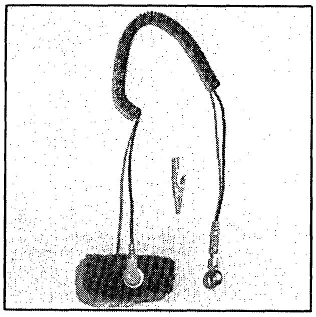
For More Effective Control of Static Electricity in Manufacturing, Assembling, Handling, Shipping



Nuclecel Ionizing Blower P2061
Neutralizes static charges on non-conductors, covering work areas with a gentle flow of ionized air. Replaceable ion cartridge available on an annual lease basis only.

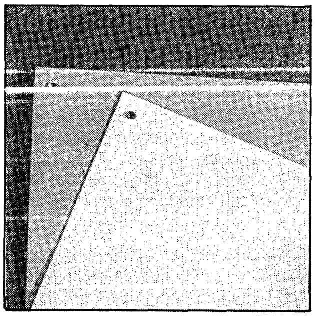


Nuclecel Ionizing Air Gun P2051
An effective, flexible, versatile means to neutralize static charges, remove surface particles and control the attraction of contaminants. A one micron filter cartridge is available. Ionizing element is available only on a yearly basis.



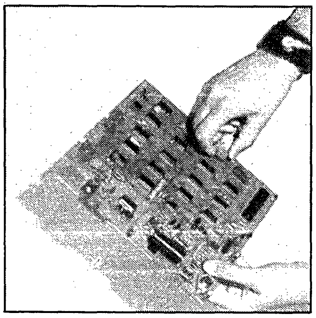
Personnel Ground Assembly 5058
A comfortable, lightweight way to link workers safely to the grounding system without inhibiting movement.

Model/Description	Size/Color
5058–6′ extended coil cord	up to 6½ circ. GREEN
5059–4′ straight cord	over 6½ circ. BLUE
5060′–12′ extended coil cord	

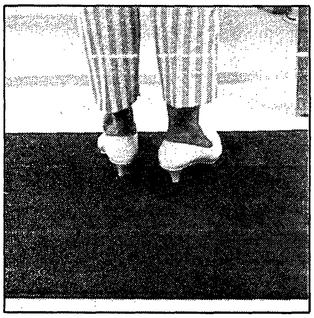


SEM Table Mats 6020
A rigid mat material with excellent conductivity that is rugged, attractive and reliable controlling static. Static dissipative and conductive ranges available.
Available in these sizes
Model 6020—24″×48″, 24″×120″, 36″×72″, 48″×120″
Colors: White, Blue, Beige or Black

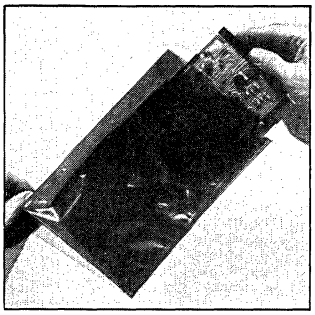
Whatever your static control requirements, including custom orders . . . check NRD first



Softouch Dissipative Table Mats 5046
Soft, attractive mats that provide a comfortable work surface.
24″×36″. Also available in 24″ or 48″ Standard size width rolls to 100 linear feet. Includes snap fasteners and ground cord, Colors: Putty, Lt. Blue



Softouch Anti-Fatigue Mats
Long lasting, cushioned floor mats that reduce operator fatigue and dissipate static. Edges are beveled to improve safety. Standard sizes 24″×36″ 36″×60″. Also available in rolls 3′×up to 60 linear feet. Color: Chocolate Brown



Static Shielding Bags
5070—Transparent, humidity independent and heat sealable, these bags protect parts from electrostatic discharges and fields while allowing easy parts identification.
Opaque Conductive Bags
5075—Opaque, volume conductive bags that provide a clean packaging medium for sensitive devices.
SIZES (opening/length) 4″×6″, 6″×10″, 8″×10″, 8″×12″, 10″×12″, 10″×14″, 12″×18″, 15″×18″, 18″×18″*, 4″×24″*, 10″×24″
(*available in opaque bags on special order only, all other sizes available in either model)

Plus These Other Fine Products

- Static control work stations
- Conductive socket shunts & bars
- Hi & lo density foam
- Static control heel straps
- Warning labels
- Conductive tote boxes/bins
- Air ionizers: in line, fixed, portable
- Standard floor & table mats

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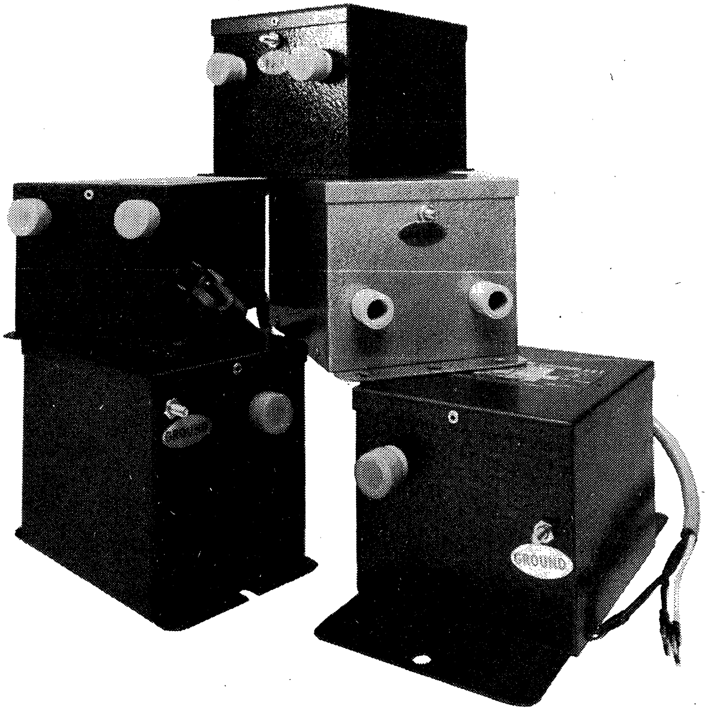
STATIC NEUTRALIZERS

ION GENERATORS

S&H units meet UL & CSA standards. Models are available with Line and Load regulation, many meet FCC 80-148/27114 Docket #20780.

These are the workhorses and the most often duplicated models in the S&H product line. Ranging from 3 to 8 KV, they power ionizing bars and grids used to combat static electricity. The most common size of these compact units is only 4½″ long, 2⅞″ deep, and 3½″ wide. All are current limited to 5 milliamperes maximum for all combinations of input and output voltages.



The following models are available for primary voltages from 120 Volts to 550 Volts, 50/60 Hz, and outputs from 4000 Volts to 8000 Volts.

MODEL NUMBER	INPUT VOLTAGE	OUTPUT VOLTAGE
M-1205	120V	5000V
M-1208	120V	8000V
M-2305	230V	5000V
M-2308	230V	8000V
R-1205X	120V	5000V*
R-1207XL	120V	7000V*
T-1204	120V	4000V**
T-1207	120V	7000V**

* Units are both Line and Load Voltage Regulated and will meet FCC Specifications as covered in Docket #20780.
** Line and Load Regulated.

S & H Industries Inc., a leader in miniature hi-voltage AC supplies now manufactures a line of hi-voltage low current DC power supplies. These supplies range up to 25 kilovolts and currents to 10MA. Ideal for use in ION generators, precipitators or duplicating machine applications.

S&H offers complete engineering design and application assistance for your specific requirements. Contact S&H today for more detailed information as well as a copy of our latest catalog featuring the entire S&H product line.

SEE OUR PAGE ON POWER SUPPLIES IN SECTION 4000 PAGE D•1829

S&H INDUSTRIES, INC.

119 GLEN COVE DRIVE • GLEN HEAD, NEW YORK 11545 • (516) 671-5600

MINIGLOSSARY SERVO COMPONENTS

SPECIFICATIONS

Excitation: The input voltage and frequency.

Transformation Ratio: The ratio of the output voltage, at maximum coupling, to the input voltage.

Phase Shift: The lead or lag of the output voltage with respect to the input voltage. For most synchros and resolvers, the phase shift can be approximated by the angle whose tangent is the ratio of the primary winding's DC resistance to its reactive component.

Impedance: Specified as R + jX, where R is the AC resistive component and X is the reactive component. Important impedances are: (a) Z_{po} (or Z_{ro} for rotor primary units), which is the impedance of the primary winding with the secondary open; (b) Z_{so}, which is the impedance of the secondary winding with the primary open; and (c) Z_{ss}, which is the impedance of the secondary with the primry shorted (essentially when driven by a low impedance).

Null Voltage: The voltage remaining when the unit is at electrical zero or in the minimum coupling position.

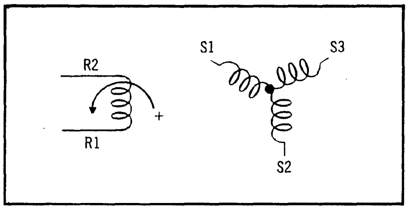
Accuracy: The error of the position of the rotor with respect to the electrical angle. It is defined as the output voltage driven by the "speed" (pole pairs) of the unit, referenced to the starting point of the calibration (usually the electrical zero position). Error is commonly expressed in minutes of arc (1/60 of a degree) or in seconds of arc.

Loads: For a transmitting unit, the impedance that the output voltage signal faces. This can be a receiver, a differential with its load, a control transformer, an A/D converter, etc.

Operation Temperature: The ambient temperature range over which the unit performs its primary function.

FUNCTIONS

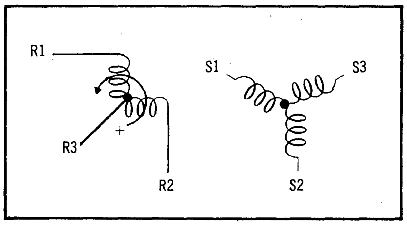
Transmitter: A unit with a Y-connected stator that outputs a signal proportional to the position of its single-phase excited rotor. High power units, called "torque transmitters," are used to drive one or more receivers. Low power transmitters are used to drive control transformers.



Receiver: A unit with a three-phase stator excited by the input, usually from a torque transmitter, and a single-phase rotor that follows the resulting stator field. Usually used to drive a position pointer.

Control Transformer: A unit with a three-phase stator excited by the input from a transmitter and a single-phase rotor mechanically driven to the null position by an external motor or other device.

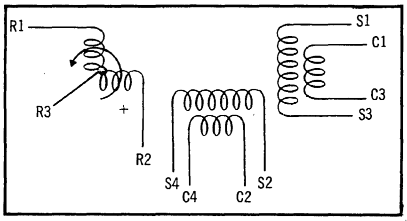
Differential: A unit with a three-phase stator and a three-phase rotor. It is usually connected between a transmitter, which excites its stator, and a receiver or control transformer. It can be used to "dial in" correction factors for the synchro chain.



Transolver: A unit with a three-phase stator and a two-phase rotor that can be used either as a control transmitter (with one rotor phase excited and the other shorted), or as a control transformer with the signal obtained from one phase of the rotor—making sure the other phase is equally loaded to prevent unbalances.

Differential Resolver: A unit with a two-phase stator and a three-phase rotor that is used as a transolver with the advantage that when connected as a control transformer, the signal does not travel through slip rings.

Resolver: A unit with a two-phase rotor and a two-phase stator that is used to create or receive SIN-COS signals such as vector resolutions for solving inertial platform coordinate transformations, unknowns of right triangles, etc. Resolvers can also be used as transmitting, differential, or receiving elements by proper choice of impedances. It is also possible to use resolvers as phase shifters where, in one mode, one rotor phase is excited and the two stator windings are feeding an appropriate RC network and indicating a phase shift, referred to the input, that corresponds to the rotor position.



Compensated Resolver: A unit with a "2×2" phase stator and a two-phase rotor used as a resolver with the added benefit of feedback windings in parallel with the stator windings that increase the useful accuracy over a wide range of environmental operating conditions.

Linear Transformer: A unit with a single-phase stator and single-phase rotor designed to provide a linear output voltage that is directly proportional to the rotor input angle. It operates over a range of less than ±90°, and is analogous to a potentiometer providing infinite resolution, but without contact between the elements. It can be used only with AC voltages.

Brushless Synchro: Available in two types—hairspring and bobbin. Hairspring synchros use spiral wound conductor springs to pick off the rotor signal, and are generally limited to a ±165° rotation. Most have mechanical stops to prevent damage due to over-rotation. Bobbin synchros pick off the rotor signal with rotary transformers inside the unit, allowing the rotor unlimited motion.

Pancake Unit: A name derived from the physical dimensions of the unit, which has a diameter that exceeds axial length. Sizes range from under 1" to 20" or more. The unit is frequently used as a gimbal pickoff element and is designed to fit a particular application envelope. It can be supplied as a rotor and stator only.

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A.C. Servo Amplifiers · Synchro Amplifiers · Modulators · Digital Controllers
Linear D.C. Powers Amps · Servo Valve Amps · Demodulators · Clutch Control Amps

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- Amplifiers available which utilize state of the art, Chips and Hybrids.
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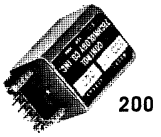
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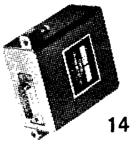
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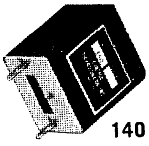
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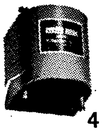
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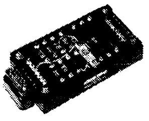
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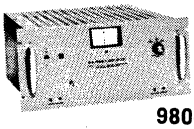
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AMPLIFIERS FOR A.C. SERVO MOTORS

MODEL	Output Power	Output Voltage	Output Frequency	Input Signal Frequency	Input Impedance	Gain	Power Required	Temperature Range
200-HP	3.5 W	40 VCT	400 Hz	400 Hz	10K	2,500	28VDC	—55°C +125°C
200-5	3.5 W	40 VCT	400 Hz	400 Hz	10K	5,000	28VDC	—55°C +125°C
930	3.5 W	40 VCT	400 Hz	400 Hz	250K	2,000	28VDC	—55°C +125°C
200-8	3.5 W	40 VCT	400 Hz	400 Hz	10K	2,500	115V 400 Hz	—55°C +125°C
216B	6 W	40 VCT	60 Hz	60 Hz	10K	1,000	28VDC	—55°C +85°C
140	6 W	40 VCT	400 Hz	400 Hz	50K	1,000	28VDC	—55°C +125°C
141	6 W (90°)	40 VCT	400 Hz	400 Hz	30K	1,000	28VDC	—55°C +125°C
416-3	16 W	40 VCT	400 Hz	400 Hz	10K	1,000	28VDC	—55°C +71°C
416A/D	16 W (0°/90°)	40 VCT	400 Hz	400 Hz (2)	10K	1,000	28VDC	—55°C +100°C
416M	16 W (90°)	40 VCT	400 Hz	DC (2)	10K	200	28 VDC 115V 400 Hz	-55°C +125°C
159	16 W	40 VCT	60 Hz	60 Hz	10K	1,000	28VDC	—55°C +100°C
159A/D	16 W (0°/90°)	40 VCT	60 Hz	DC	100K	1,000	28 VDC	-55°C +100°C
174	40 W (90°)	40 VCT	60 Hz	60 Hz	20K	1,000	28 VDC	
956B	40 W (90°)	40 VCT	400 Hz	400 Hz	10K	1,000	28VDC	—55°C +100°C
956C	40 W (90°)	40 VCT	400 Hz	DC	10K	500	28VDC 115V 400 Hz	—55°C +100°C
170-1	100 W (90°)	40 VCT	400 Hz	400 Hz	10K	1,000	28VDC	—55C° +85°C
170-3	180 W (90°)	36 VCT	400 Hz	400 Hz	10K	1,000	28VDC	—55°C +85°C

MODIFICATIONS to gain, input impedance, signal frequency, and power level are available. Matching transformers for driving motors at other voltages in stock.

LINEAR D.C. POWER AMPS

MODEL	Output Power	Output Voltage	Output Frequency	Input Signal Frequency	Input Impedance	Gain	Power Required	Temperature Range
998-2	40 W (Short Proof)	22V	DC	DC (2)	10K	50	28 VDC	—55°C +85°C
916	110 W (Short Proof)	20V	DC	DC (2)	10K	$3x10^5$	28 VDC —15 VDC	—55°C +100°C
987-17	200 W (Short Proof)	20V	DC	DC (2)	10K	10	28 VDC ±15 VDC	—55°C +71°C
980-1S	500 W (Short Proof)	50V	DC	DC	10K	100	115V 50-400 Hz	—55°C +71°C
980-28	1350 W (Short Proof)	52V	DC	DC	10K	100	50-400 Hz 3 Phase (1 Phase Available.)	—55°C +71°C
980-27	3000 W (Short Proof)	95V	DC	DC	10K	100	105 VDC and AC Fan Power	

MODIFICATIONS to gain, input impedance, signal frequency, power level and operating temperature available.

SYNCHRO AMPLIFIERS

MODEL	Output Power	Output Voltage	Output Frequency	Input Signal Frequency	Input Impedance	Gain	Power Required	Temperature Range
180-1	5W	11.8V Synchro	400 Hz	400 Hz SIN/COS	50K	3′	±15 VDC	−55°C +100°C
180-2	5W	90V Synchro	400 Hz	400 Hz SIN/COS	50K	3′	±15 VDC	−55°C +100°C
180-3	5W	90V Synchro	50/60 Hz	50/60 Hz SIN/COS	50K	3′	±15 VDC	−55°C +100°C

MODULATORS AND DEMODULATORS

MODEL	Output Power	Output Voltage	Output Frequency	Input Signal Frequency	Input Impedance	Gain	Power Required	Temperature Range
312	Full Wave	10V	DC	60 Hz	10K	10	28VDC 115V Reference	—55°C +125°C
334-1	Full Wave	50V	DC	400 Hz	10K	180	28VDC 115V 400 Hz	—55°C +125°C
334-2	Full Wave	30V	DC	400 Hz	125K	1	115V 400 Hz	—55°C +71°C
312-1	Full Wave	10V	DC	60 to 5000 Hz	10K	10	28VDC 115V Reference	—55°C +125°C
350-1	Full Wave	15V	DC	400 Hz	10K	10	28VDC 115V 400 Hz	—55°C +125°C

MODIFICATIONS to gain, output voltage and input impedance available.

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Servo Indicators Two Speed Servos Computer Interface Systems
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Servo Repeaters Data Transmission Systems Nuclear Control Rod Indicators Special Control Systems

CTC
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- Units available which will meet applicable MIL Specifications
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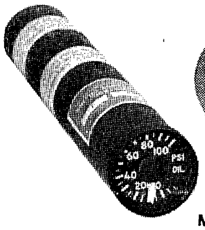
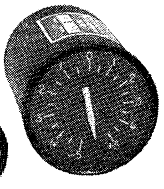
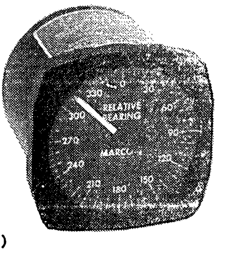
SYNCHRO AND SERVO REPEATERS



MS-33639 Case (1 in.)

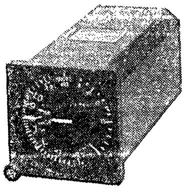


MS-33639 Case (2 in.)

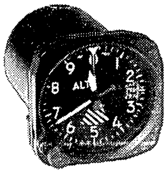


MS-33638 Case (3 in.)

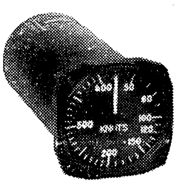
SIMULATOR INSTRUMENTS



Mach Air Speed

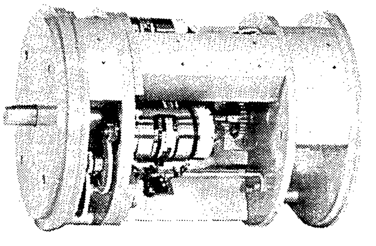


Altimeter

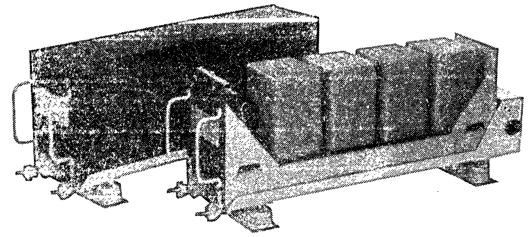


Air Speed

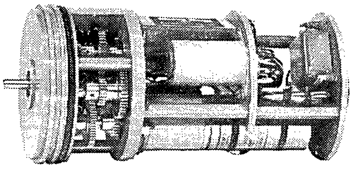
SERVO ACTUATORS



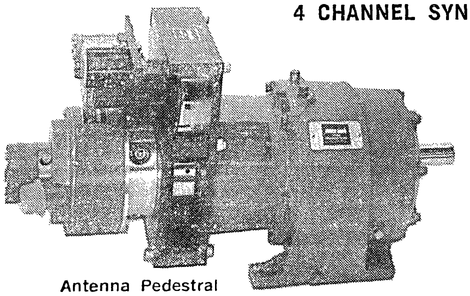
CS-202-2 300 lb. in. actuator



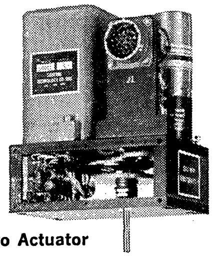
4 CHANNEL SYNCHRO AMPLIFIER



CS-198 250 oz. in. 0.1% accuracy actuator

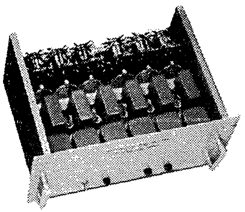


Antenna Pedestral
Azimuth Servo Drive

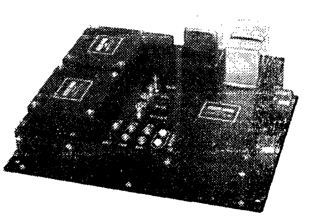


Custom Servo Actuator

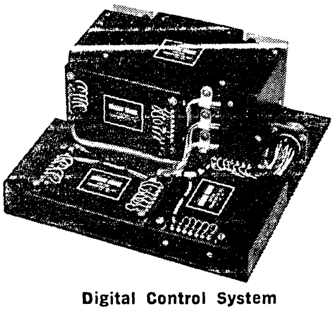
SPECIAL CONTROL SYSTEMS



Control System used in ASW



HYDRAULIC
SERVO CONTROL SYSTEM



Digital Control System

SONAR SIMULATOR

SIMULATOR CONTROL SYSTEM

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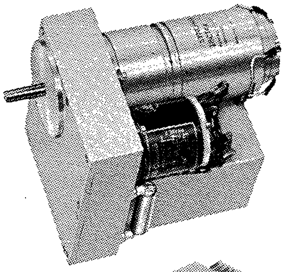
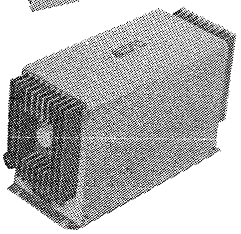


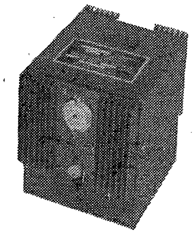
SERVO AMPLIFIERS

- For DC, 60 & 400 Hz error signals & line power.
- 3 watts to 1 KW.
- Built-in power supply & damping.



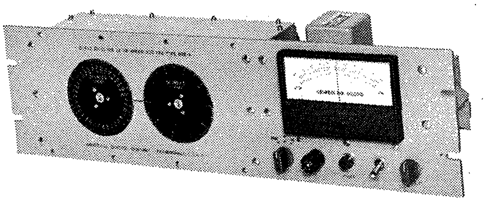
SYNCHRO AMPLIFIERS

- Solid state & electro-mechanical.
- 60 & 400 hz, single & multi-speed.
- Synchro frequency changers.



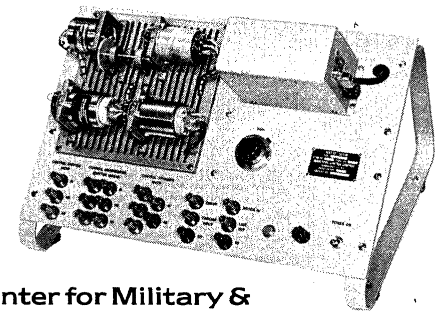
SERVO TEST EQUIPMENT

- Servo testers.
- Synchro directors, single & multi-speed.
- Harmonic motion generators.



SERVO DEMONSTRATORS

- Synchro data, single & multi-speed.
- Pot data, DC & AC error.
- For laboratory & classroom.



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- 1.5 MHz maximum clock rate

FOR STEPPING MOTOR OR SERVO MOTOR APPLICATIONS: KM3701 INTERPOLATION GENERATING CMOS LSI

Provides interpolation pulses for 2-axes movement
Linear, circular, parabolic, logarithmic and exponential interpolations
Automatic stop function
Fixed speed control

SPECIFICATIONS

Pulse Distribution Rate: 139.8 KPPS, Linear
(at 1.5 MHz clock rate) 73.2 Kpps, Circular
Data Bit Length: 24 bits
Power Requirement: +5V ±5%, 270 mW (Max)
Configuration: 28 pin ceramic DIP

AND TO CLOSE THE POSITION LOOP WHEN USING SERVO MOTORS: KM3702D COMPARATOR CMOS LSI

Monitors difference between instruction and feedback pulse
When zero error is detected, motor movement stops
Improves the accuracy of any servo system
Monitors user-selected position, saturation, and alarm zones

SPECIFICATIONS

Output: 16 bits
Throughput Rate: 13.3 μsec (1.5 MHz)
Power Requirement: +5V ±5%, 270 mW (Max)
Configuration: 40 pin plastic DIP

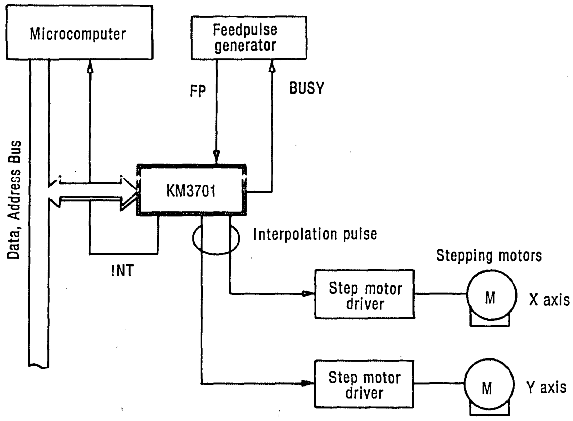
KM3703D ENCODER INTERFACE CMOS LSI

Provides CPU selectable feedback pulse multiplication of x1, x2, or x4
Detects CW/CCW motor direction

SPECIFICATIONS

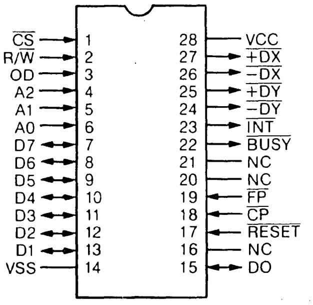
Power Requirement: +5V ±5%, 50 mW (Max)
Configuration: 16 pin plastic DIP

STEPPING MOTOR CONTROL


Microcomputer
Feedpulse generator
FP
BUSY
Data, Address Bus
KM3701
Interpolation pulse
!NT
Stepping motors
Step motor driver
M
X axis
Step motor driver
M
Y axis

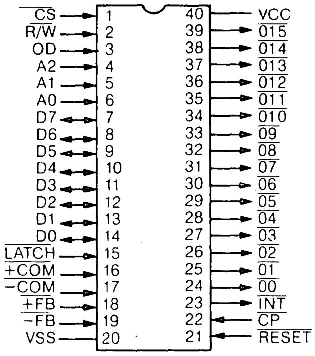
PIN ASSIGNMENT

KM-3701


CS 1
R/W 2
OD 3
A2 4
A1 5
A0 6
D7 7
D6 8
D5 9
D4 10
D3 11
D2 12
D1 13
VSS 14
28 VCC
27 +DX
26 −DX
25 +DY
24 −DY
23 INT
22 BUSY
21 NC
20 NC
19 FP
18 CP
17 RESET
16 NC
15 DO

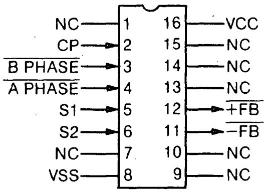
Signal	Explanation
CS	Chip Select
R/W	Read/Write
OD	Output Disable
AO~A2	Address
DO~D7	Data Bus
Reset	Reset
CP	Clock Pulse
FP	Feed Pulse
Busy	Busy
Int	Interrupt
±DX	Output (X)
±DY	Output (Y)
VCC	+5V
VSS	Ground

KM-3702-D


CS 1
R/W 2
OD 3
A2 4
A1 5
A0 6
D7 7
D6 8
D5 9
D4 10
D3 11
D2 12
D1 13
D0 14
LATCH 15
+COM 16
−COM 17
+FB 18
−FB 19
VSS 20
40 VCC
39 015
38 014
37 013
36 012
35 011
34 010
33 09
32 08
31 07
30 06
29 05
28 04
27 03
26 02
25 01
24 00
23 INT
22 CP
21 RESET

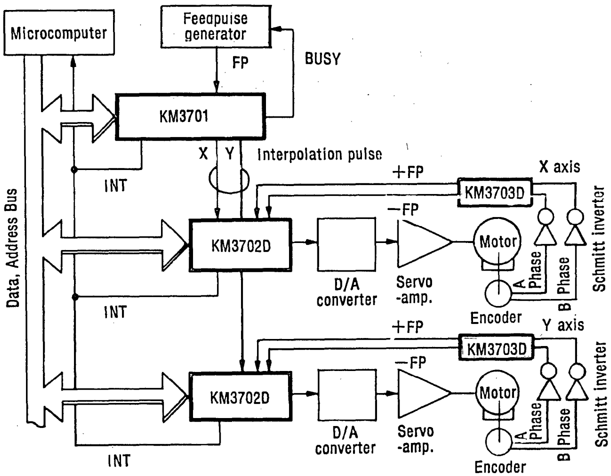
Signal	Explanation
CS	Chip Select
R/W	Read/Write
OD	Output Disable
AO~A2	Address
D0~D7	Data Bus
Latch	Latch
±Com	Command Pulse
±FB	Feedback Pulse
Reset	Reset
CP	Clock Pulse
Int	Interrupt
00~015	Output Data
VCC	5V
VSS	Ground

KM-3703-D


NC 1
CP 2
B PHASE 3
A PHASE 4
S1 5
S2 6
NC 7
VSS 8
16 VCC
15 NC
14 NC
13 NC
12 +FB
11 −FB
10 NC
9 NC

Signal	Explanation
NC	No Connection
CP	Clock Pulse
±FP	Feedback Pulse
B Phase	B Phase Signals
A Phase	A Phase Signals
S_1, S_2	TTL Lever Switch Decoder
VCC	+5V
VSS	Ground

SERVO MOTOR CONTROL


Microcomputer
Feedpulse generator
FP
BUSY
KM3701
X
Y
Interpolation pulse
Data, Address Bus
INT
+FP
X axis
KM3703D
−FP
KM3702D
D/A converter
Servo -amp.
Motor
A Phase
B Phase
Schmitt inverter
Encoder
INT
+FP
Y axis
KM3703D
−FP
KM3702D
D/A converter
Servo -amp.
Motor
A Phase
B Phase
Schmitt inverter
Encoder
INT

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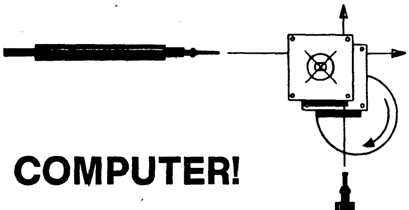

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CONTROL2 "Smartbox"

The CONTROL2 is a micro-processor-based controller that allows most computers to become a precision motion controller. The CONTROL2 interfaces the computer to most DC motors with a velocity servo and a quadrature-phase position encoder.

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The CONTROL2's command repertoire includes: Set Destination, Set Velocity, Set Current Position, Set Backlash Compensation, Set Back-off Limit Amount, Read Current Position, Read Current Status, Start All Motion, Halt All Motion.

- Also controls TSP's 1000 & 1400-Series Actuators
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Applications:

- Automate stages
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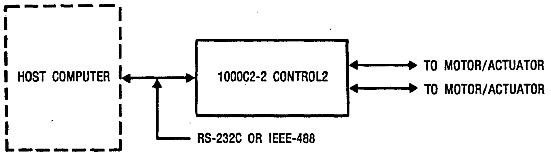
- Motorize QA & QC procedures
- Control robotic equipment



Host Computer Controlling 2 Axes of Motion

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- Smooth, quiet, variable speed linear motion up to 6 inches
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- Mean accuracy: 5 microns
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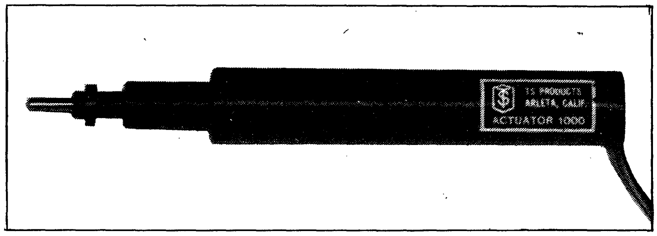
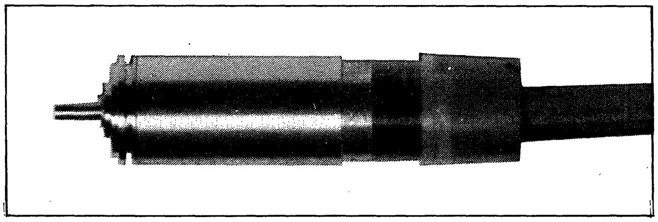
- Slew speeds up to 15 mm/second
- Internal limit-of-travel sensors
- Closed-loop velocity servo
- Non-rotating plunger
- Load capabilities up to 100 lbs.
- Computerized or manual control



1400-SERIES ROTARY ACTUATOR—A Precision Motor Drive

- Smooth, quiet, variable speed rotary motion
- Integral optical position encoder
- Compact sizes
- Available torques up to 500 oz-in
- As many as 300,000 encoder counts per output shaft revolution
- Speeds up to 1300 rpm
- Internal limit/motor stall sensors
- Closed-loop velocity servo
- Computerized or manual control



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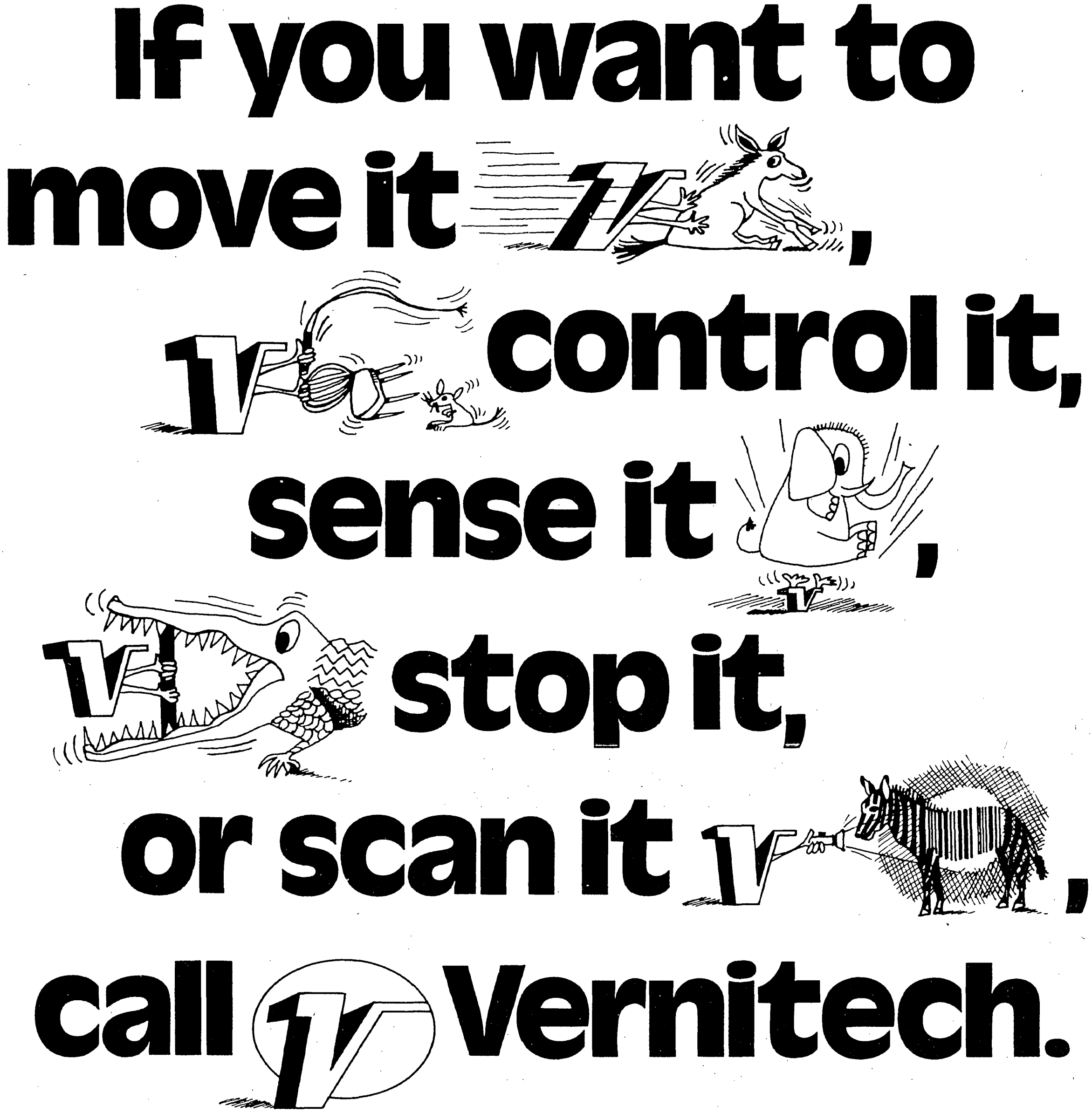

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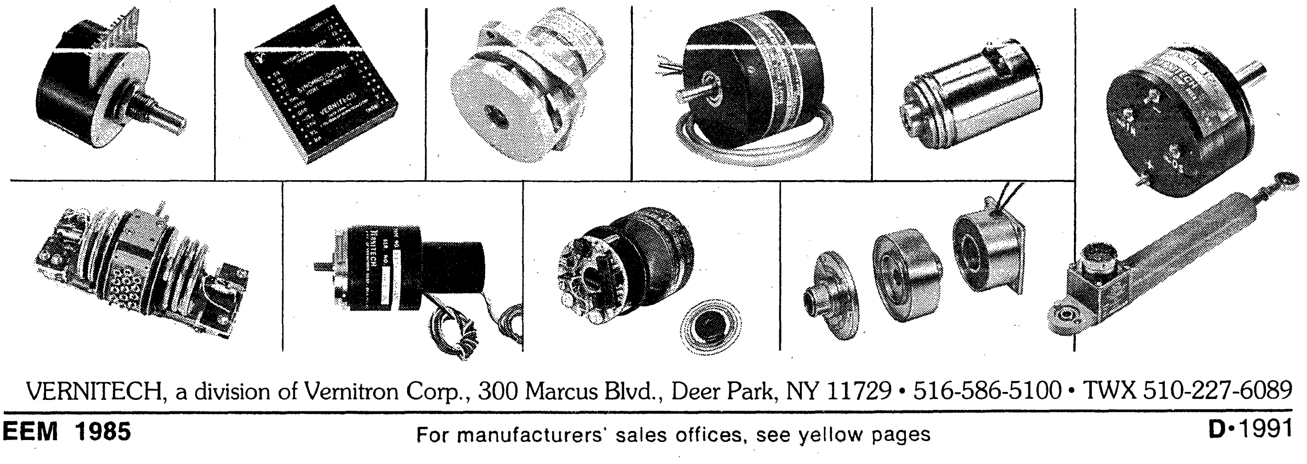

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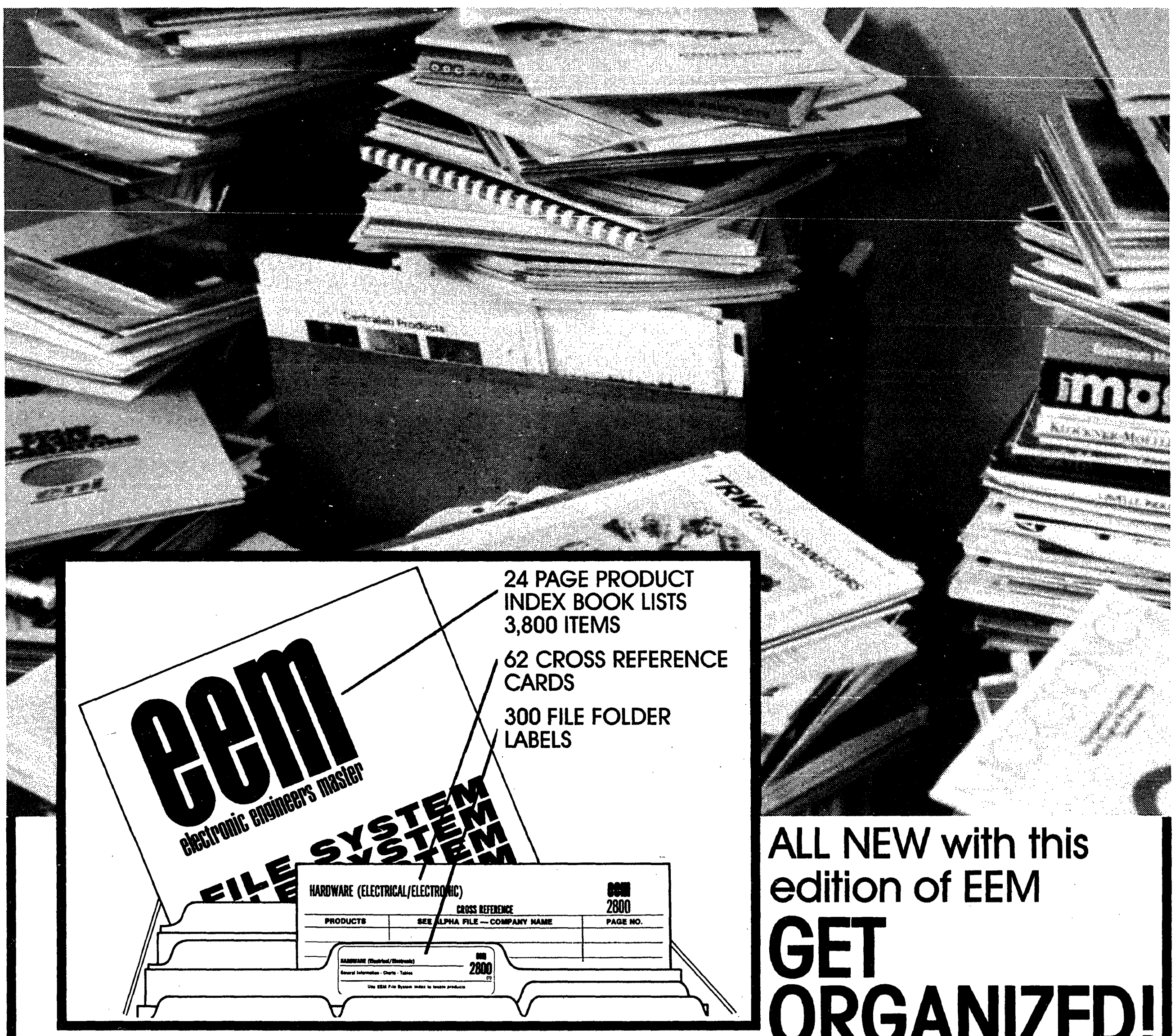
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GET ORGANIZED!

Are your catalog files organized? Can you find any given catalog in a matter of seconds? If your answer is "Yes," you probably already have the EEM File System. But, if you said "No," you really ought to look into this simple system. It will save hours of time and tons of aggravation.

The EEM File System was invented over twenty-five years ago to help people who specify, buy, or work with electronic products and equipment. It is upgraded on a constant basis to reflect the current state of the art. It's easy to use and easy to customize to your particular needs.

You say you want to file catalogs by type of product? That's easy to do with The System. But, what are you going to do when there are multiple products in one catalog? Take Mallory for example. There are all kinds of products in the Mallory Short Form Catalog. With the EEM File System all you do is file the catalog under "M" for Mallory and refer to it on all of the cross reference cards that apply.

There are thousands of EEM File Systems in everyday use in engineering and procurement offices all over the world. Shouldn't you be using this proven system?

The EEM File System is shipped in one neat package. The package contains everything you need to set up your very own filing system. Best of all, it's easy to get and very affordable. Send a check or money order for $25.00 and EEM will pay the postage and sales tax. If you must use a purchase order, please add $5.00 for postage and handling. An invoice will accompany your System.

Don't waste any more time. Get organized now!

EEM FILE SYSTEM,
645 stewart ave., garden city, ny 11530

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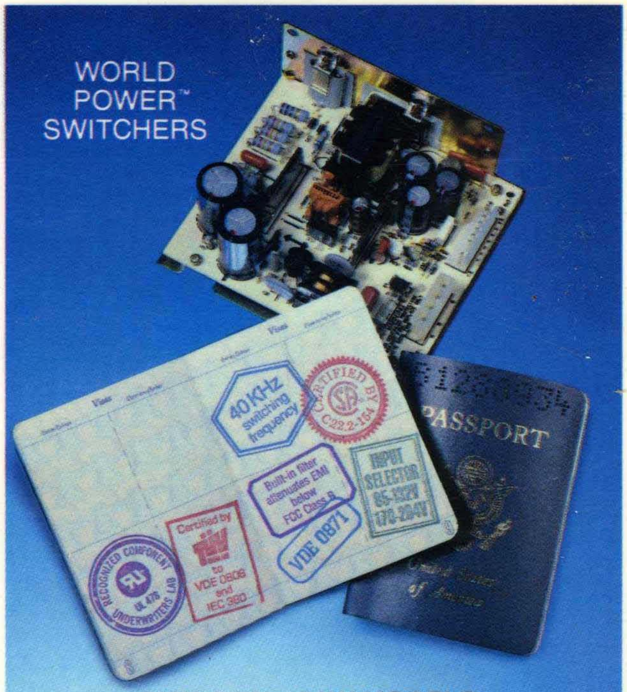
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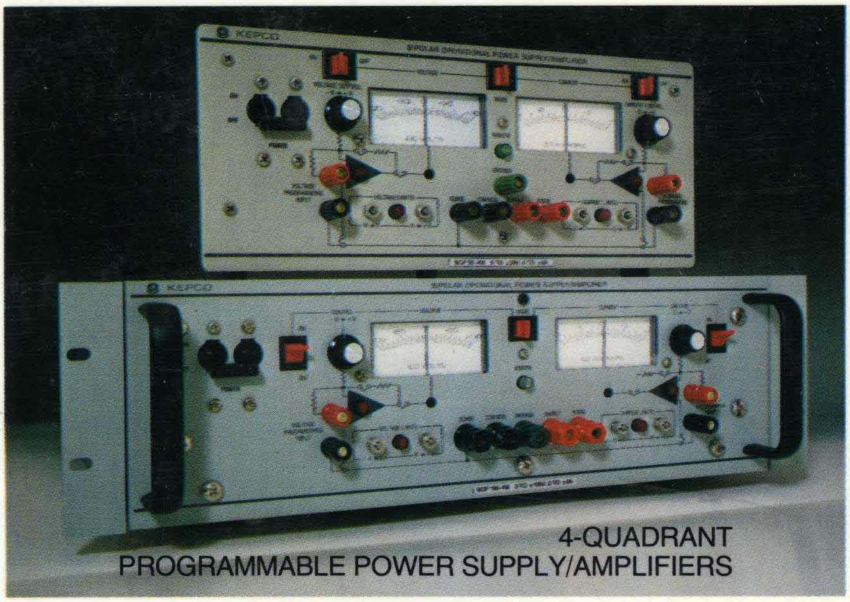
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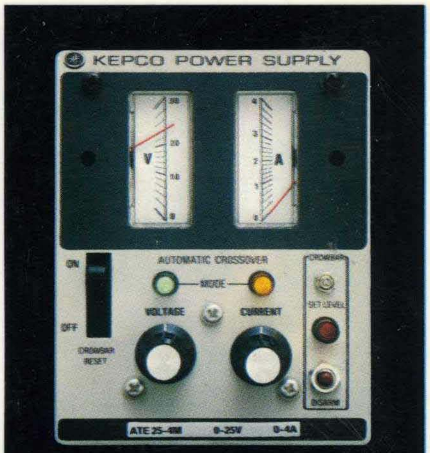
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AUTOMATIC CROSSOVER
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SET LEVEL
ATE 25-4M
0-25V
0-4A

PROGRAMMABLE LINEAR
VOLTAGE/CURRENT
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YOU MAY BE LOOKING AT THE POWER SUPPLY YOU'RE LOOKING FOR.

**You'll find it for sure if you
look at pages D•1689 through D•1714**

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